



Use Case: Metal Manager



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1. Metal Manager Introduction

1.1. Modules

Metal-Manager is a tool that contains three different functional parts (modules):

- Calculation Management
- Shop floor Management
- Quality Control Management

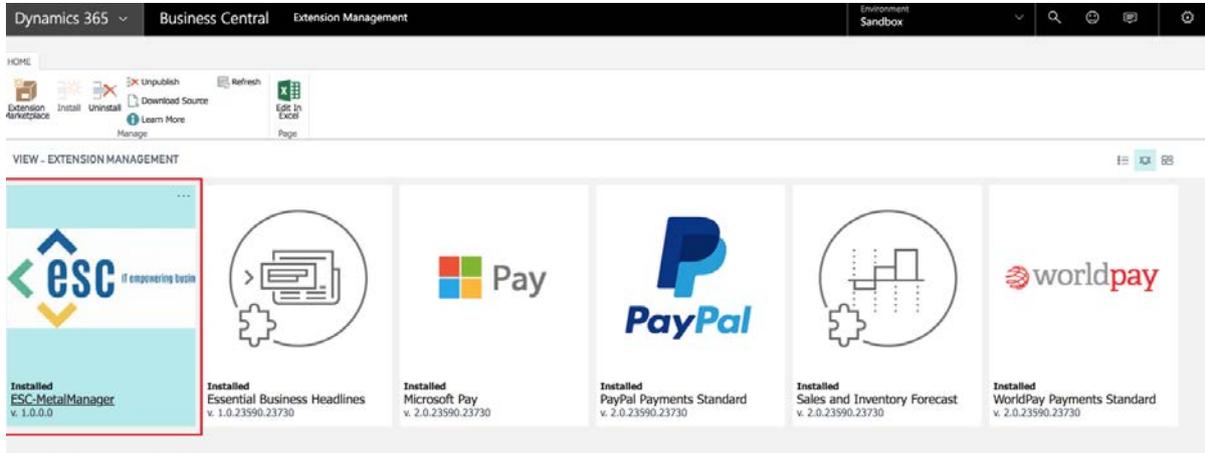
In this document, a use-case will be described for each of these modules.

1.2. Environment

This use-case example can be followed using a fresh Microsoft Dynamics 365 Business Central sandbox environment with the Belgian localization. This example is described in English but should also work in the NLB language configuration.

1.3. Extensions

Metal-Manager comes as a single Business Central Extension:



EXTENSION UNINSTALLATION



UNINSTALL EXTENSION

Uninstall extension to remove added features.

Name	ESC-MetalManager
Description	
Version	1.0.0.0
Publisher	ESC BVBA

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[Help](#)



2. Calculation Management

2.1. Flow

Metal-Manager is a tool that is designed for a specific type of customers who are working in the metal industry. A typical flow for this kind of companies is as follows:

1. Price request (quote) comes in from a (potential) customer, this is typically a technical drawing or a spec sheet.
2. A calculation is made that results in quantity specific prices that are then communicated back to the customer. This calculation can be created from scratch or based on a previous calculation.
3. When the customer agrees with the quote and orders the metal pieces, the item is created. The item should not require any more attention from the user, it should be fully configured and ready for use in a production environment.

2.2. Example Context

Before we start this use-case we should first take a look at the specific example that is going to be used:



This metal part is a fairly simple object that is a typical product made by subcontractors of larger machine building companies. This is a good example of a product that is made by a potential Microsoft Business Central customer that could need an extension like Metal-Manager.

2.2.1. Raw Materials

The only raw material we need to manufacture this specific example is sheet metal. Sheet metal comes in different thicknesses and material types. A few examples:

- Galvanized steel 3000x1500x6
- Aluminum 1500x1000x5

This raw material arrives at the manufacturing site in standard form-factors. There can be sheet metal or rolled metal:



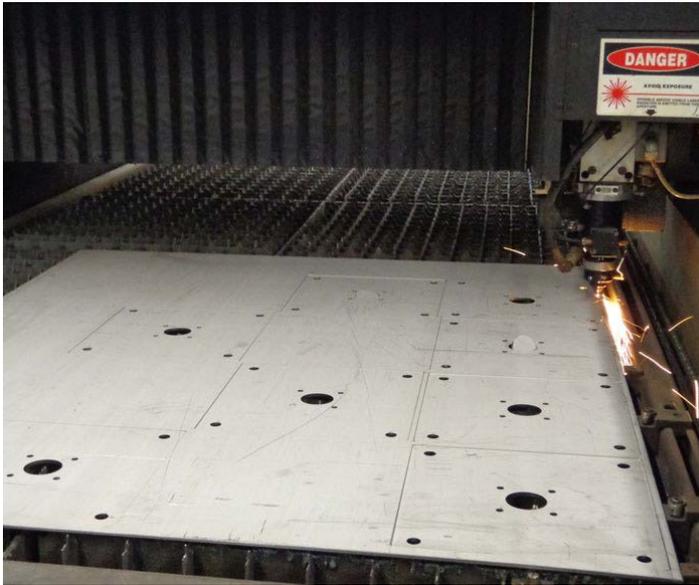
In our example we will manufacture this metal part using 6mm thick galvanized steel.

2.2.2. Manufacturing Process

In the vast majority of the cases (almost all cases) the manufacturing process results in a batch of the same parts. So, this is a serial manufacturing process. In this example we will perform the following routing actions on the sheet metal:

1. Laser cutting
2. Drilling
3. Deburring
4. Folding

2.2.2.1. Laser Cutting



As a first action in the manufacturing process the raw material (sheet metal) will be positioned on a laser cutting machine.

This machine can be programmed so it can cut the contours of our metal piece automatically, while leaving as few wastes of raw material as possible.

2.2.2.2. Drilling

The second action is drilling the holes that are needed to mount the piece to the rest of the assembly (a machine for example)

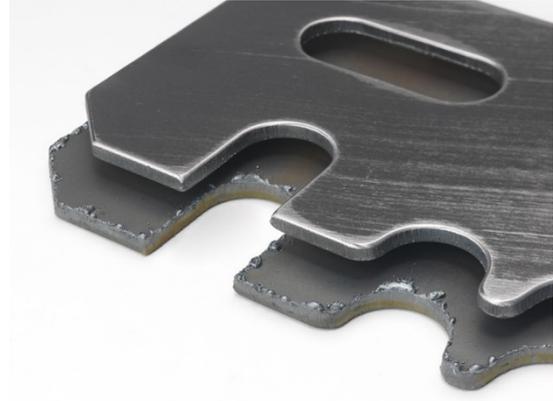
This is done as a second action because it is easier to drill holes in a flat piece of metal.



2.2.2.3. Deburring

Because the drilling process leaves burrs on the metal, we need to deburr it.

This is done using a deburring machine or a special drill-bit:



2.2.2.4. Folding

The last step in the manufacturing process is the folding of the sheet metal. This produces the end result. After this step the metal piece is finished, and it can then be shipped to the customer or put-away in the inventory.



2.3. Use-Case preparation

To be able to work your way through this use-case scenario, a few prerequisites must be met:

- User must have rights to the metal-manager extension
- Metal-Manager must be setup using the setup-wizard
- The raw material items should be available
- The work-centers and production environment in general should be setup properly.
- You will need a Business Central Premium setup.

In the following part of this document we will do the minimum that is needed to meet this prerequisite.

2.3.1. User-Rights for Metal-Manager

The user must have rights to the Metal-Manager extension. With the installation of the extension comes a permission set that can be added to the user rights of the test-user:

User Permission Sets

PERMISSION SET		DESCRIPTION	COMPANY	EXTENSION NAME
D365 BUS PREMIUM	...	Dyn. 365 Prem. Bus. Full Acc.	CRONUS BE	
D365 EXTENSION MGT	...	Dynamics 365 extensiebeheer	CRONUS BE	
LOCAL	...	Land-/regiospecifieke functie	CRONUS BE	
METALMANAGER-ALL	...	MetalManager		ESC-MetalManager

2.3.2. Raw Materials

In the item list, we need to add the item describing the sheet metal that is going to be used in the use-case. In this section of the document, only fields that are needed by the Metal-Manager extension are highlighted, all other fields follow the standard Business Central logic.

EDIT - ITEM CARD ×

1000 · Sheet Metal 6mm

Item Show less

No.	1000	Last Date Modified	23/08/2018
Description	Sheet Metal 6mm	GTIN	
Blocked	<input type="checkbox"/>	Item Category Code	DIV
Type	Inventory	Automatic Ext. Texts	<input type="checkbox"/>
Base Unit of Measure	STUKS		

Inventory Show more

Inventory	0	Unit Volume	0
Stockout Warning	Default (Yes)		

Costs & Posting Show less

COST DETAILS		POSTING DETAILS	
Costing Method	FIFO	Gen. Prod. Posting Group	DET.HANDEL
Standard Cost	0,00	VAT Prod. Posting Group	M3
Unit Cost	100,00	Inventory Posting Group	WEDERVERK
Indirect Cost %	0	Default Deferral Template	
Last Direct Cost	0,00	FOREIGN TRADE	
Net Invoiced Qty.	0	Tariff No.	
Cost is Posted to G/L	Yes		
Special Purch. Prices & Discounts	Create New...		

To be able to use this item we need some inventory. Therefore, we need to create an item journal line and post it:

HOME ACTIONS NAVIGATE

× Delete Post Print Get Standard Journals... Dimensions Print... Item Tracking Lines Edit in Excel

EDIT - ITEM JOURNAL

Batch Name: DEFAULT

POSTING DATE	ENTRYTYPE	DOCUMENT NO.	ITEM NO.	DESCRIPTION	LOCATION CODE	QUANTITY	UNIT OF MEASURE CODE	UNIT AMOUNT	AMOUNT	DISCOUNT AMOUNT	UNIT COST	APPLIES EN
23/08/2018	Positive Adjmt.	INIT	1000	Sheet Metal 6mm	WEST	15	STUKS	100,00	1 500,00	0,00	100,00	

2.3.3. Work Centers

To be able to perform this use-case we need to create 4 work centers.

- Laser
- Drill
- Deburr
- Fold

Only the highlighted fields are mandatory for Metal-Manager, the standard Business Central setup requirements also apply.

EDIT - WORK CENTER CARD

LASER · lasser Cutting

General

No. LASER
 Name lasser Cutting
 Work Center Group Code METAL
 Routing Link Code *

Alternate Work Center
 Search Name LASSEER CUTTING
 Blocked
 Last Date Modified 23/08/2018

Posting

Direct Unit Cost 1,00
 Indirect Cost % 0
 Overhead Rate 0,00
 Unit Cost 1,00
 Unit Cost Calculation Time
 Specific Unit Cost

Department Code
 Customergroup Code
 Subcontractor No.
 Flushing Method Manual
 Gen. Prod. Posting Group DIENSTEN

Scheduling

Unit of Measure Code MIN
 Capacity 1
 Efficiency 100
 Consolidated Calendar

Shop Calendar Code METAL-MGR
 Queue Time 0
 Queue Time Unit of Meas. Code

Note: The routing link field could be entered manually, but we will leave it open here because the Metal-Manager Setup-Wizard is able to do this setup automatically.

