

TOPSePAC

User's Guide

Web-based Package Design & Palletization



TOPS Engineering Corporation
275 W. Campbell Road, Suite 600
Richardson, Texas 75080 USA

TEL: 972-739-8677
FAX: 972-739-9478
info@topseng.com
Tech Support: tech@topseng.com
Web Site: www.topseng.com

Table of Contents

Section I: Introduction to TOPSePAC	1
General Information	1
Login	2
Control Panel	2
Create a New Design Sequence	3
Section II – Using TOPSePAC	4
Example 1: Case Sizing Optimization	4
Sequence Selection	4
Bottle Definition	4
Shipcase Definition	5
Adding Dividers (optional)	6
Analysis View	7
Solution View Pane	7
Solution List Pane	7
Example 2: Shipcase onto Pallet	9
Sequence Selection	9
Shipcase Definition	9
Unitload Definition	10
Analysis View	11
Solution View Pane	12
Solution List Pane	12
Example 3: Bottles to Shrink Wrap to Pallet	13
Sequence Selection	13
Can Definition	13
Shipcase Definition	14
Unitload Definition	15
Analysis View	16
Saving the Solution	17
Generating Reports	18
Printing Reports	19
Section III: TOPSePAC Menu Functions	20
File Menu	20
New	20
Open	20
Save	21
Save As	21
Print Preview	21
Edit Menu	21
Sequence Design	21
(Primary Pack) Parameters	21

Shipcase Parameters	25
Unitload Parameters.....	27
Layer Parameters	28
View Menu.....	30
Shipcase Solutions	30
Unitload Solutions	30
Tools Menu	31
Stacking Strength.....	31
Define Menu	31
Pallet	31
Session Menu.....	32
Logout.....	32
Section IV: References.....	33
Stacking Strength.....	33
The McKee Formula.....	33
Edge Crush Test.....	34
Ring Crush Test	34
Calculate Stacking Strength.....	35
Function Buttons.....	36
Stacking Strength Results	37
Function Buttons.....	39
Pallet Patterns	40
Box Styles	42
Divider Styles	44



Section I: Introduction to TOPSePAC

TOPSePAC is a web-based application for creating optimal case sizing and pallet patterns.

This User Guide is divided into the following sections:

- **Section I** – Introduction to TOPSePAC provides general information on the application and describes its main functionalities .
- **Section II** – Describes how to create different design sequences using TOPSePAC and how to create reports for printing and sharing.
- **Section III** – Describes the menu functions within TOPSePAC.
- **Section IV** – A reference section describing Stacking Strength and providing illustrations of pallet patterns, box styles and divider styles.

General Information

1. Each user account allows only one user at a time.
2. All data and analyses created with TOPSePAC will be saved in a secured server located at TOPS, not in your personal computer. This allows users to create / save data without taking-up space on the desktop.
3. The TOPSePAC session will automatically time out if inactive for 30 minutes.
4. To exit TOPSePAC, go to “Session” on the Menu Bar and logout. Do not just close the Internet browser. A waiting period of 30 minutes is required before logging back into the application if you do not logout properly.
5. TOPSePAC is a web application and its performance (response time) depends on network traffic. Please make sure an existing page has finished loading before proceeding to the next step.
If problems are encountered, clicking the refresh button of the browser can usually cure the problem. It is also good practice to take note of the browser status bar for any message.
6. Throughout TOPSePAC the term “unitload” refers to pallet loads.
7. When needed, help information is available by clicking on the Help button. When help is active, a  will appear over the fields with help information. Bring the mouse cursor over the  to read the help text or graphics (e.g. pallet patterns). To disable application Help, click on the Help button again to hide the help icons.
8. For assistance with use of the application, please contact TOPS Engineering at 972-739-8677 Monday through Friday, 7:30 AM to 5:30 PM Central Time or email us at tech@topseng.com.

Login

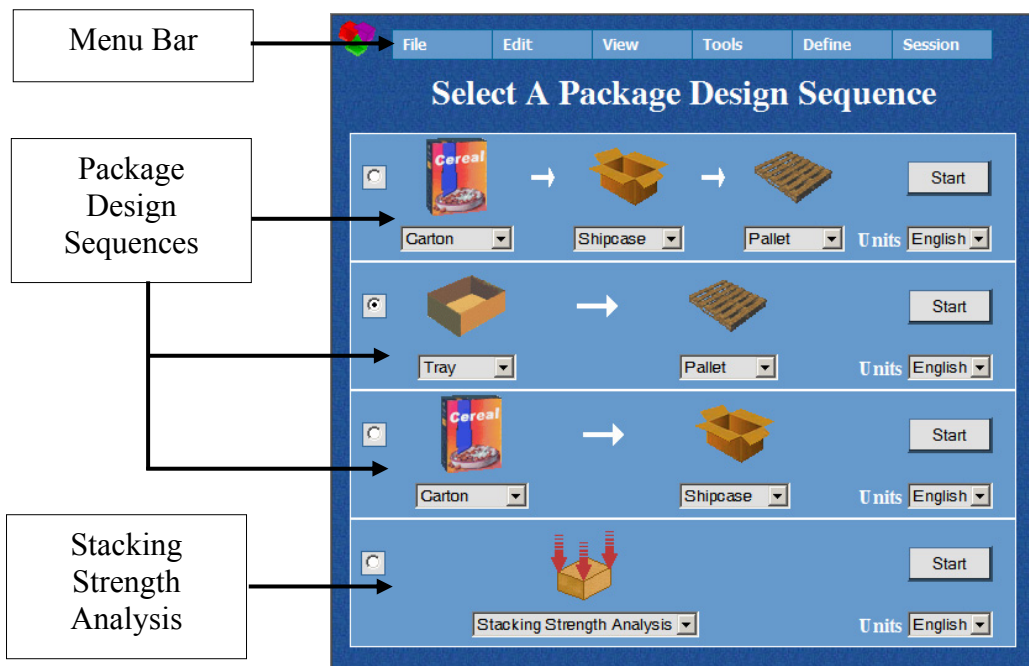
A user account is required to log in and should have been provided to you. To log in:

1. Type the URL <http://www.topsepac.com> at the address line of your internet browser.
2. Enter the user name in the Username field.
3. Enter the password in the Password field.
4. Click on the Login button.

Control Panel

After logging into TOPSePAC, the Control Panel appears. This is the working area where selection of the stages to be used in the analysis and the definition of the dimensions of each stage will be made.

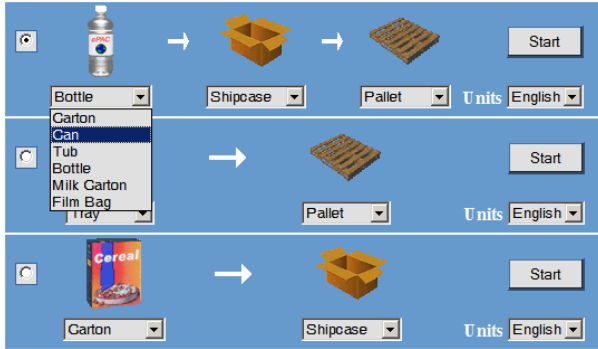
The main elements in the Control Panel are: Menu Bar, Package Design Sequences, UOM (unit of measure) selection and shortcut to Stacking Strength Analysis.



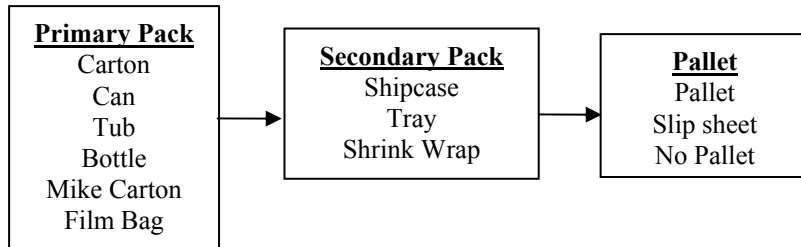
- **Menu Bar** – The Menu Bar on the top of the screen provides access to all available functions within TOPSePAC.
- **Package Design Sequences** – Allow selection of one of the three pre-defined package design sequences within TOPSePAC.
- **Stacking Strength** – Allows quick access to perform stacking analysis.

Please refer to Section III for more information on the different functions available under each menu.

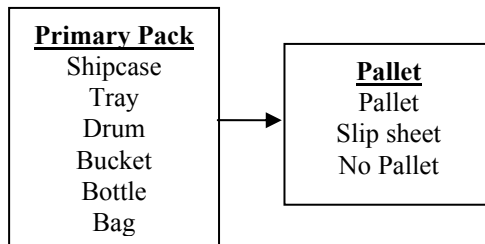
Create a New Design Sequence



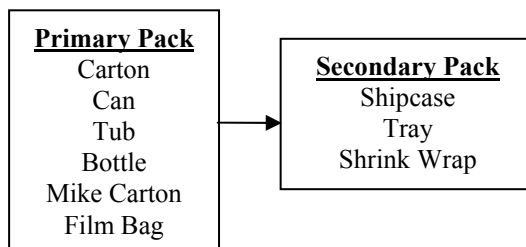
- To start a new analysis, select from one of the three design sequences by clicking on the corresponding radio button located to the left of the sequence.
 - The first sequence is used to create a 2-step analysis by placing primary packs into a secondary pack and then onto a pallet. It provides optimization on the case size and pallet load levels.



- The middle sequence is used for pallet optimization.



- The last sequence is for determining case sizing.



- At each step, use the drop down button to select from the list of available options.
- Select the measurement unit between English and Metric.
- Click the corresponding Start button on the selected sequence to start the design.

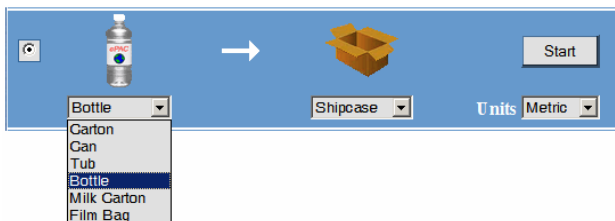
Section II – Using TOPSePAC

This section provide step-by-step examples on how to use each of the design sequences.

Example 1: Case Sizing Optimization

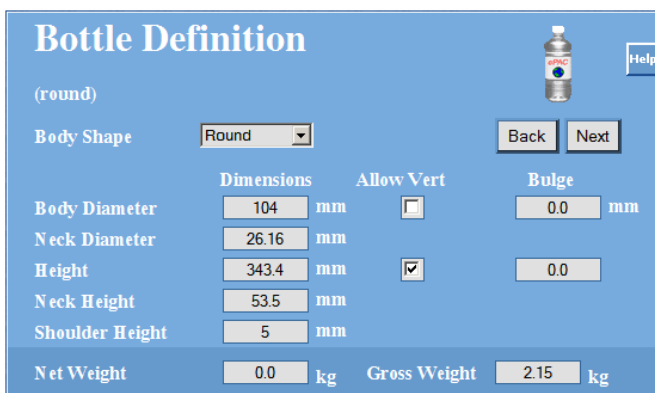
In this example, we will determine the different options of placing primary packs (bottles) inside shipping cartons. We will have TOPSePAC helps us determine the best way to pack multiple bottles inside a shipcase.

Sequence Selection



1. Click the radio button against the third design sequence.
2. Click the drop down list for the primary pack and select “Bottle”.
3. Click the drop down lost for the secondary pack to select “Shipcase” if not already selected.
4. Change Units of measure to “Metric”.
5. Click on the Start button.

Bottle Definition



	Dimensions	Allow Vert	Bulge
Body Shape	Round		
Body Diameter	104 mm	<input type="checkbox"/>	0.0 mm
Neck Diameter	26.16 mm		
Height	343.4 mm	<input checked="" type="checkbox"/>	0.0
Neck Height	53.5 mm		
Shoulder Height	5 mm		
Net Weight	0.0 kg	Gross Weight	2.15 kg

The variables in the primary pack definition screen vary according to the type of primary pack selected. Please refer to section III for the definition screens for each primary pack supported within TOPSePAC. The followings are the parameters for bottles:

- **Body Shape** – Select from the drop down list shapes among Round, Rectangular or Oval.

- **Bottle Dimensions and Weight** – These include Body Diameter, Neck Diameter, Height, Neck Height and Shoulder Height for the bottle. Enter each dimension and use the [Tab] key to navigate between the fields.
- **Allow Vert** – Check off the dimension that is allowed vertical when placed inside the secondary pack. Check off the “Height” option only if the bottles are to be packed upright only inside the shipcase.
- **Bulge** – Enter the additional space that each primary pack will take up when packed inside the shipcase. This is usually zero.
- **Weight** – Enter the net and gross weight of the primary pack. The net and gross weights can be left as zeros but the gross weight will be need if stacking analysis will be performed.

