

magic logic

Cube-IQ 5.0 Help

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1 Introduction

1.1 Introduction to Cube-IQ 5.0

Cube-IQ - Load Planning software

Cube-IQ is an **advanced Load Planning program**, capable of achieving the best possible loads/packing for your ocean containers, trucks, rail cars, ULDs, pallets, crates, totes and boxes. In tests on Containers, it has equaled or bettered all other automated systems currently available. Cube-IQ is also fast, requiring optimization times of no more than ten to twenty seconds per Container on a modern PC.

The program offers several advanced options such as allowing multiple [Configurations of Products](#), [Zones in Containers](#), true positioning of the [center of gravity](#), automatic handling of [axle weight limits](#), loading of rolls and optimization over multiple containers in multiple sizes (which includes selection of containers). It is unique in its option to handle irregularly shaped containers such as airline containers (ULD's) and refrigerated units.

Cube-IQ not only loads **boxes**, but also **rolls** and **3D L-shapes** (sofas).

Cube-IQ can optimize over **multiple containers** and container types. Taking the example of **cartonization**, the system not only packs cartons, but it also selects the best set of carton(s) from a list of those available. One of several selection rules for a multi-Container (or multi-box) Load is 'minimal overall cost' to ensure that the cheapest combination is chosen.

There are no limits on the number of Containers that can be processed at one time, nor on the number of Loads or Products the system can handle.

The software is fully compatible with Windows Server 2003/2008/2012 and Desktop XP/Vista/7/8. Networked and Citrix/Terminal Server installations are available.

To get started with Cube-IQ, please read the following brief topics first:

- [Getting Started](#)
- [Database Navigation](#)
- [Main Window](#)
- [System requirements](#)

1.2 What's new in Cube-IQ 5.0

Cube-IQ5.0 offers a significant number of new and improved features:

A completely updated user interface introduces a smooth "Metro" look & feel to the program.

Enhanced Database performance allows for faster startup and usage. Users will benefit specifically when accessing data over a network.

Images can be added for Products to help identify them more easily in the Products screen.

Folders can now be created in the [Data Tree](#) to help you organize your Loads into logical groups.

It is now possible to set up [Products where the box-shape is not just 'full'](#), but can also be 'tapered' (smaller top than footprint), or 'open', with different options for which edges are present.

And, most important of all, the **Optimization Engine of Cube-IQ** has been improved even further. We already beat all our competitors when it comes to how much gets loaded, and not by some low percentage, but by sometimes 5% or more. With Cube-IQ5.0 you will get better loads than ever before.

1.3 Getting Started

Quick start steps

Important Note: Cube-IQ uses the term '**Product**' for the items that you are loading, and the term '**Container**' for what you are loading the Products into. So, in the system a '**Product**' can be a **product**, a **SKU**, and **item**, and so on. A '**Container**' can be a **shipping container**, a **truck or trailer**, a **pallet**, a **ULD**, a **carton**, a **rail car**, etc. We even have clients filling lumber drying kilns using Cube-IQ.

Using Cube-IQ is easy. To load a Container, you need only two main steps:

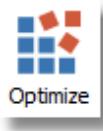
1. Create the basic data

- Enter the [Container data](#) on the main **Containers tab**.
- Enter the [Product data](#) on the main **Products tab**.

Since all Product and Container data is stored in Cube-IQ's internal database, this step is done once, and only repeated for new data. You can also import data from CSV files, XML files and Excel spreadsheets.

2 . Create and Optimize a Load

- Create the Load by clicking the big '+' icon, in the **Load Setup** screen.
- Click '**Select Containers**' in the Toolbar, and select the available Container types from the pop-up list, and enter how many are available.
- Click '**Select Products**' in the Toolbar, and select the Products from the pop-up list, and set for each Product the quantity to be loaded.
- Click the '**Optimize**' button.



It's as simple as that! You are now able to view and evaluate the results, and print out the Load Plan that clearly shows the precise Container loading sequence. From here you can modify which Products are to be loaded, set their quantities and re-optimize.

See also:

[Units](#)

[Database Navigation](#)

[Main Window](#)

[Building your first load with Cube-IQ: a tutorial video.](#)

1.4 About Help

Using the Cube-IQ Help

This Help assumes that you are familiar with using Windows (XP/Vista/7/8) to start programs, enter information, etc. We also assume that you know how to use the standard Windows keys, such as F1 for Help, Tab to move between fields, etc.

Cube-IQ has full context-sensitive Help in place. In any screen, the F1 key will take you to the appropriate section of this Help file.

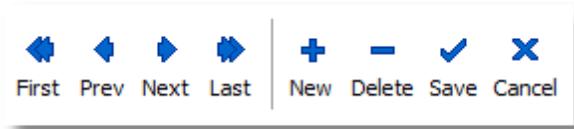
1.5 Database Navigation

Moving through Cube-IQ's database

Cube-IQ utilizes a powerful, built-in database engine to store **Container**, **Product**, **Customer** and **Load** information. To help you maintain this data, the program provides a simple interface in the form of the '**Navigation Buttons**'.

For detail data (such as the 'Configurations' of a given 'Product') you will find database buttons working specifically on that detail data.

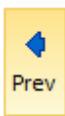
On each of the main data tabs, the Navigation Buttons look like this:



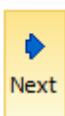
Button Icon Button Action



move to the first record or data item



move to the previous record



move to the next record



move to the last record



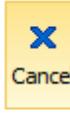
begin creating a new record



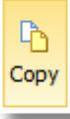
delete the current record



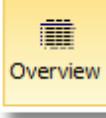
save changes to the current record.



discard any changes to the current (existing or new) record



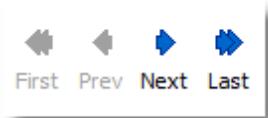
creates a copy of the current record displayed



displays the database records in a data grid format (available on the Product database records)

Notes:

Some of the buttons may be disabled, depending on the situation. If, for example, you are already on the first data item, the first two database buttons are disabled as you are unable go back any further in the database table.



As a general rule you do not have to use the Save button to store data changes in the database. This happens automatically when you leave the window, or close Cube-IQ. The effect of a change to a data field may only show when you leave the field, or the row in the grid (which is when it gets stored in the database).

See also: [Shortcut Keys](#)

1.6 Main Window

The Cube-IQ Main Window

The **Main Window** hosts the data windows of Cube-IQ. Depending on which tab is currently active, the various buttons and controls on the Ribbon Bar provide different functions.

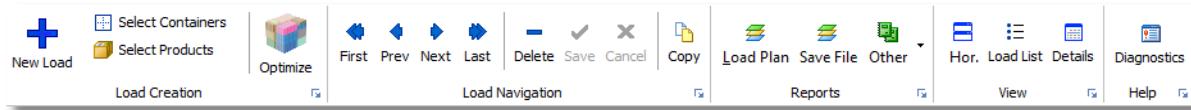
At the top of the Main Window is the Program Title Bar. The title of the program will tell you what version you are running, and also the path to the current database.

Cube-IQ 5.0.0.0 [t:\data]

Just below this is the **Ribbon Bar** consisting of a number of tabs as shown. This gives you access to the full functionality of Cube-IQ. Each tab is discussed individually in the [next section](#) of the Help.

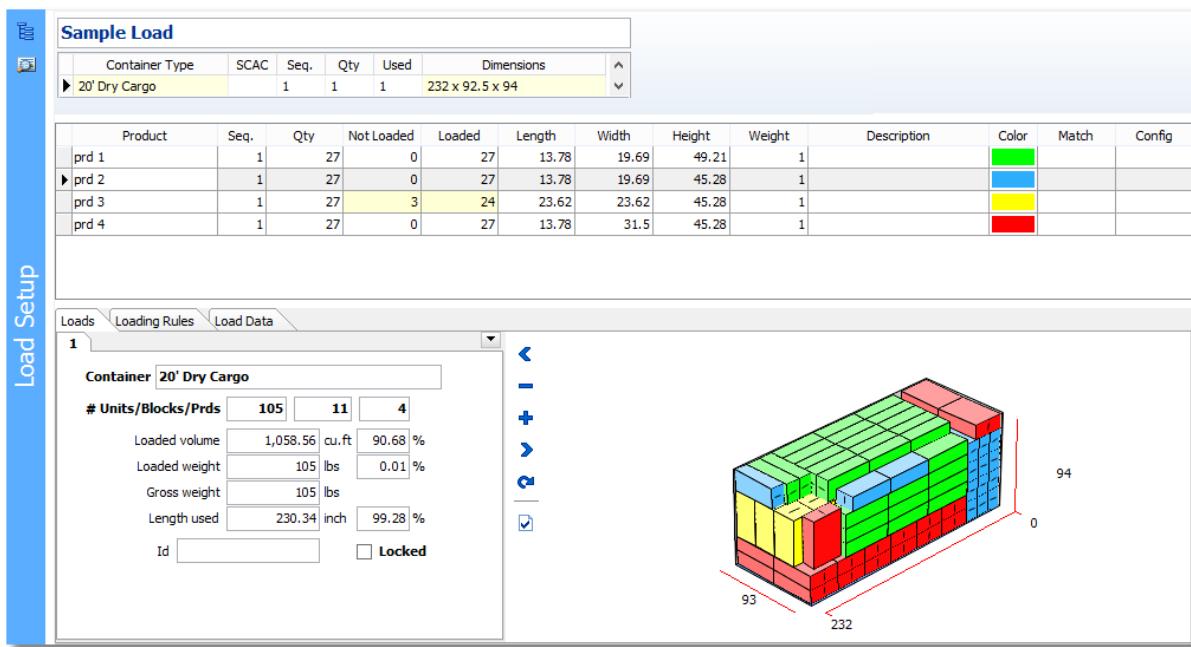
Load Setup Load Plan Load Edit Load Overview Products Containers Settings Customers Options

For each Main Tab, unique **Ribbon Bar** controls are displayed. The Ribbon Bar controls are discussed individually with each Main Menu tab. This is the Ribbon Bar when the Loads Tab is active:



The Details Window is unique to each Main Tab. Within the Details Window, you are able to input specific data parameters and/or view graphics (where applicable) specific to the Main Menu tab selected. Each Details Window is described for each individual [Main Menu](#) Tab.

For example, the Detail Window view for Loads (Load Setup) is as shown here:



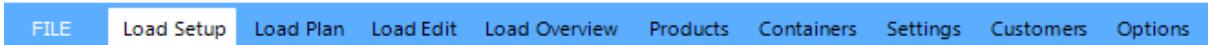
The status bar at the bottom of the window provides key statistics of the current Data Window where appropriate.

1 Loads | To load: 108 | Loaded: 105 | Not loaded: 3 | Volume: 1102.41 cu.ft | Weight: 108.0 lbs

1.7 Main Tabs

The Cube-IQ Main Tabs

The **Main Tabs** are part of the **Main Window** of Cube-IQ. It gives you access to the full functionality of Cube-IQ. With each individual tab, the Ribbon Bar will provide unique controls for each specific tab.



The following Main Tabs are available:

[FILE](#)

[Load Setup](#)

[Load Plan](#) - visible only if the current Load you are viewing has been Optimized.

[Load Edit](#) - visible only if the current Load you are viewing has been Optimized.

[Load Overview](#) - visible only if the current Load you are viewing has been Optimized.

[Products](#)

[Containers](#)

[Settings](#)

[Customers](#) - the Customers tab is visible only if that is set on the [Options tab](#).

[Options](#)

1.8 Main Window Controls

The Main Window Controls

The Main Window Controls are applicable to all windows in Cube-IQ



The **Minimize button** toggles the ribbon bar open and closed to create more space for the main window.

The **Help button** takes you to the most relevant help topic relating to the screen you are currently working in.



The **Data Tree button**  opens or closes the data tree window on the left side of the main window.

The **Search button**  allows searching on specific data items via a pop-up menu.

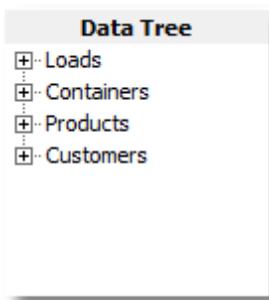
Each menu item opens a separate window to allow for advanced searching, sorting and filtering.

Loads opens a specialized dialog displaying all the Loads in a list format with the ability to sort and filter based upon Customer, Ship Date, Date and allows for custom filters to be defined in 'User String' data fields.

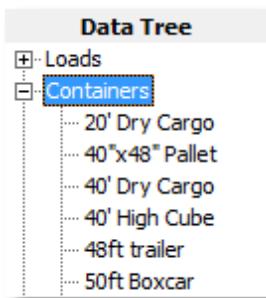
1.8.1 Data Tree



This button  opens the **Data Tree**. It is located in the sidebar on the far left of the main window:

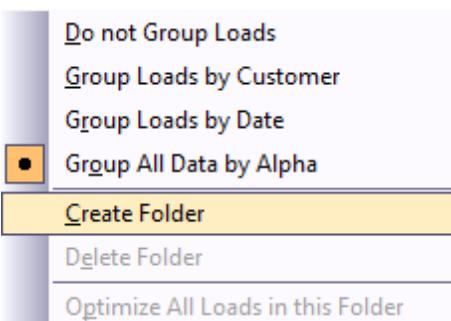


You can click on the '+' to expand a branch of the tree.

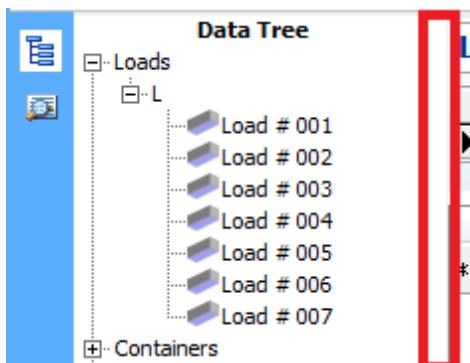


Double click an item to go directly to its data. In Load Setup, you can build a Load by dragging Containers into the Container Types grid, and Products into the Product grid.

The **Loads** node of the tree has several special functions. It is possible to group Loads by several different criteria, including user-definable folders. The options can be seen by right-clicking to open the Data Tree pop-up menu:



The width of the Data Tree window can be changed by clicking and dragging on its right-hand border, highlighted here in red:

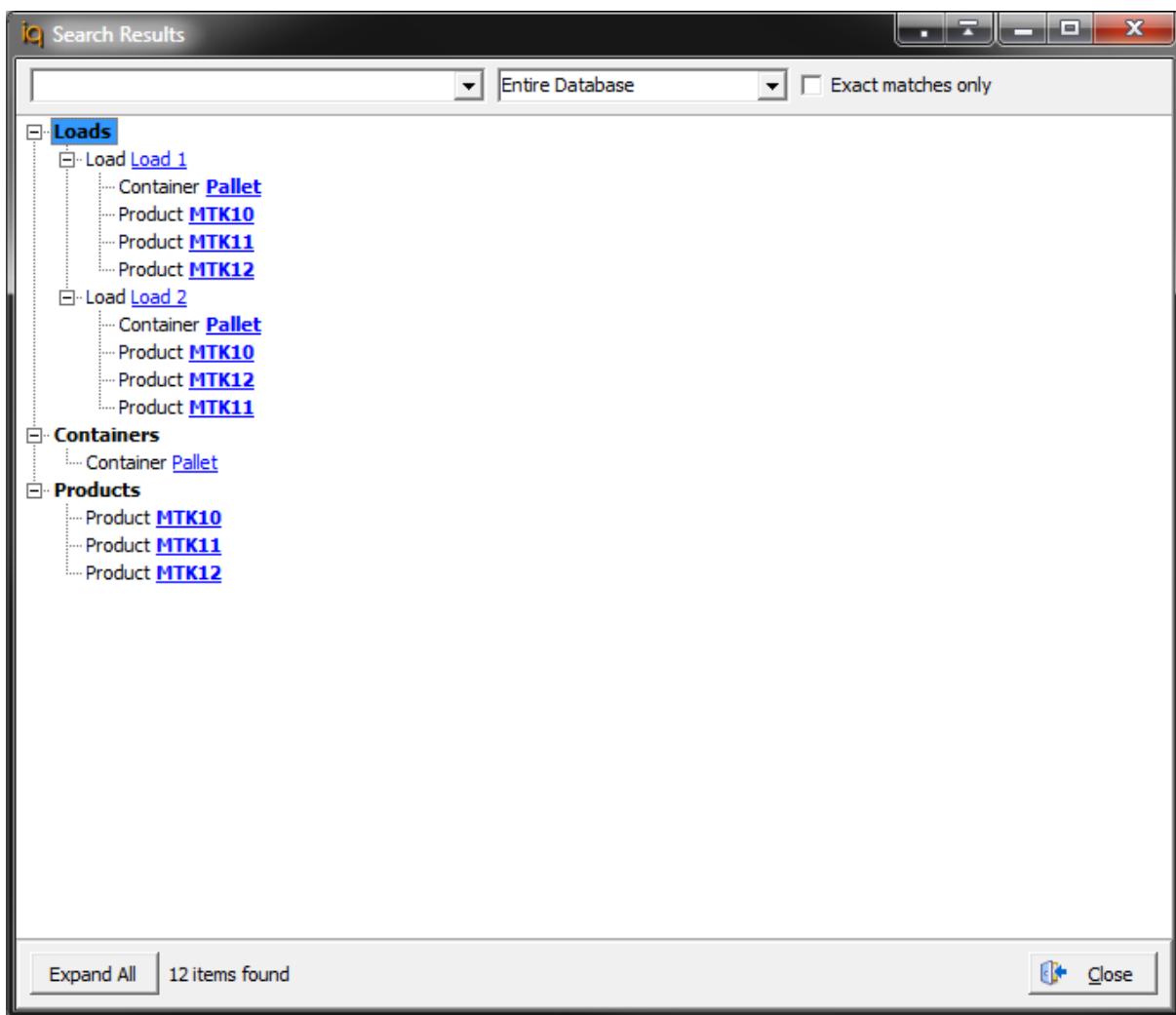


To close the Data Tree, click its button a second time.

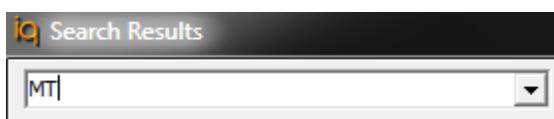
1.8.2 Search

Search

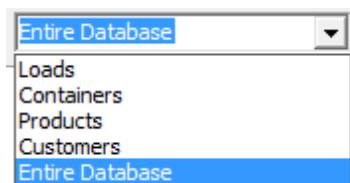
Cube-IQ provides a complete database search facility. You can use this to find and jump to any of the main data items in the program: Loads, Containers, Products or Customers.



Enter your search term in the text box at the top of the dialog. The search results will refresh as you type:



Refine the search by filtering the data items with the drop-down menu:



1.9 Shortcut Keys

Shortcut Keys

For users preferring the keyboard over the mouse, Cube-IQ offers many **Shortcut Keys**.

From **any window** :

Function Shortcuts	Shortcut key
Product data	F5
Container data	F6
Settings	F7
In all data screens (Containers, Products, Settings, loading cases) pop-up selection list	F3
Load Setup	F4
Load Plan Diagram	F8
Specific menus for data grids	Right click anywhere in the grid

For **data base navigation** , in any data window:

Go to:	Shortcut key
the first data item	Alt-Down (Alt key + cursor-down)
the previous data item	Alt-Left
the next data item	Alt-Right
the last data item	Alt-Up

In the **Load Setup** and **Load Details** windows:

Go to:	Shortcut key
the next loaded Container (for the same case)	PgUp
the last loaded Container	Ctrl+PgUp
the previous loaded Container	PgDn
first loaded Container	Ctrl+PgDn

In any **edit field** or **data grid** :

To:	Shortcut key
delete the value in the current field	BackSpace
edit the current text in a field	F2
delete the complete current row/record	Ctrl+Delete

On any **screen with tabs** :

To:	Shortcut key
navigate tabs from left to right	PgUp
navigate tabs from right to left	PgDn
navigate from cell to cell in table	Tab

In the **Graphics** window:

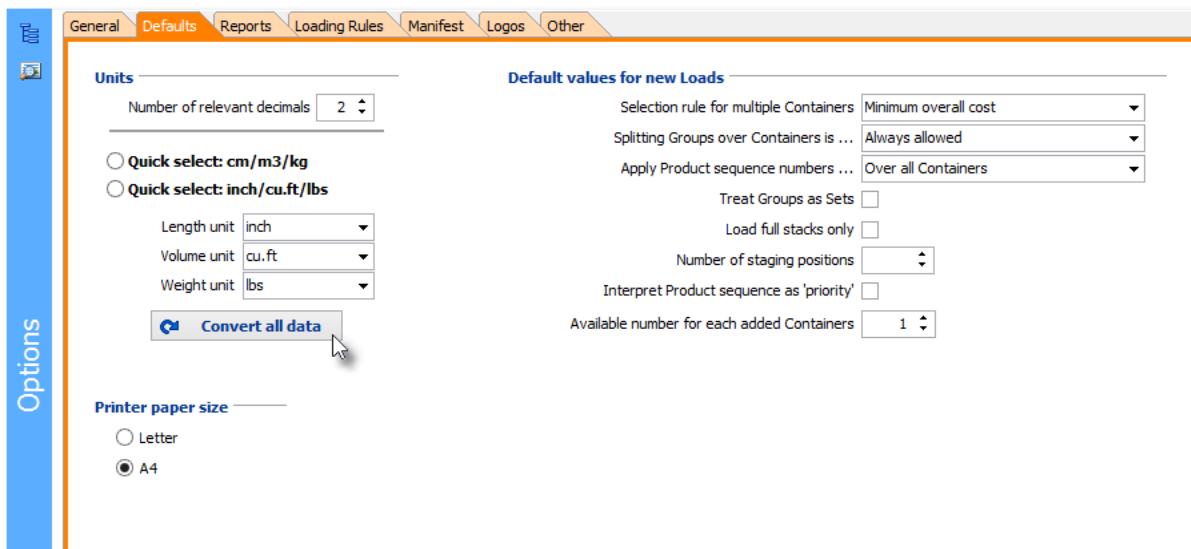
Function:	Shortcut key
to show no loaded Products	Alt-n
to show one more (block of) loaded Products	+ (repeated), or =
to show one less (block of) loaded Products	- (repeated)
to show all loaded Products	Alt-a

1.10 Units of Measure

Units for dimensions, volume and weight

Cube-IQ5.0 allows you to set the **units of length, volume and weight** for each data item (Product, Container, Settings, Load) separately. These units are used for all data display and updates. Units can be changed on the fly, with either a request for confirmation ('Convert data on change of units', in [Options](#)), or, for Loads, automatic conversion.

If you prefer to work in a single set of units, you can make the change of units option invisible on the [General tab](#) of the main Options tab.



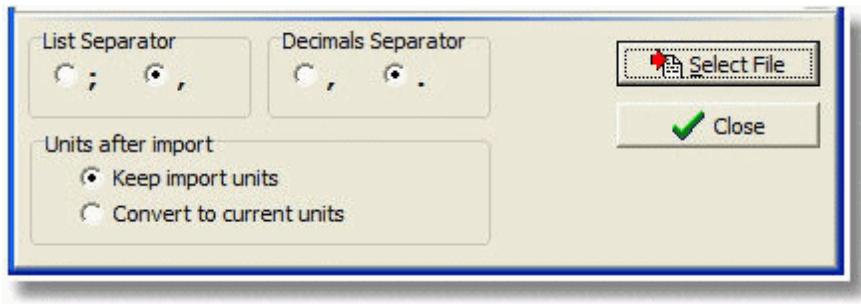
When any new item gets created (Container, Product or Settings record), the [Default Units from Options](#) will be used.

Length unit - can have the following values: 'cm', 'm', 'mm', 'inch', or 'ft'.

Volume unit - can have the following values: 'cu.inch', 'cu.ft', 'board feet', 'cm³', 'm³', 'mm³'.

Weight unit - can have the following values: 'lbs', 'kg', or 'tonnes'.

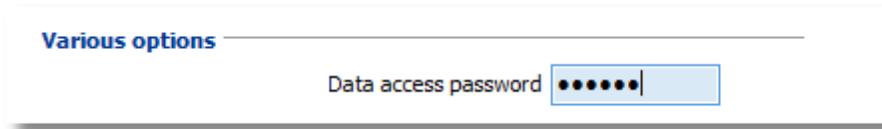
If data in other units is imported into the system, you can either accept the incoming units, or convert, depending on your selection on the Import Screen:



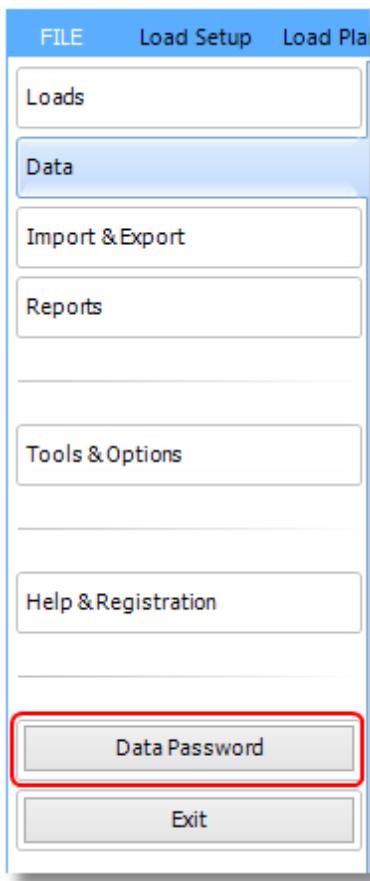
1.11 Blocking Data Access

Password protection for Permanent Data

You have the option to set a password for access to the permanent data of Cube-IQ (Containers, Settings, Products, Customers). This is done on the Options screen, under the [General Tab](#).



If a password has been set, the Cube-IQ File tab will show the **Data Password** button just above the **Exit** button, which you can click to enter the password at any time.



When clicked it will ask you for the Data Access Password as set on the [Options tab, General sub-tab](#). (If you forget the password, contact [MagicLogic support](#).)

If you enter an incorrect password, you will still be able to use that data to build Loads. However, you will not be able to modify the underlying data.

1.12 System Requirements

Minimum and recommended hardware

Cube-IQ is fully compatible with Windows XP/Vista/7/8, with the following **system requirements** :

Hardware	Minimum	Recommended
Processor	Intel Pentium 4 or AMD Athlon x64	Intel Core i5 (2.66 GHz, Quad Core) or AMD FX (3.0 GHz, Octa Core)
RAM	1GB	2GB to 8GB
Hard disk space	40 GB hard drive with at least 15% free space	250GB to 1TB
Display	1024x768	1024x768 to 2400x1200
Graphics	16 bit (65535 colors)	32 bit (16M colors, or True Color)

Note that a screen resolution of 1024x768 (or better) is a hard requirement to use Cube-IQ Release 5.0.

If the main Cube-IQ window does not seem to fit your screen, switch the Display/DPI to 'Normal size'. (Right click your Windows Desktop for a Screen Properties window. On the Settings tab of Windows, click the Advanced button.)

1.13 Special Versions

MagicLogic offers several special versions of Cube-IQ.

Pallet Loading into Rail Cars is done in a special version of Cube-IQ. This version loads along the two long walls of the rail car, minimizing pallet distance to minimize the effect of shaking. It also handles clamped pallets.

A **Viewer Version** of Cube-IQ allows access to optimized loading results, without the possibility to modify these results or its underlying data.

A simplified version of Cube-IQ is available as a **web version**, that runs inside any modern web browser. Data maintenance is to be done outside this version, possibly in a standard Cube-IQ installation. Cube-IQ offers an 'upload data' feature. The idea behind the web version is that the client takes care of all the data, and then makes it available to for example suppliers or customers. They can use the existing data to make loads, but they cannot change the data. Please contact MagicLogic for details and pricing.

1.14 Support

Support

For support, please contact your supplier/agent first. If needed, you can reach MagicLogic Optimization Inc. as follows:

email support@MagicLogic.com

tel. (+1) 206-274 6248 or 1-888-274-8616 (Toll Free in North America)

Email communication is recommended.

Telephone support is available 8AM-6PM, Pacific Standard Time (UTC - 8.), on working days.

If you appear to have problems with a specific Load, please send us the data with your comments or questions. **This greatly facilitates support.** The [Main Menu / Export](#) gives you the option to export the data of the currently visible Load to file, and then directly email that file:

After clicking Export / Email Load, Cube-IQ will open your email software and automatically attach the Load data as a single file for import. Please add any comments or remarks to the email that you think may help us to understand and solve the issue.

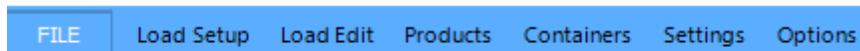
(Please note that this email facility may not work with some email software. In that case, just export the load to a file (for example on your Desktop), and attach the resulting file to an email.)

2 FILE Tab and Database Actions

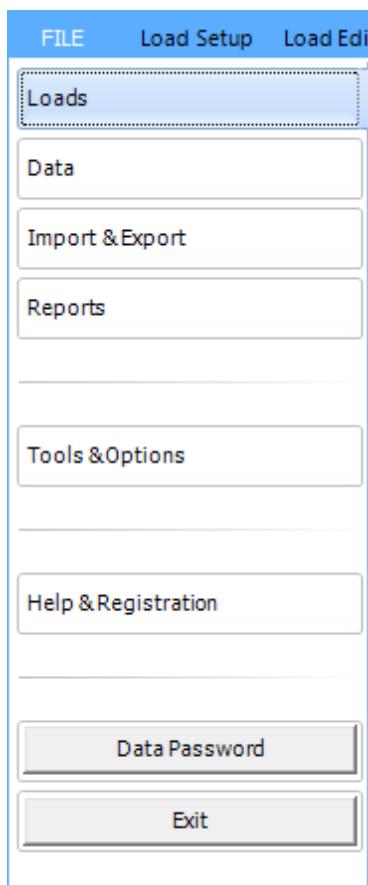
2.1 FILE Menu

The Cube-IQ FILE Menu

The **FILE Menu** is accessed by clicking the FILE tab in Cube-IQ's **Main Window**. It gives you access to the several important features of Cube-IQ, such as Recent Loads, Import/Export, and Reports.



The FILE tab is divided into six sections:



Loads lets you start a new load (just like the large '+' icon in the Ribbon Bar) and perform other Load-related actions. It also shows recently accessed loads for quick selection.

Data gives you access to complex stacking and combinability rules.

Import and **Export** allows you to load and save external data. This is useful for sharing data with colleagues, as well as for backup or support purposes.

Reports let you preview and optionally print or email various reports relating to the current Load.

Tools & Options help you to configure the software to fit your preferences, as well as providing tools to help keep the system running smoothly.

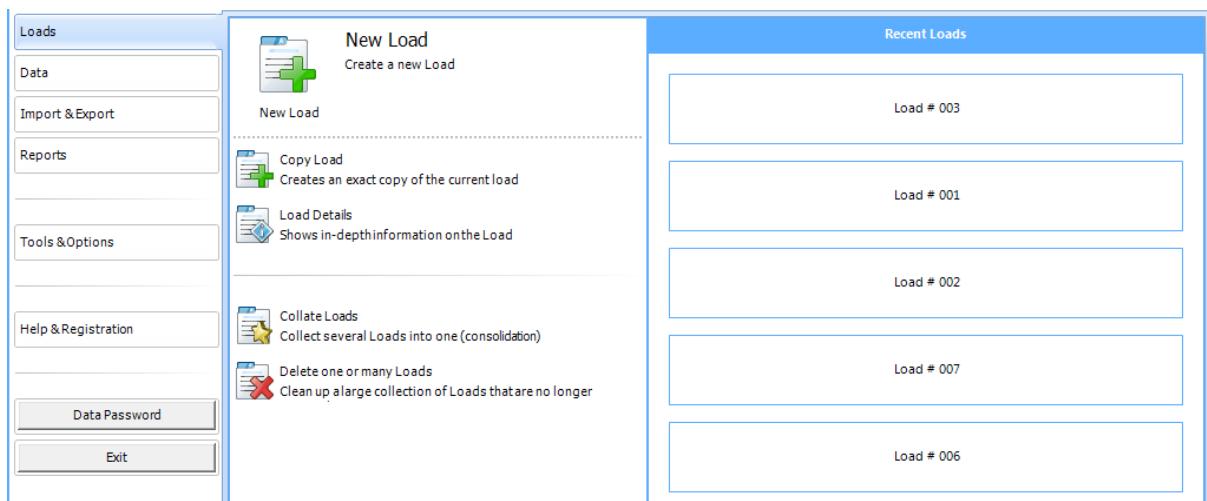
Help & Registration menu lets you access the Help file, and also a description of the shortcut keys (which can be translated by the user). In Help you can [register](#) a trial version, print a brief report on your **system setup**. It also gives you information on which 'build' of Cube-IQ you are using. You can email MagicLogic directly from here.

The **Data Password** button may be visible if you or another user has added a password to protect the database from unauthorized changes. Click this button to enter the password to unlock the database.

Clicking the **Exit** button closes Cube-IQ. Note that there is **never any need in the system to save your data or results**. This is always done automatically, into the permanent database.

2.1.1 Loads Page

The Loads page allows you to view and mani



New Load creates a new empty Load in the database, and moves you to the Load Setup page ready to add Containers and Products.

Copy Load makes a new copy of an existing Load and allows you to give it a new name. This can be very useful when working with multiple Loads that share the same or similar lists of Containers and/or Products.

Load Details switches the screen to an in-depth view of the current Load. The [Load Details](#) screen shows detailed information on the loaded Containers and their contents.

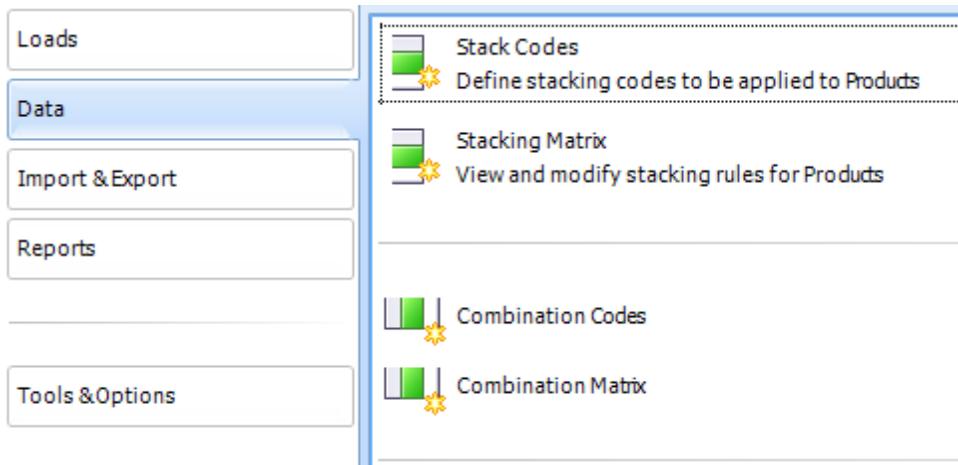
Collate Loads combines two Loads into a new Load, which you can then name.

Delete one or many Loads allows you to clean up the Cube-IQ database by selecting multiple Loads at one time for deletion. **Please note that a deleted Load cannot be recovered.**

The **Recent Loads** list shows the six most recent loads that you have worked with. Click on a Load Id to quickly jump to its Load Setup page.

2.1.2 Data Page

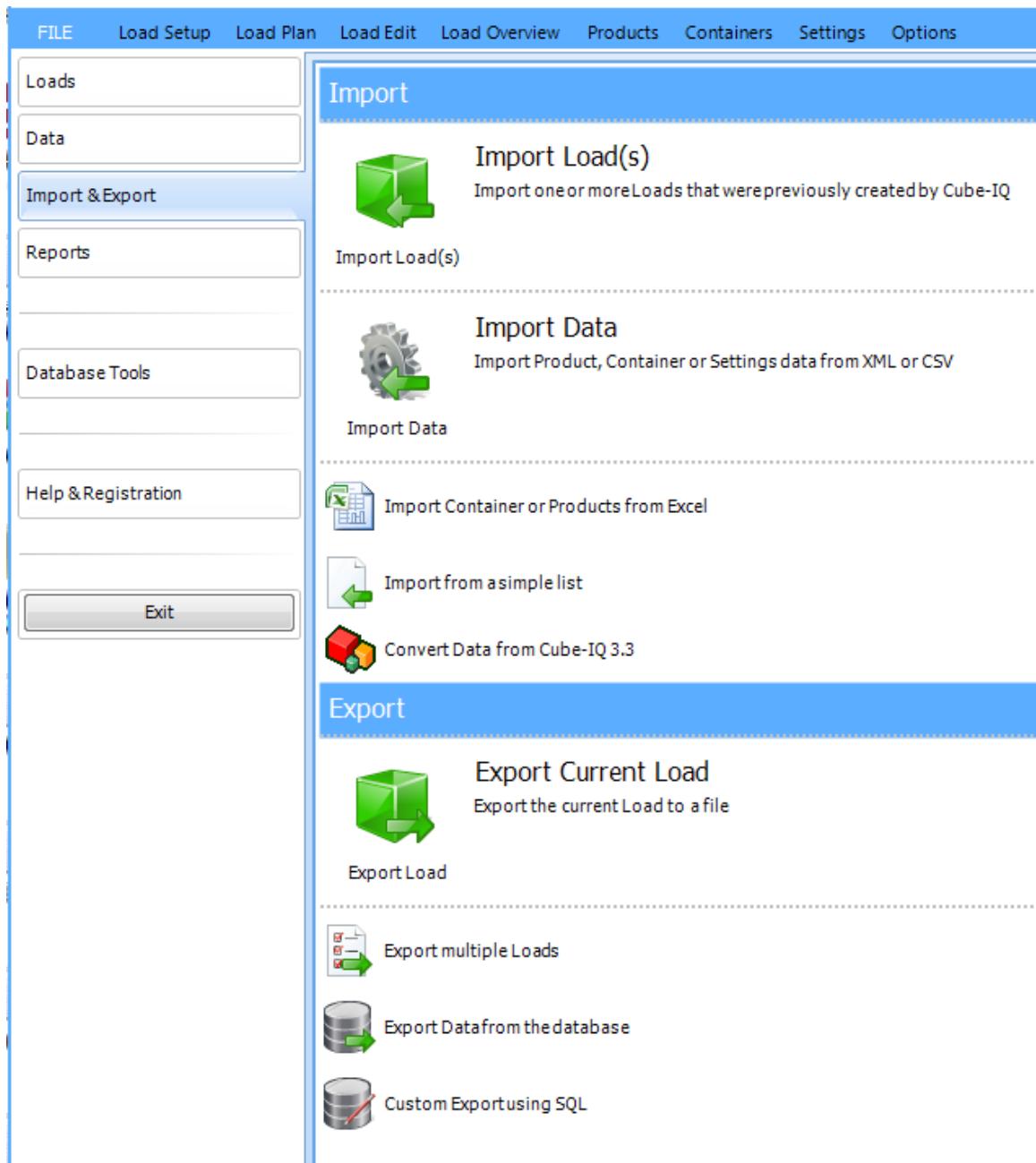
The Data Page allows you to quickly select and view specific areas of the database related to specialized Product stacking and combination rules.



