

SCM660

Handling Unit Management

SAP ERP - Procurement and Logistics Execution

Date _____
Training Center _____
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Participant Handbook

Course Version: 98
Course Duration: 2 Day(s)
Material Number: 50124765



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About This Handbook

This handbook is intended to complement the instructor-led presentation of this course, and serve as a source of reference. It is not suitable for self-study.

Typographic Conventions

American English is the standard used in this handbook. The following typographic conventions are also used.

Type Style	Description
<i>Example text</i>	Words or characters that appear on the screen. These include field names, screen titles, pushbuttons as well as menu names, paths, and options. Also used for cross-references to other documentation both internal and external.
Example text	Emphasized words or phrases in body text, titles of graphics, and tables
EXAMPLE TEXT	Names of elements in the system. These include report names, program names, transaction codes, table names, and individual key words of a programming language, when surrounded by body text, for example SELECT and INCLUDE.
Example text	Screen output. This includes file and directory names and their paths, messages, names of variables and parameters, and passages of the source text of a program.
Example text	Exact user entry. These are words and characters that you enter in the system exactly as they appear in the documentation.
<Example text>	Variable user entry. Pointed brackets indicate that you replace these words and characters with appropriate entries.

Icons in Body Text

The following icons are used in this handbook.

Icon	Meaning
	For more information, tips, or background
	Note or further explanation of previous point
	Exception or caution
	Procedures
	Indicates that the item is displayed in the instructor's presentation.

Contents

Course Overview	ix
Course Goals	ix
Course Objectives	ix
Unit 1: Basics of Handling Unit Management	1
Introduction to Handling Unit Management.....	2
Unit 2: Packing as a Basic Function of Handling Unit Management.....	25
The Packing Dialog.....	26
Packing Instructions	40
Unit 3: Procurement Processes with Handling Units.....	55
Handling Units in External Procurement	56
Handling Units in Internal Procurement.....	70
Unit 4: Sales and Distribution Processes with Handling Units	85
Handling Units in the Outbound Delivery Process.....	86
Unit 5: Handling Unit Management in Quality Assurance	105
Quality Assurance Procedures.....	106
Index	117

Course Overview

The course gives an overview of the range of functions available in Handling Unit Management. It introduces to Customizing for Handling Unit Management and outlines its use in procurement and sales processes.

Target Audience

This course is intended for the following audiences:

- Members of the project team
- Consultants

Course Prerequisites

Required Knowledge

- Good working knowledge of Procurement and Logistics Execution in *SAP ERP*



Course Goals

This course will prepare you to:

- Understand the basic functions in Handling Unit Management
- Make essential Customizing settings to use Handling Unit Management



Course Objectives

After completing this course, you will be able to:

- Describe the range of functions available in Handling Unit Management
- Make basic Customizing settings to use Handling Unit Management
- Illustrate subprocesses involving handling units in procurement, sales and Logistics Execution

Unit 1

Basics of Handling Unit Management

Unit Overview

This unit introduces to the concept of Handling Unit Management. It explains the use of the Handling Unit Monitor to display and process handling units. The unit then outlines the required Customizing settings for Inventory Management and handling unit identification.



Unit Objectives

After completing this unit, you will be able to:

- Use the Handling Unit Monitor to call up detailed information on handling units
- Make basic Customizing settings for Handling Unit Management

Unit Contents

Lesson: Introduction to Handling Unit Management	2
Exercise 1: Basic Customizing Settings	17

Lesson: Introduction to Handling Unit Management

Lesson Overview

This lesson provides an overview of the basic functions of Handling Unit Management in SAP systems. The main focus is on the main settings for Inventory Management and handling unit identification.



Lesson Objectives

After completing this lesson, you will be able to:

- Use the Handling Unit Monitor to call up detailed information on handling units
- Make basic Customizing settings for Handling Unit Management

Business Example

IDES AG produces and sells pumps and their components. The company stores and distributes the components to various locations. As a Logistic Manager, you want to use handling units to procure and distribute products.

Definition and Business Background

A handling unit (HU) is a logistic unit consisting of packaging materials and goods. Handling units have one identification number that uniquely identifies the handling unit across processes.

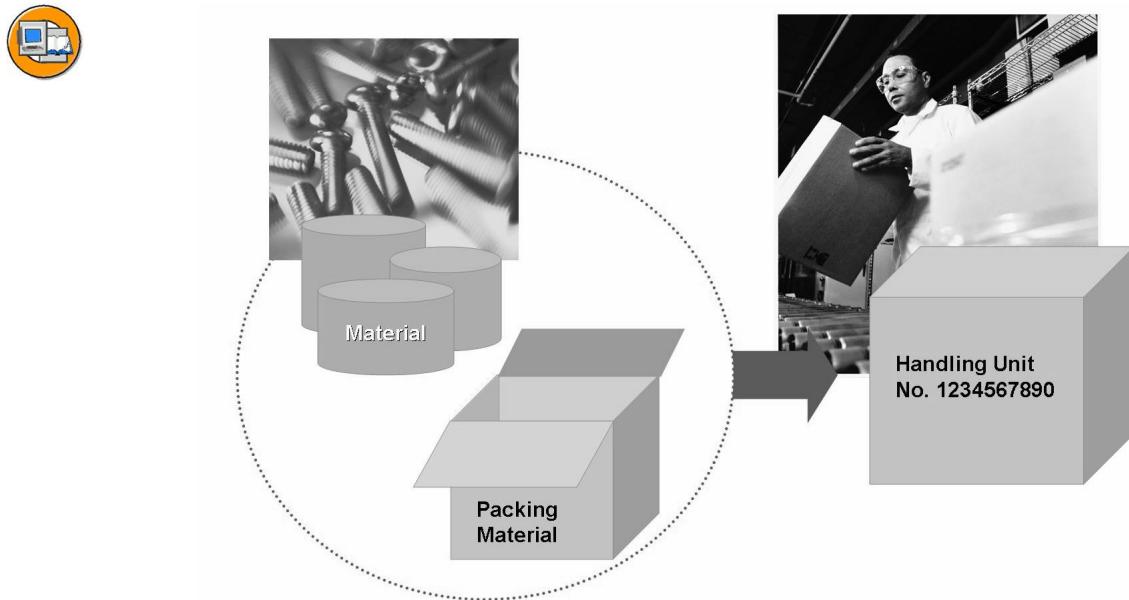


Figure 1: Definition

In Handling Unit Management, various packaging materials, containers, and load carriers, for example, carton, shrink wrapping film, pallet, container and truck, can be packaged. Using a handling unit in a cross-system logistics chain usually requires an identification number that is unique worldwide. You therefore have the option of assigning a “Serial Shipping Container Code” (SSCC) number to each handling unit. In many cases, Logistics within a company does not move individual pieces of different materials, but material quantities grouped together as packages. You can depict this situation in the SAP System using Handling Unit Management. After you create a handling unit, you can access and use all related information in all the subsequent processes. You can use handling units and can pass them to partners throughout the supply chain. You can also change them where required.

Handling Unit Management thus enables you to simplify the technical aspect of processing within logistics processes. You achieve this by creating a unit from material and packaging that represents the actual “package”. It is now possible to perform various material movements using this unit. You can always uniquely

identify this unit by a number assigned according to specific rules. You can call comprehensive information on the contents and packaging in every process step. This ensures that you can always see what is going on with the handling unit.

→ **Note:** In SAP R/3 4.6C, the term “shipping unit” has been replaced by “handling unit”. Even if you do not use Handling Unit Management as a complete solution, “handling units” are created during packing in the delivery process. These handling units have a reduced function range, similar to the old shipping unit. The previous term “shipping material” has been renamed “packaging material”, in order to provide consistent terminology for SAP R/3 4.6C.

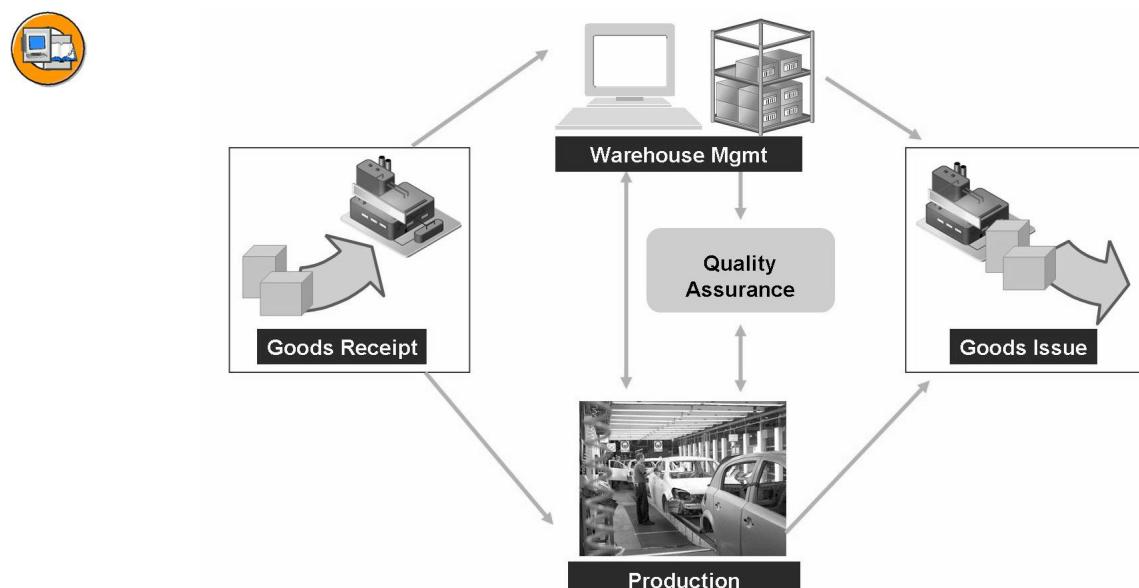


Figure 2: Process Overview

The handling unit identification number enables you to perform goods movements without entering a material or quantity.

You can access the “history” of a handling unit using the Handling Unit Monitor, or from the detail screen of the handling unit. This “history” is a cross-process, chronological documentation that describes the steps that created the handling unit, and the movements that were carried out using the handling unit. The number combinations displayed under *Object key* refer the end user to the corresponding documents. You can directly switch to these documents from the display by double clicking on the relevant line.



HU identification	112345670000001217	Identification type	C
Packaging materials	PK-095	Pallet 110 x 110 x 12,5 Type A	
HU identification 2		<input type="checkbox"/> Cust. S	Sort 1
W/Wo/Vol./Dim.		General	PackMat. data
		Addit. data	Conts.
		History	

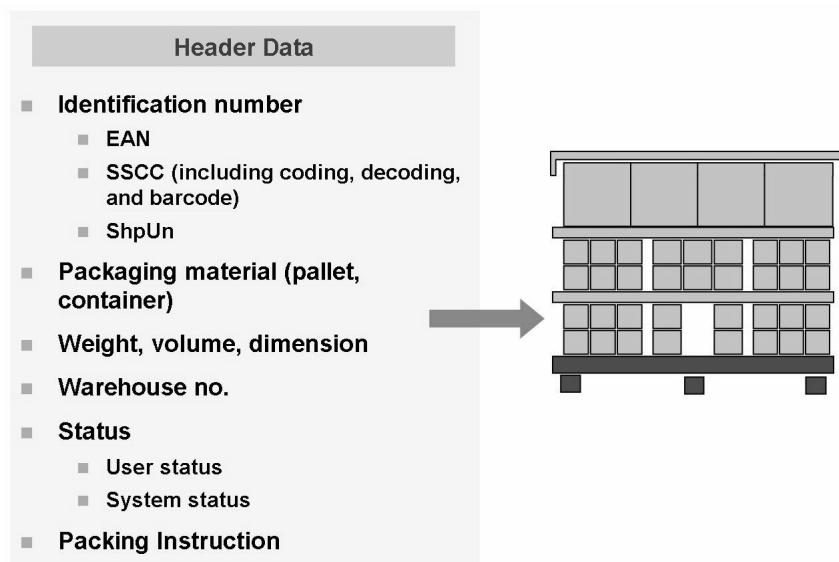
Packing object	Object key	InboxOutbox	Date	Time
Goods receipt document	50000001242001		18.06.2001	17:42:25
Inbound delivery	0180000075		18.06.2001	17:40:07

Figure 3: Cross-Process Documentation

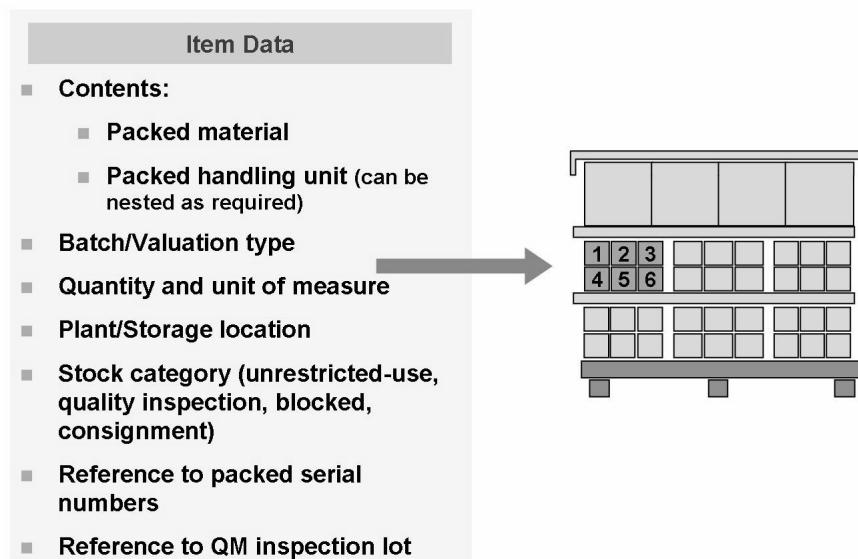
All documents affected by the handling unit are shown at the highest level. These can be:

- Inbound and outbound deliveries
- Material documents
- Work orders
- Transfer orders

You can follow the sequence of all postings in the history of a handling unit and in the related documents displayed there in chronological order. You can use the document flow to access further information on the deliveries involved, such as sales orders, transfer orders, or split deliveries.

**Figure 4: Header Data**

All header data of a handling unit are contained in table VEKP.

**Figure 5: Item Data**

All item data of a handling unit are contained in table VEPO.

The Handling Unit Monitor is a tool that displays and processes handling units. When you first access this function, which is called using the transaction code HUMO, the system initially offers several criteria for restricting the search. You can also display handling units that already exist in the system.

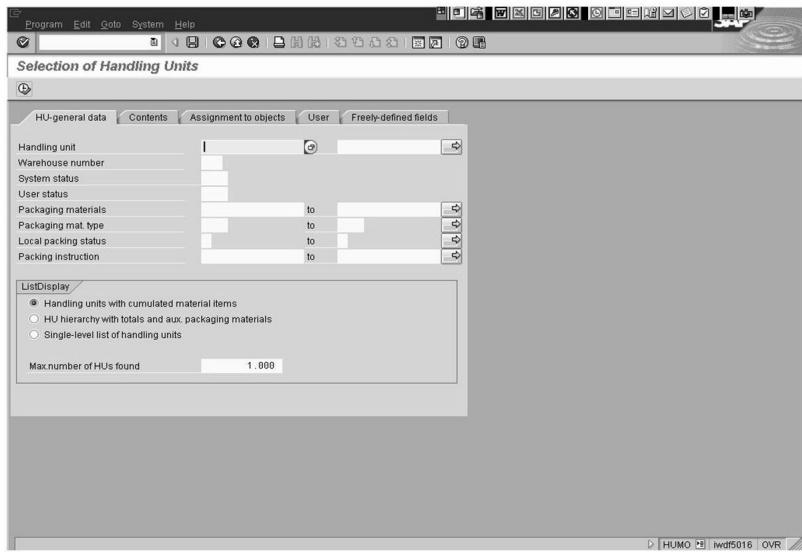


Figure 6: Handling Unit Monitor: Search Function

When you search for a handling unit item, you can choose to display either the first or the highest handling unit in the packing hierarchy. The search generally results in a list display. You can find essential information for the handling unit in this display. From this list, you can call the selected handling unit to display or edit it. You can also delete the handling unit.



Handling unit Material	ID type	Packed quantity	Created by	UoM	Batch	Created on	Changed on	PackMaterials	PkM	T	Obj	Object key	WhN	Packing
2000000009 M-08	E	ROSEMANNM	22.09.2000	ROSEMANNM	26.09.2000	PK-095	1000 9988		V060	01	00800006052	001		
312345670000000092 M-10	C	ROSEMANNM	26.09.2000	ROSEMANNM	26.09.2000	PK-100	1000 9988		V030	12	01800000066	001		
312345670000000108 M-10	C	ROSEMANNM	26.09.2000	ROSEMANNM	26.09.2000	PK-100	1000 9988		V030	12	01800000066	001		
312345670000000115 M-10	C	ROSEMANNM	26.09.2000	ROSEMANNM	26.09.2000	PK-100	1000 9988		V030	12	01800000066	001		
312345670000000122 M-10	C	ROSEMANNM	26.09.2000	ROSEMANNM	26.09.2000	PK-100	1000 9988		V030	12	01800000066	001		
312345670000000139 M-10	C	ROSEMANNM	26.09.2000	ROSEMANNM	26.09.2000	PK-100	1000 9988		V030	12	01800000066	001		
312345670000000146 M-10	C	ROSEMANNM	26.09.2000	ROSEMANNM	26.09.2000	PK-100	1000 9988		V030	12	01800000066	001		
312345670000000153 M-10	C	ROSEMANNM	26.09.2000	ROSEMANNM	26.09.2000	PK-100	1000 9988		V030	12	01800000066	001		
312345670000000160 M-10	C	ROSEMANNM	26.09.2000	ROSEMANNM	26.09.2000	PK-100	1000 9988		V030	05	00800000215	001		
312345670000000184 M-10	C	ROSEMANNM	26.09.2000	ROSEMANNM	26.09.2000	PK-100	1000 9988		V030	12	01800000067	001		
312345670000000191 M-10	C	ROSEMANNM	26.09.2000	ROSEMANNM	26.09.2000	PK-100	1000 9988		V030	12	01800000067	001		
312345670000000207 M-10	C	ROSEMANNM	26.09.2000	ROSEMANNM	26.09.2000	PK-100	1000 9988		V030	12	01800000067	001		

Figure 7: Handling Unit Monitor: List Display

Following are the options available in the list display of the Handling Unit Monitor:

- Display/Edit handling unit contents and hierarchy
- Delete handling units
- Transfer postings to unrestricted-use, quality inspection, or blocked stock, or to another storage location
- Display the history of a handling unit

From the display in the Handling Unit Monitor, you can perform transfer postings and can access information about the origin of the selected handling unit.



Examples: Transfer posting to another storage location

Packing object	Object key	Inbox/Outbox	Date	Time
Goods issue document	490000016862000		26.09.2000	17:43:00
Repack entry	00000000000000000002		26.09.2000	17:33:23
Outbound delivery	00800006053		26.09.2000	17:33:22
Warehouse Management	0000000266		26.09.2000	17:33:05

Figure 8: Handling Unit Monitor: Examples

The packing object, a two-character numeric key, indicates the document type to which a handling unit has been assigned. As a result, the packing object is always linked to an *object key* that is based on the number of the actual document. This combination produces a unique reference.



The handling unit object reference ensures that the handling unit currently being used in a certain process cannot be mistakenly processed somewhere else. You can find the object reference in the list display in the Handling Unit Monitor.

Ob	Object key
01	0080006052
01	0080006057

Figure 9: Object Reference of the Handling Unit

The following handling unit object references are defined in an SAP system:

- 01:** HU assigned to an outbound delivery
- 02:** planned HU (packing proposal in sales order)
- 03:** HU assigned to an inbound delivery, goods receipt not yet posted
- 04:** HU assigned to a shipment
- 07:** HU for packing end products in repetitive manufacturing, goods receipt not yet posted
- 08:** HU for materials staging for a work order
- 09:** HU for packing in discrete or process manufacturing, goods receipt not yet posted
- 12:** HU created in a goods receipt process (goods receipt posted); “non-assigned HU”

Handling Units in Inventory Management

Handling Unit Management requires at least two storage locations – one handling unit-managed, and one non-handling unit managed, otherwise known as the partner storage location. Both storage locations are assigned to each other using a Customizing table. This construction is necessary in order to map packing of unpacked goods and unpacking of packed goods – technically a transfer from one storage location to another. Handling units, or packed stocks, are always inventory managed in handling unit storage locations. Unpacked stocks are inventory managed in non-handling unit storage locations (as normal). When you create a non-assigned handling unit, one created without an object reference, this results

in a material document that documents this transfer posting transaction. You can now call all inventory management-relevant data, such as stock category, special stock relevance at handling unit level.



- The handling unit is the inventory management object.
- All stocks in handling unit storage locations are packed.
- Handling units are inventory managed in a separate storage location.

When changing handling units, unpacked and not-packed stocks are posted to non-handling unit-managed storage locations in transfer postings. Packed stocks are transferred to handling unit-managed storage locations.

