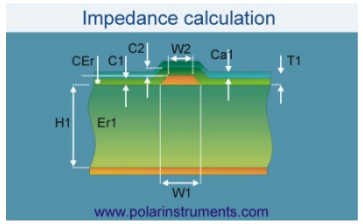
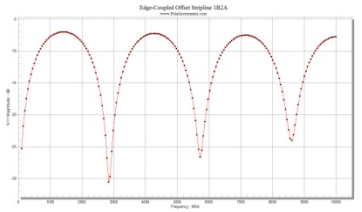
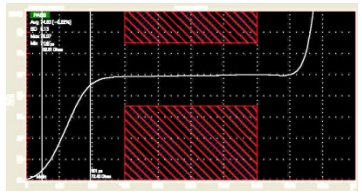
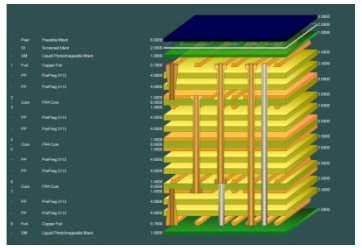
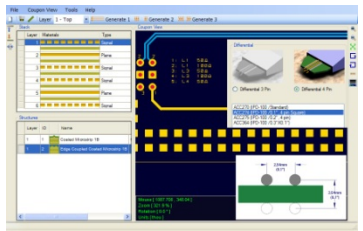










Speedstack 2019 Introduction

Richard Attrill / John Lee – Dec 2018 (Rev 2)

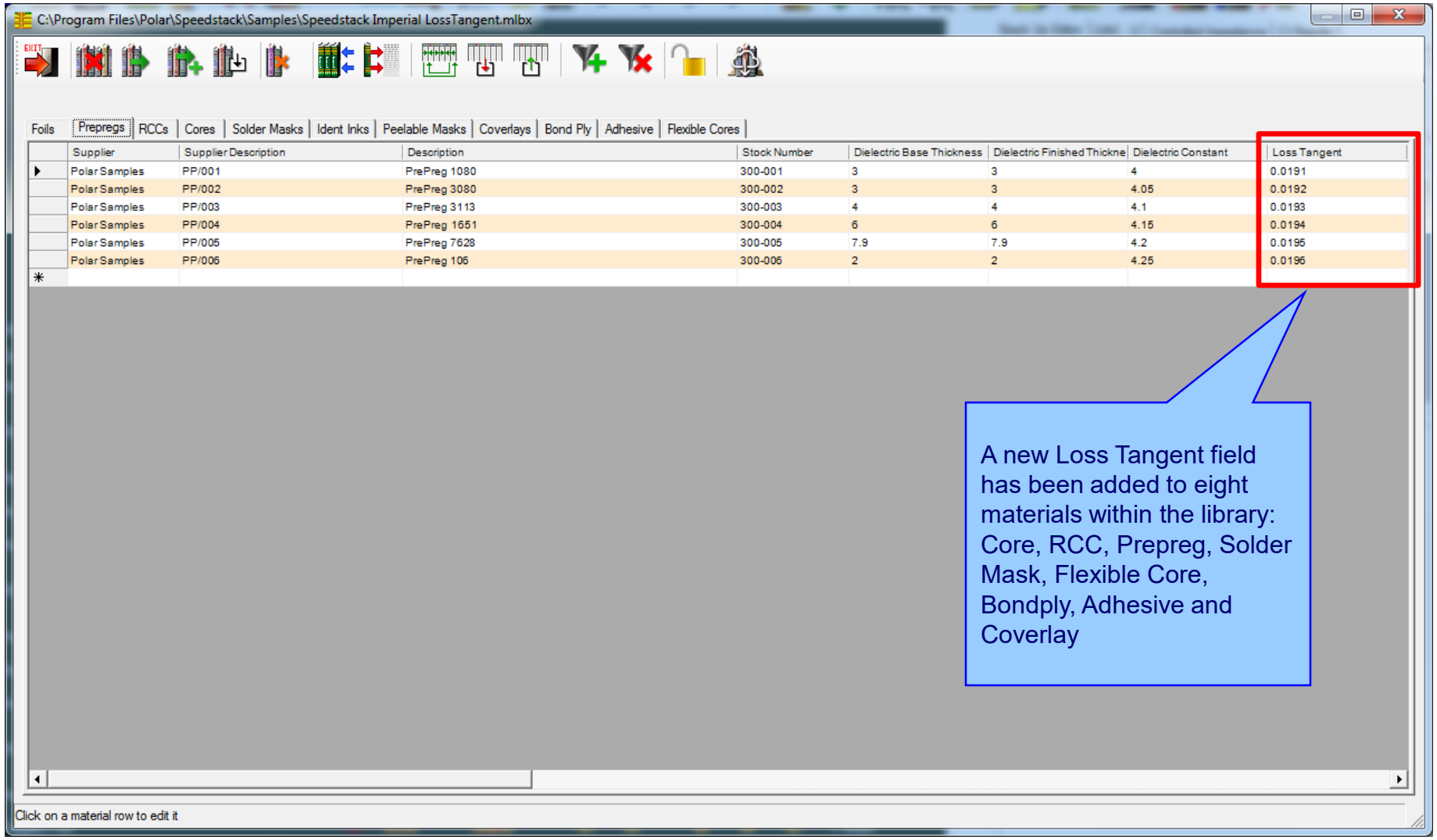
Introducing Speedstack 2019

Welcome to a preview of Speedstack 2019.

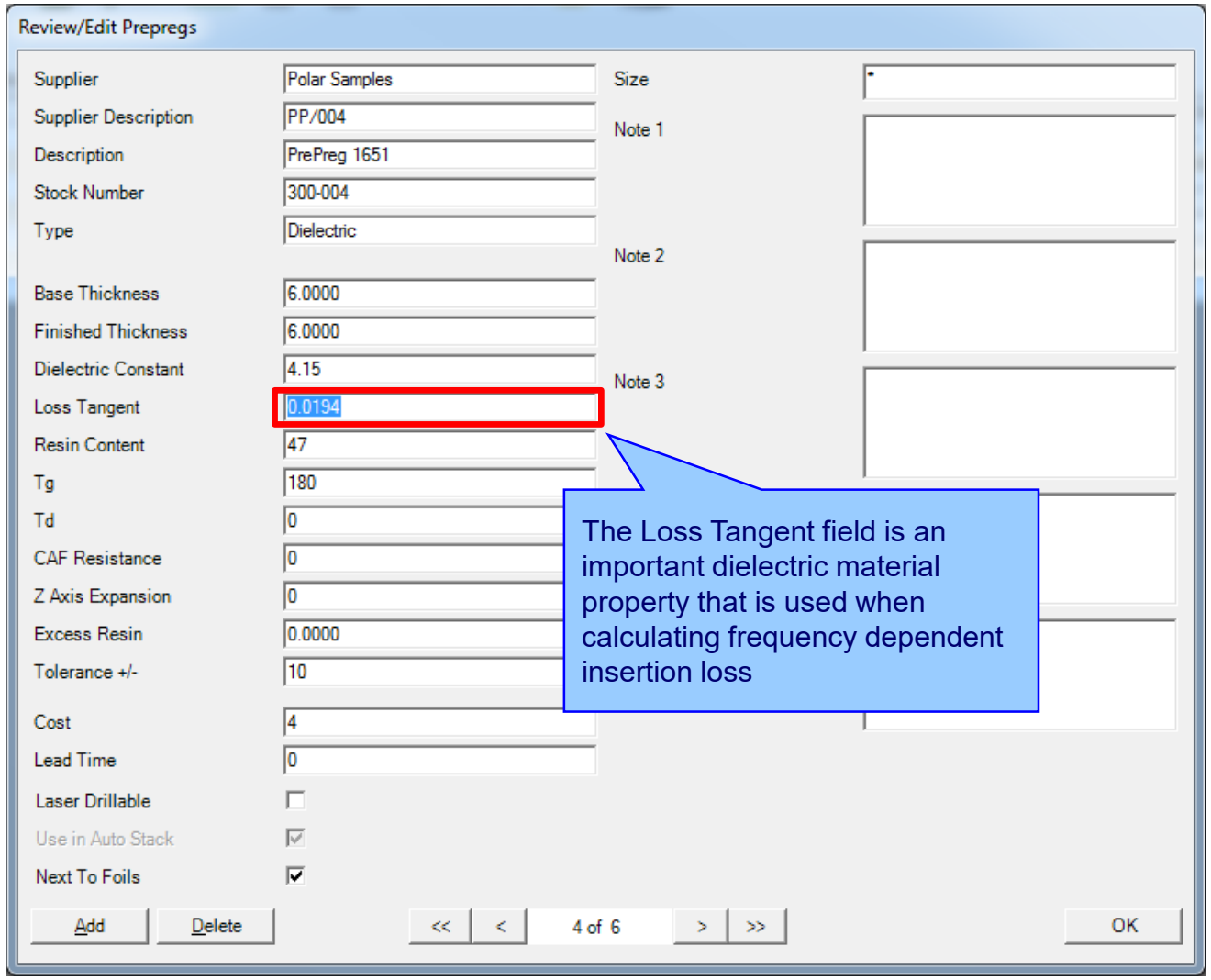
We have introduced a number of new features that have been requested through our Polarcare software maintenance service.

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.

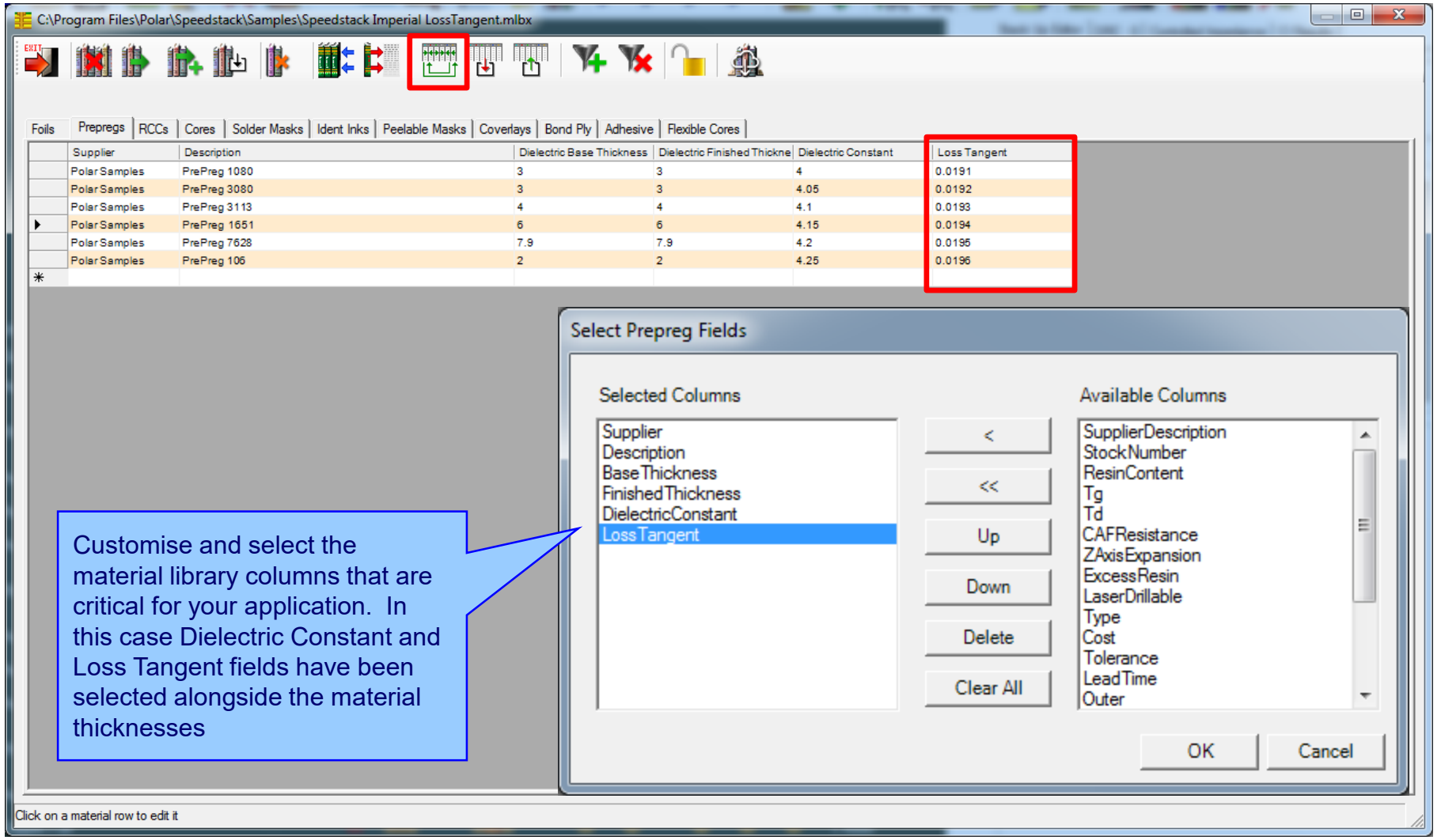
Loss Tangent field now available in the Material Library



