



InnoVites®
Driving the dimensions of your business

White Paper

InnoVites for Cable®



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Chapter 1 About Us

InnoVites is a Microsoft Dynamics partner that develops a vertical exclusively for the cable manufacturing industry. The InnoVites team is passionate about developing enterprise solutions that allow cable manufacturing companies to maximize their business performance.

The accumulated industry experience of the InnoVites team exceeds 50 years, and we combine this with practical experience in the application of IT to the cable industry.

We translate our knowledge, experience and lessons-learned into ready-made solutions with a natural fit for cable manufacturers.

With offices in India and The Netherlands we serve the cable industry globally through strategic partnerships with local Microsoft Dynamics partners.

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Chapter 2 Introduction

InnoVites for Cable® is the standard vertical for cable manufacturers on the innovative ERP solution Microsoft Dynamics AX. This vertical on Microsoft Dynamics AX provides an excellent match for the business processes in the Cable Industry.

This White Paper gives an impression of the functions and features of the first version of *InnoVites for Cable*®.

As a standard solution, *InnoVites for Cable*® will be further enriched in the coming years. Customers using this vertical will all benefit from ongoing innovation, upgrades, migration tools for the extension to newer versions of Microsoft Dynamics AX, help documentation and support.

Chapter 3 of this document explains why cable manufacturing companies struggle to work with a standard ERP package. The need and benefits of a dedicated vertical solution for this industry are discussed, as opposed to the risks and consequences of customizing an ERP package for an individual company.

From Chapter 4 onwards a description is given per functional area (e.g. sales, production, planning) of the cable specific issues of that area and examples how this is solved in the *InnoVites for Cable*® vertical.

Chapter 3 Special ERP software for a special industry

3.1 A *vertical* for cable?

The use of Enterprise Resource Planning (ERP) software is widely adopted in businesses around the world. Many companies have even replaced their ERP for the first or second time already to benefit from the ongoing advances in the Information Technology. Companies invest in ERP software to redesign, integrate and speed up their business processes and improve business performance.

When visiting the websites of ERP vendors, you will typically find information about the “Industries” for which they offer different ‘flavors’ of their ERP software. The reason for this differentiation is that there is no such a thing as ‘one size fits all’-ERP solution. The differences between industries require vendors to create separate ERP software solutions per industry, which are usually referred to as *Verticals*.



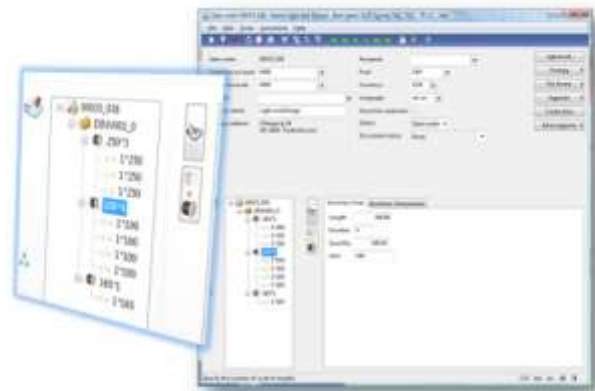
In this Chapter we address the question whether the Cable Industry is special enough to require a special vertical. In other words: is the Cable Industry so unique that cable manufacturers need a unique ERP solution to successfully support their businesses?

3.2 Company nervous system

ERP software has a crucial role in the planning and execution of business functions. The ERP system is used to record and share information in all corners of the company. This information is processed and used to make decisions and execute the business processes. In fact ERP can be seen as the nervous system of the company.

An important feature of a nervous system is its perfect connection to the body to effectively coordinate interrelated vital functions. At the same time the nervous system has to be flexible enough to grow with the body over time and to be able to adopt to change.

The same is true for ERP software: the application has to be closely connected with the business processes of the company to be able to fulfill its promise of



business improvement through integration and coordination. In other words, the software should 'understand' the characteristics of the industry and thrive the business rather than hinder it.

So it's clear that companies should select the right ERP solution that really connects to its business. Only then companies will be able to leverage innovative technologies and stay ahead of competition. The question is now: Do generic ERP verticals really understand the cable industry, or do we need a dedicated vertical?

3.3 What's so special about the cable industry?

We all know that cables are special. However a generic ERP application may not recognize that and the sales person who is trying to sell its licenses might bother even less...

So, what is it really that make cables special with regard to ERP software? Well, there are a number of unique features that are important in the cable industry. A fundamental characteristic that differentiates the cable industry from other industries is the notion of 'length'. Length information is relevant throughout the supply chain: A customer wants to have a custom length of a cable, between specific tolerances. Another example: the customer demand might be allocated to one of the (mother) drums in stock, length information is crucial in making an efficient allocation. Also in production, length information is important. In a common scenario, production planning will combine multiple customer demands into a single production length. In case of exceptions (e.g. broken length) the length information is crucial to make the right decisions. The logic of generic ERP systems allows shipping a length of 200m and 100m to fulfill a customer demand for 300m, which makes no sense in the reality of cables.



Other special functionalities that are important for cable manufacturers are: the management of the highly volatile costs of non-ferrous material, management of drums, cutting management, cable design management, and others.

The set of special requirements makes the cable industry unique, also from an ERP perspective. That's why we believe that cable manufacturers should look for an ERP vertical that uniquely focuses on their industry requirements.

3.4 The Dead-end Street of Customizations

Some IT suppliers try to sell and implement generic industry solutions to cable manufacturers. Sooner or later in these implementation projects, the gap between this software and the daily reality of the cable company becomes clear. The IT supplier will simply tell the customer that this gap can be easily closed with 'some customizations' and offers a customization project. It will be the first of a series.

The cable manufacturer in this situation will face a couple of issues. The first issue is typically a communication problem: IT suppliers without a focus on the cable industry do not talk the 'cable language' and discussions during implementation are prone to misunderstandings. This in turn leads to the next issue of customizations that fail to meet expectations. That's why customization projects typically result in budget overruns.

The end result of these projects is a highly customized software installation that is difficult or even impossible to migrate to newer versions of the underlying ERP product. It limits the

opportunities to benefit from innovation of standard technology. These customized systems are typically also very inflexible and do not support the agility that today's competitive environment requires. The maintenance of the customizations will consume a significant part of the annual IT budget, cannibalizing from the resources for innovation.

Or, as Christopher Koch, Senior Editor at cio.com, puts it (Christopher Koch, "ABC: An introduction to ERP", www.cio.com):

"...something to be avoided if at all possible, is actual customization of the core ERP software itself. This happens when the ERP software can't handle one of your business processes and you decide to mess with the software to make it do what you want. You're playing with fire. The customizations can affect every module of the ERP system because they are all so tightly linked together. Upgrading the ERP package—no walk in the park under the best of circumstances—becomes a nightmare because you'll have to do the customization all over again in the new version. Maybe it will work, maybe it won't. No matter what, the vendor will not be there to support you. You will have to hire extra staffers to do the customization work, and keep them on for good to maintain it."

3.5 Go vertical

Well-known ERP suppliers try to reduce the number of verticals to save costs. This often means that they try to convince cable manufacturers to implement generic industry solutions. We strongly believe that the cable industry is special enough to 'deserve' its own vertical. Experience proves that the business needs of cable manufacturers are not covered by generic industry solutions. Cable manufacturers are urged to consider the risks of large customizations that come with a generic ERP solution. Go smart, go vertical, go InnoVites!

Chapter 4 The InnoVites Tree

4.1 Clear presentation of Demand/Supply

The InnoVites team strongly believes that the success of an ERP implementation highly depends on the user friendliness, and ease of use of the solution.

That's why we came up with the InnoVites Tree that is used consistently in the application. It gives a quick and intuitive overview of the Sales Order, Production Order, Cutting Order, etc. and helps the user to do his task with ease while avoiding errors.

Linking demands to inventory, production or purchase can be managed by drag and drop from or to the InnoVites Tree area.

Figure 1 shows for example the InnoVites Tree in the Production Order. In once glance, the user has an overview of the status of each length and the relationships to customer demands. The InnoVites Tree is an example of innovation that InnoVites uses to help their customers to be even more successful!

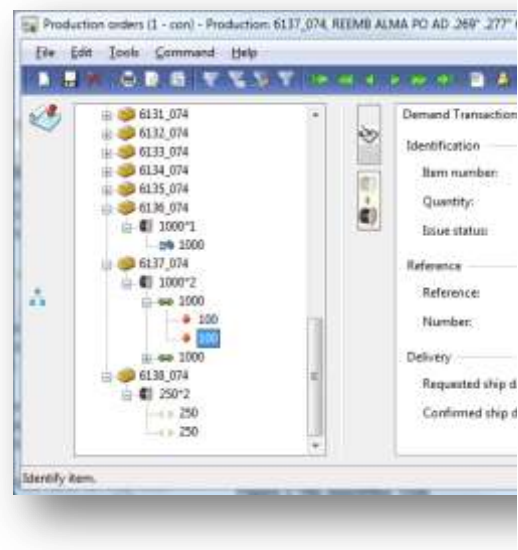







Figure 1 The InnoVites Tree

4.2 Clear presentation of Demand/Supply Length Status

The InnoVites Tree presents the status of the order with clear icons that provides the user strong visual feedback, helping the user to make the right decisions. Some examples of icons are:

Icon	Explanation	Description
	Broken link	Sales cable demand, not linked to inventory yet
	Solid link	Sales cable demand linked to a cable available from inventory, production- or purchase order
	Scissors	Sales cable demand selected for cutting
	Forklift	Sales cable demand picked for shipping
	Truck	Sales cable demand shipped to the customer

After selecting the right item, the sales representative quickly specifies the customer needs, in the screen that's especially designed for the cable industry. It records information about:

- the length required,
- the number of lengths,
- the tolerances which are acceptable for the customer,
- the drums that will be used for shipment
- the specific agreements regarding precious material, such as Copper and Aluminum

The graphical InnoVites Tree Menu gives him an overview of the customer order in one glance at any time.

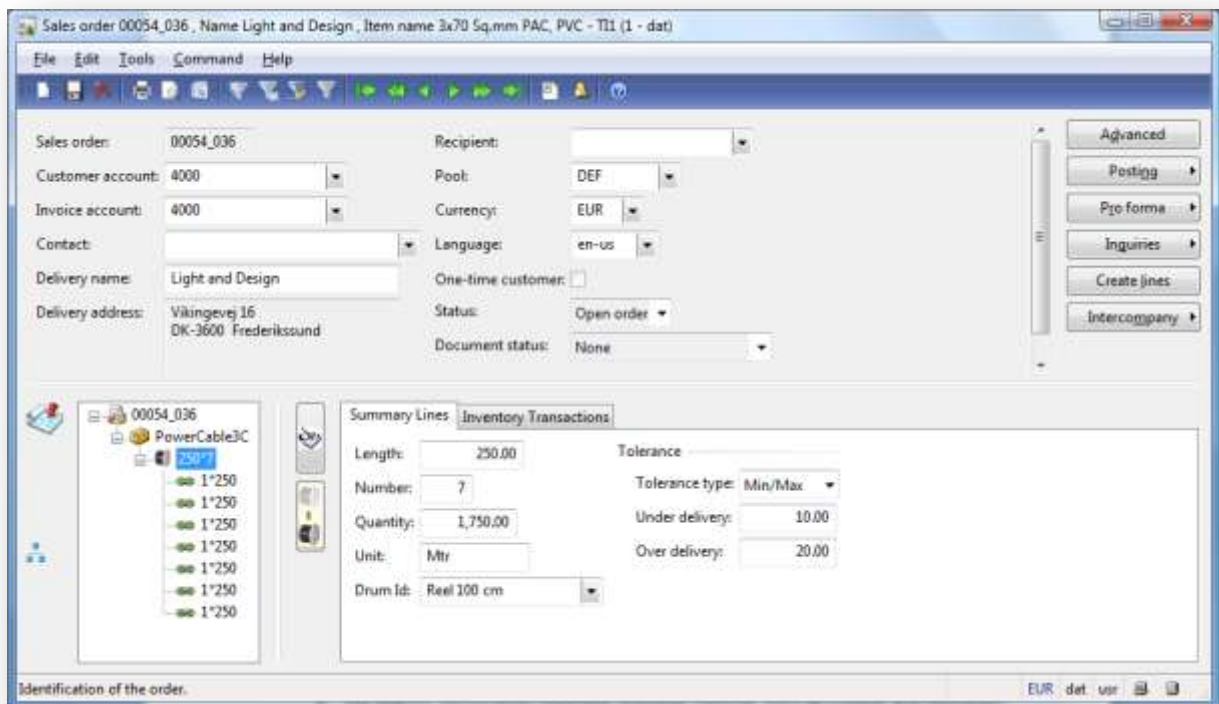


Figure 3 Easy to use Sales Order Entry screen with InnoVites Tree

This cable specific information will be available throughout the supply chain (e.g. for production, purchasing, inventory management) and it is this transparency that will help the company to continuously improve its quality and reliability of the sales and delivery process.

5.3 Sales Reservation

After specifying the needs of the customer, the demanded cable lengths can be reserved against Mother Drums in stock for cables that are produced to forecast.

The Reservation screen is an easy to use screen that gives the user a quick and complete overview of the available drums in stock that have sufficient lengths, given the tolerances of the customer. The user can now easily drag&drop (see Figure 4) the most appropriate Mother Drum that fits the demands of the customer. The easy to use screen, and the

availability of all relevant information enables the user to make an optimal allocation of (multiple) demands to the available inventory.

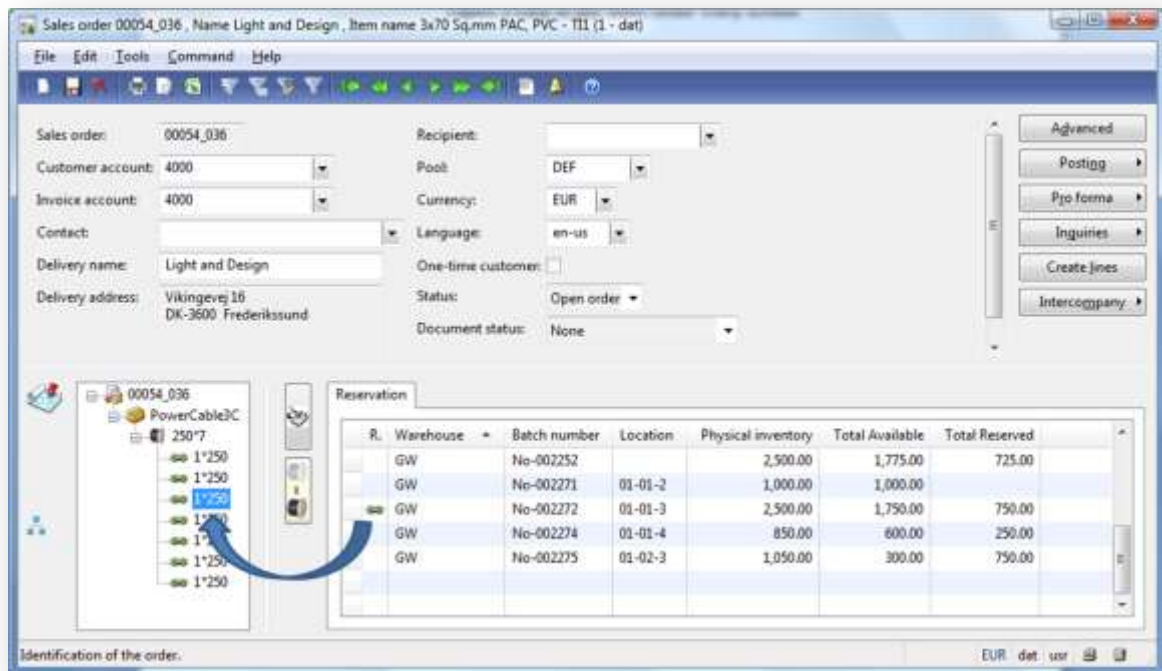


Figure 4 Sales – Inventory Reservation screen

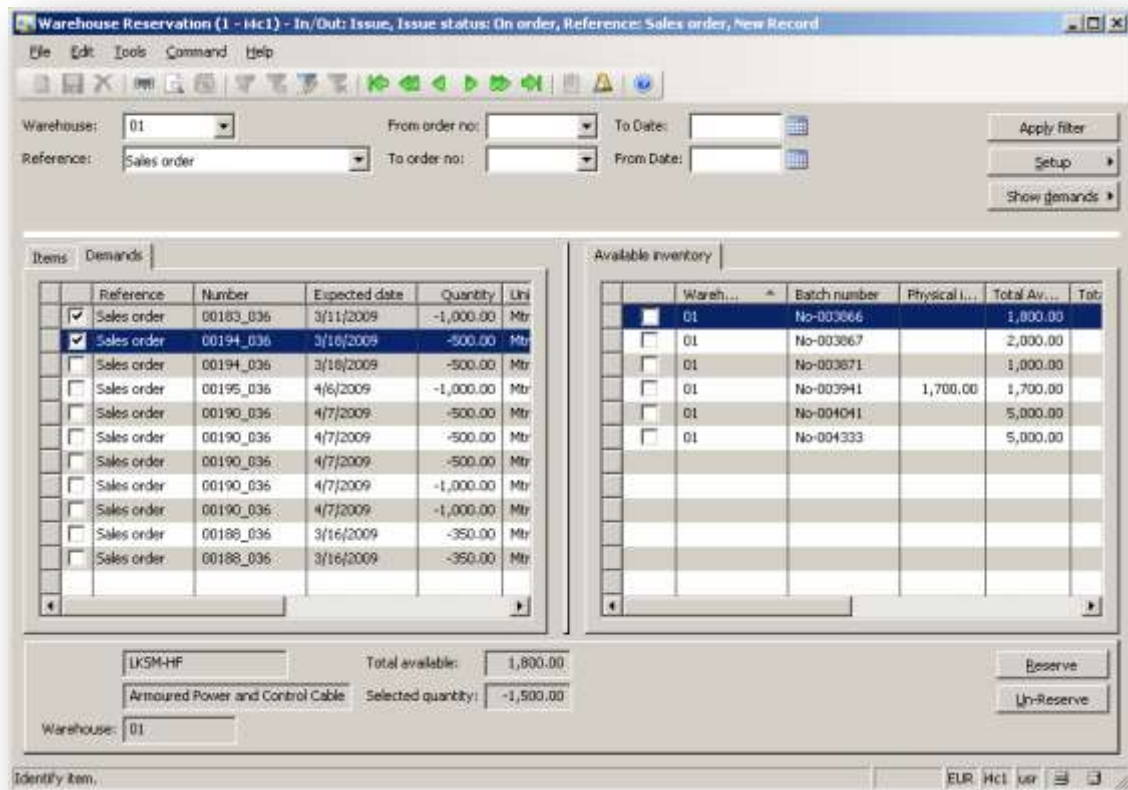
The demands of the customer can not only be reserved to physical available inventory, but also to cable lengths that are still in production. This gives the user a lot of flexibility in assigning customer demands to available stock of cables that are have to come from production yet.

The icons in the InnoVites Tree give the user in one glance a status overview of the order. The customer lengths with a 'grey, broken chain' are not reserved to any stock yet. The customer lengths with a 'green, solid chain' are already reserved against a Mother Drum, or a production length that is not finished yet.

When selecting the customer length, the screen will show the related Mother Drum or production length, and the user can easily navigate to the details to e.g. see the location or expected delivery date of the drum.

5.4 Stock allocation in high-volume environment

When the company processes many cuts and shipments per day, it's more convenient to have a screen that presents the open demands across sales orders. These open demands can then be reserved against the Mother Drums in stock. Find below the easy-to-use screen that is used to make optimal reservations of demands to stock. After this allocation the cutting of the Mother Drums can be executed as explained in Chapter 11.