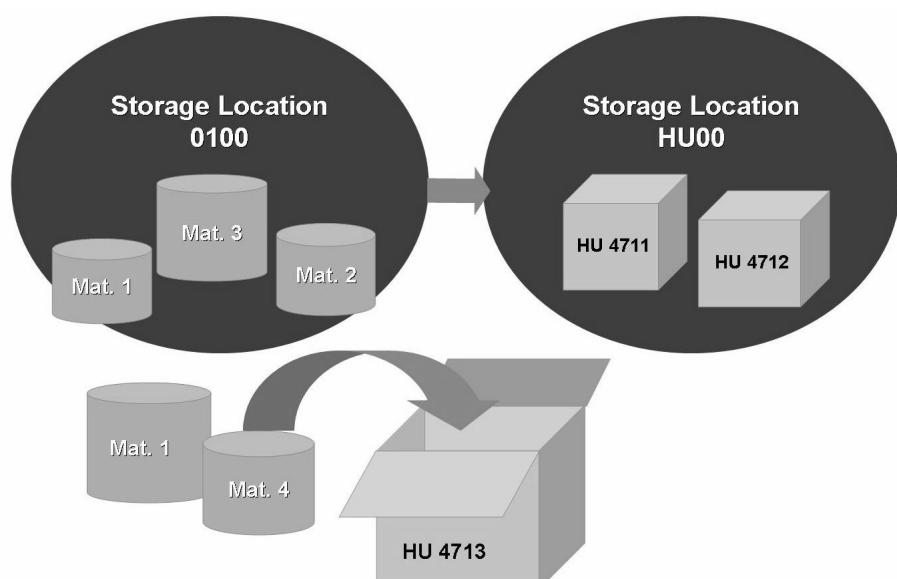


Figure 10: Pack and Unpack: Transfer Posting Transactions

If unpacked material is packed, or if handling units are unpacked, transfer postings are made from the non-handling unit-managed partner storage location to the handling unit storage location or vice versa.

Rewrapping and other changes to the handling unit can be forbidden for the following reasons:

- A delivery handling unit is packed further during transport.
- The status prohibits changes (goods issue posted, blocked, user status).
- In Warehouse Management, the handling unit in the warehouse is in a storage type that does not permit repacking. In this case, you must first pick the handling unit into an interim storage type before making changes.

→ **Note:** You cannot lock the handling unit.



- The Handling Unit Monitor can be used for:
 - Transfer postings into unrestricted-use, blocked, and quality inspection stock
 - Transfer postings to another storage location
- Transaction VLMOVE can be used for:
 - Handling unit goods movements for individual movement types
 - Creating deliveries by entering handling unit or material
- Transaction MIGO with deliveries can be used for:
 - All goods movements

Stock transfers and transfer postings of handling units are mapped by deliveries. Since no preceding document (purchase order, sales order) exists here, you have to add a default value for a dummy vendor and dummy customer in Customizing for Handling Unit Management. (*Logistics - General → Handling Unit Management → Basics → Materials Management → Inventory Management → HU Requirement for Storage Locations and Default Values for Deliveries*).

You can perform stock transfers that affect packed stocks in various ways, depending on the movement type:

- A restricted selection of movement types is available in the **Handling Unit Monitor**. The transfer posting is documented in a material document.
- An extended set of movement types is available in transaction **VLMOVE**. In this transaction, end users can enter the relevant handling units and can map the various movements in the same posting transaction. For example, you can simultaneously post one handling unit into the blocked stock, and another can be simultaneously posted from stock to a cost center. The end user can then choose between an update using the material document or processing using deliveries.
- If the transfer posting is entered using transaction **MIGO**, the system always generates a delivery if the corresponding storage location or - for stock transfers - at least one of the two relevant storage locations is handling-unit-managed. The same applies to goods receipt or goods issue postings.

 **Note:** You cannot extend the selection of movement types in the Handling Unit Monitor and in transaction VLMOVE using Customizing.

Handling Unit Identification

Handling Unit identification requires a couple of Customizing settings. Internal system number assignment is only required for the database. End users always access handling units using the “external” numbers. The internal system handling unit number can be compared to the quant number in Warehouse Management. Here also, the sequential numbering of the object is only used for updates at

database level. The term “external” in this context also includes numbers that are assigned in some way by a user, as opposed to internal numbers, meaning those numbers assigned by the system.



1. Internal handling unit identification for the database
2. External handling unit identification for the user:
 - Activate client-wide unique number assignment
 - Maintain the number ranges for client-wide unique handling unit identification:
 - For internal number assignment
 - For external number assignment, if required
 - If required, maintain settings for handling unit identification by SSCC:
 - Maintain SSCC number range object and number range interval(s)
 - Assign number range object, interval, and base ILN number to organizational units
 - Specify the number assignment type for each packaging material type

→ **Note:** You should set the “To” number in the number range interval for the internal handling unit identification to the absolute maximum value. You should check this setting when upgrading from an older release standard and should change the setting where necessary.

The term “external” has two uses in connection with handling unit number assignment:

1. As a general indicator for numbers that help access handling units as opposed to the identification numbers for the database
2. As an indicator of the number assignments made by the user as opposed to the internal assignments made by the system

Since 1973, the **Uniform Code Council** (UCC) has assigned base numbers (**Universal Product Code** and/or **European Article Number**), which form the basis for international unique product identification numbers, for the North American market. From 1977, the **European Article Numbering System** (EAN) performs this task internationally at its national and continental subsidiaries. For more information on these two institutions and their barcode systems, see <http://www.ean-int.org/>. Using this base number(s), which are assigned to a company using the UCC or EAN, company-specific extras are added to generate barcodes for products and logistic units. The **Serial Shipping Container Code** (SSCC) is a number within the EAN/UCC system, used – according to the EAN/UCC – for constructed logistic units that were created for transportation and stockholding purposes and that are moved within the entire supply chain. It is a part of the **EAN-128 pallet labeling standard**. This enables you to store

product-relevant and packing-relevant information, such as item references and quantities, batch numbers, shelf life expiration dates, in the corresponding barcode. The eighteen character SSCC provides worldwide unique identification of a logistic unit over a period of at least one year.



- ShpUn
- **SSCC (18 characters)**
- **Specifically valid worldwide for one year**

T	Origin (ILN)	Consecutive Number	C
1	2 8	9 17	18

T = Handling Unit Type C = Check Digit

- **EAN128 Definition**
 - Application Identification
 - Barcode Profile
- **EAN128 Decoding Functions**

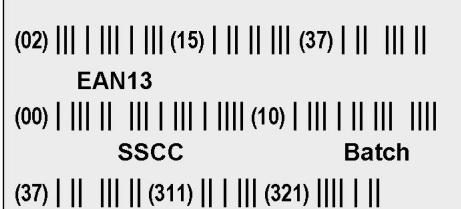


Figure 11: Handling Unit Identification According to EAN128

The SSCC consists of a one character **packaging indicator**, the seven character company number assigned by the responsible EAN organization, a nine character serial number assigned by the company, and a one character check digit according to EAN standards. A (two-character) **application identifier** (00 for SSCC) can be put in front of this number. The SSCC contains only numeric characters.

You can print the label shown on the graphic when creating a **pick-handling unit**. It is part of the transfer order print control.



Technical Name: LVSHULABEL

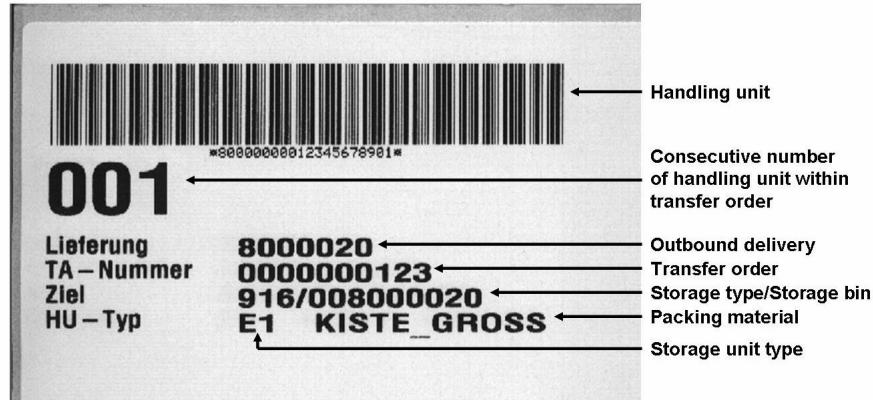


Figure 12: Labels for Pick-Handling Units

Labels for other handling units are issued using **output control**.

You can use Handling Unit Management in combination with mobile data entry. In this way, handling unit identification numbers can be scanned, or handling unit storage bin coordinates or coordinate parts can be read. This is done in order to check if the handling units have been correctly put away or withdrawn.

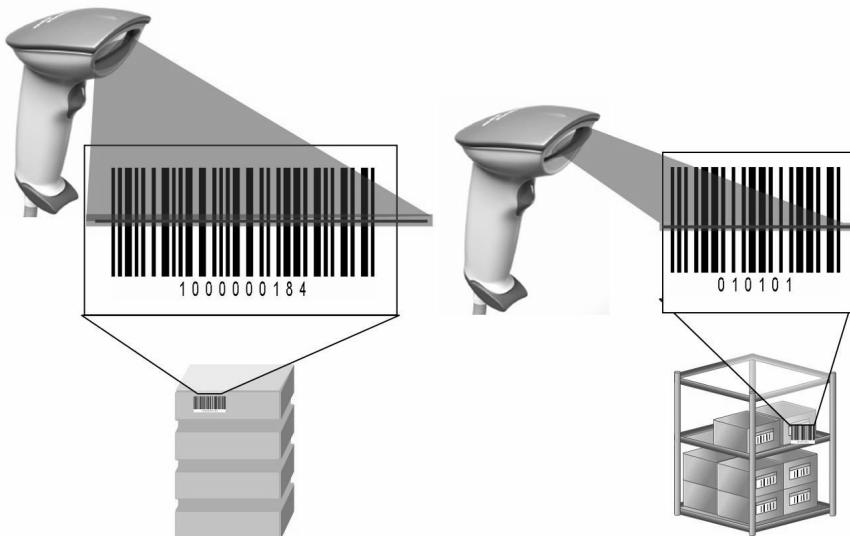


Figure 13: Handling Units and Mobile Data Entry

The following transactions are available if you want to use the Radio Frequency solution within Warehouse Management:

LM18: Inquiry – Select HU

LM19: Pack/Unpack (Pack)

- LM22: Pack/Unpack (Unpack)
- LM24: Pack/Unpack (Pack Deliveries)
- LM25: Pack/Unpack (Unpack Deliveries)
- LM26: Stock Removal After Delivery
- LM27: Putaway After Delivery
- LM35: Load Inquiry by Handling Unit
- LM45: Picking and Packing
- LM46: Picking and Packing by Delivery
- LM66: Select Storage Unit/Handling Unit (Goods Issue)
- LM76: Select Storage Unit/Handling Unit (Goods Receipt)

Exercise 1: Basic Customizing Settings

Exercise Objectives

After completing this exercise, you will be able to:

- Make basic Customizing settings for Handling Unit Management
- Use the Handling Unit Monitor

Business Example

IDES AG wants to use Handling Unit Management throughout Logistics. Therefore, they need to make the basic Customizing settings in Handling Unit Management.

Task:

You should first check whether Handling Unit Management is activated in the standard storage location **HU##**. This storage location is a production storage location and a picking storage location. The partner storage location for packing and unpacking material is the warehouse-managed storage location **01##**. You should also assign sales area data, shipping point, and partner numbers as default values for deliveries. In the next step, check the Customizing settings for handling unit identification. Conclude the exercise by displaying details of a handling unit from the Handling Unit Monitor.

1. You should first check whether Handling Unit Management is activated in the standard storage location **HU##**. The partner storage location for packing and unpacking material is the warehouse-managed storage location **01##**. You should also assign sales area data, shipping point, and partner numbers as default values for deliveries.

Field Name or Data Type	Values
Sales organization	1000
Distribution channel	10
Shipping point	1000
Division	00
Vendor	10000
Customer	10000

2. Display the number range for internal system identification of the handling units.
3. Check whether unique number assignment is activated at client level.

Continued on next page

4. Display the number range for client-wide unique handling unit identification.
5. Display the number range for handling unit identification by SSCC. The number range object has the key **LE_SSCC**.
6. Check the assignment of the number range object, the number range interval, and the base ILN number to plant **1000**.
7. Call up the Handling Unit Monitor and display the detail data for a handling unit containing material **T-K3-##**.

Solution 1: Basic Customizing Settings

Task:

You should first check whether Handling Unit Management is activated in the standard storage location **HU##**. This storage location is a production storage location and a picking storage location. The partner storage location for packing and unpacking material is the warehouse-managed storage location **01##**. You should also assign sales area data, shipping point, and partner numbers as default values for deliveries. In the next step, check the Customizing settings for handling unit identification. Conclude the exercise by displaying details of a handling unit from the Handling Unit Monitor.

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Field Name or Data Type	Values
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Distribution channel	10
Shipping point	1000
Division	00
Vendor	10000
Customer	10000

- a) Choose *Tools* → *Customizing* → *IMG* → *Execute Project* and then the *SAP Reference IMG* button. Choose *Logistics - General* → *Handling Unit Management* → *Basics* → *Materials Management* → *Inventory Management* → *HU Requirement for Storage Locations and Default Values for Deliveries*
- b) Select the table entry for plant **1000** and go to the storage location level in the dialog structure.
- c) Choose the entry for your storage location **HU##** and overwrite the partner storage location **0001** with the key for your storage location (**01##**).
- d) Assign sales organization **1000**, distribution channel **10**, shipping point **1000**, division **00**, vendor **10000**, and customer **10000** to your storage location **HU##**. Save your changes.

Continued on next page

2. Display the number range for internal system identification of the handling units.
 - a) Choose *SAP Reference IMG → Logistics - General → Handling Unit Management → Basics → Technical Basics → Define Number Ranges for Handling Units.*
 - b) Choose *Display intervals.*
3. Check whether unique number assignment is activated at client level.
 - a) Choose *SAP Reference IMG → Logistics - General → Handling Unit Management → External Identification → Set Unique Number Assignment for HU Identification.*
 - b) The indicator *HU ID unique* is set.
4. Display the number range for client-wide unique handling unit identification.
 - a) Choose *SAP Reference IMG → Logistics - General → Handling Unit Management → External Identification → Number Range Maintenance for HU Identification.*
 - b) Choose *Display intervals.*
5. Display the number range for handling unit identification by SSCC. The number range object has the key **LE_SSCC**.
 - a) Choose *SAP Reference IMG → Logistics - General → Handling Unit Management → External Identification → SSCC Generation Acc. to EAN128 → Maintain Number Range Object for SSCC.*
 - b) Enter the object key **LE_SSCC** in the *Object* field. Choose *Number Ranges* and then *Display intervals.*
6. Check the assignment of the number range object, the number range interval, and the base ILN number to plant **1000**.
 - a) Choose *SAP Reference IMG → Logistics - General → Handling Unit Management → External Identification → SSCC Generation Acc. to EAN128 → Maintain SSCC Generation for Each Plant/Storage Location.*
 - b) There are two entries for plant **1000**.
7. Call up the Handling Unit Monitor and display the detail data for a handling unit containing material **T-K3-##**.
 - a) Choose *Logistics → Central Functions → Handling Unit Management → Handling Unit Monitor.*
 - b) Choose tab strip *Contents* and enter material **T-K3-##** in field *material*.
 - c) Choose *Execute.*
 - d) Select the handling unit and choose *Display Selected HUs.*



Lesson Summary

You should now be able to:

- Use the Handling Unit Monitor to call up detailed information on handling units
- Make basic Customizing settings for Handling Unit Management



Unit Summary

You should now be able to:

- Use the Handling Unit Monitor to call up detailed information on handling units
- Make basic Customizing settings for Handling Unit Management



Test Your Knowledge

1. A handling unit has one identification number, which is unique across processes.

Determine whether this statement is true or false.

- True
- False

2. Unpacked stocks are transferred to handling unit-managed storage locations.

Determine whether this statement is true or false.

- True
- False



Answers

1. A handling unit has one identification number, which is unique across processes.

Answer: True

A handling unit has one identification number that uniquely identifies the handling unit across processes.

2. Unpacked stocks are transferred to handling unit-managed storage locations.

Answer: False

Unpacked stocks are transferred to non-handling unit-managed storage locations. Packed stocks are transferred to handling unit-managed storage locations.

Unit 2

Packing as a Basic Function of Handling Unit Management

Unit Overview

This unit gives an overview of pack Customizing. It then introduces the so-called “packing dialog” and deals with methods for automating the packing process (“packing instructions”).



Unit Objectives

After completing this unit, you will be able to:

- Make basic Customizing settings for packing
- Use the packing dialog
- Make basic settings for the use of packing instructions
- Create packing instructions and determination records

Unit Contents

Lesson: The Packing Dialog.....	26
Exercise 2: The Packing Dialog	35
Lesson: Packing Instructions.....	40
Exercise 3: Packing Instructions	47

Lesson: The Packing Dialog

Lesson Overview

This lesson explains the basic Customizing settings required for packing in Handling Unit Management as well as the use of the so-called “packing dialog”.



Lesson Objectives

After completing this lesson, you will be able to:

- Make basic Customizing settings for packing
- Use the packing dialog

Business Example

IDES AG produces and sells pumps and their components. The company stores and distributes the components to various locations. As a Logistics Manager, you want to evaluate various packing functions available in Handling Unit Management.

Basic Customizing Settings for Packing

Packing functions as the basis for Handling Unit Management are available at various points in logistics (sub)processes, in individual documents (delivery, transport), using specific transactions in the Handling Unit Management menu, and in the menus of the respective Logistics application (such as Logistics Execution and Manufacturing).

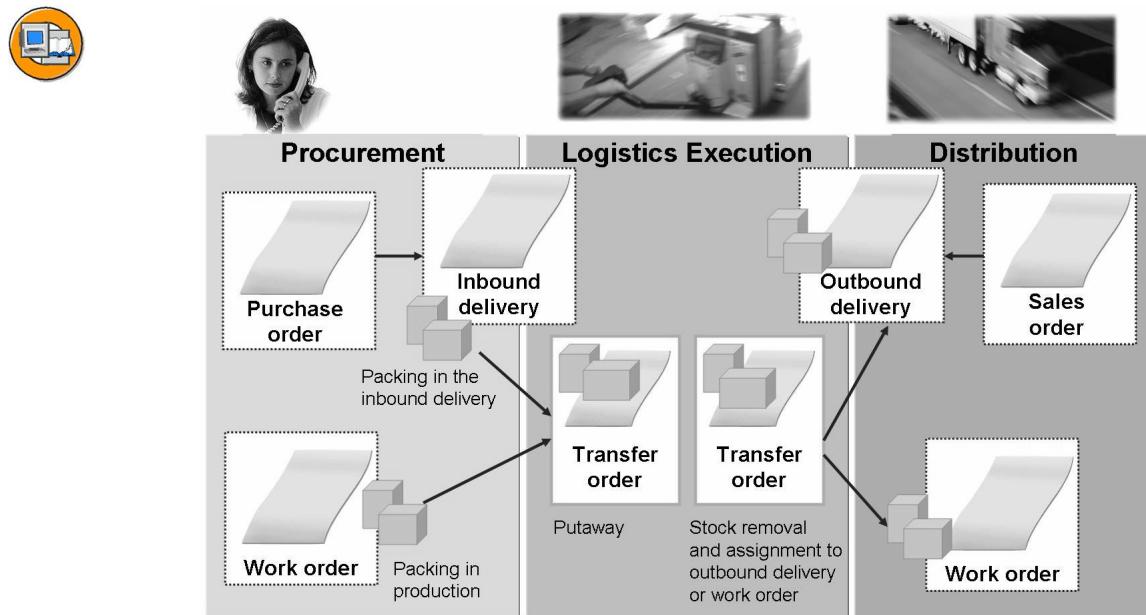


Figure 14: Packing in Logistics Processes

Packing in the SAP system means assigning materials that have been grouped according to packing attributes to packaging materials. These packaging materials are also materials with a certain material type (**VERP**). This transaction is controlled by the link between “material groups for packaging materials” and “packaging material types”. You can define these in Customizing as required and then enter them in the relevant material master records.

To use the packing functions, you must make specific settings in the material master and in Customizing.

