SHIPCONSTRUCTOR®

2012

Featuring: Database Driven Relational Object Model™ (DDROM™).

Electrical

www.ShipConstructor.com

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ShipConstructor Software Inc.
Suite 304
3960 Quadra Street
Victoria, BC
Canada V8X 4A3

Toll Free:	1-888-210-7420
Phone:	1-250-479-3638
Fax:	1-250-479-0868
Information:	info@ShipConstructor.com
Support:	support@ShipConstructor.com
Sales:	SSI@ShipConstructor.com
Website:	www.ShipConstructor.com

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8. System Configuration. Operation of the Licensed Materials requires use of the specified System Configuration, which Licensee shall acquire and implement. SSI shall not be responsible for any operational problems caused by the System Configuration.

9. Hardware Keys. Licensed Materials use requires "Hardware Keys" supplied by SSI, which can be used only at the site(s) authorized by SSI. In the event of a failure of the Licensee's System Configuration, the Licensee may upon advising SSI use the Hardware Keys and Licensed Materials on another system and/or location.

10. License Fees. Licensee shall pay to SSI the License fees applicable for the Licensed Materials as set out in and in accordance with SSI's Invoice.

11. Services. Support services after the Warranty Period (as defined in Section 15 below) are provided by SSI under the terms of the SSI Subscription Agreement. Installation, consulting, training and implementation services, if requested by the Licensee, shall be provided by separate agreement and at an additional charge.

12. Taxes. All amounts payable by Licensee to SSI are exclusive of all commodity taxes, including but not limited to applicable sales, use, value added, custom duties, excise taxes and other similar government charges, all of which will be paid by Licensee. If Licensee is required by law to withhold any taxes, then Licensee shall pay SSI a gross amount of money such that the net amount received by SSI after deducting or withholding the required taxes is equal to the amount of the fee originally charged by SSI.

13. Interest Charges. If any amount payable under this Agreement is not paid within 30 days of becoming due, SSI shall have the right to impose a charge of 2% per month (24% annually) on the unpaid balance of the amount, from the due date until the date of receipt of all amounts in arrears including interest.

14. Purchase Orders. Any purchase order (an **"Order"**) delivered by Licensee shall at all times be deemed to incorporate this Agreement by reference and shall be subject to the applicable provisions of this Agreement. Any provisions of an Order shall not apply and shall not be binding upon SSI unless they relate to information which was requested by SSI. In the event of a conflict or an inconsistency between the provisions of an Order and the terms and conditions of this Agreement, this Agreement shall govern and supersede to the extent of such conflict or inconsistency.

15. Limited Warranty. SSI warrants that during a period of 90 days from the date of delivery of the Licensed Materials to Licensee (the "**Warranty Period**"), the Licensed Materials will perform substantially in accordance with the Licensed Materials documentation specifications, when used in accordance with this Agreement on a properly operating System Configuration. SSI's sole obligation under this Warranty, and Licensee's exclusive remedy, shall be to use reasonable commercial efforts to correct Errors (a bug, defect or other problem incurred by a user in operating the Software that prevents the Software from performing in a manner consistent with the applicable specifications set out in the User Manual) that the Licensee identifies to SSI through fixes or

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17. Maintenance Services. Licensee may elect, at the expiry of the Warranty Period, to obtain maintenance, support and upgrade services from SSI in accordance with and subject to the terms of SSI's standard Subscription Agreement.

18. Loss of Data. SSI shall not be responsible for any loss of or damage to files or data caused by the Licensed Materials, or be required to restore or rebuild files or data. Licensee shall implementing adequate backup procedures to avoid any loss of files and data.

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20. Confidential Information. Each party will not use the confidential information of the other party for any purpose except for the purpose described in this Agreement, and shall not disclose it to any other person except on a confidential basis to its employees and representatives who have a need-to-know the confidential information for such purposes. This Section 23 shall not apply to confidential information which (a) is or has become readily available to the public in the same form other than by an act or omission of the receiving party, (b) was lawfully obtained in the same form by the receiving party from a third party not under an obligation of confidence to the disclosing party, (c) was in the receiving party's possession in the same and material form prior to its receipt from the disclosing party and did not otherwise originate from the disclosing party, or (d) is required to be disclosed by operation of law.

21. Termination. This Agreement may be terminated by either party, immediately by written notice, if the other party commits a breach of any material provision of this Agreement, including a failure to make payment when due, and fails to correct or rectify such breach within 30 days of receipt of the notice requesting it to do so. SSI shall be entitled to place time-lock devices and other disabling features in the Licensed Materials that become effective in the event that the Licensee has failed to comply with its payment obligations hereunder and as set out in SSI Invoices.

22. Effect of Termination. Upon termination of this Agreement Licensee shall immediately cease using the Licensed Materials, and within 14 days of termination return all Hardware Keys to SSI.

23. CONSEQUENTIAL DAMAGES. IN NO EVENT SHALL SSI BE LIABLE FOR ANY LOSS OF DATA OR PROFITS, ECONOMIC LOSS OR SPECIAL, INDIRECT, INCIDENTAL, CONSEQUENTIAL OR PUNITIVE DAMAGES WITH RESPECT TO THIS AGREEMENT OR THE LICENSED MATERIALS, HOWEVER CAUSED, EVEN IF SSI HAD OR SHOULD HAVE HAD ANY KNOWLEDGE OF THE POSSIBILITY OF SUCH DAMAGES.

24. DAMAGES LIMITATION. THE MAXIMUM LIABILITY OF SSI FOR ALL CLAIMS AND DAMAGES OF ANY KIND, WHETHER FOR FUNDAMENTAL BREACH OR ANY OTHER CAUSE UNDER THIS AGREEMENT, SHALL BE LIMITED IN THE AGGREGATE TO THE TOTAL OF ALL FEES PAID BY LICENSEE.

25. LIMITATION OF NON-APPLICABILITY. IN SOME JURISDICTIONS THE EXCLUSION OR LIMITATION OF WARRANTIES OR LIABILITY MAY NOT BE APPLICABLE, AND IN SUCH JURISDICTIONS SSI HEREBY LIMITS ITS LIABILITY TO THE FULLEST EXTENT PERMITTED BY LAW.

26. Applicable Law. This Agreement shall be subject to and construed in accordance with the laws of the Province of British Columbia, Canada, excluding its conflict of laws rules and the application of the UN Convention on Contracts for the International Sale of Goods.

27. References. SSI shall be allowed to incorporate Licensee's name in SSI's customer reference list and to use it for marketing.

28. Dispute. If any dispute arises under this Agreement, a good faith attempt to resolve the dispute will be made by senior management of both parties at a mutually agreeable site and time. If the parties are unable to reach agreement within 30 days after a request for such meeting, the dispute shall be referred to arbitration in English, before one arbitrator in Victoria, British Columbia, Canada, in accordance with the Commercial Arbitration Act of the British Columbia.

29. Entire Agreement. This Agreement contains the entire agreement between the parties and shall supersede all prior discussions and agreements between the parties regarding its subject matter.

30. Amendment. Any amendment of this Agreement must be in writing and signed by duly authorized representatives of the parties.

31. Waiver. The waiver by any party of a breach by the other party of this Agreement shall not be construed as a waiver by such party of any succeeding breach by the other party of the same or another provision.

32. Assignments. Licensee may not assign or transfer the License or Licensee's rights or obligations under this Agreement without SSI's prior written consent, and any such assignment or transfer without consent shall be null and void. A transfer of all or substantially all of the voting stock of the Licensee shall constitute a transfer for these purposes and shall be subject to SSI's prior written consent.

33. Successors and Assigns. This Agreement will bind and enure to the benefit of the parties and their respective successors and permitted assigns.

34. Severability. In the event that any provision of this Agreement is declared invalid, illegal or unenforceable by a court having jurisdiction, then the remaining provisions shall continue in full force and effect.

35. Force Majeure. Except as related to Licensee's obligation to make payments to SSI, neither party shall be liable for delays or non-performance if such delays or non-performance are beyond such party's reasonable control. A delayed party shall promptly notify the other party in writing stating the cause of the delay and its expected duration and shall use commercially reasonable efforts to remedy a delay or non-performance as soon as reasonably possible.

36. Survival. The provisions of Sections 0, 5, 10, 12, 13, 16 and 18-28 shall survive the expiry or termination of this Agreement.

37. Language. It is the express will of the parties that this Agreement and related documents have been prepared in English. C'est la volonté expresse des parties que la présente Convention ainsi que les documents qui s'y rattachent soient rédiges en anglais.

Contents

Electrical Overview

ShipConstructor Electrical is an advanced, production based electrical package that aims to:

- Facilitate communication between Electrical & Mechanical Engineers via the Project Equipment list and import/export capabilities to 3rd Party 1-line analysis tools.
- Allows for the creation of a central database of all equipment that is to be used in a project via the Project Equipment list.
- Allocate space in the 3D Production model for the required wireways and cables using the quick and easy to route “Space Allocations”
- Model individual Cable Supports in 3D, allowing for accurate interference checks and detailed reports & BOMs.
- Automatically or semi-automatically route cables in 3D space to optimize the available space in existing wireways and get accurate cable lengths.
- Produce detailed assembly drawings showing including the individual cable supports to facilitate the addition of the cable supports early on in the building process.
- Produce cable pull sheets & cable isometric drawings that show in 3D how an individual cable is to be pulled.
- Produce cross section drawings at each support showing how individual cables are intended to be nested / mounted at that location.

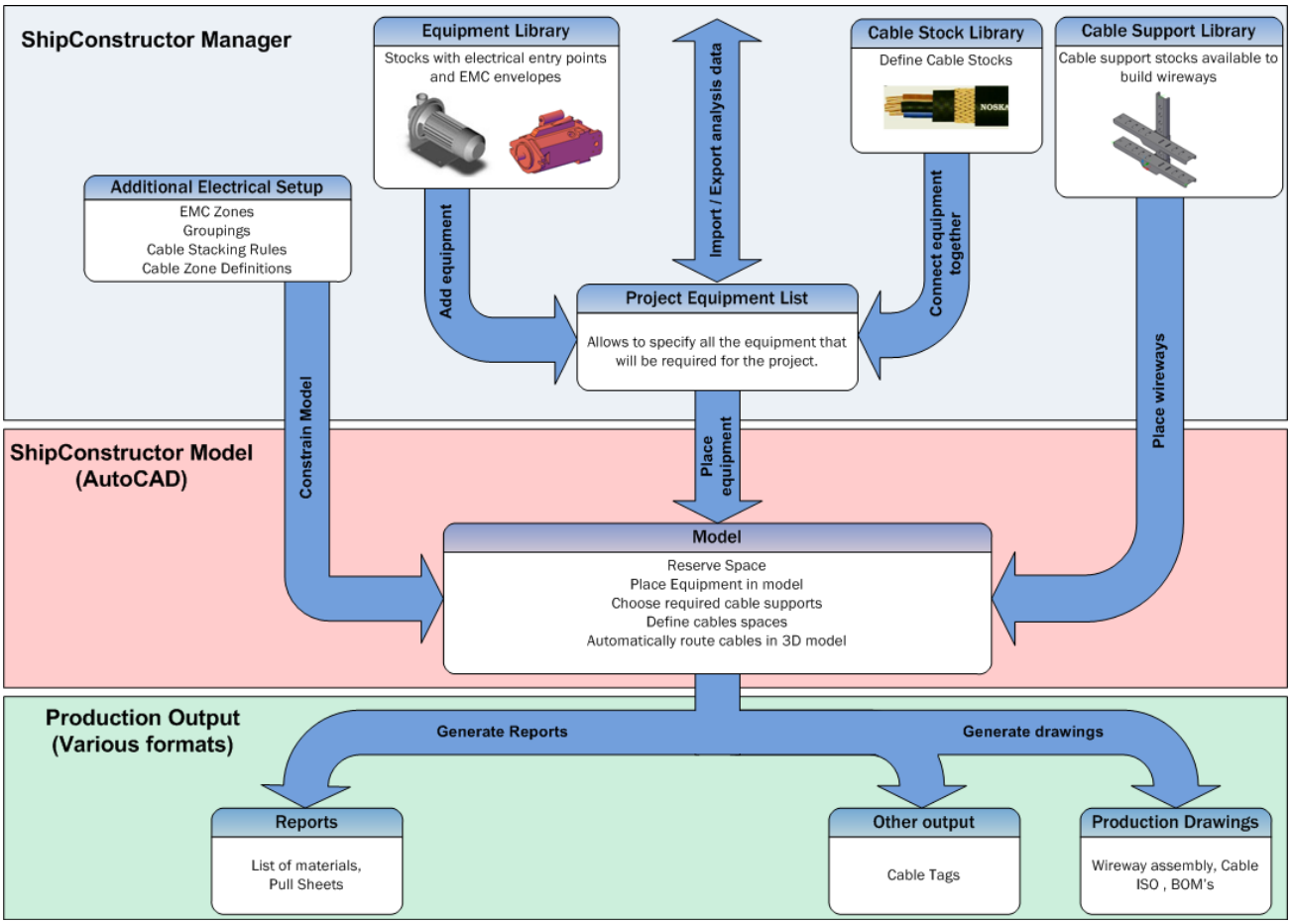


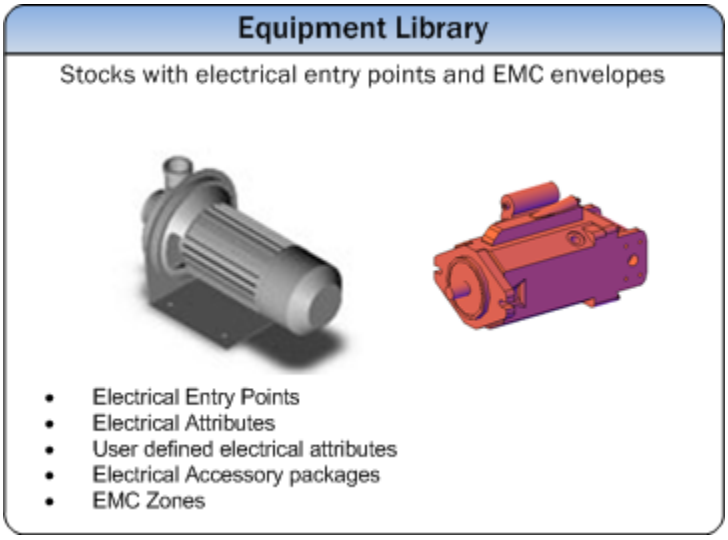
Figure 1. Electrical workflow overview.

Concepts

It is critical that all aspects of the electrical project are set up carefully to ensure the successful implementation of ShipConstructor Electrical.

Electrical Equipment

Equipment is the centerpiece of the electrical module. All cables routed, are routed between various pieces of equipment.



Electrical Entry Points

Electrical entry points are the external collection point where any number of cables may enter the piece of equipment. Individual conductors do not matter when connecting to an equipment entry point. A piece of equipment may have several entry points.