Please refer to the following sections for discussion of [Stack Codes and Stacking Matrix](#), and [Combination Codes and Combination Matrix](#).

2.1.3 Import & Export Page

Cube-IQ provides a rich set of features for importing and exporting both data and Loads.



Please refer to the various subsections of the current section.

Importing

- Import Load(s)
- Import Data
- Import Product or Container data from Excel or CSV
- Import from a simple list

Exporting

- Export Current Load
- Export multiple loads
- Export Data from the database

Custom Export using SQL

Convert Data from Cube-IQ 3.3 - this command will convert the data from an existing old-style Cube-IQ 3.3 database into a Cube-IQ 5.0 database. **Important: this command will overwrite all existing data.**

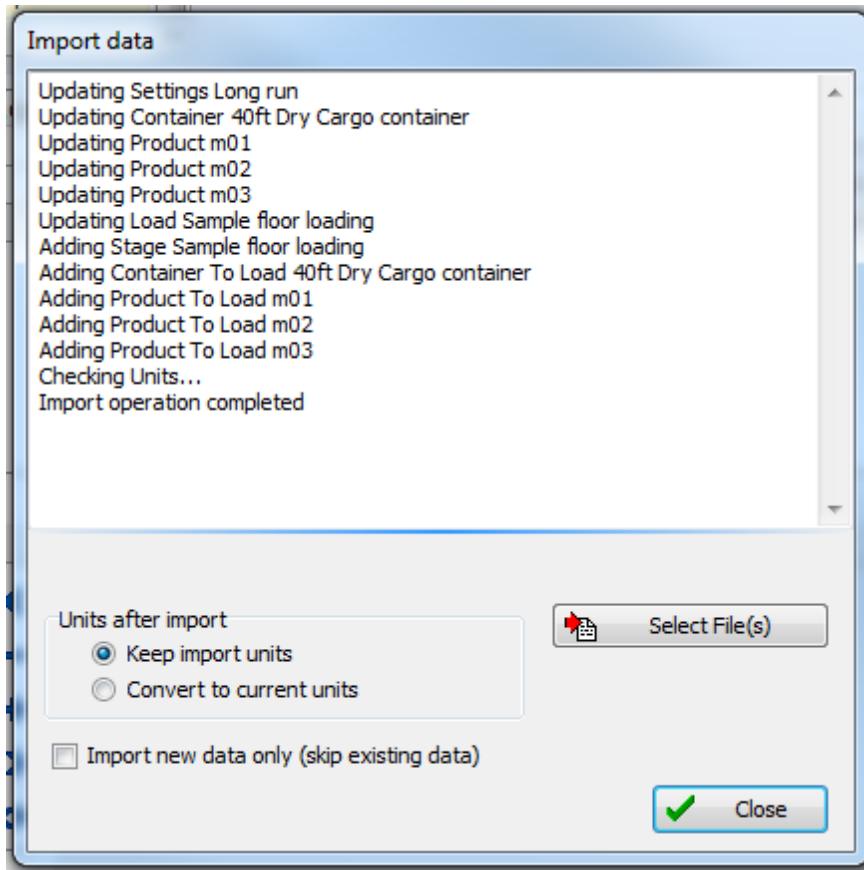
2.1.3.1 Import Load(s)

File - Import & Export - Import Load(s)

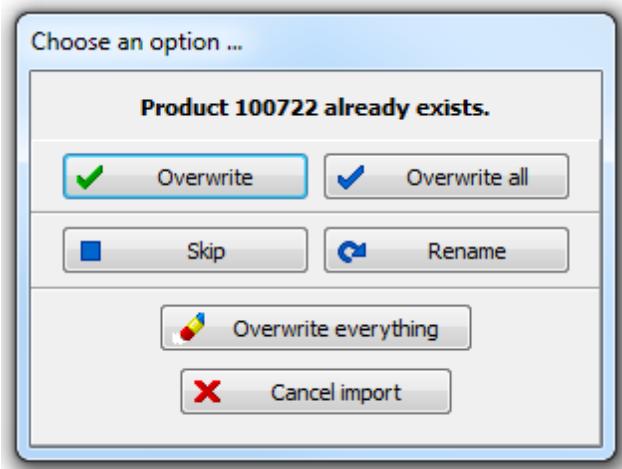
In the FILE tab, click on Import Load(s) to import one or more Cube-IQ Loads into the database. Files must be in the correct format (i.e. they must have been saved by another instance of Cube-IQ or created according to the MagicLogic file specification).

Click the **Select File(s)** button  to open the standard Windows Open File Dialog. Select the file or files you wish to import. Import will commence automatically.

The Import Loads Window is shown below. During the import, progress is shown.



If a data item is encountered with an id that already exists, you get the option to skip, overwrite, or rename.



2.1.3.2 Import Data

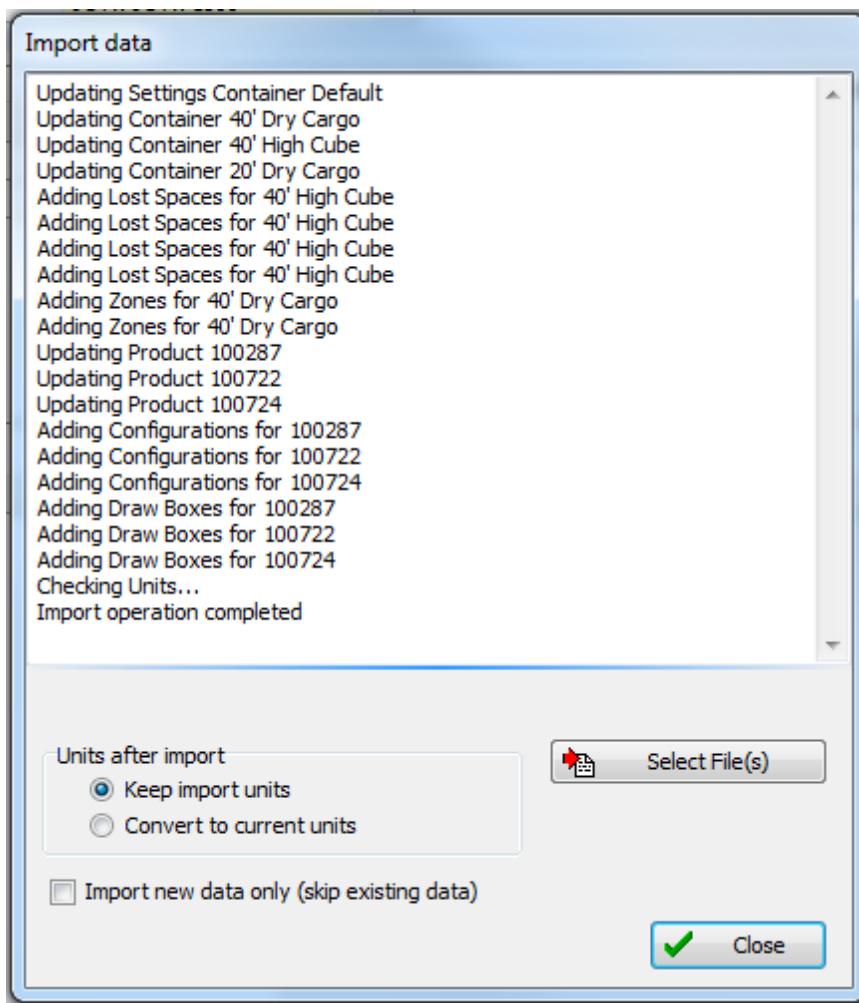
File - Import & Export - Import Data

In the FILE tab, click on the **Import Data** button to import data into Cube-IQ. **Please note that the data must be in Cube-IQ's own data format for the Import to operate correctly.** MagicLogic provides documentation for this format in your installation.

If you wish to import data held in alternative formats, please see "[Importing from Excel or CSV](#)"

Click the **Select File(s)** button  to open the standard Windows Open File Dialog. Select the file or files you wish to import. Import will commence automatically.

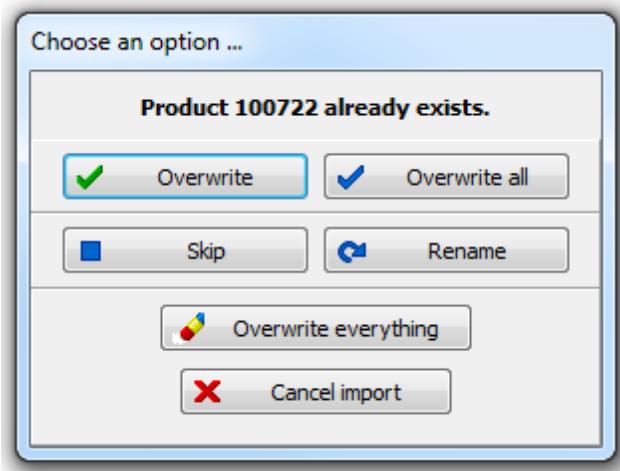
The Import Loads Window is shown below. During the import, progress is shown.



Import files can be comma-separated (.CSV), or XML files. Using the Comma Separated Value layout, you can for example gather data in Excel, and then use 'Save As' to export it into a CSV file for Cube-IQ import. The required column setup can be found in a document in the 'docs' sub-folder of a Cube-IQ installation.

If the units for length, volume or weight are different between the imported data and the existing data, a unit conversion can be done automatically, or existing units can be preserved.

If a data item is encountered with an id that already exists, you get the option to skip, overwrite, or rename. To avoid problems with automated import this dialog will assume 'overwrite' if no user action is taken within 10 seconds.



To import a file that contains your own set of columns/data fields, see [Importing from Excel or CSV](#).

2.1.3.3 Import from Excel or CSV

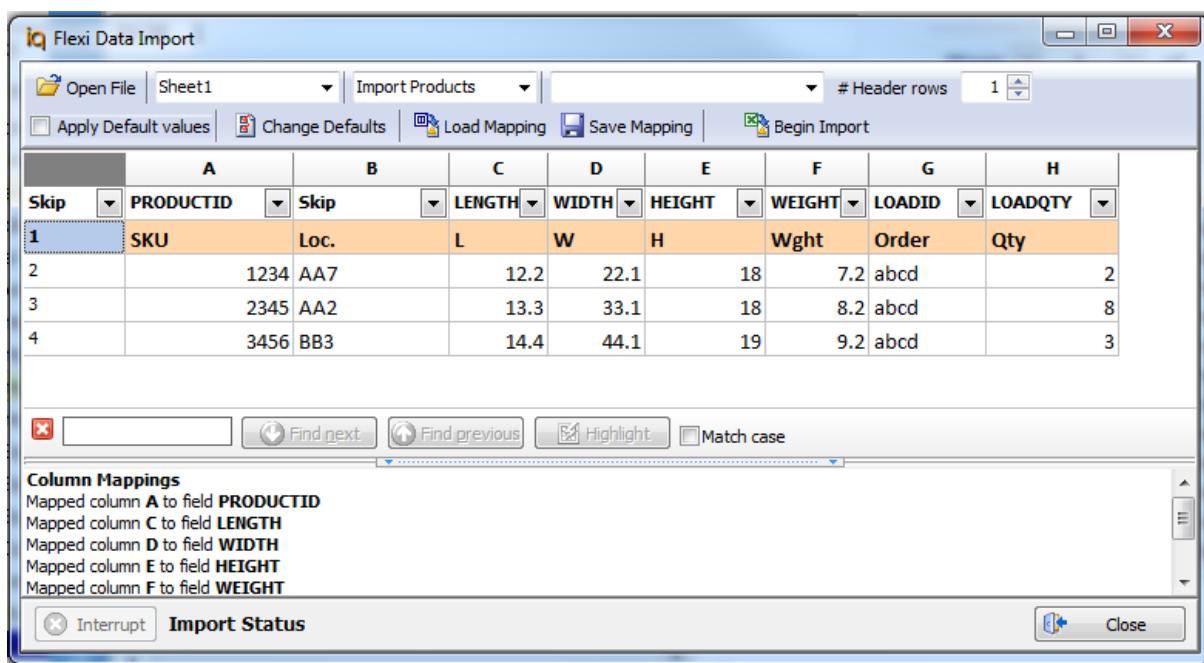
File - Import & Export - Import Containers or Products from Excel or CSV

Cube-IQ gives you the option to import Product or Container data from Excel or comma-delimited format, with your own set of fields, in any sequence, while giving default values for missing data.

Suppose the Excel file looks like this:

	A	B	C	D	E	F	G	H	I
1	SKU	Loc.	L	W	H	Wght	Order	Qty	
2	1234	AA7	12.2	22.1	18	7.2	abcd	2	
3	2345	AA2	13.3	33.1	18	8.2	abcd	8	
4	3456	BB3	14.4	44.1	19	9.2	abcd	3	
5									

You can then use the File tab, Import and Export, Import Containers or Products from Excel/CSV.

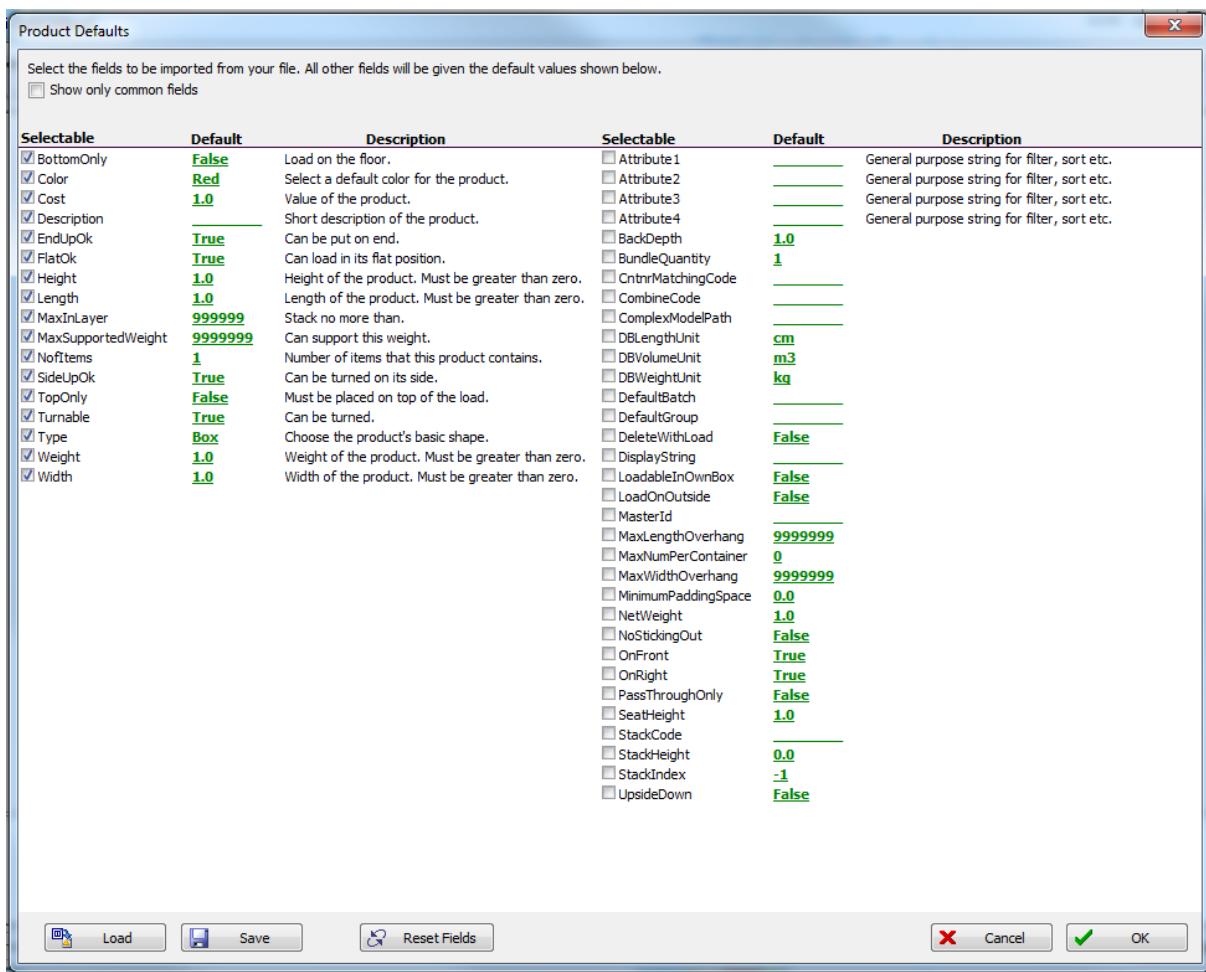


Use the Open File button to select the file containing your data. Cube-IQ will display your file in spreadsheet format, where each column in your file can be assigned to the relevant Cube-IQ Product data field as required. A list of available fields is provided in the drop-down selection at the top of each column. Use these to assign the correct fields to your data. For columns which you do not wish to import, simply leave the column header as "Skip".

Once all column headings have been assigned correctly, click the Begin Import button. Cube-IQ will scan the file and update its database with your data.

Column/data assignments can be saved for future use by clicking the Save Mapping button. To re-use a saved mapping at a later date, use the Load Mapping button.

For fields which you do not have data, Cube-IQ will use safe default values. However these values can be overridden by using the Change Defaults button. The following screen is opened which allows you to change all default values, and also select which fields will be available in the Import screen's columns. The selection and default values can be saved, and reloaded when needed using the buttons provided.



Care should be taken when modifying defaults since it is possible to assign values which make products difficult, if not impossible, to load.

To make a field available to import, simply check its box. Values shown in green are used as defaults if the data is missing from your import file. In this way it is possible to bulk import very large data sets extremely quickly.

A complete description of all data fields is available in the Cube-IQ import documentation.

2.1.3.4 Import Load List

File - Import & Export - Import Load List

Cube-IQ gives you the option to import a simple comma-delimited file of 'Products to be loaded' In the Main Menu, select **Import/ Load(s) from List**.

An example Import Load List comma-delimited text file might look like this:

```
Load=qqq
Container=ccc
p1,8,2
p2,9
```

The 'Load=' line is optional. If not present, the Products will be added to the current Load. If present, a new Load called 'qqq' will be created.

The 'Container=' line is also optional. If present, the Container called 'ccc' will be added to the list of available Containers. The Container called ccc must exist in the Cube-IQ database.

All other lines are Products (p1, p2) with quantities (8, 9). The '2' in the first Products line is a sequence number (again optional).

So, in its simplest form you can add a series of (pre-existing) Products to the current Load by importing a Load list text file like this:

```
p1,11  
p2,8  
p3,44
```

etc.

Even though the file is called 'comma delimited', the field values in each line should be separated by the **List Separator** from the **Windows Regional and Language Options**. Such a text file can be created in for example Excel. Enter the data in various columns (one row for each Product), making sure that the List Separator (comma or semi-colon) does not occur in any text values ('Product id' or 'description'). Then save the file as type 'CSV (MS-DOS) (*.csv)', which is the 'comma-delimited' format.

2.1.3.5 Export Current Load

File - Import & Export - Export Current Load

This export creates a single file that defines everything required to re-create this Load in another instance of Cube-IQ. It automatically includes the complete data of the Containers, Settings, and Products involved.

MagicLogic may also occasionally request this file in order to help with support.

2.1.3.6 Export Multiple Loads

File - Import & Export - Export Multiple Loads

In the FILE tab, click the Export multiple Loads button to open a selection dialog listing all Loads in the Cube-IQ database:

Export Loads to files

Not exported Loads	Created	# Units	# Loaded
1	26/11/2013	20	20
123	05/02/2014	4	4
1350490140-947847-1 C3I	17/10/2012	4	4
244243	06/09/2012	0	0
298_AM-FM-CD_Changer - NoTurn	01/11/2012	250000	179
339026	26/11/2013	72	72
3535434	06/09/2012	0	0
4444545455	06/09/2012	0	0
4656454	06/09/2012	0	0
57567575	06/09/2012	0	0
78785	06/09/2012	0	0
A-First Load	02/05/2011	101	100
CTH-PE1207_100027_NY-05471_THAIN_AUS	26/07/2012	100	100
CTH-PE1309_090016_SR00055230_XNUSA_USA	09/09/2013	80	78
Container Selection	22/03/2012	1055	1055
Fill Container	14/11/2012	999	152
L-Load	05/12/2013	10	10
Load # 1	30/05/2011	134	130
Load 1	14/02/2014	99999	19200
MG 1065 Icon/Oko Table 300x100 cm	24/09/2012	0	0
New Unique Load ID # 27	09/05/2011	140	140
PI-120495-XTR AMBIENTE	24/09/2012	163	148
Pallet Load #0425	08/10/2012	8	8
Pilotage F224	03/07/2012	19	19
Pilotage F224 - 2	03/07/2012	19	19
Ricardo	01/08/2013	13	13
SAINT GOBAIN	01/11/2012	500	290
Sample Load	16/11/2009	196	0
Shipment #0502	09/05/2011	142	140
TEST JLA	16/02/2014	230	230
Test	06/02/2014	109	90
Test Beispiel 1	04/02/2014	852	760
Test Beispiel 2	04/02/2014	377	80

Buttons at the bottom:

- Show all Loads (checkbox)
- Export as CSV (dropdown menu)
- Interrupt (button)
- Export selected (button)
- Close (button)

Select the Loads you wish to export by clicking each one. Ranges can be selected using the standard Windows selection methods (Ctrl+Click, Shift+Click).

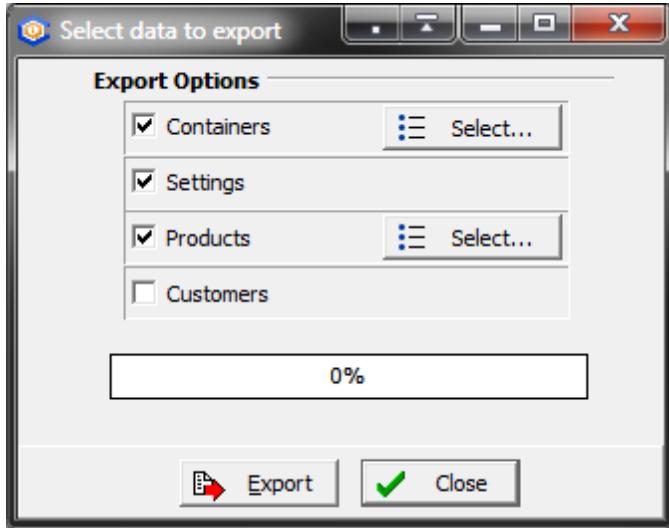
You may choose to save as either CSV or XML format. Each Load is written to a separate file in the format chosen.

Click the Close button when the export is completed.

2.1.3.7 Export Data

File - Import & Export - Export Data

From the FILE tab, click on **File / Import & Export / Export Data from the Database**



Cube-IQ allows you to export data of Containers, Products, Settings and Customers. This shows a selection window where you click which type of data to export, and for Containers and Products even precisely which ones by using the **Select** buttons.

The Windows Save File Dialog will appear, where you can give the export data file a name and select a file type.

The file can be saved as either

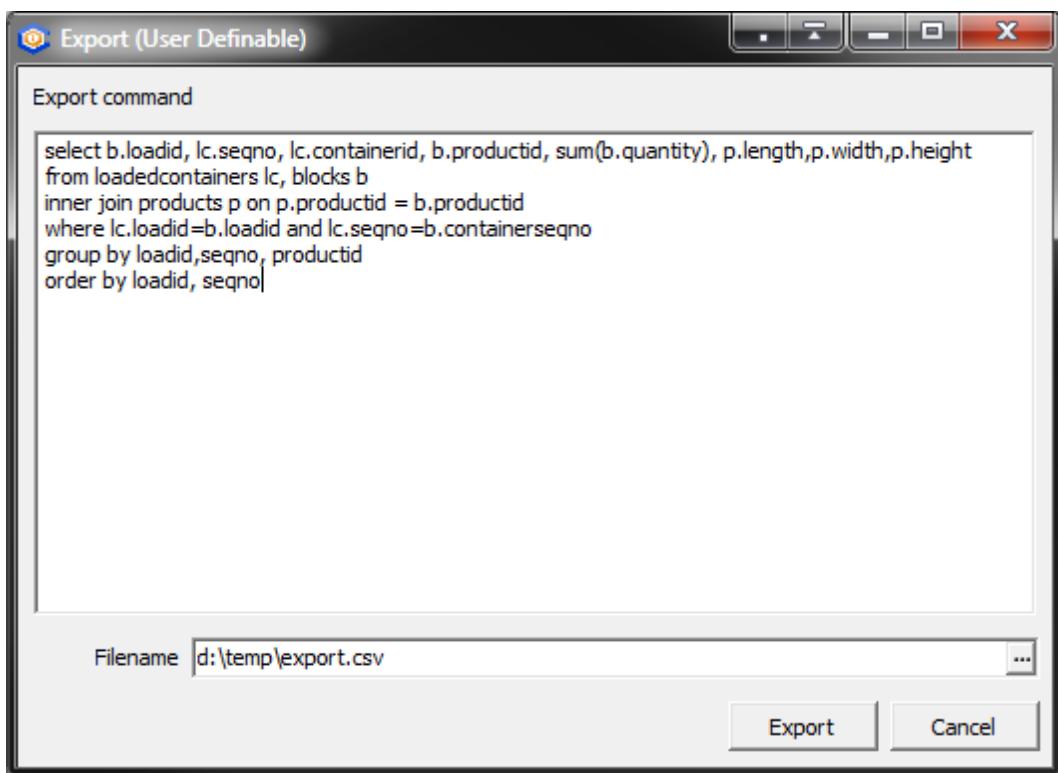
- CSV ('Comma Separated Values'), meaning that the field values in each line will be separated by either a comma, or a semi-colon (the **List Separator** as set in the **Windows Control Panel**, under **Regional and Language Options**).
- XML ('eXtensible Markup Language') will save the file in the highly portable industry-standard XML format. If you enter a name without extension, the default extension '.XML' will be used.

You can then send this file (for example by email) to another Cube-IQ system and import it there, or add import capabilities to other systems. The specification of the export/import format is included in the installation (in a folder called 'docs' inside the main installation folder). MagicLogic may also occasionally request this file in order to help with support.

2.1.3.8 Custom Export

File - Import & Export - Custom Export using SQL

In the FILE tab, click Import & Export, then select Custom Export using SQL. This feature allows you to write SQL queries to extract any type of data from the Cube-IQ database.



Enter a valid SQL query into the text box, and click Export when ready. Output will be saved to the filename you select in the filename text box at the bottom of the dialog.

If you wish to use this feature, contact MagicLogic for a detailed list of database table and field names.

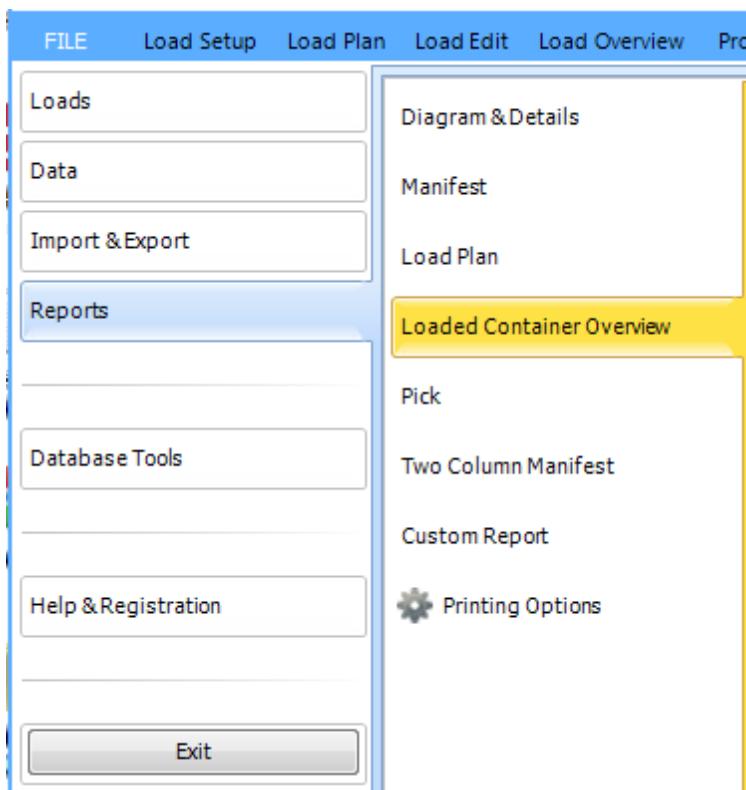
2.1.4 Reports

2.1.4.1 Reports

Reports - Introduction

Cube-IQ contains many reports to help you communicate your loading results with others.

From the FILE tab, choose **Reports**.



Cube-IQ provides seven reports on a loading case, all under the **Reports** menu in the Cube-IQ Main Menu.

All reports are first shown in preview mode, where you can click the printer icon to send the report to your printer. You can also save the reports as a **PDF file**, or **email** that PDF file as attachment.

The following Options are available:

[Load Plans Report](#)

[Diagram and Details](#)

[Loaded Container Overview](#)

[Manifest](#)

In upcoming versions more reports will be added on an 'as needed' basis. Please contact MagicLogic if you have any requests.

2.1.4.2 Preview and Toolbar

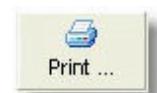
Report - Preview Screen

In every **Report** window, there is a toolbar at the top of the Preview Window.



Button

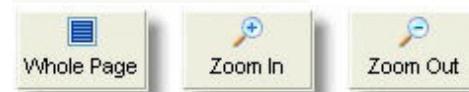
Print. This will take you to the standard [Windows Print Dialog](#).

Action

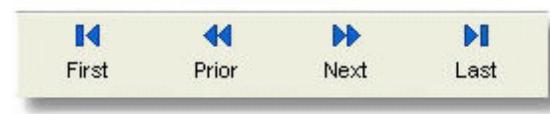
Save As will save the report as a PDF file. Email will open your email software and attach the report as PDF to a new email.



Zoom to fit, zoom to width, 100% (full page), and the current zoom percentage.



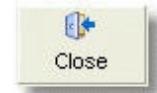
Go to page (first, previous, next, last), with 'current page' in the centre.



Choose report language.



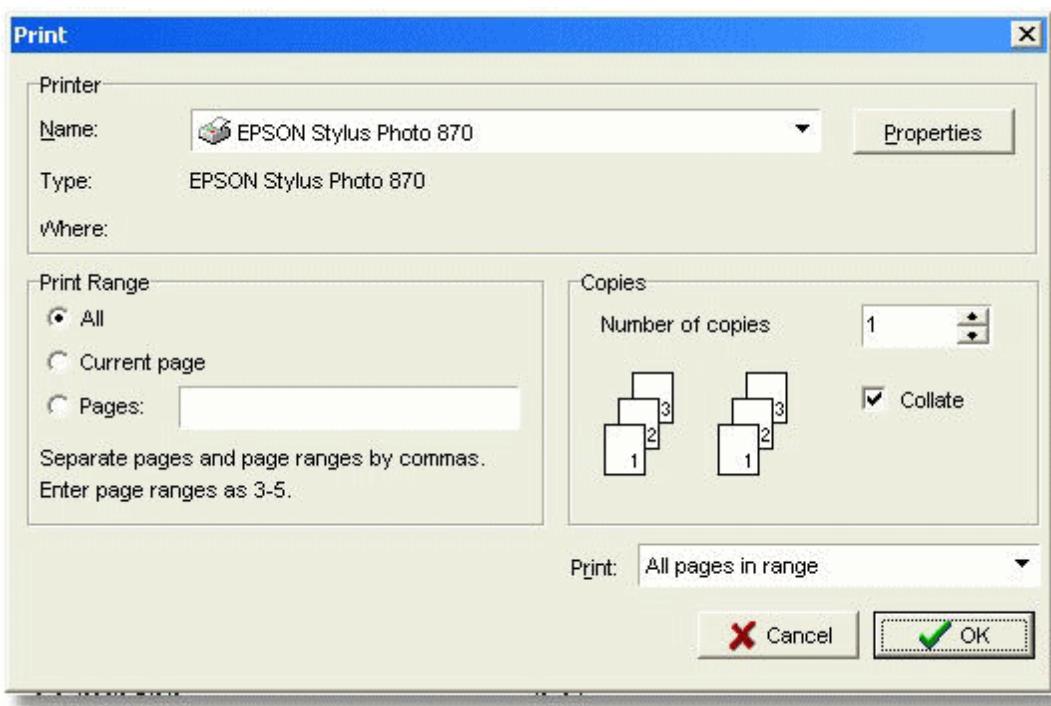
Close without printing.



2.1.4.3 Print Dialog

Report - Print Dialog

When you print a report, the standard Windows Print Dialog will be shown:

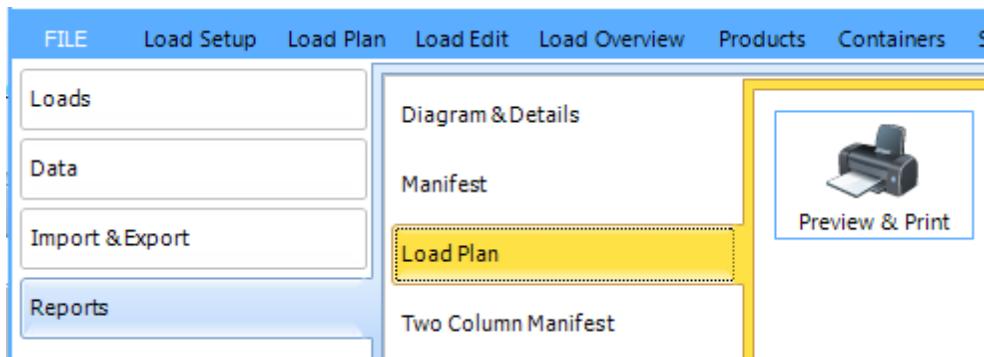


If your printer has Options like tray selection, those will be made available as well.

2.1.4.4 Load Plans

Reports - Load Plans

In the Main Menu, choose **Reports / Load Plan Report**.



The Load Plan gives you a complete report on how to load each of the loaded Containers in the current loading case. They are in fact the Loading Instructions.

For each loaded block (of one Product in one orientation) you will see how the block should be built up, and where it should be put. This is shown in co-ordinates, and, more importantly, also in a picture.

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1 of 3

Load: 40 feet HC 72 packages / 1

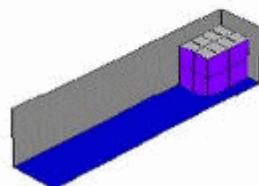
Date 12/02/2007

Container 1 / 40' High Cube ACL

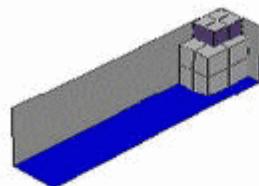
Volume: 45.73 | Weight: 11,820 | Dim. weight: 7498

Block 1 / L4

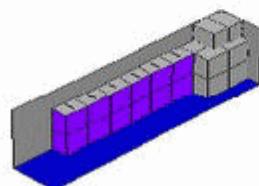
(123.4 x 82.9 x 94 as placed)

Block is: 2 deep Quantity: 8
2 wide Weight: 360
2 highPosition is: 0 from back
0 from left wall
0 from floor**Pallet****Block 2 / L3**

(82.9 x 123.4 x 74.5 as placed)

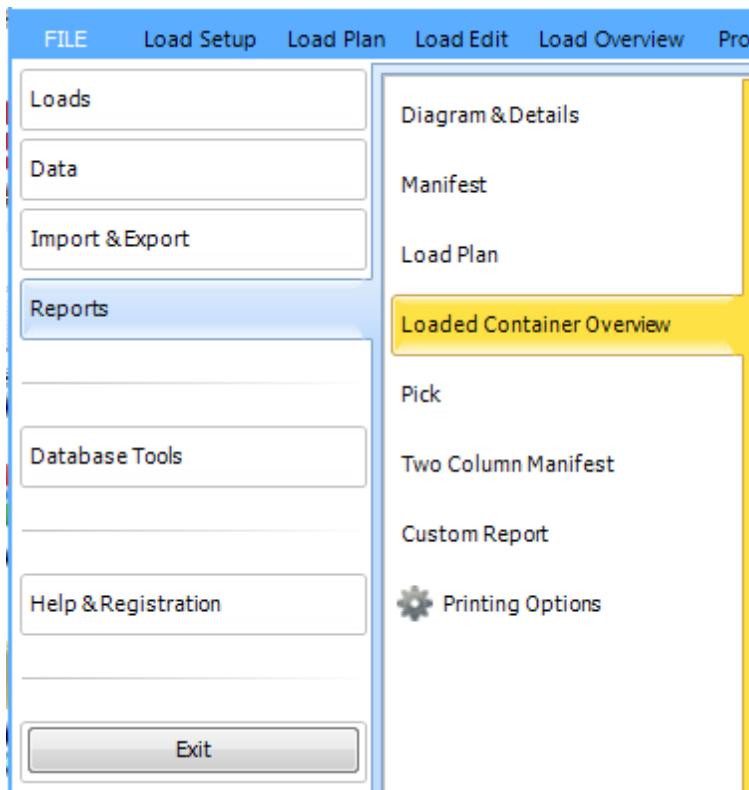
Block is: 2 deep Quantity: 2
1 wide Weight: 180
1 highPosition is: 0 from back
0 from left wall
188 from floor**Pallet****Block 3 / L4**

(123.4 x 82.9 x 94 as placed)

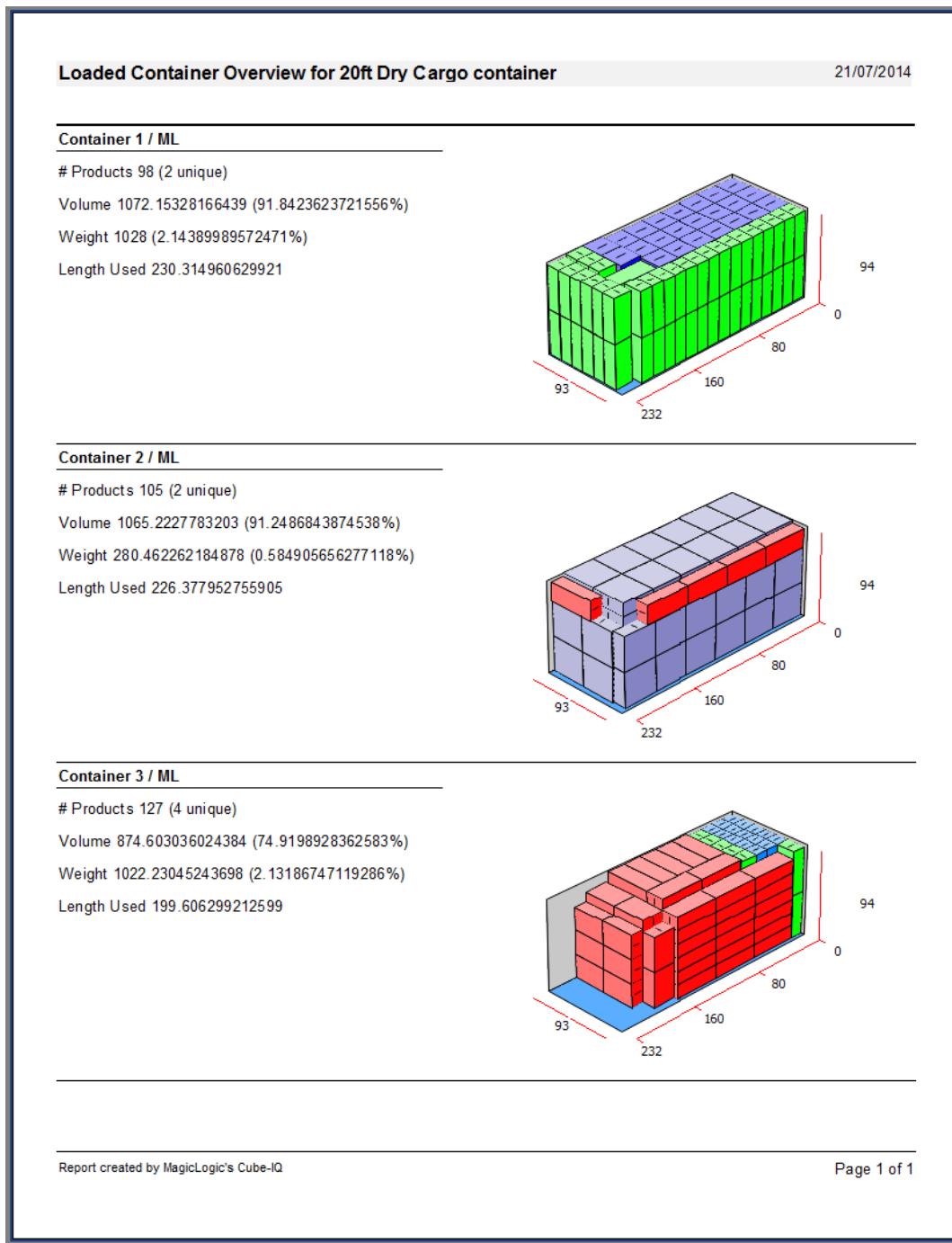
Block is: 6 deep Quantity: 12
1 wide Weight: 360
2 highPosition is: 246.8 from back
0 from left wall
0 from floor**Pallet**

For Loads involving multiple Containers, the plan is printed for each Container.