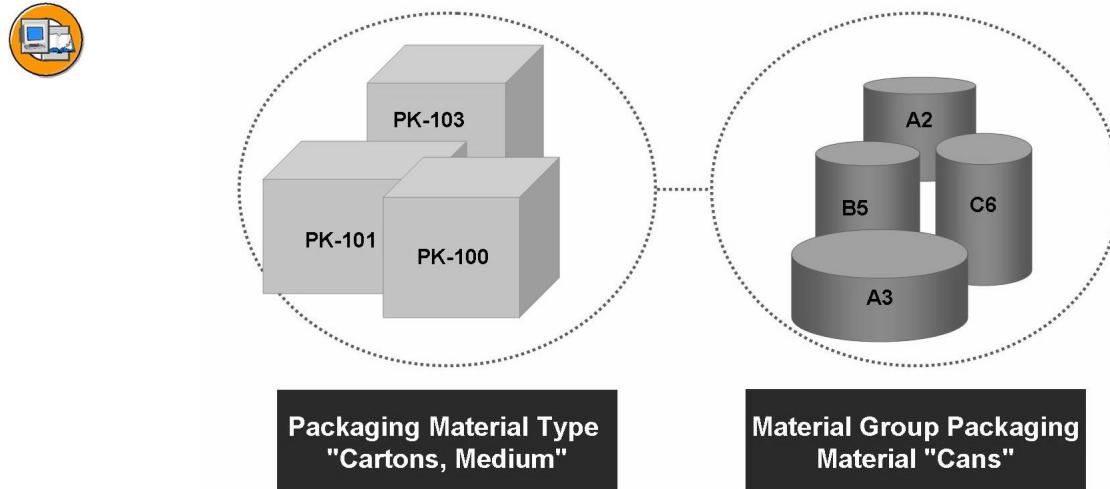


Figure 15: Customizing Settings

You can find the material groups for packaging material and the packaging material types under *Basics* in Customizing for Handling Unit Management and in Customizing for deliveries under *Packing*.

 **Note:** You should assign the “material groups for packaging material” in the material master for those materials to be packed. Materials that are not to be packed receive a material group for packaging material that is not assigned to a packaging material type.

The “Allowed Packaging Materials” function checks the assignment of the material group for packaging material of the material to be packed against the packaging material types. If you maintain the corresponding table, you can avoid incorrect packing and can also select the correct packaging material. For materials that do not receive a material group for packaging material in the master record, the function “Allowed Packaging Materials” is not supported in the packing dialog.

To automate packing, you must maintain packing instructions and determination records.

The Packing Dialog

The packing dialog is available in a couple of transactions in SAP systems. It can be used to create, change and display handling units.

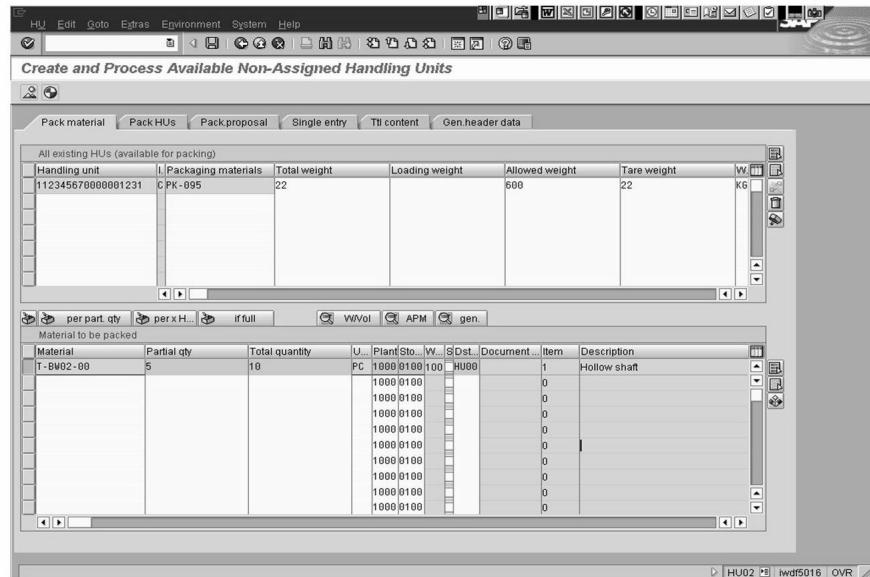


Figure 16: Packing Dialog: Packing Options

Packing options:

- *Pack*: The system creates one handling unit. Packaging material tolerances are considered.
- *New HU per part. qty of matrl*: The quantity in the *Partial qty* field serves as the divisor.
- *New HU per x HUs*: Causes the system to display a dialog box so that you can make more precise packing-relevant entries for one or more previously created handling units.
- *New HU if full*: Only the **total quantity** is considered, not the packaging material tolerance.

You can unpack complete handling units by choosing the *Empty* symbol and selected items by choosing the symbol *Unpack*. An empty handling unit is kept until it is explicitly deleted (using the *Delete Handling Unit* icon).

If you want to further pack handling units that exist, you can use the *Pack HUs* tab page. This procedure is the same as when you pack materials. You select an allowed packaging material. You then select the handling units to pack and the packaging material, then choose one button to assign the handling units and packaging material to each other.

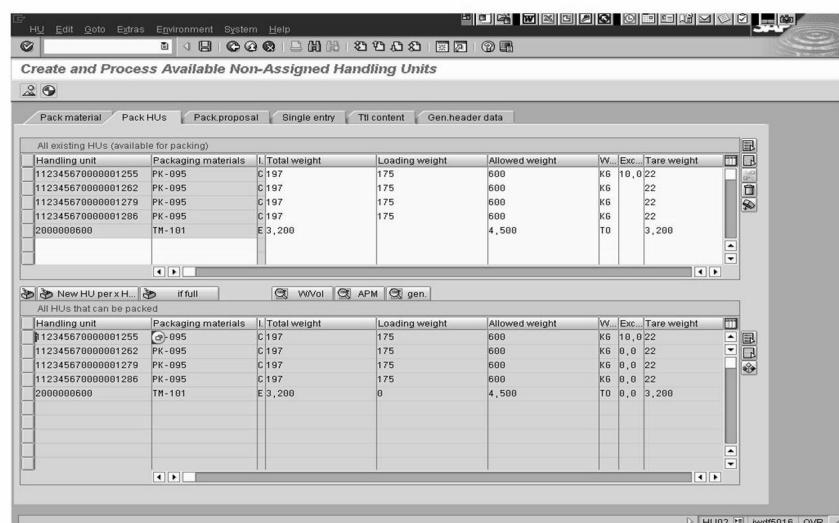


Figure 17: Packing Dialog: Packing Handling Units

On the *Pack. proposal* tab page, you can create templates to construct handling units. Templates for handling units can be manually created, or automatically using packing instruction determination, or by entering a packing instruction.



Figure 18: Packing Dialog: Packing Proposal

For example, you can pack several items of the same parts into several handling units using packing instructions. When you use the function *New HU per part. qty of matrl*, you can only pack one item with the button *New HU per x HUs*.

The following functions are available:

You can use the *Single entry* tab page to create handling units manually, or to pack materials or existing handling units further.



Figure 19: Packing Dialog: Single Entry

To assign a handling unit, enter a handling unit in the *Handling Unit* field (1)

To generate a material line, enter the material number, batch, plant, storage location, and stock category in the *Handling Unit Contents* area.

To create a handling unit, enter the packaging material in the *PackMaterials* field (2) and, if required, add the possible weight, volume, and dimensions data.

To pack into a new handling unit, enter the packaging material, the material identification, and the quantity to be packed. For document items, you can enter the document and item numbers instead of the material identification.

In sales orders or scheduling agreements whose items contain a PO item number, you can enter the PO item instead of the document item.

To pack a handling unit, you should enter the identification of the handling unit to pack instead of the material identification. You make this entry in the *Handling Unit* field (3) in the *Handling Unit Content* area.

If you want to pack into an existing handling unit that has already been assigned, then you should enter the identification number in the *Handling unit* field (1) in the *Handling unit* area. The system then ignores all other data from this area.

On the *Ttl content* tab page, you can display the content of handling units in a hierarchical form. Level 0 here corresponds to the highest-level or the outermost handling unit. From this tab page, you can choose the buttons in the lower screen area to access various data and serial numbers where serialized material has been packed. This tab page also offers unpack and delete functions.

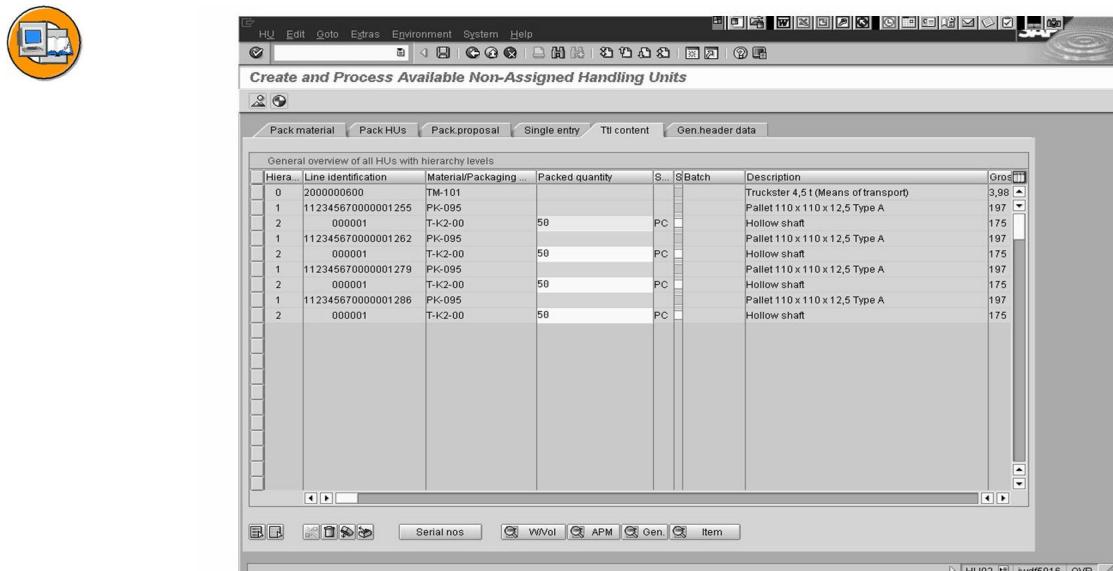


Figure 20: Packing Dialog: Total Content

In certain cases, you can make quantity changes to existing handling unit items. You can assign serial numbers to material items with a serial number requirement. You can delete complete handling unit items using the *Unpack* function.

There are comprehensive views for the various data of a handling unit. You can call the relevant tab pages by choosing the corresponding buttons.



Figure 21: Packing Dialog: Detail Data

The values on the *W/Vol./Dim.* tab page refer to the data in the material master record for the packaging material and the packed materials. These are automatically determined when you create a handling unit. In the *Dimensions* section, the end user can enter values. This can be done either when you change a handling unit, or during single entry. The *Size/dimensions* field in the *Basic Data 1* view of the material master is for information purposes only.

On the *Status* tab page, you can see the data for packing control and also important information on the status of the handling unit.

The *PackgMatls* is only relevant if one packaging material used belongs to the category *Auxiliary packaging material*.

The *Addit. Data* tab page contains information for fields that each customer can control individually. It also has information on the packing instruction, if one has been used.

The *Conts.* tab page corresponds to the (tree) display on the left side of the screen, and the *Ttl Content* tab page in the handling unit display.

The *History* tab page allows you to trace the development of the handling unit, with reference to documents and exact date/time entries. You can access these reference documents by double clicking on the object key, which is usually the document number.

Packing Station

Transaction HUPAST (*Packing Station*) was developed to simplify the display for packing transactions in the system, especially for end users who perform packing. The majority of the entries required can be made using a scanner. Keyboard entries are also possible.

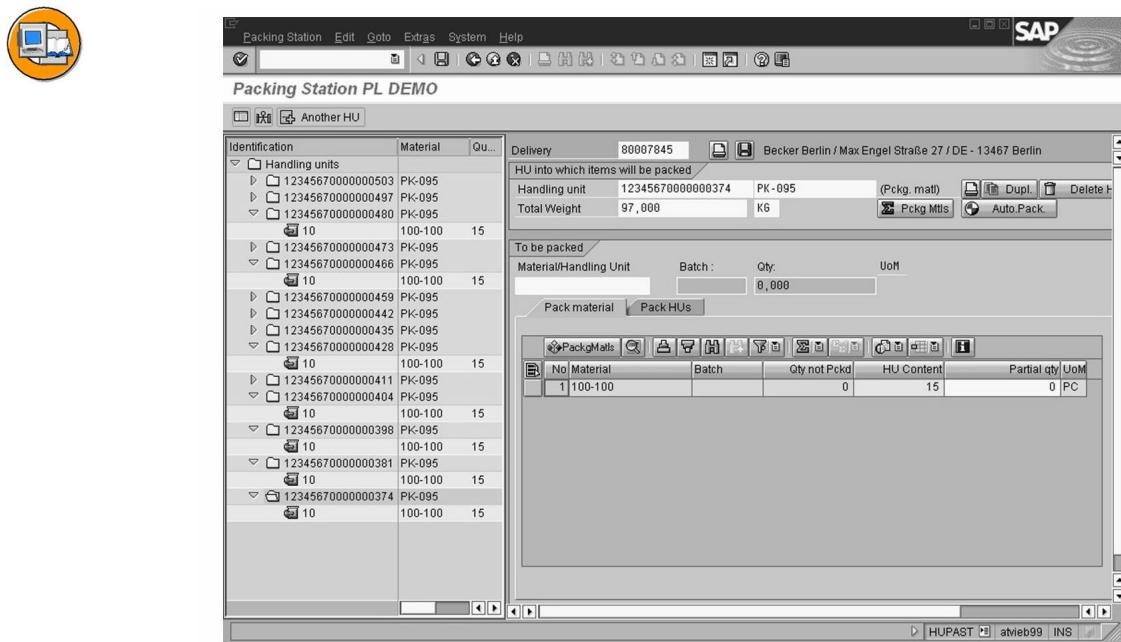


Figure 22: Other Functions: Packing Station

The following activities are available:

- Create and change handling units with reference to a delivery.
- Create handling units without object reference.
- Print labels for individual handling units.
- Update the handling unit weight.

A typical scenario involves packing materials into a warehouse container – the pick-handling unit – and subsequently transporting it to the packing station. There the material is repacked into the dispatch packaging.

→ **Note:** The *Empty* function does not exist for the packing station. To repack the material into shipping handling units, you must delete the pick-handling unit, individually unpack the materials.

There are packing station profiles to create handling units for inbound and outbound deliveries, and without object reference. In addition to the extensive control parameters, such as output device for handling unit messages, quantity proposal, there are settings that are only valid for one packing station type.

When packing deliveries, you can make a setting that triggers a direct goods receipt or goods issue posting as soon as you save a document. If you enter a packaging material in the packing station profile, then subsequent handling units are automatically created using this packaging material for each delivery to be processed. For “non-assignment” packing, you must enter a plant for the material to pack. You can also enter handling unit storage location and partner storage location. If there is only one default handling unit storage location, then the system only finds the partner storage location defined in Customizing. You can enter another non-handling unit-managed storage location in the packing station profile.

Exercise 2: The Packing Dialog

Exercise Objectives

After completing this exercise, you will be able to:

- Create handling units in the packing dialog

Business Example

IDES AG wants to test the various packing functions available within Handling Unit Management to simplify and automate the packing processes.

Task:

To test the settings that have already been made and/or those you have made yourself, you create handling units without an object reference. These are called “non-assigned” handling units. During this process you will call up various subfunctions of the packing dialog.

1. Check the stocks of pump **T-H-##** in plant **1000**.
2. Pack 6 pieces of your pump **T-H-##** on pallet **PK-HUM**.
3. Now, pack the handling units into a small van **TM-101**.
4. Check the material stocks again.

Solution 2: The Packing Dialog

Task:

To test the settings that have already been made and/or those you have made yourself, you create handling units without an object reference. These are called “non-assigned” handling units. During this process you will call up various subfunctions of the packing dialog.

1. Check the stocks of pump **T-H-##** in plant **1000**.
 - a) Choose *Logistics* → *Logistics Execution* → *Internal Whse Processes* → *Bins and Stock* → *Display* → *Total Stock per Material (Inventory Management)*.
 - b) Enter material number **T-H-##** and plant **1000**. Choose *Execute*: There are 20 pieces of the material in storage location 0001.

Continued on next page

2. Pack 6 pieces of your pump **T-H##** on pallet **PK-HUM**.
- Choose *Logistics → Central Functions → Handling Unit Management → Processing Handling Units → Create and Change (General)*.

Enter the plant and storage location from the following table in the corresponding fields on the *Gen. header data* tab page:

Field Name or Data Type	Values
<i>Plant</i>	1000
<i>Storage location</i>	0001

Go to the *Pack material* tab page.

- In the *Material to Be Packed* area, enter the material **T-H##**, the total quantity **6**, and the receiving handling-unit-managed storage location **HUMM**. Confirm your entries with *Enter*.
- In the *All existing HUs (available for packing)* area, enter the packaging material in which you want to pack your pump in the *Packaging Materials* field: **PK-HUM**. When you confirm your entries, the system assigns an identification number. Alternatively, you could select the material to be packed, choose *Extras → Allowed Packaging Material* from the menu to select the permitted packaging materials for this material, and generate the handling unit by double-clicking.
- Select both the material line for the material to be packed and the packaging material line, and choose the packing option *New HU if Full*. (Since only 2 pieces of pump T-H## can be packed in packaging material PK-HUM, the total quantity cannot be packed altogether using the *Pack* option. In this case, the system outputs the status message that “due to insufficient weight, only 3 pieces were packed”. You would therefore have to choose another packaging material, generate a new handling unit, and pack the remaining quantity in the new handling unit.)

Continued on next page

3. Now, pack the handling units into a small van **TM-101**.
 - a) Go to tab page *Pack HUs*.

In the *All HUs that can be packed* area, select one of the handling units to be packed, choose *Extras → Allowed Packaging Materials*, and select the small van **TM-101**.
 - b) Now select the handling units to be packed with packaging material **PK-HUM** in the lower screen area *All HUs that can be packed* and select the handling unit with the packaging material **TM-101** in the upper screen area *All existing HUs (available for packing)*. Choose *New HU if full* to pack your pallets in the small van.
 - c) Save the packing data. The system informs you that a material document has been generated.



Hint: The material document is evidence of the storage-location-to- storage-location posting change, which the system performed when the handling unit was created.

4. Check the material stocks again.
 - a) Choose *Logistics → Logistics Execution → Internal Whse Processes → Bins and Stock → Display → Total Stock per Material (Inventory Management)*.
 - b) Enter material number **T-H-##** and plant **1000**. Choose *Execute*.



Lesson Summary

You should now be able to:

- Make basic Customizing settings for packing
- Use the packing dialog

Lesson: Packing Instructions

Lesson Overview

This lesson explains the use of packing instructions in Handling Unit Management.



Lesson Objectives

After completing this lesson, you will be able to:

- Make basic settings for the use of packing instructions
- Create packing instructions and determination records

Business Example

IDES AG produces and sells pumps and their components. The company stores and distributes the components to various locations. As a Logistics Manager, you want to evaluate the various packing instruction functions available in Handling Unit Management.

Structure of Packing Instructions

You can, to a large extent, standardize and automate the packing transaction using packing instructions. You can consider customer-specific packing requirements and can include diagrams or descriptions of the packing transaction in the packing instruction through a link to document management. You can directly create shorter notes in the master record as text items. The determination of packing instructions is controlled using the same condition technique used at various other points in *SAP ERP Central Component*. This can be structured in various ways.



Template for creating handling units

Business Background:

- Results from packing planning
 - Optimum usage of containers
 - Transport security
 - Automatic in-house transport
 - Minimum costs
- Packing instructions are contractually agreed between supplier and customer
- Supplier requirements
 - Derivation of default values during packaging data entry
 - Instructions for packers (text, graphics)

VERPACKUNGSDATENBLATT		Arbeitsblatt
1	22.04.93	02.06.92
2	02.06.93	01.02.91
3	A 450 5678 90	
4	HALTER	
5	250	5T
6	A 390 5678 99	
7		
8	Kunde	AUTOMOBILBAU AG
9	Firma:	SCHULZ
10	Strasse/Hausnr:	020
11	PLZ/Ort:	030/1008 - 303
12		9091
13		030/1003 - 300
14		3
15	Lieferant	AUTOTEILE GMBH
16	Firma:	FUNK
17	Strasse/Hausnr:	069 / 7030 - 880
18	PLZ/Ort:	069 / 7030 - 88
19		3
20	Außenverpackung / Ladearmat	AUTOKOBILBAU AG
21	HOLZ FLACH PALETTEN	LT 5000
22	Maße:	V 5000
23	1200x200	25
24		309
25		790
26		2080
27		2
28		LT 9040
29		240
30	Innenverpackung / Grundverpackung	AUTOTEILE GMBH
31	VDA - KLT	LT 6428
32	Maße:	V 6428
33	600x400x200	4,7
34		18,4
35		88
36		5
37	PE - Folie	LT 9044
38		3
39	AUTOMOBILBAU AG	ERGÄNZENDE TECHNISCHE
40	ABT. LOG / VP	DATEN SIND DEM
41	POSTFACH 100	KATALOG DER STANDARD-
42	10439 BERLIN	VERPACKUNGEN ZU
43		ENTNEHMEN.

