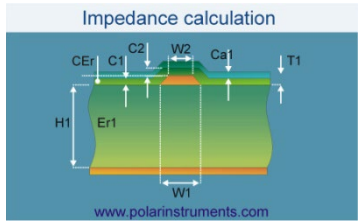
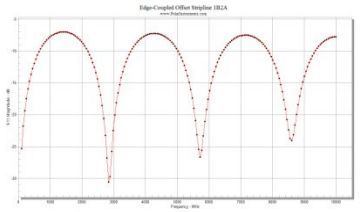
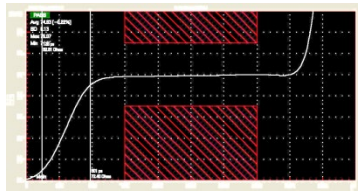
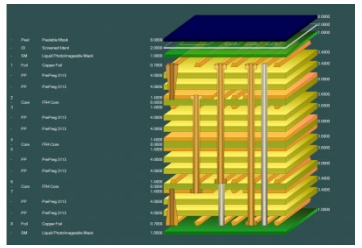
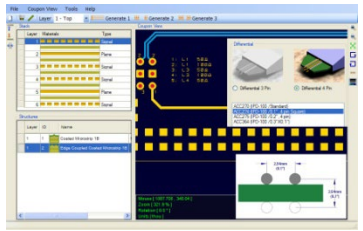










Speedstack 2022 Preview

Speedstack 2021 summary

Richard Attrill – January 2022 (Rev 1)

Introducing the latest features of Speedstack

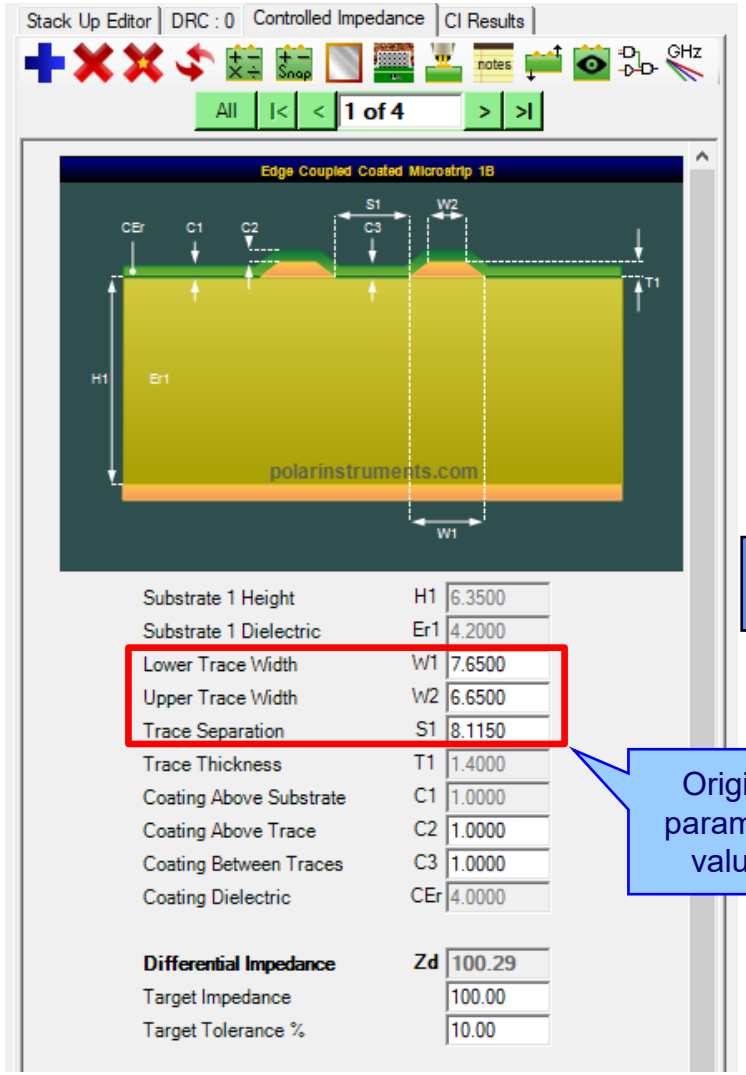
Welcome to a preview of Speedstack 2022 and a full recap of Speedstack 2021.

If you would like to have a web-based demonstration please contact your local Polar office, details are shown on the last slide of this presentation.

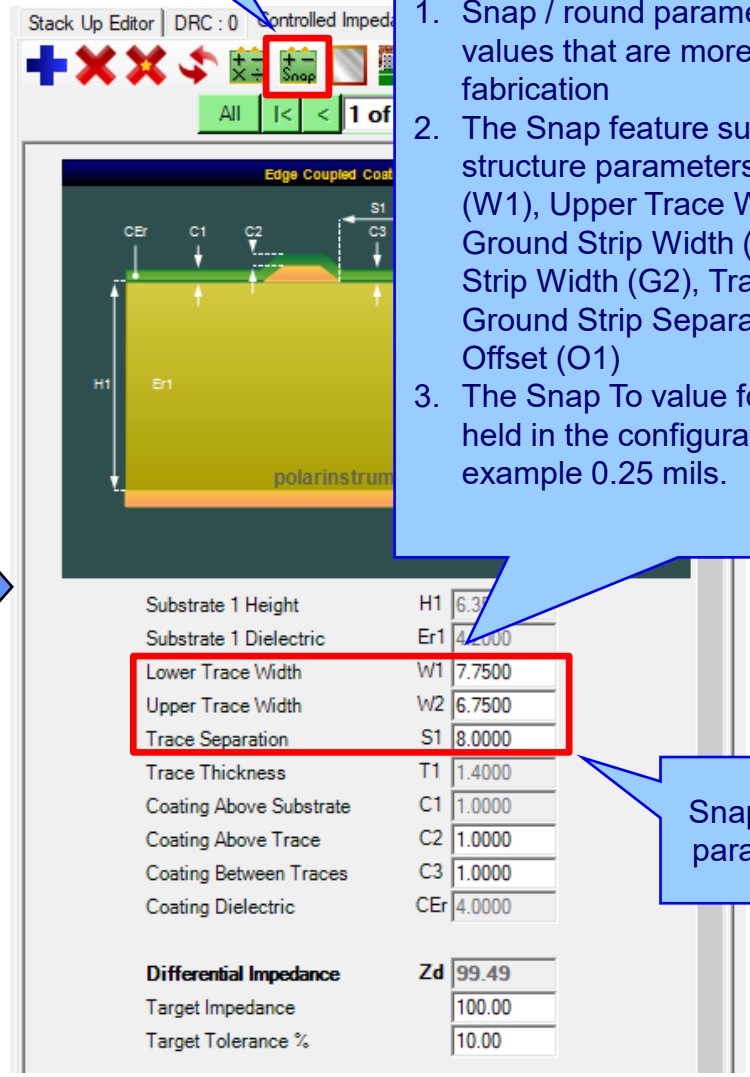
Please note: the Speedstack units have been set to Mils in the following screen grabs

Speedstack v22.01.01 (January 2022)

Snap Parameters and Calculate Structure



Original parameter values



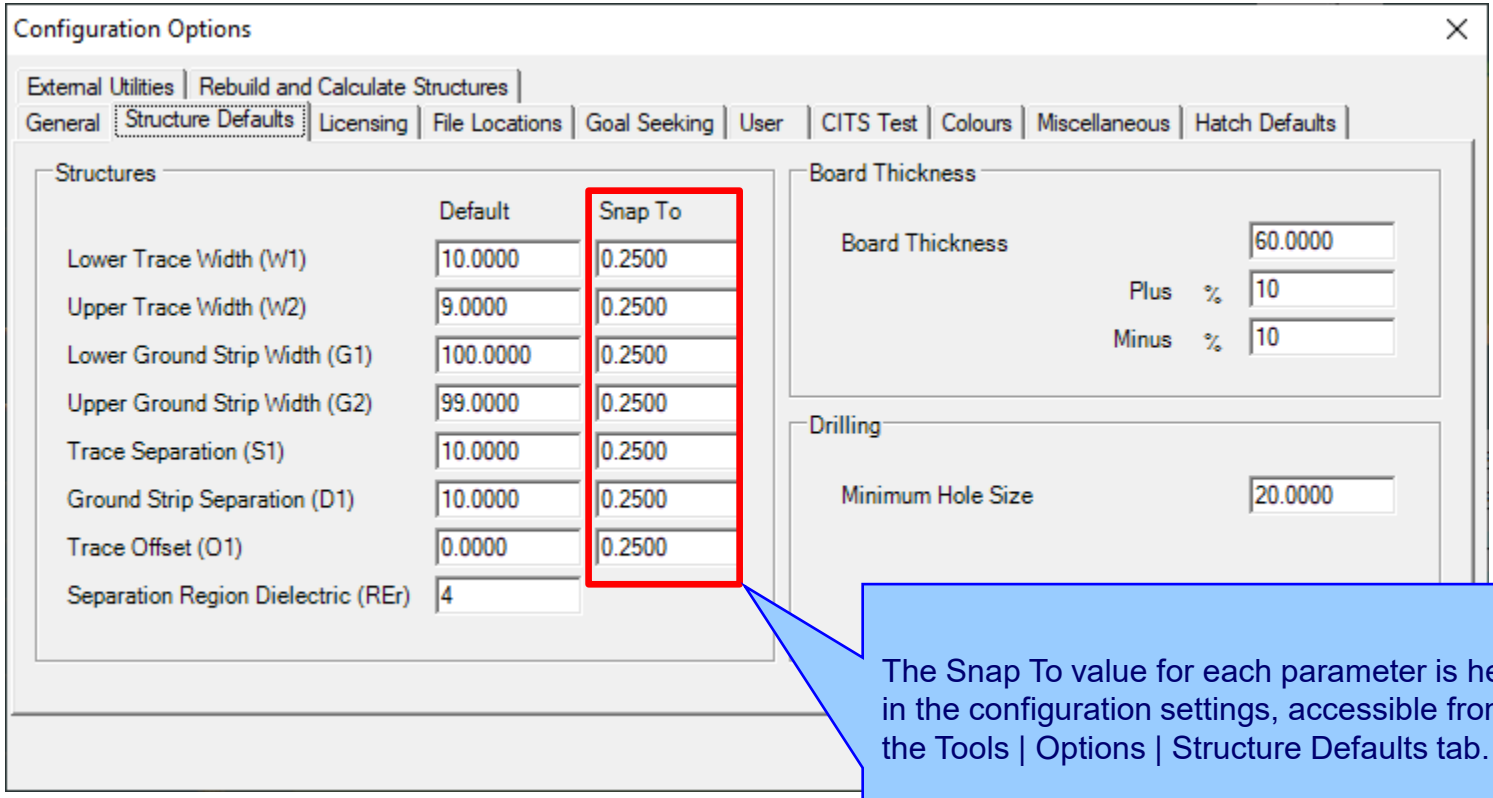
Snapped/rounded parameter values

New option

Snap Parameters and Calculate Structure

1. Snap / round parameters to practical values that are more appropriate for fabrication
2. The Snap feature supports the following structure parameters : Lower Trace Width (W1), Upper Trace Width (W2), Lower Ground Strip Width (G1), Upper Ground Strip Width (G2), Trace Separation (S1), Ground Strip Separation (D1), Trace Offset (O1)
3. The Snap To value for each parameter is held in the configuration settings, in this example 0.25 mils.

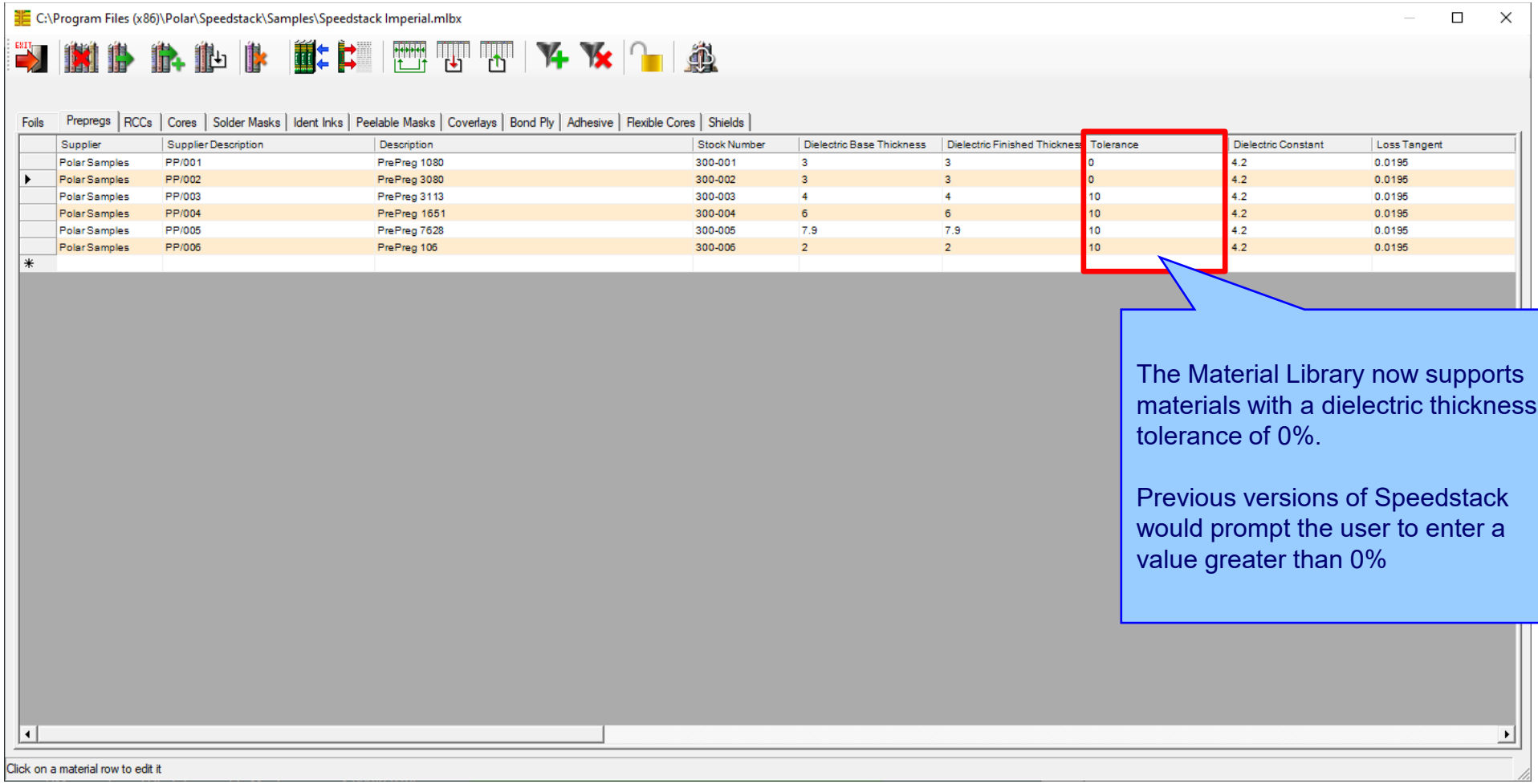
Snap Parameters and Calculate Structure



The Snap To value for each parameter is held in the configuration settings, accessible from the Tools | Options | Structure Defaults tab.

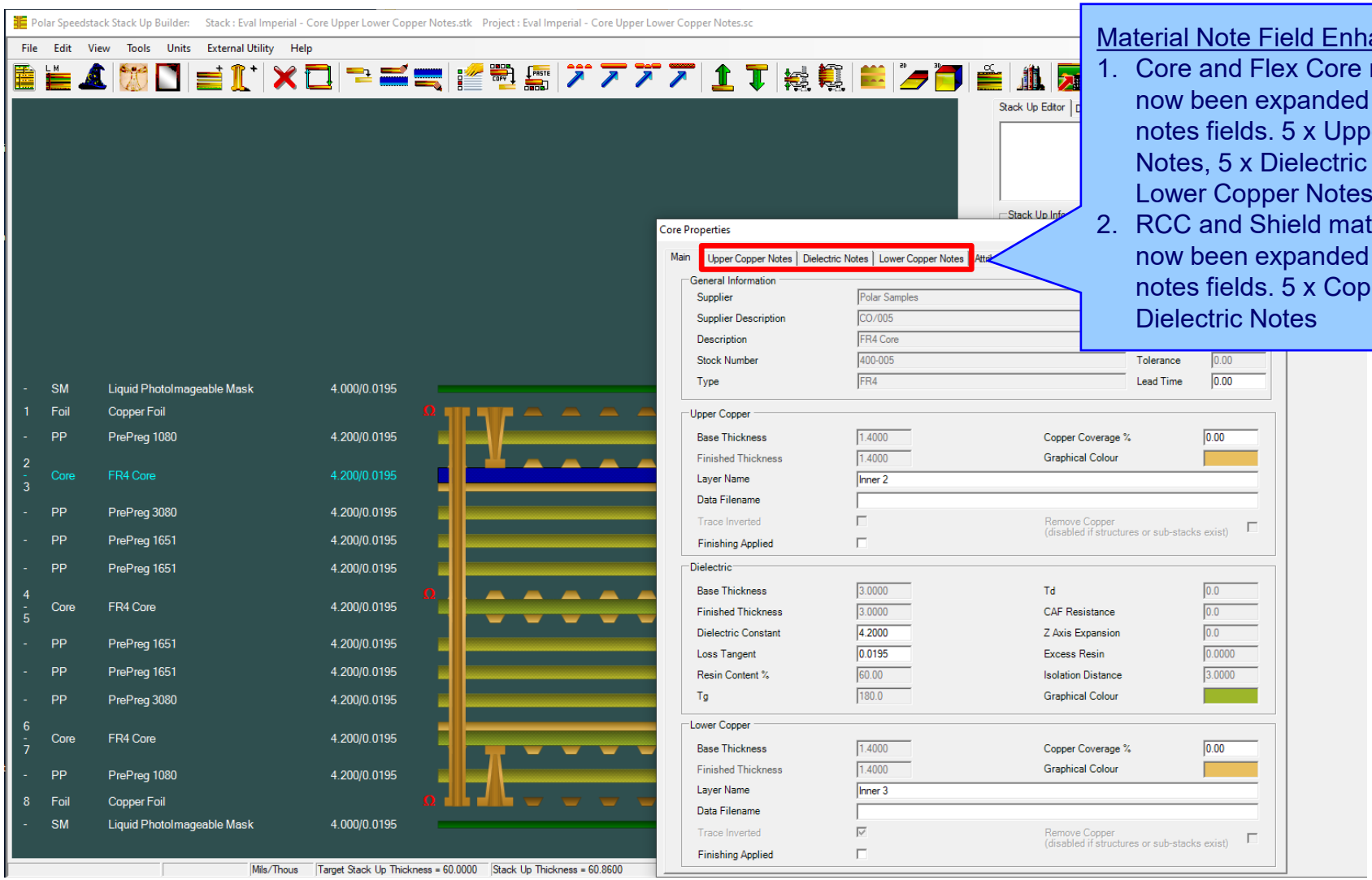
Although all Snap To values shown here are set to 0.25 mils, each parameter can support a different value

Material Library Enhancements



Speedstack v21.11.01 (November 2021)

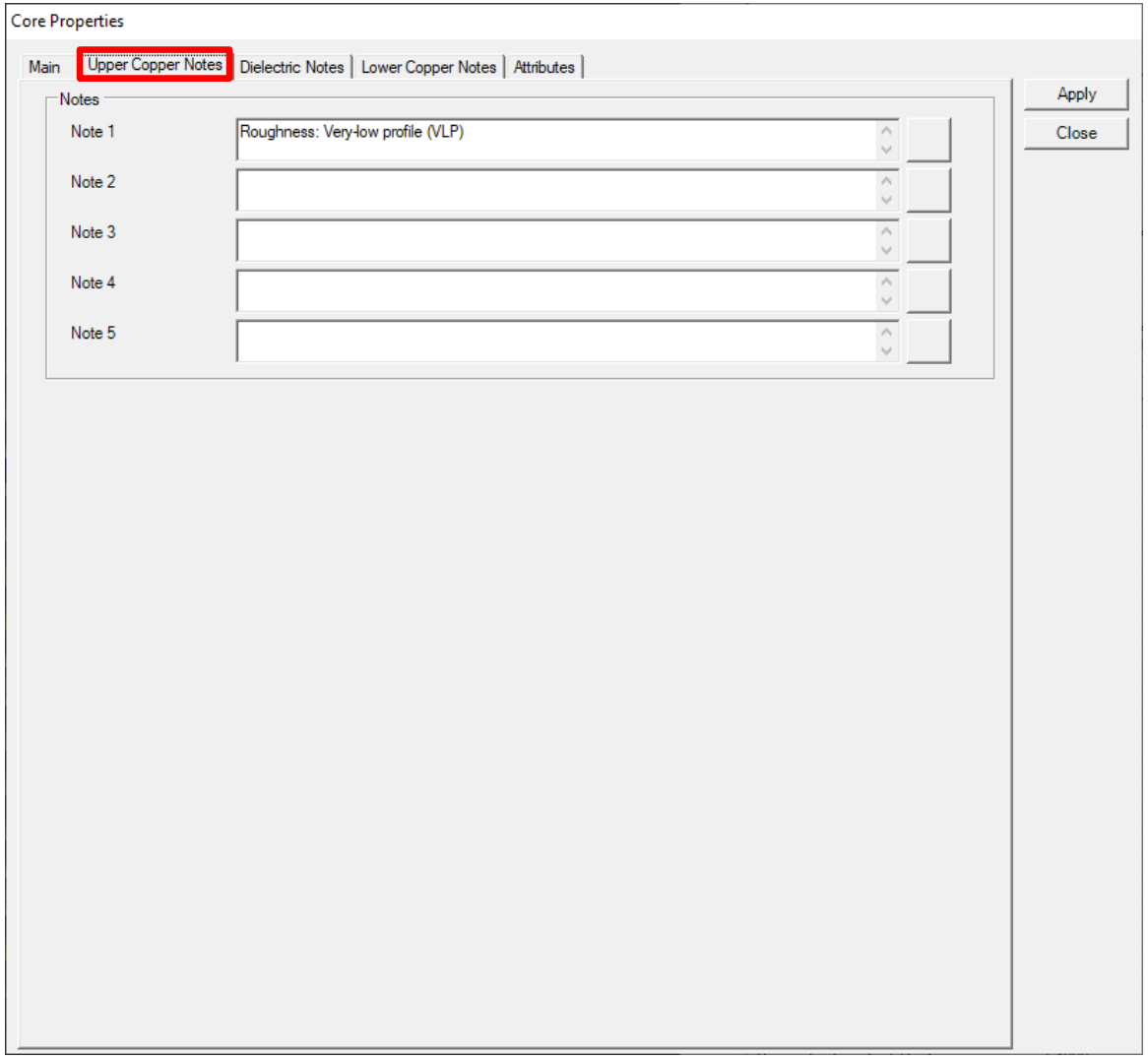
Material Note Field Enhancements – improvements to stack up documentation



