Warehouse structure is the foundation for depicting the physical layout of the warehouse in SAP EWM. A warehouse complex will likely have many physical subdivisions. These must be mapped and accurately presented in the system to map the movements and processes, relating to these subdivisions of the warehouse. This layout, created in the system, forms the basis for modeling the warehouse operations in the system.

3 Warehouse Structure

Warehouse structure varies based on the industry. Also, within the same industry, each warehouse has its own unique structural requirements. Therefore, you'll come across processes that vary based on layout details of the warehouse and not only due to specific industry and business requirements. As businesses have evolved, the logistics processes have evolved as well and led to the evolution of complex warehouses. This in turn has resulted in the evolution of warehousing solutions such as SAP EWM (see Figure 3.1).

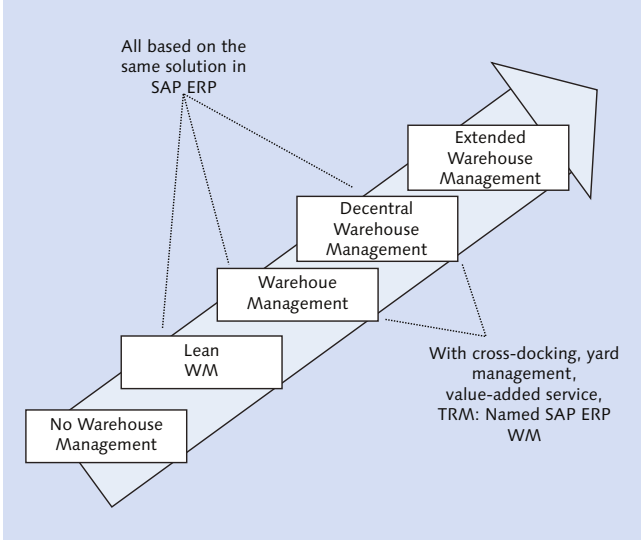


Figure 3.1 Evolution of SAP's Warehousing Solutions

The definition of warehouse structure elements helps in designing a warehouse with effective handling of materials, the best usage of warehouse handling equipment, and optimal space utilization. An organization, prior to implementing SAP EWM may try to reorganize the physical layout. Although substantial reorganization of a physical layout might not be possible and even might not be required, still it can improve operations due to better mapping in the warehouse management system (WMS). Businesses may seek the help of industrial engineers or warehouse design experts to arrive at the design and layout of the warehouse. It offers a huge cost saving potential in the medium to long run.

Warehouse structure must aim at high operational productivity and efficient space utilization. Diverse needs of the customer, in terms of warehouse structure, demand a detailed and flexible mapping from a WMS.

In the SAP solution blueprinting workshop with a customer, an SAP EWM consultant must discuss and analyze the feasibility of more accurate and effective mapping structures in the SAP EWM system.

In the following sections of this chapter, we'll discuss how to model and map the physical layout of a warehouse into SAP EWM by using layout structure definitions such as warehouse numbers, storage types, storage sections, storage bins, staging areas, doors, and so on. Figure 3.2 shows the warehouse structure elements and their hierarchy.

You'll find the definitions of warehouse structure elements in the SAP EWM Implementation Guide (IMG). Use the menu path, EWM IMG • Extended Warehouse Management • Master Data.

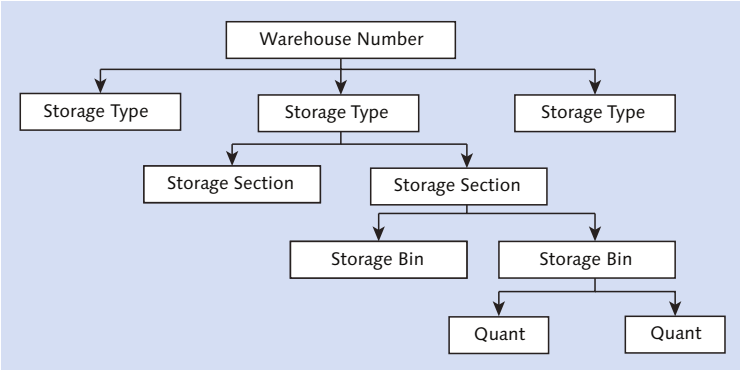


Figure 3.2 Warehouse Structure

Caution

We set up a dedicated SAP EWM system for this book and have used multiple screenshots throughout the book and especially this chapter. Because this chapter is very specifically about setting up a warehouse structure, you may need to refer to a specific screenshot to understand what a field does.

3.1 SAP EWM and SAP ERP Linkage

As discussed briefly in the previous chapter, the usage of SAP EWM is determined by the settings in the warehouse number in SAP ERP. The setup of this warehouse number shows the SAP ERP system what solution is being used—SAP ERP Warehouse Management (WM) in the central system, WM in a decentralized system, or SAP EWM.

As shown in Figure 3.3, SAP EWM requires an assignment of SAP ERP warehouse numbers to SAP EWM warehouse numbers because the names in SAP EWM can be longer and don't have to correspond to the names in SAP ERP.

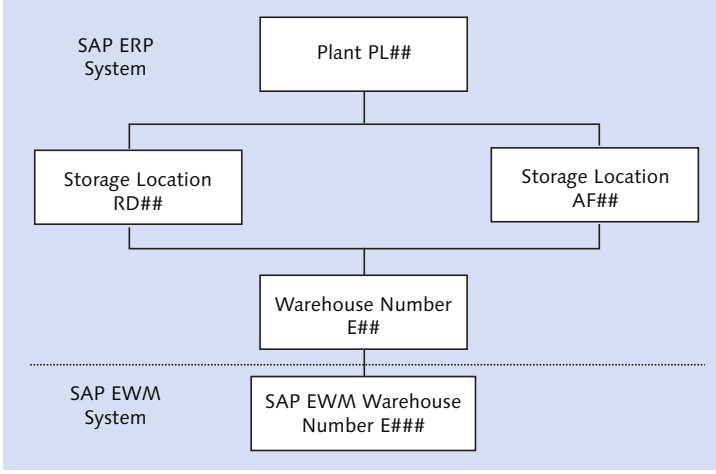


Figure 3.3 SAP ERP and SAP EWM Linkage via the Warehouse Number

The communication between SAP ERP and SAP EWM happens in two different ways. Figure 3.4 illustrates this in detail.

- For master data, the core interface (CIF) is used. CIF is the technology generally used for communication between SAP ERP and SAP Supply Chain Management (SAP SCM). For SAP EWM, the master data is only transferred from SAP ERP to SAP EWM; there is no communication back via CIF.
- For communicating delivery information between the systems, a separate distribution model, which uses queued remote function calls (qRFCs), is set up. This distribution model already exists in SAP EWM. You have to create it in Customizing in SAP ERP for every warehouse number you activate as administrated by SAP EWM.

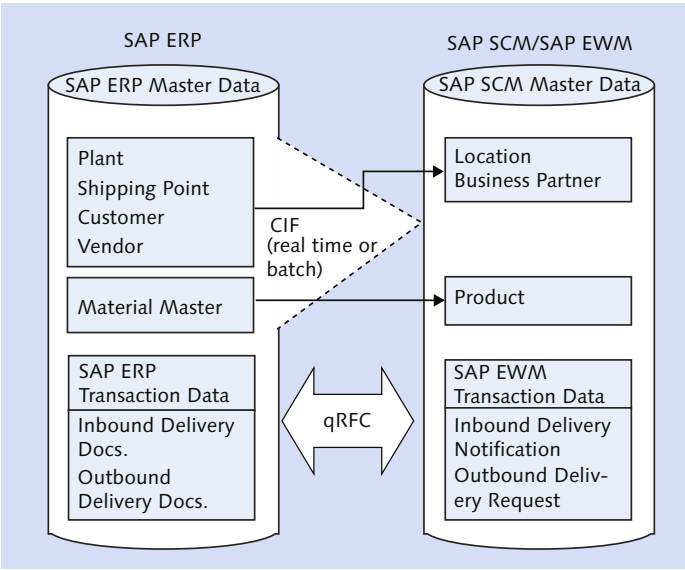


Figure 3.4 Communication between SAP ERP and SAP EWM

3.2 Storage Type

Storage type is the uppermost element and the very first in the hierarchy of the warehouse structure after the warehouse number. The storage type is the first subdivision within the warehouse. This subdivision is aimed at grouping the bins with a specific set of characteristics. These characteristics can represent various

categories, for example, nature of storage, type of storage, handling equipment usage, and so on.

A warehouse consists of thousands of bins. There might be bins at the door, bins in the goods issue area, bins in various storage areas such as high rack storage, bins in various work centers, and so on. These storage types group the bins of the same category and use. Following are some of the commonly used storage type examples:

- General Storage Area
- Rack Storage
- Bulk Storage
- Fixed Bin Storage
- Hazardous Substance Storage
- Production Supply
- Open Storage
  - Picking Area
  - Shelf Storage
  - Pallet Storage

All the storage types are tied under one warehouse number. These storage types help sort products based on similar characteristics for effective movement of pick and placement in the warehouse. In addition to these storage types, there are interim storage types, such as staging areas where the goods are stored temporarily before the final picking or putaway takes place.

In the following section, we'll discuss the parameters to be maintained within the storage type definition to control the behavior of storage types. These parameters are grouped under General, Putaway Control, Stock Removal Control, and Goods Movement Control areas of the screen.

3.2.1 General

This section of the screen provides generic parameters that control the storage type (Figure 3.5).