Figure 23: Packing Instruction

Flexible packing instructions determination based on condition technique is available in:

- Production
- Shipping
- Goods receipt
- Warehouse Management

A packing instruction consists of a load carrier, or a packaging material, and a material (to pack). You can add to this combination to meet any requirement by defining packing hierarchies (box onto pallet into container) and if required, also using lower-level packing instructions. You can also include packaging materials, such as lids, foil, and padding where the packaging material type is assigned to the category *Auxiliary packaging material*.



- **Packing instructions as the target BOM of a handling unit**
- **Structure of a packing instruction**
 - A load carrier (for example, pallet, small transporter)
 - Any number of auxiliary packaging materials (for example, lid)
 - One or more materials to be packed
- **Nesting**
 - Can be nested in the same way as single-level BOMs
 - Lower-level packing instructions can be used more than once in higher-level packing instructions

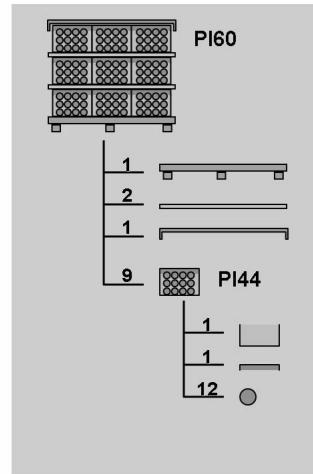


Figure 24: Packing Instruction Template for Handling Units

The graphic shows the structure of the packing instruction template for handling units. The order of possible elements within a packing instruction is largely predefined. The first item you enter always has to be the load carrier, for example, a Europallet (first level). You could then enter auxiliary packaging materials that belong to the load carrier. To generate nested handling units using the packing instruction, you need to create a second level with packaging material and auxiliary packaging material(s). You can also implement a lower-level packing instruction. The material to pack is the last item in the hierarchy. You can add text items at any point.



Item No.	Component	Short text	Target quantity	Minimum qty	Rounding qty	Unit of measure	Load carrier	MidD	Non-HU-relevant
10P	PK-184	Wooden crate for pumps (domestic)	1	1	0	PC	*		
20M	T-MS	pump (material supplying)	5	1	0	PC			

Figure 25: Packing Instructions: Components

When you create single-level or multilevel packing instructions, you should enter the items in the following order:

- Load carrier
- Auxiliary packaging materials
- Material to be packed or lower-level instructions

You can create multilevel packing instructions in one transaction. During this, the system directly creates the lower-level packing instruction from the higher-level packing instruction.

The dimensions, weight, and volume of a handling unit that has been constructed using a packing instruction are determined from the corresponding values in the material master records. You can also manually enter dimensions and weights into the master data record for the packing instruction. These values are then copied into the data record for the handling unit and take priority over the values from the material master record.

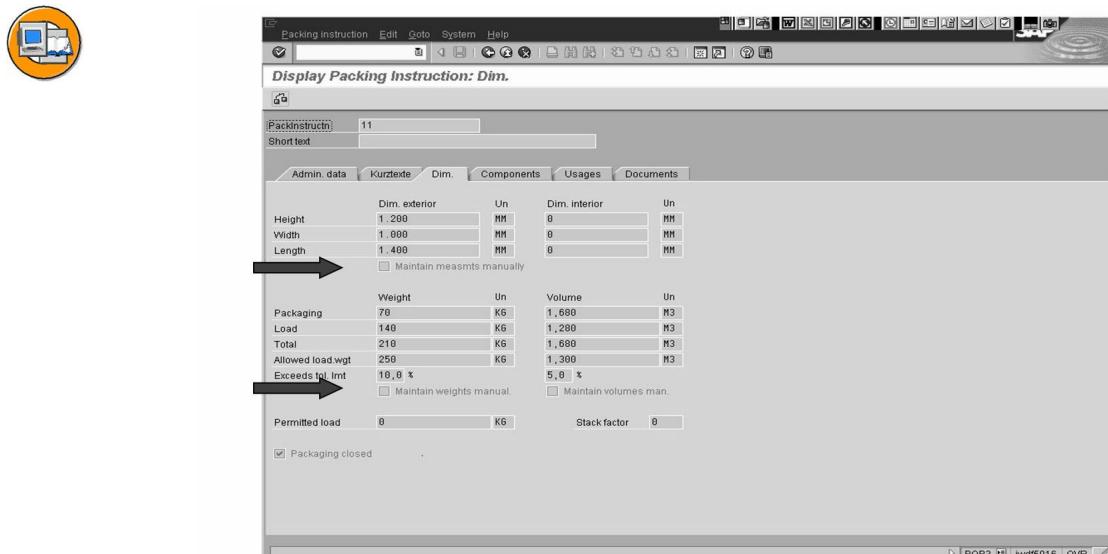


Figure 26: Packing Instructions: Dimensions

There are several available options for automating packing transactions. If you have created packing instructions, then you can tell the system to create handling units in the background. You can call this function from the packing transaction by choosing the *Automatic Packing* icon, or from the menu: *Extras → Automatic Packing*.

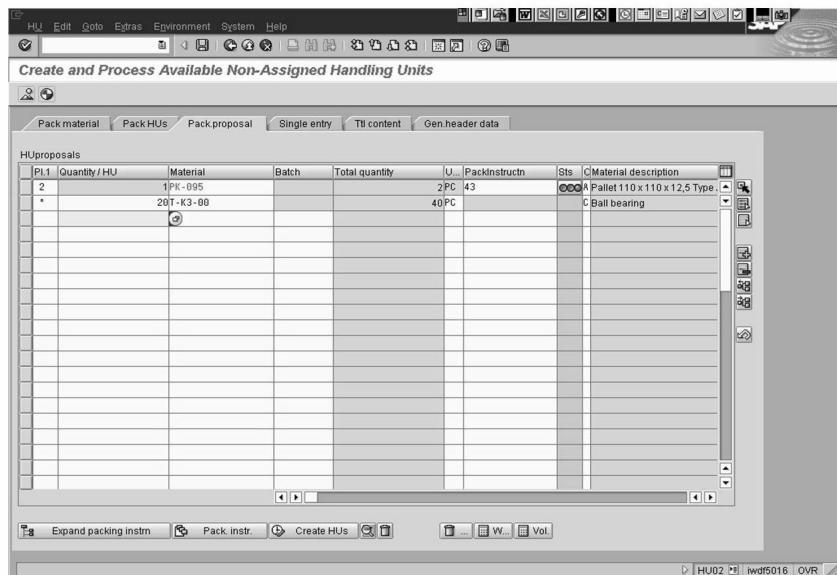


Figure 27: Automatic Packing

The system searches for the appropriate packing instruction for the material to be packed, and creates handling units according to the packing instructions it finds. The system then packs all as yet unpacked material items and/or handling units. You can however, automate packing item-by-item: *Extras → Select Items for Automatic Packing*. All selected items are packed in the background.

SAP R/3 Enterprise and *SAP ECC* enable you to use a packing instruction for more than one material.

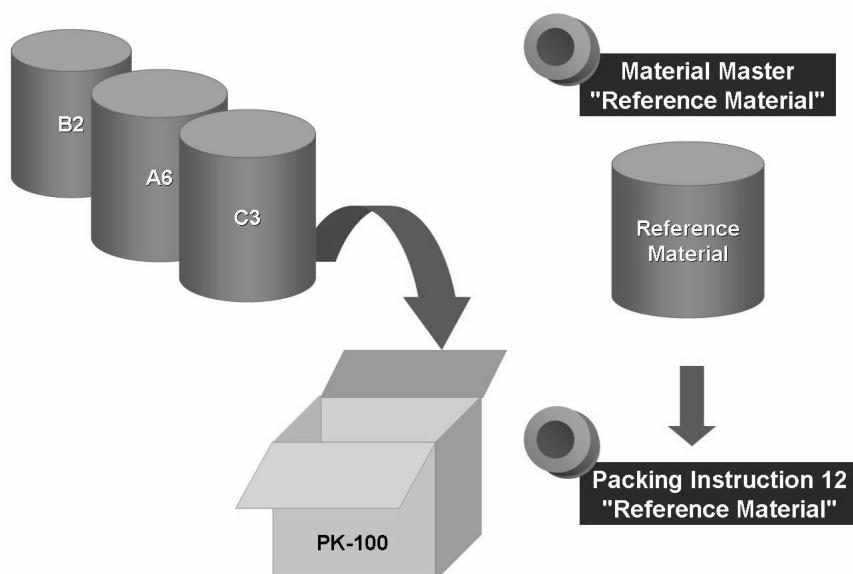


Figure 28: Reference Packing Instruction

In *SAP R/3 4.6C* it was necessary to create separate data records for each material that had to be packed using a packing instruction. In *SAP R/3 Enterprise* or *SAP ERP Central Component*, you can instead use a "**reference material**", which is used as a governing object for all materials to be packed with the same packing instruction. You create a packing instruction for this reference material. In the material master records for all materials to be packed with this packing instruction, add the material number of your reference material in the *Ref Mat. for Pckg* field in the *Basic Data 1* tab page. The determination record contains only the reference material.

To enable the user to enter data in the *Ref Mat. for Pckg* field on the *Basic Data 1* tab page, choose *Logistics General* → *Material Master* → *Basic Settings* → *Make Global Settings* from the Implementation Guide. Activate the *Reference Material for Packing* field.

In the Where-Used List for Components you can search packing instructions for materials used and reference materials. Obsolete packing instructions can be archived with the archiving object *VHU_PI*.

Exercise 3: Packing Instructions

Exercise Objectives

After completing this exercise, you will be able to:

- Create a packing instruction
- Create a determination record

Business Example

IDES Corporation wants to test the various packing instruction functions available within Handling Unit Management.

Task:

Because your pump **T-H-##** is usually packed onto pallet **PK-HUM**, you want to simplify the packing operations using a packing instruction, and to partially automate the process.

1. In Customizing, create a packing status check profile **##** for automatic packing.

Field Name or Data Type	Values
Check profile number	##
Check profile description	HUM##

2. Then, create a packing instruction with the description **SCM660-##** where you link the material **T-H-##** and packaging material **PK-HUM**. Assign your packing status check profile and note the number of the packing instruction.
3. Create a packing instruction determination record containing the condition type **ZVPA** (*Packing Shipping*) for your packing instruction. Choose the key combination *Material*.

Field Name or Data Type	Values
Determination type	ZVPA
Key combination	Material
Material	T-H-##
Packing instruction	(Number of your packing instruction)

4. Test your settings by creating another non-assigned handling unit (see exercise 2).

Solution 3: Packing Instructions

Task:

Because your pump **T-H-##** is usually packed onto pallet **PK-HUM**, you want to simplify the packing operations using a packing instruction, and to partially automate the process.

1. In Customizing, create a packing status check profile **##** for automatic packing.

Field Name or Data Type	Values
Check profile number	##
Check profile description	HUM##

- a) Choose *Logistics - General → Handling Unit Management → Automatic Packing → Packing Instructions Master Data → Define Check Profile for Packing Status*.
- b) Select the *New Entries* button.
- c) Enter **##** in the *Check profile* field and add the description **HUM##**.
- d) Select a packing status indicator for all variances and save your entries.

Continued on next page

2. Then, create a packing instruction with the description **SCM660-##** where you link the material **T-H-##** and packaging material **PK-HUM**. Assign your packing status check profile and note the number of the packing instruction.
- Choose *Logistics → Central Functions → Handling Unit Management → Master Data → Packing Instructions → Create*.

Field Name or Data Type	Values
Short text	SCM660-##
Component packaging material	PK-HUM
Component material	T-H-##
Target quantity	2

Save your entries.

- Choose *Enter* to access the initial screen.
 - Enter a short text **SCM660-##** and component **PK-HUM** (first item).
 - In the second item line, choose item category **M (Material)**, then add material **T-H-##** and *Target quantity 2*.
 - On the *Admin. data* tab page, assign your check profile **##** in the *Check profile* field. Save your entries.
3. Create a packing instruction determination record containing the condition type **ZVPA (Packing Shipping)** for your packing instruction. Choose the key combination *Material*.

Field Name or Data Type	Values
Determination type	ZVPA
Key combination	Material
Material	T-H-##
Packing instruction	(Number of your packing instruction)

- Choose *Logistics → Central Functions → Handling Unit Management → Master Data → Packing Instruction Determination Records → Create*.
- Enter the determination type **ZVPA** and choose the *Key...* button.
- Select *Material* and confirm with *Enter*.
- Enter material **T-H-##** and the number of your packing instruction. Choose *Enter* and save your determination record.

Continued on next page

4. Test your settings by creating another non-assigned handling unit (see exercise 2).
 - a) Choose *Logistics → Central Functions → Handling Unit Management → Processing Handling Units → Create and Change (General)*.
 - b) On the *Gen. header data* tab page, enter plant **1000** and storage location **0001**.
 - c) Go to the *Pack material* tab page. Enter material **T-H-##**, total quantity **2** and destination storage location **HUMM**.
 - d) On the *Pack. Proposal* tab page, choose *Pack Automatically*.
 - e) Choose *Create HUs* and save your handling unit.



Lesson Summary

You should now be able to:

- Make basic settings for the use of packing instructions
- Create packing instructions and determination records



Unit Summary

You should now be able to:

- Make basic Customizing settings for packing
- Use the packing dialog
- Make basic settings for the use of packing instructions
- Create packing instructions and determination records



Test Your Knowledge

1. The “Allowed Packaging Materials” function checks the assignment of the material group for packaging material of the material to be packed against the packaging material types.

Determine whether this statement is true or false.

- True
- False

2. Which of the following functions are available for a Packing Station?

Choose the correct answer(s).

- A Empty
- B Delete
- C Search
- D Display

3. If dimensions, weights, and volumes are maintained in the master data record for a packing instruction, they take priority over the values from the material master record.

Determine whether this statement is true or false.

- True
- False



Answers

1. The “Allowed Packaging Materials” function checks the assignment of the material group for packaging material of the material to be packed against the packaging material types.

Answer: True

The “Allowed packaging material” function matches the material group for packaging material of the material to be packed with the packaging material types.

2. Which of the following functions are available for a Packing Station?

Answer: B, C, D

Delete, Search, and Display functions are available in a packing station. A packing station does not contain the “empty” function.

3. If dimensions, weights, and volumes are maintained in the master data record for a packing instruction, they take priority over the values from the material master record.

Answer: True

In the master data record for a packing instruction, if dimensions, weights, and volumes are maintained, they take priority over the values from the material master record.

Unit 3

Procurement Processes with Handling Units

Unit Overview

This unit provides an overview of the options to use Handling Unit Management within procurement. It explains how to use handling units in Purchasing and in Manufacturing.



Unit Objectives

After completing this unit, you will be able to:

- Create handling units in inbound deliveries
- Understand the relationship between handling units and storage units in Warehouse Management
- Carry out materials staging with handling units
- Create handling units in production

Unit Contents

Lesson: Handling Units in External Procurement.....	56
Exercise 4: Handling Units in External Procurement	65
Lesson: Handling Units in Internal Procurement	70
Exercise 5: Handling Units in Internal Procurement	75

Lesson: Handling Units in External Procurement

Lesson Overview

This lesson deals with the use of handling units in external procurement processes.



Lesson Objectives

After completing this lesson, you will be able to:

- Create handling units in inbound deliveries
- Understand the relationship between handling units and storage units in Warehouse Management

Business Example

IDES AG produces and sells pumps. The company orders components for the manufacturing process from various vendors. As a Logistics Manager, you want to ensure that Handling Unit Management is implemented in external procurement.

Handling Units in the Inbound Delivery Process with Warehouse Management

In goods receipts for purchase orders without Handling Unit Management, you can post the goods receipt with reference to the purchase order. However, it is possible to work with deliveries and subsequent goods receipt postings with reference to deliveries, even if you are not using Handling Unit Management.

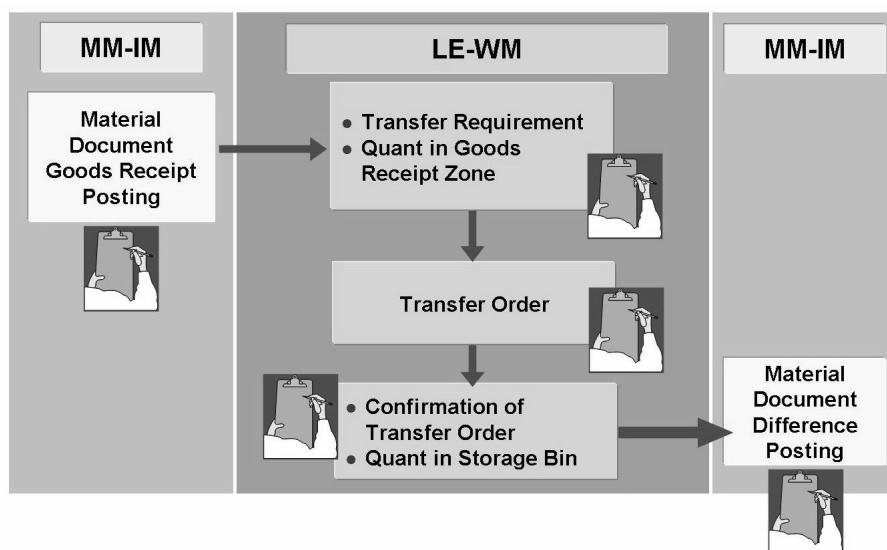


Figure 29: Goods Receipt Without Handling Unit Management

If you use Warehouse Management, the system generates a transfer requirement during the goods receipt posting. This transfer requirement is a document that is then used for planning goods movements yet to take place. At the same time, the stock increase during putaway is mapped using quants which is material quantities in storage bins, in the goods receipt zone. Putaway takes place using a transfer order that was created with reference to a transfer requirement. The system only posts the putaway material quantities as quants in the relevant destination storage bins when you confirm the transfer order.

If the system recognizes quantity differences during putaway, these can be entered when the transfer order is confirmed. The quantity difference, can then be posted in Warehouse Management and Inventory Management.

The goods receipt process using inbound deliveries realistically maps standard processes in many companies. If the vendor announces the goods receipt with a shipping notification, the inbound delivery can be created either manually or automatically on the basis of the shipping notification. It contains information transmitted by the vendor concerning the expected delivery times and quantities, as well as any information about packaging. It is also the reference document for the subsequent putaway using a transfer order. If you also use the transportation function as part of Logistics Execution, you can summarize inbound deliveries into inbound shipments. If you use Handling Unit Management, you must use the goods receipts process with inbound deliveries, since only the inbound delivery allows packing or accepting packages from the vendor.

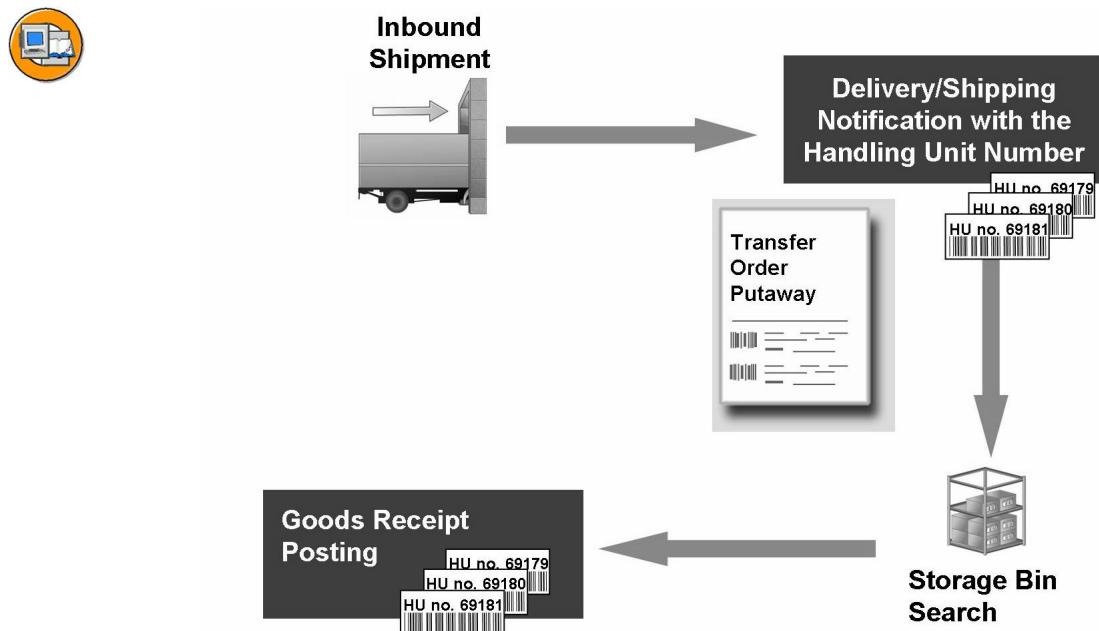


Figure 30: Handling Units in External Procurement

If you have an EDI connection to the vendor, the vendor's shipping notification can generate an inbound delivery. The purchasing document is always the reference document.

 **Note:** SAP systems map this kind of process with Intermediate Documents (IDocs) using UN/EDIFACT message type DESADV.

A transfer order is required to put away the delivered handling units. This refers to the inbound delivery. When you create the transfer order, the system uses master data and Customizing settings to determine storage types, storage sections, and storage bins for putaway. The goods receipt posting in Inventory Management, which also refers to the inbound delivery, completes the process.