Warehouse: 01 From order no: To Date: Apply filter
Reference: Sales order To order no: From Date: Setup Show demands

Items	Reference	Number	Expected date	Quantity	Unit
<input checked="" type="checkbox"/>	Sales order	00183_036	3/11/2009	-1,000.00	Mtr
<input checked="" type="checkbox"/>	Sales order	00194_036	3/16/2009	-500.00	Mtr
<input type="checkbox"/>	Sales order	00194_036	3/16/2009	-500.00	Mtr
<input type="checkbox"/>	Sales order	00195_036	4/6/2009	-1,000.00	Mtr
<input type="checkbox"/>	Sales order	00190_036	4/7/2009	-500.00	Mtr
<input type="checkbox"/>	Sales order	00190_036	4/7/2009	-500.00	Mtr
<input type="checkbox"/>	Sales order	00190_036	4/7/2009	-500.00	Mtr
<input type="checkbox"/>	Sales order	00190_036	4/7/2009	-1,000.00	Mtr
<input type="checkbox"/>	Sales order	00190_036	4/7/2009	-1,000.00	Mtr
<input type="checkbox"/>	Sales order	00188_036	3/16/2009	-350.00	Mtr
<input type="checkbox"/>	Sales order	00188_036	3/16/2009	-350.00	Mtr

Available inventory	Wareh...	Batch number	Physical I...	Total Av...	Tot...
<input checked="" type="checkbox"/>	01	No-003666		1,800.00	
<input type="checkbox"/>	01	No-003667		2,000.00	
<input type="checkbox"/>	01	No-003671		1,000.00	
<input type="checkbox"/>	01	No-003941	1,700.00	1,700.00	
<input type="checkbox"/>	01	No-004041		5,000.00	
<input type="checkbox"/>	01	No-004333		5,000.00	

LKSM-HF Total available: 1,800.00
Armoured Power and Control Cable Selected quantity: -1,500.00
Warehouse: 01

Reserve Un-Reserve

Identify item. EUR Hc1 user

Figure 5 Easy to use Allocation Screen to link customer demands to available drums

5.5 Make or Buy to order

When an item is not kept as a stock keeping unit, or there is temporarily no stock available, a new production order can be created directly to cover the demand of this sales order. This process will be described in Chapter 9 (Production). The replenishment of inventory can of course also be driven by Master Planning as described in Chapter 13.

Alternatively the system can also generate all required production (and purchase) orders automatically, using the (multi-level) Bill of Material and Route by creating a so-called Explosion. This process to create an Explosion is straightforward, and explained in the next paragraph.

5.6 Sales Order Explosion

After entering the Sales Order for a cable that will be specifically produced for a customer, the system will help the user to create the necessary Production and Purchase orders.

Based on the Bill of Material, and the Routing, the system will generate automatically planned Production and Purchase Orders, while taking the length information into account.

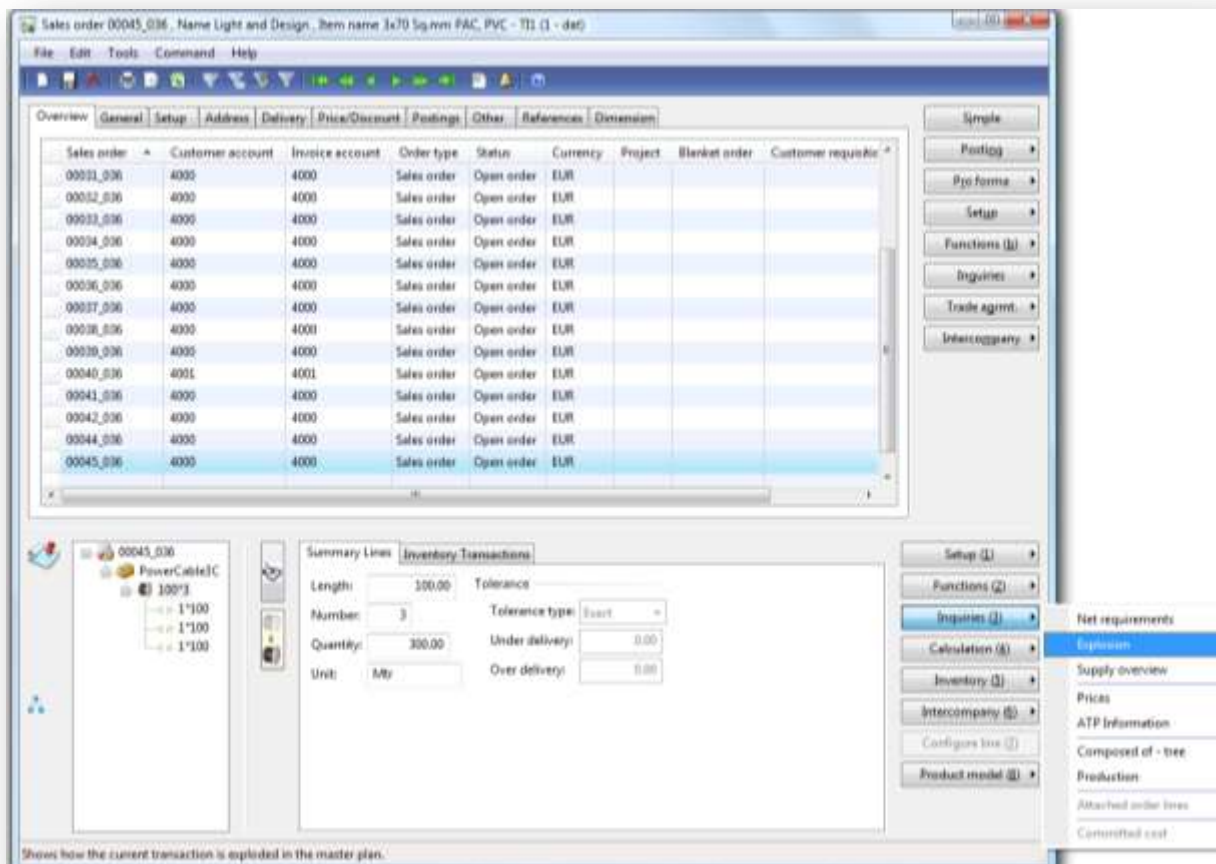


Figure 6 Create Explosion for Sales Order

After creating the Explosion from the Sales Order, the system will provide the user a clear overview of the planned Production Orders and Purchase Orders.

The production lengths in the Production Order will not exceed the maximum reel capacity.

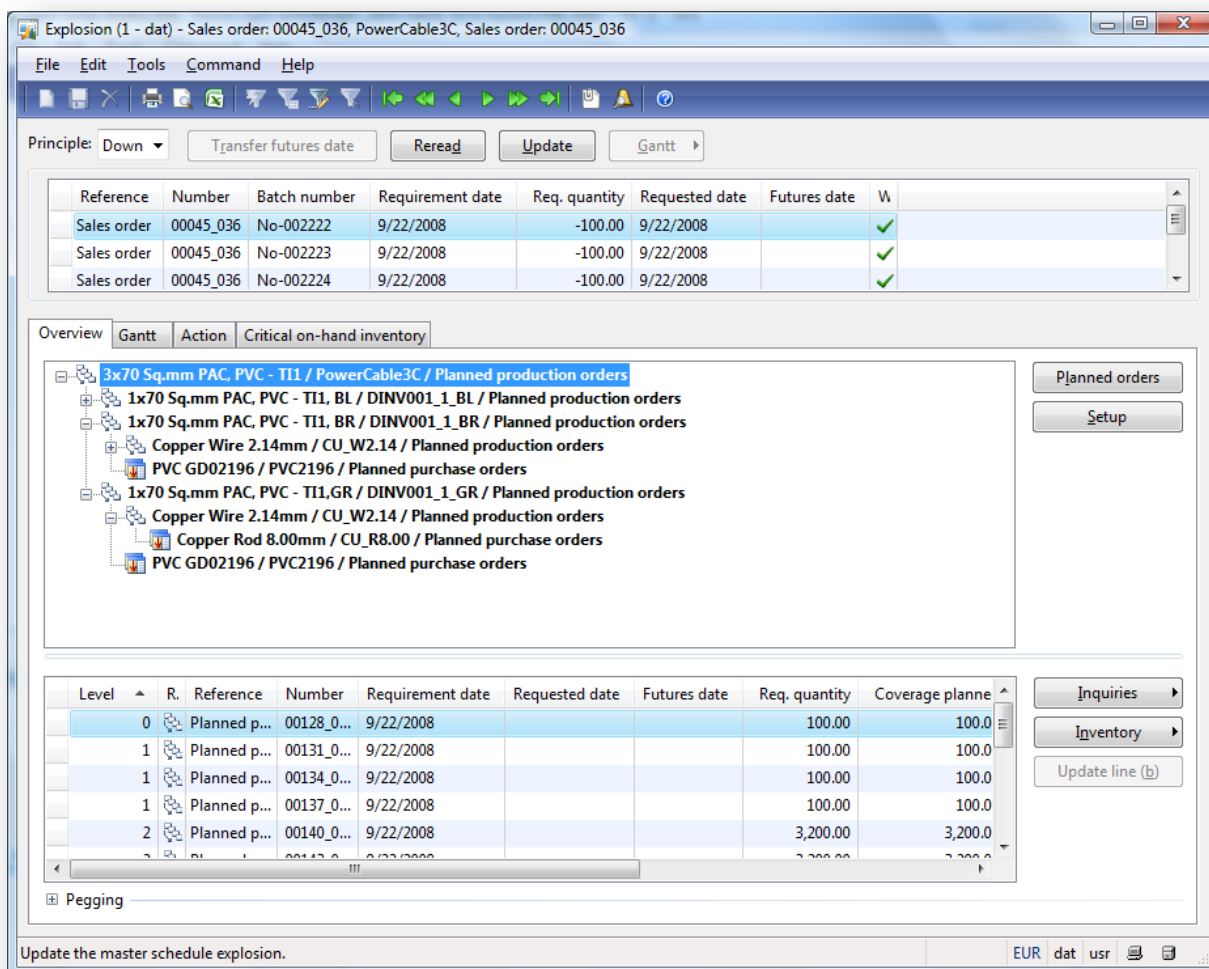


Figure 7 Overview of Explosion for Sales Order

The explosion gives a clear overview of the status of the Production and Purchase Orders and their relations. Also the link to the Sales Order is transparent.

5.7 Auto-create Purchase Order

The system supports the auto-creation of a Purchase Order, based on the Sales Order line. After selecting the lengths in the Sales Order, the system creates the corresponding lengths in a Purchase Order, while maintaining the link between customer demand and the purchased lengths.

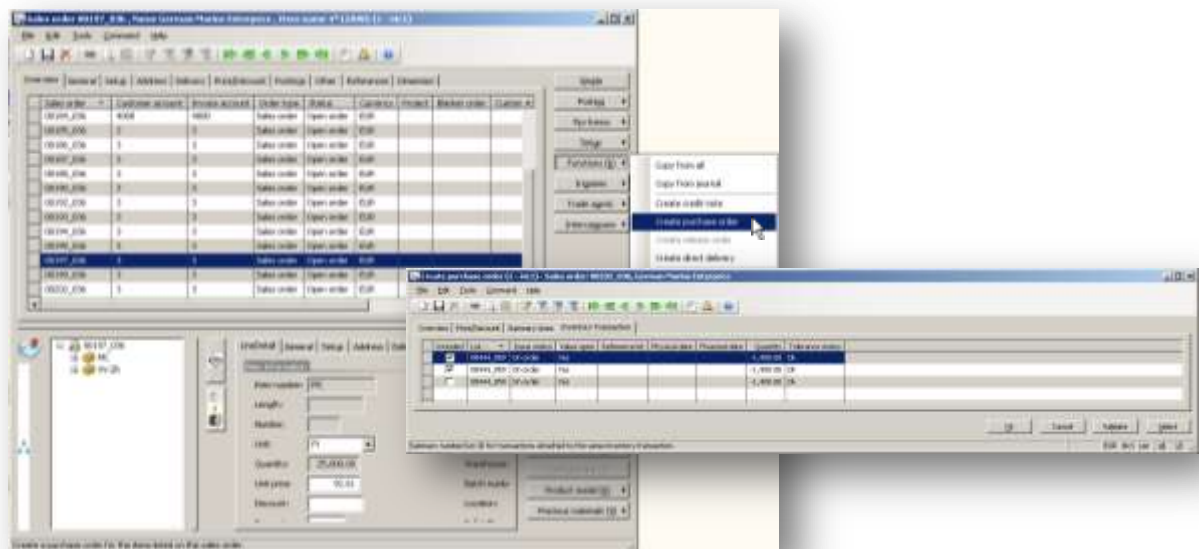


Figure 8 Create a length-based Purchase Order directly from a Sales Order

5.8 Sales Delivery

After entering the sales order, and reserving (and producing) the finished cables, the customer lengths can be delivered.

This might require a Mother Drum to be cut. This process is explained in Chapter 11. After cutting the cable to the customer demanded lengths and putting them on the right drums, the drums can be picked for delivery.

In the Picking List screen, the user can now select the individual drums that need to be picked by right-clicking the drums in the InnoVites Tree. Again, the icons will indicate the status of the drums.

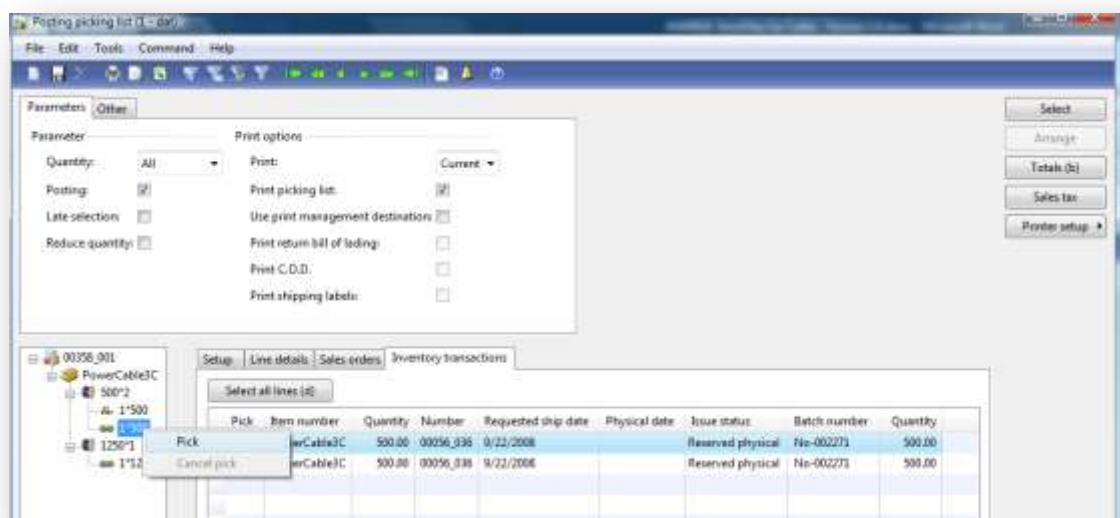


Figure 9 Picking List screen

The Picking List will be printed including the information of the location of the drum, and the user can pick the drums from the warehouse, or from the cutting area.

After picking the drums, they can be packed and shipped to the customer. The user selects the drums for packing and the system will print the Packing Slip that contains all relevant information, including the weight.

The cables are now shipped to the customer, and the invoice can be printed.

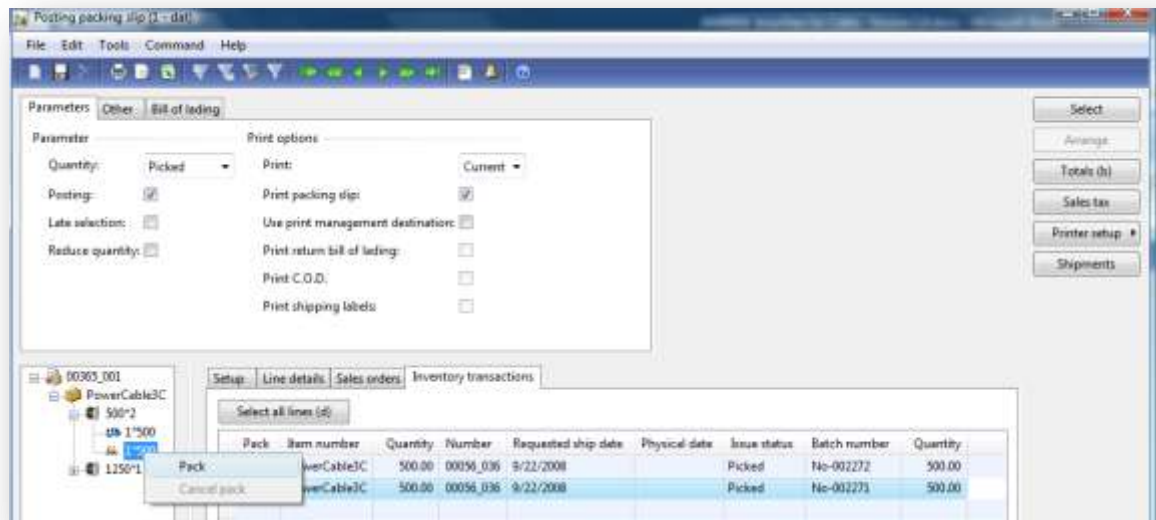


Figure 10 Packing Slip screen

5.9 Sales Invoice

After completing the packing, the sales invoice can be printed. In addition to 'standard' information, such as prices and amounts, it specifies relevant information, such as the cable lengths and the agreements regarding the precious material information if applicable.

5.10 Available functionality

- Sales Entry
 - Easy to use sales entry screen with InnoVites Tree
 - Functionality to specify the lengths, and number of them
 - Functionality to enter Tolerances that are accepted by the customer
 - Functionality to enter the required drum type
 - Functionality to enter and review Precious Material information (e.g. Cu, Al)
- Sales Reservation
 - Easy to use reservation screen to make an optimal link between demand and available Mother Drums, or cable lengths that are in production
- Sales Delivery
 - Easy to use screen to create Picking List with the InnoVites Tree
 - Easy to use screen to create Packing Slip with the InnoVites Tree
- Sales Invoicing
 - Complete information on invoice, including length and Precious Material

Chapter 6 Purchasing

6.1 Introduction

In the cable distribution business, length is a critical dimension in the operations as well. Also, more and more companies are outsourcing operations to other companies, or sister companies, and cable specific information, such as length and drums are getting more important in the sourcing functions. That's why *InnoVites for Cable*® includes length information in the Purchasing domain also.

6.2 Order Entry

Similar to the Sales Order Entry Screen, the user can specify the length and number of drums that are required. They can easily be copied from existing demands, e.g. from a Sales Order. In this case, a unique relation will be maintained in the system between the sales demand the purchased drum. Once the drum gets delivered by the supplier to the warehouse, the system will show the related Sales Order, and the customer demand can be shipped immediately.

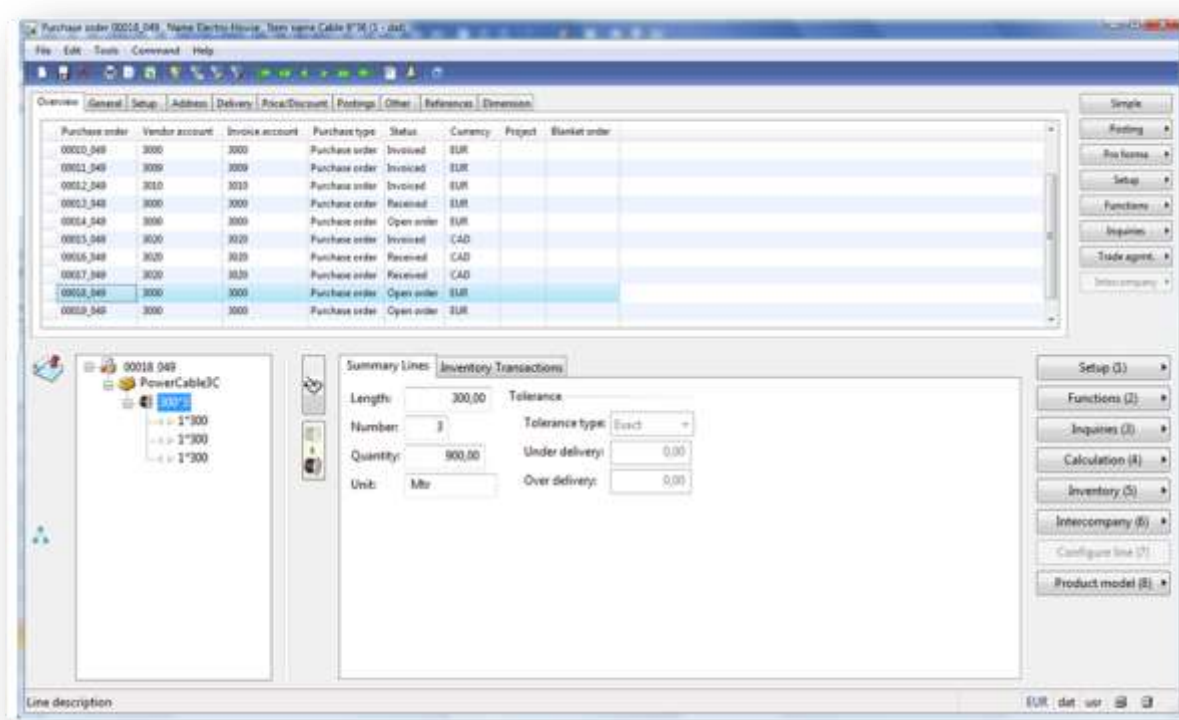


Figure 11 Purchase Order Entry screen

6.3 Goods Receipt

The same logic as in Sales applies here. The individual drums can be selected and accepted in the warehouse. At the same time Drum Labels can be printed to identify the drum for later reference.