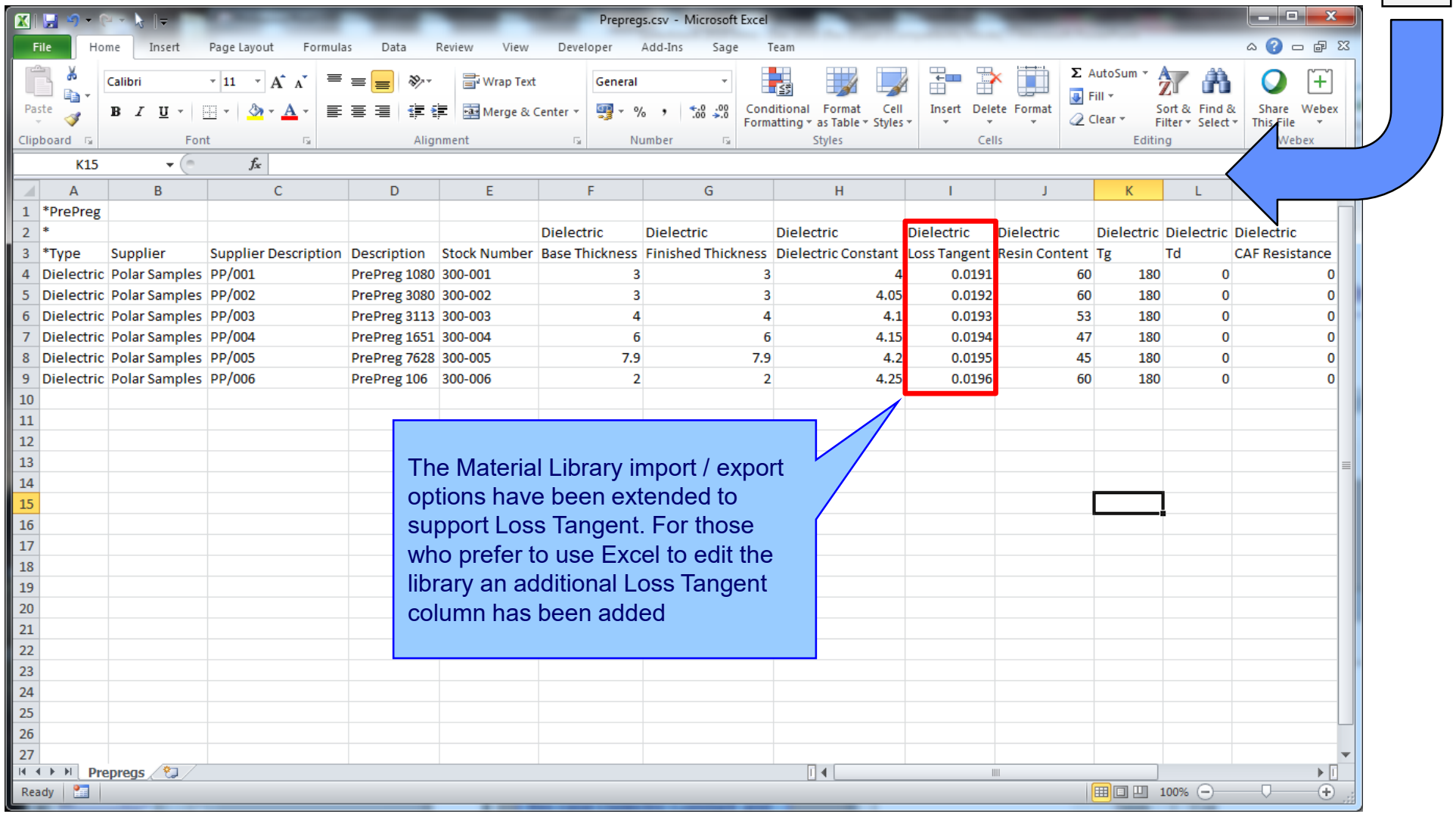
Loss Tangent field now available in the Material Library



Loss Tangent field now available in the Material Library

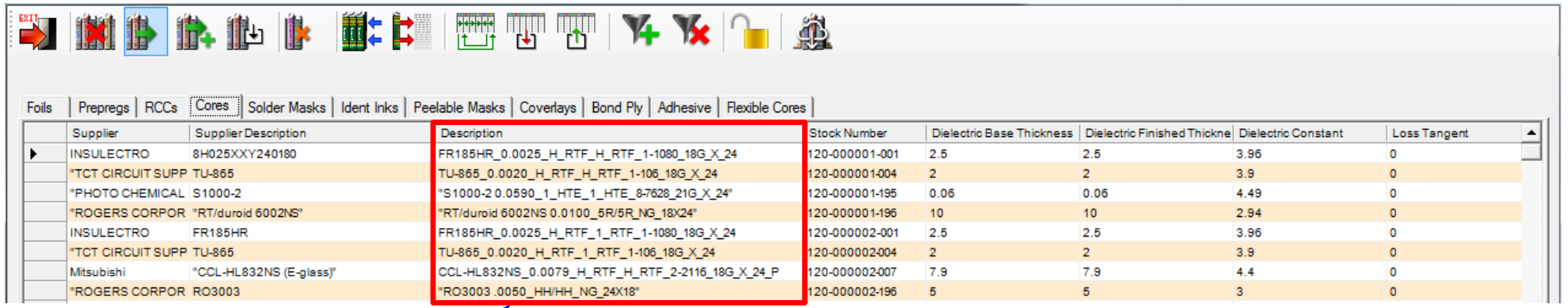


Loss Tangent field now available in the Material Library



	A	B	C	D	E	F	G	H	I	J	K	L	
1	*PrePreg												
2	*					Dielectric	Dielectric	Dielectric	Dielectric	Dielectric	Dielectric	Dielectric	Dielectric
3	*Type	Supplier	Supplier Description	Description	Stock Number	Base Thickness	Finished Thickness	Dielectric Constant	Loss Tangent	Resin Content	Tg	Td	CAF Resistance
4	Dielectric	Polar Samples	PP/001	PrePreg 1080	300-001	3	3	4	0.0191	60	180	0	0
5	Dielectric	Polar Samples	PP/002	PrePreg 3080	300-002	3	3	4.05	0.0192	60	180	0	0
6	Dielectric	Polar Samples	PP/003	PrePreg 3113	300-003	4	4	4.1	0.0193	53	180	0	0
7	Dielectric	Polar Samples	PP/004	PrePreg 1651	300-004	6	6	4.15	0.0194	47	180	0	0
8	Dielectric	Polar Samples	PP/005	PrePreg 7628	300-005	7.9	7.9	4.2	0.0195	45	180	0	0
9	Dielectric	Polar Samples	PP/006	PrePreg 106	300-006	2	2	4.25	0.0196	60	180	0	0

Description column width has been increased

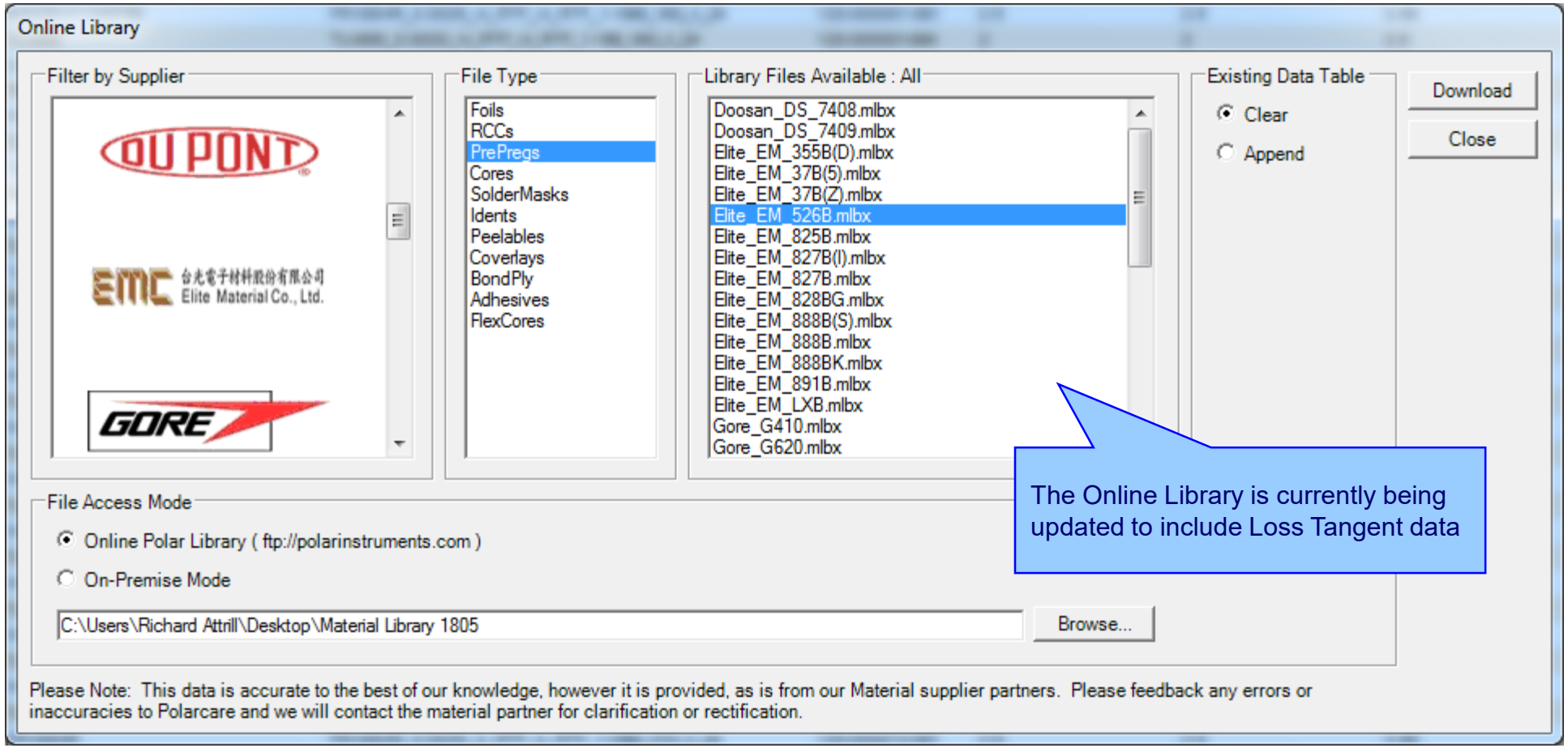


Foils | Prepregs | RCCs | Cores | Solder Masks | Ident Inks | Peelable Masks | Coverlays | Bond Ply | Adhesive | Flexible Cores

