

Microsoft Dynamics™ NAV 5.0

## Warehouse Management Systems

Technical Whitepaper

This Paper will give you an overview of the Warehouse Management Systems granule in Microsoft Dynamics™ NAV. It is written with the aim of helping anyone in the Microsoft Navision channel who is consulting on or implementing a business solution using the Warehouse Management Systems granule.

*Date: January, 2007*

[www.microsoft.com/dynamics/nav](http://www.microsoft.com/dynamics/nav)

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## *Introduction*

Warehouse Management Systems (WMS) for Microsoft Dynamics™ NAV is developed as an integrated offering for the Microsoft Navision application. It is a solution for the Microsoft Navision customer that has a need for managing inventory and distributing items in a warehouse environment. It is especially developed for warehouses that function by using specific zones and bins. WMS provides functionality for more advanced warehouse operations than the functionality in the basic Warehouse Management (WM) solution.

To obtain the WMS offering you need to buy the Advanced Management granule as well as the following granules:

4180	Put Away
4190	Warehouse Receipt
4200	Pick
4210	Warehouse Shipment
4620	Warehouse Management Systems
Optional	
4630	Internal Picks and Put Aways
4660	Bin Set-Up
4640	Automated Data Capture System

## *The Purpose and Functionality of WMS*

Before Microsoft Navision 3.10, there was no independent functionality that focused on warehouse processes. It was only possible to receive and ship from the order documents. But in distribution and manufacturing companies, the sales, purchase and warehouse functions are normally performed in different departments, and so it is not very process oriented to let warehouse staff work in the same documents as the sales and purchase staff. For example, warehouse workers don't need all the customer and vendor information, but in order to do their jobs efficiently they do need to see information from the sales and purchase orders arranged especially for their requirements.

WMS is designed to help reduce costs through effective warehouse processes. It is aimed at those companies that need to receive and ship goods, while maintaining an optimum utilization of space and knowing specifically where all goods are stored at any given time. Items can be stored either in predetermined bins or in random bins – depending on the need for optimization and the expertise of the warehouse personnel. It is also possible for WMS to keep track of the quantity of items within each bin.

The WMS granule provides functionality for handling advanced warehouse processes that involve zones and bins, directed picks and put-aways, as well as automated data capture systems. To perform directed pick and put away, it is necessary to divide the warehouse into zones and bins. A zone could be a receiving zone or a stocking zone, and each zone can consist of one or several bins.

A bin is a storage device designed to hold discrete parts. It can be a space on a shelving unit that is portioned with physical dividers, or it can be any space defined within the warehouse to hold items. Each bin must have a type attached, as explained in the Implementation Assistance section of this paper. Depending on the bin type, different processes and tasks are possible. You can also determine whether the bin content in a bin is fixed or floating. In Microsoft Navision, a fixed bin is one that holds an item or items that have been dedicated to it; it is not fixed to hold one specific item. It is predefined which specific item(s) can be placed in fixed bins, whereas floating bins are non-discriminatory – they have no particular items assigned to them. In general, the more floating bins there are in a warehouse, the better the space is utilized. However, stricter data discipline is necessary for the operation of floating bins in order to keep track of where items have been put away.

You can assign a warehouse class to items, zones and bins. For example, frozen (-20°C) or cold (+5°C). The warehouse class is an extra criterion for the program to use in determining where items should be stored. It is possible to divide any zone into several warehouse classes. For example, items in the receiving zone can be stored under different conditions.

If necessary, you can block items in a bin (the bin content) from warehouse activities, for example, if they are found to be defective or are being inspected for quality control. You can block any item for any bin from inbound activity, outbound activity or for all activity. For example, if an item is blocked in a bin for outbound activity, the program will not use the bin for picking or movements. This blocked bin content is excluded from the available-to-pick calculation.

The put-away process is improved with the introduction of a put-away template and bin ranking combined with a filtering logic similar to that for the pick side in the Warehouse Management granule, (3.10). The put-away template specifies how to find a suitable bin for an inbound item. The capacity of a bin can be controlled for quantity, total cubage, and weight.

All the picking methods that are available in WM are also available in WMS. To optimize the pick process, all zones and bins are ranked and the pick is performed according to the bin ranking as well as bin type and blocked status. The program will suggest picking the items from the bins with the higher ranking first. To optimize the general processes and the usage of warehouse space, the program can suggest replenishing higher ranking bins with goods from lower ranking bins – if this has been set up. Thereby, the forward picking areas (consisting of the bins with higher ranking) will always be filled.

Cycle counting based on items is provided to help keep the stock balance accurate for items that are available for sale. The option is available to assign how many times per year an item or stock keeping unit (SKU) must be counted.

It is possible to initiate warehouse processes without a source document by using the Internal Put-aways and Internal Picks features. For example, you can pick items for production, or for special projects or tests, and afterwards either consume them or put them away.

Source documents in Microsoft Navision consist of the following outbound and inbound document types:

*Outbound* documents:

- **Sales Order**
- **Outbound Transfer Order**
- **Purchase Return Order**
- **Released Production Orders**

*Inbound* documents:

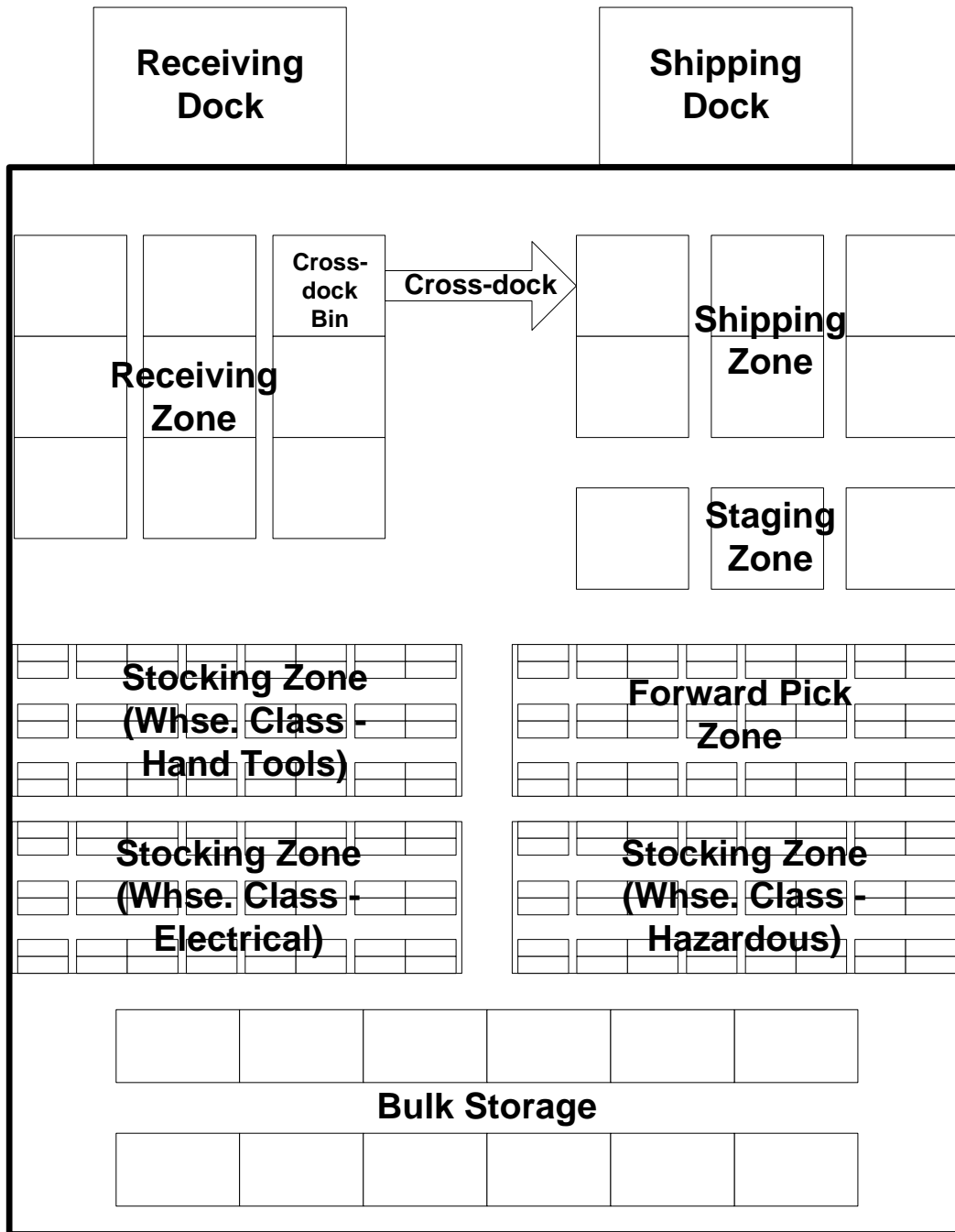
- **Purchase Order**
- **Inbound Transfer Order**
- **Sales Return Order**

The Warehouse Shipment form in both WM and WMS enables you to keep track of outgoing deliveries, provides you with the opportunity to pick items to stage, and ensures complete shipment of the delivery.

The Warehouse Receipt form in both WM and WMS enables you to plan the receipt of purchase orders, sales return orders and transfer orders.

## Warehouse Structure

The layout of a typical warehouse structure as it relates to WMS is shown in the illustration below. It shows an example of how a warehouse can be organized by using zones and bins. Note that the warehouse class code is shown only to illustrate an example of how items can be placed in a separate area in the warehouse.



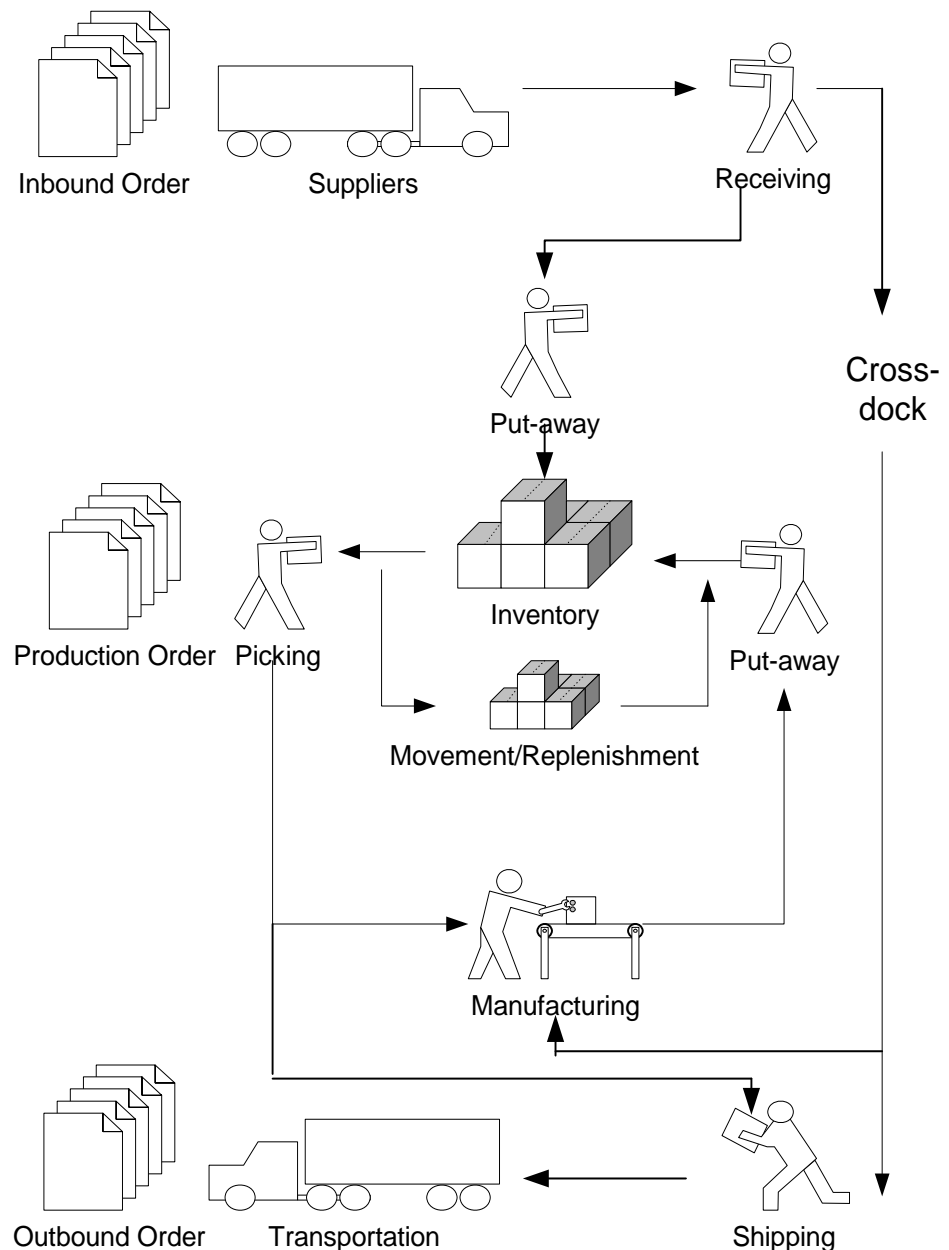
Typical Warehouse Flow Layout

## Conceptual Design

### Workflow

The layout of the WMS main menu is oriented to reflect the workflow of a typical warehouse operation. It is designed to correspond with the inbound, outbound and internal flow of items through the warehouse. The illustration below shows the WM/WMS overall workflow as it relates to orders.