6.4 Available functionality

- Purchase Order entry
 - Cable specific information can be put in the system, using the InnoVites Tree
 - Purchased drums can be linked to sales demands
- Goods Receipt
 - Cables specific information can be recorded in the system, upon delivery by the supplier
 - Drum cards can be printed to identify the drum

Chapter 7 Cable Specifications

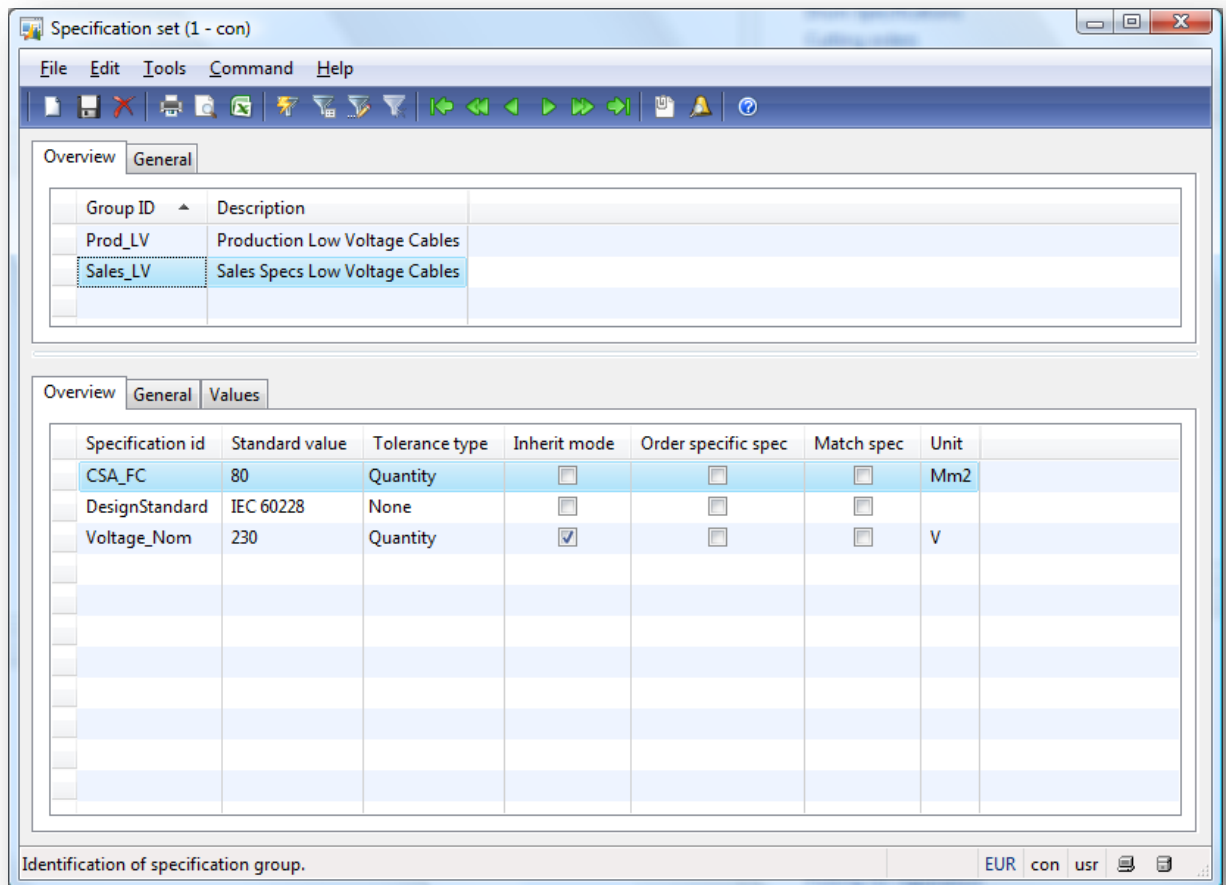
7.1 Introduction

Cables have many properties and characteristics that are used for searching items, classifying items, measuring the quality, etc. To obtain maximum customer satisfaction, cable manufacturers need to record and manage these specifications of the cable. Examples are the Design standard of the cable, the number of conductors in the cable, the maximum tension, the cross section area, the properties of the optical fibers (attenuation at different frequencies) and much more.

The Cable Specification module in *InnoVites for Cable*® provides cable manufacturers flexible and concise functionality to manage this information. It is seamlessly integrated with the Quality Control module of Microsoft Dynamics AX® (also see Chapter 8) to ensure that (where applicable) specifications of the cable are measured in the quality control processes.

7.2 Cable Specifications Set up

Cable Specifications can be set up very flexible to cater for all the requirements in the cable industry processes.



Group ID	Description
Prod_LV	Production Low Voltage Cables
Sales_LV	Sales Specs Low Voltage Cables

Specification id	Standard value	Tolerance type	Inherit mode	Order specific spec	Match spec	Unit
CSA_FC	80	Quantity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Mm2
DesignStandard	IEC 60228	None	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Voltage_Nom	230	Quantity	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	V

Figure 12 Specification Set Entry screen

Figure 12 shows how to create a group of specifications that will come as a set of related specifications. The user can record the standard value, and also set up the behavior of the specification: e.g. should the value of the specification be inherited from sales to production, should a sales specification be created in production if it doesn't exist yet, should the specification be managed through the Quality Control module, etc.

In addition, the tolerances which are applicable for each specification can be recorded. These tolerances are used when matching the customer demand with available inventory.

Now the set of specifications can get associated with e.g. Sales Order, or Production Order. Different specification sets can be linked to different combinations of Items/Customer (groups), see Figure 13.

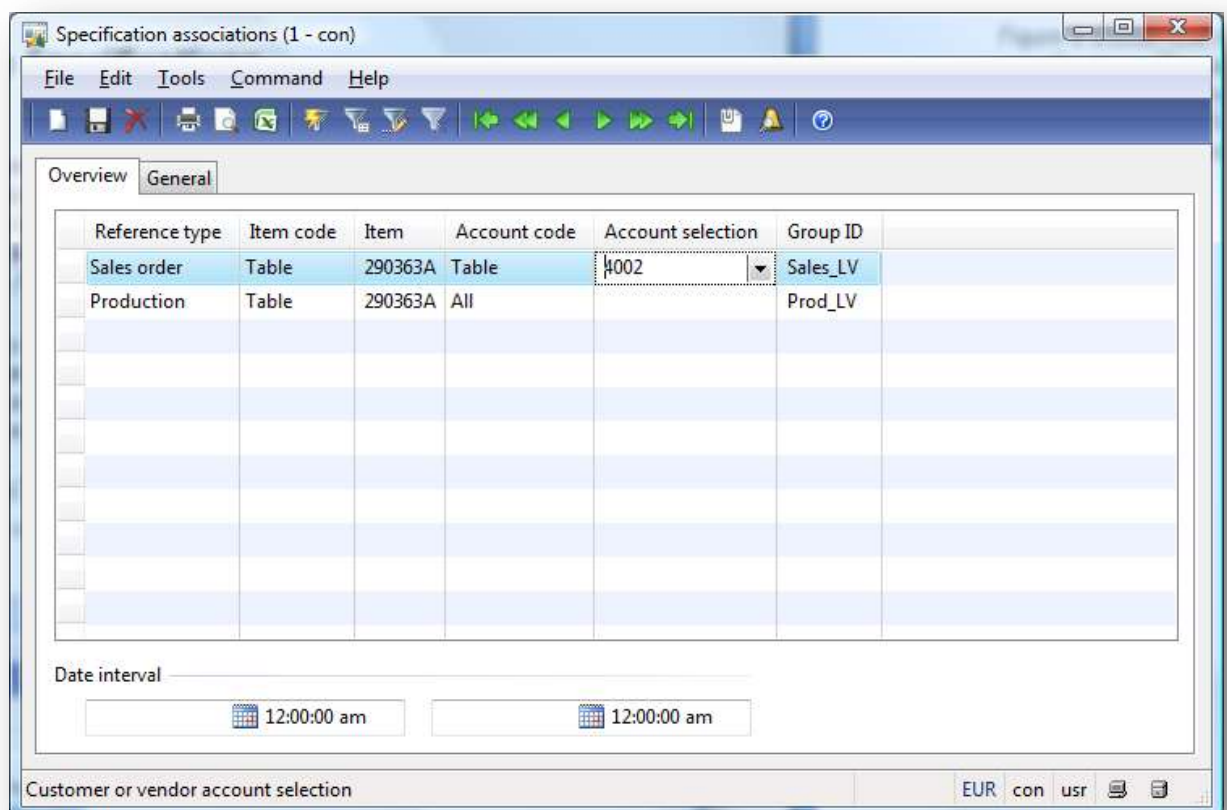


Figure 13 Specification Associations

7.3 Specifications in Sales Order

After setting up the defaults of the Specifications (e.g. for a certain Customer), the Specifications will appear in the Sales Order. The actual values of the specifications can be easily found and changed by right-clicking the individual lengths (Figure 14).

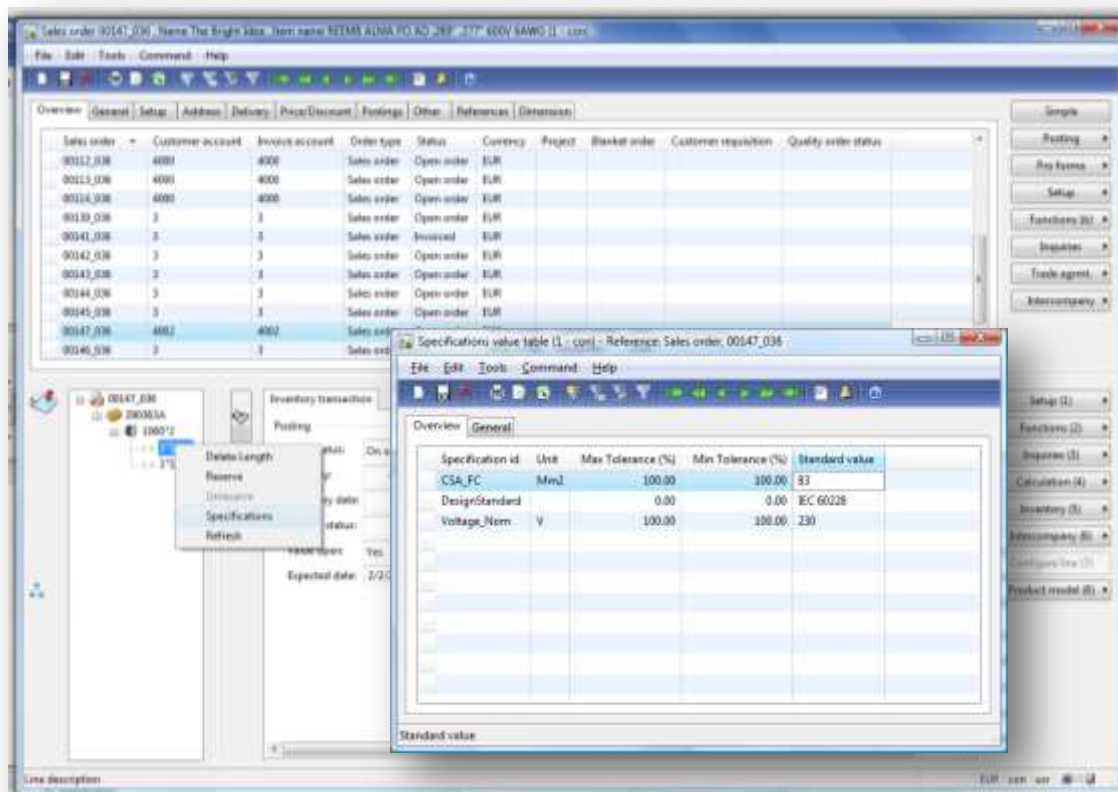


Figure 14 Checking Specifications in Sales Order

The system will match (tolerances of) specifications when showing and allocating the available inventory for this customer demand.

When creating a production order straight from the sales order demands, the system will inherit or copy the specification information from the sales order according to the set-up (Figure 15).

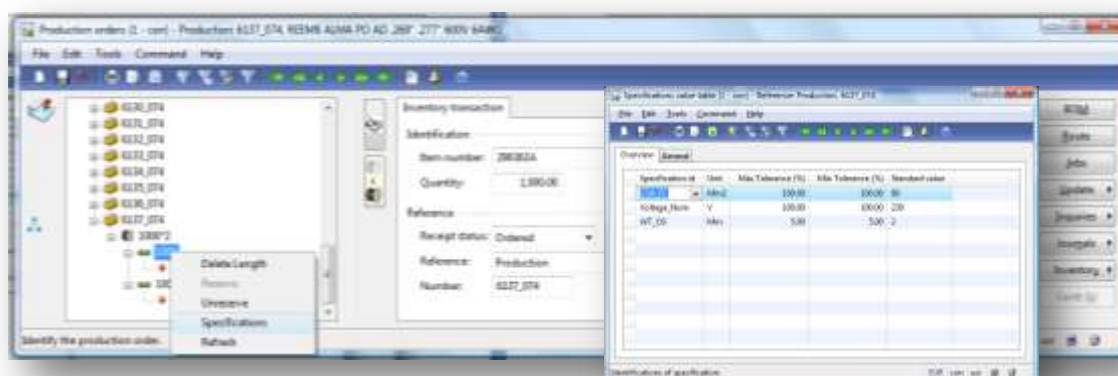


Figure 15 Specifications in Production Order

Chapter 8 Integrated Quality Control

8.1 Introduction

Quality Control is an important aspect of the business processes in cable manufacturing. A significant series of measurements needs to be completed before the cable can be released for shipment. That's why *InnoVites for Cable*® comes with the quality module integrated in the length-based order processing.

The quality management process is integrated in the InnoVites Tree.

8.2 Quality Management Set-Up

The set-up of Quality Management is similar to the Cable Specifications set-up. In a Quality Association, users can define what set of Tests need to be executed in a certain quality control measurement (Figure 16).

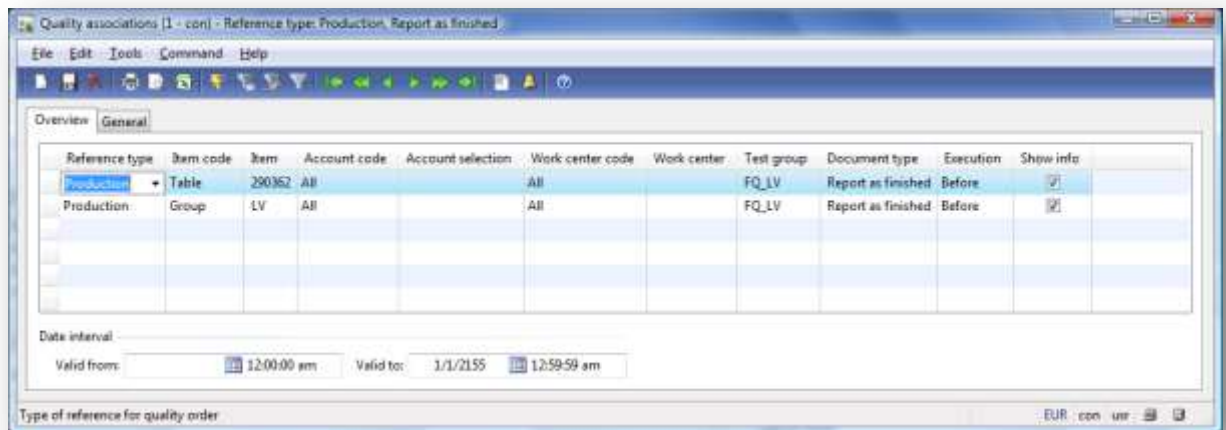


Figure 16 Setting up Quality Associations

8.3 Quality Management in Production Orders

Now, when the production order gets reported as finished, the system automatically creates Quality Orders (Figure 17).

By right-clicking the production length in the InnoVites Tree (Figure 18), the user can immediately navigate to the related Quality Order screen. In this screen the required quality measurement results can be entered per cable length (Figure 19).

This information will be printed on the Quality Certificates that can be sent to the customers.

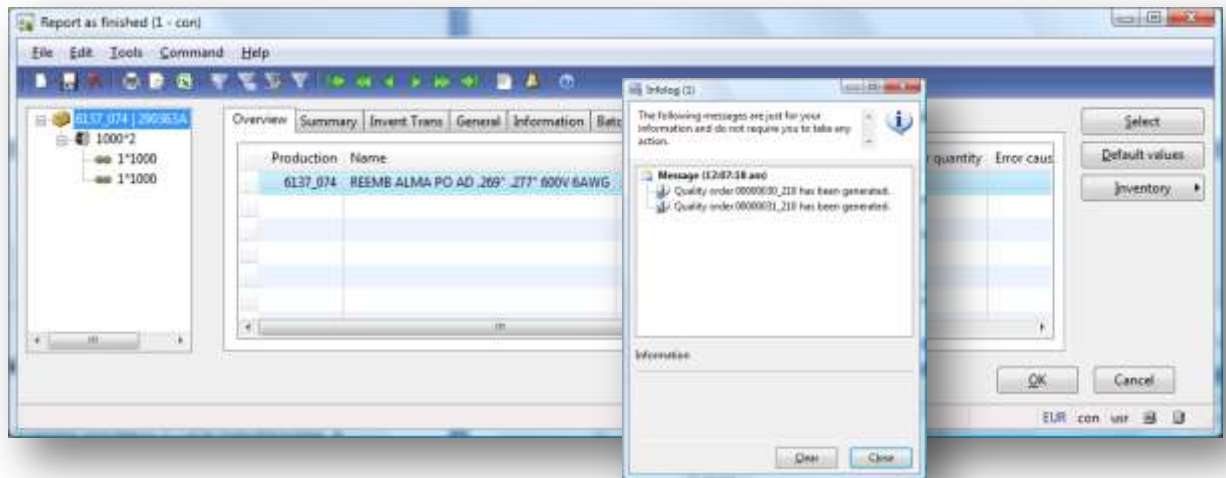


Figure 17 Quality Orders generated for Production Order lengths

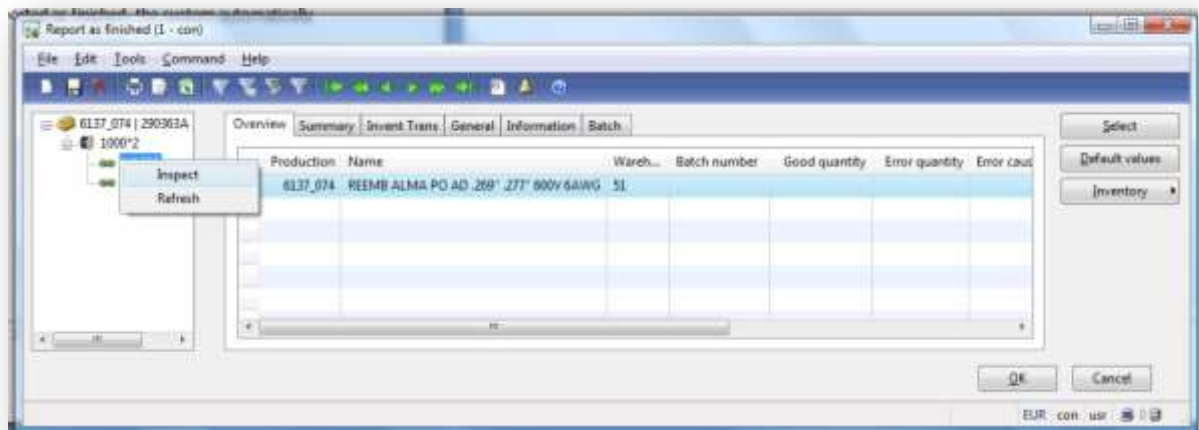


Figure 18 Quickly navigate to Quality Order from InnoVites Tree

Quality orders (1 - con) - Quality order: 00000030_210, REEMB ALMA PO AD 269" 277" 600V 6AWG, Quality order: 00000030_210

File Edit Tools Command Help

Overview General References Dimension

Quality order	Item number	Warehouse	Batch number	Test group	Quantity	Status	Reference type
00000030_210	290363A	51	No-003716	FQ_LV	1,000.00	Open	Production

Validate
Functions
Inquiries
Inventory

Overview General Test

Sequence number	Test	Test result	Results entered	Include results	D
10	DIAM01	✓	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
20	ET01	✓	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
30	ET03	✗	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

Results

Used symbols
✗ Fail ✓ Pass

Test identification

EUR con use

Figure 19 Enter quality measurement results per cable length

Chapter 9 Tolerance Management

9.1 Introduction

Length is an important aspect in the world of cables. Usually customers accept a shorter or longer cable length only within a certain bandwidth. With Tolerance Management, you can specify the range that is acceptable for a customer.