EMC Zones

Electrical EMC Zones are created around Equipment using the same methods as Maintenance Envelopes. The EMC Zones created for Equipment are used later in the process to ensure that no undesirable interference between individual pieces of equipment or between equipment and cable runs exist.

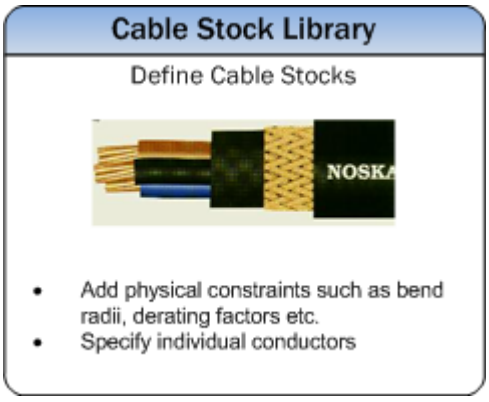
Adding this information is optional. However, if a specific piece of equipment produced significant amounts of electrical noise, it is recommended that this information be added to aid in avoiding costly interference problems later on.

Electrical Attributes

Each piece of electrical equipment has electrical attributes.

Cable Stocks

The cable stocks are the available type of cables that are available, regardless of the context they are used in. An individual cable stock may be used for many different purposes.

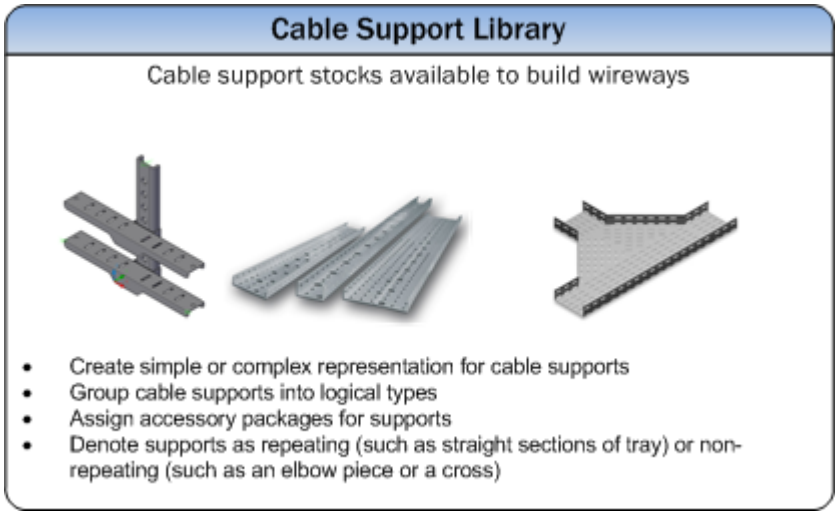


Geometric constraints

- Outer Diameter – used when nesting cables within cable trays. Accurate entry of outer diameters is critical to ensure that cable support fill ratio calculations are accurate.
- Bend Radius Factor – Used when determining actual cable paths. For large diameter cable, bending constraints can be a big issue.

Conductors
Individual conductors can optionally be specified for each cable. These internal conductors will be used at a later stage to individually terminate conductors inside equipment.

Cable Supports
Cable supports are the physical pieces of hardware that support the cables. There are a large number of different types of cable supports sold by manufacturers or custom fabricated in house. The Cable Supports Library gives you the flexibility to define how to visually represent the cable supports used in the model to an arbitrary level of detail.



Support Types
Specifying support types helps categorize the Cable Supports. Suggested support types could be “Trapeze Style”, “Inverted T Style”, “Tray” etc.

Configurations
For cable support stocks that can be assembled in different ways, the configuration feature should be used. If for example, a support is made up of one 12” downcomer and two 10” crosstiers, these may be assembled in many different ways. When generating reports and BOMs however, all of these should be considered the same for material planning reasons. Configurations allow you to create a single stock that can have different geometric representations in the model.

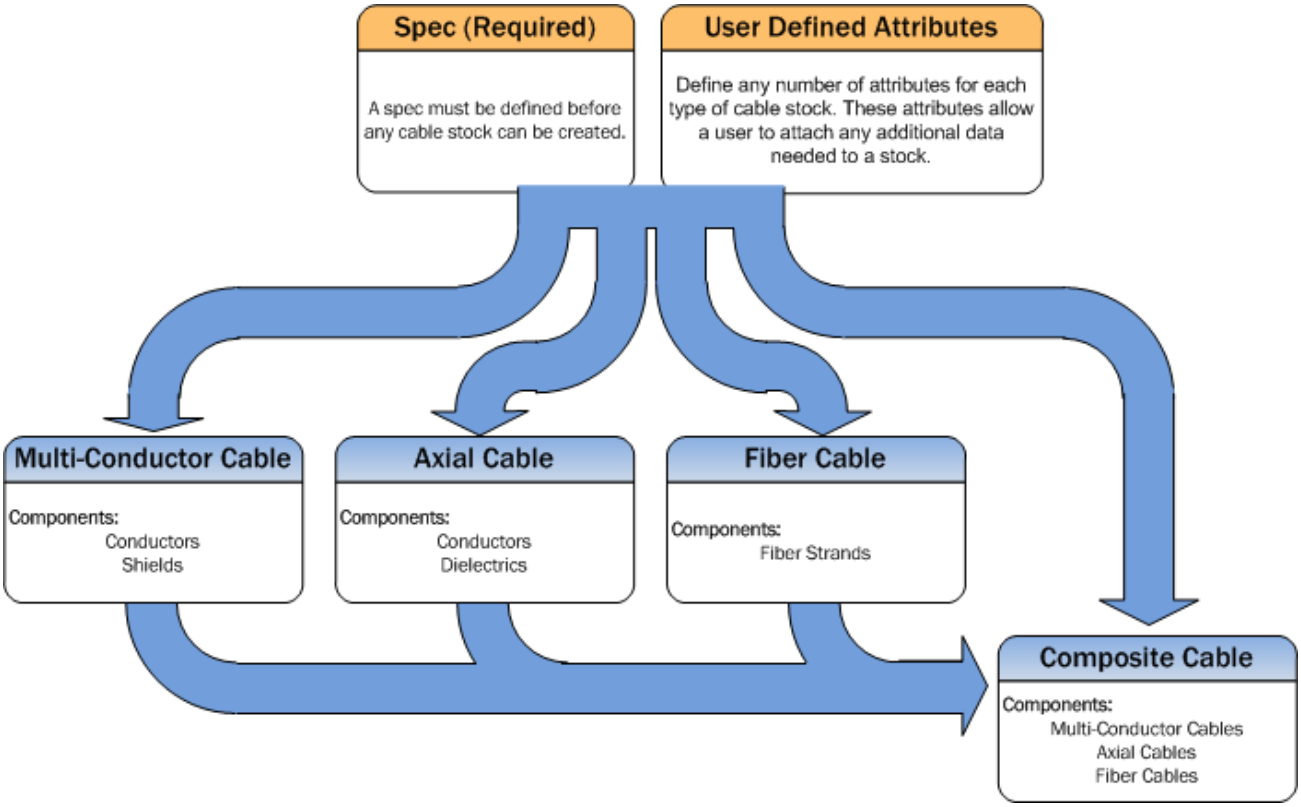
Repeating and Non-Repeating supports
When defining cable supports stocks, it is required that they be marked as repeating or non-repeating types.

- Repeating cable supports are Trapeze or Inverted T Styles, straight tray sections etc. Anything that can be inserted along a straight path over and over again is considered to be repeating.
- Non-repeating cable supports are all the components that have to be placed individually. Examples of this are elbow pieces, cross pieces, transitioning pieces etc.

Introduction to Cable Stocks

Ships require electrical cabling. Electrical cables are modeled throughout the ship. Before cables can be modeled, cable stocks need to be defined.

In ShipConstructor, there are four kinds of cable stocks: Multi-Conductor, Axial (Coaxial and Triaxial), Fiber, and Composite.



Specs are required before any stock can be defined. By defining User Defined Attributes per stock type before defining stocks, a user can save time. This is especially true if any attribute on a cable stock type has a default value defined.

User Defined Attributes

If a cable property is not found that is needed, a custom attribute can be defined for that stock cable type. This enables users to define and attach extra data to each cable as needed.

If a certain property has to be defined in all cable stocks of that type, simply check the ‘IsRequired’ box when defining the attribute for that type and ShipConstructor will make sure the attribute has a value before the data is saved.

ShipConstructor will not check to make sure the attribute has a value before being saved unless the ‘IsRequired’ box is checked. This is useful when an attribute is only applicable to a few cable stocks in a particular cable type.

Sometimes a default value is needed when defining stocks that have a certain attribute. If that is the case, the attribute should be defined with a default value before any stocks of that type are created to save time later on.

Multi-Conductor Cables

ShipConstructor will treat both Power and Multi-Conductor control cables in the same way.

Care should be taken when defining components of Multi-Conductor cables as it is an ordered list.

Each conductor and shield has a name field and will be attributed independently. Special care should be taken when naming conductors and shields in each cable. For example, in a paired control cable in the real world, shields will be associated with a specific pair. In ShipConstructor, the user can accomplish this via the name field. If a pair consists of conductors RED and BLK, the shield for that pair could be REDBLK.

Axial Cables

ShipConstructor will generalize Coaxial cables to allow them to handle the triaxial case as well. This is done by treating the inner and outer conductor(s) as n separate generic conductors.

Coaxial and Triaxial cables are composed of two types of sub-components: conductors and dielectrics. These two types of components are added to the same **ordered** list. The order of the components in the list can be used to indicate the built up composition of the cable. Each cable should only have one conductor (the center conductor) with a size in units of AWG, MCM or mm2. The other conducting sheaths around each dielectric should be sized by OD (in or mm).

Fiber Cables

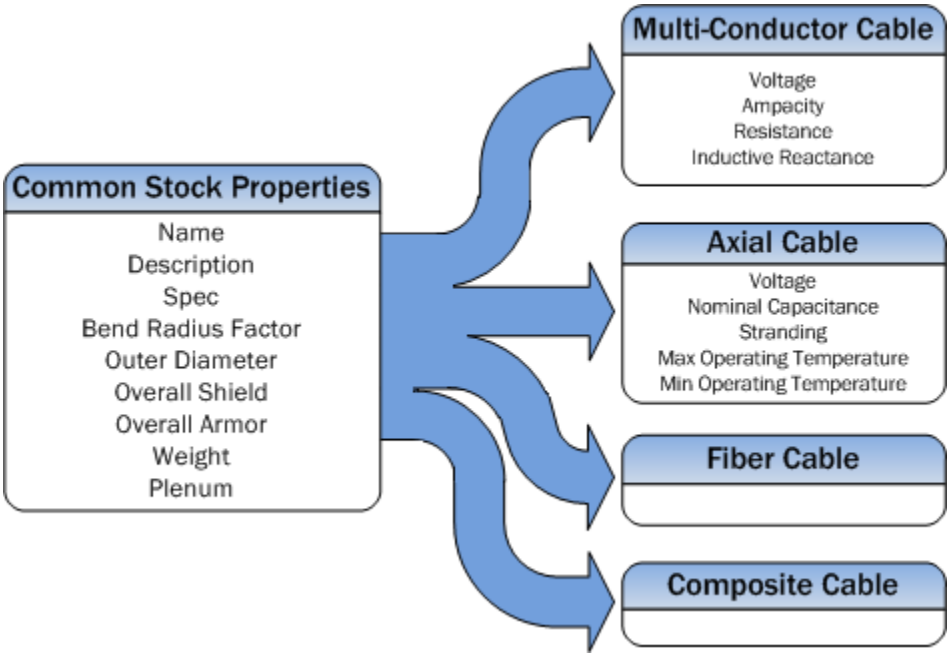
Fiber optic cable is treated similarly to the other types of cables. Fiber optic cables are composed of a single type of sub-component: fiber strands. Fiber strands are added to an **ordered** list.

Composite Cables

Composite cables are made up of Multi-Conductor, Axial, and Fiber cables. Consequently these cables need to be defined before they can be added as components to Composite cables.

Cable Properties

There are cable stock properties that are common to all types of cables. Multi-Conductor and Axial cable stocks also have type specific properties.



Common Stock Properties

Name

Names for each cable stock must be unique across all cable stocks of that type. There is no naming convention for the cable stocks as the cable name often describes the physical properties of the cable and not all cable naming properties may be present.

If some properties for the cable stock are not present but still needed, use a User Defined Attribute for that cable stock type.

Description

This string field is used to describe the cable. If a more specific cable property is needed, use User Defined Attributes.

Spec

Every cable belongs to a spec. A spec is used to identify the specification the cable stock adheres to. At least one spec must be defined before and cable stock can be created.

Bend Radius Factor

This is the factor by which the Outer Diameter is multiplied by to determine the minimum bend radius. A typical bend radius factor is 6.

Outer Diameter

This is the outer diameter of the cable.

Overall Shield

This is the overall shield for the cable.

Overall Armor

This is the overall armour for the cable.

Weight per length

This is the weight of the cable per length of cable. At the moment ShipConstructor restricts users to using millimeters as the per length unit.

Plenum

This is a Boolean field indicating whether this cable is rated such that it is allowed to be routed through or inside a plenum. A plenum is a compartment or chamber to which one or more air ducts are connected and forms part of the air distribution system.

Multi-Conductor Properties

These properties are specific to Multi-Conductor cable stocks.

Voltage

This is the voltage (RMS) for which the cable is rated.

Ampacity

This is the amount of current the cable can carry at 40°C.

Resistance

This is the amount of resistance (Ω) in the cable per unit of length. Currently ShipConstructor only supports millimeters as the unit of length.

Inductive Reactance

This is the 'Reaction' of the inductor to the changing value of alternating current. Currently ShipConstructor supports this value entered in Ω/mm.

Axial Properties

These properties are specific to Axial cable stocks.

Voltage

This is the maximum operating voltage for the cable.

Nominal Capacitance

This is the nominal capacitance of the cable measured in pF/mm.

Stranding

This is a string field used to describe the stranding in the center conductor.

Max Operating Temperature

This is the maximum operating temperature of the cable.

Min Operating Temperature

This is the minimum operating temperature of the cable.

Introduction to Cable Supports

Cable support stocks are very flexible in how they can be put together. The same parts can be assembled into several different configurations. To support this use of cable support stocks, the ShipConstructor cable support library was split into three parts: stock information, stock configurations, and accessory packages.

Cable Support Stocks

The stock of a cable support has several attributes that you can enter and modify: type, name, catalog, description, weight, whether the stock can be trimmed, as well as whether it is a repeating stock and default insertion period if it is.

Stock Type

Cable support stock type is intended to allow grouping of cable support stocks by geometrical properties. For example, it would make sense to have a tree type, a tray type, a trapeze type, etc. This attribute is only used for grouping and filtering cable support stocks. It does not affect any other part of ShipConstructor. The list of available types can be edited in the Edit Support Types dialog. A stock can have only one type.