### Inbound Flow



The inbound flow of the warehouse begins with the items coming into the warehouse and the warehouse personnel registering those items into the program. Each item is identified and matched to a corresponding inbound source document. An inbound source document can be one of the following

three types: purchase order, inbound transfer, or sales return order. The following numbered steps correspond with the diagram Inbound Flow, shown below:

1. *Warehouse Inbound Request*

During the release of the purchase order (sales return order, inbound transfer order), an inbound warehouse request is created by the program. It contains references to the source document type and number and is not visible to the user.

2. *Warehouse Receipt*

Goods arrive in the warehouse and in the warehouse receipt order window the responsible employee makes a request to the program to retrieve the necessary source document lines. Based on this inbound warehouse request, warehouse receipt order lines are created and displayed in the warehouse receipt order window.

3. The employee can update the created warehouse receipt order, fill in "qty. to handle" (this can be done automatically if allowed by the warehouse setup per location), and select the receiving zone and bin.

4. *Receipt Posting*

From the Warehouse Receipt window, the employee can use the "Post" function: The purchase order (inbound transfer order, sales return order) is posted as received, and a posted receipt and a posted warehouse receipt order are created.

The warehouse receipt order cannot be deleted until the quantity registered in the warehouse is posted as received and put away.

A warehouse receipt order line is deleted if it is completely posted and put away. If all warehouse receipt order lines are completely posted as received and put away, the warehouse receipt order is deleted.

5. *Internal Put-away*

The employee creates an internal put-away for items that have to be put away in the warehouse (for example, production output), and enters quantity, zone and bin; from where the items should be put away.

6. The employee releases the internal put-away and the program creates an internal put-away request.

7. *Put-away Worksheet*

In the Put-away Worksheet, the employee instructs the program to retrieve the lines to be put away. The program creates put-away lines, which are displayed in the worksheet.

8. The employee selects the lines to put away and then fills in the "qty. to handle." (Note: The program will automatically fill this in if it is set up per location.) The employee then instructs the program to create corresponding warehouse instructions. When the program has done this, it deletes the put-away assignment lines – after they are fully assigned.

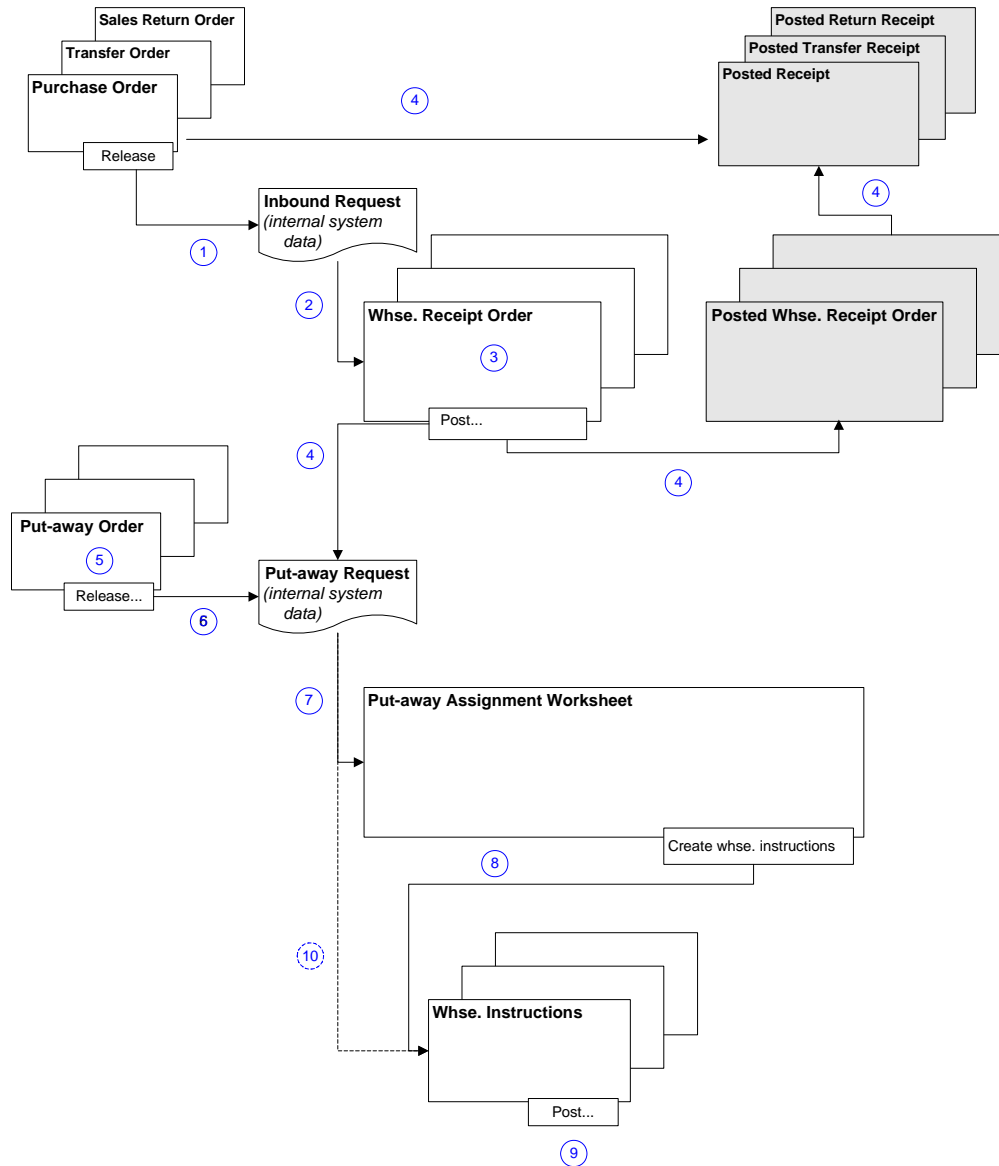
9. *Warehouse Instructions – Put-away*

The employee physically handles the put-away according to the warehouse instructions and updates the warehouse instructions document in the program accordingly. The employee posts the warehouse instructions document and the program creates warehouse entries and deletes put-away request and warehouse instructions journal lines – if fully handled. The Qty. Put Away field on the warehouse receipt order lines is updated.

10. *Variation*

Depending on the warehouse setup per location, the program immediately creates a warehouse

instruction document when the employee creates a put-away request. In this case, steps 7 and 8 can be omitted.



## Warehouse Inbound Flow Diagram

### Outbound Flow

The outbound flow in the warehouse begins with a request for shipment in the form of a sales order, an outbound transfer order or a purchase return order. The warehouse personnel will go directly to the Warehouse Shipment window to retrieve lines from these source documents. The following numbered steps correspond with the Outbound Flow diagram shown below:

#### 1. Warehouse Outbound Request

During the release of the sales order (purchase return order, outbound transfer order) an outbound

warehouse request is created. It contains references to source document type and number and is not visible to the user.

2. *Warehouse Shipments*

In the Warehouse Shipment window, the warehouse manager instructs the program to retrieve source document lines that need to be shipped. The manager has the possibility to combine several source document lines into one warehouse shipment order.

3. The warehouse manager decides to start the picking process for some shipment orders, selects the lines to be picked and specifies a bin to place picked items (a shipping bin or a staging bin). The manager calls a function to initiate picking and pick request lines are created – invisible to the user – which contain references to warehouse document type and number.

4. *Internal Pick*

The warehouse employee creates a pick order for items that have to be picked in the warehouse but should not be shipped (for example, production components), enters the lines and specifies the bin in which picked items are to be placed. The employee releases the order and pick request lines are created – invisible to the user – which contain references to warehouse document type and number.

5. *Planning the Picking Process*

The warehouse manager starts planning the picking process and, in the Pick Worksheet window, instructs the program to retrieve the lines that need to be picked. Pick lines based on pick requests are created and displayed in the Pick Worksheet window.

6. The warehouse manager enters the qty. to handle on the pick assignment lines (which can be filled in automatically if this is permitted by the location's warehouse setup), specifies a picking method for optimization of the warehouse handling, and then goes to the Create Pick function. Warehouse instructions are created and pick lines are deleted (if fully assigned).

7. *Pick*

The warehouse employee picks items according to the warehouse instructions and posts the documents.

- **Warehouse instructions are deleted if fully handled.**
- **Pick requests are deleted if fully handled.**

If picking was initiated by a pick order, a posted pick order is created and the pick order is updated or deleted if fully handled.

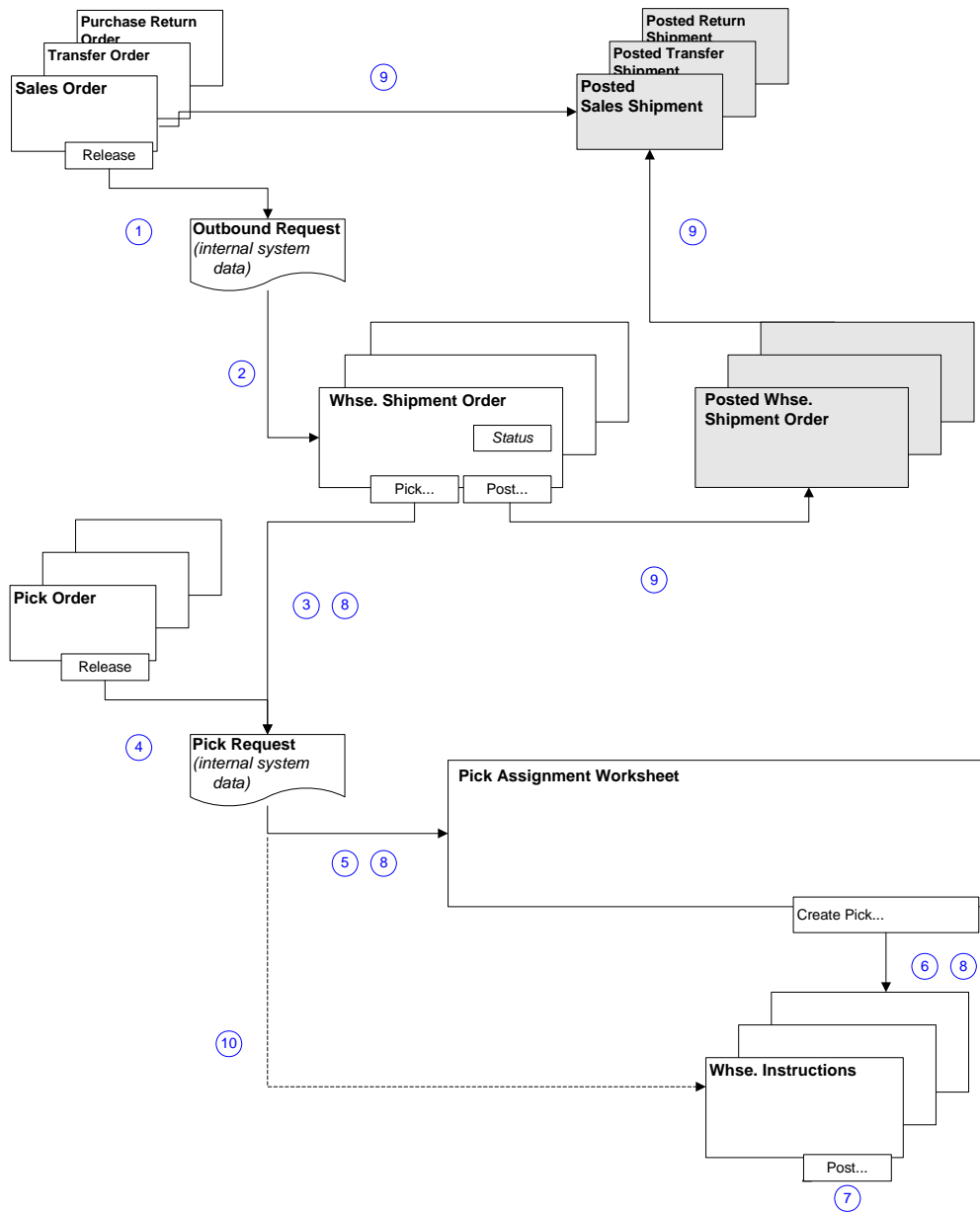
If picking was initiated by a warehouse shipment order, the status of the corresponding warehouse shipment header is changed to "Completely Picked", "Partially Picked", "Partially Shipped", or "Completely Shipped."