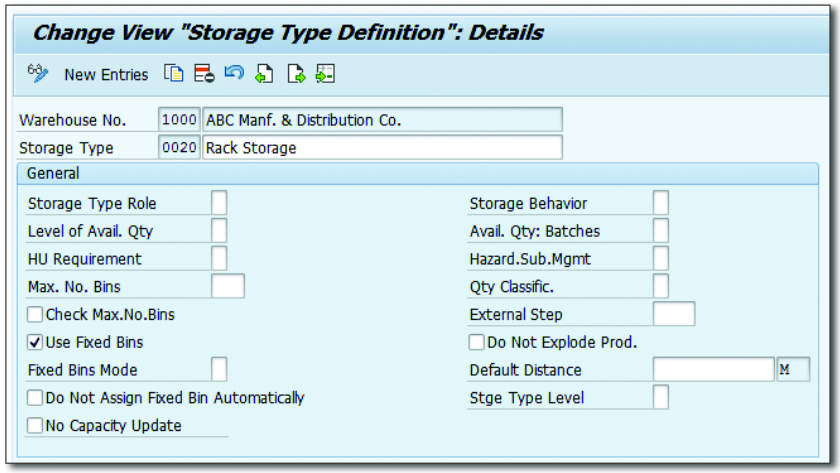


Figure 3.5 General Section in the Storage Type Definition

Storage Type Role

Storage Type Role suggests the behavior of the storage type. A storage type may act as a storage area, work center, door, identification point, and so on. A blank value in this field represents a standard storage type that is used for final storage in the warehouse. When a door is defined as a storage type, it must have door (F) as a Storage Type Role. All the interim storage types for a staging area are defined with role D. Table 3.1 lists the various roles available in SAP EWM.

Role Value	Description
(blank)	Standard Storage Type
A	Identification Point
B	Pick Point
C	Identification and Pick Point
D	Staging Area Group
E	Work Center
F	Doors
G	Yard
H	Automatic Storage Retrieval (Material Flow Control)

Table 3.1 Storage Type Roles List

Role Value	Description
I	Work Center in Staging Areas Group
J	Automatic Warehouse (Controlled by Material Flow System [MFS])
K	Production Supply

Table 3.1 Storage Type Roles List (Cont.)

Level of Available Quantity

Stock removal strategies use the LEVEL OF AVAIL. QTY field, which has two available options:

- Storage bin level
- Highest level handling unit (HU)

When the storage bin level option is chosen, the warehouse task (WT) for the stock removal is created without a source HU, and the warehouse operator can scan any HU that is available from the bin. When the highest level HU option is chosen, the WT is created with source HU in it. These WTs require the operators to scan the appropriate HU, even though it might not be feasible for them to locate the HU against every WT.

HU Requirement

This setting governs whether HU is mandatory or not for this storage type. Following are the options:

- **HU allowed but not a requirement**
  HUs aren't mandatory. Stock placement is allowed, with or without HUs, in the bins of this storage type.
- **HU requirement**
  HUs are mandatory, and stock must be kept in HUs only.
- **HU not allowed**
  Stock can't be stored in HUs. If you create an HU WT in a storage type where HUs aren't allowed, only the stock in the HU is moved. The empty HU remains in the source bin after WT confirmation.

Note

There are two types of WTs in SAP EWM: product WTs and handling unit WTs. We'll cover this in detail in later chapters.

Maximum Number of Bins

This parameter is used while creating the WT in the destination storage type when you select the Check Max.No.Bins checkbox and check Use Fixed Bins. This setting controls the maximum number of bins that are allowed per storage type for a product. The same setting can also be specified in the product-specific basis in the product master. This value in the product master precedes the priority value entered in the storage type level. With this control, more products can be stored in a well-adjusted way within the same area if this is required for subdivision in a warehouse.

Use Fixed Bins

If this indicator is flagged, the products are stored only in those bins (called fixed bins) associated with the product as fixed for storage. When you use fixed bins in a storage type, each product can be assigned with one or more such fixed bins. If fixed bins are full, then the system dynamically assigns another bin as fixed. Even if the stocks are emptied out, the fixed bins association with the product remains intact. The restriction here is that you can't use both fixed storage bins and dynamic storage bins in one storage type. Following are the dependent settings for fixed bin assignment:

- Maximum Number of Storage Bins
- Check Maximum Number of Bins
- Putaway Mode Fixed Storage Bins
- Do Not Assign Fixed Bins Automatically

Fixed Bins Mode

Two options are available with the Fixed Bins Mode setting. Either you can do a placement to a single optimum fixed storage bin or to multiple optimum fixed storage bins. This parameter is only applicable when you use slotting. With slotting, to determine the optimal bins, this indicator decides whether to place the

product in optimal bins or non-optimal bins (we'll cover more about slotting and rearrangement in Chapter 12). The results of slotting functions are stored in the fixed bin assignment in the Storage Bin Improvable column, as shown in Figure 3.6.

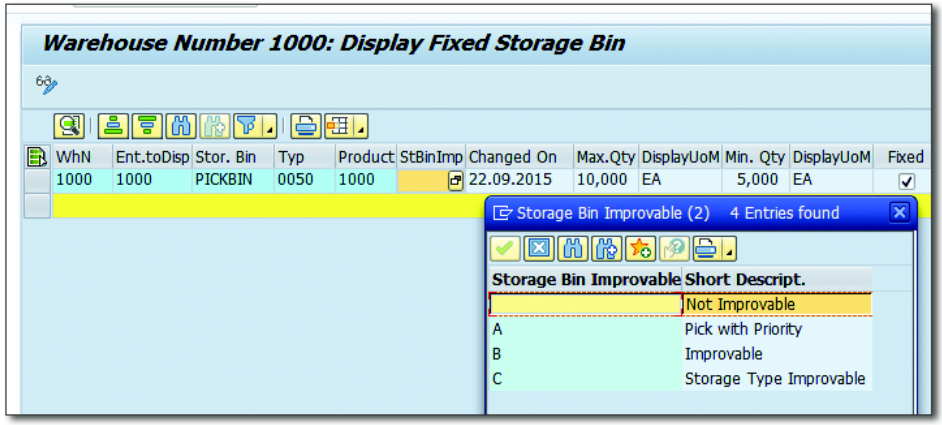


Figure 3.6 Storage Bin Improvable Field for Maintaining Fixed Storage Bins

If the Putaway to Optimum Fixed Storage Bins Only option is chosen, then stocks will be placed, only if the field on Storage Bin Improvable has the value Not Improvable. If the Putaway to Optimum Fixed Storage Bins Preferred option is chosen, fixed bins will be sorted against the Storage Bin Improvable field as one among the following:

- Not Improvable (blank)
- Pick with Priority (A)
- Improvable (B)
- Storage Type Improvable (C)

Do Not Assign Fixed Bin Automatically

With this option, you can control if fixed bin assignment to the product has to be discarded during the putaway or not. If the product doesn't have a fixed bin assignment, and all the fixed bins aren't full, the system will create a fixed bin assignment automatically during the putaway bin determination. If you don't want this to happen on the fly, choose this indicator.

No Capacity Update

The capacity and empty bin status are updated during WT creation and confirmation. When this update takes place for a bin for which more than one WT is scheduled, the database is locked while one WT is being performed. So there will be a wait time for other WTs to perform activity on this bin. By flagging this checkbox, you can prevent this capacity update, for example, when the putaway rule is EMPTY BIN for the storage type. By preventing this check, you help the system reduce the processing time.

Don't use this option if a capacity check is required for the bins of this storage type.

Storage Behavior

This has an influence on the general structure of the storage type. Let's take a look at the three available options to choose from:

- **Standard warehouse**
  This represents the general area for storage, and there are no special attributes for the bins in this storage type. Generally, in final storage and production supply area storage types, the standard warehouse behavior is used.
- **Pallet warehouse**
  High-rack storage areas use the pallet warehouse option. Normally, a high-rack storage shelf can accommodate different HU types. Shelf sections are mapped as the main section. When you perform the first putaway, the system creates the sub-bins for each pallet, for example:
  - Name of the main bin: 0010-01-01
  - Defined suffixes in section: 1 2 3
  - Name of sub-bins:
    - 0010-01-01/1
    - 0010-01-01/2
    - 0010-01-01/3
- **Bulk storage**
  This behavior is used most widely. When pallets are handled in high volumes and placed in one area (a bin), then this is the appropriate option to use. These bulk areas are structured in row, stack, and height. Bulk storage provides higher storage volume and is easily accessible by warehouse workers. You've

likely seen a warehouse where the bulk storage bins are marked on the floor representing the row, depth, and height stacked per the definition in bulk structure. They are sometimes stacked one on top of another, forming a pyramid-like structure.

Available Quantity: Batches

There are two options available to control the batches: batch-specifically or batch-neutrally. If you want to handle the stocks irrespective of the batch, enter "1". With this option, operators have the flexibility to choose any batch available in the bin when they scan the HU. But if you want the quantity to be batch specific, then leave the field blank. In this event, the stocks available in the bins are batch managed, and WTs, once created, will be batch specific.

Hazardous Substance Management

You can use this indicator to control the hazardous substance check. During the putaway of product, you can control whether you need to perform the check at the storage type level, perform the check at the storage type and storage section level, or perform no check at all.