Material Note Field Enhancements

1. Core and Flex Core materials have now been expanded to support 15 notes fields. 5 x Upper Copper Notes, 5 x Dielectric Notes, 5 x Lower Copper Notes
2. RCC and Shield materials have now been expanded to support 10 notes fields. 5 x Copper Notes, 5 x Dielectric Notes

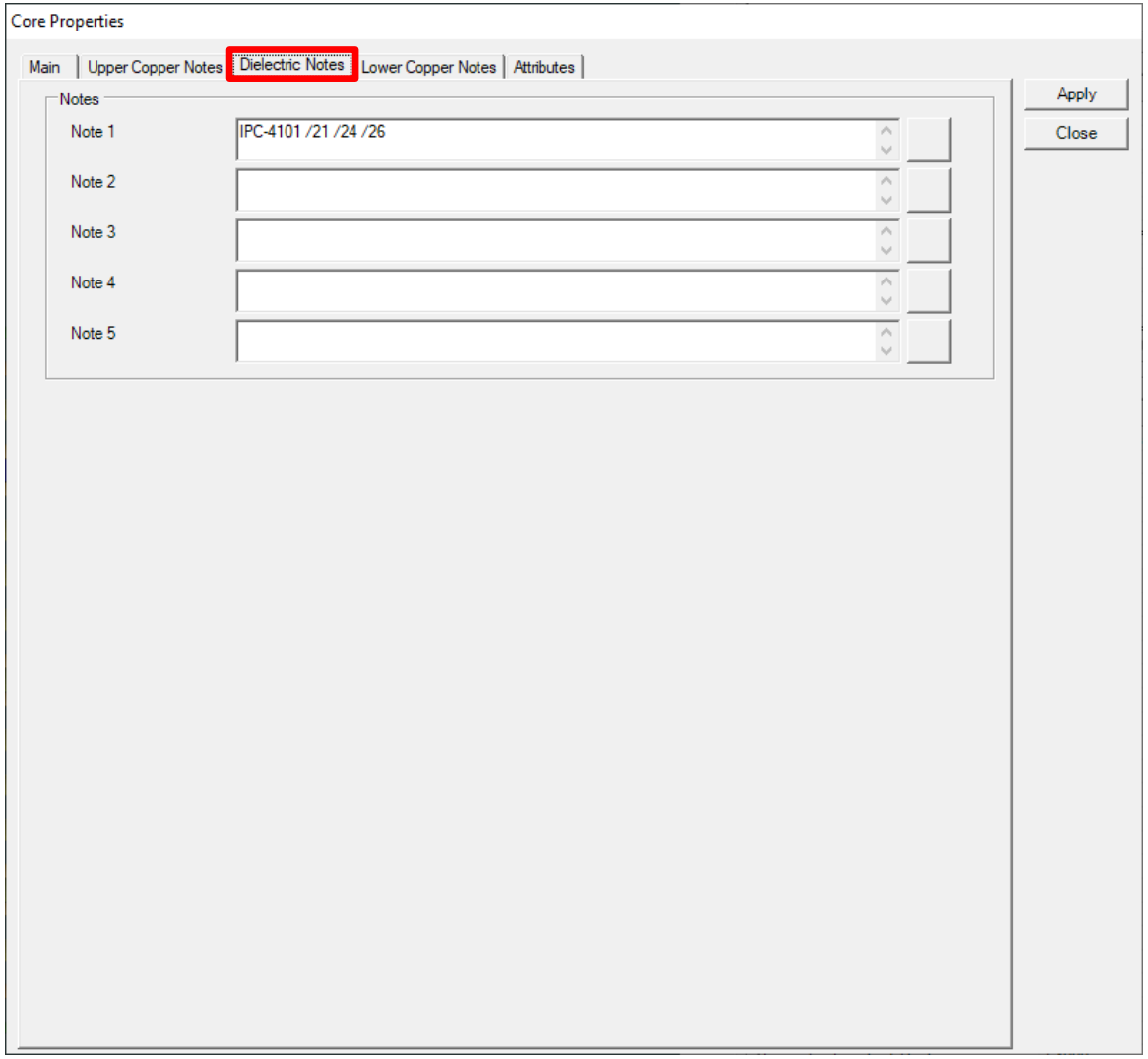
Material Note Field Enhancements – improvements to stack up documentation



The new Upper and Lower Copper Notes allow the user to specify important information about the copper surfaces for a Core and Flex Core material.

For instance, copper roughness and plating fabrication information can be specified

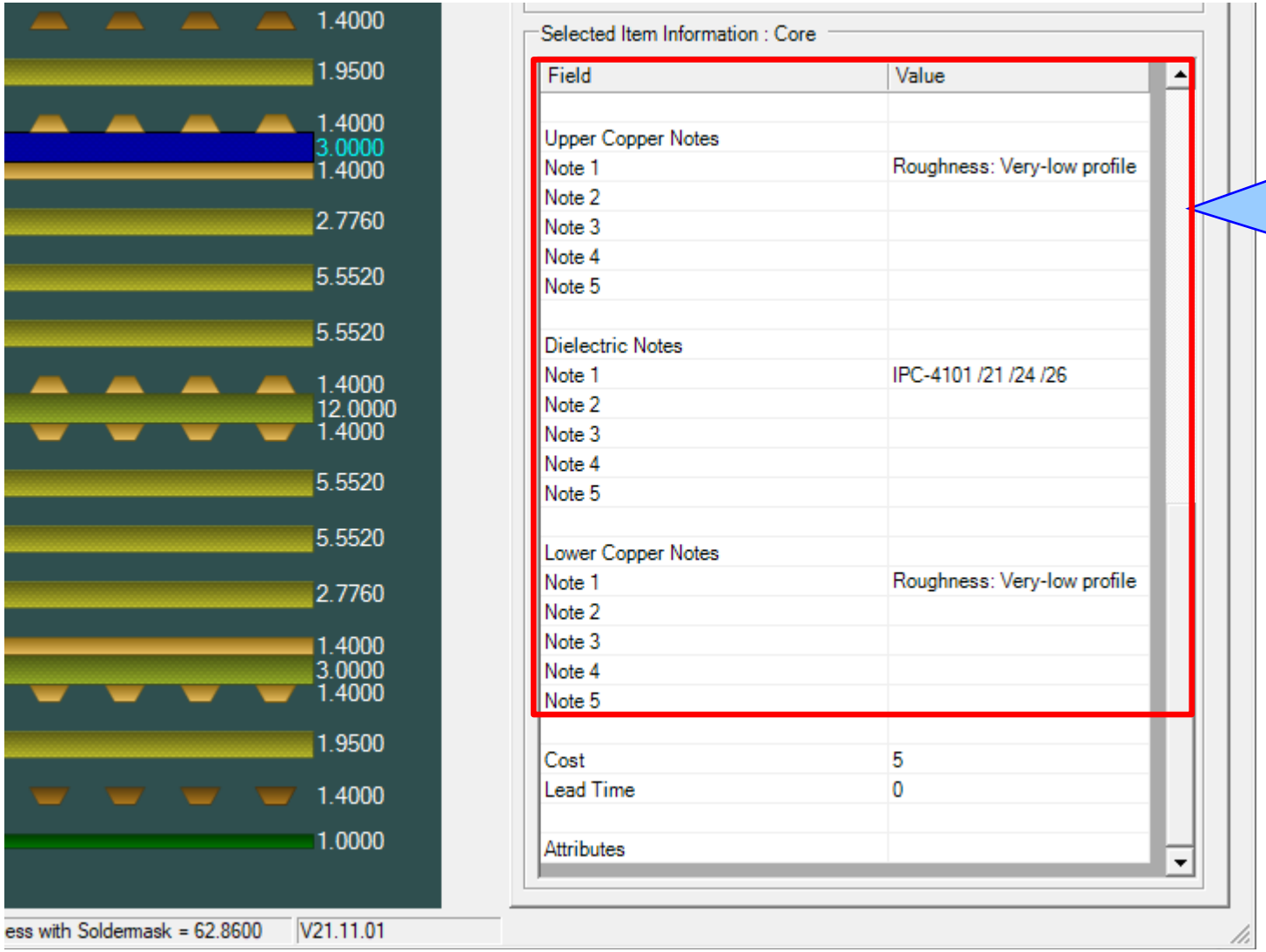
Material Note Field Enhancements – improvements to stack up documentation



Dielectric Notes are useful for specifying IPC-4101 slash sheet categories, glass weave information (spread glass) and other important information regarding the dielectric region of the core.

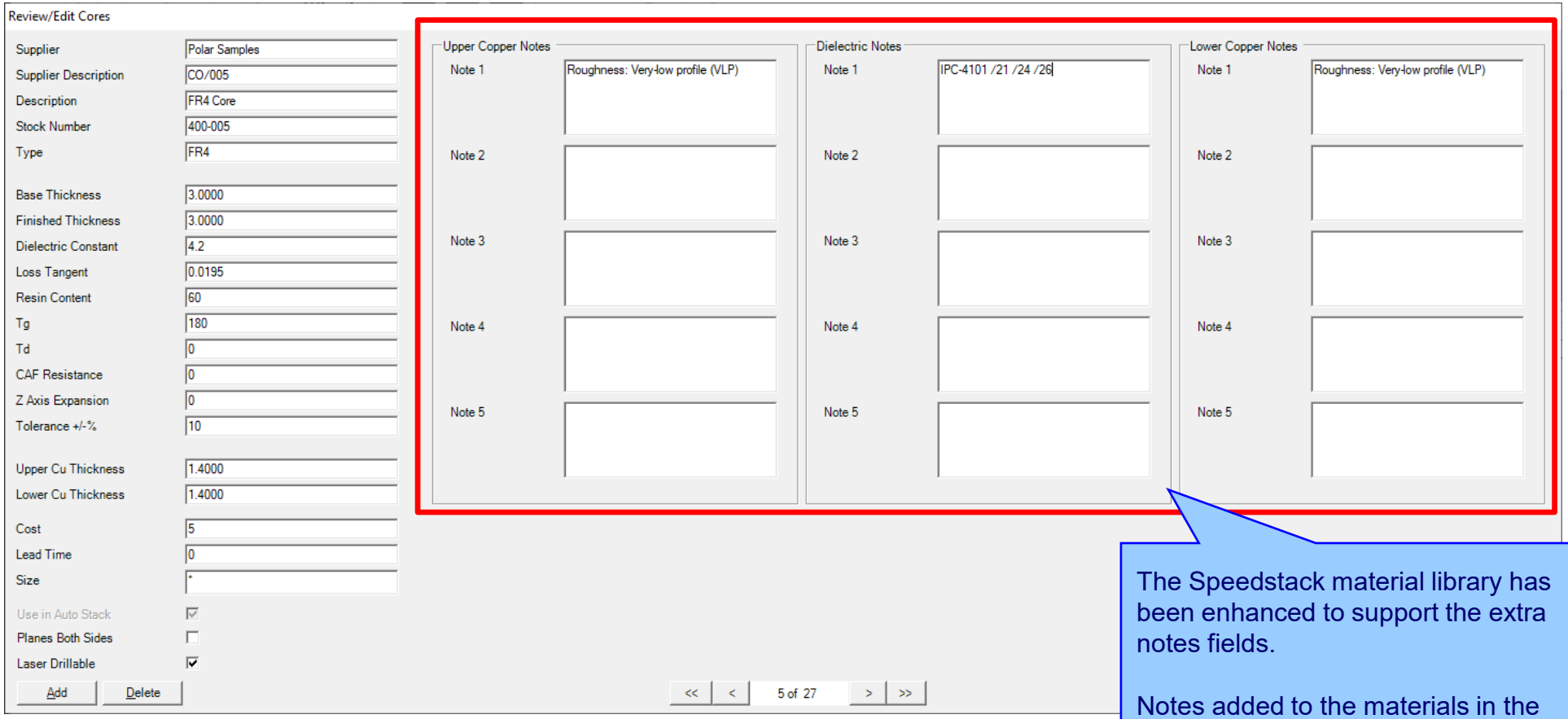
The existing five Notes fields from previous versions of Speedstack will be allocated as Dielectric Notes.

Material Note Field Enhancements – improvements to stack up documentation



When selecting a core / flex core material the Upper Copper, Dielectric and Lower Copper Notes can be confirmed here.

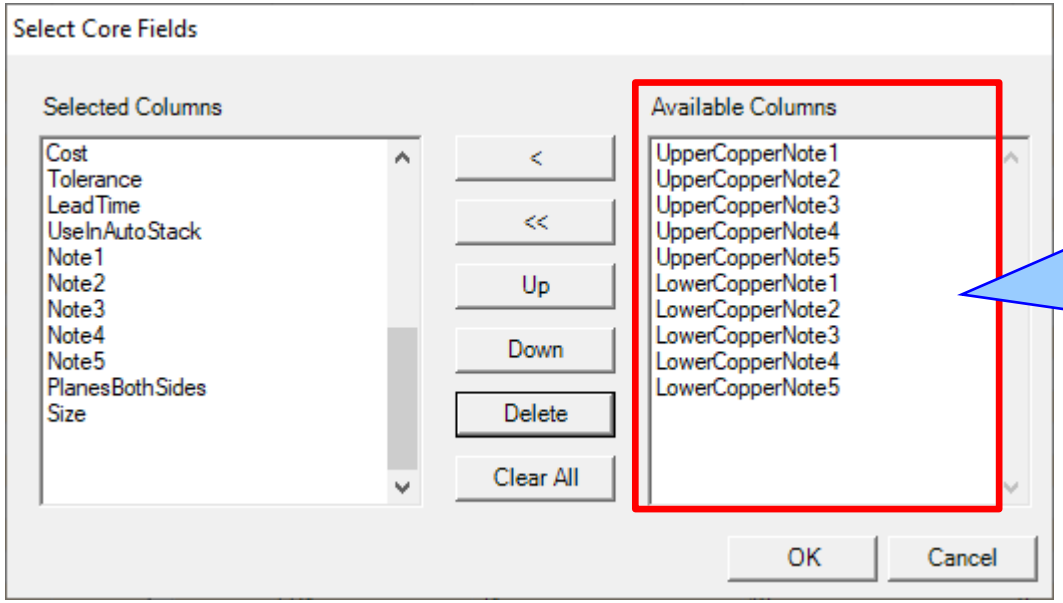
Material Note Field Enhancements – library enhancements



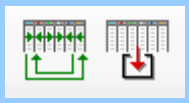
The Speedstack material library has been enhanced to support the extra notes fields.

Notes added to the materials in the library will automatically be transferred to the stack up.

Material Note Field Enhancements – library enhancements



For existing Speedstack users upgrading to v21.11, use the Select and Arrange Columns and Save Column Order toolbar options to add these new material library columns to the Data Grid view

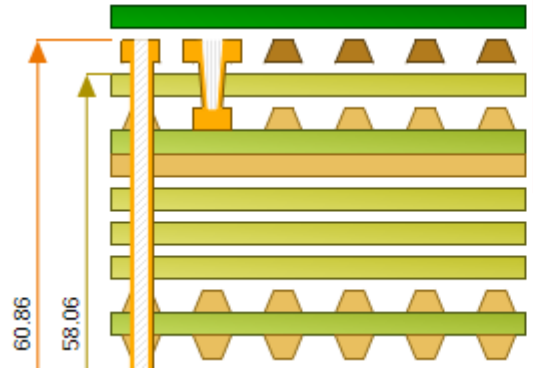


Material Library Import / Export

The import / export options have been enhanced to support the additional material library notes columns.

Material Note Field Enhancements – technical report enhancements

C:\Apps\Samples\Eval Imperial - Core Upper Lower Copper Notes.sci Units: Mils

Layer	Stack up	Manufacturing Notes	Copper Layer Name	Supplier	Description
				Polar Samples	Liquid PhotoImageable Mask
1			Top	Polar Samples	Copper Foil
				Polar Samples	PrePreg 1080
2		Roughness: Very-low profile (VLP) IPC-4101 /21 /24 /26	Inner 2		
				Polar Samples	FR4 Core
3		Roughness: Very-low profile (VLP)	Inner 3		
				Polar Samples	PrePreg 3080
				Polar Samples	PrePreg 1651
4					
5					

The technical report has been updated to support the additional notes fields. Notice the Upper Copper, Dielectric and Lower Copper Notes align with the appropriate part of the Core material.

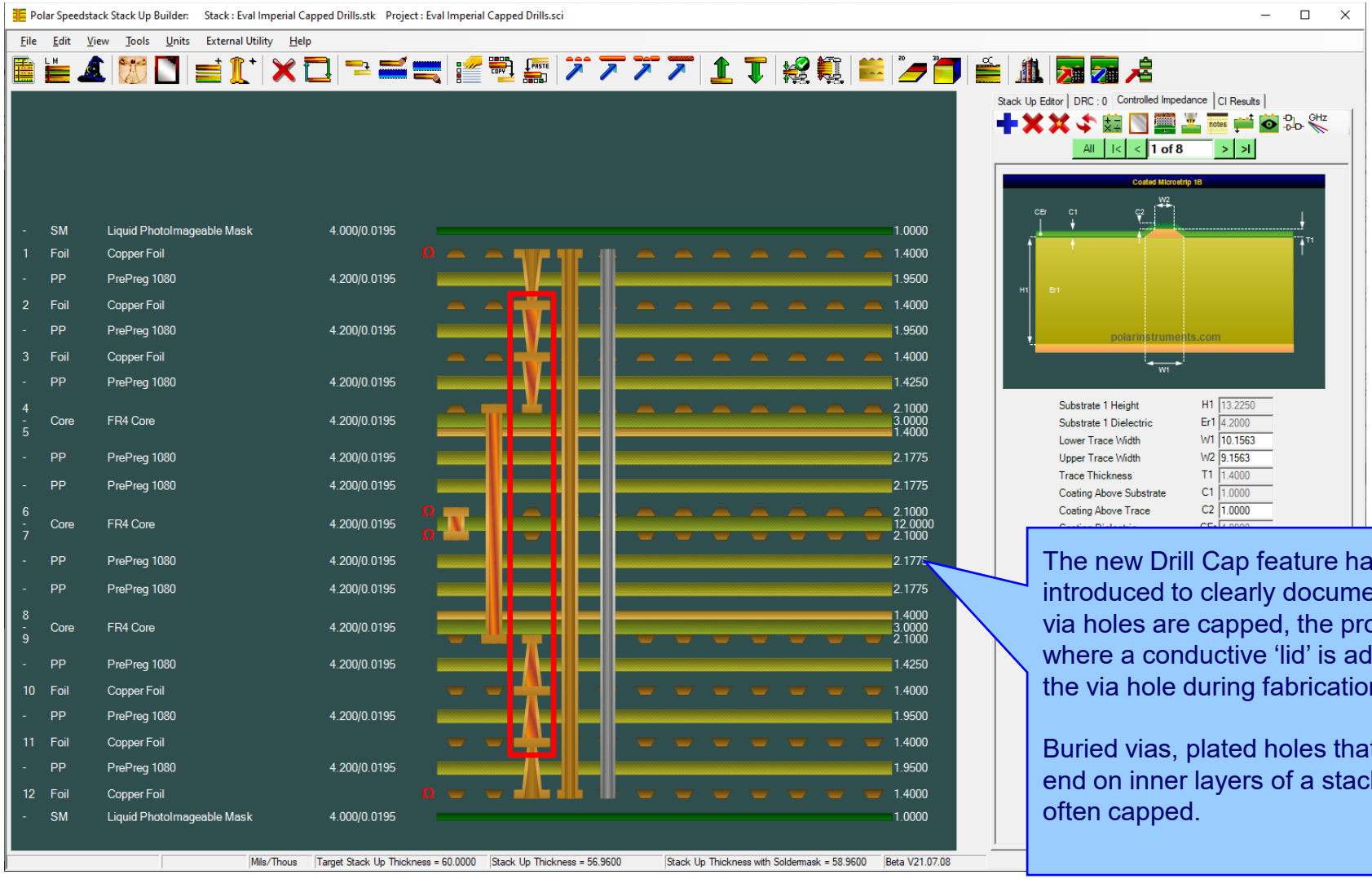
Import / Export enhancements

The following Import / Export options have been updated to support the additional material notes properties introduced with Speedstack v21.11.01:

- XML STKX v23.00 and SSX v13.00 import / export options
- CSV export option

Speedstack v21.07.08 (July 2021)

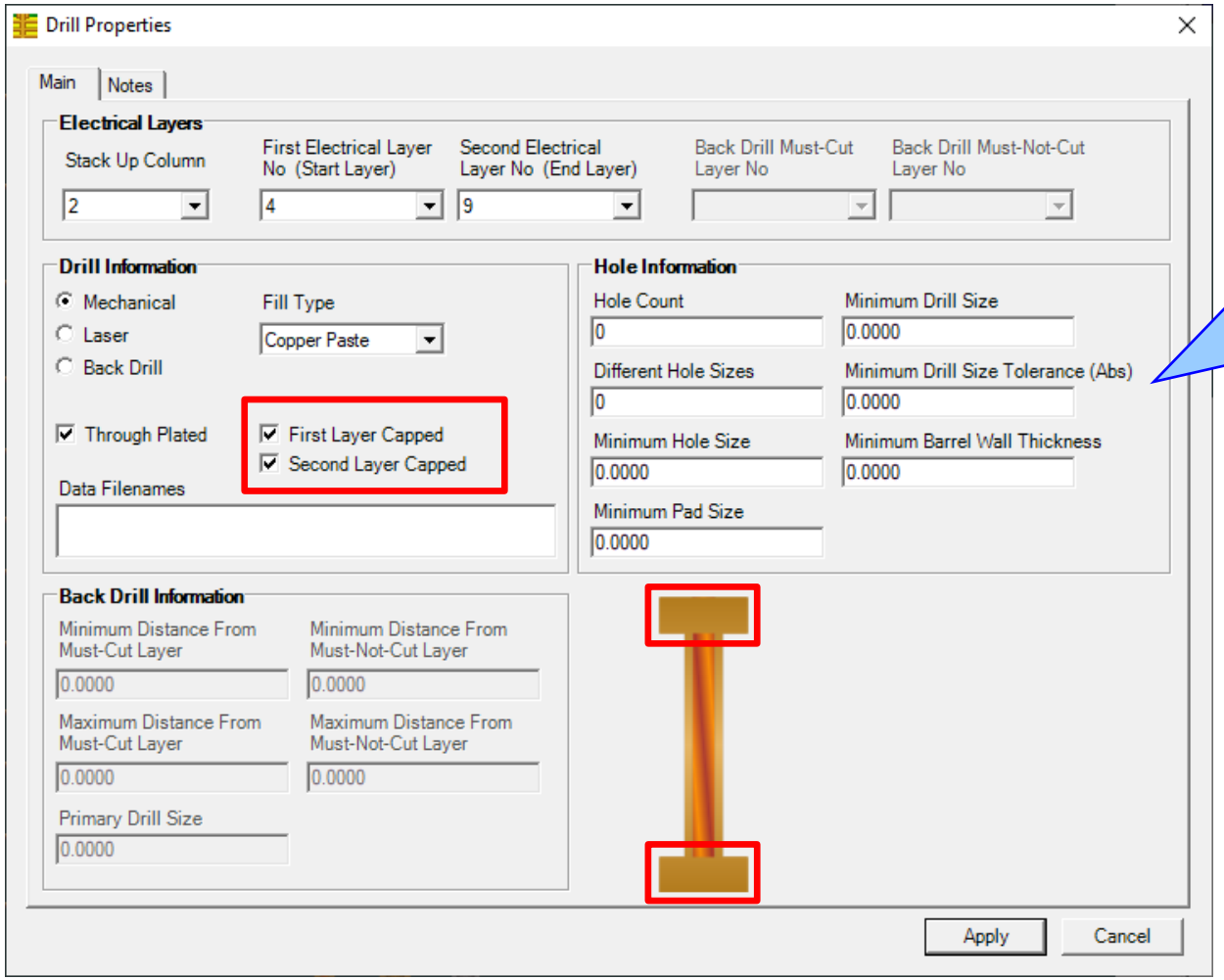
New Drill Cap feature



The new Drill Cap feature has been introduced to clearly document when via holes are capped, the process where a conductive ‘lid’ is added to the via hole during fabrication.