After all bottle parameters have been defined, click on the Next button to go to the next step in the Design Sequence – Shipcase.

Shipcase Definition

At the New Shipcase Definition screen, TOPSePAC will determine what shipcase size to use based on these information:

- **Style** – Select the shipcase style from the drop down list. Refer to Section IV – Box Styles for illustrations of the different predefined box styles.
- Select “New” Case in order for the program to calculate the dimension of the shipcase. When “Fixed” is selected, the user is to provide the dimension of the shipcase to carry the products.

- **Dividers** – Clicking the Dividers button opens the dialog box to add dividers and/or pads in the shipcase.
- **Shipcase Quantities** – Use a “Range” or “Exact Values” to specify the quantity of primary packs to pack. In this example, we are using a range from 6 to 12 bottles. To use exact values, check off the “Values” box and enter the desired quantities in the adjacent boxes.
- **Allow Vert** – Check off the dimension for the Shipcase that is allowed vertical when placed onto the pallet.
- **Material** – Corresponds to the material thickness of the shipcase. This value will be added to the inside dimension (if used) of the shipcase to get the overall shipcase size used for calculation.
- **Dimensions** – Specify whether the dimensions used are “Outside” or “Inside” dimension of the shipcase
- **Max Weight** – Defines the weight limit to be carried by the shipcase.
- **Slack and Bulge** – Specifies any slack or bulge along each dimension of the shipcase. This can be used to accommodate space taken up by packing materials.
- **Optional Sizing Limits** – These provide additional criteria to limit the solutions to certain configurations only. For example, by setting “Maximum along Depth” to 1 will limit solutions (bottles inside shipcase) to only 1 layer high.
- **Allowed Patterns** – Specifies what patterns will be allowed for the solution. For example, by removing “Staggered” pattern, you will only get solutions with bottles in block(s) but never staggered.

After specifying all parameters, click on the Next button to view the solutions.

Adding Dividers (optional)

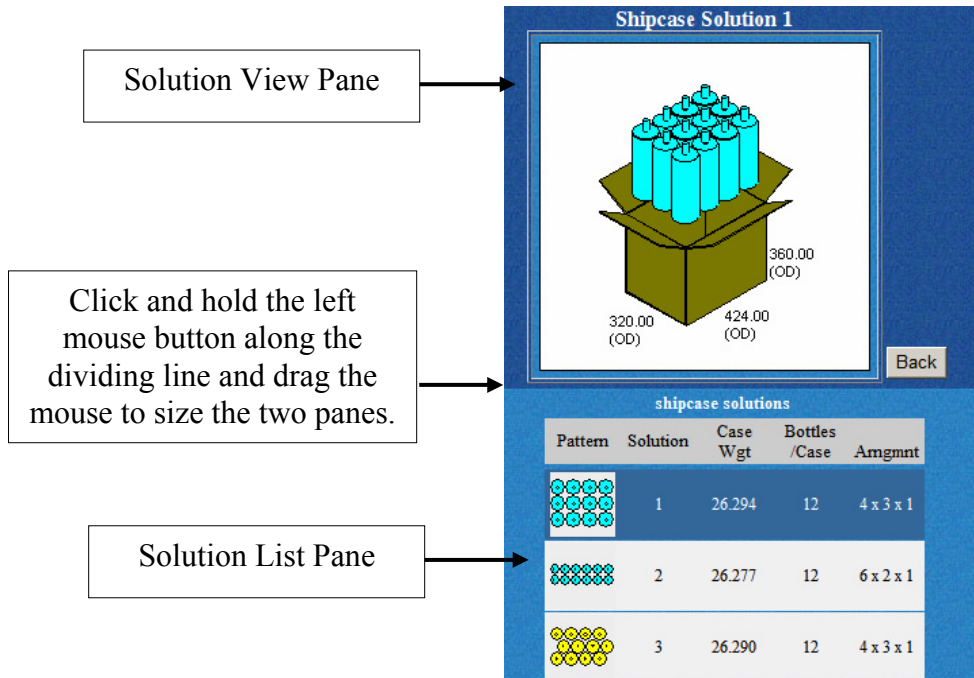
When available, you can click on the “Dividers” button to add dividers/pads inside a shipcase.

- **Style** – Click on the drop down list to select the divider style.
- **Board** – Select from the drop down list the board grade to be used for the divider.
- **Material** – Check off “Caliper” and enter the thickness if the divider is of cardboard rather than corrugated paper. Check off “Flute” and select the type of flute from the drop down list. The material provided will be used in calculating stacking strength.

- **Pads** – Check off any applicable options for pads and divider height.
Note: If “Pads on Top” is selected, you might not see the divider which will be covered by the pad.

Analysis View

TOPSePAC displays solutions in the Analysis View, as pictured below. Use the Analysis View to study the different solutions and select the one that best meets your requirements.



- **Solution View Pane** – The top pane displays a 3D view of the selected shipcase solution, depicting how the bottles are loaded into the shipcase.
- **Solution List Pane** – The bottom half of the application lists all possible solutions generated for the analysis, along with statistics for each solution.

Solution View Pane

The Solution View Pane displays a 3-D graphic of the selected solution. It is linked to the Solution List pane. For example, if Solution 1 is selected in the Solution List, the Solution View displays a graphic that corresponds to Solution 1. If Solution 3 is selected in the Solution List, the Solution View displays a graphic for Solution 3, and so on.

Solution List Pane

The Solution List Pane displays a list of all solutions generated for the analysis. A scroll bar on the right allows you to move up and down the list. For each solution, 5 items appear in columns across the pane. The solutions are ranked by the quantity / shipcase.

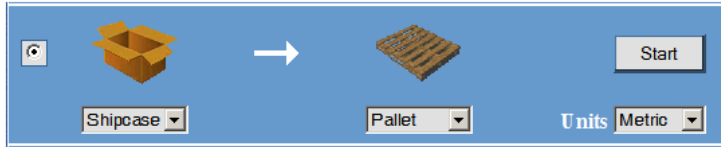
- **Pattern** – Displays an overhead view of the pattern. In this case, the arrangement of bottles inside the shipcase.
- **Solution** – Identifies the solution number (Solution 1, 2, 3, etc.).
- **Case Weight** – The total weight of the shipcase, this includes the weights of bottles and the carton.
- **Bottles/Case** – Provides the quantity of primary pack per shipcase.
- **Arngmnt** – Gives the arrangement of the product inside the carton. Note that these are all one layer arrangement since we have restricted the “maximum (sizing) along depth” to be 1 in the New Shipcase Definition screen.

More statistics, e.g. RSC board area, area and cubic efficiency are available in the report for the analysis and is described on page 18.

Example 2: Shipcase onto Pallet

In this example, we will determine the optimal pallet pattern for a fixed shipcase.

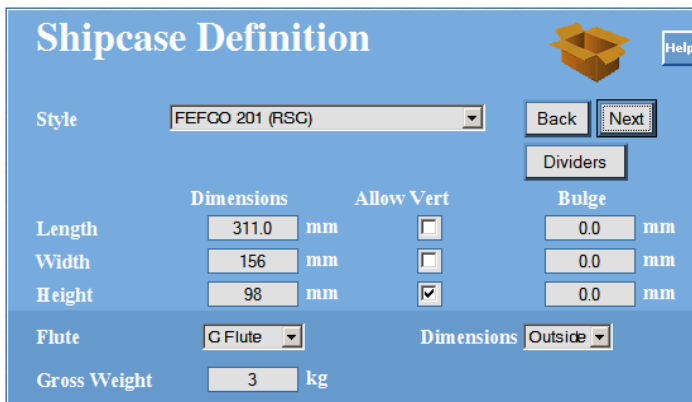
Sequence Selection



1. Click the radio button against the second design sequence.
2. Click the drop down list to select “Shipcase” and “Pallet”.
3. Change Units of measure to “Metric”.
4. Click on the Start button.

Shipcase Definition

At the Shipcase Definition screen, enter the dimension and weight of the shipcase to be placed on the pallet:



	Dimensions	Allow Vert	Bulge
Length	311.0 mm	<input type="checkbox"/>	0.0 mm
Width	156 mm	<input type="checkbox"/>	0.0 mm
Height	98 mm	<input checked="" type="checkbox"/>	0.0 mm

Flute: C Flute Dimensions: Outside

Gross Weight: 3 kg

- **Style** – Select the shipcase style from the drop down list. Refer to Section IV – Box Styles for illustrations of the different predefined box styles. In this example, please select the FEFCO 201 (RSC) as illustrated above.
- **Dimensions** – Enter the dimensions of the shipcase in the selected unit of measure.
- **Allow Vert** – Check off the dimension for the Shipcase that is allowed vertical when placed onto the pallet.
- **Flute** – Select from the drop down list the flute used for the shipcase. The flute value (material thickness of the shipcase) will be added to the inside dimension (if used) provided to get the overall shipcase size used for calculation.
- **Dimensions** – Specify whether the dimensions used are “Outside” or “Inside” dimension of the shipcase.
- **Bulge** – Specifies any bulge along each dimension of the shipcase. This can be used to accommodate space taken up by packing materials.

- **Gross Weight** – This is the overall weight of the shipcase and its contents.
- **Dividers** – Click on the Dividers button to add dividers and/or pads to the shipcase. Adding dividers will affect the stacking results of the unitloads.

After specifying all parameters, click in the Next button to define the pallet parameters.

Unitload Definition

At the Unitload Definition screen, select the pallet to be used together with any other related parameters like maximum unitload height or any overhangs on the pallet.

The screenshot shows the 'Unitload Definition' interface. On the left, five callout boxes point to specific fields: 'Pallet Name' points to the dropdown menu; 'Pallet Dimensions and overhang' points to the Max Height, Max Weight, Max Length Overhang, and Max Width Overhang fields; 'Allowed Patterns' points to the grid of pattern checkboxes; 'Clamp Options' points to the 'Clampable Width' checkbox; and 'Corner Posts' points to the 'Clampable Length' checkbox and the 'Use Corner Posts' section.

- **Pallet Name** – Select from the drop list the type of pallet to be used. TOPSePAC comes predefined with some commonly used pallets. You can also define new pallets under the Define > Pallet menu. Please see page 31 for more details.
- **Max Height** – Enter the maximum height for the unitload. This includes the height of the pallet and controls how high the shipcases can stack on the pallet.
- **Max Weight** – Enter the maximum allowable weight for the unitload.
- **Max Length Overhang** – Input the maximum amount of overhang allowed along the length of the pallet.
- **Max Width Overhang** – Input the maximum amount of overhang allowed along the width of the pallet.
- **Pallet Dimensions** – Displays the dimension of the selected pallet. Note that these are display fields and cannot be edited. To change the dimension of the pallet, you'll need to use the Define > Pallet function.
- **Allowed Patterns** – Check off the pallet patterns allowed for the unitload. Check all if you want to see all possible pallet patterns. Illustrations of different pallet patterns can be found in Section IV.
- **Clampable Width/Length** – Check off the dimensions (width or length) that are clampable during loading or unloading. Leave the two options unchecked if no clamping is allowed on the unitload.

- **Use Corner Posts** – To use corner posts for the unitload, check off this option and enter length and thickness of the corner posts to be used.

After specifying all parameters, click in the Next button to view the solutions.

Analysis View

TOPSePAC displays solutions in the Analysis View, as pictured below. Use the Analysis View to study the different solutions and select the one that best meets your requirements.

Pattern	Solution	Dim Vert	UL Wgt	Ptm Type	Cases /Layer	Cases /UL	Area Eff	Cubic Eff
	1	H	761.0	B	21	252	85%	83%
	2	H	761.0	B	21	252	85%	83%
	3	H	761.0	B	21	252	85%	83%
	4	H	761.0	C	21	252	85%	83%
	5	H	761.0	D	21	252	85%	83%

- **Solution View Pane** – The top pane displays a 3D view of the selected unitload solution, depicting how the shipcases are stacked on the pallet. Note that there might be thumbnails to the right of the solution, showing “Alternate Patterns” for the current solution. Clicking on the thumbnail will update the current view of the solution.
- **Solution List Pane** – The bottom half of the application lists all possible unitload solutions generated for the analysis, along with statistics for each solution.

Solution View Pane

The Solution View Pane displays a 3-D graphic of the selected solution. It is linked to the Solution List pane. For example, if Solution 1 is selected in the Solution List, the Solution View displays a graphic that corresponds to Solution 1. If Solution 3 is selected in the Solution List, the Solution View displays a graphic for Solution 3, and so on.