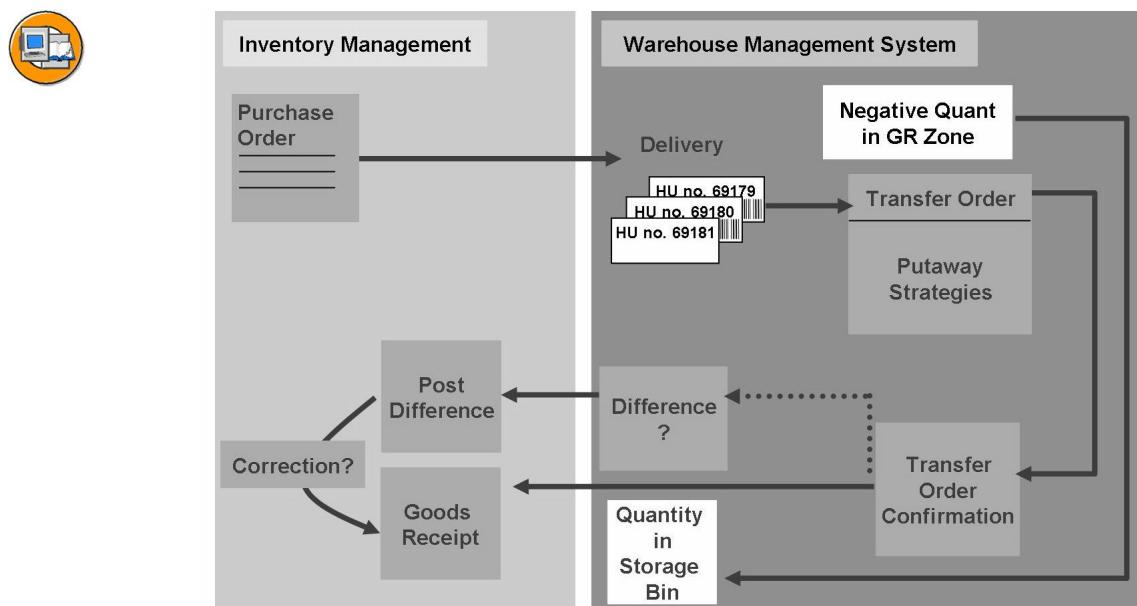


Figure 31: Process Flow with Integrated Warehouse Management

During putaway, **one** transfer order is created for **each** handling unit of the inbound delivery. If the destination storage type is subject to a confirmation requirement, you can only post the goods receipt after you have confirmed the transfer order.

Warehouse Management can be used independently from the central ERP system. The SAP Warehouse Management System can be connected as a separate unit to an SAP system or an external ERP system. Both systems – central and decentralized – are normally installed on separate computers. These computers communicate using “Business Application Program Interfaces” (BAPIs). A BAPI is a standardized programming interface that can be accessed using the “SAP Business Objects” (for example, purchase order, sales order, customer) using various programming languages and other tools. Central and decentralized systems use “Application Link Enabling” (ALE), a technology for constructing

and running distributed applications, to exchange data in the form of “Intermediate Documents” (IDocs). IDocs are documents in a standard SAP format that are used for electronic data exchange between different SAP and/or external systems.

Goods receipt and goods issue processes are performed in decentralized Warehouse Management exclusively using deliveries. The reference document (purchase order and/or sales order) is entered in the central system. The delivery is replicated in the decentralized system. In other words, the delivery is created in the system with the same object key. The delivery-related transfer orders for controlling putaway and/or picking are only created and processed in the decentralized system. The subsequent posting of the stock increase or decrease is made in the decentralized system. From there it is reported back to the central system.

If you use Handling Unit Management in connection with decentralized Warehouse Management, there are two possible process flows:

In the first case, the vendor sends a shipping notification by EDI containing packaging information, so that the system already recognizes the handling units when the delivery is created in the ERP system. The delivery with the handling units is replicated in decentralized Warehouse Management. The transfer order for putaway is generated here when the goods arrive in the receiving plant. After the transfer order has been confirmed, you can then post the goods receipt in the Warehouse Management system. This triggers the confirmation to the central ERP system, where the goods receipt is then posted.

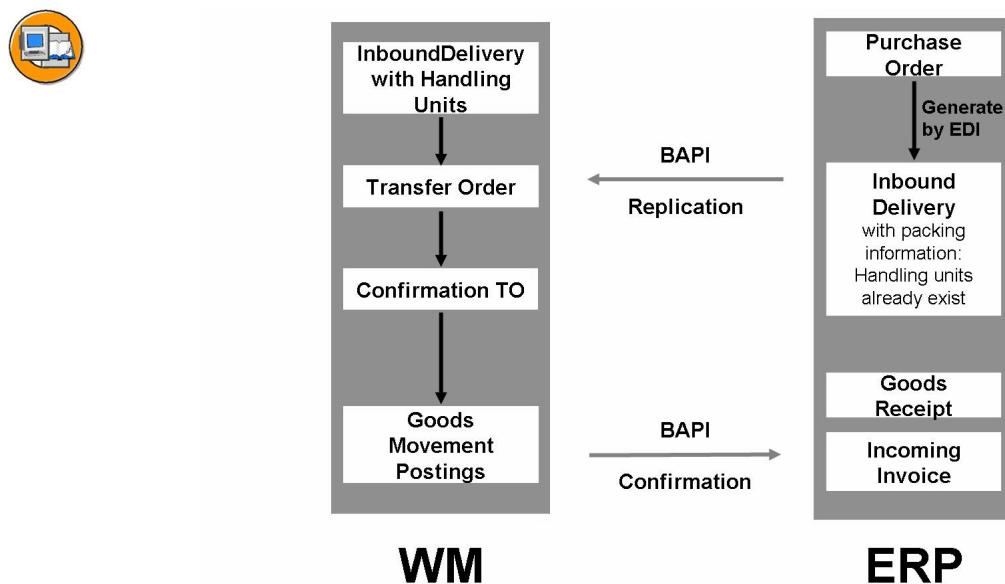


Figure 32: Process Flow with Decentralized Warehouse Management

If the vendor does not transmit any packaging information in the shipping notification, or if the inbound delivery is created manually and “unpacked” in the central system, then the handling units for the inbound delivery must be generated

in the decentralized system before you can create the putaway transfer order. After putaway, the goods receipt is posted for the inbound delivery and is then reported back to the central system. The packaging information is now added to the inbound delivery. This means that the handling units now also exist in the central system.

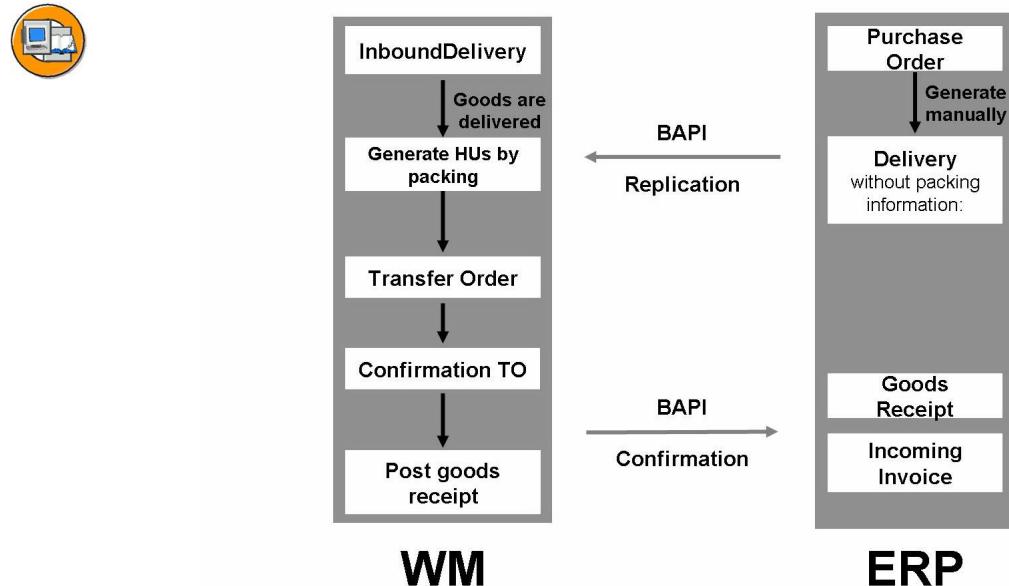


Figure 33: Process Flow with Decentralized Warehouse Management

Stock Transport Orders with Handling Units

Material can be ordered from another plant within your own company or group. This means that stocks must be transferred from the supplying plant to the receiving plant. Stock transfer orders are created with their own purchasing document type (**UB**) in the system. If you are not using Handling Unit Management, then you can process these orders with or without deliveries. If, however, you are using Handling Unit Management, then you must always work with deliveries where a handling unit-managed storage location is affected.

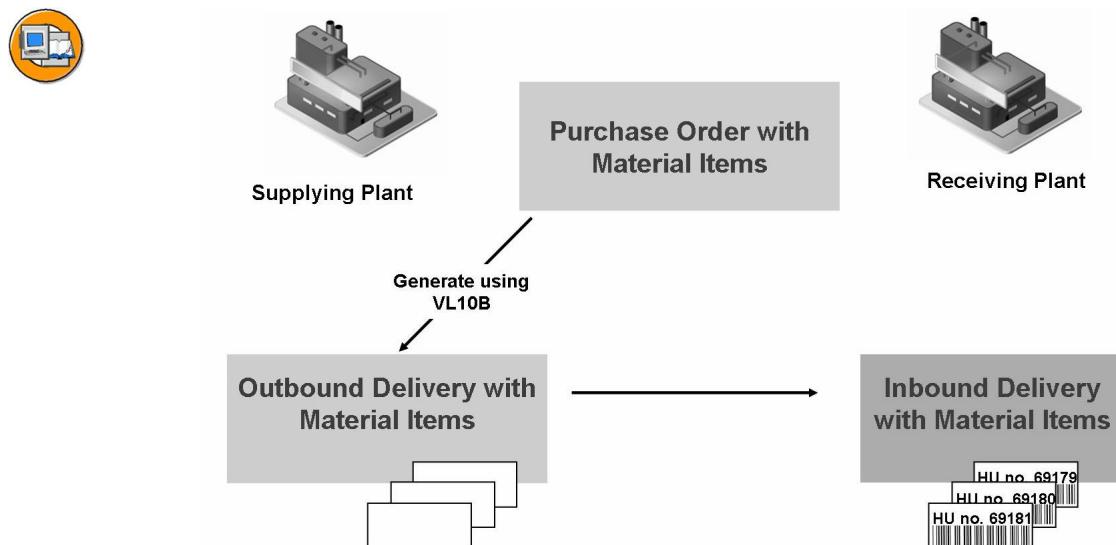


Figure 34: Procurement Using a Stock Transport Order

For procurement transactions with a stock transport order where both the issuing and receiving storage locations are handling-unit-managed, you must create an outbound delivery in the issuing plant and an inbound delivery in the receiving plant. The outbound delivery with reference to the stock transport order is generated using transaction VL10B. You manually assign the handling units to be transferred to this outbound delivery. The inbound delivery is generated in the receiving plant when the goods movement is posted using transaction MIGO, either for the stock transport order or for the outbound delivery. If the outbound delivery is the reference document for the goods receipt posting, the system updates the document flow. You must also manually assign the handling units to transfer to the inbound delivery.

→ **Note:** For simple plant-to-plant stock transfers where both the issuing and receiving storage locations are handling-unit-managed, you also work with one outbound and one inbound delivery. You can use the *SAP Business Workflow WS12300004* in these circumstances. It defines that after the goods issue posting for the outbound delivery in the issuing plant, an inbound delivery is automatically created in the receiving plant, and the handling units assigned to the outbound delivery are assigned to the inbound delivery.

Handling Units in Warehouse Management

In Warehouse Management, you can work with storage unit management independently of Handling Unit Management. This additional function allows you to enter materials and load carriers as logistic units that can only be identified within a warehouse using a number. If you use Handling Unit Management in connection with Warehouse Management, then you must activate storage unit

management for all storage types in which you want to store handling units. During putaway, the system creates a storage unit for the handling unit of the reference document, e.g. the inbound delivery. This storage unit has the same identification number as its “sister” handling unit.

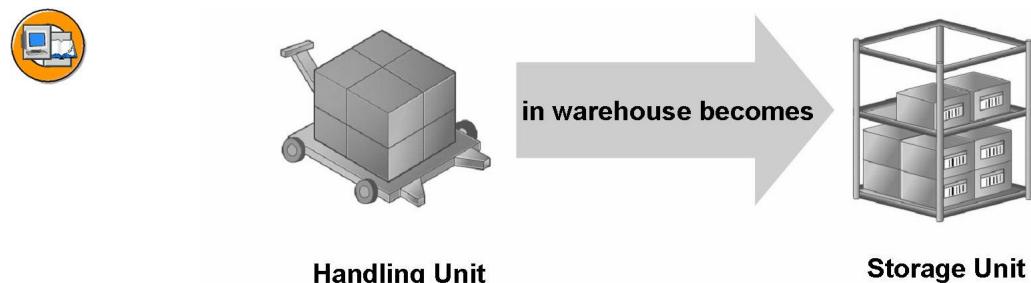


Figure 35: Handling Units in Warehouse Management

When you use Handling Unit Management storage unit numbering is controlled by the numbering parameters you have set up for handling units, and not using the number range(s) from Storage Unit Management. For this reason, you must activate length conversion for storage unit numbers in Customizing for Storage Unit Management. You must set the same numbers of characters as in the handling unit identification numbers. The setting is effective across the whole client (menu path in the IMG: *Logistics Execution → Warehouse Management → Storage Units → Master Data → Define Number Ranges → Conversion exit for storage unit number*).

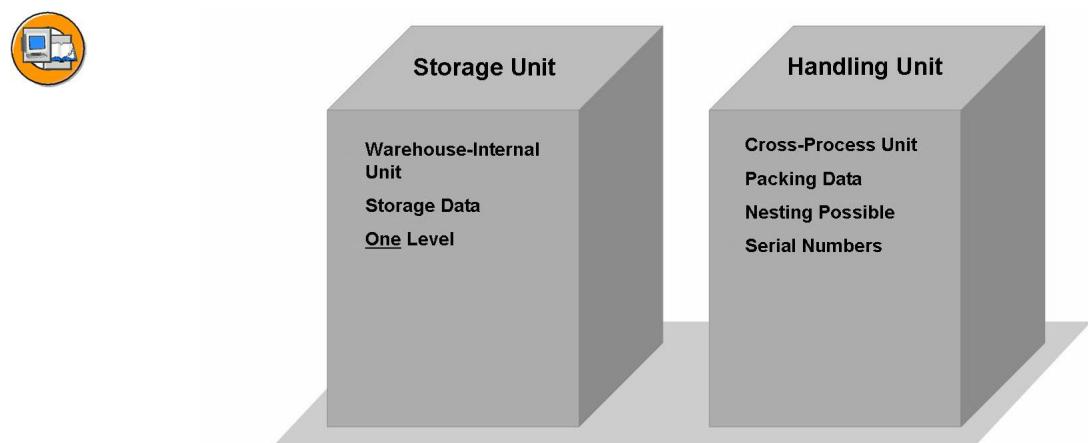


Figure 36: Handling Units and Storage Units: Comparison

The data record for the storage unit contains only storage-related information. You can access the data record from the Logistics Execution menu (transaction LS33), the stock overviews, or from the transfer order. You can display the packaging details of handling units putaway as storage units from this data record. The system now goes to the same handling unit display that you can also see in the delivery.

You can now also track serial numbers of packed materials in Warehouse Management using handling units.

Evaluations are made at storage unit level. This corresponds to the highest packing level for nested handling units. In Warehouse Management stock overviews, you can only display handling units through the storage bin data. When picking partial quantities of a storage unit, you must enter the affected lower-level handling units and serial numbers.

Exercise 4: Handling Units in External Procurement

Exercise Objectives

After completing this exercise, you will be able to:

- Create handling units in the inbound delivery
- Put handling units away in the warehouse

Business Example

IDES Corporation receives unpacked goods from the vendor C.E.B. Berlin. You need to pack the delivered material and put it away as handling units.

Task 1:

The company receives the two components for pump **T-H##**, - material numbers **T-K1##** and **T-K2##** - from vendor C.E.B. Berlin (vendor number **1000**). These components are packed when the inbound delivery is received.

1. Create a purchase order for 100 pieces of each material for plant **1000**, storage location **HU##**.



Hint: You must specify in the purchase order that the goods receipt will be processed using an inbound delivery. To do this, choose the confirmation control key **Inbound Delivery ECC (ANLI)** for both items on the *Confirmations* tab page.

2. Create an inbound delivery with reference to the purchase order, then pack the materials using packaging material **PK-095**. Pack the entire quantity of each delivery item on to separate pallets.

Task 2:

The handling units should now be put away.

1. Create a transfer order with reference to the inbound delivery.
2. Confirm the resulting transfer orders in the background.

Task 3:

The process is complete when you post the goods receipt for the inbound delivery.

1. Post the goods receipt for the inbound delivery.
2. Check the warehouse stocks of both materials.

Solution 4: Handling Units in External Procurement

Task 1:

The company receives the two components for pump **T-H-##**, - material numbers **T-K1-##** and **T-K2-##** - from vendor C.E.B. Berlin (vendor number **1000**). These components are packed when the inbound delivery is received.

1. Create a purchase order for 100 pieces of each material for plant **1000**, storage location **HU##**.



Hint: You must specify in the purchase order that the goods receipt will be processed using an inbound delivery. To do this, choose the confirmation control key **Inbound Delivery ECC (ANLI)** for both items on the *Confirmations* tab page.

- a) *Logistics → Materials Management → Purchasing → Purchase Order → Create → Vendor/Supplying Plant Known* Enter the following data:

Field Name or Data Type	Values
Vendor	1000
Purchasing organization	1000
Purchasing group	000
Company code	1000
Material	T-K1-##, T-K2-##
PO quantity	100 (PC of each material)
Plant	1000
Storage location	HU##

- b) At item level, go to the *Confirmations* tab page and assign confirmation control key **Inbound Delivery ECC** to the item.

Continued on next page

2. Create an inbound delivery with reference to the purchase order, then pack the materials using packaging material **PK-095**. Pack the entire quantity of each delivery item on to separate pallets.
 - a) *Logistics → Logistics Execution → Inbound Process → Goods Receipt for Inbound Delivery → Inbound Delivery → Create → Single Documents*
 - b) If necessary, enter the number of your purchase order and the vendor number **1000**. Choose *Enter*: The overview screen for the inbound delivery appears.
 - c) Choose the *Pack* symbol. The packing dialog appears.
 - d) Pack the materials separately using packaging material **PK-095** for both handling units. Save the inbound delivery.

Task 2:

The handling units should now be put away.

1. Create a transfer order with reference to the inbound delivery.
 - a) *Logistics → Logistics Execution → Inbound Process → Goods Receipt for Inbound Delivery → Putaway → Create Transfer Order → For Inbound Delivery*
 - b) Enter your warehouse number **1##** and the document number of your inbound delivery.



Hint: If you have not noted the number, you can also create the transfer order using the inbound delivery monitor (*Button Delivery monitor inb. deliveries*), by searching for the inbound delivery document using your warehouse number **1##**. To do this, choose the *For Putaway* button.

- c) Choose *Putaway background* or *TO in backgr.* (delivery monitor) and save. If you use the delivery monitor, confirm the message regarding the putaway quantity with *Enter*: The system creates two transfer orders.

Continued on next page

2. Confirm the resulting transfer orders in the background.
 - a) *Logistics → Logistics Execution → Inbound Process → Goods Receipt for Inbound Delivery → Putaway → Confirm Transfer Order → Single Document → In One Step*
 - b) In the *Control* area, choose the *Background* processing option and confirm your selection with *Enter*. The system confirms the transfer order in the background.
 - c) Repeat step b) for the second transfer order.

Task 3:

The process is complete when you post the goods receipt for the inbound delivery.

1. Post the goods receipt for the inbound delivery.
 - a) *Logistics → Logistics Execution → Inbound Process → Goods Receipt for Inbound Delivery → Post Goods Receipt → Inb.Delivery Indiv.Document*
 - b) To post the goods receipt, choose the *Post Goods Receipt* button.
2. Check the warehouse stocks of both materials.
 - a) *Logistics → Logistics Execution → Internal Whse Processes → Bins and Stock → Display → Total Stock per Material (Warehouse Management)*
 - b) Both materials are now “available stock” of storage type **035 (Packed Materials)**.



Lesson Summary

You should now be able to:

- Create handling units in inbound deliveries
- Understand the relationship between handling units and storage units in Warehouse Management

Lesson: Handling Units in Internal Procurement

Lesson Overview

This lesson helps you understand the use of handling units in manufacturing. It explains material staging with handling units as well as packing in production.