Quantity Classification

Products are generally stored in different packaging units in the warehouse. Packaging units can be pallets, boxes, cartons, cases, bags, and so on. When one product has multiple possible packaging units based on the quantity, the Qty Classific. setting helps determine which packaging unit is to be used for storage.

The quantity classification is used in conjunction with the packaging specifications (Figure 3.7). The packaging specification holds the quantity classification details maintained at each level; this forms the basis for derivation of quantity classification for the requested quantity.

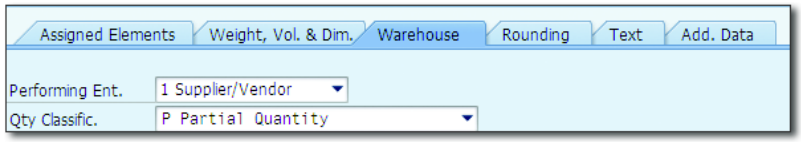
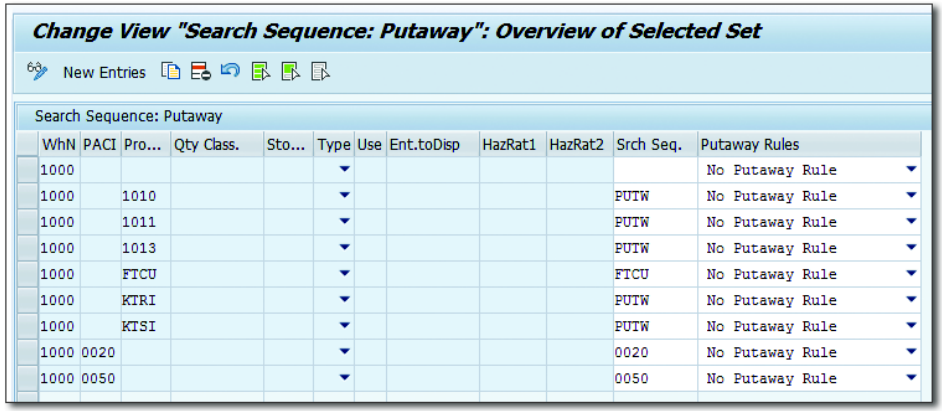


Figure 3.7 Quantity Classification in the Packaging Specifications

Quantity classification is also a criteria for determination of storage type search sequence (Figure 3.8). The storage type search sequence for both putaway and stock removal has quantity classification in it.



Change View "Search Sequence: Putaway": Overview of Selected Set

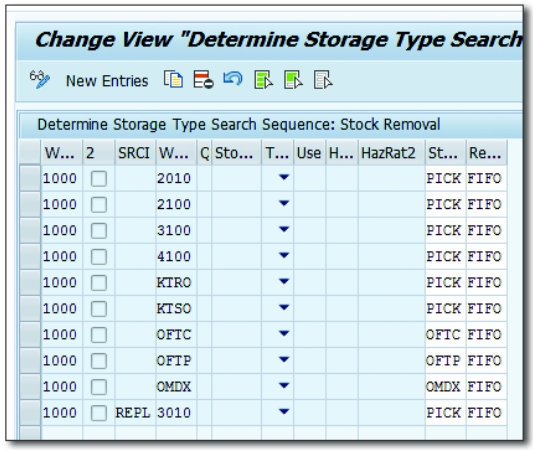
New Entries

Search Sequence: Putaway

WhN	PACI	Pro...	Qty Class.	Sto...	Type	Use	Ent.toDisp	HazRat1	HazRat2	Srch Seq.	Putaway Rules
1000											No Putaway Rule
1000		1010								PUTW	No Putaway Rule
1000		1011								PUTW	No Putaway Rule
1000		1013								PUTW	No Putaway Rule
1000		FTCU								FTCU	No Putaway Rule
1000		KTRI								PUTW	No Putaway Rule
1000		KTSI								PUTW	No Putaway Rule
1000	0020									0020	No Putaway Rule
1000	0050									0050	No Putaway Rule

Figure 3.8 Quantity Classification in Storage Type Search Sequence for Putaway

The operative unit of measure is derived from the same packaging specification level identified. Rounding data at the storage type level rounds the stock removal quantity based on the operative unit of measure (Figure 3.9).



Change View "Determine Storage Type Search

New Entries

Determine Storage Type Search Sequence: Stock Removal

W...	2	SRCI	W...	Q	Sto...	T...	Use	H...	HazRat2	St...	Re...
1000			2010							PICK	FIFO
1000			2100							PICK	FIFO
1000			3100							PICK	FIFO
1000			4100							PICK	FIFO
1000			KTRO							PICK	FIFO
1000			KTSO							PICK	FIFO
1000			OFTC							OFTC	FIFO
1000			OFTP							OFTP	FIFO
1000			OMDX							OMDX	FIFO
1000		REPL	3010							PICK	FIFO

Figure 3.9 Quantity Classification in Storage Type Search Sequence for Stock Removal

External Step

This setting refers to the process steps performed in the warehouse. These process steps are linked to a predefined internal process step, which is useful when you're using the storage control functionality of SAP EWM. Using this functionality, you can define a destination location for a storage process step in relation to the source location.

Do Not Explode Product

This indicator influences the update of HU content on a separate tracking table while WT confirmation happens. You might need the tracking table update for a storage type where you handle the inventory differences so you can track the differences.

You can display all the movements of a product, including all HU WTs, via the monitor by choosing Documents • All Movements for Product • Display All Movements for a Product in the warehouse management monitor. Pay attention to the inclusion/exclusion for the appropriate storage types because these updates are additional system overheads that can impact the performance of WT creation. If you're using SAP BusinessObjects BI for reporting, you might need these details from the tracking table.

Default Distance

Whenever the warehouse operator performs an activity using radio frequency (RF) devices, the distance he travels between the last bin confirmed and the first bin in the warehouse order (WO) is calculated. Sometimes, for a paper-driven warehouse facility, the WT confirmation is done on the desktop user interface (UI). In such a situation, where you don't have the processor information, calculation of travel distance takes place by using the value maintained in the Default Distance field. This default value represents the average distance one has to cover to reach the bin of this storage type.

Storage Type Level

The graphical warehouse layout (GWL) uses this parameter (Figure 3.10). The storage type level depicts the multiple storage levels in the warehouse based on the level maintained. If the level is the same across certain storage types, GWL

presents these storage types on the same level. If no levels are maintained, the system considers all storage types at the same level.

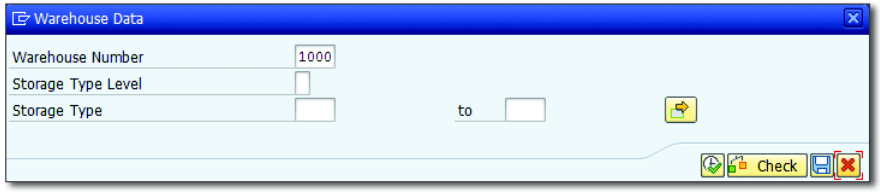


Figure 3.10 Storage Type Level in the Default Graphical Warehouse Layout

We'll discuss GWL in detail in Chapter 13.

3.2.2 Putaway Control

This section of the storage type definition controls the way in which the stock placement happens for a product into the bin (Figure 3.11). The putaway can be against inbound delivery or internal movements from one bin to another within or across the storage type. We'll walk through the putaway function parameters and their attributes.

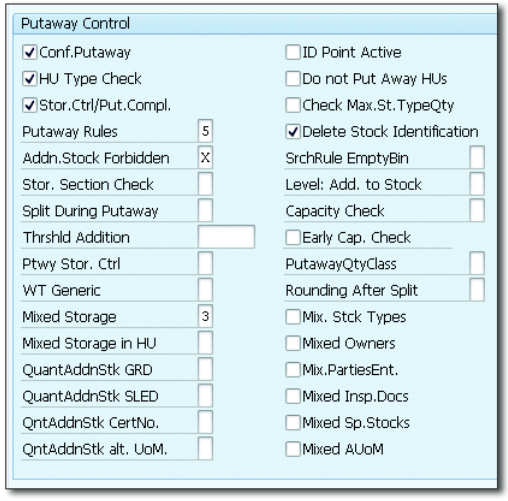


Figure 3.11 Putaway Control Parameters in the Storage Type Definition

Confirm Putaway

When the putaway is done into this storage type, the WTs have options of either automatic confirmation by system or manual confirmation by the user. If the Conf.Putaway flag is set in the storage type, the WTs are supposed to be confirmed automatically for the stock movement. Only when the WTs are confirmed does the associated stock become available. If this flag isn't checked, the stock becomes available upon WT creation.

HU Type Check

This parameter checks, whether an HU type is allowed for the destination storage type or not. When a WT is created with an HU assignment and destination as this storage type, the HU type check occurs.

When the HU Type Check flag is checked, the storage bin type becomes mandatory while creating the storage bin for this storage type.

The allowed HU type for the storage type is maintained in the IMG; navigate via Transaction SPRO to the SAP EWM IMG. Use the menu path, Extended Warehouse Management • Cross-Process Settings • Handling Units • Basics • Define HU Types for Each Storage Type.

Storage Control/Putaway Completed

This indicator controls the final putaway process against the Process-Oriented Storage Control (POSC). This indicator is checked for the bins with storage types representing the physical warehouse. The interim bins don't use this indicator.

Putaway Rules

The Putaway Rules setting determines the logic in which destination bins are determined during the putaway process. The options for this setting are the following:

- **Addition to existing stock/empty bin**
  During the bin determination, the system will try to find a bin in which stock exists, and capacity isn't exhausted. If it doesn't find any such bin, the system will go for an empty bin for stock placement.

