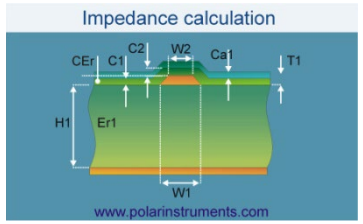
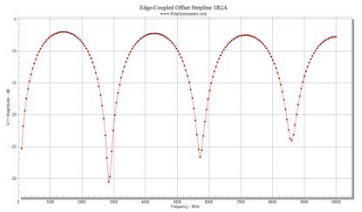
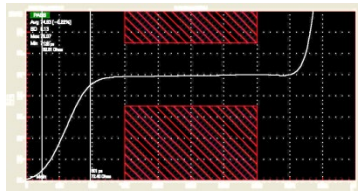
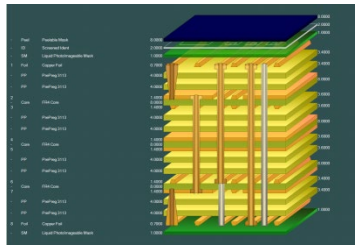
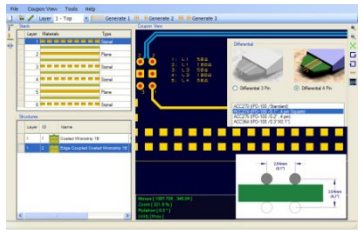









# Speedstack 2022 – 2021 Preview
# July edition introduces “Grid View”

Richard Attrill – July 2022 (Rev 8)

## Introducing the latest features of Speedstack

Welcome to a preview of Speedstack.

This highlights the most recent changes in a *“newest first”* format.

If you would like to have a web−based demonstration or request an evaluation license 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 v22.07.20 (July 2022)

# Introducing Grid View

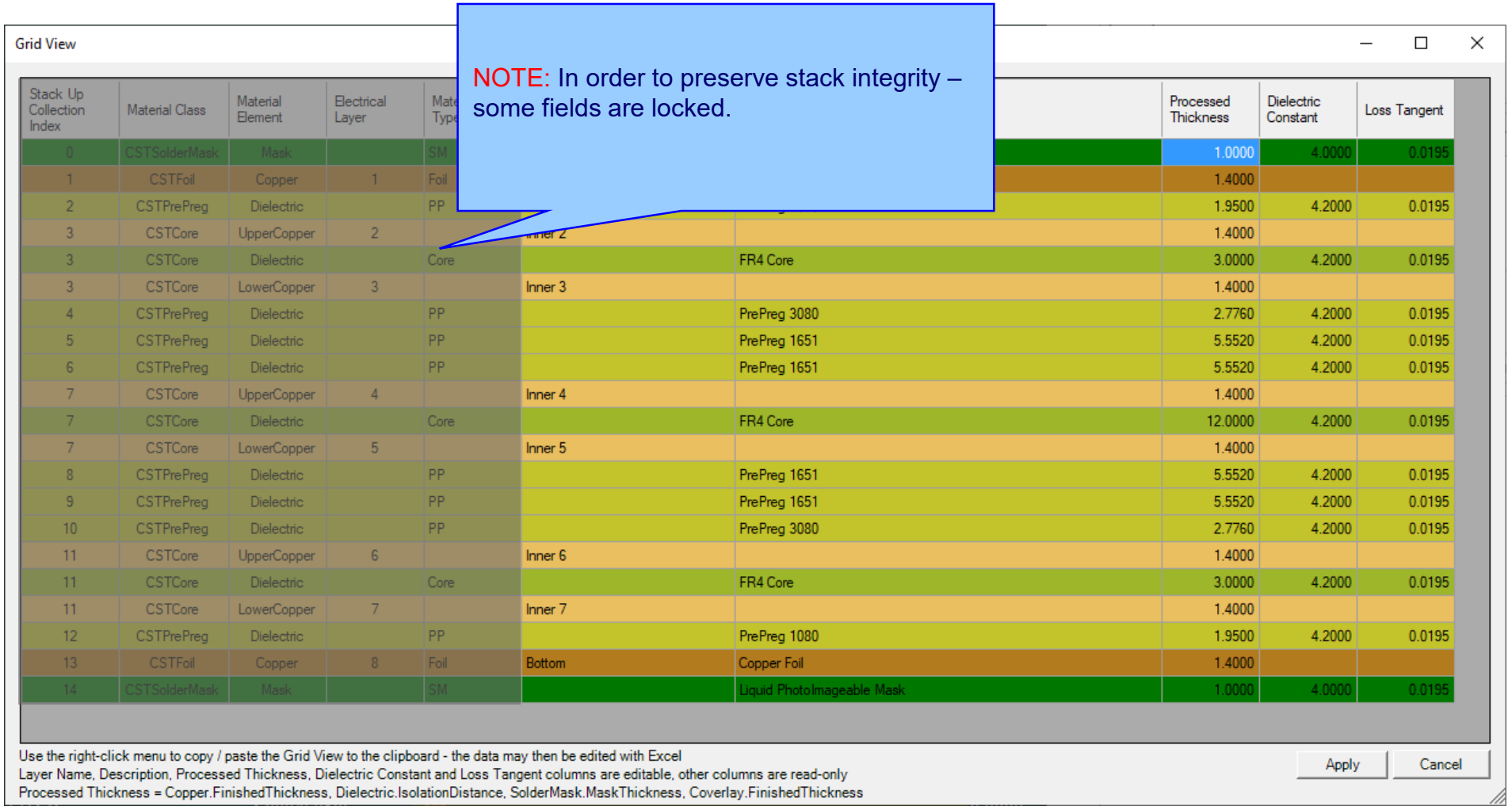
Grid View presents the current stack up in an editable data grid form to allow for easy editing of multiple materials from a single dialog


Grid View allows for quick editing of key stack up information such as Material Description, Processed Thickness, Dielectric Constant and Loss Tangent.

The stack up data from Grid View can also be edited in Microsoft Excel using the Grid View copy and paste functions

Changes in Grid View can be saved back to the original stack up design

# Introducing Grid View

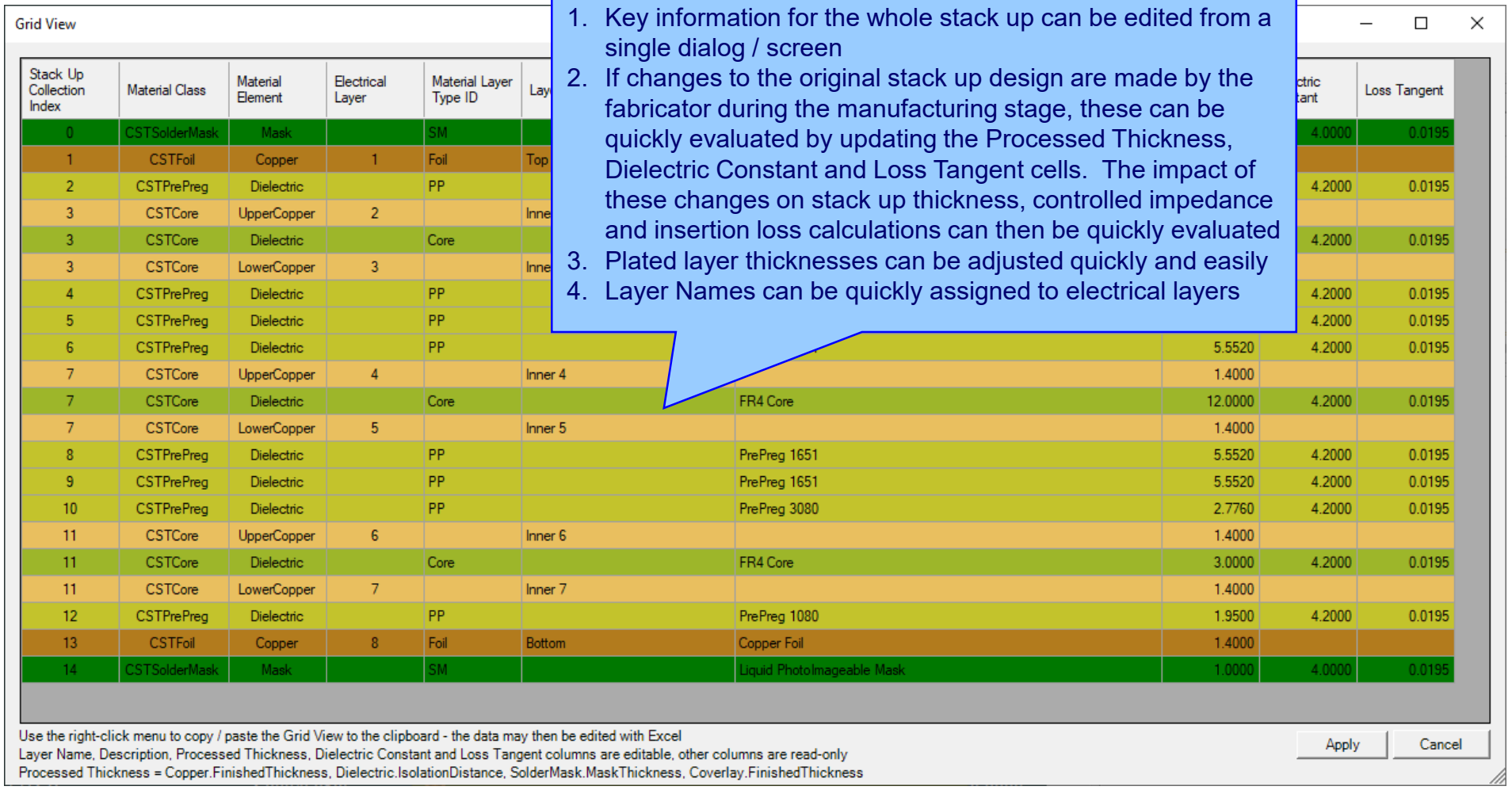



| Stack Up Collection Index | Material Class | Material Element | Electrical Layer | Material Type | | | Processed Thickness | Dielectric Constant | Loss Tangent |
|---|---|---|---|---|---|---|---|---|---|
| 0 | CSTSolderMask | Mask | | SM | | | 1.0000 | 4.0000 | 0.0195 |
| 1 | CSTFoil | Copper | 1 | Foil | | | 1.4000 | | |
| 2 | CSTPrePreg | Dielectric | | PP | | | 1.9500 | 4.2000 | 0.0195 |
| 3 | CSTCore | UpperCopper | 2 | | Inner 2 | | 1.4000 | | |
| 3 | CSTCore | Dielectric | | Core | | FR4 Core | 3.0000 | 4.2000 | 0.0195 |
| 3 | CSTCore | LowerCopper | 3 | | Inner 3 | | 1.4000 | | |
| 4 | CSTPrePreg | Dielectric | | PP | | PrePreg 3080 | 2.7760 | 4.2000 | 0.0195 |
| 5 | CSTPrePreg | Dielectric | | PP | | PrePreg 1651 | 5.5520 | 4.2000 | 0.0195 |
| 6 | CSTPrePreg | Dielectric | | PP | | PrePreg 1651 | 5.5520 | 4.2000 | 0.0195 |
| 7 | CSTCore | UpperCopper | 4 | | Inner 4 | | 1.4000 | | |
| 7 | CSTCore | Dielectric | | Core | | FR4 Core | 12.0000 | 4.2000 | 0.0195 |
| 7 | CSTCore | LowerCopper | 5 | | Inner 5 | | 1.4000 | | |
| 8 | CSTPrePreg | Dielectric | | PP | | PrePreg 1651 | 5.5520 | 4.2000 | 0.0195 |
| 9 | CSTPrePreg | Dielectric | | PP | | PrePreg 1651 | 5.5520 | 4.2000 | 0.0195 |
| 10 | CSTPrePreg | Dielectric | | PP | | PrePreg 3080 | 2.7760 | 4.2000 | 0.0195 |
| 11 | CSTCore | UpperCopper | 6 | | Inner 6 | | 1.4000 | | |
| 11 | CSTCore | Dielectric | | Core | | FR4 Core | 3.0000 | 4.2000 | 0.0195 |
| 11 | CSTCore | LowerCopper | 7 | | Inner 7 | | 1.4000 | | |
| 12 | CSTPrePreg | Dielectric | | PP | | PrePreg 1080 | 1.9500 | 4.2000 | 0.0195 |
| 13 | CSTFoil | Copper | 8 | Foil | Bottom | Copper Foil | 1.4000 | | |
| 14 | CSTSolderMask | Mask | | SM | | Liquid PhotoImageable Mask | 1.0000 | 4.0000 | 0.0195 |

# Introducing Grid View

Grid View has many uses, some are highlighted here:

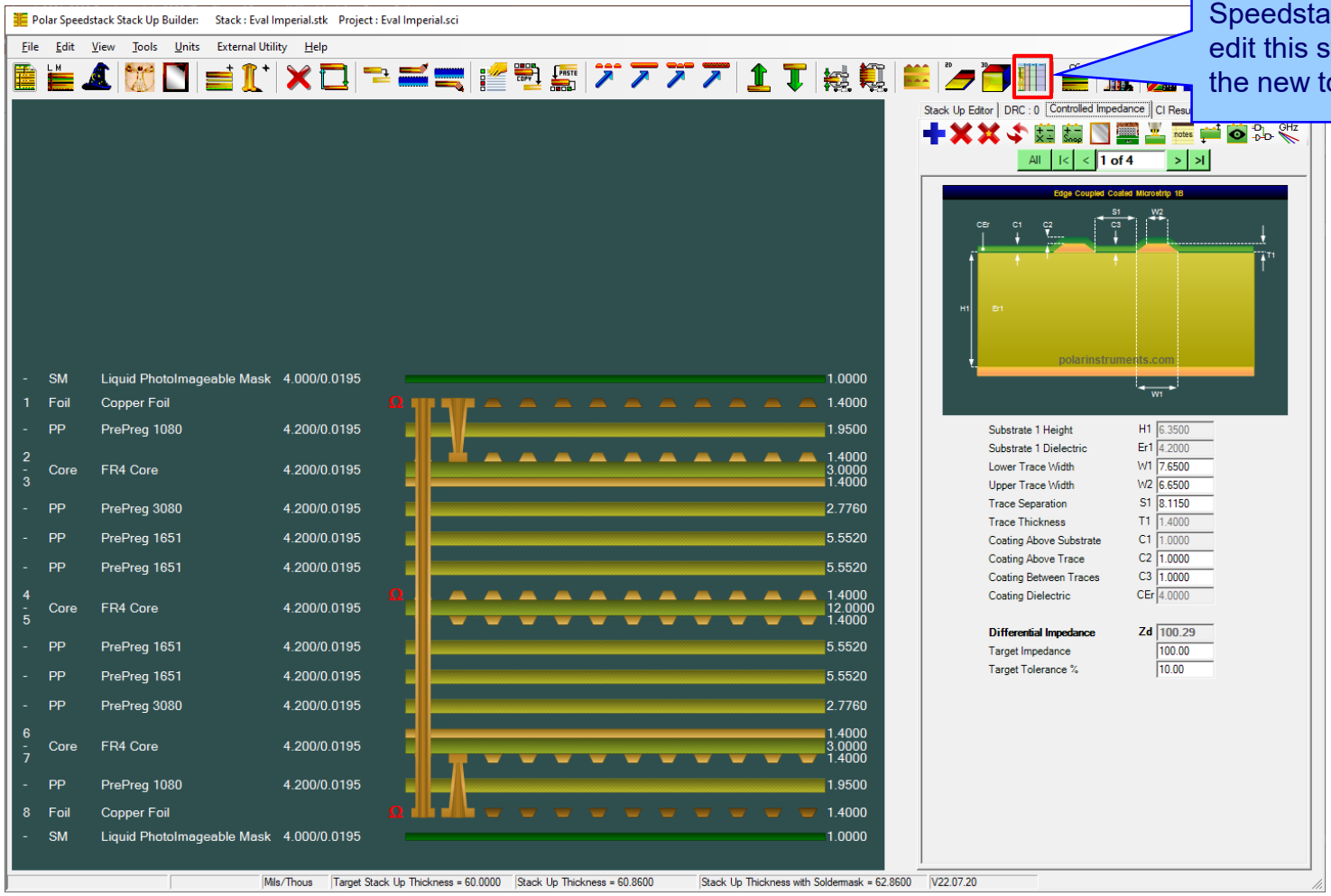
1. Key information for the whole stack up can be edited from a single dialog / screen
2. If changes to the original stack up design are made by the fabricator during the manufacturing stage, these can be quickly evaluated by updating the Processed Thickness, Dielectric Constant and Loss Tangent cells. The impact of these changes on stack up thickness, controlled impedance and insertion loss calculations can then be quickly evaluated
3. Plated layer thicknesses can be adjusted quickly and easily
4. Layer Names can be quickly assigned to electrical layers




| Stack Up Collection Index | Material Class | Material Element | Electrical Layer | Material Layer Type ID | Lay | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 0 | CSTSolderMask | Mask | | SM | | | | 4.0000 | 0.0195 |
| 1 | CSTFoil | Copper | 1 | Foil | Top | | | | |
| 2 | CSTPrePreg | Dielectric | | PP | | | | 4.2000 | 0.0195 |
| 3 | CSTCore | UpperCopper | 2 | | Inne | | | | |
| 3 | CSTCore | Dielectric | | Core | | | | 4.2000 | 0.0195 |
| 3 | CSTCore | LowerCopper | 3 | | Inne | | | | |
| 4 | CSTPrePreg | Dielectric | | PP | | | | 4.2000 | 0.0195 |
| 5 | CSTPrePreg | Dielectric | | PP | | | | 4.2000 | 0.0195 |
| 6 | CSTPrePreg | Dielectric | | PP | | | 5.5520 | 4.2000 | 0.0195 |
| 7 | CSTCore | UpperCopper | 4 | | Inner 4 | | 1.4000 | | |
| 7 | CSTCore | Dielectric | | Core | | FR4 Core | 12.0000 | 4.2000 | 0.0195 |
| 7 | CSTCore | LowerCopper | 5 | | Inner 5 | | 1.4000 | | |
| 8 | CSTPrePreg | Dielectric | | PP | | PrePreg 1651 | 5.5520 | 4.2000 | 0.0195 |
| 9 | CSTPrePreg | Dielectric | | PP | | PrePreg 1651 | 5.5520 | 4.2000 | 0.0195 |
| 10 | CSTPrePreg | Dielectric | | PP | | PrePreg 3080 | 2.7760 | 4.2000 | 0.0195 |
| 11 | CSTCore | UpperCopper | 6 | | Inner 6 | | 1.4000 | | |
| 11 | CSTCore | Dielectric | | Core | | FR4 Core | 3.0000 | 4.2000 | 0.0195 |
| 11 | CSTCore | LowerCopper | 7 | | Inner 7 | | 1.4000 | | |
| 12 | CSTPrePreg | Dielectric | | PP | | PrePreg 1080 | 1.9500 | 4.2000 | 0.0195 |
| 13 | CSTFoil | Copper | 8 | Foil | Bottom | Copper Foil | 1.4000 | | |
| 14 | CSTSolderMask | Mask | | SM | | Liquid PhotoImageable Mask | 1.0000 | 4.0000 | 0.0195 |

# Grid View – Walkthrough Step #1

Step #1
An 8 layer stack up is loaded into the Speedstack editor. To examine and edit this stack up in Grid View select the new toolbar button



# Grid View – Walkthrough Step #2

Step #2
Using the Grid View editor the following cells are amended. Layer Names have been changed and Processed Thickness adjusted

Grid View

| Stack Up Collection Index | Material Class | Material Element | Electrical Layer | Material Layer Type ID | Layer Name | Description | | | |
|---|---|---|---|---|---|---|---|---|---|
| 0 | CSTSolderMask | Mask | | SM | | Liquid PhotoImageable Mask | 1.0000 | 4.0000 | 0.0195 |
| 1 | CSTFoil | Copper | 1 | Foil | Top | Copper Foil | 1.4000 | | |
| 2 | CSTPrePreg | Dielectric | | PP | | PrePreg 1080 | 1.9500 | 4.2000 | 0.0195 |
| 3 | CSTCore | UpperCopper | 2 | | Inner 2 | | 1.4000 | | |
| 3 | CSTCore | Dielectric | | Core | | FR4 Core | 3.0000 | 4.2000 | 0.0195 |
| 3 | CSTCore | LowerCopper | 3 | | Power | | 1.4000 | | |
| 4 | CSTPrePreg | Dielectric | | PP | | PrePreg 3080 | 2.5000 | 4.2000 | 0.0195 |
| 5 | CSTPrePreg | Dielectric | | PP | | PrePreg 1651 | 2.5000 | 4.2000 | 0.0195 |
| 6 | CSTPrePreg | Dielectric | | PP | | PrePreg 1651 | 6.0000 | 4.2000 | 0.0195 |
| 7 | CSTCore | UpperCopper | 4 | | Inner 4 | | 1.4000 | | |
| 7 | CSTCore | Dielectric | | Core | | FR4 Core | 12.0000 | 4.2000 | 0.0195 |
| 7 | CSTCore | LowerCopper | 5 | | Inner 5 | | 1.4000 | | |
| 8 | CSTPrePreg | Dielectric | | PP | | PrePreg 1651 | 6.0000 | 4.2000 | 0.0195 |
| 9 | CSTPrePreg | Dielectric | | PP | | PrePreg 1651 | 6.0000 | 4.2000 | 0.0195 |
| 10 | CSTPrePreg | Dielectric | | PP | | PrePreg 3080 | 2.5000 | 4.2000 | 0.0195 |
| 11 | CSTCore | UpperCopper | 6 | | Ground | | 1.4000 | | |
| 11 | CSTCore | Dielectric | | Core | | FR4 Core | 3.0000 | 4.2000 | 0.0195 |
| 11 | CSTCore | LowerCopper | 7 | | Inner 7 | | 1.4000 | | |
| 12 | CSTPrePreg | Dielectric | | PP | | PrePreg 1080 | 1.9500 | 4.2000 | 0.0195 |
| 13 | CSTFoil | Copper | 8 | Foil | Bottom | Copper Foil | 1.4000 | | |
| 14 | CSTSolderMask | Mask | | SM | | Liquid PhotoImageable Mask | 1.0000 | 4.0000 | 0.0195 |

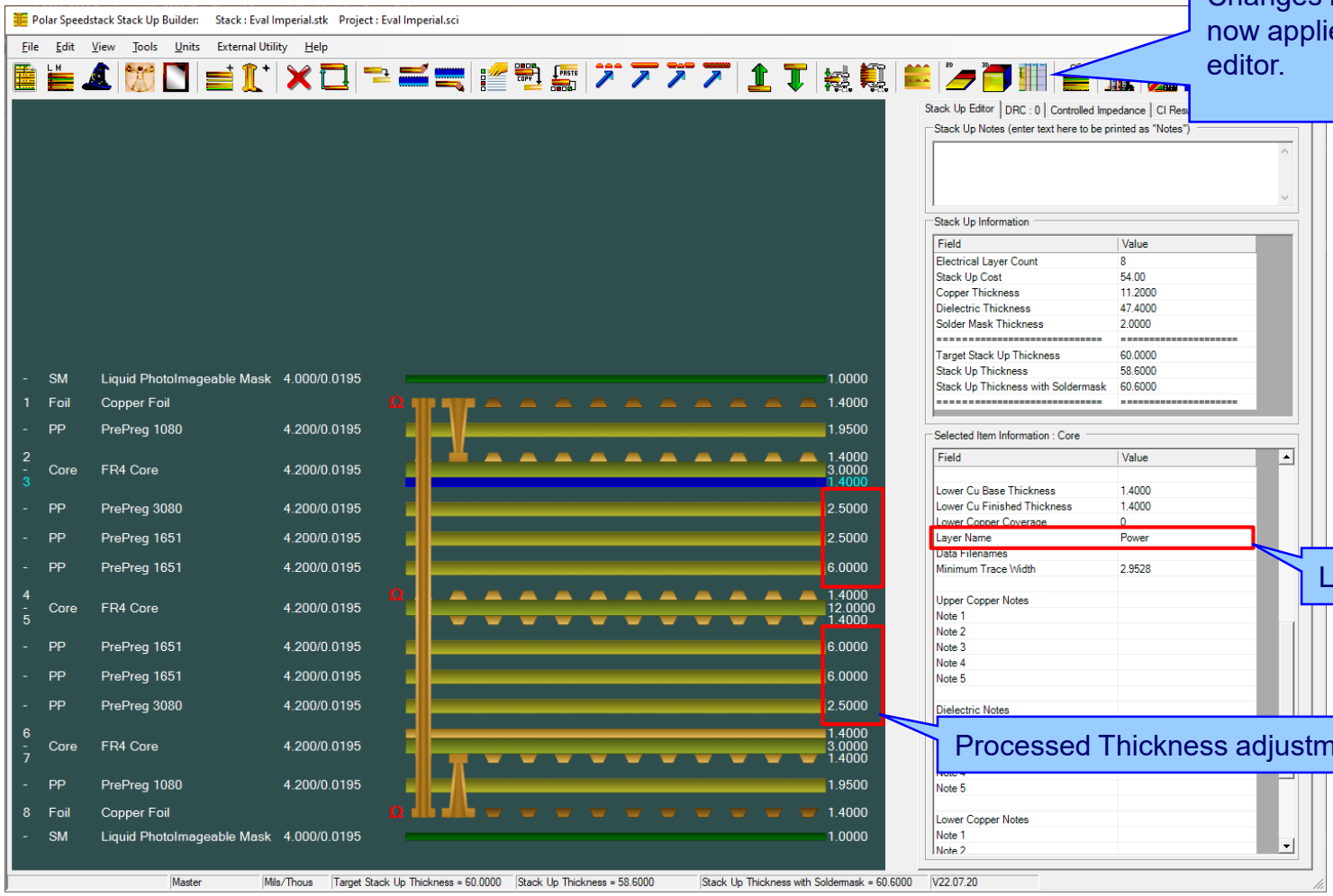
Use the right-click menu to copy / paste the Grid View to the clipboard - the data may then be edited with Excel
Layer Name, Description, Processed Thickness, Dielectric Constant and Loss Tangent columns are editable, other columns are read
Processed Thickness = Copper.FinishedThickness, Dielectric.IsolationDistance, SolderMask.MaskThickness, Coverlay.FinishedThi

Apply Cancel

Selecting Apply will save the changes back to the stack up editor

# Grid View – Walkthrough Step #3

Step #3
Changes made under Grid View are now applied back to the stack up editor.

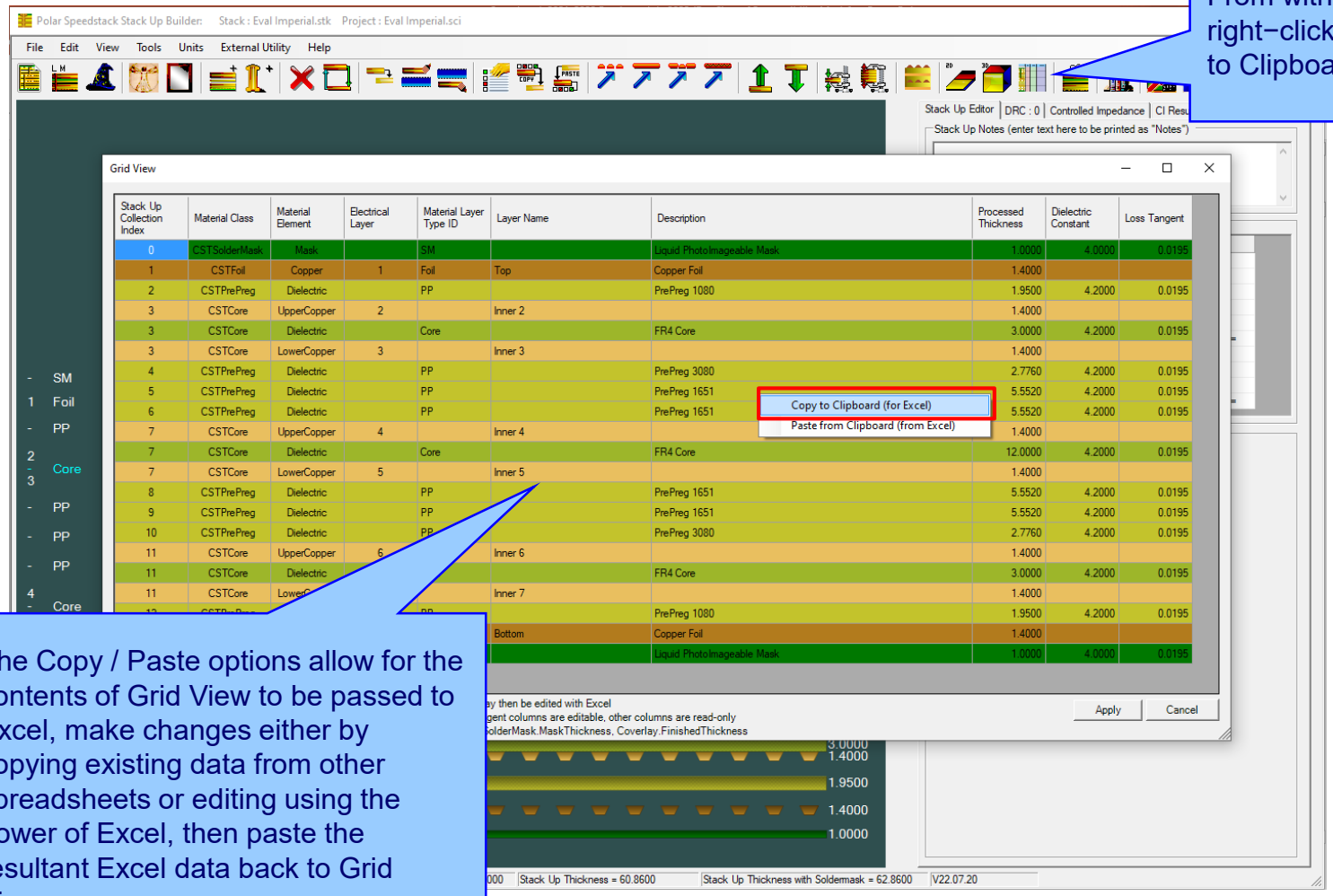



Layer Name change

Processed Thickness adjustments

# Using Grid View with Microsoft Excel – Step #1

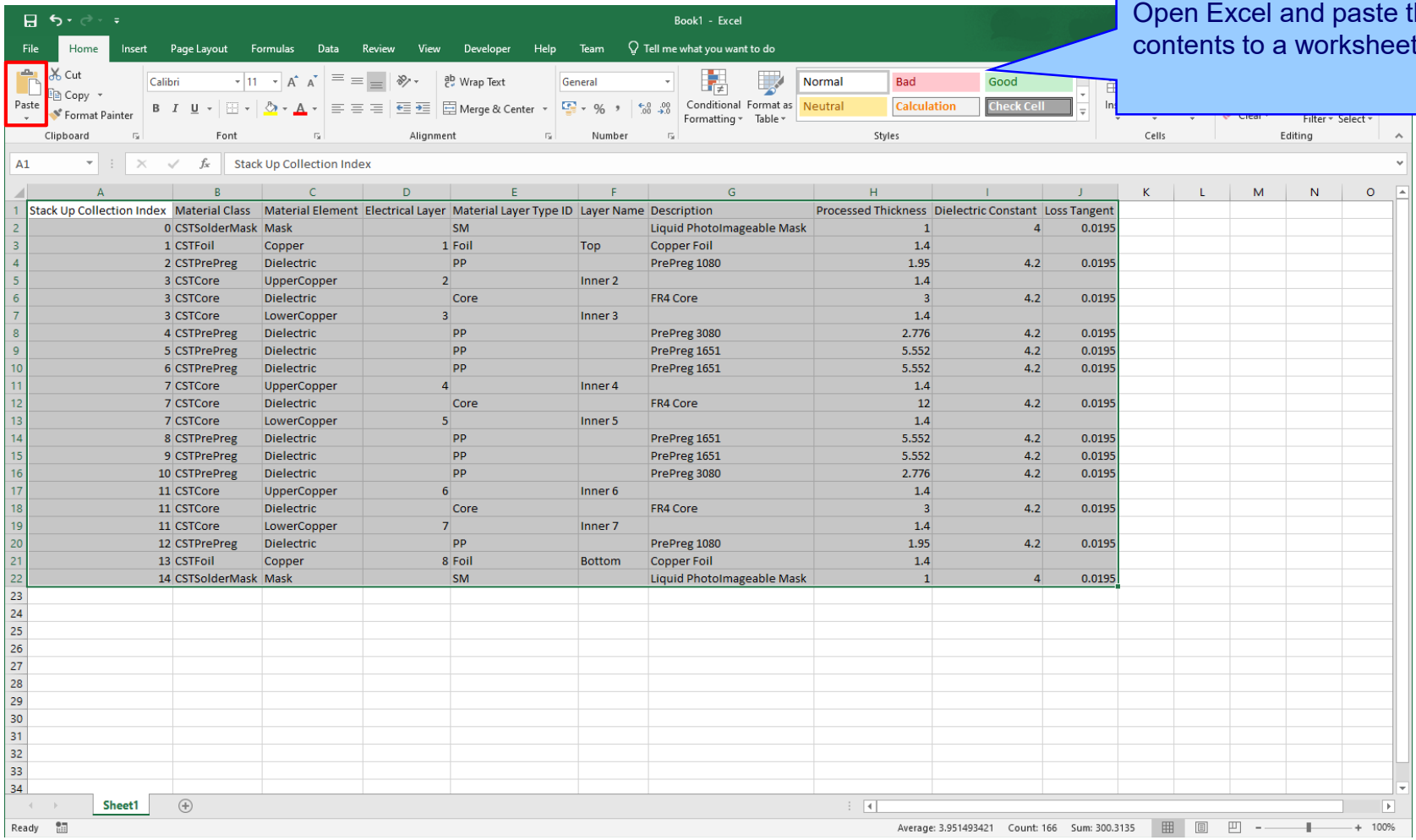
Step #1
From within Grid View use the right-click menu and select the Copy to Clipboard option.