Lesson Objectives

After completing this lesson, you will be able to:

- Carry out materials staging with handling units
- Create handling units in production

Business Example

IDES AG produces and sells pumps and their components in Germany. As a Logistics Manager, you want to ensure that materials staging for production as well as goods receipt of end products is carried out using Handling Unit Management.

Materials Staging with Handling Units

You can use Handling Unit Management in discrete, repetitive, and process manufacturing. In discrete and process manufacturing, you can stage components for work orders in the form of handling units. The consumption posting is made with reference to the handling unit or the work order. You cannot perform materials staging with handling units in repetitive manufacturing.

In the three manufacturing forms, the end products can be packed and then put away as handling units. The goods receipt posting is made with reference to the handling unit, discrete and process manufacturing also contain references to the relevant work order.



- Materials staging of components for production:
 - Packing components to be staged or withdrawal of complete handling units
 - Goods issue posting for the handling unit or the work order
- End product putaway:
 - Manual or automatic packing
 - Goods receipt posting for the handling unit or the work order

Materials staging with handling units can be performed without using Warehouse Management. The components for the production order are either packed into a new handling unit, or staged as complete handling units (transaction COPAWA).

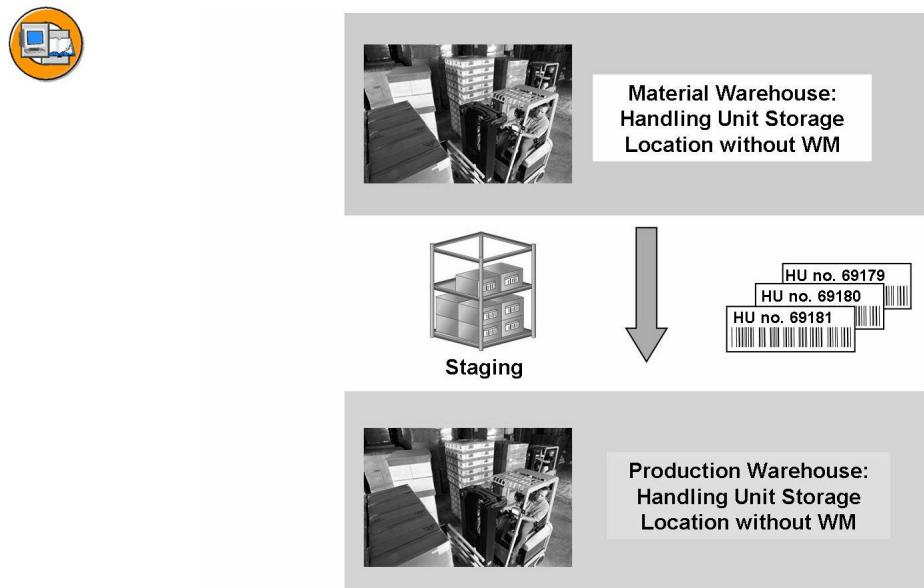


Figure 37: Discrete Manufacturing: Materials Staging Without Warehouse Management

The goods issue for consumption of the components is posted with reference to the handling unit or production order (transaction COWBHUWA). Partial goods issue is also possible. You can assign handling units to an order that are no longer required for this order to another order, but you cannot delete the assignment.

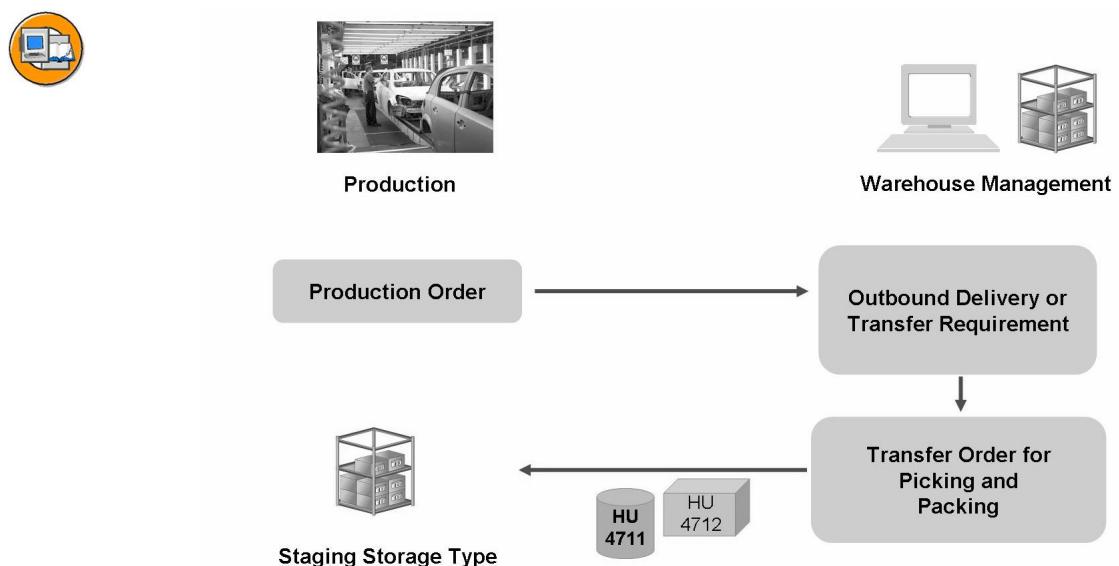


Figure 38: Discrete Manufacturing: Materials Staging With Warehouse Management

When using the WM-PP interface, you can stage components as:

- Pick parts: Order-based materials staging
- Crate parts: Order-independent materials staging with fixed number of pieces
- Release order parts: Cross-order staging

You can request component staging from the warehouse using a transfer requirement or an outbound delivery. Picking is performed with the aid of a transfer order. You can automatically or manually create outbound deliveries and transfer requirements. The handling units are staged in a specific storage type for production supply. The goods issue posting is made with reference to the production order or to the outbound delivery.

If you use Handling Unit Management in addition to production supply, the components are staged either in complete handling units that already exist in the warehouse, or in pick-handling units into which the picked materials are packed.

If the production storage location is not handling-unit-managed, then the staged handling units must be unpacked. A transfer posting of the contents in handling unit is made to the production storage location.

Packing in Production

You can pack end products from discrete manufacturing and process manufacturing into handling units for putaway (transaction COWBPACK).

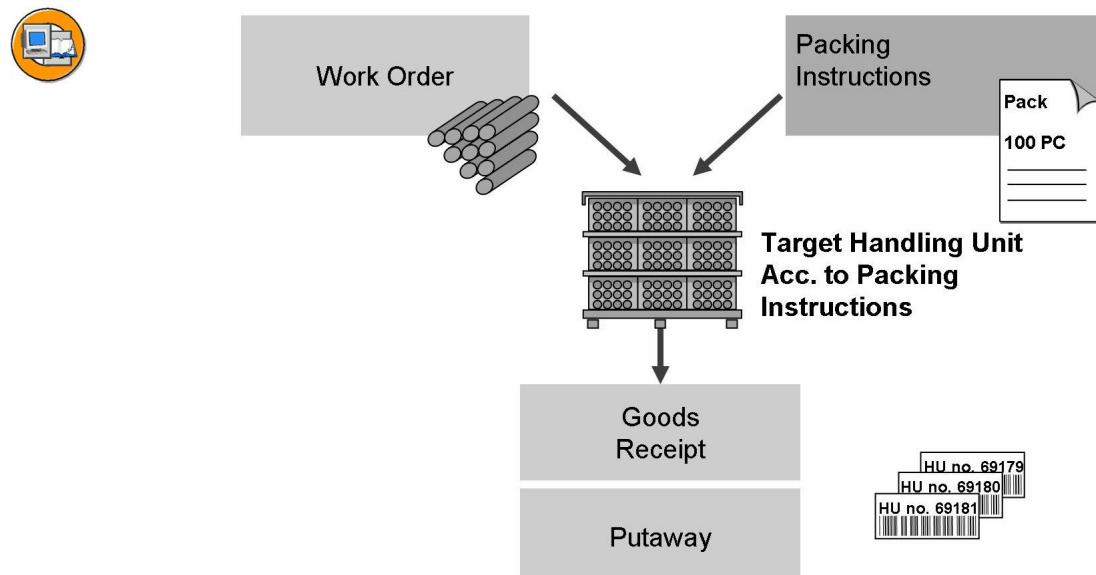


Figure 39: Packing in Discrete Manufacturing and in Process Manufacturing

The goods receipt is posted with reference to the handling unit or work order (transaction COWBHUWE).

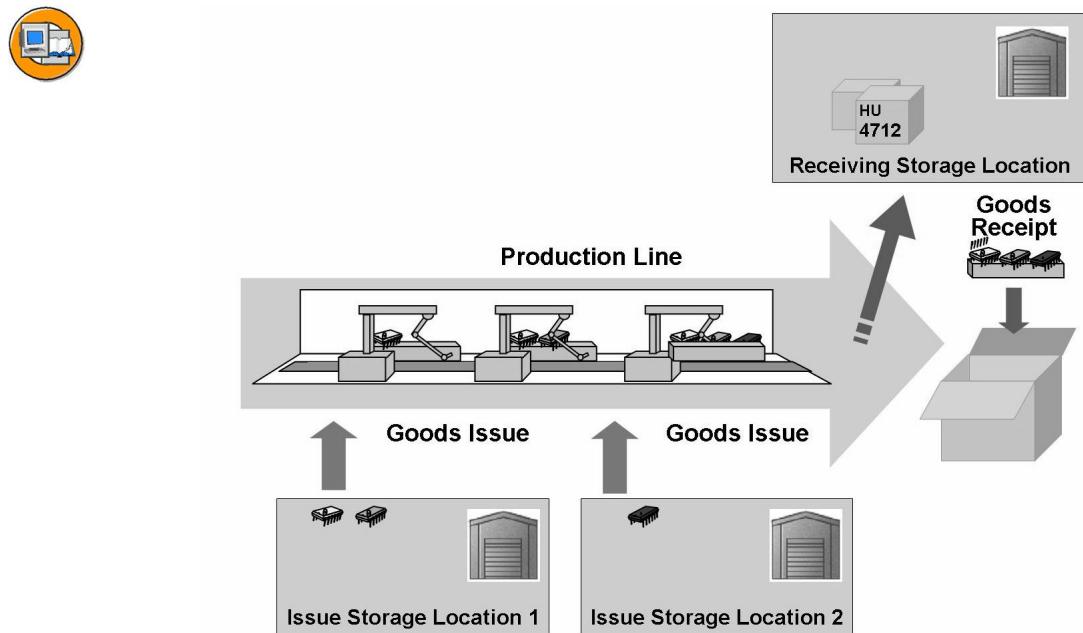


Figure 40: Packing in Repetitive Manufacturing

Handling Unit Management offers specific transactions for packing and putaway of repetitive manufacturing products as following:

- You can create handling units using the “Packing in Repetitive Manufacturing” function (transaction HUP1).
- You post the goods receipt using the “Goods Receipt in Repetitive Manufacturing” function (transaction MFHU).

Exercise 5: Handling Units in Internal Procurement

Exercise Objectives

After completing this exercise, you will be able to:

- Use Handling Unit Management to stage components for a production order

Business Example

IDES AG produces and sells pumps and their components. The components need to be staged from the warehouse for the production of pumps.

Task 1:

You want to produce ten pumps **T-H-##**. The manufacturing process is controlled using a production order. Warehouse Management and Handling Unit Management are used for staging the components.

1. Create a production order for 10 pumps **T-H-##**. The production plant is plant **1000** and the order type has the key **PP01**. Since backward scheduling is set up, enter a finishing basic date for the production operation (for example, one week from today). Check the component overview of the order to see which components are required in which quantities for producing the pump. Release the order for production and save the document. Order number: _____
2. Request staging of the components **T-K1-##** through **T-K4-##** from the warehouse for production supply area **PVB HU##**.
3. Display the transfer requirement generated by the staging request.

Task 2:

Carry out component staging with the aid of the transfer order. The required quantities of each component are withdrawn from the warehouse handling units and packed into a pick-handling unit.

1. Create a transfer order with reference to the transfer requirement.



Hint: You can create the transfer order directly from the transfer requirements list you called up in the last step (Buttons *TO in Foreground* or *TO in Background*).

Continued on next page

2. Before you confirm, pack the withdrawn components into a pick-handling unit.



Hint: On the initial screen for confirmation, you can go to the *Assign Pick HU to TO* function by choosing the *Pack* button.

3. Post the goods issue of the staged components with reference to the handling unit.

Task 3:

Once the production process is complete, two pumps **T-H-##** are packed on to each **PK-HUM** pallet. You can now post the goods receipt for the resulting handling units. Finally, the handling units are put away using transfer orders.

1. Pack the ten pumps **T-H-##** onto pallet **PK-HUM** using transaction **COWBPACK**.



Hint: The system uses a packing instruction.

2. Post the goods receipt for the new handling units using transaction **COWBHUWE**.
3. Check the stocks of pump **T-H-##** from the Warehouse Management view. The ten newly-produced examples should now be posted in the *GR Area for Production* (storage type **901**).
4. Put away the resulting handling units with the aid of transfer orders. To do this, from the menu, choose *Create Transfer Order From Stock List* (transaction **LT10**). The appropriate Warehouse Management movement type has the key **999** (*Warehouse Supervision*). Confirm the transfer orders.
5. Check the stocks again.

Solution 5: Handling Units in Internal Procurement

Task 1:

You want to produce ten pumps **T-H-##**. The manufacturing process is controlled using a production order. Warehouse Management and Handling Unit Management are used for staging the components.

1. Create a production order for 10 pumps **T-H-##**. The production plant is plant **1000** and the order type has the key **PP01**. Since backward scheduling is set up, enter a finishing basic date for the production operation (for example, one week from today). Check the component overview of the the order to see which components are required in which quantities for producing the pump. Release the order for production and save the document. Order number: _____
 - a) Choose *Logistics → Production → Shop Floor Control → Order → Create → With Material*
 - b) Enter material number **T-H-##**, plant **1000**, order type **PP01**, and choose *Enter*.
 - c) Enter **10** in the *Total Qty* field and a future date (for example, current date + one week) in the *Finish* field. Confirm with *Enter*. The system checks the routing and BOM for the material in the background.
 - d) Choose *Release order* and save your entries.
2. Request staging of the components **T-K1-##** through **T-K4-##** from the warehouse for production supply area **PVB HU##**.
 - a) Choose *Logistics → Production → Shop Floor Control → Goods Movements → WM Material Staging → For Order*
 - b) Enter your order number and select *Request rem..*
 - c) Choose *WM materials staging* or *Enter* to access the RFQ screen. Choose *WM material staging* and save your entries.
3. Display the transfer requirement generated by the staging request.
 - a) Choose *Logistics → Logistics Execution → Internal Whse Processes → Transfer Requirement → Display → By Requirement*
 - b) Enter warehouse number **1##** and requirement type: **P** (*production supply*) in the *Req. Tracking Number* field and confirm with *Enter*.

Continued on next page

Task 2:

Carry out component staging with the aid of the transfer order. The required quantities of each component are withdrawn from the warehouse handling units and packed into a pick-handling unit.

1. Create a transfer order with reference to the transfer requirement.



Hint: You can create the transfer order directly from the transfer requirements list you called up in the last step (Buttons *TO in Foreground* or *TO in Background*).

- a) Choose the *TO in backgr.* button.
b) The system creates the transfer order in the background.
2. **Before** you confirm, pack the withdrawn components into a pick-handling unit.



Hint: On the initial screen for confirmation, you can go to the *Assign Pick HU to TO* function by choosing the *Pack* button.

- a) Choose *Logistics* → *Logistics Execution* → *Outbound Process* → *Goods Issue for Other Transactions* → *Picking* → *Confirm Transfer Order* → *Single Document* → *In One Step*
b) Choose the *Pack* button.
c) Enter packaging material **PK-095**. When you save, the system creates an empty pick-handling unit.
d) Confirm the transfer order. The pick-handling unit is displayed in the *Assigned Handling Units* as well as in the *Dest. storage unit* field.
3. Post the goods issue of the staged components with reference to the handling unit.
 - a) Choose *Logistics* → *Production* → *Shop Floor Control* → *Goods Movements* → *Goods Issue with HU*
b) Enter your order number and choose *Propose HU*.
c) Post the goods issue by saving your entries.

Continued on next page

Task 3:

Once the production process is complete, two pumps **T-H-##** are packed onto each **PK-HUM** pallet. You can now post the goods receipt for the resulting handling units. Finally, the handling units are put away using transfer orders.

1. Pack the ten pumps **T-H-##** onto pallet **PK-HUM** using transaction COWBPACK.



Hint: The system uses a packing instruction.

- a) Choose *Logistics → Production → Shop Floor Control → Goods Movements → Pack Material*.
 - b) Enter your order number and choose *Enter*: The system has expanded a packing instruction for material **T-H-##**.
 - c) Choose the *Save HUs* button.
2. Post the goods receipt for the new handling units using transaction COWBHUWE.
 - a) Choose *Logistics → Production → Shop Floor Control → Goods Movements → Goods Receipt with HU*
 - b) Choose the *Propose HU* button and save post the goods receipt.
 3. Check the stocks of pump **T-H-##** from the Warehouse Management view. The ten newly-produced examples should now be posted in the *GR Area for Production* (storage type **901**).
 - a) Choose *Logistics → Logistics Execution → Internal Whse Processes → Bins and Stock → Display → Total Stock per Material (Warehouse Management)*
 - b) Enter warehouse number **1##** and material number **T-H-##**, and choose *Enter*: The material is now in interim storage area **901**.

Continued on next page

4. Put away the resulting handling units with the aid of transfer orders. To do this, from the menu, choose *Create Transfer Order From Stock List* (transaction LT10). The appropriate Warehouse Management movement type has the key **999 (Warehouse Supervision)**. Confirm the transfer orders.
 - a) Choose *Logistics → Logistics Execution → Internal Whse Processes → Stock Transfer → Create Transfer Order → From Stock List*.
 - b) Enter warehouse number **1##** and storage type **901**, then choose *Execute*.
 - c) Select any stock found, then choose *Stock Transf. Background*.
 - d) Choose *Logistics → Logistics Execution → Internal Whse Processes → Stock Transfer → Display Transfer Order → For Material*.
 - e) Select *Only open TO items* and choose *Execute*: The transfer orders you just created are listed item-by-item.
 - f) Place the cursor between the storage bin coordinates and the quantity in the row of the first item and choose *Confirmation in Background*. Repeat this step for the other items.
5. Check the stocks again.
 - a) Choose *Logistics → Logistics Execution → Internal Whse Processes → Bins and Stock → Display → Total Stock per Material (Warehouse Management)*
 - b) Enter warehouse number **1##** and material **T-H-##**, then choose *Execute*.



Lesson Summary

You should now be able to:

- Carry out materials staging with handling units
- Create handling units in production



Unit Summary

You should now be able to:

- Create handling units in inbound deliveries
- Understand the relationship between handling units and storage units in Warehouse Management
- Carry out materials staging with handling units
- Create handling units in production



Test Your Knowledge

1. It is not possible to work with deliveries and subsequent goods receipt postings with reference to deliveries, if you are not using Handling Unit Management.

Determine whether this statement is true or false.

- True
- False

2. Goods receipts in handling unit-managed storage locations can only be posted using _____.

Fill in the blanks to complete the sentence.

3. You cannot perform materials staging with handling units in _____ manufacturing.

Fill in the blanks to complete the sentence.

4. In Warehouse Management stock overviews, you can only display handling units through the storage bin data.

Determine whether this statement is true or false.

- True
- False



Answers

1. It is not possible to work with deliveries and subsequent goods receipt postings with reference to deliveries, if you are not using Handling Unit Management.

Answer: False

It is possible to work with deliveries and subsequent goods receipt postings with reference to deliveries, even if you are not using Handling Unit Management.

2. Goods receipts in handling unit-managed storage locations can only be posted using inbound deliveries.

Answer: inbound deliveries

3. You cannot perform materials staging with handling units in repetitive manufacturing.

Answer: repetitive

4. In Warehouse Management stock overviews, you can only display handling units through the storage bin data.

Answer: True

You can only display handling units through the storage bin data in Warehouse Management stock overviews.

Unit 4

Sales and Distribution Processes with Handling Units

Unit Overview

The main focus of this unit is on how to use handling units for Sales and Distribution. It explains the use of pick-handling units as pick containers. It also explains the available options to create automatic pick-handling units.



Unit Objectives

After completing this unit, you will be able to:

- Use Handling Unit Management in sales processes

Unit Contents

Lesson: Handling Units in the Outbound Delivery Process	86
Exercise 6: Picking with Handling Units	95

Lesson: Handling Units in the Outbound Delivery Process

Lesson Overview

The lesson explains the use of handling units in sales processes. The main focus is on picking using handling units.



Lesson Objectives

After completing this lesson, you will be able to:

- Use Handling Unit Management in sales processes

Business Example

IDES AG produces and sells pumps and their components. As a Logistics Manager, you want to ensure that pick-handling units for outbound processes are created automatically by the system.