Name and Description

Cable support stocks do not have a naming convention, so support stock name can be any string as long as it is unique in the project. The uniqueness constraint is enforced by ShipConstructor.

Description is a free-form field that can be used to store additional information about a stock. It does not need to be unique.

Catalog

Catalogs are another way to group cable support stocks. It is very similar to stock type in that the list of available catalogs is user defined, however, a stock can belong to several catalogs.

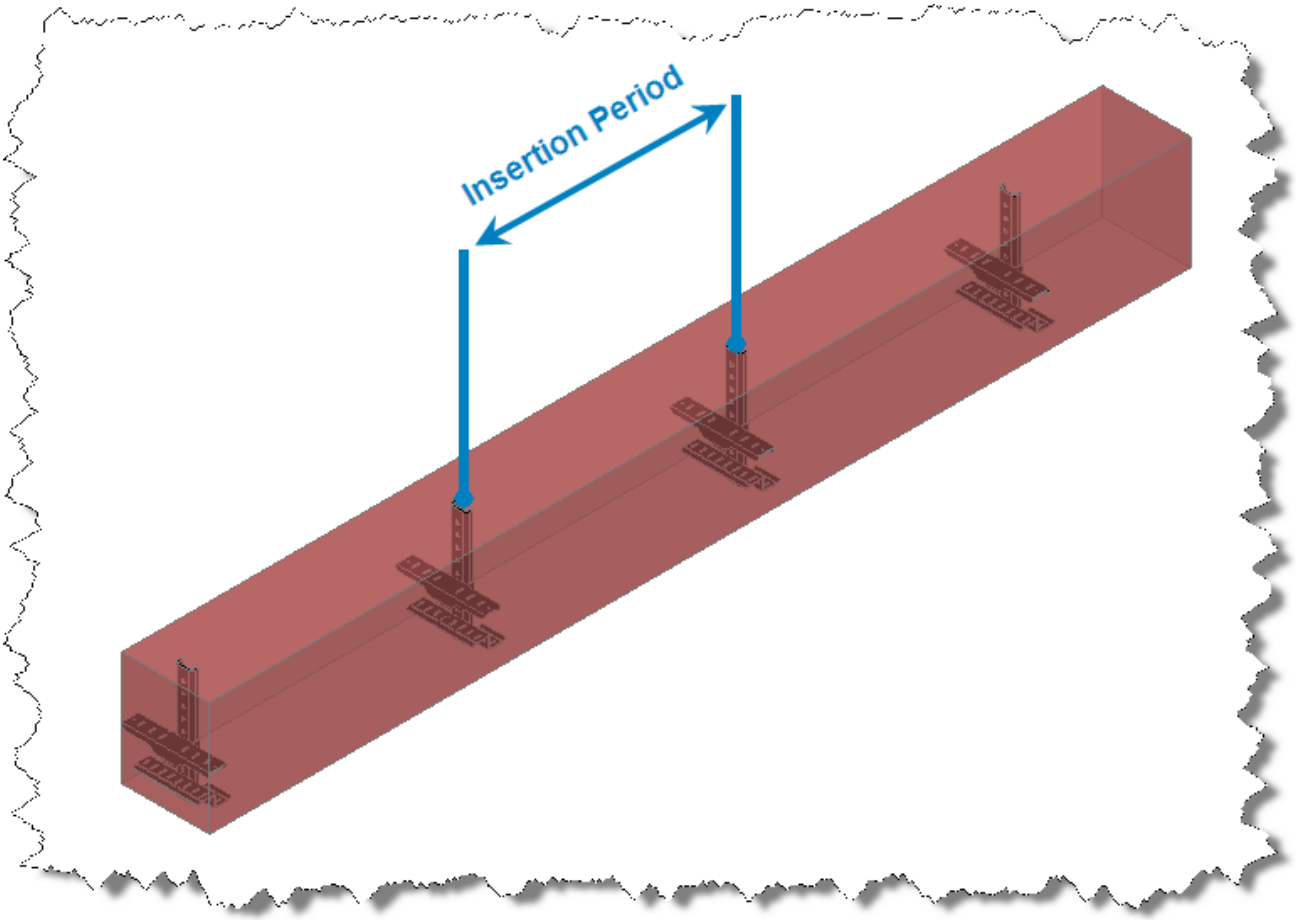
Weight

The weight property is the weight of an assembled instance of the stock.

Trimmable

Trimmable flag indicates to ShipConstructor that it can insert a cut back instance of the stock if there is no room for a whole one. Otherwise, if a support cannot be trimmed and there is no room for a whole instance, ShipConstructor will not try to insert one. Please, refer to modeling documentation for more details.

Is Periodic and Insertion Period



If a cable support stock is periodic, ShipConstructor can insert several of them in a straight line using Insertion Period attribute and geometry information to calculate how many supports to insert. Insertion Period can be negative, indicating that the cable supports are interlocking.

Cable Support Configurations

Cable support configurations are ShipConstructor models of different assemblies of the same cable support stock. As an example, figure 1 shows the parts that make up a stock as well as two different configurations made out of those parts.

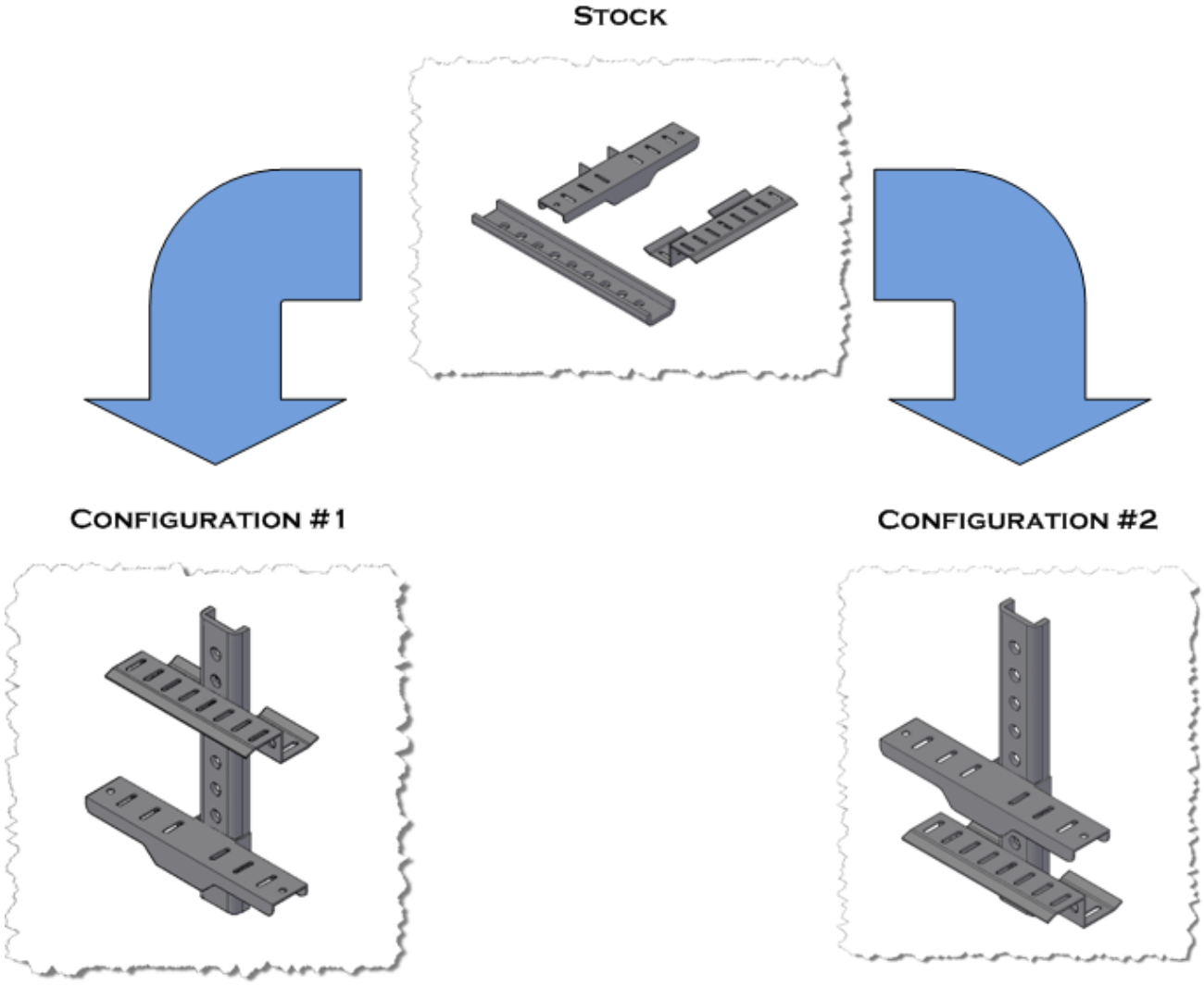


Figure 1. Relationship between a stock and its configurations.

Each configuration has a name, geometry, center of gravity (CG Point), and a list of insertion points. Configuration name should be unique within the stock. Configurations must have at least one insertion point for cable support allocation to work. More insertion points can be added to make it easier to align the cable supports to other geometry during placement.

ShipConstructor assumes that in a cable support configuration model, up is the positive Z direction and that the model extends in the positive Y direction. Figure 2 shows how orientation of the configuration geometry affects cable support allocation. Also, note how in figure 3 a trimmable support gets cut incorrectly because its geometry was not aligned properly.

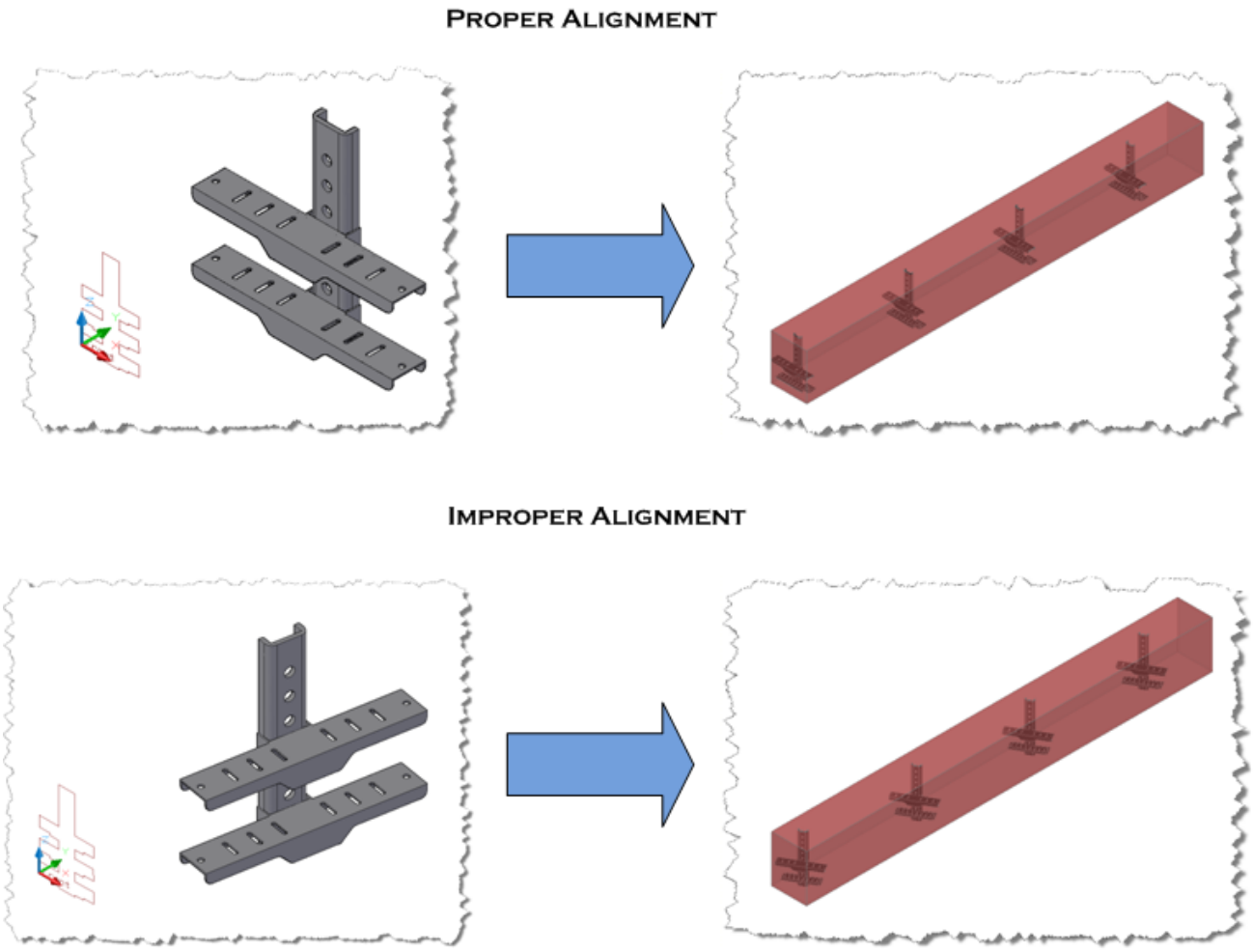


Figure 2. Effect of configuration orientation on cable support routing.