For this use-case we need the following list of work centers:

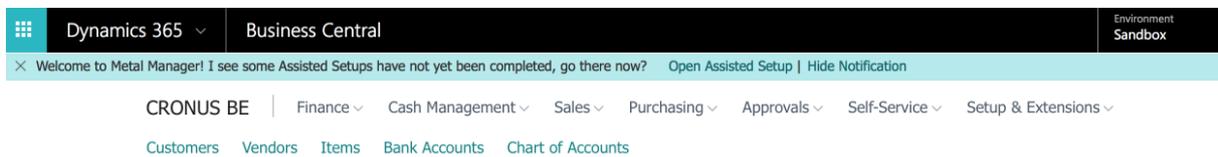
VIEW - WORK CENTER LIST + New

NO.	NAME	ALTERNATE WORK CENTER	WORK CENTER GROUP CODE	UNIT OF MEASURE CODE	CAPACITY	SHOP CALENDAR CODE	SEARCH NAME
LASER	lasser Cutting		METAL	MIN	1	METAL-MGR	LASSEER CUTTING
DRILL	Drilling		METAL	MIN	1	METAL-MGR	DRILLING
DEBURR	Deburring		METAL	MIN	1	METAL-MGR	DEBURRING
FOLD	Folding		METAL	MIN	1	METAL-MGR	FOLDING



2.3.4. Metal-Manager Setup-Wizard

After the user has been granted rights to the extension, the default role-center makes a remark about the lack of setup for the Metal-Manager module:



In this screen, click on the 'Open Assisted Setup' link. The Assisted Setup list page opens:

Set up Metal Manager Calculation	Not Completed
Set up Metal Manager Quality	Not Completed
Set up Metal Manager Shopfloor	... Completed

The Metal-Manager extension contains three Setup-Wizards:

- Set up Metal Manager Calculation
- Set up Metal Manager Quality
- Set up Metal Manager Shop floor

Remark: *The shop floor setup-wizard is completed by default. This is because there are no settings that need to be filled in. The Setup-Wizard could be run again to change the default settings.*

For this part of the use-case we only need to run the Set-up Metal Manager Calculation Assisted-Setup. Clicking on the start-setup function starts this Setup-Wizard:



A calculation is a new type of document that needs a number series setup. The setup-wizard can use a default no. series, that will be created by the setup-wizard itself, or another, user defined no. series. For this use-case we will use the default setting. Then click Next.

CALCULATION SETUP WIZARD  



Setup the default behaviour of a calculation. This can be changed per Calculation.

Standard Margin %	<input type="text" value="10,00"/>
Rounding Precision	<input type="text" value="0,01"/>

The Due Date Calculation Formula determines how long a Price Calculation is valid. The Resulting Calculation date will be transferred to the Due Date field in the Quote.

Due Date Calculation Formula	<input type="text" value="10D"/>
------------------------------	----------------------------------

The second step in the setup-wizard asks for the following settings:

- **Standard Margin %:** the default margin percentage that is applied to the cost prices that will be calculated, this gives us the sales price that is used on the quote.
- **Rounding Precision:** this field indicates the rounding precision that will be applied to the quantities that we will specify in de materials list of a calculation.
- **Due Date Calculation Formula:** When we write a quote to a customer, there will be a due date. This setup field indicates how long a quote will be valid.

After this setup is done, click next.

CALCULATION SETUP WIZARD  



In order to link work centers and machine centers to the materials that will be used while performing the routing steps we use routing links

How do you want to setup the routing link codes?

Default 

Since Metal-Manager uses the manufacturing module of Business-Central we need the routing link codes to be properly setup. This step in the setup-wizard makes sure that all work centers are linked to a routing link code correctly. When this option is left at default, the system will automatically create the missing routing link codes and link them to the work centers. When we use the manual option, the system will rely on the user to make sure all routing link codes are properly setup.

Click next.

CALCULATION SETUP WIZARD  



When creating a new calculation that is not based on an existing Item you can set a default Item Template.

(Optional)

ARTI000001 

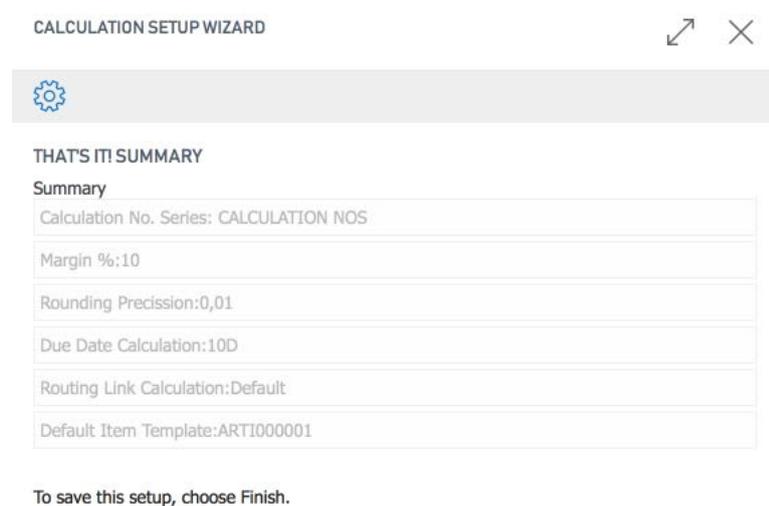
CODE	DESCRIPTION
ARTI000001	Artikel
ARTI000002	Service
ARTI000003	VRACHT
ARTI000004	Kantoormeubilair
ARTI000005	Diversen

+ New [Select from full list](#)

The next step in the setup-wizard asks for an optional item template code that will be used when we create a new item based on a calculation. When this field is left blank, users will be asked for an item template every time a new item is created.

Choose the ARTI000001 item template and click next.

The final screen in the Metal-Manager Setup-Wizard gives an overview of the chosen settings. Click Finish to save all settings and complete the wizard.



The screenshot shows a window titled "CALCULATION SETUP WIZARD" with a gear icon and window control buttons. Below the title bar is a grey header with a gear icon. The main content area is titled "THAT'S IT! SUMMARY" and contains a "Summary" section with a table of settings.

THAT'S IT! SUMMARY	
Summary	
Calculation No. Series:	CALCULATION NOS
Margin %:	10
Rounding Precision:	0,01
Due Date Calculation:	10D
Routing Link Calculation:	Default
Default Item Template:	ARTI000001

To save this setup, choose Finish.

2.3.5. Another setup

In the use-case we use a standard Business Central Cronus Customer template. This template misses some data that will be a problem while creating a quote from a calculation. If we do not correct this missing setup we will get the following error:

! Gen. Bus. Posting Group must have a value in Customer Template:
Code=BEDRIJF. It cannot be zero or empty.

OK

To correct this, we must go to the customer template list, select the 'Bedrijf' record and change it so it looks like this:

EDIT - CUSTOMER TEMPLATE CARD

BEDRIJF

General

Code	BEDRIJF	Customer Price Group	
Description	Zakelijke klant (bank)	Customer Disc. Group	
Contact Type	Company	Allow Line Disc.	<input checked="" type="checkbox"/>
Country/Region Code		Invoice Disc. Code	BEDRIJF
Territory Code		Prices Including VAT	<input type="checkbox"/>
Currency Code		Payment Terms Code	1M(BD)
Gen. Bus. Posting Group	BINNENLAND	Payment Method Code	BANK
VAT Bus. Posting Group	BINNENLAND	Shipment Method Code	
Customer Posting Group	BINNENLAND		

The Manufacturing Setup is also not set by default in a sandbox Cronus. The Manufacturing Setup page should look like this:

HOME			
EDIT - MANUFACTURING SETUP			
Manufacturing Setup			
General			
Normal Starting Time	<input type="text"/>	Planning Warning	<input type="checkbox"/>
Normal Ending Time	<input type="text"/>	Doc. No. Is Prod. Order No.	<input checked="" type="checkbox"/>
Preset Output Quantity	<input type="text" value="Expected Quantity"/>	Dynamic Low-Level Code	<input type="checkbox"/>
Show Capacity In	<input type="text" value="MIN"/>	Cost Incl. Setup	<input type="checkbox"/>
Numbering			
Simulated Order Nos.	<input type="text"/>	Work Center Nos.	<input type="text"/>
Planned Order Nos.	<input type="text"/>	Machine Center Nos.	<input type="text"/>
Firm Planned Order Nos.	<input type="text"/>	Production BOM Nos.	<input type="text" value="PRODBOM"/>
Released Order Nos.	<input type="text" value="RELPROD"/>	Routing Nos.	<input type="text" value="ROUTING"/>
Planning			
Current Production Forecast	<input type="text"/>	Combined MPS/MRP Calculation	<input type="checkbox"/>
Use Forecast on Locations	<input type="checkbox"/>	Components at Location	<input type="text"/>
Default Safety Lead Time	<input type="text"/>	Default Dampener Period	<input type="text"/>
Blank Overflow Level	<input type="text" value="Allow Default Calculation"/>	Default Dampener %	<input type="text"/>

All number series must be default no. series and have a valid configuration.

2.4. Use-Case walkthrough

2.4.1. Business Opportunity

Our customer asks us for a quote for the metal part that has been described in the section 'Example Context' of this document:



It is uncertain if this part will have to be manufactured or not, so it should not be in our item list yet. Metal-manager allows us to configure and calculate the price of this part without the need for it to be in the item list. In order to do so, we start from the contact card (if the potential customer is not yet in our customer list) or from the customer card. In this use-case we will start from a new contact.

2.4.2. Contact Creation

Create a contact describing the potential customer that is asking for a quote:

NEW - CONTACT CARD - CT000023 - METAL-MANAGER CUSTOMER ✕

CT000023 · Metal-Manager Customer

General Show more

Name	Metal-Manager Customer	Company Name	Metal-Manager Customer
Type	Company		

Communication Show more

ADDRESS	CONTACT
Address	Phone No.
Address 2	Mobile Phone No.
Post Code	Email
City	Home Page
Country/Region Code	Language Code

Address: Metalic street 4
 Post Code: 1000
 City: BRUXELLES
 Country/Region Code: BE
 Language Code: NLD

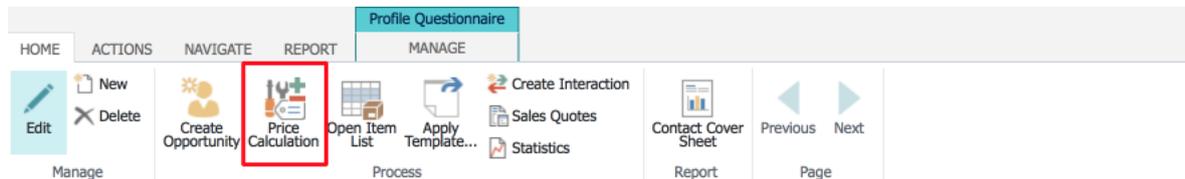
[Show Map](#)

Starting from this contact card we will create a new calculation sheet that describes the metal part.

2.4.3. Calculation

2.4.3.1. New Calculation Card

To create a new calculation, click on the button in the ribbon of the contact card:



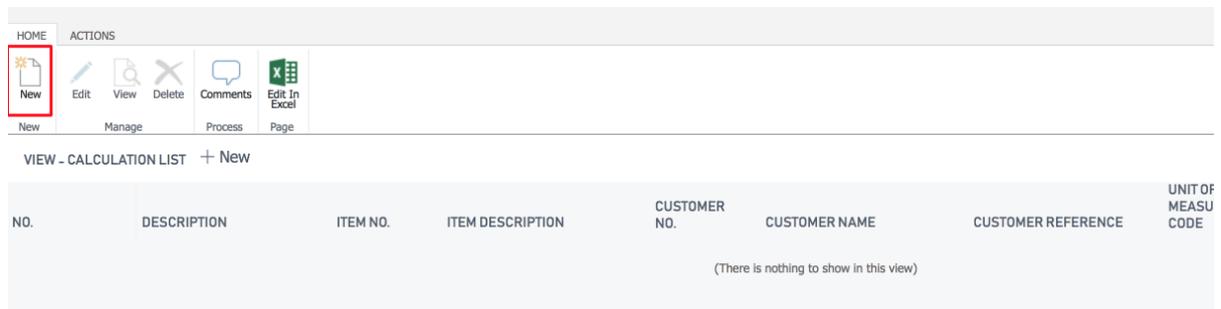
NEW - CONTACT CARD - CT000023 · METAL-MANAGER CUSTOMER

CT000023 · Metal-Manager Customer

General

Name	Metal-Manager Customer	Company Name
Type	Company	

This opens the list of existing calculations for this contact
(should be empty right now):



HOME ACTIONS

New Edit View Delete Comments Edit in Excel

New Manage Process Page

VIEW - CALCULATION LIST + New

NO.	DESCRIPTION	ITEM NO.	ITEM DESCRIPTION	CUSTOMER NO.	CUSTOMER NAME	CUSTOMER REFERENCE	UNIT OF MEASU CODE
(There is nothing to show in this view)							

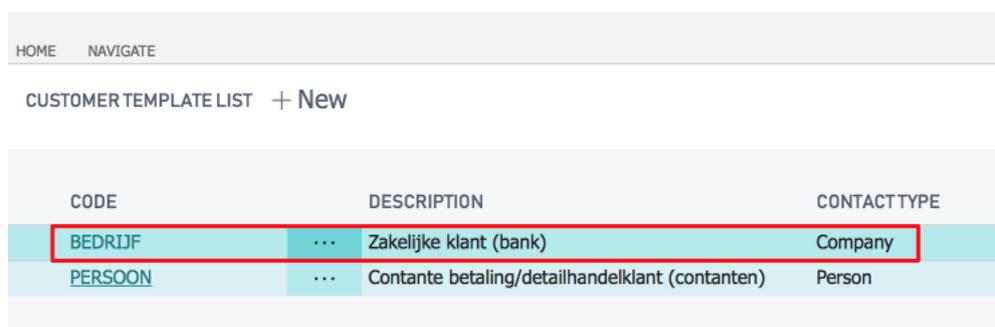
The 'new' button on the ribbon creates a new calculation for this contact, before the system can create a calculation however, it asks for a customer template:

? Do you want to select the customer template?