The Copy / Paste options allow for the contents of Grid View to be passed to Excel, make changes either by copying existing data from other spreadsheets or editing using the power of Excel, then paste the resultant Excel data back to Grid View.

# Using Grid View with Microsoft Excel – Step #2

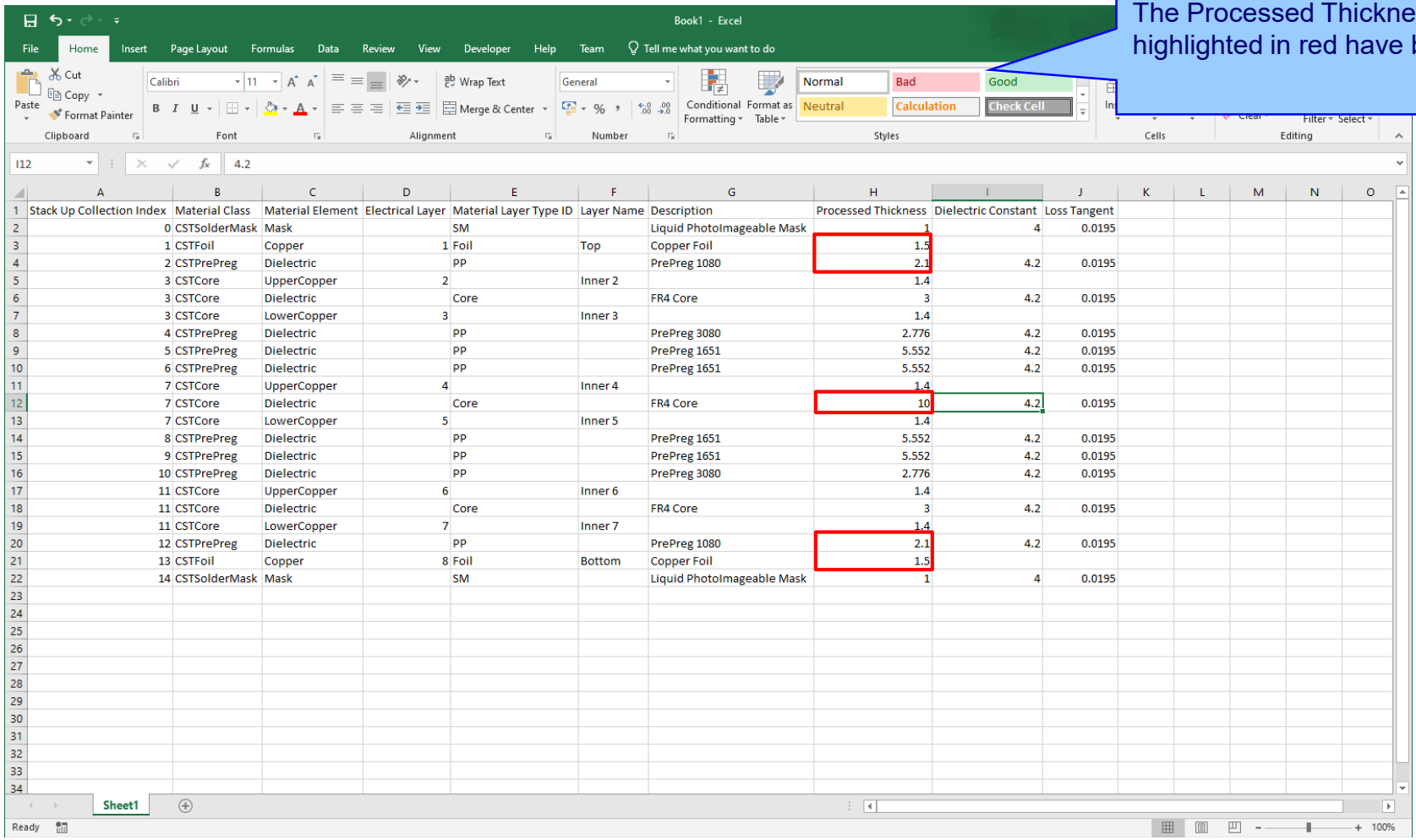
Step #2
Open Excel and paste the clipboard contents to a worksheet




| Stack Up Collection Index | Material Class | Material Element | Electrical Layer | Material Layer Type ID | Layer Name | Description | Processed Thickness | Dielectric Constant | Loss Tangent |
|---|---|---|---|---|---|---|---|---|---|
| 0 | CSTSolderMask | Mask | | SM | | Liquid PhotoImageable Mask | 1 | 4 | 0.0195 |
| 1 | CSTFoil | Copper | 1 | Foil | Top | Copper Foil | 1.4 | | |
| 2 | CSTPrePreg | Dielectric | | PP | | PrePreg 1080 | 1.95 | 4.2 | 0.0195 |
| 3 | CSTCore | UpperCopper | 2 | | Inner 2 | | 1.4 | | |
| 3 | CSTCore | Dielectric | | Core | | FR4 Core | 3 | 4.2 | 0.0195 |
| 3 | CSTCore | LowerCopper | 3 | | Inner 3 | | 1.4 | | |
| 4 | CSTPrePreg | Dielectric | | PP | | PrePreg 3080 | 2.776 | 4.2 | 0.0195 |
| 5 | CSTPrePreg | Dielectric | | PP | | PrePreg 1651 | 5.552 | 4.2 | 0.0195 |
| 6 | CSTPrePreg | Dielectric | | PP | | PrePreg 1651 | 5.552 | 4.2 | 0.0195 |
| 7 | CSTCore | UpperCopper | 4 | | Inner 4 | | 1.4 | | |
| 7 | CSTCore | Dielectric | | Core | | FR4 Core | 12 | 4.2 | 0.0195 |
| 7 | CSTCore | LowerCopper | 5 | | Inner 5 | | 1.4 | | |
| 8 | CSTPrePreg | Dielectric | | PP | | PrePreg 1651 | 5.552 | 4.2 | 0.0195 |
| 9 | CSTPrePreg | Dielectric | | PP | | PrePreg 1651 | 5.552 | 4.2 | 0.0195 |
| 10 | CSTPrePreg | Dielectric | | PP | | PrePreg 3080 | 2.776 | 4.2 | 0.0195 |
| 11 | CSTCore | UpperCopper | 6 | | Inner 6 | | 1.4 | | |
| 11 | CSTCore | Dielectric | | Core | | FR4 Core | 3 | 4.2 | 0.0195 |
| 11 | CSTCore | LowerCopper | 7 | | Inner 7 | | 1.4 | | |
| 12 | CSTPrePreg | Dielectric | | PP | | PrePreg 1080 | 1.95 | 4.2 | 0.0195 |
| 13 | CSTFoil | Copper | 8 | Foil | Bottom | Copper Foil | 1.4 | | |
| 14 | CSTSolderMask | Mask | | SM | | Liquid PhotoImageable Mask | 1 | 4 | 0.0195 |

# Using Grid View with Microsoft Excel – Step #3

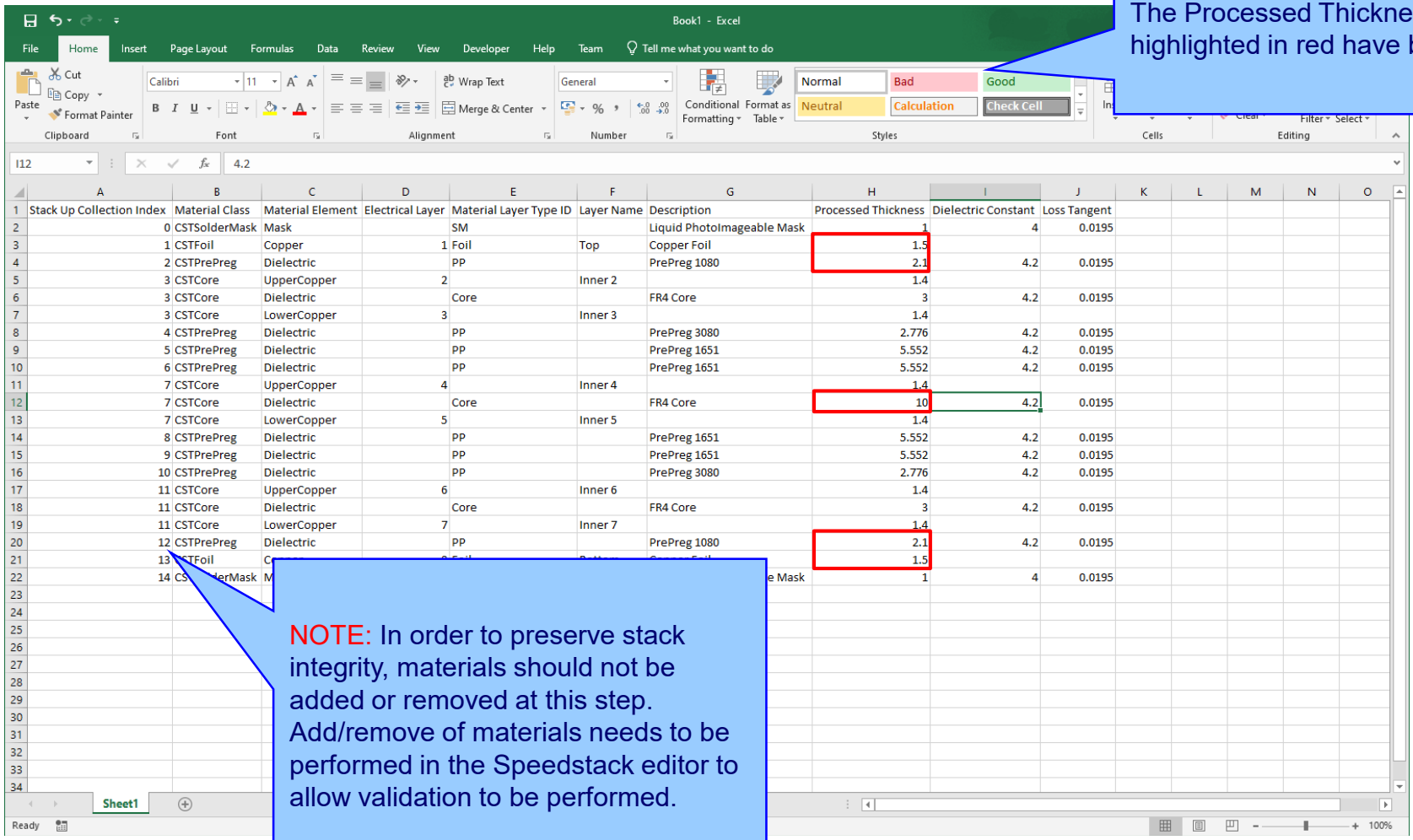
Step #3
The Processed Thickness cells highlighted in red have been changed




| | A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Stack Up Collection Index | Material Class | Material Element | Electrical Layer | Material Layer Type ID | Layer Name | Description | Processed Thickness | Dielectric Constant | Loss Tangent |
| 2 | 0 | CSTSolderMask | Mask | | SM | | Liquid PhotoImageable Mask | 1 | 4 | 0.0195 |
| 3 | 1 | CSTFoil | Copper | 1 | Foil | Top | Copper Foil | 1.5 | | |
| 4 | 2 | CSTPrePreg | Dielectric | | PP | | PrePreg 1080 | 2.1 | 4.2 | 0.0195 |
| 5 | 3 | CSTCore | UpperCopper | 2 | | Inner 2 | | 1.4 | | |
| 6 | 3 | CSTCore | Dielectric | | Core | | FR4 Core | 3 | 4.2 | 0.0195 |
| 7 | 3 | CSTCore | LowerCopper | 3 | | Inner 3 | | 1.4 | | |
| 8 | 4 | CSTPrePreg | Dielectric | | PP | | PrePreg 3080 | 2.776 | 4.2 | 0.0195 |
| 9 | 5 | CSTPrePreg | Dielectric | | PP | | PrePreg 1651 | 5.552 | 4.2 | 0.0195 |
| 10 | 6 | CSTPrePreg | Dielectric | | PP | | PrePreg 1651 | 5.552 | 4.2 | 0.0195 |
| 11 | 7 | CSTCore | UpperCopper | 4 | | Inner 4 | | 1.4 | | |
| 12 | 7 | CSTCore | Dielectric | | Core | | FR4 Core | 10 | 4.2 | 0.0195 |
| 13 | 7 | CSTCore | LowerCopper | 5 | | Inner 5 | | 1.4 | | |
| 14 | 8 | CSTPrePreg | Dielectric | | PP | | PrePreg 1651 | 5.552 | 4.2 | 0.0195 |
| 15 | 9 | CSTPrePreg | Dielectric | | PP | | PrePreg 1651 | 5.552 | 4.2 | 0.0195 |
| 16 | 10 | CSTPrePreg | Dielectric | | PP | | PrePreg 3080 | 2.776 | 4.2 | 0.0195 |
| 17 | 11 | CSTCore | UpperCopper | 6 | | Inner 6 | | 1.4 | | |
| 18 | 11 | CSTCore | Dielectric | | Core | | FR4 Core | 3 | 4.2 | 0.0195 |
| 19 | 11 | CSTCore | LowerCopper | 7 | | Inner 7 | | 1.4 | | |
| 20 | 12 | CSTPrePreg | Dielectric | | PP | | PrePreg 1080 | 2.1 | 4.2 | 0.0195 |
| 21 | 13 | CSTFoil | Copper | 8 | Foil | Bottom | Copper Foil | 1.5 | | |
| 22 | 14 | CSTSolderMask | Mask | | SM | | Liquid PhotoImageable Mask | 1 | 4 | 0.0195 |

# Using Grid View with Microsoft Excel – Step #3

Step #3
The Processed Thickness cells highlighted in red have been changed



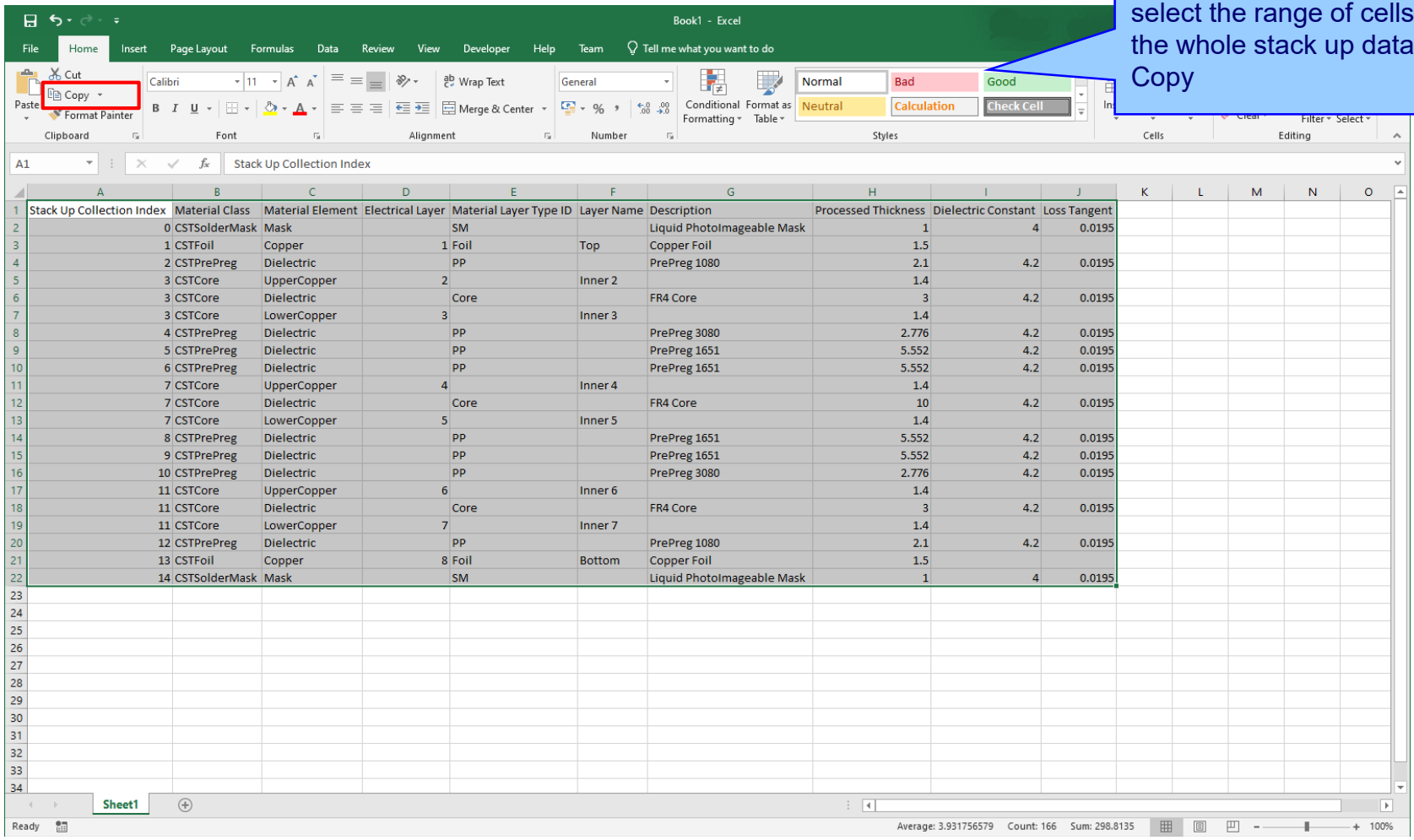

| | A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Stack Up Collection Index | Material Class | Material Element | Electrical Layer | Material Layer Type ID | Layer Name | Description | Processed Thickness | Dielectric Constant | Loss Tangent |
| 2 | 0 | CSTSolderMask | Mask | | SM | | Liquid PhotoImageable Mask | 1 | 4 | 0.0195 |
| 3 | 1 | CSTFoil | Copper | 1 | Foil | Top | Copper Foil | 1.5 | | |
| 4 | 2 | CSTPrePreg | Dielectric | | PP | | PrePreg 1080 | 2.1 | 4.2 | 0.0195 |
| 5 | 3 | CSTCore | UpperCopper | 2 | | Inner 2 | | 1.4 | | |
| 6 | 3 | CSTCore | Dielectric | | Core | | FR4 Core | 3 | 4.2 | 0.0195 |
| 7 | 3 | CSTCore | LowerCopper | 3 | | Inner 3 | | 1.4 | | |
| 8 | 4 | CSTPrePreg | Dielectric | | PP | | PrePreg 3080 | 2.776 | 4.2 | 0.0195 |
| 9 | 5 | CSTPrePreg | Dielectric | | PP | | PrePreg 1651 | 5.552 | 4.2 | 0.0195 |
| 10 | 6 | CSTPrePreg | Dielectric | | PP | | PrePreg 1651 | 5.552 | 4.2 | 0.0195 |
| 11 | 7 | CSTCore | UpperCopper | 4 | | Inner 4 | | 1.4 | | |
| 12 | 7 | CSTCore | Dielectric | | Core | | FR4 Core | 10 | 4.2 | 0.0195 |
| 13 | 7 | CSTCore | LowerCopper | 5 | | Inner 5 | | 1.4 | | |
| 14 | 8 | CSTPrePreg | Dielectric | | PP | | PrePreg 1651 | 5.552 | 4.2 | 0.0195 |
| 15 | 9 | CSTPrePreg | Dielectric | | PP | | PrePreg 1651 | 5.552 | 4.2 | 0.0195 |
| 16 | 10 | CSTPrePreg | Dielectric | | PP | | PrePreg 3080 | 2.776 | 4.2 | 0.0195 |
| 17 | 11 | CSTCore | UpperCopper | 6 | | Inner 6 | | 1.4 | | |
| 18 | 11 | CSTCore | Dielectric | | Core | | FR4 Core | 3 | 4.2 | 0.0195 |
| 19 | 11 | CSTCore | LowerCopper | 7 | | Inner 7 | | 1.4 | | |
| 20 | 12 | CSTPrePreg | Dielectric | | PP | | PrePreg 1080 | 2.1 | 4.2 | 0.0195 |
| 21 | 13 | CSTFoil | C | | | | | 1.5 | | |
| 22 | 14 | CS derMask | M | | | | e Mask | 1 | 4 | 0.0195 |



NOTE: In order to preserve stack integrity, materials should not be added or removed at this step. Add/remove of materials needs to be performed in the Speedstack editor to allow validation to be performed.

# Using Grid View with Microsoft Excel – Step #4

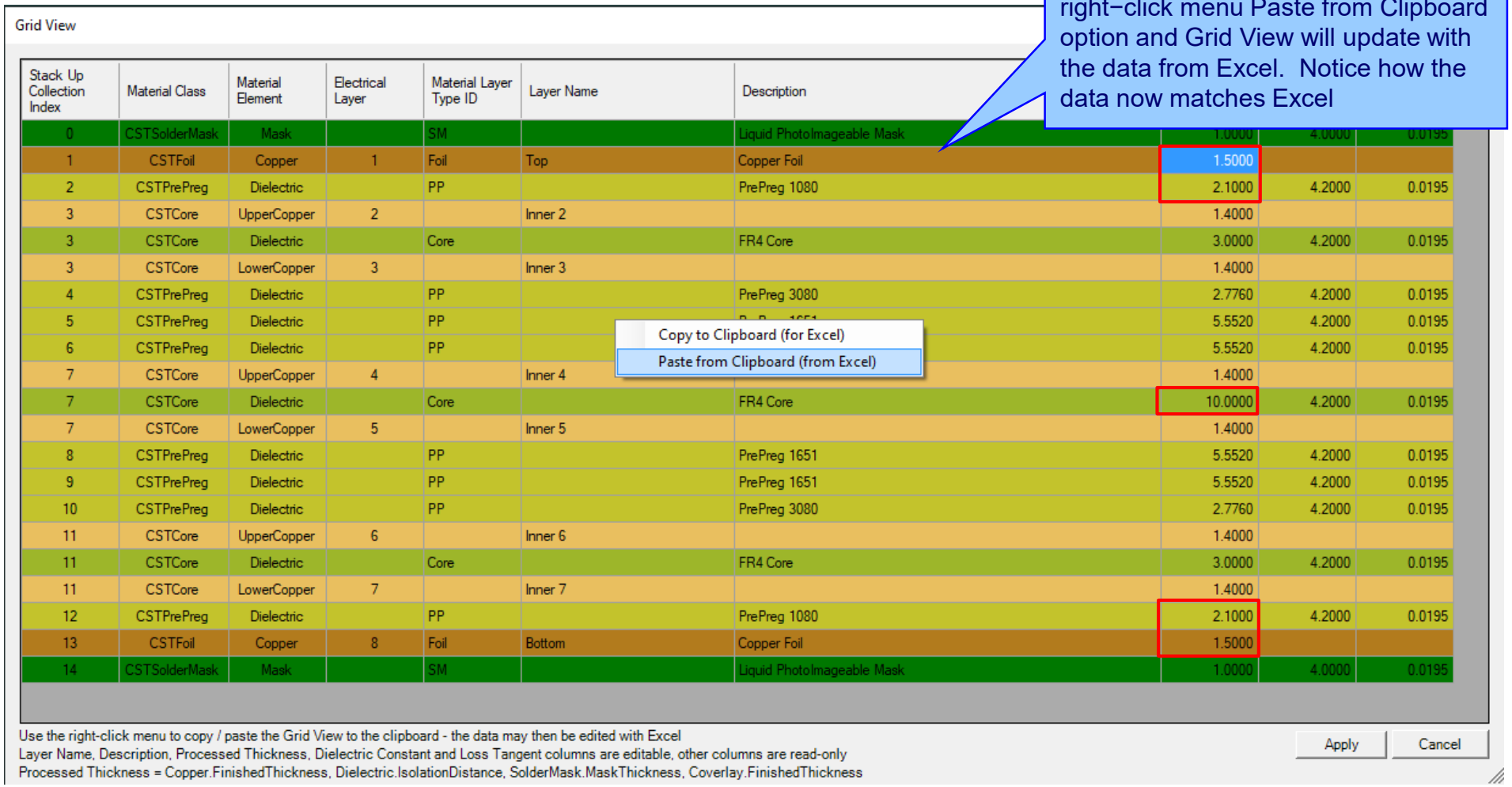
Step #4
Once the Excel changes are complete select the range of cells representing the whole stack up data and select Copy




| Stack Up Collection Index | Material Class | Material Element | Electrical Layer | Material Layer Type ID | Layer Name | Description | Processed Thickness | Dielectric Constant | Loss Tangent |
|---|---|---|---|---|---|---|---|---|---|
| 0 | CSTSolderMask | Mask | | SM | | Liquid PhotoImageable Mask | 1 | 4 | 0.0195 |
| 1 | CSTFoil | Copper | 1 | Foil | Top | Copper Foil | 1.5 | | |
| 2 | CSTPrePreg | Dielectric | | PP | | PrePreg 1080 | 2.1 | 4.2 | 0.0195 |
| 3 | CSTCore | UpperCopper | 2 | | Inner 2 | | 1.4 | | |
| 3 | CSTCore | Dielectric | | Core | | FR4 Core | 3 | 4.2 | 0.0195 |
| 3 | CSTCore | LowerCopper | 3 | | Inner 3 | | 1.4 | | |
| 4 | CSTPrePreg | Dielectric | | PP | | PrePreg 3080 | 2.776 | 4.2 | 0.0195 |
| 5 | CSTPrePreg | Dielectric | | PP | | PrePreg 1651 | 5.552 | 4.2 | 0.0195 |
| 6 | CSTPrePreg | Dielectric | | PP | | PrePreg 1651 | 5.552 | 4.2 | 0.0195 |
| 7 | CSTCore | UpperCopper | 4 | | Inner 4 | | 1.4 | | |
| 7 | CSTCore | Dielectric | | Core | | FR4 Core | 10 | 4.2 | 0.0195 |
| 7 | CSTCore | LowerCopper | 5 | | Inner 5 | | 1.4 | | |
| 8 | CSTPrePreg | Dielectric | | PP | | PrePreg 1651 | 5.552 | 4.2 | 0.0195 |
| 9 | CSTPrePreg | Dielectric | | PP | | PrePreg 1651 | 5.552 | 4.2 | 0.0195 |
| 10 | CSTPrePreg | Dielectric | | PP | | PrePreg 3080 | 2.776 | 4.2 | 0.0195 |
| 11 | CSTCore | UpperCopper | 6 | | Inner 6 | | 1.4 | | |
| 11 | CSTCore | Dielectric | | Core | | FR4 Core | 3 | 4.2 | 0.0195 |
| 11 | CSTCore | LowerCopper | 7 | | Inner 7 | | 1.4 | | |
| 12 | CSTPrePreg | Dielectric | | PP | | PrePreg 1080 | 2.1 | 4.2 | 0.0195 |
| 13 | CSTFoil | Copper | 8 | Foil | Bottom | Copper Foil | 1.5 | | |
| 14 | CSTSolderMask | Mask | | SM | | Liquid PhotoImageable Mask | 1 | 4 | 0.0195 |

# Using Grid View with Microsoft Excel – Step #5

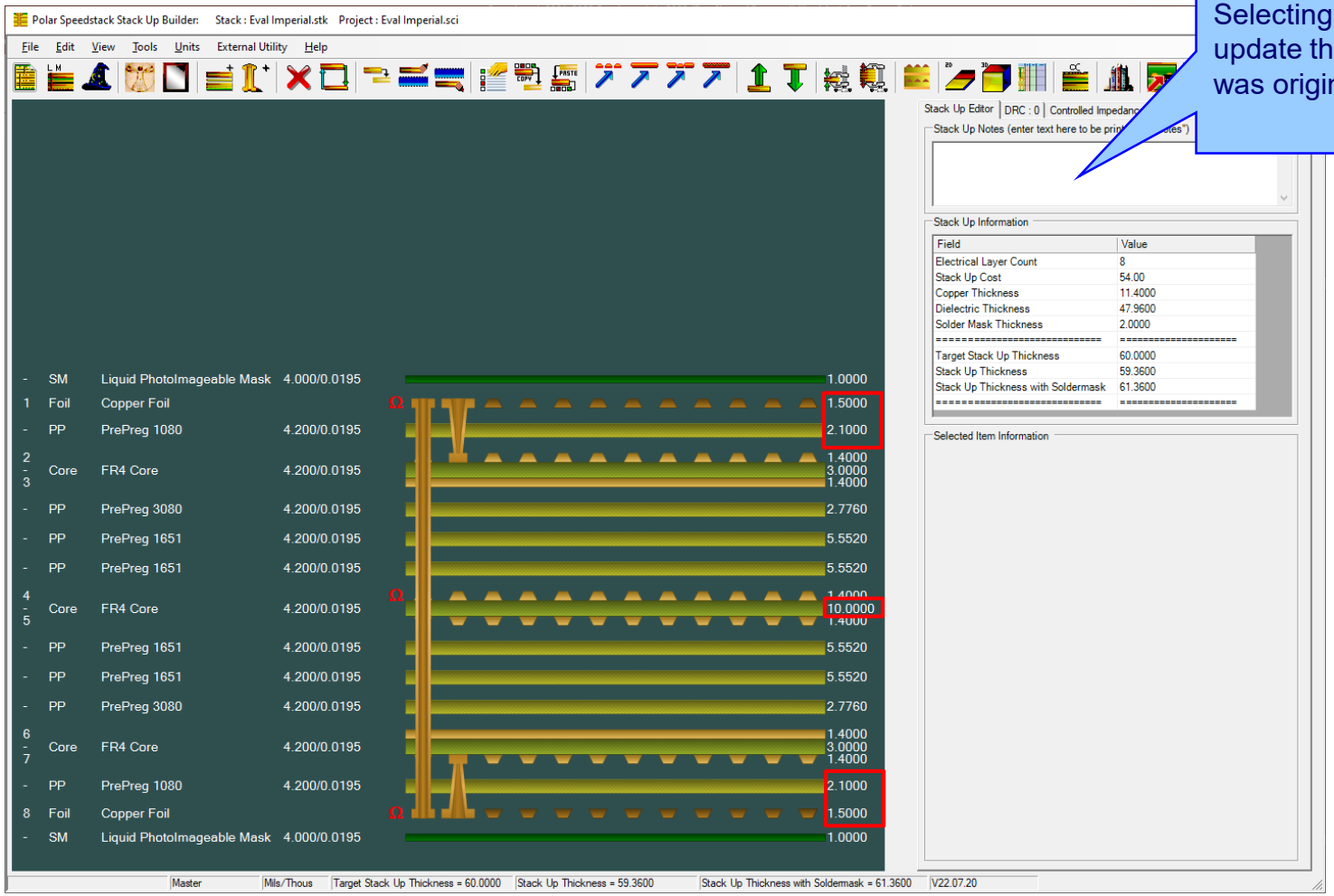
Step #5
Back in Grid View select the right-click menu Paste from Clipboard option and Grid View will update with the data from Excel. Notice how the data now matches Excel




| Stack Up Collection Index | Material Class | Material Element | Electrical Layer | Material Layer Type ID | Layer Name | Description | | | |
|---|---|---|---|---|---|---|---|---|---|
| 0 | CSTSolderMask | Mask | | SM | | Liquid PhotoImageable Mask | 1.0000 | 4.0000 | 0.0195 |
| 1 | CSTFoil | Copper | 1 | Foil | Top | Copper Foil | 1.5000 | | |
| 2 | CSTPrePreg | Dielectric | | PP | | PrePreg 1080 | 2.1000 | 4.2000 | 0.0195 |
| 3 | CSTCore | UpperCopper | 2 | | Inner 2 | | 1.4000 | | |
| 3 | CSTCore | Dielectric | | Core | | FR4 Core | 3.0000 | 4.2000 | 0.0195 |
| 3 | CSTCore | LowerCopper | 3 | | Inner 3 | | 1.4000 | | |
| 4 | CSTPrePreg | Dielectric | | PP | | PrePreg 3080 | 2.7760 | 4.2000 | 0.0195 |
| 5 | CSTPrePreg | Dielectric | | PP | | | 5.5520 | 4.2000 | 0.0195 |
| 6 | CSTPrePreg | Dielectric | | PP | | | 5.5520 | 4.2000 | 0.0195 |
| 7 | CSTCore | UpperCopper | 4 | | Inner 4 | | 1.4000 | | |
| 7 | CSTCore | Dielectric | | Core | | FR4 Core | 10.0000 | 4.2000 | 0.0195 |
| 7 | CSTCore | LowerCopper | 5 | | Inner 5 | | 1.4000 | | |
| 8 | CSTPrePreg | Dielectric | | PP | | PrePreg 1651 | 5.5520 | 4.2000 | 0.0195 |
| 9 | CSTPrePreg | Dielectric | | PP | | PrePreg 1651 | 5.5520 | 4.2000 | 0.0195 |
| 10 | CSTPrePreg | Dielectric | | PP | | PrePreg 3080 | 2.7760 | 4.2000 | 0.0195 |
| 11 | CSTCore | UpperCopper | 6 | | Inner 6 | | 1.4000 | | |
| 11 | CSTCore | Dielectric | | Core | | FR4 Core | 3.0000 | 4.2000 | 0.0195 |
| 11 | CSTCore | LowerCopper | 7 | | Inner 7 | | 1.4000 | | |
| 12 | CSTPrePreg | Dielectric | | PP | | PrePreg 1080 | 2.1000 | 4.2000 | 0.0195 |
| 13 | CSTFoil | Copper | 8 | Foil | Bottom | Copper Foil | 1.5000 | | |
| 14 | CSTSolderMask | Mask | | SM | | Liquid PhotoImageable Mask | 1.0000 | 4.0000 | 0.0195 |

# Using Grid View with Microsoft Excel – Step #6

Step #6
Selecting Apply in Grid View will update the stack up with the data that was originally changed in Excel



## Should I update now (July 2022) ?

- If you have been waiting for this view, YES, though..
- Polar plans another major release in August / September offering enhanced visibility of all impedance structures from the main edit view.