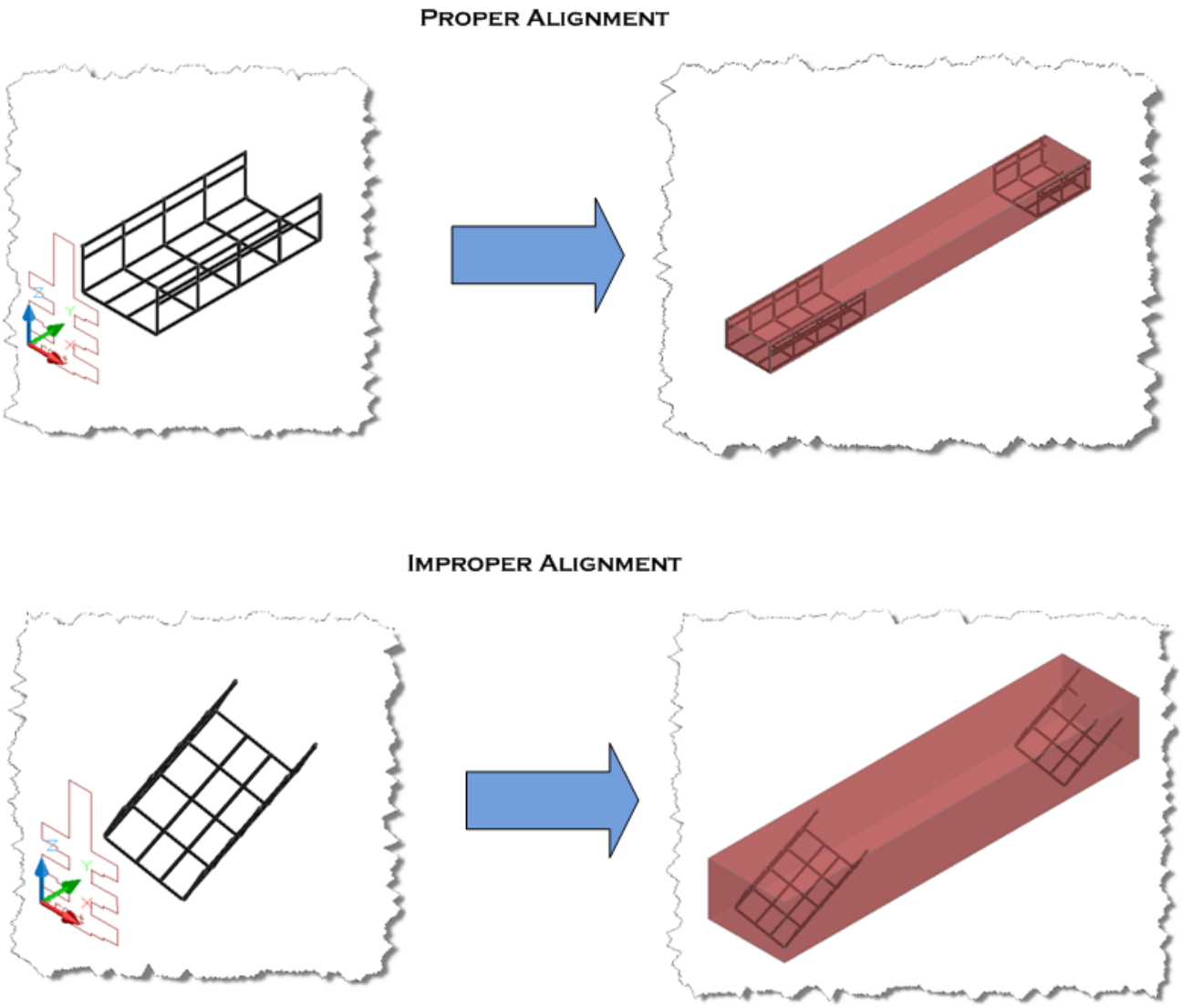


Figure 3. Effect of configuration orientation on cable support trimming.

Accessory Packages

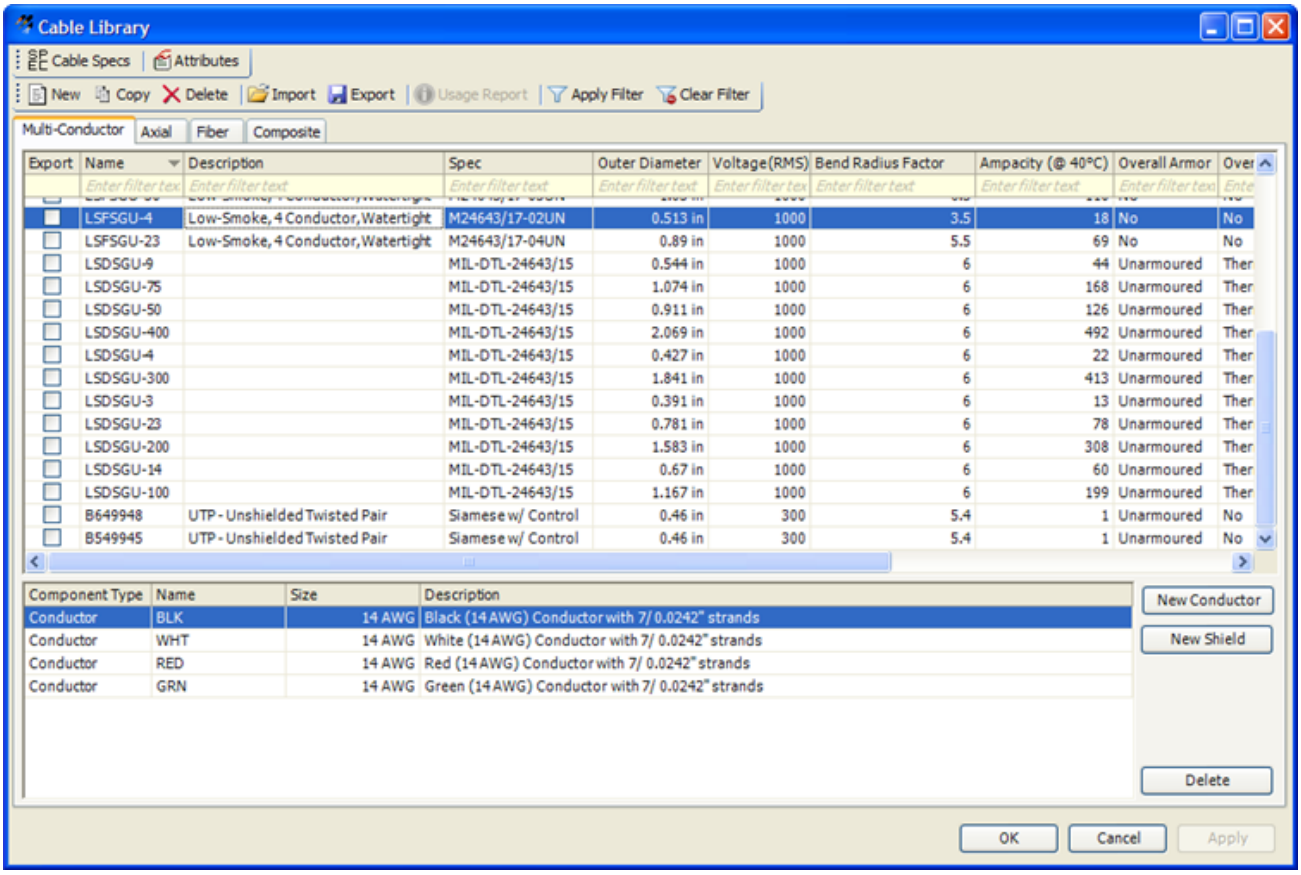
An accessory package is a collection of small items (nuts, bolts, washer, etc) needed to put the support together or mount it. Accessory packages are assigned to cable support stocks, not cable support configurations. This is consistent with the idea that different configurations of the same stock are the same parts assembled in a slightly different way. Assigning an accessory package to cable support stock means that the supports of this stock can be installed with this accessory package: when the support is actually placed in the model the exact accessory packages needed for that particular support will need to be selected.

Accessory packages for cable supports can be created in the Accessory Package editor and are assigned to cable support stocks in the cable support stock library.

Using the Cable Stock Library

The Cable Stock Library is used to create Multi-Conductor cable stocks, Axial (Coaxial and triaxial) cable stocks, Fiber cable stocks, and Composite cable stocks. These stocks are used to create parts (cables) in a drawing.

While entering data in the library, it is highly recommended to read Common Dialog Controls as there are numerous ways of customizing the view of the library to save time when entering data.



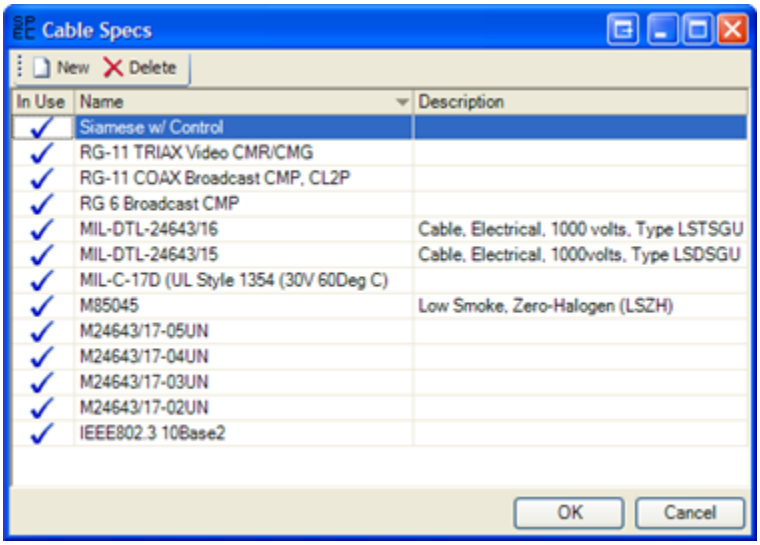
Cable library using view customization of hidden columns and display units.

To open the Cable Stock Library

1. Choose ShipConstructor > Manager to open Manager.
2. Choose Electrical > Cable Library

Specs

Before any cable stock can be defined, a spec must be created.



To open Cable Specs

1. In the Cable Stock Library, click on the Cable Specs button.

To create a new Cable Spec

1. Open the Cable Spec dialog
2. Click on the New button
3. Enter a unique name
4. Click OK

To delete a Cable Spec (Not In Use)

1. Open the Cable Spec dialog
2. Select all Cable Specs to delete
3. Click on the Delete button
4. Click OK

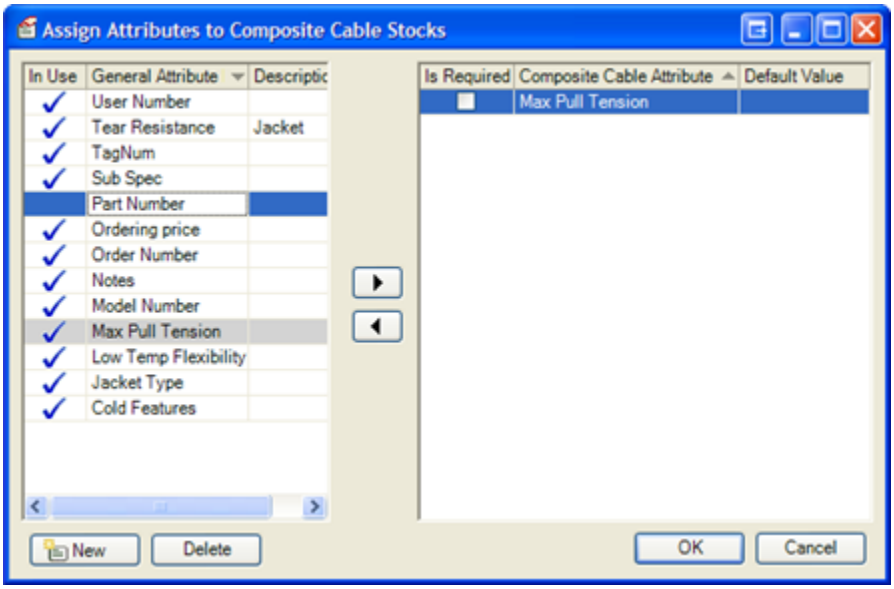
Attributes

User Defined Attributes are used when custom or additional data needs to be entered for stocks. Attributes are limited to strings only.

Cable Stocks use the list of attributes that are general to ShipConstructor. General Attributes must be assigned to be used in a specific cable stock type through the Assign Attributes Dialog.

If a specific attribute is required to have data in it, check the Is Required checkbox for that attribute and ShipConstructor will check the attribute has data in it for that cable type.

If there is a default value for an attribute, enter the string under the Default Value column.



To open a specific cable stock type Assign Attributes Dialog

1. Open the Cable Library
2. Go to the specific cable stock type tab in the library
3. Click the Attributes button

Note: Depending on which cable stock type tab is open, will depend on which type of Assign Attributes Dialog is open.

To create a new General Attribute

1. Open the Assign Attributes Dialog for the specific cable stock type
2. Click the New button

To create a new Cable Stock Type Attribute

1. Open the Assign Attributes Dialog for the specific cable stock type
2. Select a General Attribute
3. Click on the Right arrow 

To delete a General Attribute (Not In Use)

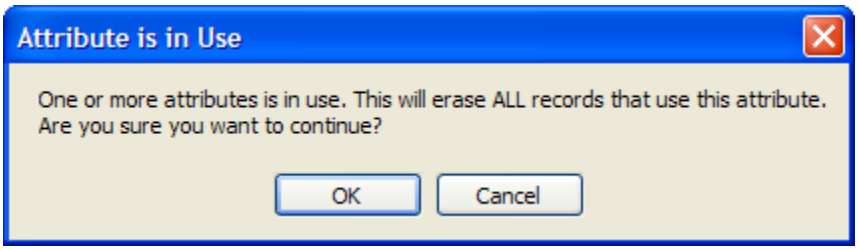
1. Open the Assign Attributes Dialog for the specific cable stock type
2. Click the Delete button

To delete a Cable Stock Type Attribute

1. Open the Assign Attributes Dialog for the specific cable stock type
2. Select the Cable Stock Type Attribute
3. Click on the Left arrow 

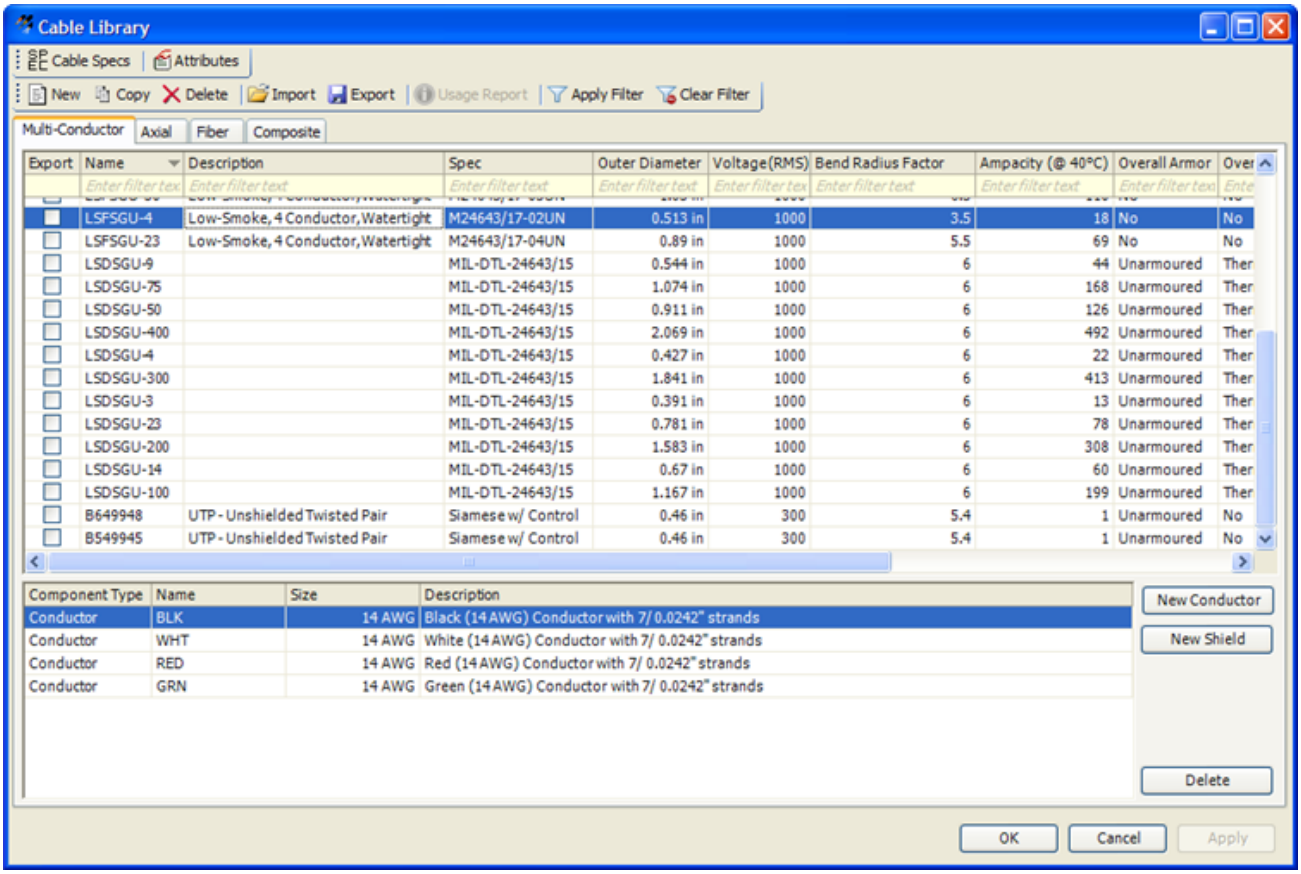
Note: Take care when deleting a cable type attribute. Some attributes may be in use.