In the [Tools/Options menu](#) you can select different layouts for the Load Plan report. Some are more compact, but do show less information. Others are specifically for two sided Load Plans.**2.1.4.5 Loaded Container Overview****Reports - Loaded Container Overview**In the Main Menu, choose [Reports / Load Plans Overview](#).



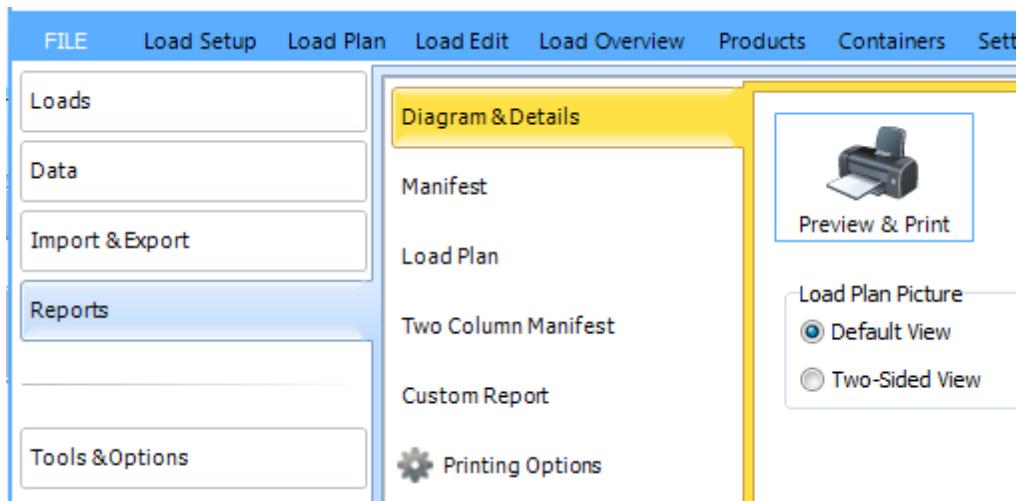
The Load Plans Overview report prints one picture for each loaded Container in the current Load, including some statistics.



2.1.4.6 Diagrams/Details

Reports - Diagrams/Details

In the Main Menu, choose **Reports / Diagrams/Details**.



The Diagrams/Detail report show a single diagram of the current loaded Container, several loading statistics, plus a list of the loaded Products.

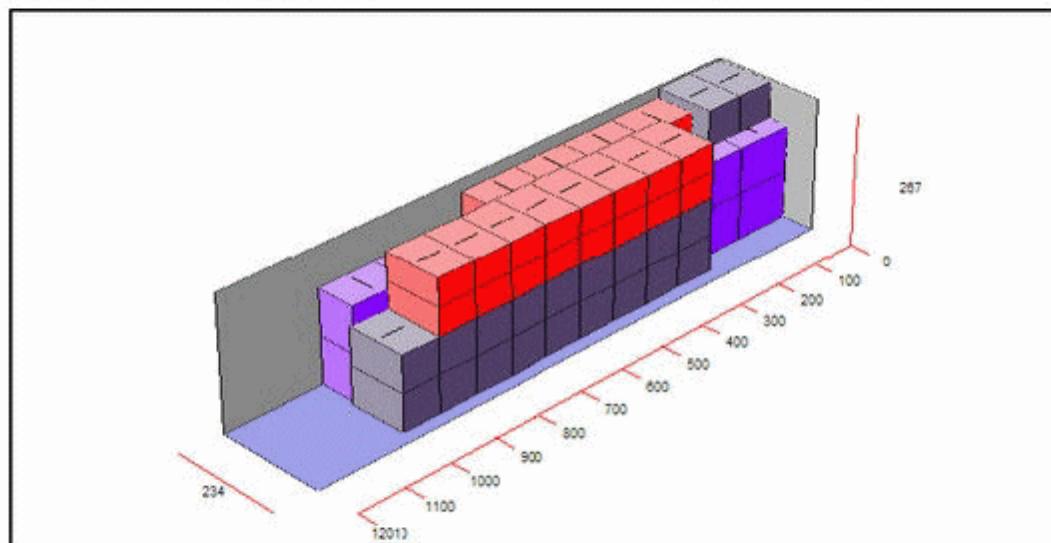
MagicLogic Optimization Inc.

12/02/2007

Load: 40 feet HC 72 packages

Cost: 10000

Container	1 / 40' High Cube ACL	Cost: 5000	Volume	45.73 m3	61.07 %
Load dimensions	992.9 / 206.3 / 262.5	Cost/Object: 83.33	Weight	11,820 kg	56.29 %
Available space	1201.4 / 233.7 / 266.7		Objects	60	



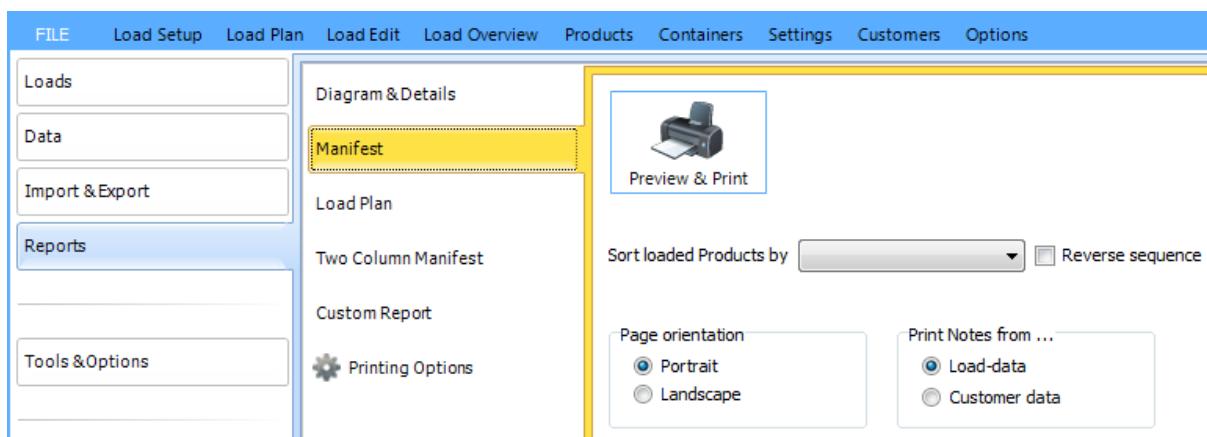
#	Object ID	# L.	Seq.	Stack	Length	Width	Height	Weight	Net.W.	Tot.W.
1	L4	20	1	Pallet	82.90	123.4	94	360	7200.00	
2	L3	20	1	Pallet	82.90	123.4	74.5	180	3600.00	
3	L2	20	1	Pallet	82.90	123.4	55	51	1020.00	

Load dimensions	992.9 / 206.3 / 262.5	Volume	45.73 m3	61.07 %
Available space	1201.4 / 233.7 / 266.7	Weight	11820 kg	56.29 %

2.1.4.7 Manifest

Reports - Manifests

In the Main Menu, choose Reports / Print manifest.



The Loading Manifest is intended to accompany a shipment. It gives an overview of what the Containers contains.



Manifest: Name

Manifest: Address1
 Manifest: Address2
 Manifest: Address3
 Manifest: City
 Manifest: Country
 Manifest: ZIP
 Manifest: Phone / Fax

To: **Madeup Ltd.** Date: 21/04/2005
 123 Somewhere Rd.
 Anytown
 V1A 1A1 Invoice No.:

Packing List: **1 / 40"x48" Pallet**

Load	ID	Seq. Description	Items	Cartons	Weight	PLength	PWidth	PHeight	Volume
1-28	101311	1 Chianti La Colomb	336	28	431.82	31.9	24.99	30	0.67
29-41	10322	1 Cointreau	156	13	126.19	30.48	22.99	17.91	0.16
42-49	190	1 Smirnoff Vodka	96	8	169.61	40.64	30.48	31.09	0.31
50-56	71126	1 Heineken 6 PK-C+	28	7	60.33	41	27	11	0.09
Totals:			616	56	787.94				1.23
					Gross:	837.94			

This **Loading Manifest** is printable, and uses the Customer data, as definable under [Data / Customers](#) on the Main Menu.

To get your own company information in the header of the manifest, use the [Translation](#) facility on the strings that you see in the top-middle of the printed manifest.

To set which items are to be shown on the manifest, use [Tools / Options / Manifest Tab](#).

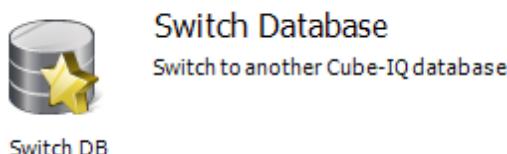
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2.1.5 Tools & Options Page

2.1.5.1 Changing Database

Tools & Options - Switch Database

In the FILE tab, choose **Tools & Options** and select the **Switch Database** button.

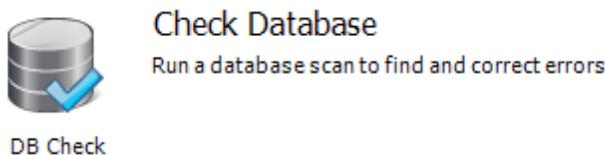


Under certain circumstances it may be useful to work with different data sets, perhaps when testing new products or loading rules, or perhaps to split very large data sets into smaller functional or business areas. The Cube-IQ database is effectively a folder containing a set of files/ It is possible to copy a Cube-IQ database using simple file commands, and then switch freely between them using this feature.

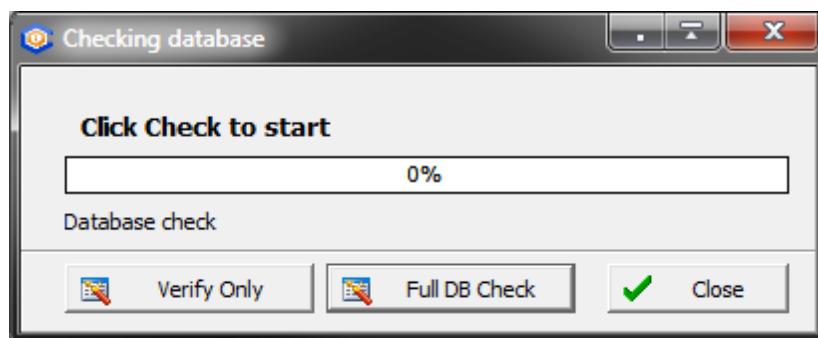
2.1.5.2 Check Database

Tools & Options - Check Database

In the FILE tab, choose **Tools & Options** and select the **Check Database** button:



This will open the **Check Database** dialog screen.



This process will attempt to correct certain errors that may occur in the Cube-IQ database if for some reason the system is not closed down properly. It is the first thing to try if you get an '**invalid variant type conversion**' error, which indicates that some data field should have a value, but doesn't.

Verify Only is a fast way to check your database for errors. If any errors are indicated, use **Full DB Check** to perform an in-depth scan and repair.

The menu should also be used if one of the Loads incorrectly gets a **READ ONLY** status. Normally this indicates that you are on a network installation, and that some other user is currently editing this Load.

2.1.5.3 Backup/Restore Database

Tools & Options - Backup/Restore Database

The Cube-IQ database is the complete set of files in the 'data' folder, which in a standard installation is a sub-folder inside the main installation folder.

It is a good idea to make periodic backups of your whole database.

In the Main Menu, choose **Data / Options**, or in the Ribbon Bar, select the **Options tab**. Select the Database Options.



Backup Database
Save the database to a singlezip file

Backup DB



Restore Database
Restore the database from a previous backup

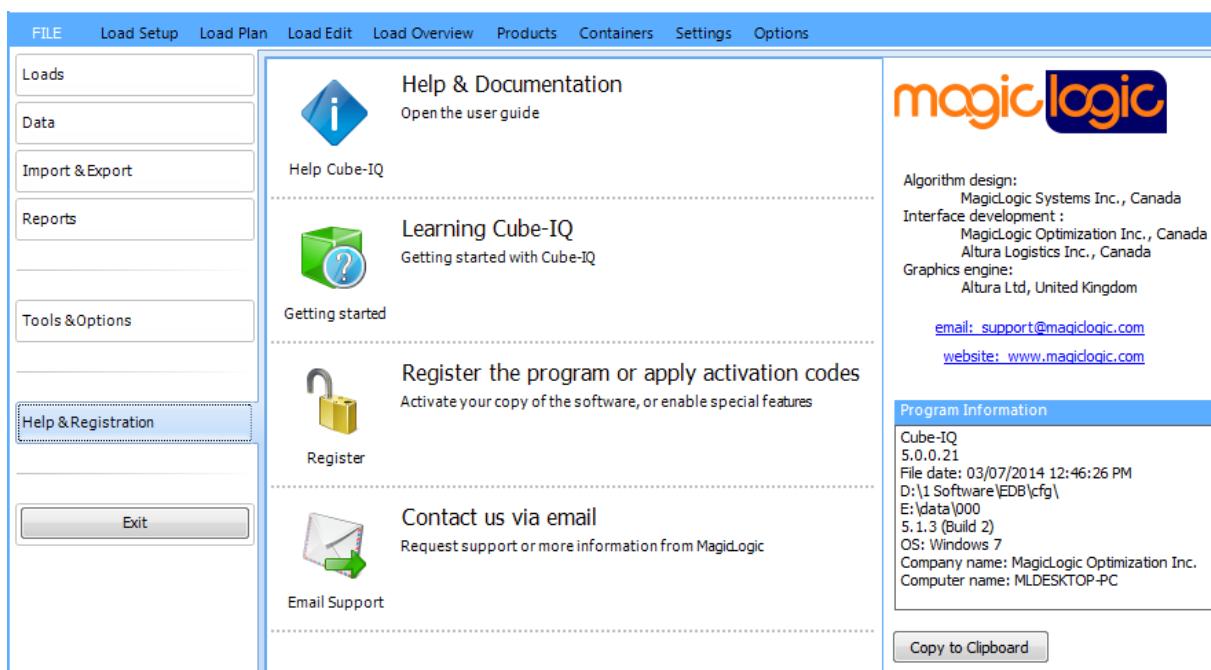
Restore DB

Select **Backup Database**, which will open the Windows Save dialog. Here you can select path and name for the file into which Cube-IQ will zip your whole database.

To restore a previously created backup, choose the **Restore** button. This will show the Windows Open File dialog. You can select the zip-file of an earlier backup to restore the database. **Keep in mind that the restore operation will completely overwrite your existing database.**

2.1.6 Help & Registration Page

On the FILE tab, Help and Registration gives you access to some generally useful options. Under Register you will enter your Registration Code after purchasing a license.



If you need support and suspect some system problem, this is the place to find the current release and build number. The FILE item also gives you a **direct email link** to MagicLogic. This works with most but not all email programs. The **Copy to Clipboard** button puts all info on the Windows Clipboard for easy Paste into an email.

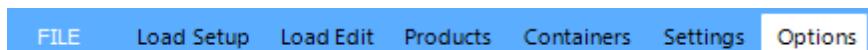
3 Options

3.1 Options - Introduction

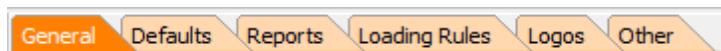
Options

Options

In the Ribbon Bar, select the **Options** tab.



In the Options window you can view and modify general options used in the system. These Options are grouped under several tabs:



You can use PgUp/PgDn to move between the tabs. The following tabs are available:

[General](#)

[Defaults](#)

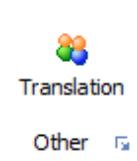
[Reports](#)

[Loading Rules](#)

[Logos](#)

[Misc.](#)

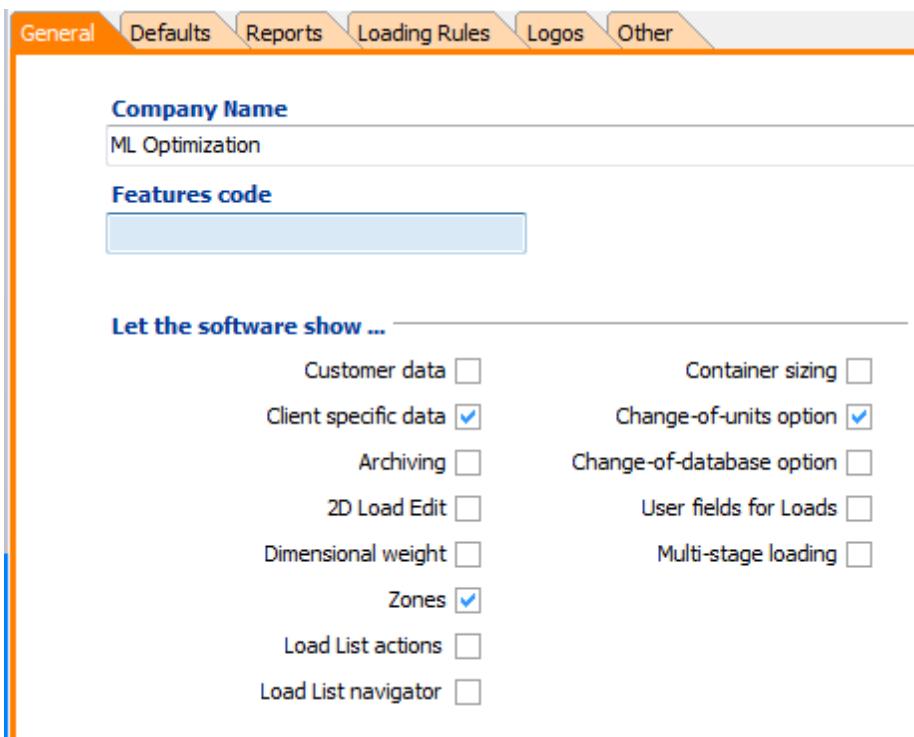
The Options tab also gives you access to the system's [screen translation](#) feature.



3.2 General

Options - General Tab

In the Ribbon Bar, select the **Options tab**. Click on the **General** tab.



Company Name - this will be displayed on the start-up screen, and also on some of the reports. If your company's name contains an '&' use '&&', as a single '&' will cause the next character being underlined as if it were a shortcut.

Features code - used to switch on features that have been built in for specific users, but that are not relevant to others. If you need this, MagicLogic will provide you with a special code, to be entered here. Otherwise please ensure this field is left empty.

Let the software show ... -

Allows the user to conveniently set unused systems features be to 'invisible'. The following features are switchable:

[Customer data](#), [Client specific Settings](#), [Archiving](#), [Dimensional Weight](#), [Zones](#), [Load List actions](#), [Load List navigator](#), [Container Sizing](#), [Change-of-units](#), [Change-of-database](#), [User fields for Loads](#), [Multi-stage loading](#).

Preferred language

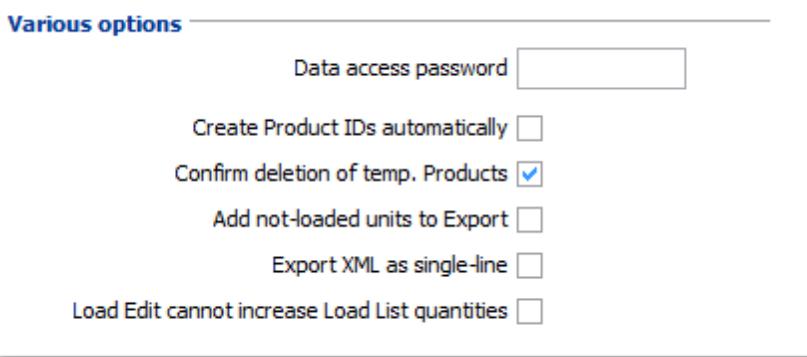


Here you can set which language to use for the system and which one for the reports. You can also change the report language once the preview of a report is shown. (Cube-IQ 4.1 will include full Unicode support.)

New languages are stored in external files which can be added at any time. Please contact MagicLogic if you

have requirements for a language that is not shown in the list.

Various Options



Data access password - if not blank, the splash screen (start-up screen) of Cube-IQ will give you an extra button that you can click in order to get access to the permanent data of Cube-IQ (Containers, Products, Customers). When clicked it will ask you for the Data Access Password, which is what you set here in Tools/Options/General. This means that not clicking this data access button (or not entering the right password) will block the user from access to any of the data screens, except for those related to Loads.

Create Product IDs automatically - if checked, an ID will be created automatically for a new Product, if the ID of the current Product ends on '- x', where 'x' is a number. So, if the current Product is 'Some ID - 4', a new Product will get a proposed ID 'Some ID - 5'.

Confirm deletion of temporary Products - Products have a 'Delete with Load' field, which will delete a Product from the database with the last Load that uses it. Effectively this means that the Product was for temporary use only. If you check this Option, the system will ask confirmation before deleting a temporary Product.

Add not loaded units to Export - when checked, Cube-IQ will add unloaded units to the export file. This is to facilitate processing of the results by other systems.

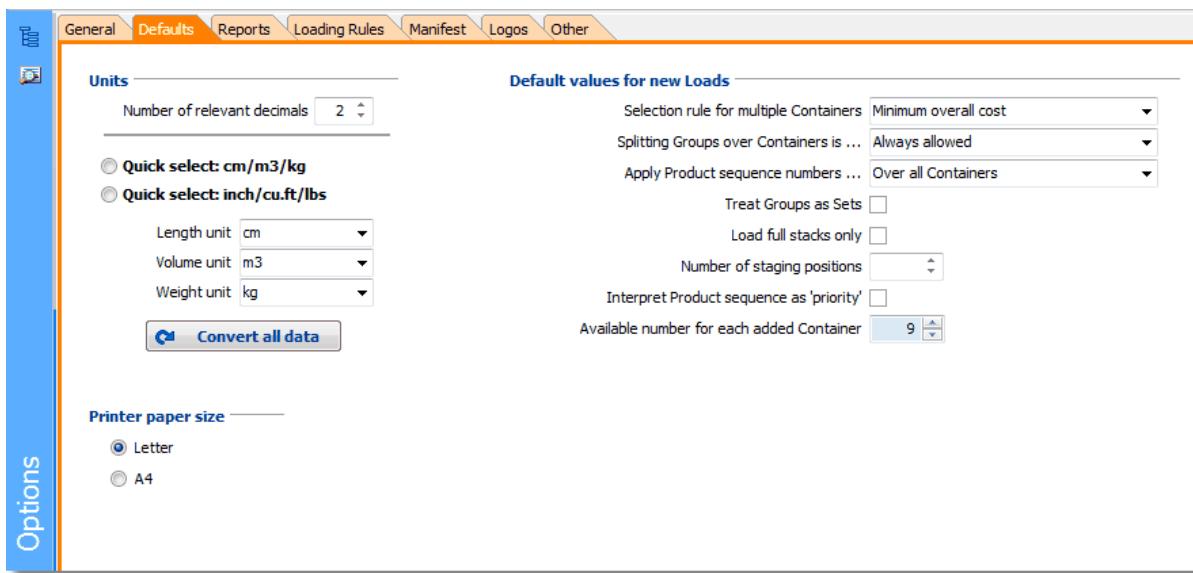
Export XML as single line - when checked, any XML output from Cube-IQ will be in a single line. According to the official XML specifications, this is how it is supposed to be, but relaxing this requirement makes for much more readable files.

Load Edit cannot increase Load List quantities - When checked, using the Add button on Load Edit limits the user to the quantities given in the load list of Load Setup. If not checked, Products can be added above the original quantities.

3.3 Defaults

Options - Defaults for new Loads Tab

In the Ribbon Bar, select the **Options tab**. Click on the **Defaults** tab.



On this tab, you can set **default values for various data fields**.

Units

These values will be used for new data items, such as Products, Containers and Loads. See also [Units](#). The user is also given the possibility to convert ALL existing data into the new units by clicking the 'Convert all data' button. This will convert field values for data that is not yet in those units.

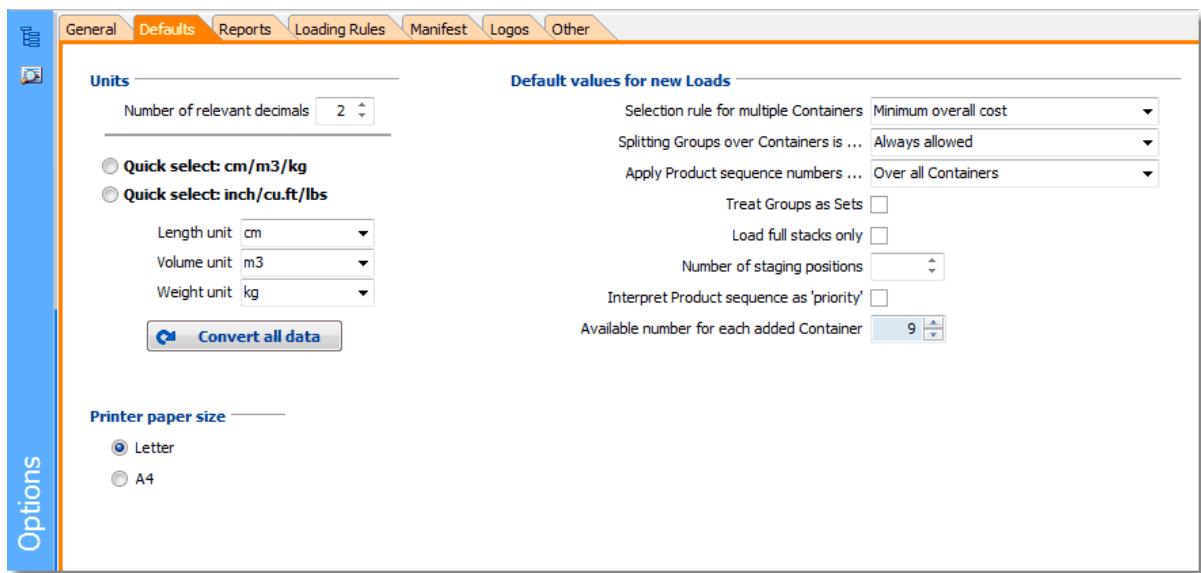
Printer Paper Size

Paper size can be selected for default when printing from the Cube-IQ5.0application. Printing paper size Options include Letter (default) and A4.

Default values for new Loads

The following Load data fields can be given a default value here:

- Selection rule for multiple Containers
- Splitting Groups over Containers is ...
- Apply Product sequence numbers ...
- Treat Groups as Sets



- Load full stacks only
- Number of staging positions
- Interpret Product sequence as 'priority'

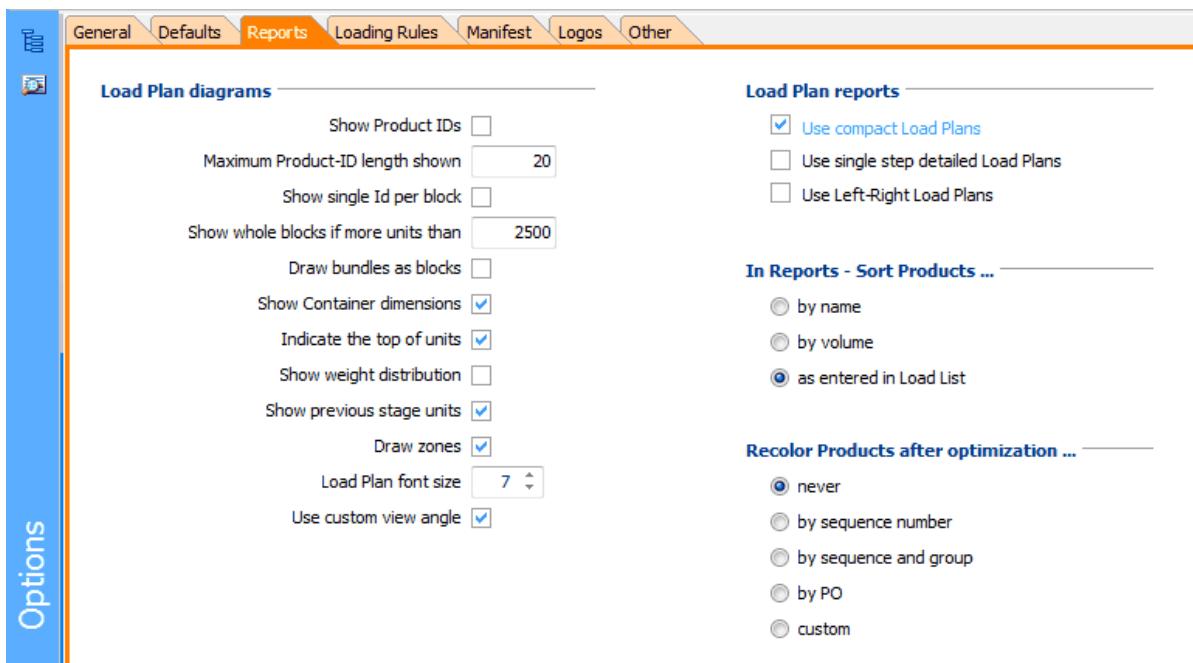
For an explanation of these fields, please refer to [Other Load Data](#).

- Available number for each added Container - when selecting Containers for a newly created Load, this is the number that will be made available by default (and that can then still be changed by the user). You can also set this quantity per [Container](#).

3.4 Reports

Options - Reports Tab

In the Ribbon Bar, select the **Options tab**. Click on the **Reports** sub-tab:



Load Plan diagrams

Show Product IDs - if checked, the ID of the Product currently under the cursor will be shown

Maximum Product-ID length shown - the number of characters shown of the Product ID text string (truncated when longer)

Show single ID per block - if not checked, the Product ID will be shown on each Product in a block

Show whole blocks if more units than - if a block consists of more units than this value, the block will be displayed as a single large box

Draw bundles as blocks - if checked, a block that is a 'bundle' of a given Product is drawn as a single box

Show Container dimensions - if checked, the length, width and height of Containers are shown in the various diagrams

Indicate the top of units - if checked, the orientation of the Product will be indicated with a single line on the top face of the Product.

Show weight distribution - if checked, some reports will show data on the weight distribution in the Container.

Show previous stage units - if checked, the Load Plans will show not only what was loaded in the current stage, but also what was loaded inside the units, that is, in previous stages. So, if you load boxes on pallets in Stage 1, then pallets into containers in Stage 2, the Load Plans of Stage 2 will show the boxes on the pallets inside the container. If not checked, you will only see the pallets in the container, drawn as a single large box. Checking this option may lead to significantly slower drawing of Load Plans.

Draw Zones - if checked, the Zones inside the Container (if any) will be drawn in Load Plans.

Load Plan reports

In Options, you can choose whether the standard Load Plan report is used, or a more compact version (check **Use compact Load Plans**), or one in which each step shows a picture with multiple extra blocks of units (check **Use single step detailed Load Plan**). You can also choose a Load Plan specifically for two-sided Loads (check **Use Left-Right Load Plans**), as used for lumber loading.

In Reports, sort Products ... - Choose from

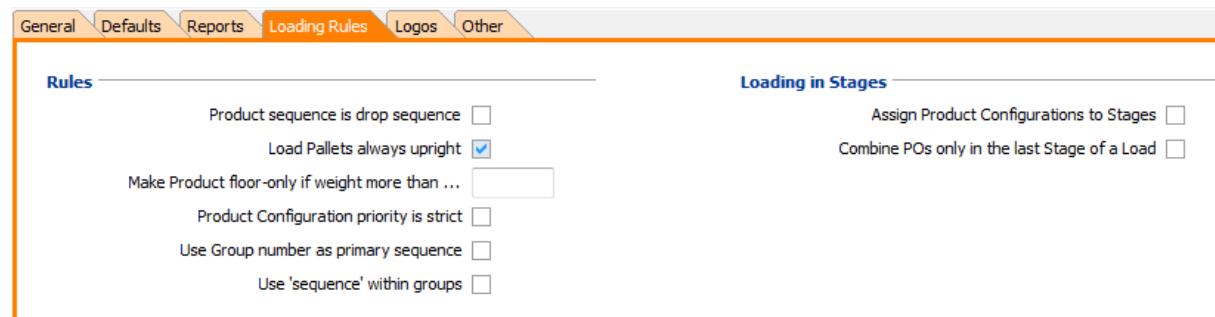
- by name
- by volume
- in the sequence in which they were entered in the Load list

Recolor Products after optimization - if checked, Cube-IQ will re-color Products after optimization. This makes it easier to see the load sequence in the graphics, but has the disadvantage that Products may keep getting new colors (and therefore may also be a different color than shown in other Loads). If you choose for recoloring, this can be done by sequence, or by sequence and group. You should select 'custom' if you actually enter your own colors in the [Load List of Load Setup](#) (after making the 'RGB' column visible).

3.5 Loading Rules

Options - Loading Rules Tab

In the Ribbon Bar, select the **Options tab**. Click on the **Loading Rules** tab.



Rules

Product sequence is drop sequence - if checked, the Product sequence in the Load Setup will be interpreted as a drop sequence, which is the reverse of the standard 'Load sequence'. So, Products with sequence 1 will be loaded last, as they are for drop 1 on a route.

Load Pallets always upright - Products of type 'Pallet' will only be loaded straight-up, without the need to set their [orientations](#).

Make Product floor-only if weight more than ... - allows you to let new Products get the Bottom-only attribute automatically if their weight is above this limit.

Product Configuration priority is strict - If checked, the load optimization cannot select Product Configurations with a smaller number of units instead of those with a larger number. For example, if 24 units are needed, and Configurations of 10 units, and of 1 unit are available, the system will load 2x10 + 4x1. It is not allowed to do for example 1x10, and 14x1, for possibly better fit.

Use Group number as primary sequence - If checked, the Group number is used to sequence the loaded

Products, instead of just being used to keep groups of Products together without any particular order.

Use 'sequence' within groups - If checked, the importance of 'sequence' and 'group' gets reversed. Normally sequence is primary, and groups are used to keep Products together. Now, Groups are still being kept together (no sequence between Groups), and within the Group, products have to get loaded in the given sequence.

Loading in Stages

Assign Product Configurations to Stages

Combine POs only in the last Stage of a Load

Loading in Stages

Assign Product Configurations to Stages - if checked, the 'priority' field of a Product Configuration is interpreted as the Stage of a Load in which this Configuration is to be loaded. So, a priority '1' means it will be used only a Stage 1 of a multi-stage Load.

Combine POs only in the last Stage of a Load - If checked, Products in the Load List will get loaded only with Products having the same PO, except in the last Stage of the Load involved. This allows you to keep POs together, for example in cartons, or on pallets, but then to combine Pallets for different POs in a truck.

3.6 Logos

Options - Logo Tab

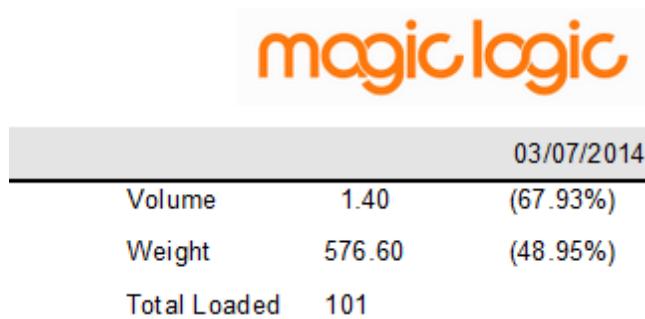
In the Ribbon Bar, select the **Options tab**. Select the **Logo** tab.



Reports logo

If the edit box contains the location and name of a bitmap file (extension .BMP), this file will be shown on the Diagram Details and the Load Plan. You can use the **Load Bitmap** button to select a file, the **Scale** button to let it

fit the available space (in either width or height), and the **Clear** button to remove a file reference. Checking **Fit picture** will stretch the bitmap to fill the available space exactly.



The picture shows the selected logo in the Manifest report.