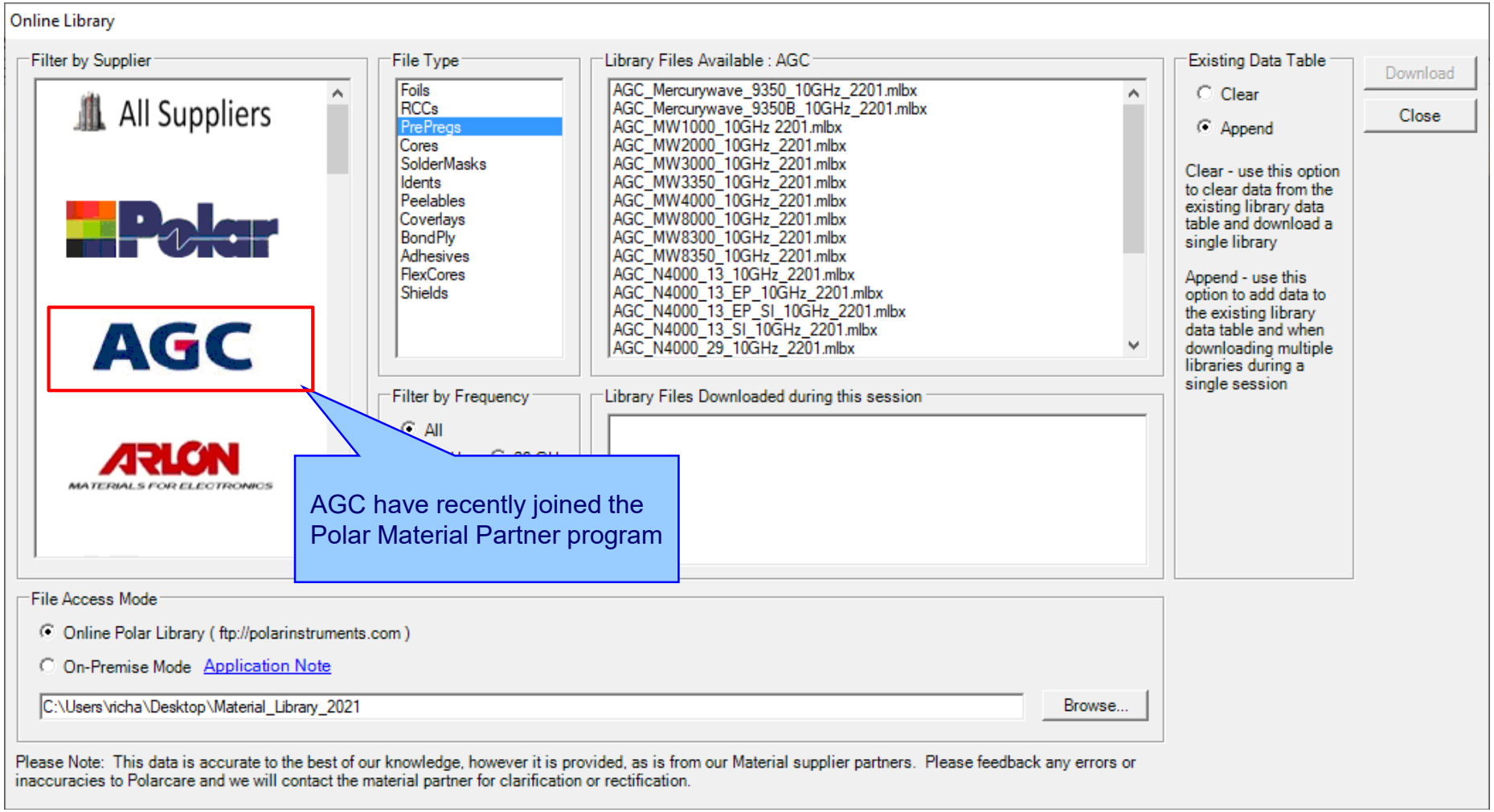
- So you may prefer to await the August / September edition to minimise the number of updates you need to install.

## Other enhancements

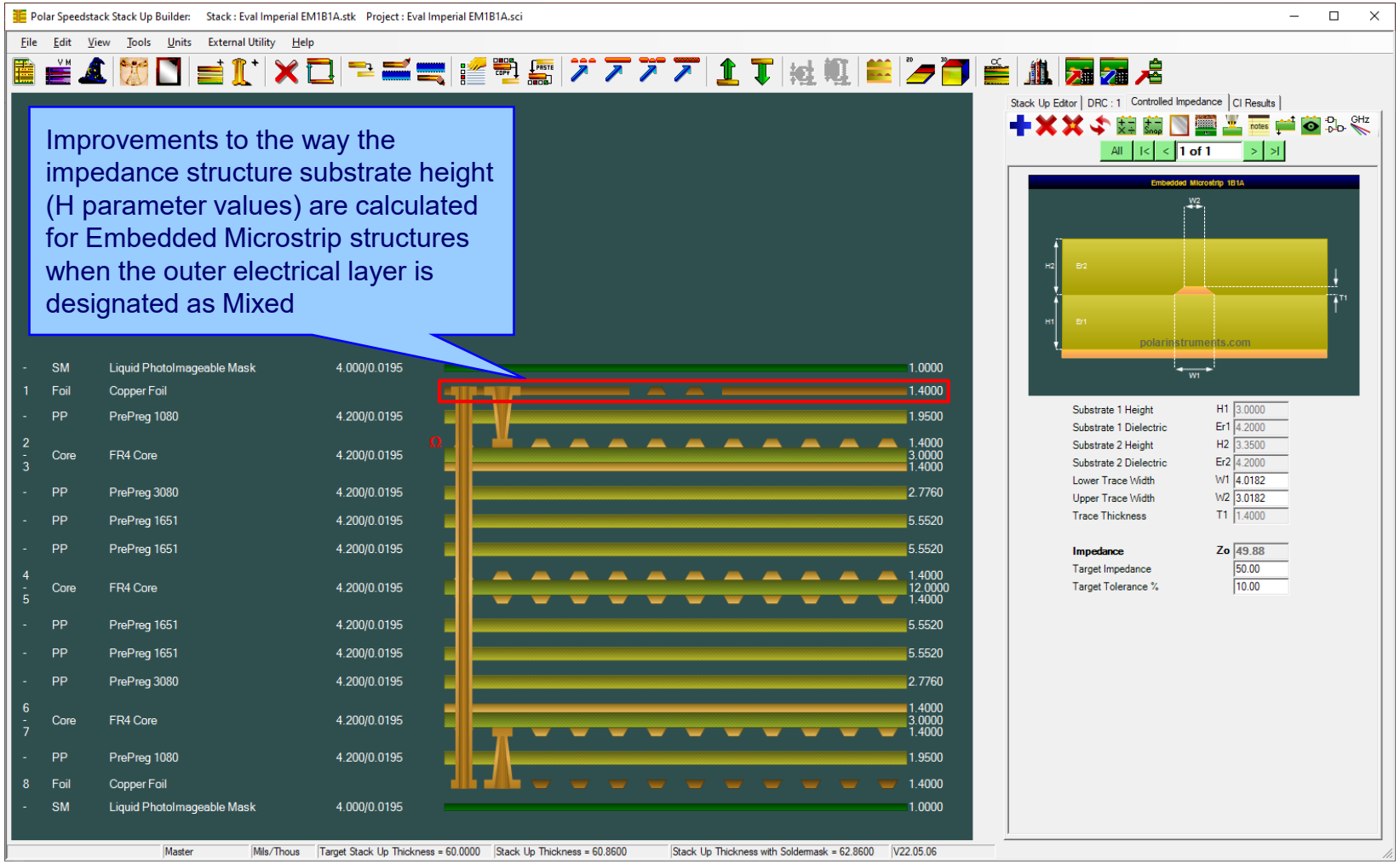
- Stack Up Notes user interface improvements
- The Tools | Options | Structure Defaults | Separation Region Dielectric (REr) now supports double data types. Previously, it only supported integers

# Speedstack v22.05.06 (May 2022)

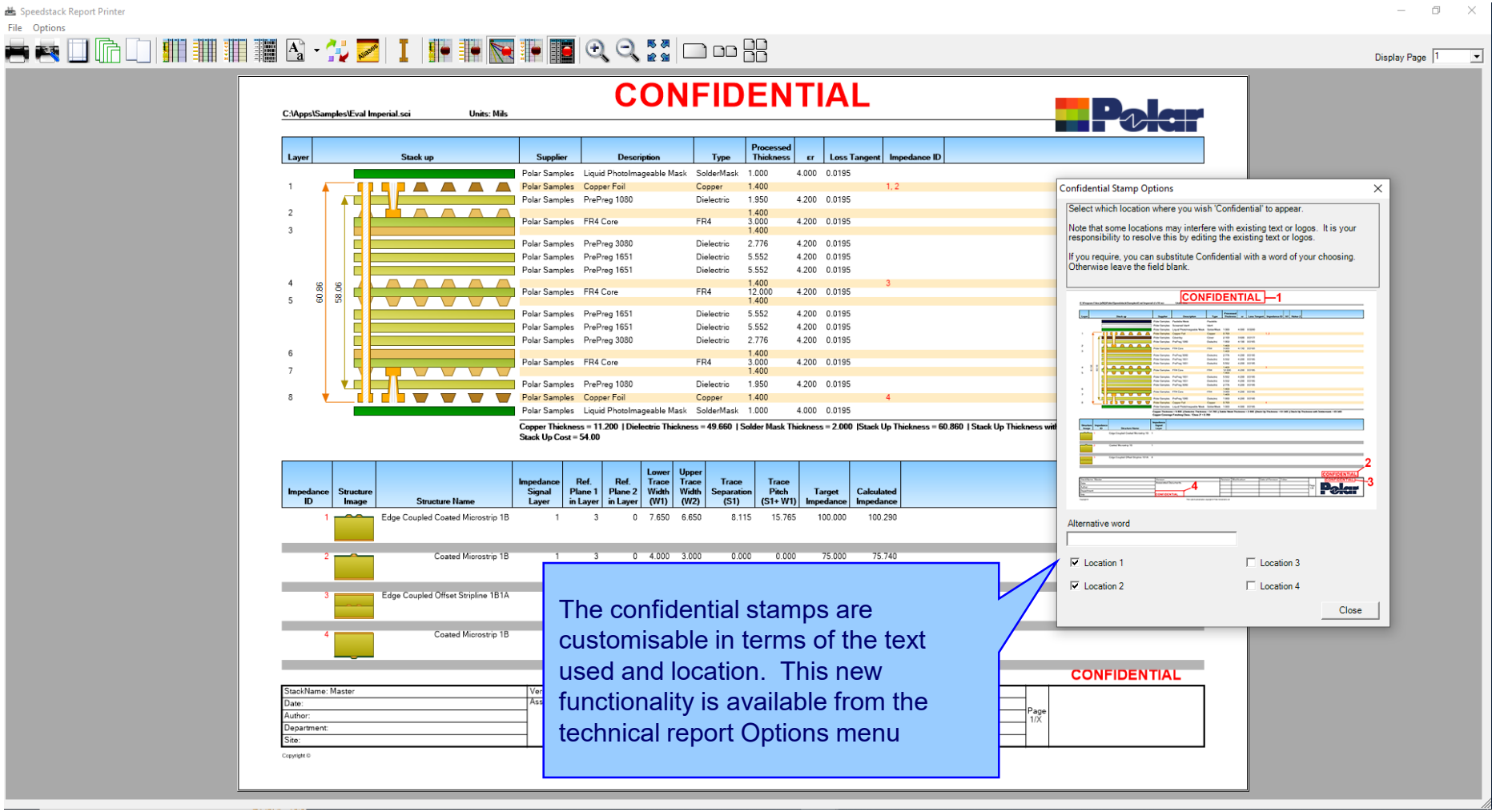
# Online Library enhancements



# Embedded Microstrip structure enhancements

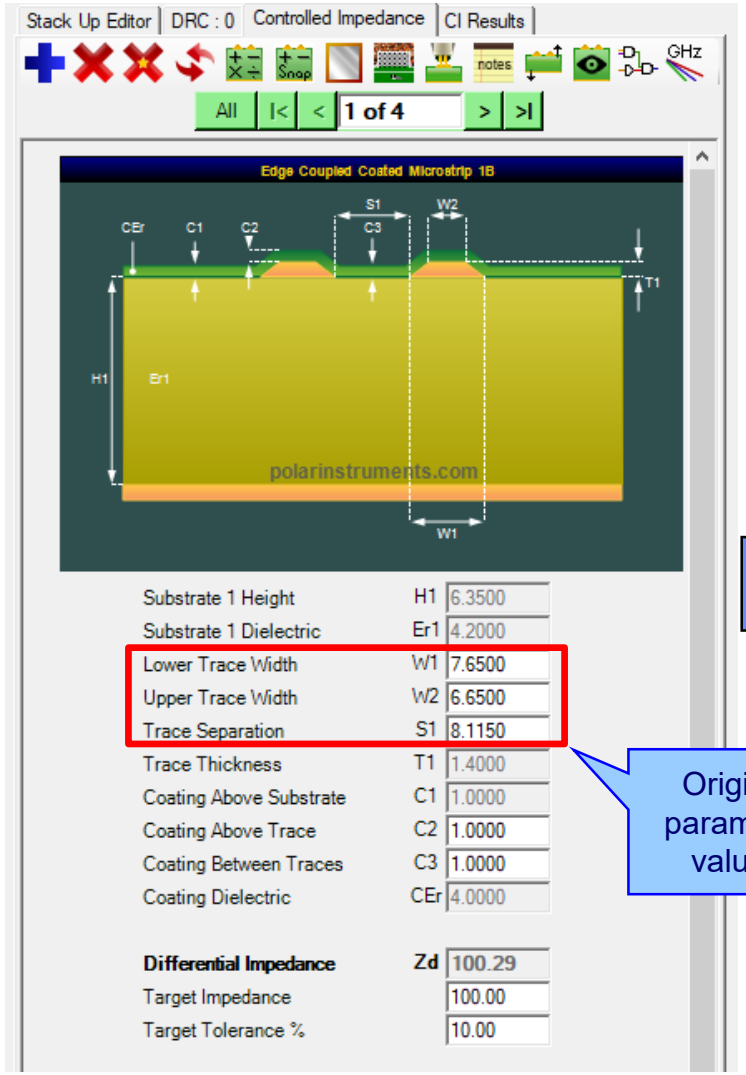


# New Confidential Stamp options added to the technical report

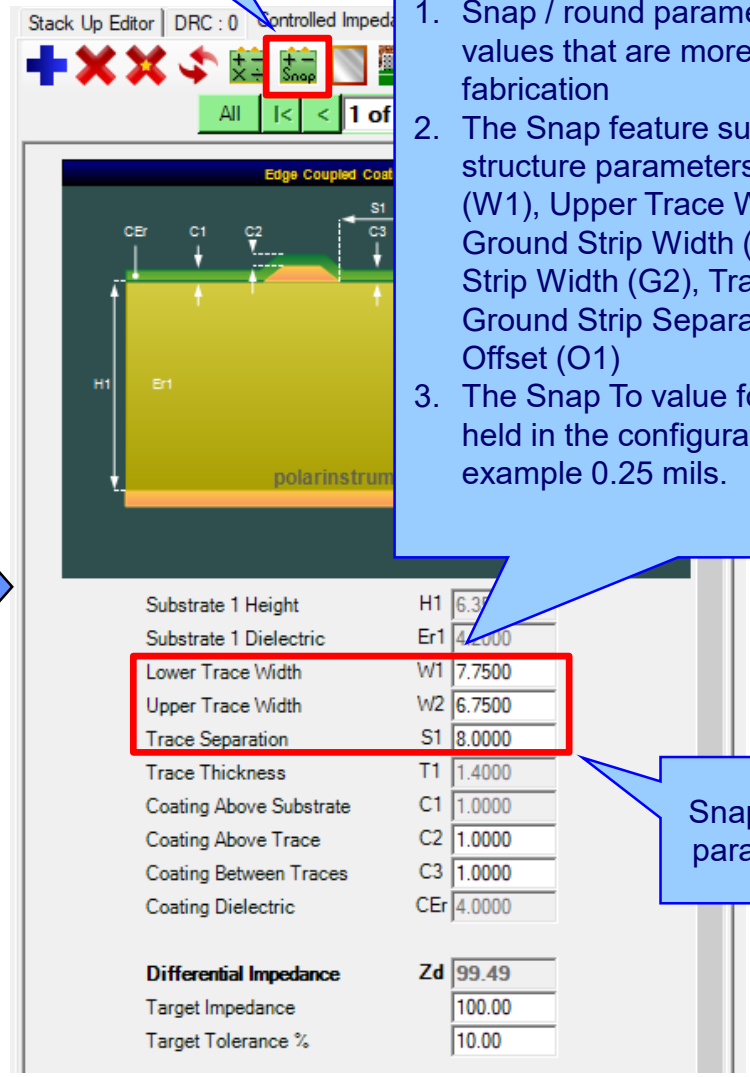


# Speedstack v22.01.01 (January 2022)

# Snap Parameters and Calculate Structure




Original parameter values



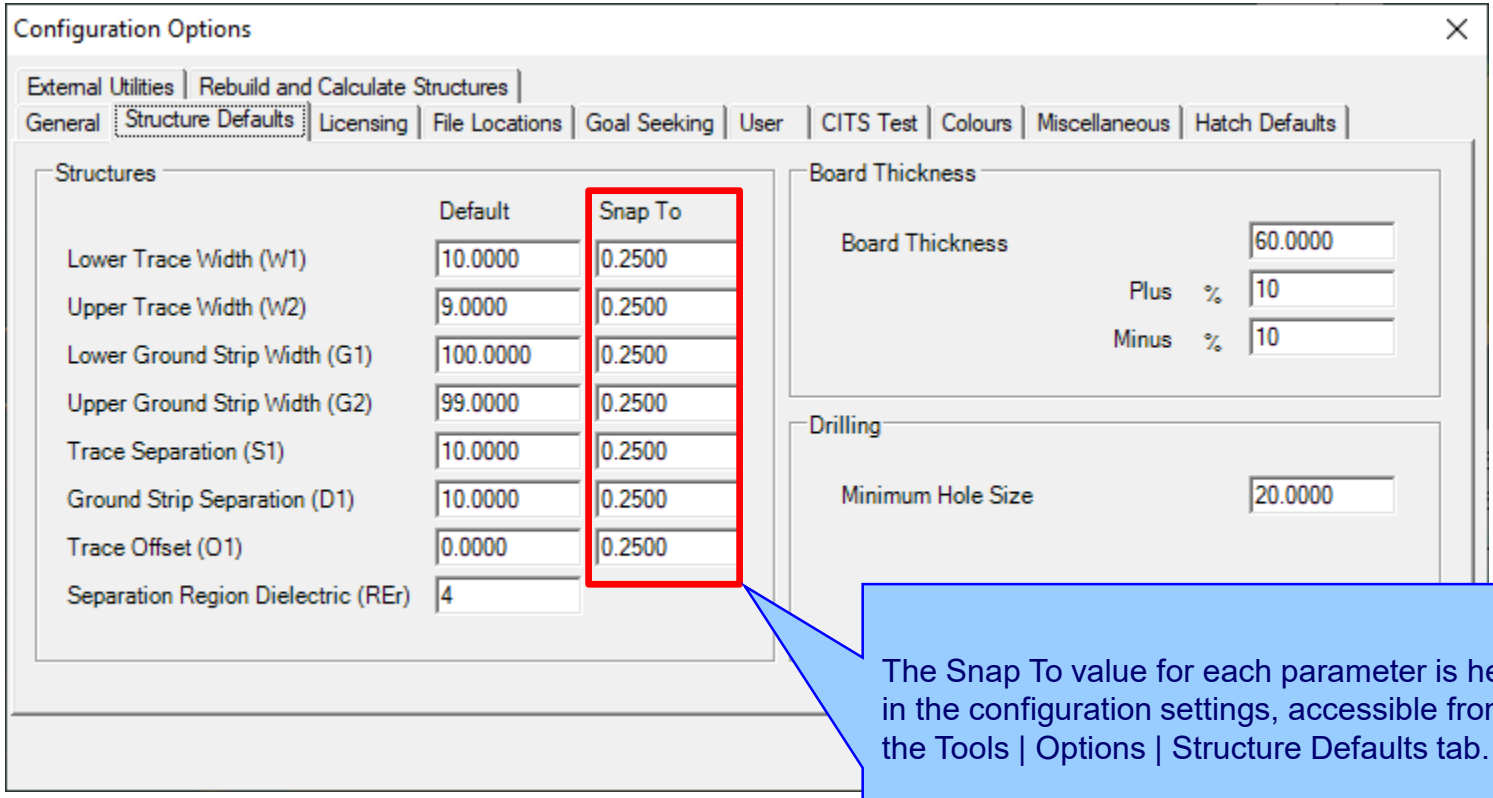

Snapped/rounded parameter values

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.

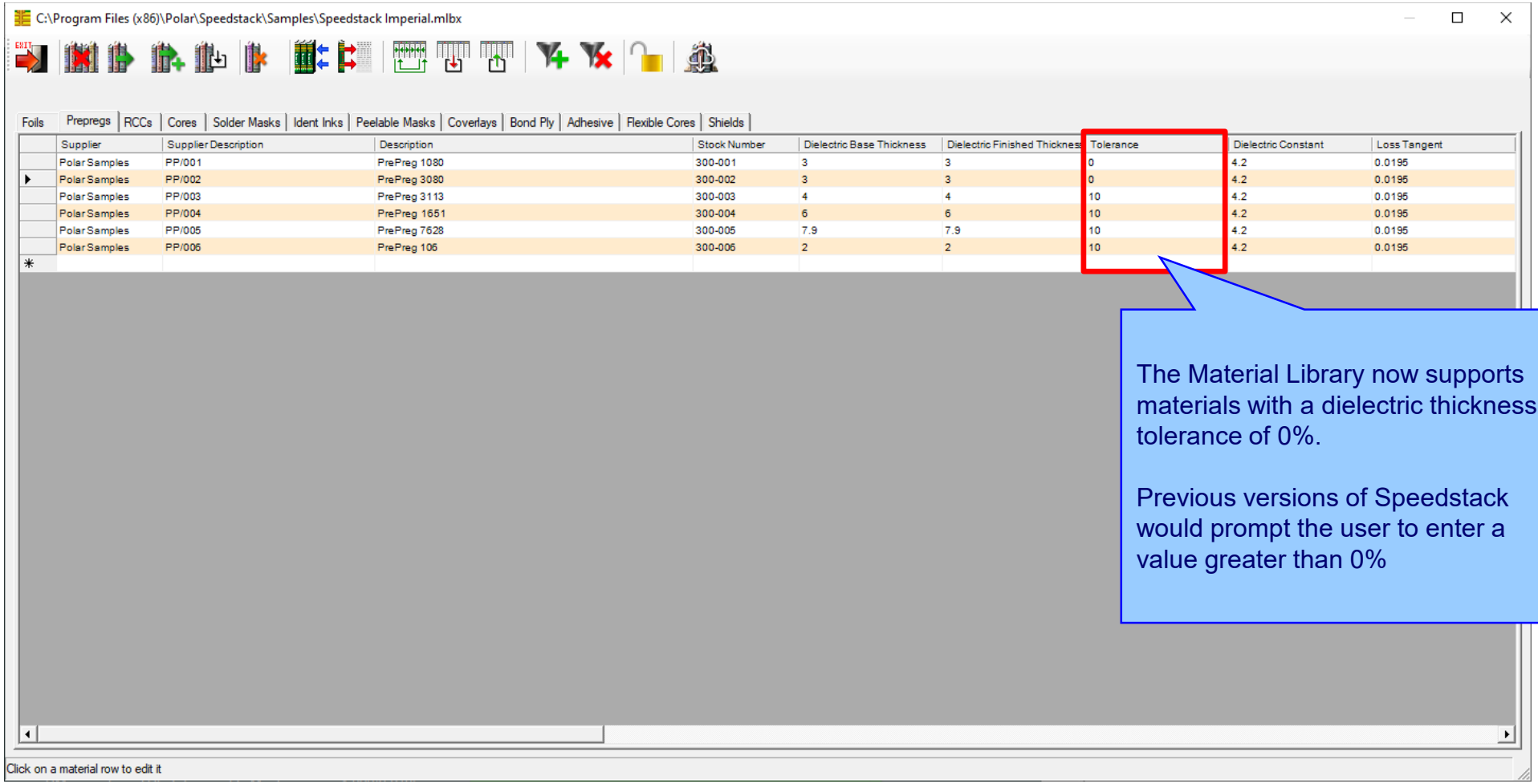
# Snap Parameters and Calculate Structure




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

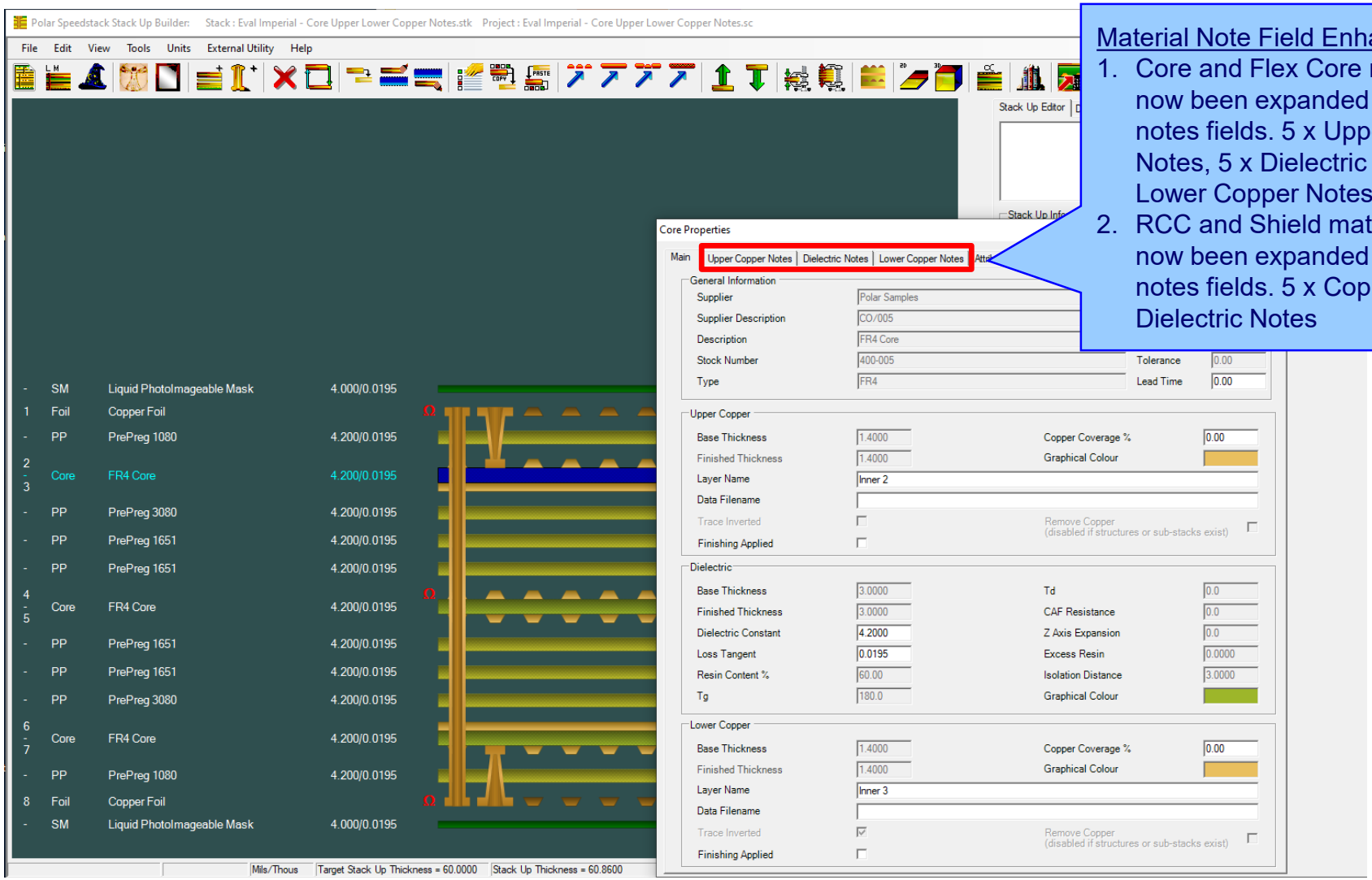



The Material Library now supports materials with a dielectric thickness tolerance of 0%.