If an attribute is in use, a warning dialog will be shown if trying to delete it.



Multi-Conductor Cable Stocks

Multi-Conductor cables are cables that can contain any number of conductors and shields. These types of cables can be used for power and control.



To create a Multi-Conductor cable stock

1. Click on the Multi-Conductor tab in the Cable Library
2. Click the New button from the ToolStrip or right-click in the main grid and select New from the context menu.

Note: If you have a Multi-Conductor cable stock selected, clicking or selecting New will copy the selected stock.

To create Multi-Conductor components

1. Select a Multi-Conductor cable stock.

2. Click the New Conductor or New Shield button or right-click in the components grid and select New Conductor or New Shield from the context menu.

To copy Multi-Conductor cable stocks

1. Select all the Multi-Conductor cables that need copying.
2. Click the Copy button or right-click in the main grid and select Copy from the context menu.

To delete Multi-Conductor cable stocks (Not In Use)

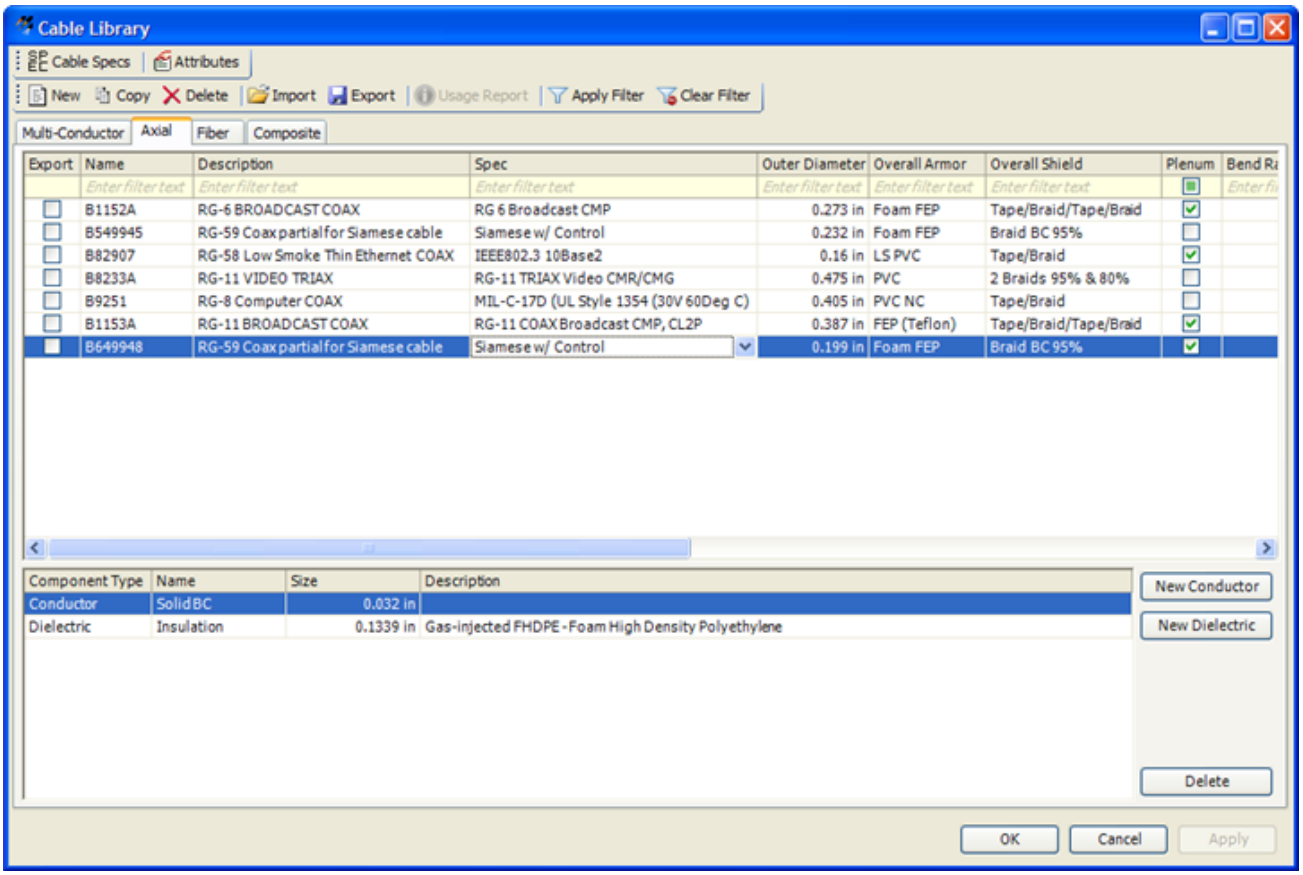
1. Select the stocks for deletion.
2. Click the Delete button or right-click in the main grid and select Delete from the context menu.

To delete Multi-Conductor cable components

1. Select the components for deletion.
2. Click the Delete button located in the components grid or right-click in the components grid and select Delete from the context menu.

Axial Cable Stocks (Coaxial and Triaxial)

ShipConstructor generalizes coaxial cables to allow this type to handle triaxial cables as well.



To create an Axial cable stock

1. Click on the Axial tab in the Cable Library
2. Click the New button from the ToolStrip or right-click in the main grid and select New from the context menu.

Note: If you have an Axial cable stock selected, clicking or selecting New will copy the selected stock.

To create Axial components

1. Select an Axial cable stock.
2. Click the New Conductor or New Dielectric button or right-click in the components grid and select New Conductor or New Dielectric from the context menu.

To copy Axial cable stocks

1. Select all the Axial cables that need copying.
2. Click the Copy button or right-click in the main grid and select Copy from the context menu.

To delete Axial cable stocks (Not In Use)

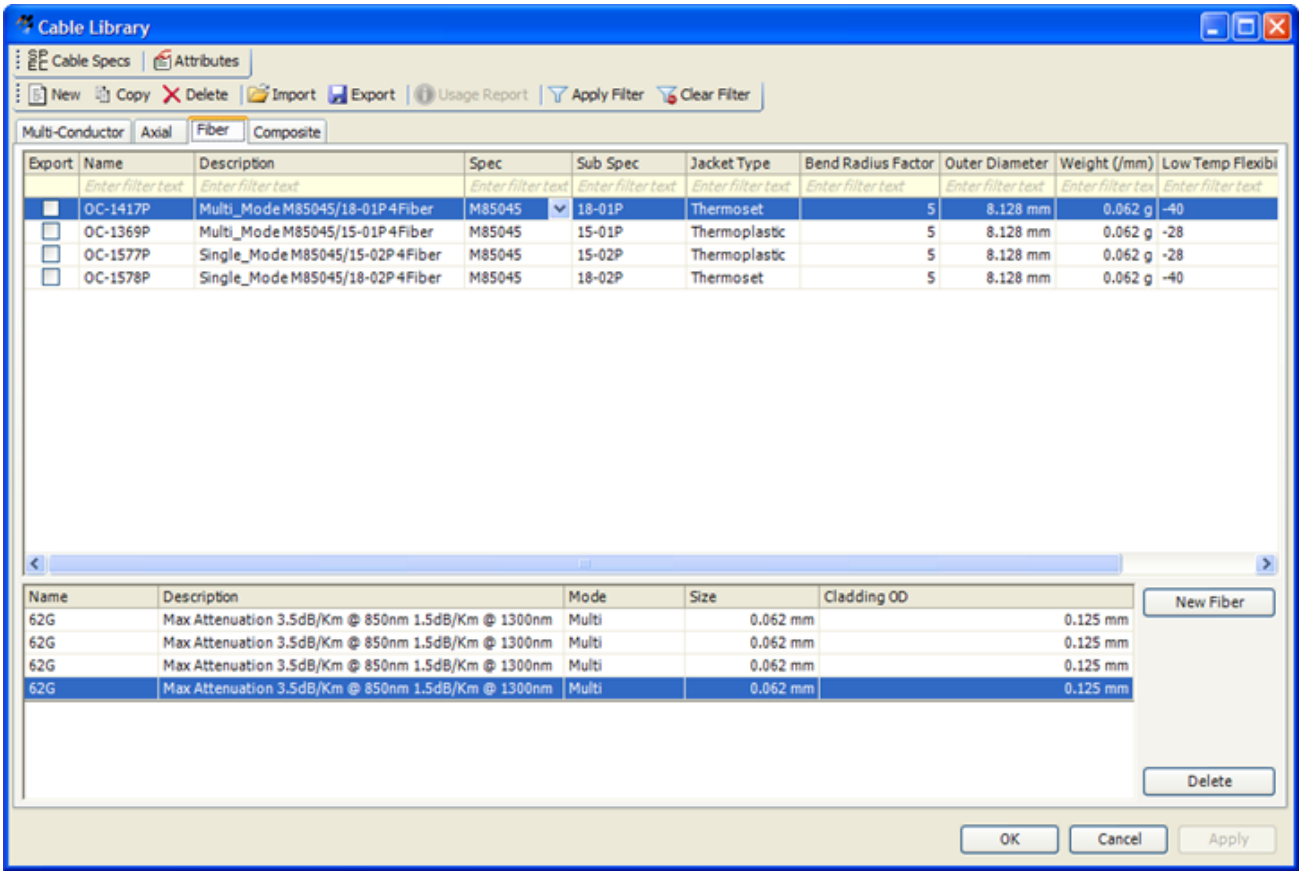
1. Select the stocks for deletion.
2. Click the Delete button or right-click in the main grid and select Delete from the context menu.

To delete Axial cable components

1. Select the components for deletion.
2. Click the Delete button located in the components grid or right-click in the components grid and select Delete from the context menu.

Fiber Cable Stocks

Fiber optic cables are composed of a single type of sub-component: fiber strands.



To create a Fiber cable stock

1. Click on the Fiber tab in the Cable Library
2. Click the New button from the ToolStrip or right-click in the main grid and select New from the context menu.

Note: If you have a Fiber cable stock selected, clicking or selecting New will copy the selected stock.

To create Fiber Strands

1. Select a Fiber cable stock.
2. Click the New Fiber button or right-click in the components grid and select New Fiber from the context menu.

To copy Fiber cable stocks

1. Select all the Fiber cables that need copying.
2. Click the Copy button or right-click in the main grid and select Copy from the context menu.

To delete Fiber cable stocks (Not In Use)

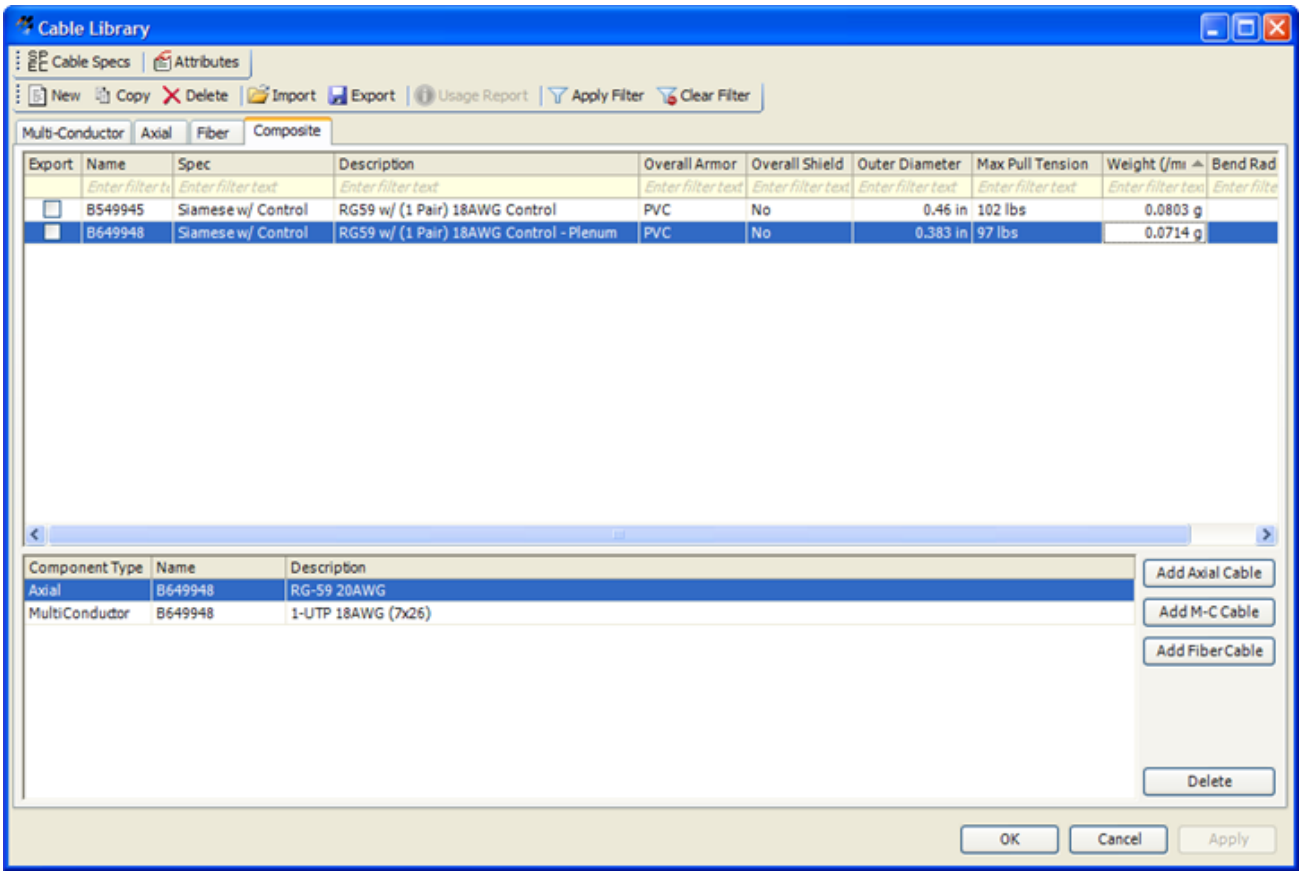
1. Select the stocks for deletion.
2. Click the Delete button or right-click in the main grid and select Delete from the context menu.