Solution List Pane

The Solution List Pane displays a list of all solutions generated for the analysis. A scroll bar on the right allows you to move up and down the list. For each solution, 9 items appear in columns across the pane. The solutions are ranked by cubic efficiency (Cubic Eff).

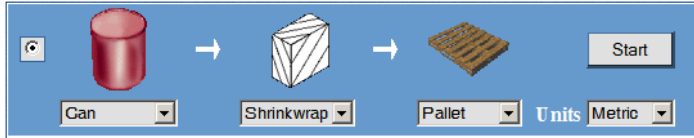
- **Pattern** – Displays an overhead view of the unitload pattern.
- **Solution** – Identifies the solution number (Solution 1, 2, 3, etc.).
- **Dim Vert** – Indicates which dimension of the shipcase is stacked vertical.
- **UL Wgt** – The total weight of the unitload including shipcases and pallet.
- **Ptrn Type** – The pallet pattern used to configure the unitload.
- **Cases/Layer** – The number of shipcases in each layer of the unitload.
- **Cases/UL** – The total number of shipcases in the unitload.
- **Area Eff** – The percentage of the pallet area that is used in the configuration. TOPSePAC calculates this value based on how much pallet area is covered by the shipcases.
- **Cubic Eff** – The percentage of cubic space that is used in the configuration. TOPSePAC calculates this value based on how much space is being used versus the space you're trying to fill.

More statistics, e.g. RSC board area, area and cubic efficiency, total cube are available in the report for the analysis and is described on page 18.

Example 3: Bottles to Shrink Wrap to Pallet

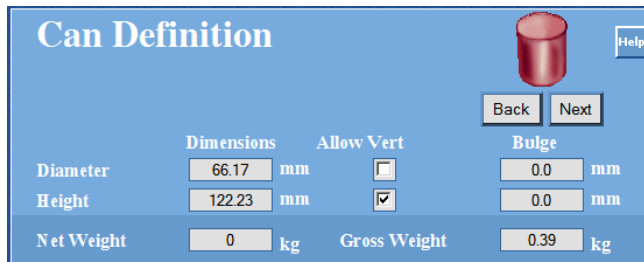
In the example, 6 cans will be shrink wrapped and then placed onto a pallet to determine the most optimal pallet pattern.

Sequence Selection



1. Click the radio button against the first design sequence.
2. Click the drop down list to select “Can” for primary, “Shrinkwrap” for secondary and then “Pallet”.
3. Change Units of measure to “Metric”
4. Click on the Start button.

Can Definition

The image shows a 'Can Definition' form with a blue header and a red can icon. The form contains several input fields and checkboxes. The 'Diameter' field is set to 66.17 mm. The 'Height' field is set to 122.23 mm. The 'Allow Vert' checkbox is checked. The 'Bulge' field is set to 0.0 mm. The 'Net Weight' field is set to 0 kg. The 'Gross Weight' field is set to 0.39 kg. There are 'Back' and 'Next' buttons at the top right, and a 'Help' button in the top right corner.

	Dimensions	Allow Vert	Bulge
Diameter	66.17 mm	<input type="checkbox"/>	0.0 mm
Height	122.23 mm	<input checked="" type="checkbox"/>	0.0 mm
Net Weight	0 kg	Gross Weight	0.39 kg

The variables in the primary pack definition screen vary according to the type of primary pack selected. Please refer to section III for the definition screen for each primary pack supported within TOPSePAC.

- **Diameter** – Enter the diameter of the can to be packed.
- **Height** – Enter the height of the can to be packed.
- **Allow Vert** – Check off the dimension that is allowed vertical when placed inside the secondary pack, shrinkwrap in this case. Check the “Height” option only since the cans will be packed upright.
- **Bulge** – Enter the additional space that each primary pack will take up when packed inside the shipcase. This is usually zero.
- **Weights** – Enter the weights for the can. They are be left at zeros or entered for gross weight only.

After all can parameters have been defined, click on the Next button to go to the next step in the Design Sequence – Shipcase (Shrinkwrap).

Shipcase Definition

At the New Shipcase Definition screen, TOPSePAC will determine what shipcase size to use based on these information:

- **Style** – Select the shipcase style from the drop down list. “Shrink Wrap” is pre-selected since it was specified in the Package Design Sequence. Select “New” Case instead of “Fixed”.
 - New – TOPSePAC will determine the size of the secondary pack.
 - Fixed – You will provide the dimension of the secondary pack for use in the analysis.
- **Shipcase Quantities** – Use a “Range” or “Exact Values” to specify the quantity of primary packs to pack. In this example, we are creating a 6-pack, so check off the “Values” option and enter 6 in the first box and keep the remaining boxes as zeros.
- **Allow Vert** – Check off the dimension for the secondary pack (shrinkwrapped 6-pack) that is allowed vertical when placed onto the pallet.
- **Material** – Enter the caliper/thickness of the shrinkwrap to be used. In this example, enter 0.01mm. If you are using a corrugated box, select the flute type from the drop down list.
- **Dimensions** – Specify whether the dimensions used are “Outside” or “Inside” dimension for the secondary pack.
- **Max Weight** – Defines the weight limit to be carried by the shipcase/shrinkwrap.
- **Round to nearest 1/16** – Uncheck this box in order to get the most accurate dimensions. Enabling this option will lead to overstatement of the measurements.

- **Slack and Bulge** – Specifies any slack or bulge along each dimension of the shipcase. This can be used to accommodate space taken up by packing materials.
- **Optional Sizing Limits** – These provide additional criteria to limit the solutions to certain configurations only. For example, by setting “Maximum along Depth” to 1 will limit solutions to only 1 layer high for the 6-pack. The default value for “Length to Width Ratio” is 4.5 – with this value, the can arrangement of 1x6 will not be displayed. To see the 1x6 solution, change this value to 10.
- **Allowed Patterns** – Specifies what patterns will be allowed for the solution. For example, by removing “Staggered” pattern, you will only get solutions with bottles in block(s) but never staggered.

After all shipcase parameters have been defined, click on the Next button to go to the next step in the Design Sequence – Unitload.

Unitload Definition

At the Unitload Definition screen, you will provide details with regards to the unitload to be created:

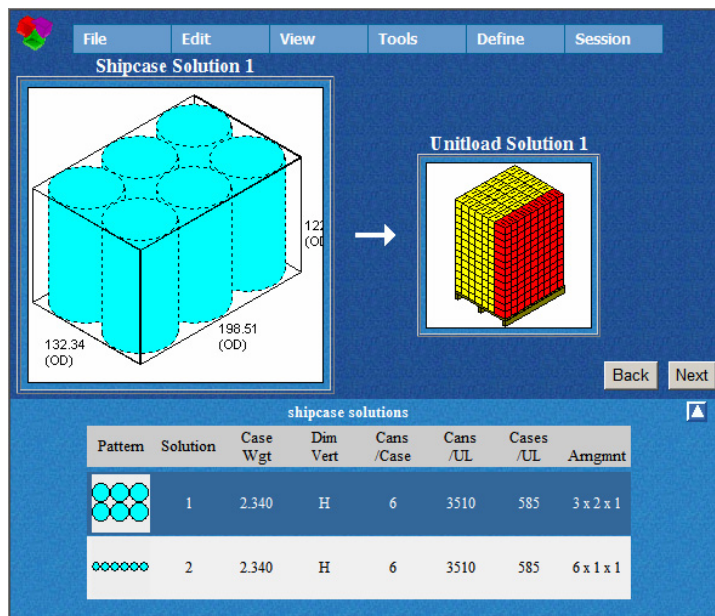
- **Pallet Name** – Select the pallet from the drop down list.
- **Max Height** – Enter the maximum height for the unitload. This includes the height of the pallet and controls how high the shipcases can stack on the pallet.
- **Max Weight** – Enter the maximum allowable weight for the unitload.
- **Max Length Overhang** – Input the maximum amount of overhang allowed along the length of the pallet.
- **Max Width Overhang** – Input the maximum amount of overhang allowed along the width of the pallet.

- **Pallet Dimensions** – Displays the dimension of the selected pallet. Note that these are display fields and cannot be edited. To change the dimension of the pallet, you'll need to use the Define > Pallet function.
- **Allowed Patterns** – Check off the pallet patterns allowed for the unitload. Check all if you want to see all possible pallet patterns. Illustrations of different pallet patterns can be found in Section IV.
- **Clampable Width/Length** – Check off the dimensions (width or length) that are clampable during loading or unloading. Leave the two options unchecked if no clamping is allowed on the unitload.
- **Use Corner Posts** – To use corner posts for the unitload, check off this option and enter length and thickness of the corner posts to be used.

After completing the unitload parameters, click on the Next button, TOPSePAC will use the defined parameters to generate all possible solutions for the load analysis.

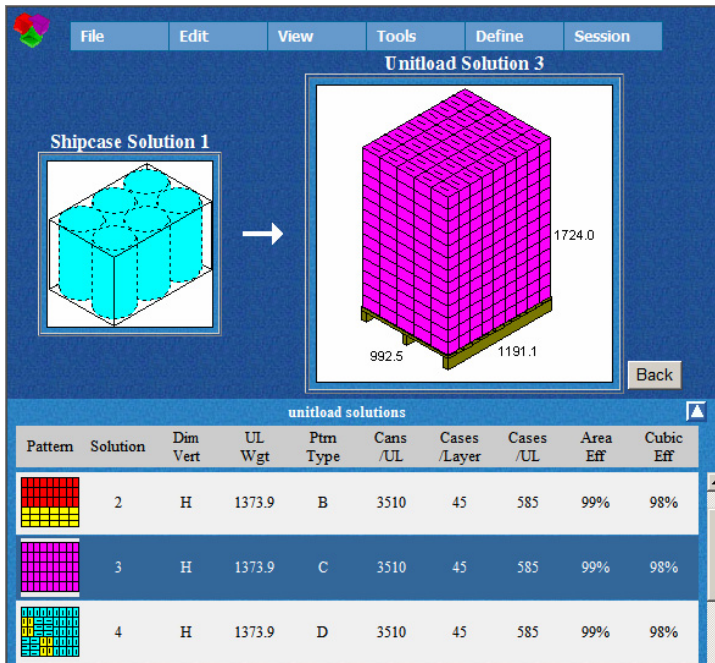
Analysis View

The first analysis TOPSePAC displays will be the solution for secondary package, i.e. how to shrink wrap the 6 cans.



- **Solution View Pane** – The top pane on the left displays a 3D view of how the cans can be packed, its dimension together with the resultant unitload.
- **Solution List Pane** – There are only two solutions, the 3x2x1 and 6x1x1 arrangements. The total number of cans per unitload is the same for both solution.

Select the first solution by highlighting it and then click on the Next button. TOPSePAC will then display the unitload solutions where you can pick the pallet pattern.



- **Solution View Pane** – The top pane displays a 3D view the pallet pattern for the selected secondary 6-pack of cans.
- **Solution List Pane** – The illustration above lists 3 different pattern pallets (B=bi-block, C=column stack, D=diagonal), all yielding the same load and cubic efficiency.

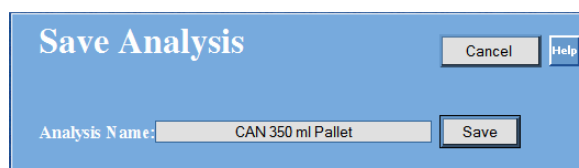
Saving the Solution

Once you have picked the solution, you can save it to the database.

Note: Be aware that this Save function works differently from the normal save function in the Windows environment. TOPSePAC does not save an analysis as a file on your hard drive, rather, it saves the analysis as a record to the database on the TOPSePAC server. To save a copy on you local machine, you can save the analysis report in PDF in you PC (will be described later on page 19).