Previous versions of Speedstack would prompt the user to enter a value greater than 0%

# Speedstack v21.11.01 (November 2021)

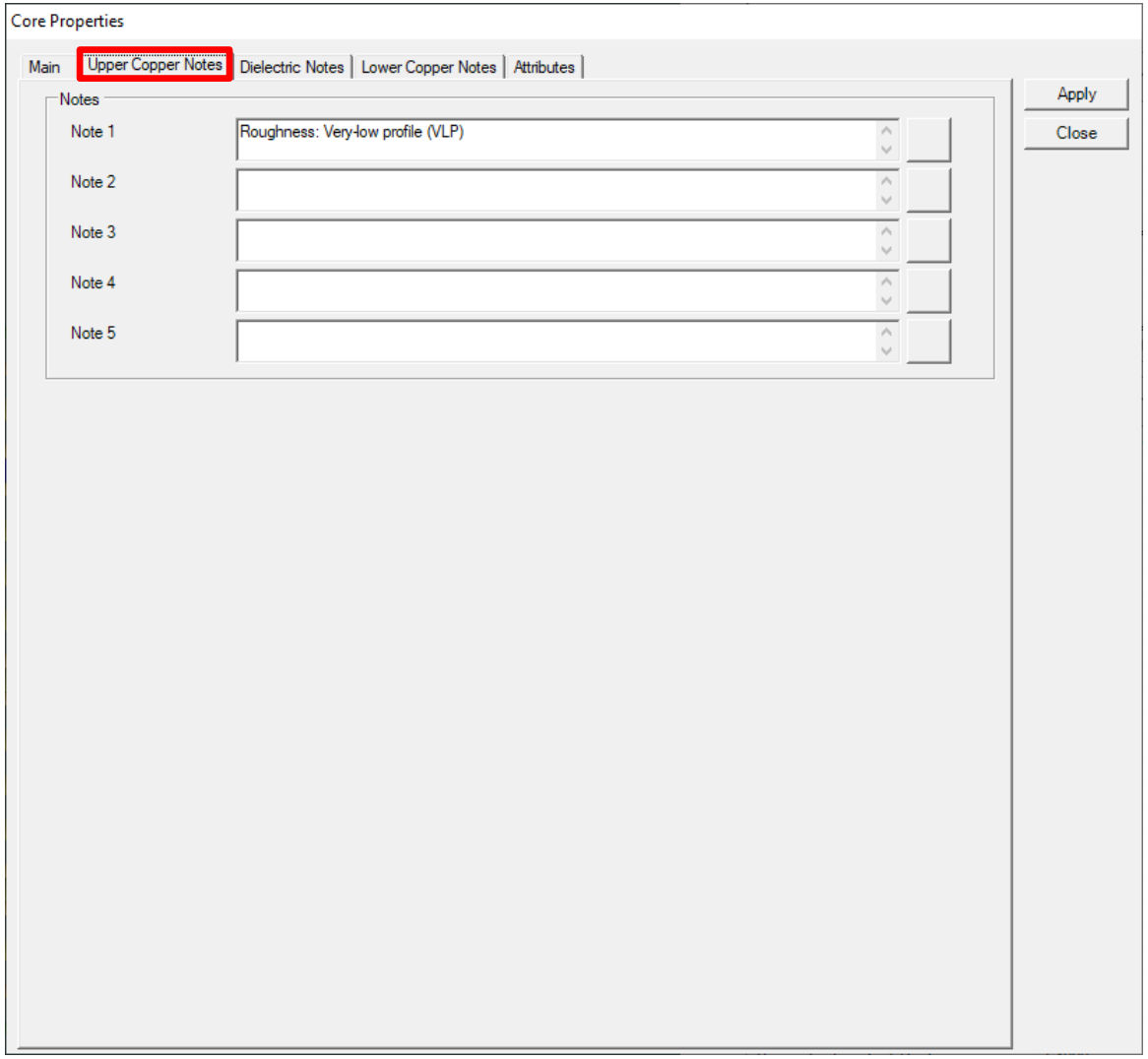
# Material Note Field Enhancements – improvements to stack up documentation




**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

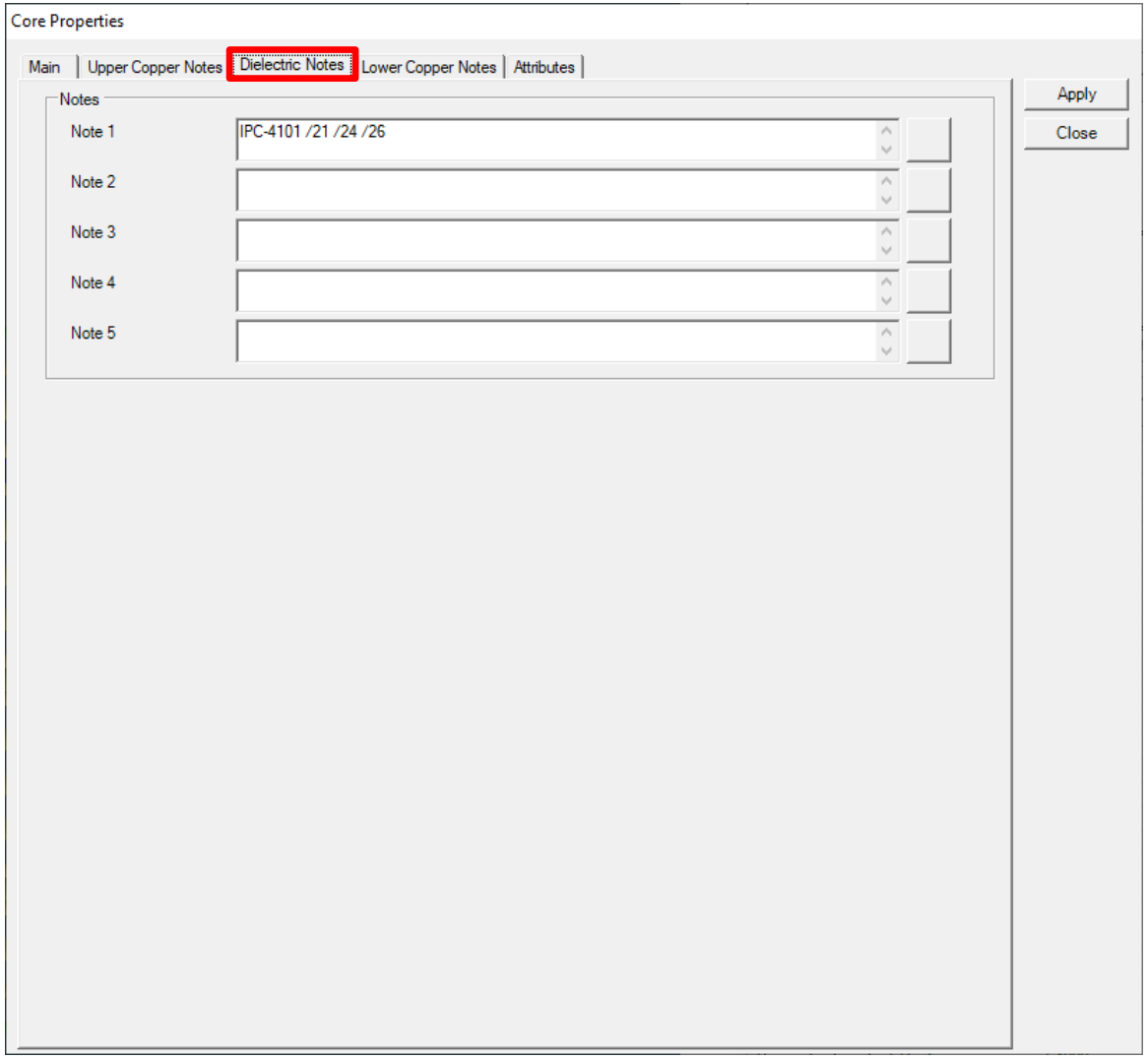
# Material Note Field Enhancements – improvements to stack up documentation




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

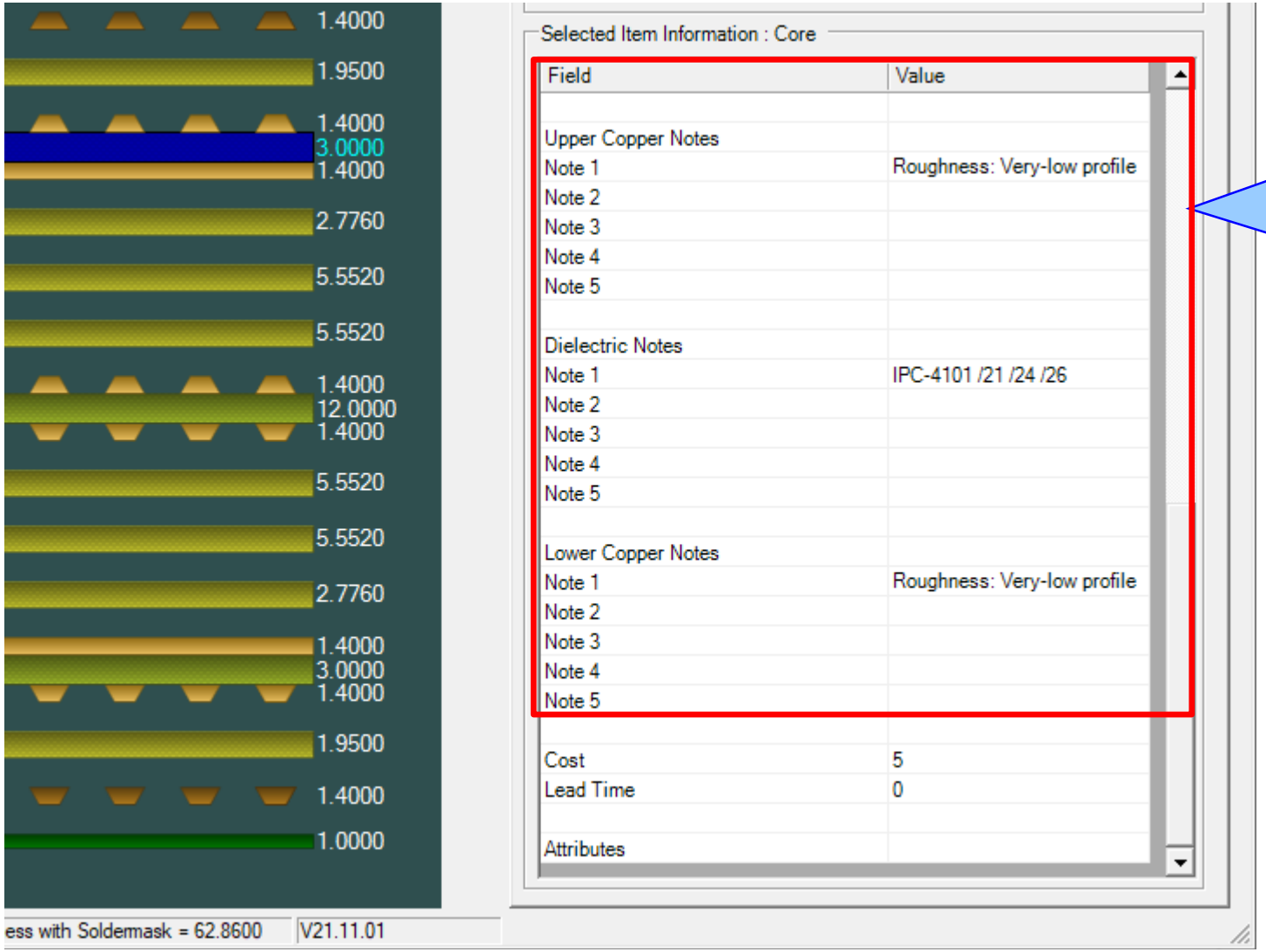
# Material Note Field Enhancements – improvements to stack up documentation




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.

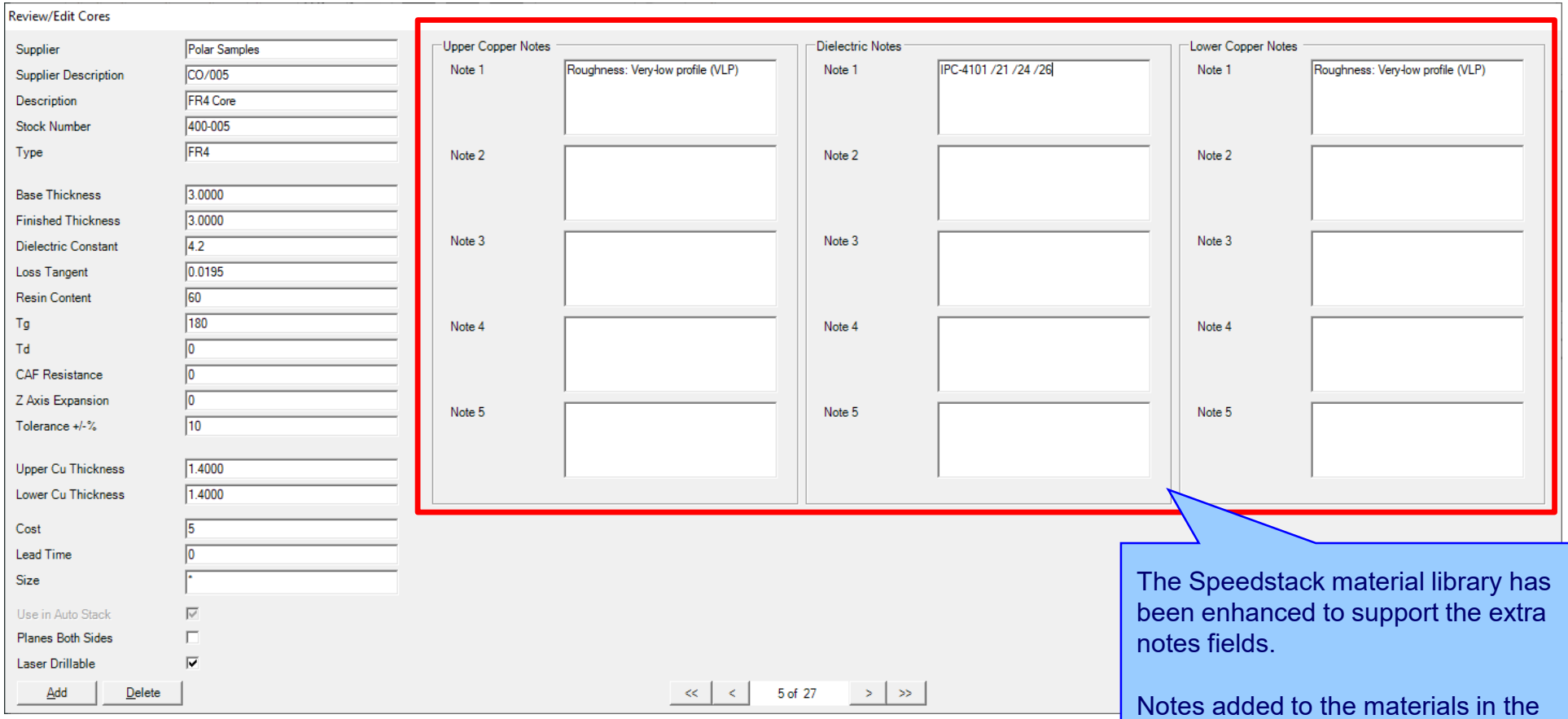
The existing five Notes fields from previous versions of Speedstack will be allocated as Dielectric Notes.

# 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.

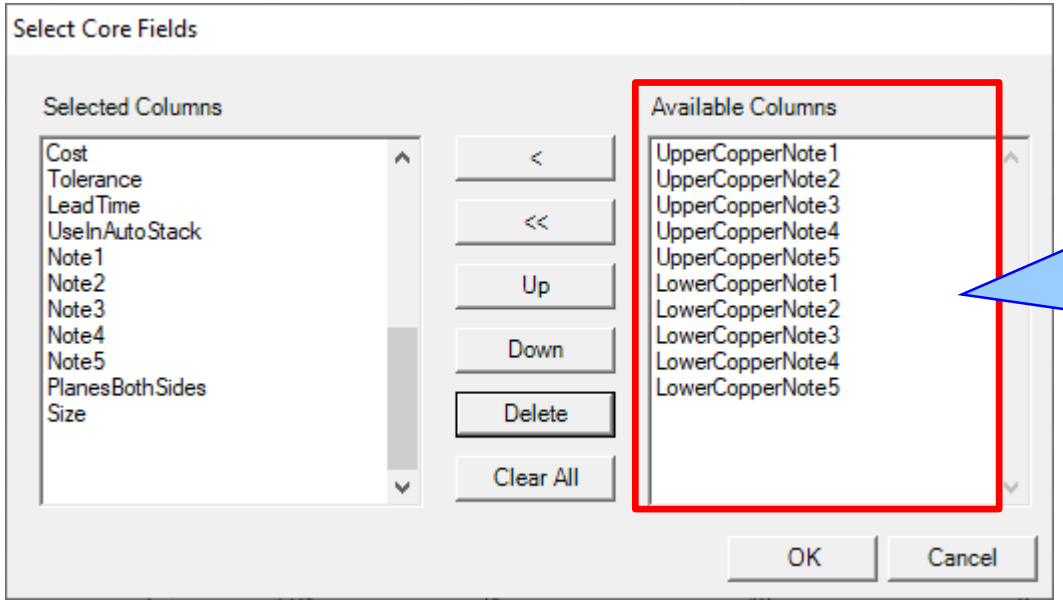
# Material Note Field Enhancements – library enhancements



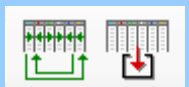

The Speedstack material library has been enhanced to support the extra notes fields.

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

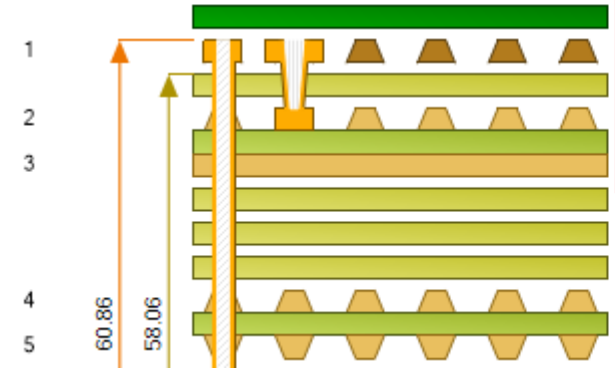


Material Library Import / Export

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) | Inner 2 | | |
| | | IPC-4101 /21 /24 /26 | | 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.

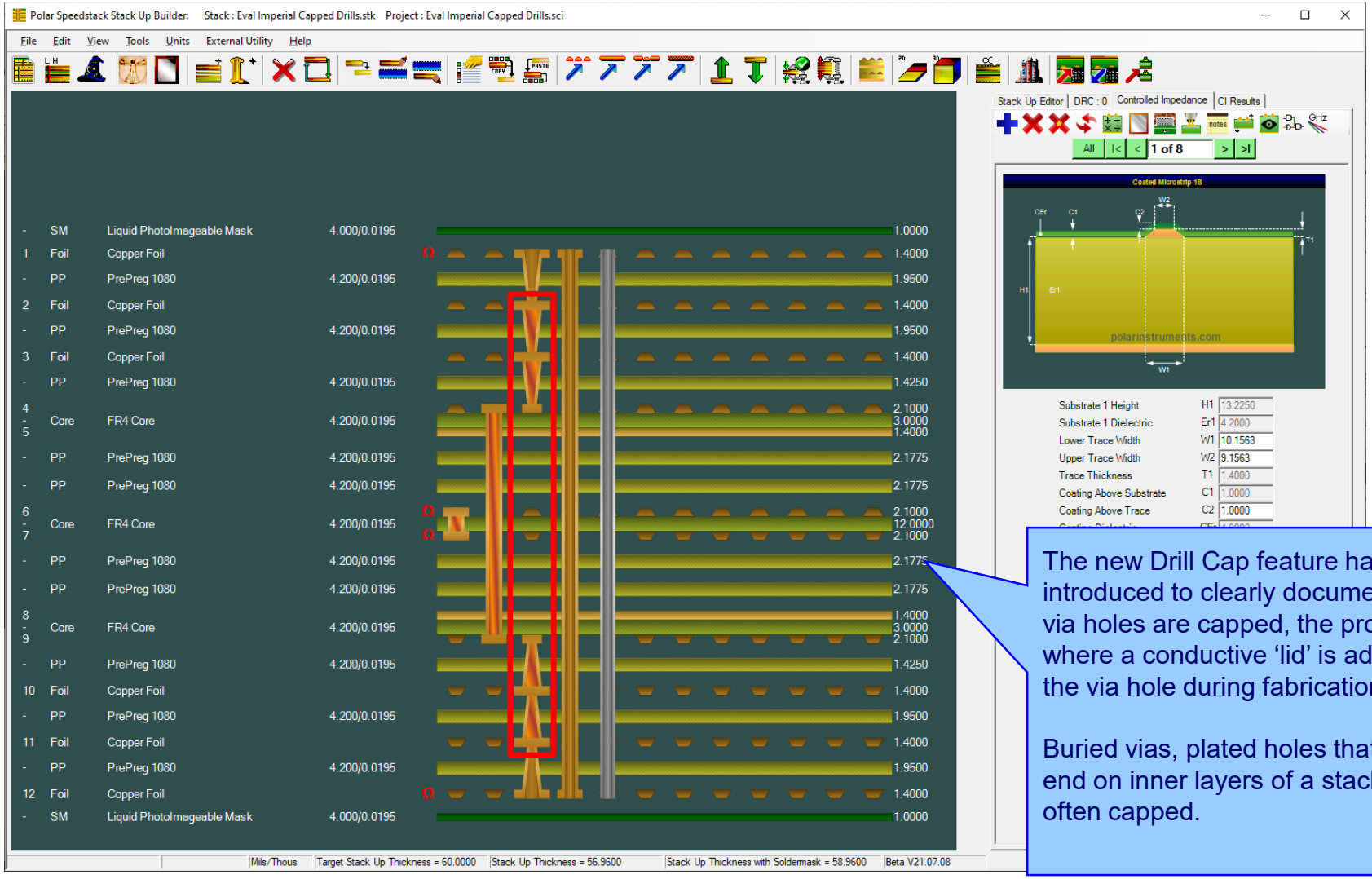
## Import / Export enhancements

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)

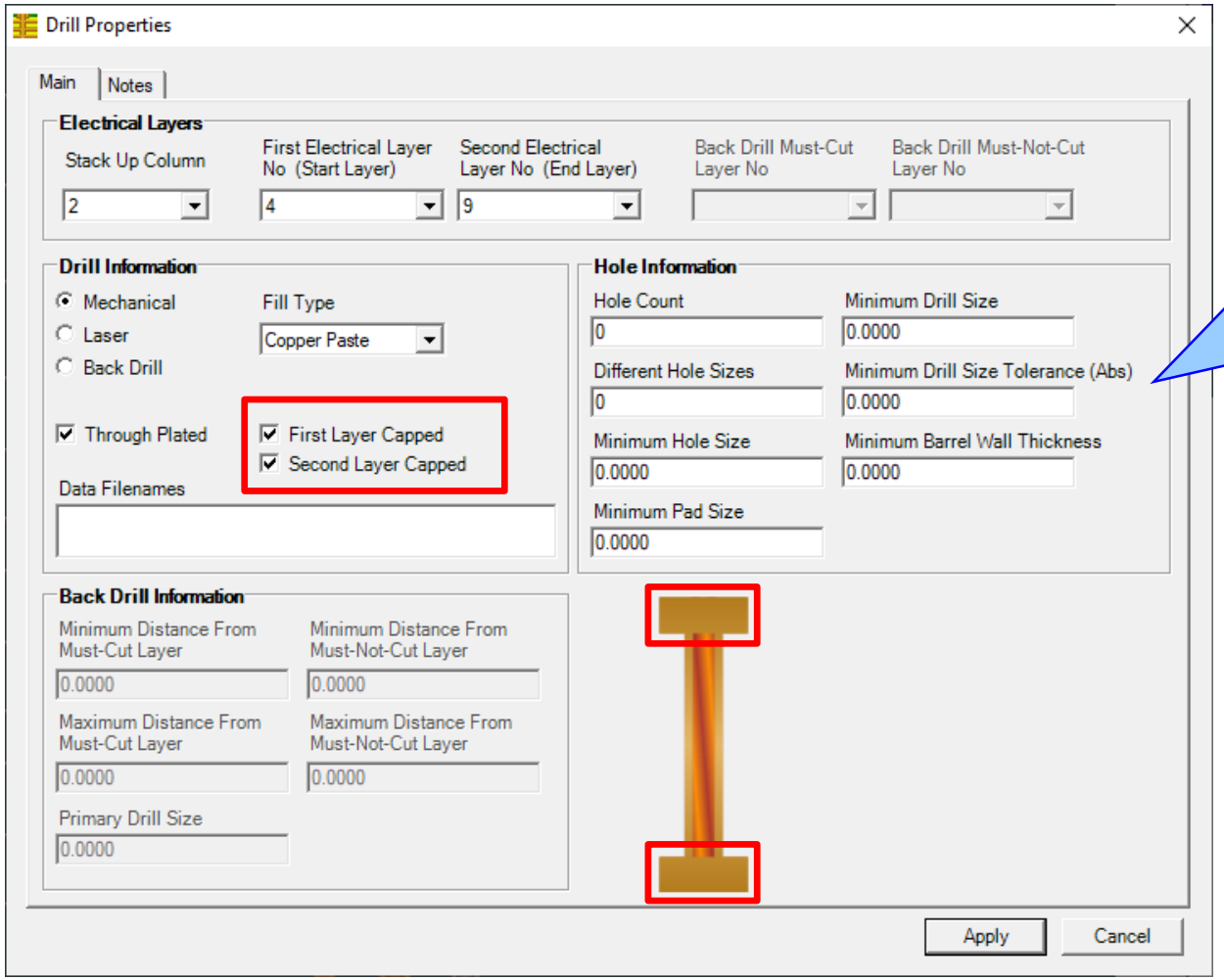
# New Drill Cap feature




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.

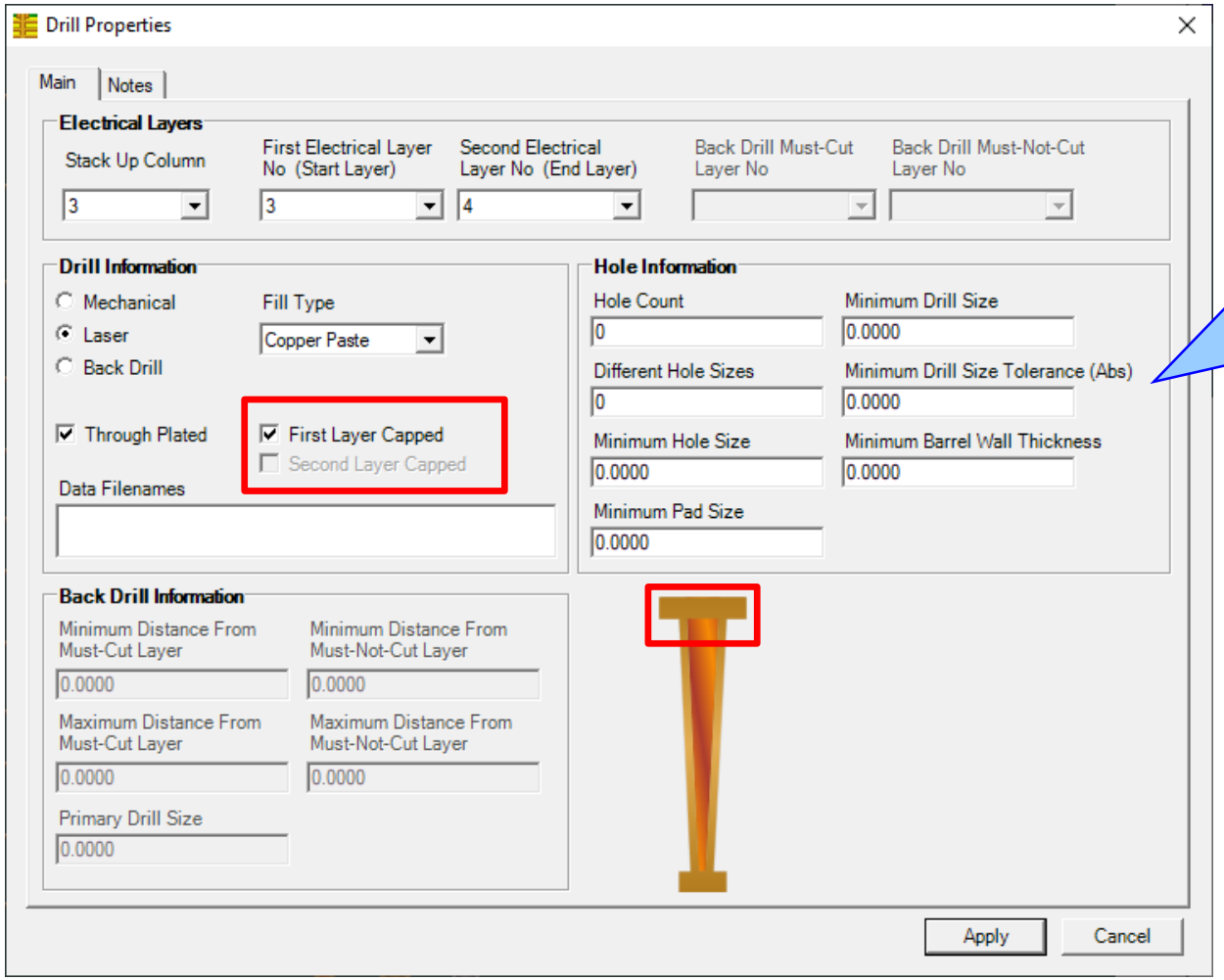
Buried vias, plated holes that start and end on inner layers of a stack up, are often capped.