The tolerance information is crucial information that is available throughout the supply chain to support decision making in case of exceptions.

Example: A customer orders an electrical low voltage ground cable with a length of 500m. The supplier has a length in stock of 499m. May he ship this cable or does he need to produce another one?

Depending on the contractual agreement with the customer, this length might be acceptable.

Or another example: a special cable is produced to customer order for 230m. However, due to a problem in production, the finished cable is only 210m.

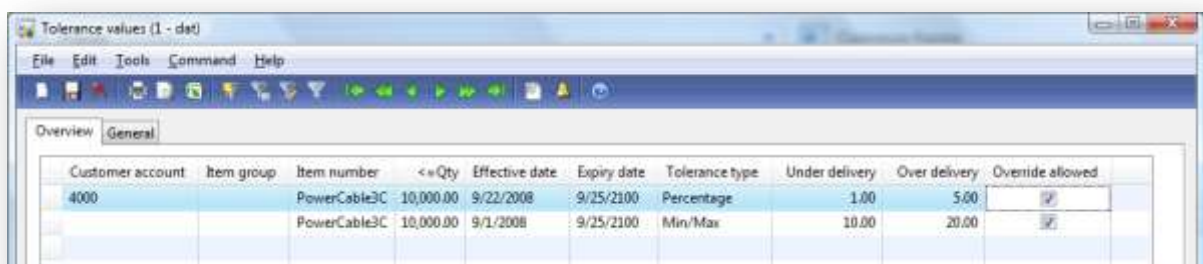
The system needs to flag the problem in this situation and facilitate decision making.

InnoVites for Cable® provides the functionality to recognize and manage these situations immediately and with ease. Tolerances can be specified, and workflows can be defined that are activated in case of tolerance violations.

9.2 Types of tolerance specifications

The following possible types of tolerance specification can be recognized:

- Exact Example: 100m
- Min/Max Example: 100m Min 95m / Max 105m
- Percentage Example: 100m -5% / +5%



Customer account	Item group	Item number	<=Qty	Effective date	Expiry date	Tolerance type	Under delivery	Over delivery	Override allowed
4000		PowerCable3C	10,000.00	9/22/2008	9/25/2100	Percentage	1.00	5.00	<input checked="" type="checkbox"/>
		PowerCable3C	10,000.00	9/1/2008	9/25/2100	Min/Max	10.00	20.00	<input checked="" type="checkbox"/>

Figure 20 Setting up Tolerances

9.3 Tolerance exception handling

A customer orders a cable of 100m with a Min/Max deviation tolerance of 0m/5m. This means that the cable to be delivered has to be between 100m and 105m. After finishing cutting the measured length is 99,5 m. What to do, deliver this length or cut a new length.

For these cases it is important to be able to have the flexibility to specify the actions that need to be taken to address the tolerance violation.

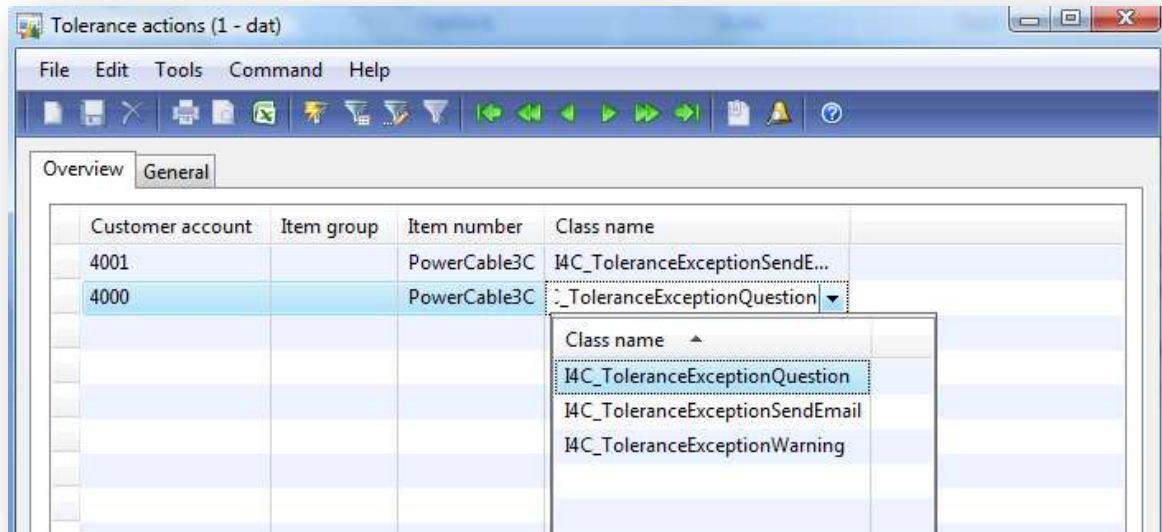


Figure 21 Flexible Tolerance actions can be specified that get triggered after a tolerance violation

“Hard” actions can be defined, e.g. the system will give a message that the length is outside the tolerance and block the delivery which means that a new cable has to be cut.

Also “Soft” actions can be linked to a tolerance violation. The system will give a message that the length is outside the tolerance and asks to continue or not. It will be possible to consult the customer and ask if he will accept the length or not. If the customer accepts the length the delivery is still possible.

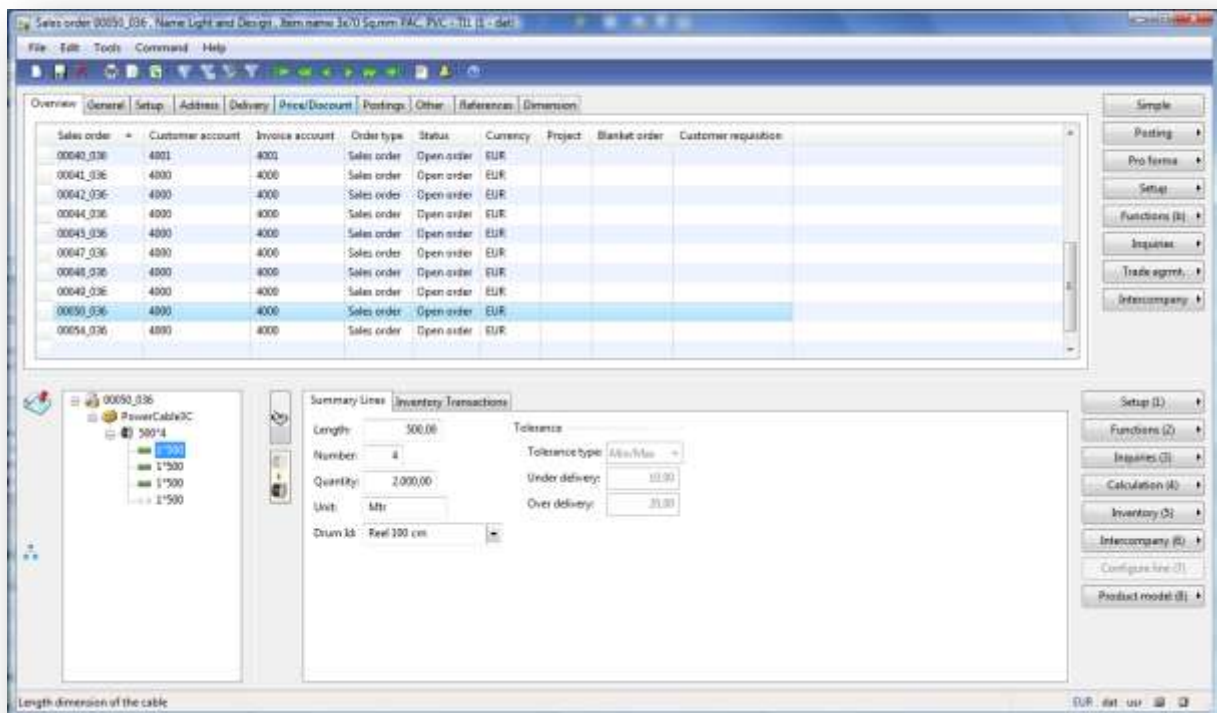
9.4 Microsoft Dynamics AX Workflow

A lot of flexibility is provided in the definition of the actions that follow on tolerance violations. It includes the invocation of the powerful Microsoft Dynamics AX Workflow functionality. Based on the exception that occurs (e.g. the cable falls short to the minimum tolerance) the company may specify simple, or complex workflows that determine the behavior of the system and the required actions of the users.

The workflow functionality that is now available in Microsoft Dynamics AX is a powerful feature that significantly adds to the flexibility and transparency of business processes. *InnoVites for Cable*® leverages its capabilities not only in the management of Tolerances, but also in other parts of the system.

9.5 Tolerances in Sales Order handling

In Figure 22 you find the Sales Order entry screen in which the Tolerances can be specified. The system will take by default the values which are specified in the Tolerance set up by customer.



The screenshot displays the 'Sales order 00050_036' window in the InnoVites software. The window has a menu bar (File, Edit, Tools, Command, Help) and a toolbar. Below the toolbar is a tabbed interface with tabs for Overview, General, Setup, Address, Delivery, Price/Discount, Postings, Other, References, and Dimension. The 'Overview' tab is active, showing a table of sales orders.

Sales order	Customer account	Invoice account	Order type	Status	Currency	Project	Blanket order	Customer requisition
00040_036	4001	4001	Sales order	Open order	EUR			
00041_036	4000	4000	Sales order	Open order	EUR			
00042_036	4000	4000	Sales order	Open order	EUR			
00044_036	4000	4000	Sales order	Open order	EUR			
00045_036	4000	4000	Sales order	Open order	EUR			
00047_036	4000	4000	Sales order	Open order	EUR			
00048_036	4000	4000	Sales order	Open order	EUR			
00049_036	4000	4000	Sales order	Open order	EUR			
00050_036	4000	4000	Sales order	Open order	EUR			
00054_036	4000	4000	Sales order	Open order	EUR			

On the right side of the window, there is a vertical toolbar with buttons for Simple, Posting, Proforma, Setup, Functions (F), Inquiries, Trade agree, and Intercompany. Below these are buttons for Setup (I), Functions (2), Inquiries (3), Calculation (4), Inventory (5), Intercompany (6), Configure line (3), and Product model (8).

The bottom section of the window is divided into two main areas. On the left, there is a tree view showing the product hierarchy: 00050_036, Power Cable 9C, 50014, 1500, 1500, 1500. On the right, there is a 'Summary Lines' section with a 'Tolerance' tab. This section contains fields for Length (500.00), Number (4), Quantity (2,000.00), Unit (Mtr), and Drum id (Reel 100 cm). To the right of these fields are tolerance settings: Tolerance type (Atto/Max), Under delivery (10.00), and Over delivery (35.00).

At the bottom left of the window, there is a text label: 'Length dimension of the cable'. At the bottom right, there is a status bar showing 'EUR', 'dat', 'usr', and a small icon.

Figure 22 Tolerance specification in Sales Order entry

When the sales representative tries to reserve a length to the customer demand that violates the tolerances as set by the customer, multiple actions can be triggered. E.g. a message will prompt on the screen to warn the sales representative.

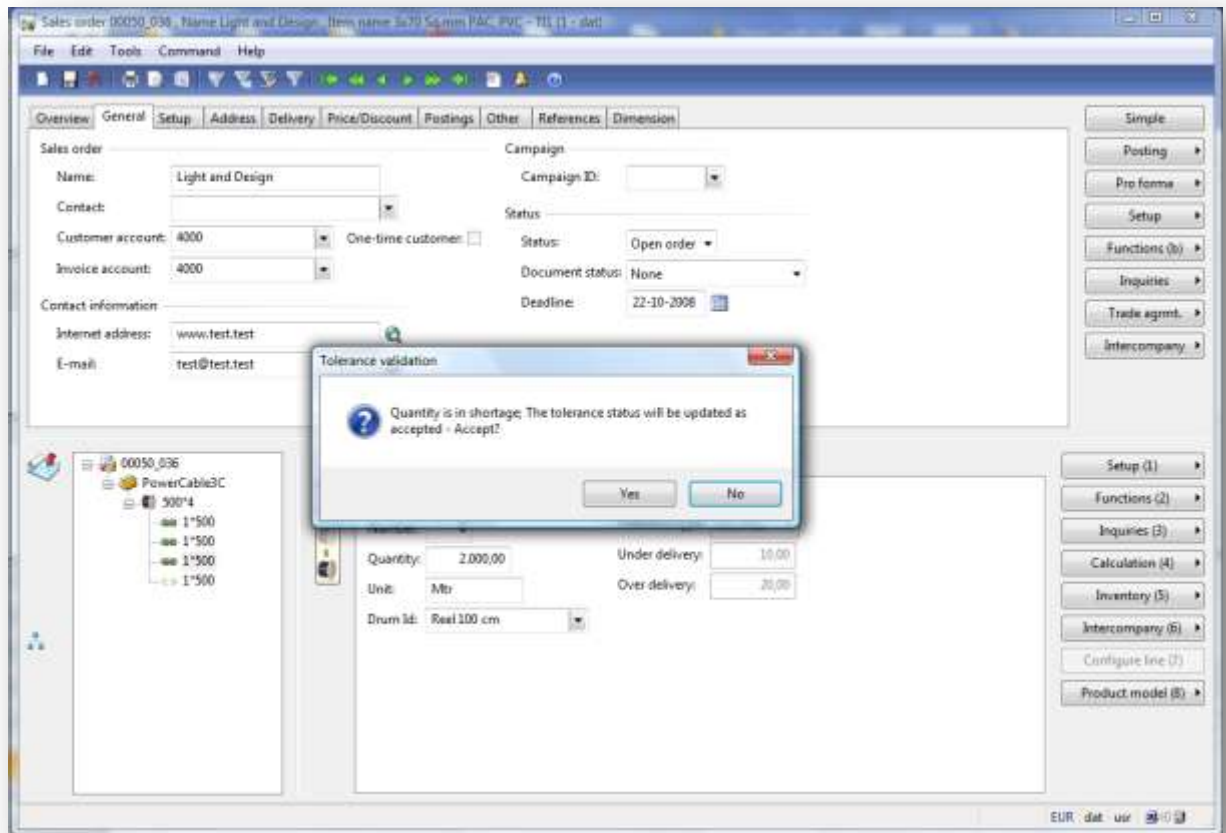


Figure 23 Warning when trying to pick a length for shipping outside tolerance

9.6 Available Functionality

InnoVites for Cable® will support Tolerance Management.

Tolerance Management will have impact on several places in the ERP package:

- Item Control / Item Group Control / Customer Control
 - Specify kind of tolerance and tolerances values (if applicable)
 - Specify if changing tolerances is allowed during sales order entry
 - Specify behavior when product is outside tolerance
- Sales Order Control
 - Specification of tolerances during order entry (based on setup on Item / Item Group / Customer level)
 - Check lengths for picking are within tolerance
 - Check if lengths for shipment are within tolerance.
- Production Order Control
 - Copy tolerances from demand lengths to production
 - Give warning when produced lengths are outside tolerance
- Purchase Order Control
 - Copy tolerances from demand lengths to purchase
 - Give warning when received lengths are outside tolerance
- Cutting Order Control
 - Give warning when cut lengths are outside tolerances

Chapter 10 Production

10.1 Introduction

The raw materials used in the cable industry (e.g. copper, aluminum) are very expensive. Typically the raw material costs account for 60-80% of the cost price of a cable. This means that it's critical for cable manufacturers to have a close eye on its production processes. A wrong decision on the shop floor can have a big impact on the business performance. Cable manufacturers need an ERP solution that is tightly connected to the processes in production. The system needs to integrate production with the other functions in the company such as Sales to help management making the right decisions. At the same time, the solution should be flexible enough to manage the exceptions that always happen on the shop floor.

10.2 Order Entry

A Production Order for a finished cable or any other 'length-sensitive' product can be entered in multiple ways.

Users can simply create a Production Order and specify the lengths that need to be produced.

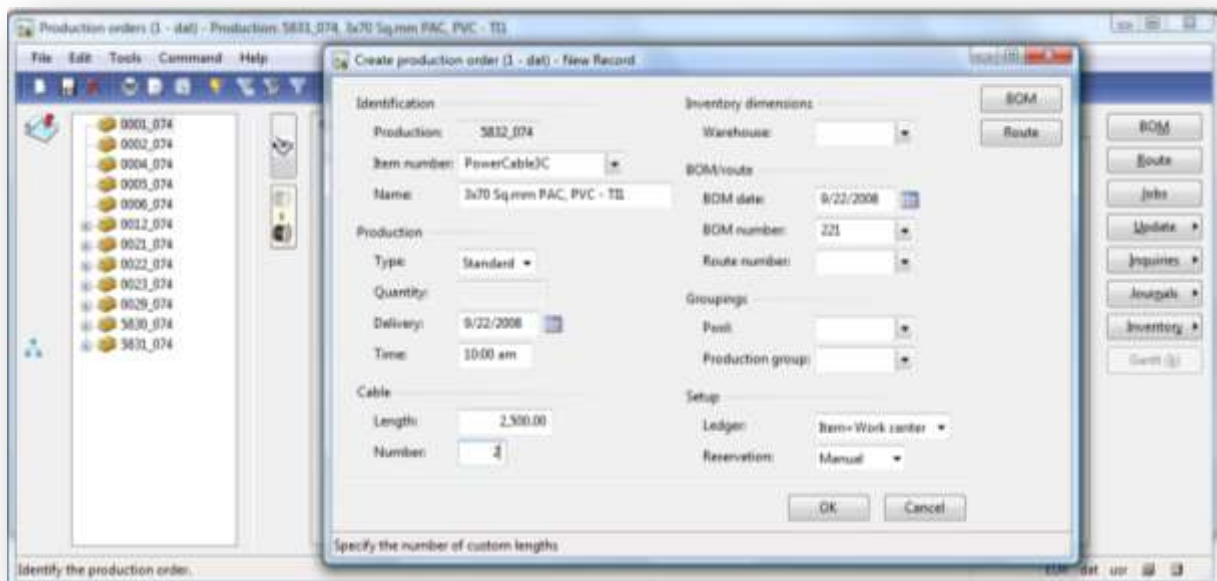


Figure 24 Simple Production Entry screen

A Production Order will be created with the lengths as specified. Not that the Tolerance details are automatically taken into account when creating the Production Order.