Yes

No

Note: This question enables the calculation to create a new customer when the calculation is validated, and the item is effectively ordered. This question is only shown when we start from a contact card that has no business-relation to an existing customer.



HOME NAVIGATE

CUSTOMER TEMPLATE LIST + New

CODE	DESCRIPTION	CONTACT TYPE
BEDRIJF	... Zakelijke klant (bank)	Company
PERSOON	... Contante betaling/detailhandelklant (contanten)	Person

When the customer template is chosen, the calculation screen opens:

EDIT - CALCULATION CARD		CONTACT	
C0000001		Contact No.	CT000023
General		Contact Name	Metal-Manager Customer
No.	C0000001	Customer Template Code	BEDRIJF
Description	Metal Part 001	CALCULATION	
Quote No.	-	Default Margin Percentage	10,00
ITEM	-	Calculation Date	23/06/2018
Item No.	-	Expiration Calculation	10D
Item Description	-	Expiration Date	2/09/2018
Unit of Measure Code	STUKS	Status	Open
Item Template	ART000001		
Net Weight	0,00		
Gross Weight	0,00		
CUSTOMER	-		
Customer No.	-		
Customer Name	-		
Customer Reference	-		

The calculation screen has the following data structure:

- Calculation with a **general** tab
- **Subpage 'Routing'**: that describes the steps to manufacture the item
 - Every routing line has the used materials as detail lines. This means that when you switch records on the routing subpage, the contents of the materials subpage will change.
- **Charges subpage**: that contains the costs that have to be made to manufacture this product.
- **Prices subpage**: the calculation results in a price structure that is visualized in this subpage.

In the general tab we enter the description for this calculation, in this case 'Metal part 001' The link to the contact, the due date and default margin are already present in the page. The status of the calculation is 'open'.

2.4.3.2. Routing Subpage

We now need to describe how the metal part will be manufactured, see the section 'Manufacturing process' for more details about this. To add this data to the calculation we need to enter data in the Routing and Materials subpages.

The following data should be entered in the routing subpage:

Field	Value
Record 1:	
Type	Work Center
No.	Laser
Setup Time	15
Run Time	1
Record 2:	
Type	Work Center
No.	Drill
Setup Time	5
Run Time	2
Record 3:	
Type	Work Center
No.	Deburr
Setup Time	10
Run Time	10
Record 4:	
Type	Work Center
No.	Fold
Setup Time	10
Run Time	10

This gives us the following data in the subpage:

EDIT - CALCULATION CARD ✕

C0000001

General >

Routing

CO... EXIST	TYPE	NO.	DESCRIPTION	FIX... QU...	UNIT COST CALCULA...	SETUPTIME	SETUP TIME UNIT OF MEAS. CODE	RUN TIME	RUN TIME UNIT OF MEAS. CODE	WAIT TIME
<input type="checkbox"/>	... Work Center	LASER	lasser Cutting	<input type="checkbox"/>	Time	15,00 MIN		1,00 MIN		0
<input type="checkbox"/>	... Work Center	DRILL	Drilling	<input type="checkbox"/>	Time	5,00 MIN		2,00 MIN		0
<input type="checkbox"/>	... Work Center	DEBURR	Deburring	<input type="checkbox"/>	Time	10,00 MIN		5,00 MIN		0
<input type="checkbox"/>	... Work Center	FOLD	Folding	<input type="checkbox"/>	Time	10,00 MIN		5,00 MIN		0

2.4.3.3. Materials Subpage

In this use-case only the first routing line needs raw materials. In this case we will manufacture the metal part based on the previously created sheet metal 6 mm item.

In the routing subpage, select the first line that describes the Laser Cutting step of the manufacturing process. In de Materials Subpage enter the following data:

Field	Value
Type	Item
Quantity	0,1 (we will manufacture 10 pieces from 1 sheet metal plate)

This results in the following data in the page:

General >

Routing

CO... EXIST	TYPE	NO.	DESCRIPTION	FIX... QU...	UNIT COST CALCULA...	SETUPTIME	SETUP TIME UNIT OF MEAS. CODE	RUN TIME	RUN TIME UNIT OF MEAS. CODE	WAIT TIME
<input type="checkbox"/>	... Work Center	LASER	lasser Cutting	<input type="checkbox"/>	Time	15,00 MIN		1,00 MIN		0
<input type="checkbox"/>	... Work Center	DRILL	Drilling	<input type="checkbox"/>	Time	5,00 MIN		2,00 MIN		0
<input type="checkbox"/>	... Work Center	DEBURR	Deburring	<input type="checkbox"/>	Time	10,00 MIN		5,00 MIN		0
<input type="checkbox"/>	... Work Center	FOLD	Folding	<input type="checkbox"/>	Time	10,00 MIN		5,00 MIN		0

Materials

CO... EXIST	TYPE	NO.	DESCRIPTION	FIX... QU...	VAR... QU...	QUANTITY	UNIT OF MEASURE CODE	SCRAP FACTOR %	QTY. INCL. SCRAP	UNIT COST
<input type="checkbox"/>	... Item	1000	Sheet Metal 6mm	<input type="checkbox"/>	<input type="checkbox"/>	0,10 STUKS		0,00	0,10	100,00



2.4.3.4. Charges Subpage

The last (and optional) step is the creation of specific charges for this calculation. In this example we will take the administrative costs into account by adding them to the calculation of the metal part that will be manufactured.

To do this we first need to add a Charge to the Charge table by selecting the code dropdown and using the 'new' function:

Charges

The screenshot shows the 'Charges' subpage interface. At the top, there are columns for 'NO.' and 'DESCRIPTION'. Below this, a dropdown menu is open, showing a search bar with the text '(There is nothing to show in this view)'. A red box highlights the '+ New' button in the bottom left corner of the dropdown. To the right of the search bar is a link that says 'Select from full list'. Below the dropdown, there is a header 'SELECT - CALCULATION CHARGES + New' with search and refresh icons. Below that is a table with columns 'CODE', 'DESCRIPTION', and 'UNIT COST'. The table contains one row with 'ADMINISTRATION' in the CODE column, 'Administration Costs' in the DESCRIPTION column, and '25,00' in the UNIT COST column.

NO.	DESCRIPTION

CODE	DESCRIPTION	UNIT COST
ADMINISTRATION	Administration Costs	25,00

Now we can add this charge to the calculation:

Charges

NO.	DESCRIPTION	QUANTITY	UNIT COST	TOTAL COST
ADMINISTRATION	Administration Costs	1,00	25,00	25,00

In the quantity field we can specify what quantity of this charge must be calculated. In this case enter 1 in this field.

2.4.3.5. Prices Subpage

The last step in the calculation is the definition of the sellable quantities for this item. In this case we can ship the metal part in batches of 10, 100 or 1000. We also want to know how much a single item (like when we have to make a prototype) would cost.

In the 'prices' subpage define these sellable quantities by creating 4 records where you only validate the quantity field. This gives you the following data:

Prices

QUANTITY	UNIT COST	UNIT PRICE	MARGIN	DISCOUNT PERCENTAGE	NET UNIT PRICE	NET MARGIN
1,00	110,50	121,55	10,00	0,00	121,55	10,00
10,00	38,50	42,35	10,00	0,00	42,35	10,00
100,00	31,30	34,43	10,00	0,00	34,43	10,00
1 000,00	30,58	33,64	10,00	0,00	33,64	10,00

In this case we see a clear difference between the prototype (110,50 EUR) and the batch of 100 pieces (31,30 EUR/piece). This price difference can be explained because of the fact that the setup times for the different routing lines and the administration cost (charge) can be spread out over all the units in the batch.

Note: For commercial reasons it is still possible to change the margin or net unit price in the 'prices' subpage. In this case we could state that the sales price for the 100 batch should be 34/piece and for the 1000 batch it should be 33,5/piece. This can be done by entering a discount percentage and/or a unit price:

Prices

QUANTITY	UNIT COST	UNIT PRICE	MARGIN	DISCOUNT PERCENTAGE	NET UNIT PRICE	NET MARGIN
1,00	110,50	121,55	10,00	0,00	121,55	10,00
10,00	38,50	42,35	10,00	2,00	41,50	7,80
100,00	31,30	34,00	8,63	0,00	34,00	8,63
1 000,00	30,58	33,50	9,55	0,00	33,50	9,55

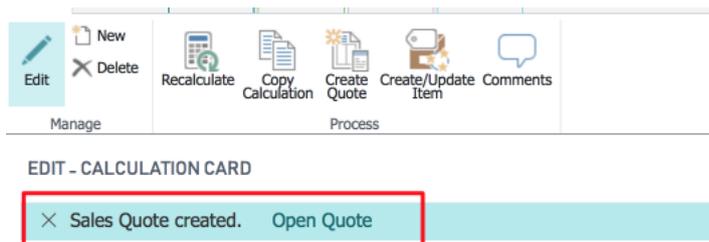
2.4.4. Quote Creation

Now that we have a fully configured calculation we can create a new sales quote that we can send to our customer/contact.

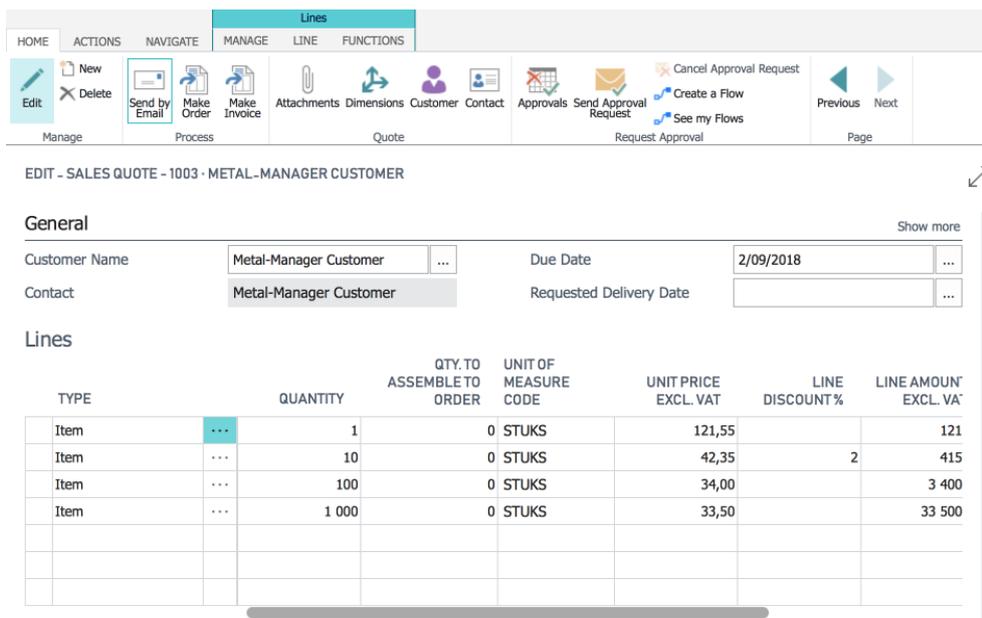
To do this, click on the 'Create Quote' action:



After this button has done the create quote function the system reacts with a notification:



Click on the 'Open Quote' link. The system will open the sales quote:



The Quote can now be processed using standard Business Central functionality.