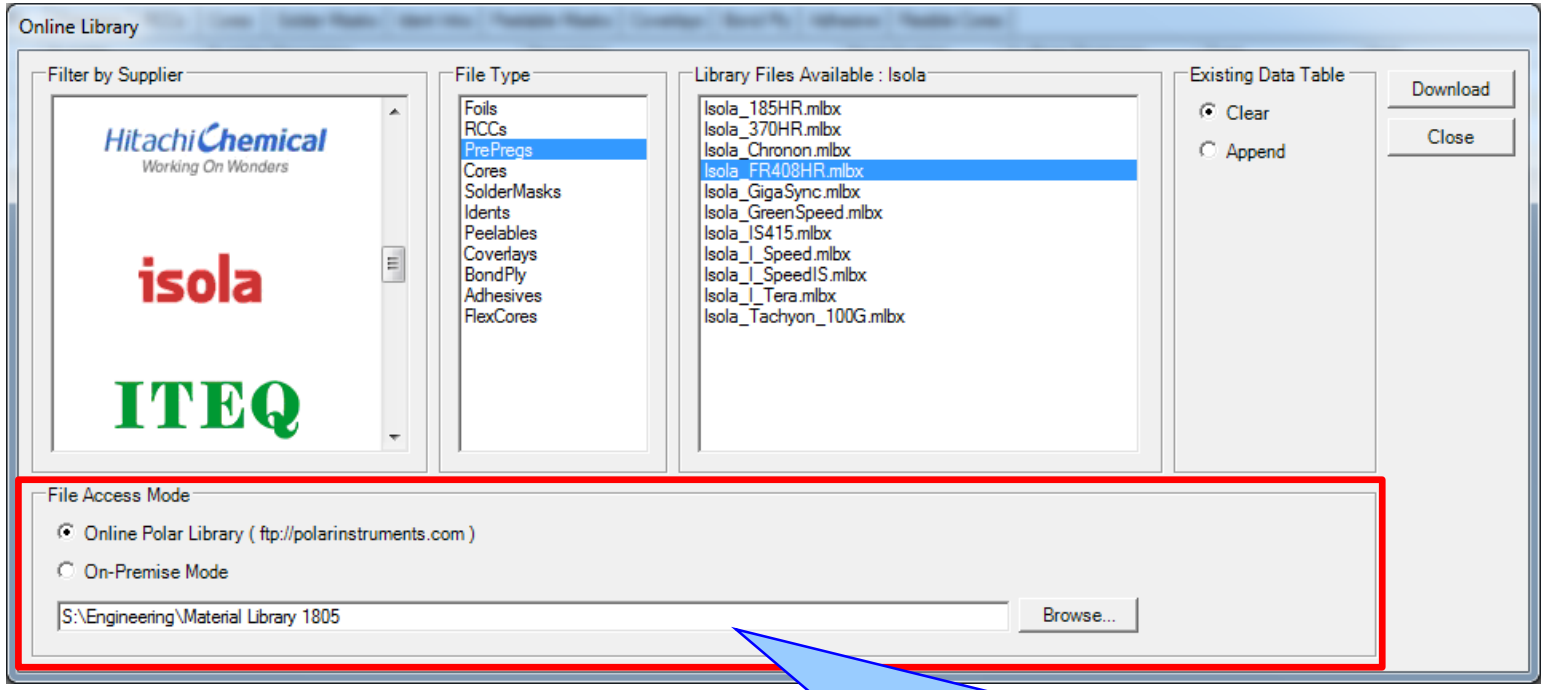
Supplier	Supplier Description	Description	Stock Number	Dielectric Base Thickness	Dielectric Finished Thickne	Dielectric Constant	Loss Tangent
INSULECTRO	8H025XXY240180	FR185HR_0.0025_H_RTF_H_RTF_1-1080_18G_X_24	120-000001-001	2.5	2.5	3.96	0
"TCT CIRCUIT SUPP	TU-865	TU-865_0.0020_H_RTF_H_RTF_1-106_18G_X_24	120-000001-004	2	2	3.9	0
"PHOTO CHEMICAL	S1000-2	"S1000-2 0.0590_1_HTE_1_HTE_8-7628_21G_X_24"	120-000001-195	0.06	0.06	4.49	0
"ROGERS CORPOR	"RT/duroid 6002NS"	"RT/duroid 6002NS 0.0100_5R/5R_NG_18X24"	120-000001-196	10	10	2.94	0
INSULECTRO	FR185HR	FR185HR_0.0025_H_RTF_1_RTF_1-1080_18G_X_24	120-000002-001	2.5	2.5	3.96	0
"TCT CIRCUIT SUPP	TU-865	TU-865_0.0020_H_RTF_1_RTF_1-106_18G_X_24	120-000002-004	2	2	3.9	0
Mitsubishi	"CCL-HL832NS (E-glass)"	CCL-HL832NS_0.0079_H_RTF_H_RTF_2-2116_18G_X_24_P	120-000002-007	7.9	7.9	4.4	0
"ROGERS CORPOR	RO3003	"RO3003 .0050_HH/HH_NG_24X18"	120-000002-196	5	5	3	0

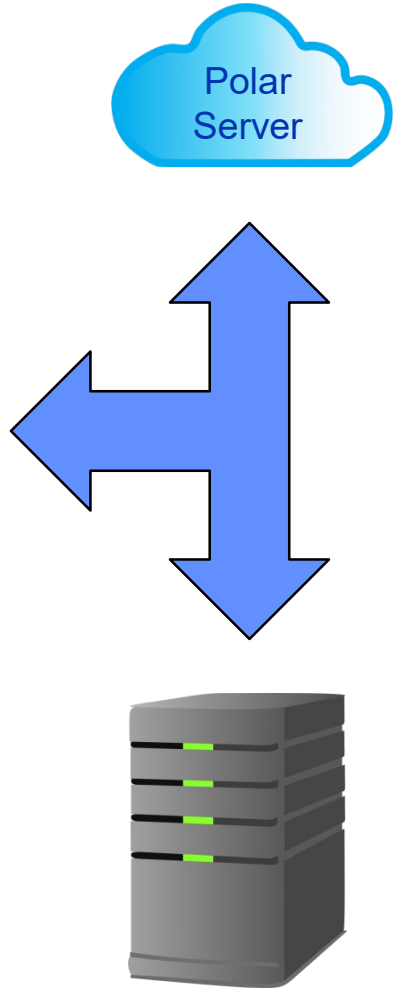
More detailed material descriptions can now be viewed without needing to adjust the column widths

Online Library – Now supports libraries contain Loss Tangent data



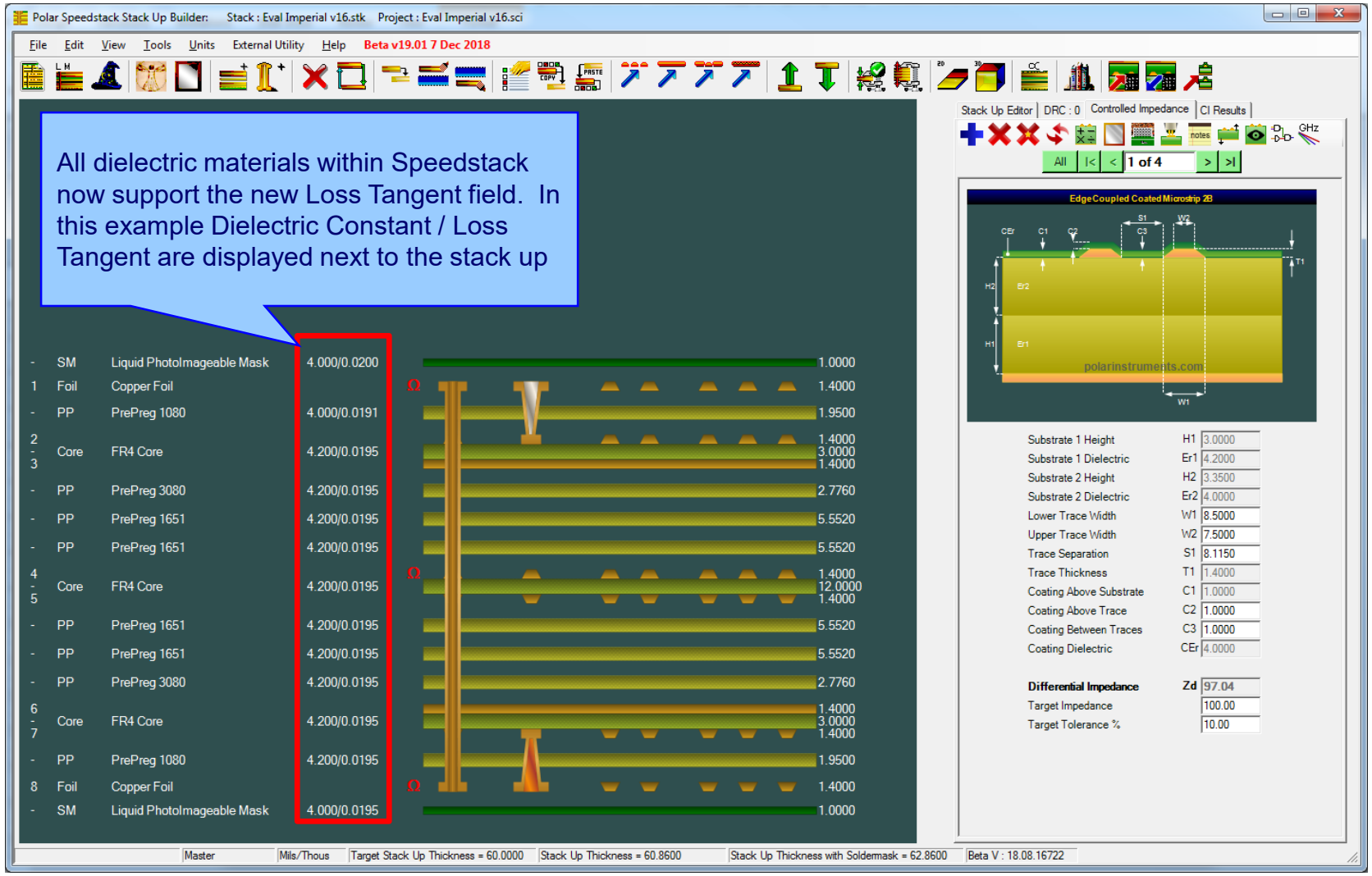
Online Library – On-Premise Mode has been enhanced