8. *Re-pick*

If items for a warehouse shipment order have been staged for a while, a repicking process should be initiated before shipping in order to move the items from a staging bin to a shipping bin. In the Warehouse Shipment window, the user specifies a shipping bin and calls the "Create Pick" function, steps 3, 5, 6, 7 above are repeated, and the status of the warehouse shipment order lines change to indicate that shipping (step 9) is now possible.

9. *Ship*

After the items have been picked and moved to shipping bins, the user goes to the post shipment function. Sales orders, transfer orders and purchase return orders are posted as shipped. A posted warehouse shipment is created, and the warehouse shipment is deleted when it is fully posted. The outbound warehouse request is deleted if fully handled, and warehouse entries are created.



**Warehouse Outbound Flow Diagram**

### Movements within the Warehouse

The flow of items from bin to bin within a warehouse location can be controlled by using the Movement Worksheets. Movements are exclusive of pick and put-away and can be limited only by blocking or warehouse classes.

## *Development Design*

### **Solution Concept**

To enable the handling of items on the zone and bin level, all the information must be traced for each transaction or movement in the warehouse. Therefore, an entry-table, Warehouse Entry, is used. Each transaction is stored in the warehouse register.

Warehouse documents and the warehouse journal are used to register item movements within the warehouse. Every time an item in the warehouse is moved (receipt, put-away, pick, shipment, adjustment, and so on), warehouse entries are posted in order to store the physical information regarding zone, bin, and quantity.

The Bin Content table is used to handle all the different dimensions of the contents of a bin per item (unit of measure, maximum qty., minimum qty., and so on). This table also contains flow fields to the warehouse entries, warehouse instructions and warehouse journal lines, which enable the program to very quickly and simply calculate the availability of an item per bin and the availability of a bin for an item.

A default adjustment bin per location is used whenever an item posting is made outside the warehouse module. During the physical inventory of the warehouse, movements instead of adjustments will be posted to move any discrepancies between the calculated and counted quantities to the adjustment bins. You can read more about adjustments in the section **WMS with Inventory** in the **Integration** chapter.

Additionally, WMS is now integrated with item tracking. The integration is provided by the reservation/item tracking functionality.

## Integration

### WMS with Warehouse Management (WM)

With the development of WMS, there have been some changes made to the basic functionality of Warehouse Management. The functions that are available in the WM form Warehouse Assignment are now accessible in the Warehouse Shipments form. You can set up each individual location to run differently to the others by selecting whether or not to use the zones and bins option.

### WMS with Manufacturing

#### Internal Put-Aways and Internal Picks

The Internal Put-aways and Internal Picks menu items provide access to the integration of the warehouse and the manufacturing application area. The main connection between warehouse and the manufacturing production orders can be found on the Released Production Order form: you can create a warehouse pick from a released production order. Another link is through the inbound and outbound production bins and the open shop bin – all of which you define on the Zones and Bins tab of the location card.

#### Automatic Flushing

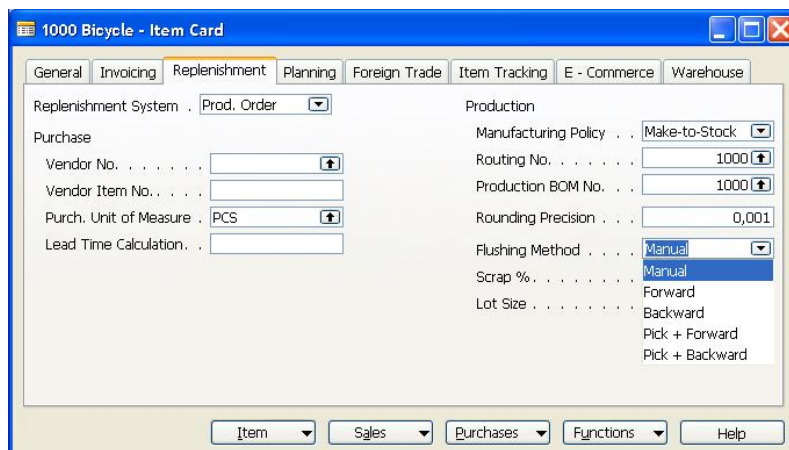
In version 3.60, when a user is working with a production order where the items were picked from a WMS location, the user could not use automatic flushing. Instead, he had to manually flush the components that had been picked and placed in the inbound production bin, a process that could be quite time-consuming.

This problem has been solved since version 3.70 (and also by Hot Fix releases) by creating two options for defining an item's flushing method: "Pick + Forward" and "Pick + Backward". When one of these two flushing methods has been defined for the item, the program will ensure that the item has been picked in the warehouse before automatically flushing the item, either forwards with a routing link code or backwards.

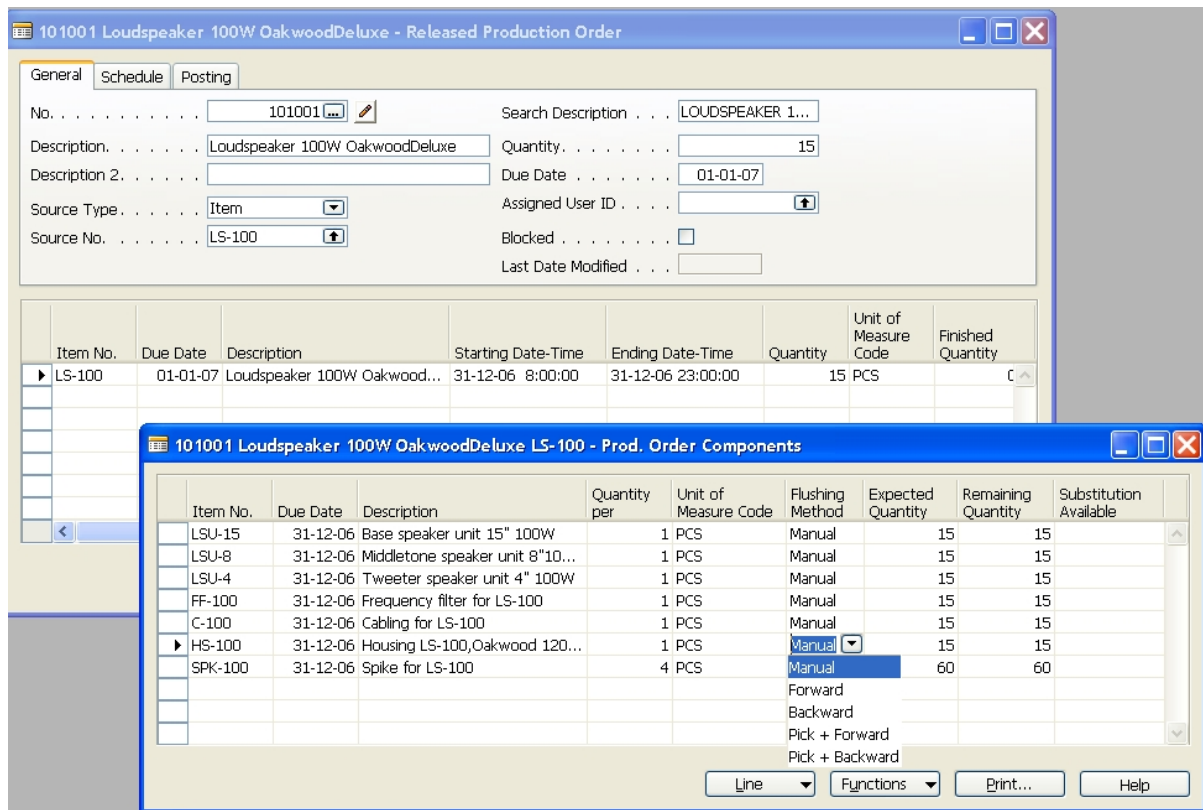
Note that the "Pick + Forward" and "Pick + Backward" settings only work for a location that uses WMS.

#### User Interface Changes

These options appear in two places in the program. One is on the Replenishment tab on the Item Card:



The other is in the Prod. Order Components window:



The program uses these options when the user creates a pick from the production order.

### Using Automatic Flushing in a WMS Location

To get a better understanding of how the changes are implemented, imagine the following scenario:

In the CRONUS company, the warehouse location that stores items for production is the White location. This is a WMS location that uses zones and bins and where the warehouse employees use pick documents to register the picking information. A production order for 15 PCS of item LS-100 is received. Some of the items on the component list must be manually flushed and other items on the list can simply be picked and automatically backward flushed. The items that can be automatically flushed have a flushing method of "Pick + Backward". The following steps describe in detail the actions that the user takes and how the program reacts:

1. *The production manager releases the order.* The program subtracts the inventory from the open shop floor bin for any items with the flushing method "Forward" that do not have a routing link code.
2. *The production manager creates a pick from the production order by clicking Functions, Warehouse, Create Pick.* The program creates a warehouse pick for items with flushing methods "Manual", "Pick + Backward", and "Pick + Forward" (with a routing link code). These items will be placed in the inbound production bin.
3. *The warehouse manager assigns the picks to warehouse employees.*

4. *The warehouse employee picks the items from the appropriate bins and places them in the inbound production bin.*
5. *The warehouse employee registers the pick.* The program subtracts the appropriate quantities from the pick bins and adds the appropriate quantities to the inbound production bin. The program also updates the **Qty. Picked** field on the component list for all picked items.
6. *The production employee informs the production manager that the items are finished.*
7. *The production manager uses the consumption journal to post the consumption for the items using the flushing method "Manual" and for the items with flushing method "Forward" with routing link code and "Pick + Forward" with a routing link code.*
8. *The production manager posts the output from the production order and finishes the released production order.* The program subtracts the quantities for the components with flushing method "Backward" from the open shop floor bin and with flushing method "Pick + Backward" from the inbound production order bin.

## WMS with Inventory

The **Warehouse Management** and **Inventory** granules mainly interact with one another in physical inventory and inventory adjustment. The item card has a Warehouse tab where you must set up certain parameters defining how the item is handled within the warehouse. You can also see warehouse information regarding the item by clicking the Item button and selecting Bin Contents.

## Physical Inventory

The warehouse physical inventory journal is used in conjunction with the physical inventory journal for all locations where WMS is used. The program calculates the inventory on bin level and provides a printed list for the warehouse employee detailing which items in which bins need to be counted.

The warehouse employee enters the quantity that has been counted in the warehouse physical inventory journal (this process is similar to the existing physical inventory journal). Then the warehouse manager posts the warehouse physical inventory journal.

If the counted quantity is greater than the quantity on the warehouse physical inventory journal line, a movement is posted for this difference from the default adjustment bin to the counted bin. This increases the quantity in the counted bin and decreases the quantity in the default adjustment bin.

If the quantity counted is less than the quantity on the warehouse physical inventory journal line, a movement for this difference is posted from the counted bin to the default adjustment bin. This decreases the quantity in the counted bin and increases the quantity in the default adjustment bin. The bookkeeper can use the existing phys. inventory journal to post the adjustments.

If WMS is used for a location, the program retrieves the **Quantity (Calculated)** from the item ledger entries and the **Quantity (Phys. Inventory)** from warehouse entries – excluding the adjustment bin content.

The program fills in the **Quantity** field as a difference between the first two – which should be equal to the contents of the adjustment bin.

When the bookkeeper posts the physical inventory journal, the inventory and the default adjustment bin are updated.

## Warehouse Inventory Adjustments to the Item Ledger

You can use the existing item journal to adjust inventory on the item ledger in accordance with an adjustment that has been made to the item quantity in a warehouse bin. In order to create a link between the inventory and the warehouse, you have to define a default adjustment bin per location.