To save the analysis:

1. At the TOPSePAC Menu Bar, select File | Save As.
2. The Save Analysis Dialog Box appears as below.

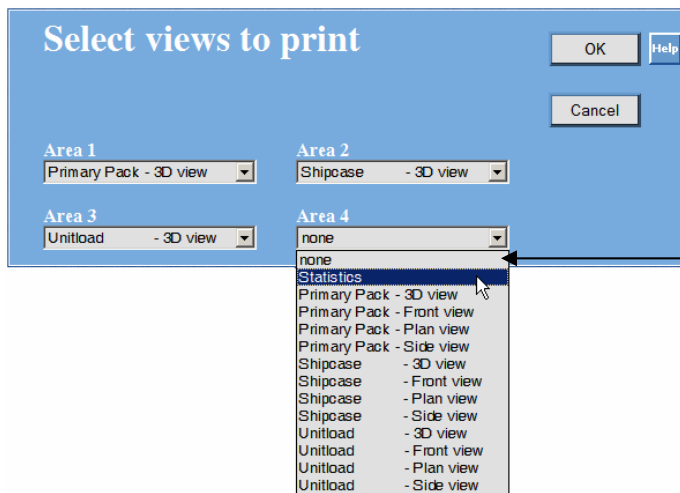
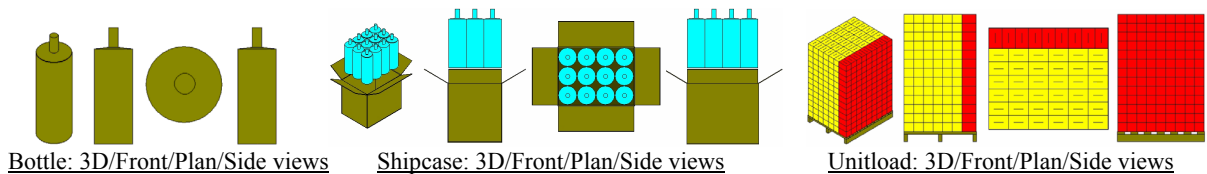


3. Enter the Analysis Name to be used and click on Save.
4. TOPSePAC saves the analysis to the database and confirms with a successful message.

Generating Reports

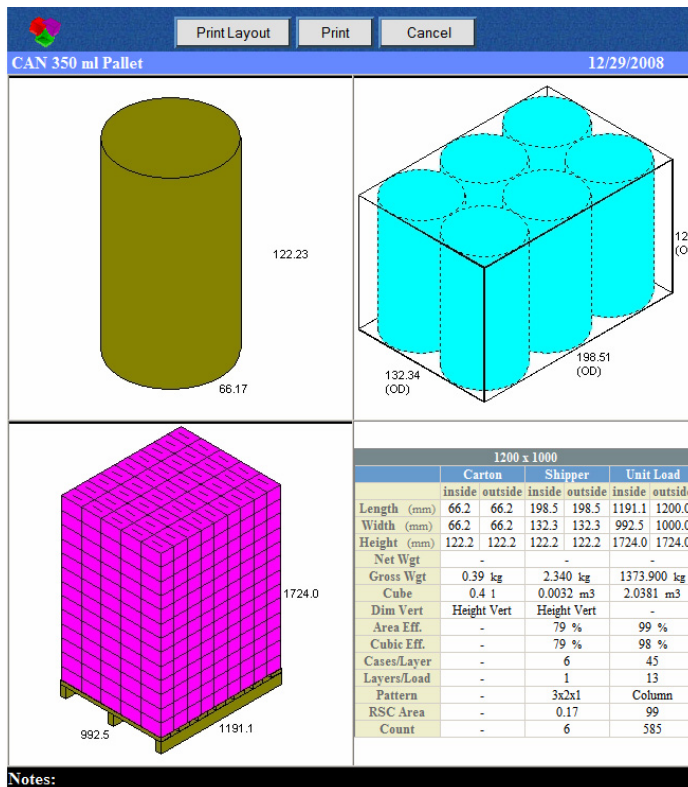
To view the report for each analysis, go to File | Print Preview on the Menu Bar. The report is divided into four areas where you can specify the data to be included in each section. Depending on the type of design sequence performed, the following information are available for the report:

<u>Primary Pack</u>	<u>Shipcase</u>	<u>Unitload</u>	<u>Statistics</u>
3D view	3D view	3D view	Includes dimension (inside and outside),
Front view	Front view	Front view	net and gross weight, cube, vertical
Plan view	Plan view	Plan view	dimension, area and cubic efficiency,
Side view	Side view	Side view	cases/layer, layers/load, RSC area and
			count.



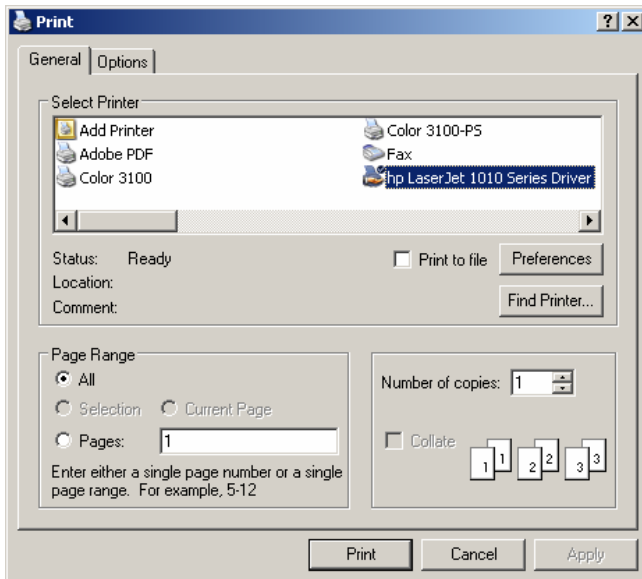
If you select “none”, the data in the adjacent pane will take up the entire

Select the data to be displayed using the drop down list and click on OK to display the report.



Printing Reports

At the Print Preview screens, click the “Print” button at the top of the page. At the Windows Print dialog box as shown here, select the printer from the list. Click Print to print the report.



If you have Adobe Acrobat or other third-party PDF writer installed on your computer, you can select and create a PDF file to be saved on your local machine.

Section III: TOPSePAC Menu Functions

File Menu

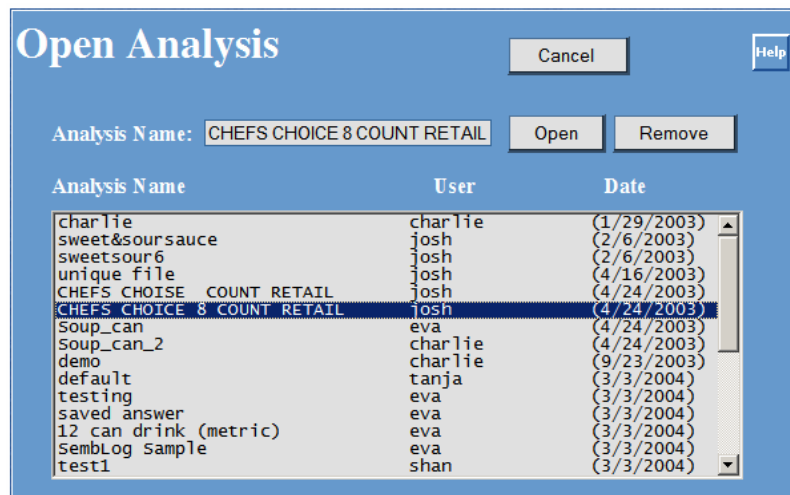


New

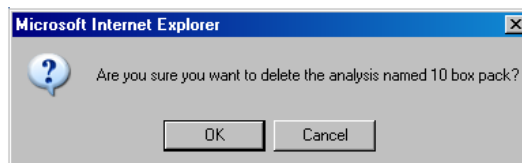
Return to the Control Panel to select a new package design sequence to begin a new analysis.

Open

Display the Open Analysis dialog box to open an existing analysis. Each user can only see analyses created by the login user.

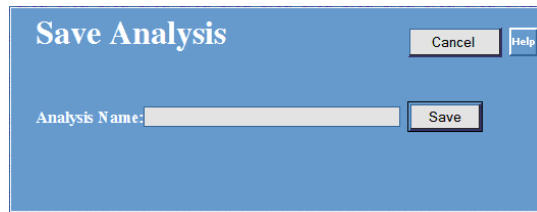


- **Open** – To open an analysis, double click the selected analysis from the list or click the Open button after highlighting the analysis in the list.
- **Remove** – The user can remove the highlighted analysis from the database by clicking the Remove button.



Save

Save the current analysis to the TOPSePAC database. If this is a new analysis, the Save Analysis dialog box will appear.



Enter a name in the Item Description field and click the Save button. If this is an existing analysis, it will be updated and saved under the same analysis name. In either case, a confirmation message saying the analysis has been successfully saved will appear.

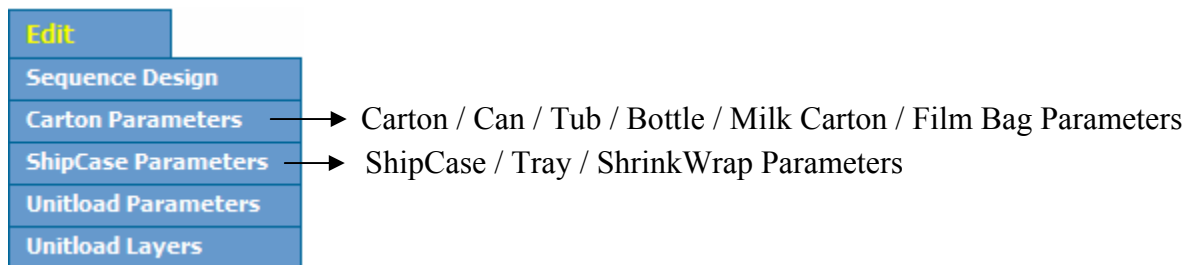
Save As

Display the “Save Analysis” dialog box to save an analysis record to the database. Enter a name in the Item Description field and click the Save button.

Print Preview

Provide a report preview of the current analysis.

Edit Menu



Sequence Design

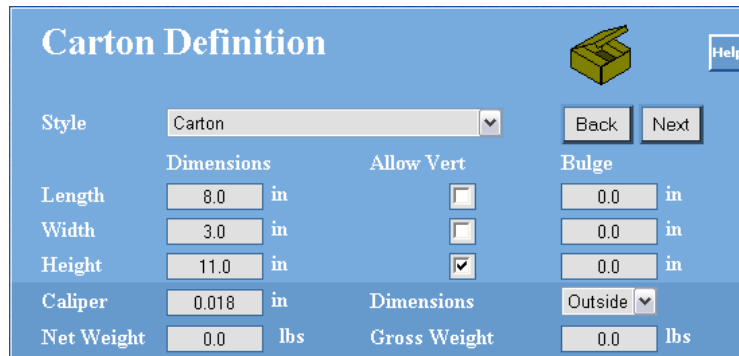
Return back to the main screen of TOPSePAC and select a new Package Design Sequence.

(Primary Pack) Parameters

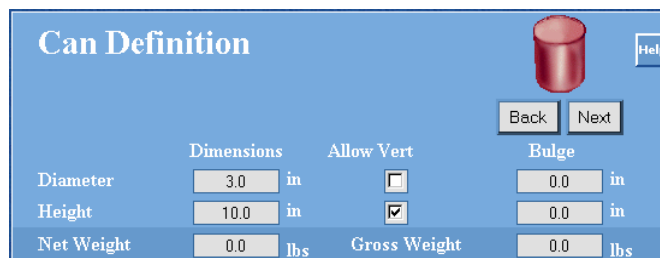
Depending on the design sequence selected and the type of primary units (if selected as part of the sequence), the second function menu under the Edit Menu can be:

- **None Parameters** – This is grey-out (not available) when the opened analysis does not contain primary packs in the sequence.

- **Carton Definition** – Open the Carton Definition dialog box if carton is selected as primary units.



- Style – Select from the drop list the box style of the carton.
 - Length, Width and Height – Enter the length, width and height for the carton.
 - Allow Vert – Check the boxes against the dimensions (length, width or height) this carton is allowed vertical when placed inside the shipcase.
 - Bulge – Enter the amount of bulge allowed along each dimension of the carton.
 - Caliper – Enter the thickness of the paper used for the carton.
 - Dimensions – Select from the drop list if the dimensions entered are of Outside or Inside measure.
 - Net Weight – Enter the net weight of the carton.
 - Gross Weight – Enter the total weight of the carton including its contents.
- **Can Definition** – Open the Can Definition dialog box if can is selected as primary pack.



- Diameter – Enter the diameter of the can.
- Height – Enter the height of the can.
- Allow Vert – Check the boxes against the dimensions (diameter or height) this can is allowed vertical when placed inside the shipcase.
- Bulge – Enter the amount of bulge allowed along each dimension of the can.
- Net Weight – Enter the net weight of the can.
- Gross Weight – Enter the total weight of the can including its contents.