- **Consolidation group**
  When a storage type is used as a work center for packaging, there might be a need to store the HUs of the same consolidation group in one bin. This option ensures assignation of the consolidation group to the bin after the first HU is moved to that bin.
- **General storage area**
  The general storage area consists of one large bin that can accommodate products for interim storage. From general storage, products later move to their final destination bin. For example, general storage can be a clearance area. Once deconsolidated, products are moved to the final bins or toward the dispatch area for loading onto the transportation unit. It can also be a clearance area where the damaged products or products approaching shelf life are stored for speedy clearance or sale. The general storage area bin allows addition to existing stock and to mixed storage of all types.
- **Empty bin**
  Every time stock placement happens, only the empty bins are considered, and bins with existing stocks are ignored.

Addition to Existing Stock Forbidden

This parameter allows or prohibits addition to the existing stock to the bin. There are three possible options:

- **Addition to existing stock permitted**
  System allows additions if the product and attributes are the same as compared to that of the existing quant in the bin.
- **Addition to existing stock generally not permitted**
  System prohibits addition to the existing quant in the bin.
- **Product putaway profile decides**
  The product putaway profile controls the addition to the existing stock (Figure 3.12).

To define the product putaway profile, go to the SAP EWM IMG, and follow the menu path, Extended Warehouse Management • Goods Receipt Process • Strategies • Define Product Putaway Profile.

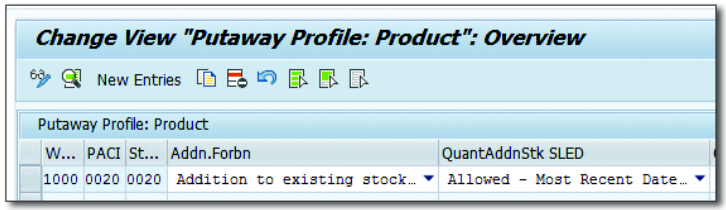


Figure 3.12 Product Putaway Profile

Storage Section Check

This indicator allows you to enable the storage section search and check functionality during the automatic bin determination for putaway in accordance with the strategies defined for the section search. The possible options are listed here:

- No storage section determination or check
- Storage section determination and check
- Storage section determination; no check

Split during Putaway

The SPLIT DURING PUTAWAY setting allows the products to be either allowed for placement without split or to be split if the quantity exceeds the bin capacity at the first bin. It also allows the decision to be made based on the split indicator in the product master (Figure 3.13), which is maintained in the storage type data view of product master. The following options are available:

- Do not split during putaway
- Split during putaway
- Product master decides

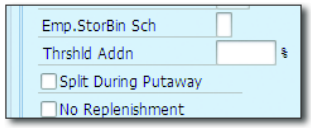


Figure 3.13 Split Indicator in the Storage Type View of the Product Master

Threshold Addition

This setting works in conjunction with the Split During Putaway indicator. When the Split During Putaway indicator is set, the available bin capacity is checked with the threshold value, and only if the available capacity is greater than the threshold value does the split occur.

Putaway Storage Control

This parameter controls the characteristic of the created WT. The WT can either be an HU WT or a product WT. The following options are available:

- Storage control: Putaway with HU WT
- Storage control: Putaway with product WT
- Storage control: Dynamically evaluated

If you enter the option as dynamically evaluated, POSC settings determine this characteristic per the assignment in the storage process step under the storage process definition, as shown in Figure 3.14.

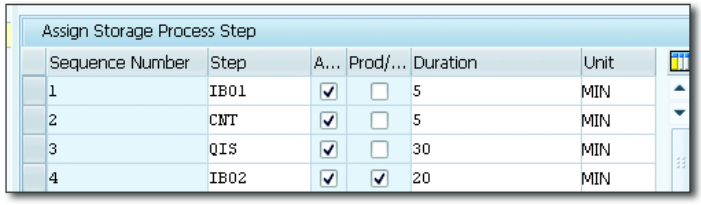


Figure 3.14 Dynamically Controlled Production/Handling Unit Warehouse Task in the Storage Process Step

WT Generic

The WT Generic field controls the determination of destination storage data. With this parameter, you can control which part of the destination data needs to be determined at the time of WT creation. When putaway is done in the packing station, you shouldn't determine the destination storage bin because at the point of WT creation, it isn't known. Instead, the destination storage bin only needs to be identified during the WT confirmation. The options for this field are the following:

- Not generic (storage type, storage section, and storage bin)
- Storage type and storage section
- Only storage type

Mixed Storage

The Mixed Storage field allows placing different quants of various products in one single storage bin. The following options are available:

- **Mixed storage without limitations**
  More than one product is allowed to be stored in a bin without any limitation on product and batch. Any product and any batch can be stored in a single bin.
- **Several non-mixed HUs with the same product/batch**
  Different HUs can be placed but with the same product and same batch in the bin.
- **Several HUs with different batches of the same product**
  HUs belonging to the same product can be placed from different batches in a single bin.
- **One HU allowed per bin**
  Only a single HU, containing multiple products, is allowed in one bin. This depends on the Mixed storage in HU indicator, as described in the next subsection.

Mixed Storage in HU

This parameter controls mixing different products and batches within an HU in a storage bin of this storage type. The potential options are the following:

- **Mixed storage not allowed**
  If this indicator is set, mixing of product isn't allowed in an HU.
- **Several batches of the same product per HU**
  If this is set, only one product is allowed in an HU, but several batches can be accommodated in it.
- **Mixed storage without limitations in HU**
  With this option, more than one product and multiple batches within the product are allowed in a single HU.

Quant Addition to Stock Goods Receipt Date

When different stocks are allowed to be placed in a storage bin or HU, there can be only one stock goods receipt date because a quant can accommodate only one date. This indicator influences the control of goods receipt date update in the quant when there is an addition of stock with a different goods receipt date. The following are the possible options to influence the goods receipt date:

- **Allowed—most recent date dominant**
  The latest goods receipt date is taken for consideration in quant update over that of old stock.
- **Allowed—earliest date dominant**
  The oldest date of goods receipt is updated in the quant.
- **Not allowed**
  Doesn't allow adding if the goods receipt date is different from that in the quant.
- **Product putaway profile decides**
  The product putaway profile determines one out of the preceding three possibilities.

Quant Addition to Stock Shelf Life Expiration Date (SLED)

This indicator also works in a similar way as the QuantAddnStk GRD. When stocks are added to the existing stock, the SLED date of the quant is also updated. You can control this by using the following options:

- Allowed—most recent date dominant
- Allowed—earliest date dominant
- Not allowed
- Product putaway profile decides

Quant Addition to Stock Certificate Number in Storage Bin/Handling Unit

This indicator is used to control the way in which the certificate numbers are stored during quant addition to stock. Following are the three options:

- Allowed—delete
- Not allowed
- Product putaway profile decides

Quant Addition to Stock Alternative UoM

This parameter controls the way in which the alternative unit of measure (UoM) is handled in the quant. The potential options are as follows:

- **Allowed—first alternative UoM dominant**
  Retain the first alternative UoM in the quant. For all subsequent movements, it's maintained in the base UoM (BUoM) and converted to the first alternative UoM (AUoM).
- **Allowed—manage stock in BUoM only**
  The AUoM is ignored, and all stocks are maintained in BUoM.
- **Not allowed**
  The UoM is not allowed.
- **Partly allowed—manage stock in AUoM**
  Only one AUoM is allowed; you can't add stock with different AUoMs into the existing stock.
- **Product putaway profile decides**
  Product putaway profile setting decides from the preceding alternatives.

ID Point Active

This indicator controls the storage of product in the intermediate location, before it's finally put away. An ID point is used in association with Layout-Oriented Storage Control (LOSC). In certain situations, for example, if the product has to be placed in a high rack storage area, before moving it to the final destination, you might move it to an interim place. This movement is controlled via the ID Point Active setting.

Note

We'll discuss LOSC in detail in Chapter 5.

Do Not Putaway HUs

If you flag this indicator, the putaway of HUs isn't allowed in this storage type. When a product is removed and placed in a pick HU on a resource, the stock removal WT gets confirmed, and the system automatically creates a WT for moving the product from a resource to the destination bin. Therefore, if you don't flag this indicator, an HU WT is created for the final putaway. Otherwise, a product WT is created for the final putaway.

Check Maximum Stock Type Quantity

This parameter influences the putaway of the product when it exceeds the maximum quantity specified in the storage type view of the product master. If this indicator is set, the system doesn't allow the maximum quantity to be exceeded in the storage type.

Delete Stock Identification

This is a unique number used for identifying the stock with its stock attributes. This indicator influences the retention of stock identification in the storage type and works in combination with the STOR.CTRL/PUT. COMPL indicator. When you do a final putaway of a product and don't want stock identification, then you can flag this indicator for deletion of stock ID. We'll cover stock identification in detail in Chapter 5, Section 5.6.

Search Rule Empty Bin

When the PUTAWAY RULES setting is 2 (addition to existing stock/empty bin) or 5 (empty bin), the sorting of bins is based on the following options:

- **Sorting according to definition**
  The standard sort definition is used to identify the empty bin. Whenever you implement, roll out, or add/delete the bin, sorting has to be performed to reinitiate the sort sequence per the new definition. To sort, use Transaction /SCWM/SBST (Sort Storage Bins) or navigate via the path, SAP EASY ACCESS screen UNDER EXTENDED WAREHOUSE MANAGEMENT • MASTER DATA • STORAGE BIN • SORT STORAGE BINS.