To delete Fiber cable components

1. Select the components for deletion.
2. Click the Delete button located in the components grid or right-click in the components grid and select Delete from the context menu.

Composite Cable Stocks

Composite cables are made up of Multi-Conductor, Axial, and Fiber cables. Consequently these cables need to be defined before they can be added as components to Composite cables.



To create a Composite cable stock

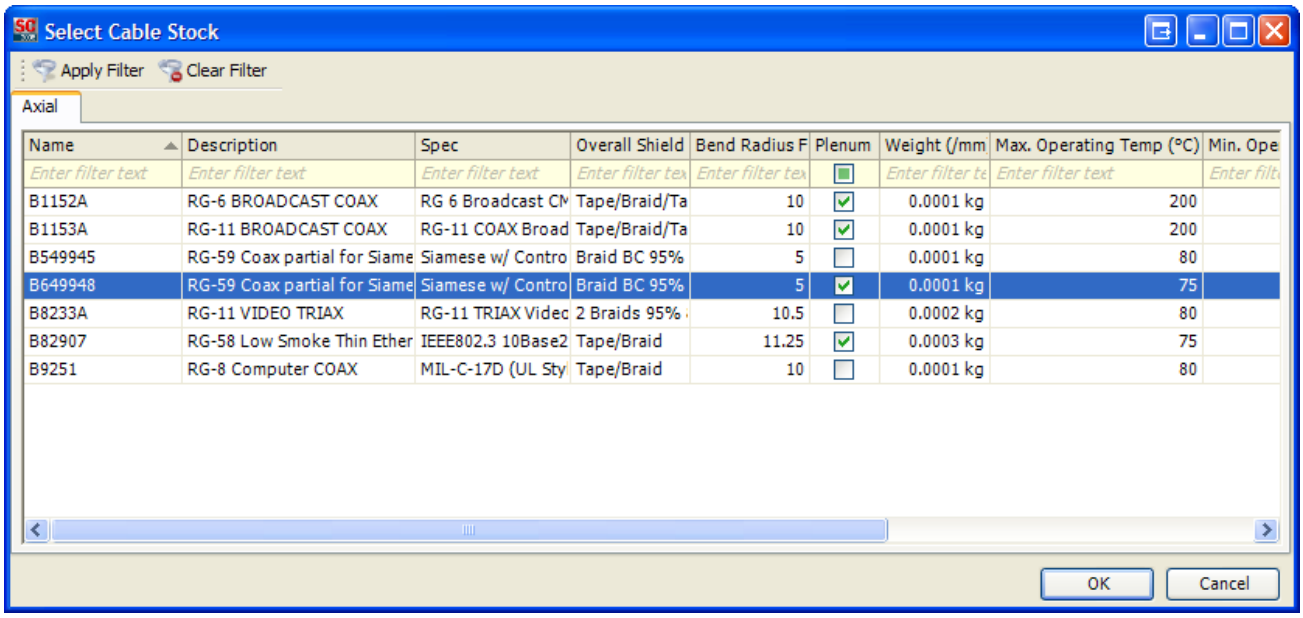
1. Click on the Composite tab in the Cable Library.
2. Click the New button from the ToolStrip or right-click in the main grid and select New from the context menu.

Note: If you have a Composite cable stock selected, clicking or selecting New will copy the selected stock.

To create Composite components

Note: At least one other type of cable needs to be defined. Composite stocks are made up of other defined stocks. If there are no stocks of a type defined, the button will be grayed out.

1. Select a Composite cable stock.
2. Click the Add Axial Cable or Add M-C Cable or Add Fiber Cable button or right-click in the components grid and select Add Axial Cable or Add M-C Cable or Add Fiber Cable from the context menu.
3. Select a cable from the list and click OK, or double click on a cable stock in the list.



To copy Composite cable stocks

1. Select all the Composite cables that need copying.
2. Click the Copy button or right-click in the main grid and select Copy from the context menu.

To delete Composite cable stocks (Not In Use)

1. Select the stocks for deletion.
2. Click the Delete button or right-click in the main grid and select Delete from the context menu.

To delete Composite cable components

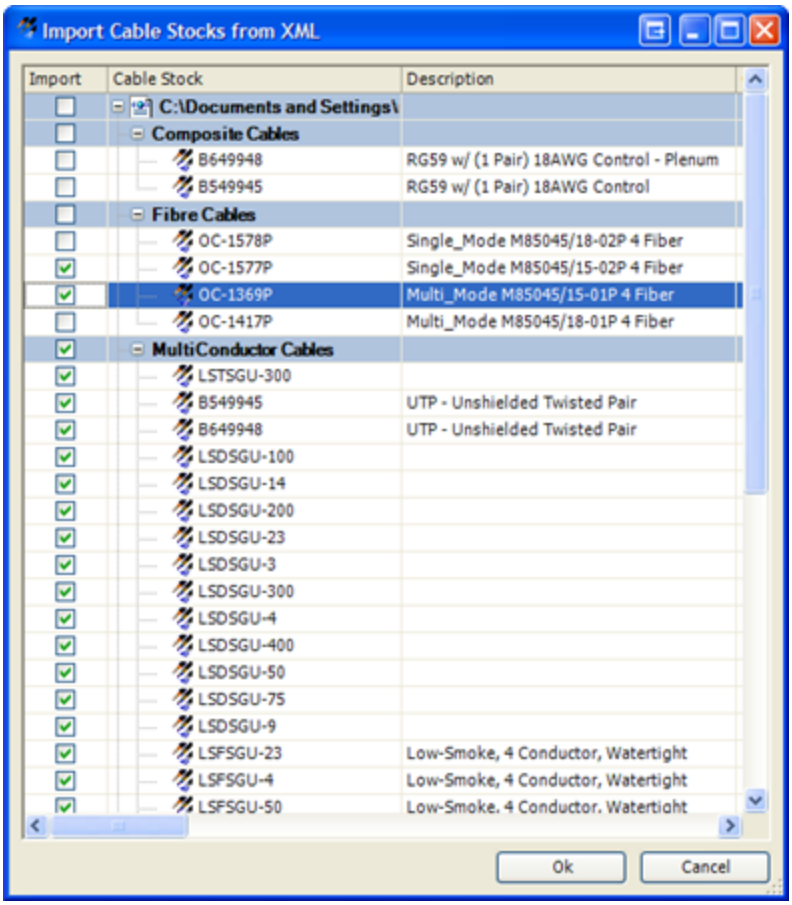
1. Select the components for deletion.
2. Click the Delete button located in the components grid or right-click in the components grid and select Delete from the context menu.

Importing Cable Stocks

Cable stocks can be imported from a .PRO file or .XML file created by using the Export feature in the Cable Library.

To import Cable Stocks

1. Select the Import button in the Cable Library.
2. Select a file to import from and click Open.
3. Select which cables you would like to import. By checking a heading node, cables underneath will be checked.
4. Click OK.



Export Cable Stocks

To export Cable Stocks

1. Check all the cables in every tab type that needs to be exported.
2. Click the Export button.
3. Enter a file name for the exported cables and click Save.

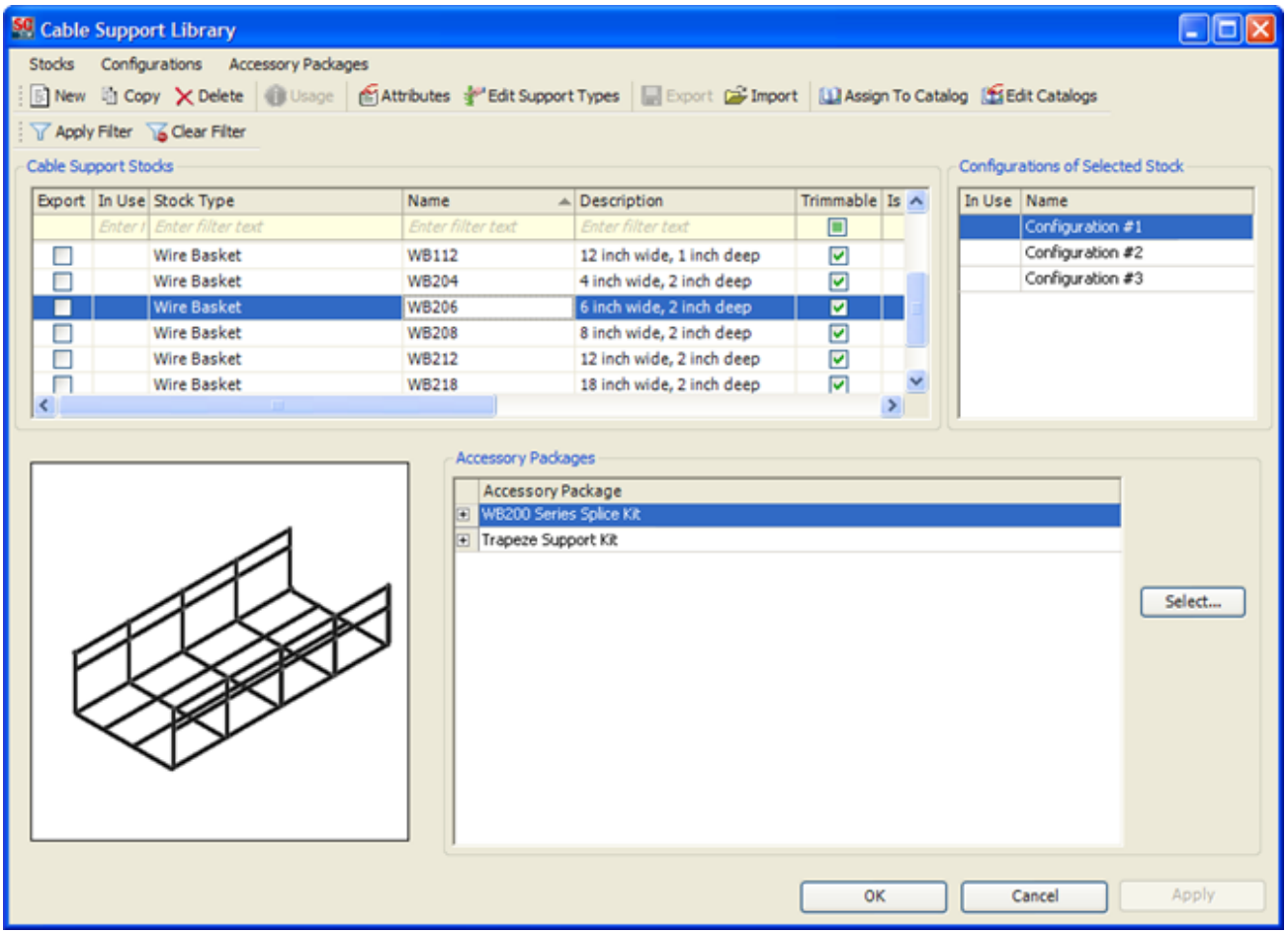
Usage Report

This feature is currently not enabled.

Using the Cable Support Library

The Cable Support Stock Library is used to create cable support stocks. These stocks are used to create parts (cable supports) in a drawing.

Before entering data in the library, it is highly recommended to read Common Dialog Controls as there are numerous ways of customizing the view of the library to save time when entering data.

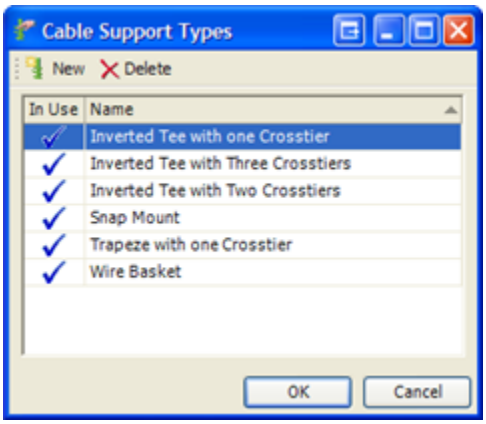


To open the Cable Stock Library

3. Choose ShipConstructor > Manager to open Manager.
4. Choose Electrical > Cable Support Library.

Cable Support Types

Before any cable stock can be defined, at least one cable support type must be created.



To open Cable Support Types Editor

2. In the Cable Stock Library, click on the Edit Support Types button.

To create a new Cable Support Type

5. Open the on Cable Support Types dialog.
6. Click on the New button.
7. Enter a unique name.
8. Click OK.

To delete a Cable Support Type (if it is not in use)

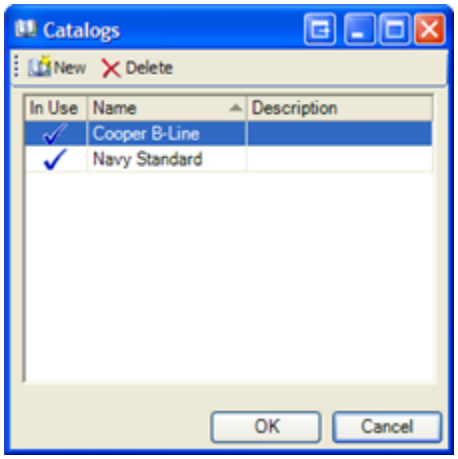
5. Open the Cable Support Types dialog.
6. Select all Cable Support Types to delete.
7. Click on the Delete button.
8. Click OK.

Catalogs

Catalogs are used to organize cable support stocks into logical groupings like by manufacturer or by standards they comply with. A cable support stock can belong to several catalogs.

To open Cable Support Catalog Editor

1. In the Cable Stock Library, click on the Edit Catalogs button.



To create a new Cable Support Catalog

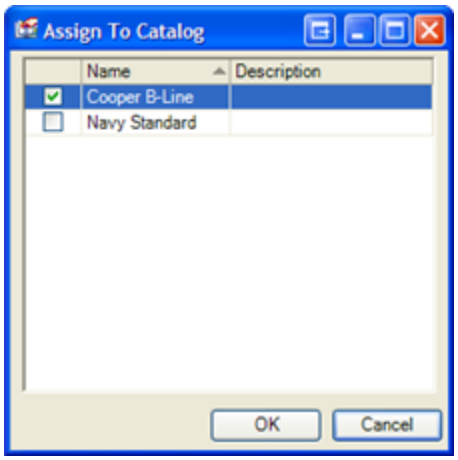
1. Open the Cable Support Catalog Editor dialog.
2. Click the New button.
3. Enter a unique name.
4. Click OK.

To delete a Cable Support Catalog

1. Open the Cable Support Catalog Editor dialog
2. Select all Cable Support Catalogs to delete
3. Click on the Delete button
4. Click OK

To assign a Cable Support Stock to a Catalog

1. Select all the cable support stocks to assign.
2. Click the Assign To Catalog button.
3. Check the catalogs to assign the selected stocks to.
4. Click OK.