This default adjustment bin is used to register items in the warehouse when posting an increase for the inventory. However, if you post a decrease, the quantity on the default bin is also decreased. In both cases item ledger entries and warehouse entries are created. This bin is not included in the availability calculation.

If you want to adjust the bin content, you can use the warehouse item journal, from which you can enter the item number, zone code, bin code, and quantity that you want to adjust.

If you enter a positive quantity and post the line, the inventory stored in the bin will increase and the quantity of the default adjustment bin will decrease correspondingly.

If you enter a negative quantity and post the line, the inventory stored in the bin is decreased and the quantity of the default adjustment bin is increased.

## Available Qty. to Pick and Reservation Feature

In Microsoft Dynamics NAV, calculation of item quantities can be made in both the "warehouse" area of the application and in the "inventory" area of the application. These two areas contain different information related to where the items are stored and how the items are used: the "warehouse" calculation takes into account the bins and bin types where the items are stored, and the "inventory" calculation takes into account reservations placed on the items. The Available Qty. to Pick and Reservation feature address the problem of creating a link between the quantities calculated in warehouse management and those calculated in inventory, especially in the areas of picking and reservation.

The changes made to the pick and reservation quantity calculations do not take the following into consideration:

- Special order flow
- Blocked bins
- "Allow Breakbulk" setting on the location

### ***Available Quantity to Pick***

In version 3.60, prior to the Critical Update release, calculation of the available quantity to pick, which takes place in the "warehouse" part of the application, did not take into account any quantities that had been reserved for outgoing orders. The result was that, even if some items had been reserved for a customer whose order was shipping later, those items might be picked for a different sales order that was shipping earlier.

The calculation of the available quantity to pick has been changed with the Critical Update so that the calculation subtracts the reserved quantities of sales orders, quantities on pick orders and "picked but not shipped" quantities.

## Calculating the Available Quantity to Pick

In version 3.60, prior to the Critical Update release, the Available Qty. to Pick (A) was defined as the quantity on all bins with bin type "Pick" (B) minus quantities already assigned to picks (C). With this definition, the Available Qty. to Pick sometimes included items that had been reserved from the bins with bin type "Pick".

The Available Qty. to Pick (A) is therefore re-defined as the quantity on all bins with bin type "Pick" (B) minus quantities already assigned to picks (C) AND minus the quantities that have been reserved from bins with bin type "Pick".

The complication of this re-defined calculation is that the quantity on all bins with bin type "Pick" (B) and the quantities assigned to picks (C) both come from the Warehouse Entry table, while the quantities of reserved items come from the Reservation Entry table, which is connected to the Item Ledger Entry (ILE) table. In our new calculation, we must create a relation between the warehouse entries, which specify a bin type, and the reserved quantities from the item ledger entries, which do not specify a bin type.

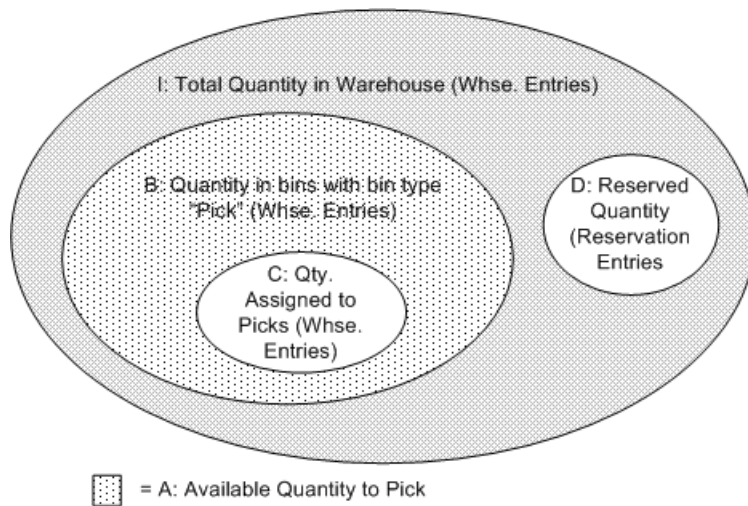
We assume that all already-created reservations will primarily affect bins with bin types other than "Pick" (e.g. bins with bin type "Receive", "Put-away", etc.). If there are more items reserved than there are items in these bins in warehouse, the quantity that exceeds this must be reserved on bins with bin type "Pick".

We create a relation between reservation on ILE and items in the warehouse by calculating the quantity in warehouse on all bins (I) except shipment bin, inbound production bin, open shop floor bin and adjustment bin (J) and except all quantities that are on bins with bin type "Pick" (B). If this quantity (H) is smaller than the total reserved quantity (D) then the difference must be reserved from bins with bin type "Pick". So this difference ( $D - H$ ) must be subtracted from (A). If quantity (H) is greater than the total reserved quantity (D) then all reserved items are on bins that do not have bin type "Pick", and so nothing must be subtracted from quantity (A).

If there are reserved quantities that are already assigned to picks as well as on shipments after the pick was registered, these quantities were already subtracted from (A) by quantities already assigned to picks (C). So we would subtract these reserved quantities twice if we just subtract the quantity  $D - H$ . Therefore we must add these quantities (E) again.

And finally, we must add the reserved quantity for the current line (F) because this quantity is also part of the total reserved quantity.

If we suppose that no items have been reserved from "Pick" bins, the calculation of "Available Qty. to Pick" is as follows:



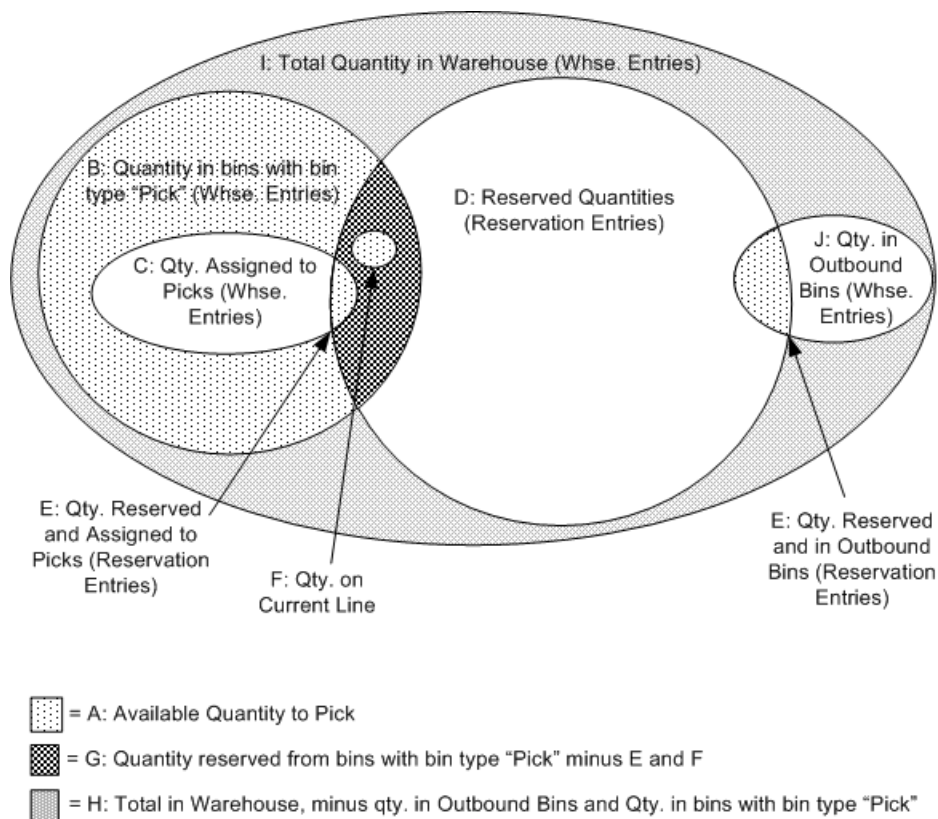
$$A = B - C$$

A = Available quantity to Pick

B = Quantities on bins with bin type "Pick" in warehouse (CALCSUMS in table 7312 Warehouse Entry)

C = Quantities that are already on picks ("Qty. Assigned to Pick")

However, when some items have been reserved from the "Pick" bins, the calculation will be as follows:



$$A = B - C + G$$

A = Available quantity to Pick

B = Quantities on bins with bin type "Pick" in warehouse (CALCSUMS in table 7312 Warehouse Entry)  
C = Quantities that are already on picks ("Qty. Assigned to Pick")

$G = H - D + E + F$  (this quantity is always smaller than or equal to 0, with the condition for E and F below)

$H = I - J - B$

I = Total available quantity in warehouse (CALCSUMS in table 7312)

J = Sum of quantities that are on outgoing bins (CALCSUMS in table 7312)

D = Reserved quantities ("Reserved Qty. on Inventory")

E = Quantities that are on picks and are reserved (new calculation: CALCSUMS in table 7312 warehouse entry on the field Reserved Pick & Ship Qty.)

F = Reserved quantity for the current line for which calculation is called ("Current Reserved Quantity")

**If  $D - H < E + F$  then  $E = D - H - F$**

The sum  $E + F$  must not be greater than the total remaining reserved quantity  $D - H$  so E might be set to a smaller value than actually calculated because the other values H and F are fixed.

If  $H < D$ , then there is a reserved quantity on bins with bin type "Pick" that has to be regarded in the calculation.

Else if  $H \geq D$ , then all reserved quantities are on bins with bin types other than "Pick", so they need not be regarded in the calculation.

### **Where the Calculation is Used**

This calculation is used in two places in the program, the Pick Worksheet and the Warehouse Shipment. In the Pick Worksheet, the calculation of the "Available Qty. to Pick" field takes place in table 7326 Whse. Worksheet Line. In the Warehouse Shipment, the calculation is performed when the user creates a pick from a shipment. The calculation here is performed by a procedure in codeunit 7312 Create Pick.

### **Limitations**

In order to handle the fact that a given quantity of an item can be allocated both by reservations and in the warehouse, a field has been added to the Reservation table (Reserved Pick & Ship Qty). This field protects against double allocation. It is filled in by the system when a pick line is created, and it follows the transaction into the shipping bin (or inbound production bin) when the user registers the pick.

When you start to use the updated system, this field will be empty. Consequently, you might find that the availability is under-calculated when you first start using it, but only regarding the reserved orders that have been picked and have not left the warehouse/inventory. After approximately 1 to 3 days when the items picked before the update was implemented have been shipped, the calculation of available quantity will work correctly.

The less time it takes from the time the pick is created until it is finally shipped (or consumed), the sooner the system can adjust itself.

### **Reservation Feature**

In version 3.60, prior to the Critical Update release, calculation of the available quantity to reserve, which takes place in the "inventory" area of the application, did not take into account items that had been allocated for outbound movements in the warehouse. The result was that it was possible to place a reservation on items that had already been allocated for a pick or a shipment.

The calculation of available quantity to reserve has been changed so that it does not include quantities on not-registered picks or quantities in outbound bins, such as the shipment bin, inbound production bin, open shop floor bin and the adjustment bin.

#### User Interface Changes

One field called "Qty. Allocated in Warehouse" has been added to form 498 Reservation to show what quantity of the item on the reservation line has been allocated in the warehouse.

Summary Type	Total Qua...	Total Res...	Qty. Allocated in ...	Total Av...	Current ...
Item Ledger Entry	80	22	37	21	

#### New Calculation

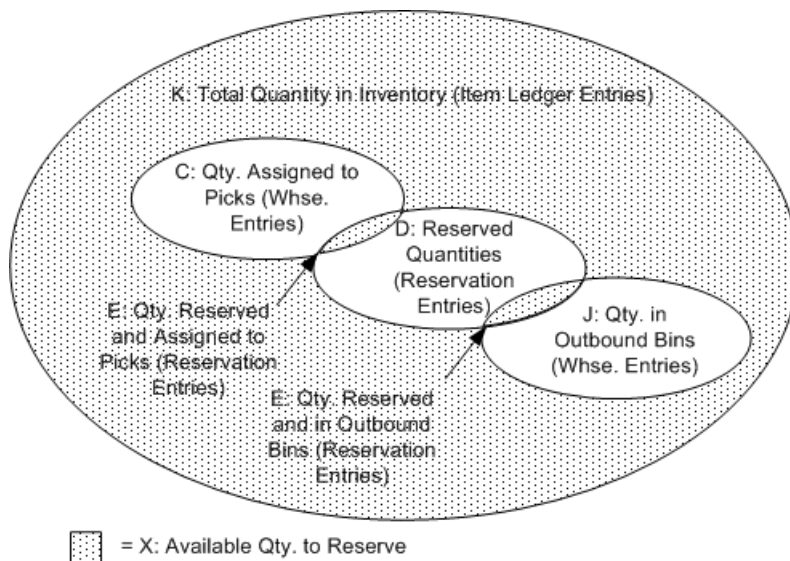
It should be possible to reserve all items in inventory, except those that have started to be processed, meaning that they are allocated to production on the inbound production bins or allocated to the shipment bin from a registered pick where the shipment is not yet posted.