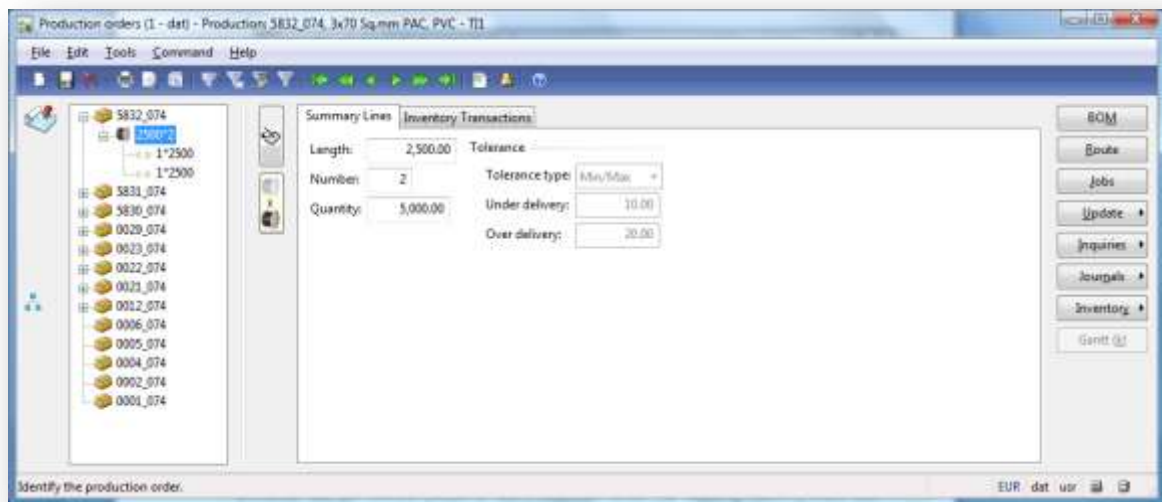


Figure 25 Production Order

The production lengths can now be reserved from Sales Orders. Alternatively, the customer demands can be directly linked to the Production Order by copying them in from the Reservation screen in the Production Order. The Reservation screen will show all customer demands for the item that will be produced, and the user can easily drag&drop them into one Production Order (see Figure 26) e.g. based on the Requested Ship Date. During the whole process the link between the customer demand and the production length will be maintained.

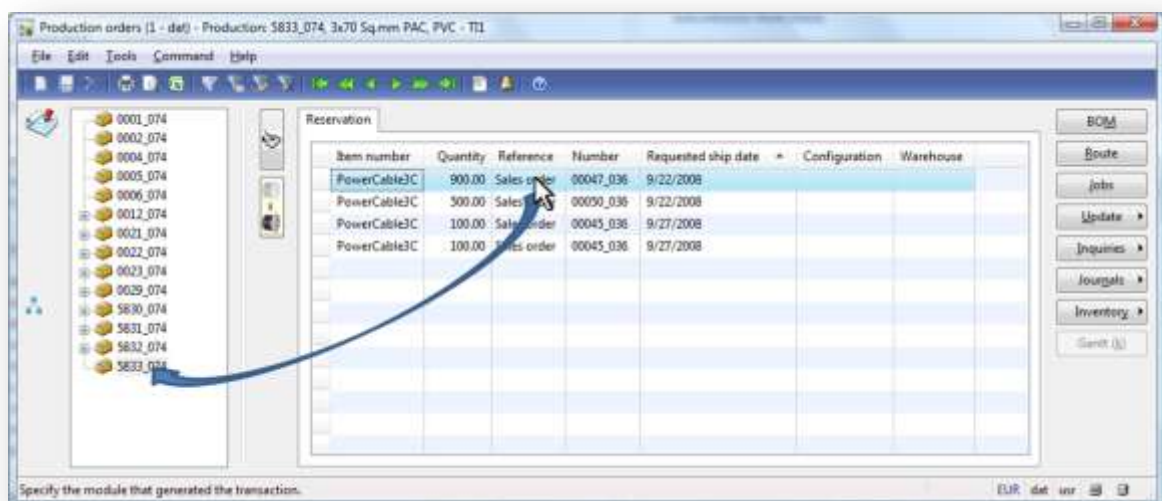


Figure 26 Dragging customer demands into Production Order

After dragging all customer demands which are to be produced in this Production Order into the InnoVites Tree, the Production Order is ready to be released to the shop floor and production documentation can be printed.

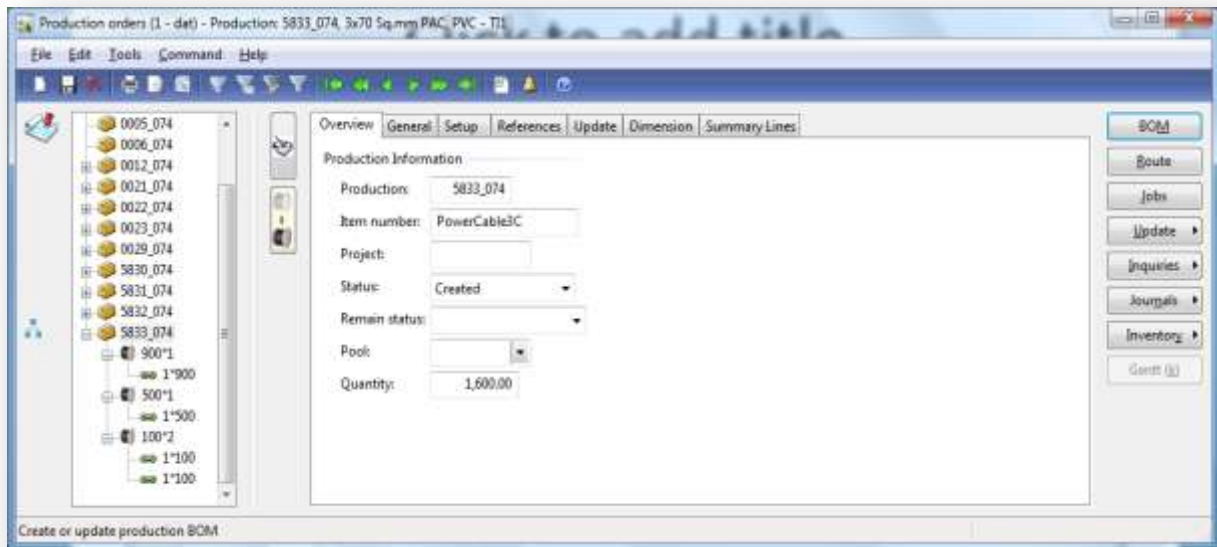


Figure 27 Production Order ready to be released to shop floor

An alternative way of creating the Production Order is by selecting customer demands in a separate screen, after which the system will automatically create a Production Order, using a predefined algorithm. E.g. one algorithm merges demands into production length until the maximum production is reached.

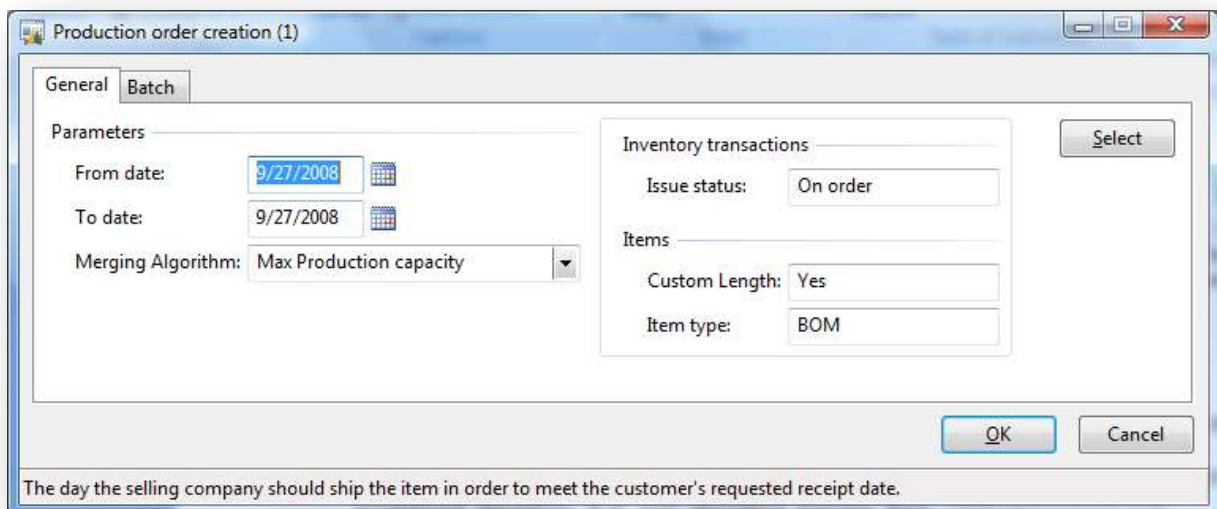


Figure 28 Production creation screen with Algorithm selection

The system will take all sales orders with the specified Required Shipping Date and Item and merge them into production lengths, based on the maximum quantity that is feasible.

10.3 Order Planning

After creating the Production Order, the required input materials will be calculated. In cable production the production reels can put a constraint on the length of the input material (e.g. strands). That's why in *InnoVites for Cable*® it is possible to create multiple positions for a single BOM line. This makes the input side of the Production Order also 'length sensitive'.

InnoVites for Cable® adds cable specific functionality to the Order Planning process, but doesn't put any restrictions on the rich planning features that standard Microsoft Dynamics AX provides.

10.4 Order Execution

With *InnoVites for Cable*® the user can track and trace a single cable length throughout the production process.

Length information is available when reporting the operations and orders complete.

This provides complete transparency at the shop floor, and gives the company full control over the production operations.

Exceptions (broken length, length outside tolerances) are efficiently dealt with using the workflow capabilities of AX. Depending on the issue, the right actions are invoked and followed up.

10.5 Available functionality

- Production Order Entry
 - Specify lengths in Production Order
 - Linking customer demands to production lengths
 - Create Production Order directly from selection of customer demands
- Production Order Planning
 - All standard planning functionality are applicable for cable items
 - Length information in Production Order inputs
- Production Order Execution
 - Length and tolerance information is traced throughout the production operations
 - Length and tolerance information is recorded and checked when completing the Production Order

Chapter 11 Cable Cutting

11.1 Introduction

Cutting management is a typical operation in cable manufacturing in which cable lengths from drums in stock are taken and cut to customer lengths and rewound on the transportation drums.

The drums in stock are often referred to as 'Mother Drum'.

11.2 Cutting Advice

The cutting department can get the requirements for cutting directly from *InnoVites for Cable*®. The user can either look up the requirements in the screen as a form, or print a Cutting List e.g. daily. The form and the report will both allow the user to define a selection for the demands that need to be cut (e.g. a range of delivery dates).

The report would show all customer lengths in the selected range, and the Mother Drums from which these customer lengths need to be cut.



Figure 29 Selection screen for Cutting List

Cutting orders list - Report

File Edit Tools Command Help

The Light Company

Page 1
9/22/2008
03:07:53 pm

Cutting orders list

Mother Drum	Item number	Available physical	Physical reserved	Warehouse	Location
No-002243	PowerCable3C	8,500.00	1,500.00	GW	

Demands to be cut

Requested ship date	Reference	Number	Customer Name	Quantity
9/22/2008	Sales order	00047_036	Light and Design	500.00
9/22/2008	Sales order	00047_036	Light and Design	500.00
9/22/2008	Sales order	00047_036	Light and Design	500.00
Tot Qty to be cut from Mother Drum : No-002243				1,500.00

Mother Drum	Item number	Available physical	Physical reserved	Warehouse	Location
No-002251	PowerCable3C	50.00	2,450.00	GW	

Demands to be cut

Requested ship date	Reference	Number	Customer Name	Quantity
9/22/2008	Sales order	00048_036	Light and Design	125.00
9/22/2008	Sales order	00048_036	Light and Design	125.00
9/22/2008	Sales order	00049_036	Light and Design	1,100.00
9/22/2008	Sales order	00049_036	Light and Design	1,100.00
Tot Qty to be cut from Mother Drum : No-002251				2,450.00

Mother Drum	Item number	Available physical	Physical reserved	Warehouse	Location
No-002252	PowerCable3C	1,775.00	725.00	GW	

Demands to be cut

Requested ship date	Reference	Number	Customer Name	Quantity
9/22/2008	Sales order	00048_036	Light and Design	725.00
Tot Qty to be cut from Mother Drum : No-002252				725.00

Page 1/1

EUR dat usr

Figure 30 The Cutting List, showing Mother Drum and customer demands

The Cutting Order form will provide the same information in the screen, and allow the user to proceed and record the cutting.

11.3 Cutting Process

In the Cutting Order form, the user can select the customer lengths that he wants to cut from the Mother Drums. This can be easily done by right-clicking the customer lengths and selecting 'Cut'. Also here, the InnoVites Tree speeds up the process and gives the user an overview of the work to be done and the status of each individual drum.

The user will also be able to confirm or amend the drums that are used for the customer lengths.

After the user has completed his selection of customer lengths to be cut, and specified the drums that are used to pick up the customer lengths, he can easily proceed by clicking OK and the cable lengths will be cut to the customer demands as required.

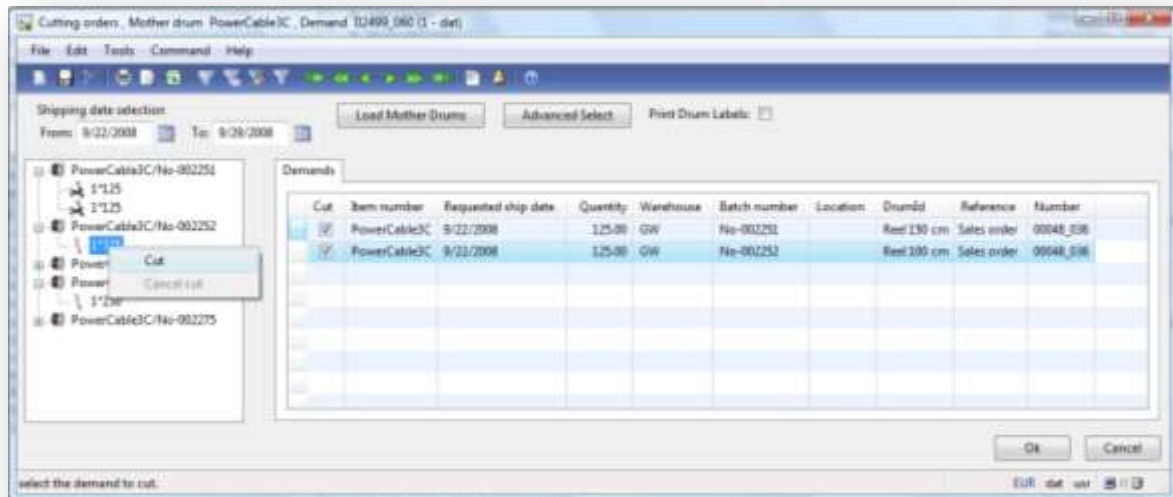


Figure 31 Selecting lengths to cut in Cutting Order screen

After proceeding with the cutting, the system gives the option to print the required drum cards for the customer lengths, and for the Mother Drum which has a new length now.

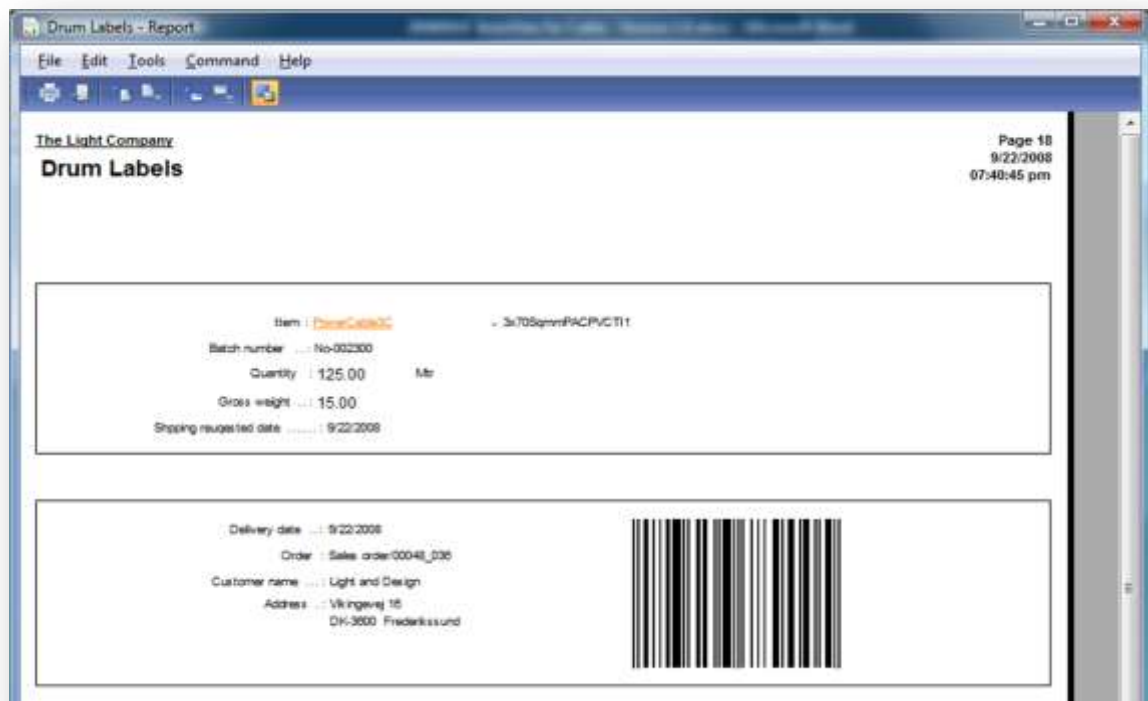


Figure 32 Printing the Drum Label

11.4 Available functionality

- Cutting Advice
 - Cutting List report
- Cutting Process
 - Cutting and Rewind Order form
 - Drum Label report

Chapter 12 Inventory Management

12.1 Introduction

Cable manufacturing as a conversion industry has a lot of Working Capital tied up in inventories. Cables contain a high amount of expensive raw materials (e.g. Cu, Al) which means that the value of inventory (raw material, WIP and finished cables) can be extremely high.

The average DWO (Days of Working Capital) for the industry is 91, which is high compared to other industries. Companies that manage their inventories well manage to outperform their peers and reduce it to 61 days. These reductions have a high impact on the ROCE of a company.

The management of inventory is therefore crucial for the performance of a cable manufacturer. The special characteristics of cable manufacturing operations place special requirements on the inventory management module in the ERP package.

12.2 Inventory search

ERP systems use 'items' to identify products. However, in cable manufacturing the users search for items based on attributes like cross section, number of conductors, type of armouring, etc. *InnoVites for Cable*® supports this type of inventory search to help users to find available stock quickly, or find alternative products that meet the customer demand. The search can be done on the specifications of the item or even on the values of specifications for individual cable lengths.

This search mechanism will be synchronized with the cable design software CableBuilder of our partner Cimteq to ensure consistency throughout the company.