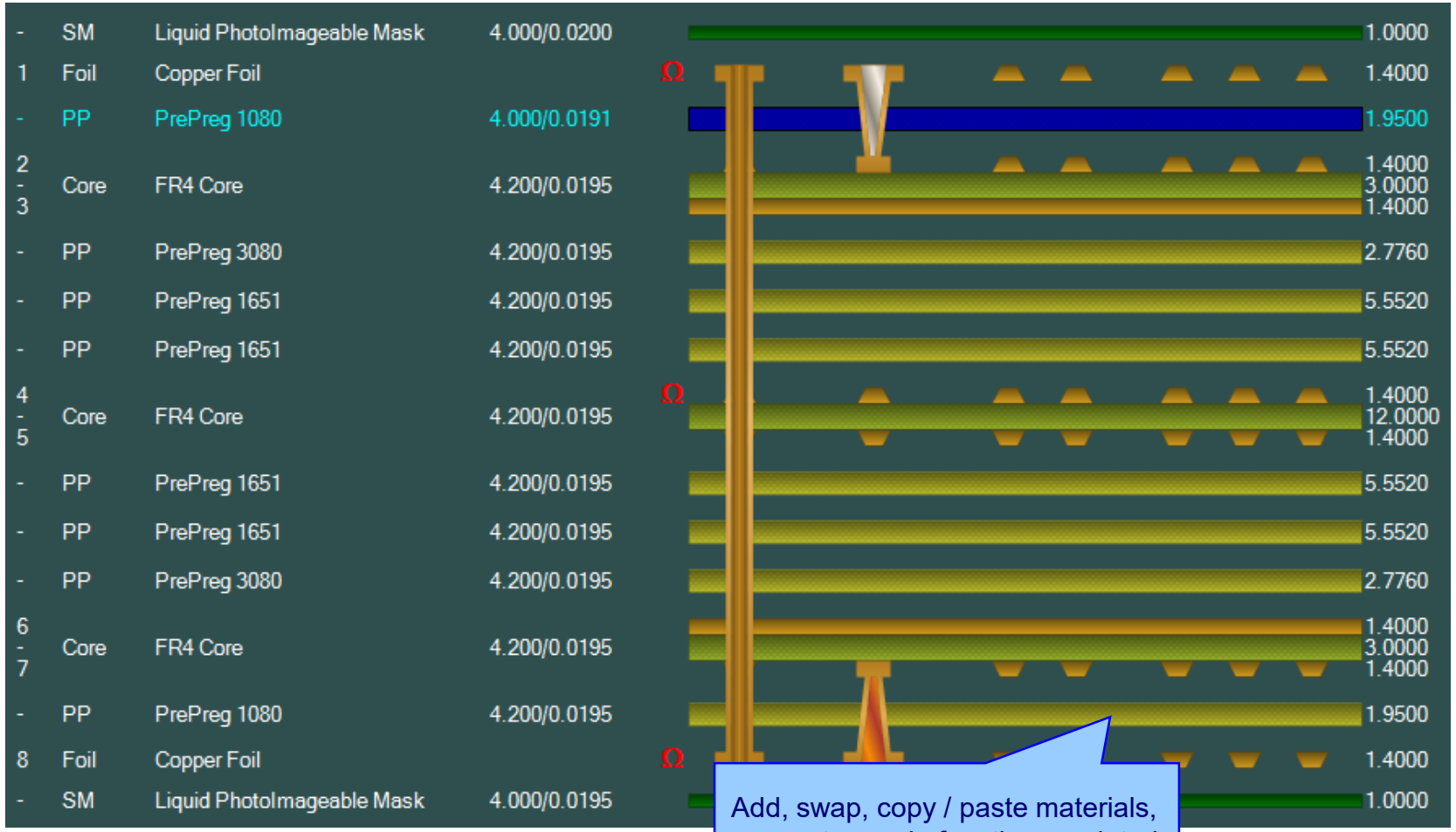


The Online Library can access the latest material library data from either the Polar FTP Server or an On-Premise Server.
The On-Premise Mode is ideal for those users where internal security policies prevent access to external FTP servers. Further enhancements have been made when no access to the Polar FTP Server is allowed

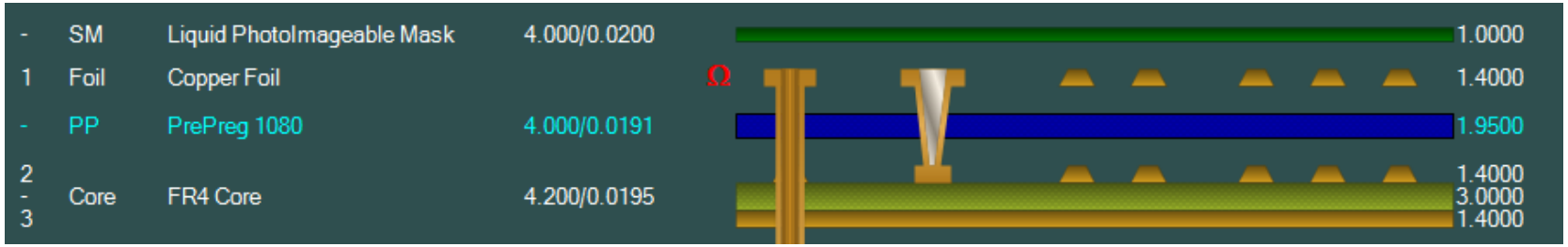
Stack Up Editor Enhancements – Support for Loss Tangent



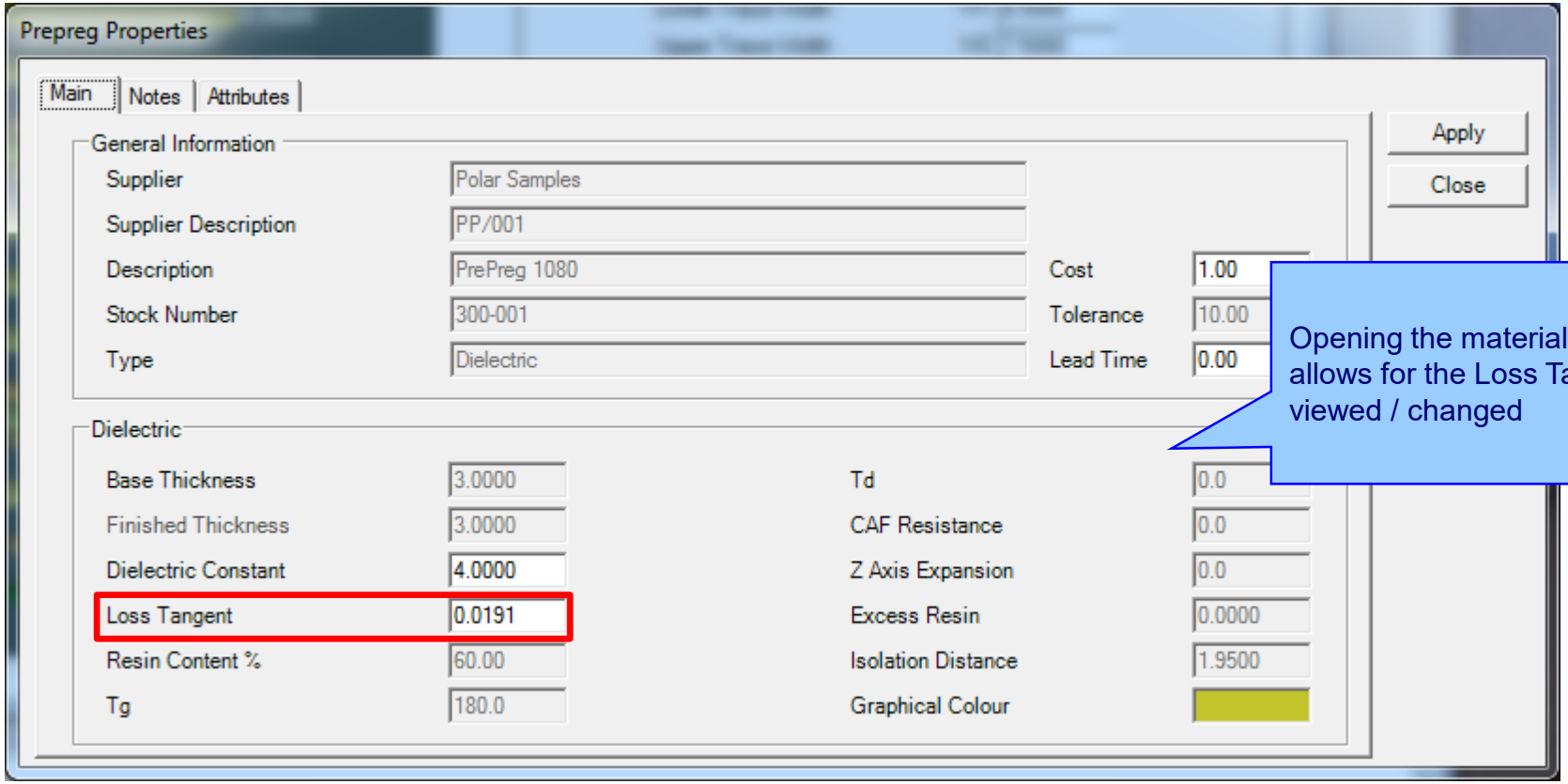
Stack Up Editor Enhancements – Support for Loss Tangent