The changed *Available Qty. to Reserve* is defined as the quantity on all bin types in the warehouse except the following "outbound" bins:

- Shipment bin
- Inbound production bin
- Open shop floor bin
- Adjustment bin

The program also subtracts the quantities on created picks that are not yet registered from the Available Qty. to Reserve as well.

In general, bin types like QA or Bulk or Blocked are not considered as they are assumed to be the responsibility of the warehouse manager (or other persons responsible for the business flow in the warehouse) and in order to ensure that these quantities are available for sales/reservation. The calculation of the "Available Qty. to Reserve" is as follows:



$$X = K - C - J - D + E$$

X = Available quantity to Reserve (Total available Quantity)

K = Total available quantity in inventory (CALCSUMS in table 32 Item Ledger Entry)

C = Quantities that are already on picks ("Qty. Assigned to Pick")

J = Sum of quantities that are on outbound bins (CALCSUMS in table 7312 Warehouse Entry)

D = Reserved quantities ("Reserved Qty. on Inventory")

E = Quantities that are reserved and that are on picks or on outbound bins (new field "Reserved Pick & Ship Qty." in table 337 Reservation Entry)

### ***Where the Calculation is Used***

The enhanced calculation above applies to reservations made in the following documents:

- Sales Order
- Sales Invoice
- Service Invoice
- Transfer Order
- Purchase Credit Memo
- Purchase Return Order
- Item Journal Line
- Production Order
- Production Order Component
- Requisition Worksheet
- Cross-Dock opportunity window

A procedure was created in code unit 99000845 Reservation Management to calculate the quantity that is already reserved but on picks. In procedure UpdateStatistics in the same code unit. The program inserts this calculated quantity into the created or modified reservation entry and subtracts from the calculated field Total Available Quantity, which is also stored in the reservation entry.

## Limitations

It is not possible to sporadically reserve lot or serial numbers from inventory. The reason for this is that with the current design of the system, it is not possible to know the exact whereabouts of remaining quantities of item-tracked items in the warehouse when some entries contain item-tracking information and some do not. (free entry Item tracking code is not supported)

For example, suppose you create inventory in the WHITE location for 200 PCS of a lot-tracked item, TEST, with 2 lots, LOT01 and LOT02, of 100 PCS each. You then create a sales order for 50 PCS of the item, and you create a shipment and pick from LOT01, without specifying the lot number until you pick the item. If you were then to create a new sales order for 90 PCS of the item, specifying that you wanted to pick from LOT01, the program would allow you to reserve the full quantity from LOT01, even though a pick had already been registered 50 PCS of that lot.

The workaround to this problem is to always enter the item-tracking information when reserving items from the warehouse. This ensures that each entry contains item-tracking information so that the quantities available for item-tracked items can be properly calculated.

## Undo Receipt

Prior to the Critical Update release for version 3.60, the undo receipt functionality for posted receipts from purchases or sales returns has not been available for those users who receive their items into a WMS location with the Warehouse Receipt document.

The change to the Undo Receipt functionality allows users to undo a posted receipt of an item that was posted as received into the warehouse using a Warehouse Receipt. The precondition for the undo is that the item cannot yet be put-away. If the user has created a put-away but has not yet registered the lines, the program will give the user an error message stating that the receipt cannot be undone until the put-away lines have been deleted.

## *User Interface Changes*

This change does not affect the user interface. The Undo Receipt function continues to be available only from the Posted Purchase Receipt and from the Posted Sales Return Receipt forms.

## **To Undo a Warehouse Receipt**

When a user performs an undo receipt for an item that was received into the warehouse, the program performs the following steps:

1. Create a new line for a negative quantity in the posted receipt document.
2. Update the Qty. to Receive in the original document (purchase order or sales return order), just as it does in the current application.
3. Create a new line in the Posted Whse. Receipt for the negative quantity of the undone line.
4. Create and post a Warehouse Entry for the new negative line, thereby also creating a Warehouse Register.
5. If the Warehouse Receipt was only partially posted, the undone quantity will be added to the Qty. to Receive on the Warehouse Receipt line.
6. If the Warehouse Receipt line included cross-docking, the corresponding sales order lines will also be updated.

## Implementation Assistance

### WMS Setup

#### Bin Types

A bin is the smallest container unit in the WMS warehouse. You can restrict the activities that are allowed for a bin by assigning a bin type to it, and you use the Bin Type table to assign types to bins. There are eight possible bin types, and each type is a warehouse activity or a combination of two activities that can be assigned to a bin. They are as follows:

1. Receive
2. Put-away
3. Pick
4. Ship
5. Receive and Pick
6. Put-away and Pick
7. Receive and Ship
8. None

You can assign any code name you want to each one of these types, but you can only have a total of eight, and you cannot have more than one code for each bin type.

The program will not perform any activity other than that which is allowed for the bin by its bin type. For example, a bin that has the type Receive and Pick will be seen by the program as a bin that can only be received into and/or picked from. However, you can override these restrictions by manually assigning additional bin activities.

#### Creating Bins

The WMS warehouse model is organized using racks, sections, and levels. Each bin within the warehouse is identified by an individual bin code that is unique to that bin. The unique code is a number of 20 characters that is made up of the rack, section and level number where the bin is located.

#### Warehouse Classes

The program checks the warehouse class of a receiving and shipping bin so that when you work with warehouse classes and a default receiving/shipping bin, you must manually fill in the appropriate bins in the warehouse receipt and shipment lines. No warehouse class is checked for the production bins.

**Note:** When you set up an item with a warehouse class code, you must also assign the same warehouse class to a bin in the receiving zone; and any other area you want that item to reside in.

#### Setting Maximum Quantities for Bins

On each item card, you can assign a unit of measure (UOM) for each item: pieces, pallets, liters, grams, boxes and so forth. You can also have a base UOM for an item and specify larger UOMs that are based on it. For example, you can define a pallet to equal 16 pieces – the latter being the base UOM.

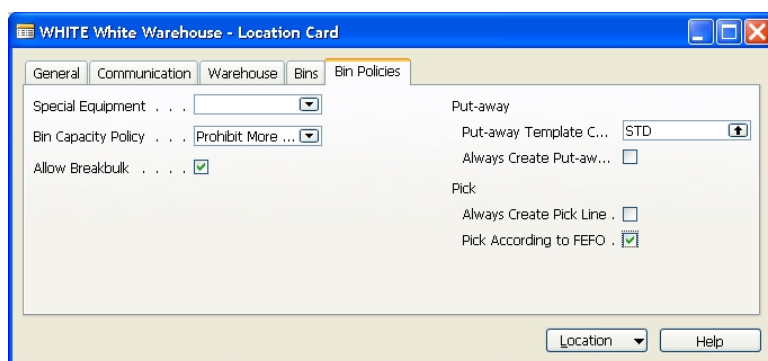
In a situation where you want to set a maximum quantity of a specific item to be stored in an individual bin and the item has more than one UOM, you must set the maximum quantity for every UOM that exists on the item card. For example, if a specific item has been set up on the item card for pieces and

pallets, then the Max.Qty. field for that item in the bin must also be in pieces and pallets. Otherwise, the program will not correctly calculate the allowable quantity for that bin.

**Note:** Before you set capacity restrictions for bin contents on a bin, you must first ensure that the UOM and dimensions of the item have been set up on the item card.

### Pick According to FEFO (Version 5.00)

The Bin Policies tab on the Location card introduces a check mark field, **Pick According to FEFO**. Placing a check mark in the field lets the program use the First-Expired-First-Out (FEFO) method to determine which item-tracked items to pick, according to their expiration dates. The program prioritizes items with the earliest expiration dates to be picked first.



*The new interface*

In order for FEFO to work in the program the location and items must meet the following criteria:

- The **Pick According to FEFO** field in the location card must contain a check mark. For locations that do not require pick, this field does not affect how items are selected for shipment.
- The item tracking code for the item must be set up for serial-number-specific or lot-specific warehouse tracking.
- The item entries must be registered and posted with expiration dates.

When all of these criteria are met, the program creates picks according to FEFO in pick and movement documents, only when the source document line does not already contain item tracking information about which serial or lot number should be used. If only part of the quantity of the line is defined by specific lot or serial numbers, the program uses FEFO to define the remaining quantity to be picked.

When picking by FEFO, the program selects available items that expire first, and the result is a temporary item tracking list based on the expiration date. If two items have the same expiration date, then the program selects the item with the lowest lot or serial number. If the lot or serial numbers are the same, the program selects the item that was registered first. The criteria for selecting a pick bin such as Bin Ranking or Break Bulk is applied to this temporary FEFO item tracking list.

**Note:** To create movements according to FEFO, leave the **From Bin Code** field empty in the Movement Worksheet.

## *Specific Features*

### **The Warehouse Reclassification Journal (Version 5.0)**

Besides being used as a movement journal, this journal can also be used for classification of bins, such as deleting or renaming bins. Restrictions have been implemented on the usage of reclassification journals when using the Item Tracking system in version 5.0. For Location using WMS, reclassification of item tracking information MUST start in the Whse Reclassification Journal, and registering this information will automatically trigger a posting of the Item Reclassification Journal. This has been improved in order to ensure rigorous synchronization between Whse entries and Item Ledger entries.

### **Filtering**

The Use Filters to Get Source Documents function is available from the Warehouse Receipt and the Warehouse Shipment windows. It enables the user to set up and use filters to retrieve relevant source document lines for creating receipts or shipments.

You can create different filter variations and save them for future use. You can create a new filter variation, save it, and give it a code name from the Source Document Filter card. Most of the fields in this card are filter fields; therefore, the program will accept any combination of characters in the non-date fields without validating them. For example, you can enter an invalid customer number in the Sell-to-Customer No. field and the program will accept it without giving you a message that the number is invalid.

### **Posting versus Registering**

Within the activities of the warehouse, WMS introduces a type of posting called registering. With this, you can register certain warehouse activities such as picks, put-aways and movements (within the warehouse). By registering something, you are creating an entry in the program that records an action completed in the warehouse. Registering differs from posting in that it does not create any entries in the general ledger or the inventory item ledger. In WMS, you can post a receipt and a shipment.

### **Cross-docking**

Cross-docking with WMS requires that cross-docking bins be set up per location to pick from and put away to. From the receipt side, the program can calculate any cross-dock opportunities that exist when an inbound order is received.

### **Changes in earlier versions**

The Cross-Dock Available field on the put-away line that exists in Microsoft Navision 3.10 (Form 5770, Table 5767) is not available in Microsoft Navision 3.60 WMS. The purpose of this field was to automatically notify the user before the item was put away that a cross-dock opportunity was available but, because the receiving and put-away process is somewhat different in WMS than in 3.10, this field has been removed in order to maintain a high level of performance and provide the user with updated relevant data for decision-making.

In WMS, a field corresponding to the old Cross-Dock Available field could have to be placed on the Receipt form, however, the program would have had to make a calculation for each line as you entered items during the receipt process, and the receipt process would therefore be slower than it now is in WMS. In Microsoft Navision 3.10, the Cross-Dock Available field was calculated during the posting of the receipt and, therefore, the user did not find the calculation a hindrance to performance. This field would have to be present on the Receipt form in WMS, but the program would have had to perform a

more complicated calculation than if it were from the put-away line. This, in turn, would decrease the performance of the WMS processes.

Regarding the issue of updated valid data, a check mark in such a field would only be valid for the moment that you entered the line on the receipt. In a multiple-user environment, this information could be outdated very quickly. In the 3.60 release, you get a valid quantity to cross dock from the Calculate Cross-Dock function because the calculation includes the quantity on outbound documents and the quantity already in the cross-dock bin.