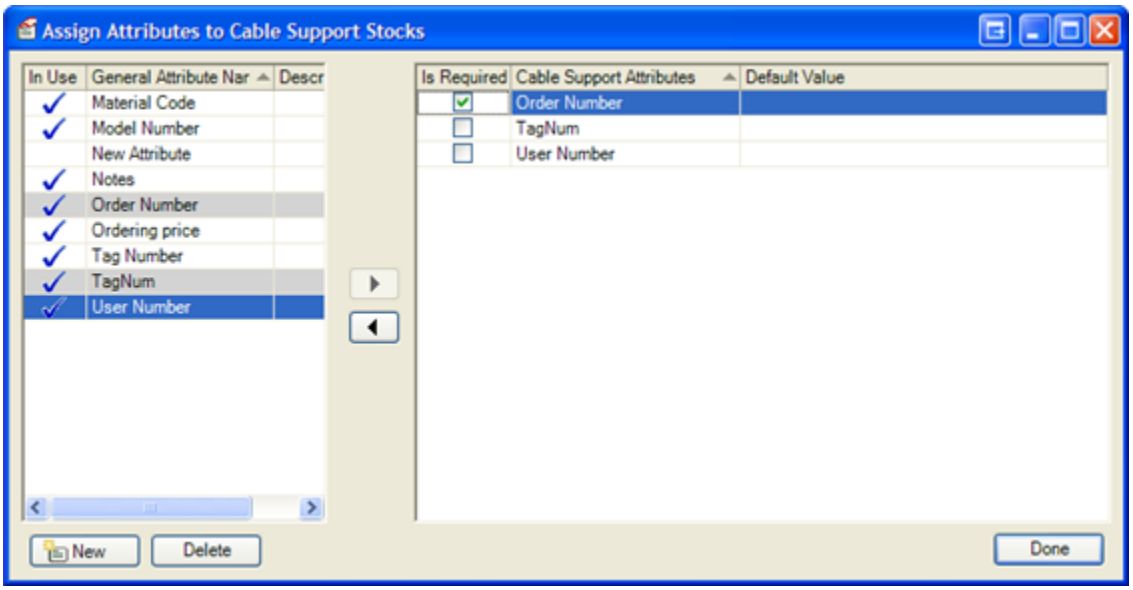
Attributes

User Defined Attributes are used when custom or additional data needs to be entered for stocks. Attributes are limited to strings only.

Cable Support Stocks use the list of attributes that are general to ShipConstructor. General Attributes must be assigned to be used in a cable support stocks through the Assign Attributes Dialog.

If a specific attribute is required to have data in it, check the Is Required checkbox for that attribute and ShipConstructor will check the attribute has data in it for that cable support stock.

If there is a default value for an attribute, enter the string under the Default Value column.



To open the Assign Attributes Dialog

4. Open the Cable Support Library.
5. Click the Attributes button.

To create a new General Attribute

3. Open the Assign Attributes Dialog.
4. Click the New button.

To create a new Cable Support Stock Attribute

4. Open the Assign Attributes Dialog.
5. Select a General Attribute.
6. Click on the Right arrow  .

To delete a General Attribute (Not In Use)

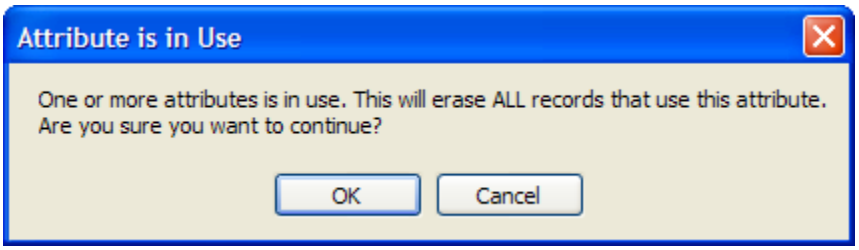
3. Open the Assign Attributes Dialog.
4. Select a General Attribute.
5. Click the Delete button.

To delete a Cable Support Stock Attribute

4. Open the Assign Attributes Dialog.
5. Select the Cable Support Stock Attribute.
6. Click on the Left arrow  .

Note: Take care when deleting a cable support attribute. Some attributes may be in use.

If an attribute is in use, a warning dialog will be shown if trying to delete it.



Stocks

To create a new cable support stock

1. Click the New button from the tool strip or right-click in the main grid and select New from the context menu.

To copy an existing cable support stock

1. Select all the cable support stocks that need copying.
2. Click the Copy button or right-click in the main grid and select Copy from the context menu.

To delete a cable support stock

1. Select all the cable support stocks to be deleted.
2. Click Stocks > Delete in the menu bar or right click on the main grid and select Delete from the context menu.

To import cable support stocks

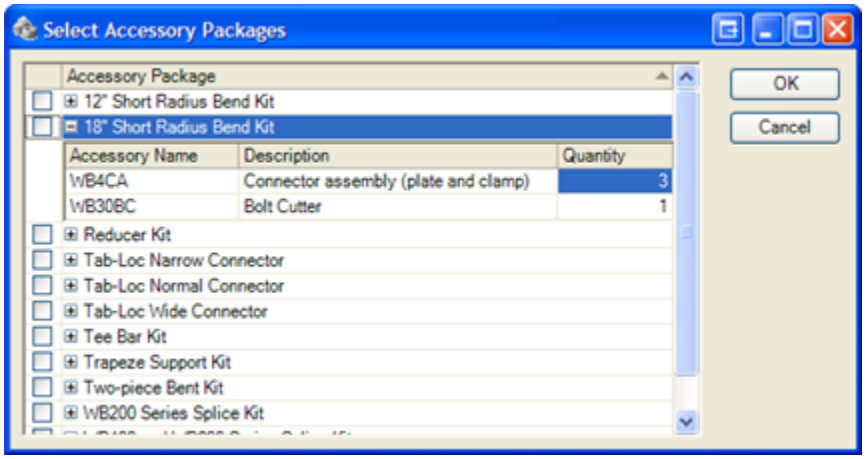
1. Select the Import button in the Cable Support Library.
2. Select a file to import from and click Open.
3. Select which cables support you would like to import. By checking a heading node, cables underneath will be checked.
4. Click OK.

To export cable support stocks

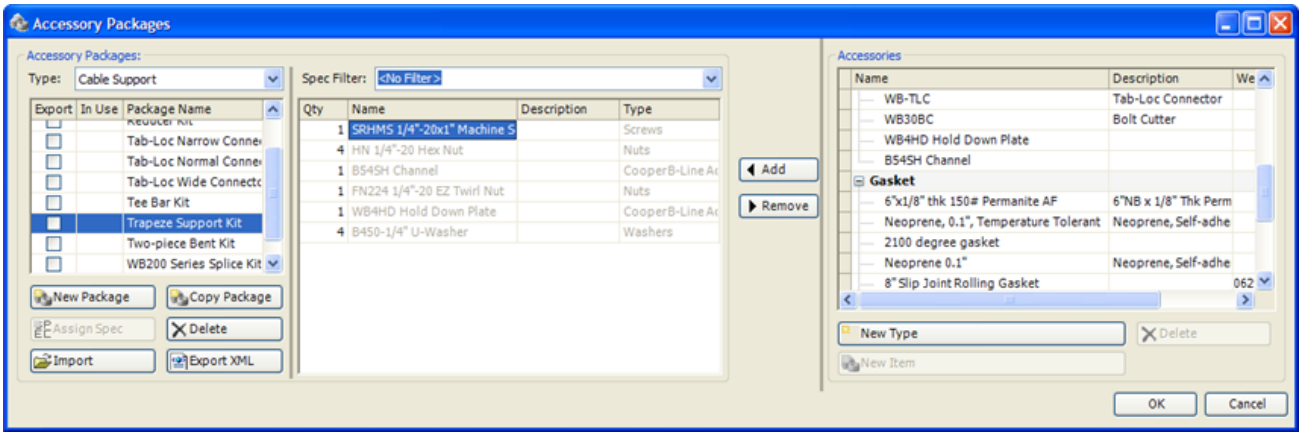
4. Check all the cables support stocks that needs to be exported.
5. Click the Export button.
6. Enter a file name for the exported cables and click Save.

To assign accessory packages to a cable support stock

1. Select all the cable support stocks to assign accessory packages to.
2. Click the Select button.
3. Select the check boxes by all the accessory packages required for the selected stocks.
4. Click OK.



Accessory Packages



To open Accessory Packages Library

1. Choose ShipConstructor > Manager to open Manager.
2. Choose General > Accessory Packages to open the Accessory Packages window.

To create a new cable support accessory package

1. Open the Accessory Packages Library.
2. Set Type to Cable Support.
3. Click New to create a new accessory package.
4. Enter a name for the accessory package and press Enter.

To create an accessory type

1. Open the Accessory Packages Library.
2. Click the New Type button.
3. Enter a name for the accessory type and press Enter.

To create an accessory

4. Open the Accessory Packages Library.
5. Under Accessories, select the desired accessory type.
6. Click New Accessory to create a new accessory of the selected type.

Note: The New Accessory button changes to the name of the selected accessory type.

7. Enter a name for the accessory and press Enter.
8. Enter a Description and Weight for the accessory.

To copy a cable support accessory package

1. Open the Accessory Packages Library.
2. Set Type to Cable Support.
3. Select the accessory package you want to copy.
4. Click Copy to copy the accessory package.
5. Enter a name for the copied accessory package and press Enter.

To delete a cable support accessory package

1. Open the Accessory Packages Library.
2. Set Type Cable Support.
3. Select the accessory package you want to delete.
4. Click Delete to delete the accessory package.

To add or remove an accessory to or from an accessory package

1. Open the Accessory Packages Library.
2. Set Type to the type of accessory packages you want to list.
3. Select the accessory package you want to add or remove an accessory to or from.

   Accessories that currently belong to the accessory package are listed under Spec Filter.
4. To add an accessory to the accessory package, under Accessories select the desired accessory and click Add.

   Note: To add several of the same type of accessory, add the accessory once and set the Qty value.

   To remove an accessory from the accessory package, under Spec Filter select the desired accessory and click Remove.

To import accessory packages

1. Open the Accessory Packages Library.
2. Click Import to open a File Browser.
3. Select a project file (*.PRO) or XML file (*.XML).
4. Click Open.
5. Check the check boxes next for the accessory packages to import.
6. Click OK to close the Accessory Packages window.

To export accessory packages

1. Open the Accessory Packages Library.
2. Set Type to the type Cable Support.
3. Check the Export check boxes for the accessory packages to export
4. Click Export XML to open a File Browser.
5. Enter a name for the XML file.
6. Click Save.
7. Click OK to close the Accessory Packages window.

Configurations

Configurations are used to represented different assemblies of the same stock.

To add a configuration to a cable support stock

1. Select the cable support stock to add a configuration to.
2. Click Configurations > New in the menu bar or right-click in the configuration grid and select New.

To copy a cable support configuration

1. Select the cable support stock with a configuration to copy.
2. Right-click on the configuration to copy and select Copy or select the configuration and click Configurations > Copy. This will create a new configuration for the same stock with the same geometry and insertion points but a different name.

To delete a cable support configuration

1. Select the cable support stock with a configuration to delete.
2. Right-click on the configuration to delete and select Delete or select the configuration and click Configurations > Delete.

To edit a cable support configuration geometry

1. Select the cable support stock with the configuration to edit and select the configuration in the Configurations table.
2. Choose Edit Drawing from the right-click menu for the configuration or click Configurations > Edit Drawing.

To import cable support configuration drawing

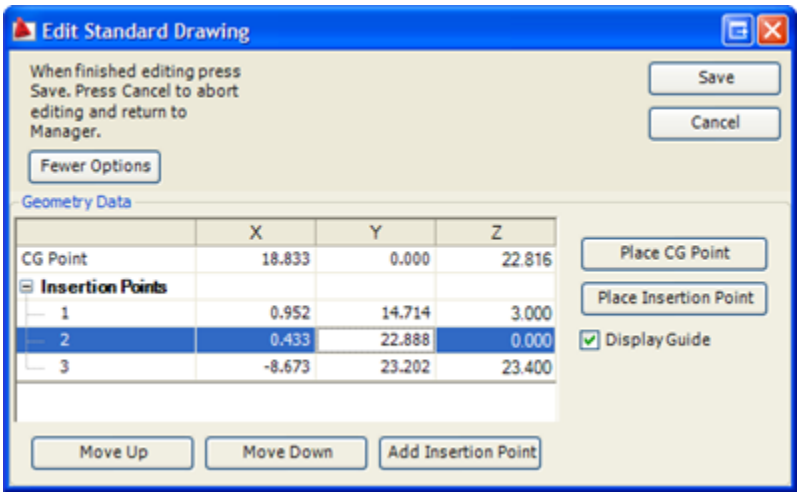
1. Select the cable support stock with a configuration to import geometry for.
2. Select the configuration.
3. Click Configurations > Import Drawing in the menu bar.
4. Select the drawing that contains the geometry for this configuration.
5. Click OK.

To export cable support configuration drawing

6. Select the cable support stock with a configuration to export geometry from.
7. Select the configuration.
8. Click Configurations > Export Drawing in the menu bar.
9. Choose a file name for the DWG file as well as the folder to save it to.
10. Click OK.

Cable Support Configuration Drawing Editor

Cable support configuration geometry is edited in AutoCAD. ShipConstructor adds several functions to associate additional information with the geometry to facilitate wireway modeling as well as report generation.



To place the Center of Gravity

1. Click the Place CG Point button
2. Place the point in AutoCAD.

Note: The coordinates of the center of gravity can be modified in the Geometry Data grid.

To place an insertion point

1. Click the Place Insertion Point button.
2. Place the point in AutoCAD.

To add an insertion point

1. Click the Add Insertion Point button.

Note: The coordinates of any insertion point can be modified in the Geometry Data grid.

To delete an insertion point

1. Selected the insertion point to delete under the Insertion Points node in the Geometry Data grid.
2. Press the Delete key on the keyboard.

To modify the order of insertion points

1. Select the insertion point to move in the Geometry Data grid, under the Insertion Points node.
2. Click the Move Up or Move Down button to move the point in the desired direction.

To toggle the visibility of the geometry orientation guide

1. Check or uncheck the Display Guide check box.

Common Dialog Controls

By using some of the main features listed below, users can customize their view of the data in a majority of dialogs. By customizing the view of dialogs, time can be saved.