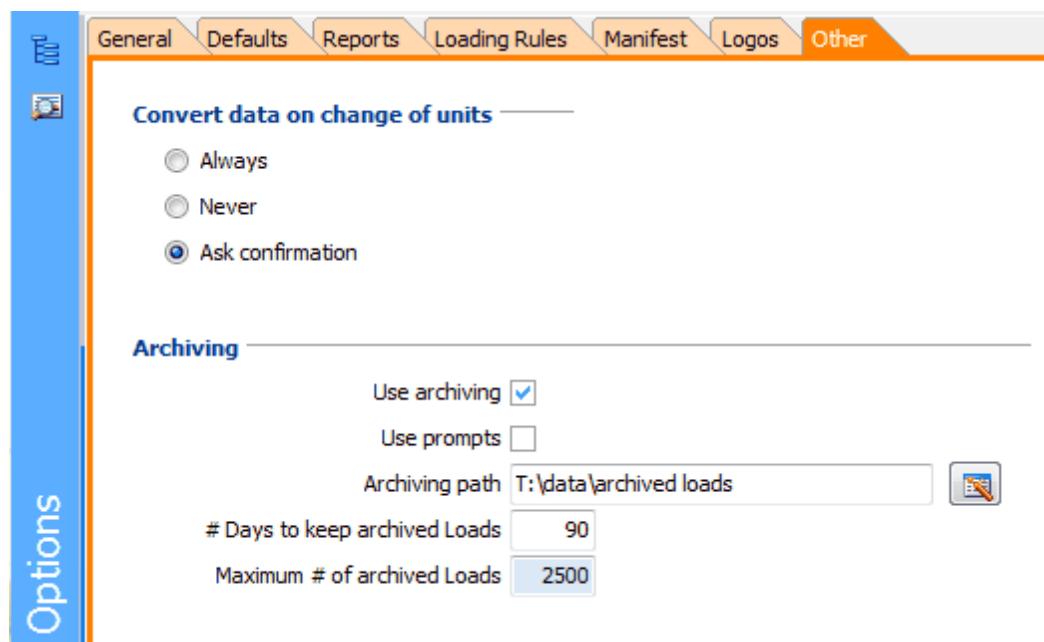
On-screen logo

On this Options tab, you can also select a logo that will be used on-screen (instead of the Cube-IQ logo). If the edit box contains the location and name of a bitmap file (extension .BMP), this file will be shown on the Load Setup screens. You can use the **Load Bitmap** button to select a file, the **Scale** button to let it fit the available space, and the **Clear** button to remove a file reference.

3.7 Other

Options - Other Options Tab

In the Ribbon Bar, select the **Options tab**. Select the '**Other**' Tab.



Convert data on change of units

Allows the user to control what happens to an existing data record when its units are changed. The following Options can be applied:

- Always - convert the data to the new units without prompting (e.g. 20 cm -> 7.87 inches)
- Never - maintain the current values, but they now represent the new units (e.g. 20 cm -> 20 inches)
- Ask confirmation - the user is presented with a dialog to choose whether the data is converted or not.

Archiving

The Archiving feature of Cube-IQ lets the system use stored results for Loads (if available), rather than re-optimize each Load.

If **Use Archiving** is checked, Cube-IQ will take two steps as part of any optimization:

- (1) Before optimizing, it will check if the same Load exists in archived form, and if so, it will use the archived results instead of re-optimizing.
- (2) After optimization, and if no archived results were found, Cube-IQ will store the loading results as an xml file in its archive (on the user's hard disk).

Besides speed, the main advantage of archiving is that archived Loads may also be based on optimization, followed by Load editing. Archiving also takes place after any [Load Editing](#) by the user.

You can set the following fields on this tab:

Use Prompts - if checked, the user will be prompted before a Load gets archived, or before an archived Load gets used.

Archiving path - the path to the archived files. This must be set so that Cube-IQ has read-write access to this folder, and in the case of multiple users, it must be accessible by all users.

In order to keep the size of the archive under control, the user can set '**# Days to keep archived Loads**', and/or the '**Maximum # of archived Loads**'.

SQL Interpreter

This tab also shows an Interpreter for SQL to manipulate the tables in your database directly. **Warning:** Please do not use this feature unless you are very experienced in the use of SQL, as any errors may damage your data beyond repair. (It is recommended to make a [Backup of the database](#) first, under the FILE menu.)

Advanced

Improper use can damage your data!

SQL Interpreter

Shared User

Automatically close program if unused for minutes (0 / blank: do not close)

Shared User

It is possible to have Cube-IQ shut itself down automatically after a configurable period of inactivity. This is a useful feature for users who share an installation or a networked database, preventing users holding a dormant session open and preventing other users logging in. If this field is set to zero or left blank, the feature

is inactive.

4 Containers

4.1 Containers - Introduction

Container Details

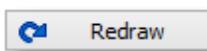
Cube-IQ uses the word 'Container' for anything that can contain other objects. So, a Container can be a standard ocean container, but also a truck, a rail car, a pallet, a crate, a box, or even an irregularly shaped airline container or pallet (ULD).

To access Container Details click on the main **Container tab**, or use the **F6 key**.

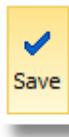


In the **Container Details Window**, you can:

1. Get a selection list of the Containers either by clicking the Select button, pressing F3, or right-clicking the mouse anywhere in the Container Details window. You can also use the [Database Navigation buttons](#) in the Ribbon Bar to select the Container you wish to modify.
2. Create a new Container, or make the necessary changes to the data of an existing Container.
3. View a graphic of the Container by pressing the **Redraw** button. You can view the Container from different angles by dragging the mouse over the picture.



4. Finish by simply leaving the screen, or by clicking the Save button.

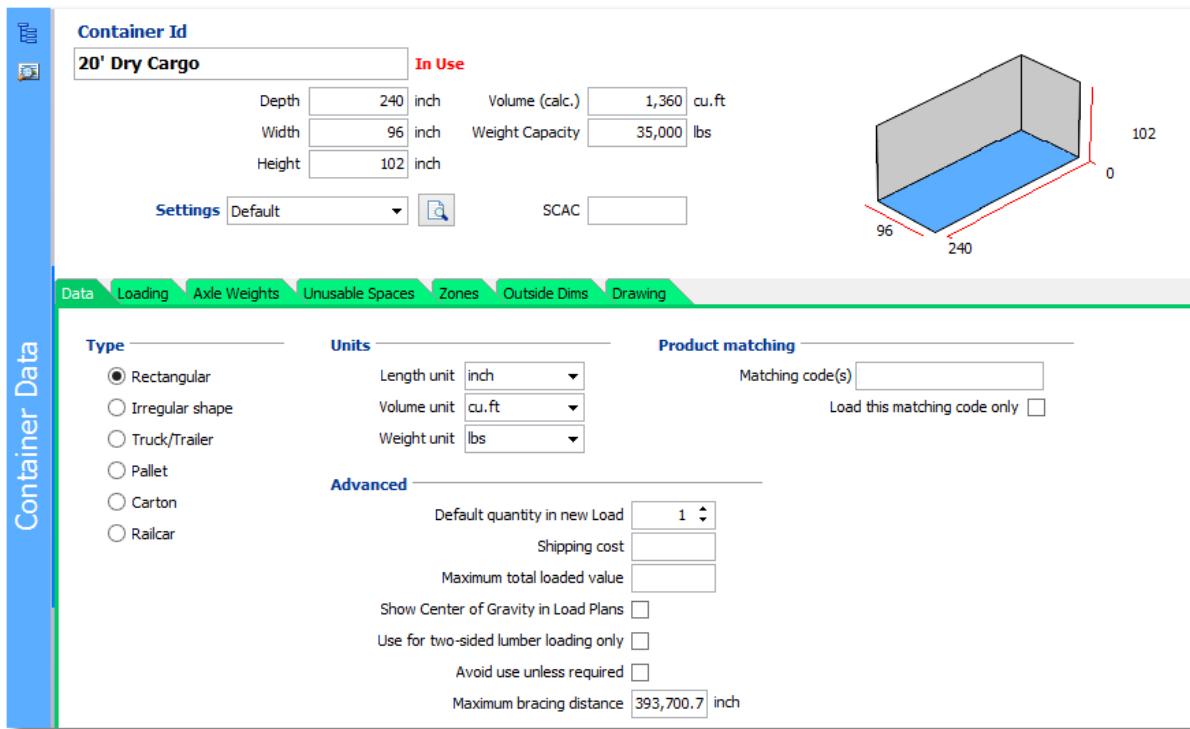


All Containers must have this set of base data:

- ID - an unique identifier or name for this Container type, which will be used when you define loading cases
- Type - 'Rectangular', 'Irregular Shape', 'Truck/Trailer', 'Pallet', 'Box', or 'Railcar'
- Depth (the distance from back to front, in the length unit selected for this Container on its Data tab)
- Width (the distance from left to right)
- Height (the distance from floor to ceiling)
- Weight Capacity (in the weight unit of your choice)

You must also enter which '[Settings](#)' are to be used when optimizing Loads for this Container - a set of tuning parameters. Each of these sets has an id, which is to be entered in the 'Settings' field of the Container (or selected from the drop-down list). You can use the Show Settings button to go directly to the [Settings data](#) of the current selection for this Container.

The length measurements are for the **inside dimensions**. Cube-IQ will calculate the **volume** automatically, again using the units on the Data tab.



On the Container Details Window, you can access other data fields for Containers by clicking on one of the detail data tabs. You can use **PgUp/PgDn** to move between the tabs. Depending on the selected type of Container, some of the tabs may not be visible.

These are the Container Details tabs:

[Data](#)

[Loading](#)

[Pallet rules](#) (only if the Container is of type 'pallet'),

[Floor and Ceiling Shape](#) (only if the Container is of type 'Irregular')

[Axe weights](#)

[Unusable spaces](#)

[Zones](#)

[Outside dimensions](#)

[Drawing](#)

4.2 Containers

Containers

A **Container** is defined as any object that you may wish to load with smaller items. In Cube-IQ, this is either a rectangular Container, or one with a (within limits) irregularly shaped floor and/or ceiling.

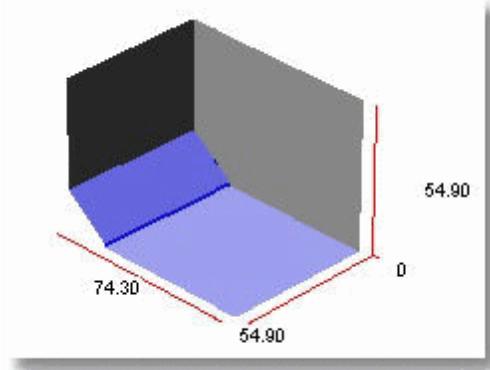
Examples of **rectangular Containers** are:

- ocean containers
- pallets
- crates
- trucks/trailers
- rail cars
- boxes.

Examples of **irregular Containers** are airline containers such as:

- LD-3 (AKE/AVE)
- LD-7
- XAW

Note: airline containers (Unit Load Devices, ULD's) may have cut-off corners along the top and/or bottom of one or more walls.



Certain types of trucks, for example split-level trucks, may need to be set up as [irregular Containers](#) as well. Alternatively ['Unusable spaces'](#) can be used, or ['Zones'](#).

Custom Containers

Cube-IQ offers a new feature called '[Container sizing](#)' to determine optimal container dimensions.

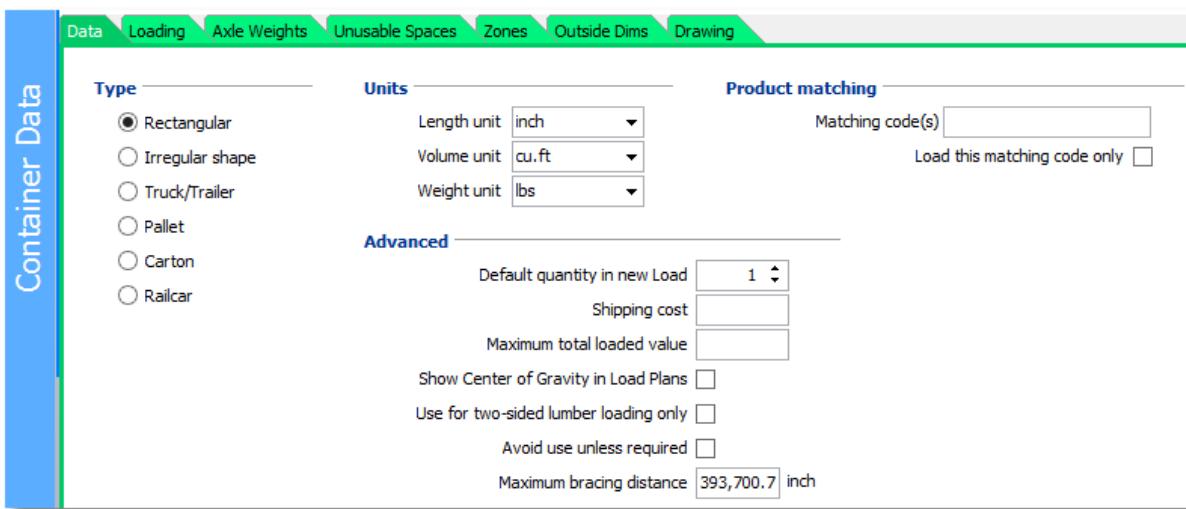
4.3 Container Tabs

4.3.1 Data

Container Details - Data Tab

Click on the main **Containers tab**, or use the **F6 key**.

Click on the **Data tab**. On this tab, you can enter values for several data fields of the 'Container'.



The following information is set up here:

Type - 'Rectangular', 'Irregular shape', 'Truck', 'Pallet', 'Carton' or 'Railcar'. The optimization engine uses different rules according to the type entered here.

Units - visible only if set as 'to be shown' in [Options/General](#). Numerical values will be converted automatically when the Container is used in a Load, to the units of that Load.

Advanced

Default quantity in new load - when making a Container available for a Load, this value is used as initial value for the number available.

Shipping cost - if not blank, and greater than zero, this value is used by the optimizer when Container selection for a multi-container Load is based on '**minimal total cost**'.

Maximum total loaded value - each Product can be given a (cost) value, and Cube-IQ will not load a higher total value in this Container than allowed by this data field.

Product matching

Matching code - used to force certain Products to be loaded only in certain Containers: if the Product also has a 'matching code' it will be loaded only in a Container that has the same code. You can use any text string as matching code.

Treat blank as matching code - if checked, Products with a blank [Matching Code](#) can only be loaded in a Container that has a blank Matching Code.

4.3.2 Loading

Container Details - Loading Tab

Click on the main **Containers tab**, or use the **F6 key**.

Click on the **Loading tab**. On this tab, you can enter values for several data fields of the 'Container'.

Load Direction

- Back to Front
- Bottom to Top

Load compacting

- Along length
- In height

Container sizing

Dimensions to be optimized

Minimum depth	0 inch	Maximum depth	9,999,999 inch
Minimum width	0 inch	Maximum width	9,999,999 inch
Minimum height	0 inch	Maximum height	9,999,999 inch

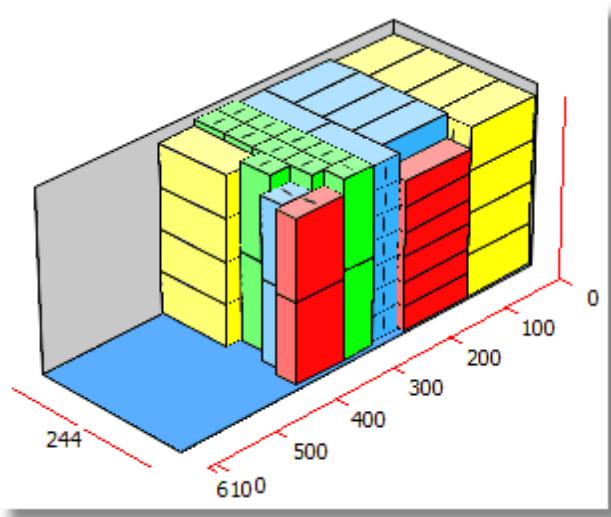
Fill limits

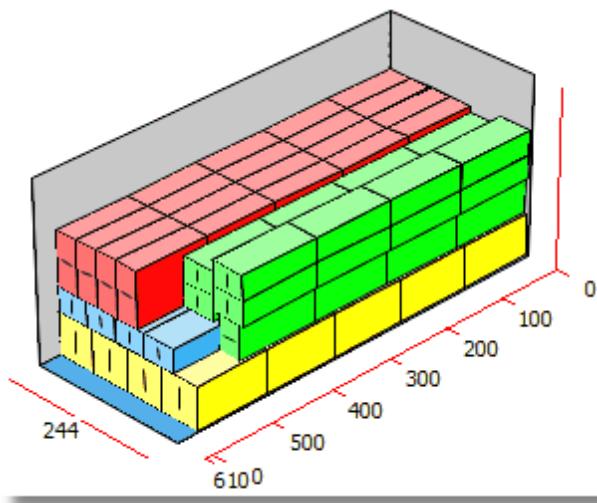
Minimum	0 %	Maximum	100 %
Hard minimum	<input type="checkbox"/>	Last Container maximum	100 %
Minimum volume to load	0 cu. ft		
Minimum weight to load	0 lbs		

Load Direction - a choice between 'Back to Front' and 'Bottom to Top'. The first option is typically used for shipping containers and trucks, and the latter for pallets, crates and boxes.

(Note that the normal loading sequence in a truck is called 'back to front' in Cube-IQ. So, what Cube-IQ calls the 'back' is typically at the front of a truck.)

Load compacting - if 'Along length' is checked, partial Loads will be loaded as far back in the Container as possible. 'In height' will let the Load engine spread partial Loads over the Container floor. Below, the first picture shows 'Use Back first', and the second 'Use Floor first'.





Fill percentage - If 'Hard minimum' is checked, no Container will be loaded below the minimum fill percentage. (Note that this may leave some Products unloaded.) If the minimum fill percentage is not 'hard', Containers may be loaded below that value, but a warning will be given in Load Setup by showing the fill percentage in red and bold. You can also set a maximum fill percentage, and even use a higher fill percentage for the very last Container in a multi-Container Load. This may avoid one extra Container with some very low fill.

On the main [Options Tab](#), you can set Cube-IQ to show '**Container sizing**'. This allows the user to set minimum and maximum dimensions for the Container(s) to be used. Given the Load, the system will then propose internal Container dimensions that would fit that Load optimally. It may be used when the Container will be some custom-made box or crate. This is typical for the loading of art, or custom window and doors.

In this example, the original full dimensions of the Container are set as follows:

Container Id	
Custom Container	In Use
Depth	200 inch
Width	80 inch
Height	160 inch

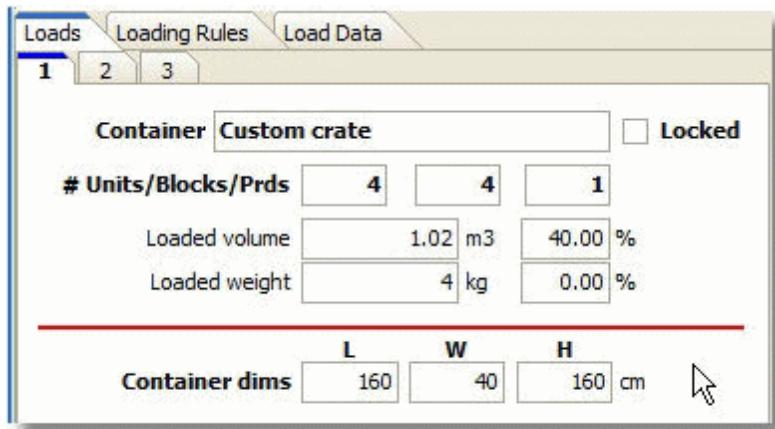
The sizing data is

Container sizing			
Dimensions to be optimized <input checked="" type="checkbox"/>			
Minimum length	50 cm	Maximum length	200 cm
Minimum width	20 cm	Maximum width	80 cm
Minimum height	50 cm	Maximum height	160 cm

Note that the original size is set to define the shape of the crate. It is to be long and narrow. It is important to give the system ample time to find the best Containers, which is done by giving the [Optimizer Settings](#) field

'Maximum run time' a value of at least 30 seconds, and the field 'Maximum number of non-improving iterations' a value of at least 1000 (2500 preferred).

After optimizing a Load, and even after manual editing of the Load, the proposed custom dimensions are shown on the **Results tab of Load Setup**:



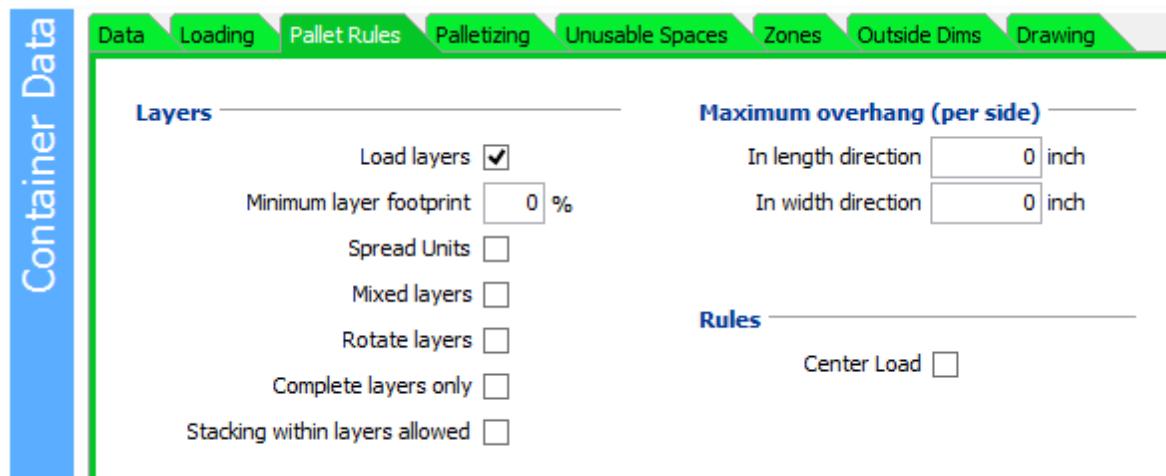
In this case, Cube-IQ proposes three custom crates, of dimensions 160x40x160 (shown), 120x60x120, and 180x40x120.

4.3.3 Pallet Rules

Container Details - Pallet Rules Tab

Click on the main **Containers tab**, or use the **F6 key**.

Click on the **Pallet Rules tab** (visible only if the Container is of type 'Pallet').



For a **Pallet** special rules can be set up on how to load it. The **Loading Rules** fields are:

Load Layers - check if the pallet must be loaded in layers of products.

The following fields are relevant only if Load Layers is checked:

- **Minimum Layer Footprint** - a threshold value for the optimizer, indicating that there is no need to create layers if doing so would give a layer floor space utilization lower than this percentage. This rule leaves it to the optimizer to determine if using layers is a good idea, depending on the loadable Products.
- **Spread Products** - check if blocks of Products within a layer must be spread to fill out the pallet area as completely as possible.
- **Mixed Layers** - check if different Products may be used within a layer. This is done with reference to the Container setting **Maximum Support Height Difference**, which determines to what extent height differences within a layer will be accepted (see [Settings](#)).
- **Rotate Layers** - check if even-numbered layers must be rotated by 180 degrees to improve pallet stability. Rotating layers requires the layers to be 'spread' as well.
- **Complete layers only** - check if partials layers are not allowed. If, for example, a layer can contain ten boxes, only 60 out of 64 will get loaded.
- **Stacking within layers allowed** - check if, within a layer, a stack of boxes may be used.

Maximum overhang (per side) - Here you can set that part of the Container/Pallet is actually 'overhang'. If the length is 100, and you set a value of 10 for the length direction, space available is still 100 (NOT 120). The first and last 10 are considered to be overhanging. So, the **internal dimensions of the Container are assumed to include the overhang**. If not in use, the fields values can be 0, or blank.

Center Load - If checked, the loaded units will be centered on the Pallet, in both length and width direction. If overhang is allowed, the Load will always be centered, as this minimizes the use of overhang.

4.3.4 Floor Shape and Ceiling Shape

Container Details - Floor and Ceiling Shape Tabs

Click on the main **Containers tab**, or use the **F6 key**.

Click on either the **Floor Shape** or the **Ceiling Shape** tab, which is visible only if the Container is of type 'Airline (ULD)'.

On this tab you can enter data to change the shape of the Container in either front or left-side view. You will then get a drawing to help you check the shape data.

Given the view, Cube-IQ lets you define points where the floor/ceiling height changes. Such a point requires a coordinate and the height of the floor/ceiling at that coordinate. In 'front view', the coordinate is the distance from the left to right. In 'left-side view', it is the distance from the back.

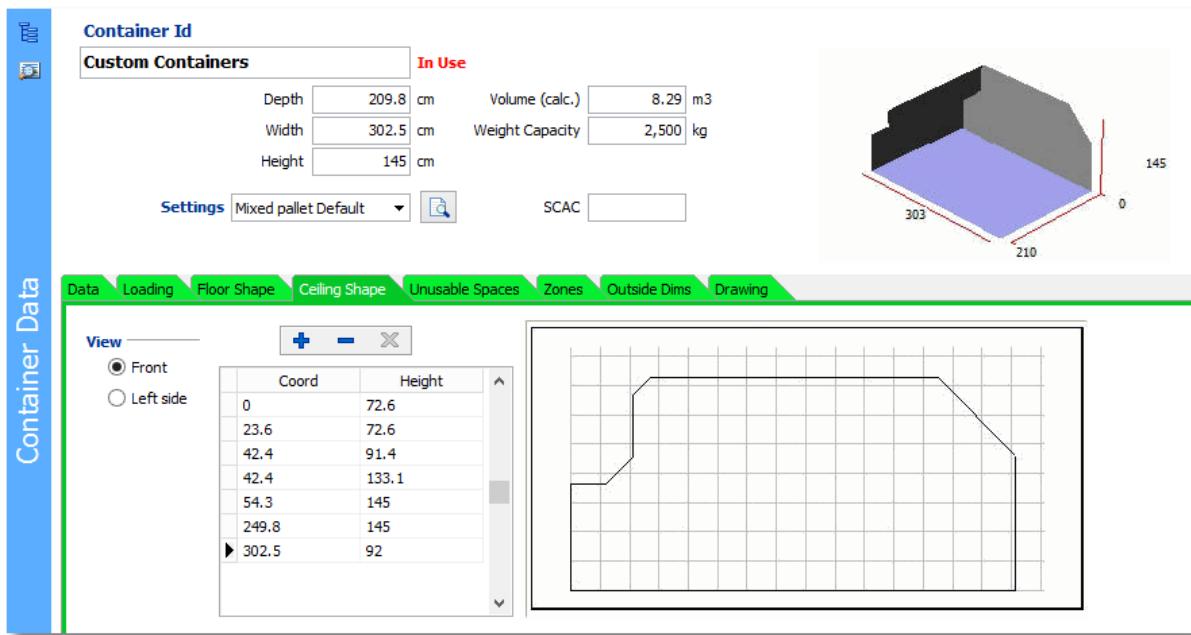
The two outside points should always be in the list. Also, **you cannot have two points at the same coordinate**. For any straight-up Container wall, create a minimal angle by setting one coordinate for example 0.01 distance units from the previous one.

The floor and ceiling can only be irregular in the same view. If you need to define a 'shape' in the other view as well, you can simulate this using several '[unusable spaces](#)'.

Theoretically you can set up an irregular floor that changes height in 'left-side view', but the optimization of Cube-IQ cannot handle this set up. It is possible to make this left-view setup work by cleverly adding Zones.

Please contact MagicLogic Support for help.

Here is an example of an irregular ceiling:



Note that the ceiling height changes direction at seven coordinates, and that we made the fourth coordinate minimally different from the third..

At floor/ceiling coordinates that are not in the list, Cube-IQ will calculate the height through **interpolation**. A change to a point will only show when you leave the row in the grid (which is when it gets stored in the database).

Adding/deleting a floor or ceiling point is done by using the database buttons above the small grid. To delete you can also place the cursor in the left-most column of the row to be deleted, and hit Ctrl+Del (which must be followed by confirmation).

Some more explanation by example:

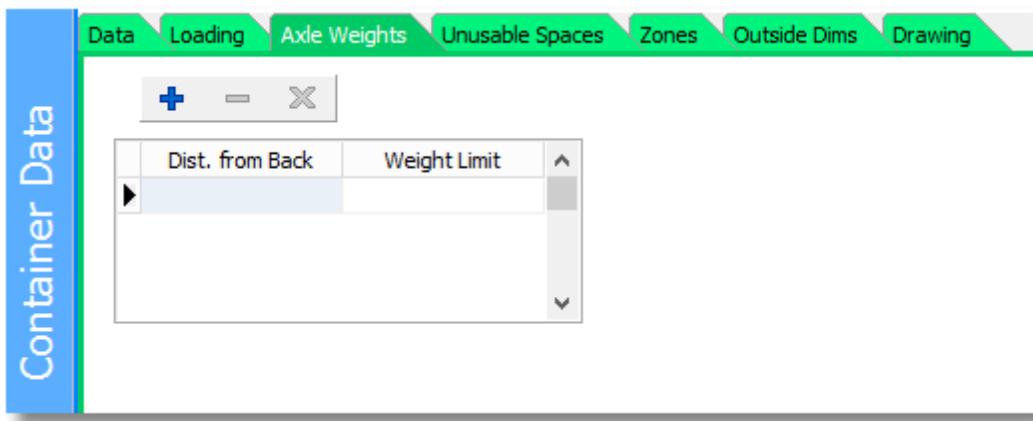
- A Container with a sliced-off corner on one side requires a minimum of three height-change points.
- A Container with sliced-off corners on both sides requires at least four height-change points.
- Rounded corners can be described by introducing several pairs of height-points along the curve. The more points you define, the closer you can approximate true rounding.

4.3.5 Axle Weights

Container Details - Axe Weights Tab

Click on the main **Containers tab**, or use the **F6 key**.

Click on the **Axle Weights** tab.



Cube-IQ can take limits into account on the weight bearing upon each of (exactly) two axles. For each of the two axles, the distance from the back of the Container (usually of type 'truck') and the maximum weight can be defined.

The navigator allows you to delete an axle weight limit, or to discard changes to the current one. You can also delete a whole row by using Ctrl+Delete when positioned in that row.

After optimizing a Load, the weight on each axle can be viewed from the **Loads/Details** in the Main Menu. The axles weights are expressed as a percentage of the maximum weight.

Center of Gravity	Axle Weights	Overall Load Dim.
94.58 45.1%		L=585.06
147.91 48.9%		W=230.02
71.28 49.2%		H=235.05

Instead of using axle weight limits, you can also set up [a target area for the Centre of Gravity](#). This is done under **Containers / Settings (F7)** rather than under **Container Details (F6)**.

4.3.6 Unusable Spaces

Container Details - Unusable Spaces Tab

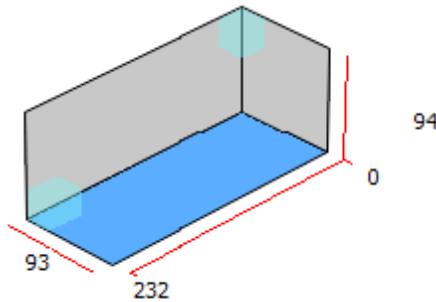
Click on the main **Containers tab**, or use the **F6 key**.

Click on the **Unusable Spaces** tab.

Depth ^{crd}	Width ^{crd}	Height ^{crd}	Depth	Width	Height
0	0	69	25	25	25
200	0	0	32	25	25

Cube-IQ allows the user to define three-dimensional rectangular spaces in the Container that cannot be used for loading. Such a space is defined by its co-ordinates in the Container space, and its dimensions. After entering the information, click the **Redraw** button to display the unusable space. The coordinates are for the **back-left-lower corner** of the unusable space.

In the example, two 'unusable spaces' have been set up, the first one in the back, left, top, and the second in the front, left, bottom of the Container.



The navigator allows you to add or delete an unusable space, or to discard changes to the current one. You can also delete a whole row by using **Ctrl+Delete** when positioned in that row.

On this tab you can also set a general unusable space over the whole top of the full container, by defining a '**Not usable height at top**'. This effectively lowers the height of the container for loading purposes, but will still count the unusable space in volume calculations.

4.3.7 Zones

Container Details - Zones tab

Click on the main **Containers tab**, or use the **F6 key**.

Click on the **Zones** tab.

Zones are one the main new features of Cube-IQ 4. Use of Zones allows you to handle some very complex loading preferences, if set up properly. Please see later in this section for some examples.

Seq.	Depth Crd	Width Crd	Height Crd	Depth	Width	Height	Max. Weight	Dir.	Match	Max. # Prds	Min. # Units	Max. # Units	Flex.
1	0	0	0	130	92.52	105.906	B-F (L)						<input type="checkbox"/>
2	0	0	0	260	92.52	105.906	B-F (L)						<input type="checkbox"/>
3	0	0	0	390	92.52	105.906	B-F (L)						<input type="checkbox"/>
5	0	0	0	473.622	92.52	105.906	B-F (L)						<input type="checkbox"/>

On this tab, you can define different 'Zones' (called 'Load Spaces' in a previous release of Cube-IQ) inside the Container. Each Zone has a location (coordinates from back, left, bottom) and internal loadable dimensions. Zones can overlap. If the height co-ordinate of a Zone is greater than zero, its floor is assumed to support loaded units.

Each Zone can also have its own values for several other data fields:

- **Sequence** - the Zone with the lowest sequence number will be loaded first, and so on.
- **Max. Weight** - the weight capacity of the Zone
- **Load direction** - possible values are B-F (= Back-Front), F-B, L-R (= Left-Right) and R-L. The L/R between brackets indicates the alignment, which can be (L) for 'left in the Load direction' or (R) for 'right in the Load direction'. The starting corner for loading in a given Zone is shown as a small red dot in the graphics.
- **Match** - just like a Container, a Zone can have its own Matching Code, allowing you to let certain Products be loaded only in Zones that have the same Matching Code as the Product involved.
- **Maximum number of different Products** (for now, this value can only be blank = 'no limit', or 1 = 'single unit only')
- **Minimum and maximum number of units**
- **Flexible** - within certain limits, Cube-IQ will vary the length/height of the zone (depending on the main Load Direction of the Container) automatically , in order to find an optimal fill. The amount of variation is set in the Containers' Flexible Zone variation factor, also on this Container tab.

Zones with their own data gives the user a **very flexible mechanism** to set up some rather complex loading scenarios. Here are some examples:

(1) in the picture above, a rail car has been set up with doors in the middle of the right side. It will be first loaded from the 'back' (top right in the picture) towards the door, then from the front towards the door, and finally from the other wall to the door. Note that the Zones could have been made to overlap.

(2) if you want to load a Container with pallets only, except that boxes are allowed in any remaining space close to the door, you need two Zones. One for the whole Container, and one for a small space close to the door. The second Zone gets 'door' as Product matching code, and all boxes get 'door' as Container matching code. As a result the boxes are not allowed in the main Zone, only at the door. To avoid that the system puts a small number of boxes in the Container, you could give the 'Minimum # boxes' field a value, like 30.

(3) in Australia, drop deck trailers have separate weight limits for the 'high' space, and for the 'low' space. Two Zones with their own limits will do the trick.

Available, but still under development is a new field for Zones: 'Flexible'. A Zone can only be flexible if two of its three dimensions are the same as those of the container, and the third one is different. The third, different

dimension will be used in a flexible manner by Cube-IQ, with a maximum variation of a percentage of the corresponding full container dimension. This percentage can be set in the field 'Flexible zone variation factor', right above the Zone data grid.

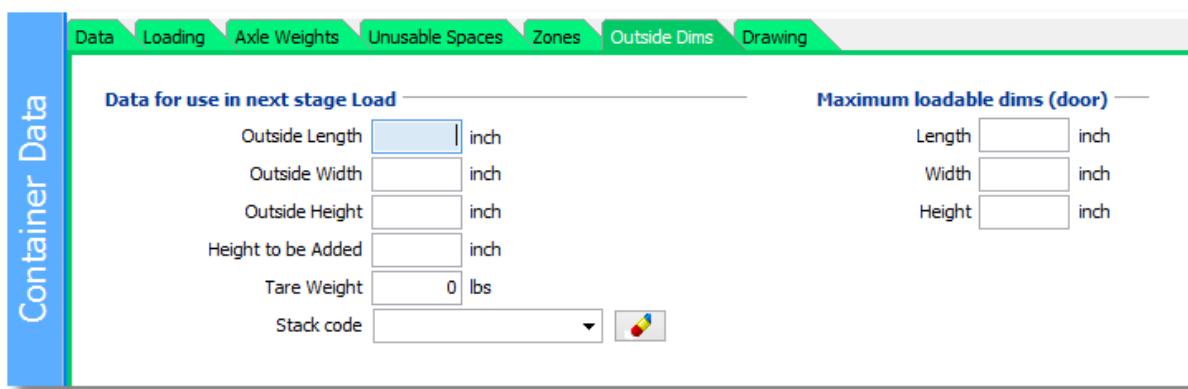
In the example below, Cube-IQ will find an optimal length for the first Zone, between

4.3.8 Outside Dimensions

Container Details - Outside Dimensions Tab

Click on the main **Containers tab**, or use the **F6 key**.

Click on the **Outside Dims** tab.



Data for use in next stage load

When a loaded pallet, crate or box is to be loaded into a Container or truck in a next loading stage, the dimensions have to be re-calculated. Effectively, Cube-IQ converts the loaded container into a temporary 'Product', which can then be part of the next stage of the same Load. The **Outside Dims** tab gives you access to several Container data fields for this recalculation.

- **Outside Length** and **Outside Width** - values will be used if entered. If not, the overall length and width of the Load will be used as outside length and width.
- **Outside Height** - if given a value, this will be used as the overall outside height of the Container (converted to a Product),
- **Height to be added** - is added to the overall height of the Load in the Container. This rule is intended for use with pallets.
- **Tare Weight** - this value will be added to the weight of the Load when moving a Container into stage 2 loading.
- **Stack Code** - this is a field that gives the converted container (now a Product) its Stack Code. See Product Details for more information on [Stack Codes](#).

Note: You can use **Outside Height** or **Height to be added**, not both.

Door opening

If values are given for the door opening, Cube-IQ will only Load Products into the Container that fit through the

door opening. If a Product only fits in certain orientations, only those orientations will be considered when loading.

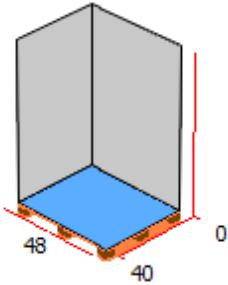
4.3.9 Drawing

Container Details - Drawing

Click on the main **Containers tab**, or use the **F6 key**.

Click on the **Drawing** tab. On this tab, you can define a series of 'boxes'. When the Container is drawn for example in a Load Plan, all these boxes will be drawn, as well as the original Container (which is its internal space).