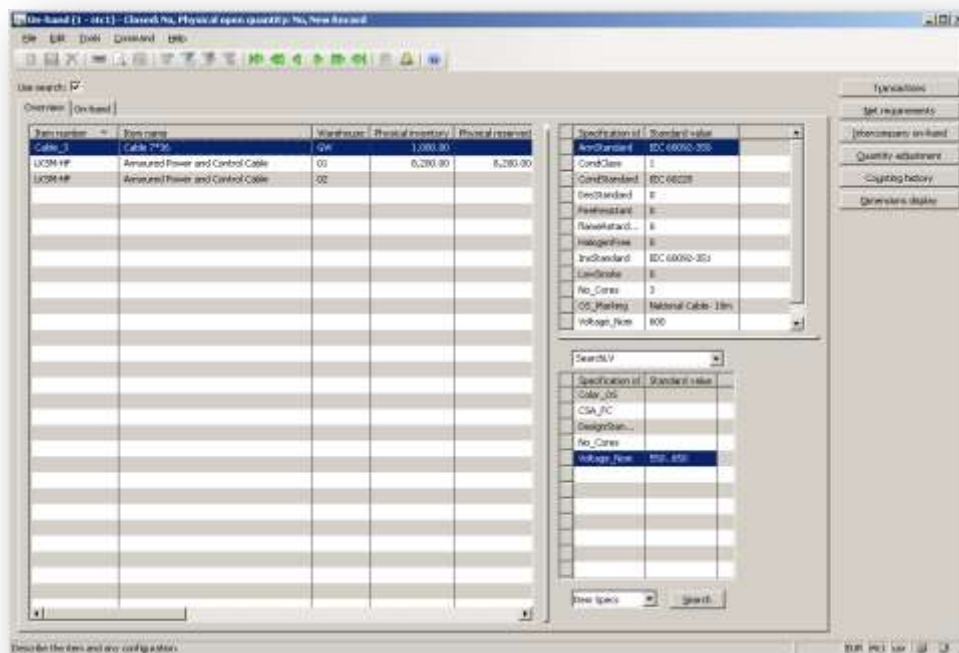
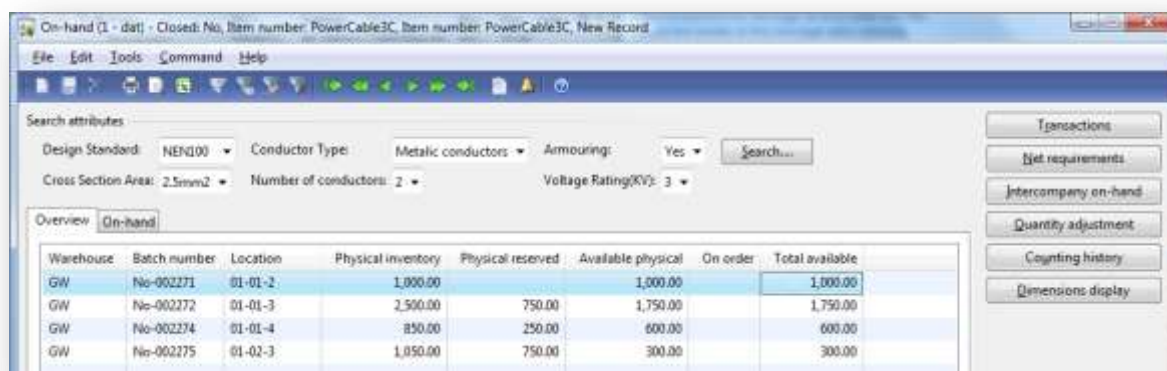


Figure 33 Search screen for inventory, using cable attributes

12.3 Inventory overview

To be able to control inventory, *InnoVites for Cable*® will come with inventory screens that give a good overview of the inventory levels.

Users can search for available stock on higher level (see Figure 33), after which they can zoom in to find the details of the drums. The details of the drums include the unique batch number, the length, the location, etc.



On-hand (1 - dat) - Closed: No, Item number: PowerCable3C, Item number: PowerCable3C, New Record

Search attributes:

Design Standard: NEN100 Conductor Type: Metallic conductors Armouring: Yes Search...

Cross Section Area: 2.5mm² Number of conductors: 2 Voltage Rating(KV): 3

Overview On-hand

Warehouse	Batch number	Location	Physical inventory	Physical reserved	Available physical	On order	Total available
GW	No-002271	01-01-2	1,000.00		1,000.00		1,000.00
GW	No-002272	01-01-3	2,500.00	750.00	1,750.00		1,750.00
GW	No-002274	01-01-4	850.00	250.00	600.00		600.00
GW	No-002275	01-02-3	1,050.00	750.00	300.00		300.00

Transactions

Net requirements

Intercompany on-hand

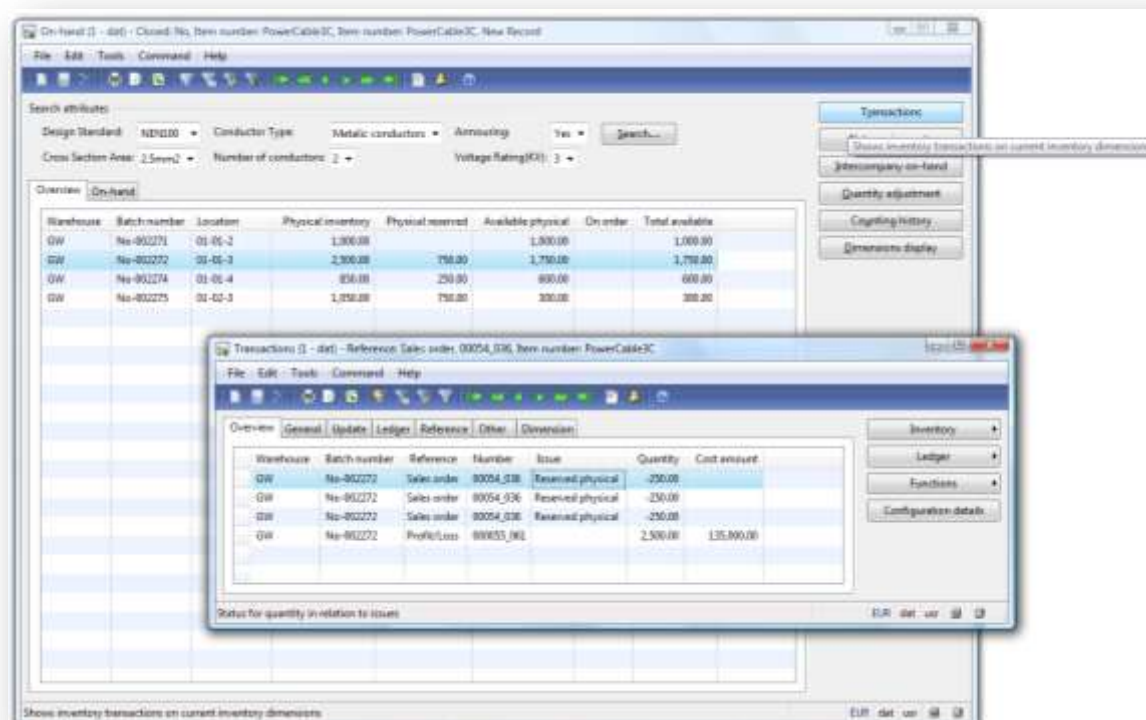
Quantity adjustment

Counting history

Dimensions display

Figure 34 Inventory screen, showing all details of cable drum (Batch number)

From this screen, the user can immediately check the historical transactions (e.g. Production Order, Cutting Order) and future transactions (e.g. Sales Orders) which is important for traceability reasons.



On-hand (1 - dat) - Closed: No, Item number: PowerCable3C, Item number: PowerCable3C, New Record

Search attributes:

Design Standard: NEN100 Conductor Type: Metallic conductors Armouring: Yes Search...

Cross Section Area: 2.5mm² Number of conductors: 2 Voltage Rating(KV): 3

Overview On-hand

Warehouse	Batch number	Location	Physical inventory	Physical reserved	Available physical	On order	Total available
GW	No-002271	01-01-2	1,000.00		1,000.00		1,000.00
GW	No-002272	01-01-3	2,500.00	750.00	1,750.00		1,750.00
GW	No-002274	01-01-4	850.00	250.00	600.00		600.00
GW	No-002275	01-02-3	1,050.00	750.00	300.00		300.00

Transactions

Show inventory transactions on current inventory dimensions

Intercompany on-hand

Quantity adjustment

Counting history

Dimensions display

Transactions (1 - dat) - Reference: Sales order: 00054_036, Item number: PowerCable3C

Overview General Update Ledger Reference Other Dimension

Warehouse	Batch number	Reference	Number	Issue	Quantity	Cost amount
GW	No-002272	Sales order	00054_036	Reserved physical	-250.00	
GW	No-002272	Sales order	00054_036	Reserved physical	-250.00	
GW	No-002272	Sales order	00054_036	Reserved physical	-250.00	
GW	No-002272	Profit/Loss	000033_001		2,500.00	135,000.00

Status for quantity in relation to issues

Show inventory transactions on current inventory dimensions

Inventory

Ledger

Functions

Configuration details

Figure 35 Inventory screen with the historical/future transactions (Sales Orders) of the cable drum

12.4 Traceability

For quality reasons, it is important that users can trace back e.g. the copper rod, or the optical fiber that was used to produce the finished cable.

InnoVites for Cable® will give full multi-level traceability across products, to give users full insight in the source and destination of any cable in the company. *InnoVites for Cable*® provides traceability screens such as in Figure 35 throughout the application to help users find the source and destination of finished cables and sub-assemblies.

12.5 Available functionality

- Inventory Search
 - Attribute definition form
 - Item Attribute form
 - Inventory search form
 - Inventory selection report
- Inventory Overview
 - Inventory form with drum information
 - Inventory form with traceability information

Chapter 13 Master Planning

13.1 The Cockpit for the Planner

The master planning module in Axapta is the cockpit for the planner. It gives the planner up-to-date advices for purchase as well as production.

For standard cables Microsoft Dynamics AX already has many facilities to get proper production and purchase advices. Including exception messages (produce earlier / later).

Different requirement coverage models are provided, like "Period", "Min/Max", "Requirement" and "Manual".

13.2 Planning with length

In the Cable Industry, length is a key element in the production planning process. When everything runs as predicted and is very static, the lack on detailed length information is, possibly, not directly recognized.

However, in real life, lengths are not produced according plan for different reasons (quality issues, broken cable, and customer change requests). It is impossible to deal with these situations if you don't have the length information at your finger tips. This is what *InnoVites for Cable*® provides in Master Planning.

For any demand (Sales Orders, Production order demands, etc.), *InnoVites for Cable*® provides registration of length information.

Master planning groups individual lengths together upto a maximum length quantity, which is based on machine drum capacities.

It provides strong mechanisms for the planner to easily change this plan. The planned production orders will have the Innovites Tree showing the planned orders, including information on the individual lengths. It is possible to move lengths between planned orders, just via drag & drop.

InnoVites for Cable® supports different planning strategies, refer to the table below.

Planning Strategy	Description
Make exact length	In this scenario, based on an independent demand, the exact length, that is required, will be produced. It can happen that multiple lengths are combined in a single production order, but still the knowledge of the individual lengths is known. Even for lower levels in the BOM if on higher levels combination is done.
Make standard lengths	The thing here is not the production of standard lengths, but allocation against standard lengths. In this case, you need to do a proper allocation (limit scrap, etc) and still keep handling to achieve this low.
No length administration	In this category you will find the items without a length dimension and the items for which no planning is done on length level (e.g. copper wire).

13.3 Grouping lengths in Operations

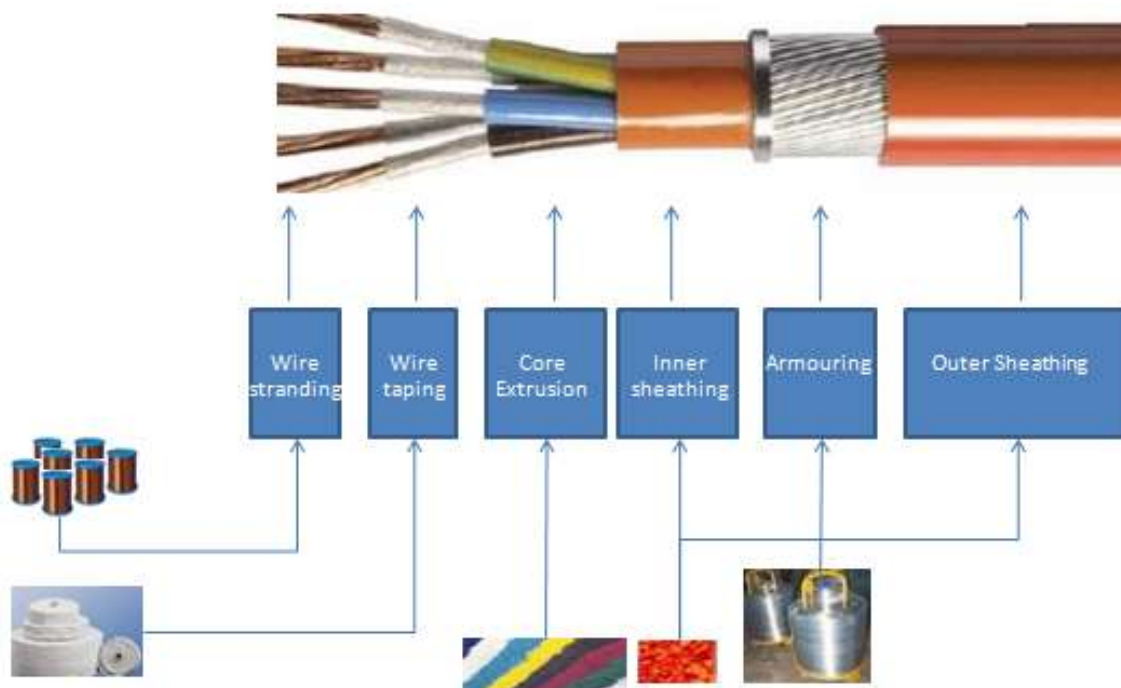
In the Cable industry the drum capacity is an important constraint in the lengths that can be produced. A matter of fact is that the further in the process (towards finished product), the thicker the cable is. As a result, each operations output lengths might be shorter than their previous operations output lengths.

Reasons for this are:

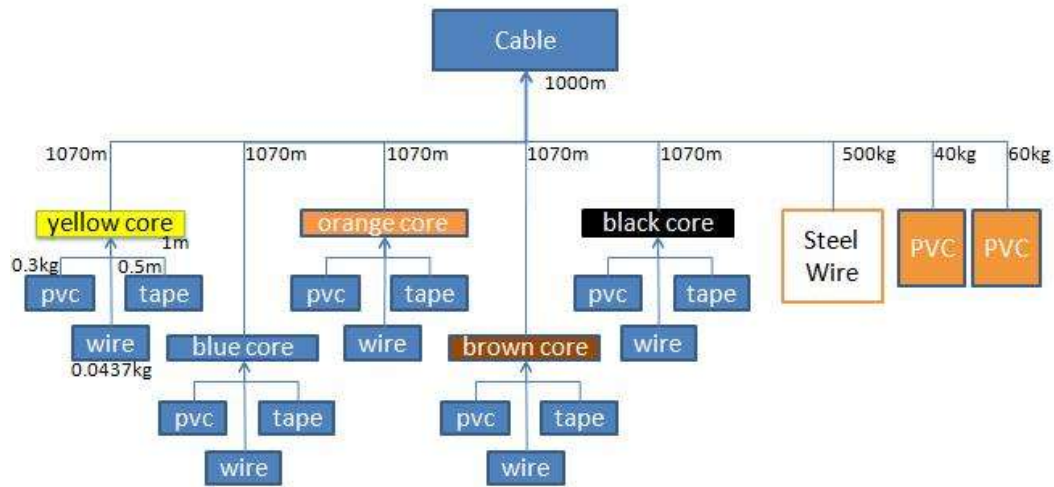
- Stranding makes shorter
- Initial- and exit scrap
- Thicker cable requires bigger drums for same length and lengths are limited by drum capacities.

Refer to the following example given:

We want to produce the following cable, which consists of 6 operations and several materials. The customer is asking for 4x420 and 10x750m:



The Bill of Material looks as follows:



Main item	Sub Item	Qty (1000m)	Qty (750m)	Qty (420m)
Cable	Yellow Core	1070m	802.5m	449.4m
	Blue Core	1070m	802.5m	449.4m
	Orange Core	1070m	802.5m	449.4m
	Brown Core	1070m	802.5m	449.4m
	Black Core	1070m	802.5m	449.4m
	Steel Wire	500kg	375kg	210kg
	PVC (inner sheath)	40kg	30kg	
	PVC (outer)	60kg	40kg	
		(Qty per 1m)	(Qty per 750m)	(Qty per 420m)
Per Core	PVC	0.05kg	37.5kg	21kg
	Tape	0.5m	375m	210m
	Copper wire	0.1kg	0.75kg	0.42kg

*) the quantities in the picture above do not include the setup scrap per operation.

For the wire we produce (copper drawing) spools of 200kg which is 10km of length (covering 1 lengths). Cores are produced on spools of 5km and in the last operation the lengths are cut to customer length.

Operation	In	Out	Out	Out
Wire Stranding	25x200kg	10x4911		
Core insulation			10x4911	
Core Stranding				2x4911
Outer Sheathing				4x420
				10x750

Finding the optimal balance between flexibility and optimal material usage is mainly constrained by the following criteria:

- Different products require different drums
- Machines cannot handle all (machine) drums
- Machines can handle limited weight on the input side / output side of a cable + drum
- Not all machines can run all products, but one machine can run different products.
- Products that are subject the cable breakage can be combined on one drum, so that in case of broken cable, not both are too short, but possibly long enough for one of the individual demands.
- For single cores, (only insulated), the recycling can be less costly than produce against specific length.
- The required lengths can always quite optimally be allocated against standard lengths, so it does not make sense to plan length driven.

13.4 Using algorithms make length grouping flexible

In *InnoVites for Cable*®, we pay high attention to extensibility of the application. We do not believe in the fact that we can foresee all situations. So we use software development techniques that make it very easy to apply company specific algorithms without the need of big customizations.

13.5 Planned orders

InnoVites for Cable® leverages the AX Master Planning engine, and adds the cable-specific logic to the planning calculations. Remember: 200+100 does not equal 300 in the cable industry; in other words: if there is a customer demand for 300m, while there is 200m in stock, it makes no sense to produce just 100m.

That's why *InnoVites for Cable*® applies specific length-based calculations in the Master Planning for cables.

The resulting Planned Orders (Production and Purchase) contain the length information, which is presented in the familiar InnoVites Tree.

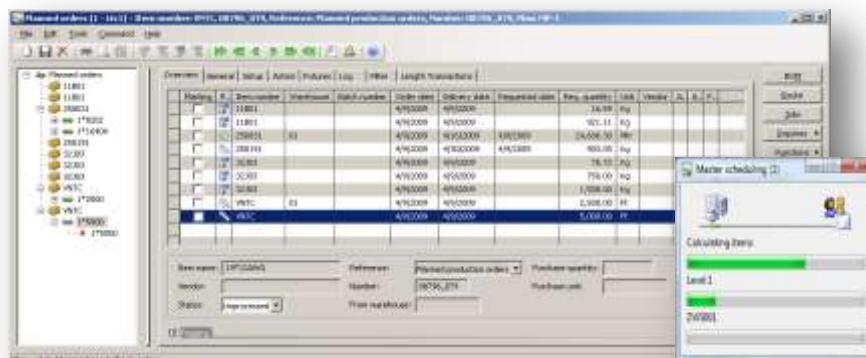


Figure 36 Planned, length-based orders showing related (in)direct demand

13.6 *InnoVites for Cable*® provides

- Drum capacity calculation
- Grouping demands using drum capacity
- Production length optimization using different Planning Strategies
- User friendly and transparent overview of Master Plan
- Rapid and easy change of Master Planning
- Transfer Master planning proposal to actual orders (including length information).

Chapter 14 Precious Materials Management

14.1 Introduction

The price volatility of metals such as copper and aluminum, combined with the fact that they often represent 80 percent of the value of the finished goods, means that very specific and tight controls are required to minimize risk and exposure.

With metal prices changing on a daily basis, cable manufacturers must protect themselves against unfavorable price changes by reflecting the actual cost of raw materials in the price of the finished goods, or by managing the return on risk if they fix their price of copper at the time of order.

Due to the high cost of raw materials, cable manufacturers must always be sure that the exact length of cable required by the customer is produced using the smallest quantity of raw materials possible.

Today's cable manufacturers need systems that track processes and enable changes to be reflected in the final order value, depending on the nature of the agreement with the customer.

14.2 Example calculation

A company produces and sells cable DINV001_0 which exists of three conductors of 70 mm² each. The construction of this cable is shown below.