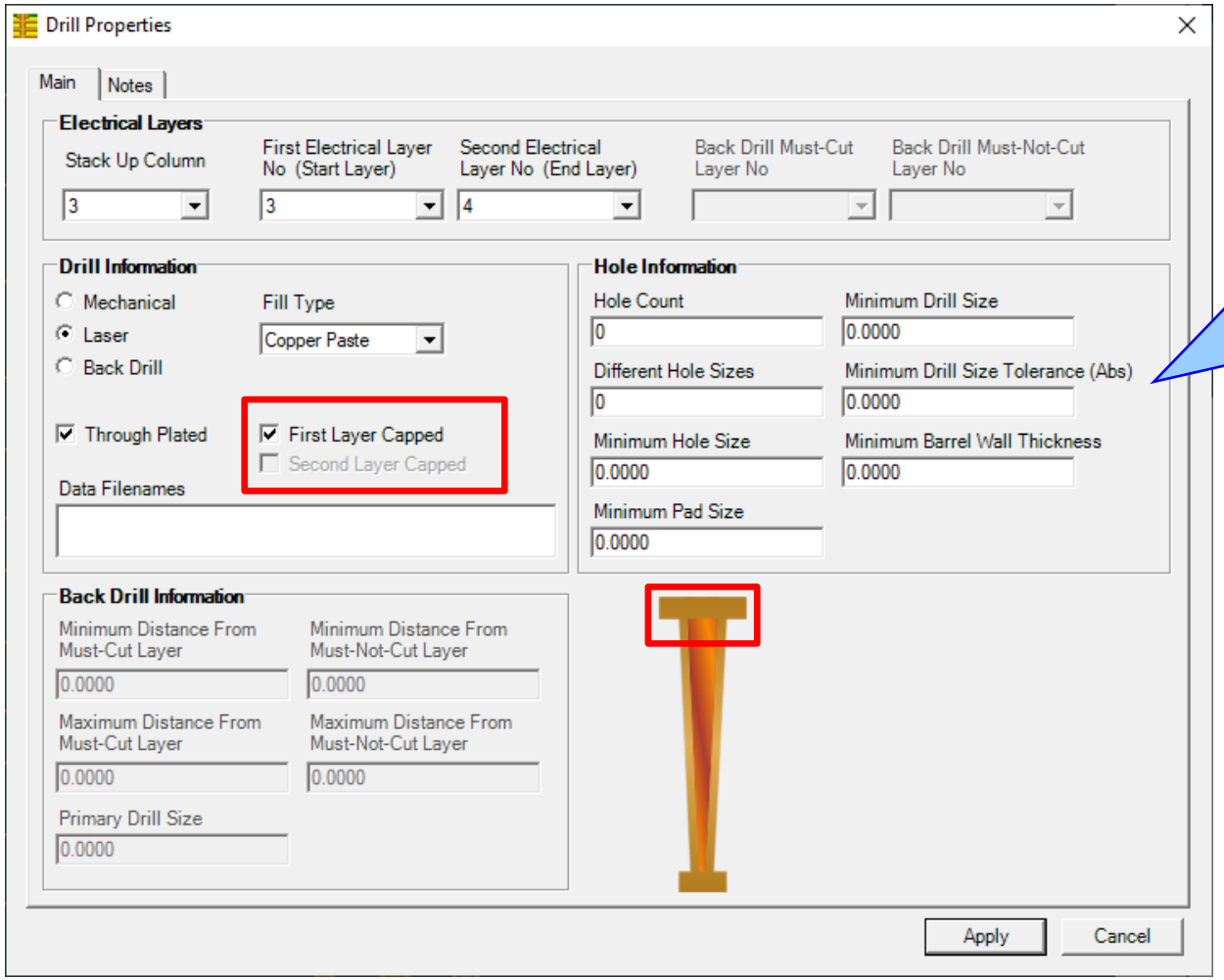
Buried vias, plated holes that start and end on inner layers of a stack up, are often capped.

Drill Cap option – mechanical through plated drills



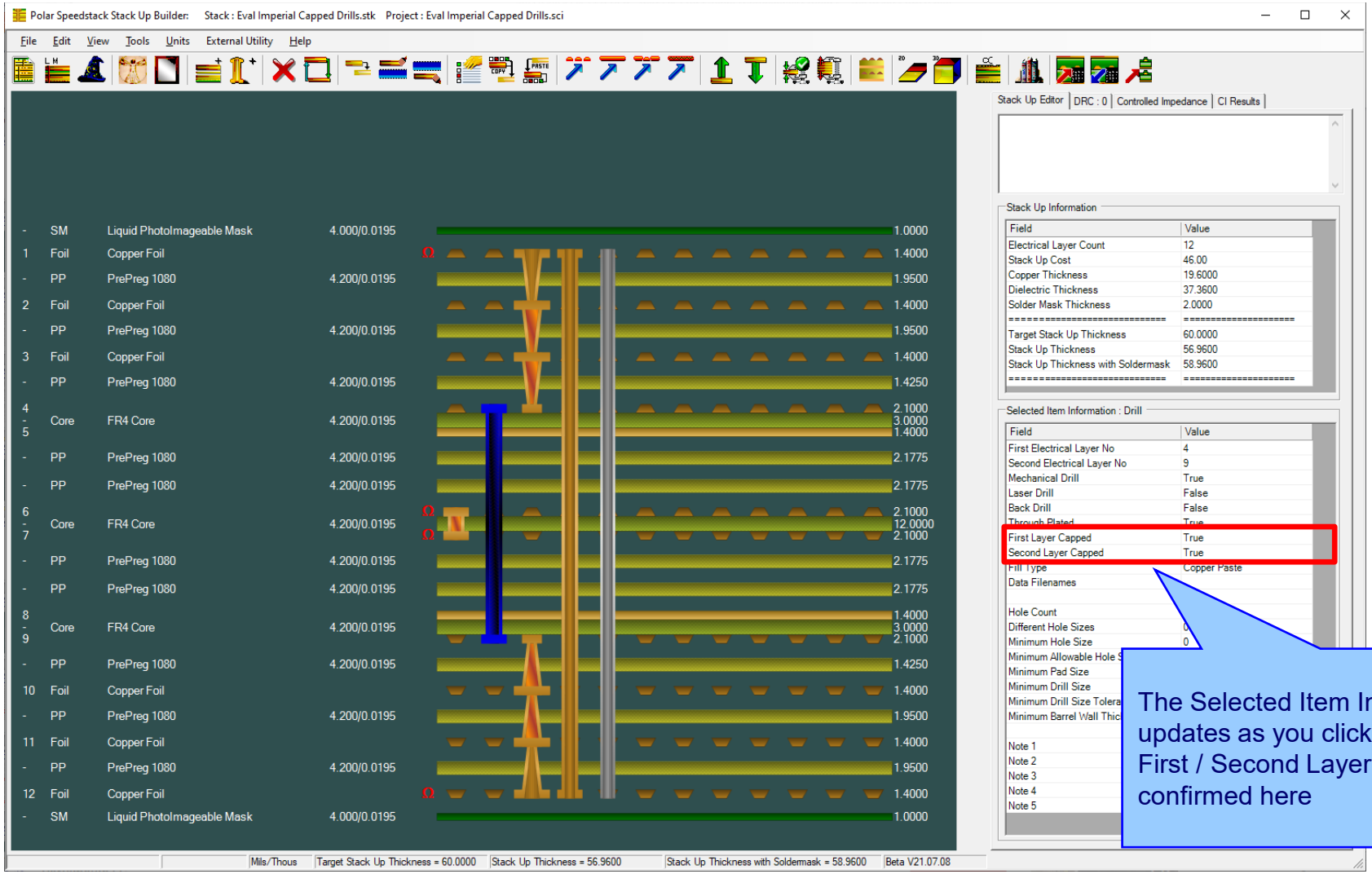
Mechanical
For mechanical drills it is possible to have four states:
1.Neither first or second layer capped (default when adding a drill)
2.First layer capped
3.Second layer capped
4.Both layers capped

Drill Cap option – laser drills

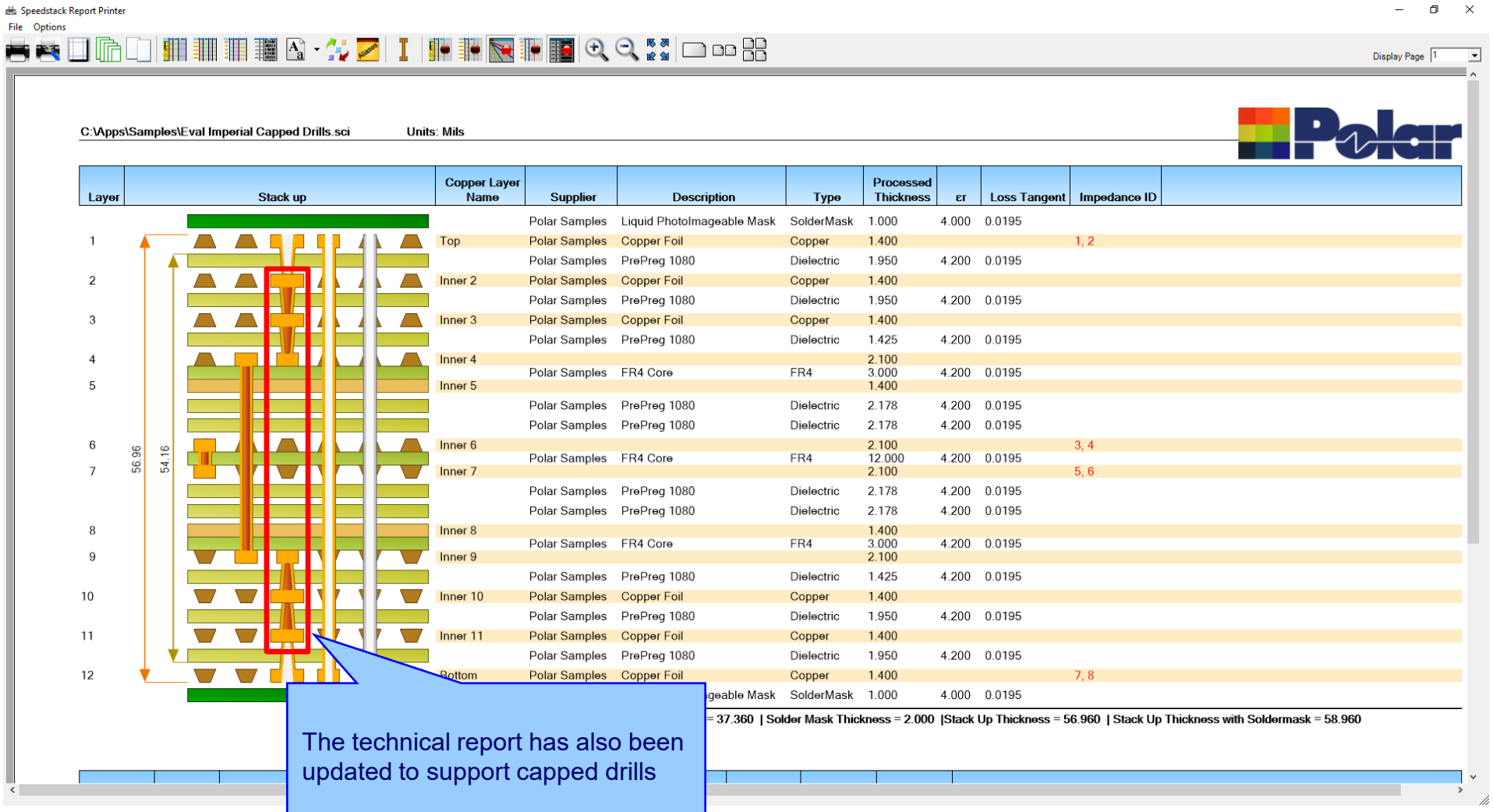


Laser
For laser drills it is possible to have two states as the Second Layer Capped checkbox is disabled:
1.Not capped (default when adding a drill)
2.First layer capped

New Drill Cap feature



New Drill Cap feature – technical report enhancements



Layer	Stack up	Copper Layer Name	Supplier	Description	Type	Processed Thickness	εr	Loss Tangent	Impedance ID
			Polar Samples	Liquid PhotoImageable Mask	SolderMask	1.000	4.000	0.0195	
1		Top	Polar Samples	Copper Foil	Copper	1.400			1, 2
			Polar Samples	PrePreg 1080	Dielectric	1.950	4.200	0.0195	
2		Inner 2	Polar Samples	Copper Foil	Copper	1.400			
			Polar Samples	PrePreg 1080	Dielectric	1.950	4.200	0.0195	
3		Inner 3	Polar Samples	Copper Foil	Copper	1.400			
			Polar Samples	PrePreg 1080	Dielectric	1.425	4.200	0.0195	
4		Inner 4				2.100			
			Polar Samples	FR4 Core	FR4	3.000	4.200	0.0195	
5		Inner 5				1.400			
			Polar Samples	PrePreg 1080	Dielectric	2.178	4.200	0.0195	
			Polar Samples	PrePreg 1080	Dielectric	2.178	4.200	0.0195	
6		Inner 6				2.100			3, 4
			Polar Samples	FR4 Core	FR4	12.000	4.200	0.0195	
7		Inner 7				2.100			5, 6
			Polar Samples	PrePreg 1080	Dielectric	2.178	4.200	0.0195	
			Polar Samples	PrePreg 1080	Dielectric	2.178	4.200	0.0195	
8		Inner 8				1.400			
			Polar Samples	FR4 Core	FR4	3.000	4.200	0.0195	
9		Inner 9				2.100			
			Polar Samples	PrePreg 1080	Dielectric	1.425	4.200	0.0195	
10		Inner 10	Polar Samples	Copper Foil	Copper	1.400			
			Polar Samples	PrePreg 1080	Dielectric	1.950	4.200	0.0195	
11		Inner 11	Polar Samples	Copper Foil	Copper	1.400			
			Polar Samples	PrePreg 1080	Dielectric	1.950	4.200	0.0195	
12		Bottom	Polar Samples	Copper Foil	Copper	1.400			7, 8
				ageable Mask	SolderMask	1.000	4.000	0.0195	

= 37.360 | Solder Mask Thickness = 2.000 |Stack Up Thickness = 56.960 | Stack Up Thickness with Soldermask = 58.960

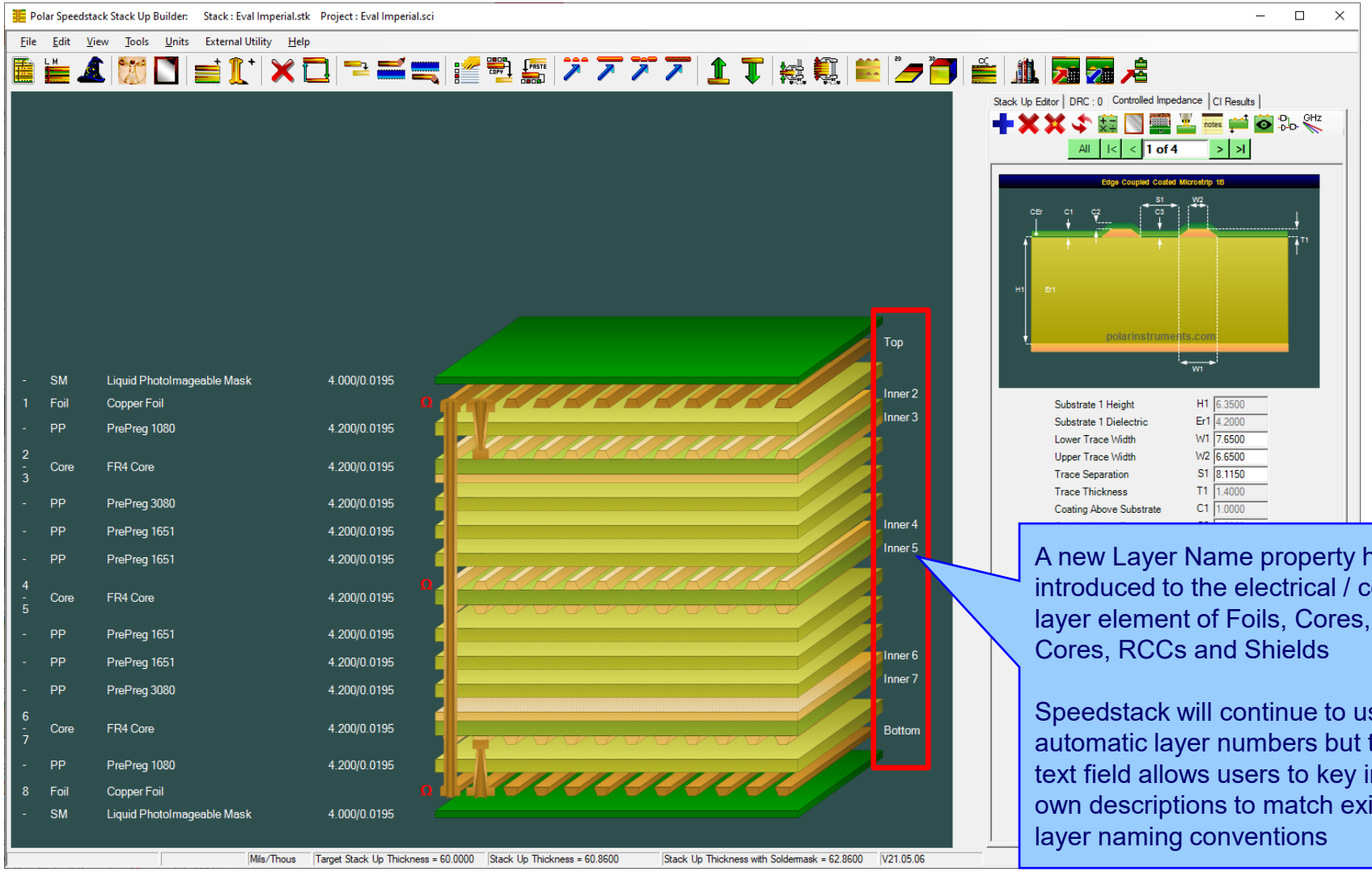
Import / Export enhancements

The following Import / Export options have been updated to support the drill cap properties introduced with Speedstack v21.07.08:

- XML STKX v22.00 and SSX v12.00 import / export options
- CSV export option

Speedstack v21.05.06 (May 2021)

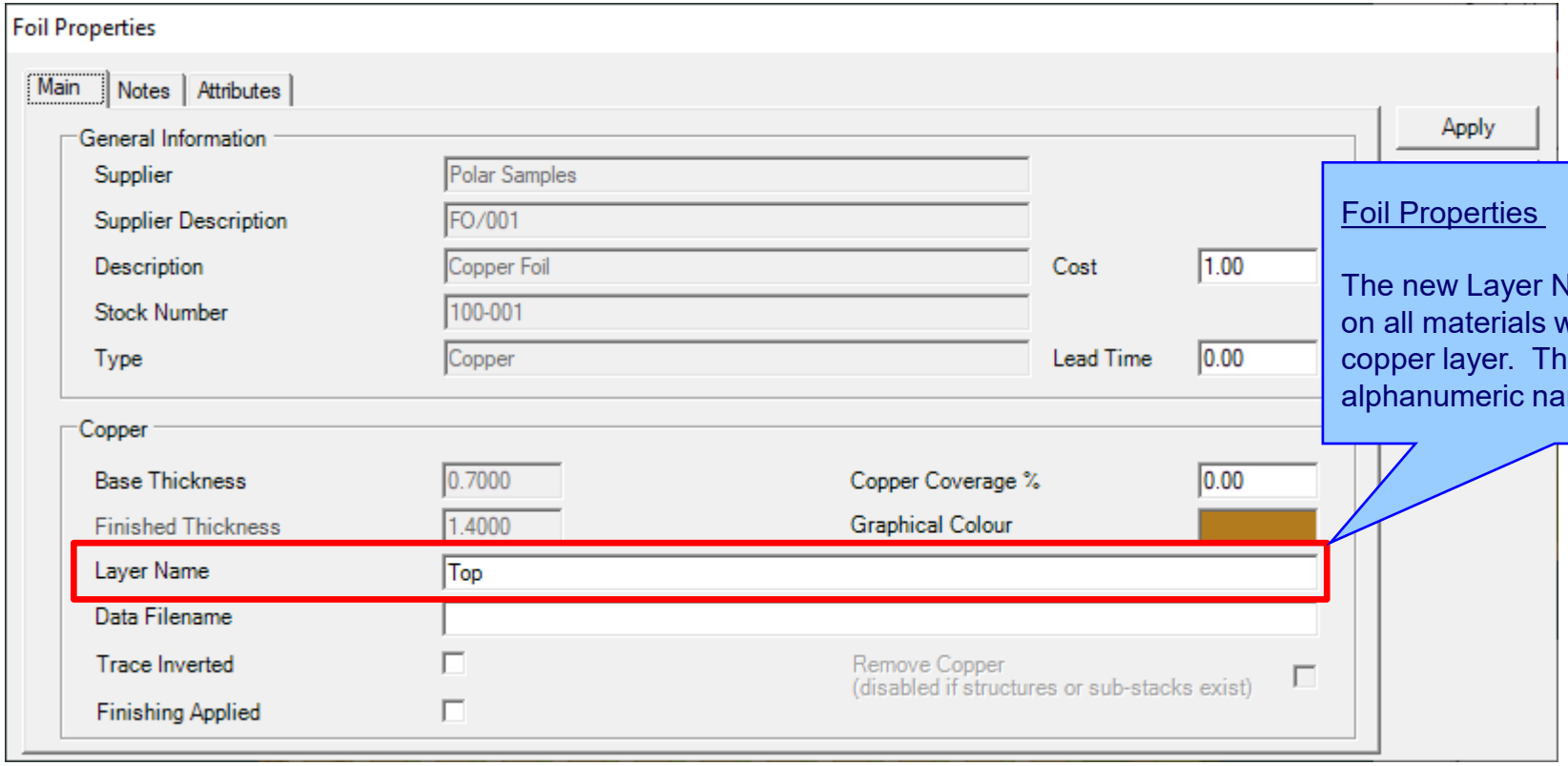
New Layer Name property for electrical / copper layers