- **Near to fixed bin**
  When you use this option, the system searches for the fixed bin. If it doesn't find the fixed bin empty, it searches for the nearest fixed bin using reserve storage types. The assignment of reserve storage types can be done in Customizing by navigating the path, Extended Warehouse Management Under Goods Receipt Process • Strategies • Putaway Rules • Sorting Near To Picking Bin • Storage Type Control: Near to Picking Fixed Bin or Define Search Scope for Each Level.
- **Product decides**
  You have an option to decide on the preceding parameters based on settings in the product master. For this, you need to maintain the Emp.StorBin Sch (empty storage bin search) field on the Storage Type Data view of the product master.

Level of Addition to Stock

This indicator controls the level at which the stock is added to the existing stock during the stock placement. The following options are available:

- **Addition to stock at bin level**
  Stocks are added to the bin level. You need not enter the destination HU while confirming the WT.
- **Addition to stock at highest HU level**
  When you add the stocks to the highest level of HU, you need to enter the destination HU. When the WT is created, the system proposes the destination HU.

Capacity Check

This parameter helps control the bin capacity. When you're using dimensionless capacity, you need to specify the capacity data in a storage bin or storage bin type. Capacity check is performed against the dimensionless capacity data maintained in the Unit of Measure tab against the product master, packaging material, or both.

These are the possible options:

- No check according to key figure
- Check acc. to key figure product
- Check acc. to key figure packaging material

- Check acc. to key figures product and packaging material
- No check against key figure, weight, and volume

Early Capacity Check for Bin Types

This check enables you to activate the early capacity check (while creating a putaway task for the storage type) for the storage bin type. If you activate this check, and the capacity of storage bin type is exceeded, such storage bin types are excluded from the search. This helps improve the performance by avoiding the capacity check for all the bins individually.

Putaway Quantity Classification

This setting controls the packaging unit in which a product is stored in the warehouse.

Rounding after Split

If the split rule is used during putaway task creation, this parameter controls the rounding off of the quantity after the split. The possible options are the following:

- No rounding
- Round down WT quantity to a multiple of a unit

These factors round off the quantity based on the quantity classification defined in the putaway control (previous section) of the storage type.

Mixed Stock Types for the Same Product

This indicator controls whether different stock types of the same product are allowed to be stored in a storage bin or HU. If this field isn't checked, the system allows you to mix the different stock types; otherwise, the system doesn't allow mixing of different stock types.

Mixed Owners for the Same Product

This indicator controls whether products from more than one owner are allowed in the same bin or HU. Owner in SAP EWM is a business partner, that is, a

representative of the organization that owns the stock. You'll need to select this if you need to store the products from different owners in the same bin or HU in this storage type.

Mixed Parties Entitled to Dispose the Same Product

The party entitled to dispose is generally a plant or organization that has authorization for disposing of the stock. This indicator controls whether a bin or an HU in this storage type is allowed to contain products from more than one party entitled to dispose.

Mixed Inspection Documents for the Same Product

When a product is received for quality inspection (QI), the same is stored as QI stock in the bin or HU. The quant representing the stock has a quality inspection document associated with it. This indicator controls whether multiple inspection documents are allowed for the same product in a bin or HU when you receive a QI stock. If you don't check the indicator, it allows multiple inspection documents for the same product in a bin or HU.

Mixed Special Stocks for the Same Product

This indicator controls whether more than one special stock can exist in a storage bin or HU. If the field is blank, different special stocks are allowed to be maintained in a bin or HU; if selected, only one special stock can be maintained.

Mixed AUoM for the Same Product (Stock Level Dependent)

This indicator controls whether different AUoM in a bin or HU are allowed. If this field is blank, different AUoM are allowed; if selected, the product or batch can exist in one AUoM only.

3.2.3 Stock Removal Control

The stock removal control parameters of a storage type influence the stock removal processes (Figure 3.15). Whenever stock is removed from a bin, these parameter act as influencing factors. Let's go through these parameters one by one.

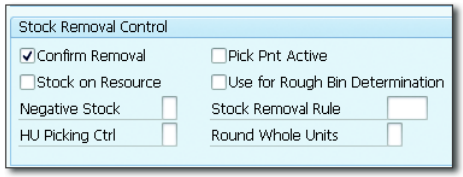


Figure 3.15 Stock Removal Control Parameters

Confirm Removal

If this indicator is flagged, then the WT confirmation is mandatory for stock removal from a bin in a storage type. Only when the WT is confirmed does the stock become available in the bin.

Stock on Resource

Set this indicator if you want the stock on the resource to be available for stock removal. In certain instances, stock is picked from the shelf and loaded on to the warehouse handling equipment, for example, a forklift. Under this circumstance, the stock is available on the resource, and if you want to consider this stock during stock removal, you need to flag this indicator.

Example

If a high rack storage area is connected with an ID point, when the stock moves from resource to ID point as depicted in Figure 3.16, the stock on resource is also considered for stock removal.

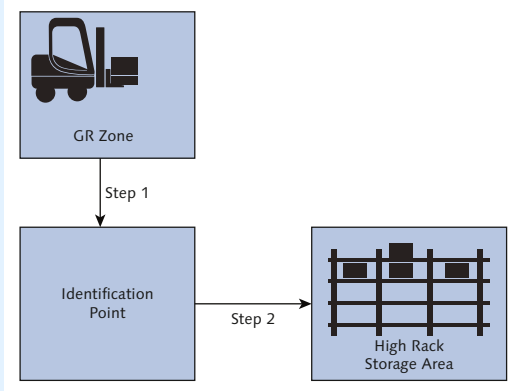


Figure 3.16 Stock on Resource While Moving to the ID Point

Negative Stock

If you allow negative stock at the storage type level, it allows a negative quant to be posted. Available options are the following:

- **Negative stocks not allowed**
  You cannot allow stock to be negative, meaning WT confirmation is not allowed without available stock.
- **Negative available quantity allowed (A)**
  The WTs are allowed to be created even if the stocks aren't available. However, confirmation of WTs isn't allowed. Prior to confirmation of WTs, you need to bring the stock in.
- **Negative stocks allowed**
  You can allow the stock to be negative, meaning WT confirmation is allowed without available stock.

Example

If you have a scenario of loose cases for deliveries in your warehouse, and the replenishment is ordered based on the actual warehouse request, you can choose indicator A (negative available quantity allowed). With this choice, you allow WTs to be created even without available stock and trigger an order-based replenishment for loose case picking. We'll discuss replenishment in detail in Chapter 12.

HU Picking Control

This indicator controls how the system should behave when you remove a homogeneous HU from a bin. The following are the available options:

- Adopt source HU with lower-level HUs into pick HU
  The first pick HU assigned to the WT is copied as the destination HU. While doing the confirmation, the HU copy indicator is set automatically.
- Propose source HU as destination HU
  The source HU is copied as the destination HU. The HU copy indicator is set automatically if you use this option.
- Warehouse process type controls proposal for destination HU
  The settings control for HU pick in the warehouse process type controls the behavior.
- Only adopt contents (prod. and lower-level HUs) into pick HU
  Only the contents of the source HU are adopted as the destination HU.

Pick Point Active

If you activate this indicator, all the withdrawal goods movement will be processed via pick point. Pick point acts as a work center and is used in the LOSC functionality. The withdrawals from the source HU are done using this work center, and the remaining quantities are repacked into a different HU. The leftover quantity is returned back through the return transfer storage type/bin entered in the work center.

Use for Rough Bin Determination

You use this indicator to set the source bin data in the delivery item even if there is no stock available. After you have the source bin information, you can trigger order-related replenishment for picking the product at a later point in time against this delivery item.

Stock Removal Rule

The stock removal rule is defined in the IMG via the menu path, Extended Warehouse Management • Goods Issue Process • Strategies • Specify Stock Removal Rule.

Commonly used rules are Last-In-First-Out (LIFO), First-In-First-Out (FIFO), Best-Before-Date (BBD), and so on. Based on this rule definition, the quants are sorted for stock removal. Firstly, the storage type search sequence is checked for stock removal. If no definition is found, the system checks for the storage type group and storage type for stock removal.

Round Whole Units

Depending on the situation and business necessity, you can round off the quantity in terms of whole units. This may save time and effort of workers at the picking location. When pallets are rounded up or down, you need not break the pallets for partial picking or in terms of case/loose picking. The following options are available:

- No rounding
- Round down WT quantity to single unit
- Round down WT quantity to a multiple of a unit

- Round up WT quantity to a multiple of a unit
- Round WT quantity to available quantity

3.2.4 Goods Movement Control

Now we'll discuss the various control parameters in the Goods Movement Control section of the storage type definition (Figure 3.17). These parameters influence the goods movement in a storage type.

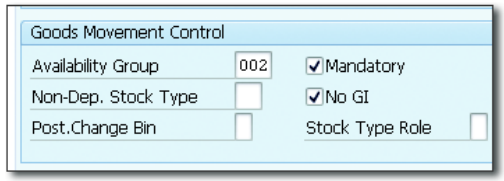


Figure 3.17 Goods Movement Control Indicators

Availability Group

The Availability Group parameter controls the availability of stock according to SAP Advanced Planning and Optimization (SAP APO) availability. The configuration of availability group and mapping of stock type with the SAP ERP storage location is done in the IMG by using the menu paths, Extended Warehouse Management • Goods Receipt Process • Configure Availability Group for Putaway and Extended Warehouse Management • Interfaces • ERP Integration • Goods Movements • Map Storage Locations from ERP System to EWM.