Stack Up Editor Enhancements – Support for Loss Tangent



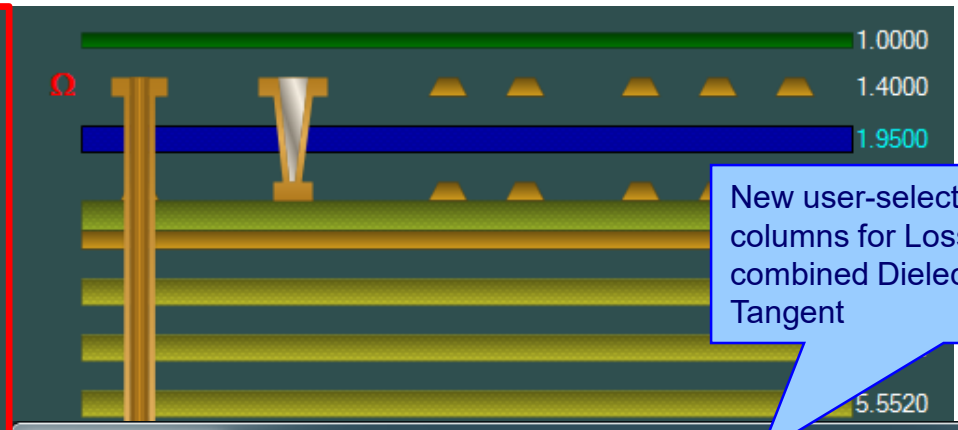
Properties



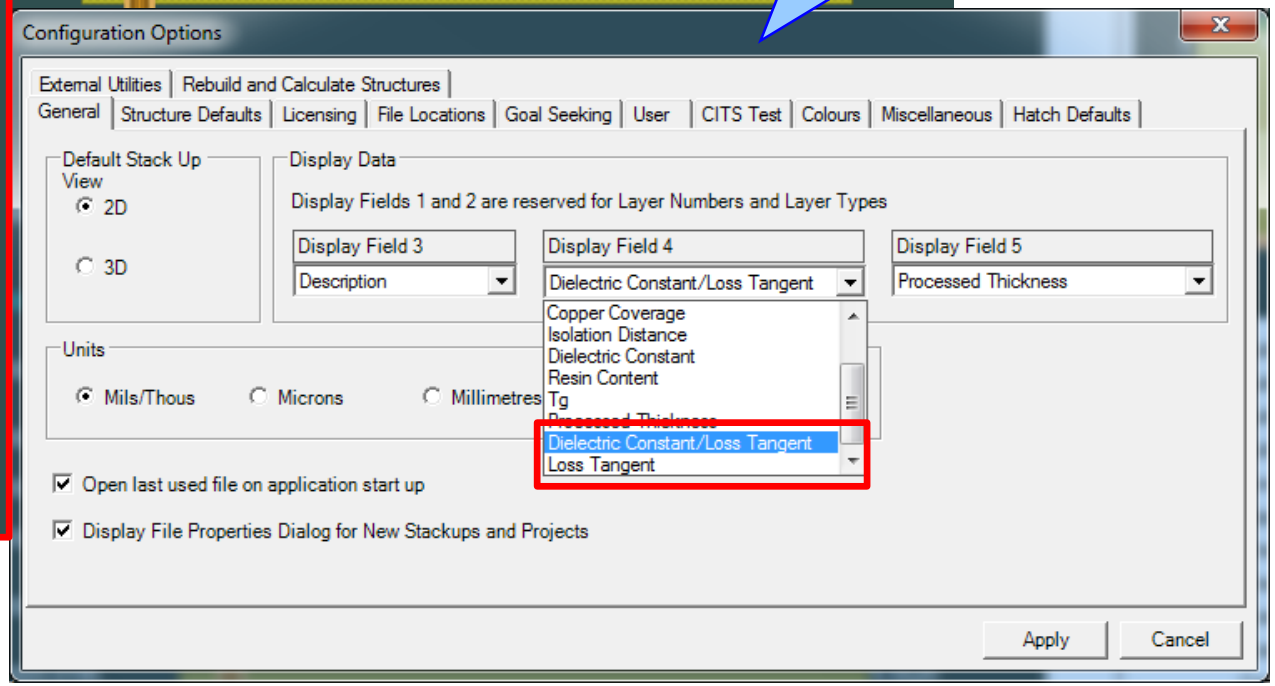
Opening the material Properties dialog allows for the Loss Tangent value to be viewed / changed

Stack Up Editor Enhancements – Support for Loss Tangent

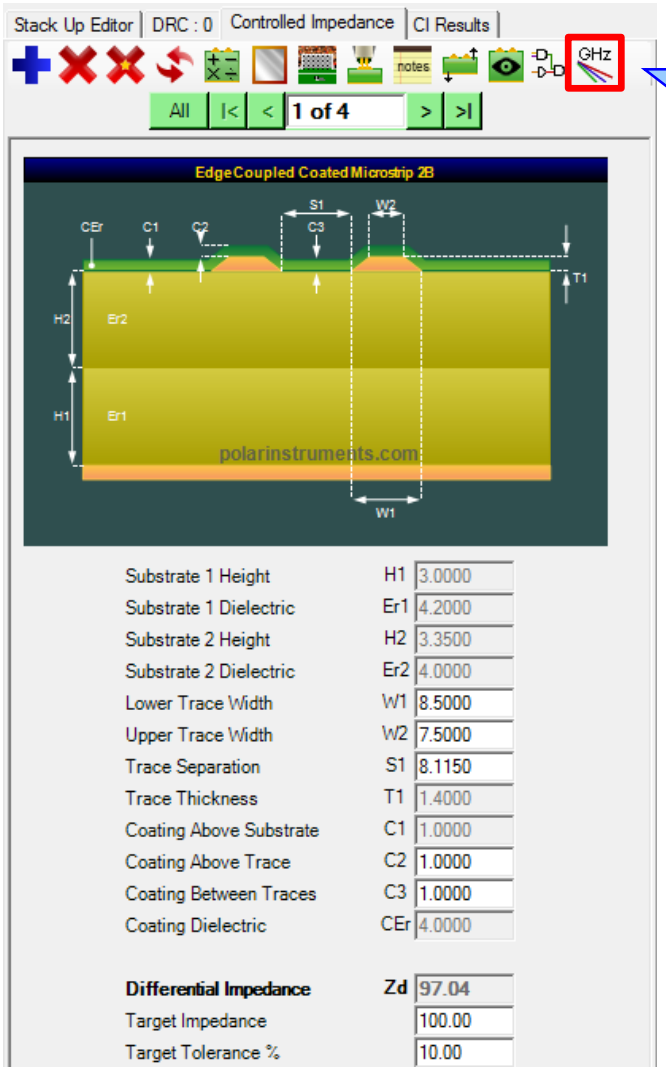
-	SM	Liquid Photoimageable Mask	4.000/0.0200
1	Foil	Copper Foil	
-	PP	PrePreg 1080	4.000/0.0191
2 - 3	Core	FR4 Core	4.200/0.0195
-	PP	PrePreg 3080	4.200/0.0195
-	PP	PrePreg 1651	4.200/0.0195
-	PP	PrePreg 1651	4.200/0.0195
4 - 5	Core	FR4 Core	4.200/0.0195
-	PP	PrePreg 1651	4.200/0.0195
-	PP	PrePreg 1651	4.200/0.0195
-	PP	PrePreg 3080	4.200/0.0195
6 - 7	Core	FR4 Core	4.200/0.0195
-	PP	PrePreg 1080	4.200/0.0195
8	Foil	Copper Foil	
-	SM	Liquid Photoimageable Mask	4.000/0.0195



New user-selectable display columns for Loss Tangent and a combined Dielectric Constant / Loss Tangent

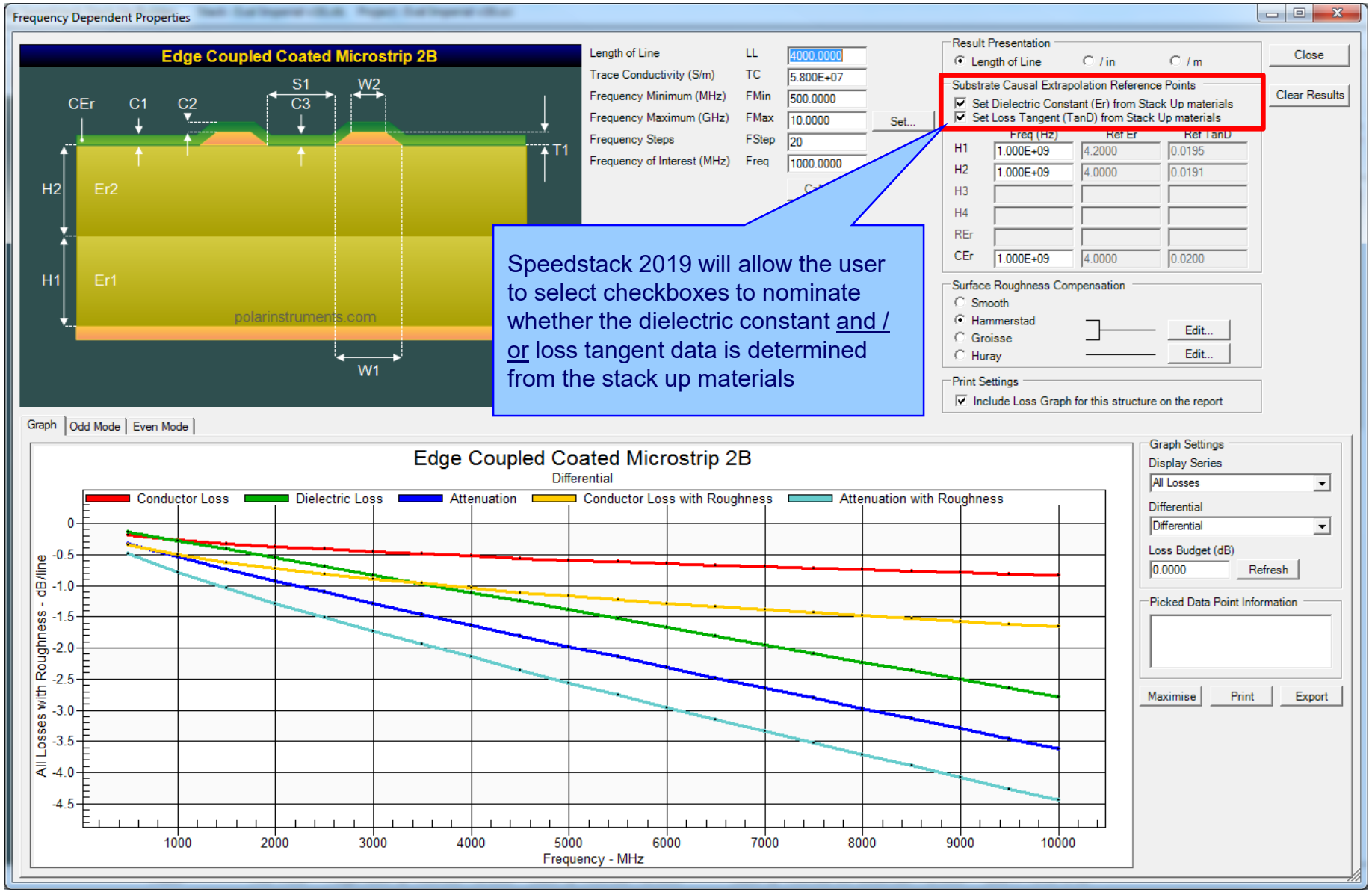


Frequency Dependent Calculation Enhancements (Speedstack Si)

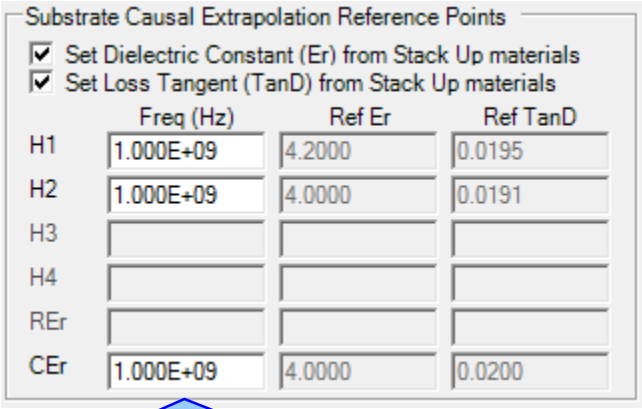


In order to accurately calculate frequency dependent loss it is necessary to know the critical information regarding the transmission line structure.