A new Layer Name property has been introduced to the electrical / copper layer element of Foils, Cores, Flex Cores, RCCs and Shields

Speedstack will continue to use the automatic layer numbers but this new text field allows users to key in their own descriptions to match existing layer naming conventions

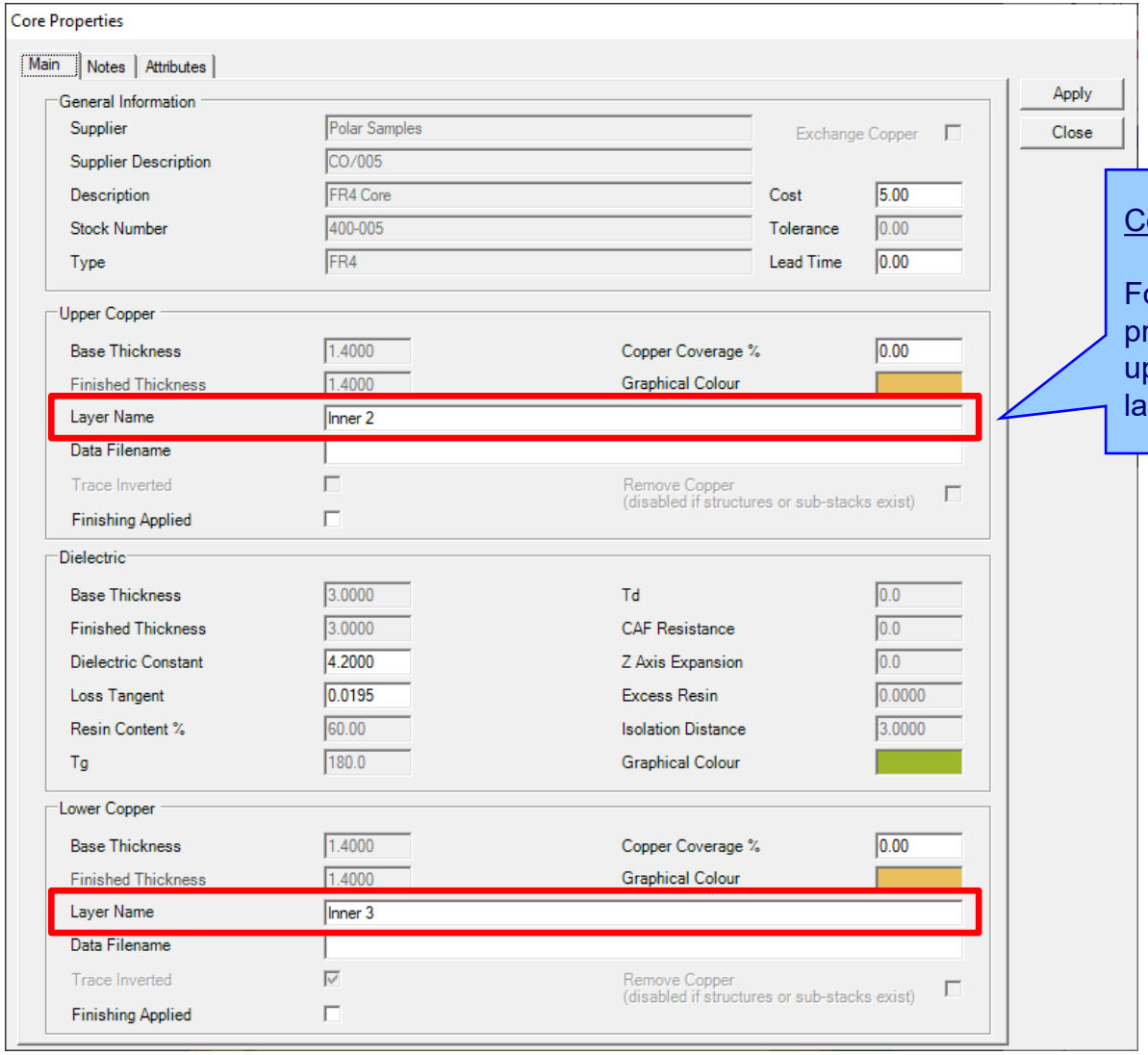
New Layer Name property for electrical / copper layers



Foil Properties

The new Layer Name property exists on all materials with an electrical / copper layer. The user can key in any alphanumeric name

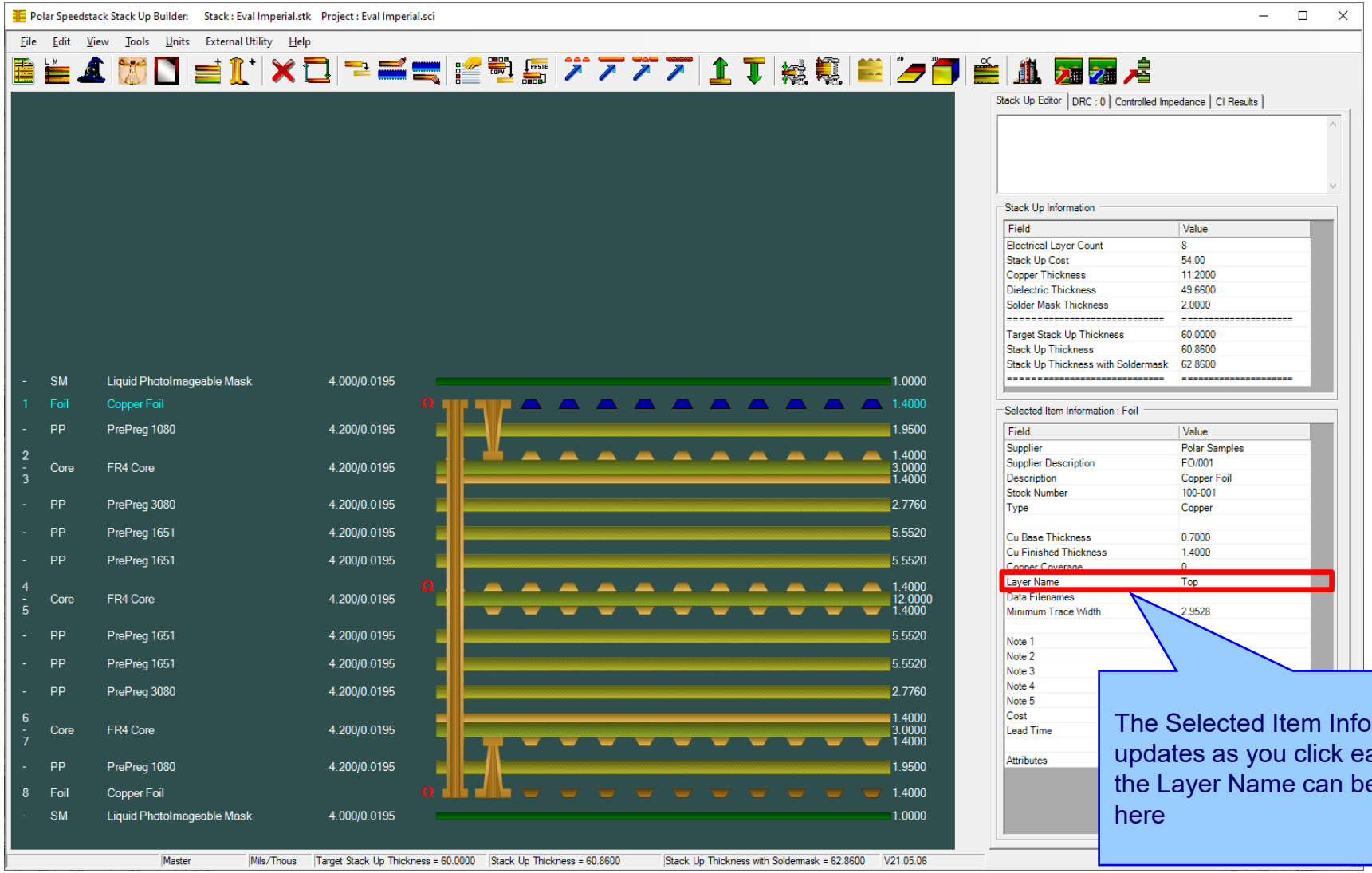
New Layer Name property for electrical / copper layers



Core Properties

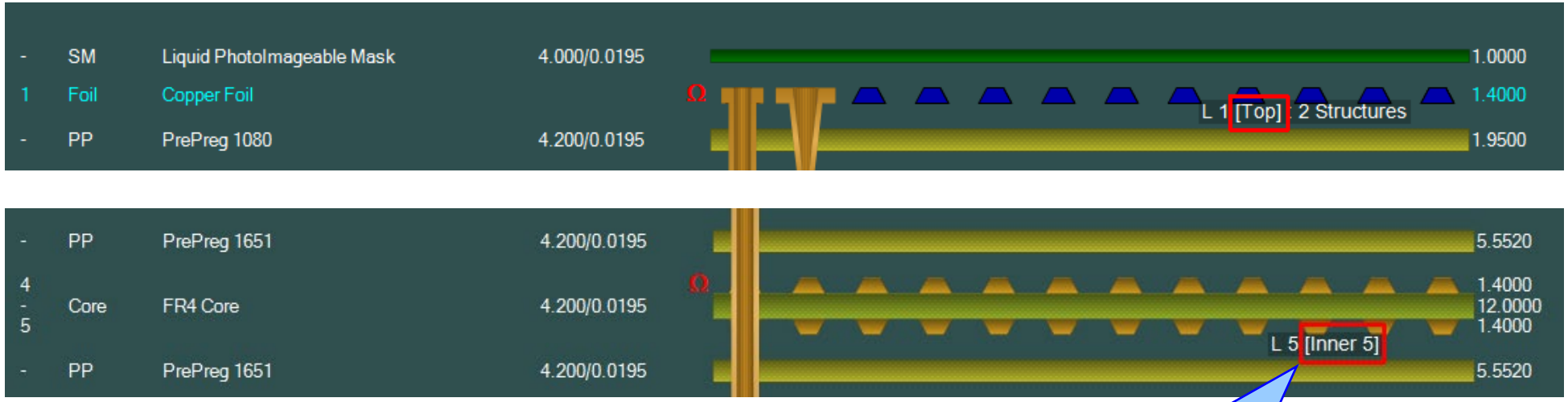
For core materials, a new Layer Name property has been added for both upper and lower electrical / copper layers

New Layer Name property for electrical / copper layers



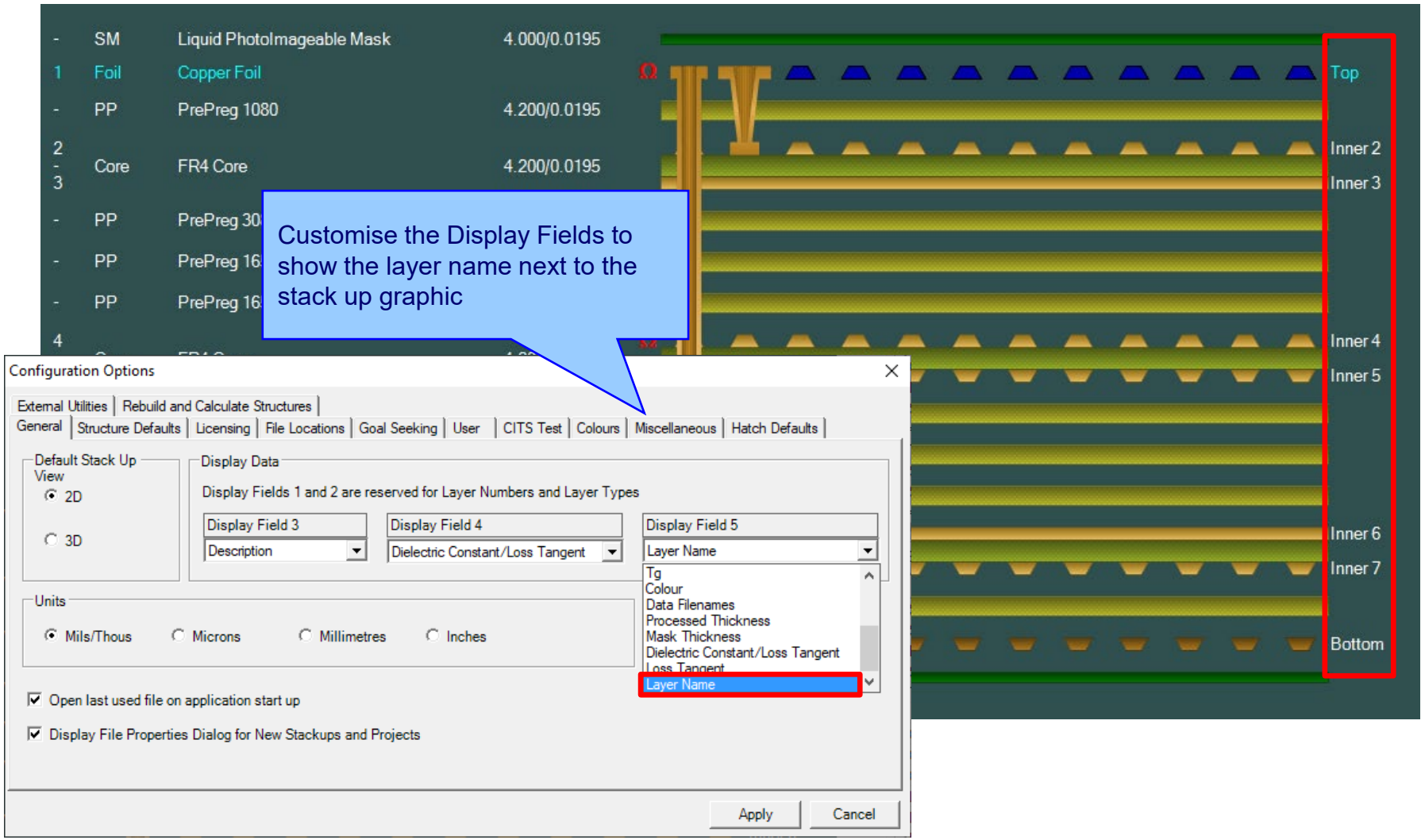
The Selected Item Information auto updates as you click each material, the Layer Name can be confirmed here

New Layer Name property for electrical / copper layers

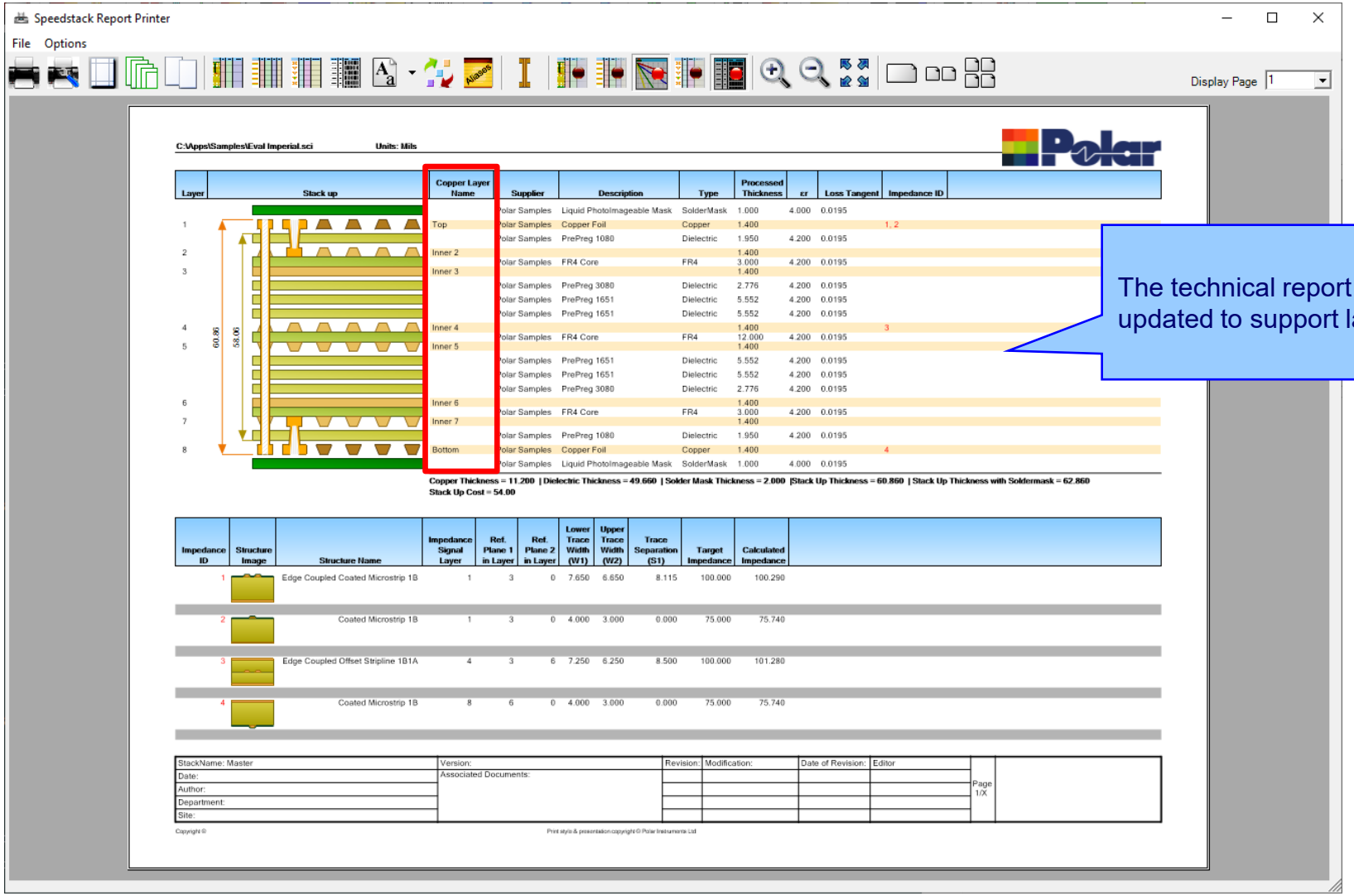


Mouse over the electrical layer and the Layer Name will display alongside the layer number and the amount of structures. Very quickly confirm the Layer Name without needing to open the Properties dialog