Description	Depth Crd	Width Crd	Height Crd	Depth	Width	Height
Top plate	0	0	-1.02	40	48	0.79
Bottom plate	0	0	-4.72	40	48	0.79
Block back left	0	0	-3.94	4.72	4.72	3.15
Block back mid	0	21.64	-3.94	4.72	4.72	3.15
Block back right	0	43.28	-3.94	4.72	4.72	3.15
Block mid left	17.64	0	-3.94	4.72	4.72	3.15
Block mid right	17.64	43.28	-3.94	4.72	4.72	3.15
Block front left	35.28	0	-3.94	4.72	4.72	3.15
Block front mid	35.28	21.64	-3.94	4.72	4.72	3.15
Block front right	35.28	43.28	-3.94	4.72	4.72	3.15



Each row in the grid on the **Drawing** tab represents one 'draw-box', with its own dimensions, and co-ordinates relative to the lower-left-back corner of the original Container. The Set Color button allows you to select a color for the currently selected draw box.

So, as an example, you can create a series of small boxes that together make up the picture of a real pallet, as shown above. Note that the coordinate (0, 0, 0) defines the back-left-lower corner of the loadable space. So, the pallet needs to be drawn at negative height coordinates in order for it to be drawn below the loadable space.

If the Container is of type '**Pallet**', a button is available to set up draw-boxes automatically. There is also a button to draw the Container as Slip Sheet.

Any draw-box with a height co-ordinate greater than zero will be drawn transparently, as it is assumed to be a **cover**.

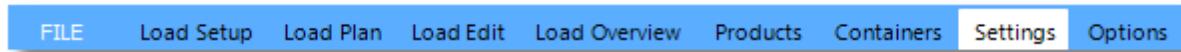
There is no need to set up data to show the original loading space, as it will be drawn in any case.

4.4 Settings

4.4.1 Settings - Introduction

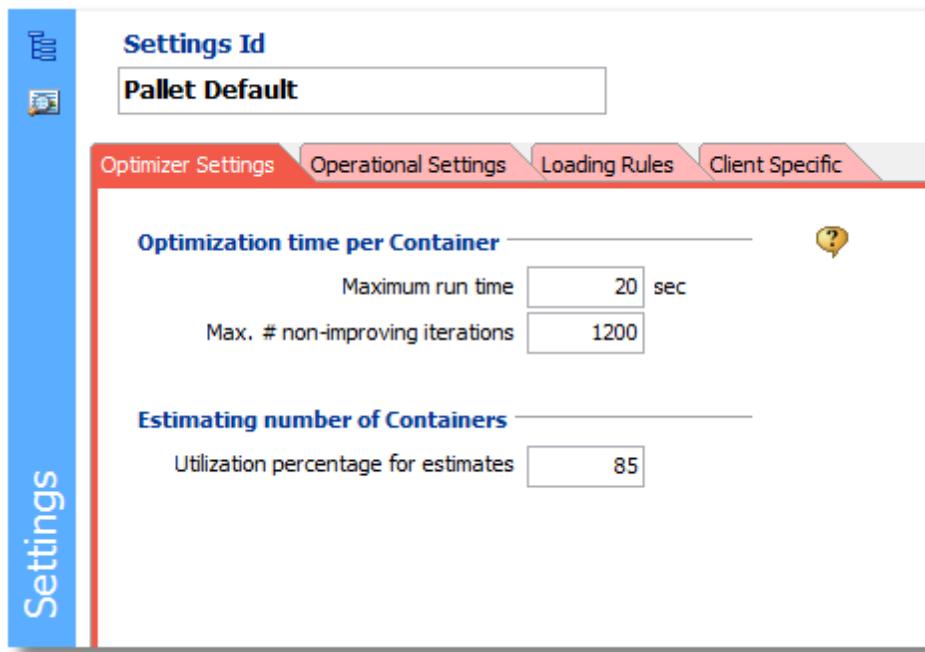
Settings - Data Window

Click on the main **Settings tab**,



Here you will find a number of Settings that influence the way the optimization engine of Cube-IQ finds an optimized loading.

A key requirement for a good loading solution is that each type of loading case is tuned uniquely. You can define named groups of Settings (as **Settings Id**). These unique Settings can then be assigned to Container types in the [Container window](#). This is a key feature of Cube-IQ.



The picture above shows Settings that go by the Id of 'Container', as the user intends to use them when loading Containers. You can create as many sets of Settings as you like and give them any appropriate name.

Note that you can also set the [units](#) for setting fields with absolute values.

There are several types of Settings here, grouped under tabs. The **PgUp** and **PgDn** keys let you move between tabs.

The following groups of Settings exist:

[Optimizer Settings](#)

[Operational Settings](#)

[Loading Rules](#)

and

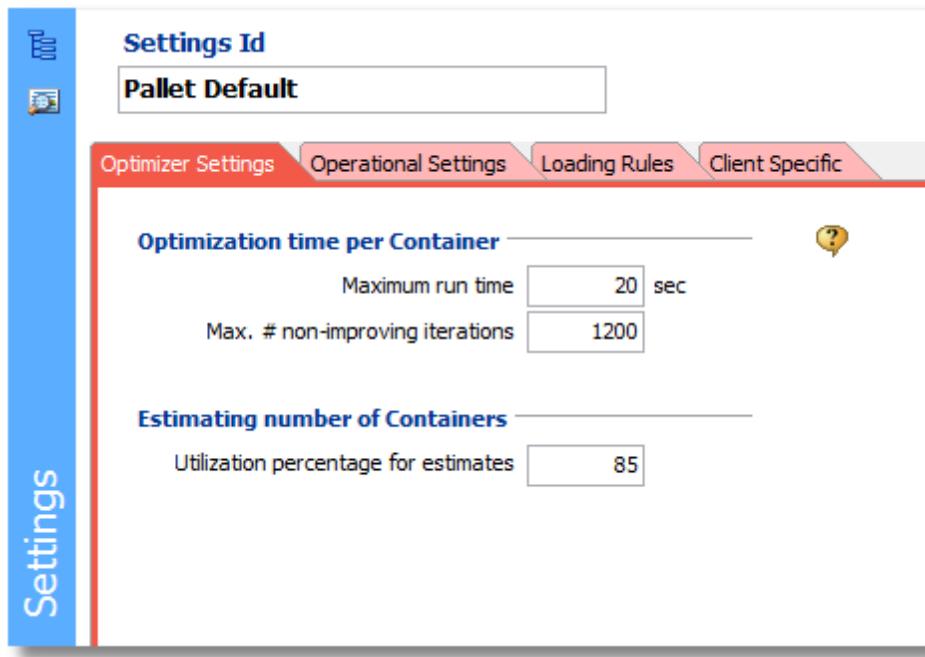
[Client Specific](#) (Only visible when set as such in Options.)

4.4.2 Optimizer Settings

Optimizer Settings

Click on the main **Settings tab**, or press **F7**.

Click on the **Optimizer Settings** tab (if not already selected).



Optimization time per Container

The **Optimizer Settings** determine how long an optimization run should maximally take:

Maximum run time - the number of seconds allowed for the loading of one Container (so a setting of 15 seconds to load four Containers can lead to a run of one minute). A good value is 15 seconds on a modern PC.

Maximum number of non-improving iterations - a setting that tells the solver how many more iterations to spend searching for an improved loading. For loading cases with a low number of units, a value of 500 or 1000 iterations is recommended, for slow optimization runs, 50 iterations is a good value.

Estimating number of Containers

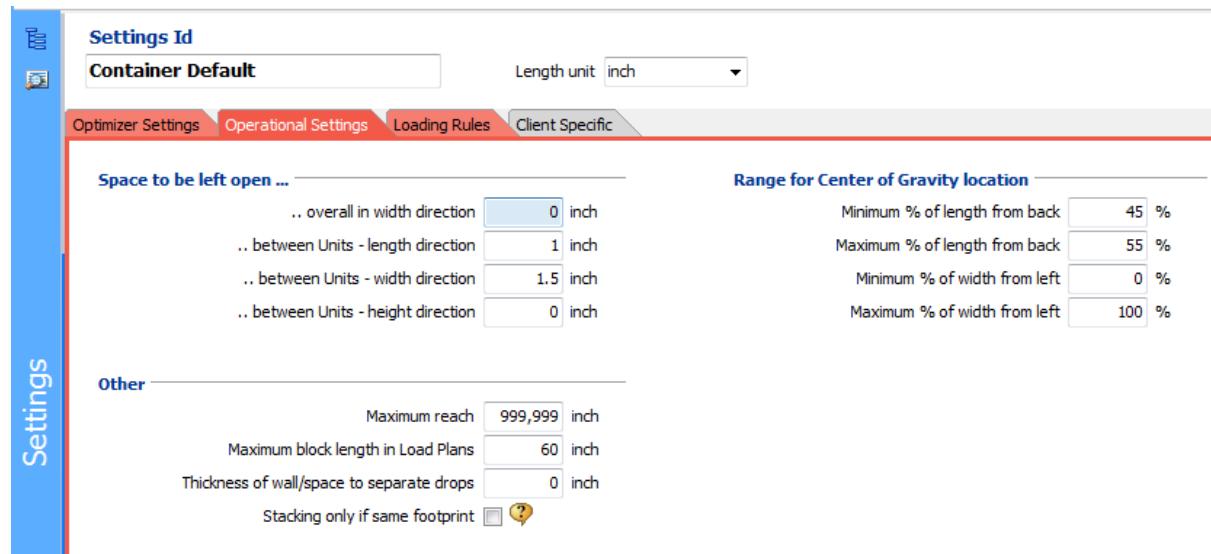
Utilization percentage for estimates - on the [Load Setup](#) window, Cube-IQ can show how many Containers of the currently selected type would minimally be required. (Use the right-click pop-up menu of the Container Type grid.) The calculation uses this setting as estimate for utilization.

4.4.3 Operational Settings

Settings - Operational

Click on the main **Settings tab**, or press F7.

Then click on the **Operational Settings** tab.



The **Operational Settings** define rules on how the Container is to be loaded.

Space to be left open ...

.. overall in width direction - lets you define a certain amount of space that needs to be kept when loading, possibly to cater for data uncertainty, or for ease of loading. Note that this is an absolute value, not a percentage. Cube-IQ will leave this space one time in the width direction

.. between units - length/width/height direction - lets you define a certain amount of space that needs to be kept between each pair of loaded units, in the loading direction from back to front/left to right/bottom to top. Again that this is an absolute value.

Range for Centre of Gravity location

The **Centre of Gravity** data fields provide Settings on how the optimization should position the centre of

gravity (automatically). Here you can set limits for back, front, left and right. These are percentages of the full dimensions. For example, if you want the center of gravity in the length direction to be within 45% and 55% of the Container length (that is, +/- 5% from the length centre), enter a 45 for the 'back' limit and a 55 for the 'front' limit.

The positioning of the center of gravity will only take place for directions (length or width) where two values have been entered.

Other

Maximum reach - sets how far 'reach' back into the Container is possible, for example after finishing all boxes of a given sequence number, and starting the next sequence number.

Maximum block length in Load Plans - is used to determine the maximum depth dimension of blocks of units, which will make up the loading sequence. So, this is the length-wise step size of the Load Plan. If you give this Setting a large value (say 1,000,000), blocks may be as long as the whole container. This makes for much smaller Load Plans (far less blocks), but is not easy to interpret as loading instructions.

Thickness of wall to separate drops - If a positive value is present in this field, the system will not mix units with different sequence numbers (that is, for different drops), but keep them separated by an invisible wall that has this value as its width. If mixing units with different sequence numbers is ok, you can leave this field blank, or use a value 0.

Stacking only if same footprint - If checked, Cube-IQ will only stack a unit on top of another unit, if both have exactly the same foot print. Rules like this are common when loading paper rolls, or pallets that have slots.

4.4.4 Loading Rules

Settings - Loading Rules

Click on the main **Settings tab**, or press **F7**.

Then click on the **Loading Settings** tab.

Loading Rules concern rules on what is to be loaded and in which sequence or grouping.

Load each product together ..

.. not required - Products may get split during loading

.. within each Zone, or Container if no Zones - each Product will be loaded consecutively, that is, after loading the first one, all will be loaded (with possibly a leftover going into a later Container).

.. and start next Zone/Container with final Product of previous - Products will get loaded together, also when starting a next Zone, or even Container. This is typically only used in production environments, where Products need to get loaded as they become available.

.. just try not to split over Containers - this is not a hard rule. Cube-IQ will minimize the number of Products that have been to be split over Containers in multi-Container Loads. Note that Products may still end up getting split.

Product Handling

Target number of Products per Container - the optimization engine of Cube-IQ will Load no more different Products than this number in a single Container, as long as the volume utilization reaches at least the value of the next setting (see below). If this utilization cannot be reached, the system will try to load one more Product. This will continue until the target number is the original number plus three. From then on the system will simply optimize overall volume/weight without regard to how many different units are used. **Note:** Users should experiment with several values to find out what works best in their particular situation.

Increase target number of Products if utilization less than .. - the system will automatically keep increasing the target number of Products (previous Settings) until this utilization percentage can be reached.

Products with different sequence numbers can be mixed - if checked, the optimization can combine units with different sequence numbers in one Container. This setting is typically used in palletization or cartonization, where each sequence number represents a Customer or a drop, and units for different Customers cannot be mixed on one pallet or on one box.

Copy not loaded units to next stage - a setting for multi-stage loading, say, boxes on pallets and pallets onto a truck. If checked, not just the loaded pallets are made available for loading in Stage 2, but also all boxes that were not loaded in Stage 1.

Never split over Containers (unless quantity too big) - hard rule that each Product must be loaded within a single Container (unless really not possible due to total volume for the Product).

Roll loading rule

New to Cube-IQ5.0 is that it can Load rolls on their (round) side. With this rule, you can set that loading of rolls can be done

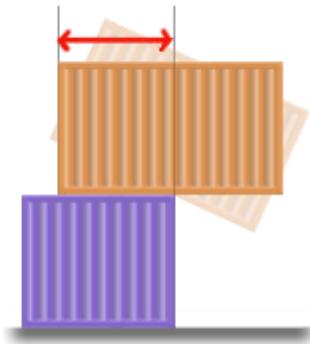
- Free, which includes the possibility lean rolls against Container walls,
- in Pyramids only (where each roll is either on the floor, or saddle supported by two other rolls).
- Straight Allowed, which is the same as Free, but straight above another rolls is allowed,
- Straight Only, which effectively means that the rolls are treated as boxes.

Support

Minimum support required - to avoid 'floating' units support is needed for at least this factor's value of the length and the width of the unit. This is set with this value (as illustrated in the **Settings** window)

Support / Bracing

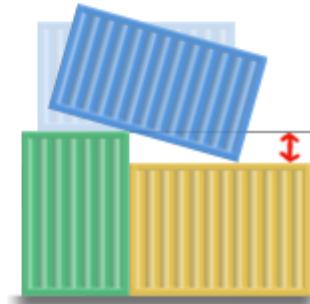
Minimum support required	0.75	
Maximum support height difference	3	inch
Maximum support height difference at top		inch
Maximum unit overhang		inch
Units must be braced at the back	<input type="checkbox"/>	



Maximum support height difference - Cube-IQ assumes that a unit may be supported by one that is slightly lower with its top than the unit is with its bottom level (absolute value, illustrated in the **Settings** window)

Support / Bracing

Minimum support required	0.75	
Maximum support height difference	3	inch
Maximum support height difference at top		inch
Maximum unit overhang		inch
Units must be braced at the back	<input type="checkbox"/>	

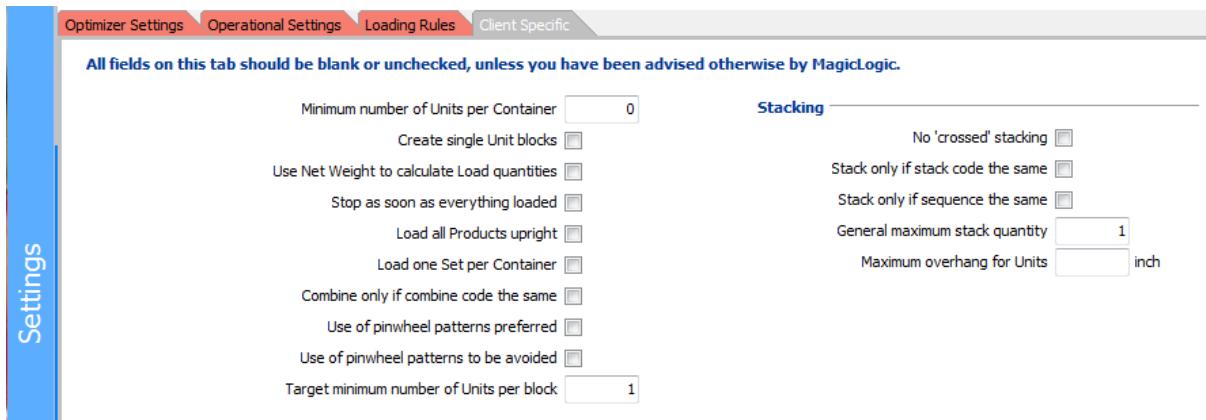


4.4.5 Client Specific

Client specific Settings

Click on the main **Settings tab**, or press **F7**.

Then click on the **Client Specific** tab. You may have to make this tab visible first in the [Options window](#).



Some features of Cube-IQ have been added at specific request of clients. On this tab you can control such features. As a general rule, **all fields on this tab should be blank or unchecked**, unless you have been instructed otherwise by MagicLogic.

Minimum number of units per Container - this setting is useful for two-stage loading, for example boxes on pallets, and next pallets into a truck. If the value here is (say) 2, there is no point in putting just these two units on a pallet, as they may as well be loaded separately into the truck.

Create single unit blocks - If checked, Cube-IQ will split all blocks into single unit blocks during its output phase. This is useful for example when feeding the results into a conveyor belt sequence.

Use Net Weight to calculate Load quantities - When building a Load you have the option to let the system calculate the quantities from a 'total weight to be loaded'. Normally this calculation uses the weight of the product, but some clients prefer to use its net weight.

Stop as soon as everything is loaded - check this if you only want to know whether a certain Load fits in a single Container and if quickly determining 'fit' is really important. The optimization will stop as soon as all units are loaded, and will not attempt to find a better (= easier) loading.

Load all products upright - is for cases where Products can be loaded in Containers in any orientation, but if the same Products are loaded on a pallet, they have to be upright. This avoids the need to keep changing Product data.

Load one set per Container - client special

Combine only if combine codes the same - client special to set a special loading scenario, without having to fill in a complete [combination matrix](#).

Use of pinwheel patterns preferred - use of pinwheel patterns (loading four boxes into a long, wide, long, wide 'circle') will get some priority during the optimization.

Use of pinwheel patterns to be avoided - pinwheel patterns will not get loaded.

Target minimum number of units per block - A value of 1 will give standard loading results. In cases with many units, values like 4, 6 or even 12 will give a more regular loading. This avoids the operationally undesirable loading of very small blocks of units into small spaces to obtain a higher space utilization. Each loaded block of units will contain at least this number of units (if still available). If less units are still to be loaded than this Settings, smaller blocks will be created.

Stacking

No 'crossed' stacking - Cube-IQ will try to avoid loading a Product that is longer than wide on top of a Product that is wider than long, and vice versa.

Stack only if stack code the same - Cube-IQ will only stack Products with the same [Stack Code](#).

Stack only if sequence the same - Cube-IQ will only stack Products if they have the same sequence number in the [Load List](#).

General maximum stacking quantity - Cube-IQ will never stack more boxes than this setting.

Load in single stack only - In each Container (typically a box), Cube-IQ will create only a single pile of units. (Used for packing carpets in cartons.)

Robotics

Cube-IQ can be used to optimize Mixed Pallet loading, using robots. These two settings determine at which point the true approach to the placement point starts.

5 Customers

5.1 Customer Data

Customer - Data Window

To access the Customer Data window, click on the main **Customers** tab.

The screenshot shows the 'Customer - Data Window' interface. On the left, a vertical blue sidebar labeled 'Customer Data' contains icons for a list, a search bar, and a refresh button. The main window has a title bar 'Name Sample customer'. It includes fields for 'Address Line 1' through 'Address Line 5', 'Phone', 'Fax', and a large 'Notes' area. Below these are fields for 'Contact', 'Email', and 'www'.

The user can set up a record for each Customer. This data can then be used as part of the [Loading Manifests](#). This is the only use that Cube-IQ makes of Customer data.

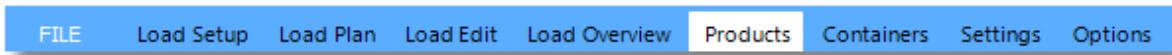
6 Products

6.1 Introduction

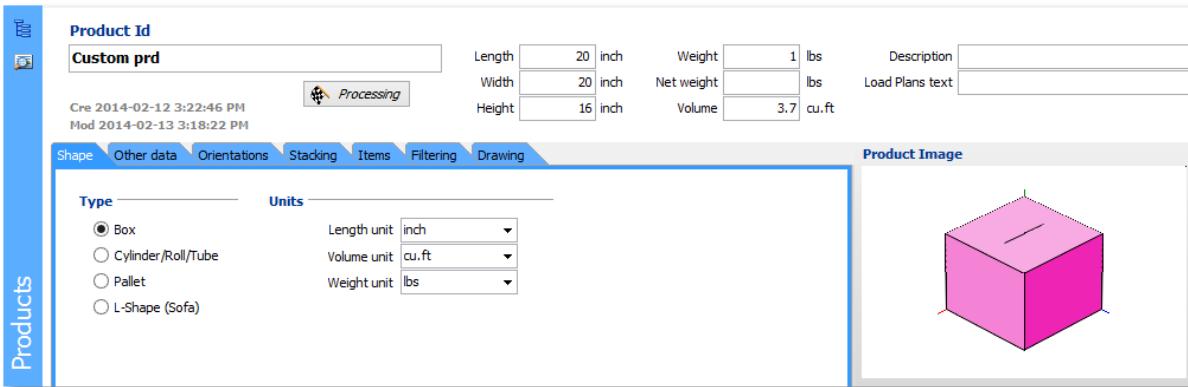
Product Details

A Product is defined as any object that can be loaded into one of Cube-IQ's Containers. The object must be rectangular, cylindrical or 'sofa'-shaped (a 3-dimensional L-shape). Examples of rectangular objects are boxes, cartons, or even whole pallets. Cylindrical objects are for example drums, rolls or tubes. Within some limitations, Cube-IQ can also load T-shaped objects and trapezoids.

To access the Product details, click on the main **Product tab**, or use the **F5 key**.



The **Product Details Window**:



Each Product must have a unique identifier (name) that will be used when setting up Loads. Besides the ID, the following four data values are required:

1. **Length** - in Cube-IQ defined as back to front, in the length units selected in [Options](#)
2. **Width** - dimension from left to right,
3. **Height** - dimension from bottom to top,
4. **Weight** - used to check the loaded weight against the weight capacity of Containers and against [axle weight limits](#), and also used in the positioning of the [Center of Gravity](#). Must be in the weight unit selected in [General Settings](#).

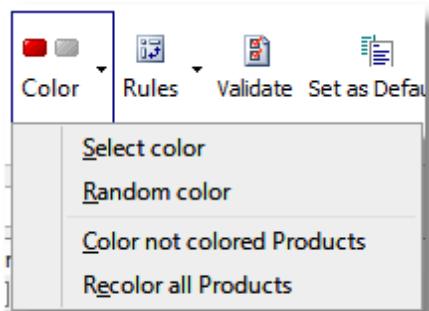
The **volume** of the Product is calculated automatically by Cube-IQ, once all dimensional data is in place. The two other fields on the main screen are

Description - this text is used only for user definable information. It is shown in various windows and reports.

Load Plans text - here you can enter some abbreviated descriptor for the Product. This will then be used in the various Load Plans (loading diagrams), which tend to be clearer when shorter Product Ids are used.

When you are in **Product Details**, the **Ribbon Bar** shows these common actions:

- **Overview** takes you to a grid window with a grid/table view of all the Products created in the database. The only drawback here is that only important fields can be shown due to lack of space. The data items in this view are discussed in a [separate section](#).
- The **Copy** Product item creates a new Product with the same data as the current Product, except for the ID.
- The **Color** button opens a small menu, with four options to let Cube-IQ allocate a random color to one or more Products.



- Clicking the **Set as Default** button in the Ribbon Bar will let Cube-IQ use the values of the current Product as initial data values for any new Product. This is for example useful if none of your Products is ever 'On Side' or 'On End'.

Right click anywhere in the Product window to see a **pop-up selection list** of all currently defined Products. You can also use the Select button or the **F8** key to access this selection list.

All other data fields are logically combined into groups, each represented by a tab on the Product data screen. We will discuss each of these data tabs below in detail. You can use **PgUp** and **PgDn** to browse the tabs.

The Product Details Tabs are:

- [Shape](#)
- [Other Data](#)
- [Orientations](#)
- [Configurations](#)
- [Stacking](#)
- [Items](#)
- [Filtering](#)
- [Drawing](#)

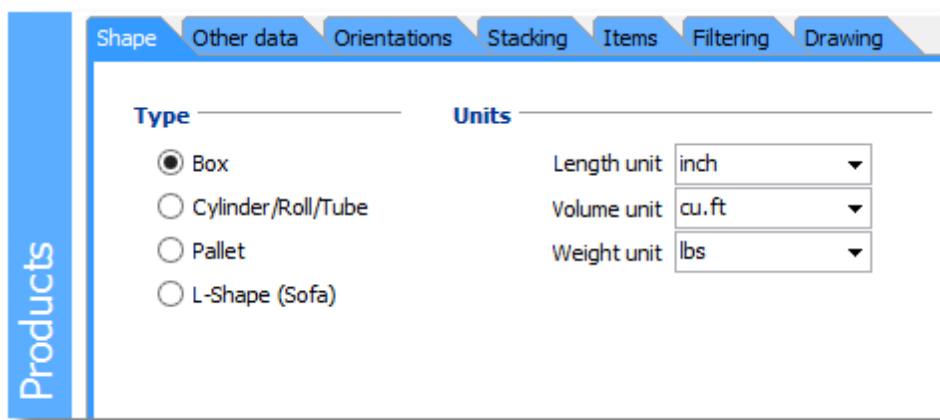
6.2 Product Tabs

6.2.1 Shape

Product Details - Shape

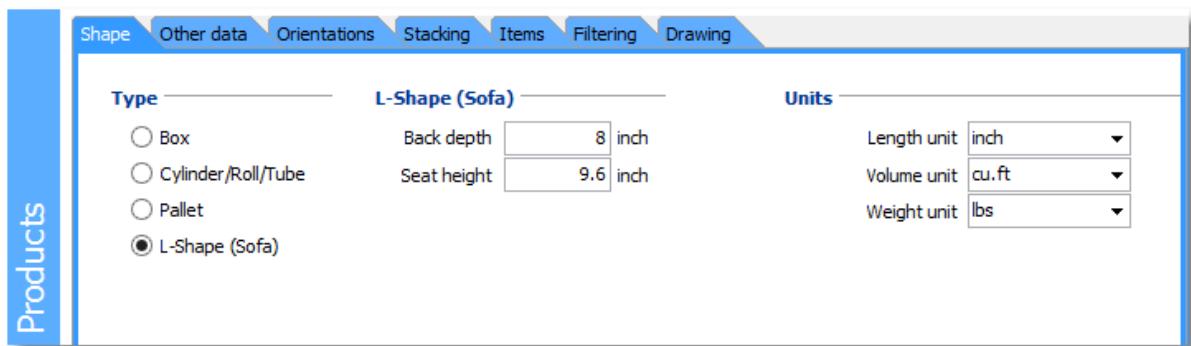
Select the main **Products tab**, or use the **F5** function key.

Click on the **Shape** tab.



Select 'Box', 'Cylinder/Roll/Tube', 'Pallet', 'L-Shape' (a 3-dimensional 'L', as a sofa in side view), or 'T-Shape' (a 3-dimensional 'T' as seen from above). Each of the 'shapes' will trigger different rules in the loading process. The loading of Trapezoids and Complex shapes is currently under development.

Selection of L-shape will show two additional fields:

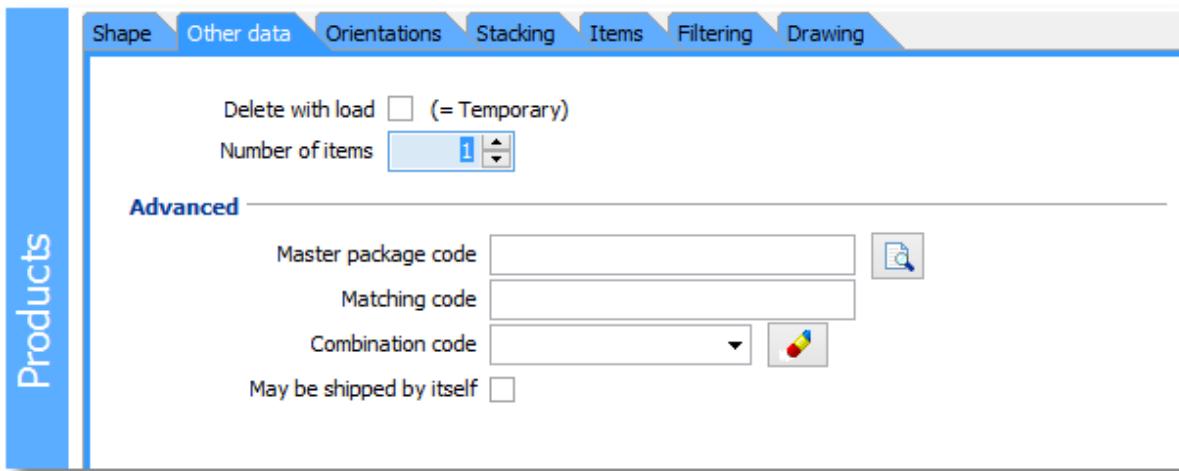


6.2.2 Other data

Product Details - Other Data

Select the main **Products tab**, or use the **F5** function key.

Click on the **Other Data** tab.



On the Data tab the following Product data fields can be accessed:

Delete with Load - if checked, the Product will be deleted with the last Load in which it was used. This allows you to define temporary Products specifically for a given Load, without leaving the Product data in the system once the loading case gets deleted.

Number of items - shown on the loading manifest, but not used in the loading optimization.

The '**Advanced**' fields are displayed only after you have clicked the '**Advanced**' button in the Ribbon Bar.

Master package code - when two products share a Master package code, they will be assumed to be equivalent for loading purposes (like Code and Sprite). This means that even Configurations may get loaded that contain some units of one Product, and some of the other.

Matching code - if this code has a (text) value, the Product will be loaded only in a [Container](#) (or a [Container Zone](#)) that has the same code as its '**Matching code**' (as set in [Container Details](#)). This allows the user to indicate that certain Products can be loaded only in certain Containers/Zones.

Combination Code - If [combination codes](#) have been set up, as well as a combination matrix, giving a Product such a code will let you set with which Products it can be combined in a Container.

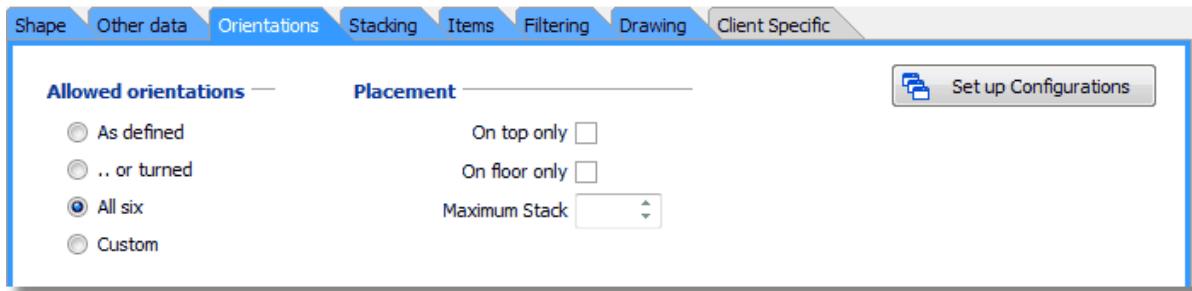
May be shipped by itself - (used in cartonization) if the packaging of a Product would allow it to be shipped 'unpacked'. Cube-IQ will then still try to pack it with other Products into a carton, but only if that does not lead to using more or bigger cartons

6.2.3 Orientations

Product Details - Orientations

Select the main **Products tab**, or use the **F5** function key.

Click on the **Orientations** tab. Unless under 'Allowed orientations' the user has selected Custom, you see the simple form of orientation control:



If 'Custom' is selected, the tab changes to this:

Nr.	Length	Width	Height	Allowed	On Floor	On Top	Max. Stack	Max. Weight	Stack Index	Match
1	35	50	125	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		3		
2	50	35	125	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		3		
3	125	50	35	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
4	50	125	35	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
5	35	125	50	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
6	125	35	50	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				

Selecting 'Custom' gives you access to all six orientations of a box, and lets you set certain data fields for individual orientations, rather than just for the whole Product.

As above, the Orientations tab now shows the six different ways in which a given Product can be loaded. This can be seen by clicking on any of the six rows, and watching the Product picture. You cannot delete or add orientations, and the dimensions are also given..

Cube-IQ allows the user to define various complex loading rules, by making standard rules available per orientation of the package, rather than just 'per package'.

The following rules can be set 'per orientation':

Allowed - 'Yes/No' indicator whether the package can be loaded in this orientation.

On Floor - indicates that in this orientation, the Product must be loaded on the floor of the Container, possibly in a stack (see **Maximum in Stack**).

On Top - indicates that no other Products may be loaded on top of this Product in this orientation, unless they are Products of the same type, and the number in the stack is no greater than the **Max. Stack** value.

Max. Stack (= Maximum number in a stack) - if a Product in a given orientation is bottom-only or top-only, the maximum number of this type of Products that can be stacked.

Supp.Weight (= Supported Weight) - the maximum weight that the Product can support. If this feature is not to be checked, leave the value blank (not zero!).

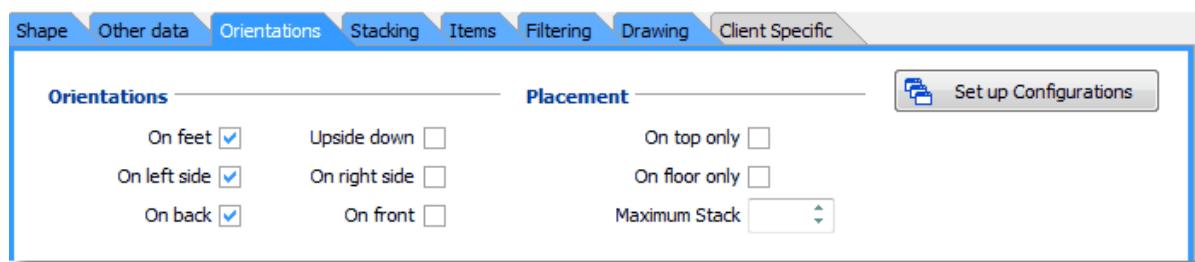
Stack Index - This index is some whole, non-negative number. If not blank, the Product will support only Products (or Product orientations) that have the same stack index or a lower one (think 'lighter'). This feature will allow you to direct more fragile Products to be loaded higher up in the Container. So, Products with a lower stack index will be loaded higher in the Container.

Some examples of loading rules that can be set up using this orientation-based mechanism are:

Only flat if on top - indicates that the Product must be loaded on its side or end if it supports other Products. If flat (lowest dimension as height) it is to be treated in the same way as **Top Only**.

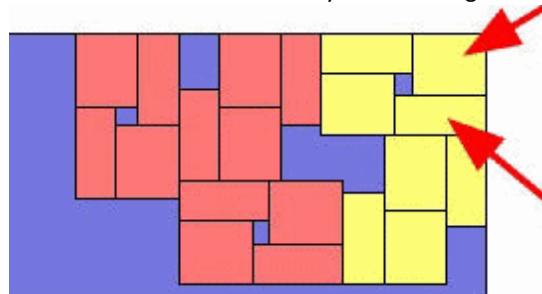
Straight up if not on top - indicates that the Product may only be loaded on its side or end if it is also loaded on top. If on its side or end, it is treated as Top Only. This loading rule is for Products that can only support other Products if their highest dimension is upright.

For an **L-shaped Product**, you get more orientation options. The orientations for a 'sofa' follow slightly different rules.



Due to the asymmetric shape, loading a sofa upside down will give a different loading. Cube-IQ makes the assumption that each sofa orientation represents a side onto which the sofa may be loaded, with each of the four different rotations allowed if an orientation is allowed. Also if both rotations 1 and 2 are allowed, two sofas may be combined with one upside down on top of the other. Combining two sofas in orientation 3 (standing on the right hand side) leads to the same combination, as the picture below shows from the top view.

The two arrows point to the two parts that together make up one sofa. In this picture you can also see that Cube-IQ has two different ways of combining two standing-up sofas.

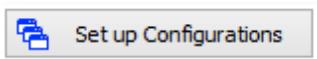


6.2.4 Configurations

Product Details - Configurations

Select the main **Products tab**, or use the **F5** function key.

Click on the **Configurations tab** if it is visible. If not, click the **Orientations tab**, and then the '**Set up Configurations**' button:



A 'configuration' is one way of loading a Product, for example a 'unit', a 'carton' of 12 units, or a 'pallet' of 220 units. You can define your own configurations, give them a name, number of units, dimensions, and loading rules.

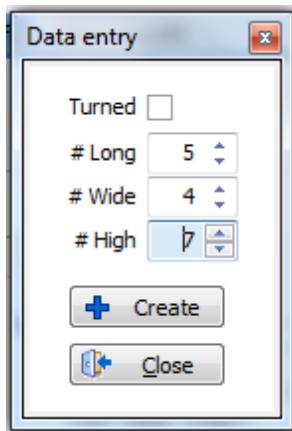
Name	# Units	Priority	Color
Cfg1 5x4x7	140	1	Pink

Length	Width	Height	# Orientations	Split in Load	Stacking																	
25 inch	24 inch	35.5 inch	2	<input type="checkbox"/>				Code: <input type="text"/> Max. supp. weight: <input type="text"/> Fixed stack qty: <input type="text"/>						Mirroring <input checked="" type="radio"/> None <input type="radio"/> Length only <input type="radio"/> Width only <input type="radio"/> Length and width <input type="radio"/> Turn 90						Placement <input type="checkbox"/> On top only <input type="checkbox"/> Not on floor <input type="checkbox"/> On floor only <input type="checkbox"/> Max. Stack: <input type="text"/>		
			Code: <input type="text"/> Max. supp. weight: <input type="text"/> Fixed stack qty: <input type="text"/>																			
			Mirroring <input checked="" type="radio"/> None <input type="radio"/> Length only <input type="radio"/> Width only <input type="radio"/> Length and width <input type="radio"/> Turn 90																			
			Placement <input type="checkbox"/> On top only <input type="checkbox"/> Not on floor <input type="checkbox"/> On floor only <input type="checkbox"/> Max. Stack: <input type="text"/>																			

In the picture, a pallet has been set up as configuration. It loads $5 \times 4 \times 7 = 140$ units on a 48"x40" pallet. Note that the weight of the pallet has been set 10 lbs higher than that of its units, and that the pallet is also 4" higher than its seven layers of units.