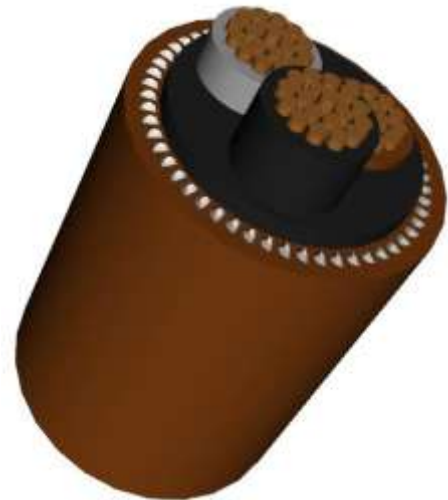
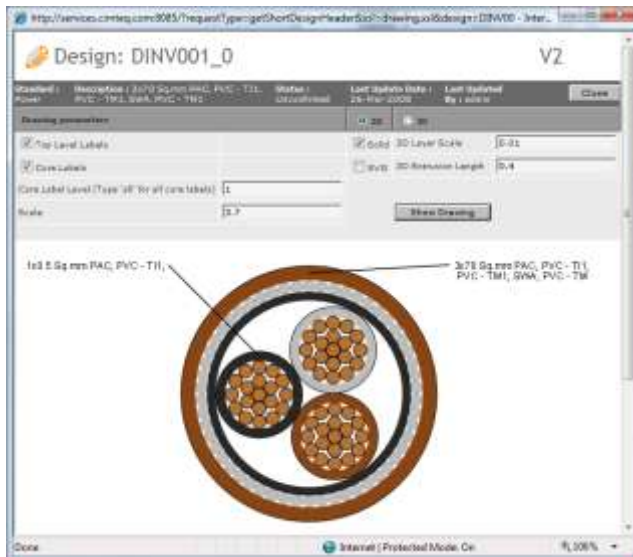


Figure 37 Cable design, made in cable design software (CableBuilder)

This product has the following base data:

- Item Code : DINV001_0
- Product description : 3 x 70 mm², PVC - TI1, PVC - TM1, SWA, PVC - TM1
- Copper Weight : 1.873 kg/m
- Product Weight : 2.063 kg/m

NB: The density of copper is 8,920 kg/m³

In the first week of January of 2007 a customer orders 3,000 m of this cable.

On the order date the copper price according to the LME is 6,700 US\$ per tonne and the Euro / US\$ exchange rate is 1.460.

See the order details below:

Order Data:

- Sales Order : 100123
- Product : DIN001_0
- Length : 3,000 m
- Weight Copper : 5,620 kg
- Weight Cable : 6,189 kg
- Copper Price : 7,000 US\$/tonne
- Euro/US\$ Rate : 1.460
- Cost Price Copper : 26,943 Euro
- Cost Price Cable : 29,790 Euro
- Sales Price : 32,000 Euro

Based on this information the profit on this deal is:

- Profit : 2,210
- Percentage : 7%

About the delivery we agreed the following with the customer:

Delivery date : March 1st 2008

What would have happened in case this company did not made any arrangement about risk coverage for the copper price and currency exchange rate?

In the two following tables we see the development of the currency exchange rates and the copper price during that period:



Figure 38 Copper Price Graph from LME

From the graph we can read the following copper rates:

- Order Date : 7,000 US\$/tonne
- Delivery Date : 8,500 US\$/tonne



Figure 39 Euro/US\$ Exchange Rate

During this period the fluctuation of the Euro/US\$ exchange rate is limited:

- Order Date : 1.460
- Delivery Date : 1.459

If we substitute the new values in the sales order the outcome is:

Delivery Data:

- Sales Order : 100123
- Product : DIN001_0
- Length : 3,000 m
- Weight Copper : 5,620 kg
- Weight Cable : 6,189 kg
- Copper Price : 8,500 US\$/tonne

- Euro/US\$ Rate : 1.459
- Cost Price Copper : 32,739 Euro
- Cost Price Cable : 35,586 Euro
- Sales Price : 32,000 Euro

Based on this information the profit on this deal is:

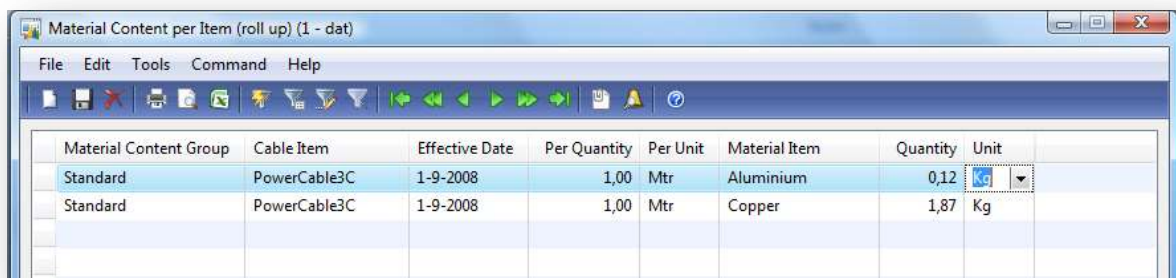
- Profit : -3,586 Euro
- Percentage : -10%

As mentioned before, copper is the main component of many cables. For other cables this is aluminum. The time between sales and purchase for production of both of these materials can have a tremendous impact on the margin of a company. Between making profit and making loss. Over the years companies have developed different methods to minimize this risk.

14.3 Material content per item

InnoVites for Cable® automatically calculates the material content for e.g. Cu and Al (or any other precious material), using the information of the Bill of Material.

Figure 40 gives an example.

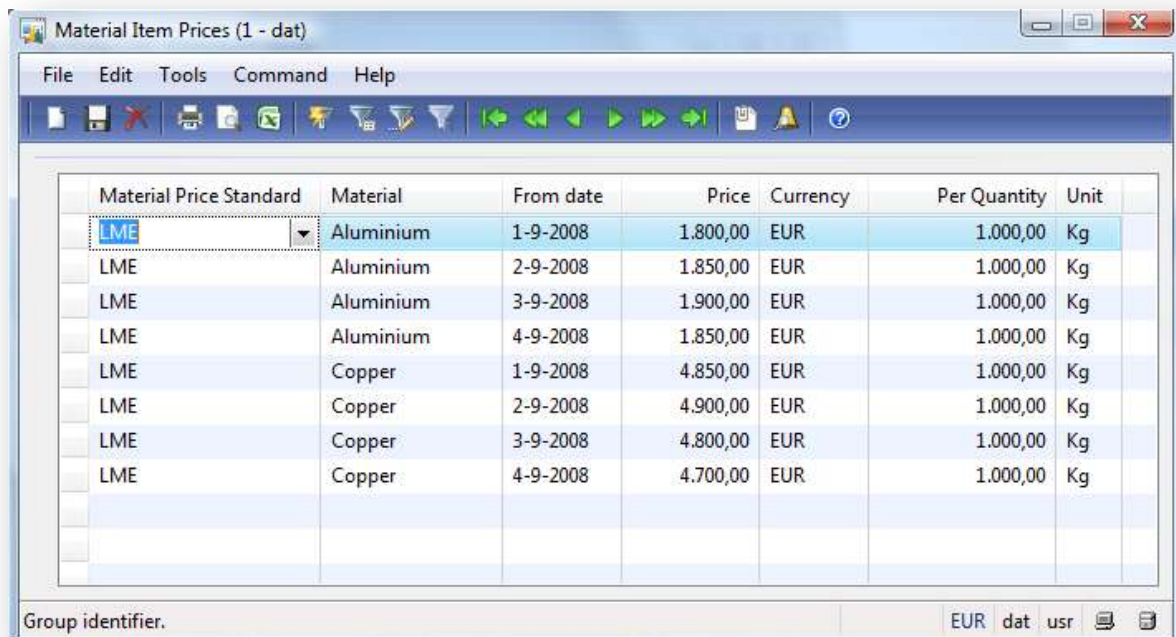


Material Content Group	Cable Item	Effective Date	Per Quantity	Per Unit	Material Item	Quantity	Unit
Standard	PowerCable3C	1-9-2008	1,00	Mtr	Aluminium	0,12	Kg
Standard	PowerCable3C	1-9-2008	1,00	Mtr	Copper	1,87	Kg

Figure 40 Overview Precious Materials by Item

14.4 Prices per Material and Material Price Standard

InnoVites for Cable® records the actual prices of the Material that is listed at any Material Price Standard. This can be e.g. the LME, but also a virtual Standard that contains specific agreements per customer.



Material Price Standard	Material	From date	Price	Currency	Per Quantity	Unit
LME	Aluminium	1-9-2008	1.800,00	EUR	1.000,00	Kg
LME	Aluminium	2-9-2008	1.850,00	EUR	1.000,00	Kg
LME	Aluminium	3-9-2008	1.900,00	EUR	1.000,00	Kg
LME	Aluminium	4-9-2008	1.850,00	EUR	1.000,00	Kg
LME	Copper	1-9-2008	4.850,00	EUR	1.000,00	Kg
LME	Copper	2-9-2008	4.900,00	EUR	1.000,00	Kg
LME	Copper	3-9-2008	4.800,00	EUR	1.000,00	Kg
LME	Copper	4-9-2008	4.700,00	EUR	1.000,00	Kg

Group identifier. EUR dat usr

Figure 41 Daily Precious Material prices

14.5 Precious Materials Agreements by Customer

There are different ways to minimize the financial risks when dealing with precious materials. Some examples are:

Precious Material price based on the trading day before Order Entry Date

The sales price of a cable is based on the precious material price on the trading day before the order entry date of that cable (for which the LME price is known). When the customer accepts the order, the same day an equivalent of precious material needed for the production of the cable is purchased at the commodity market.

Precious Material price based on Specified Date

An agreement is made with the customer about the valuation date of the precious material content of the cable. The customer will pay based on the rate on this date. This is the date an equivalent of precious material needed for production will be purchased at the commodity market.

Examples of dates are:

- The day of dispatch
- The 15th of the month prior to the dispatch
- The 15th of the month prior to scheduled due date
- The invoice date

Precious Material price based on Average Price

There are also companies who calculate with average values over a certain period. Examples are:

- Last year, moving by 1 month
- Last quarter, moving by 1 month
- Last X months, moving by one month

Precious Material price based on Material Base and Surcharge Price

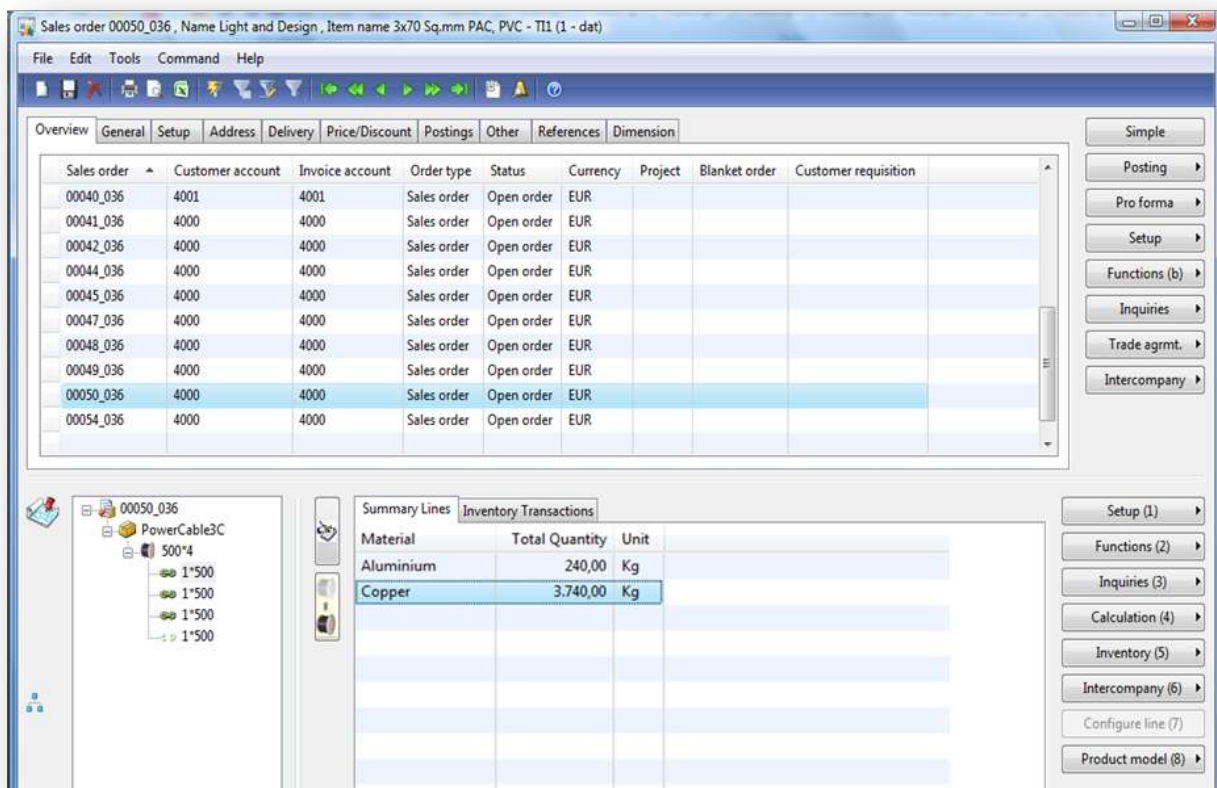
The cable price consists of a fixed and a variable part. The fixed part contains all manufacturing and additional costs as well as costs for all non-metallic ingredients. The variable part is the metal price on an earlier fixed metal basis and will be adjusted according to daily actual material price one day after receipt of order.

Other pricing techniques

Since there are as many methods as there are cable companies in the world, it must be very flexible and easy to add your own calculation mechanism.

Figure 42 shows a screen with the information about the precious materials that are used in the sales order line.

Figure 43 shows an example of a Precious Material contract as recorded in the system.

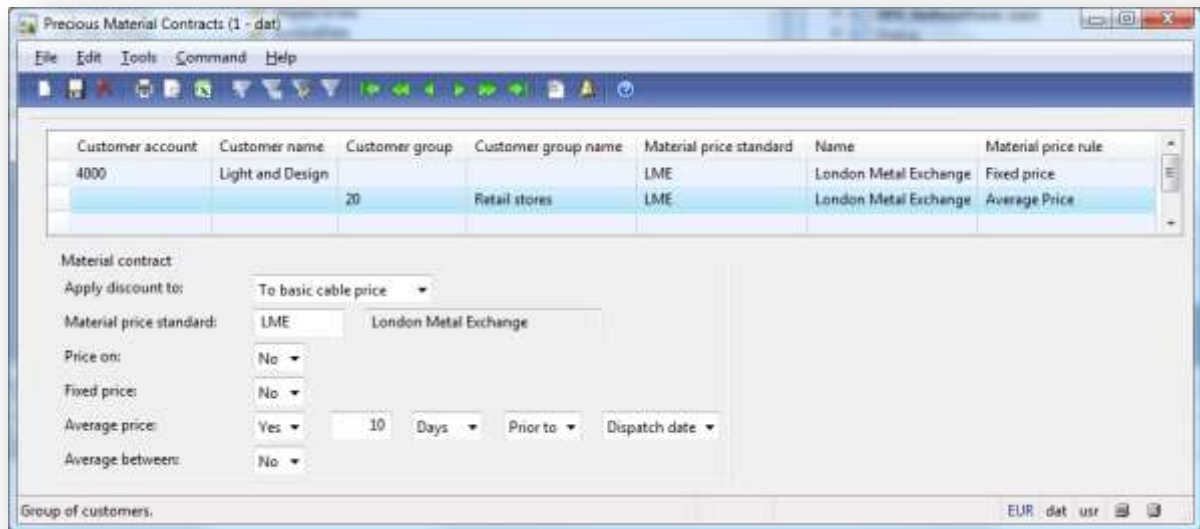


The screenshot displays the 'Sales order 00050_036' window. The 'Overview' tab is active, showing a table of sales order lines. The selected line (00050_036) is highlighted. Below the table, the 'Summary Lines' tab is active, showing the material content for the selected line. The material content table lists 'Aluminium' and 'Copper' with their respective quantities and units.

Sales order	Customer account	Invoice account	Order type	Status	Currency	Project	Blanket order	Customer requisition
00040_036	4001	4001	Sales order	Open order	EUR			
00041_036	4000	4000	Sales order	Open order	EUR			
00042_036	4000	4000	Sales order	Open order	EUR			
00044_036	4000	4000	Sales order	Open order	EUR			
00045_036	4000	4000	Sales order	Open order	EUR			
00047_036	4000	4000	Sales order	Open order	EUR			
00048_036	4000	4000	Sales order	Open order	EUR			
00049_036	4000	4000	Sales order	Open order	EUR			
00050_036	4000	4000	Sales order	Open order	EUR			
00054_036	4000	4000	Sales order	Open order	EUR			

Material	Total Quantity	Unit
Aluminium	240,00	Kg
Copper	3.740,00	Kg

Figure 42 Precious Material content by sales order summary line



Customer account	Customer name	Customer group	Customer group name	Material price standard	Name	Material price rule
4000	Light and Design	20	Retail stores	LME	London Metal Exchange	Fixed price
				LME	London Metal Exchange	Average Price

Material contract

Apply discount to: To basic cable price

Material price standard: LME London Metal Exchange

Price on: No

Fixed price: No

Average price: Yes 10 Days Prior to Dispatch date

Average between: No

Group of customers: EUR dat usr

Figure 43 Example of Precious Material Contract for a Customer Group

14.6 Available functionality

- Item Control
 - Manufacturing Items : Calculate Precious Materials weight per unit
 - Purchase Items : Maintain Precious Materials weight per unit
- Precious Materials Control
 - Daily precious material price
 - Invoicing methods
- Customer Control
 - Register the invoicing method by Precious Materials
- Sales
 - Calculation of precious materials content at order entry
 - Calculation of sales price based on precious materials content and customers invoicing method
 - Specify the precious materials content on the Order Acknowledgement
 - Specify the precious materials content on the Invoice
- Inventory
 - Inventory valuation based on Precious Materials and Added Value
- Finance
 - Precious materials booked to dedicated account

Chapter 15 Cable Packaging Management

15.1 Introduction

After a cable has been produced it has to be packed. Dependent on the size, length and value the cable is packaged as e.g. a coil, in boxes or on a reel. Sometimes expensive reels are returnable and the customer is expected to return the drum after a certain period.

Often several cables are packaged together on a pallet. This pallet can be the storage unit in the warehouse or the shipment unit when transporting to a customer.

Cable Packaging Management in *InnoVites for Cable*® supports the different functions and features of cable packaging.



Cables packed as a coil, in a box and on a reel

15.2 Product identification

The product identification depends on the way a product is packed.

- Coils are identified with a label which contains the product and length information.
- Boxes are identified with the information printed on the box. This is the information about the kind of cable and its length.
- A cable on a reel is identified by a label which contains the information of that cable and the unique reel number (often painted on that reel).

15.3 Reel Handling

Types of reels

Different types and sizes of reels can be distinguished. Dependent of the kind of cable and the length they can be made of carton, wood or metal.