New Layer Name property for electrical / copper layers

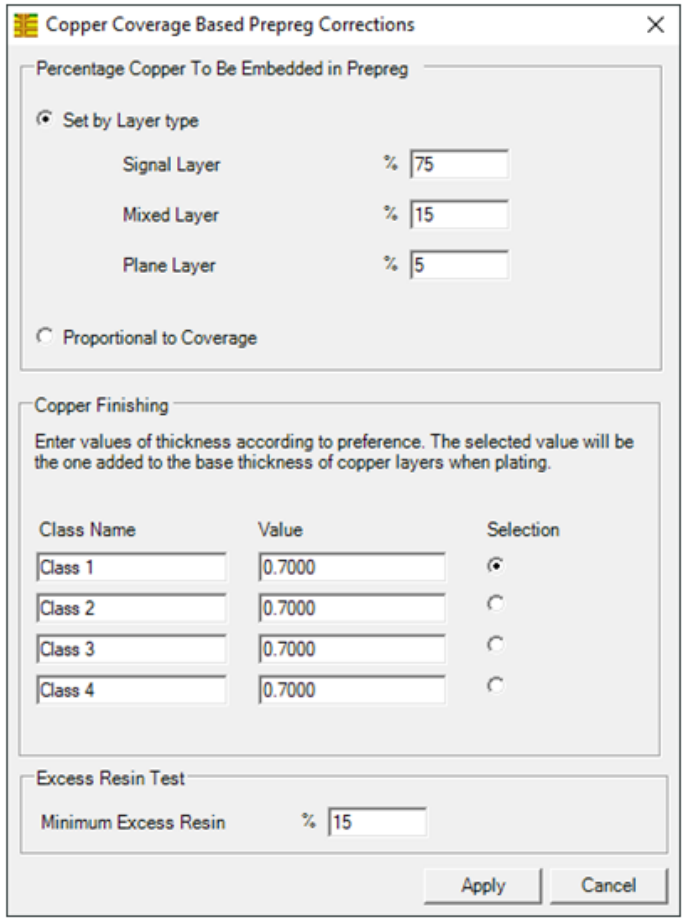


New Layer Name property for electrical / copper layers

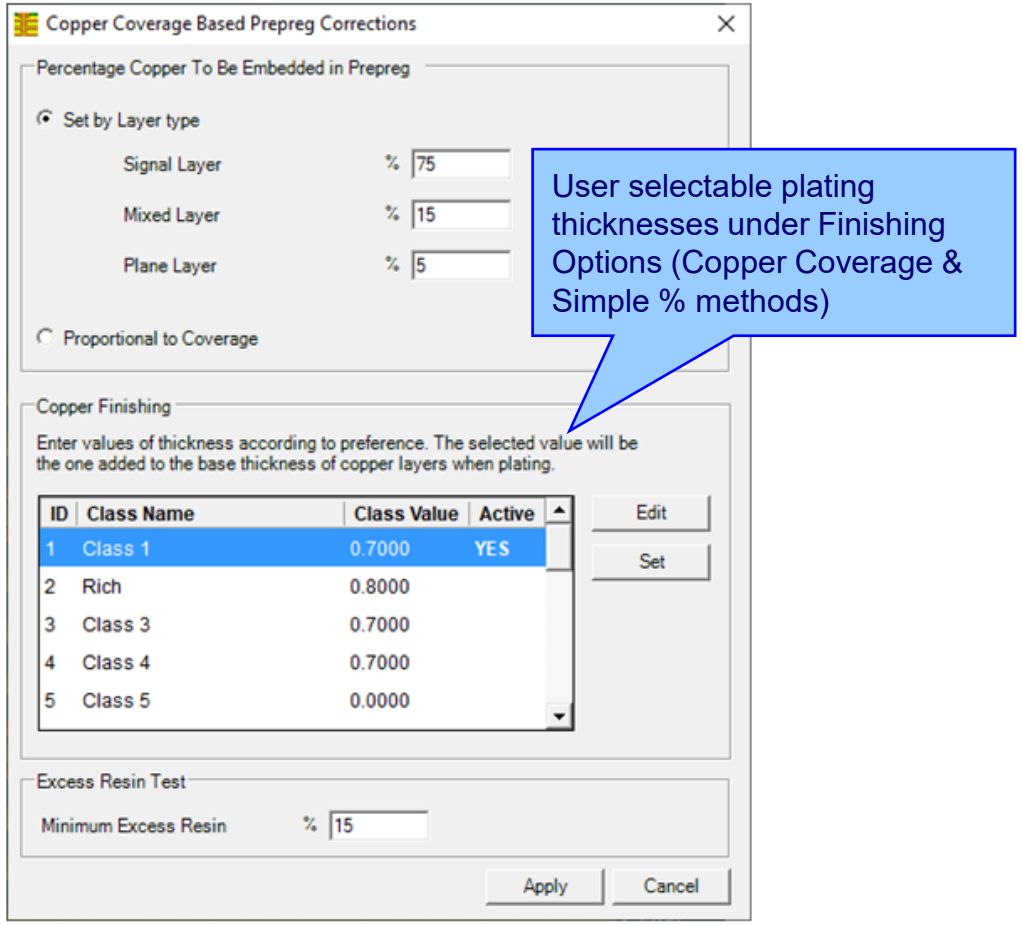


The technical report has also been updated to support layer names

Copper Finishing classes increased



Speedstack v21.04 and earlier supported 4 classes



Speedstack v21.05 now supports 20 classes

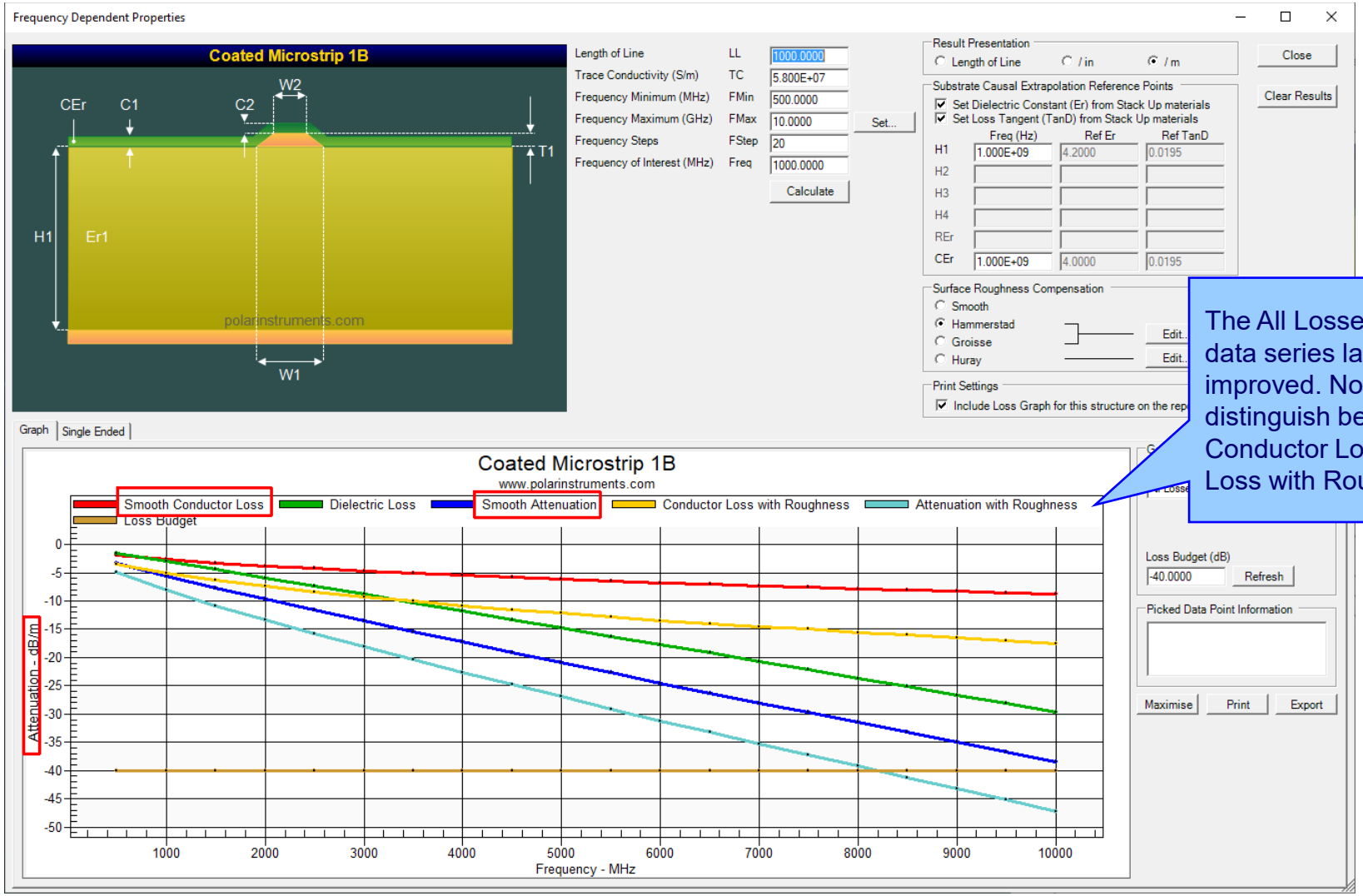
Import / Export enhancements

The following Import / Export options have been updated to support the layer name property introduced with Speedstack v21.05.06:

- XML STKX v21.00 and SSX v11.00 import / export options
- CSV export option
- Gerber / DXF export option

Speedstack v21.04.00 (April 2021)

All Losses plot - clearer labelling



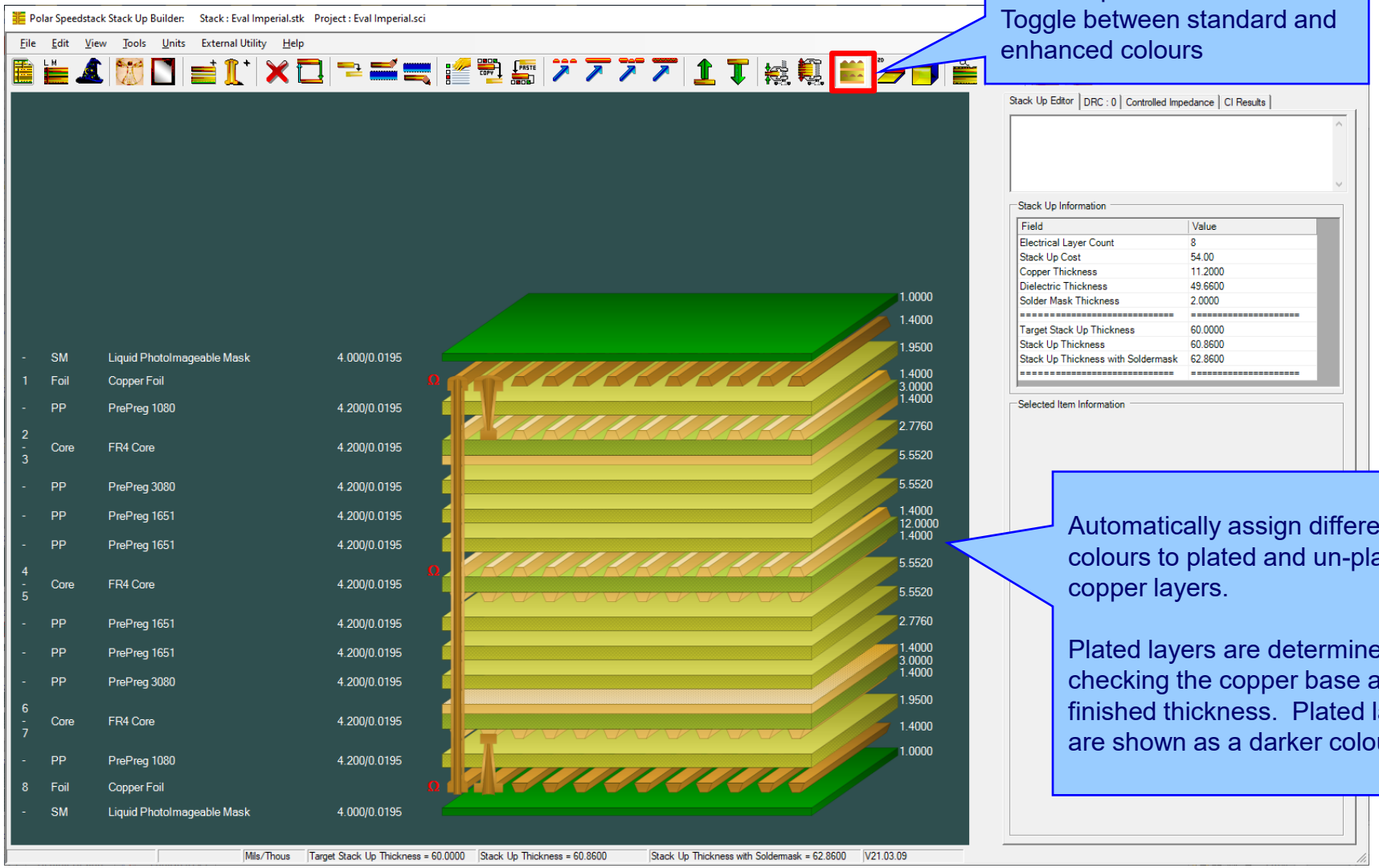
The All Losses plot y-axis and data series labelling has been improved. Now easier to distinguish between Smooth Conductor Loss and Conductor Loss with Roughness

Other enhancements

- The controlled impedance and insertion loss Calculation Engine updated to the latest edition
- Frequency Dependent Calculations graphing library enhancements

Speedstack v21.03.09 (March 2021)

New Apply Plating Colours toolbar option

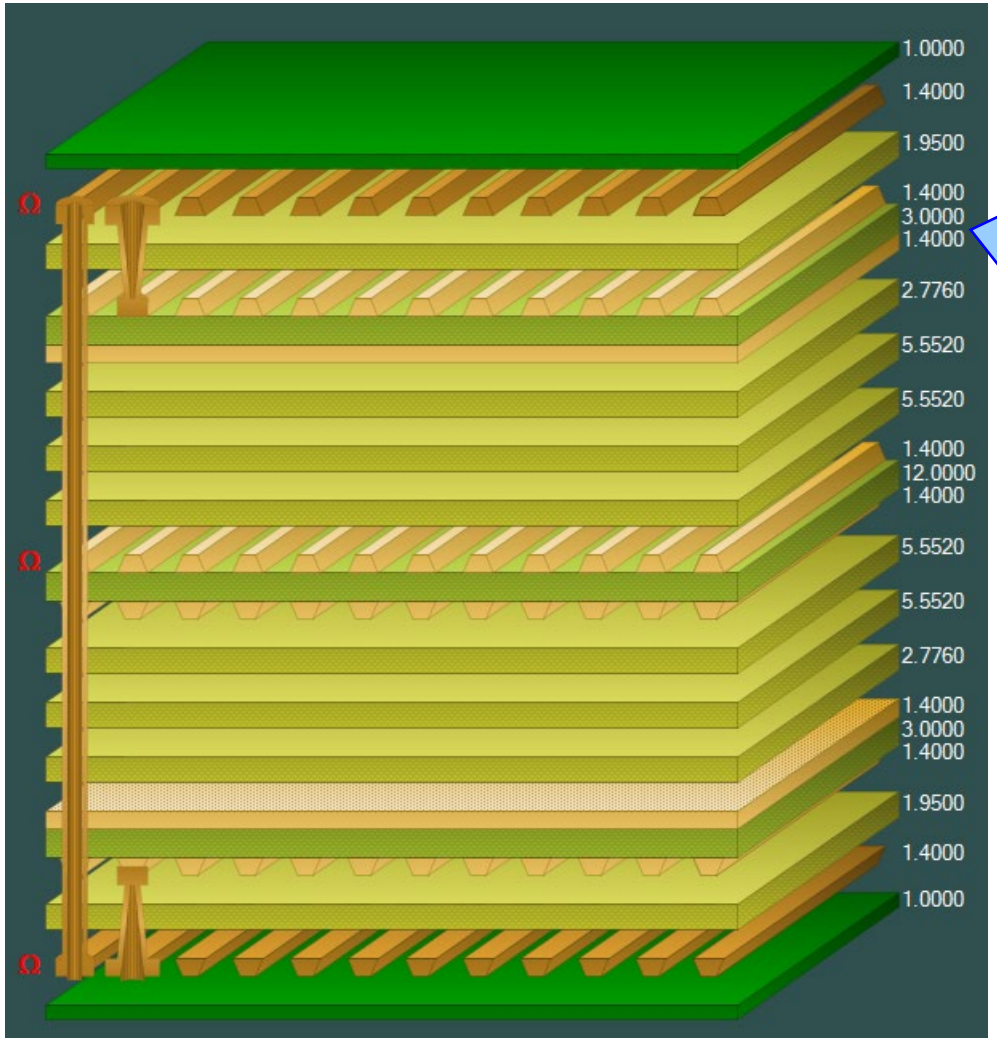


New Apply Plating Colours toolbar option.
Toggle between standard and enhanced colours

Automatically assign different colours to plated and un-plated copper layers.

Plated layers are determined by checking the copper base and finished thickness. Plated layers are shown as a darker colour

New Apply Plating Colours toolbar option



Plated Copper Layers

During PCB fabrication drill holes commonly have copper applied to the barrel wall by an electroplating process. This provides an interconnect between copper layers in the stack up.

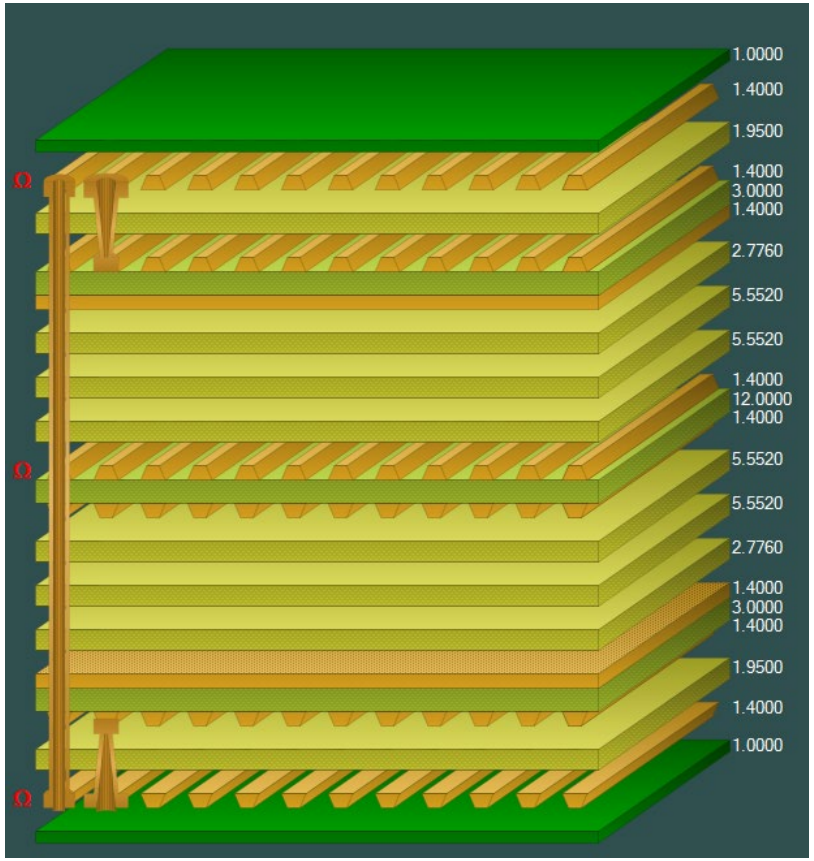
This electroplating process often results in additional copper also being applied to the exposed copper layers where the mechanical drill starts / ends.

It is important to account for this additional plated copper thickness when calculating the overall stack up thickness and controlled impedance / insertion loss structures.

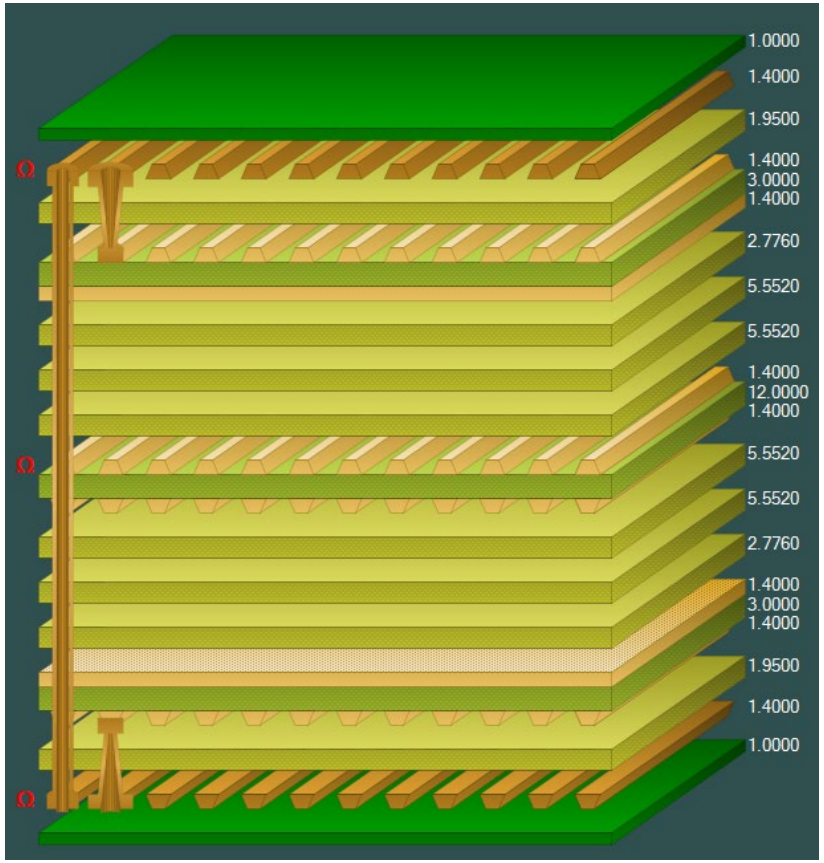
Speedstack has always allowed this additional plating thickness to be applied to the relevant copper layers. With v21.03 this has been enhanced further with automatic colour assignments to the plated and un-plated layers

New Apply Plating Colours toolbar option

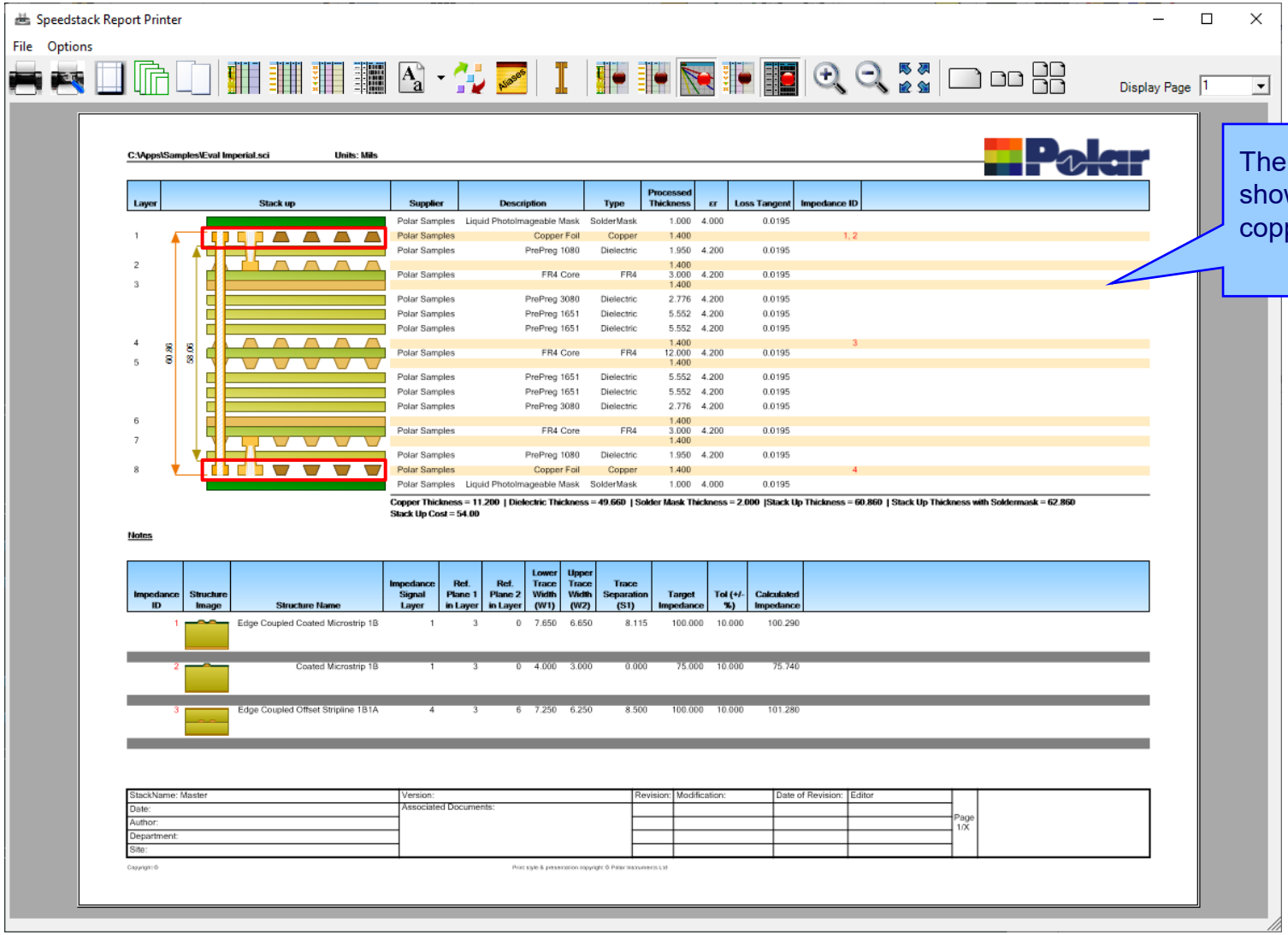
Standard Colours



Apply Plating Colours

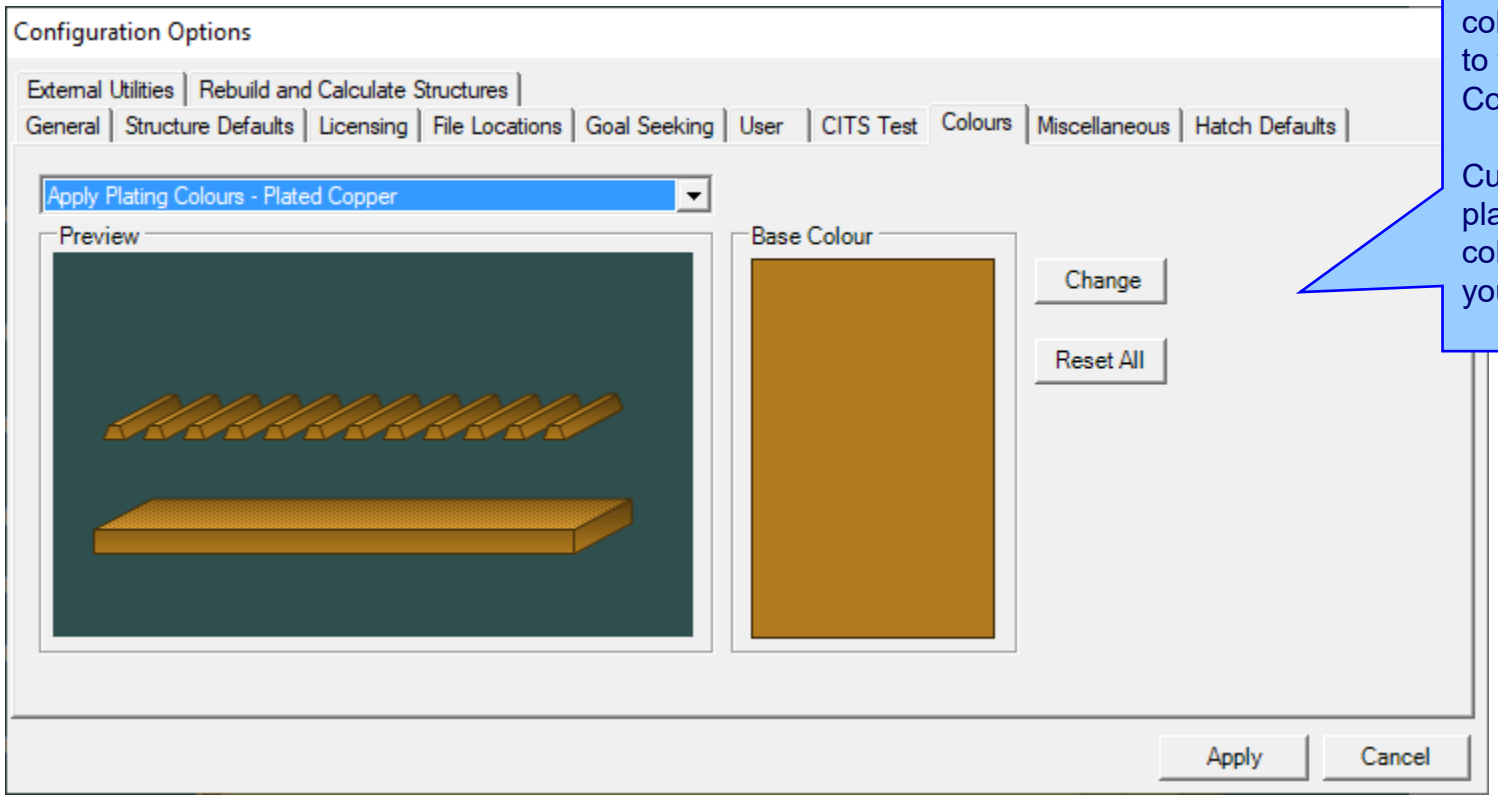


New Apply Plating Colours toolbar option



The technical report will also show the plated and un-plated copper layers.