Each configuration can be given a Priority, which allows you to automatically load 268 units as two pallets of 100 each, four cartons of 15 units, and 8 loose units.

The **Add Config** button will open the Data Entry window, which can be a quick and easy way to help set up initial values for new configurations. After clicking Create, the configuration data can then be adjusted if needed.



The Use Orientations button lets you go back to using [Orientations](#) instead of Configurations.

6.2.5 Stacking

Product Details - Stacking

Select the main **Products tab**, or use the **F5** function key.

Click on the **Stacking** tab.

The screenshot shows the 'Products' interface with the 'Stacking' tab selected. The interface includes the following tabs:

- Shape
- Other data
- Orientations
- Stacking**
- Items
- Filtering
- Drawing

The 'Stacking' tab has the following sections:

- Stacking on other Products**: Contains fields for Stack code (dropdown menu), Stack index (text box), and Minimum support factor (text box).
- Supporting other Products**: Contains fields for Max. supported weight (text box) and Supports same footprint only ().
- Stacking on same Product**: Contains a field for Height increase when nested/stacked (text box) and inch unit indicator.

A separate panel on the right, titled 'Special box shapes', contains the following options for 'Top is ..':

- Normal box
- Smaller top
- Open, perimeter
- Open, length sides
- Open, width sides
- Open, corners

In Cube-IQ, **stacking rules** can be set-up in two different ways. A rule 'per Product' is set up here (using **Stack Codes**), a rule that may be different for each orientation of a Product is defined under the [Orientations tab](#) (see **Stack Index**).

The stacking-related data fields are:

Stacking on other Products

Stack Code - used in combination with the [Stacking Matrix](#), discussed in a next section. The code can be cleared using the **Clear** button.

Stack index - if not blank, the Product will support only Products (or Product orientations) that have the same stack index or a lower one (think 'lighter'). (The value must be some whole, non-negative number, or blank.)

Minimum support factor - (this is a Product specific version of the [Setting](#) with the same description) To get enough support, at least this factor's value of the length and width will need to be supported. Typical value is 75% in most applications, but having this at the Product level allows you to set it st for example 0.90 for a flimsy carton.

Supporting other Products

The following two fields are used only if '**Allowed Orientations**' is not set to 'Custom' on the Product's [Orientation Tab](#). The fields are also not used when [Configurations](#) have been set up.

Max. supported weight - the maximum total weight that can be loaded on top of this Product. Note that Cube-IQ calculates how much weighs on each unit, if something is loaded on top of two units. On the [Orientations tab](#) you can also set this value differently for different Orientations. If [Configurations](#) have been set up for this Product, these can each have their own value for maximum supported weight.

Supports same footprint only - if checked, only a Product with exactly the same length and width may be place, and also at exactly the same length/width coordinates (straight).

Stacking on same Product

It is also possible to indicate that a Product can be 'nested' if loaded on top of a similar Product. This is done by giving a value to the field called '**Height increase when nested/stacked**'. If a Product is for example 40 high, a stack of two of these Products would normally be 80 high. But if the top Product nests somewhat into the bottom Product, the total height may be only 65. In that case the value of this field should be 25. A stack of three would then get total height 90.

Special box shapes

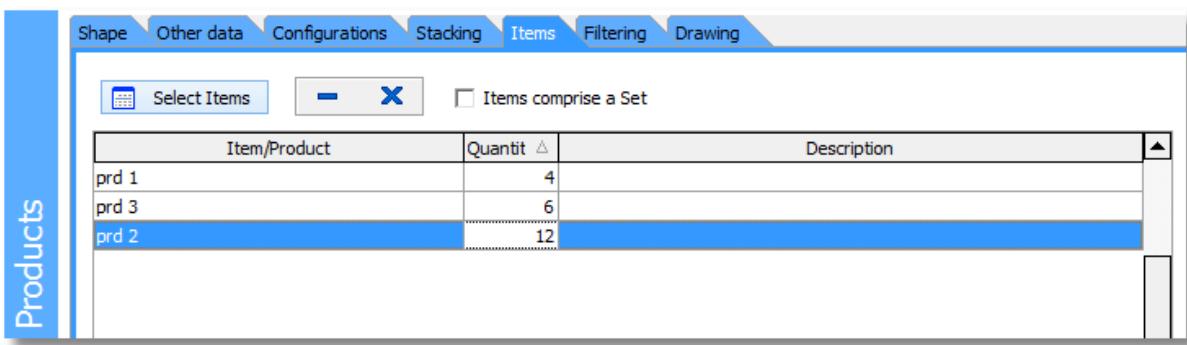
Cube-IQ 5.0 supports the option to define Products of other box shapes than just 'full' (also known as 'brick'). 'Smaller Top', also know as 'Tapered' is for units that have a smaller (centered) top than its footprint. Then there are four 'Open' types, with different edge configurations.

6.2.6 Items

Product Details - Items

Select the main **Products tab**, or use the **F5** function key.

Click on the **Items** tab.

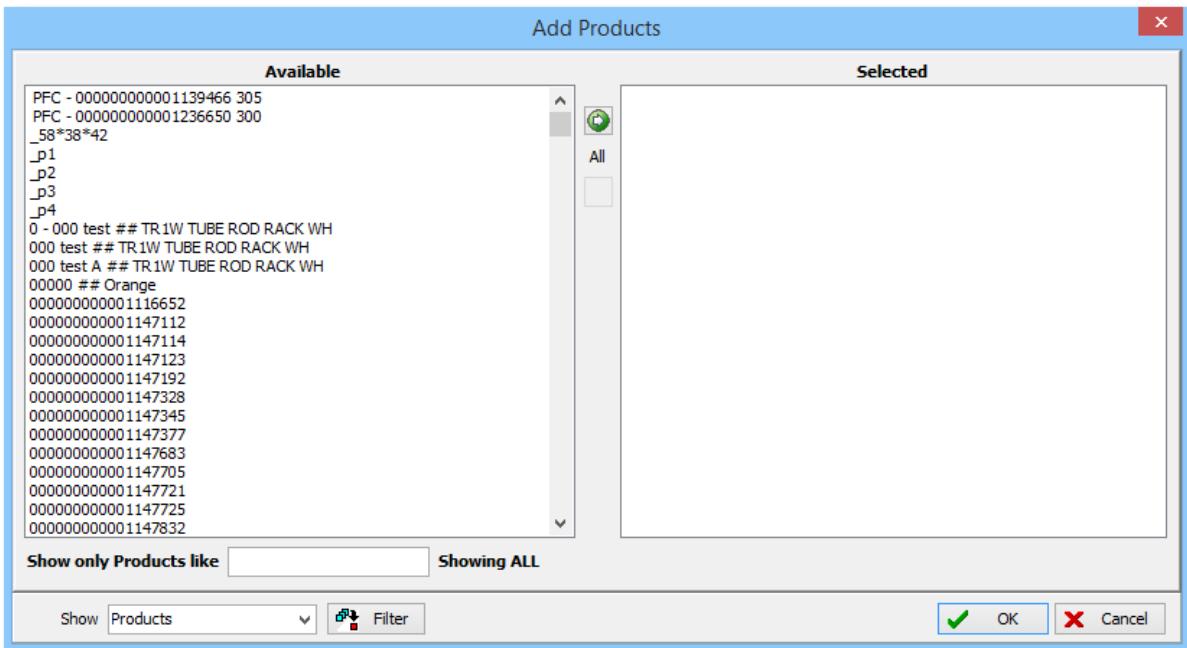


The **Items tab** gives you access to a list into which you can select other Products as 'items' inside the current Product. Note that any item must be defined as a 'Product' first.

When a Product gets added to a load, and that Product has '**Items comprise a Set**' checked, the item products will get added to a Load (with their quantities) instead of the comprising Product itself.

To insert items into the list,

1. Right-click the list to get a pop-up menu.



2. Click in the left list of the pop-up window on the Products you want to insert, optionally after [filtering](#) which Products are visible. (If you make a mistake, click on the same Product when it is in the right hand list.)

3. Press the OK button.

The use of 'items' inside a 'Product' is useful when you want to set up irregularly shaped items on for example a pallet. Given the irregular shape of the items, Cube-IQ cannot do this for you, but it can still load the (now also irregularly shaped) pallet into a truck as a 'Top Only' Product.

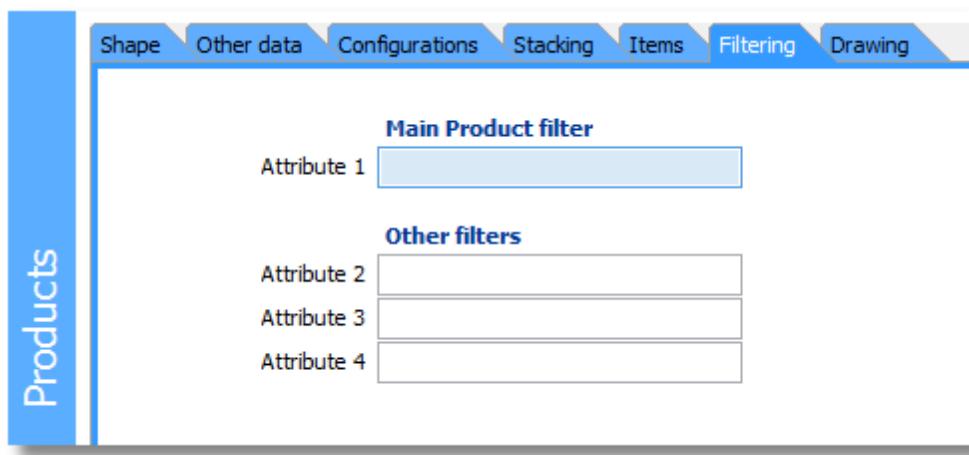
Items are also used by Cube-IQ in [Two-Stage loading](#). For example, if in Stage 1 boxes are loaded onto a pallet, then in Stage 2 the pallets can get loaded into a truck. In the second stage the pallet becomes a 'Product', with the boxes on the pallet becoming the 'items' of the Product.

6.2.7 Filtering

Product Details - Filtering

Select the main **Products tab**, or use the **F5** function key.

Click on the **Filtering** tab.

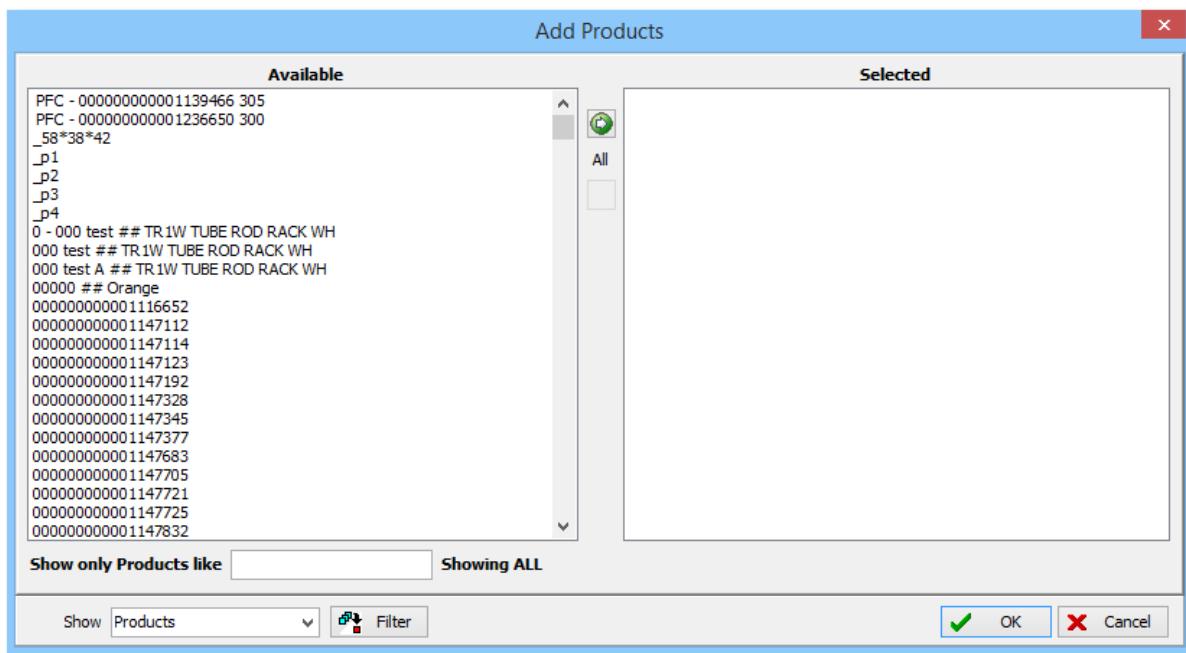


Each Product has four fields that can be used to filter which Products are visible for use in Loads.

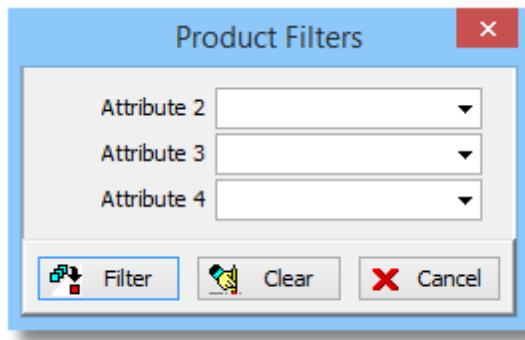
The first field is used for Product Filtering from the Load Setup Form. If any value is entered in the Product Filter field, only Products with this value for their **main product filter** will be visible while on this Load. This allows the user to set up several sets of Products, for example for different suppliers or for different clients. When building loads, the visible Products can then be limited to the supplier/client for which the Load is being set up.

The other fields are for use during the selection of Products for a Load. For example, by filling one of the fields with the name of a Plant, and using Cube-IQ's Translation to change 'Attribute 1' into 'Plant', you can temporarily narrow down the selection list of Products.

The filter value is applied when clicking the Filter in Product Selection. You can now for example require the value of 'Plant' to be 'Orlando', or 'Anaheim'. This is what the Product selection window looks like:



Clicking the Filter button brings up this screen, where you can set required values for the various attributes:



You can specify for each of the three attribute fields which values should only be shown. After entering values in one or more fields, click the Filter button. If more than one attribute has a required value, only Products are shown that have ALL those values.

6.2.8 Drawing

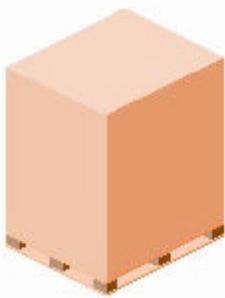
Product Details - Drawing

Select the main **Products tab**, or use the **F5** function key.

Click on the **Drawing** tab.

Drawing								
Length	Width	Height	Depth Crd	Width Crd	Height Crd	Description		Config.
120	80	138	0	0	12	Main Box		
120	80	2	0	0	10	Top plate		
120	80	2	0	0	0	Bottom plate		
12	12	8	0	0	2	back left		
12	12	8	0	34	2	back mid		
12	12	8	0	68	2	back right		
12	12	8	54	0	2	mid left		
12	12	8	54	68	2	mid right		
12	12	8	108	0	2	front left		
12	12	8	108	34	2	front mid		
12	12	8	108	68	2	Block front right		

Each of the rows in the grid represents one 'draw-box', with its own dimensions, and co-ordinates relative to the lower-left-back corner of the original Product. This allows you to draw a more complex Product as a series of rectangular boxes. In this way, you can for example make a pallet-type box truly look like a pallet:



If at least one draw box has been defined, all draw boxes will be drawn instead of the original box. The draw boxes are not used for the Load optimization itself at all; they only play a role in the Load Plans.

The **Color** button allows you to assign a color to the currently selected draw box.

If you have [Configurations](#) defined for this Product, you can enter a Configuration number in the 'Config' column. In that case, the draw-box involved will only be drawn if that Configuration is used in a Load.

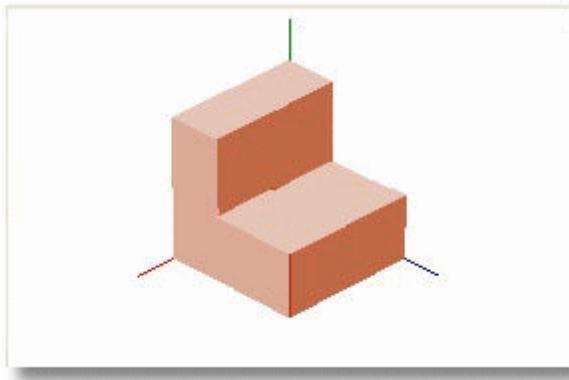
A **Draw as Pallet** button (only shown if the Product is of type 'Pallet') gives a proposed set of draw boxes for a pallet, to be drawn underneath the loadable space. If the type of the Product is 'sofa', there is also a special button to set up the drawing of a Product as a two-box sofa.

Depending on the type of Product ('Sofa', 'Box') there can also be other 'Draw as ..' buttons available.

Here is an example on how to draw a sofa as a pair of boxes (one for the 'back', one for the 'seat').

The screenshot shows the software's main window with a vertical blue sidebar labeled "Products". At the top, there is a navigation bar with tabs: Shape, Other data, Orientations, Stacking, Items, Filtering, and Drawing. Below the navigation bar are several buttons: a plus sign (+), a minus sign (-), an X, a color palette icon labeled "Color", and a button labeled "Draw as Sofa". A table is displayed below these controls, containing columns for Length, Width, Height, Depth Crd, Width Crd, Height Crd, Description, and Config. The table has two rows of data:

Length	Width	Height	Depth Crd	Width Crd	Height Crd	Description	Config.
100	38	100	0	0	0	Back	
100	62	45	0	38	0	Seat	

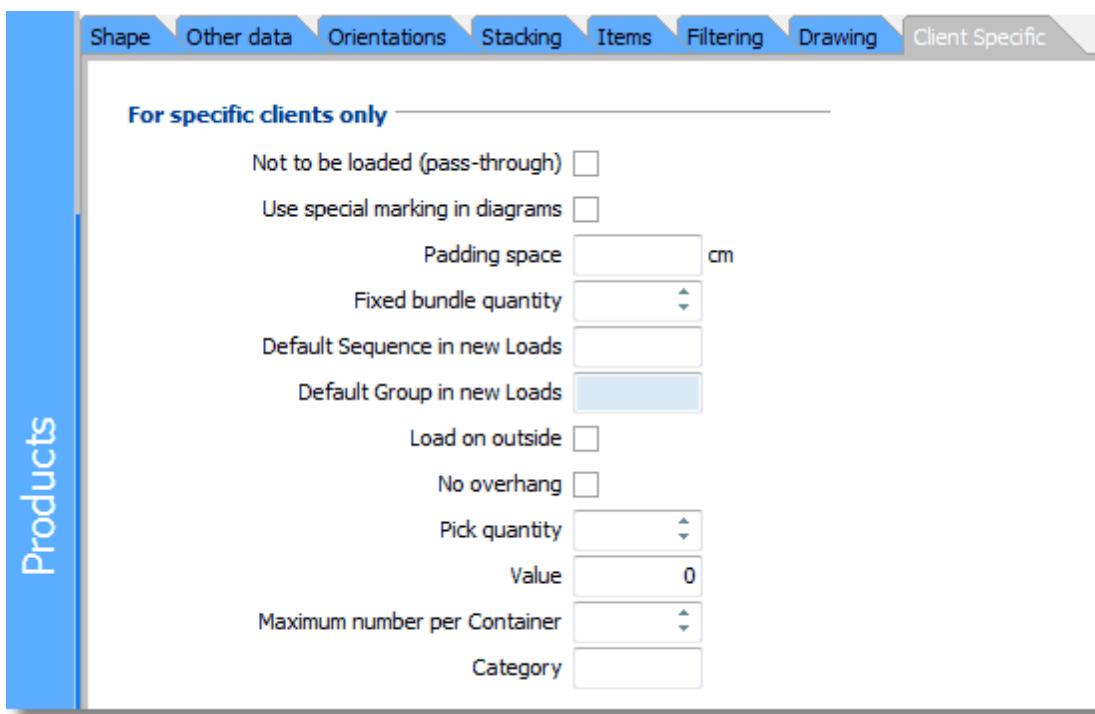


6.2.9 Client specific

Product Details - Client specific

Select the main **Products tab**, or use the **F5** function key.

Click on the **Client Specific** tab. You may have to make this tab visible first on the General Tab of the main Options tab.



Please contact MagicLogic support for details if a field seems of interest. But **please keep all field values at blank/unchecked**, as many of these fields trigger more than one optimization feature. Some of these will only work out well for the client who asked for them.

Here are brief descriptions of the fields:

Not to be loaded (pass-through) - if checked, Cube-IQ will not load units of this Product. In certain applications, some order items are not to be loaded (if they come in their own shippable box), but should still show up in the output.

Use special marking in diagrams - Checking this box allow you to show some special Product characteristic in the Load Plans.

Padding space - The amount of space that is to be kept open on **all** sides of this Product. It is equivalent to the 'Space to be left open' in the [Settings](#), except that here such a value can be set per Product.

Fixed bundle quantity - If greater than 1, Cube-IQ will Load the Product only in stacks of this value (and a single stack of less if needed). So, with a bundle value of 10, and 36 to be loaded, the Product will be shipped as three stack of 10, and one of 6. This is often used to double-stack pallets, using value 2.

Default Sequence in new Loads - Products will be loaded if given a sequence number. If this Product always the same sequence number (for example a pick location in a warehouse), you can set that here.

Default Group in new Loads - 'Groups' are used to keep certain Products together within a Load. If this Product is always part of a certain Group, you can set that here.

Load on outside - used for hazardous materials that on pallets may have to be loaded in such a way that they are at all times visible from the outside.

No Overhang - indicates that Products loaded on top of this Product have to stay within its length and width perimeter. Some Cube-IQ users, for example in the loading of pallets, start by loading smaller Products on top

of a large one on the pallet, still outside the Container. Only then do they move the whole set of Products into the Container. So, the large Products should not have any overhang.

Pick quantity - if '[Load each Product together](#)' is set to 'in each Container' in Settings, this will be done in smaller batches of the Pick Quantity, instead of for all the units of this Product. So, if 11 units of a Product are to be loaded, and the Pick Quantity is to 4, Cube-IQ will not need to keep all 11 together, but only 4, then 4 more, and finally 3. This is typically used in **Mixed Palletizing** only.

Value - the Value of one unit of this Product. It is used if a Container has a [Maximum total loaded value](#). The value is also considered if loading is to take place 'By Value', which means that Loads are considered 'better' if a higher total value is loaded, rather than a higher total volume.

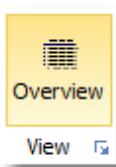
Maximum number per Container - if not blank, this determines how many of this Product are to be loaded in a Container (usually a Pallet). This is useful if for example 50 fit, but the user only wants to load 48. Also, no other Products will get added when the maximum number can be reached.

Category - not yet in use.

6.3 Product Overview

Products - Grid View

When you are in the Product Details Window, click the '**Overview**' button in the ribbon bar, or use the Ctrl+F5 function keys.



You are then presented with the **Product Grid Window**. This window shows all Products in a data grid. Click on the **Product Details button** to go to the standard **Product Details Window**, which will show you a single Product at a time.

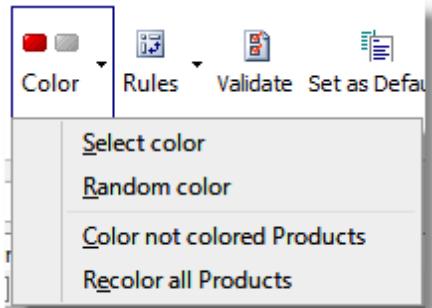
 A screenshot of the 'Product Grid Window'. The window title is 'Update all Products - change'. It features a toolbar with buttons for 'View', 'Print', and 'Apply'. The main area is a data grid with the following columns: Product Id, Length, Width, Height, Weight, Turn, Flat, On Side, On End, Floor, Top, Max. Stack, and Description. There are 7 rows of data, each with a checkbox in the 'Turn' column. The last row contains numerical values: 13.78, 19.69, 45.28, 1, checked, checked, checked, checked, checked, checked, checked, 99.

Product Id	Length	Width	Height	Weight	Turn	Flat	On Side	On End	Floor	Top	Max. Stack	Description
Custom prd	100	100	16	1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					
Custom prd 2	193	40	160	1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					
prd 1	49.21	19.69	13.78	1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	99
prd 2	13.78	19.69	45.28	1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	99				
prd 3	23.62	23.62	45.28	1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	99				
prd 4	13.78	31.5	45.28	1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	99				

As you can see, the **Grid View** of the Product data allows comparing Products quickly. It also facilitates changing a single field for many Products. On the other hand, not all fields are shown here, and details like orientation and items are not visible.

When you are in **Product Overview**, the **Ribbon Bar** shows these common actions:

- The **Copy** Product item creates a new Product with the same data as the current Product, except for the ID.
- The **Color** button opens a small menu, with four options to let Cube-IQ allocate a random color to one or more Products.



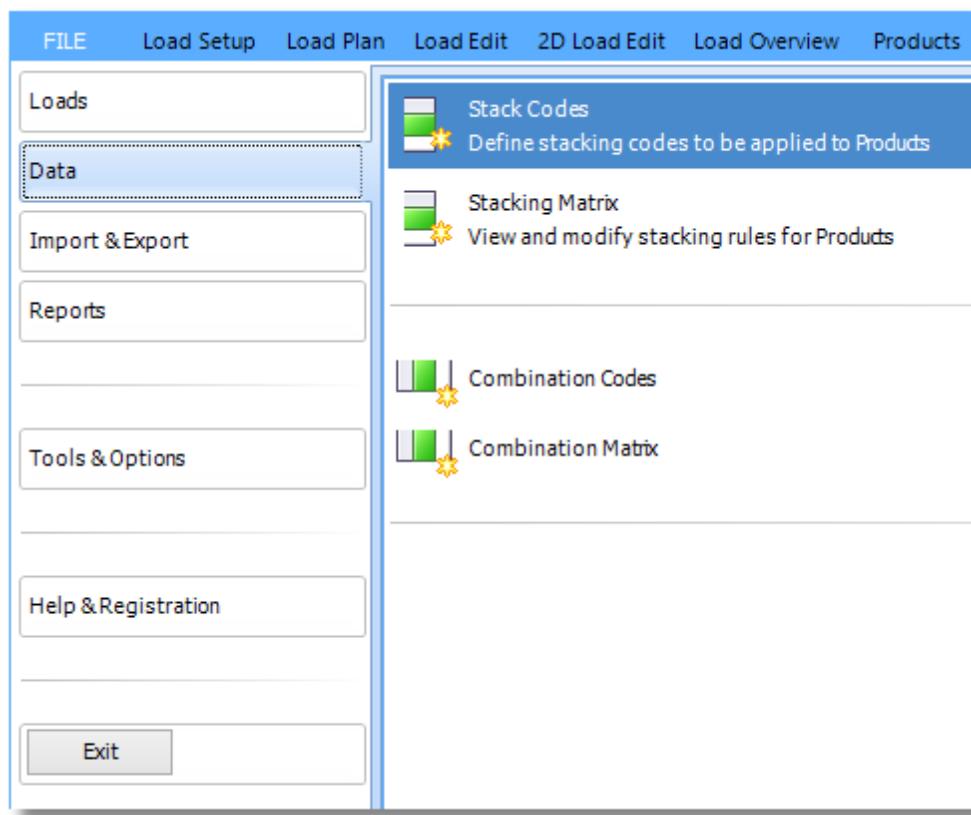
- Clicking the **Set as Default** button in the Ribbon Bar will let Cube-IQ use the values of the current Product as initial data values for any new Product. This is for example useful if none of your Products is ever 'On Side' or 'On End'.

6.4 Stack Codes

Products - Stack Codes

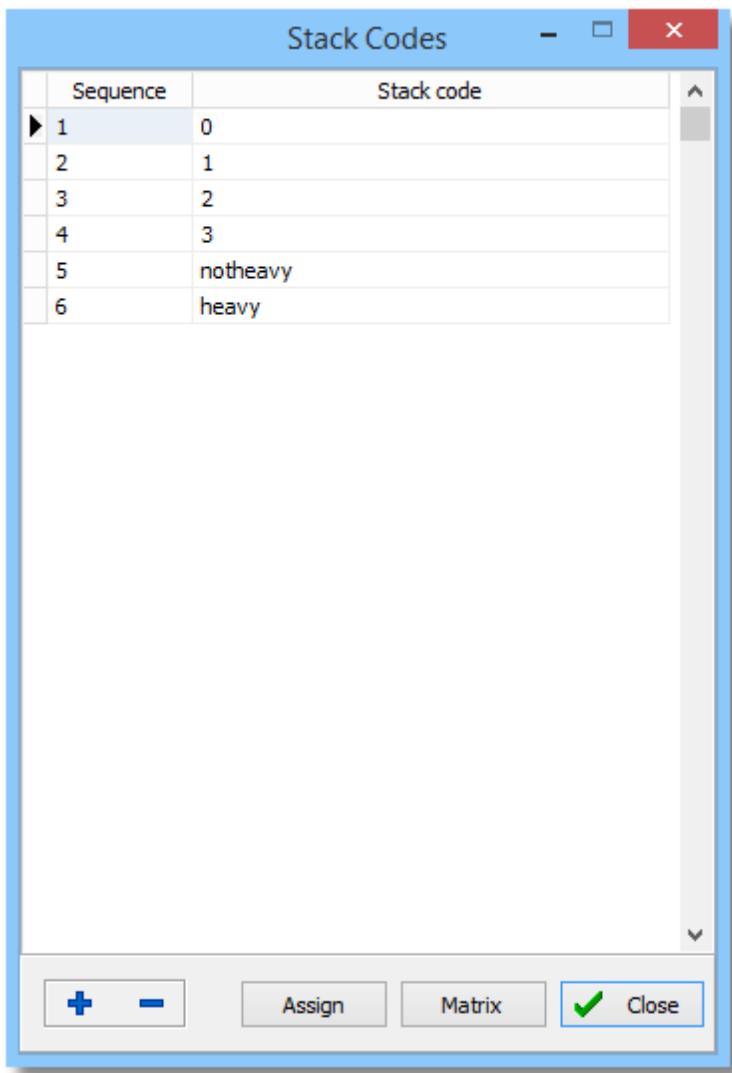
Stack Codes

From the File Menu, choose **Data / Products / Stack Codes** , and, after creating appropriate stacking codes, select **Data / Products / Stack Matrix** .

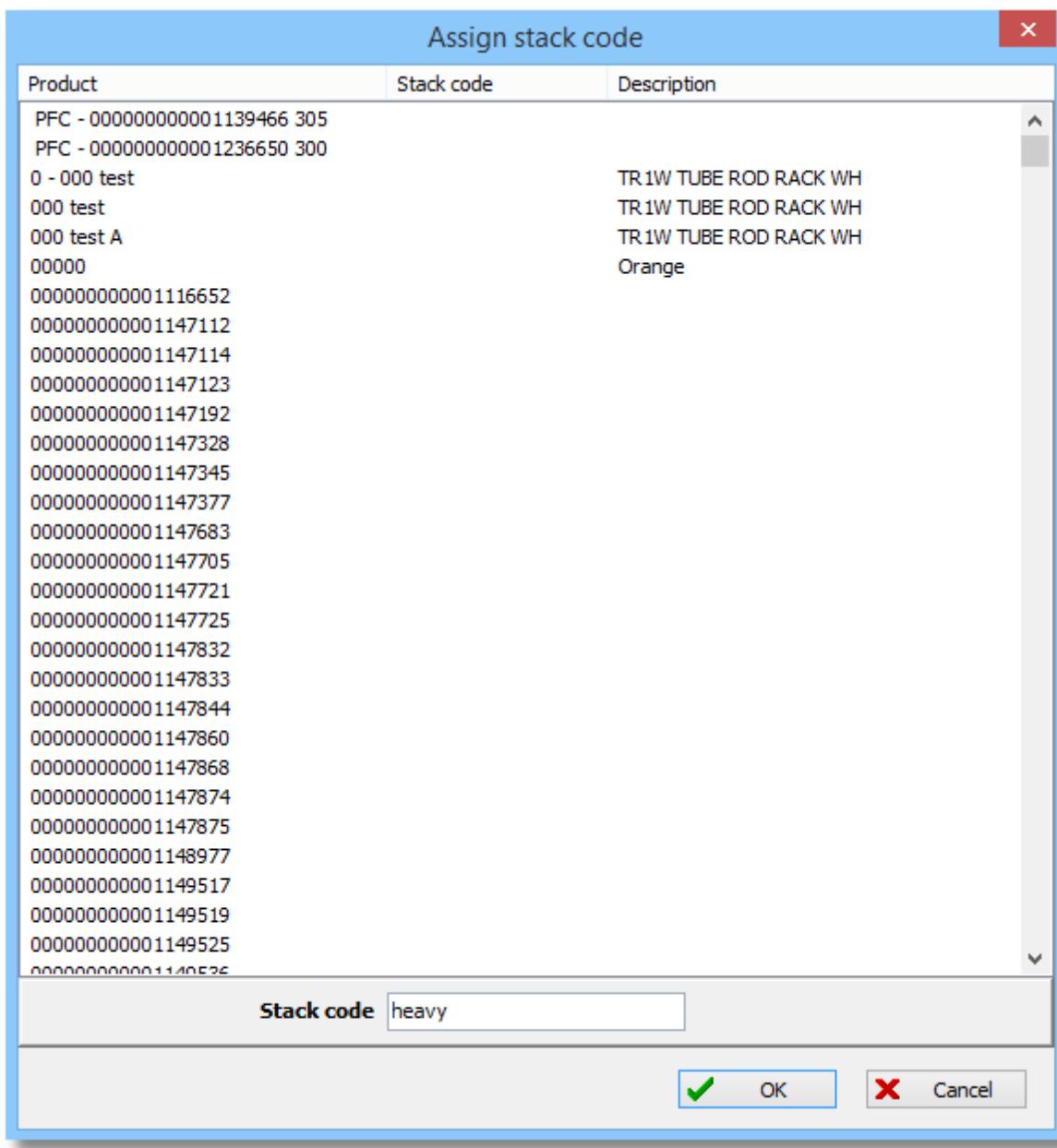


In Cube-IQ the user can set up stacking rules in two different ways. The first method is to use the stacking index, as can be defined for each [orientation](#) of a Product.

Secondly, as discussed here, a **stacking code** can be allocated to each Product. These codes have to be defined first in the **Stacking Codes window** shown below. **Sequence** indicates in which sequence the **codes** will appear in the stacking matrix. If you change a sequence number, the other ones will automatically be renumbered or shifted up. On exit, the numbering will be changed to 1, 2, 3, ...

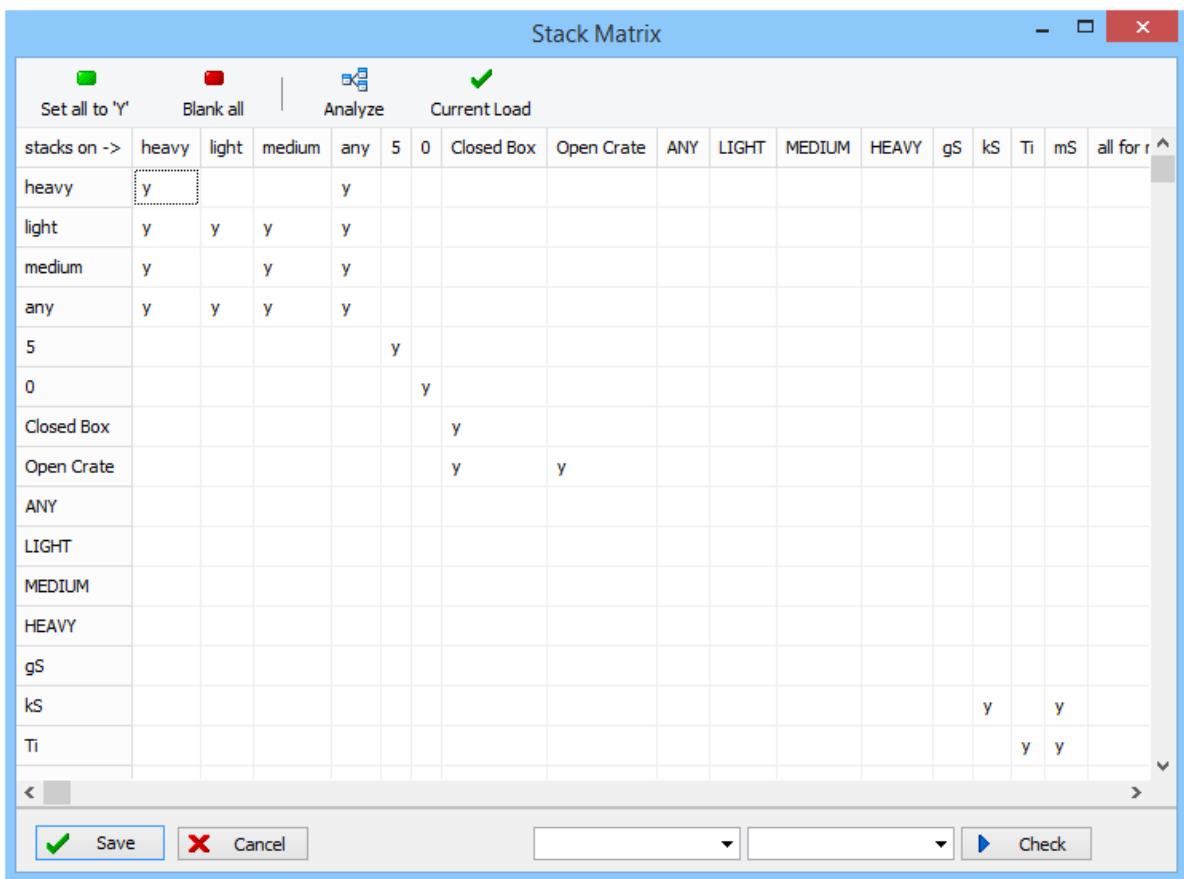


To allocate the currently selected code to multiple Products, click the **Assign** button. This takes you to the following window:



You can use the standard Windows list key clicks to make **multiple selections** (as done above), and then click the **Done** button to give each selected Product the current Stacking Code. To select a consecutive series of Products, click on the first one, then hold down the Shift and click on the last Product. You can also hold down the Ctrl key to select random multiple Products.