# Drill Cap option – mechanical through plated drills



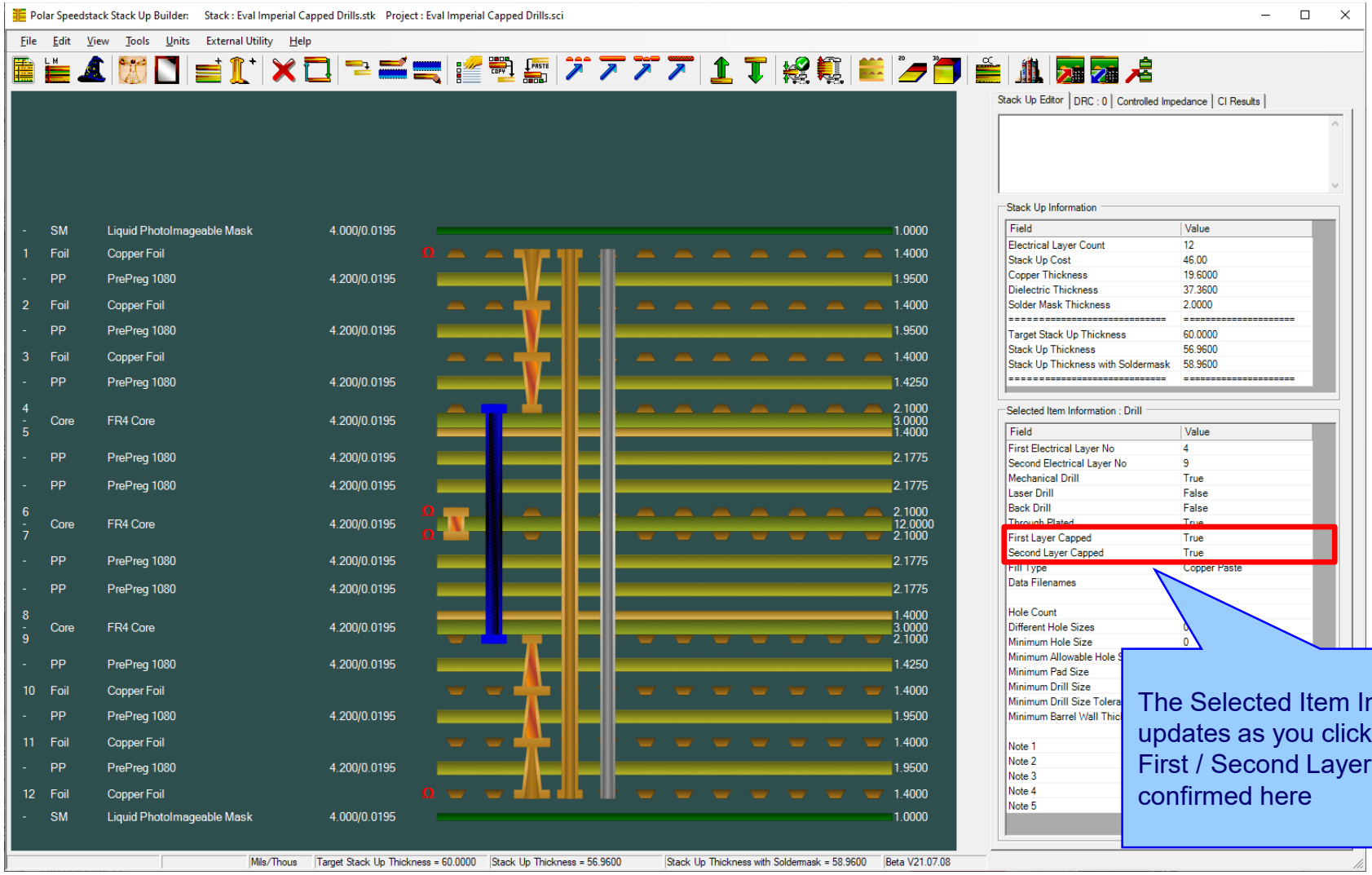

Mechanical
For mechanical drills it is possible to have four states:
1.Neither first or second layer capped (default when adding a drill)
2.First layer capped
3.Second layer capped
4.Both layers capped

# Drill Cap option – laser drills

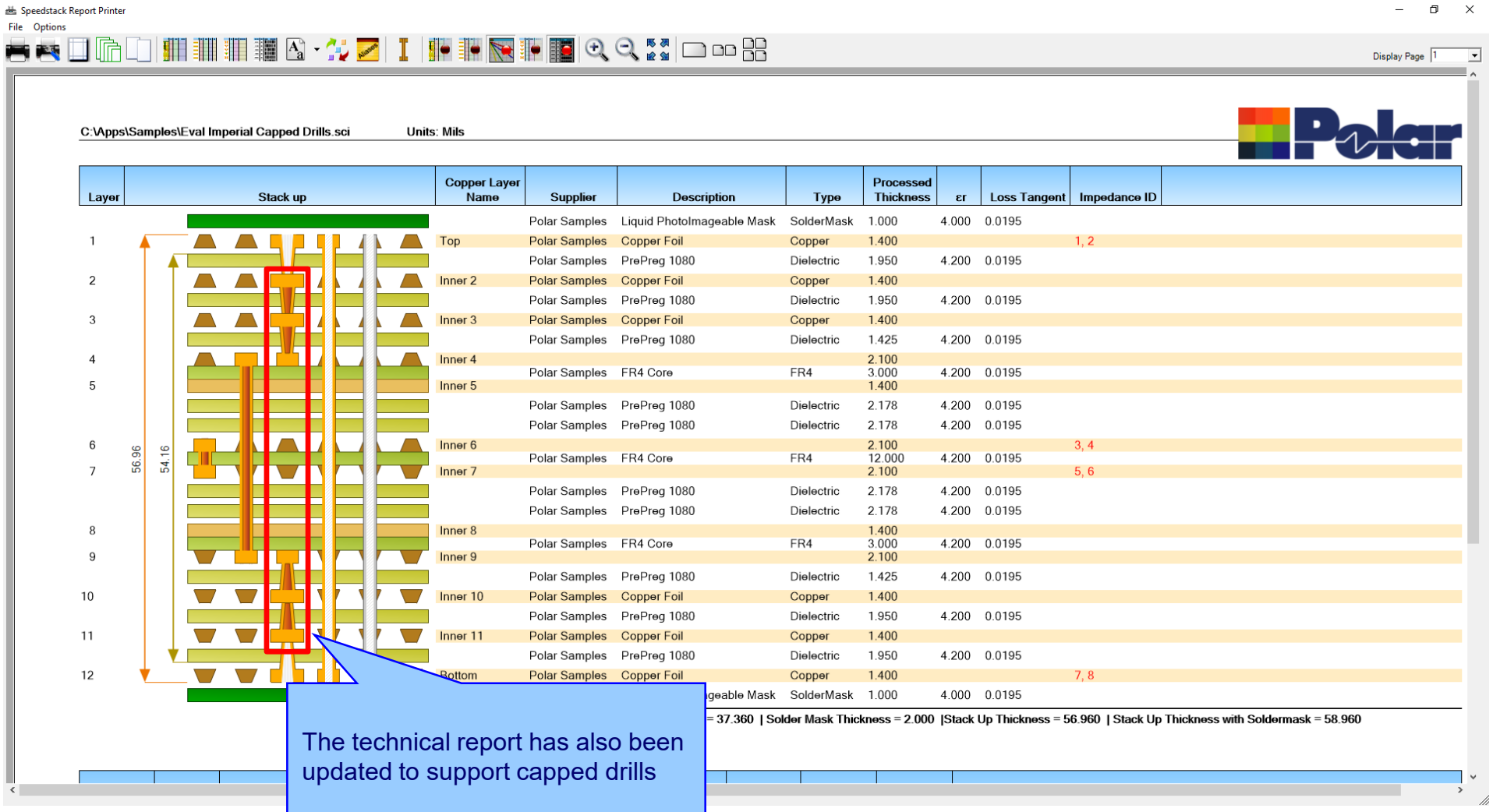



Laser
For laser drills it is possible to have two states as the Second Layer Capped checkbox is disabled:
1.Not capped (default when adding a drill)
2.First layer capped

# New Drill Cap feature



# New Drill Cap feature – technical report enhancements



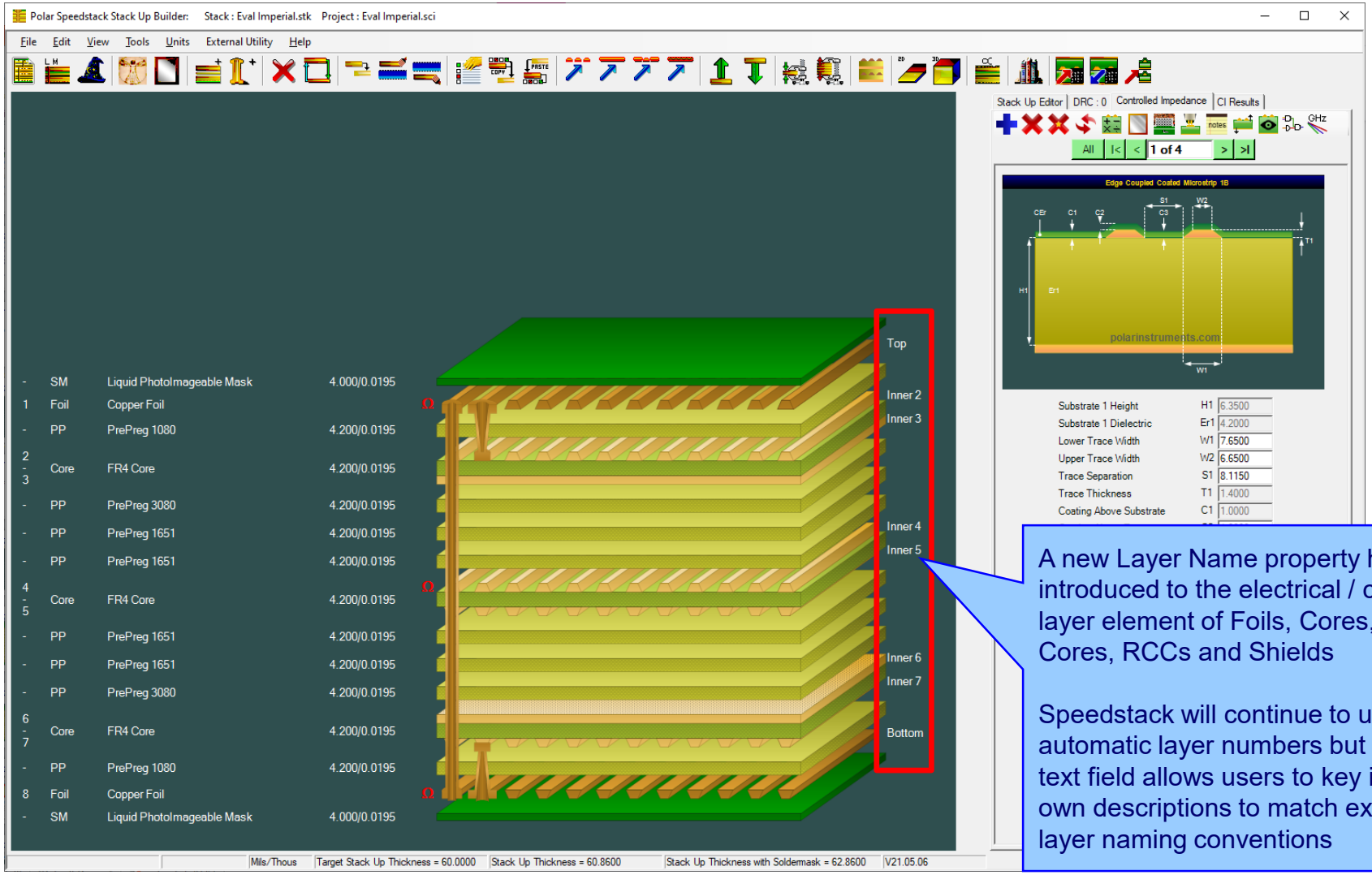
## Import / Export enhancements

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)

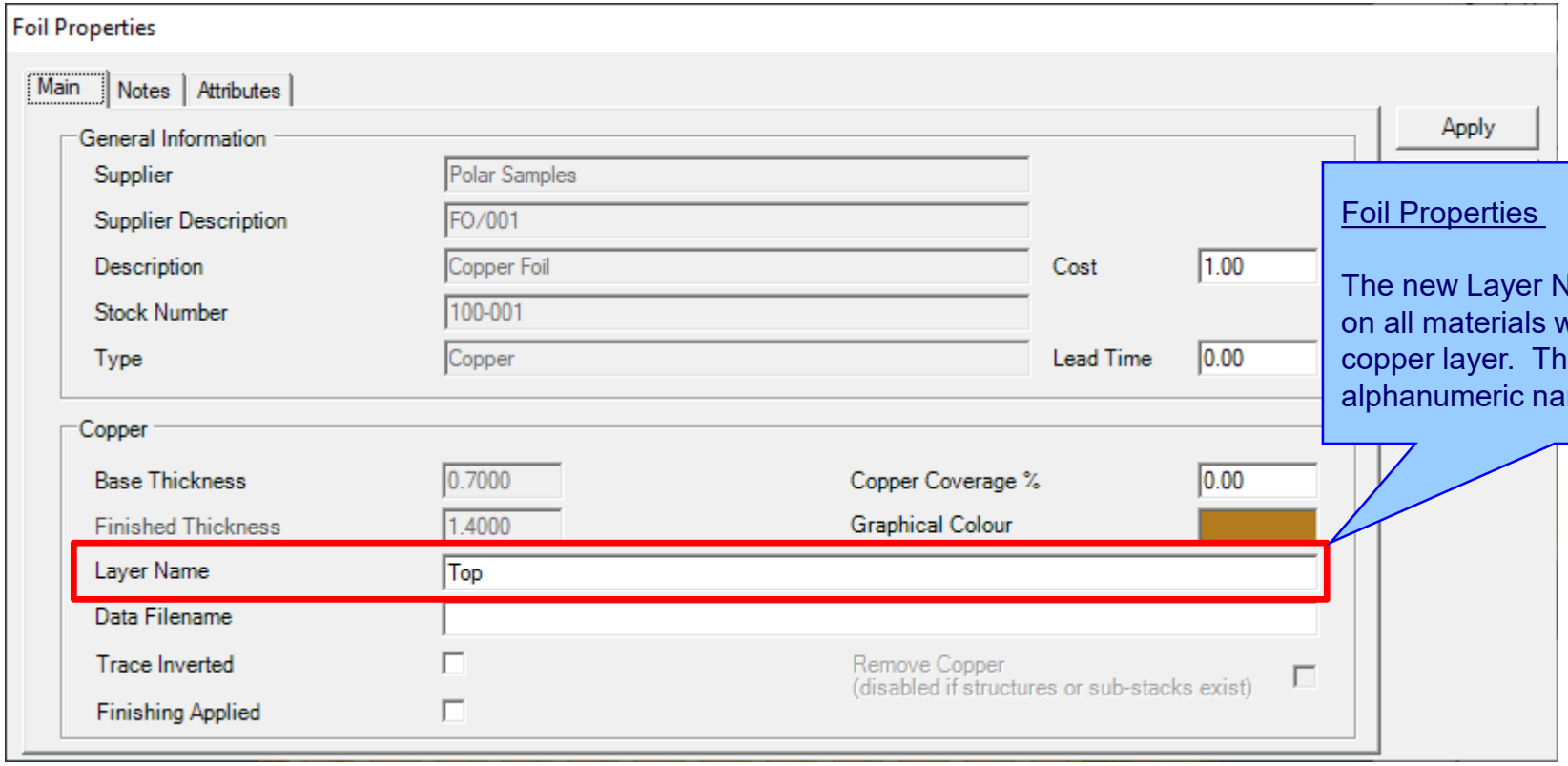
# New Layer Name property for electrical / copper layers




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

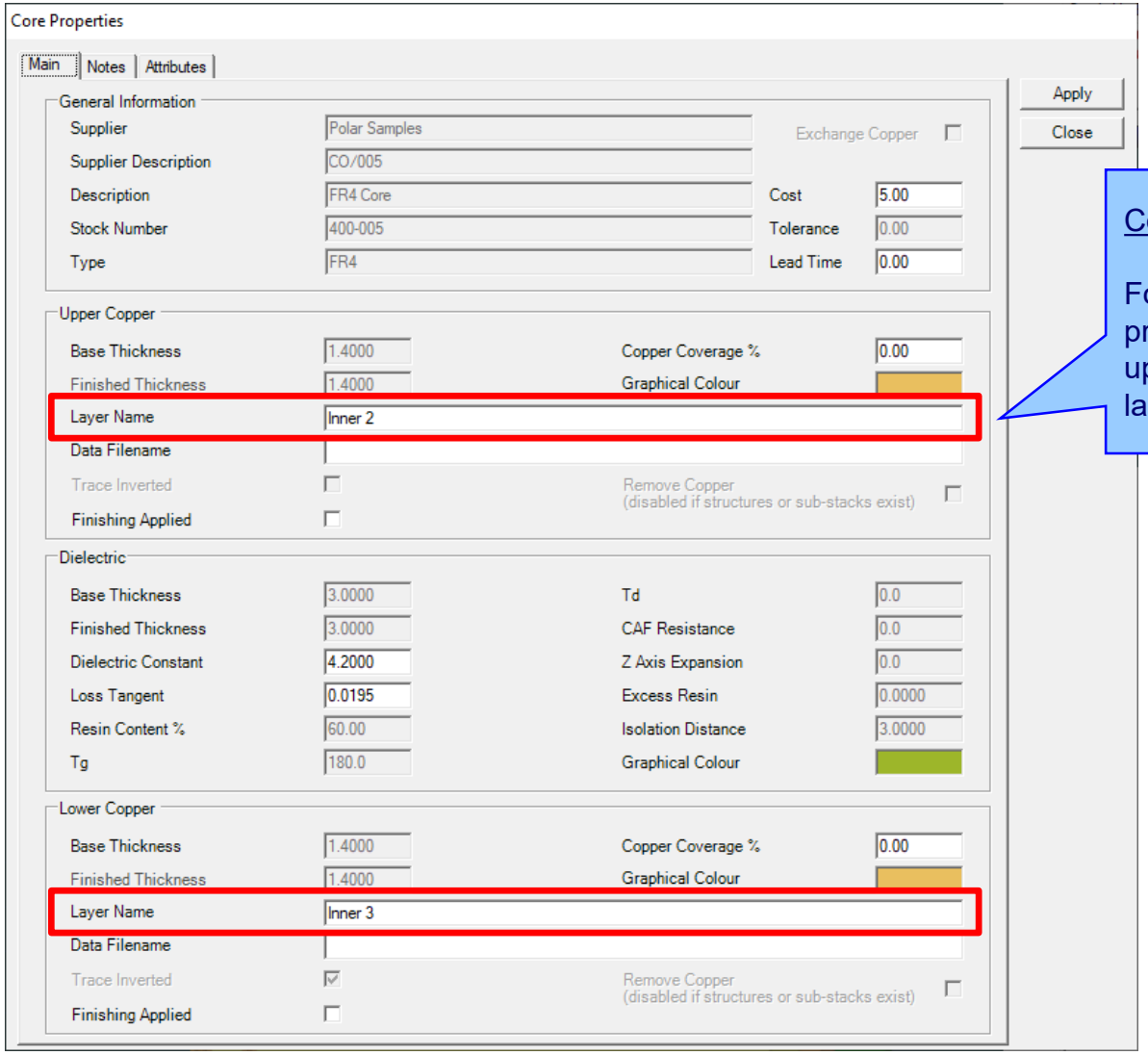
# New Layer Name property for electrical / copper layers




Foil Properties

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

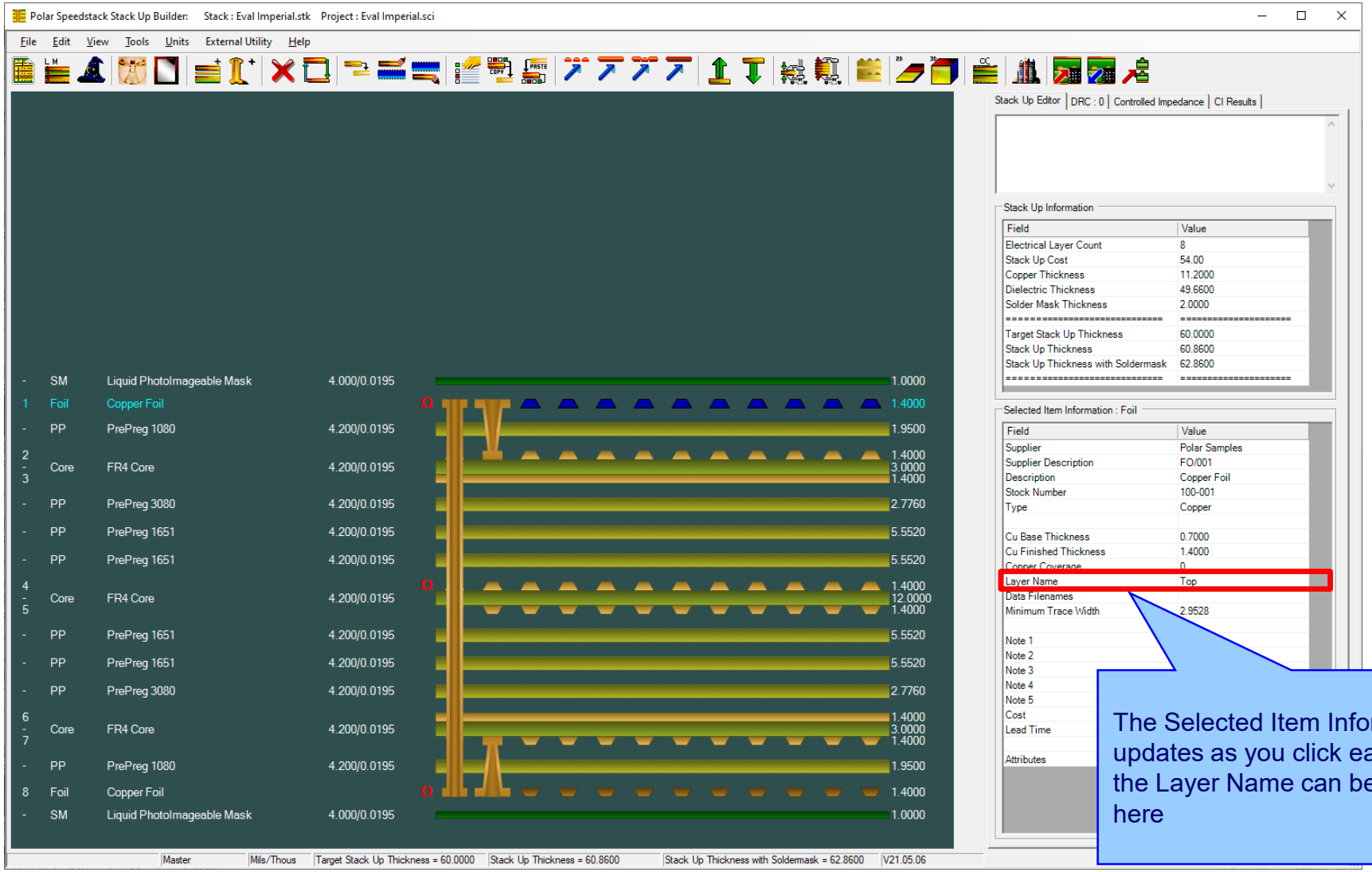
# New Layer Name property for electrical / copper layers




Core Properties

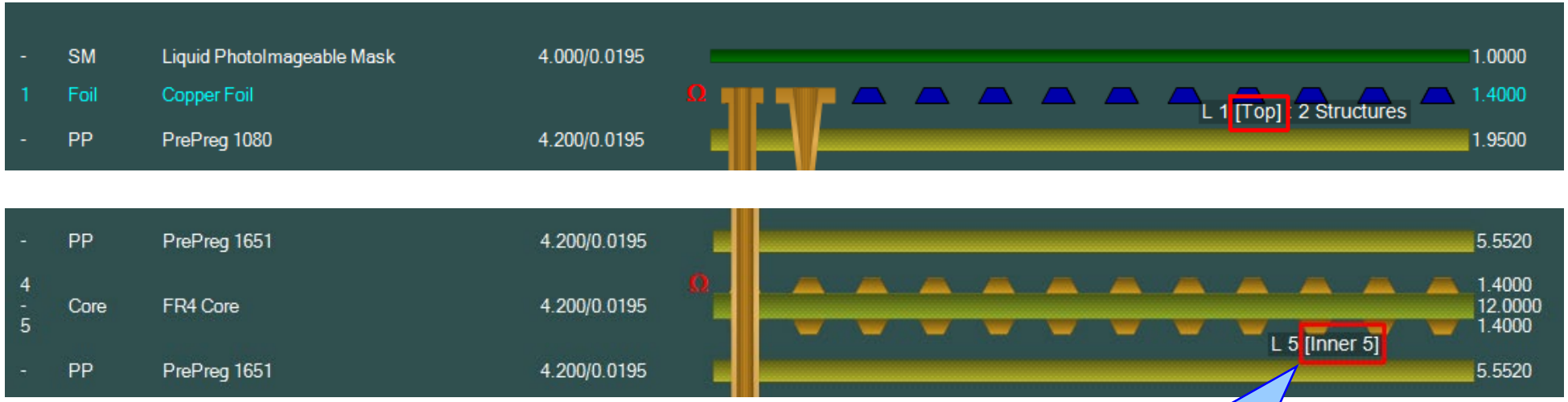
For core materials, a new Layer Name property has been added for both upper and lower electrical / copper layers

# New Layer Name property for electrical / copper layers



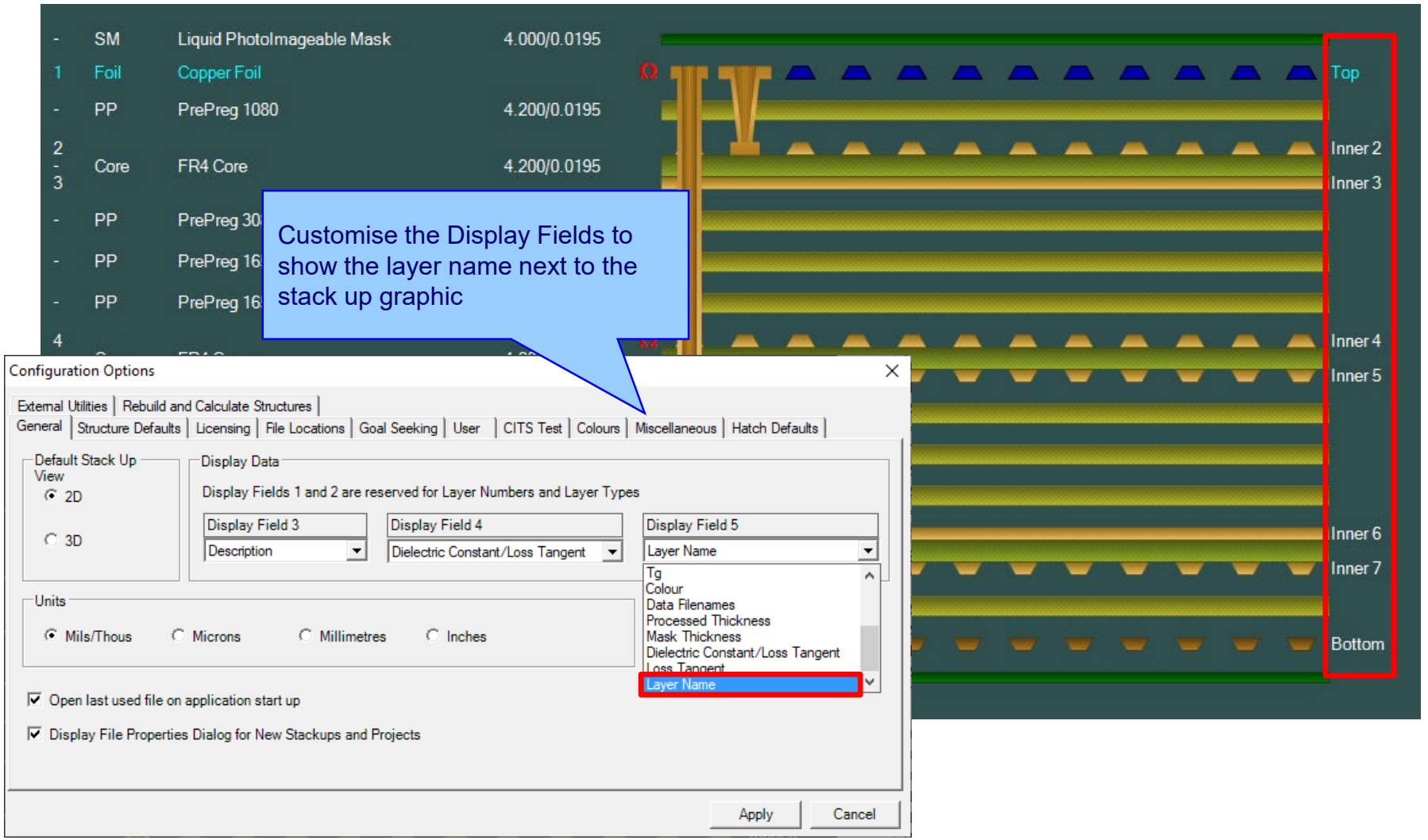

The Selected Item Information auto updates as you click each material, the Layer Name can be confirmed here

# New Layer Name property for electrical / copper layers

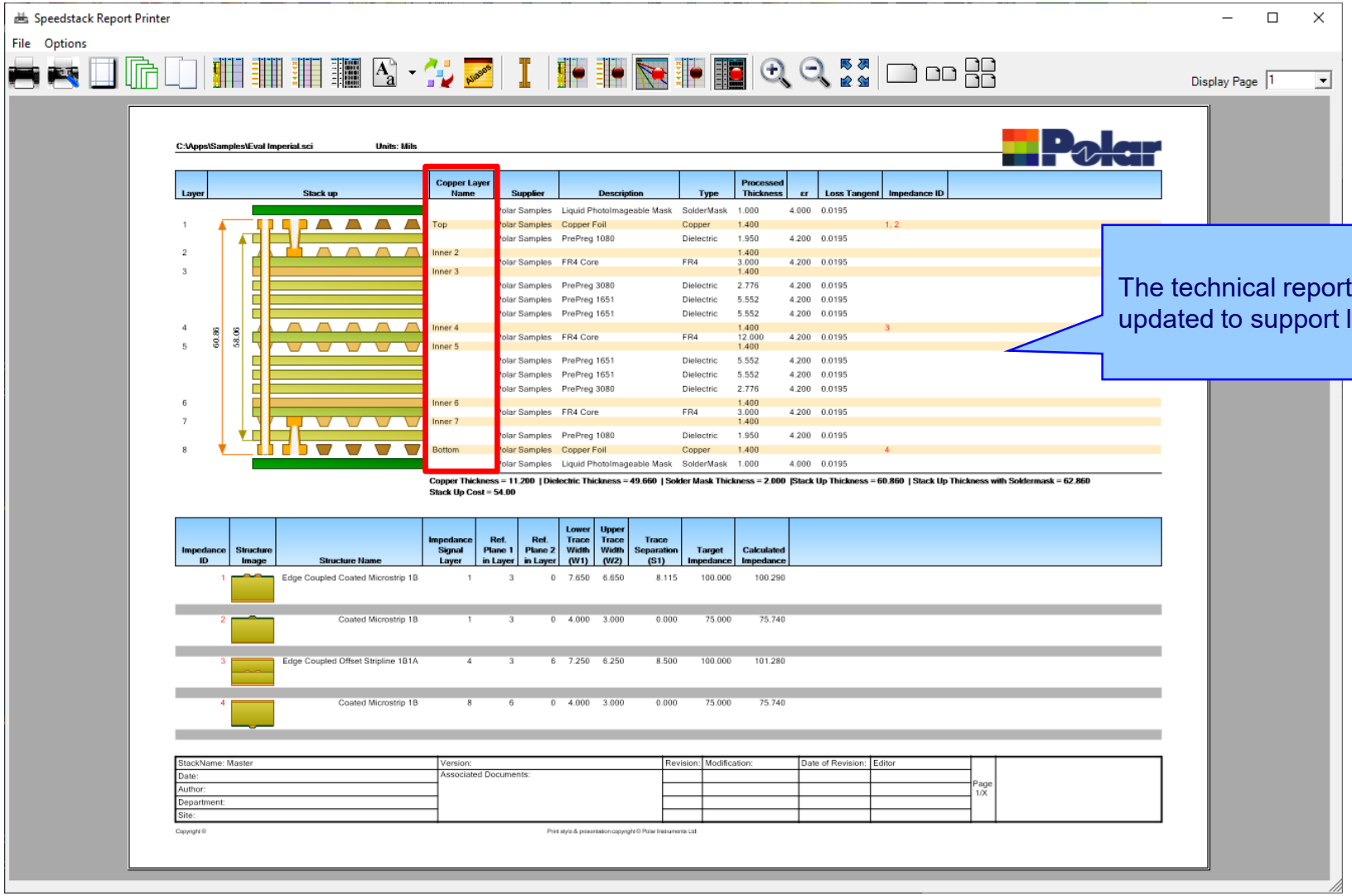



Mouse over the electrical layer and the Layer Name will display alongside the layer number and the amount of structures. Very quickly confirm the Layer Name without needing to open the Properties dialog