Defining the availability group at the storage type level makes the stock available at the mapped stock type in SAP EWM and storage location in the SAP ERP after the WT is confirmed.

Non-Dependent Stock Type

This parameter defines the quality of stock such as unrestricted, quality inspection, blocked, and so on, irrespective of an availability group of the storage type. The following options are available:

- Blocked stock (BB)
- Unrestricted-use stock (FF)

- Stock in quality inspection (QQ)
- Blocked stock returns (RR)

For example, if you want return stock to be blocked, kept as nonvaluated and not available to promise (ATP) in SAP APO till it's cleared, enter "RR" as the location-independent stock type.

Posting Change Bin

This indicator controls the posting change of product/HU from one stock type to another in a storage bin with or without creating a WT. The following options are available:

- **Posting change always in storage bin**
  Posting change is done within a bin without a WT. The stocks remain in the same storage bin as a result of the posting change.
- **Posting change according to mixed storage setting**
  Posting change is done in dependency with mixed storage settings. If the settings aren't permitted, and the stock is moved to a new storage bin, the system creates a WT for the posting change.
- **Posting change never in storage bin (create transfer order)**
  The WT is always created, and the stock is moved to a new storage bin.

Mandatory

Only stocks for this availability group (mentioned in the storage type settings) are allowed to be placed in the bin. If you have a stock quantity with a different stock type, the system automatically performs a posting change for the quantity in the relevant stock type of the mandatory availability group during WT confirmation.

No Goods Issue

This indicator controls the goods issue (GI) from the storage type. If the indicator is set, it doesn't allow posting GI directly from the storage bin of this storage type. This is flagged mostly for interim bins where the GI doesn't happen normally.

Stock Type Role

This parameter controls the automatic change in the stock type of the products that are moved into this storage type. The possible options are the following:

- Customs blocked stock
- Scrapping stock
- Normal stock

Hint

Under certain circumstances, businesses might need to hold the expired stock for scrapping. A particular stock type can be used for distinguishing the expired stock. You can use the STOCK TYPE ROLE parameter to control the holding of stock types with these attributes.

3.2.5 Replenishment

Replenishment parameters control the way in which the replenishment process works (Figure 3.18). We'll discuss this in detail in Chapter 12, Section 12.1.

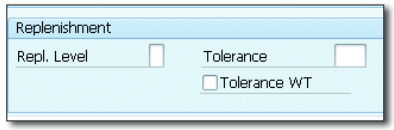


Figure 3.18 Replenishment Control Parameters

Replenishment Level

There are two levels at which you can do the replenishment, which you designate in the REPLENISHMENT LEVEL setting:

- **Storage bin level for fixed bins**
  This scenario is applicable when you have a fixed storage bin for a product. When replenishment is triggered, the stock data is read at the fixed bin level versus the required quantity. Replenishment proposals are then triggered based on this calculation.
- **Storage type level**
  If you opt for storage type level replenishment, the entire stock within the storage type is read. Based on this calculation between the existing stock and required stock, the replenishment proposals are triggered.

Tolerance

You define the tolerance level in a percentage. If the replenishment quantity is less than the requested quantity, and the difference is within the defined percentage limit, then the replenishment request is set to complete, and no further replenishment proposals are created. This field works in combination with the TOLERANCE WT indicator.

3.3 Storage Section

Storage sections are subdivisions or subsections of storage types. Storage sections obviously represent a group of bins with the same attribute (Figure 3.19).

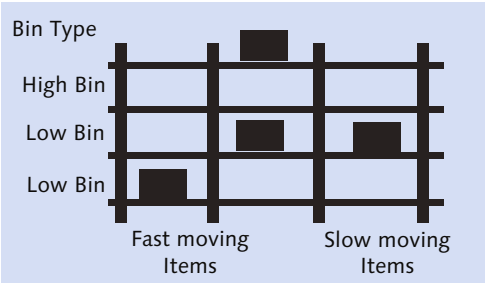


Figure 3.19 Storage Sections

For example, in finished goods storage types, a business might want to have different sections for fast-moving and slow-moving goods. Thus, all fast-moving items are stored in the bins classifying fast-moving section attributes.

In certain cases, a business might not need to subdivide the storage type in storage sections. In this situation, only one section will be created in the system because it's mandatory to do so. The one section will represent the entire storage type in this case.

Storage sections are four-digit alphanumeric codes in the SAP EWM system. Storage sections can be created by navigating to the menu path, EWM IMG • EXTENDED WAREHOUSE MANAGEMENT • MASTER DATA • DEFINE STORAGE TYPE.

3.4 Storage Bin

The storage bin is the smallest physical space in the warehouse. In fact, entire warehouse can be summed up as a set of storage bins. Standard storage types may have thousands of bins wherein the final storage takes place, whereas storage types such as door, staging area group, work center, and so on might have a smaller or a limited number of bins. The storage bin represents the exact position of space within the warehouse by means of a coordinates system. Coordinates are maintained in the storage bin master.

Bins are 18-character-long alphanumeric codes. Naming of bins requires special attention because it can represent the position of the bin in the warehouse. Careful naming of bins can help workers identify the bins easily.

3.4.1 Storage Bin Types

Storage bin types are used to group the storage bins based on the size or physical attributes of the storage bin. To create the storage bin types in the IMG, follow the menu path, Extended Warehouse Management • Master Data • Storage Bins • Define Storage Bin Types.

Example

A storage bin type includes the physical attributes such as size and dimensions representing a group of bins with similar attributes. For example, a bin type can be created for dimensions 2W × 1D × 5 H (W represents the bin width, D represents the bin depth, and H represents the bin height in the pallet unit).

3.4.2 Bin Access Type

Bin access types are used in resource management to let certain resource types access the only allowed bin access types (Figure 3.20). In this way, they can control the access to certain areas within the warehouse for certain resource types who have special skills to handle those bins.

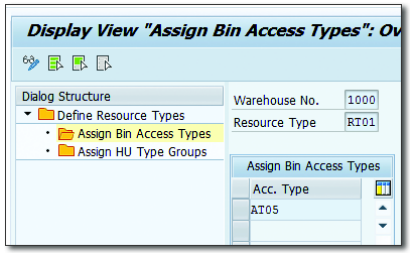


Figure 3.20 Bin Access Type Assignment against Resource Types

3.4.3 Storage Bin Structure

As a warehouse might have thousands of bins, it's unwise to create the bins one by one. With the help of a storage bin structure, you can expedite the storage bin creation activity. This is useful in creating a huge number of bins in one go. Bin definition can be provided using a template and structure (Figure 3.21).

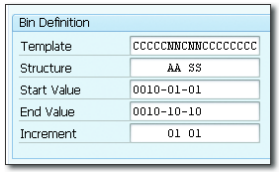


Figure 3.21 Storage Bin Definition

In the TEMPLATE field, "C" represents constant, "N" represents numeric character, and "A" represents alphabetic character (see Figure 3.21). The STRUCTURE field suggests the division of aisles, stacks, layers, and so on in the warehouse. For example, if you have aisles numbered 1 to 10 in the warehouse, you'll need to reserve two characters for them in the bin number so that it accommodates from 01 to 10.

Values used in STRUCTURE definition, such as A, S, L, and so on are called storage bin identifiers. These identifiers can be created by navigating to EWM IMG • EXTENDED WAREHOUSE MANAGEMENT • MASTER DATA • STORAGE BINS • DEFINE STORAGE BIN IDENTIFIERS FOR STORAGE BIN STRUCTURES.

The START VALUE (first bin name) to END VALUE (last bin name) fields help the system understand the first and last bin name it has to generate. Increments in each of the characters can be set appropriately based on requirements. Generation of bins using a bin structure will be discussed in the next section.

3.4.4 Storage Bin Master

The storage bin is the smallest spatial unit in a warehouse. Therefore, the storage bin represents the exact position in the warehouse where products are or can be stored.

Creating Storage Bins

Bins can be created manually by navigating to the menu path, SAP Easy Access Menu • Extended Warehouse Management • Master Data • Storage Bin • Create Storage Bin. Alternatively, you can use Transaction /SCWM/LS01 for bin creation. Transactions /SCWM/LS02 and /SCWM/LS03 can be used for change and display of bin, respectively. Note that a storage bin name is unique across the entire warehouse.

When storage bins are created, three fields are mandatory: Warehouse No., Storage Bin, and Storage Type. Let's now discuss the importance of other fields on the bin master (Figure 3.22).