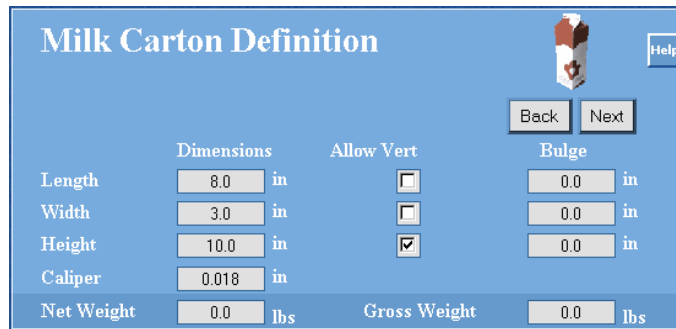
- **Tub Definition** – Open the Tub Definition dialog box if tub is selected.

- Body Shape – Select the shape of the tub from the drop list.
- Top Diameter – Enter the top diameter of the rounded tub.
- Bottom Diameter – Enter the bottom diameter of the rounded tub.
- Height – Enter the height of the tub.
- Pitch – Enter the distance between adjacent tubs when nested together.
- Allow Vert – Check the boxes against the dimensions (diameter or height) this tub is allowed vertical when placed inside the shipcase.
- Bulge – Enter the amount of bulge allowed along each dimension of the tub.
- Net Weight – Enter the net weight of the tub.
- Gross Weight – Enter the total weight of the tub including its contents.

- **Bottle Definition** – Open the Can Definition dialog box if bottle is selected.

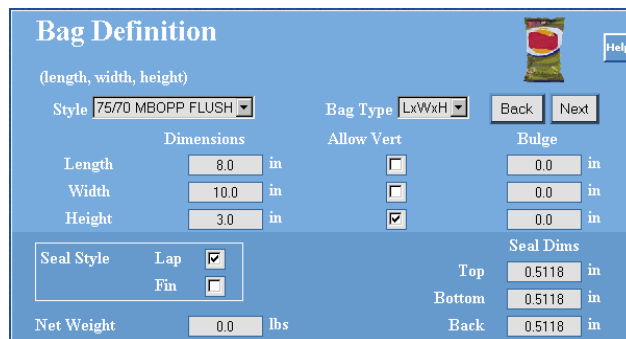
- Body Shape – Select from the drop list if the bottle is of round, rectangular or oval shape.
- Dimensions
 - Round - Enter Body Diameter, Neck Diameter, Height, Neck Height and Shoulder Height
 - Rectangular – Enter Body Length, Body Width, Neck Diameter, Height, Neck Height and Shoulder Height
 - Oval – Enter Body Length, Body Width, Neck Diameter, Height, Neck Height and Shoulder Height
- Allow Vert – Check the boxes against the dimensions (length, width or height) the bottle is allowed vertical when placed inside the shipcase.
- Bulge – Enter the amount of bulge allowed along each dimension of the bottle.
- Net Weight – Enter the net weight of the bottle.
- Gross Weight – Enter the total weight of the bottles including its contents.

- **Milk Carton Parameters** – Open the Can Definition dialog box if milk carton is selected as primary packs.



	Dimensions	Allow Vert	Bulge
Length	8.0 in	<input type="checkbox"/>	0.0 in
Width	3.0 in	<input type="checkbox"/>	0.0 in
Height	10.0 in	<input checked="" type="checkbox"/>	0.0 in
Caliper	0.018 in		
Net Weight	0.0 lbs	Gross Weight	0.0 lbs

- Length, Width and Height – Enter the length, width and height for the milk carton.
 - Allow Vert – Check the boxes against the dimensions (length, width or height) the milk carton is allowed vertical when placed inside the shipcase.
 - Bulge – Enter the amount of bulge allowed along each dimension of the milk carton.
 - Caliper – Enter the thickness of the paper used for the milk carton.
 - Net Weight – Enter the net weight of the carton.
 - Gross Weight – Enter the total weight of the carton including its contents.
- **Film Bag Definition** – Open the Can Definition dialog box if film bag is selected as primary packs.



		Dimensions	Allow Vert	Bulge
Style	7570 MBOPP FLUSH	Length: 8.0 in	<input type="checkbox"/>	0.0 in
		Width: 10.0 in	<input type="checkbox"/>	0.0 in
		Height: 3.0 in	<input checked="" type="checkbox"/>	0.0 in
Bag Type	LxWxH			
Seal Style	Lap <input checked="" type="checkbox"/> Fin <input type="checkbox"/>			
Seal Dims				
				Top: 0.5118 in
				Bottom: 0.5118 in
				Back: 0.5118 in
Net Weight	0.0 lbs			

- Style – Select from the drop list the bag style to use in your analysis.
- Bag Type – Select from the drop list the bag type to be defined. Select from LxWxH or FxRxA (Former-Repeat-Air Fill).
- Length, Width and Height – Enter the length, width and height for the bag.
- Allow Vert – Check the boxes against the dimensions (length, width or height) this bag is allowed vertical when placed inside the shipcase.
- Seal Style – Select either Lap or Fin to specify how the bag will be sealed.
- Seal Dims – Specify the dimensions of the seal along top, bottom and back of the bag.
- Net Weight – Enter the Net Weight of the bag including its contents.

Shipcase Parameters

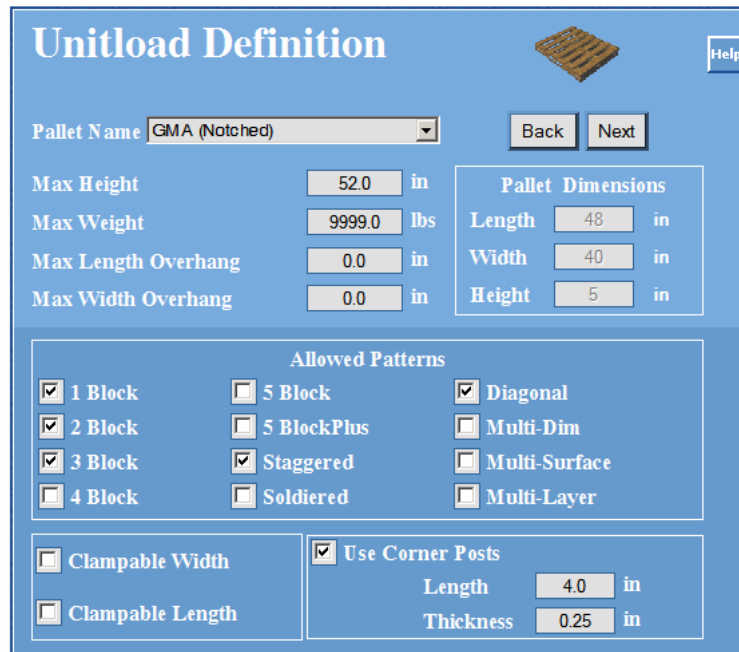
If the design sequence includes primary packs, the “New Shipcase Definition” screen will appear.

- **Style** – Select from the drop list the shipcase style to hold the primary packs. Please refer to Section IV for illustrations of the different box styles.
 - **New** – Select New for Style if TOPSePAC will determine the optimal dimensions of the shipcase. You don’t need to enter the carton dimension in this case.
 - **Fixed** – Select Fixed to use an existing carton with known dimensions. Enter the Length, Width and Height.
- **Dividers** – Click this button add divider to separate primary packs inside the carton. Section IV provides illustrations of different divider style available in TOPSePAC.
- **Shipcase Quantities** – Specify the quantity of primary packs to be placed inside the shipcase. Specify a range or a set number of units.
 - **Range** – To use a range, check the Range option and enter the minimum and maximum count in the corresponding box.
 - **Values** – To use set values, check the Values option and enter the quantities of units to be packaged inside the shipcase. Erase any existing quantities not required.
- **Allow Vert** – Check the boxes against the dimensions (length, width or height) the shipcases are allowed vertical when placed on the pallet or when bundled.

- **Material** – Select the materials for the carton.
 - Specific Caliper – Check this option and enter the thickness of the paper for non-corrugated paper.
 - Flute – For corrugated carton, check this option and select the flute size of the box from the drop list.
- **Dimensions** – Select from the drop list if the dimensions entered are of Outside or Inside measure.
- **Max Weight** – Enter the maximum weight of the carton.
- **Round to nearest 1/16** – Check the box to force TOPSePAC to round the slack dimensions to the nearest 1/16 of an inch. Do not check this option if you are afraid the program will over round up the measurements.
- **Slack** – Refer to the extra space you intend to include in the carton configuration. Enter the amount of slack allow along each dimension (length, width and height) of the carton.
- **Bulge** – Enter the amount of bulge allowed along each dimension of the carton.
- **Optional Sizing Limits** – Allow you to fine tune the size dimensions of the carton by limiting the scope of the solutions.
 - Max along Length – Enter the maximum number of primary packs and dimension along the length of the shipcase.
 - Max along Width – Enter the maximum number of units and dimension along the width of the shipcase.
 - Max along Depth – Enter the maximum number of units and dimension along the depth of the shipcase.
 - Length to Width Ratio: Enter the length to width ratio for the quantity of primary packs to be placed in the shipcase.
 - Depth to Width Ratio: Enter the depth to width ratio for the quantity of primary packs to be placed in the shipcase
- **Allowed Patterns** – Check the box against the allowable patterns when packaging the primary packs inside the shipcase.

Unitload Parameters

Bring up the “Unitload Definition” screen.



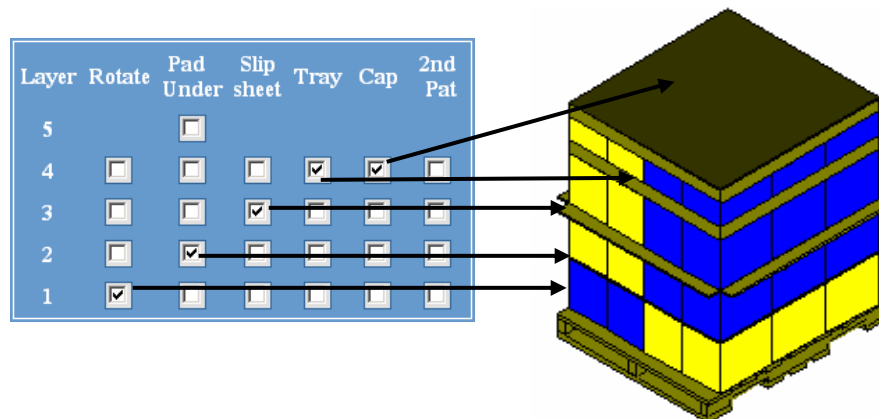
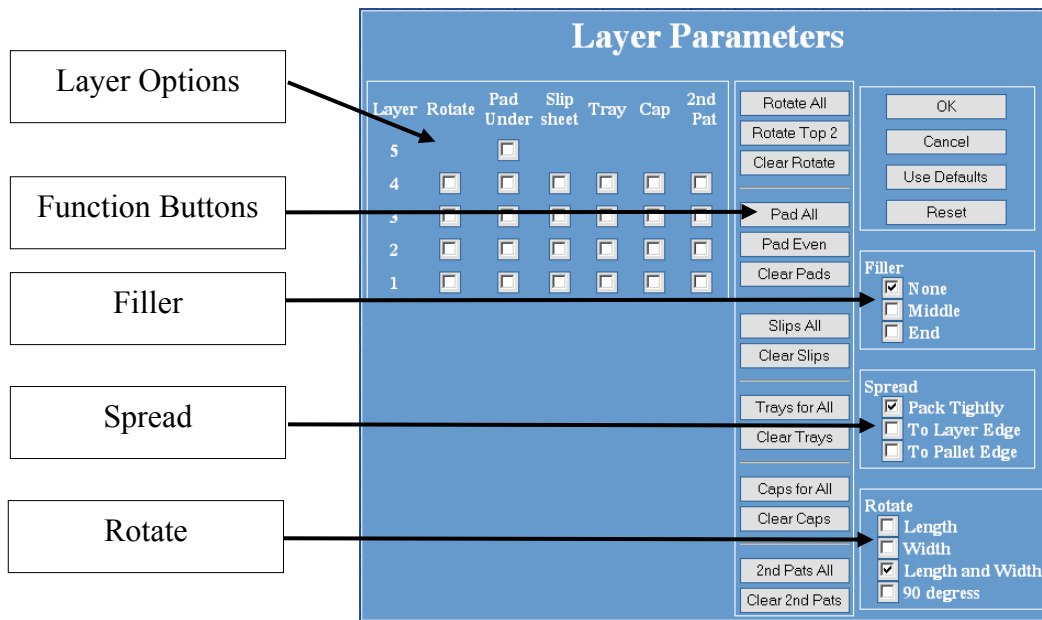
The screenshot shows the "Unitload Definition" screen with the following fields and options:

- Pallet Name:** GMA (Notched) (dropdown menu)
- Buttons:** Back, Next, Help
- Max Height:** 52.0 in
- Max Weight:** 9999.0 lbs
- Max Length Overhang:** 0.0 in
- Max Width Overhang:** 0.0 in
- Pallet Dimensions:**
 - Length: 48 in
 - Width: 40 in
 - Height: 5 in
- Allowed Patterns:**
 - 1 Block
 - 2 Block
 - 3 Block
 - 4 Block
 - 5 Block
 - 5 BlockPlus
 - Staggered
 - Soldiered
 - Diagonal
 - Multi-Dim
 - Multi-Surface
 - Multi-Layer
- Clampable Width:**
- Clampable Length:**
- Use Corner Posts:**
 - Length: 4.0 in
 - Thickness: 0.25 in

- **Pallet Name** – Select the pallet from the drop down list.
- **Pallet Dimensions** – The dimensions of the pallet are pre-defined (grey-out) but you can specify the maximum height, weight and overhangs for the unitload.
- **Allowed Patterns** – Check off the pallet patterns allowed for the unitload. Illustrations of different pallet patterns are available in the Reference Section IV.
- **Clampable Load** – Specify if the unitloads are clampable and the clamp-allowable dimension. Leave the two options unchecked if no clamping is allowed on the unitload.
- **Corner Posts** – To use corner posts for the unitload, check off this option and enter length and thickness of the corner posts to be used.