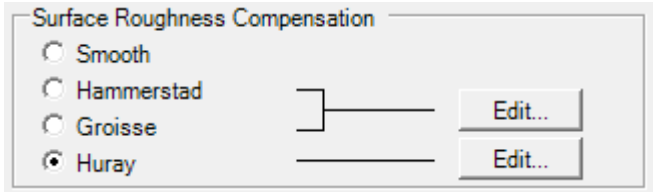
Speedstack 2019 will now use the dielectric constant and loss tangent data from the stack up

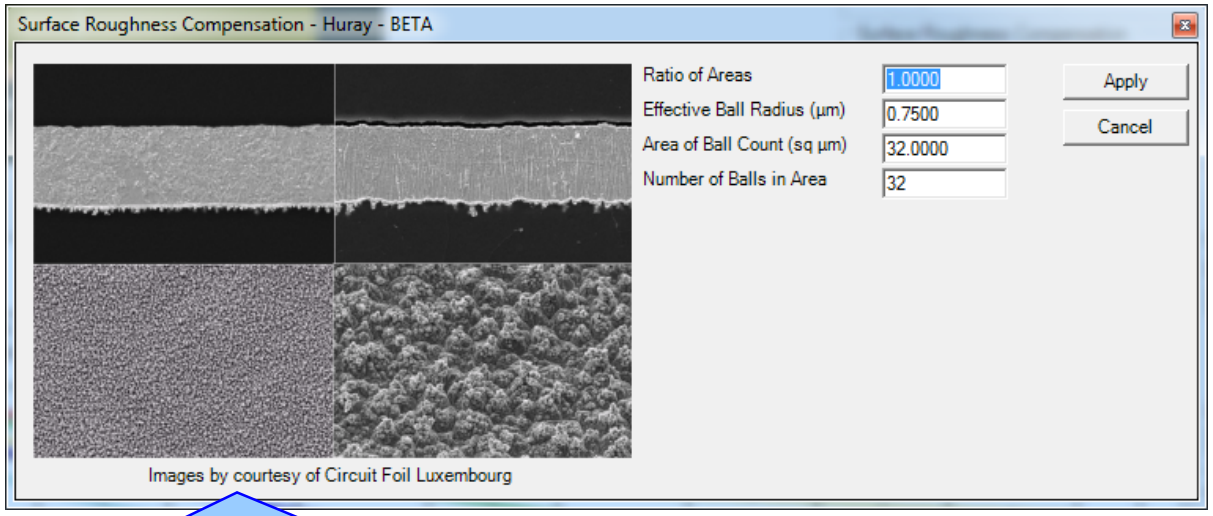


Speedstack – Material and Surface Roughness properties



In order to accurately calculate Dielectric Loss it is important to understand the material / substrate properties.
These substrate properties including dielectric constant (Er) and loss tangent (TanD) are specified here for each structure substrate region.
Speedstack causally extrapolates Er and TanD over the specified frequency range using the Svensson-Djordjevic method, hence the ability to specify the extrapolation reference points for each substrate region.
The reference point data is usually available from the material supplier data sheet and can be added to the Speedstack material library.
The checkbox options will automatically populate these fields from the stack up materials.

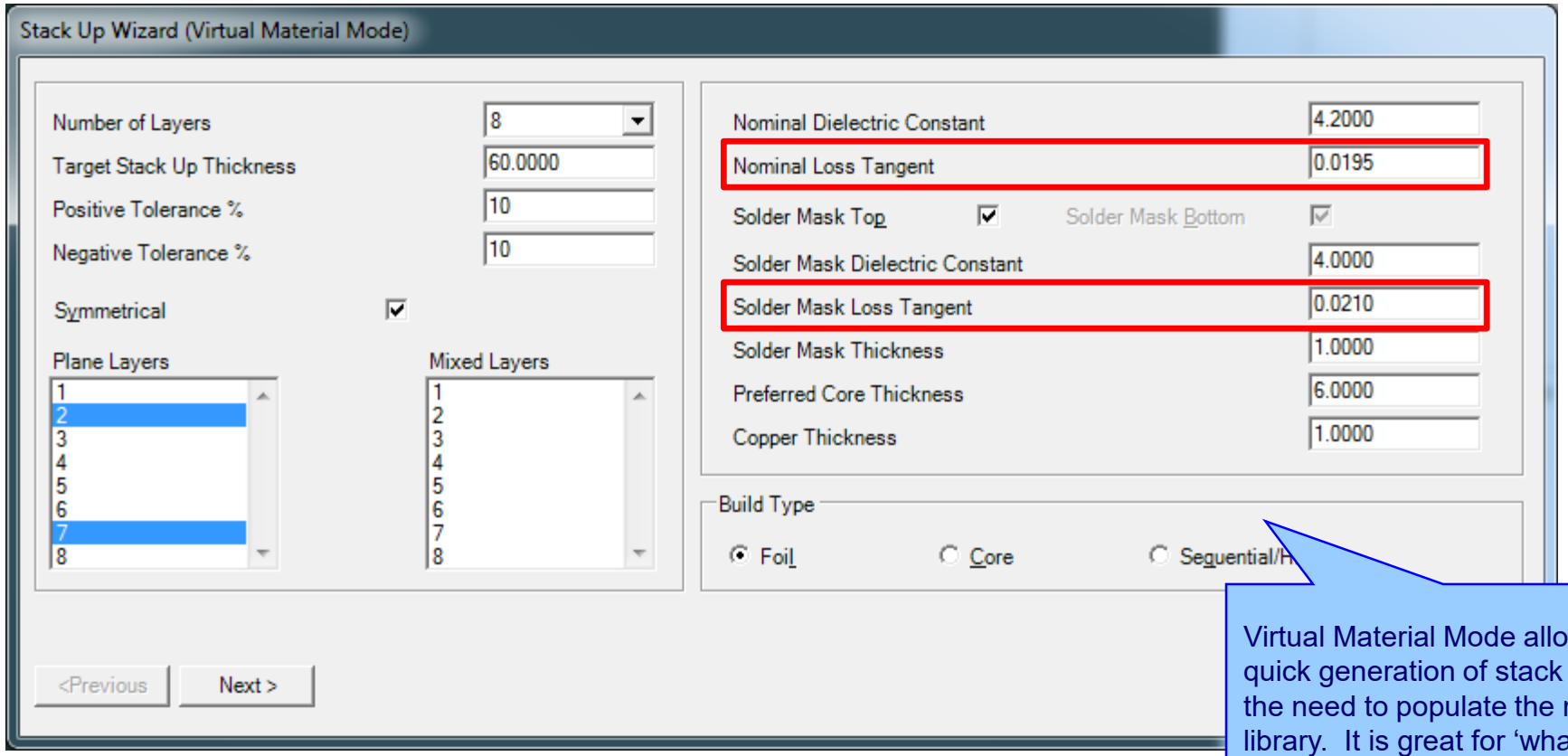




To accurately calculate Conductor Loss it is necessary to specify the surface roughness parameters.

Speedstack supports multiple roughness models: Hammerstad, Groisse, Huray and Cannonball-Huray. In this example the Huray method is used, the dialog prompts for the required roughness parameters.

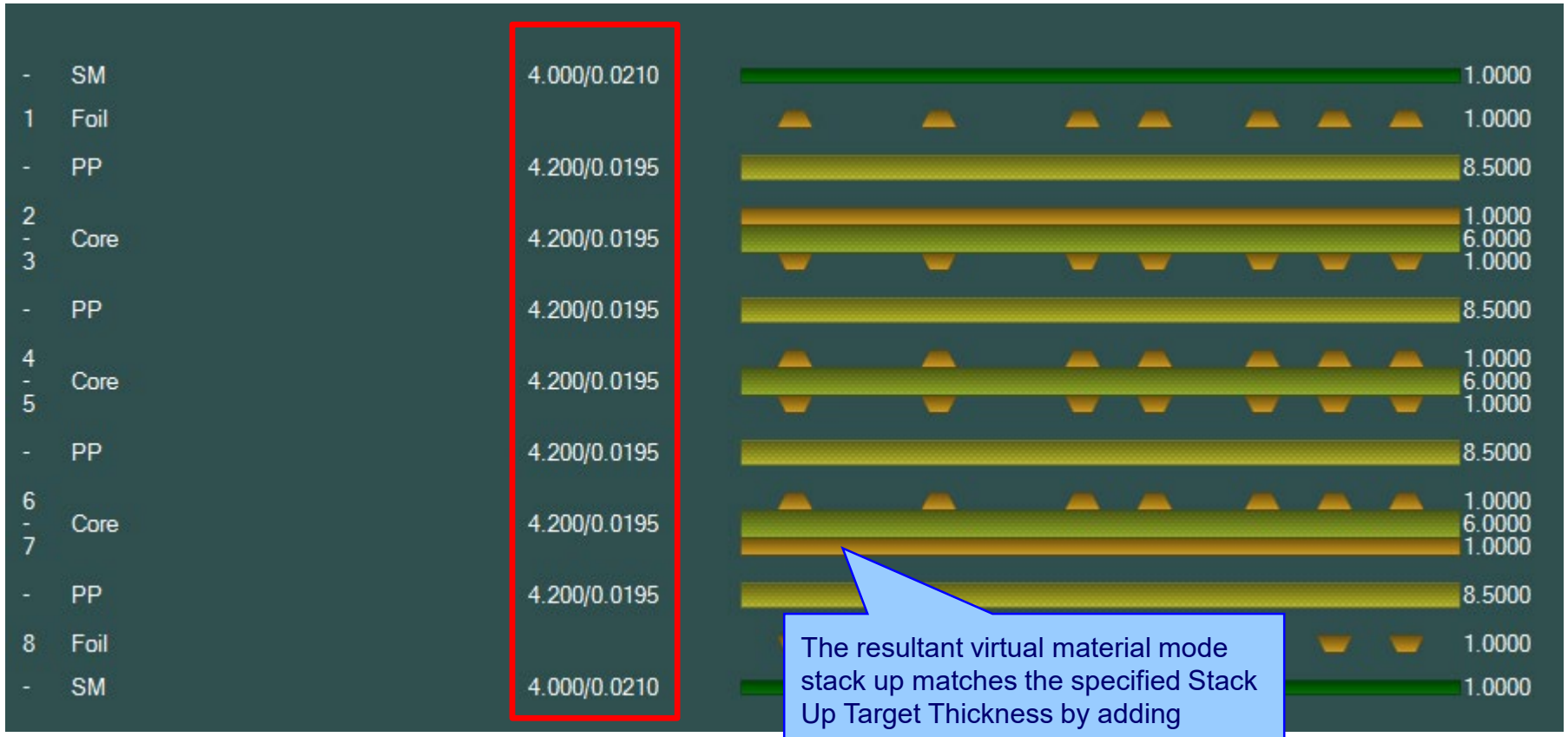
Virtual Material Mode enhancements



Virtual Material Mode allows for very quick generation of stack ups without the need to populate the material library. It is great for 'what if' scenarios.

Speedstack 2019 introduces material and solder mask loss tangent parameter entries to the wizard.