To set up the stacking matrix, choose the **Data / Products / Stacking Matrix** menu . This displays the following Window, showing all existing stacking codes in the order of their sequence numbers:



In this window you can set for each pair of codes whether a Product with the first code can be stacked on one with the second code. If there are codes and there is a stacking matrix, Products without a code are assumed to be loadable on and under any other Product.

You can click the **Analyze** button to get an overview of which codes can be combined or skipped on your Loads.

Click the Save button to store your changes.

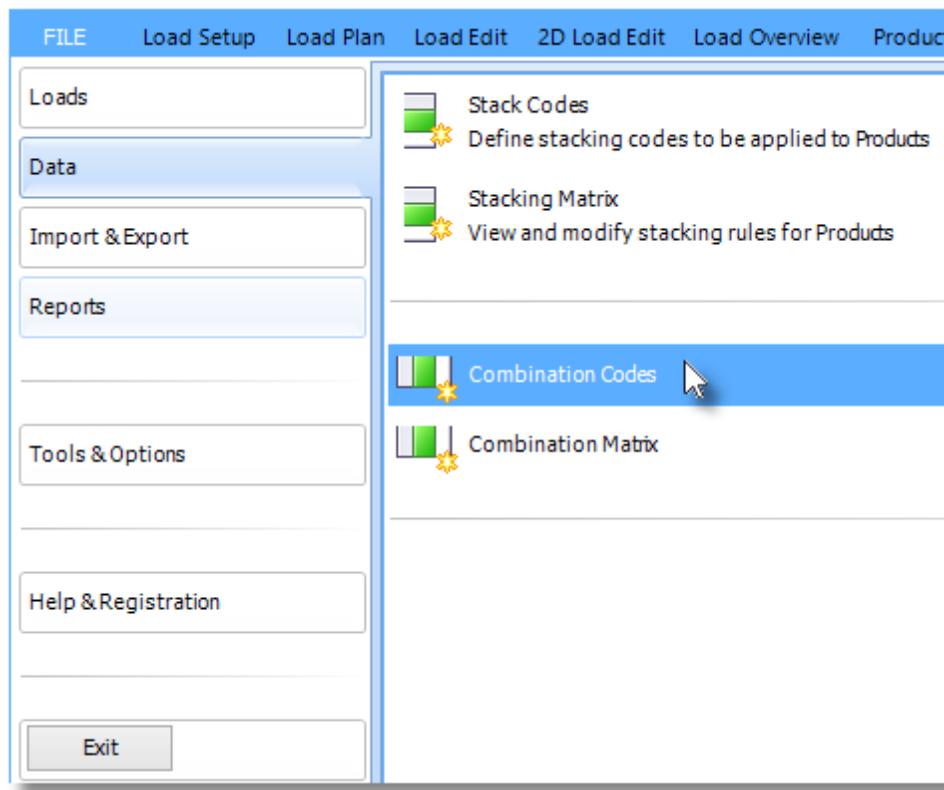
The **Set all to 'Y'** and **Set all to 'N'** buttons allow you to quickly change the whole table.

6.5 Combination Codes

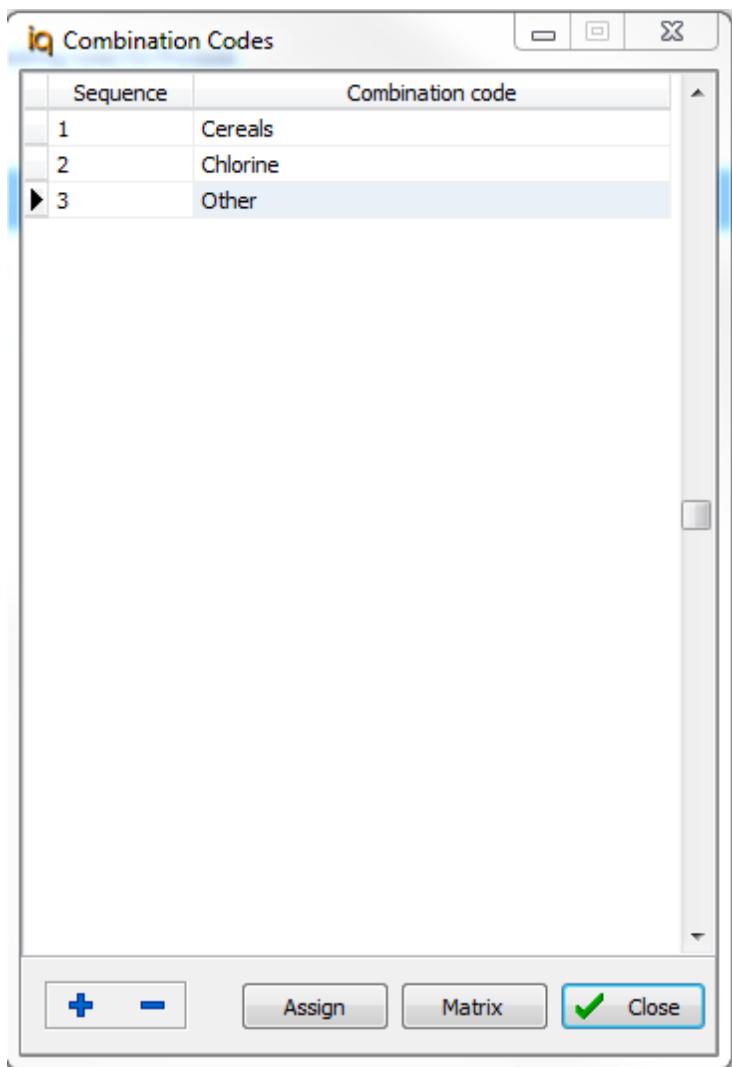
Products - Combination Codes

Combination Codes

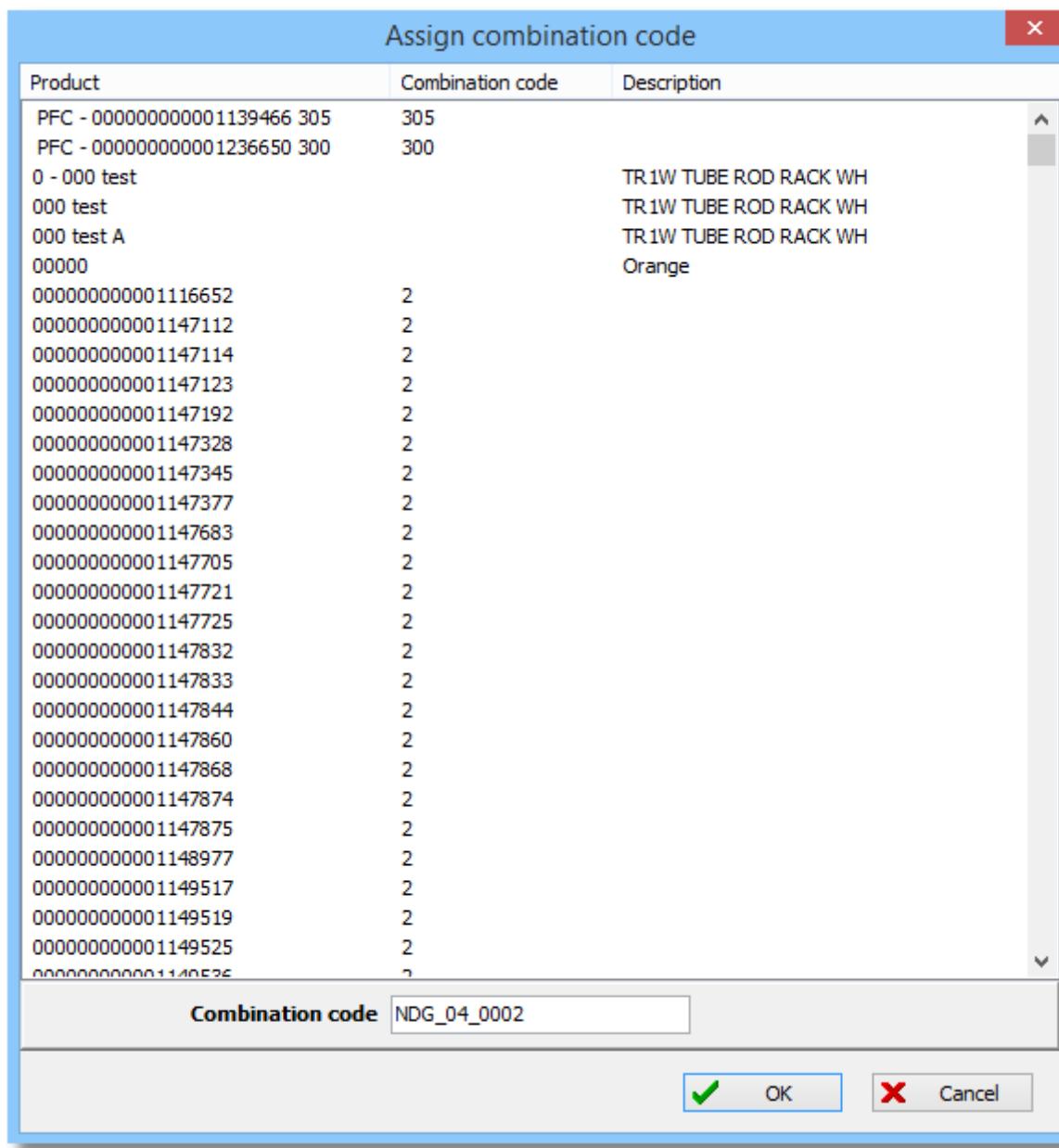
From the File Menu, choose **Data / Products / Combination Codes**, and, after creating appropriate combination codes, select **Data / Products / Combination Matrix**.



Each Product can be given a **combination code**, which lets you define which Products can be combined within one loaded Container. These codes have to be defined first in the **Combination Codes window** shown below. **Sequence** indicates in which sequence the **codes** will appear in the combination matrix. If you change a sequence number, the other ones will automatically be renumbered or shifted up. On exit from this window, the numbering will be changed to 1, 2, 3, ...

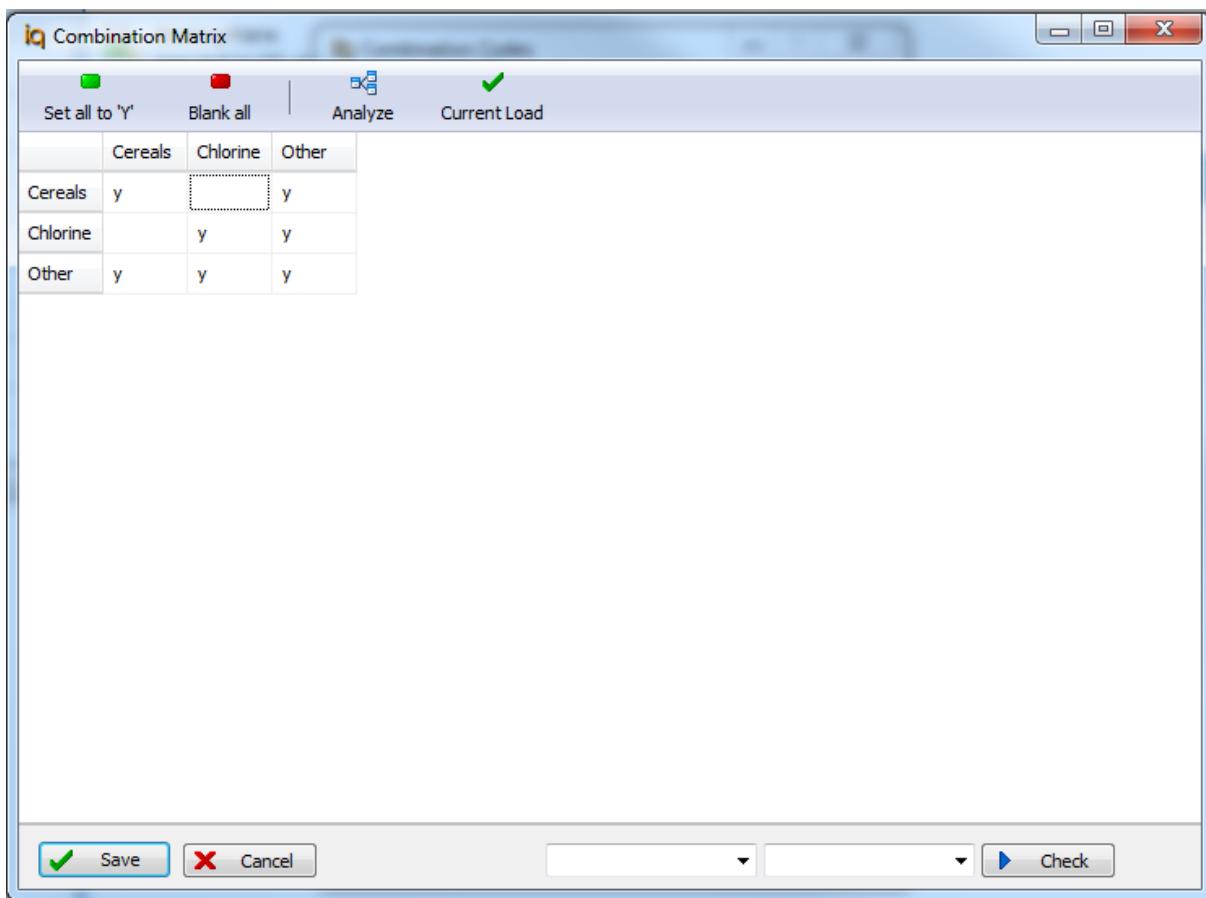


To allocate the currently selected code to multiple Products, click the **Assign** button. This takes you to the following window:



You can use the standard Windows list key clicks to make **multiple selections** (as done above), and then click the **Done** button to give each selected Product the current Combination Code. To select a consecutive series of Products, click on the first one, then hold down the Shift and click on the last Product. You can also hold down the Ctrl key to select random multiple Products.

To set up the combination matrix, choose the **Data / Products / Combination Matrix** menu. This displays the following Window, showing all existing combination codes in the order of their sequence numbers:



In this window you can set for each pair of codes whether a Product with the first code can be combined (within the same Container) with a Product having the second code. Even if there are codes and there is a combination matrix, Products without a code are assumed to be loadable with any other Product.

You can click the Analyze buttons to get an overview of which codes may be combined or skipped without impact on loading. Click the Save button to store your changes.

You can also check for a given pair of codes whether they can be combined or not, which is useful when the matrix is really large.

7 Loading

7.1 The Loading Operation

Load - Operations

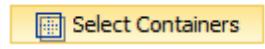
Setting up a new Load is done in three steps using the **Load Creation** controls:



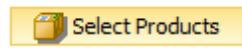
1. Click on the '+' icon on the Load Setup icon bar, or use the **Loads / New Load button** in the FILE tab. Enter a name/ID for the Load. This can be up to 64 characters in length, and must uniquely identify the current Load.



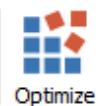
2. Add Container(s) into the [Stage 1](#) and set the fields accordingly.



3. Select Products into the [Load List](#), and set the quantities to be loaded.



Now setup is complete with the Container List and the Load List in place. Use (4.) the Optimize button to get the Load optimized.



5. Finally you can inspect the [Load Plan](#),



6. [Print it](#), and print the [Loading Manifest](#).

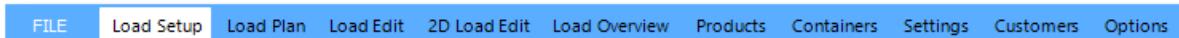
Click here for more information on the [Load Setup Window](#).

Before you can do these steps the following data must be in place:

(a) the [Containers](#) (that is, what we are loading into, for example shipping Containers, trucks, ULDs, pallets, crates, totes, or boxes)

(b) the [Products](#) (that is, what we are loading: SKUs, boxes, cartons, articles, items, rolls).

Accessing, editing and viewing the Load details can all be accessed through the Main Menu tabs.



Loads Setup - opens the [Load Setup Window](#), with all data fields empty. Start typing the name of the new Load.

Load Plan - opens the 3D Load Diagram (Graphics) screen.

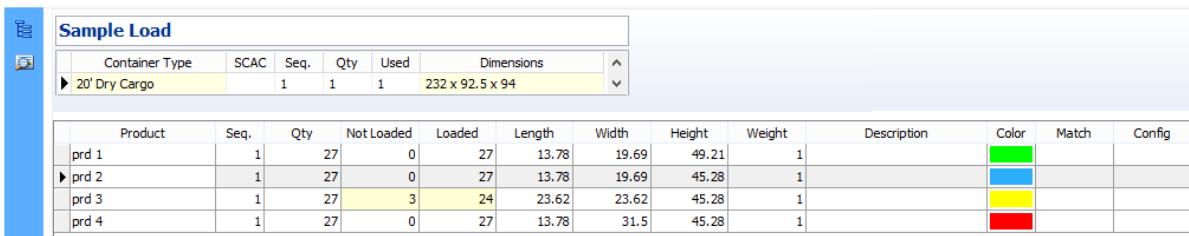
Load Edit - opens a screen in which you can use interactive drag&drop to modify a Load Plan. (**2D Load Edit** is a special Load Edit variant for the loading of lumber.)

Load Overview - at-a-glance view of all loaded containers.

7.2 Load Setup Window

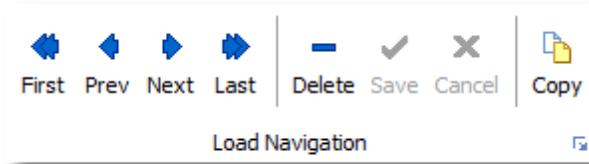
Load Setup Screen

The Load Setup Window is where you define new loading cases, and modify or delete existing cases. In the Main Menu, click on **Loads / Go To Loads.... (F3)**, or click on **Loads tab** in the Main Menu tabs.



The **Load Setup Screen** displays one Load at one time. To move between Loads you can use the following methods:

- **Load Navigation** controls to move to the first, previous, next or last Load
- **Data Tree**
- **Search** button



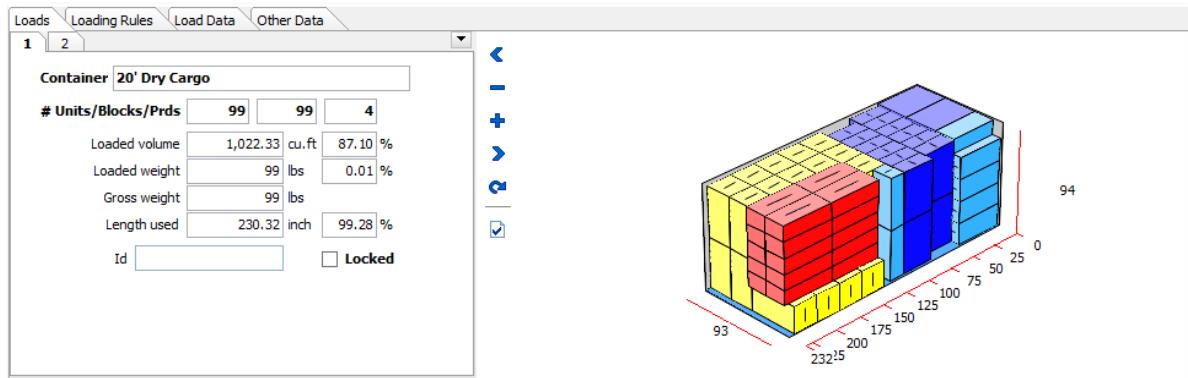
At the top of the Window you see the name of the Load in the **Load ID** field. To the right of the **Load ID**, is the [Container List](#), and below that, you will see the [Load List](#).

To process the loading case, simply click the **Optimize** button in the Load Controls. A small dialogue box will appear showing you the progress of the optimizer as it processes. You can interrupt this processing at any time by clicking on the **Interrupt** button at the bottom of the dialog. The best loading calculated by Cube-IQ so far will be stored in the database for reference. Note that not interrupting the optimizing process may lead to a better loading in the end.

In the Icon Bar, you can access common tasks in the Load Setup context. This is also where you can start a [Stage 2 Loading Case](#), or modify the Load List through a menu.

The various menu items are described in the section on the [Load List](#).

After a successful optimization, Cube-IQ shows [information on each loaded Container](#) along the bottom of the window, including a small graphical Load Plan.



7.3 The Container List

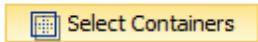
Load - Container List

The Container List is the grid shown on the [Load Setup](#) screen:

Container Type	SCAC	Seq.	Qty	Used	Dimensions
► EuroPallet		1	5	2	47.2 x 31.5 x 42.5

In the Container List you can change all fields, except for the 'Dims' column, which is only informational. You can add a Container type in two ways:

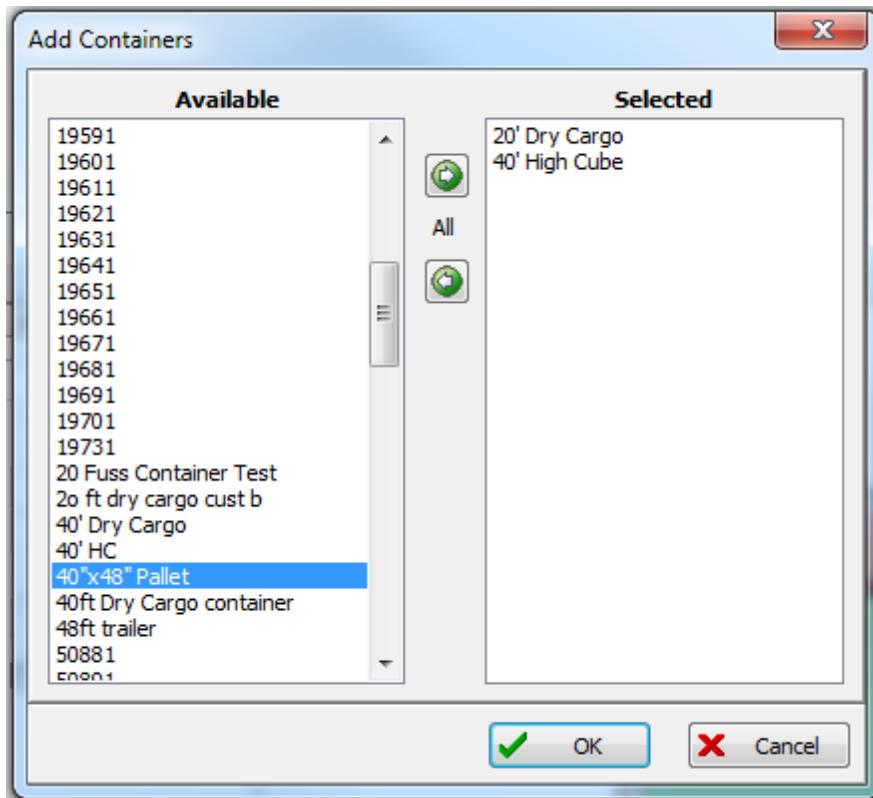
1. Use the **Add Container** button in the **Load Creation** controls of the Ribbon bar.



Alternatively:

2. Right-click in the grid for a popup menu, and choose **Add Containers**.

A selection box will appear from which you can choose the Container(s). As you click on the Containers in the Available box, they automatically are moved to the Selected box. To add more than one type of Container, simply choose the various types from the Available list.



You can also start typing the ID of a Product, and the list will jump to the first Product that has an ID starting with the same keys. Use the spacebar or a mouse click to move the Product to the right hand side. Press OK to move the selected Containers into the Container List.

After selecting the Containers, fill in the Seq. (sequence) and Number boxes. (The used box will be filled in by the program.)

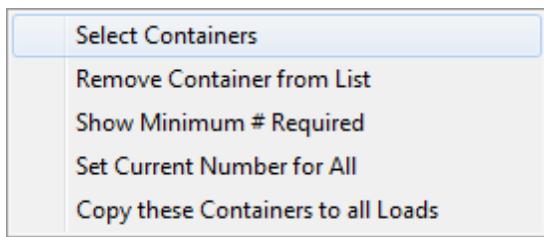
Seq. - The Containers will be loaded in sequence number order, but only if the option for optimizing over multiple Containers in the [Tools / Options / Loading Rules](#) is set at **Given sequence** .

Number indicates the available numbers for the various types.

Used shows how many of each type are in use in the current loading.

To access the data of the currently selected Container, use the **F6 key**.

The Container List has its own **popup-menu**. Right-click anywhere in the grid:



Besides Add Containers as discussed above, you will find:

Remove Container from List - removes a row from the Container List. You can also use Ctrl+Del to remove the current row.

Show Minimum # Required - Shows how many are required of the type currently selected (clicked on) in the Container List. This is based on the Volume Utilization defined in the [Settings](#).

Set Current Number for All - sets the number available for all Containers to the value for the current Container.

Copy these Containers to all Loads - copies the current containers listed in this load to all other loads. Use with care, as this operation cannot be undone.

7.4 The Load List

7.4.1 The Load List

Loading - The Load List

In the Load List you can select the type, sequence and quantity of Products that are to be loaded for this particular Load. Cube-IQ will Load as much Product volume as possible given which Containers are available.

Action	Product	Color	Seq.	Qty	Not Loaded	Loaded	Length	Width	Height	Weight	Description
<input type="checkbox"/>	160		1	750	677	73	9.94	5.75	10	5.04	Exhaust System Joint & Crack Sealer
<input type="checkbox"/>	161		1	66	25	41	9.25	5.25	9.63	5.04	Muffler & Exhaust Repair
<input type="checkbox"/>	46445		1	56	24	32	14.63	10	8.44	13.5	VIENNA FINGERS 16OZ.
<input type="checkbox"/>	46509		1	100	0	100	9	5.5	5.5	1.2	5 Minute# Gel Epoxy System

The Load List grid also shows (in the **# Loaded** column) how many of each Product have been loaded (in total, over all loaded Containers).

The grid has a pop-up menu if you right click anywhere in the grid. The items in this menu are:

[Select Product\(s\)](#)

Remove Product from List - Select this menu item to remove the current line from the Load list. **Tip:** To remove a whole row from any grid, click anywhere in that row, and use **Ctrl+Delete**.

[Split Product Line](#)[Copy Product Line](#)

Collate - combines lines that have the same Product with the same sequence number and group into a single Load List line.

[Select visible columns](#)

Show Load List actions - toggles whether Load List Actions are visible or not.

Undo Sorting - you can sort the grid on each column by clicking the column header. Selecting this item will undo any sorting.

Reset Load List Grid - reset the grid to its original setup (visible columns, column sequence, column width, etc)

Clear Load List - removes all Lines from the Load List grid.

Archive Load - archives the Load (see [Archiving](#) for details).

Set quantities to loaded - copy the values of the Loaded column into the Quantity column.

Increase/decrease all quantities - allows the user to increase/decrease all Product quantities by some percentage (to be chosen).

[Check adding Products](#)

The **sequence number field** can be used for two purposes:

1. To indicate which Products should be loaded first, second, third etc., in a LIFO fashion. If the order of loading is not important, leave this value as '1' for all Products. The sequence can be based on a picking order sequence, or on a drop shipment sequence, or on an LTL sequence etc. How the sequence is applied over the Containers is set in [Options](#).
2. To trigger **Spread-out loading**: if you have a multi-Container loading case, you can let the system spread certain Products over multiple Containers by giving them a sequence number of 0. For example, if you order 1000 cups and 1000 saucers, you may not want all cups to go in one Container, and all saucers to go a different one. If one Container gets lost, you may be left with 1000 cups without saucers. A sequence number of '0' will let Cube-IQ (more or less) spread the quantities over several Containers.

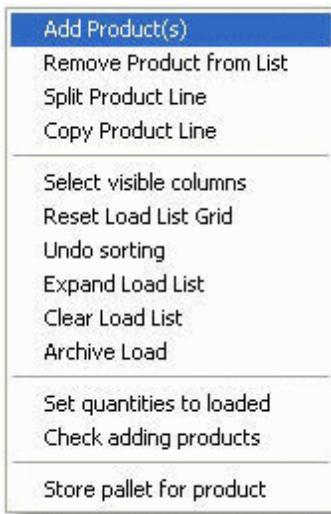
After selecting the Products, set the **quantities to be loaded**.

To **remove a complete Product row** from the grid, click on the far left of the grid to highlight the line you wish to delete, then press **Ctrl+Del** (or use the pop-up menu). You can also use the pop-up menu as described above.

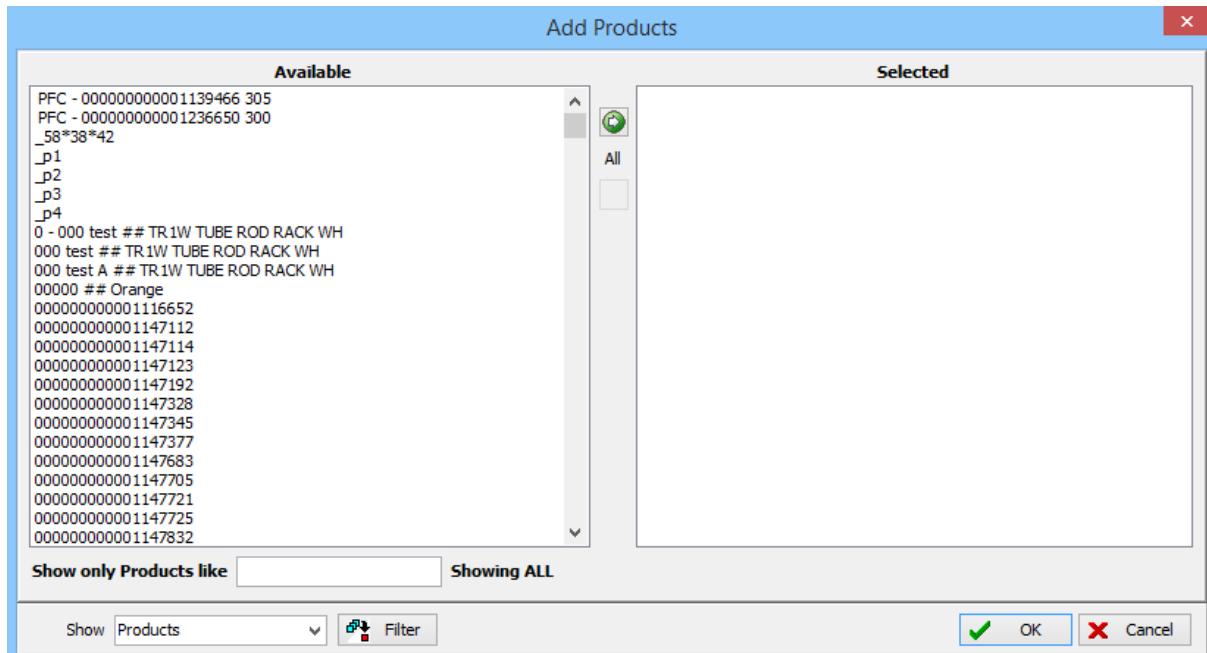
7.4.2 Load List: Select Products

Load - Add Products

Right click in the [Load List](#) grid, and choose **Add Product(s)**.



The **Select Products** window appears. On the left it show a list of Products and their descriptions.



Select Product(s) - gives you a selection list of Products that have been created in the [Product Data Window](#) (F5) window.

From the **Available** window, click on the Products you wish to include in the current Load. As you do so, the Products will appear in the **Selected** window. You can also start typing the ID of a Product, and the list will

jump to the first Product that has an ID starting with the same keys. Use the space bar or a mouse click to move the Product to the right hand side.

If you make a mistake, click the Product on the right to move it back to the left.

Press one of the buttons in the centre to move all Products right or left.

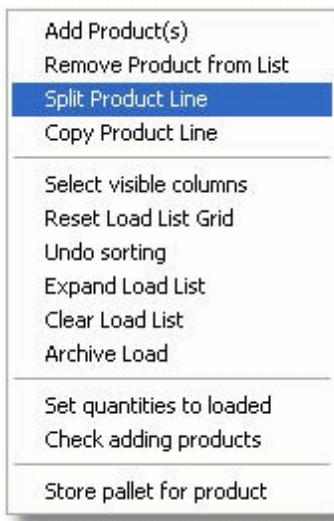
If you want to see only a subset of the Products, you can click the **Filter** button. This allows you to filter Products on the values that you have given to the Attribute fields of the Products (on the [Filtering tab](#) of Product Data).

7.4.3 Load List: Split Product Line

Load - Split Product Line

Splitting a Product line may be useful if you wish to set different sequence numbers for one Product. A split may also be useful when part of a [Load is to be fixed](#).

To split a Product line in the Load List, right click the list, and choose **Split Product Line**.



This will split the currently selected line in the table into two, adding a new line for the same Product at the end, with the quantity set at zero. You can now modify the table, for example for LIFO requirements.

Splitting a Product will allow you to get from this:

Action	Product	Color	Seq.	Qty	Not Loaded	Loaded	Length	Width	Height	Weight	Description
	160		1	750	677	73	9.94	5.75	10	5.04	Exhaust System Joint & Crack Sealer
	161		1	66	25	41	9.25	5.25	9.63	5.04	Muffler & Exhaust Repair
	46445		1	56	24	32	14.63	10	8.44	13.5	VIENNA FINGERS 16OZ.

to this:

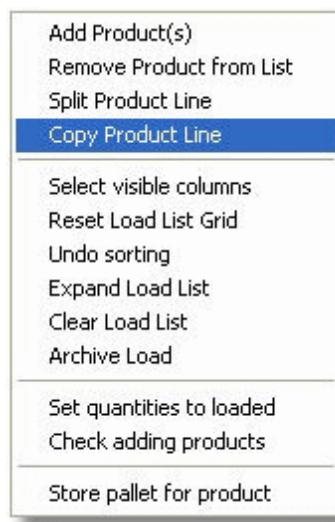
Action	Product	Color	Seq.	Qty	Not Loaded	Loaded	Length	Width	Height	Weight	Description
	160		1	500	427	73	9.94	5.75	10	5.04	Exhaust System Joint & Crack Sealer
<input checked="" type="checkbox"/>	160		2	250	250	0	9.94	5.75	10	5.04	Exhaust System Joint & Crack Sealer
	161		1	66	25	41	9.25	5.25	9.63	5.04	Muffler & Exhaust Repair
	46445		1	56	24	32	14.63	10	8.44	13.5	VIENNA FINGERS 16OZ.

Note that the first original row is now split into rows 1 and 2, and that these rows have different sequence numbers. We then changed the quantities from 750 + 0 to 250 + 500.

7.4.4 Load List: Copy Product Line

Load - Copy Product Line

Clicking 'Copy Product Line' in the pop-up menu will create a copy of the row on which you clicked.



If this is the list before the copy operation:

Action	Product	Color	Seq.	Qty	Not Loaded	Loaded	Length	Width	Height	Weight	Description
<input checked="" type="checkbox"/>	160		1	500	427	73	9.94	5.75	10	5.04	Exhaust System Joint & Crack Sealer
	161		1	66	25	41	9.25	5.25	9.63	5.04	Muffler & Exhaust Repair
	46445		1	56	24	32	14.63	10	8.44	13.5	VIENNA FINGERS 16OZ.

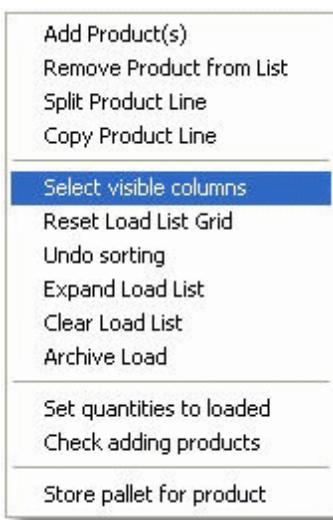
a right click in the row of 1904409 will give you a pop-up menu, and then selecting Copy Product Line leads to this:

Action	Product	Color	Seq.	Qty	Not Loaded	Loaded	Length	Width	Height	Weight	Description
	160		1	500	427	73	9.94	5.75	10	5.04	Exhaust System Joint & Crack Sealer
<input checked="" type="checkbox"/>	160		1	1	1	0	9.94	5.75	10	5.04	Exhaust System Joint & Crack Sealer
	161		1	66	25	41	9.25	5.25	9.63	5.04	Muffler & Exhaust Repair
	46445		1	56	24	32	14.63	10	8.44	13.5	VIENNA FINGERS 16OZ.

7.4.5 Load List: Select Visible Columns

Load - Select visible columns

In the **Load List**, a large set of columns is available, most of which are not visible by default. Many support additional functionality as described below. In the right-click pop-up menu of the Load List, click on 'Select visible columns':



This will give you the following screen, where columns can be made visible in the grid by dragging their name into the column header section, and dropping it in the preferred place. A visible column can be made invisible by clicking it in the header row of the grid, and dragging it out of there.

ID	Length	Width	Height	Weight	Description	Color	Match
0	2	2	1	0.5			
11	8	8	1	0.5			
11	1	1	1	0.5			

Customization

Columns

- #Bundles
- #Bundles Out
- Bundle Qty
- Category
- Comb.code
- Config
- Config Name
- Delayed
- Due Date
- Fixed
- Items
- Max Stack

The following columns are available:

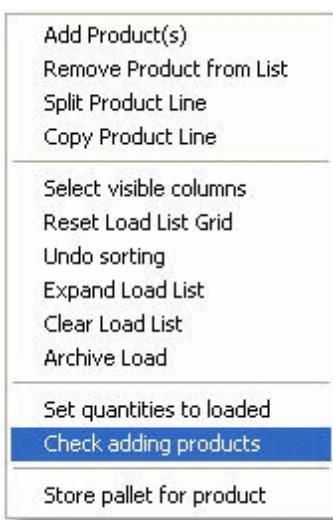
- Product - the id, must remain visible
- Sequence - required loading sequence

- Group - group number
- Original Quantity - if you enter the quantities here, they will be kept for reference. This is useful if user manipulation of quantities (using the Quantity column) is required for optimal loading.
- Quantity - the quantity to be loaded. This field will be filled with any values that are entered under Original Quantity.
- Maximum Quantity -
- Loaded
- Fixed
- Not loaded
- Total Volume
- Total Weight
- Total Items
- Length
- Width
- Height
- Weight
- True weight
- Unit volume
- Volume
- Items
- Order
- Product type
- #Bundles
- #Bundles out

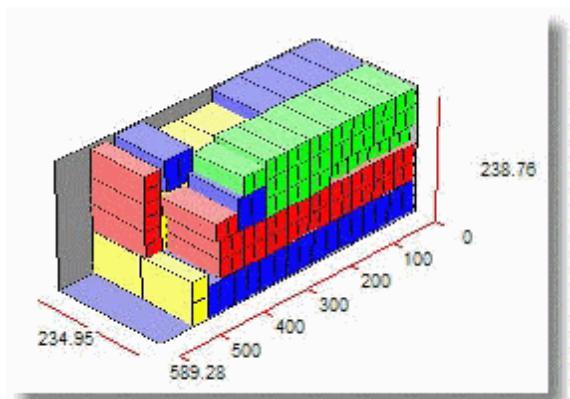
7.4.6 Load List: Check adding products

Load List: Check adding Products

The Load List submenu lets you select 'Check adding Products':

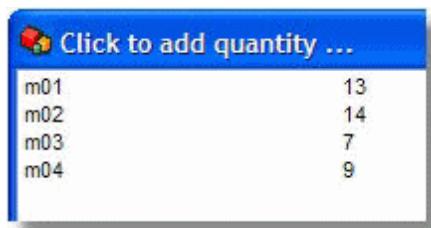


This menu item only works when all Products have been loaded. For a partial Load like this:



you will then get a rough estimate for each Product as to how many can be added:

TICKET #1150 - unable to get remaining screen grabs because of this issue



If the original Load list is as follows:

	Package	Seq.	Qty
►	m01	1	22
	m02	1	22
	m03	1	22
	m04	1	22

clicking in the m01 row of 'Click to add' will lead to this new Load list:

	Package	Seq.	Qty
I	m01	1	35
	m02	1	22
	m03	1	22
	m04	1	22

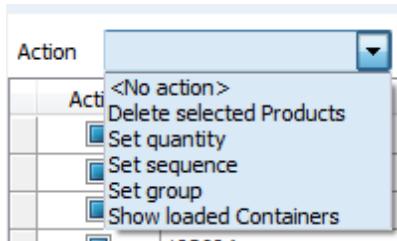
7.4.7 Load List: Actions on Marked Products

Load List: Actions

Common actions that can be apply to an individual Product or multiple Products in the Load list are available. If not visible, toggle visibility of the right click menu of the Load List grid.