# New Layer Name property for electrical / copper layers

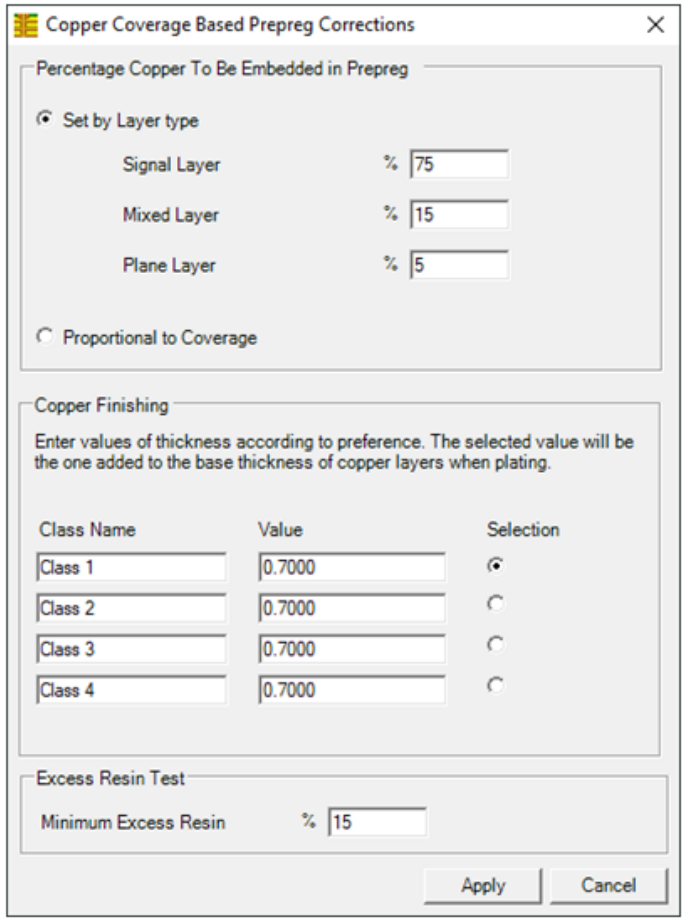


# New Layer Name property for electrical / copper layers

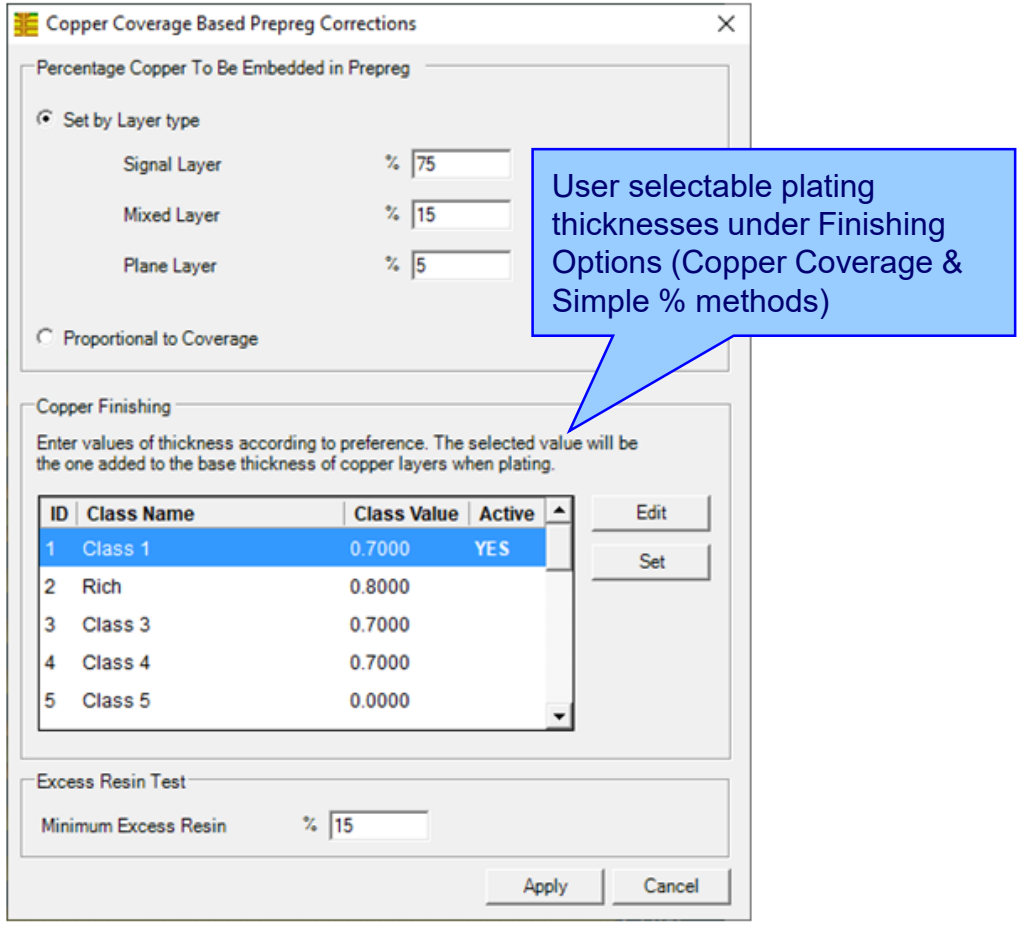



The technical report has also been updated to support layer names

# Copper Finishing classes increased




Speedstack v21.04 and earlier supported 4 classes




Speedstack v21.05 now supports 20 classes

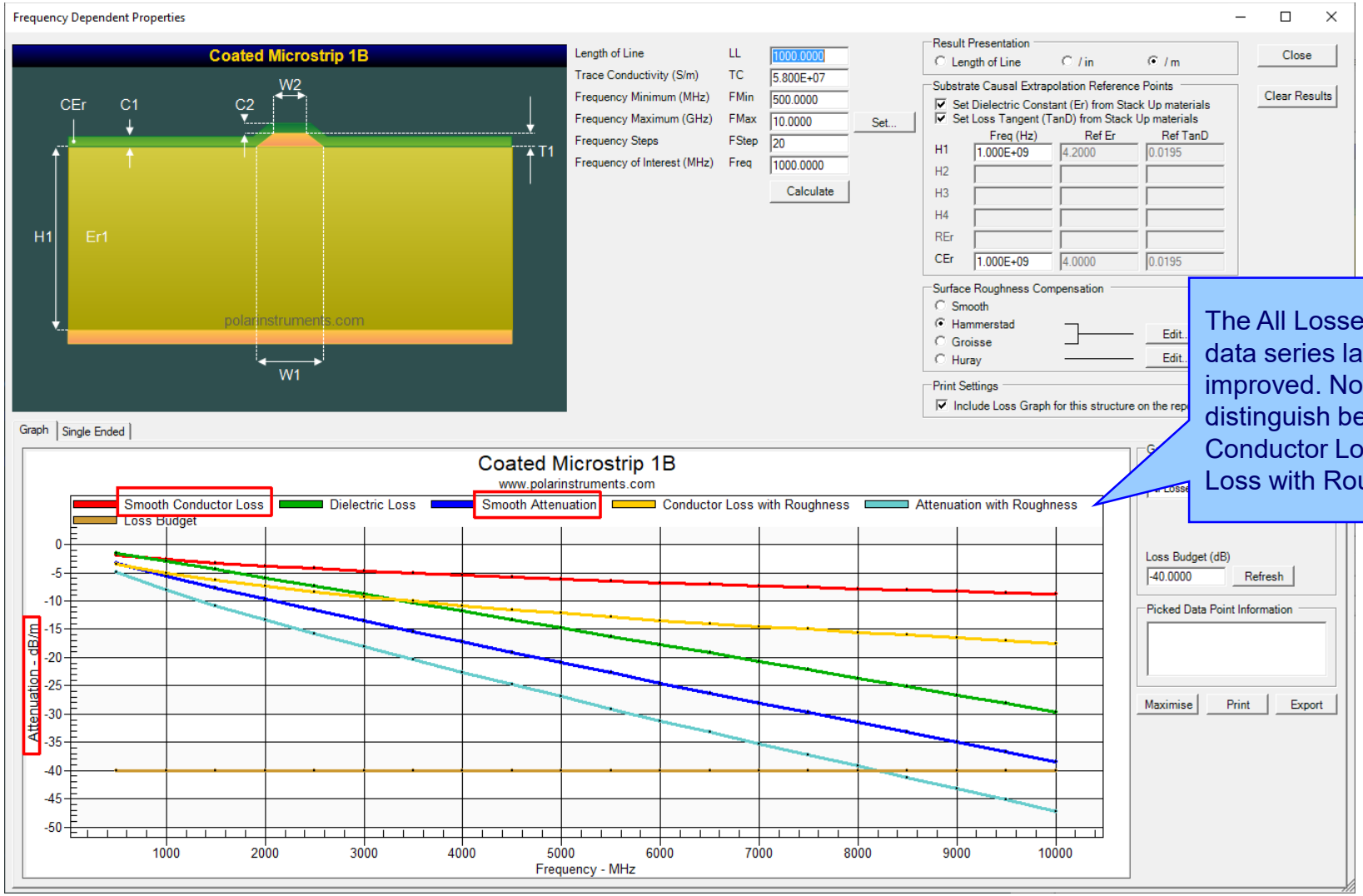
## Import / Export enhancements

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



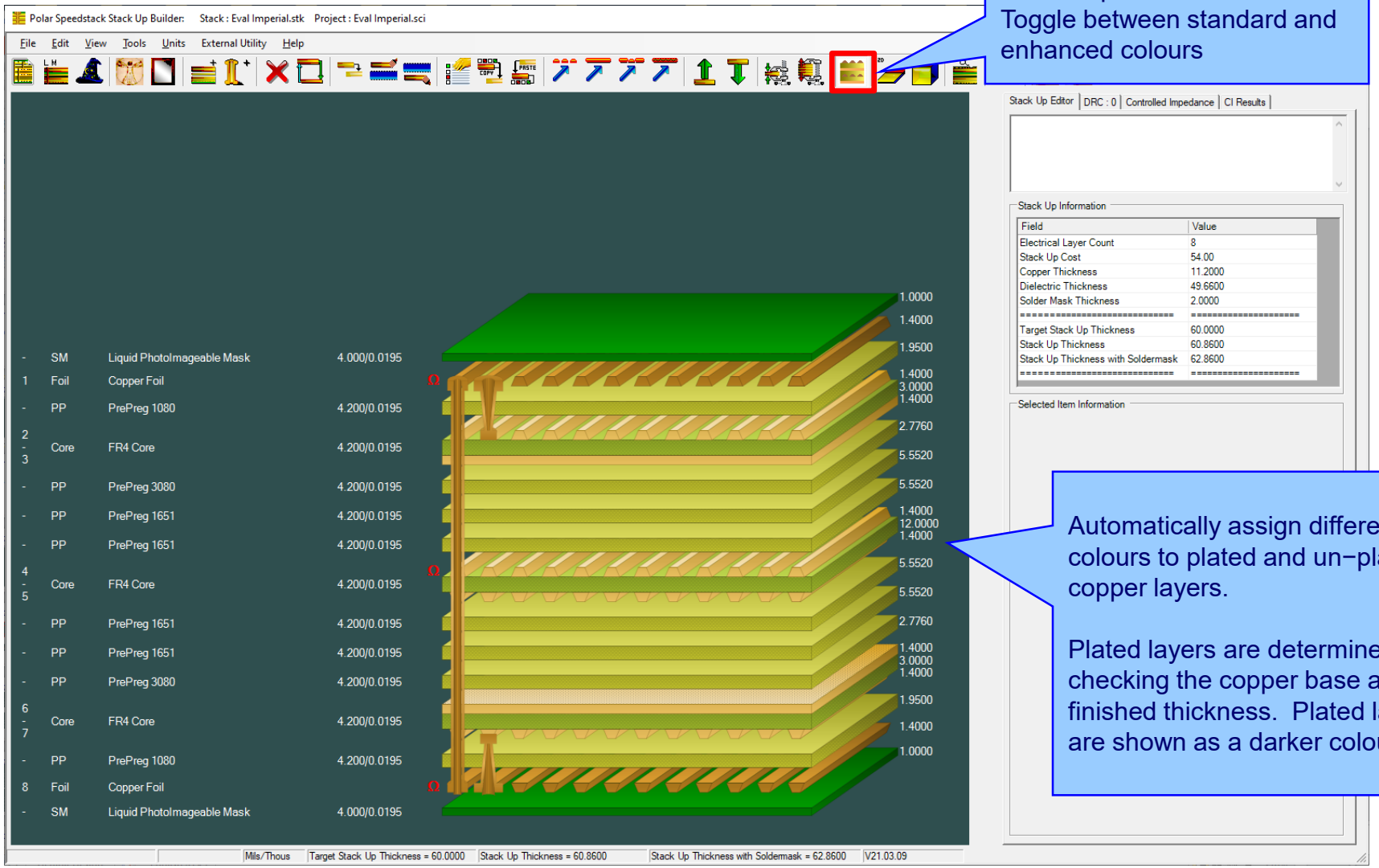

The All Losses plot y–axis and data series labelling has been improved. Now easier to distinguish between Smooth Conductor Loss and Conductor Loss with Roughness

## 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

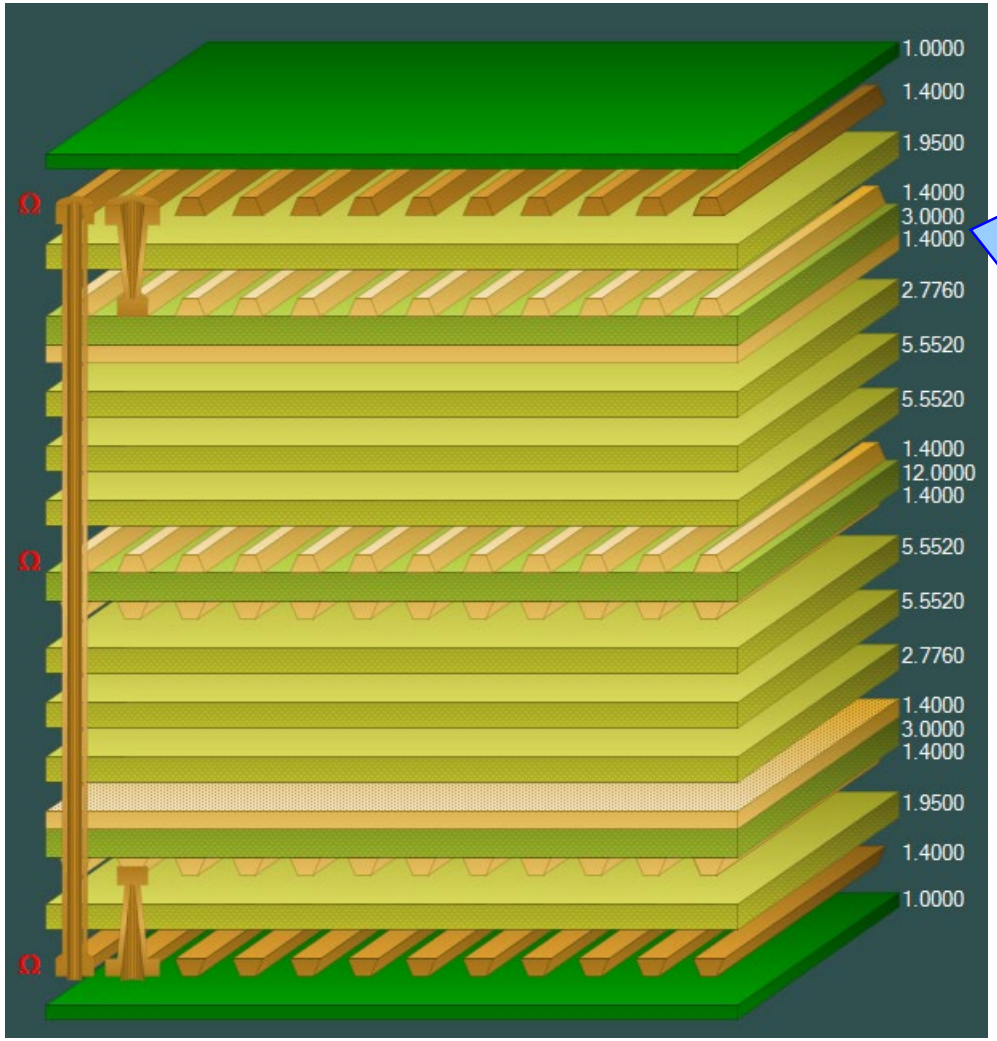



New Apply Plating Colours toolbar option.
Toggle between standard and enhanced colours

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.

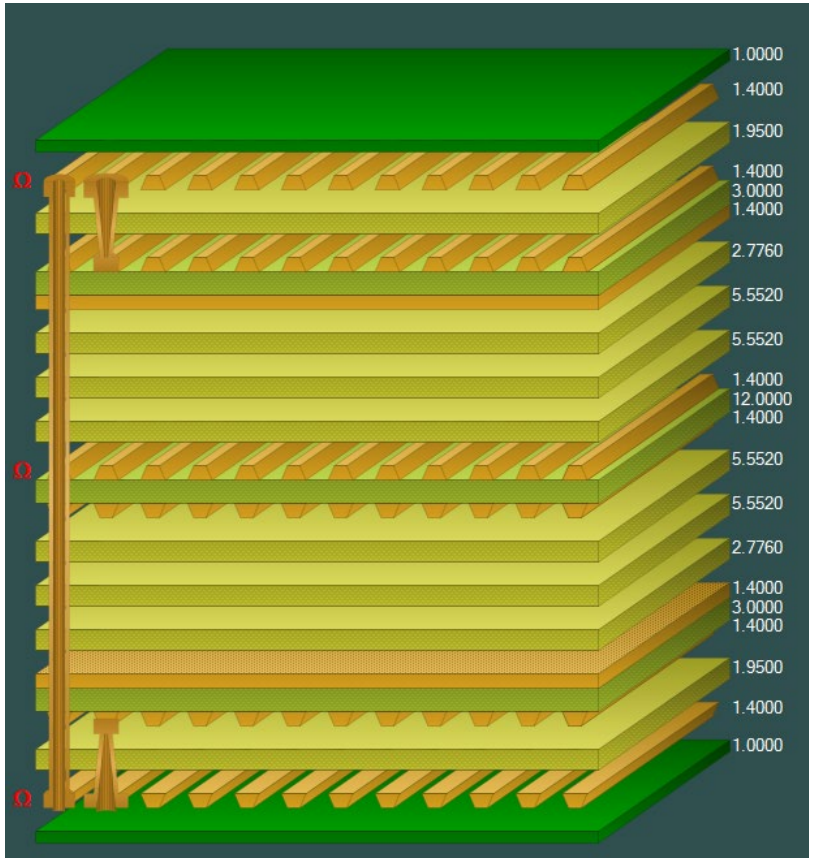
This electroplating process often results in additional copper also being applied to the exposed copper layers where the mechanical drill starts / ends.

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

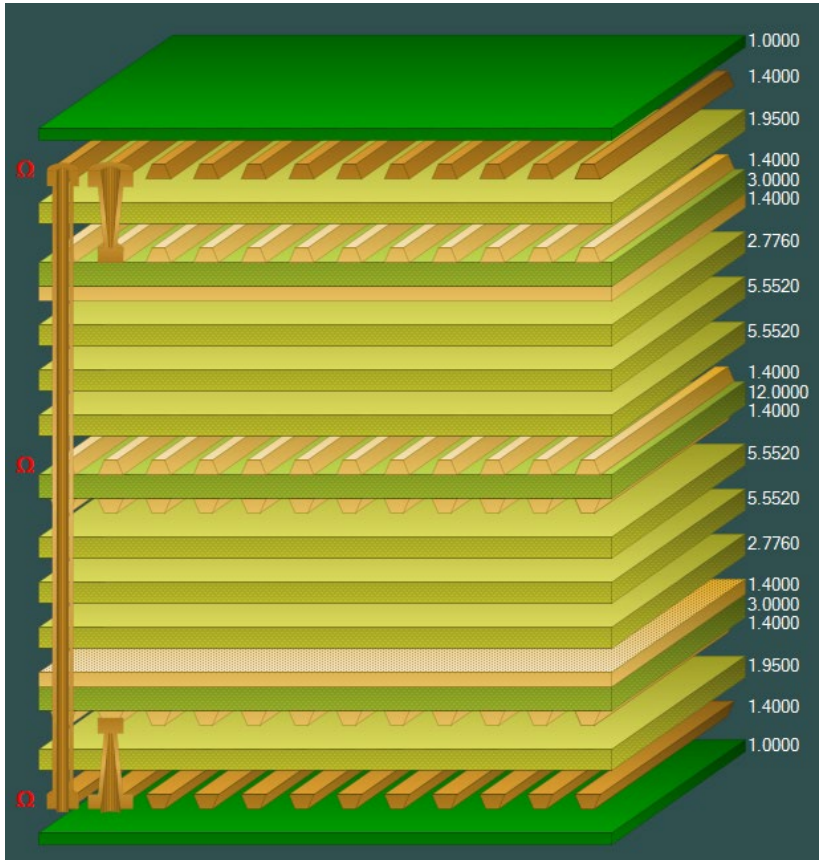
Speedstack has always allowed this additional plating thickness to be applied to the relevant copper layers. With v21.03 this has been enhanced further with automatic colour assignments to the plated and un−plated layers

# New Apply Plating Colours toolbar option

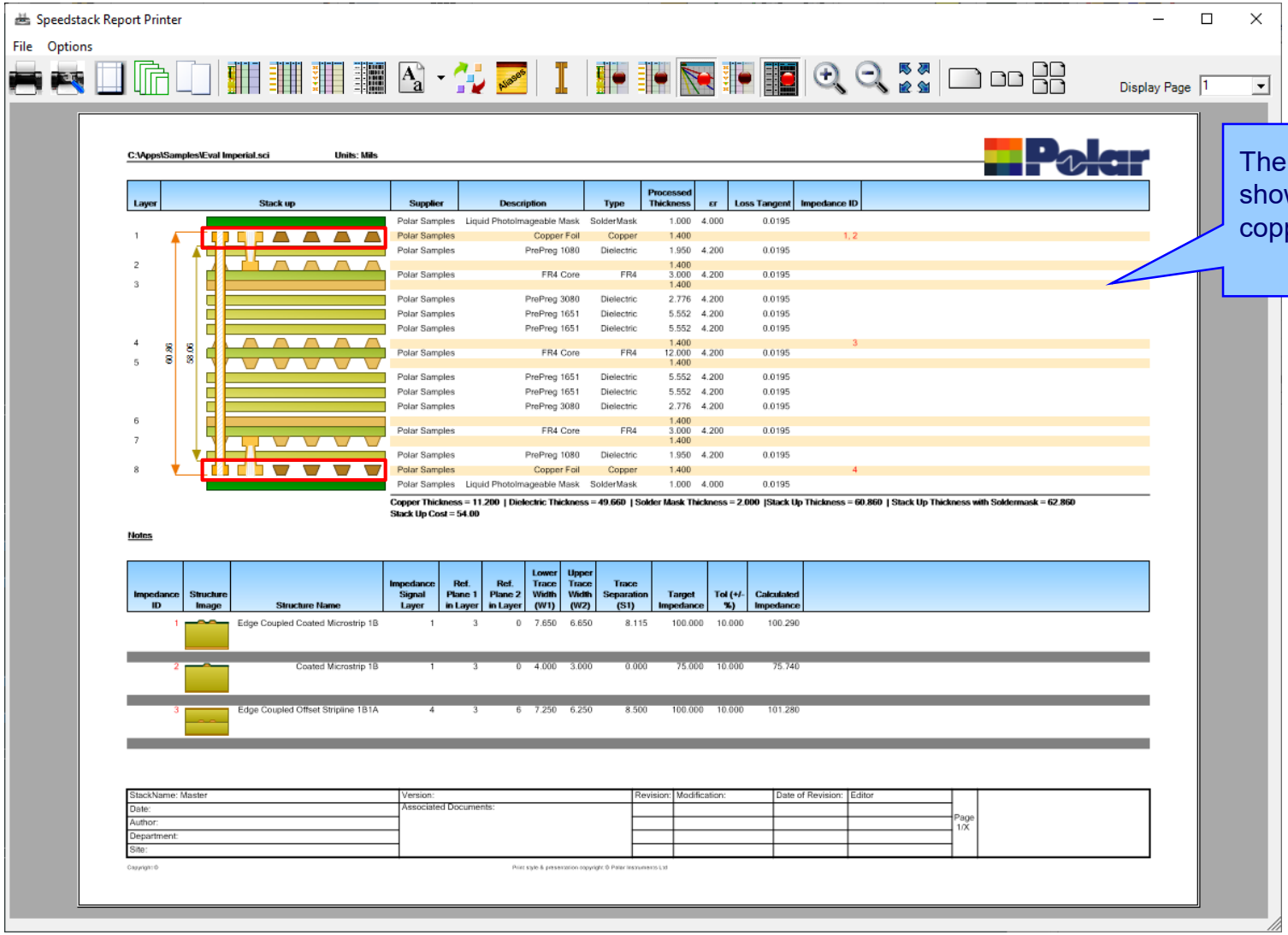
## Standard Colours




## Apply Plating Colours

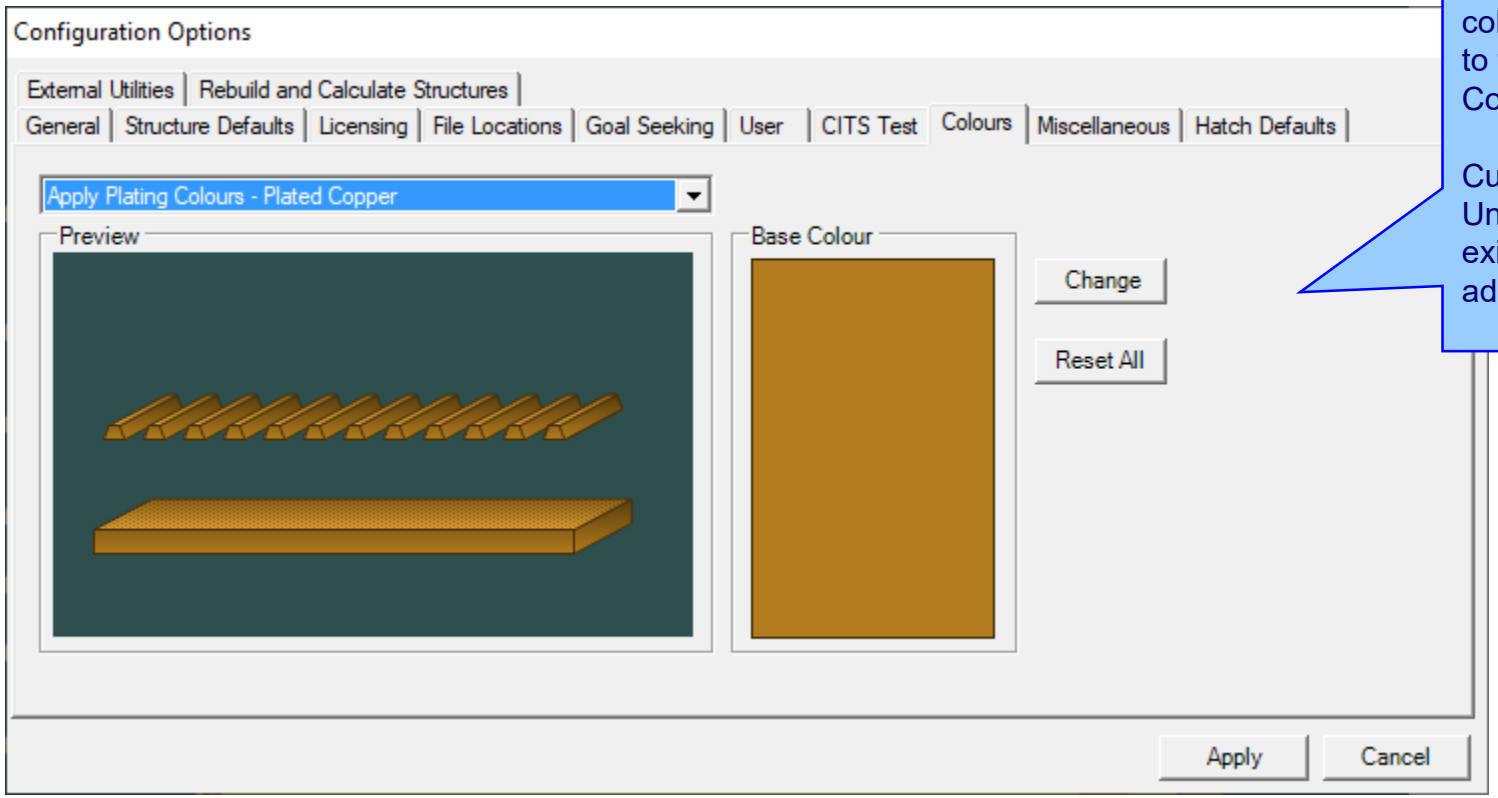


# New Apply Plating Colours toolbar option




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

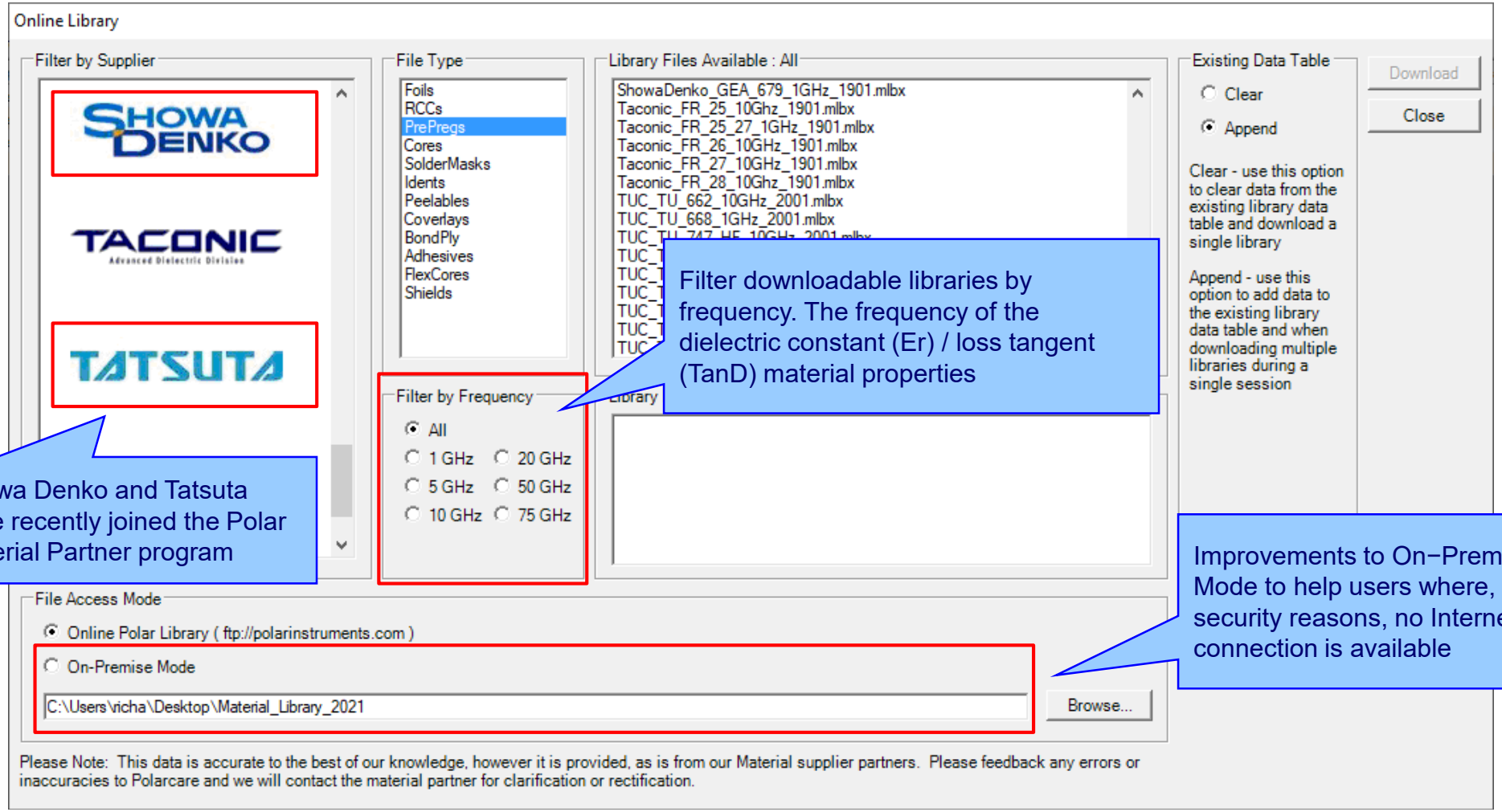
# New Apply Plating Colours toolbar option