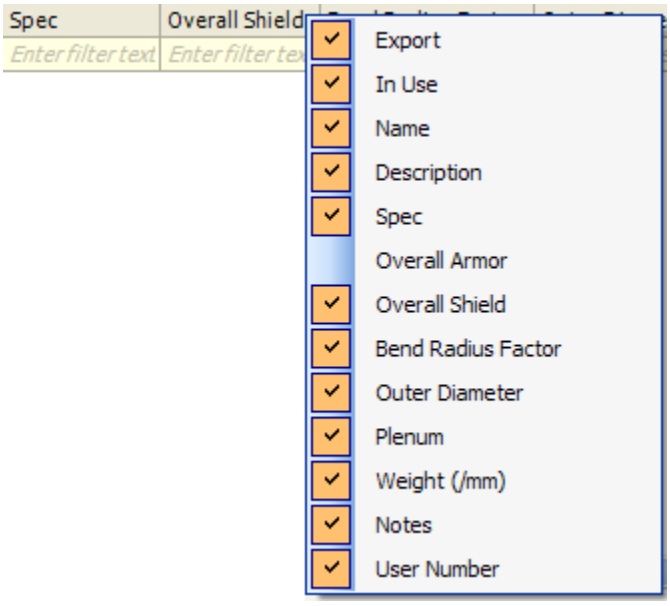
The most common dialog controls are explained in this section.

Context Menus

Most dialogs with grid controls and other controls have right-click context menus. Simply right-clicking on a control in a dialog will determine whether that control has a context menu. Some context menus are sensitive to the location of the mouse when a user right-clicks, such as the Header Row context menu. The context menus documented here are examples of some of the most common ones.

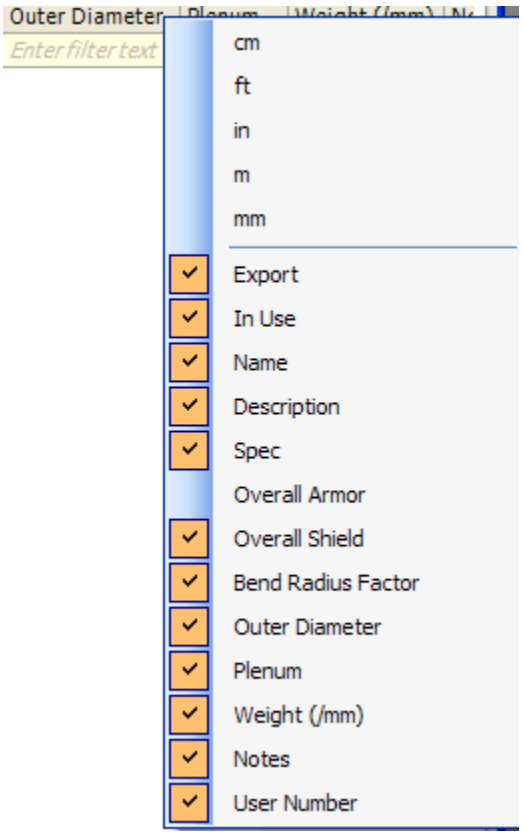
Header Row

The most common context menu is the header row context menu. This menu enables the user to show and hide various columns usually including User Defined Attributes. The menu can be seen by right-clicking on the header row in a grid.



Checked means the column is shown, unchecked means the column is hidden. The order the columns are listed in is the order of the columns shown from left to right in the grid.

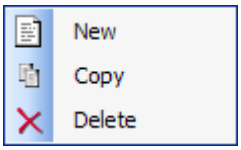
When right clicking on a header row over a unit column, unit views are also shown. This enables the user to select what type of unit the column is displayed in. This does not affect the unit when entering data that is a separate control, it only affects the display.



Control Menus

Another common type of right-click menu is shown when right-clicking inside a grid, or on a control in a dialog.

These types of context menus usually provide quick short cuts to existing commands in the dialog.



Filter Row

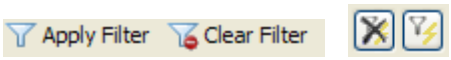
The filter row is a tool implemented in most grids to allow the user to filter down data. It is a ‘contains’ filter only. This means that entering the string ‘15’ will show strings containing 15, 155, Stock15, and any other string containing 15 in that column. By entering a filter string in more than one filter cell, data can be significantly filtered down.

Boolean columns have a tri-state checkbox as a filter. When the filter checkbox is checked, only items that are checked in that column are shown. This behaves the same for an unchecked filter checkbox. When the filter checkbox is in the tri-state, the column is not filtered.

Each text filter cell has an ‘in cell’ clear button which is shown when focus is in the cell. By clicking on this button, the cell is cleared of the filter string without having to clear all filter cells.

Filter row above shows the ‘in cell’ clear button in a used filter cell, Boolean filter cell, and normal unused filter cell.

Near the grid with the filter row, are buttons to apply the filter or clear the filter row. These buttons may look different in different dialogs.

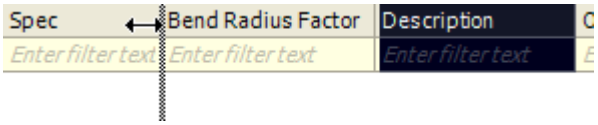


Apply and Clear filter buttons on a tool strip shown on left, Clear and Apply buttons in a different dialog shown on right.

The filtering is only applied to rows that are shown. This means if a node in a tree is collapsed, the filter is applied, then the node is expanded, the expanded rows will not have been filtered. If that happens, clicking on the apply filter button again will now filter those rows.

Reordering Columns

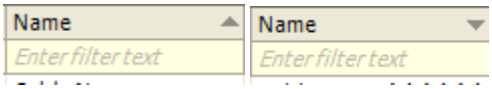
Most columns in grids allow reordering. By clicking on a column and dragging it left or right, a user can rearrange the order columns are shown in a grid.



Shown above is an example of ‘Description’ column getting reordered to be in between ‘Spec’ and ‘Bend Radius Factor’ columns.

Sorting Columns

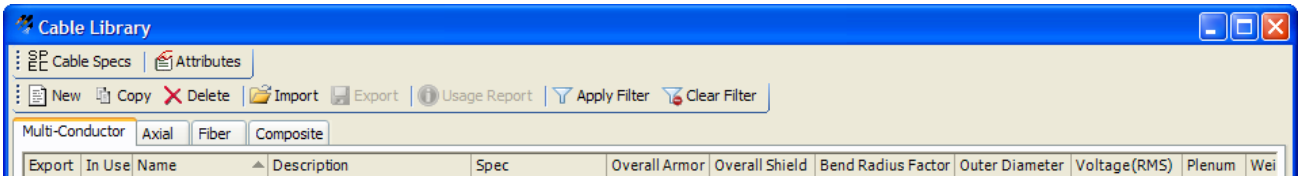
By clicking on a header row for a column, the column can be sorted ascending or descending. There is no multi-column sort.



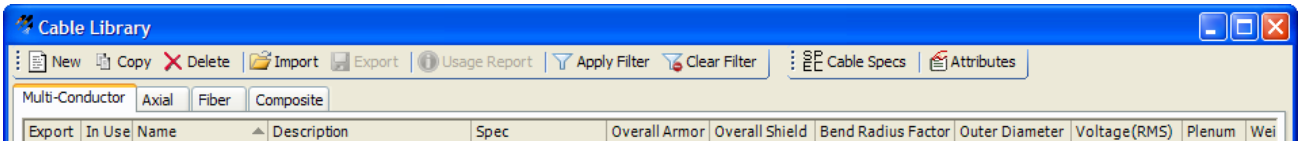
Shown above is column sorted ascending and descending respectively.

ToolStrip

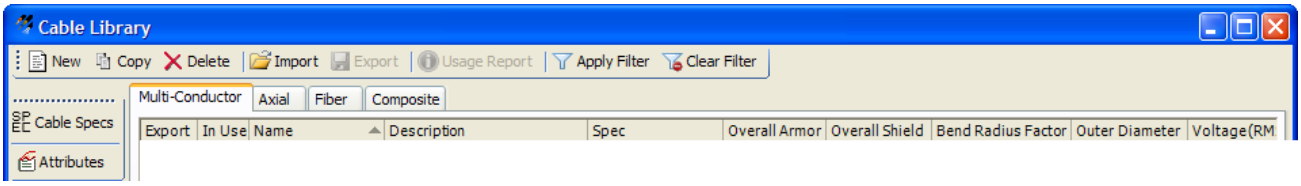
Newer dialogs may have one or more ToolStrips. ToolStrips are small shortcut toolbars that can generally be moved around the dialog and positioned near the edges of the dialog.



Two ToolStrip menus arranged one on top of the other.



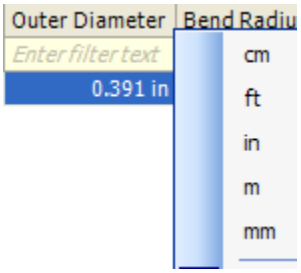
Same two ToolStrip menus arranged side by side.



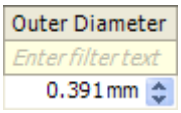
Same two ToolStrip menus one arranged on top, one on the left edge.

Units

Various unit types are used in grids. Grids that have unit Context Menus, also have unit cell controls. Unit cell controls control the unit that data gets input in as, and the context menu controls how it is displayed in the grid. Upon leaving the cell control, the data entered will change to adhere to the column's display units.

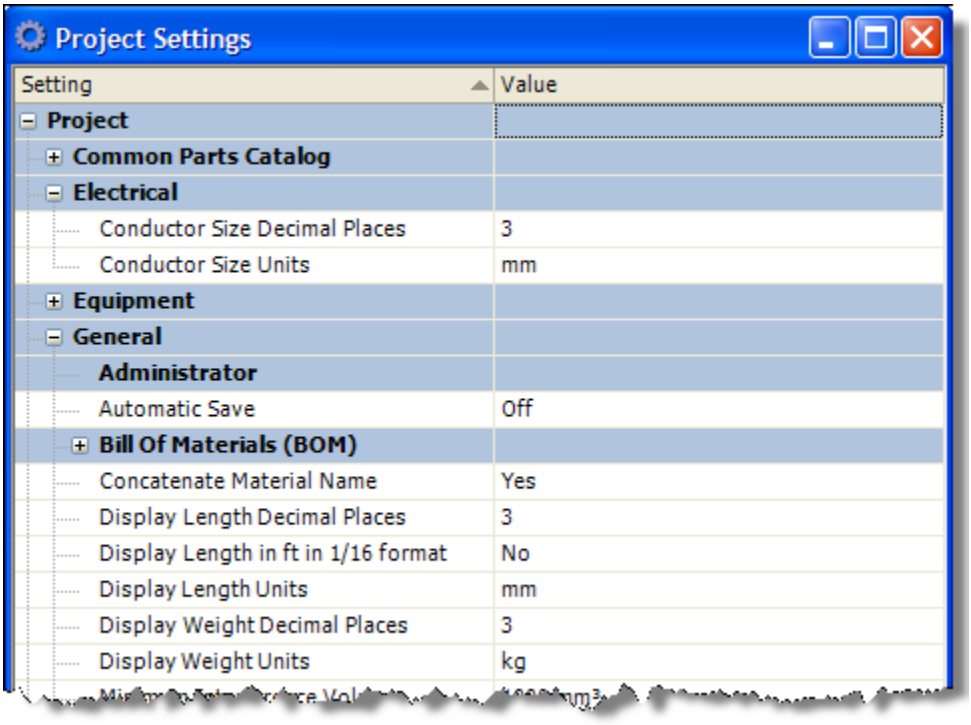


Unit Column 'Outer Diameter' shown with unit context menu. Units displayed in 'in'.



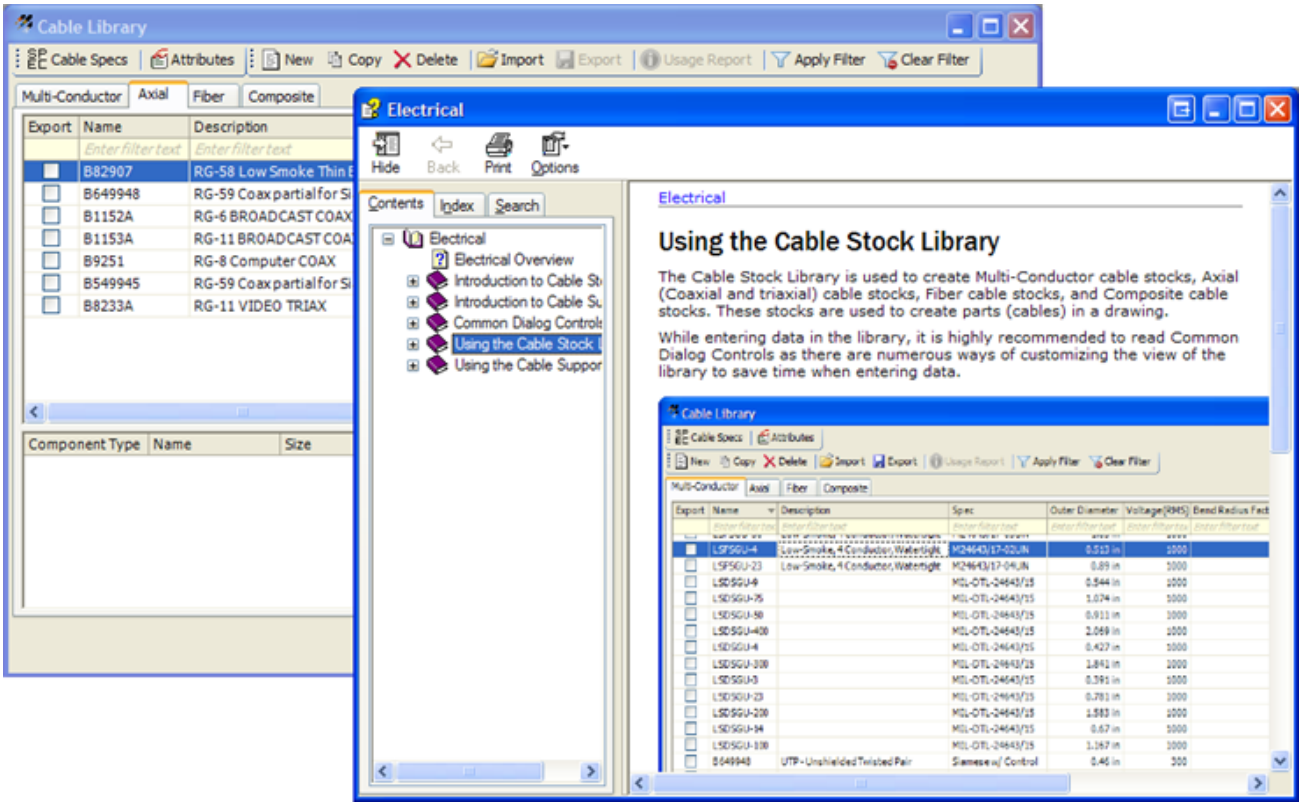
Unit Column 'Outer Diameter' shown using the unit cell control to enter data in 'mm'.

If there is too few or too many decimal places shown, the property known as Display Decimal Places can be changed in the Project Settings in Manager under the specific unit type.



Help

Help for some dialogs can be accessed by pressing F1 while the dialog is currently active. If nothing happens, help has not currently been made available for that particular dialog.



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