Layer Parameters

Once a solution has been selected, work with the individual layers in the unitload by adding caps, pads, trays, slip sheets, etc. To define layer parameters, go to Edit | Unitload Layers.



- **Layer Options** – Check the corresponding box on the left side of the dialog box to enable a function by layer.
 - Layer – Indicate the layer in the unitload to which a function/feature will be applied.
 - Rotate – Check the box to rotate a corresponding layer in the unitload.
 - Pad Under – Check the box to insert a pad under a specific layer in the unitload.
 - Slip Sheet – Check the box to insert a slip sheet under a specific layer in the unitload.
 - Tray – Check the box to insert a tray in the unitload.
 - Cap – Check the box to insert a cap over a specific layer in the unitload
 - 2nd Pat – Check the box to use a secondary layer pattern for a specific layer in the unitload.

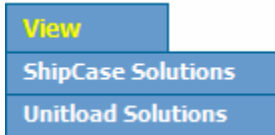
- **Function Buttons** – Clicking the functions buttons along the middle will perform global functions on the unitload layers.
 - Rotate All – Rotate all layers in the unitload.
 - Rotate Top 2 – Rotate the top two layers in the unitload.
 - Clear Rotate – Clear all the rotate commands set up for the unitload.
 - Pad All – Insert pads between each layer in the unitload.
 - Pad Even – Insert pads under only the even-numbered layers in the unitload.
 - Clear Pads – Clear all the pad commands set up for the unitload.
 - Slips All – Insert slip sheets between each layer in the unitload.
 - Clear Slips – Clear all the slip sheet commands set up for the unitload.
 - Trays for All – Place every layer in the unitload on a tray.
 - Clear Trays – Clear all the tray commands set up for the unitload.
 - Caps for All – Place a cap on every layer in the unitload.
 - Clear Caps – Clear all the cap commands set up for the unitload.
 - 2nd Pat All – Replace all the current layers in the unitload with the selected secondary pattern.
 - Clear 2nd Pats – Clear all the secondary layer pattern commands set up for the unitload.

- **Filler** – Filler serves primarily to fill empty space between layers and prevents load shifting.
 - None – No filler is inserted between layers.
 - Middle – Inserts filler in the middle of the layers.
 - End – Inserts filler at the ends of the layers.

- **Spread** – The Spread function specifies how the layers will be spread on the pallet.
 - Pack Tightly – Shipcases in each layer are packed tightly toward the center, with minimum spread in between.
 - To Layer Edge – Shipcases in each layer are spread to the edge of the unitload. This option "squares up" the unitload.
 - To Pallet Edge – Shipcases in each layer are spread to the edge of the pallet.

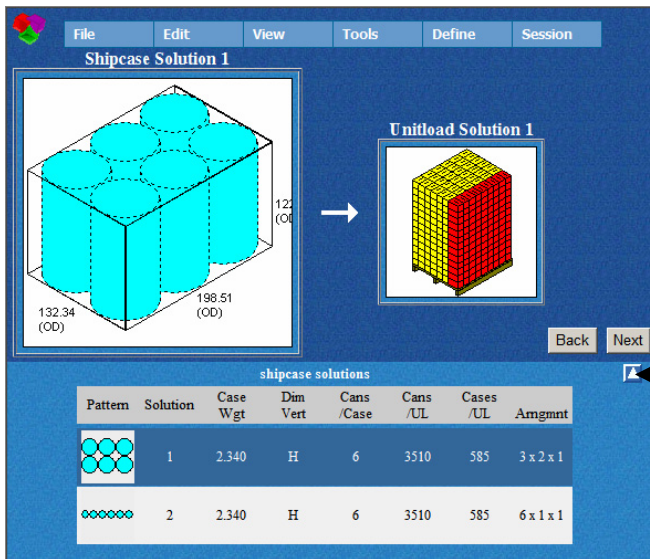
- **Rotate** – This specifies how the layers will be rotated.
 - Length – Rotates the layer along its length.
 - Width – Rotates the layer along its width.
 - Length and Width – Rotates the layer along both its length and width.
 - 90 Degrees – Rotates the layer 90 degrees.

View Menu



Shipcase Solutions

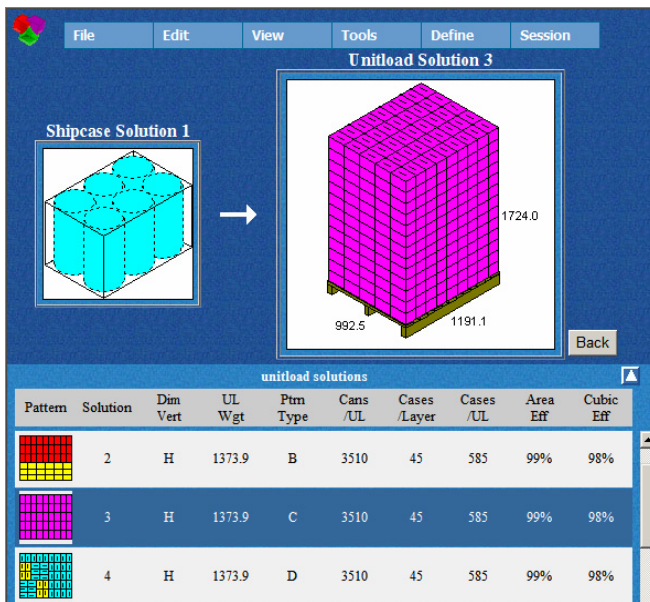
The Shipcase Solutions option displays a list of all possible shipcase solutions for the primary packs. Each shipcase solution will correspond to different unitload solutions or pallet patterns.



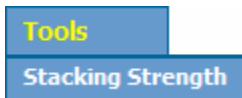
Click this UP arrow to maximize the solution list.

Unitload Solutions

Similar to the Shipcase Solutions above, the Unitload Solutions displays the possible unitload solutions for the analysis.



Tools Menu



Stacking Strength

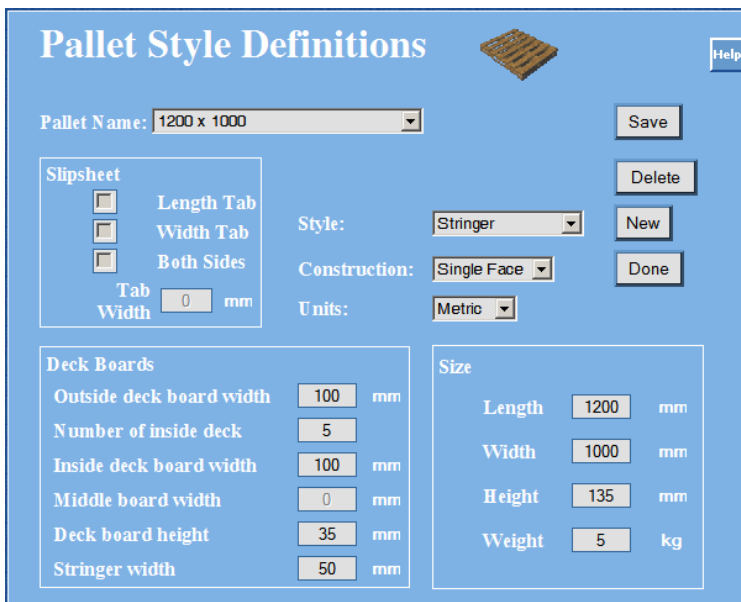
The Stacking Strength option displays the Stacking Strength dialog box, used to perform a stacking strength test on a package analysis. For details on how to perform stacking strength analysis, please go to Section III.

Define Menu



Pallet

Define or modify an existing pallet or slipsheet in the Define Pallet menu option.

A screenshot of the 'Pallet Style Definitions' dialog box. The dialog has a blue background and a title bar. It contains several sections: 'Pallet Name' (1200 x 1000), 'Slipsheet' (checkboxes for Length Tab, Width Tab, Both Sides, and Tab Width), 'Style' (Stringer), 'Construction' (Single Face), 'Units' (Metric), 'Deck Boards' (Outside deck board width: 100 mm, Number of inside deck: 5, Inside deck board width: 100 mm, Middle board width: 0 mm, Deck board height: 35 mm, Stringer width: 50 mm), and 'Size' (Length: 1200 mm, Width: 1000 mm, Height: 135 mm, Weight: 5 kg). There are buttons for Save, Delete, New, and Done, and a Help button in the top right corner.

- **Pallet Name** – Enter a new pallet, type in the name of the pallet. For an existing pallet, select a pre-defined pallet or type in the first few letters of the pallet.
Note: When selecting a pre-defined pallet, TOPSePAC will automatically insert values in the various dimension fields.
- **Style** – Select the style of pallet to define from the following: Stringer, Notched Stringer, Block, Slipsheet, EuroPallet, and No Style.
Note: The No Style option creates a pallet without labeling it as one of the existing pallet styles, or performs an analysis without showing the pallet. Sometimes it's necessary to define a No Style pallet because TOPSePAC needs an area of space to use in order to palletize, even a pallet isn't needed.

- **Construction** – Specify how the pallet is constructed: **Single Face** construction has deck boards on one side, **Double Face** construction is basically a pallet that is identical on both sides.
- **Units** – Select either Imperial or Metric.
- **Slipsheet** – If Slipsheet is selected under Pallet Name, users can further specify these fields:
 - Click on the **Length Tab** box to add a tab to slipsheet length
 - Click on the **Width Tab** box to add a tab to slipsheet width
 - Click on the **Both Sides** box to add a tab on both sides of the slipsheet
 - Enter the **Tab Width** in inches or millimeters, depending on the Units selected
- **Deck Boards** – For Pallet Name selections other than slipsheet or none, these deck board fields are available:
 - Outside deck board width
 - Number of inside deck boards
 - Inside deck board width
 - Middle board width
 - Deck board height
 - Stringer width
- **Size** – Specify the size of the pallet including Length, Width, Height and Weight of the pallet.
- **Save** – Click this button to save the current setting in the database.
- **Delete** – Click this button to delete the current selection from the database.
- **New** – Click this to create a new pallet in data base. You will be prompted for a pallet name.
- **Done** – Click this button to exit the Pallet Style Definitions dialog box.

Session Menu



Logout

Allow the user to end TOPSePAC session. The users will receive a confirmation message “Are you sure you want to logout?”, click “Yes” to exit, otherwise click “Cancel” to resume the TOPSePAC session.

Section IV: References

Stacking Strength

TOPSePAC uses the McKee formula to calculate the stacking strength of a regular slotted container (RSC).

The McKee Formula

The McKee formula uses two laboratory tests performed on board components – the edge crush test (ECT) and/or the ring crush test (RCT) – to derive a box compression strength value. TOPSePAC adjusts this compression strength value (lab compression) with a variety of environmental and structural factors to calculate a box performance value.

Important Note

Even though the McKee formula is a generally accepted design formula, the packaging engineer is ultimately responsible to evaluate the degree to which this formula might apply and perform the physical tests to assure safety.