## **Batch Job to Enable a Location for WMS**

In the current application, it is not possible to use the existing warehouse functionality (warehouse adjustments and the warehouse physical inventory journal) to enable an existing location with inventory to be a WMS location that uses zones and bins. With this Critical Update, running a specific batch enables an existing inventory location to use zones and bins and to operate as a WMS location.

The batch job to create a warehouse location creates initial warehouse entries for the warehouse adjustment bin for all items that have inventory in the location. These initial entries will be balanced when warehouse physical inventory entries are entered after the batch job is run. It is assumed that even for a conversion of an existing location, the business flow will include a subsequent physical inventory counting.

The physical inventory posting is not part of this batch job and must be done by the user manually after the batch job has completed.

As preconditions for running the batch job, it is necessary that all negative inventories and any open warehouse documents be cleared before the batch job runs. To help users identify the negative inventory and open warehouse documents, the Critical Update also contains a report that prints a list of items with negative inventory and prints which types of warehouse documents are open for the location.

### ***User Interface Changes***

In version 3.60, a new menu item was added to the Periodic Activities menu in the Warehouse Management main menu: Check on Negative Inventory. This option runs the report to check for items with negative inventory in a location and open warehouse documents.

In version 3.70, two new menu items were added to the Periodic Activities menu in the Warehouse Management main menu, Check on Negative Inventory and Create Whse. Location. The Check on Negative Inventory option runs the report to check for items with negative inventory. The Create Whse. Location option starts the batch job to enable the location to use zones and bins.

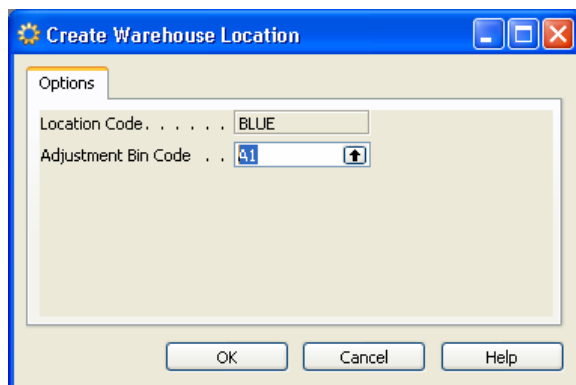
### ***Enabling a Location for WMS***

To enable a location to be a WMS location, the user will create a new bin (and, in version 3.60 a new zone) to act as the new adjustment bin for the location. The system manager will then enable the key group containing the necessary key for this batch job.

In version 3.60, the user will place a check mark in the "Use Zones and Bins" field on the Location Card. If the location contains inventory, the program will ask the user if the location should be enabled as a WMS location with a warning that this process is irreversible.

In version 3.70, to start the batch job, the user will run the Create Whse. Location batch job from the Periodic Activities on the Warehouse Management menu. As in 3.60, if the location contains inventory, the program will warn the user that the process is irreversible and ask for confirmation.

If the user confirms this message, the following request form will then open:



In this window, the user enters the Bin Code for the location's new adjustment bin. When the user clicks OK, the program will run through the following steps to enable the location to become a WMS location:

1. The program runs a series of checks to ensure that:
  - The bin entered in the Adjustment Bin Code field on the request form really exists in the Bin table.
  - There are no warehouse entries for this location.
  - There are no unposted warehouse documents for this location.
  - The field Adjustment Bin Code on the Location Card is empty.
2. Using the open entries for the specified location from the Item Ledger Entry (ILE) table, the program creates a sum for each combination of Item No., Variant Code, Unit of Measure Code, and, if necessary, Lot No. and Serial No. The program creates a temporary warehouse journal line for each of these combinations. The warehouse journal lines will have the following values:
  - Location Code = Location Code to be converted
  - Bin Code = Adjustment Bin Code of the location to be converted
  - Entry Type = Positive Adjustment
  - Item No. = Current Item No. from ILE
  - Variant Code = Current Variant Code from ILE if not empty
  - Unit of Measure Code = Current Unit of Measure Code from ILE
  - Lot No. = Current Lot No. from ILE, if not empty
  - Serial No. = Current Serial No. from ILE, if not empty
  - Quantity = the sum just calculated for this combination of fields

**NOTE:** If the program finds that one of these sums is negative, it will show an error stating that the location cannot have negative inventory.

3. Once all of the item ledger entries have been processed, the program will post the warehouse journal lines. In posting these lines, the program will perform the following:
  - Create warehouse entries to place all the items in the adjustment bin.
  - Create a warehouse register.
  - Set the Adjustment Bin Code field on the Location Card to the adjustment bin code entered on the request form for the batch job.

To see which items were added to the adjustment bin during the batch job, the user can run the Whse. Adjustment Bin report from the Reports menu on the Warehouse Management main menu.

Once the batch job has completed, the users must perform and post a warehouse physical inventory. The user can create zones and bins either before or after the conversion. The only bin that must be created before the conversion is the one that is to be used as the future adjustment bin.

It is recommended that the user run this batch job at a time when it will not impact the daily work in the system. This job processes each entry in the Item Ledger Entry table, and if there are a large number of item ledger entries, the job can last several hours.

For those locations that did not use warehouse management documents before the conversion, users must re-open and release any source documents that were partially received or partially shipped before the conversion.

## Glossary

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<b>adjustment bin</b>	A virtual bin that is used by the program for purposes of reconciling inventory adjustments.
<b>batch picking</b>	APICS: A method of picking orders in which order requirements are aggregated by product across orders to reduce movement to and from product locations. The aggregated quantities of each product are then transported to a common area where the individual orders are constructed.
<b>bin</b>	<p>A physical storage unit that is used for placing and storing items in. This can be anything from a small container box to an open space on a pallet rack.</p> <p>The smallest unit of the warehouse logical structure.</p> <p>APICS: 1. A storage device designed to hold small discrete parts. 2. A shelving unit with physical dividers separating the storage locations.</p>
<b>bin content</b>	The contents that are contained within the bin, including the physical quantity of items in the bin, as well as information about volume and status (e.g. defective). Bin content is the basis for the pick and put-away creation in the program.
<b>bin ranking</b>	A measure for prioritizing replenishment movements. This indicates which bin should be replenished first. The greater the number the higher the priority. For example, the program will replenish a bin with the bin ranking of 200 before it replenishes a bin with the ranking of 100.
<b>bin replenishment</b>	<p>Relocating material from a bulk storage area to an order pick storage area, and documenting this relocation. This is so that the proper quantity of items is maintained for that bin so that the performance of the warehouse is kept at an optimum level.</p> <p>APICS: <i>Replenishment: Relocating material from a bulk storage area to an order pick storage area, and documenting this relocation.</i></p>
<b>bin type</b>	A classification for the type of activity that is performed from a particular bin. For example, a bin that has the bin type "receiving," should contain only items that have been received into the warehouse but have not been put away. Some examples of bin types are: receiving, shipping, picking and put-away.

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<b>break-bulk</b>	APICS: <i>Dividing truckloads of homogeneous items into smaller, more appropriate quantities for use.</i> (See break-package.)
<b>break-package</b>	To break a larger unit of measure down to a lower unit of measure during the picking process in order to fulfill the correct quantity for the picking order.
<b>bulk storage</b>	APICS: <i>Large-scale storage for raw materials, intermediates, or finished products. Each vessel normally contains a mixture of lots and materials that may be replenished and withdrawn for use or pack-out simultaneously.</i>
<b>cross-docking</b>	To move items directly from the receiving area to the shipping area, thereby minimizing handling and storage and allowing sales orders to be shipped sooner. Additional Information: The program systematically compares inventory receipts with outstanding sales orders and suggests a cross-docking opportunity.
<b>cycle counting</b>	APICS: <i>An inventory accuracy audit technique where inventory is counted on a cyclic schedule rather than once a year. A cycle inventory count is usually taken on a regular defined basis (often more frequently for high-value or fast-moving items and less frequently for low-value or slow-moving items). Most effective cycle counting systems require the counting of a certain number of items every workday with each item counted at a prescribed frequency.</i>
<b>dedicated bin</b>	This is a synonym for fixed bin. It was used in previous versions in the Warehouse Management applications. (See fixed bin.)
<b>directed pick</b>	A process where information on the warehouse document directs the warehouse worker to the bin that is most efficient to pick from.
<b>directed put-away</b>	A process where information on the warehouse document directs the warehouse worker to the bin that is most efficient to put items away in.

<b>fixed bin</b>	A bin that has been specified to hold items which are dedicated to that particular bin. (In Microsoft Navision, an item is fixed to a bin, but a bin is not fixed to a specific item. Therefore, a fixed bin can still contain several different items.) <i>Syn: fixed-location storage (APICS): A method of storage in which a relatively permanent location is assigned for the storage of each item in a storeroom or warehouse Although more space is needed to store parts than in a random-location storage system, fixed locations become familiar, and therefore a locator file may not be needed. See: random-location storage.</i>
<b>floating bin</b>	Any bin that is not fixed to store a specific item or type of item and are used to store items as they come into the warehouse <i>Syn: random-location storage (APICS): A storage technique in which parts are placed in any space that is empty when they arrive at the storeroom. Although this random method requires the use of a locator file to identify part locations, it often requires less storage space than a fixed-location storage method. Syn: floating inventory location system. See: fixed-location storage.</i>
<b>flushing</b>	A method of issuing components from inventory. Methods include issuing the component when the production order is released (forward flushing), and issuing the component when the production order is finished (backward flushing).
<b>forward picking zone</b>	An area in the warehouse where items are to be picked from first. (See bin ranking)
<b>location</b>	A physical structure or place where inventory is received, stored and shipped. A location can be a warehouse, service car, showroom, plant or area within a plant.
<b>movement</b>	The physical or virtual movement of items from one bin to another bin within the same warehouse A virtual movement would take place, for example, in a bin content adjustment. Note: A movement does not affect the availability of an item, a pick or put-away does.
<b>order picking</b>	<i>APICS: Selecting or `picking` the required quantity of specific products for movement to a packaging area (usually in response to one or more shipping orders) and documenting that the material was moved from one location to shipping.</i>
<b>physical inventory</b>	<i>APICS: The determination of inventory quantity by actual count. Physical inventories can be taken on a continuous, periodic, or annual basis. Syn: annual inventory count, annual physical inventory.</i>

<b>picking</b>	<p>APICS: <i>The process of withdrawing from stock the components to make the products or the finished goods to be shipped to a customer.</i></p> <p>Note: In the WMS application, once an item has been registered as picked, the program considers it no longer available.</p>
<b>posting</b>	<p>The final registration of an amount on an account. Once you have posted in Microsoft Navision, the amount cannot be deleted, so errors can be corrected only by posting reversing or adjusting entries.</p>
<b>pick-to-stage</b>	<p>The process where the warehouse worker picks items and puts them away in a staging area to be arranged for shipping. The items are then picked again for shipment.</p>
<b>put-away</b>	<p>APICS: <i>Removing the material from the dock (or other location of receipt), transporting the material to a storage area, placing that material in a staging area and then moving it to a specific location, and recording the movement and identification of the location where the material has been placed.</i></p> <p>Note: In the WMS application, items are available to pick only after they have been registered as put-away.</p>
<b>put-away template</b>	<p>A form in the application that is used to setup the parameters that the program uses during the put-away process. Multiple templates may be entered and assigned for use per location or per item.</p>
<b>registering</b>	<p>Creating an entry in the program that records an action completed in the warehouse. For example, you can register the put-away, picking or movement of an item into or from a specific bin. Registering differs from posting in that it does not create any entries in the general ledger or the inventory item ledger.</p>
<b>staging</b>	<p>APICS: <i>Pulling material for an order from inventory before the material is required. This action is often taken to identify shortages, but it can lead to increased problems in availability and inventory accuracy. See: accumulating.</i></p>
<b>warehouse adjustment</b>	<p>The process of adjusting bin content records. A negative adjustment decreases the quantity of items in the bin. A positive adjustment increases the quantity of items in the bin.</p>
<b>warehouse adjustment bin</b>	<p>A virtual bin in the program that provides a place for the result of the adjustment calculation to be recorded. For example, if a negative quantity for an item exists the adjustment bin, then a positive adjustment has been made for that item in a bin in the warehouse. This quantity stays in the adjustment bin until the adjustment has been posted in the item journal.</p>

<b>warehouse assignment</b>	The procedure of prioritizing several pick and/or put-away requests in one or more warehouse documents and allocating tasks to users.
<b>warehouse class</b>	The categorization of items, zones, and bins according to special conditions or special equipment that are required for the storage of items. Examples of warehouse classes can be: frozen, dry, hazardous, and so on.
<b>warehouse instructions</b>	Instructs the warehouse personnel what items to pick or put-away and where and when to perform those activities.
<b>warehouse receipt</b>	The physical acceptance and recording in the program of an item arriving into a warehouse location.
<b>warehouse request</b>	An internal system table that contains references to warehouse source documents that are ready for shipment or receipt. Used to initiate warehouse processes.
<b>warehouse shipment</b>	The act of shipping items from a warehouse location and recording the shipment in the program.
<b>zone</b>	A continuous area within a warehouse location that is usually distinguished from adjoining areas by the function for which it is used.