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

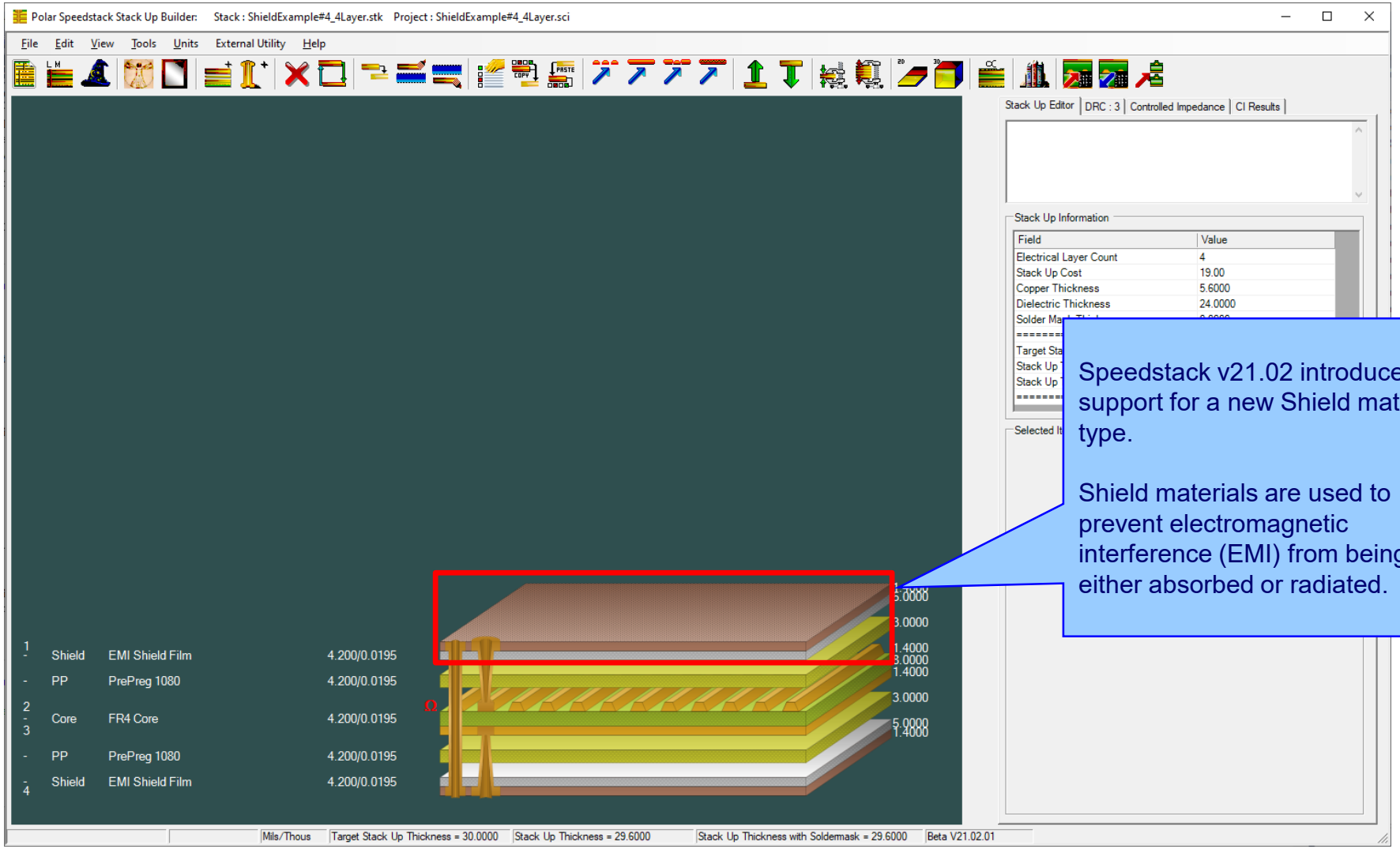
Customise the Plated and Un–plated colours to suit existing colour schemes adopted by your organisation

# Online Library enhancements



# Speedstack v21.02.01 (February 2021)

# New Shield material

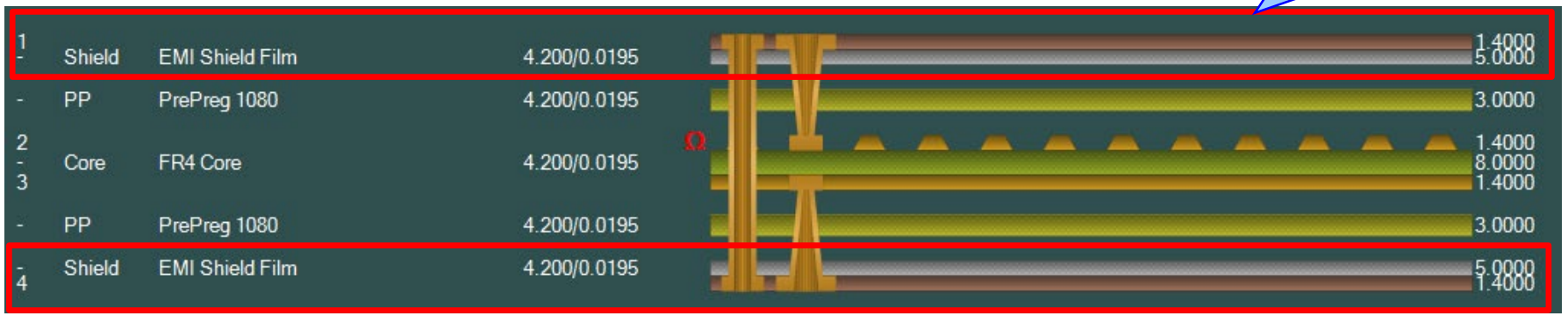


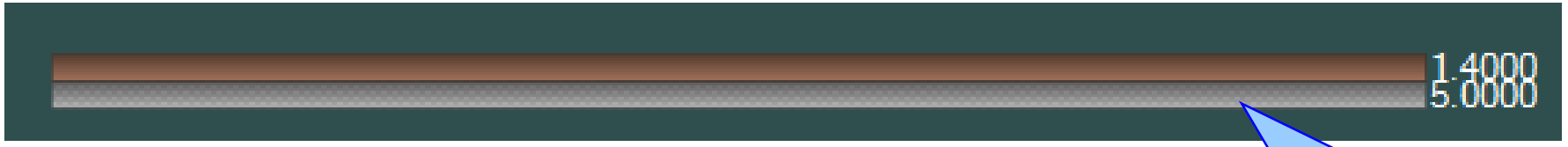

Speedstack v21.02 introduces support for a new Shield material type.

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

# New Shield material

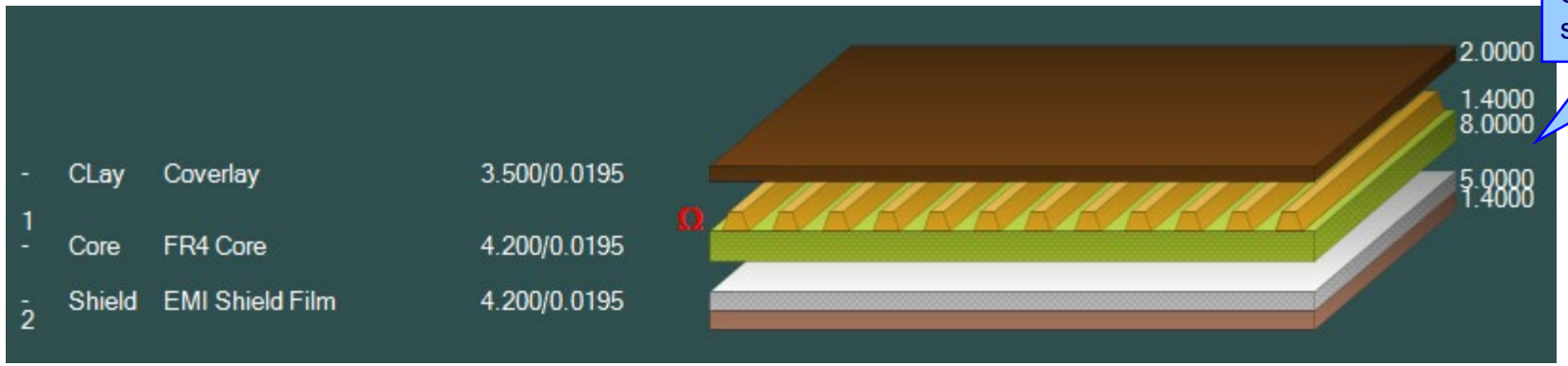
Shields are typically applied to the outer layer(s) of the stack up



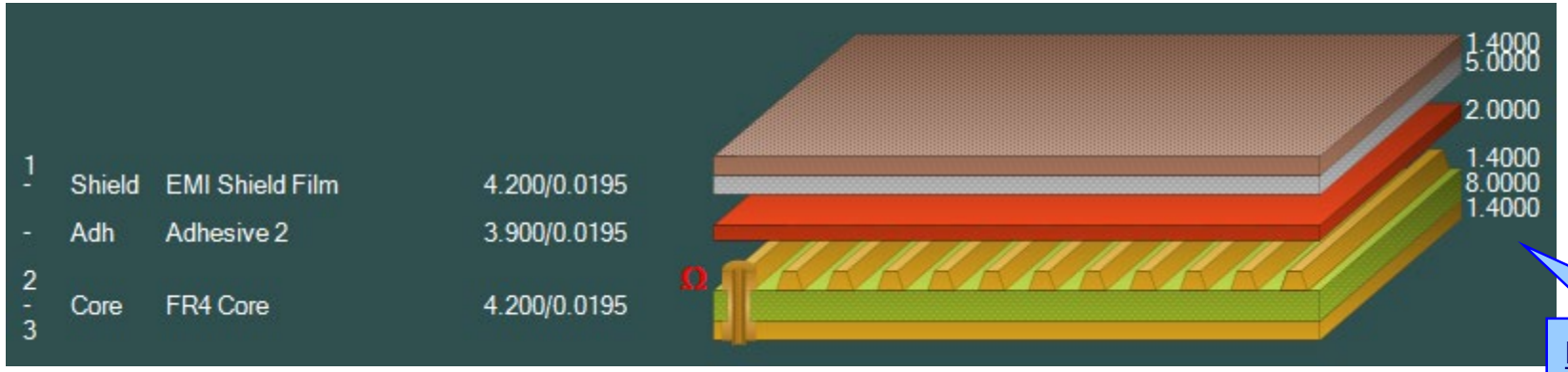




They consist of a shield layer (brown) and dielectric adhesive (silver)

# Shield material examples

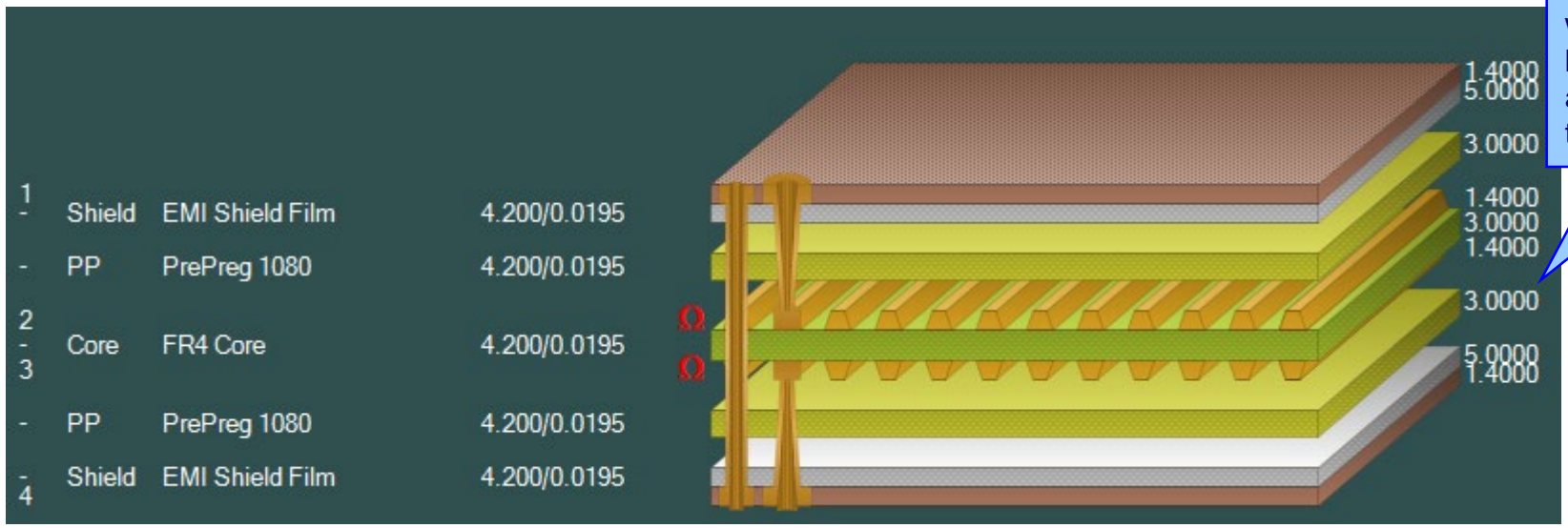



Example #1
Single−sided core, coverlay above trace, shield below

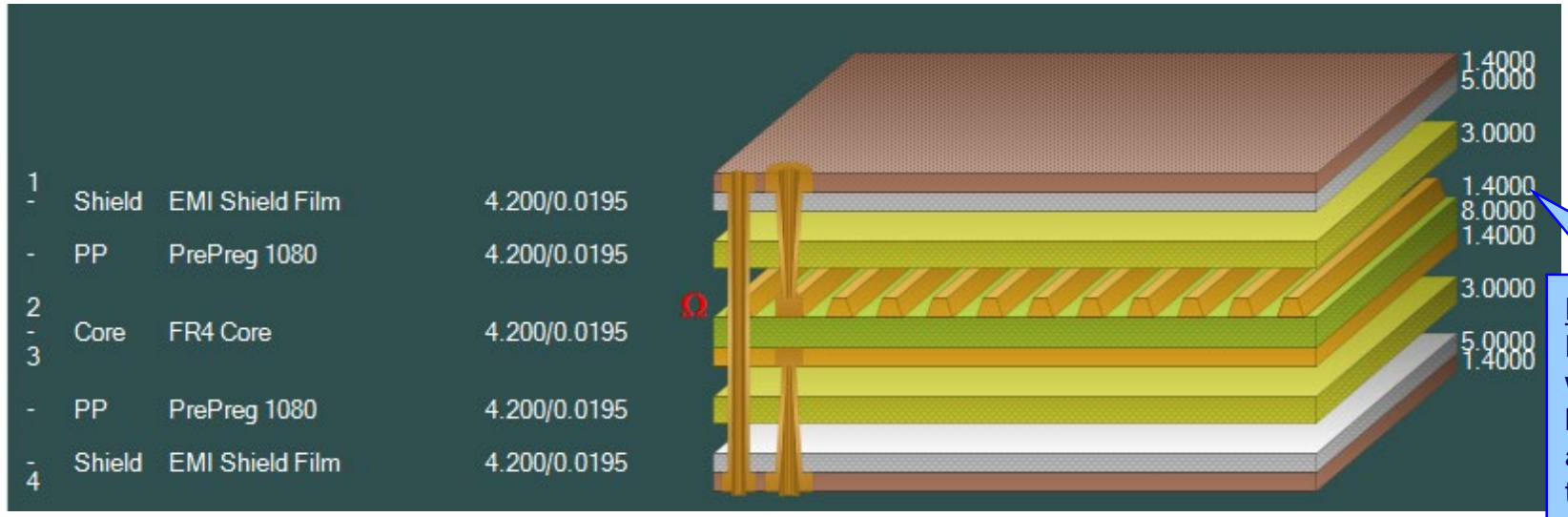



Example #2
Double−sided core, adhesive and shield above

# Shield material examples

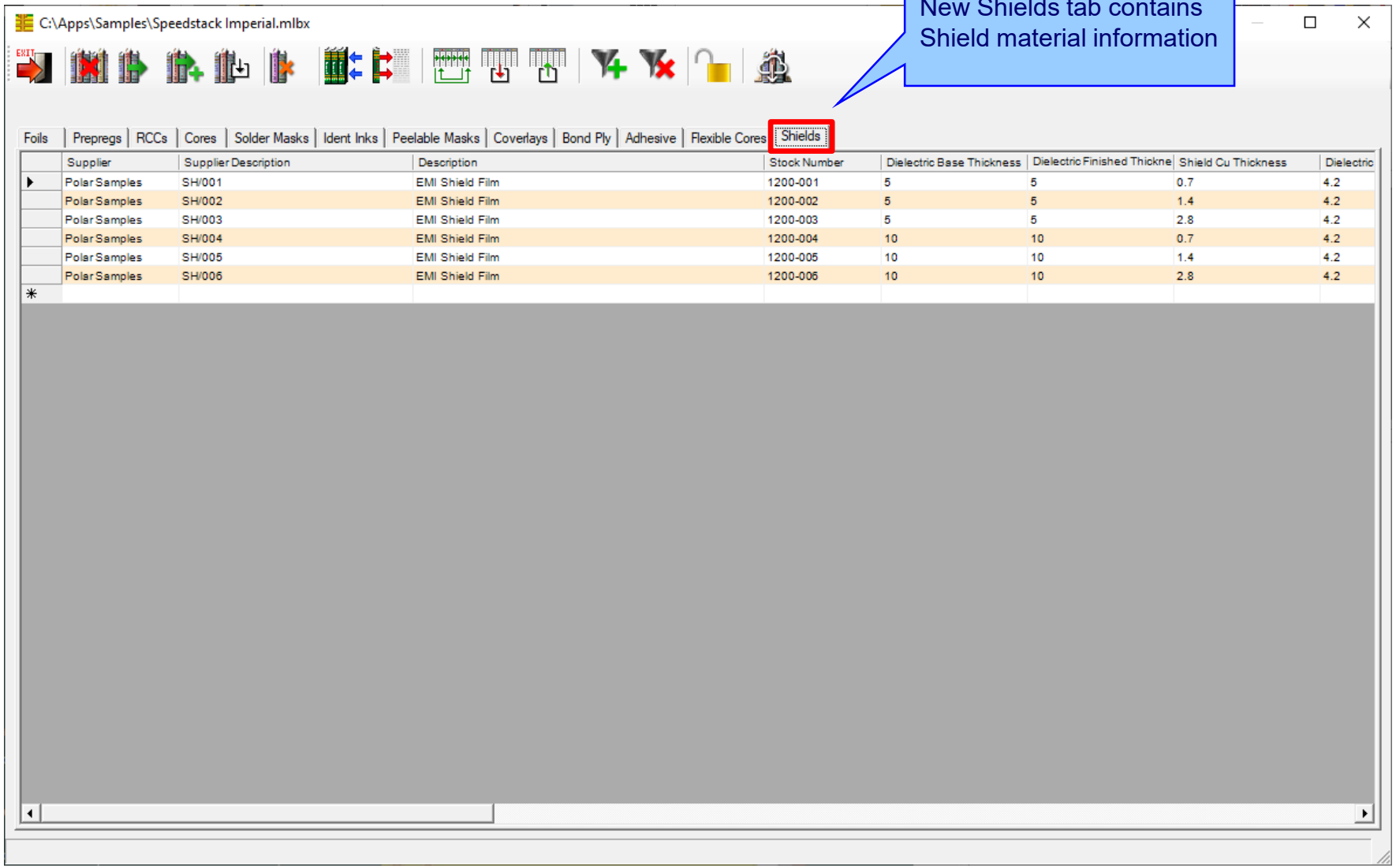



Example #3
Double−sided core with two signal trace layers with shield above and below trace layers



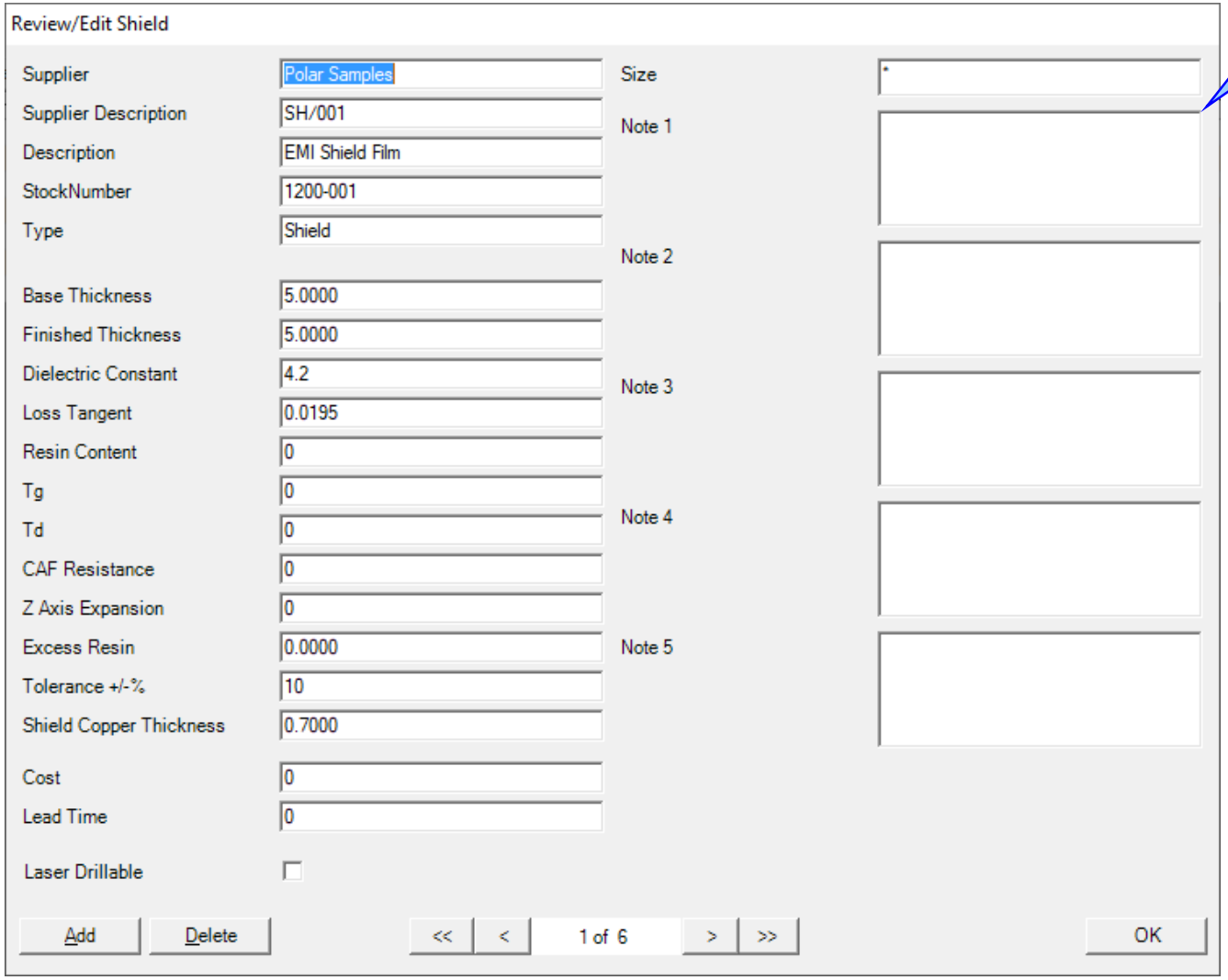

Example #4
Double−sided core with one signal trace layer with shield above and below trace layers

# Material library enhancements



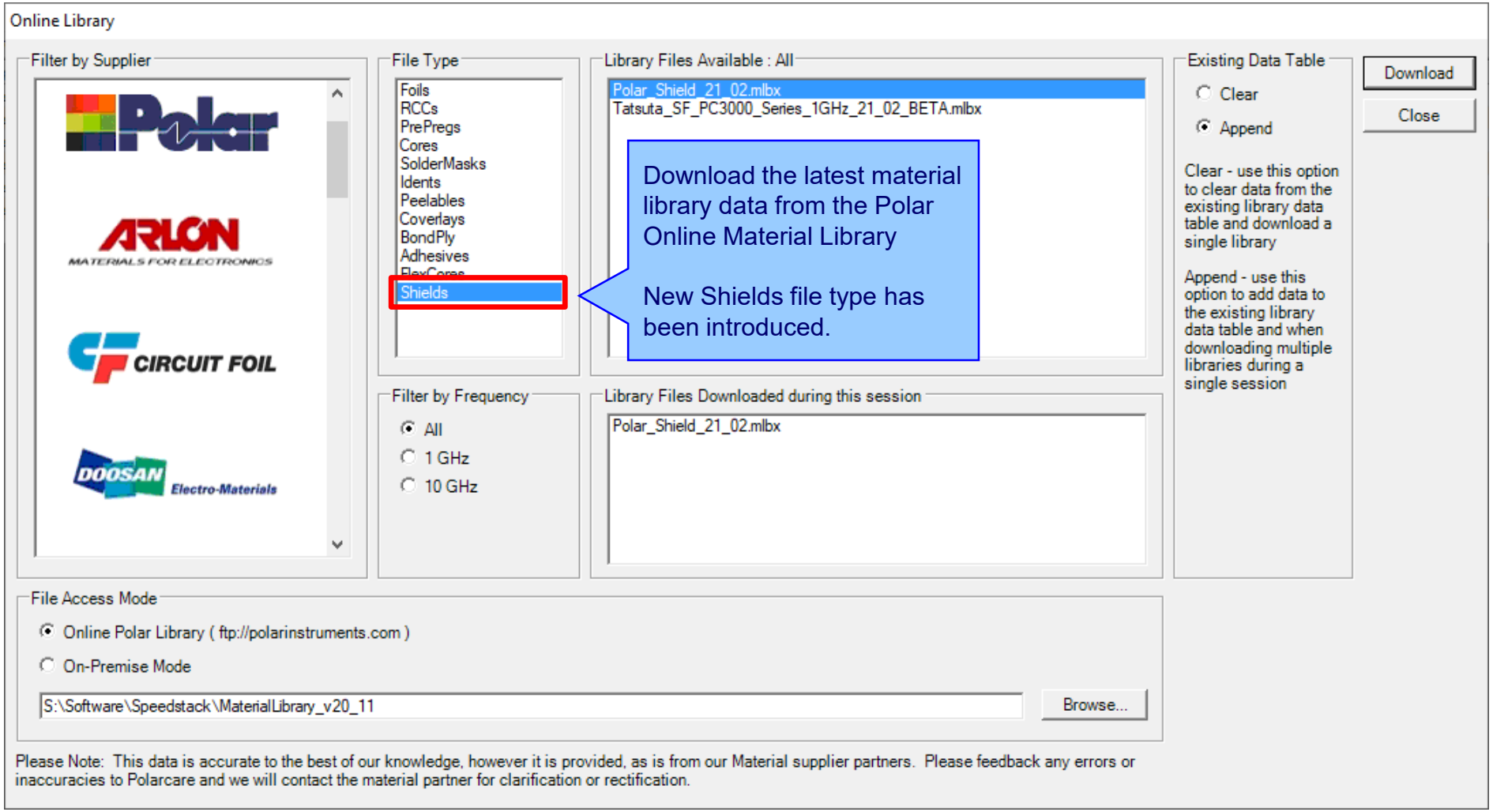

| Supplier | Supplier Description | Description | Stock Number | Dielectric Base Thickness | Dielectric Finished Thickne | Shield Cu Thickness | Dielectric |
|---|---|---|---|---|---|---|---|
| Polar Samples | SH/001 | EMI Shield Film | 1200-001 | 5 | 5 | 0.7 | 4.2 |
| Polar Samples | SH/002 | EMI Shield 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