Note: *It is pointless to print this quote with a total price since it is a price list describing the prices per quantity. Since lay-outs are customer-specific we cannot provide a lay-out for this type of quotes as part of our extension.*

2.4.5. Item Creation

When the customer agrees with the quote and wants to order the item we need to validate the calculation and create the item, so it can be used in the order and the manufacturing functionality of Business Central

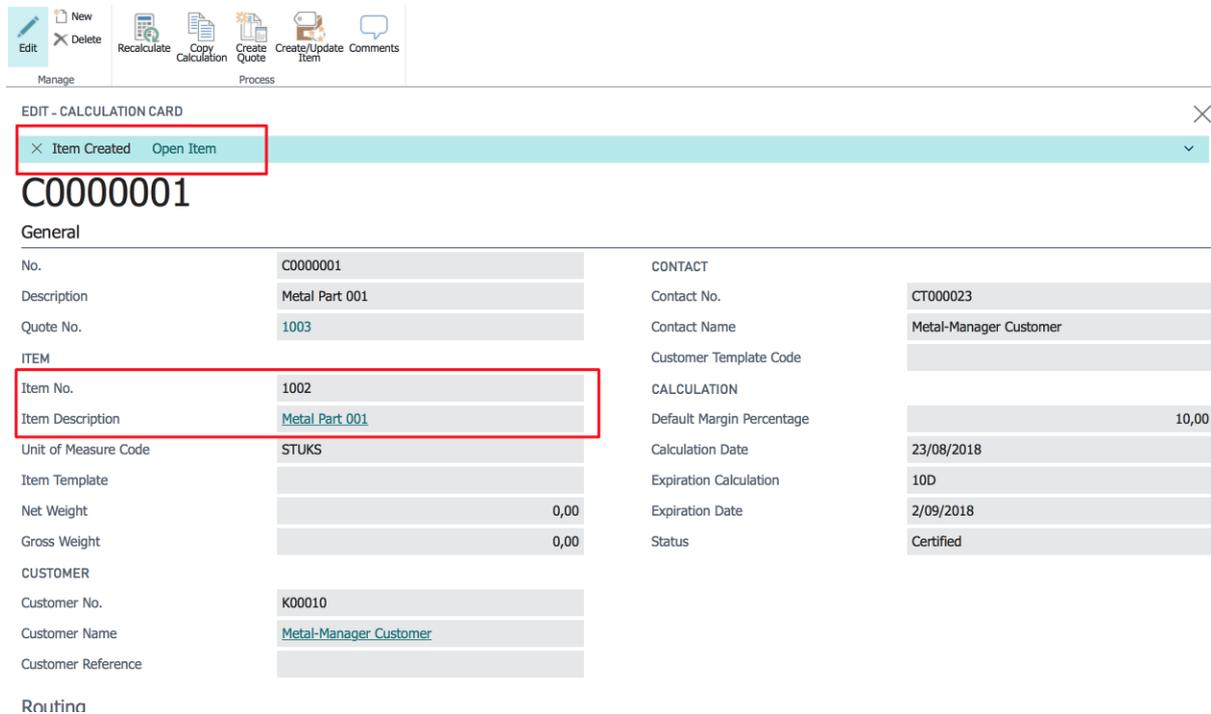
To create the item, open the calculation and click on the "Create/update Item" action:



The screenshot shows the Business Central interface for a calculation card. The top navigation bar includes 'HOME', 'ACTIONS', and tabs for 'Routing', 'Materials', 'Charges', and 'Prices', each with a 'MANAGE' sub-tab. Below this is a ribbon with various actions: 'New', 'Delete', 'Recalculate', 'Copy Calculation', 'Create Quote', 'Create/Update Item' (highlighted with a red box), and 'Comments'. The main area displays 'VIEW - CALCULATION CARD' for 'C0000001'.

General	
No.	C0000001
Description	Metal Part 001
Quote No.	1003
ITEM	
Item No.	
Item Description	—
Unit of Measure Code	STUKS
Item Template	APT000001
CONTACT	
Contact No.	CT000023
Contact Name	Metal-Man
Customer Template Code	BEDRIJF
CALCULATION	
Default Margin Percentage	
Calculation Date	23/08/201
Expiration Calculation	100

After the system succeeded in creating the item the following feedback returns to the user:



The screenshot shows a software interface with a notification bar at the top. The notification bar is light blue and contains the text "Item Created" and "Open Item". Below the notification bar is a large heading "C0000001". Underneath the heading is a section titled "General" which contains a table of data. The table is divided into three columns: "ITEM", "CONTACT", and "CALCULATION". The "ITEM" column contains fields for "Item No." (1002) and "Item Description" (Metal Part 001). The "CONTACT" column contains fields for "Contact No." (CT000023) and "Contact Name" (Metal-Manager Customer). The "CALCULATION" column contains fields for "Default Margin Percentage" (10,00), "Calculation Date" (23/08/2018), "Expiration Calculation" (10D), "Expiration Date" (2/09/2018), and "Status" (Certified). Below the "General" section is a section titled "CUSTOMER" which contains fields for "Customer No." (K00010) and "Customer Name" (Metal-Manager Customer). Below the "CUSTOMER" section is a section titled "Routina".

EDIT - CALCULATION CARD

Item Created Open Item

C0000001

General

ITEM		CONTACT		CALCULATION	
No.	C0000001	Contact No.	CT000023		
Description	Metal Part 001	Contact Name	Metal-Manager Customer		
Quote No.	1003	Customer Template Code			
Item No.	1002	Calculation			
Item Description	Metal Part 001	Default Margin Percentage		10,00	
Unit of Measure Code	STUKS	Calculation Date	23/08/2018		
Item Template		Expiration Calculation	10D		
Net Weight		Expiration Date	2/09/2018		
Gross Weight		Status	Certified		
CUSTOMER					
Customer No.	K00010				
Customer Name	Metal-Manager Customer				
Customer Reference					
Routina					

You can open the new item by clicking the 'Open item' link in the notification.

The new item is fully configured for manufacturing and has a new BOM and Routing linked to it:

EDIT - ITEM CARD - 1002 - METAL PART 001

Item

No. 1002
Description Metal Part 001

Blocked
Type Inventory
Base Unit of Measure STUKS

Last Date Modified 23/08/2018
GTIN
Item Category Code
Service Item Group
Automatic Ext. Texts

Inventory > 0
Costs & Posting > 0,00 DET.HANDEL WEDERVERK
Prices & Sales > 0,00

Replenishment

Replenishment System Prod. Order
Lead Time Calculation
PURCHASE
Vendor No.
Vendor Item No.
Purch. Unit of Measure STUKS

PRODUCTION

Manufacturing Policy Make-to-Stock
Routing No. ROUTING00001
Production BOM No. BOM0001
Rounding Precision 1
Flushing Method Manual

Attachments
Documents
Item Attributes
ATTRIBUTE VALUE
(There is nothing to show in this view)
Forecast
Status Not enough historical

The calculation Routing and Materials have been entered into the routing and the BOM that are both certified:

EDIT - ROUTING

ROUTING00001 - Metal Part 001

General

No. ROUTING00001
Description Metal Part 001
Type Serial
Status Certified

Search Description METAL PART 001
Version Nos.
Active Version
Last Date Modified 23/08/2018

Lines

OPERATION NO.	TYPE	NO.	DESCRIPTION	SETUP TIME	RUN TIME	WAIT TIME	MOVE TIME	FIXED SCRAP QUANTITY	SCRAP FACTOR %	CONCURRENT CAPACITIES	SEND_AHEAD QUANTITY	UN
10	Work Center	LASER	laser Cutting	15	1	0	0	0	0	1	0	
20	Work Center	DRILL	Drilling	5	2	0	0	0	0	1	0	
30	Work Center	DEBURR	Deburring	10	5	0	0	0	0	1	0	
40	Work Center	FOLD	Folding	10	5	0	0	0	0	1	0	

EDIT - PRODUCTION BOM

BOM0001 - Metal Part 001

General

No. BOM0001
Description Metal Part 001
Unit of Measure Code STUKS
Status Certified

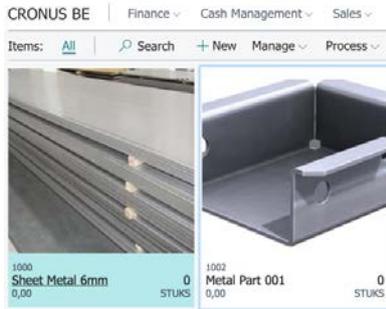
Search Name METAL PART 001
Version Nos.
Active Version
Last Date Modified 23/08/2018

Lines

TYPE	NO.	DESCRIPTION	QUANTITY PER	FIXED QUANTITY	UNIT OF MEASURE CODE	SCRAP %	ROUTING LINK CODE
Item	1000	Sheet Metal 6mm	0,1		STUKS	0	LASER



The new item is now available in the item list and can be used to manufacture using the default manufacturing module of Business Central:



The item also contains the calculated prices:

General

Sales Type Filter: None | Starting Date Filter: |
 Sales Code Filter: | Currency Code Filter: |
 Item No. Filter: 1002

SALES TYPE	SALES CODE	ITEM NO. ▼	UNIT OF MEASURE CODE	MINIMUM QUANTITY	UNIT PRICE	STARTING DATE	ENDING DATE
Customer	...	K00010	1002	STUKS	1	121,55 23/08/2018	2/09/2018
Customer	...	K00010	1002	STUKS	10	42,35 23/08/2018	2/09/2018
Customer	...	K00010	1002	STUKS	100	34,00 23/08/2018	2/09/2018
Customer	...	K00010	1002	STUKS	1 000	33,50 23/08/2018	2/09/2018

And discounts:

EDIT - SALES LINE DISCOUNTS - ITEM 1002 + New

General

Sales Type Filter: None | Type Filter: Item |
 Sales Code Filter: | Code Filter: 1002 |
 Starting Date Filter: | Currency Code Filter: |

SALES TYPE	SALES CODE	TYPE ▼	CODE ▼	UNIT OF MEASURE CODE	MINIMUM QUANTITY	LINE DISCOUNT %	STARTING DATE	ENDING DATE
Customer	...	K00010	Item	1002	STUKS	10,00	2,00 23/08/2018	2/09/2018



In order to be able to follow the next chapter in this document you should create a released production order that looks like this and finish it:

The screenshot shows a software interface for managing production orders. At the top, there is a navigation bar with tabs for HOME, ACTIONS, NAVIGATE, REPORT, MANAGE, FUNCTIONS, and LINE. Below this is a toolbar with various icons for actions like New, Delete, Refresh Production Order, Replenish, Change Status, Update Unit Cost, Job Card, Mat. Requisition, Shortage List, Print Barcodes, and Report. The main title is "EDIT - RELEASED PRODUCTION ORDER - PO00001 - METAL PART 001".

PO00001 · Metal Part 001

General

No.	PO00001	Quantity	100
Description	Metal Part 001	Due Date	15/09/2018
Description 2		Assigned User ID	
Source Type	Item	Blocked	<input type="checkbox"/>
Source No.	1002	Last Date Modified	23/08/2018
Search Description	METAL PART 001		

Lines

ITEM NO.	DUE DATE	DESCRIPTION	STARTING DATE-TIME	ENDING DATE-TIME	QUANTITY	UNIT OF MEASURE CODE	FINISHED QUANTITY	REMAINING QUANTITY	UNIT COST	COST AMOUNT
1002	15/09/2018	Metal Part 001	12/09/2018 12:40	14/09/2018 17:00	100	STUKS	0	100	0,00	0,00

Schedule

Starting Time	12:40:00	Ending Time	17:00:00
Starting Date	12/09/2018	Ending Date	14/09/2018



3. Shop floor Management

3.1. Flow

Metal-Manager contains a fully functional shop floor management system. This enables our customers to manage the actions in the manufacturing process and enables collection of the correct data in an easy way.