Handling Units in the Outbound Delivery Process

The central document in Logistics Execution, the outbound delivery, is created with reference to the sales order. You have the choice between various forms of collective processing. The outbound delivery adopts the main data from the order, including the planned dates for the follow-on process. In the outbound delivery, the system also determines a **picking location** for each document item. If the system determines that this storage location has been assigned to a warehouse number in Customizing, it displays this warehouse number in the outbound delivery. The system also assigns an overall picking status and a stock removal status. The user can then see immediately whether the subsequent stock removal must be performed in Warehouse Management using a transfer order.

If the picking location of the delivery item is subject to Handling Unit Management, the system does not permit packing in the outbound delivery. If you are not using Warehouse Management, you can assign an entire existing handling unit to the outbound delivery. However, if you want to pick **partial quantities** for the outbound delivery from existing handling units, you have to use Lean Warehouse Management at least to create **pick-handling units** (see below). If (full) Warehouse Management is used, the transfer order is needed to pick both complete units and partial quantities.

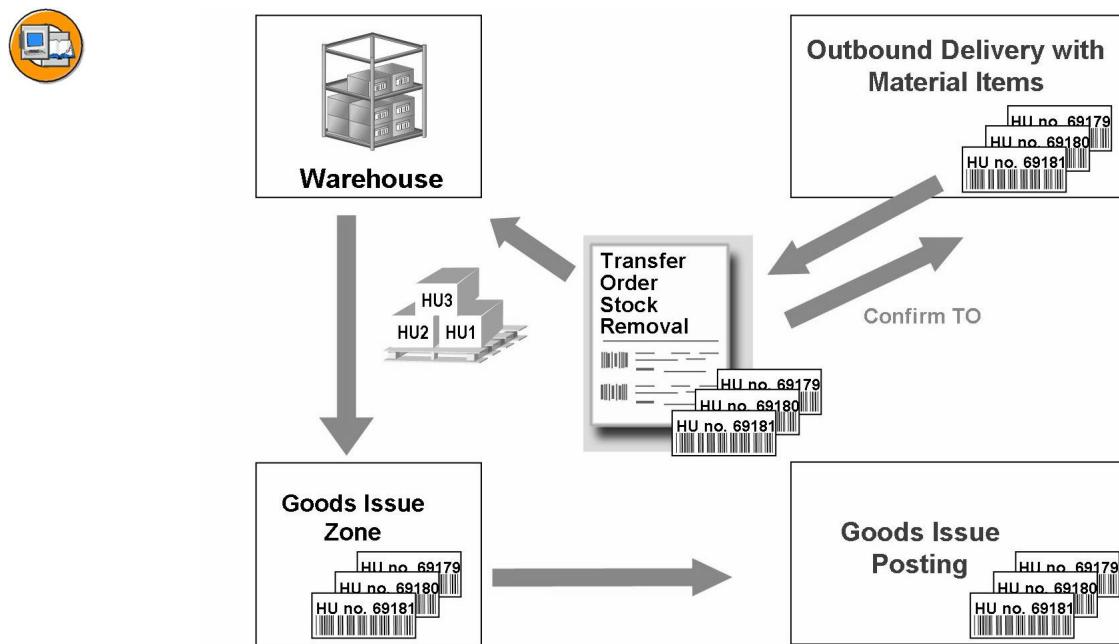


Figure 41: Goods Issue Process with Handling Units

Thus, the substeps of the picking process with handling units are:

- Create the transfer order with reference to the outbound delivery; determine the withdrawal storage bins using Warehouse Management
- Create pick-handling units, if you do not pick complete storage units
- Confirm the transfer order

For each delivery item, the system searches pickable stocks according to the valid picking strategy in the source storage type in Warehouse Management. In the outbound delivery, you cannot specify which handling units to pick. When the transfer order is confirmed, the pick handling unit is assigned to the outbound delivery.

Pick-Handling Units

A pick-handling unit is always required when you pick a **partial quantity** of a handling unit that is in the warehouse in the shape of a storage unit. You must create the pick-handling unit and assign it to the transfer order before you can confirm the latter. When you create a pick-handling unit you can also print a pick-handling unit label.

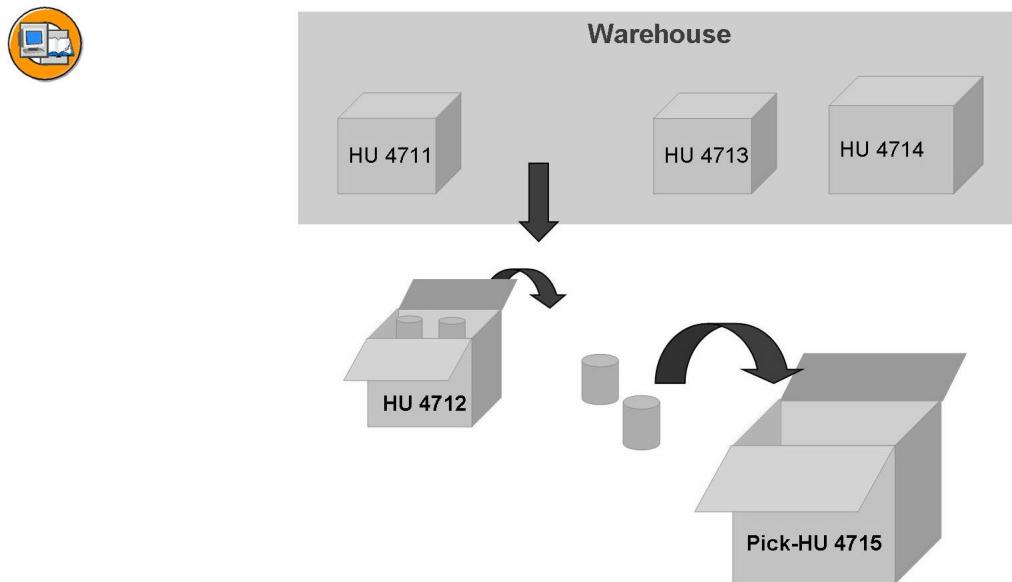


Figure 42: Pick-Handling Unit

Procedures to create pick-handling units are:

- Manual pick-handling unit creation using transaction LH01
- Automatic pick-handling unit creation when creating transfer orders according to Customizing settings
- Pick-handling units construction using packing instructions

You can automate the creation of pick-handling units using entries in a special Customizing table. You define a packaging material for warehouse numbers for certain goods movements and storage types. The system can then create the pick-handling according to these settings, or it can propose the appropriate packaging material.

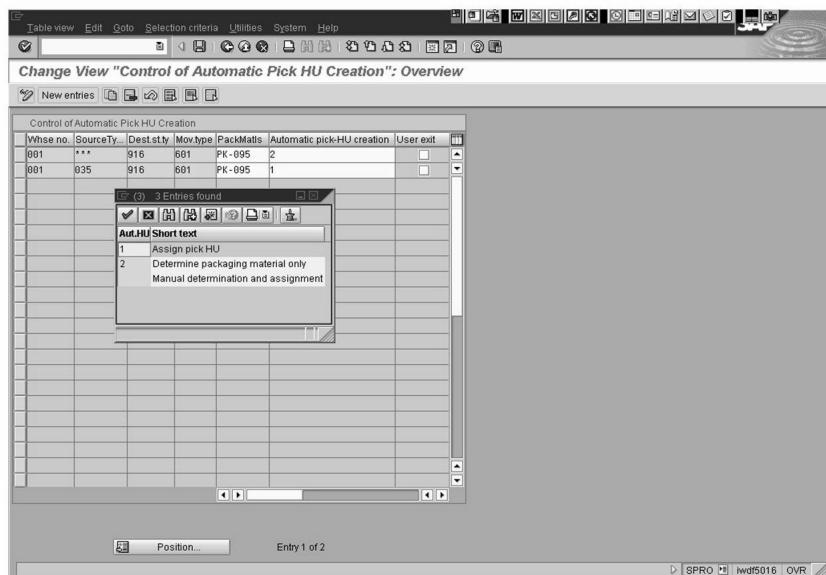


Figure 43: Automatic Pick-Handling Unit Creation

The options for pick-handling unit creation are:

- The system creates the pick-handling unit and assigns it to the transfer order (1)
- Only the packaging material is determined and is noted in the transfer order for a subsystem (2).
- No pick-handling unit is created (empty field).

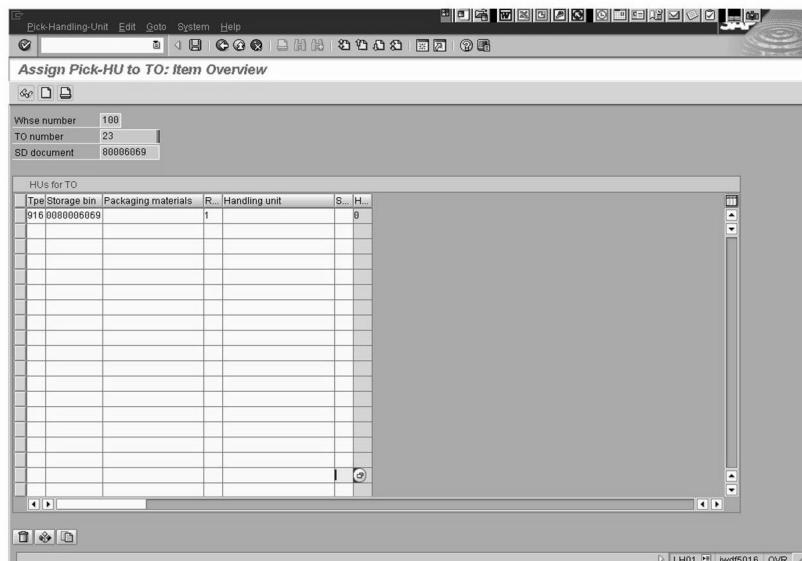


Figure 44: Pick-Handling Unit Creation

If a packaging material or the pick-handling unit itself was not automatically assigned when the transfer order was created, the system creates one line for each destination storage type for the pick-handling unit. Here, you can assign the packaging material or the handling unit you want to use for picking manually.



Type	Storage bin	Packaging materials	Required number HUs	Handling unit	SUT	HU identification
916 0089006689	PK-095	1	1	112345678900001309	IP	0

Figure 45: Pick-Handling Unit Assignment (Display)

You cannot delete the assignments automatically made when creating the transfer order. You can only subsequently edit or delete manual assignments made using transaction LH01.

When the transfer order is created, Warehouse Management decides whether or not a storage unit is completely picked. The storage unit can be any simple or nested handling unit.

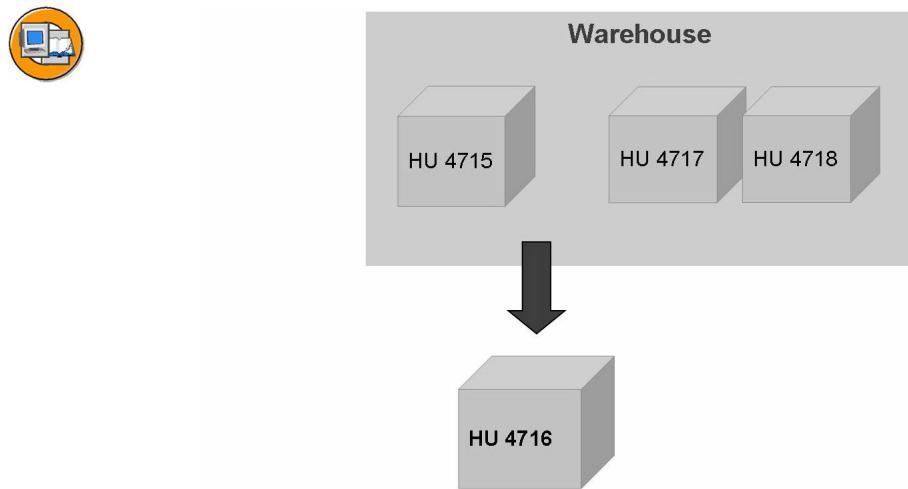


Figure 46: Withdrawing Complete Storage Units

The storage unit can be picked into a pick-handling unit. This results in a nested pick-handling unit. If the storage unit is not picked into a pick-handling unit, it is directly assigned to the outbound delivery when you confirm the transfer order. The storage unit number remains the same.

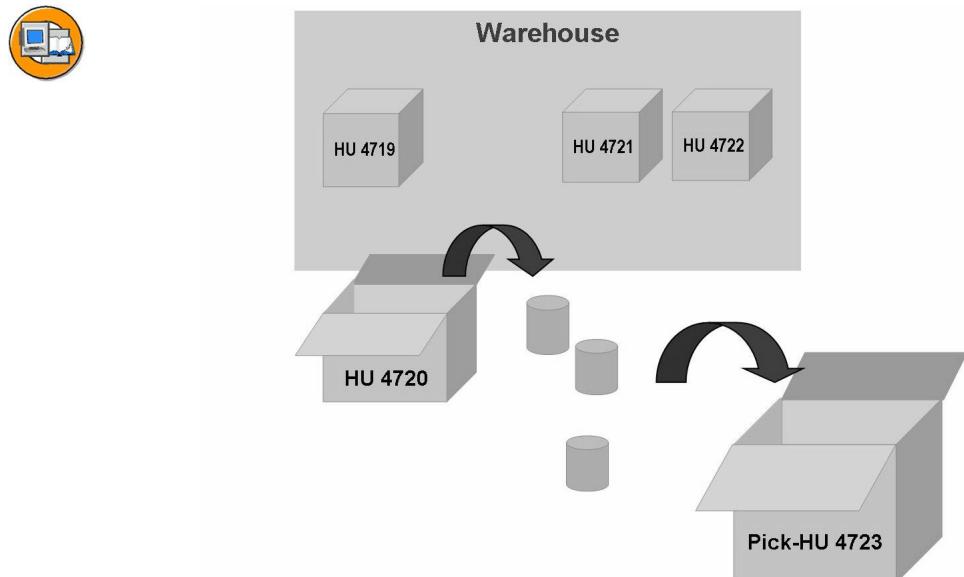


Figure 47: Withdrawing Partial Quantities

You must assign the picked quantity of a pick handling unit for each transfer order item. You can divide a transfer order item across two pick handling units. You cannot assign a transfer order item to a lower-level handling unit within a pick handling unit. You can perform picking for complete lower-level handling units.

To do this, you must enter the lower-level handling units. You can perform picking for partial quantities from lower-level handling units. For materials subject to a serial number requirement, you must enter the picked serial numbers.

If you have created more than one pick-handling unit for the outbound delivery, then at this point in the process, you must specify into which of the pick-handling units the system should pick. You do this for each transfer order item using the *HU identification*. You decide whether or not a complete storage unit is packed further into a pick-handling unit using the *HU withdrawal* indicator.



Handling unit	HU identification/Packaging materials	SUT	Tpe	Storage bin
11234567000001309	PK-095	IP		916 0080006069

Figure 48: Confirming the Transfer Order

You assign the transfer order item to the pick-handling unit using the HU identification or by entering the handling unit number.

Indicator *HU withdrawal*: If this indicator is set in the transfer order item, you can pick the entire storage unit. A pick-handling unit is not necessary.

In customizing settings of movement types of warehouse management, following default values for withdrawals of complete handling units are possible:

- The source storage unit is packed into the pick-handling unit . The pick-handling unit thus becomes a nested handling unit.
- The source storage unit becomes the destination storage unit.
- The total material quantity from the source storage unit is packed into the pick-handling unit.

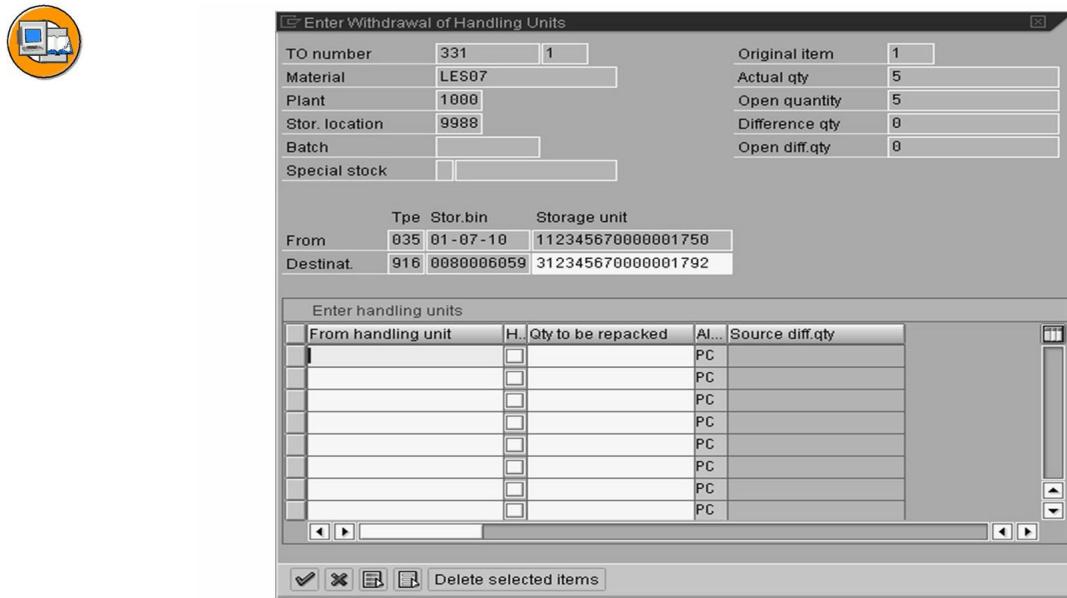


Figure 49: Confirming with Nested Handling Units

You need to enter the lower-level handling unit(s) when:

- You want to withdraw a partial quantity from the source storage unit, or
- A difference quantity has been entered. You must enter the lower-level unit where the difference occurred.

You can copy complete lower-level handling units into the pick-handling unit(s). The pick-handling unit becomes a nested handling unit. You can copy the total material quantity of a lower-level handling unit into the pick-handling unit without copying the lower-level handling unit. You can make partial withdrawals from lower-level handling units.

Two-step confirmation is available in Warehouse Management at goods receipt and goods issue, independently of Handling Unit Management. Here, the withdrawal from the source storage bin and putaway into the destination storage bin are separately confirmed. The advantage of this procedure for goods issues is that the source storage bin is immediately available again for picking after the withdrawal confirmation.

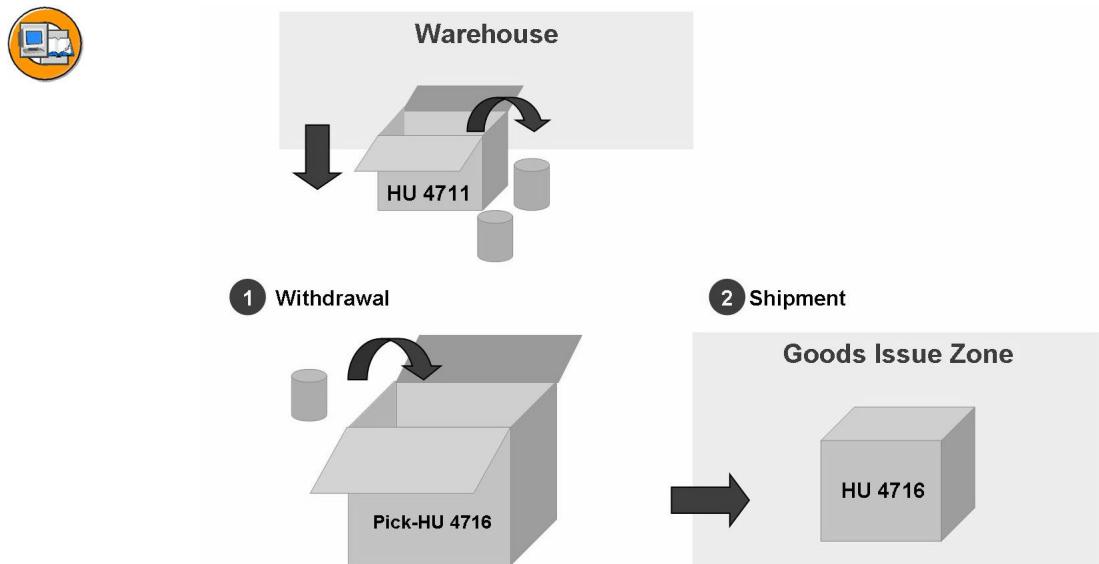


Figure 50: Two-Step Confirmation

The prerequisite to use the two-step confirmation is a general authorization for the procedure for the relevant warehouse number, and an active confirmation requirement in all affected storage bins, as well as goods receipt and goods issue zones.



Hint: You must enter differences from picking during the first step. The delivery is only updated after the second step.

When you confirm transfer orders in Warehouse Management, you can retain any differences in the system, such as missing quantities, that were determined during picking or putaway. Difference quantities are posted to a specific storage type in the standard system: 999. From there, they are posted from Warehouse Management and Inventory Management in one step. If you work with Handling Unit Management, a “virtual” difference handling unit is used, into which the missing quantity is packed. When you pick nested handling units, you must enter the lower-level handling unit where the difference occurred.



Caution: When you pick a material subject to serial number requirement, you cannot enter difference quantities.