The McKee formula is defined as follows:

$$(FC) \times (ECT) \times (BP)^{.4924} \times (Caliper)^{.5076}$$

$$\text{Lab Compression} = [(FC) \times (ECT) \times (BP)^{.4924} \times (Caliper)^{.5076}] \times (\text{Shape Factor}) \times (\text{Length-to-Width Ratio Factor}) \times (\text{Horizontal Flute Factor}) \times (\text{Printing Factor})$$

$$\text{Box Performance} = (\text{Lab Compression}) \times (\text{Flap Gap Factor}) \times (\text{Humidity Factor}) \times (\text{Storage Time Factor}) \times (\text{Pallet Spacing Factor}) \times (\text{Interlock Factor}) \times (\text{Overhang Factor}) + (\text{Product Support})$$

The abbreviated components in the formula are outlined below:

FC = Flute Constant (5.87)

ECT = Edge Crush Test

BP = Box Perimeter

$$\text{Overhang Factor} = 1 - [\text{minimum of (square root of overhang) } \times 32.25 \div 100, 1]$$

Horizontal Flute Factor (HFF) = 1, unless non-vertical flute is selected. If non-vertical flute is selected, TOPSePAC looks at HFF for the specific board grade. However, there is no generally accepted industry standard for how much a non-vertical flute's compression will degrade. TOPSePAC currently ships with a HFF of 0.9 for a 10 percent reduction

Shape Factor: Shape Factor is based on the proportions of the box – relative to box depth – and dimension vertical

Printing Factor: Printing Factor is based on printing type (Flexo Ink or Quick Set) and quantity.

For all other factors, TOPSePAC looks up the environmental factors. Other factors, which the McKee formula does not account for, include rough handling, transportation conditions, workers sitting on the box, die cuts, adhesive additives, etc.

Edge Crush Test

Box compression strength is a matter of structural mechanics. Engineering formulas have been developed using various relationships to predict compression strength. The general formula used here predicts Box Compression Test (BCT) value as related to Edge Crush Test (ECT), Flexural Rigidity and box perimeter.

Edge Crush Test, also known as Short Column Test, is measured as the pounds of force per inch needed to crush a portion of the sidewall of combined corrugated board. Although not the sole criterion for box performance, ECT values are an excellent indicator of Box Compression Test values and box performance in most of today's applications.

Ring Crush Test

The Ring Crush Test (RCT) measures paper strength – specifically stiffness. RCT has been widely used and has a history of more than 20 years of data correlated to combined board strength (ECT).

In the RCT, a strip of paper is placed into a jig that curls it into a short, tubular ring. Pressure is then applied perpendicular to the exposed edge. Ring Crush is measured as the pounds of force required to crush this specimen. This value has a direct relationship to predicting Edge Crush values of the combined board and, ultimately, box compression strength.

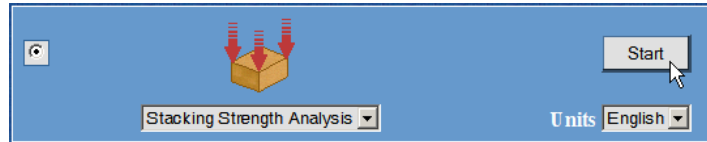
Due to industry-wide improvements in the paper-making process, industry average RCT values have gradually increased for a given Basis Weight over the years. However, across the industry, there is substantial variation in Ring Crush for a given Basis Weight – from different paper mills, even from different paper machines within the same mill.

"High Ring Crush" or "High Performance" linerboard and medium are well above the industry average, at the upper end of the industry variability range for a given Basis Weight. Generally, these papers are more tightly pressed – thinner/denser/less porous – than those at the average or lower end of the range, which gives paper greater strength per pound.

Calculate Stacking Strength

In this exercise, we will perform a stacking strength analysis. To calculate stacking strength, start from the Control Panel and follow these instructions:

1. Select a Stacking Strength Analysis package design sequence and click on Start.



2. At this point, you'll need to make decisions regarding the following parameters:



Stacking Strength

Calculate | Help

Cancel

Filter

Dividers

Calculation Method: Ring Crush

Case Specifications	Vert	Unitload Specifications
Length: 16.0 in	<input type="checkbox"/>	Pallet: GMA (NOTCHED)
Width: 12.0 in	<input type="checkbox"/>	Cases per Layer: 0
Height: 10.0 in	<input checked="" type="checkbox"/>	Layers per Load: 0
Weight: 0.0 lbs		Overhang: 0.0 in
Flap Gap: 0 in		Rotation: none
Product Support: 0 lbs		Footprint Factor: 36
Flute Direction: Depth		

Environment	Print
Storage Time: 1 month	Amount of Printing: none
Humidity: 50	<input type="checkbox"/> QuickSet
Number of Unitloads High: 1	<input checked="" type="checkbox"/> FlexoInk

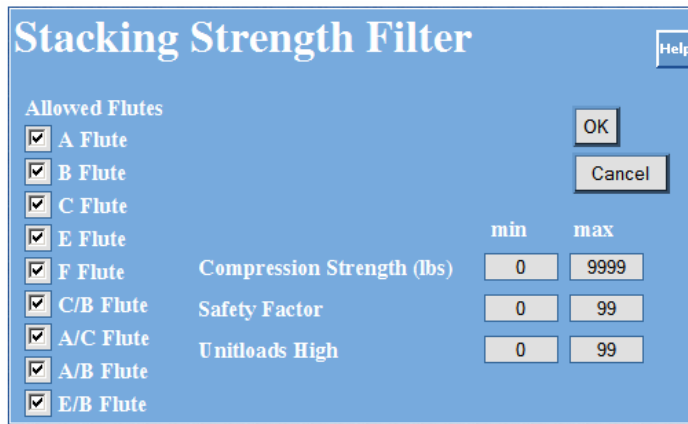
- **Calculation Method** – Select the method used to calculate stacking strength. Use these guidelines:
 - The **Ring Crush method** looks up the ring crush values of the board combination's liners and mediums and then calculates the edge crush test (ECT) value from those values.
 - The **Edge Crush method** uses the exact ECT value typed in for each board combination.
- **Case Specifications**
 - Enter the dimensions and weight of the shipcase.
 - Designate which dimension is in the vertical orientation by checking off the corresponding box.
 - Enter the amount of differential between the minor flaps and major flaps of the shipcase as the **Flap Gap**.
 - **Product Support** is the added strength provided by a product packaged inside the shipcase. The value is entered as the total weight that the product inside the shipcase (on the whole case basis) can handle.

- Select the direction the flute runs in relation to the shipcase as the **Flute Direction**.
- **Environment** – Specify the environmental factors affecting the stacking strength calculations.
 - Select the target **Storage Time** for the unitloads – the period of time you expect the unitloads to be stored in a warehouse; for example, three months.
 - Enter the **Humidity** percentage that exists in the warehouse. The default is 50 percent; a typical humidity factor is 85 percent.
 - **Number of Unitloads High** is the target number of pallets high the unitload can be stacked in the warehouse.
- **Unitload Specifications** – Specify the unitload parameters.
 - Select the type of **Pallet** to be used for the unitload.
 - Specify the number of Cases of Layer for the unitload.
 - Specify the total number of **Layers per Load**.
 - Enter the amount of **Overhang** for the unitload.
 - Select the **Rotation** to be used for the unitloads. If the unitloads are columnar (non-interlocked), select None. This rotation yields no degradation in stacking strength. If the unitloads are fully interlocked, select All. This rotation yields a 30 percent degradation in stacking strength. If the unitloads are partially interlocked – for example, only the top two layers – select Some. This rotation yields a 15 percent degradation in stacking strength.
 - **Footprint Factor** – If you have multiple unitloads and not all shipcases help support the unitload above, specify how many shipcases do help support. Lowering this number reduces the number of bottom-most cases that help support the above unitload.
- **Print** – Specify the print parameters affecting the stacking strength calculations
 - Amount of Printing – Select the amount of printing on the shipcases. Be aware that heavy printing does reduce the stacking strength of most corrugated materials
 - Select the type of printing on the shipcases – **QuickSet or FlexoInk**

Note: For example purposes add a weight of 10 lbs in the Stacking Strength dialog box and leave the other defaults as it is.

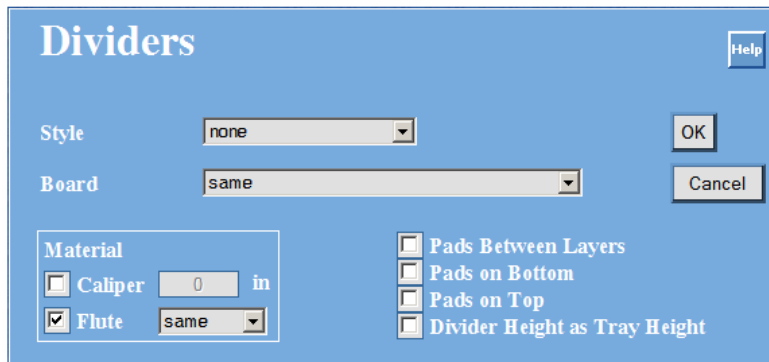
Function Buttons

- **Calculate Button** – After completing the stacking strength parameters, click the Calculate button.
- **Cancel Button** – Clicking on Cancel button closes the Stacking Strength window and takes you back to the Control Panel.
- **Filter Button** – Display the stacking strength Filter dialog box, which allows you to select a number of flute sizes and define minimum and maximum values for compression strength, safety factor and unitloads high.



- **Dividers Button** – Display the Dividers dialog box to change the dividers parameters.

Dividers provide a significant increase in stacking strength of your shipcases. For example, a 12-cell divider, if made of the same cardboard as the shipcase, increases stacking strength by 108 percent.



Stacking Strength Results

Once you've calculated a stacking strength analysis, TOPSePAC displays the Stacking Strength Results Screen, as pictured below. This screen is divided into two panes:

- **Stacking Strength Statistics Pane** – This information includes any added data related to the stacking strength option and your package design.
- **Stacking Strength List Pane** – This pane, the lower section of the screen, displays the stacking strength results.

Selected for Print	Board Description	Construction	Flute	Total Lab	Box Perf.	Safety Factor	Safety Margin	Loads High	ECT lbs/in
<input checked="" type="checkbox"/>	150-MULLEN	A	846.6	508.0	0.00	0%	0.0	34.0	
<input checked="" type="checkbox"/>	150-MULLEN	B	632.2	379.3	0.00	0%	0.0	33.1	
<input checked="" type="checkbox"/>	150-MULLEN	C	745.5	447.3	0.00	0%	0.0	33.6	
<input checked="" type="checkbox"/>	150-MULLEN	E	478.3	287.0	0.00	0%	0.0	32.6	
<input checked="" type="checkbox"/>	175-MULLEN	A	951.1	570.6	0.00	0%	0.0	38.0	

The Stacking Strength Results Screen provides the following stacking strength information:

- **(A) At 2 Loads High, bottom case must support 84.33 lbs** – Amount of weight that must be supported by a box on the bottom layer of the bottom pallet.
- **(B) Board Spacing** – Also known as pallet spacing. Use these guidelines:
 - If this value is less than 0.1 inch, you have tight pallet spacing.
 - If this value is greater than 0.1 inch and less than 3 inches, you have normal pallet spacing.
 - If this value is greater than or equal to 3 inches, you have wide pallet spacing.
- **(C) Selected for Print** – Check this checkbox to select the stacking strength result.
- **(D) Board Description** – Display the stacking strength result.
- **(E) Construction** – Display the construction in terms of mediums and liners for the corresponding Board Description.
- **(F) Flute** – Display the flute used for the corresponding board combination.
- **(G) Total Lab** – Total Lab Compression. If you've defined a divider, this value is the sum of the divider compression and box lab compression; i.e., Total Lab Compression = Lab Compression of the divider + Lab Compression of the box without the divider.
- **(H) Box Perf** – Box Performance. The resulting compression strength, which takes into account the environmental conditions you've specified.
- **(I) Safety Factor** – Total Lab divided by the weight that must be supported by the bottom case.
- **(J) Safety Margin** – The percentage that the box performance exceeds the weight that must be supported by the bottom case; i.e., $G = (F - A) \div A$. Boards with Safety Margins that are greater than zero are highlighted in blue.

- **(K) Loads High** – How many unit loads it takes to reach the limit (box performance) of a bottom-most case.
- **(L) ECT lbs/in** – The ECT of the board. If the calculation method is Edge Crush, this value is the empirical value entered for each board in the TOPS Configuration program. If the calculation is Ring Crush, TOPS will calculate the ECT from the Ring Crush Factor (RCF) of each board's papers.