The shop floor system collects all data that is needed to process a released production order document in Business Central. Every action is driven by a separate barcode. These barcodes are printed at the moment the production order is released to the manufacturing process. The following actions can be performed using the Metal-Manager Shop floor system:

- Open the Production order document
- Add Comments to the production order document
- Start working time on a routing line
- End working time on a routing line
- Register general working time on a routing line
- Finish a quantity of products on a routing line
- Finish a routing line

The barcodes contain some contextual information on their own, only variable data (quantities, times, ...) will be required as input. In this way Metal-manager shop floor management minimizes the amount of data that the workers have to provide.

3.2. Example Context

For this use-case we will continue to use the example we prepared in the chapter about calculation. We will go through the production process of the released production order and process it using the Shop floor system that comes with the Metal-manager extension.

The following actions will be taken:

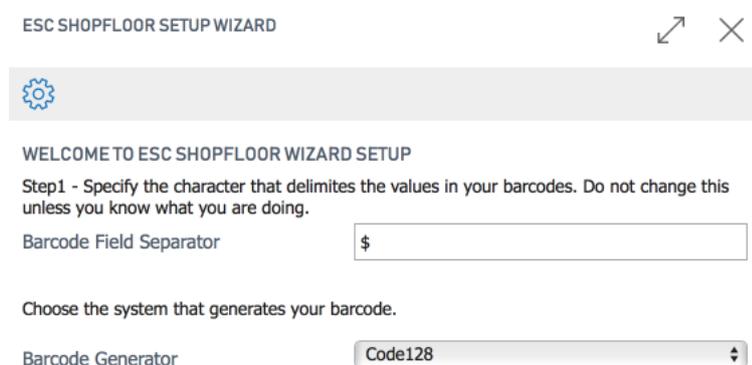
- Open the Production order document
- Add a comment to the production document
- Start the first routing by starting time registration
- Ending the first routing by ending time registration
- Finishing a quantity on the first routing
- Adding general working time on the second routing
- Finish all quantities and routings so the system will post some output on the production order.

3.3. Use-Case Preparation

3.3.1. Metal-Manager Setup-Wizard

The Metal-Manager extension comes with a setup-wizard for the shop floor system. This wizard shows up as completed right after you have installed the extension. This is because all setup that is required is set by default. You can re-run the wizard by using the Assisted Setup functionality of Business Central.

The first step in the wizard is:



ESC SHOPFLOOR SETUP WIZARD

WELCOME TO ESC SHOPFLOOR WIZARD SETUP

Step1 - Specify the character that delimites the values in your barcodes. Do not change this unless you know what you are doing.

Barcode Field Separator

Choose the system that generates your barcode.

Barcode Generator

In this step you can specify barcode field separator. Like already mentioned above, the barcodes that are used in the shop floor system already contain some data. The separate fields of this data are split by using this separator character. By default, we use the dollar sign, but this can be changed. Only change this if there is a technical problem with the scanner.

The second part of this step manages the way the barcodes will be generated. You can choose from the following barcode types:

- Code128: a default code 128 barcode is generated
- Code39: a default code 39 barcode is generated
- Webservice: Metal-Manager provides a web service that is able to generate code 128 barcodes from an azure-function in the cloud. The URL for this function is: <https://escbarcodegenerator.azurewebsites.net/api/GenerateBarCode>

Click next to go to the second step of the setup-wizard:

ESC SHOPFLOOR SETUP WIZARD  



You have to login with a specific user. If you dont check this box then you will have to identify yourself with each barcode scan.

Require Resource to Login

Specify wether you want to see every scan or only running activities.

Activity View

If this is enabled then the system will suggest the quantities for you.

Initialize Quantities

In this step you can change the way the shop floor system identifies the users that are logging data into the database. There are two ways of managing this.

- **Require Resource to login = true:** The shop floor system requires a user to login first before he can log data. When all data is entered, the user must log out of the shop floor screen, enabling a colleague to login and enter data.
- **Require Resource to login = false:** Every time a user wants to log something, the shop floor system will ask for identification.

The default setting is 'True'.

The Shop floor system also provides the users with a history log of all scans that have been made. You can choose the level of detail of this history:

- **Full history:** Every scan will be visualized on the shop floor screen
- **Active Operations Only:** Only active operations will be shown in the shop floor screen.

The last field in this step is the 'Initialize Quantities' field. If this field is set to true, the shop floor system will provide the user with the remaining quantity of whatever he is trying to enter. If the field is set to false, the user will be forced to enter all quantities himself.



Click next...

This concludes the setup-wizard:

ESC SHOPFLOOR SETUP WIZARD  



THAT'S IT!
To save this setup, choose Finish.

3.3.2. Released production Order

If you haven't already made a released production order in the Calculation chapter of this document, do so now. We will use this production order and process is using the shop floor system:

NEW - RELEASED PRODUCTION ORDER - P000002 - METAL PART 001 

General

No.	P000002	Quantity	100
Description	Metal Part 001	Due Date	24/08/2018
Description 2		Assigned User ID	
Source Type	Item	Blocked	<input type="checkbox"/>
Source No.	1002	Last Date Modified	24/08/2018
Search Description	METAL PART 001		

Lines

ITEM NO.	DUE DATE	DESCRIPTION	STARTING DATE-TIME	ENDING DATE-TIME	QUANTITY	UNIT OF MEASURE CODE	FINISHED QUANTITY	REMAINING QUANTITY	UNIT COST	COST AMOUNT
1002	24/08/2018	Metal Part 001	22/08/2018 12:40	24/08/2018 17:00	100	STUKS	0	100	10,00	1 000,00
					0		0	0	0,00	0,00

Schedule > 12:40:00 22/08/2018 17:00:00 24/08/2018

Posting

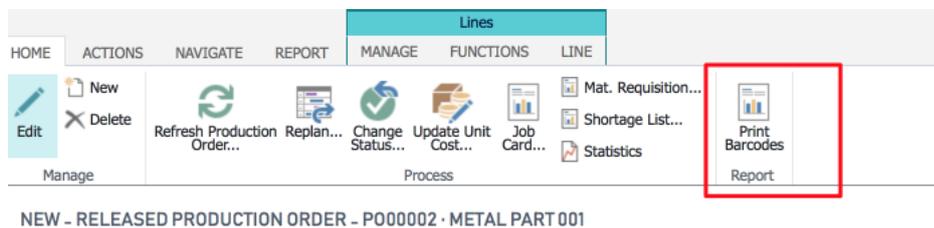
Inventory Posting Group	WEDERVERK	Customergroup Code	
Gen. Prod. Posting Group	DET.HANDEL	Location Code	WEST
Gen. Bus. Posting Group		Bin Code	
Department Code			

3.4. Use-Case walkthrough

3.4.1. Preparing Shop Floor Documents

Before we can use the shop floor system on the production order we first need to print the production documents. These documents will contain the barcodes that will be scanned throughout this walkthrough.

To print the documents, navigate to the released production order and use the 'print bar codes' action in the ribbon:



This action will launch a few reports:

- General Production order sheet
- Routing Sheets

3.4.1.1. General production order sheet

The first print gives you the general overview of the manufacturing process and contains two barcodes:



Production Order

Item	Description	Quantity	Unit of Measure	Inventory	
1002	Metal Part 001	100	STUKS		
Due Date		24/08/2018 0:00:00			
Item	Description	Quantity Per	Quantity	Unit of Measure	Inventory
1000	Sheet Metal 6mm		0,1	10 STUKS	109
Description	Setup Time	Run Time			
lasser Cutting	15	1			
Drilling	5	2			
Deburring	10	5			
Folding	10	5			

When you don't have a scanner installed, you can copy the data underneath into the shop floor system (will only work when working on the same order no.):

Function	Barcode Data
Open production Order	POD\$PO00002
Add Comment	PAC\$PO00002\$10000

3.4.1.2. Laser Cutting

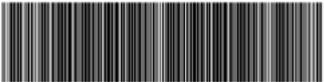
For the laser cutting routing a specific sheet is created:

cronus

Production Order

Open Production Order	Add Comment
	
POD\$PO00002	PAC\$PO00002\$10000

Description	Setup Time	Run Time
lasser Cutting	15	1

Start Time Registration	Stop Time Registration
	
PT1\$PO00002\$10000\$10	PT0\$PO00002\$10000\$10
Manual Time Registration	Finish Quantity
	
PTR\$PO00002\$10000\$10	PFQ\$PO00002\$10000\$10
Finish Operation	Add Comment
	
PFO\$PO00002\$10000\$10	PAC\$PO00002\$10000

Barcode Data:

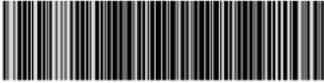
Function	Barcode Data
Open production Order	POD\$PO00002
Add Comment	PAC\$PO00002\$10000
Start Time Registration	PT1\$PO00002\$10000\$10
Stop Time Registration	PT0\$PO00002\$10000\$10
Manual Time Registration	PTR\$PO00002\$10000\$10
Finish Quantity	PFQ\$PO00002\$10000\$10
Finish Operation	PFO\$PO00002\$10000\$10
Add Comment	PAC\$PO00002\$10000

3.4.1.3. Drilling

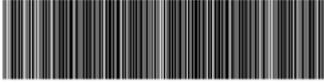
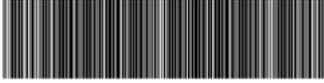
For the drilling routing a specific sheet is generated:



Production Order

Open Production Order	Add Comment
	
POD\$PO00002	PAC\$PO00002\$10000

Description	Setup Time	Run Time
Drilling	5	2

Start Time Registration	Stop Time Registration
	
PT1\$PO00002\$10000\$20	PT0\$PO00002\$10000\$20
Manual Time Registration	Finish Quantity
	
PTR\$PO00002\$10000\$20	PFQ\$PO00002\$10000\$20
Finish Operation	Add Comment
	
PFO\$PO00002\$10000\$20	PAC\$PO00002\$10000

Barcode Data:

Function	Barcode Data
Open production Order	POD\$PO00002
Add Comment	PAC\$PO00002\$10000
Start Time Registration	PT1\$PO00002\$10000\$20
Stop Time Registration	PT0\$PO00002\$10000\$20
Manual Time Registration	PTR\$PO00002\$10000\$20
Finish Quantity	PFQ\$PO00002\$10000\$20
Finish Operation	PFO\$PO00002\$10000\$20
Add Comment	PAC\$PO00002\$10000

3.4.1.4. Deburring

For the deburring routing a specific sheet is generated:



Production Order

Open Production Order	Add Comment
	
POD\$PO00002	PAC\$PO00002\$10000

Description	Setup Time	Run Time
Deburring	10	5

Start Time Registration	Stop Time Registration
	
PT1\$PO00002\$10000\$30	PT0\$PO00002\$10000\$30
Manual Time Registration	Finish Quantity
	
PTR\$PO00002\$10000\$30	PFQ\$PO00002\$10000\$30
Finish Operation	Add Comment
	
PFO\$PO00002\$10000\$30	PAC\$PO00002\$10000

Barcode Data:

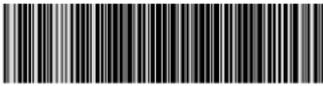
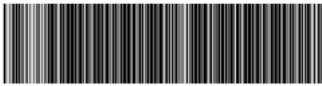
Function	Barcode Data
Open production Order	POD\$PO00002
Add Comment	PAC\$PO00002\$10000
Start Time Registration	PT1\$PO00002\$10000\$30
Stop Time Registration	PT0\$PO00002\$10000\$30
Manual Time Registration	PTR\$PO00002\$10000\$30
Finish Quantity	PFQ\$PO00002\$10000\$30
Finish Operation	PFO\$PO00002\$10000\$30
Add Comment	PAC\$PO00002\$10000

3.4.1.5. Folding

For the folding routing a specific sheet is generated:



Production Order

Open Production Order	Add Comment
	
POD\$PO00002	PAC\$PO00002\$10000

Description	Setup Time	Run Time
Folding	10	5

Start Time Registration	Stop Time Registration
	
PT1\$PO00002\$10000\$40	PT0\$PO00002\$10000\$40
Manual Time Registration	Finish Quantity
	
PTR\$PO00002\$10000\$40	PFQ\$PO00002\$10000\$40
Finish Operation	Add Comment
	
PFO\$PO00002\$10000\$40	PAC\$PO00002\$10000

Barcode Data:

Function	Barcode Data
Open production Order	POD\$PO00002
Add Comment	PAC\$PO00002\$10000
Start Time Registration	PT1\$PO00002\$10000\$40
Stop Time Registration	PT0\$PO00002\$10000\$40
Manual Time Registration	PTR\$PO00002\$10000\$40
Finish Quantity	PFQ\$PO00002\$10000\$40
Finish Operation	PFO\$PO00002\$10000\$40
Add Comment	PAC\$PO00002\$10000

3.4.1.6. Resource barcodes

You will need a list of barcodes based on the resources in the system. Metal-Manager provides a report that prints all resource barcodes. You can start this report from the shop floor setup card:



The resulting report looks like this:

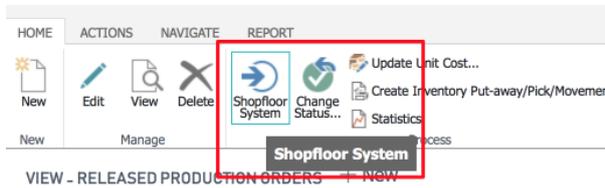


Resource Barcode List	
Resource Name	Barcode
Berend Otten	 BEREND
Dick Wenning	 DICK
Jan Hoek	 DAVY
Tsing-Mun To	 TSING

Note: *The barcode data is in this case the resource No. field. So, for testing purposes you can just enter the resource no. where the shop floor system asks you to scan the resource barcode.*

3.4.2. Shop Floor screen

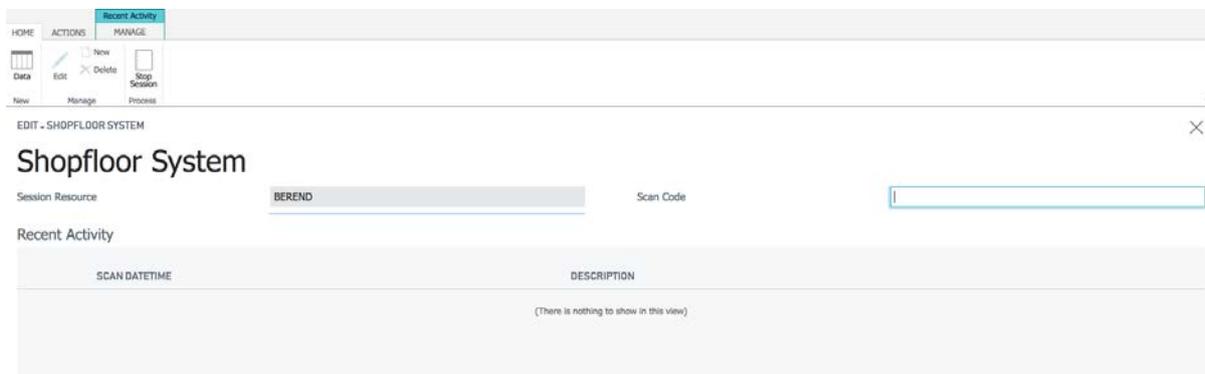
The shop floor screen can be opened from the released production orders list:



Depending on the setup, there will be a login screen first (when you have set-up the system, so it requires the resource to login).



Enter a resource no. in this field to login to the shop floor screen:

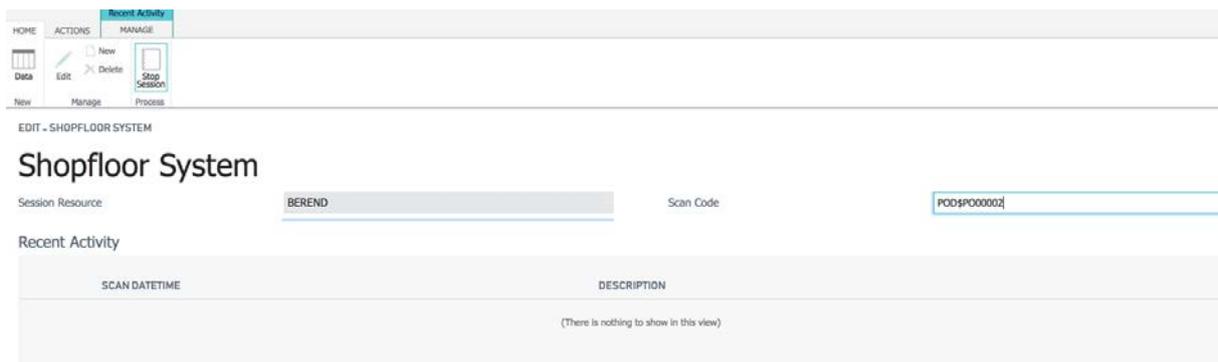


The shop floor system screen is kept very simple on purpose. There are only two fields that are visible:

- **Session Resource:** The resource that is currently logged in to the shop floor. All registrations will be linked to this resource until he uses the 'Stop Session' action in the ribbon.
- **Scan Code:** This field is the place where the cursor must be positioned in order to scan a barcode. After validation of this field the scanned barcode is parsed, and the function is launched.

3.4.3. Open production order

As a first action, we will scan (or type) the barcode in the scan code field to open the production order screen.

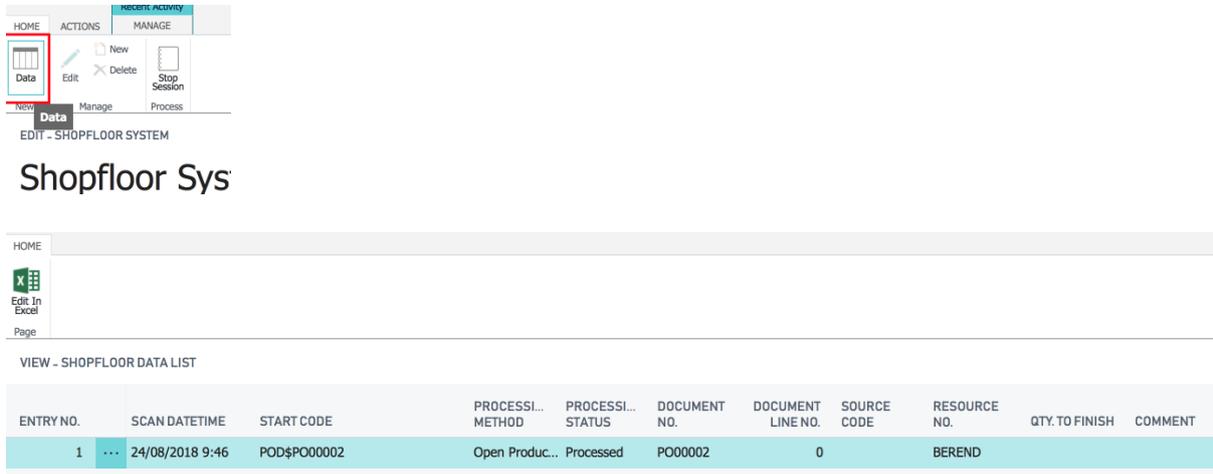


The screenshot shows the 'Shopfloor System' interface. At the top, there is a ribbon with 'HOME', 'ACTIONS', and 'MANAGE' tabs. Under 'ACTIONS', there are buttons for 'Data', 'Edit', 'Delete', 'New', 'Stop Session', and 'Process'. Below the ribbon, the page title is 'EDIT - SHOPFLOOR SYSTEM' and 'Shopfloor System'. There are two input fields: 'Session Resource' with the value 'BEREND' and 'Scan Code' with a barcode. Below these fields is a 'Recent Activity' section with a table header containing 'SCAN DATETIME' and 'DESCRIPTION'. The table is currently empty, with a message '(There is nothing to show in this view)'.

After validation, the production order card should open.

3.4.3.1. Checking the scanning history

The scan history can at all times be checked by using the 'Data' action on the shop floor screen:



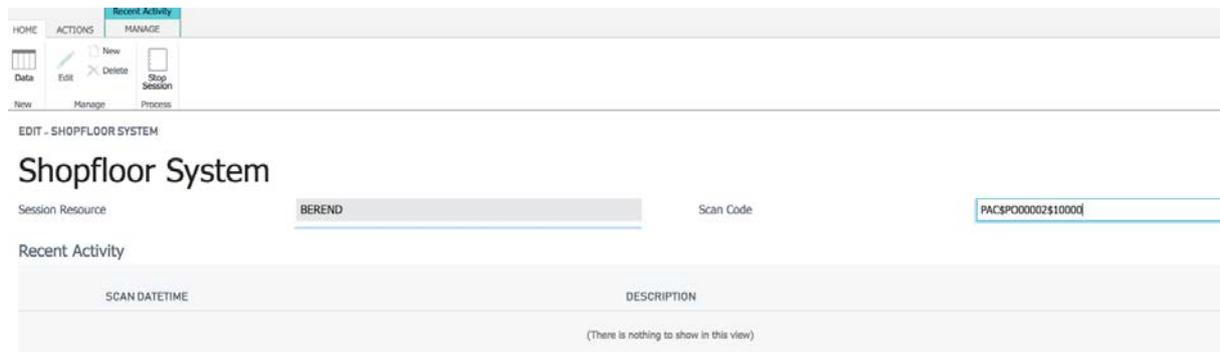
The screenshot shows the Shopfloor Sys interface. At the top, there is a ribbon with tabs for 'HOME', 'ACTIONS', and 'MANAGE'. Under the 'ACTIONS' tab, the 'Data' button is highlighted with a red box. Below the ribbon, the title 'Shopfloor Sys' is displayed. The main content area shows a table titled 'VIEW - SHOPFLOOR DATA LIST'. The table has the following columns: ENTRY NO., SCAN DATETIME, START CODE, PROCESSI... METHOD, PROCESSI... STATUS, DOCUMENT NO., DOCUMENT LINE NO., SOURCE CODE, RESOURCE NO., QTY. TO FINISH, and COMMENT. The first row of data is highlighted in light blue and contains the following values: 1, 24/08/2018 9:46, POD\$PO00002, Open Produc..., Processed, PO00002, 0, BEREND.

ENTRY NO.	SCAN DATETIME	START CODE	PROCESSI... METHOD	PROCESSI... STATUS	DOCUMENT NO.	DOCUMENT LINE NO.	SOURCE CODE	RESOURCE NO.	QTY. TO FINISH	COMMENT
1	24/08/2018 9:46	POD\$PO00002	Open Produc...	Processed	PO00002	0		BEREND		

Note: *this data is also used by the job queue to process the scans to the database. In this use-case we will process the data manually by using the 'Process Data' action in the ribbon.*

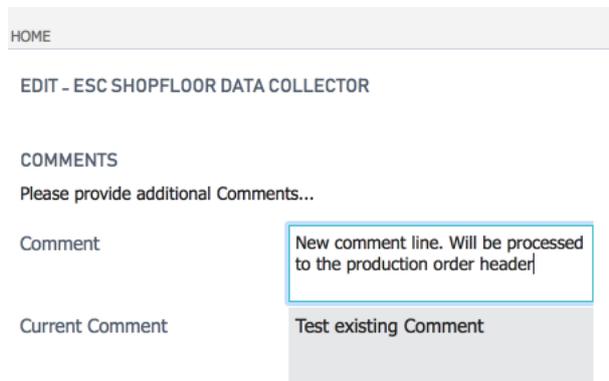
3.4.4. Adding Comments to the production order

Next, we will add some comments to the production order from within the shop floor system. To do so, return to the shop floor screen and scan/type the barcode to start this action:



The screenshot shows the 'Shopfloor System' interface. At the top, there is a navigation bar with 'HOME', 'ACTIONS', and 'MANAGE'. Below this is a toolbar with icons for 'Data', 'Edit', 'Delete', 'New', 'Manage', 'Process', and 'Stop Session'. The main content area is titled 'EDIT - SHOPFLOOR SYSTEM' and 'Shopfloor System'. It features a 'Session Resource' field with the value 'BEREND' and a 'Scan Code' field with the value 'PAC\$P000002\$10000'. Below these fields is a 'Recent Activity' section with a table. The table has two columns: 'SCAN DATETIME' and 'DESCRIPTION'. The table is currently empty, with a message '(There is nothing to show in this view)' centered below it.