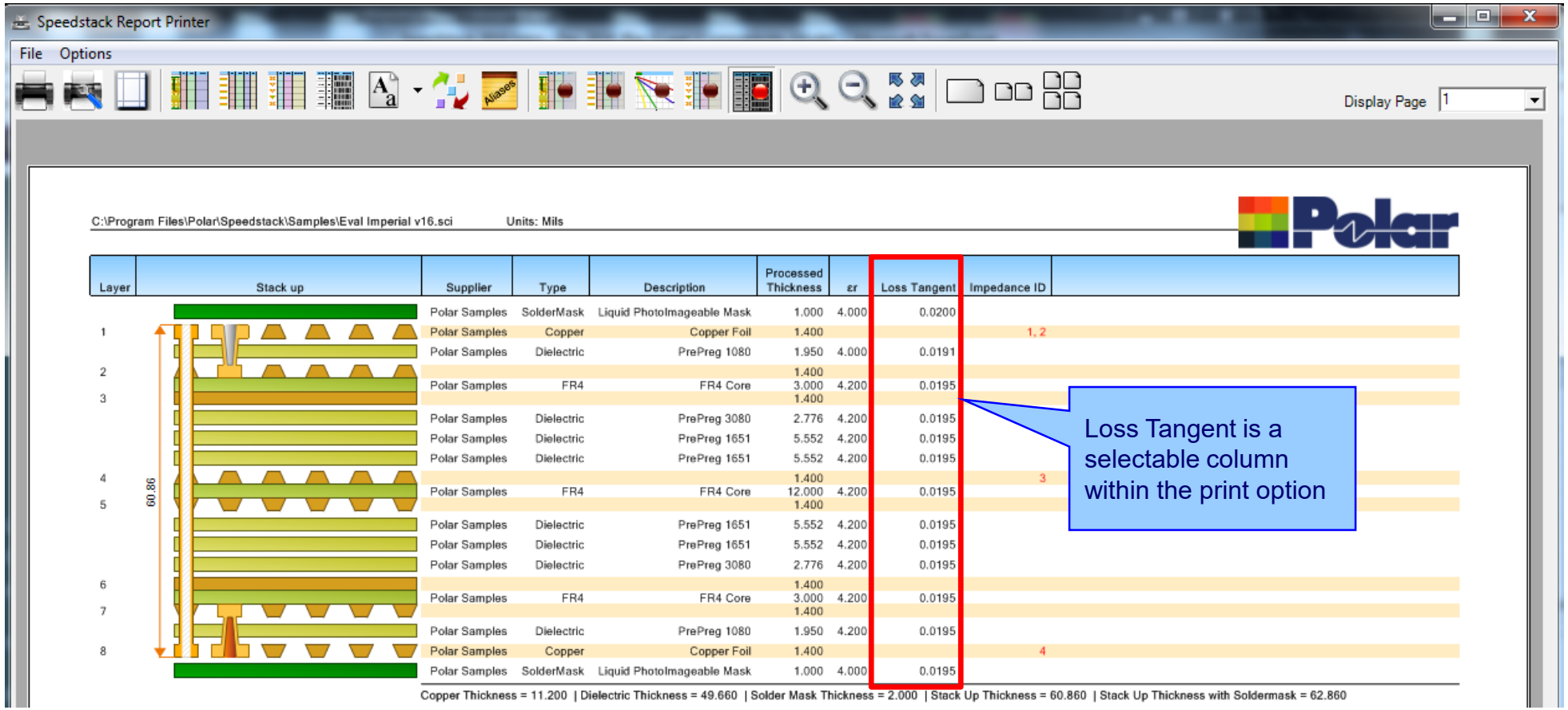
Virtual Material Mode enhancements



The resultant virtual material mode stack up matches the specified Stack Up Target Thickness by adding suitable Prepreg thicknesses between each nominated Foil and Core materials.

Speedstack 2019 introduces core / prepreg and solder mask loss tangent parameters.

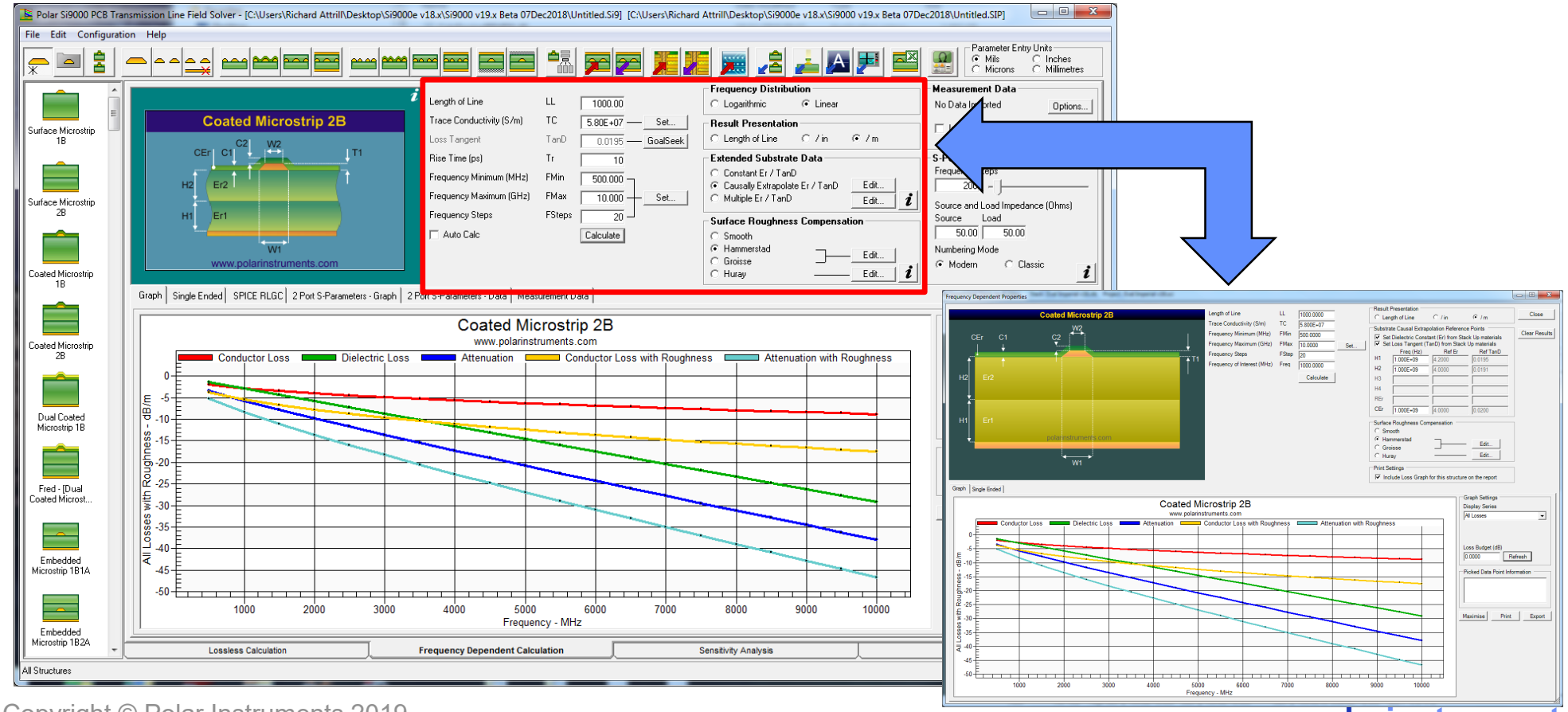
Printing Enhancements – Support for Loss Tangent



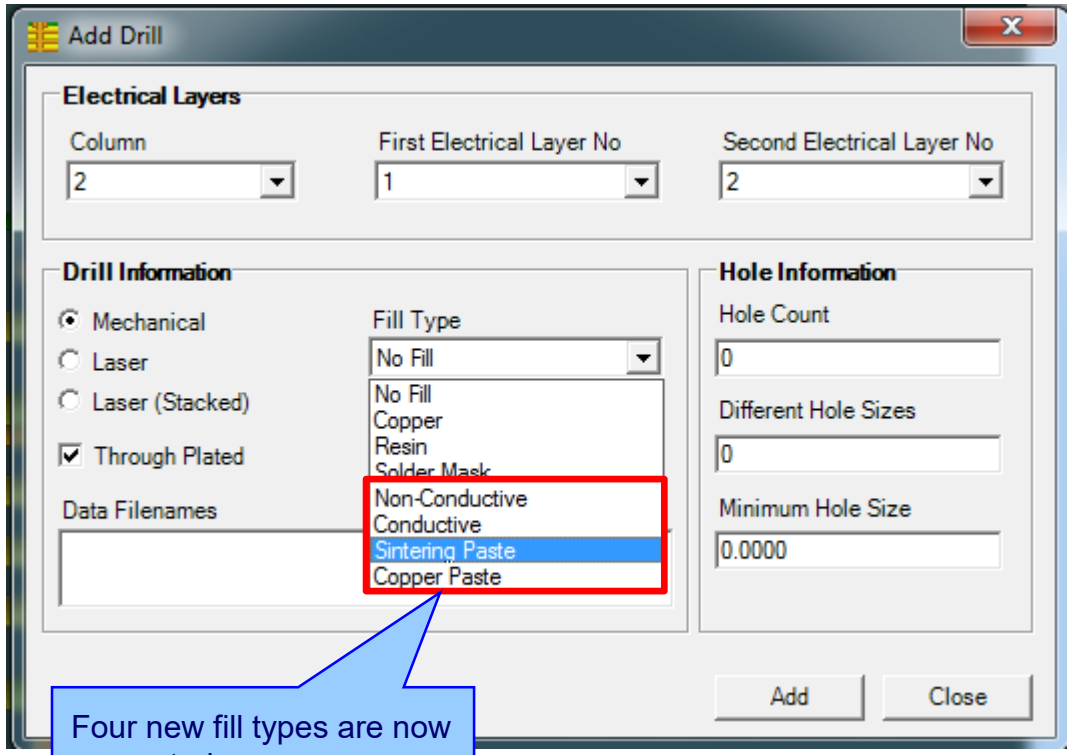
Layer	Stack up	Supplier	Type	Description	Processed Thickness	εr	Loss Tangent	Impedance ID
		Polar Samples	SolderMask	Liquid PhotoImageable Mask	1.000	4.000	0.0200	
1		Polar Samples	Copper	Copper Foil	1.400			1, 2
		Polar Samples	Dielectric	PrePreg 1080	1.950	4.000	0.0191	
2					1.400			
		Polar Samples	FR4	FR4 Core	3.000	4.200	0.0195	
3					1.400			
		Polar Samples	Dielectric	PrePreg 3080	2.776	4.200	0.0195	
		Polar Samples	Dielectric	PrePreg 1651	5.552	4.200	0.0195	
		Polar Samples	Dielectric	PrePreg 1651	5.552	4.200	0.0195	
4					1.400			3
		Polar Samples	FR4	FR4 Core	12.000	4.200	0.0195	
5					1.400			
		Polar Samples	Dielectric	PrePreg 1651	5.552	4.200	0.0195	
		Polar Samples	Dielectric	PrePreg 1651	5.552	4.200	0.0195	
		Polar Samples	Dielectric	PrePreg 3080	2.776	4.200	0.0195	
6					1.400			
		Polar Samples	FR4	FR4 Core	3.000	4.200	0.0195	
7					1.400			
		Polar Samples	Dielectric	PrePreg 1080	1.950	4.200	0.0195	
8		Polar Samples	Copper	Copper Foil	1.400			4
		Polar Samples	SolderMask	Liquid PhotoImageable Mask	1.000	4.000	0.0195	

60.86

Speedstack 2019 allows comprehensive bidirectional copy and paste from Speedstack into Si9000e including all relevant loss tangent, roughness and roughness method parameters along with frequencies of interest.