Function Buttons

- **Print Button** – Bring up the Print dialog box where users can select a printer and other print parameters for the selected stacking strength results.
- **Filter Button** – Bring up the Filter Dialog box that allows the user to narrow the stacking strength results by selecting among various flute sizes and settings limits for compression strength, safety factor, and unitload height.
- **Parameters Button** – Bring up the stacking strength dialog box which allows the user to change any parameters for better results.
- **Recalculate Button** – Recalculate the analysis for stacking strength results.
- **Select All Button** – Select all the displayed stacking strength results.
- **Unselect All Button** – Unselect all the displayed stacking strength results.
- **Close Button** – Close the Stacking Strength results screen and takes the user back to the Control Panel.

Pallet Patterns

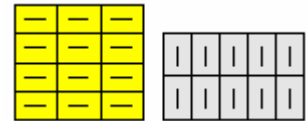
TOPSePAC allows you to configure unitloads with a specific pattern. For example, the Unitload Definition Screen allows you to select one or multiple pattern arrangements for TOPSePAC to consider when the system generates solutions for an analysis. This section describes the pattern styles you can use with TOPSePAC.

Depending on your situation, you may want to use a number of patterns in your analysis to get a tighter load. Conversely, you might want to eliminate some options because you want simpler patterns.

Note: Each pattern style has a corresponding letter in parentheses. This letter is used in the various List panels and unitload statistics, and is a single-letter abbreviation for that particular pattern style.

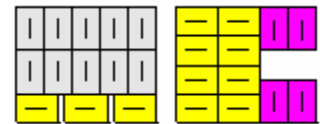
1-Block Pattern (C)

The 1-block, column stack pattern is a simple pattern with one block of shipcases.



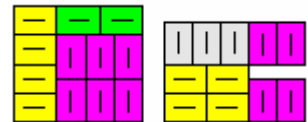
2-Block Pattern (B)

The 2-block pattern, also known as an interlock or bi-block configuration.



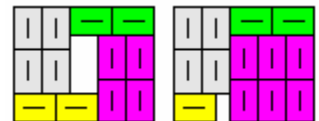
3-Block Pattern (T)

The 3-block, or tri-block, pattern is pictured here.



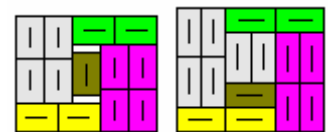
4-Block Pattern (W)

The 4-block, pinwheel pattern is pictured below. In the two unitloads, this pattern is made up of four blocks of shipcases that form a pinwheel-like figure.



5-Block Pattern (P)

In these two 5-block unitloads, four blocks of shipcases form a pinwheel configuration; the fifth block of shipcase is positioned in the middle.



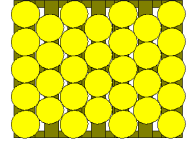
5-Block Plus Pattern (Q)

This is a 5-block pattern with another 5-block pattern in the middle of the configuration. In these two unitloads, four blocks of shipcases form a pinwheel configuration; a separate 5-block configuration of shipcases is positioned in the middle.



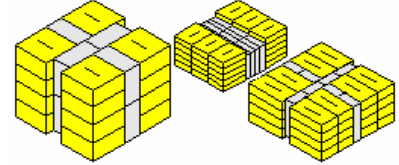
Staggered Pattern (N)

The staggered pattern is used to load round containers onto a pallet. As you can see, the round containers mean the configuration will have a staggered, rather than linear, pattern.



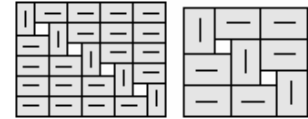
Soldiered Pattern (S)

In the two unitloads, the cases are spaced apart so that other cases can be turned on their sides and fit into the space.



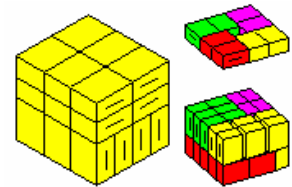
Diagonal Pattern (D)

The diagonal pattern is pictured here. In these two unitloads, this pattern has alternating blocks of shipcases that form a diagonal configuration.



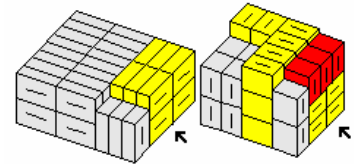
Multi-Dimension Pattern (Z)

In the multi-dimension pattern, each layer has a different vertical dimension in the unitload.



Multi-Surface Pattern (O)

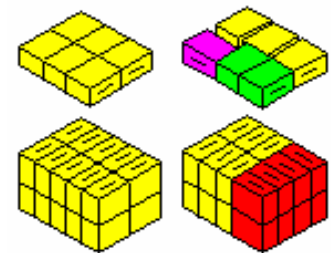
With the multi-surface pattern, TOPSePAC turns the pallet on its side, loads the pallet, configures the pattern, then turns the pallet upright again. In the figures to the right, the arrows indicate the side on which TOPSePAC loaded the pallet.



To use a multi-surface pattern, it's necessary to select at least two dimensions as vertical dimensions. When you use a multi-surface pattern, TOPSePAC automatically calculates other multi-patterns.

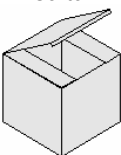
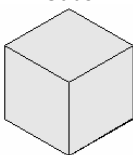
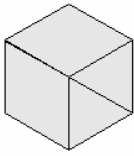
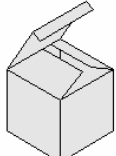
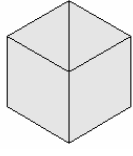
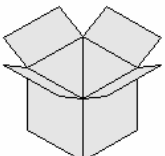
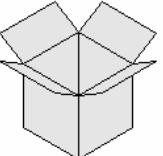
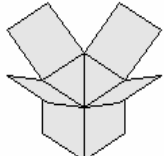
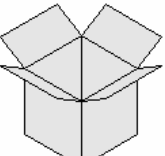
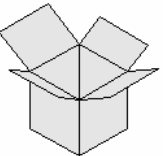
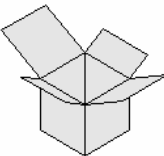
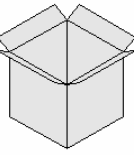
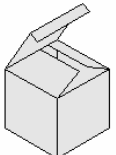
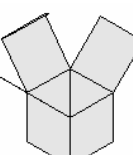
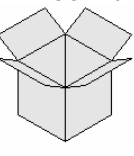
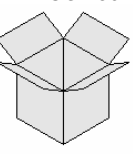
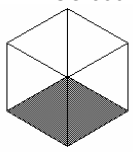
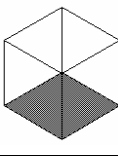
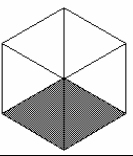
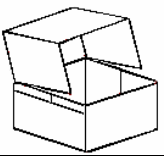
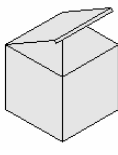
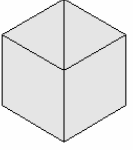
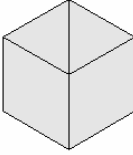
Multi-Layer Pattern (Z)

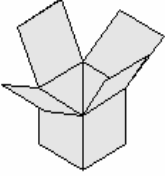
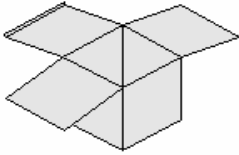
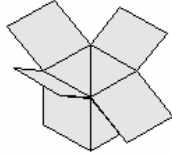
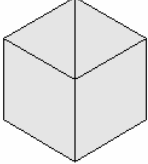
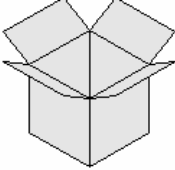
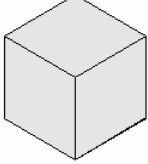
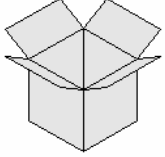
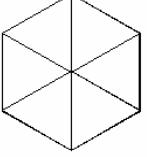
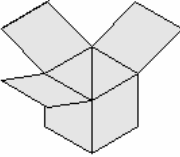
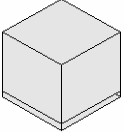
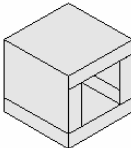
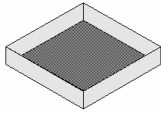
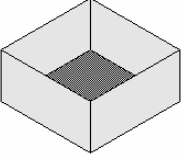
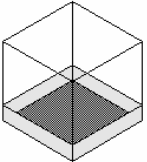
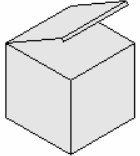
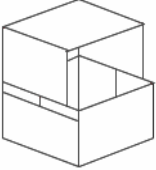
In these two unitloads, the top layer is lifted to show that different layers have different patterns. With a multi-layer pattern, TOPSePAC configures the unitload with the vertical dimension you specified, with the exception of the top layer. (The top layer is not affected by stacking strength).



Box Styles

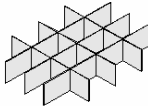
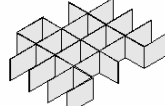
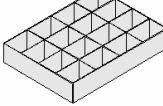
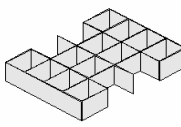
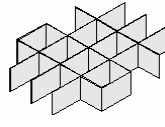
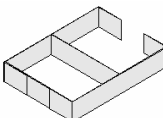
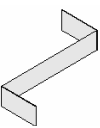
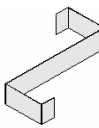
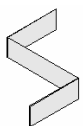
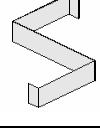
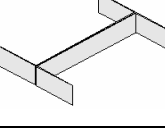
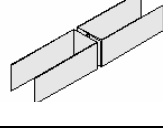
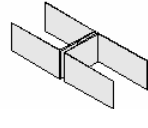
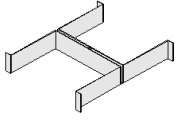
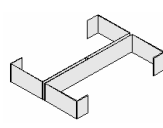
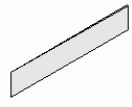
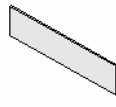
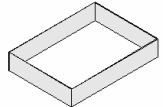
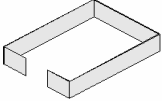
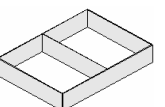
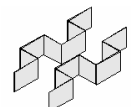
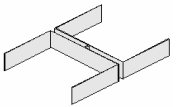
This section outlines the box styles defined in the TOPSePAC database:

Bundle (Invisible)	Carton 	Cube 
Cube (No Thicknesses) 	Die Cut 	FEFCO 200 
FEFCO 201 (RSC) 	FEFCO 202 	FEFCO 203 (FOL) 
FEFCO 204 	FEFCO 205 	FEFCO 206 
FEFCO 209 	FEFCO 210-15 (Die Cut) 	FEFCO 215 
FEFCO 216 	FEFCO 230 	FEFCO 300 
FEFCO 304 	FEFCO 308 	FEFCO 406 
FEFCO 421 	FEFCO 422 	FEFCO 453 

<p>FOL</p> 	<p>Friction Lock Tuck</p> 	<p>Full Overlap Seal End Carton</p> 
<p>HSC</p> 	<p>RSC</p> 	<p>RSC (Closed)</p> 
<p>RSC (FEFCO 0201)</p> 	<p>Shrink Wrap</p> 	<p>Standard Reverse Tuck Carton</p> 
<p>Telescoping</p> 	<p>Tray and Shroud</p> 	<p>Tray (2-inch)</p> 
<p>Tray (Half Height)</p> 	<p>Tray (Shrink Wrap)</p> 	<p>Tuck</p> 
<p>Wrap Around</p> 		

Divider Styles

This section outlines the partitions/divider styles defined in the TOPSePAC database:

<p>2-Way Cell (A)</p> 	<p>2-Way w/ Partial (B)</p> 	<p>2-Way w/ Sleeve (C)</p> 
<p>2-Way w/ Closed E (D)</p> 	<p>2-Way w/ Closed M (E)</p> 	<p>3-Cell w/ Tabs (F)</p> 
<p>Z-Part Length (G)</p> 	<p>Z-Part Length w/ T (H)</p> 	<p>Z-Part Width (I)</p> 
<p>Z-Part Width w/ T (J)</p> 	<p>H-Part (Inside) (K)</p> 	<p>H-Part (Outside) (L)</p> 
<p>H-Part (Outside) (M)</p> 	<p>H-Part w/ tabs (Outside) (N)</p> 	<p>H-Part w/ Tabs IN (O)</p> 
<p>Split Width (P)</p> 	<p>Split Length (Q)</p> 	<p>Perimeter (R)</p> 
<p>Perimeter w/ Gap (S)</p> 	<p>Perimeter w/ Center T (T)</p> 	<p>U-Part w/ Tabs (U)</p> 
<p>Dual U w/ Box IN (V)</p> 	<p>Cradle (W)</p> 