## Appendix A: Demonstration Data Specifications

(Date: May 8, 2002)

This is the specification for all the required demonstration data for the Warehouse Management

Systems functionality. The demonstration data serves several purposes: training developers can use it to create scenarios for training purposes; training instructors can use it in their training courses for Microsoft Certified Business Solutions Partners; and sales persons can use it to demonstrate the functionality to potential customers.

### Goals

It should be possible to perform scenarios for basic warehouse management processes without the need for further setup or change; this includes all use cases in the functional specification (except for the Set Up use case).

All forms must have valid data.

- **Data must be adjusted and balanced to each other.**
- **Data have to include ongoing orders.**
- **Data should be based on source documents.**

### Setup Forms

#### Warehouse Mgt. Setup

WMS Numbering	Number series
Whse. Receipt Order number series	WMS-RCPT
Posted Receipt Order number series	WMS-RCPT+
Whse. Shipment Order number series	WMS-SHIP
Posted Whse. Shipment Order number series	WMS-SHIP+
Put-away Order number series	WMS-PUT
Posted Put-away Order number series	WMS-PUT+
Pick Order number series	WMS-PICK
Pick Order number series	WMS-PICK+
WHSE. Instructions Number series	INSTRDOC

### Put-away templates

#### STD

Dedicated	Floating	Find Same Item	Unit of Measure Code Match	Find Bin less than Min. Qty	Find Empty Bin
True		True	True	True	
True		True	True		
True					True
	True	True	True		
	True	True			

Dedicated	Floating	Find Same Item	Unit of Measure Code Match	Find Bin less than Min. Qty	Find Empty Bin
	True				True
	True				

## VAR

Dedicated	Floating	Find Same Item	Unit of Measure Code Match	Find Bin less than Min. Qty	Find Empty Bin
	True	True	True		
	True				True
	True				

## Location Card

### White Location

Field text	Code
Code	WHITE
Name	White Warehouse
Address	Merrily Grove Avenue 6
Post code	GB-V295
City	Onbrook
Country/region	GB
Phone	+44-(0)50 4567 9771
Use WMS	True
Receipt Zone code	Receive
Receipt Bin code	W-08-0001
Shipment Zone code	Ship
Shipment Bin code	W-09-0001
Adjustment Zone code	Adjustment
Adjustment Bin code	W-11-0001
Production Zone code	Production
Open shop floor bin no	W-07-0001
Inbound Production Bin	W-07-0002
Outbound Production Bin	W-09-0003
Check Bin capacity	Prohibit excess
Allow break bulk	Checked
Default Adjustment Zone	QA
Put Away Template Code	STD
Autofill qty. To handle	True

## Bin Type

The following Bin Types will be created.

Code	Description	Receive	Ship	Put Away	Pick
CROSS-DOCK	Cross-Docking	TRUE	TRUE		
PICK	Pick				TRUE
PUTPICK	Put Away and Pick			TRUE	TRUE
PUT AWAY	Pick type correct?			TRUE	
QC	No type				
RECEIVE	Receive type	TRUE			
SHIP	Ship type		TRUE		
Stage	Stage	TRUE			TRUE

## Special Equipment

The following Special Equipment will be created.

Code	Description
HT1	Hand truck one
HT2	Hand truck two
LIFT	Lift

## Warehouse Classes

Code	Description
Heated	Heated to 15 degrees Celsius
Frozen	- 8 degrees Celsius
Cold	2 degrees Celsius
Dry	Not to exceed 60 % humidity
Nonstatic	Anti static area

## Zones

Location Code	Code	Description	Bin Types Code	Special Equip.	Zone Ranking
White	BULK	Storage Zone	PUT AWAY	LIFT	50
White	PICK	Picking Zone	PUTPICK		100
White	RECEIVE	Receiving Zone	RECEIVE	HT1	10
White	SHIP	Shipping Zone	SHIP	HT2	10
White	QC	Quality Assurance Zone	QC		0
White	Stage	Staging Zone	PICK		5
White	ADJUST MENT	Virtual for Adjustment	QC		0
White	PRODUC TION	Production	QC	LIFT	0

## Bins

### Erecting bins for White BULK

Bin No.	Maximum Cubage	Maximum Weight	Whs. Class code	Bin Ranking	Fixed	Item no.	Min qty.	Max qty.	UOM
W-05-0001	1500	1000	Heated	60	Yes	LS-MAN-10		2500	Pcs
W-05-0002	1500	1000	Heated	60	Yes	LS-S15		500	pcs
W-05-0003	1500	1000	Heated	60	Yes	LS-10PC		400	box
W-05-0004	1500	1000	Heated	60	Yes	LS-10PC		400	box
W-05-0005	1500	1000	Heated	60	Yes	LS-120		30	pcs
W-05-0006	1500	1000	Heated	50	Yes	LS-120		30	pcs
W-05-0007	1500	1000	Heated	50	Yes	LS-150		20	pcs
W-05-0008	1500	1000	Heated	50	Yes	LS-150		20	pcs
W-05-0009	1500	1000	Heated	50	Yes	LS-2		1200	box
W-05-0010	1500	1000	Heated	50	Yes	LS-75		40	pcs
W-05-0011	1500	1000	Heated	50	Yes	LS-75		40	pcs
W-05-0012	1500	1000	Heated	50					
W-05-0013	3000	2000	Heated	50					
W-05-0014	3000	2000	Heated	50					
W-05-0015	3000	2000	Heated	50					
W-05-0016	3000	2000	Heated	50					
W-05-0017	3000	2000	Heated	50					

### Erecting bins for White PICK

Bin No.	Max. Cubage	Max. Weight	Whs. Class code	Bin Ranking	Fixed	Item no.	Min qty.	Max qty.	UOM
W-01-0001	2500	15000	Heated	100	Yes	LS-75	12	40	pcs
W-01-0002	250	150	Heated	90	Yes	LS-75	2	8	pcs
W-01-0003	250	150	Heated	90	Yes	LS-10PC	100	400	box
W-02-0001	2500	15000	Heated	100	Yes	LS-120	10	30	pcs
W-02-0002	250	150	Heated	90	Yes	LS-120	6	10	pcs
W-02-0003	250	150	Heated	90	Yes	LS-S15	10	50	pcs
W-03-0001	2500	15000	Heated	100	Yes	LS-150	10	20	pcs
W-03-0002	280	200	Heated	90	Yes	LS-150	2	6	pcs
W-03-0003	280	200	Heated	90	Yes	LS-2	20	200	box
W-04-0001	250	150	Heated	100	Yes	LS-10PC	10	40	box
W-04-0002	250	150	Heated	90	Yes	LS-MAN-10	1000	2500	pcs
W-04-0003	250	150		90					
W-04-0004	250	150		90					
W-04-0005	250	150		90					
W-04-0006	250	150		90					
W-04-0007	250	150		90					
W-04-0008	250	150		90					
W-04-0009	250	150		90					
W-04-00010	250	150		90					
W-04-00011	250	150		90					
W-04-00012	250	150		90					
W-04-00013	250	150		90					
W-04-00014	250	150		90					
W-04-00015	250	150		90					

**Erecting bins for White RECEIVE**

<b>Bin No.</b>	<b>Maximum Cubage</b>	<b>Maximum Weight</b>
W-08-0001	10000	10000
W-08-0002	10000	10000
W-08-0003	10000	10000
W-08-0004	10000	10000

**Erecting bins for White SHIP**

<b>Bin No.</b>	<b>Maximum Cubage</b>	<b>Maximum Weight</b>
W-09-0001	20000	30000
W-09-0002	20000	30000
W-09-0003	20000	30000
W-09-0004	20000	30000
W-09-0005	20000	30000
W-09-0006	20000	30000

**Erecting bins for White QC**

<b>Bin No.</b>	<b>Maximum Cubage</b>	<b>Maximum Weight</b>
W-10-0001	20000	30000
W-10-0002	20000	30000

**Erecting bins for STAGE**

<b>Bin No.</b>	<b>Maximum Cubage</b>	<b>Maximum Weight</b>
W-06-0001	10000	30000
W-06-0002	10000	30000
W-06-0003	3000	3000
W-06-0004	3000	3000
W-06-0005	300	300
W-06-0006	300	300

**Erecting bins for Bins for Production**

<b>Bin No.</b>	<b>Maximum Cubage</b>	<b>Maximum Weight</b>
W-07-0001	20000	30000
W-07-0002	20000	30000
W-07-0003	20000	30000
W-07-0004	20000	30000

**Erecting bins for Bins for Adjustment**

<b>Bin No.</b>	<b>Maximum Cubage</b>	<b>Maximum Weight</b>
W-11-0001		
W-11-0002		

The adjustment bin is an "account" bin, it is not really physically existing, therefore max. cubage and weight should not be defined.

## Physical Inventory

### Phys. Invt. Cycles

Code	Description	Count frequency
FAST	Fast movers or high value	6
Normal	Normal sale or medium value	2
SLOW	Slow movers or low value	1

## Dynamic Data

### Items

#### Item No.: LS-75

Field Name	Value
No.	LS-75
Description	Loudspeaker, Cherry, 75 W
Base Unit of Measure	PCS
Unit of Measure	PCS – Qty. Per Unit of Measure =1
UoM Length	2
UoM Width	2
UoM Height	4
Total Volume	16
Total Weight	16
Unit of Measure	Pallet – Qty. Per Unit of Measure = 16
UoM Length	8
UoM Width	4
UoM Height	8
Total Volume	256
Total Weight	256
Costing Method	FIFO
Unit Cost	36,00
Unit price	79,00
Gen.Prod.posting group	Retail
VAT Prod.posting group	VAT25
Inventory posting group	RESALE
Sales Unit of Measure	PCS
Purchase Unit of Measure	PALLET
Put-away Unit of Measure	PALLET

#### Item No.: LS-120

Field Name	Value
No.	LS-120
Description	Loudspeaker, Black, 120 W
Base Unit of Measure	PCS
Unit of Measure	PCS – Qty. Per Unit of Measure =1

Field Name	Value
UoM Length	3
UoM Width	3
UoM Height	6
Total Volume	54
Total Weight	66
Unit of Measure	Pallet – Qty. Per Unit of Measure =12
UoM Length	9
UoM Width	6
UoM Height	12
Total Volume	648
Total Weight	780
Costing Method	FIFO
Unit Cost	45,00
Unit price	88,00
Gen.Prod.posting group	Retail
VAT Prod.posting group	VAT25
Inventory posting group	RESALE
Sales Unit of Measure	PCS
Purchase Unit of Measure	PCS
Put-away Unit of Measure	PCS

**Item No.: LS-150**

Field Name	Value
No.	LS-150
Description	Loudspeaker, Cherry, 150 W
Base Unit of Measure	PCS
Unit of Measure	PCS – Qty. Per Unit of Measure =1
UoM Length	3
UoM Width	5
UoM Height	6
Total Volume	90
Total Weight	99
Unit of Measure	Pallet – Qty. Per Unit of Measure =6
UoM Length	6
UoM Width	5
UoM Height	12
Total Volume	360
Total Weight	400
Costing Method	FIFO
Unit Cost	72,00
Unit price	129,00
Gen.Prod.posting group	Retail
VAT Prod.posting group	VAT25
Inventory posting group	RESALE
Sales Unit of Measure	PCS
Purchase Unit of Measure	PCS

Field Name	Value
Put-away Unit of Measure	PCS

**Item No.: LS-10PC**

Field Name	Value
No.	LS-10PC
Description	Loudspeakers, White for PC
Base Unit of Measure	Box
Unit of Measure	Box – Qty. Per Unit of Measure =1
UoM Length	2
UoM Width	2,5
UoM Height	1
Total Volume	5
Total Weight	4
Costing Method	FIFO
Unit Cost	25,00
Unit price	59,00
Gen.Prod.posting group	Retail
VAT Prod.posting group	VAT25
Inventory posting group	RESALE
Sales Unit of Measure	BOX
Purchase Unit of Measure	BOX
Put-away Unit of Measure	BOX