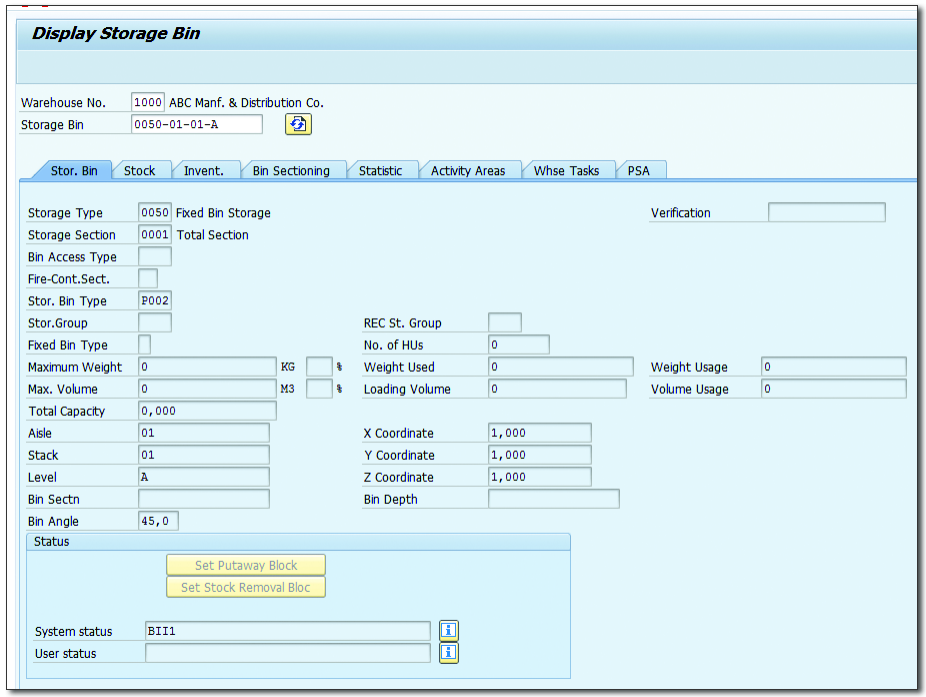


Figure 3.22 Creation of a Storage Bin Master

Fire Containment Section

This indicator helps to classify the storage bin to a fire containment section in the warehouse, thereby listing the hazardous substances within the fire containment section.

Storage Group

Storage groups are used in LOSC to determine the intermediate storage type. To create the storage group, follow the menu path, Extended Warehouse Management • Cross-Process Settings • Warehouse Task • Define Storage Groups for Layout-Oriented Storage Control.

Fixed Bin Type

This field isn't editable. The system doesn't allow you to maintain a value here. The same data from the fixed bin assignment of the product master are used at runtime.

Total Capacity

Capacity usage is maintained in this field, and it corresponds to the capacity usage defined in the product master and storage unit type.

Bin Section and Bin Angle

These parameters are used in GWL and provide additional information.

Verification

This setting is used during execution of warehouse processes using RF devices to confirm the correctness of bins. Verification fields can be set as the bin name if you want to keep the process of verification simpler. If you want to ensure the operational accuracy on every warehouse activity by verifying the bin verification, you can maintain the complex by keeping the readable verification different from the actual verification.

Resource Execution Constraint Storage Group

This parameter helps group the storage bins and control the space within the warehouse without any crowding of operators who execute the task in a certain area.

You can do the assignment in menu path, Extended Warehouse Management • Cross-Process Settings • Resource Management • Control Data • Assign Resource Execution Constraints to REC Storage Group. You can activate the resource execution constraint (REC) per REC storage group in the following menu path: SAP Easy Access Menu • Extended Warehouse Management • Master Data • Resource Management • Activate Resource Execution Control for Storage Groups. We'll be discussing this in detail in Chapter 5, Section 5.7.

3.4.5 Loading Storage Bins

At the time of implementation or rollout of a project, you need to create thousands of bins. Creating these bins manually is an error-prone and time-consuming task. If your business has the bin data in a third-party system, it can be uploaded using Transaction /SCWM/SBUP.

Follow the menu path, SAP Easy Access Menu • Extended Warehouse Management • Master Data • Storage Bin • Load Storage Bins. Upon successful upload, bins get created automatically. You may use the Successful Changes and Failed Changes tabs to see the report on bin creation (Figure 3.23).

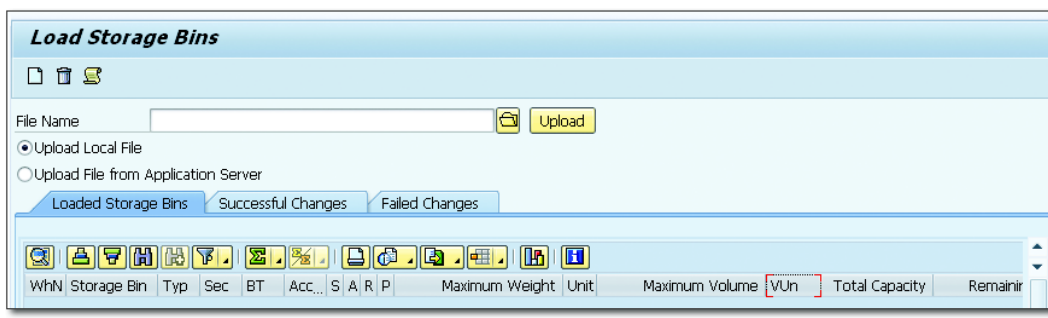


Figure 3.23 Loading Storage Bins

3.4.6 Mass Changes to Storage Bins

Businesses sometimes need to make changes in thousands of bins, which would be extremely time consuming to make in each of the bins manually. SAP has provided a tool to enable mass changes to be made instead (Figure 3.24).

Example

If you change the rack section within a warehouse from four stack height to five stack height to accommodate more products and for optimum utilization of space, you may want to classify this under a new section. By using mass change, you can reset all the bins to a new storage section at the same time.

To make a mass change to storage bins, use Transaction /SCWM/LS11. Alternatively, use the navigation path, SAP Easy Access Menu • Extended Warehouse Management • Master Data • Storage Bin • Mass Change to Storage Bins.

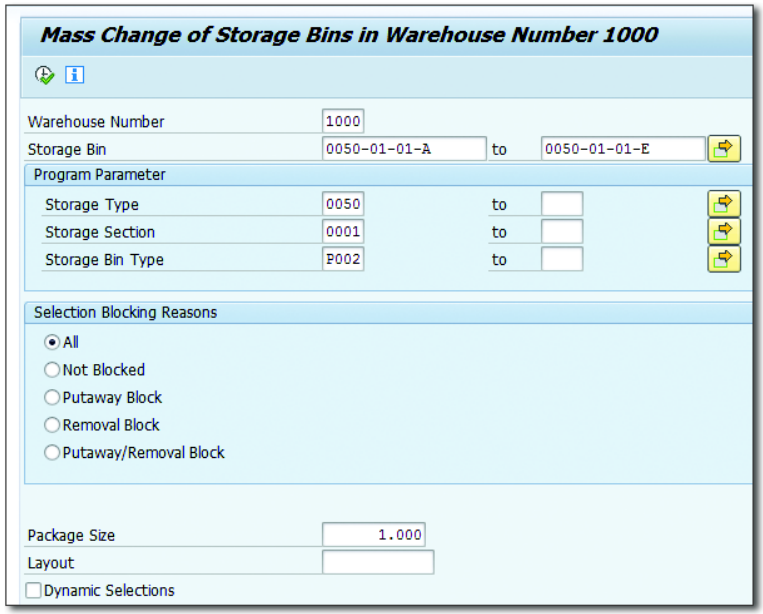


Figure 3.24 Selection Screen for Mass Change of Storage Bins

3.4.7 Generating Storage Bins

Bins can also be collectively generated using structures. Names for bins are automatically derived from the values provided in the Structure, Start Value, End

Value, and Increment fields (Figure 3.25). Use Transaction /SCWM/LS10 or the navigation path, SAP Easy Access Menu • Extended Warehouse Management • Master Data • Storage Bin • Generate Storage Bins.

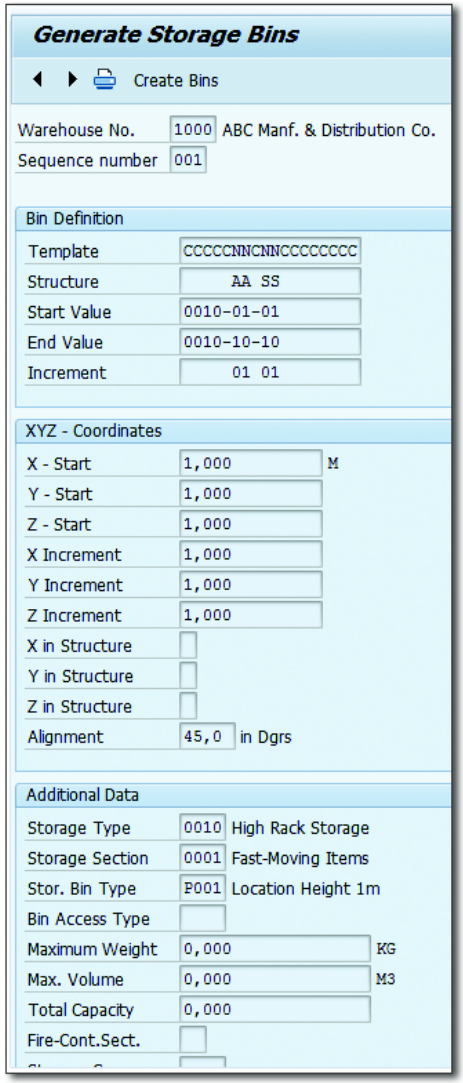


Figure 3.25 Generate Storage Bins Using a Storage Bin Structure

3.4.8 Loading Storage Bins Sorting

An automated tool for sorting the bins is required to rearrange the sort for bins in certain warehouses (Figure 3.26). You can load the bin sorting via Transaction /SCWM/SRTUP or the navigation path, SAP Easy Access Menu • Extended Warehouse Management • Master Data • Storage Bin • Load Storage Bin Sorting.