Reel logistics management

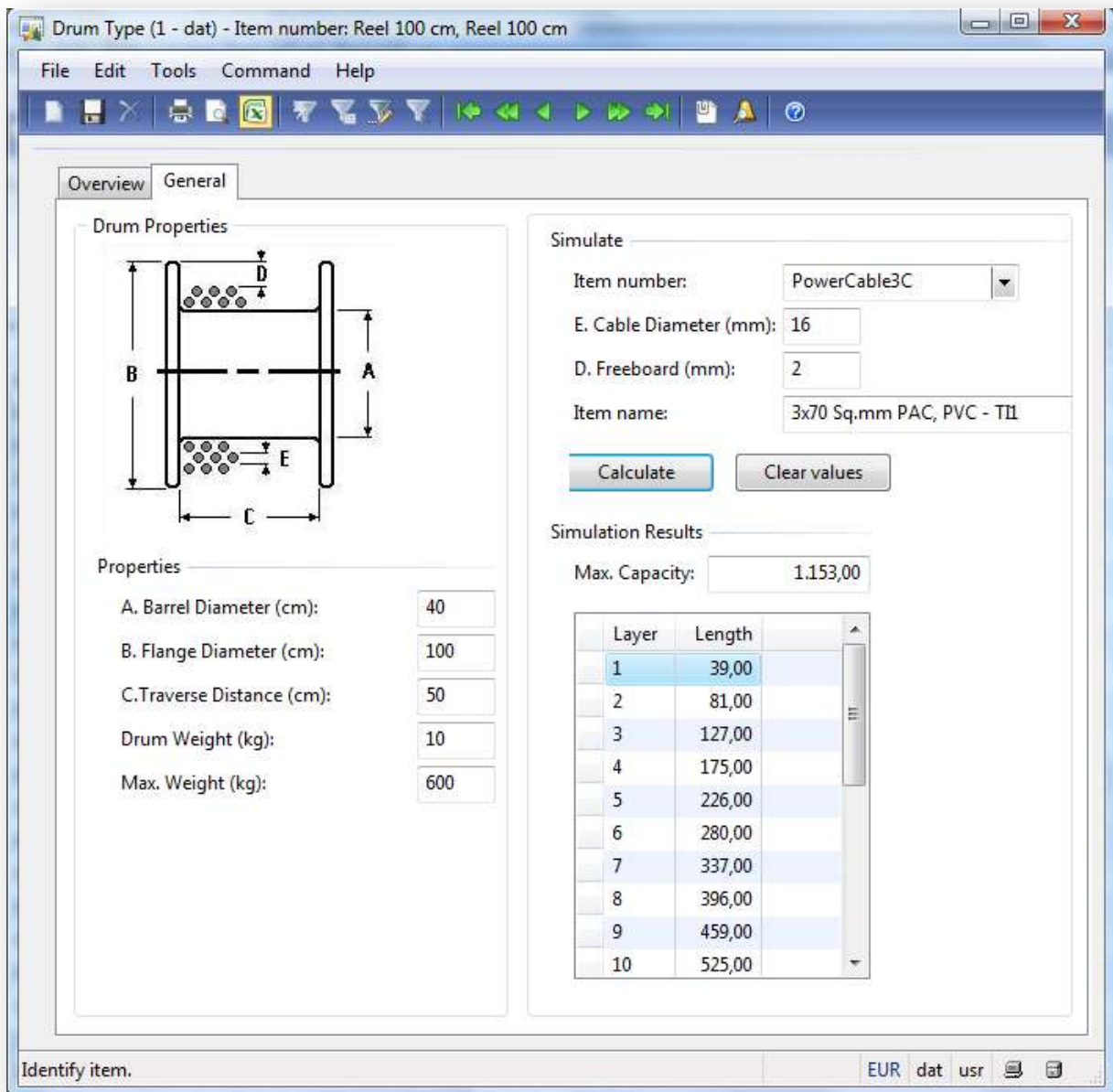
Reels are available in different sizes. The bigger ones can have a diameter over 2 meters.

Reels can be that expensive those customers have to pay a deposit or rent during the time they own the reel. In Germany for instance, a special organization, the "Kabel Trommel Gesellschaft" manages a pool of reels for the cable industry in several countries. Customers have to pay a deposit when they start using a reel. When they deliver the reel back in good condition they get a portion of the deposit back.

Reel and Cable management

Not every reel can be used to store a cable. The following dependencies have to be taken into account:

1. The capacity
The inner and outer diameter and the width of the reel determine the capacity which can be stored on it (see Figure 44)
2. The bending radius
Each cable has a maximum bending radius. In general, the thicker the cable, the longer the minimum radius. With the selection of the reel this bending radius has to be taken into account.
3. The machine
The sizes of reels are limited by the machine which has to handle the cable.
4. Transport possibilities
When a cable has to be transported by road or within buildings, limitations have to be taken into account too.
5. The final destination
There are situations that it is impossible or costly for the customer to ship the reels back (e.g. off-shore industry). If possible cheap or older reels are used.



Drum Type (1 - dat) - Item number: Reel 100 cm, Reel 100 cm

File Edit Tools Command Help

Overview General

Drum Properties

Properties

A. Barrel Diameter (cm): 40

B. Flange Diameter (cm): 100

C. Traverse Distance (cm): 50

Drum Weight (kg): 10

Max. Weight (kg): 600

Simulate

Item number: PowerCable3C

E. Cable Diameter (mm): 16

D. Freeboard (mm): 2

Item name: 3x70 Sq.mm PAC, PVC - T11

Calculate Clear values

Simulation Results

Max. Capacity: 1.153,00

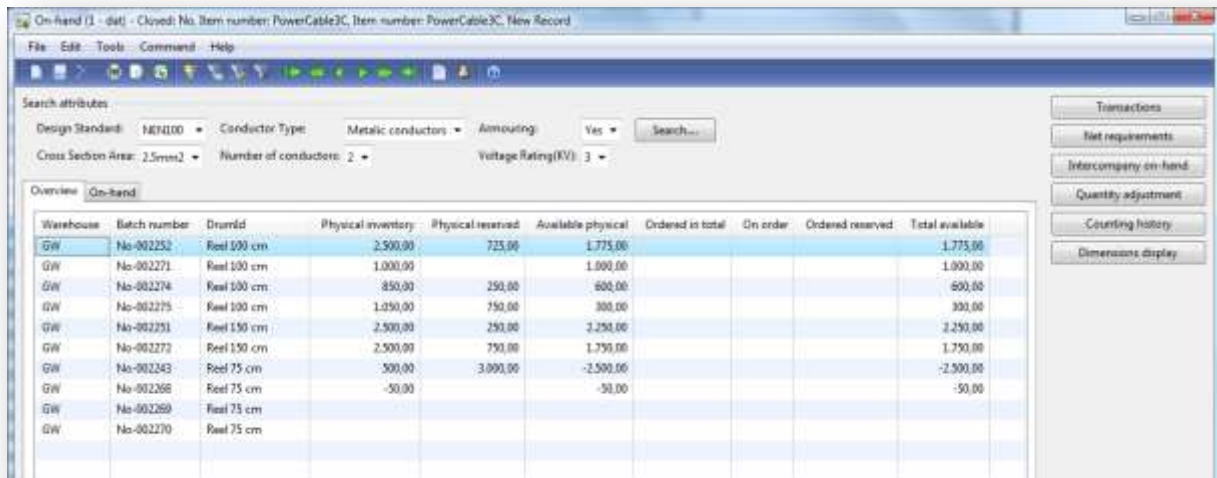
Layer	Length
1	39,00
2	81,00
3	127,00
4	175,00
5	226,00
6	280,00
7	337,00
8	396,00
9	459,00
10	525,00

Identify item. EUR dat usr

Figure 44 Reel Management, properties of a Drum Type

When searching for available cable length in inventory that matches a particular customer, the drum information is important. Ideally the cable is on a drum that is accepted by the customer, in which case the cable would not have to be rewinded.

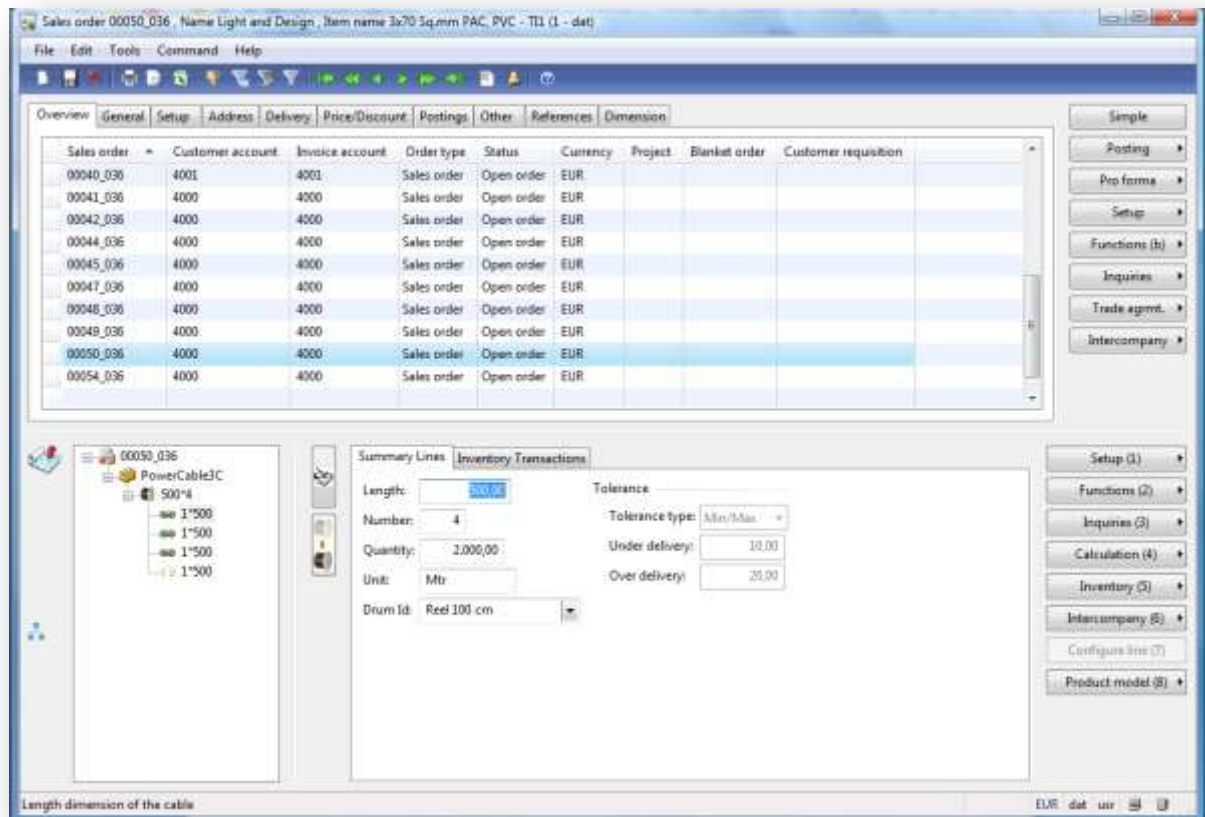
InnoVites for Cable® comes with easy inventory screens that present the drum information to the user (see Figure 45).



Warehouse	Batch number	DrumId	Physical inventory	Physical reserved	Available physical	Ordered in total	On order	Ordered reserved	Total available
GW	No-002252	Reel 100 cm	2,500.00	725.00	1,775.00				1,775.00
GW	No-002271	Reel 100 cm	1,000.00		1,000.00				1,000.00
GW	No-002274	Reel 100 cm	850.00	250.00	600.00				600.00
GW	No-002275	Reel 100 cm	1,050.00	750.00	300.00				300.00
GW	No-002251	Reel 150 cm	2,500.00	250.00	2,250.00				2,250.00
GW	No-002272	Reel 150 cm	2,500.00	750.00	1,750.00				1,750.00
GW	No-002243	Reel 75 cm	500.00	3,000.00	-2,500.00				-2,500.00
GW	No-002268	Reel 75 cm	-50.00		-50.00				-50.00
GW	No-002269	Reel 75 cm							
GW	No-002270	Reel 75 cm							

Figure 45 Inventory Overview, showing drum details by cable length

Figure 46 show the drum details in the Sales Order entry screen. Based on the constraints that were mentioned earlier (Drum dimensions, max bending radius, etc) the system will present a list of drums that are applicable for this specific situation.



Sales order	Customer account	Invoice account	Order type	Status	Currency	Project	Blanket order	Customer requisition
00040_036	4001	4001	Sales order	Open order	EUR			
00041_036	4000	4000	Sales order	Open order	EUR			
00042_036	4000	4000	Sales order	Open order	EUR			
00044_036	4000	4000	Sales order	Open order	EUR			
00045_036	4000	4000	Sales order	Open order	EUR			
00047_036	4000	4000	Sales order	Open order	EUR			
00048_036	4000	4000	Sales order	Open order	EUR			
00049_036	4000	4000	Sales order	Open order	EUR			
00050_036	4000	4000	Sales order	Open order	EUR			
00054_036	4000	4000	Sales order	Open order	EUR			

Summary Lines: Length: 100.00, Number: 4, Quantity: 2,000.00, Unit: Mtr, Drum Id: Reel 100 cm

Inventory Transactions: Tolerance type: Min/Max, Under delivery: 10.00, Over delivery: 20.00

Figure 46 Sales Entry screen including drum details

15.4 Available functionality

- Item Control
 - Specification of kinds of packaging by Item and logistical function (sales, production, purchase) (e.g. boxes, reels, etc.)
- Reel Control
 - Reel parameters (inner and outer diameter, width, weight, maximum load, etc.)
 - Reel identification (unique)
 - Reel inventory
 - Reel location (internal or external)
 - Reel status and asset value (depreciation)
 - Reel issue and receipt management
 - Reel billing (in case of lent out)
- Inventory Control
 - Presentation of packaging details by cable
- Sales
 - Specification of packaging details by cable
 - Packaging billing method (none, deposit or rent)

Chapter 16 Integration with CableBuilder

16.1 Best of breed applications for the cable industry

InnoVites aims to provide superior business solutions to the cable industry. That's why InnoVites has a strategic partnership with Cimteq Ltd. Cimteq developed and sells Cable Builder, a design software that is exclusively focused on the cable industry.

By integrating *InnoVites for Cable*® with CableBuilder, we are able to provide best of breed software solutions that help cable manufacturers to optimize their business performance.



16.2 Responsiveness and Quality are Order Winners

The market place has changed in the last few years. It is no longer enough to compete simply on price. Prices have converged due to the high commodity and transportation costs. It is now the quality of service that is, and will remain for the foreseeable future, the differentiator between profitable organizations and struggling ones.

Good quality service start from the first contact with a client and ends several of tens of years later when the cable is finally out of commission.

The speed of the response of the cable manufacturer is critical to the success of converting a quotation to an order. Accuracy of technical information and accuracy of prices are important too. It is critical that the correct materials content are used to calculate the price. A small underestimate in material content can be disastrous to the profitability of a big order.

16.3 Traditional cable design cycle

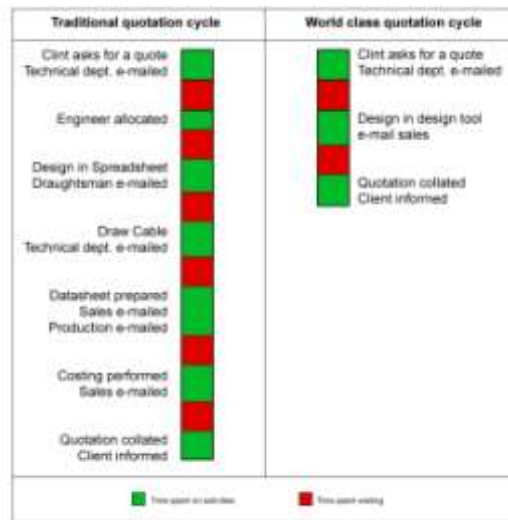
Traditionally the cable design and quotation process is managed using generic office applications. The salesman asks the technical department for a quotation for a design through e-mail. The request waits to first be allocated to an engineer, and then waits for the engineer to be free. The design is usually constructed in a spreadsheet with individual design engineers having their own set of rules. The design is sent by e-mail to a draughtsman to draw the cable in CAD. The e-mile waits in the draughtsman's in-box until he has time to make the drawing. The drawing is then e-mailed back to the design engineer. It will again wait in his in-box until he can action it. The data from the spreadsheet is copied manually to a word processor along with the drawing to create the datasheet. The design is also e-mailed to production to estimate material content and material cost, and production time and production cost. Since the production department is very busy, the e-mail waits until they have time to action it. All the e-mails arrive in the salesman's in-box and waits for him to collate the information together and send them to the client.

16.4 World-class cable design cycle

World-class cable manufacturers have managed to drastically cut the time taken to quote a client by simple anticipating the client's requirements. For example, manufacturers would publish the company's catalogues and datasheets on the



Internet for products they don't even manufacture, but are capable of manufacturing. They would also include a datasheet with every quotation for every quotation item. These measures impresses the client, it saves them time, and would also save the manufacturers time in the long run. A quotation for standard and semi-standard cable designs takes few minutes. A Quotation for special cable designs would takes hours rather than days.



Time analysis of cable design and quotation cycle

How do world-class manufacturers do it?! First they remove the waiting from the quotation process, and then reduce the time it takes to perform each activity. To remove the waiting time, the number of people involved in the quotation process has to be reduced. For example, the design engineer, or the salesman can cost the cable based on clear guidelines without waiting for production. The design engineer can automatically generate the drawing for his cable from the design without waiting for a draughtsman. The introduction of product aware salesmen that can perform the all quotation activities, including designing simple cables, without reference to another person.

Companies facilitate this change to improve by using purpose built integrated cable design

software tools. They are either developed in-house, or available commercially, such as CableBuilder, from Cimteq. These tools are fed by technical and quotation specifications as well as the latest material prices. The output is a cost quotation with automatically generated datasheets, drawings, and estimate of material requirements and operation lead-time. The result is a short quotation lead-time, accurate cable designs based on consistent rules, and accurate prices.

Once the order is placed, the cable design tools would send the designs to the companies ERP system as Bill-Of-Materials, routing and manufacturing instructions. This saves time and avoids mistakes.

What is more, cable manufacturers using such information systems will monitor their quotation to order conversion success, monitor the time it took to respond to clients, and monitor client's feedback.

16.5 Integration of Product and Design data

To avoid inconsistencies in basic data, the basic data from *InnoVites for Cable*® will be synchronized with CableBuilder.

This means that information about Raw Materials, Machines, Work Centers, Costs etc. will be automatically synchronized between *InnoVites for Cable*® and CableBuilder. Data will be maintained only in one place. This



avoids human errors, and saves time.

16.6 Integration of Quotations and Sales Orders

In CableBuilder the design engineers will design cables for customer quotations, using the basic data that has been transferred from *InnoVites for Cable*®.

When the customer accepts a quotation, the product data such as Item Master data, Bill of Material data and Routing data are transferred from CableBuilder to *InnoVites for Cable*® by one single push on the button.

Not only product data can be transferred from CableBuilder to *InnoVites for Cable*®, also the successful Quotation in CableBuilder can be converted into a Sales Order in *InnoVites for Cable*® by a simple mouse-click.

This will further increase the speed of business of the cable manufacturer.



16.7 Available functionality

- Integration Basic Data to CableBuilder
- Integration of Design Data (Item, BOM, Route) with CableBuilder
- Integration of Quotation data in CableBuilder to Sales Order in *InnoVites for Cable*®

Chapter 17 Technical Outline

The Vertical *InnoVites for Cable* © is built on top of Microsoft Dynamics AX. Microsoft Dynamics AX is a state of the art Enterprise Resource Planning system. Deep integration of Microsoft Dynamics AX in to the innovative Microsoft product stack give companies an unbeatable level of integration and makes Microsoft Dynamics AX easy to implement.

InnoVites for Cable © adopts a component based development model which is a solid and stable foundation for customizations that give the application the finishing touch. This enables Value Added Resellers (VAR) to provide customers specific solutions at low costs.

InnoVites for Cable © has a very long track record in developing Enterprise Applications. From the past the InnoVites team learned that it is very difficult to build applications that can keep in pace with the fast moving business needs. This can only be achieved by building for change, rather than building to last.

InnoVites applies latest technologies, like Service Oriented Architectures, Workflow, Portals, Collaboration in the development of *InnoVites for Cable* ©. By leveraging these innovative horizontal technologies, we are able to materialize our mission to help our customers continuously improve their business performance. Not only today, but also in the future!

For more information about Microsoft Dynamics AX and its system requirements, please visit:
<http://www.microsoft.com/dynamics/ax>

Chapter 18 Contact InnoVites

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Microsoft Dynamics

Looking for ERP software that fits your industry?

Let's get wired!

Cable calculus

Length management is a critical factor throughout customer order entry, production planning and the cable manufacturing process. *InnoVites for Cable®* is length-driven throughout.

Appetite for capital

The cable manufacturing industry involves copper and other very expensive raw materials. This makes the industry particularly hungry for capital. *InnoVites for Cable®* makes the management and control of working capital integral to your success.

Capricious prices

InnoVites for Cable® helps you to manage the risk of price volatility of raw materials such as copper and aluminum that often represent 80 per cent of the value of the finished goods.

Copper counts

The high cost of raw materials make production efficiency crucial for the profitability of a cable manufacturer. *InnoVites for Cable®* helps you to get exact insight in your production planning and performance.

Find the fiber

Cable manufacturers have to be able to track and record a host of information regarding the raw materials used. *InnoVites for Cable®* brings this information at your fingertips!