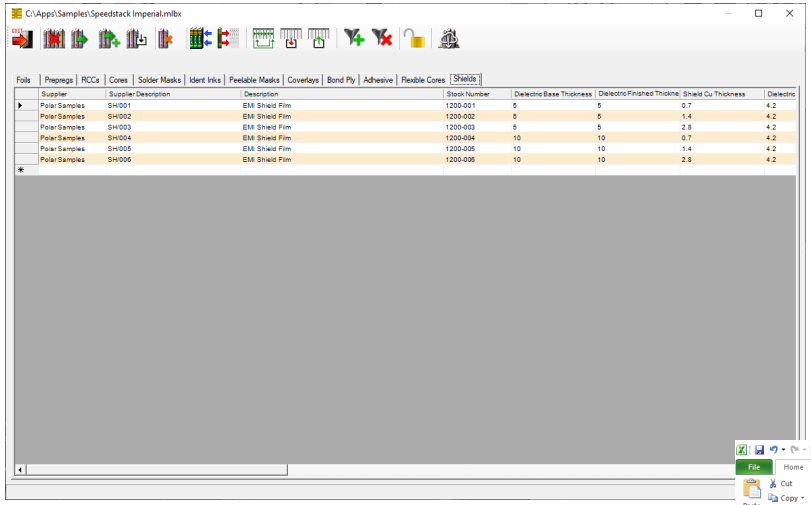


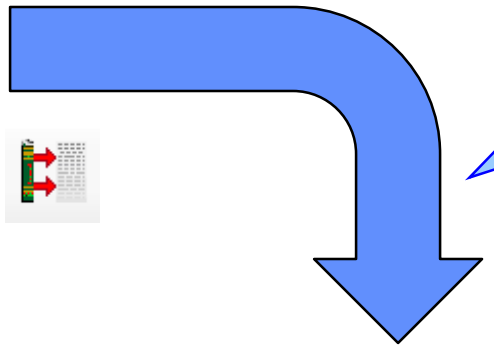

Material library Edit Shield dialog

# Online Library enhanced to support Shield materials

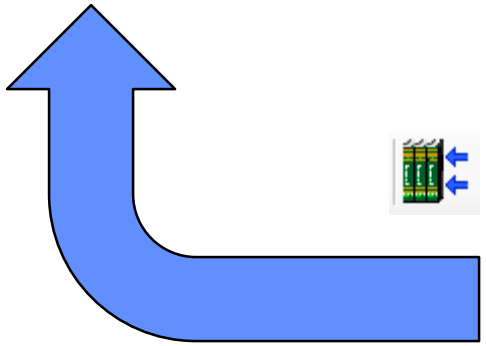


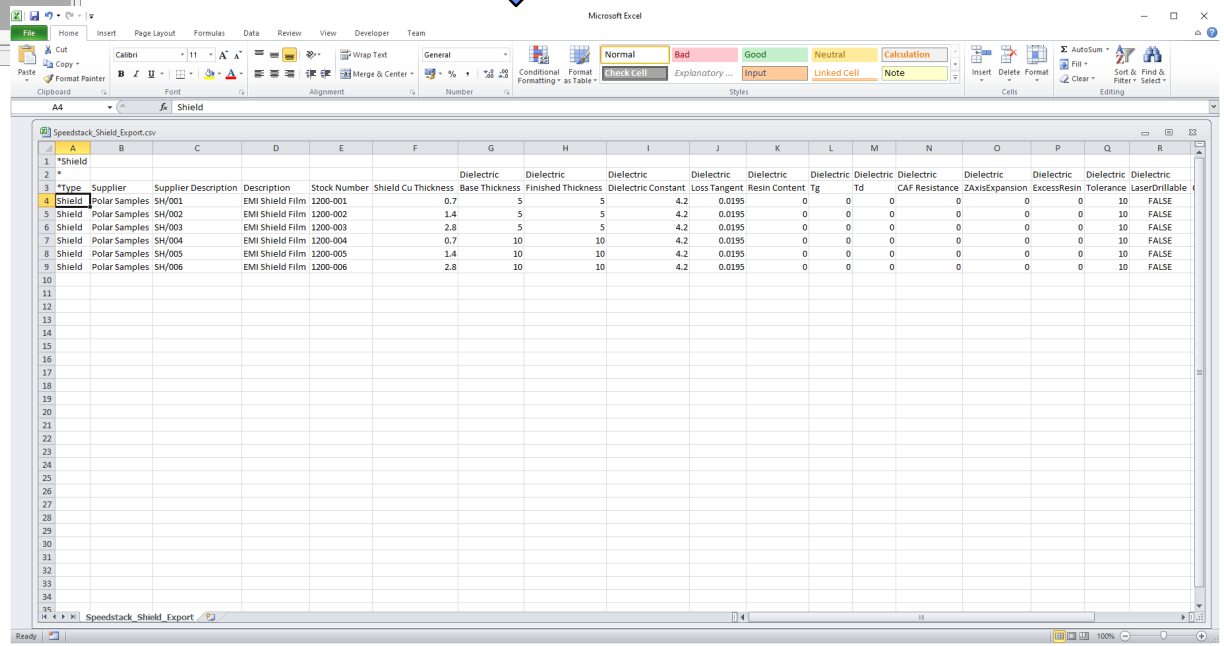
# Export / Import Shield library to Excel



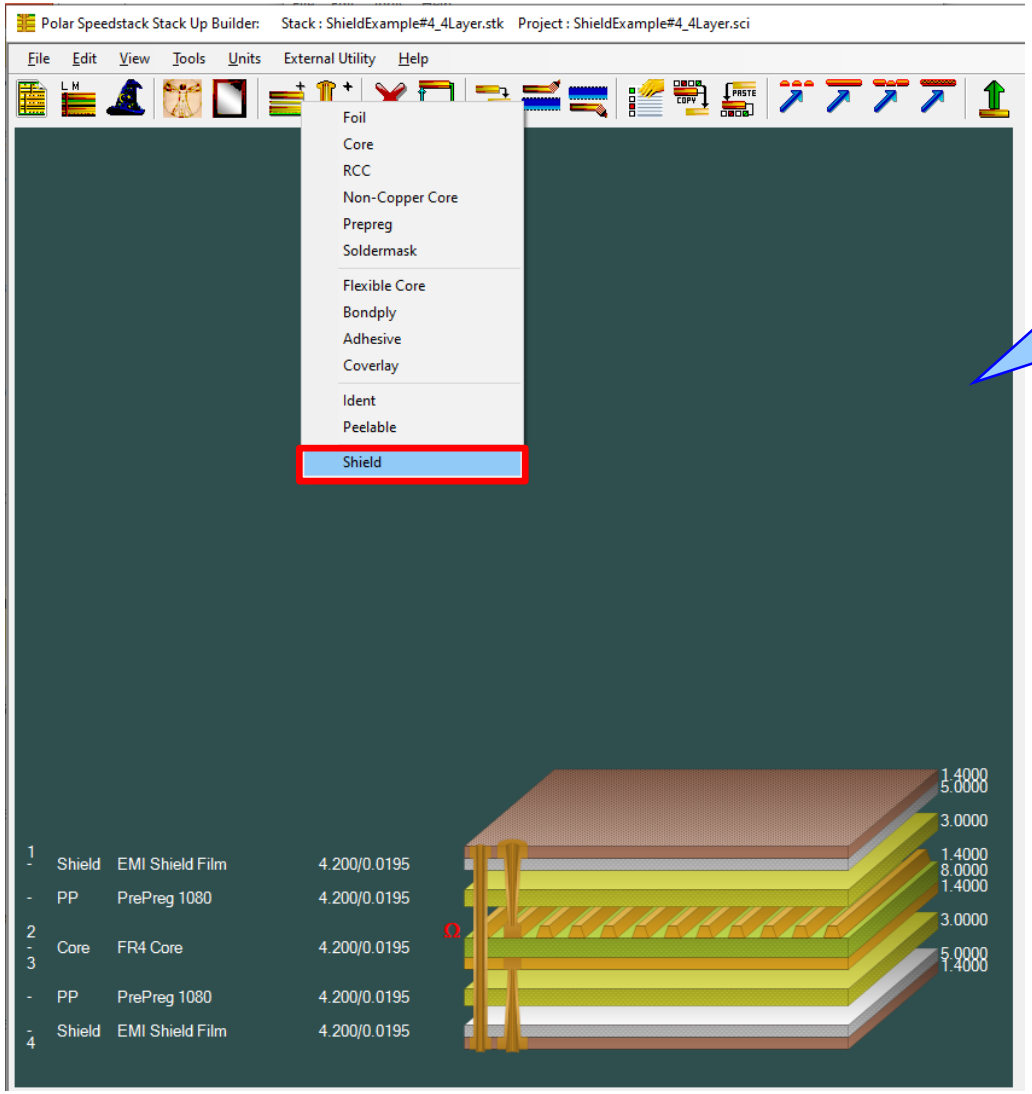


It is possible to export / import Shield library data with 3rd part tools like Excel





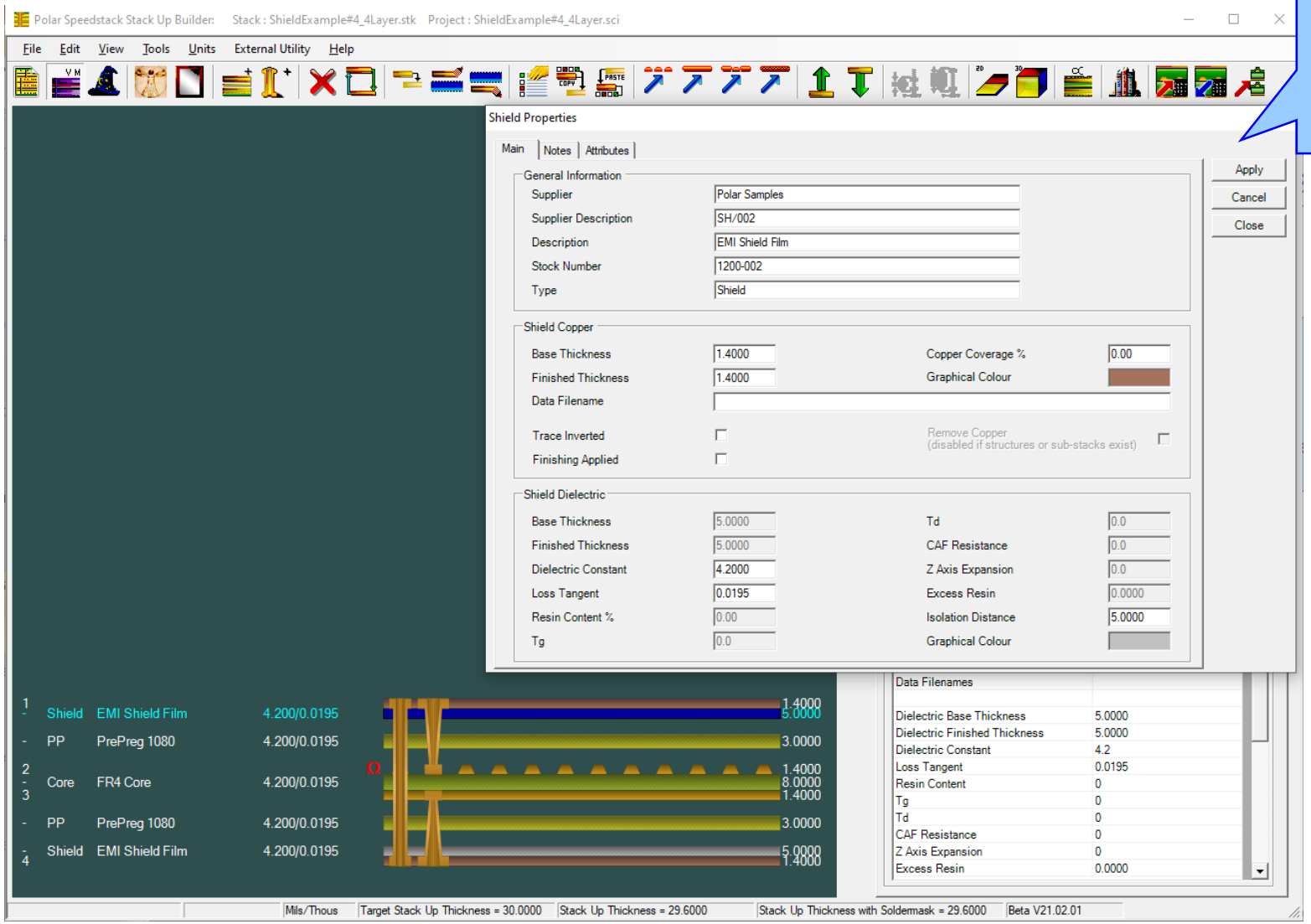
# Stack up editor enhancements




Stack Up editor enhancements:

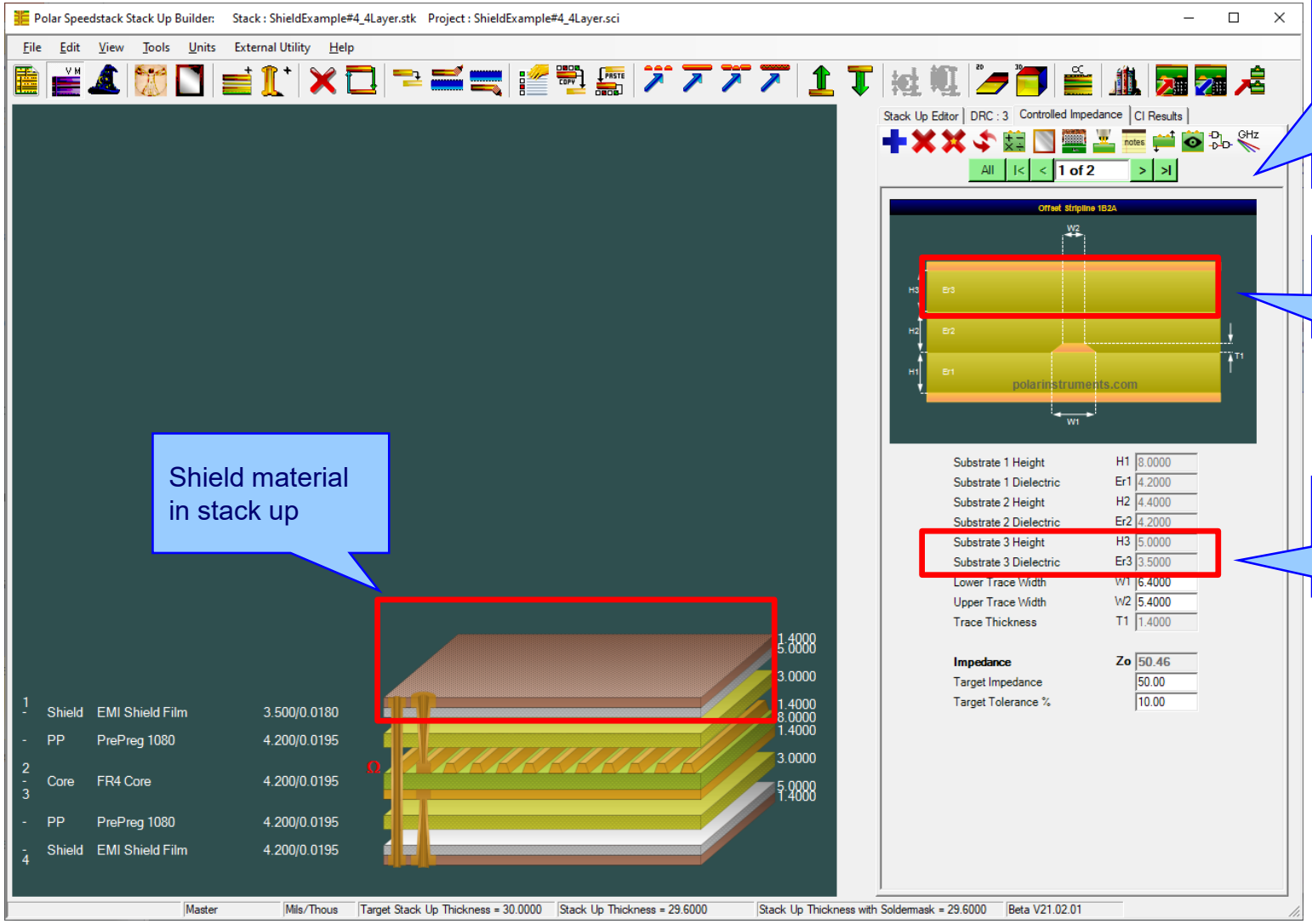
Shield material options to add, delete, swap, move up, move down, symmetry and set properties

# Shield properties




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

# Controlled impedance and insertion loss calculations

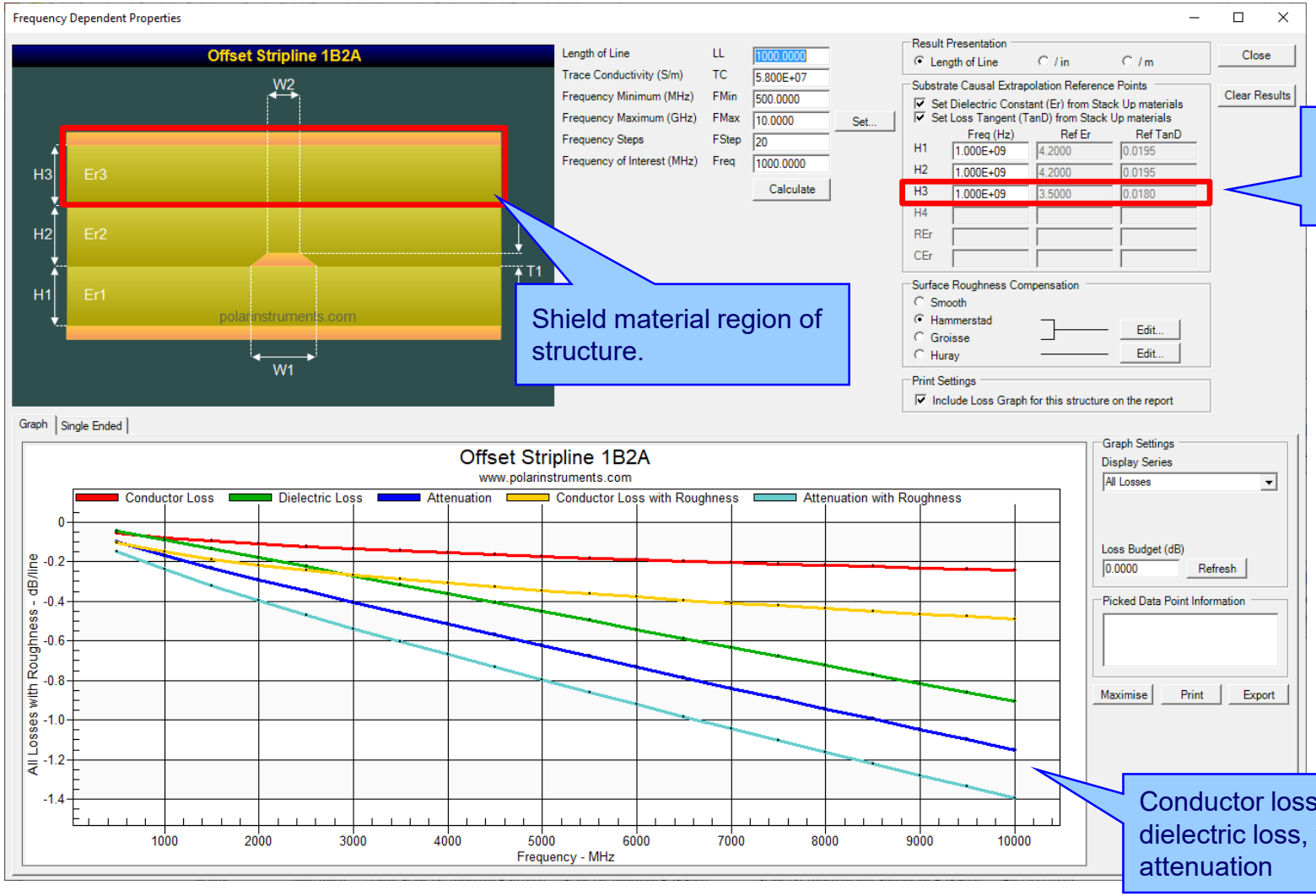



Impedance and insertion calculations support the new Shield material type.

Shield material region of structure.

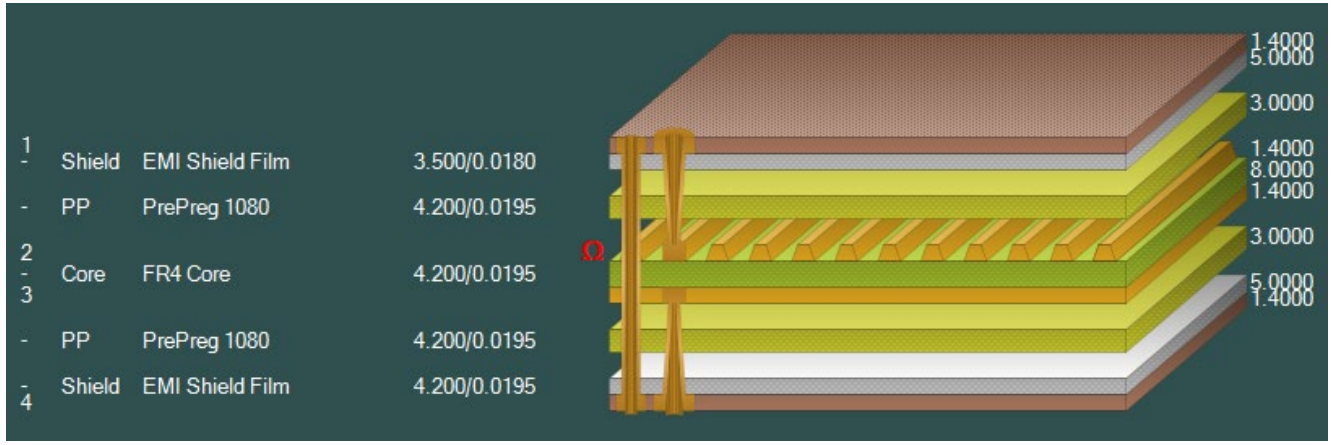
Shield adhesive height / thickness dimension and dielectric constant.

# Controlled impedance and insertion loss calculations



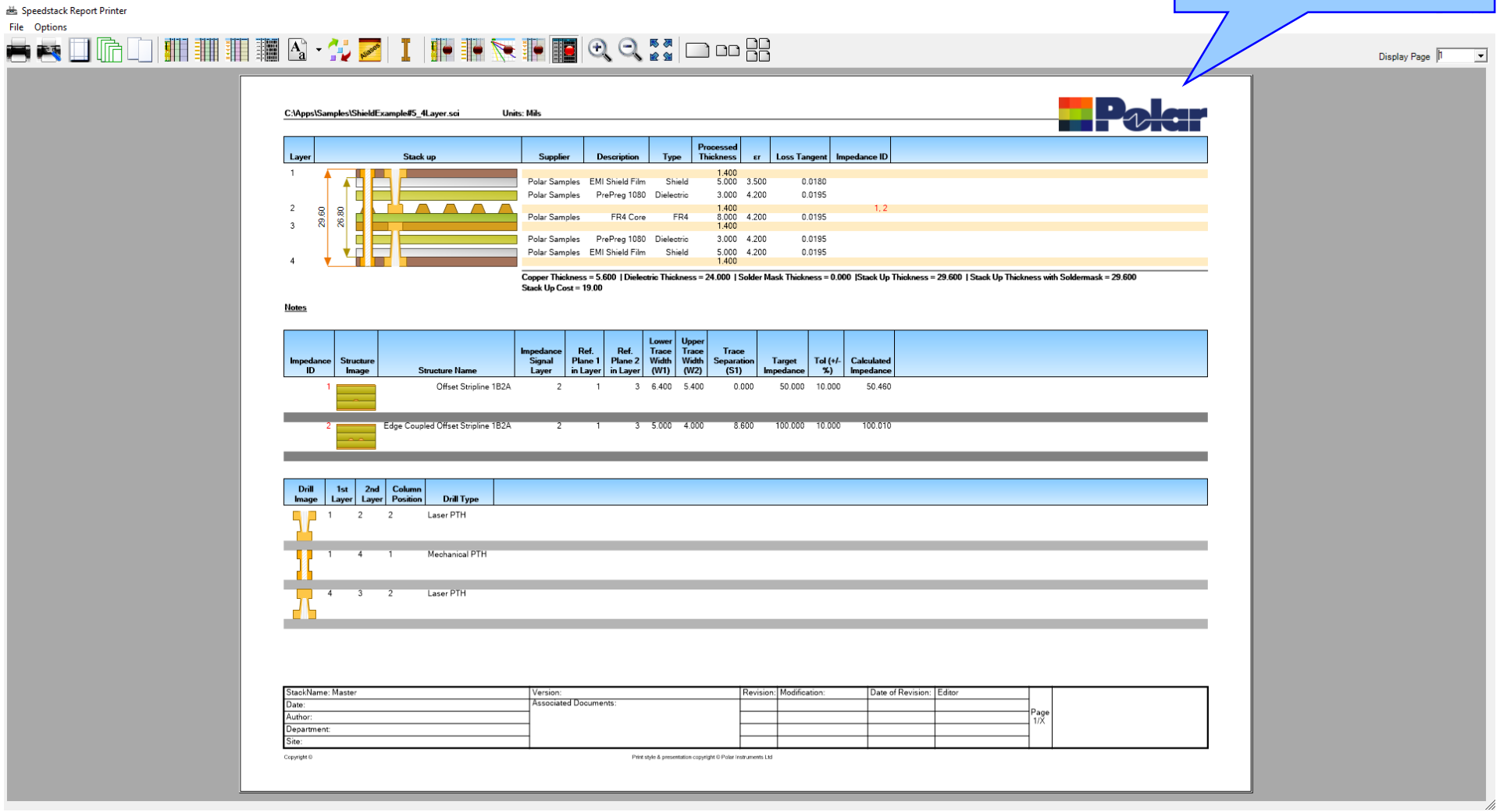
## Controlled impedance and insertion loss calculations

*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'.*



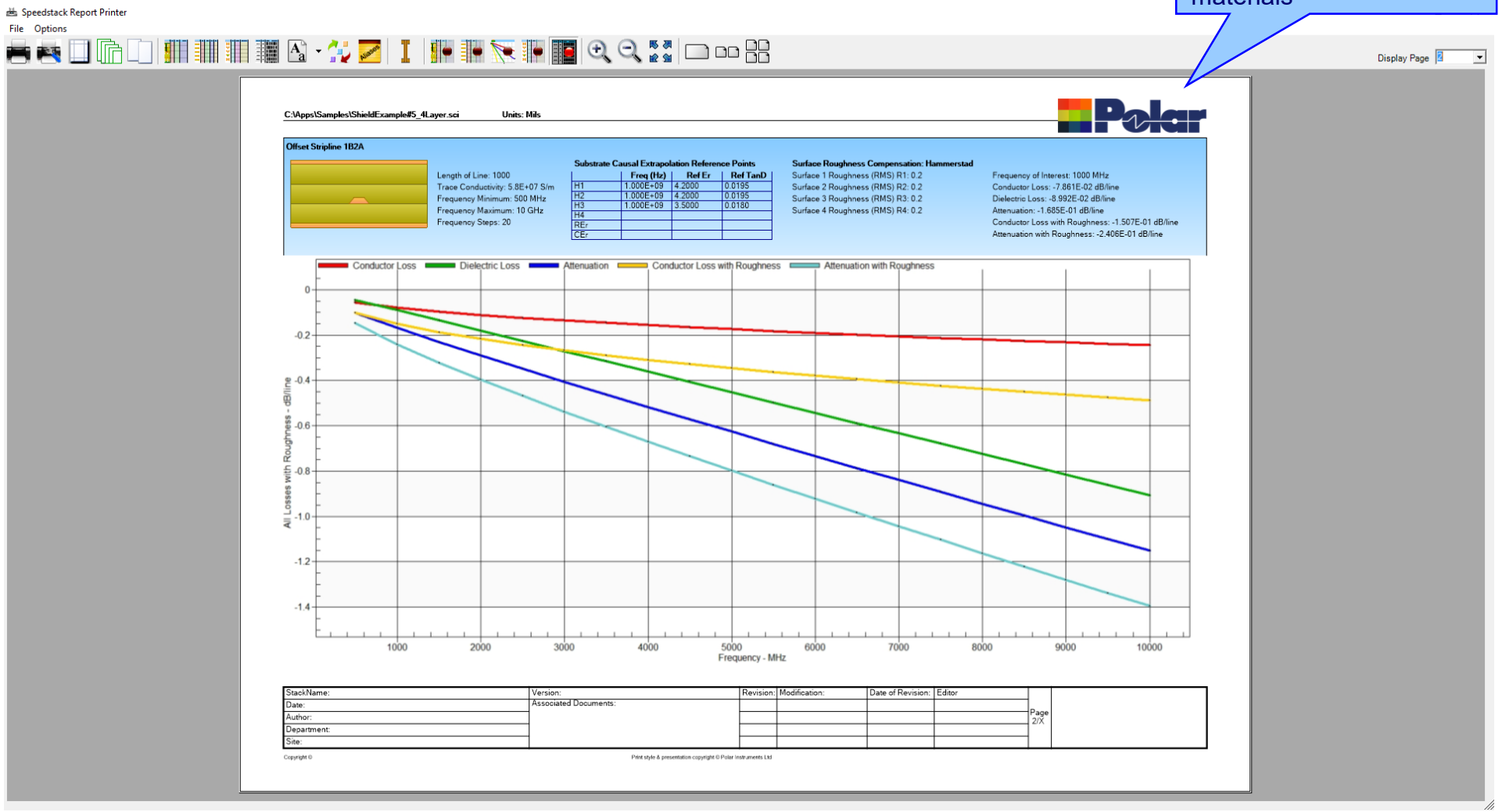
# Technical report enhancements

Technical report showing shield materials



# Technical report enhancements

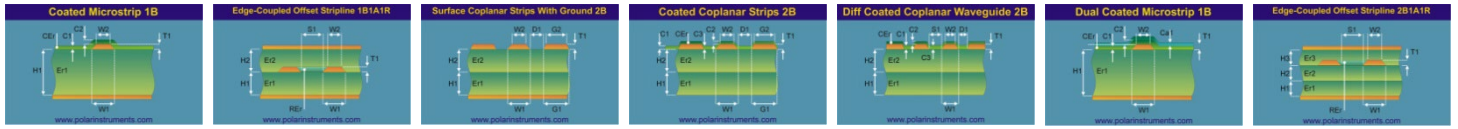
Insertion loss report supporting shield materials

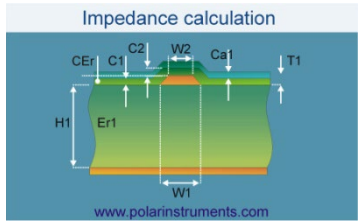


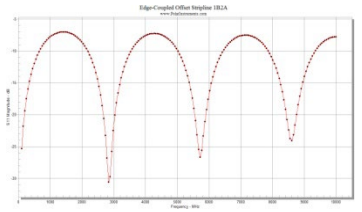
## Import / Export enhancements

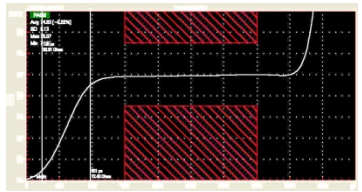
The following Import / Export options have been updated to support the new shield material introduced with Speedstack 2021:

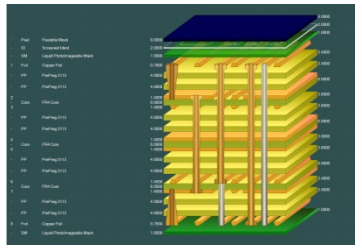
- XML STKX v20.00 and SSX v10.00 import / export options
- CSV export option
- Gerber / DXF export option

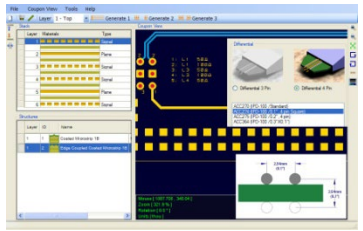


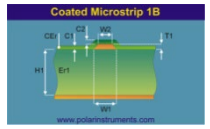



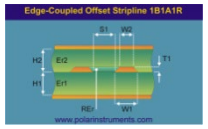


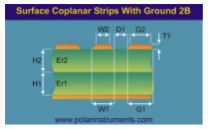


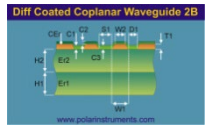


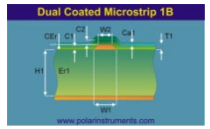
*Thank you for viewing this Speedstack 2021 – 2022 preview. If you have questions we would be delighted to help you. Your local contact information is contained on the following slide*

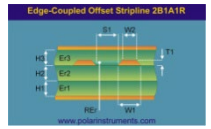


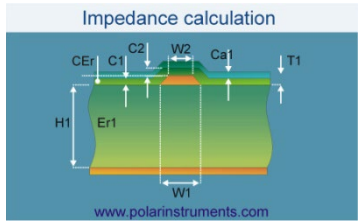


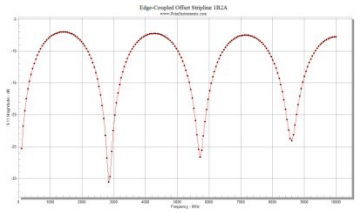


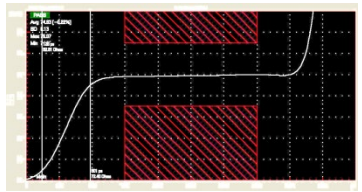


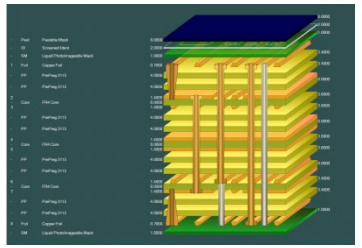


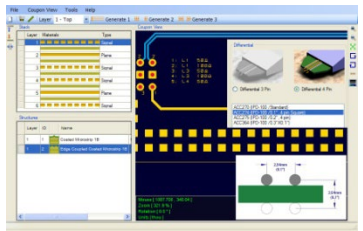








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