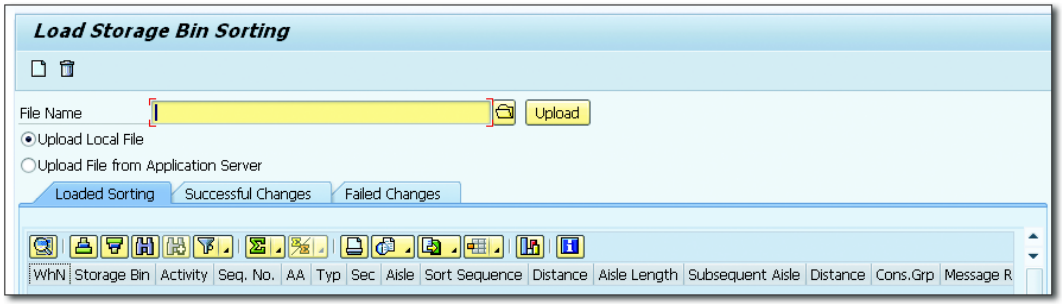


Figure 3.26 Load Storage Bin Sorting

3.4.9 Sorting Storage Bins

Sorting is a must before SAP EWM allows you to perform an activity on the bin. You need to sort the bins for the activity you want to perform on it. Sorting is performed at the activity area level (Figure 3.27). But you can't perform the sorting unless activity area has been created for this bin, that is, until the bin belongs to an activity area. Use Transaction /SCWM/SBST or the navigation path, SAP Easy Access Menu • Extended Warehouse Management • Master Data • Storage Bin • Sort Storage Bins.

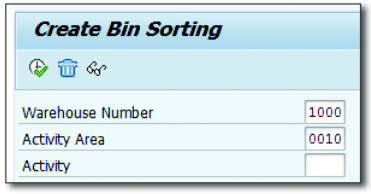
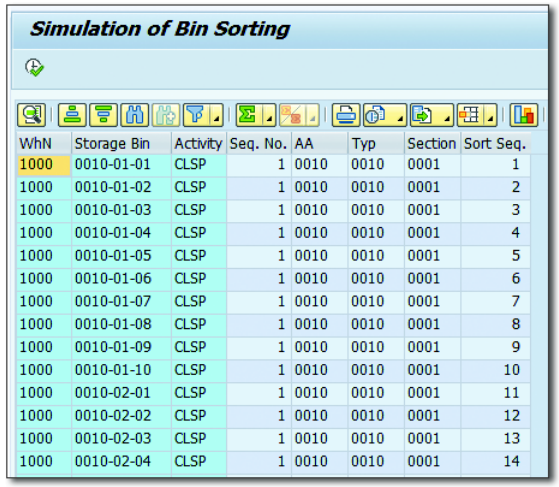


Figure 3.27 Bin Sorting Selection Screen

Use the execute button to sort the bins for the entered values (Figure 3.28). The system confirms that the sorting was completed successfully.



WhN	Storage Bin	Activity	Seq. No.	AA	Typ	Section	Sort Seq.
1000	0010-01-01	CLSP	1	0010	0010	0001	1
1000	0010-01-02	CLSP	1	0010	0010	0001	2
1000	0010-01-03	CLSP	1	0010	0010	0001	3
1000	0010-01-04	CLSP	1	0010	0010	0001	4
1000	0010-01-05	CLSP	1	0010	0010	0001	5
1000	0010-01-06	CLSP	1	0010	0010	0001	6
1000	0010-01-07	CLSP	1	0010	0010	0001	7
1000	0010-01-08	CLSP	1	0010	0010	0001	8
1000	0010-01-09	CLSP	1	0010	0010	0001	9
1000	0010-01-10	CLSP	1	0010	0010	0001	10
1000	0010-02-01	CLSP	1	0010	0010	0001	11
1000	0010-02-02	CLSP	1	0010	0010	0001	12
1000	0010-02-03	CLSP	1	0010	0010	0001	13
1000	0010-02-04	CLSP	1	0010	0010	0001	14

Figure 3.28 Simulation of Bin Sorting

3.4.10 Fixed Bin Assignments

When you need a fixed bin—for example, if you're handling loose cases for certain products, and you replenish from bulk bins to these fixed bins—you may need fixed bin assignments for the product (Figure 3.29). Transaction /SCWM/BINMAT is used to maintain fixed bins, and the navigation path is SAP Easy Access Menu • Extended Warehouse Management • Master Data • Storage Bin • Maintain Fixed Storage Bin.

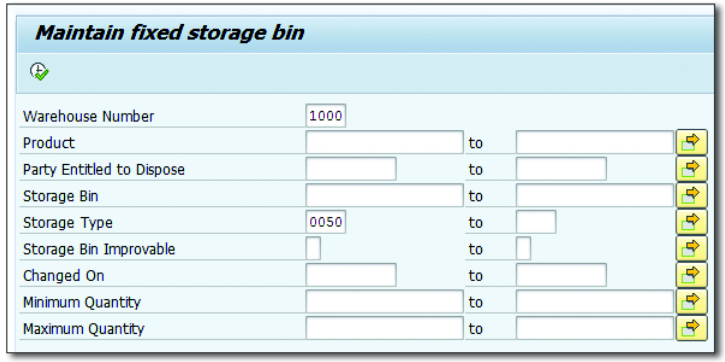


Figure 3.29 Maintain Fixed Storage Bin

You can also use Assign Fixed Storage Bins to Products for automatic assignment of storage bins to products. Use Transaction /SCWM/FBINASN or the menu path, SAP Easy Access Menu • Extended Warehouse Management • Master Data • Storage Bin • Assign Fixed Storage Bins to Products.

3.4.11 Maintaining Verification Field

You have a provision of creating the bin verification automatically using the utility provided in SAP EWM via Transaction /SCWM/LX45 (Figure 3.30). Using this transaction, the verification can be created in a uniform array. The navigation path is SAP Easy Access Menu • Extended Warehouse Management • Master Data • Storage Bin • Maintain Verification Field. There are three options for creating the bin verification:

- Adopt bin completely
  With this option, the bin name is written as the bin verification.
- Adopt bin partially
  With the coordinate input options provided in this transaction, you can remove any prefix, suffix, hyphens, and so on from the bin name. You can also realign characters or digits in the bin name per the desired sequence using these coordinate options.
- BAdI
  Using the Business Add-In (BAdI), you can define your own pattern in which you want to add the bin verification.

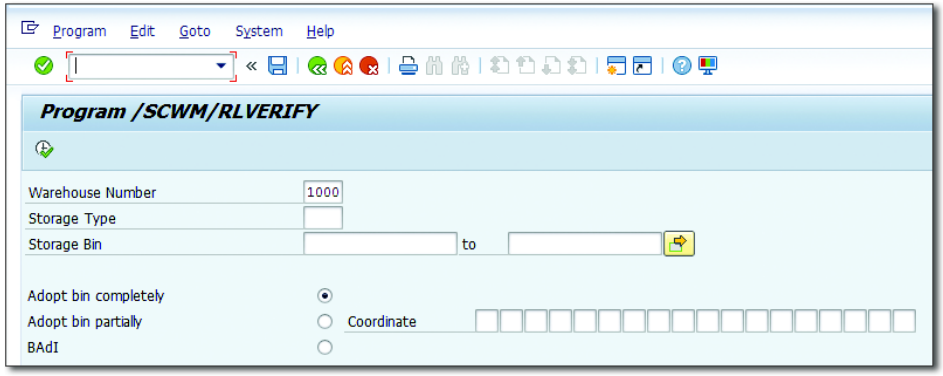


Figure 3.30 Program to Maintain Verification Field for Bins

3.4.12 Printing Labels for Storage Bins

Labels are used by workers for verification of bins in the warehouse. The label contains the ID or bin number of the bin. To print a bin label, you can use Transaction /SCWM/PRBIN or navigate via path, SAP EASY ACCESS MENU • EXTENDED WAREHOUSE MANAGEMENT • MASTER DATA • STORAGE BIN • PRINT STORAGE BIN LABEL.

3.5 Staging Area

Staging areas represent the space near the warehouse door for temporary storage of products, either before they are transferred to final storage bins within the warehouse or before loading onto the transportation units (e.g., a truck) headed toward the ship-to parties. This is important for the immediate discharge of the transportation unit and the availability of free doors.

For inbound delivery, a staging area stores goods temporarily after being unloaded from the truck/trailer at the warehouse door. For outbound delivery, goods are staged at the staging area for immediate loading to the transportation unit after it arrives at the door.

Staging areas can be defined via the IMG by following the menu path, EXTENDED WAREHOUSE MANAGEMENT • MASTER DATA • STAGING AREAS • DEFINE STAGING AREAS.

Staging area group corresponds to the storage type with storage type role D. A staging area represents a storage section. While defining the staging area, you assign the staging area group (STGAREAGRP), staging area (STGAREA), GR/GI checkbox indicating the purpose of goods receipt or goods issue or both, and the LOAD.RULE (Figure 3.31). LOAD.RULE has three options:

- LOADING CAN START WHEN THE FIRST HU HAS ARRIVED
- LOADING CANNOT START UNTIL STAGING HAS BEEN COMPLETED
- LOADING CANNOT START UNTIL 24 HOURS WAIT TIME HAVE PASSED

The capacity of the staging bin in the staging area allows you to limit the maximum number of deliveries that can be staged at a time.