Because the system cannot parse all data from the barcode scan (the actual comment is not in there) the data collector screen is triggered. In this screen we can enter the comment data:



The screenshot shows the 'EDIT - ESC SHOPFLOOR DATA COLLECTOR' interface. It has a 'HOME' button at the top. Below it is the title 'EDIT - ESC SHOPFLOOR DATA COLLECTOR'. The 'COMMENTS' section is active, with the instruction 'Please provide additional Comments...'. There are two input fields: 'Comment' and 'Current Comment'. The 'Comment' field contains the text 'New comment line. Will be processed to the production order header'. The 'Current Comment' field contains the text 'Test existing Comment'.

When the data collector screen is closed, the data is written to the database for further processing.

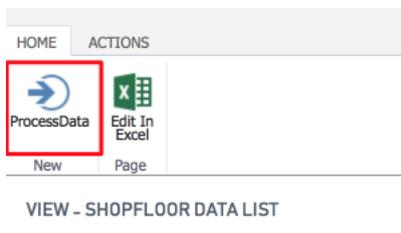
3.4.4.1. Checking The data

When we take a look at the data again the following should now be visible:



ENTRY NO.	SCAN DATETIME	START CODE	PROCESSI... METHOD	PROCESSI... STATUS	DOCUMENT NO.	DOCUMENT LINE NO.	SOURCE CODE	RESOURCE NO.	QTY. TO FINISH	COMMENT	REGISTRATION DATE AND TIME
3	24/08/2018 10:03	PAC\$P000002\$10000	Add Comment	New	P000002	10000	BEREND			New comment line. Will be proces...	

This data is now ready to be processed to the production order. To do this click on the 'Process Data' action in the ribbon:



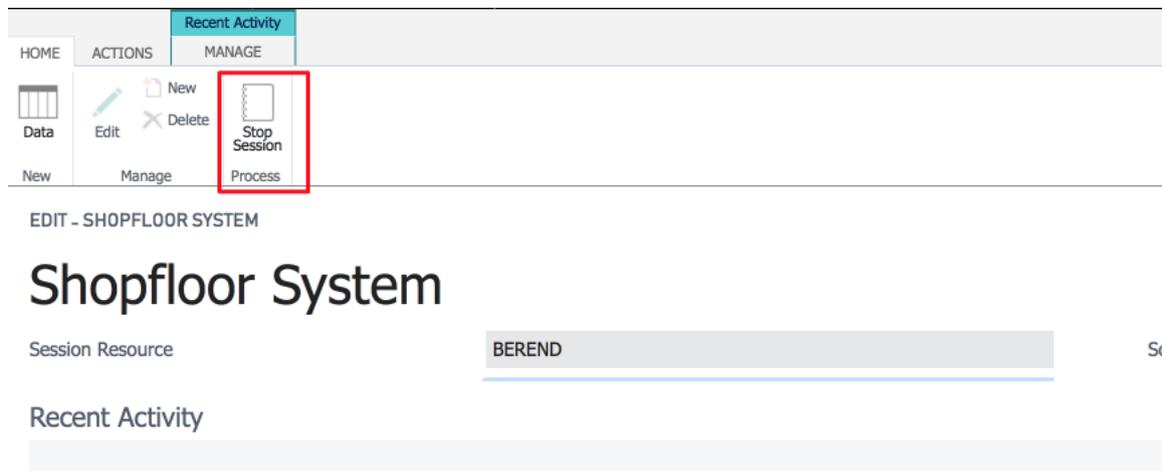
When we now go and take a look at the production order header, the following comment should be visible:



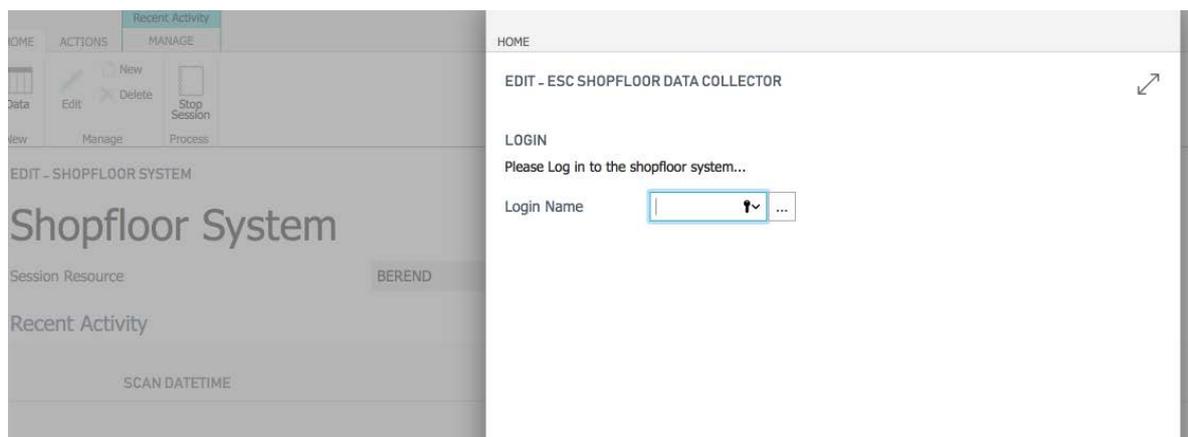
DATE	COMMENT
	...
	...
	New comment line. Will be processed to the production order header

3.4.5. Logging out of the Shop Floor

Before we start processing the production order we will first log out of the shop floor system. To do so, click the 'Stop Session' action on the ribbon:



This ends the session of the current resource and respawns the login screen:



Log in to the shop-floor system with a different resource by entering or scanning his no. in the login name field.

3.4.6. Starting Time Registration on a routing

In this use-case, the resource DAVY will start working on the laser cutting step. Before he does so, he will register this in the shop floor. After login in to the system enter the start time registration barcode into the start code field:

EDIT - SHOPFLOOR SYSTEM

Shopfloor System

Session Resource Scan Code

After this barcode has been validated the data collector page opens up. In this page the current date and time is entered by default:

EDIT - ESC SHOPFLOOR DATA COLLECTOR

RESOURCESCAN

Registration Date and

This can be changed by using the 'Change Registration Date and Time' action in the ribbon, this action will make the field editable:

HOME

Change Registration Date and Time

EDIT - ESC SHOPFLOOR DATA COLLECTOR

After this action is performed, the routing 'Laser Cutting' has been started, this will be visualized on the 'Recent activity' subpage of the Shop Floor screen:

Recent Activity

SCAN DATETIME	DESCRIPTION
24/08/2018 10:20	Jan Hoek started working on prod. order P000002 - laser Cutting - Metal Part 001

No processing is needed after the 'Start Time Registration' action. The time registration is not complete, it requires a 'Stop Time Registration' action first.

3.4.7. Stopping Time Registration on a routing

Before the system can calculate how long a resource has been working on a routing line, the stop time registration function must be performed. Do this by scanning/entering the appropriate barcode into the start code field:

EDIT - SHOPFLOOR SYSTEM

Shopfloor System

Session Resource: Scan Code:

Recent Activity

SCAN DATETIME	DESCRIPTION
24/08/2018 10:20	Jan Hoek started working on prod. order P000002 - laser Cutting - Metal Part 001

Because the system still needs more information the data collector screen pops up:

HOME

Change Registration Date and Time View

EDIT - ESC SHOPFLOOR DATA COLLECTOR

RESOURCESCAN

Registration Date and ...

This screen is the same as the one showing while using the start time registration function. After the screen is closed, the routing line is stopped:

EDIT - SHOPFLOOR SYSTEM

Shopfloor System

Session Resource: Scan Code:

Recent Activity

SCAN DATETIME	DESCRIPTION
24/08/2018 10:30	... Jan Hoek stopped working on prod. order P000002 - laser Cutting - Metal Part 001

3.4.7.1. Checking The data

Now that we have an ending time for the work on the laser cutting routing, we can post this time to the production capacity ledger entries. To do this, go to the shop floor data screen and click on the process data action:

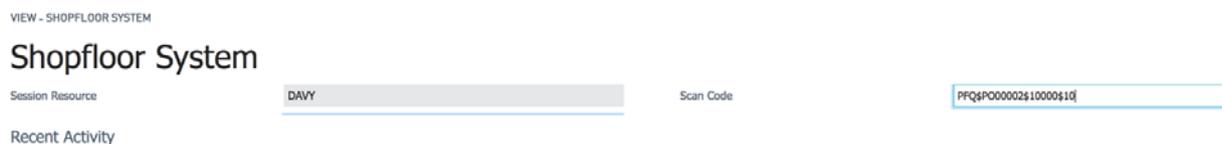
 registering 9 minutes

OK

In this specific case, the difference between the start time registration scan and the stop time registration scan was 9 minutes. This is now posted to the capacity ledger entries on the production order.

3.4.8. Finish quantity on a routing

Now that we have registered some time on the laser cutting routing line, we are able to finish some products. This is done by using the following scan code:



Again, the data collector pops up to ask the user for the quantity that is to be finished:



After you entered the quantity the screen closes, and the data is written to the shop floor system data table:

Recent Activity

SCAN DATETIME	DESCRIPTION
24/08/2018 10:53	100 units have been finished on prod. order PO00002 - lasser Cutting - Metal Part 001
24/08/2018 10:30	Jan Hoek stopped working on prod. order PO00002 - lasser Cutting - Metal Part 001

3.4.8.1. Checking the data

Again, go to the shop floor data screen. The following data should show up:



ENTRY NO.	SCAN DATETIME	START CODE	PROCESSING METHOD	PROCESSING STATUS	DOCUMENT NO.	DOCUMENT LINE NO.	SOURCE CODE	RESOURCE NO.	QTY TO FINISH	COMMENT	REGISTRAR DATE AND TIME
7	24/08/2018 10:53	PFQ\$PO00002\$10000\$10	Finish Quantity New		PO00002	10000	10	DAVY	100,00		
6	24/08/2018 10:34	POD\$PO00002	Open Production	Processed	PO00002	0		DAVY			

Using the process data action processes this new line. After processing is finished the user receives a notification confirming the successful processing:

VIEW - SHOPFLOOR DATA LIST

✕ Finishing 100 units on prod. order 100, line no. 10000, Operation 10

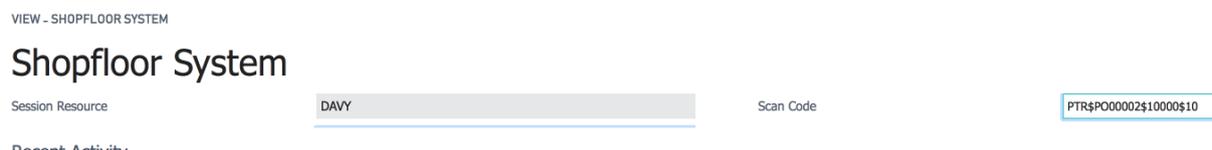


3.4.9. Manual time registration on routing

Another way of registering time on the routing is with the manual time registration function. The main difference between this and the start/stop method is that only one scan is needed. The data collector page will ask for a specific quantity of minutes instead of registering a start datetime and a stop datetime separately.

The downside to this way of logging times is that there's no indication in the recent activity log which routings are currently running.

Open the data collector screen by scanning/entering the following barcode data in the start code field:



VIEW - SHOPFLOOR SYSTEM

Shopfloor System

Session Resource: DAVY Scan Code: PTR\$P000002\$10000\$10

Recent Activity:

After validating the field, the data collector page asks the user for the time registration in minutes:



HOME

View

Manage

EDIT - ESC SHOPFLOOR DATA COLLECTOR

TIMEREGISTRATION

Time Registration: 15

Closing the data collector screen registers this in the shop floor date table.