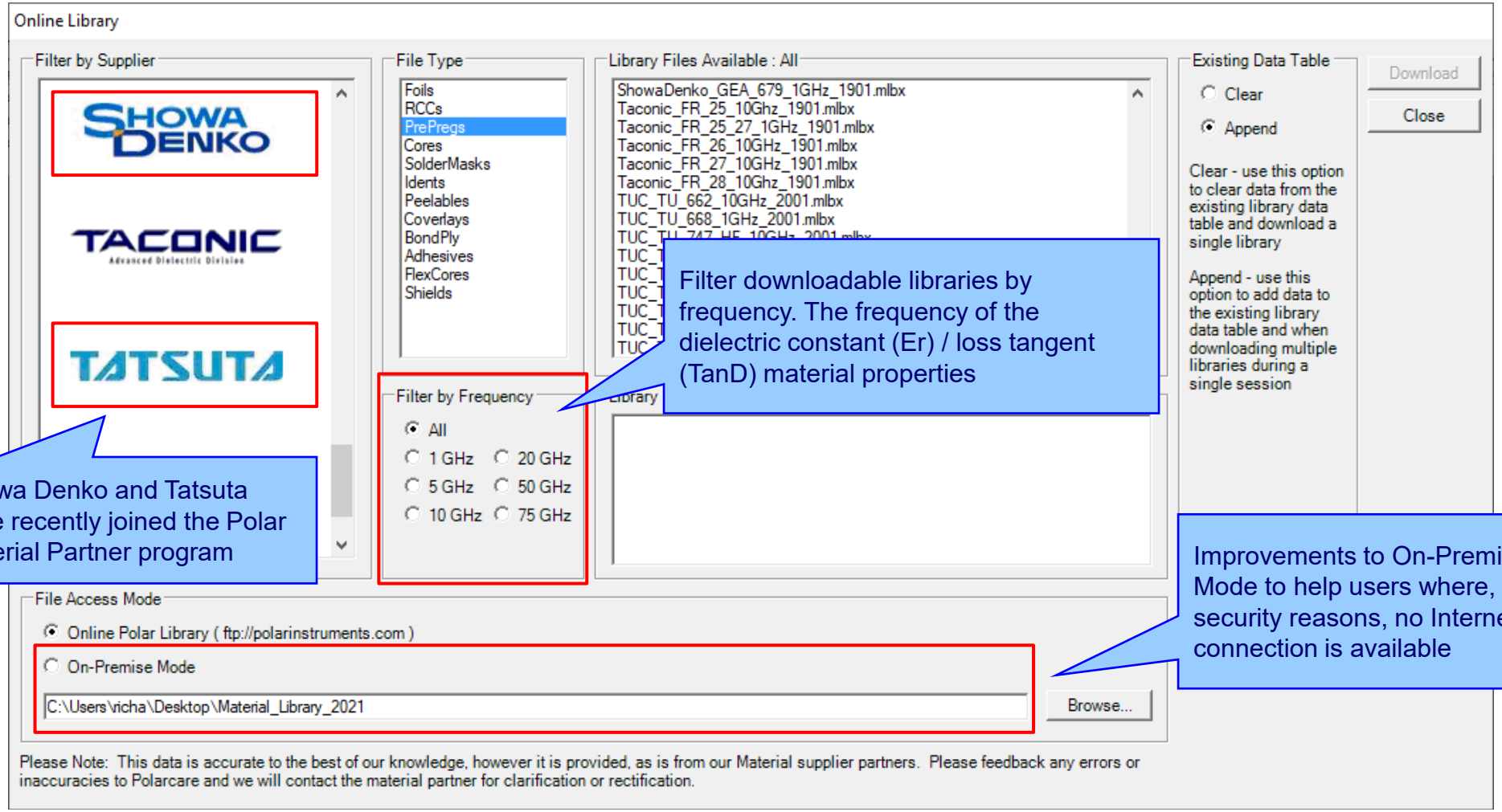
New Apply Plating Colours toolbar option



Two new user-definable colours have been introduced to the Speedstack Configuration Options.

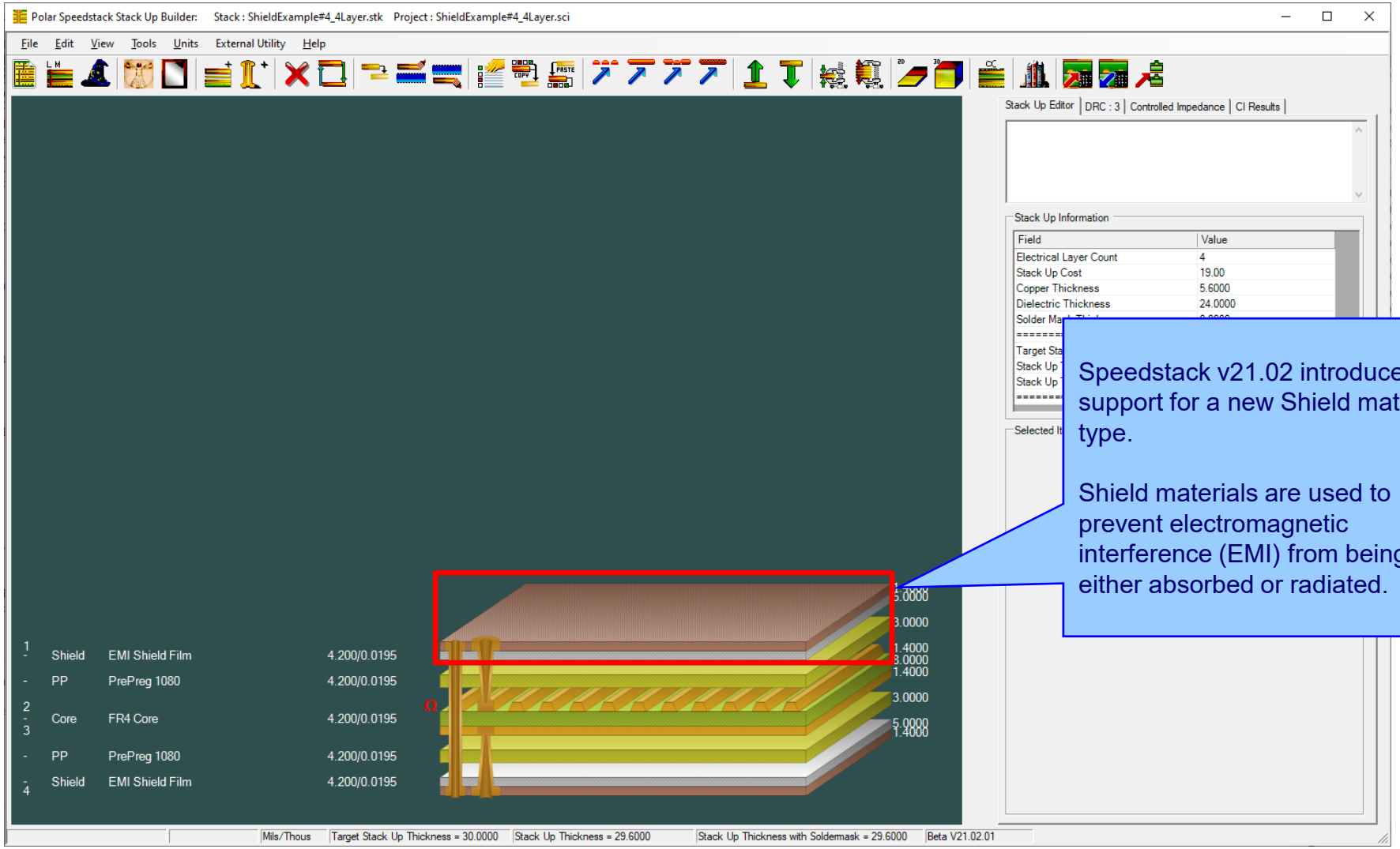
Customise the Plated and Un-plated colours to suit existing colour schemes adopted by your organisation

Online Library enhancements



Speedstack v21.02.01 (February 2021)

New Shield material

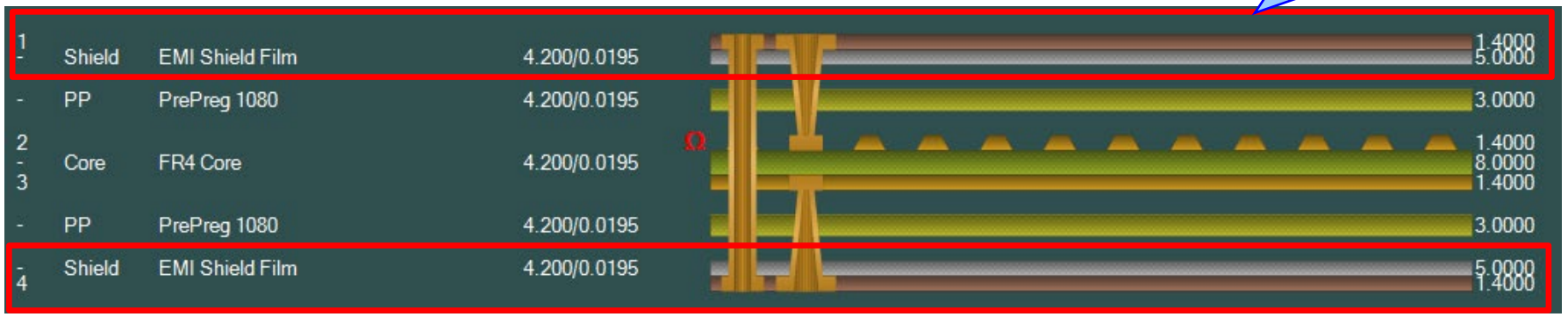


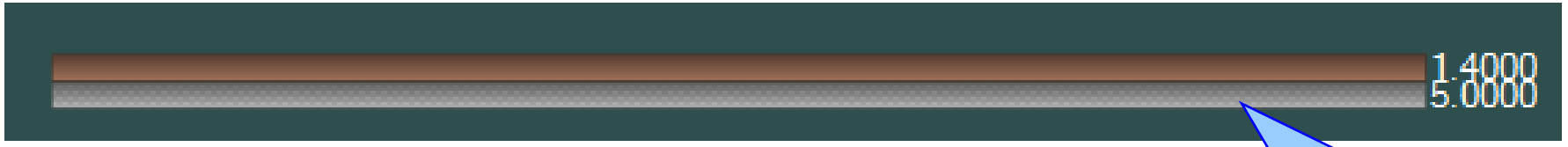
Speedstack v21.02 introduces support for a new Shield material type.

Shield materials are used to prevent electromagnetic interference (EMI) from being either absorbed or radiated.

New Shield material

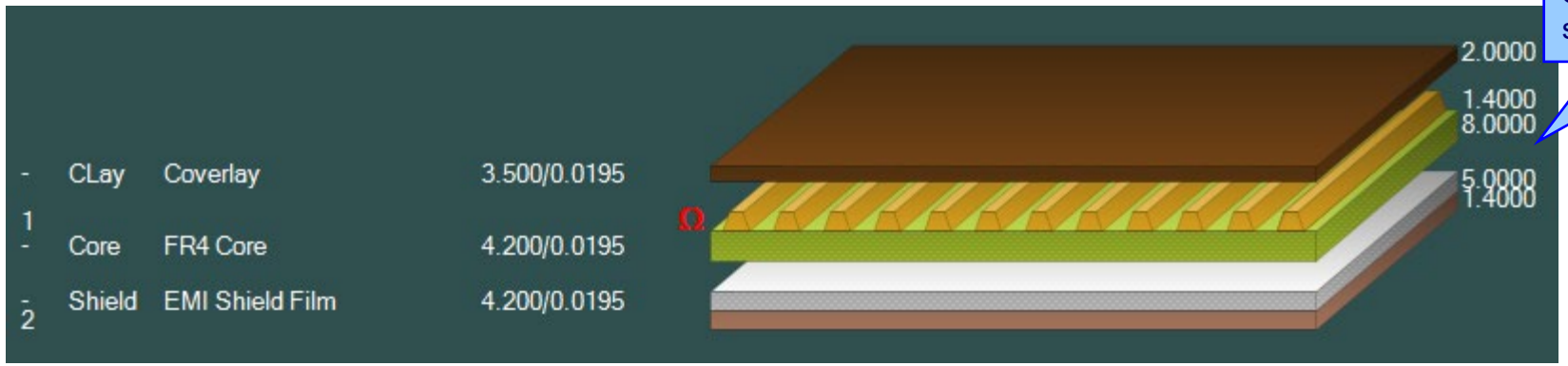
Shields are typically applied to the outer layer(s) of the stack up



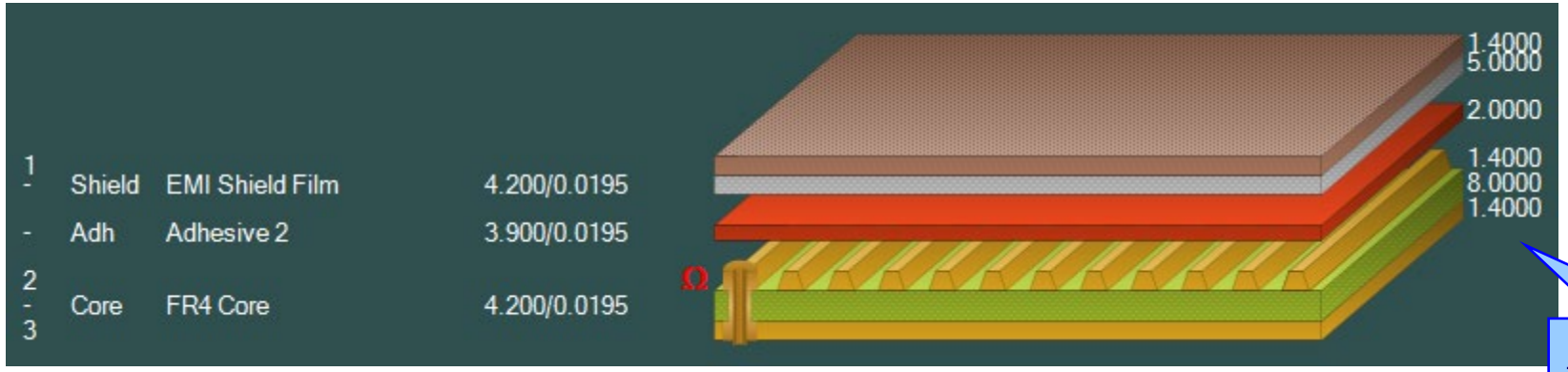


They consist of a shield layer (brown) and dielectric adhesive (silver)