**Item No.: LS-Man-10**

Field Name	Value
No.	LS-Man-10
Description	Manual for Loudspeakers
Base Unit of Measure	PCS
Unit of Measure	PCS Unit of Measure =1
UoM Length	1
UoM Width	1
UoM Height	1
Total Volume	1
Total Weight	1,2
Costing Method	FIFO
Unit Cost	12,00
Unit price	0,00
Gen.Prod.posting group	Retail
VAT Prod.posting group	VAT25
Inventory posting group	RESALE
Sales Unit of Measure	PCS
Purchase Unit of Measure	PCS
Put-away Unit of Measure	PCS

**Item No.: LS-2**

<b>Field Name</b>	<b>Value</b>
No.	LS-2
Description	Cables for Loudspeakers
Base Unit of Measure	Box
Unit of Measure	Box Unit of Measure =1
UoM Length	1
UoM Width	1
UoM Height	1,1
Total Volume	1,1
Total Weight	0,9
Costing Method	FIFO
Unit Cost	15,00
Unit price	21,00
Gen.Prod.posting group	Retail
VAT Prod.posting group	VAT25
Inventory posting group	RESALE
Sales Unit of Measure	BOX
Purchase Unit of Measure	BOX
Put-away Unit of Measure	BOX

**Item No.: LS-S15**

<b>Field Name</b>	<b>Value</b>
No.	LS-S15
Description	Stand for Loudspeakers LS-150
Base Unit of Measure	PCS
Unit of Measure	PCS Unit of Measure =1
UoM Length	2
UoM Width	3
UoM Height	3
Total Volume	18
Total Weight	26
Costing Method	FIFO
Unit Cost	45,00
Unit price	79,00
Gen.Prod.posting group	Retail
VAT Prod.posting group	VAT25
Inventory posting group	RESALE
Sales Unit of Measure	PCS
Purchase Unit of Measure	PCS
Put-away Unit of Measure	PCS

### Items used for Production order

Data are equal to item LS-2 with the following exceptions:

Field	Value
UOM:	PCS
Purchase	UoM
Sales	UoM

Item	Description		Requisition system	Requisition method code
LS-100	Loudspeaker 100W Oakwood Deluxe		Prod. order	M-T-S
LSU-15	Bass speaker unit 15" 100W		Purchase	Purchase
LSU-8	Middletone speaker unit 8" 100W		Purchase	Purchase
LSU-4	Tweeter speaker unit 4" 100W		Purchase	Purchase
FF-100	Frequency filter for LS- 100		Purchase	Purchase
C-100	Cabling for LS-100		Purchase	Purchase
HS-100	Housing for LS-100, Oakwood 120 liters		Purchase	Purchase
SPK-100	Spike for LS-100		Purchase	Purchase

### BOM

LS-100 (Base UOM 1)	Unit	Quantity
	LSU-15	1
	LSU-8	1
	LSU-4	1
	FF-100	1
	C-100	1
	HS-100	1
	SPK-100	4

### Item Variant

Item No.	Variant Code	Description
LS-75	LS-75-B	Black
LS-10PC	LS-10PC-B	Black

### SKU on White location

Item No.	Variant Code	Put-away template code	Put-away UoM	Requisition system	Vendor no.	Reorder point	Reorder quantity
LS-75	LS-75-B	STd.	Pcs.	Purchase	30000	12	40
LS-120		STd.	Pcs.	Purchase	40000	10	36
LS-150		STd.	Pcs.	Purchase	50000	6	32
LS-10PC	LS-10PC-B	STd.	Pcs.	Purchase	40000	30	100
LS-Man-10		Var.	Pcs.	Purchase	30000	200	100
LS-2		Var.	Box	Transfer	Green	100	60
LS-S15		Var.	Pcs.	Transfer	Blue	50	30

### Customers

	New Customer 1	New Customer 2	New Customer 3
No.	35654165	843613654	93466354
Name	HiFi Shop	Sound&Vision	The Device shop
Address	28 Baker street	159 Fairway	273 Basin Street
City	London	London	London
Country/Region code	GB	GB	GB
Search name	HiFi Shop	Sound&Vision	Electronics ltd. Correct?
Sales person Code	JR	PS	PS
Respons. center	London	London	London
Gen.bus. posting group	National	National	National
VAT bus. posting group	National	National	National
Customer posting group	Domestic	Domestic	Domestic
Application Method	Manual	Manual	Manual
Payment term code	1M(8D)	1M(8D)	14Days
Reminder terms code	Domestic	Domestic	Domestic
Fin. Charge terms	1.5 DOM.	1.5 DOM.	1.5 DOM.
Location	WHITE	WHITE	WHITE
Combine shipments	Checked	Checked	Checked
Reserve	OPTIONAL	OPTIONAL	OPTIONAL
Shipping Advice	Partial	Complete	Partial
Shipment method code	EXW	EXW	EXW
Shipping Agent code	DHL	FEDEX	UPS

### Vendors

	New Vendor 1	New Vendor 2	New Vendor 3
No	6735654165	678465466	26498498
Name	Gadgets Ltd.	Electronics ltd.	Walker
Address	8 One way	354 Oxford street	116 Kensington Rd.
City	London	London	London
Country/Region code	GB	GB	GB

Search name	HiFi Shop correct?	Electronics Ltd.	Walker
Purchaser Code	RQ	RQ	RQ
Respons. Center	London	London	London
Gen. bus. posting group	National	National	National
VAT bus. posting group	National	National	National
Customer posting group	Domestic	Domestic	Domestic
Application Method	Manual	Manual	Manual
Payment term code	COD	COD	COD
Priority	1	2	3
Locations code	WHITE	WHITE	WHITE
Shipment method code	CIF	CPT	CFR
Currency code			

### Purchase orders (Location WHITE)

P.O.no.	Vendor no.	Item no.	Quantity	Status
104001	30000	LS-Man-10	100	Received, put-away printed
104001	30000	LS-75	50	Received, put-away printed
104002	40000	LS-120	10	Received, put-away printed
104002	40000	LS-10PC	22	Received, put-away printed
104003	50000	LS-150	8	Received, put-away printed
104004	40000	LS-10PC	40	Released, not Received
104004	40000	LS-150	20	Released, not Received
104005	50000	LS-150	12	Released, not Received
104006	30000	LS-Man-10	50	Released, not Received
104006	30000	LS-2	100	Released, not Received
104007	40000	LS-S15	20	Released, not Received
104008	6735654165	LS-75	20	Released, not Received
104008	6735654165	LS-120	10	Released, not Received
104008	6735654165	LS-150	12	Released, not Received
104009	678465466	LS-Man-10	100	Released, not Received
104009	678465466	LS-10PC	60	Released, not Received
104010	26498498	LS-2	40	Released, not Received
104010	26498498	LS-10PC	100	Released, not Received

### Sales orders (Location WHITE)

S.O. no.	Cust. no.	Item no.	Quantity	Status
2001	10000	LS-Man-10	4	Picked
2002	20000	LS-75	10	Picked
2002	20000	LS-120	6	Picked
2002	20000	LS-10PC	20	Picked
2003	30000	LS-150	8	Picked
2004	40000	LS-10PC	30	Picked
2005	50000	LS-150	16	Released
2005	50000	LS-150	22	Released
2006	10000	LS-Man-10	10	Released

S.O. no.	Cust. no.	Item no.	Quantity	Status
2007	20000	LS-2	20	Released
2007	20000	LS-S15	12	Released
2007	20000	LS-Man-10	30	Released
2007	20000	LS-75	16	Released
2008	30000	LS-120	10	Released
2009	40000	LS-10PC	12	Released
2009	40000	LS-150	8	Released
2010	50000	LS-10PC	20	Open
2011	10000	LS-150	10	Open
2012	20000	LS-150	8	Open
2012	20000	LS-Man-10	20	Open
2012	20000	LS-2	10	Open
2013	30000	LS-S15	12	Open
2014	40000	LS-75	8	Open
2015	50000	LS-120	4	Open
2016	35654165	LS-75	4	Open
2016	35654165	LS-120	2	Open
2016	35654165	LS-150	2	Open
2017	843613654	LS-Man-10	1	Open
2018	93466354	LS-10PC	2	Open
2018	93466354	LS-2	2	Open

#### Transfer orders to White

Tr.O. no.	Location	Item no.	Quantity	Status
1004	Blue	LS-75	11	Released, Shipped
1005	Green	LS-120	13	Released, Shipped

#### Transfer orders from White

Tr.O. no.	Location	Item no.	Quantity	Status
1006	Red	LS-150	12	Released
1007	Yellow	LS-10PC	14	Released

#### Production Order:

Released Production order (Location WHITE )

Released Production order: Source no. LS-100

R.P.O.no.	Item no.	Quantity	Status	Location
1011100	LS-100	15	Released	WHITE
1011101	LS-100	12	Released	WHITE
1011102	LS-100	10	Released	WHITE

## Items by location

Items in Receive zone and Ship zone must be based on a source document.

Location	Zone	Bin	Item	Quantity
WHITE	BULK	W-05-0001	LS-75	12
WHITE	BULK	W-05-0002	LS-120	6
WHITE	BULK	W-05-0003	LS-150	7
WHITE	BULK	W-05-0004	LS-10PC	38
WHITE	BULK	W-05-0010	LS-Man-10	100
WHITE	BULK	W-05-0011	LS-2	200
WHITE	BULK	W-05-0012	LS-S15	60
WHITE	PICK	W-01-0001	LS-75	14
WHITE	PICK	W-02-0001	LS-120	22
WHITE	PICK	W-02-0003	LS-150	37
WHITE	PICK	W-05-00012	LS-10PC	58
WHITE	PICK	W-05-00013	LS-Man-10	122
WHITE	PICK	W-05-00014	LS-2	17
WHITE	PICK	W-04-00015	LS-S15	12
WHITE	RECEIVE	W-08-0001	LS-Man-10	100
WHITE	RECEIVE	W-08-0002	LS-75	10
WHITE	RECEIVE	W-08-0003	LS-120	10
WHITE	RECEIVE	W-08-0004	LS-10PC	22
WHITE	RECEIVE	W-08-0004	LS-150	8
WHITE	SHIP	W-09-0001	LS-Man-10	4
WHITE	SHIP	W-09-0001	LS-75	10
WHITE	SHIP	W-09-0001	LS-120	6
WHITE	SHIP	W-09-0002	LS-10PC	20
WHITE	SHIP	W-09-0002	LS-150	8
WHITE	SHIP	W-09-0002	LS-10PC	30
WHITE	QA	W-10-0001	LS-150	1
WHITE	STAGE	W-06-0001	LS-Man-10	40
BLUE/OWNLOG.	N/A	N/A	LS-75	11
GREEN/OWNLOG.	N/A	N/A	LS-120	13
WHITE	BULK	W-05-0007	LS-100	32
WHITE	BULK	W-05-0008	LSU-15	28
WHITE	BULK	W-05-0009	LSU-8	15
WHITE	BULK	W-05-0010	LSU-4	100
WHITE	BULK	W-05-0011	FF-100	42
WHITE	BULK	W-05-0012	C-100	33
WHITE	BULK	W-05-0013	HS-100	56
WHITE	BULK	W-05-0014	SPK-100	78

## Warehouse Movement

These movements must be based on a movement journal:

### Header

No	Location	ADMIN
WM000001	WHITE	

### Lines

Activity	Item no.	Zone	Bin	Qty.	Qty. to handle
Pick	LS-120	PICK	W-02-0001	2	0
Put-away	LS-120	QC	W-10-0001	2	0
Pick	LS-Man-10	BULK	W-05-0010	40	0
Put-away	LS-Man-10	Stage	W-06-0001	40	0

## Warehouse Pick

Blank.

## Pick worksheet

Blank.

## Warehouse Put-away

Blank.

## Put-away worksheet

Blank.

## Warehouse Source Filter selection

Field	Value
Code	DHL_FILTER
Description	Filters for Shipping agent DHL
Shipping Agent code filter	DHL

Field	Value
Code	OwnLog
Description	Filters for Transfer order with Own Logistics
In Transit code filter	Own Logistics

Field	Value
Code	Customers
Description	All customers
Sell to customer no. filter	1..999999

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