3.4.9.1. Checking the data

In the recent activity subpage of the shop floor system you should see the following entry:

Recent Activity

SCAN DATETIME	DESCRIPTION
24/08/2018 11:01	Jan Hoek registered time on Prod. order Metal Part 001 - laser Cutting: (15)

Processing this from the data page creates a new capacity ledger entry on the production order:

 registering 15 minutes

OK

3.4.10. Finishing the routing operation

When the routing line is complete, it should be finished. After finishing the routing line, no further postings can be done on it. To finish a routing line for the laser cutting we will scan/enter the appropriate barcode in the start code field:

EDIT - SHOPFLOOR SYSTEM

Shopfloor System

Session Resource

DAVY

Scan Code

PFO\$PO00002\$10000\$10

After validating this start code the recent activity subpage is update:

Recent Activity

SCAN DATETIME	DESCRIPTION
24/08/2018 11:07	Operation lasser Cutting on Prod. Order PO00002 - has been finished

3.4.10.1. Checking the data

In the data page of the shop floor system the following should be visible:

ENTRY NO.	SCAN DATETIME	START CODE	PROCESSI... METHOD	PROCESSI... STATUS	DOCUMENT NO.	DOCUMENT LINE NO.	SOURCE CODE	RESOURCE NO.	QTY. TO FINISH	COMA
10	24/08/2018 11:07	PFO\$PO00002\$10000\$10	Finish Opera...	New	PO00002	10000	10	DAVY		

Using the action 'process data' the system will now process this line and change the status of the routing to Finished. On the routing in the production order the status should now look like this:

EDIT - PROD. ORDER ROUTING - PO00002 METAL PART 001 ROUTING00001 + New



OPERATION NO.	ENDING DATE-TIME	SETUPTIME	RUN TIME	WAITTIME	MOVETIME	ROUTING STATUS
10	22/08/2018 14:35	15	1	0	0	0 Finished
20	23/08/2018 9:00	5	2	0	0	0
30	24/08/2018 8:30	10	5	0	0	0
40	24/08/2018 17:00	10	5	0	0	0

3.4.11. Finishing the production order

The standard manufacturing functionality of Microsoft Business Central only posts output to the inventory when the last routing line is finished. To be able to test this, repeat the above steps for all routing lines. In principle, it is enough to just repeat the Finish quantity and finish operation steps. The Time registration step can be skipped.

After everything is scanned/entered and validated the recent history subpage looks like this:

Recent Activity

SCAN DATETIME	DESCRIPTION
24/08/2018 11:26	Operation Folding on Prod. Order P000002 - has been finished
24/08/2018 11:26	100 units have been finished on prod. order P000002 - Folding - Metal Part 001
24/08/2018 11:26	Operation Deburring on Prod. Order P000002 - has been finished
24/08/2018 11:25	100 units have been finished on prod. order P000002 - Deburring - Metal Part 001
24/08/2018 11:25	Operation Drilling on Prod. Order P000002 - has been finished
24/08/2018 11:25	100 units have been finished on prod. order P000002 - Drilling - Metal Part 001
24/08/2018 11:07	Operation laser Cutting on Prod. Order P000002 - has been finished

You now need to post all data by opening the data page and clicking on the 'Process Data' action the output is posted. After finishing the Folding routing line, the system should create an output line in the item ledger entries:

POSTING DATE	ENTRY TYPE	DOCUMENT TYPE	DOCUMENT NO.	ITEM NO.	DESCRIPTION	LOCATION CODE	QUANTITY	INVOICED QUANTITY	REMAI QUAN
23/08/2018	Output		P000002	1002		WEST	100	0	



4. Quality Management

4.1. Flow

The Metal-Manager quality management module provides our customer with a tool that allows them to check materials on specific moments in the default Business Central flow and make notes about the quality of the products. It does not take any action on the default flow of Business Central, but only enables the user to describe the quality of the materials at that specific moment in the flow.

4.2. Example Context

In this use-case we will continue where the production module left off, just after finishing the production order for 100 pieces of the Metal part from the previous Chapter of this document. This batch will be sold to our newly created customer from the previous chapter.

4.3. Use-Case Preparation

4.3.1. Metal-Manager Setup-Wizard

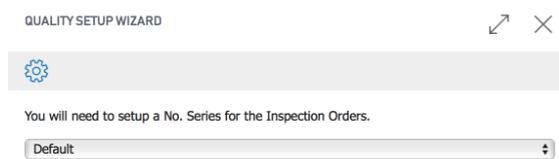
Metal-manager provides an assisted setup-wizard. Start it from the assisted-setup list:

The first step in the wizard is just a welcome message:



Click next.

The second step asks the user for a number series:



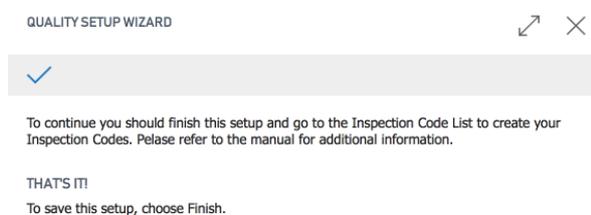
QUALITY SETUP WIZARD

You will need to setup a No. Series for the Inspection Orders.

Default

Here we can choose for the default no. series that will be created by the wizard or provide a manually created no. series. Choose default and click next.

In the last step the system provides a summary. Just click finish to save the settings:



QUALITY SETUP WIZARD

To continue you should finish this setup and go to the Inspection Code List to create your Inspection Codes. Pelase refer to the manual for additional information.

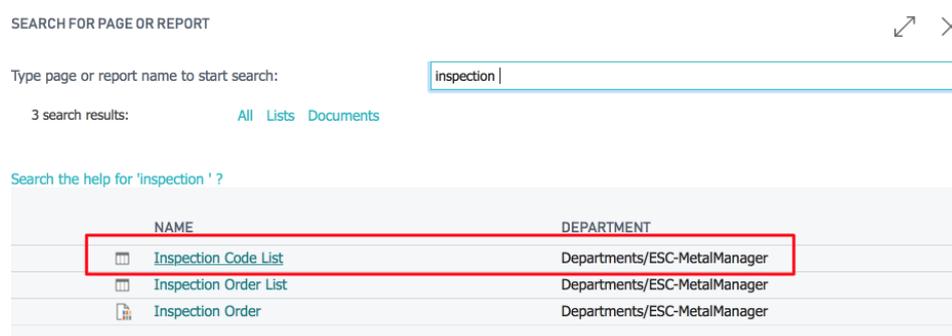
THAT'S IT!

To save this setup, choose Finish.

4.3.2. Inspection Codes

The last wizard step makes mention of them, but unfortunately not all settings for this module can be provided by the wizard. We still need to create the inspection codes for the quality module.

To do this we need to search for the 'inspection code list' in the search functionality:



SEARCH FOR PAGE OR REPORT

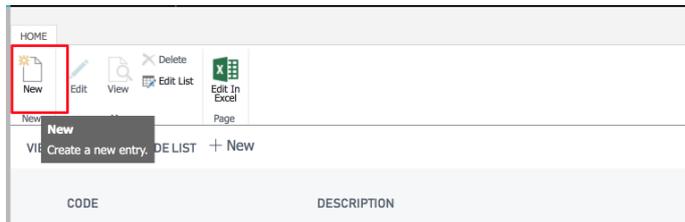
Type page or report name to start search: inspection

3 search results: [All](#) [Lists](#) [Documents](#)

[Search the help for 'inspection' ?](#)

NAME	DEPARTMENT
Inspection Code List	Departments/ESC-MetalManager
Inspection Order List	Departments/ESC-MetalManager
Inspection Order	Departments/ESC-MetalManager

In the Inspection code list click new:



Create an inspection code card as below:

EDIT - INSPECTION CODE CARD

SALES OUT

General

Code	SALES OUT	Purchase Inbound	<input type="checkbox"/>
Description	Inspection before shipping to customer	Purchase Outbound	<input type="checkbox"/>
Required	<input checked="" type="checkbox"/>	Sales Inbound	<input type="checkbox"/>
Warehouse Inbound	<input type="checkbox"/>	Sales Outbound	<input checked="" type="checkbox"/>
Warehouse Outbound	<input type="checkbox"/>		

Comments

Questions

COMMENT	
Before the shipment can be released to the carrier please check the following things:	...
	...
- Is there a label on the packaging?	...
- Does the quantity on the label match the quantity in the box?	...
- Does the box show any signs of damage?	...
- Does the shipping address match the address on the shipment note?	...

Answers

COMMENT	
	Yes / No

The inspection card has two very important fields that decide how this inspection code will be used. In this case we want the quality check to be required in outbound sales situations.

Link this inspection code to the metal part item on the item card:

EDIT - ITEM CARD ×

1002 · Metal Part 001

Item Show less

No.	1002	...	Last Date Modified	23/08/2018
Description	Metal Part 001		GTIN	
Blocked	<input type="checkbox"/>		Item Category Code	...
Type	Inventory		Service Item Group	...
Base Unit of Measure	STUKS		Automatic Ext. Texts	<input type="checkbox"/>

Inventory > 100

Costs & Posting > 10,00 | DET.HANDEL | WEDERVERK

Prices & Sales > 0,00

Replenishment > Prod. Order

Metal Manager

Inspection Code	SALES OUT	...
-----------------	-----------	-----

Planning > None

4.4. Use-Case Walkthrough

4.4.1. Sales order

First step in the use-case is to create a sales order to the customer that we created in the first chapter of this document. Create the following sales order:

EDIT - SALES ORDER - 101005 - METAL-MANAGER CUSTOMER ✕

✕ Inspection Orders have been created. [Open Inspection Order List.](#)

101005 · Metal-Manager Customer

General Show more

Customer Name	Metal-Manager Customer	...	Due Date	23/09/2018	...
Contact		...	Requested Delivery Date		...
Posting Date	23/08/2018	...	External Document No.		
Order Date	23/08/2018	...			

Lines

TYPE	NO.	DESCRIPTION	LOCATION CODE	QUANTITY	RESERVED QUANTITY	UNIT OF MEASURE CODE	UNIT PRICE EXCL. VAT	LINE DISCOUNT%	
Item	...	1002	Metal Part 001	WEST	100	-	STUKS	34,00	2

After validation of the item no. you will notice that a notification is thrown. This notification indicates that a new inspection order has been created.

After validation of the item no. the Metal-Manager quality management module creates the inspection order based on the inspection code that has been linked to the item.

You can click on the notification link to open the inspection order:

EDIT - INSPECTION ORDER CARD

IO0000005

General

Document No.	IO0000005	No.	1002
Document Date	23/08/2018	Description	Metal Part 001
Inspection Code	SALES OUT	Due Date	
Inspection Description	Inspection before shipping to customer	Inspected By	
Assigned User ID		Inspected On	
Status	Open		

Comments

Questions

COMMENT	
Before the shipment can be released to the carrier please check the following things:	...
- Is there a label on the packaging?	...
- Does the quantity on the label match the quantity in the box?	...
- Does the box show any signs of damage?	...
- Does the shipping address match the address on the shipment note?	...

Answers

COMMENT	
	Yes / No

When you try to post the shipment without approving/rejecting the inspection order you will get the following error message:

EDIT - SALES ORDER - 101005 - METAL-MANAGER CUSTOMER

✕ An Approved / Rejected Inspection Order is needed for Sales Line: Order,101005,10000. [Open Inspection Order List.](#)

101005 - Metal-Manager Customer

General

Customer Name	Metal-Manager Customer	Due Date	23/09/2018
Contact		Requested Delivery Date	
Posting Date	23/08/2018		
Order Date	23/08/2018		

Lines

TYPE	QUANTITY	RESERVED QUANTITY	UNIT OF MEASURE CODE

An Approved / Rejected Inspection Order is needed for Sales Line: Order,101005,10000.

OK

For your convenience, the link to the required inspection order is shown as a notification.

4.4.2. Inspection Order

In this case, the inspection code is set as required so we need to fill it in and approve/reject it.

In this case fill in the inspection order and approve it:

EDIT - INSPECTION ORDERS + New

DOCUMENT NO.	DOCUMENT DATE	INSPECTION CODE	INSPECTION DESCRIPTION	ASSIGNED USER ID	STATUS	TYPE	NO.
IO0000005	23/08/2018	SALES OUT	Inspection before shipping to cus		Open	Item	1002

Comments

Questions

COMMENT	
Before the shipment can be released to the carrier plea...	...
...	...
- Is there a label on the packaging?	...
- Does the quantity on the label match the quantity in t..	...
- Does the box show any signs of damage?	...
- Does the shipping address match the address on the s..	...

Answers

COMMENT	
...	...
...	...
Yes	...
Yes	...
Yes: Minor scratches in the box, nothing serious	...
Yes	...

Now the shipment can be posted. The inspection order is linked to the resulting sales shipment document.