Action	Product	Seq.	Qty	Not Loaded	Loaded	Length
<input type="checkbox"/>	115584	1	4	4	0	401
<input type="checkbox"/>	115586	1	2	2	0	401
<input type="checkbox"/>	115585	1	2	2	0	401
<input type="checkbox"/>	102604	1	1	1	0	470
<input checked="" type="checkbox"/>	102603	1	2	2	0	470

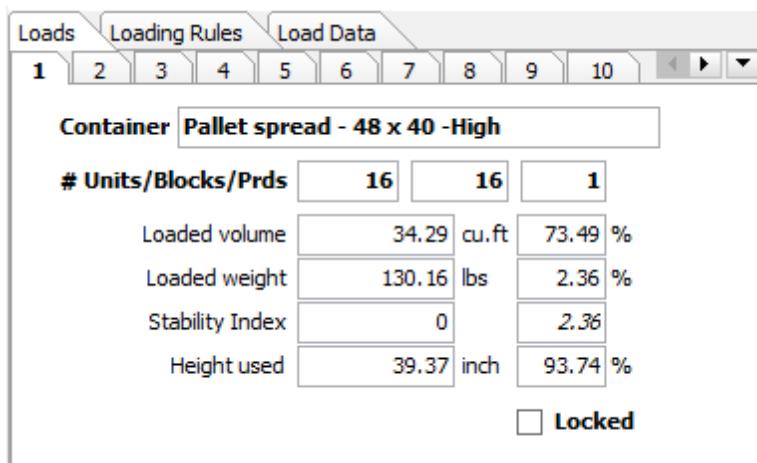
Product lines can be selected in the new column on the left. Click on the drop down to select the action to take on the marked lines. Each selection will then give you follow up options.



7.5 Loaded Containers Details

Load - Loaded Containers Details

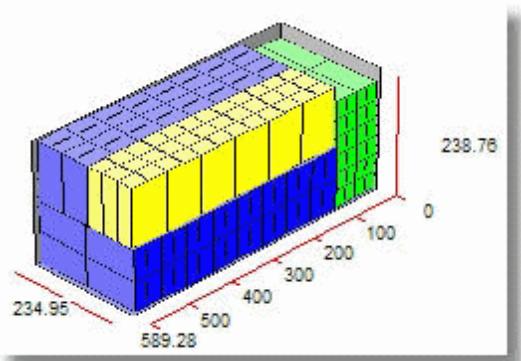
For each loaded Container, an information tab is shown in the lower left corner of the Load Setup window:



On these tabs, you can decide to '**lock**' the Load of the current Container. This is useful if you are satisfied with one or more of the Loads, but would like to manipulate the remaining Products and Containers. Locking Loads will keep them in place when you optimize a Load again, possibly after changing its data. If you lock (say) Loads 1, 3 and 5, these will become 1, 2 and 3 after optimizing again.

You can click on each tab, and also move between tabs using PgUp/PgDn.

To the right of the loaded-container data, a small picture of the Load Plan is shown:



You can manipulate what is shown using the small Toolbar:



The function of the five buttons is from top to bottom: (1) show all Products/blocks in the Container, (2) show one more loaded block, (3) show one less loaded block, (4) show no Products, and (5) rotate the picture to a view from the next angle (of four).

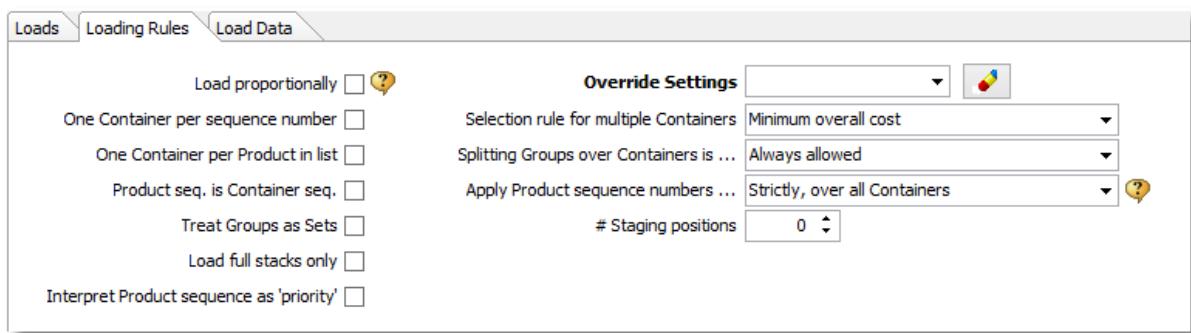
If you check 'Locked' the loading of this container will stay in place when you click Optimize again.

7.6 Other Load Setup tabs

Load - Other Data

Next to the Loads tab for the results are two more tabs on **Load Setup**. The first additional tab is for **Loading Rules**, the second for additional **Load Data** fields.

This is the **Loading Rules** tab of **Load Setup**:



For many of the **rules** set here you can define [default values for newly created Loads](#) on the main Options tab.

Check '**Load Proportionally**' if the quantities in the Load List indicate in which proportion the various Products are to be loaded. If, for example, you do not know the exact numbers of Products that will fill a Container, but only want to set relative numbers, start by making only one Container available. If you would then give three Products quantities 1, 2, and 4, Cube-IQ will Load maximum numbers, roughly proportional to 1:2:4, for example, 100, 195 and 408.

Check '**One Container per sequence number**' if you want the sequence column in the Load List to indicate into which Container in the list certain Products should go. So, Products with sequence 2 will go into the Container that is second in the list, for example.

Check '**One Container per Product in list**' if you want to find out for many Products how many of each (on their own) fit in one Container. We see this typically being used in Palletizing. So, if you have 200 Products in the list, you will get 200 loaded pallets, one for each Product.

Check '**Product seq. is Container sequence**' if you want the sequence column in the Load List to indicate into which loaded Container certain Products should go. (Products with sequence 2 will go into the second Container, for example.) This option is used in some cases where Customers of Cube-IQ clients specify the whole Load allocation, and Cube-IQ is used only to check those Loads.

Check '**Treat Groups as Sets**' if you have split the Products in the list into groups (by giving each group a unique (Integer) number, where each group represents a set. An example is 'one table and four chairs'. If such a group/set gets loaded, loading will always take place proportionally. So, if you ask for five sets to be loaded (5 tables and 20 chairs), and this does not fit, the system may cut the quantities to 4 tables and 16 chairs. It will not do 5 tables and 13 chairs.

Check '**Load full stacks only**' if you want the software to only load bundles of a Product that have as many units in the height as the Product's maximum stack quantity..

Interpret Product sequence as 'priority' loads the Container in Product sequence, but on the assumption that

the actual loading may take place differently. So, the sequence is more of priority, than one of operational necessity. It also means that settings like 'Maximum Reach' do not kick in, and that the sequence presented to the user may not adhere to the Product sequence.

You can select here a set of Settings that is to be used to **override the Settings** of the selected Containers. This is useful if you have set up special Settings with different (possibly relaxed) loading rules.

The **Selection rule for multiple Containers** sets in which order different Containers are to be used by the optimization, when doing a Load involving multiple Container types. The choices are

- **Best fit sequence** - in each step, all Containers are loaded, and the one with the highest utilization is selected,
- **Largest first** - in each step the largest available Container is used, except in the last step where the best fitting Container is used.
- **Minimum overall cost** - the system will attempt to determine which set of Containers will lead to the lowest overall Container cost. If no costs are provided (in Container Details), the system will calculate its own 'costs', which are designed to minimize the number of Containers used, and given the number used, the overall volume used.
- **One Container only** - a single Container will be loaded, and if more than one Container is required, no Load will be produced at all. (This particular rule is only used in some cartonization applications.)
- **Largest reaching minimum fill first** - repeatedly the system will Load the largest Container that can be filled for at least its minimum fill percentage.
- **Sequenced reaching minimum fill first** - repeatedly the system will Load the Container with the lowest sequence number that can be filled for at least its minimum fill percentage.
- **Minimum overall cost + Largest First** - both rules are applied in two consecutive, separate runs of the optimizer, and the best results are presented to the user. This rule is based on the experience of some users who found that one rule works best on some of their loads, and the other rule best on other loads.

Note that the Container Selection rule is not used when different (hard) sequence numbers have been entered for the available Container types, as shown here:

	Container Type	SCAC	Seq.	Qty
	40' Dry Cargo		2	10
	20' Dry Cargo		3	10
I	40' High Cube		1	10

Splitting groups over Containers is ...

This rule selects what the optimization is allowed to do with Products that share a 'group' number. The Options for splitting of groups over loaded Containers are:

- **Always allowed** - in this case, groups are only used to keep Products together within a loaded Container, even when a subsequent Container may also another group of these Products.
- **Allowed if it avoids an extra Container** - group splitting is not done, unless it saves a whole Container.
- **Allowed only when too large for one Container** - groups are not split, except when the whole group would not fit into a single Container.
- **Never allowed** - the results may be that groups are not loaded when too large or too heavy for one Container.

The 'Apply Product sequence number ..' rule gives you a choice of two Options:

- (1) **'Strictly, over all Containers'**, which leads to the Product sequence numbers being applied 'hard' over all Containers. The system starts loading the lowest sequence number on the first Container, and continues with this sequence number until they are all done. So, no Product with a certain sequence number will be loaded until all Products with lower sequence numbers are in some loaded Container.
- (2) **'Strictly per Container, skipping allowed'**, as used in for example cartonization. The Product sequence gets

applied for each individual Container (typically a pallet or carton). This means for example that the first carton may contain Products with sequence numbers 2, 3 and 4, the second Container may hold 1, 2, 5, and the third Container 4, 5, and 6.

And the third tab is for some other **Load Data** fields:

The screenshot shows the 'Load Setup' interface with the 'Load Data' tab selected. The 'Customer' field has a dropdown arrow and a clear button. The 'Ship Date' and 'Creation Date' fields have dropdown arrows. The 'Notes' section is on the right.

If a **Customer** has been selected (click the drop down arrow for a list, and the '-' button to clear), its data will be used when printing a [Loading Manifest](#).

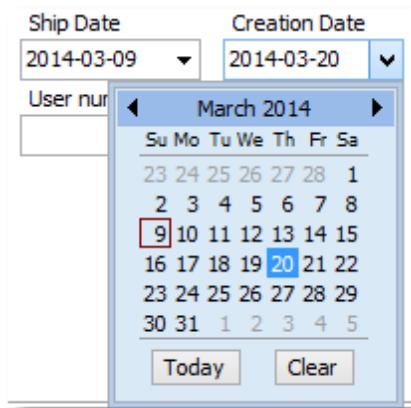
The **Product Filter** is a very important tool to restrict which Products are currently visible. If this field is given a value, only Products with the same value or with no value in their **Main Product Filter** field will be visible. You database may contain Products for Customers named Jones, Smith and Johnson Brothers. If Product Filter is set to 'Johnson Brothers' only the Product for that client will be visible in the system (as long as you are working on this Load). This is what the field looks like in the [Product Data window](#):

The screenshot shows the 'Products' window with the 'Filtering' tab selected. It contains sections for 'Main Product filter' (Attribute 1) and 'Other filters' (Attribute 2, Attribute 3, Attribute 4).

The **Notes** are printed on the [Load Plan](#) and the [Manifest](#), if on the FILE tab you selected '[Print Notes from Load Data](#)'.

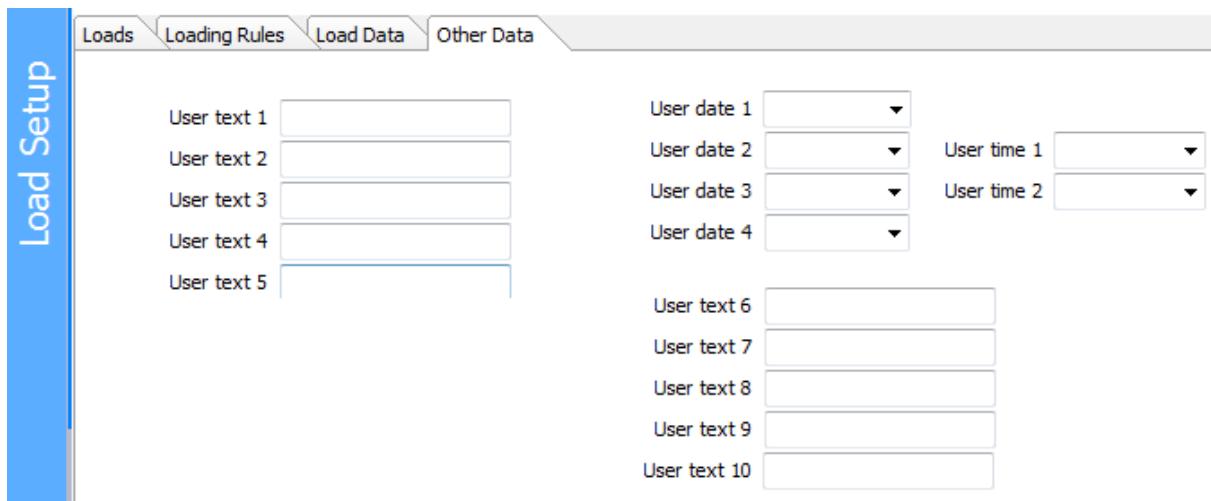
'**P.O Number**' is in fact a user-definable string of information, not used directly by Cube-IQ but displayed and printed in some reports. You can use **Tools/Translation** to change the text 'P.O. Number' into something else. The user also has '**User number**' and '**User text**' available for any purpose, that can be set by translating the captions.

'**Ship Date**' a date field which can be used for example for the expected shipping date. This field is used only for display and printing. Click the down arrow for a Date Picker as shown below.



'Creation Date' is the date when the Load was last optimized.

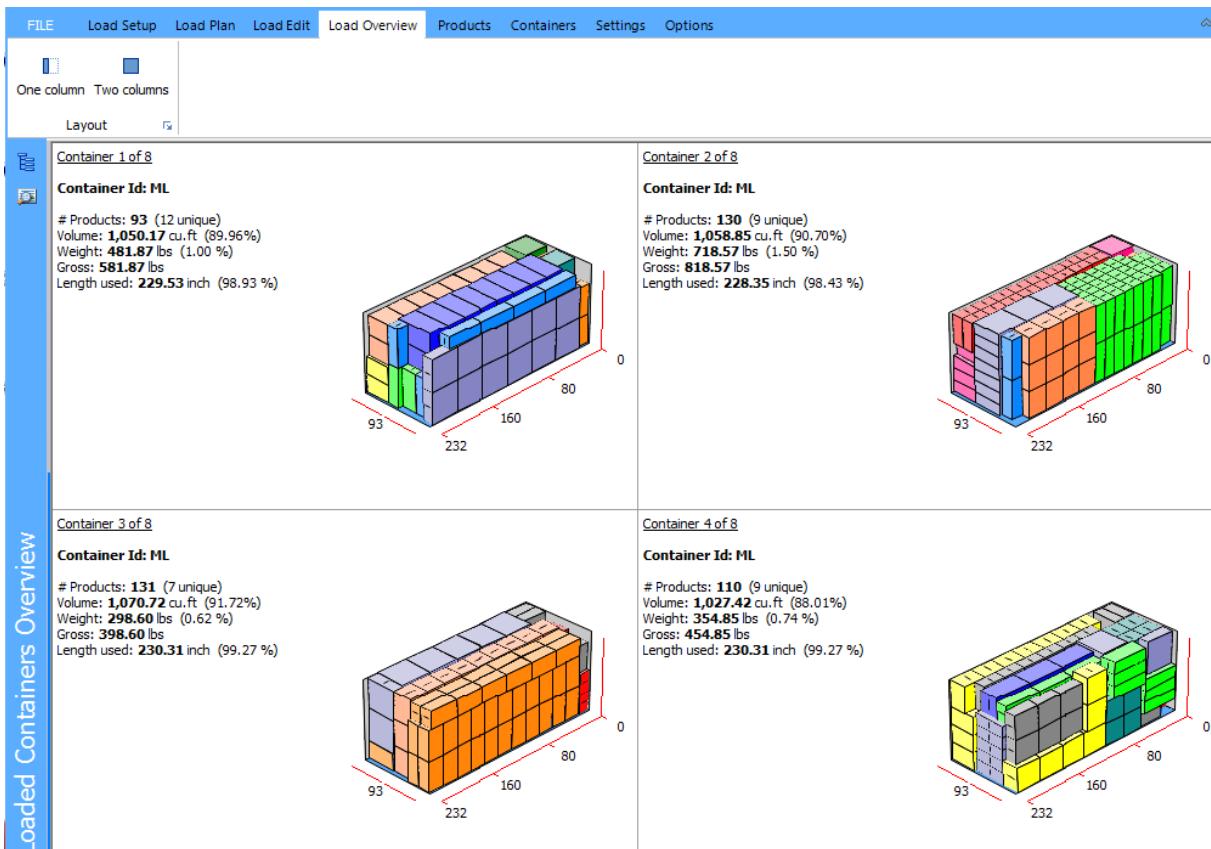
Finally, in Options, General tab, you can make a fourth tab visible for access to a series of **User Definable fields**. These can be used for various purposes.



7.7 Load Overview Tab

Load - Load Overview

Load Overview shows a small picture, with some detailed information, of every loaded container in the current Load.



7.8 Load Details Window

Load - Load Details

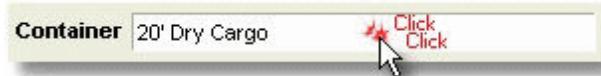
Click Load Details on the Actions tab of the Icon Bar to access the Load Details Window. This shows you all the intricate details of the current loaded Container, as it is for example exported to other system for further processing. Typically this screen is not relevant for day-to-day operations.

Product	Seq.	Grp	Quantity	# Loaded	Fixed	Present	Length	Width	Height	Weight	Not Loaded
Pallet spread - HKJ1325 -2	1		200	200	0	16	24.02	15.67	9.84	8.135	0

This window shows one tab for each loaded Container in the current Load. You can use the Main Navigator to move between cases, and the smaller 4-button Navigator to move between loaded Containers (tabs) within in Load. You can also use PgUp/PgDn.

For each loaded Container, the window shows

- which Container type is involved (double click to access its data)



- how many Products are in this Container

# Packages	# Blocks	# SKUs
49	8	3

- how many blocks are in the Container (Cube-IQ Loads Products in '**blocks**', that is, blocks of Products of the same type, in the same orientation, in a certain number deep, wide and high)
- how many different Products (SKUs) have been loaded
- the **weight distribution** (position of the centre of gravity as a percentage of the full length/width/height, and the weight on each defined axle as a percentage of the maximum allowed weight)
- the **overall Load dimensions** (used for example when deciding how big to build a crate). (An interesting aspect of the optimization is that the system will try to minimize the length of the Load, once it determines that all Products can be loaded. Here you can also check which part of the Container length is in use.)

nr 5	Cntr 6	Cntr 7	Cntr 8
Center of Gravity		Axle Weights	Overall Load Dim.
117.58 50.7%			L=229.53
50.39 54.5%			W=92.13
44.24 47.1%			H=92.52

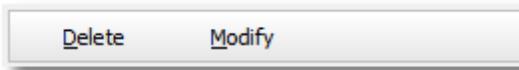
(In this example, no axle weight limits were defined.)

- Load statistics, Container ID, and SCAC

Loaded volume	1,050.17	cu.ft	89.96
Loaded weight	481.87	lbs	1.00
Total weight	581.87	lbs	
SCAC			
Physical Container			

Here you can enter the ID number and the SCAC of the Container that will actually be used for this particular Load. This will then be shown on various reports.

In the Load Details window you can **delete** one of the loaded Containers, for example in a multi-Container Load where the last Container has not been filled well.



You can also change the Load List for one of the loaded Containers, and then re-optimize only this Container. The '**Modify**' button gives you access to a window to edit the Load list, adding Products, or changing quantities, possibly to zero. (See [Options - Loading Rules](#) to set which Products will be shown in the Modify - Load List.) The Modify button is also very useful when you have [fixed part of a Load](#), and would like to re-optimize the remainder.

The '**Re-Optimize**' button will then process the changes, and re-optimize this Container's loading.

The **Loaded Blocks grid** shows the composition and location of every block in the currently selected Container:

Product	Block	Unit Length	Unit Width	Unit Height	Deep	Wide	High	Depth Crd	Width Crd	Hght Crd
00951D	15	10.25	6.63	6.88	5	4	1	276.75	41	95
05171014 - K1	16	10.25	6.88	6.63	6	4	1	0	67.52	95
05171014 - K1	17	10.25	6.88	6.63	9	3	1	61.5	67.52	95
05171014 - K1	18	10.25	6.88	6.63	9	3	1	153.75	67.52	95
05171014 - K1	19	10.25	6.88	6.63	8	3	1	246	67.52	95
00951D	20	10.25	6.63	6.88	9	1	1	61.5	88.16	95
00951D	21	10.25	6.63	6.88	7	1	1	153.75	88.16	95
► 00103	22	75	95	100	1	1	1	550	0	0

You will also see the **original Load List** for the case, but here with two extra columns:

Product	Seq.	Quantity	# Loaded	Fixed	Present	PLength	PWidth	PHeight	Weight	Description
▶ Product B	1	12	12	0	11	50	95	95	250	
00951D	1	400	400	0	400	9.38	7.88	14.63	1.68	No-Fog Windshield Cloth Dispenser
05171014 - K1	1	400	400	0	102	50	74.02	48.82	396.83	
00103	1	400	19	0	1	10.25	6.88	6.63	7.32	Muffler Weld Exhaust Repair

The '**Present**' column shows how many of each Product have been loaded in the currently viewed Container.

The '**Fixed**' column shows how many of each Product has been fixed in place before the optimization.

7.9 Multi Stage Loading

Load - Multi-Stage Loading

Cube-IQ caters for [multi-stage loading](#), for example boxes onto pallets, and then those pallets into trucks. Start by setting up a Load for loading only the smallest items into the smallest container type.



Important: For the Stage 2 creation to work correctly, the 'Container' of Stage 1 (usually carton or pallet) must have its '[Outside Dimensions](#)' filled in in [Container Details](#).

After creation of Stage 2, you will be able to find all loaded pallets of Stage 1 in the Product Details, as these 'Containers' have now been converted automatically to 'Products'. If the name of the Stage 1 Load was 'xyz', they will be called 'xyz/1', 'xyz/2' etc. In [Product Details](#) you will find what was loaded on the pallets on the [Items tab](#). These temporary, artificial Products will get deleted with the Load in which they play a role.

7.10 Fixing Partial Loads

Load - Fixing Products

In Cube-IQ, you have the possibility to optimize a loading, then to fix part of the loading, modify the input for the loading, and finally to re-optimize with the fixed part unchanged.

Fixing a complete loading can be very useful when you inspect the loading, and notice that some Products could have been added to the Product list for this loading. Rerunning the whole optimization may give you a different loading. So, rather than re-optimizing, you fix the whole loading, then add some Products, and re-optimize with most of the loading fixed.

Fixing part of a Load is also used in cases where the Load list changes after the actual loading has started. What is physically loaded is then 'fixed', and after modifying the Load List the case is re-optimized.

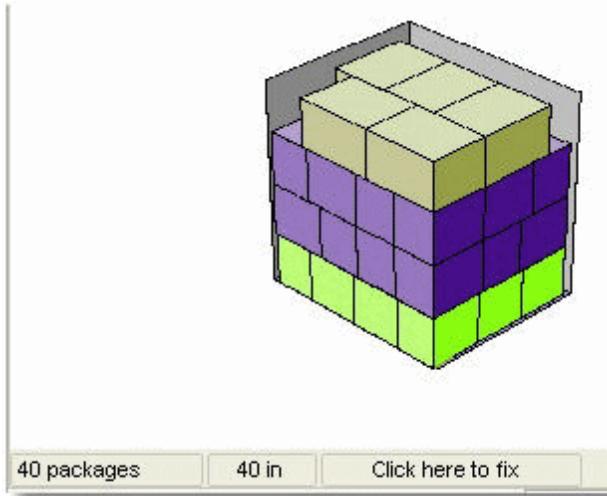
Use the 'Modify' button on [Load Details](#) to fix loaded units using the 'None' and 'All' to unfix, respectively fix

all of the loaded Products:

The screenshot shows the 'Loading' software interface. At the top, there's a blue header bar with the word 'Loading'. Below it, a toolbar has two tabs: 'Load' (which is selected) and 'Test Shipment'. The main area is divided into several sections:

- Container:** Shows '1 of 4' containers, specifically a '53ft trailer'.
- Fix loaded units:** Buttons for 'None' and 'All'.
- Statistics:** Loaded volume (3,123.13 cu.ft, 85.76 %), Total (1219), and Fixed (0) are 'Loaded'; Loaded weight (43,906.19 lbs, 99.79 %), Total (831), and Fixed (388) are 'Not loaded'.
- Product List:** A table showing products, descriptions, sequence numbers, quantities, and presence status. The table includes columns for Product, Description, Seq., Quantity, Present, and # Fixed. One row is highlighted with a blue background: 'Product A'.

Alternatively, on the main [Load Plan Tab](#) you can click in the Status Bar where the text 'Click here to fix' appears. First use the 'None', '−', '+' and 'All' buttons to show exactly what you would like to fix, then click in the Status Bar.



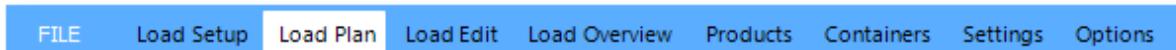
Note that with a partially fixed Load, you cannot use the normal Optimize button as that will un-fix the Load. You will receive a warning when you use Optimize anyway.

8 Load Plan diagram

8.1 Load Plan

Load Plan

The Load Plan of Cube-IQ can be accessed by selecting the **Load Plan** tab on the main screen, or by using the F4 function key.



You can manipulate the graphics in the Graphics window in various ways:

1. Dragging to rotate

The graphical display allows you to check the loading visually from any angle. The picture in the **Graphics** window can be turned by dragging the mouse over the window.

2. Using the **Viewing Cube** on the right-side of the screen. Click on any face, edge or corner to quickly move the image to the related viewing angle.

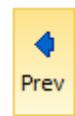
3. Using the **Toolbar**

Various functions (as described below) can be performed by clicking on one of the buttons in the **Graphics** window.



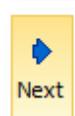
Function
Prev

Button

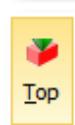


Keyboard

Next



Top view



Alt-T

View from Left



Alt-L

View from Right



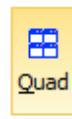
Alt-R

View from Front



Alt-F

Show a quadruple view (one from each corner)



View from Front Left



View from Front Right



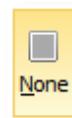
View from Back Left



View from Back Right

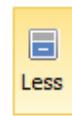


Do not show any blocks/Products



Alt-N

Show one less block of Products



-

Show one more block of Products



+ (or =)

Show all Products



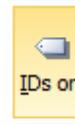
Alt-A

Toggle the display between blocks and individual Products



Alt-B

Toggle the display of IDs



Alt-I

Select various viewing styles in the following formats:

Normal -

Placement Sequence -

Ghost -

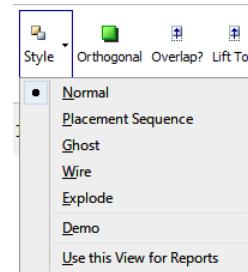
Wire -

Explode -

Demo -



You can also set here if the View is to be used for reports.



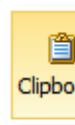
Toggle orthogonal view



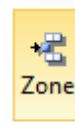
Toggle lifting the top from the view



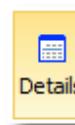
Place the current view of the Load Plan on the Windows Clipboard



Select a Zone, in order to show only the units in that Zone



Toggles to the detail view of the Load



To see how the Load gets built up, you can also use the **Slider** along the right hand side of the view

3. Using **Keyboard shortcuts** as in the table above. A 'p' prints an 'as is' report, showing the Container as currently displayed. For this function you can also use the Print button in the main menu toolbar.

At the bottom off the screen you can click in the status bar, in order to fix that parts of the loading that is currently visible. This will allow you to make changes to the Load list or the Settings, followed by re-optimizing. This will keep the fixed part of the Load in place. The re-optimize can be accessed only the Load Details screen.

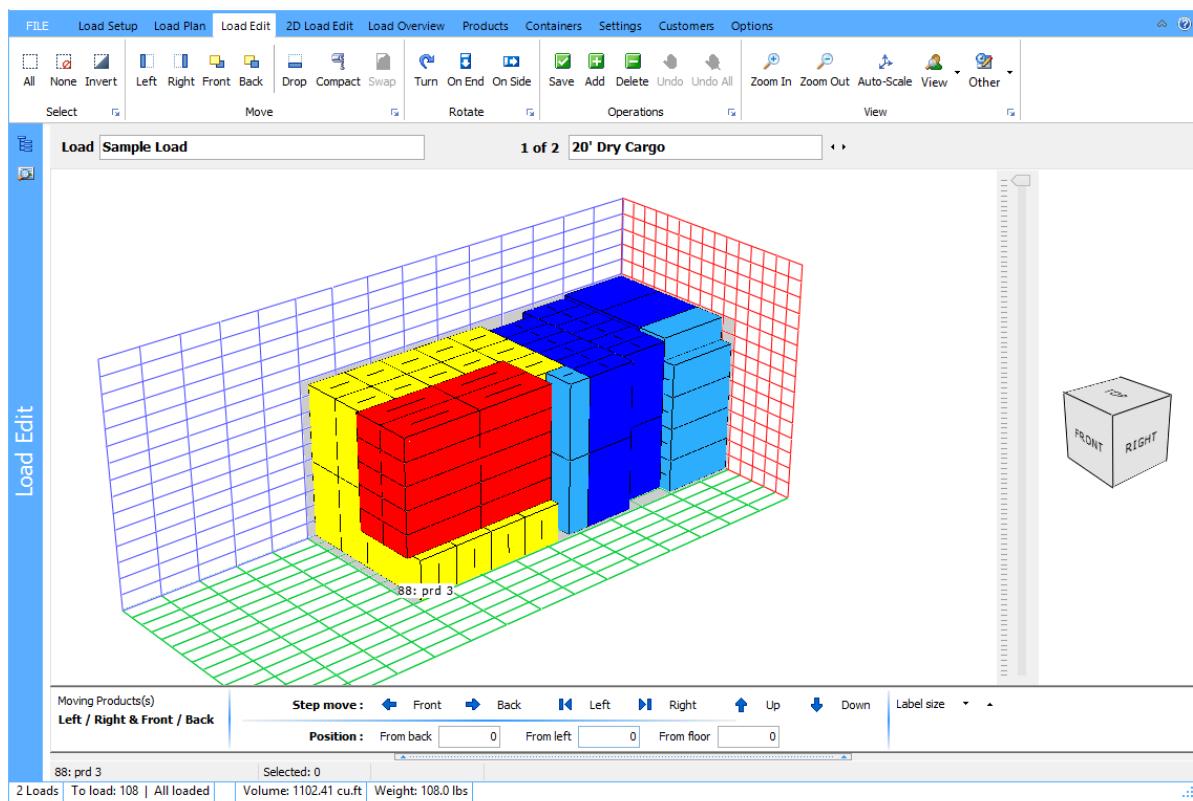
To move between loaded Containers within one Load, use the PgUp/PgDn keys, or click the Prev/Next buttons at the top.

To move between Loads, use the two Navigator Buttons, top left of the graphics, or Alt combined with one of the cursor keys.

8.2 Load Editing

Load Editing

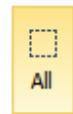
The Load Edit functions of Cube-IQ can be accessed by selecting the **Load Edit** tab on the main screen.





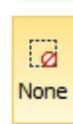
Function
All

Button



Keyboard

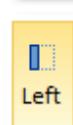
None



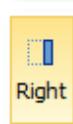
Invert



Move to Left



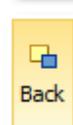
Move to Right



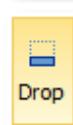
Move to the Front



Move to the Back



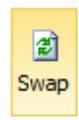
Drop



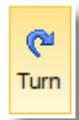
Compact



Swap



Rotate



On End



On Side



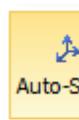
Zoom In



Zoom Out



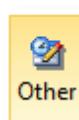
Auto Scale

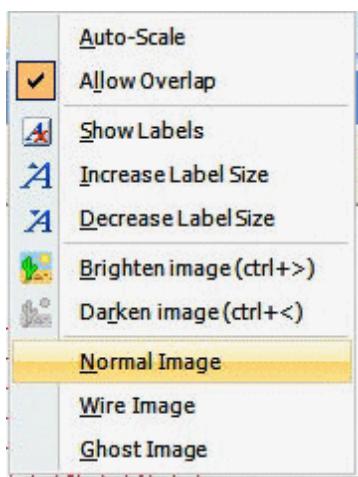


View



Other





9 Other Features

9.1 Translation

Tools - Translation

From the Options screen, choose the **Translate** button.

The translation of Cube-IQ is stored in an XML file, in a sub-folder of the main installation folder called 'Translations'. The file names are used to define the 'language', so 'German.xml' will show up as 'German' in selection lists. To select a translation language, see [Options tab, Misc. sub-tab](#).

Each Cube-IQ also has a **local translation** file that contains translated screen strings that (if present) override the strings in the translation file. The Tools/Translate menu allow you to add your own translations to the local translation file. This file is called 'Cube-IQ Local.xml', and it is stored in 'Documents and Settings/user'/application data/MagicLogic'. You can copy it between installations to transfer full translations.

Translation		
Original Text	Overwrite Translation	Location
# Blocks		Load Details
# Containers:		Totals Report
# Days to keep archived loads		Options
# Fixed		Re-optimization
# High		Product Data
# Items		Product Data Grid
# L.		Diagram + Load Lists
# Loaded		Load Details
# Long		Product Data
# Prds		Load Details
# Stages		Load Setup
# Units		Load Details
# Units/Blocks/Prds		Load Setup
# Wide		Product Data
#Bundles		Load Setup
#Bundles Out		Load Setup
&Add Containers		Load Setup
&Add Product(s)		Load Setup
&All		
&Apply		Load Filter
&Assign		Stack Codes
&Blocks		Message
&Boxes		Message
&Cancel		Import Options
&Clear		Product Data
&Close		Diagnostics
&Color		Product Data Grid
&Convert		Load Details
&Copy Product Line		Load Setup

The text on all Cube-IQ windows and in all reports can be translated. This enables you to use Cube-IQ in another language, or simply to change certain terminology to suit your operation. For example, if you prefer to

use the term 'carton' instead of 'Product' you can use this function to find and replace all occurrences of the word 'Product'.

Another example of how the translation can be used is keeping your users from changing a setting by the trick of translating its description into 'Do not modify'.

The picture above show part of the translation window, with first the original text, then the translation. The location shows the window using the text, which may be useful if you need to check the context.

Some other remarks on translation:

- You can also change **shortcut commands**. Shortcuts appear at the top of the translation list, starting with the shortcut symbol '&'. So for example you could modify the menu item '&Product' (shown as 'Package' in the menu) into 'Bo&x' (will appear as 'Box' and can now be accessed using ALT+x). Bear in mind that you will need to keep shortcuts unique in order for them to work properly.
- To show '&' in a translated text, use '&&' instead.
- To keep a string from being shown at all, translate it into a single dash, as in '-'. Translating into one or more spaces does not work.
- **Never delete any 'original' text strings.**
- If you translate a text, and then translate it again in the same session, the effect can only been seen the next time Cube-IQ is started up.
- If you find a text that cannot be translated, you can add it to the translation by using the Ins key (=Insert), which will open up a row to enter the text and its translation.

Translation can be switched off if you want to use the original US-English text. There is a click box on the Translation window, but the effect can only be seen in the next Cube-IQ session.

Translating the Help itself cannot be done from within the system, as it requires the use of various other software tools. Please contact your supplier or MagicLogic, if you'd like more information on this.

10 Help

10.1 Help - Register Cube-IQ

Help - Register Cube-IQ

If you have an unregistered (trial) version of Cube-IQ, use **Help / Register Cube-IQ** to enter the unlock code. This will be given to you by MagicLogic when you purchase a license to the software.

10.2 About MagicLogic

Help - About MagicLogic

MagicLogic Optimization Inc. of Vancouver, British Columbia, Canada specializes in solving complex optimization problems. MagicLogic has been active in various types of scheduling optimization. Besides Cube-IQ for Container Loading, the company markets Plan-IQ for Panel Cutting Optimization, as used in the wood cutting, sheet metal, glass and PCB industry.

World Wide Web : www.MagicLogic.com

Phone : +1-206-274 6248

Email : info@MagicLogic.com or support@MagicLogic.com

Altura Limited is a UK-based company that developed the graphical engine for Cube-IQ, and large parts of its User Interface. The company specializes in bespoke software applications such as Cube-IQ, and also creates graphics and images for video and the Web.

World Wide Web : www.altura.co.uk

Phone : +1-206-274 6248 (Ext. 2)

Email : info@altura.co.uk

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