Exercise 6: Picking with Handling Units

Exercise Objectives

After completing this exercise, you will be able to:

- Using Handling Unit Management in an outbound delivery process
- Make Customizing settings for automatic pick-handling unit creation

Business Example

IDES Corporation produces and sells pumps and their components. The company supplies pump and individual components to A.I.T. GmbH.

Task 1:

A.I.T. GmbH (customer account number **1400**) orders two pumps **T-H-##** and twenty ball-bearings **T-K2-##**.

1. Create the order (order type **OR**) using the following data:

Field Name or Data Type	Values
<i>Sold-to party</i>	1400
<i>PO number</i>	##
<i>Material</i>	T-H-##
<i>Order quantity</i>	2
<i>Material</i>	T-K2-##
<i>Order quantity</i>	20

2. Create an outbound delivery with reference to this sales order (shipping point **1000**). Check the picking location for both items.



Hint: Move the selection date for the delivery creation date (determined using shipment scheduling in the order) forward a week.

Task 2:

Production always packs two pumps **T-H-##** onto one pallet **PK-HUM**. These handling units are then put away in warehouse number **1##**. Component **T-K2-##** was packed 100 pieces onto a pallet at the time of the inbound delivery, and has been put away as such.

1. Check the stocks of both materials from the Warehouse Management view.

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-
2. From the display, go to the storage unit master data, and from there to the handling unit views.

Task 3:

During picking for the outbound delivery, a complete storage unit with **T-H-##** can be withdrawn. To pick the required partial quantity of **T-K2-##** however, you need to use a pick-handling unit. To simplify the pick process, you configure automated pick-handling unit assignment in Customizing.

1. Make the required settings in Customizing.
2. Create a transfer order for the outbound delivery.
3. Confirm the transfer order. Check whether your settings for automated pick-handling unit assignment have taken effect. The storage unit containing two pieces of **T-H-##** should be picked directly. What does the system propose?
4. Display both handling units for the outbound delivery.
5. Post the goods issue for the outbound delivery.

Solution 6: Picking with Handling Units

Task 1:

A.I.T. GmbH (customer account number **1400**) orders two pumps **T-H-##** and twenty ball-bearings **T-K2-##**.

1. Create the order (order type **OR**) using the following data:

Field Name or Data Type	Values
<i>Sold-to party</i>	1400
<i>PO number</i>	##
<i>Material</i>	T-H-##
<i>Order quantity</i>	2
<i>Material</i>	T-K2-##
<i>Order quantity</i>	20

- a) Choose *Logistics → Sales and Distribution → Sales → Order → Create*.
- b) Select order type **OR (Standard Order)** and confirm your entries with *Enter*.



Hint: You do not need to enter data in any other fields. In the next step, the system will determine the sales area data from the customer master record.

- c) Enter sold-to-party, PO number, material numbers and quantity (see table), then choose *Enter*. Save the order.

Continued on next page

2. Create an outbound delivery with reference to this sales order (shipping point **1000**). Check the picking location for both items.



Hint: Move the selection date for the delivery creation date (determined using shipment scheduling in the order) forward a week.

- a) Choose *Logistics* → *Logistics Execution* → *Outbound Process* → *Goods Issue for Outbound Delivery* → *Outbound Delivery* → *Create* → *Single Document* → *With Reference to Sales Order*.
- b) Enter shipping point **1000** and your order number.
- c) Move the selection date for the delivery creation date forward a week and choose *Enter*.
- d) The picking location for both delivery items should be **HU##**. Save the outbound delivery.

Task 2:

Production always packs two pumps **T-H-##** onto one pallet **PK-HUM**. These handling units are then put away in warehouse number **1##**. Component **T-K2-##** was packed 100 pieces onto a pallet at the time of the inbound delivery, and has been put away as such.

1. Check the stocks of both materials from the Warehouse Management view.
 - a) Choose *Logistics* → *Logistics Execution* → *Internal Whse Processes* → *Bins and Stock* → *Display* → *Total Stock per Material (Warehouse Management)*
 - b) Enter warehouse number **1##** and material number **T-H-##** and **T-K2-##** respectively, and choose *Enter*.
2. From the display, go to the storage unit master data, and from there to the handling unit views.
 - a) From the stock overview, choose *Bin Stock*, and from there call up the storage bin master. In the *Stock per storage bin* field, select the material line and choose the *Stor. unit* button.
 - b) To go from the storage unit display to the handling unit, choose *HU stock*.

Continued on next page

Task 3:

During picking for the outbound delivery, a complete storage unit with **T-H-##** can be withdrawn. To pick the required partial quantity of **T-K2-##** however, you need to use a pick-handling unit. To simplify the pick process, you configure automated pick-handling unit assignment in Customizing.

1. Make the required settings in Customizing.
 - a) In Customizing, choose *Logistics - General → Handling Unit Management → Basics → Warehouse Management → Define Control for Automatic Creation of Pick HUs.*
 - b) Copy the entry for warehouse number **001**, source type **035**, destination storage type **916**, movement type **601** and indicator **1** to the *Automatic Pick-HU creation* field, then overwrite the warehouse number with your warehouse number **1##**. Save your entries.
2. Create a transfer order for the outbound delivery.
 - a) Choose *Logistics → Logistics Execution → Outbound Process → Goods Issue for Outbound Delivery → Picking → Create Transfer Order → Single Document* and then *Enter*.
 - b) Choose *Generate TO item* and save the transfer order.
3. Confirm the transfer order. Check whether your settings for automated pick-handling unit assignment have taken effect. The storage unit containing two pieces of **T-H-##** should be picked directly. What does the system propose?
 - a) Choose *Logistics → Logistics Execution → Outbound Process → Goods Issue for Outbound Delivery → Picking → Confirm Transfer Order → Single Document → In One Step*.
 - b) Choose *Enter*: The system proposes a pick-handling unit for **both** transfer order items.
 - c) As you want to withdraw the complete storage unit containing material **T-H-##**, remove the *HU identification (1)* of item **T-H-##** and choose *Enter*: Source storage unit and destination storage unit are now identical. Save the transfer order.
4. Display both handling units for the outbound delivery.
 - a) Choose *Logistics → Central Functions → Handling Unit Management → Display of HUs → For Outbound Delivery*.
 - b) The system proposes your outbound delivery. Choose *Enter*.

Continued on next page

5. Post the goods issue for the outbound delivery.
 - a) Choose *Logistics* → *Logistics Execution* → *Outbound Process* → *Goods Issue for Outbound Delivery* → *Post Goods Issue* → *Outbound Delivery Single Document*.
 - b) Choose the *Post goods issue* button.



Lesson Summary

You should now be able to:

- Use Handling Unit Management in sales processes



Unit Summary

You should now be able to:

- Use Handling Unit Management in sales processes



Test Your Knowledge

1. A pick-handling unit is always required when you pick a partial quantity from an existing handling unit for an _____.
Fill in the blanks to complete the sentence.
2. When a complete storage unit is packed into a pick-handling unit, the system creates a _____ handling unit.
Fill in the blanks to complete the sentence.
3. Under which circumstances you cannot enter difference quantities?

4. When the picking location of an outbound delivery item is a handling unit storage location which is at the same time warehouse-managed, you need the transfer order for packing.

Determine whether this statement is true or false.

- True
- False



Answers

1. A pick-handling unit is always required when you pick a partial quantity from an existing handling unit for an outbound delivery.

Answer: outbound delivery

2. When a complete storage unit is packed into a pick-handling unit, the system creates a nested handling unit.

Answer: nested

3. Under which circumstances you cannot enter difference quantities?

Answer: When you pick a material subject to serial number requirement, you cannot enter difference quantities.

4. When the picking location of an outbound delivery item is a handling unit storage location which is at the same time warehouse-managed, you need the transfer order for packing.

Answer: True

The transfer order for packing is needed when the picking location of an outbound delivery item is a handling unit storage location which is at the same time warehouse-managed.

Unit 5

Handling Unit Management in Quality Assurance

Unit Overview

This unit deals with the various options and procedures for quality assurance in the logistics process in connection with Handling Unit Management. It covers Quality Management, Serial Number Management and Batch Management.



Unit Objectives

After completing this unit, you will be able to:

- Explain the integration of Handling Unit Management into Serial Number Management, Quality Management and Batch Management

Unit Contents

Lesson: Quality Assurance Procedures 106

Lesson: Quality Assurance Procedures

Lesson Overview

This lesson covers the options for quality assurance in the logistics process in connection with Handling Unit Management.



Lesson Objectives

After completing this lesson, you will be able to:

- Explain the integration of Handling Unit Management into Serial Number Management, Quality Management and Batch Management

Business Example

IDES AG produces and sells pumps and their components. The company stores and distributes the components to various locations. As a Logistics Manager, you want to ensure that Handling Unit Management is used in quality assurance processes.

Quality Inspection

In the standard process flow, the system creates an inspection lot when you post the goods receipt with reference to a purchase order for a material that is relevant for Quality Management. If you use Handling Unit Management, the inspection lot is created as soon as you create an inbound delivery containing handling units. The inspection lot is assigned to the handling unit(s) from the inbound delivery. The procedure to process these inspection lots is the same as the inspection process for unpacked materials. If the checks are made without sample management, then you cannot assign the inspection samples to individual handling units from an inbound delivery. Only when you perform checks with sample management, or according to the requirements of a “sample drawing procedure”, can you determine exactly which inspection sample in an inspection lot was withdrawn from which handling unit.

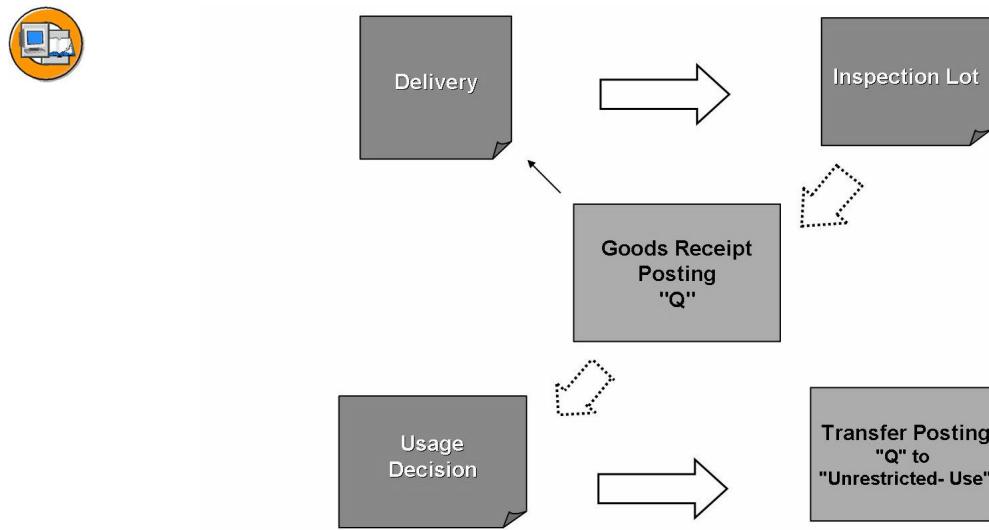


Figure 51: Quality Inspection with Handling Units

To use Quality Management in conjunction with Handling Unit Management, you must make the following settings in the material master and in Customizing:

- **Material master:** The system uses the inspection types defined in the inspection settings within the *Quality Management* view to control processes such as automatic generation of inspection lots. For the combination of Handling Unit Management and Quality Management, you can use the inspection types *Goods Receipt Inspection for Order (01)* and *Final Inspection at GR from Production (04)*. You must activate the *Insp. for HU* field.
- In **Customizing** for Handling Unit Management, you can define for each movement type, which postings can be performed for handling units to which an inspection lot is assigned, and when they can be performed: *Logistics - General → Handling Unit Management → Basics → Quality Management → Maintain Allowed Goods Movements*.

When you create an inbound delivery for a purchase order, the system generates an inspection lot for each delivery item. The inspection lot is assigned to the handling units that were created for the delivery item. You can access this assignment from the handling unit, as well as from the inspection lot. The goods receipt posting is made with reference to the inbound delivery. Finally, you make the usage decision. Depending on the results of the inspection, the quality inspection stocks are transfer posted into the unrestricted-use stock.

Serial Number Management

A serial number, which can also be assigned to the material number, uniquely identifies one piece of a material in connection with the material number. Serial Number Management is available in various subfunctions within *SAP ECC*. This means that serial numbers are used in production and maintenance processing, as well as in Inventory Management, Quality Management, and Sales.

To work with serial numbers, you must first create a serial number profile in Customizing. This profile controls serial number assignment in the company's various business transactions. You then enter the profile key into the master records for all materials whose serial numbers should be assigned using this profile (Views: *Sales: Gen./Plant Data*, *Work Scheduling*, or *General Plant Data/Storage 2*). You can create serial number master records based on materials. The system uses this to generate a pool of serial numbers, which you can access during a business transaction.

- **Note:** If you have created serial number master data records, you can assign these to the materials to pack. During automatic creation, the system generates new serial number master data records in the background.

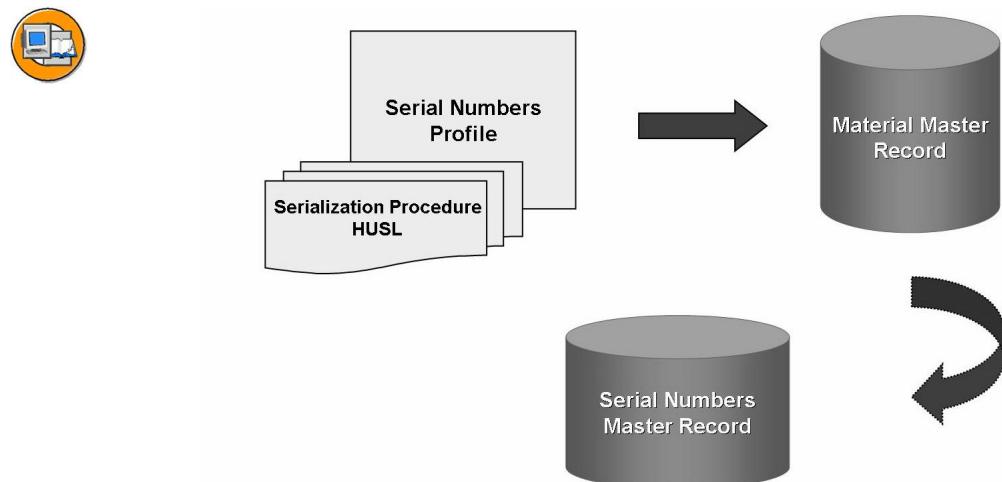


Figure 52: Serial Number Management with Handling Units: Basics

If you want to use serial numbers from handling units, then the serial number profile must contain a serialization procedure with the key **HUSL** (*Maintain handling unit*). Serialization procedures control the assignment or use of serial numbers in various documents and postings, such as in production orders or deliveries.

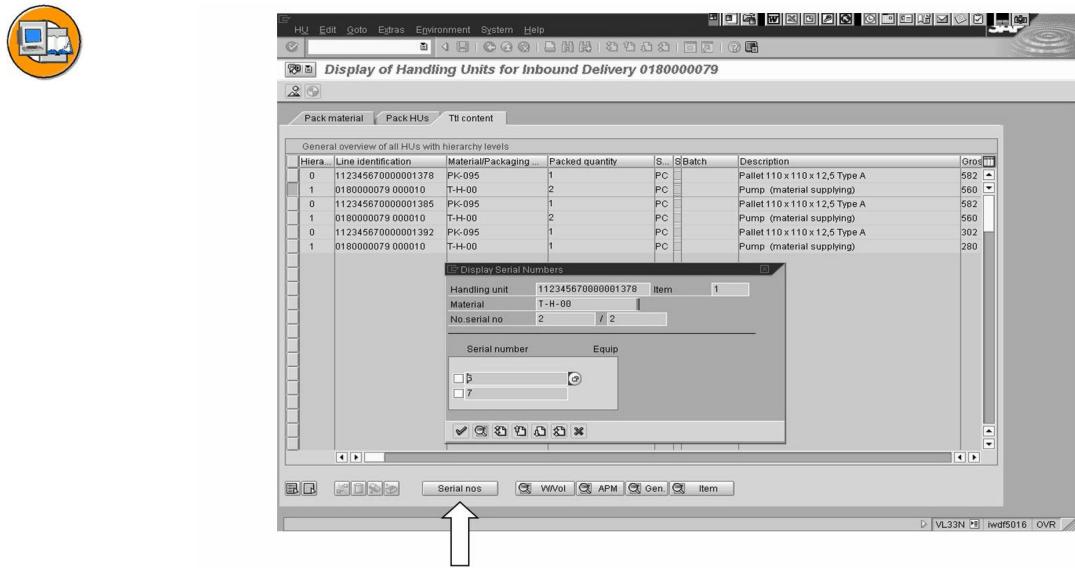


Figure 53: Serial Number Management with Handling Units: Details

You can display the serial numbers of materials packed in handling units by choosing *Serial nos* on the *Ttl content* tab page. If the material has been packed or repacked several times, then you can only use its serial number using the handling unit in which the material currently resides.

When picking partial quantities or serialized materials from handling units, you must enter the serial numbers of the individual pieces to be picked. When posting the goods issue, the serial numbers for the delivered materials are copied into the outbound delivery. You can then display the serial numbers in the document by choosing *Extras* from the menu. If you use Handling Unit Management, you can also perform a delivery split by serial numbers.

Batch Management

Batch Management can be used for product-related quality assurance. The batch number differs from the serial number in that it identifies a certain quantity of a material. Batches are the result of a production process, usually in the chemicals/pharmaceuticals or food industries, but are also used in other industries and in retail. Batch Management is concerned with the fact that the attributes of characteristics and the proportion of ingredients in many products constantly change between certain fixed values within the manufacturing process. As a result, they cannot be reproduced – with the subsequent effects on the quality of the product in question.

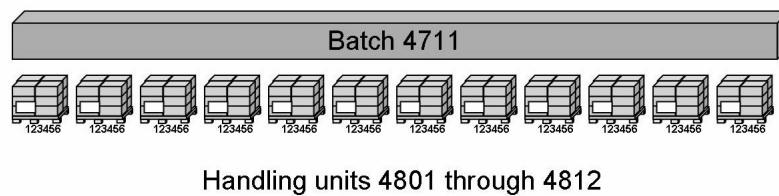


Figure 54: Batch Management with Handling Units

You can access the batch of the packed material using the handling unit. You can distribute materials for a batch across several handling units. A handling unit can contain several batches of a material. Handling units do not require any characteristics.



Lesson Summary

You should now be able to:

- Explain the integration of Handling Unit Management into Serial Number Management, Quality Management and Batch Management



Unit Summary

You should now be able to:

- Explain the integration of Handling Unit Management into Serial Number Management, Quality Management and Batch Management



Test Your Knowledge

1. You can display the serial numbers for the delivered materials copied into the outbound delivery by choosing _____ from the menu.

Fill in the blanks to complete the sentence.

2. The system generates inspection lots for each handling unit when an inbound delivery for a purchase order is created.

Determine whether this statement is true or false.

- True
- False

3. Handling units do not require any characteristics.

Determine whether this statement is true or false.

- True
- False



Answers

1. You can display the serial numbers for the delivered materials copied into the outbound delivery by choosing Extras from the menu.

Answer: Extras

2. The system generates inspection lots for each handling unit when an inbound delivery for a purchase order is created.

Answer: False

The system generates inspection lots for each delivery item when an inbound delivery for a purchase order is created. The inspection lots are then assigned to the handling units that were created for the delivery item.

3. Handling units do not require any characteristics.

Answer: True

No characteristics are required by the handling units.



Course Summary

You should now be able to:

- Describe the range of functions available in Handling Unit Management
- Make basic Customizing settings to use Handling Unit Management
- Illustrate subprocesses involving handling units in procurement, sales and Logistics Execution

Index

A

Application Link Enabling (ALE), 58

B

Batch, 109

C

Crate parts, 72

E

Electronic Data Interchange (EDI), 58

H

Handling unit, 2

Handling Unit Monitor, 6

I

Inbound delivery, 57

Inspection lot, 106

Intermediate Document (IDoc), 58

L

Lean Warehouse

Management, 86

M

Material groups for packaging materials, 27

Mobile Data Entry, 15

O

Object key, 8

Outbound delivery, 61, 86

P

Packaging material type, 27

Packing dialog, 28

Packing instruction, 40

Packing proposal, 29

Packing station, 33

Pick parts, 72

Pick-handling unit, 87

Picking location, 86

R

Reference material, 45

release order parts, 72

S

SAP Business Workflow, 61

Serial number, 108

Serial Shipping Container Code (SSCC), 3

Shipping notification, 57

Shipping unit, 4

Stock transport order, 60

Storage unit (SU), 61

Storage Unit Management, 62

T

Transfer order, 58

Transfer requirement, 72

Feedback

SAP AG has made every effort in the preparation of this course to ensure the accuracy and completeness of the materials. If you have any corrections or suggestions for improvement, please record them in the appropriate place in the course evaluation.