Shield material examples

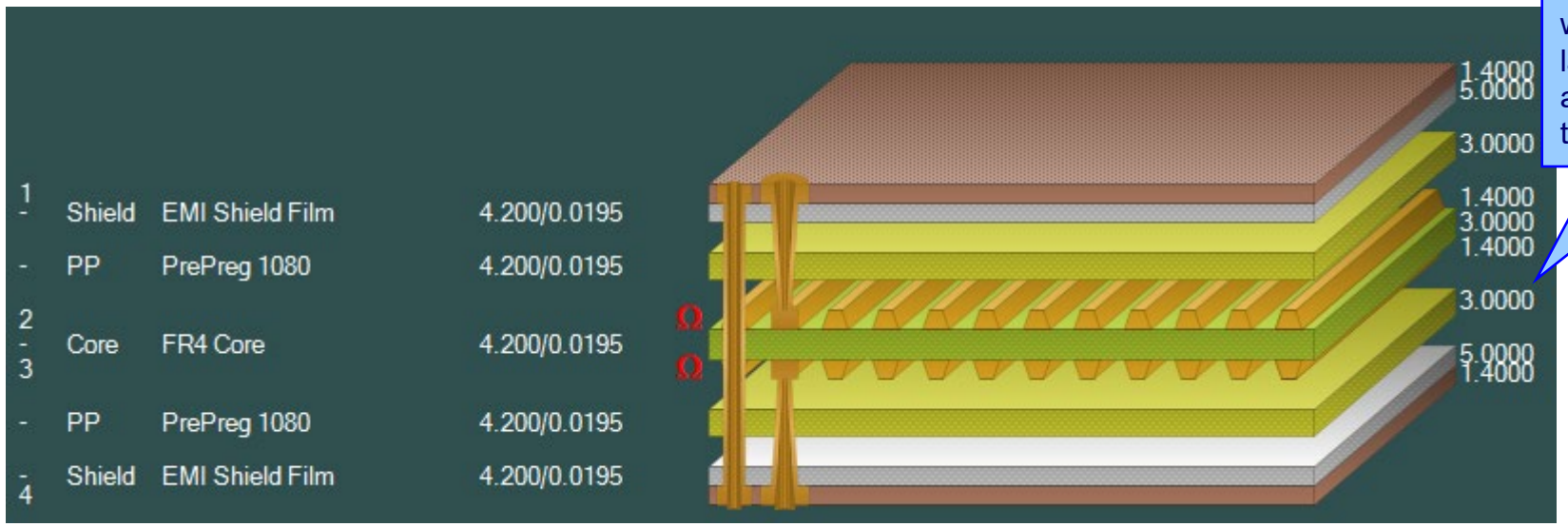


Example #1
Single-sided core, coverlay above trace, shield below

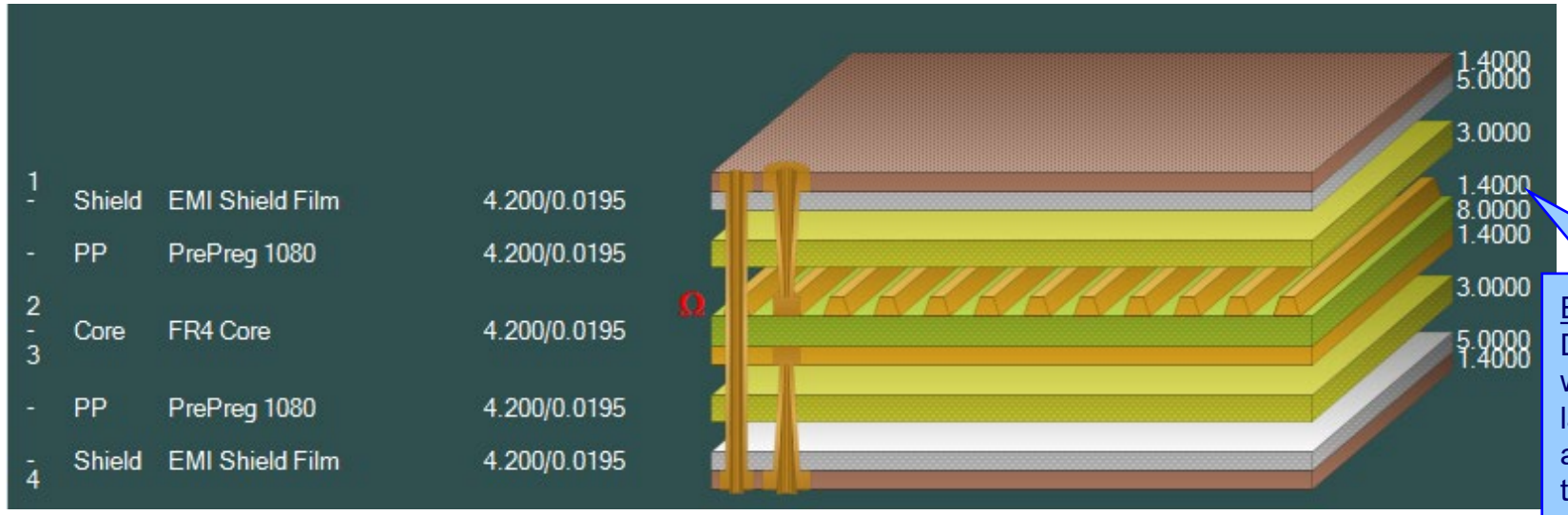


Example #2
Double-sided core, adhesive and shield above

Shield material examples

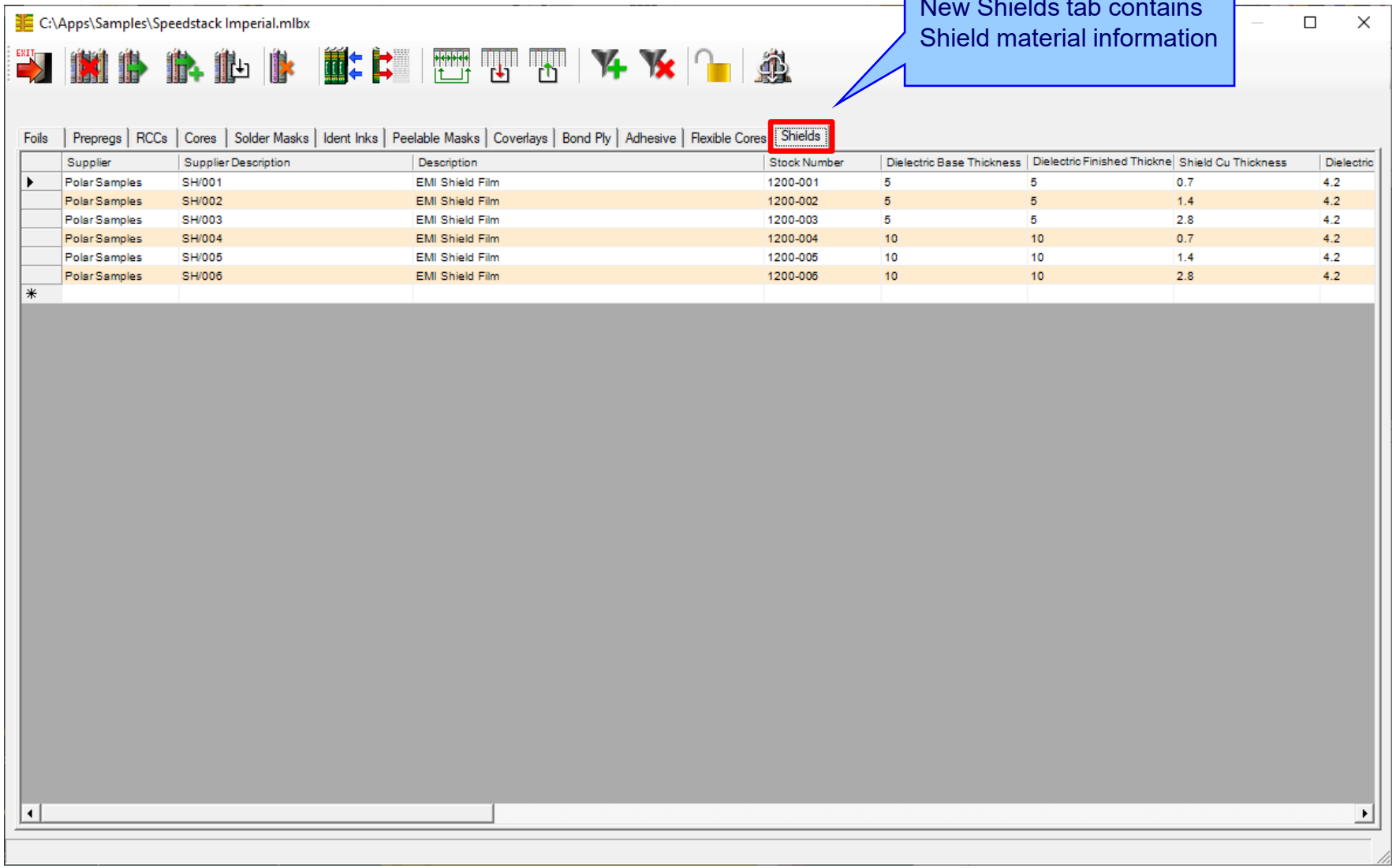


Example #3
Double-sided core with two signal trace layers with shield above and below trace layers



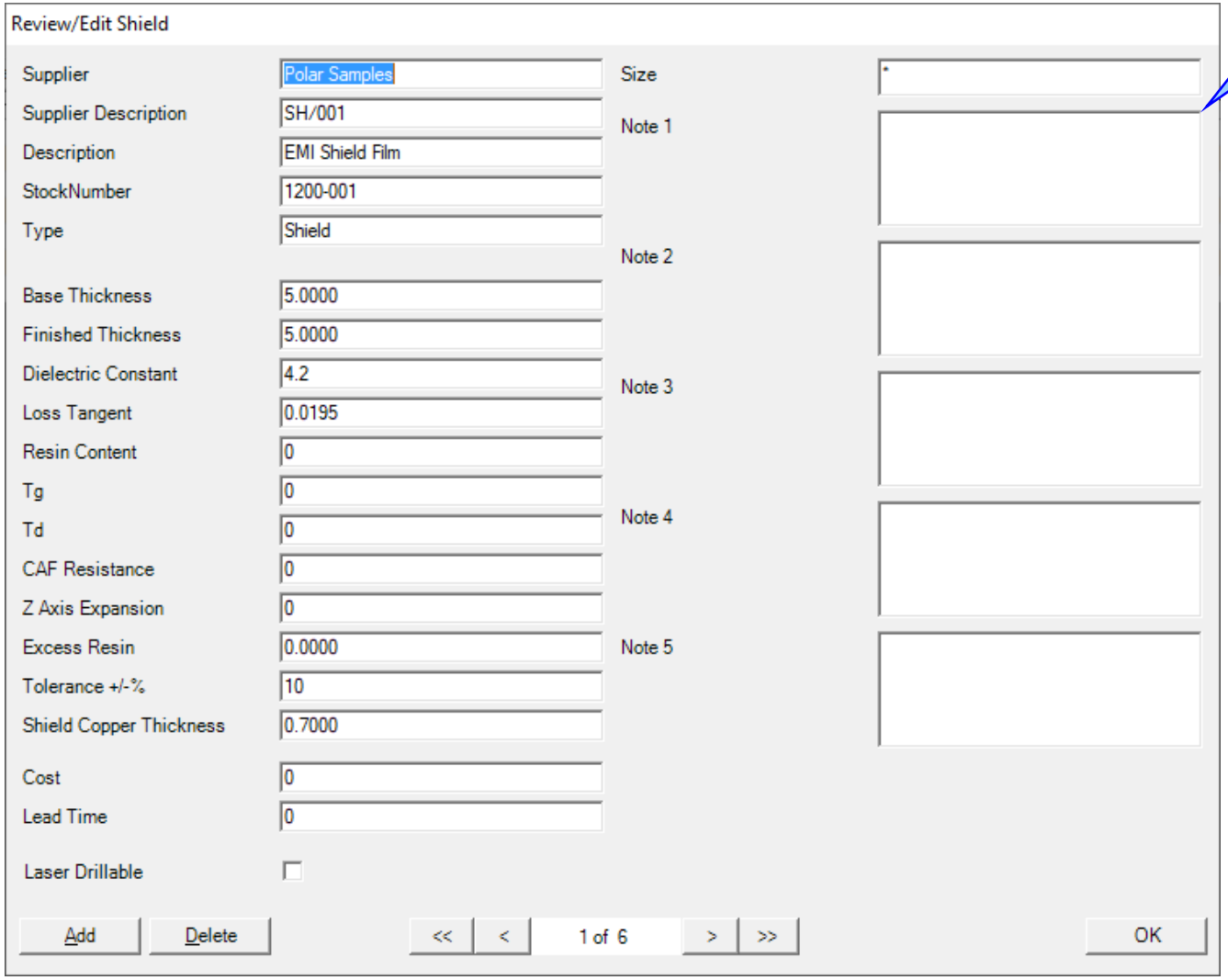
Example #4
Double-sided core with one signal trace layer with shield above and below trace layers

Material library enhancements



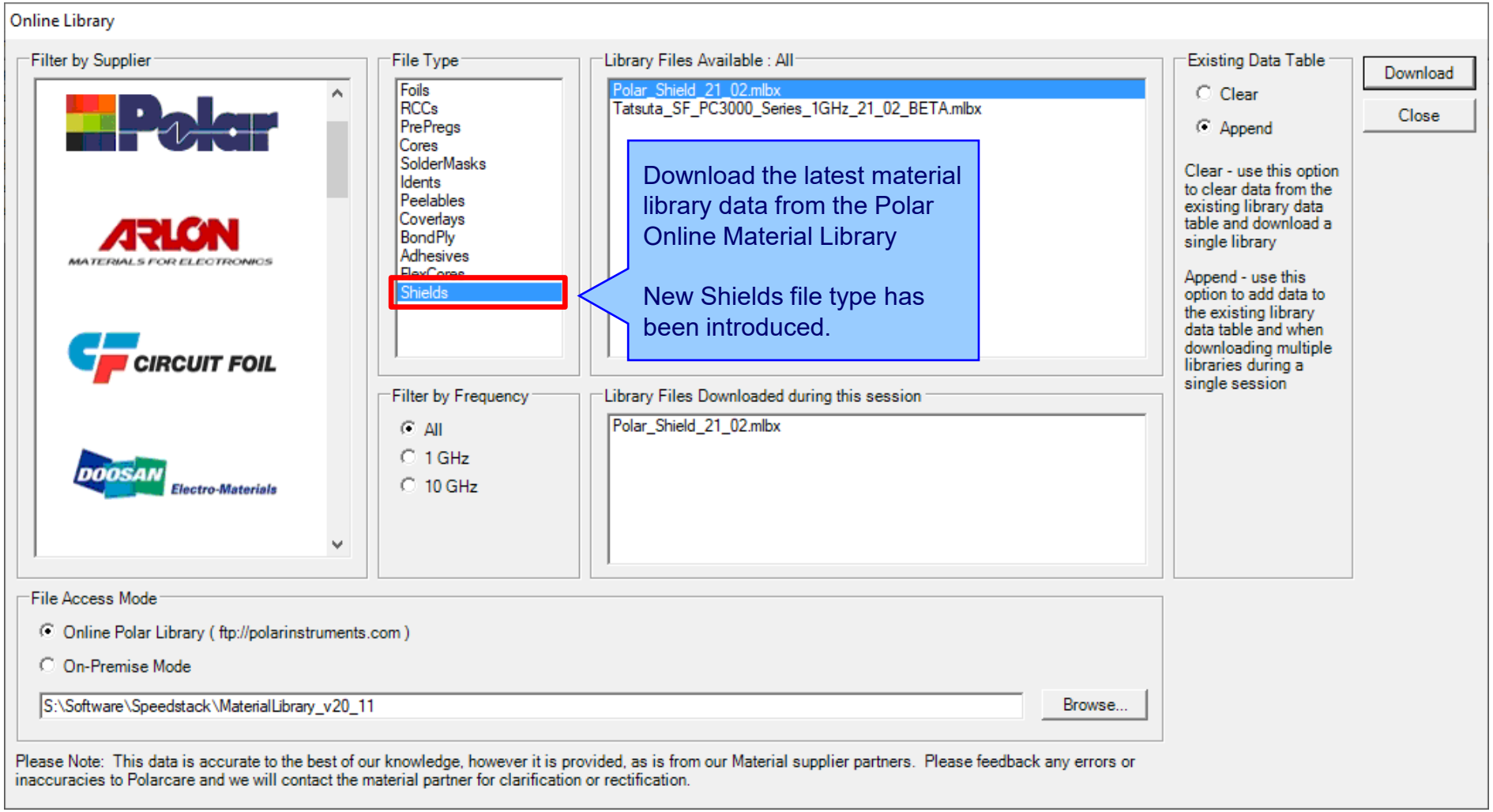
Supplier	Supplier Description	Description	Stock Number	Dielectric Base Thickness	Dielectric Finished Thickne	Shield Cu Thickness	Dielectric
Polar Samples	SH/001	EMI Shield Film	1200-001	5	5	0.7	4.2
Polar Samples	SH/002	EMI Shield Film	1200-002	5	5	1.4	4.2
Polar Samples	SH/003	EMI Shield Film	1200-003	5	5	2.8	4.2
Polar Samples	SH/004	EMI Shield Film	1200-004	10	10	0.7	4.2
Polar Samples	SH/005	EMI Shield Film	1200-005	10	10	1.4	4.2
Polar Samples	SH/006	EMI Shield Film	1200-006	10	10	2.8	4.2

Material library enhancements

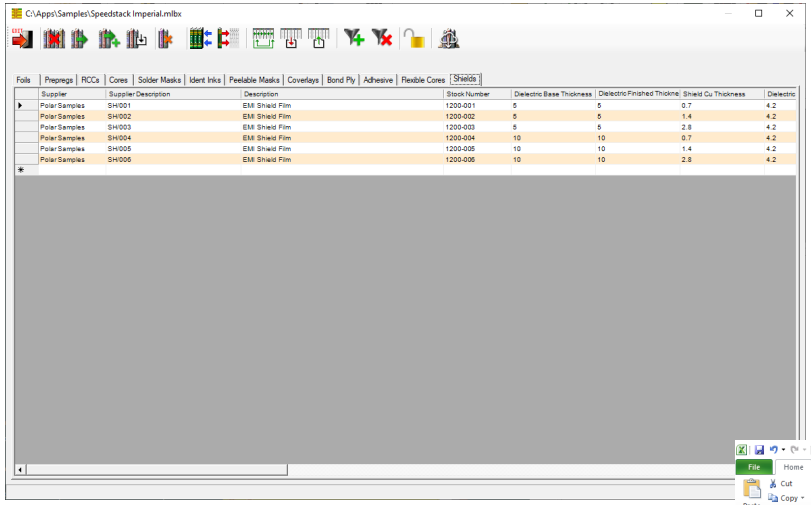


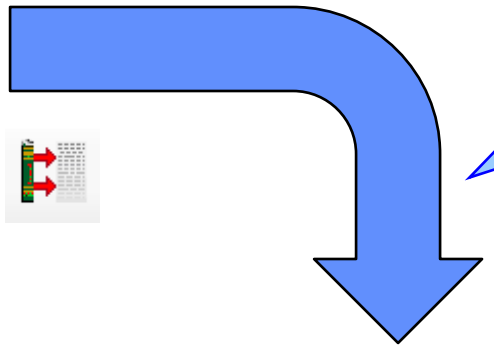
Material library Edit Shield dialog

Online Library enhanced to support Shield materials

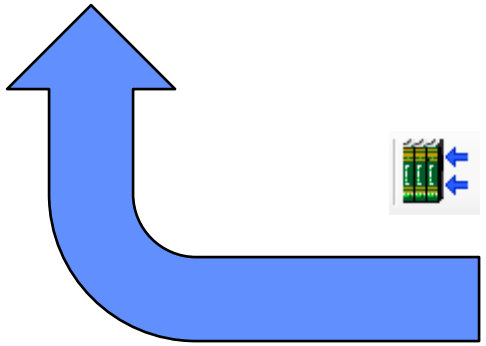


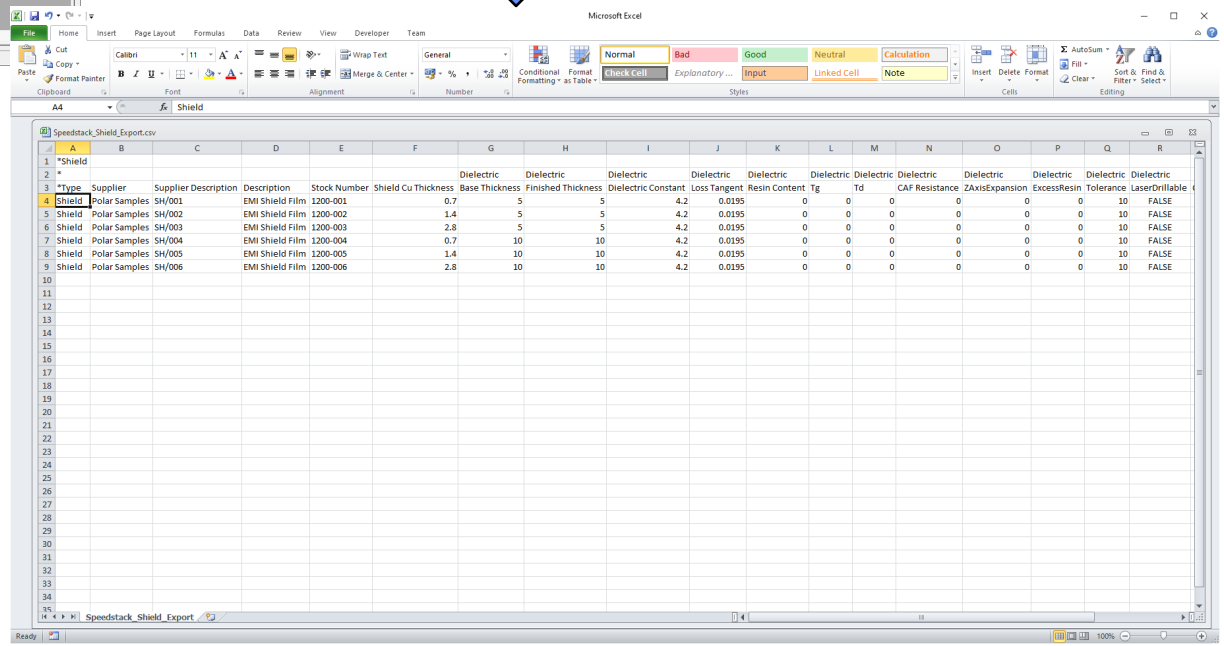
Export / Import Shield library to Excel



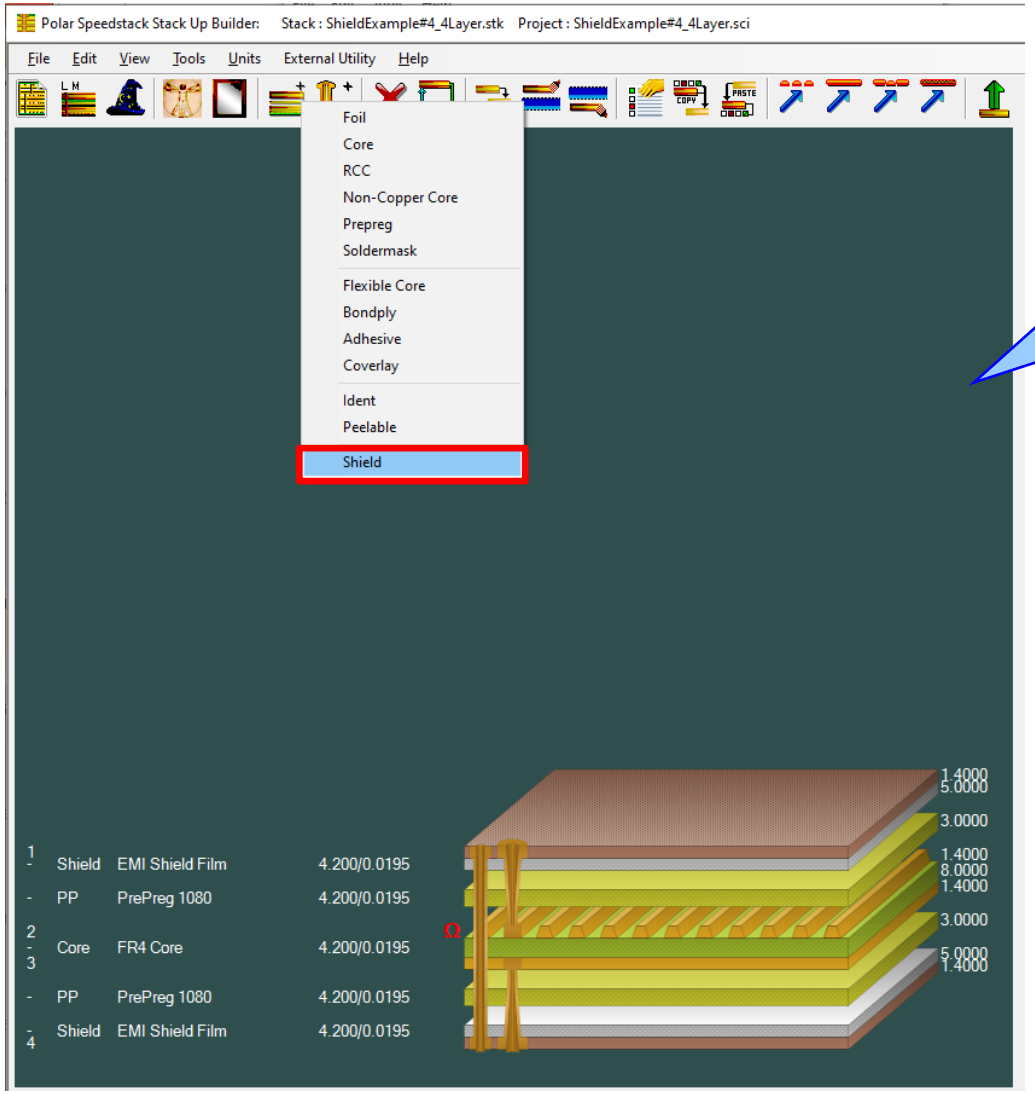


It is possible to export / import Shield library data with 3rd part tools like Excel





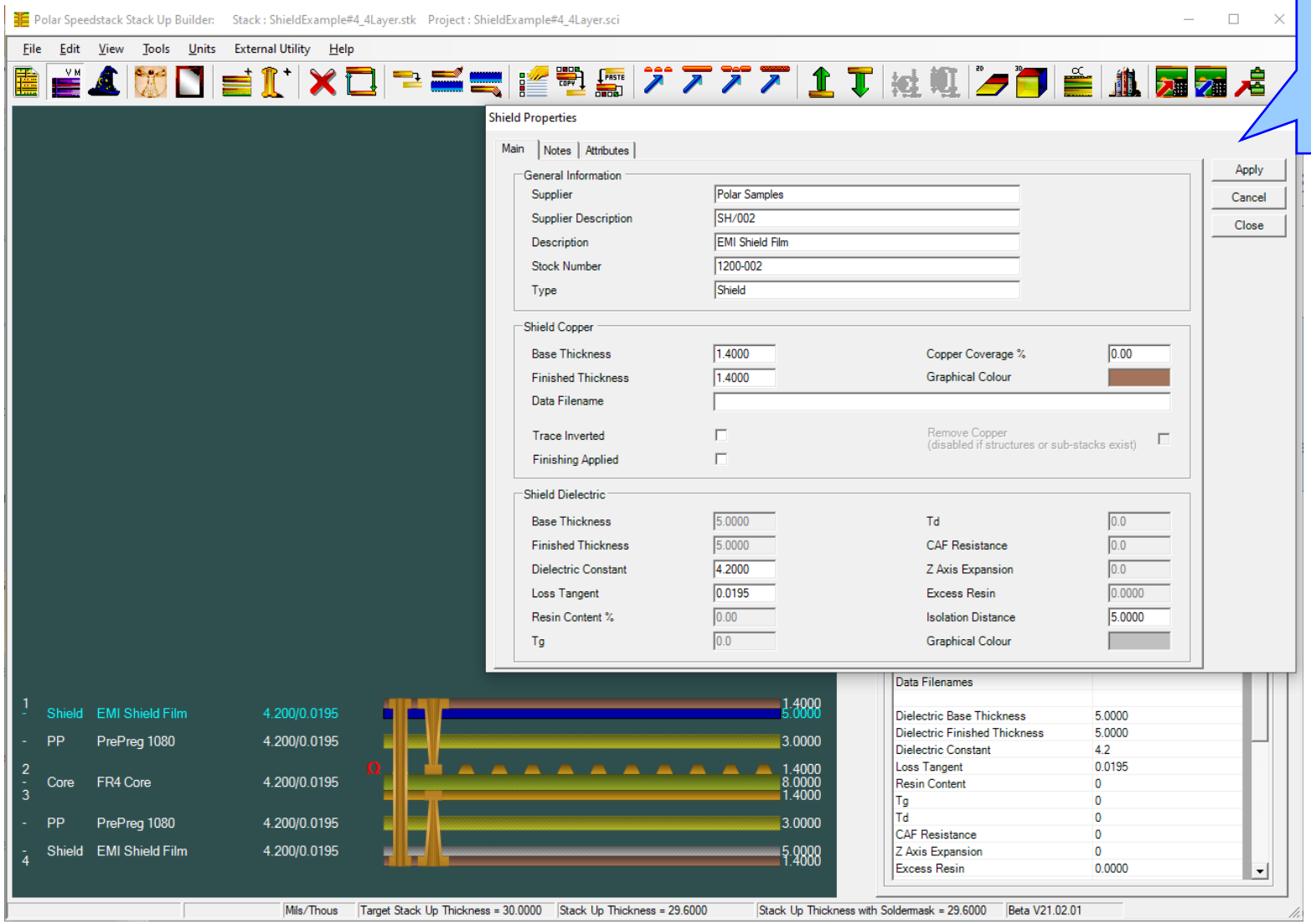
Stack up editor enhancements



Stack Up editor enhancements:

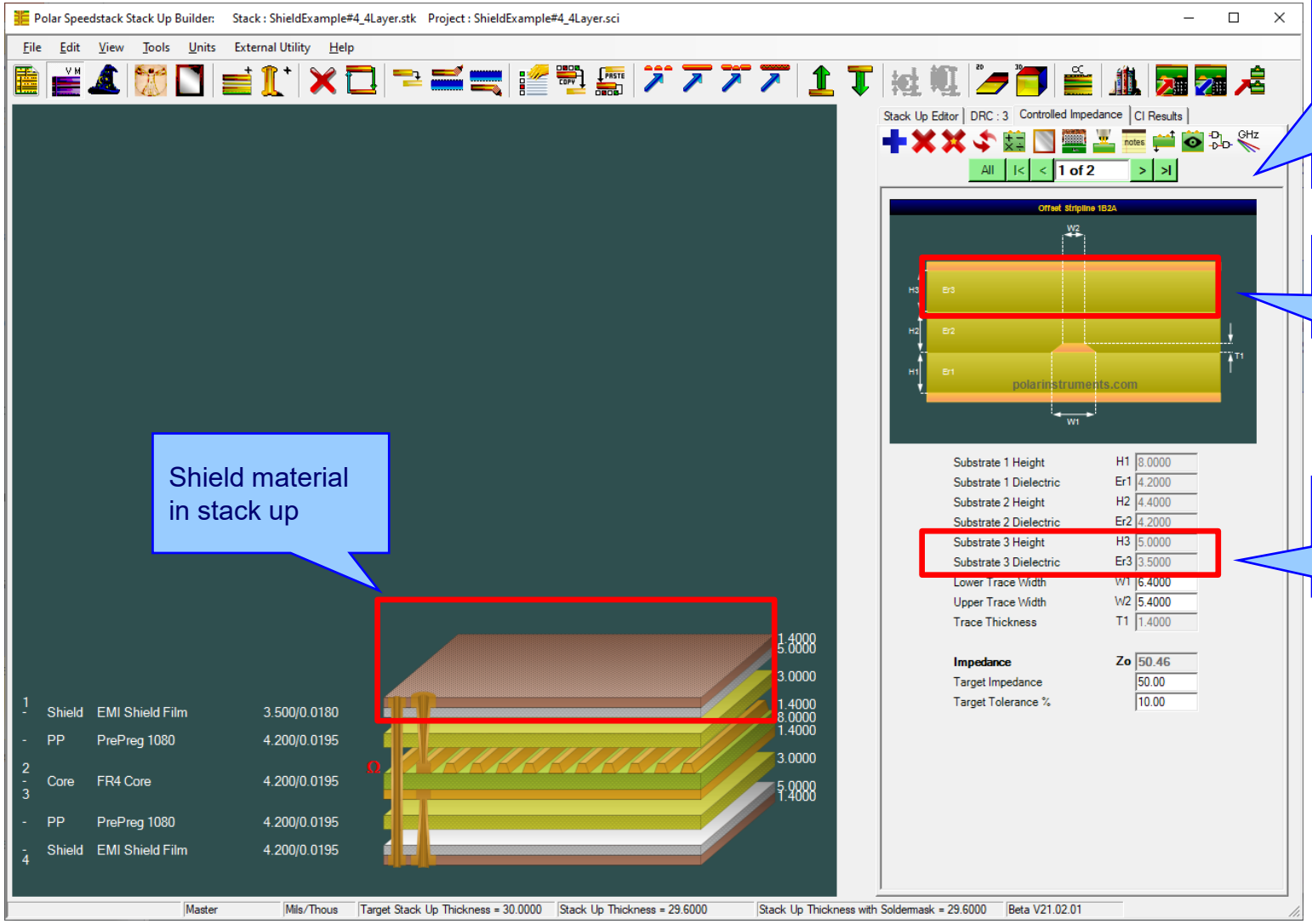
Shield material options to add, delete, swap, move up, move down, symmetry and set properties

Shield properties



View and customise the Shield properties. Useful in 'what-if' scenarios

Controlled impedance and insertion loss calculations

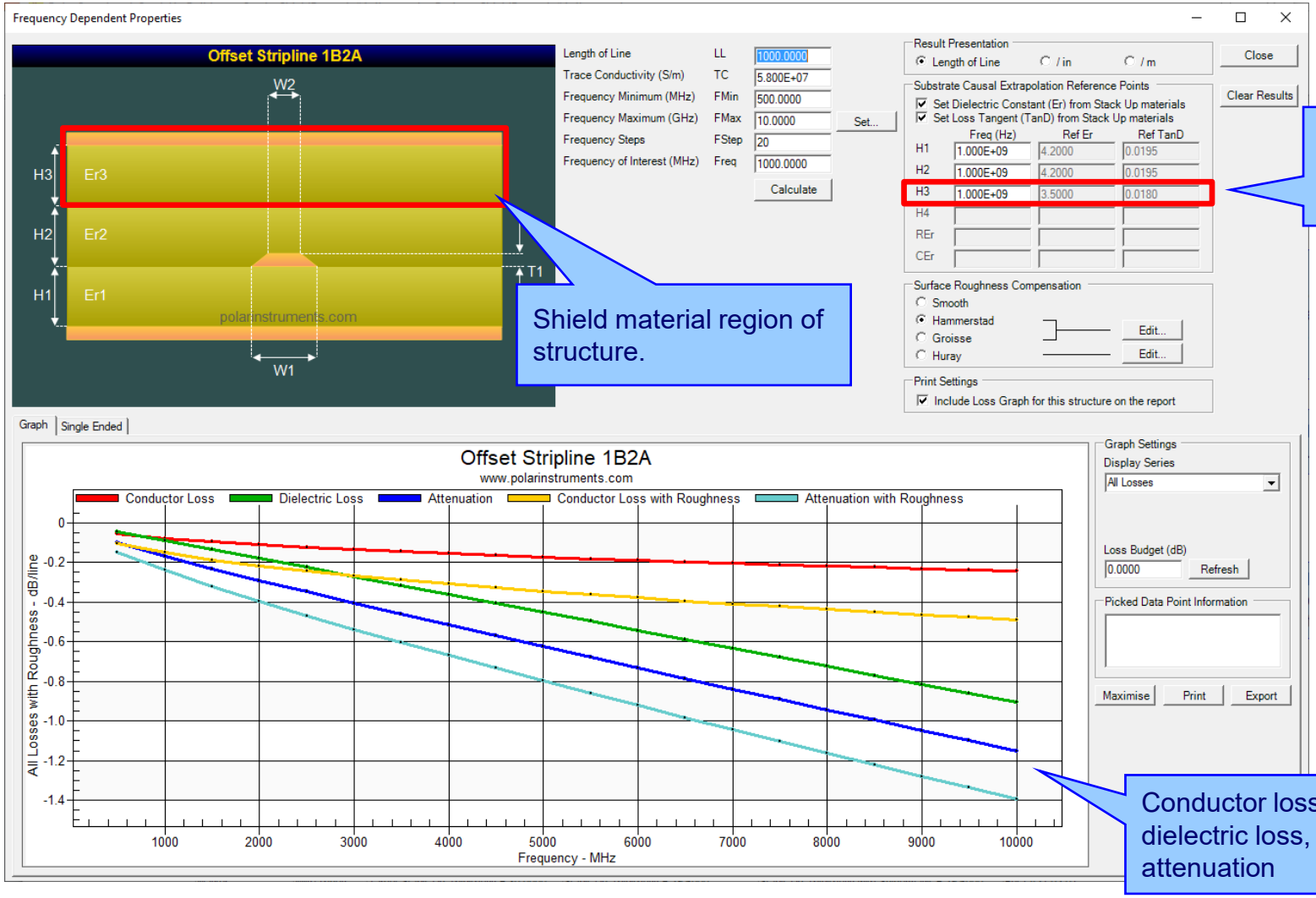


Impedance and insertion calculations support the new Shield material type.

Shield material region of structure.

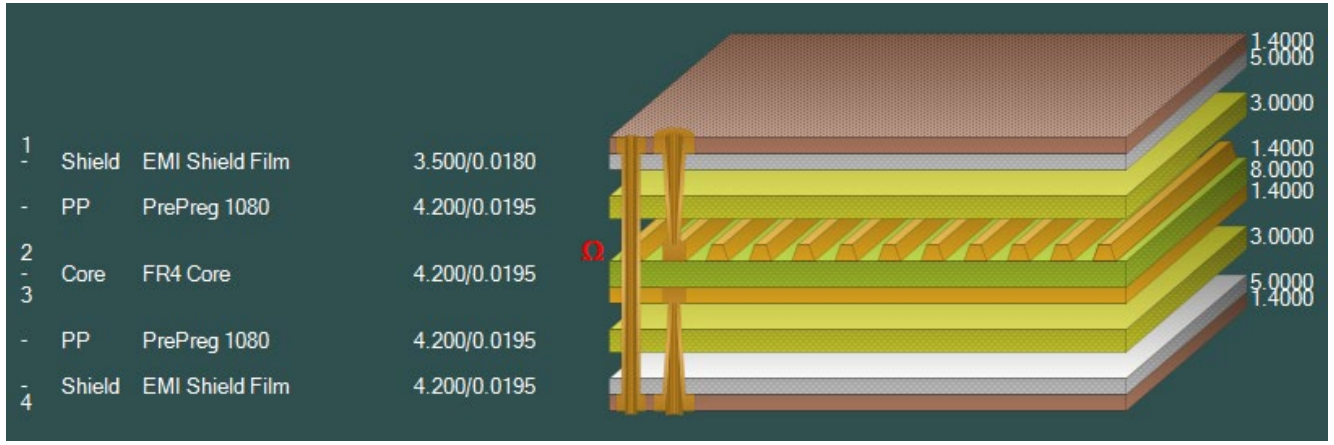
Shield adhesive height / thickness dimension and dielectric constant.

Controlled impedance and insertion loss calculations



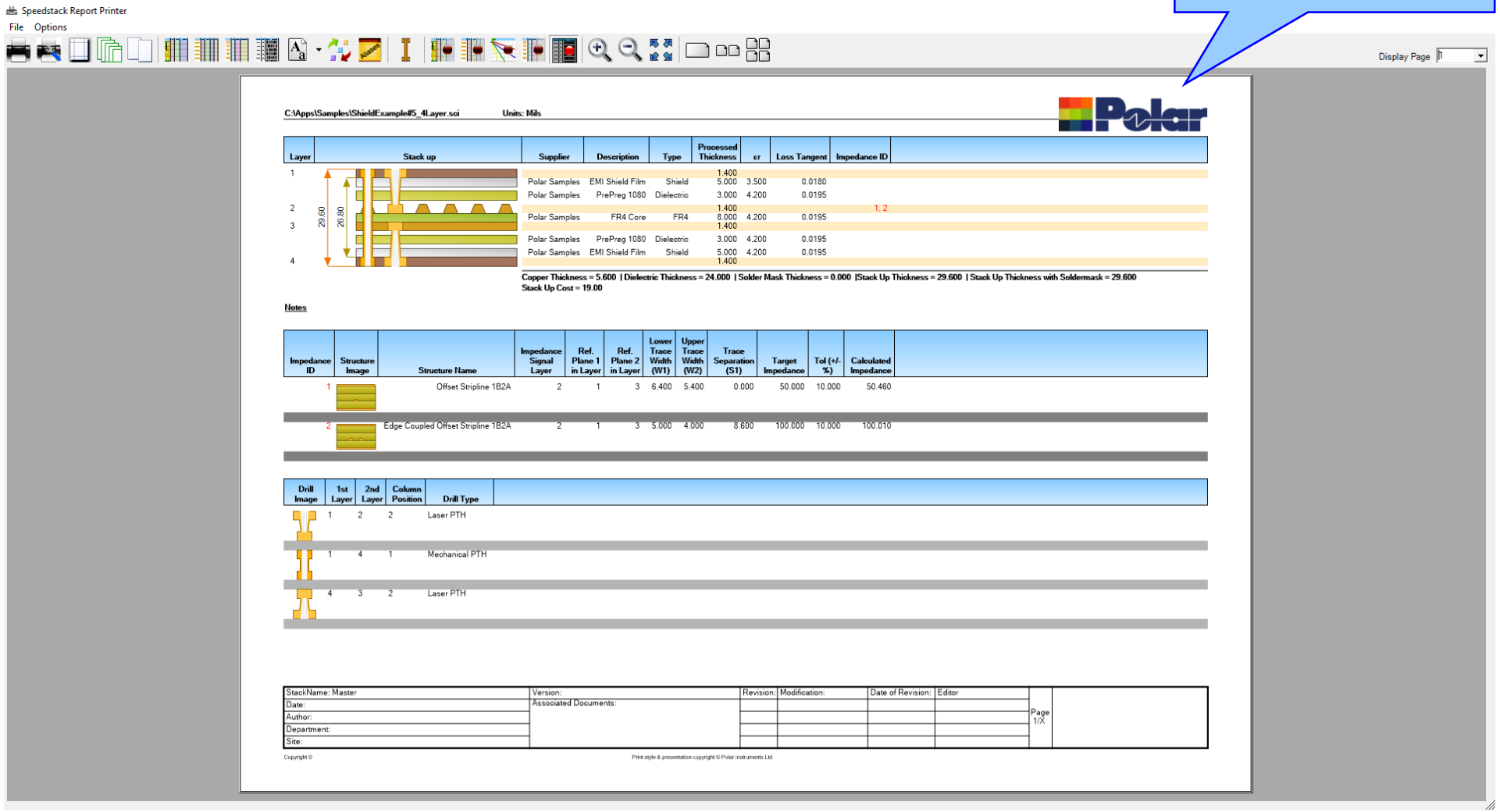
Controlled impedance and insertion loss calculations

Please note: Speedstack is capable of supporting many shield types for stack up design and documentation. However, it is important to use the correct type of shield material for controlled impedance and insertion loss applications. They are often designated by the shield vendor as 'for high speed signal transmission applications'.



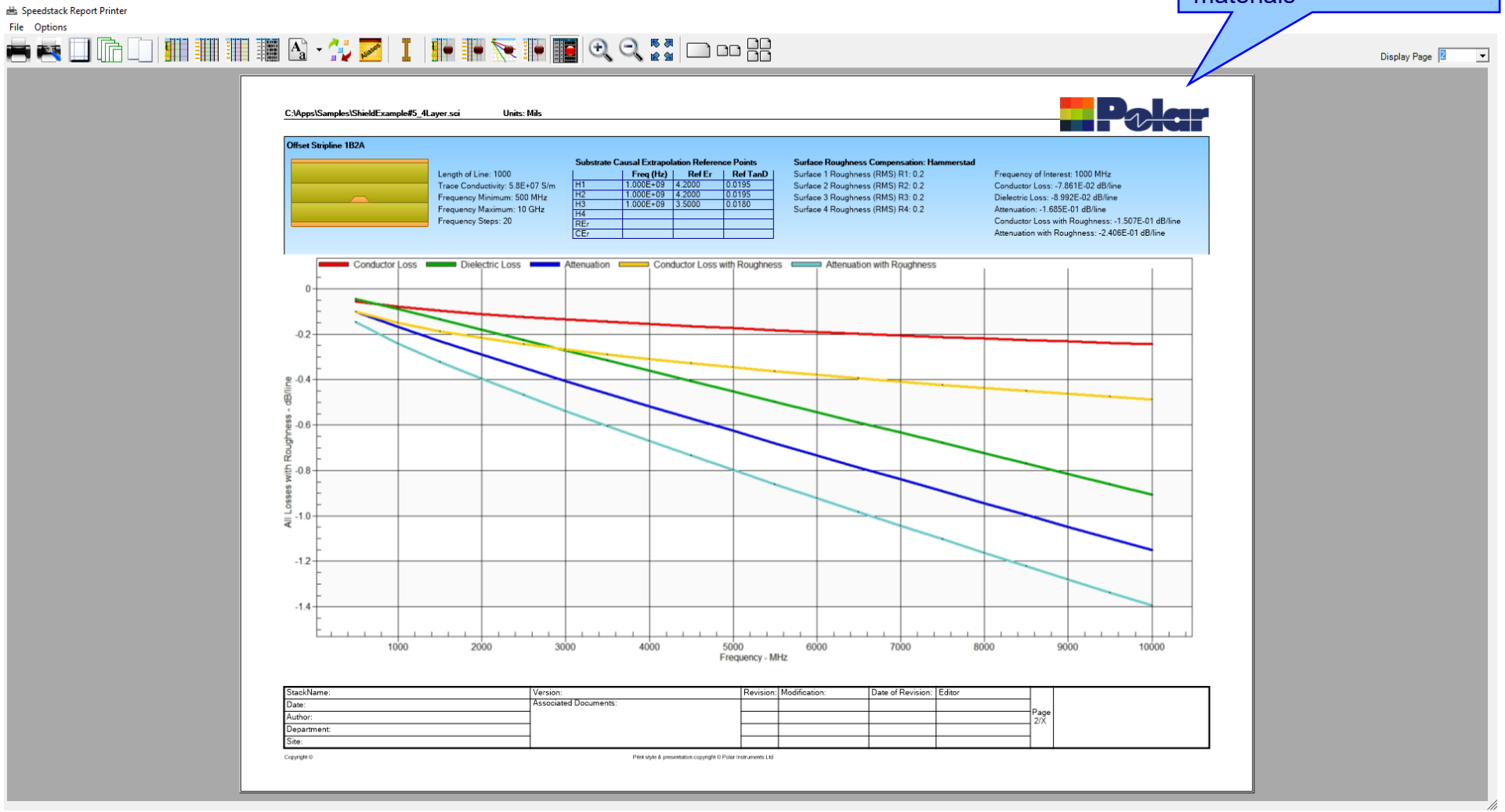
Technical report enhancements

Technical report showing shield materials



Technical report enhancements

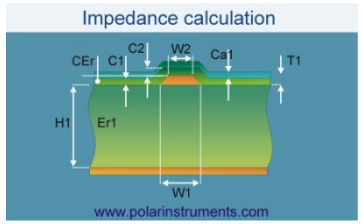
Insertion loss report supporting shield materials

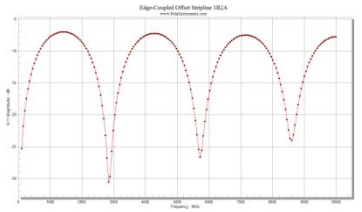


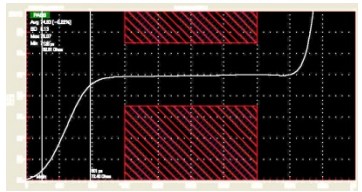
Import / Export enhancements

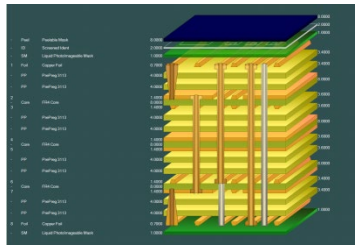
The following Import / Export options have been updated to support the new shield material introduced with Speedstack 2021:

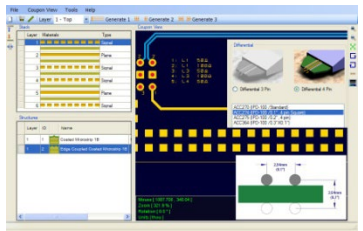
- XML STKX v20.00 and SSX v10.00 import / export options
- CSV export option
- Gerber / DXF export option



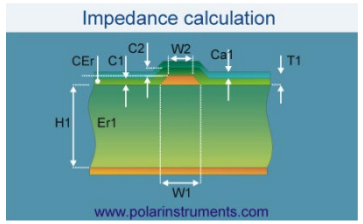


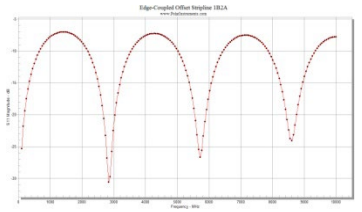


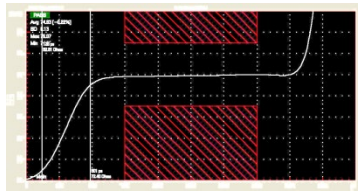


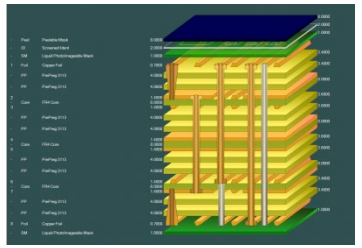


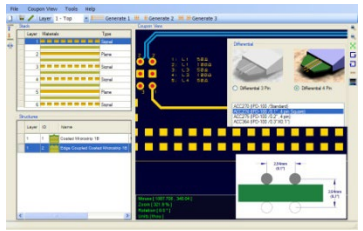
Thank you for viewing this Speedstack 2022 preview and 2021 recap. If you have questions we would be delighted to help you. Your local contact information is contained on the following slide











For more information:

Contact Polar now:	**Phone**
USA / Canada / Mexico	
Geoffrey Hazelett	**(503) 356 5270**
Asia / Pacific	
Terence Chew	**+65 6873 7470**
UK / Europe	
Neil Chamberlain	**+44 23 9226 9113**
Germany / Austria / Switzerland	
Hermann Reischer	**+43 7666 20041-0**

www.polarinstruments.com