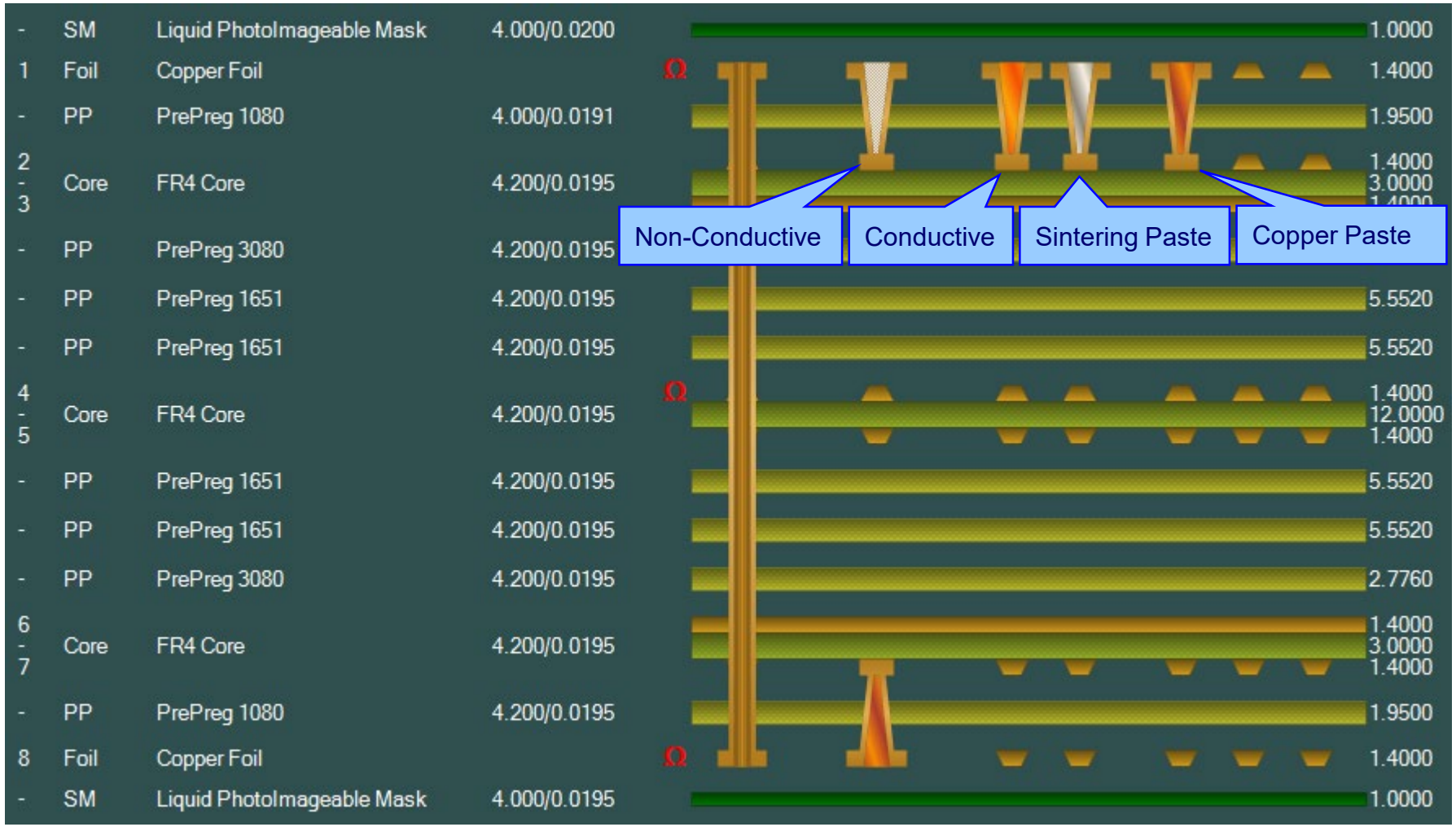
Drill / Via Fill Types – Four new types added



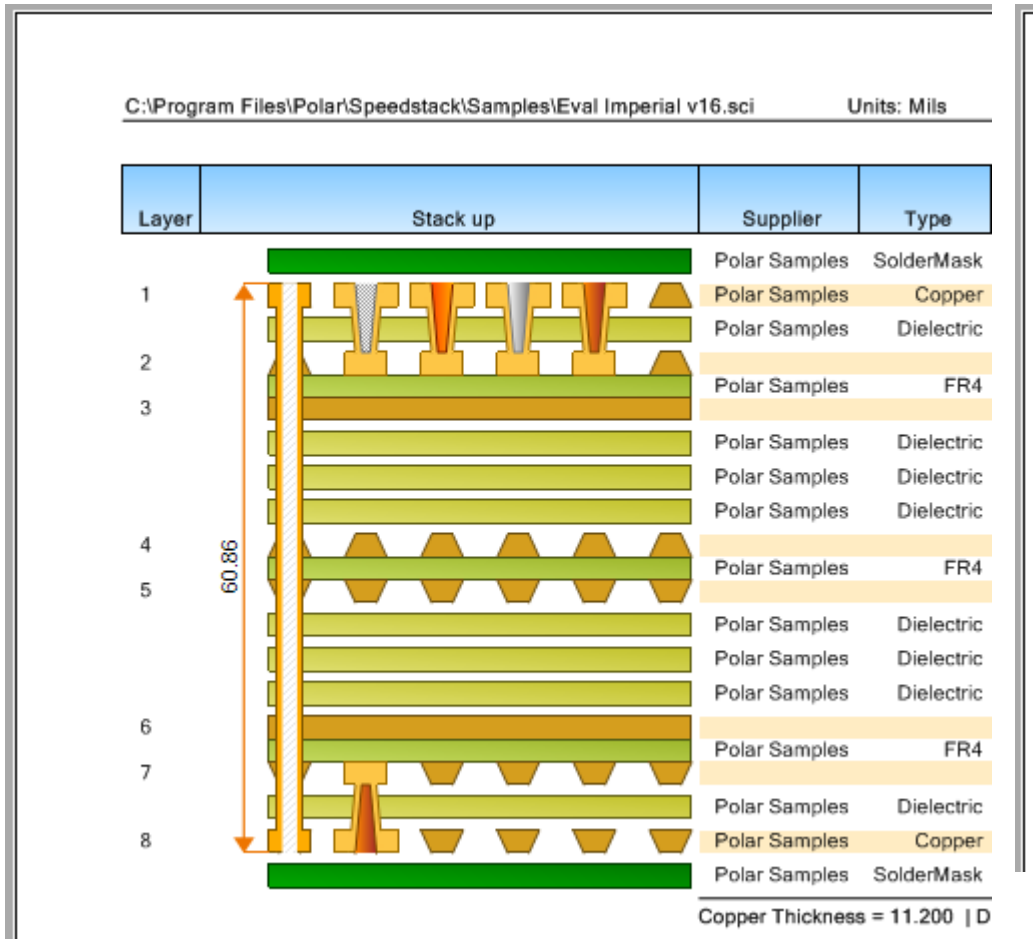
Four new fill types are now supported:

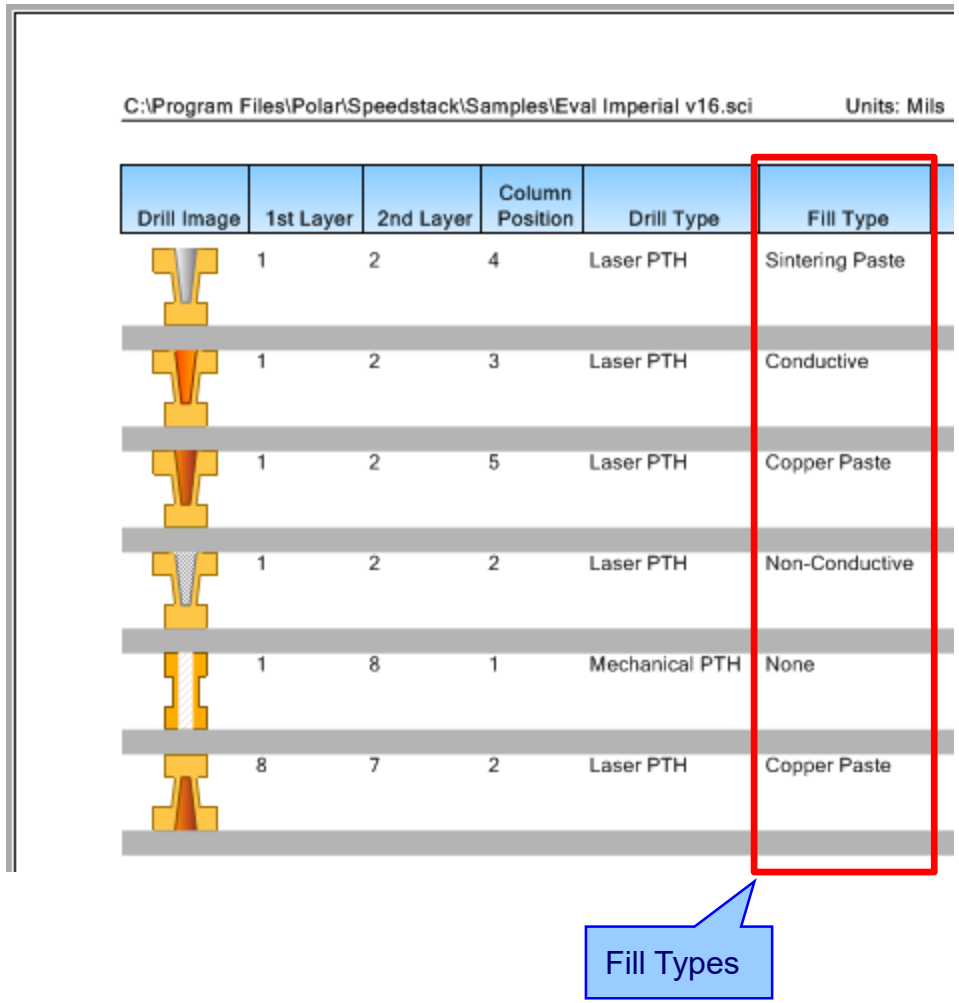
1. Non-Conductive
2. Conductive
3. Sintering Paste
4. Copper Paste

Drill / Via Fill Types – Four new types added



Drill / Via Fill Types – Four new types added





The following Import / Export options have been updated to support new fields introduced with Speedstack 2019:

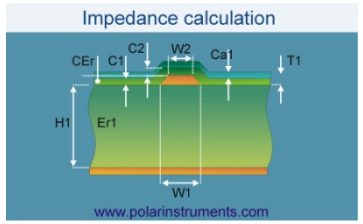
- XML STKX v16.00 and SSX v6.00 import / export options
- IPC-2581 Rev B import / export options
- CSV export option
- Gerber export option
- DXF export option

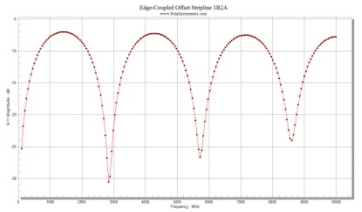
Impedance and Insertion Loss Calculations:

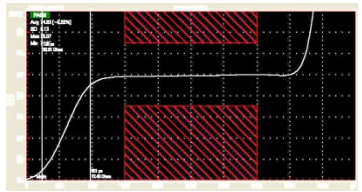
- New amalgamation algorithm - now amalgamates multiple substrates to a single substrate for both dielectric constant and loss tangent
- Modifications implemented to support causal surface roughness

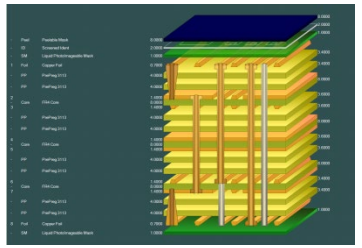
Rigid-Flex Improvements. When introducing air gaps into a sub-stack that previously had contiguous materials it is now possible to reassign this sub-stack to one that contains mini-stacks, by using the 'Reset Mini-Stack Settings' option from the Navigator menu. This is especially useful when designing 'book-binder' or 'doublet' rigid-flex constructions

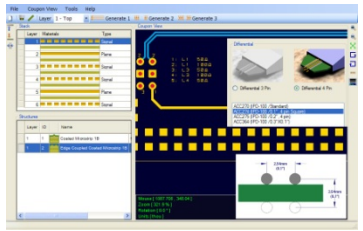
Ucamco Interface. The File menu 'Save and Continue' and 'Save and Quit' options now support the SSX v6.00 file format



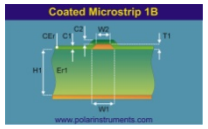


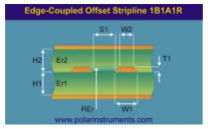


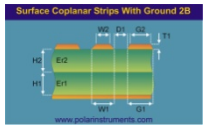


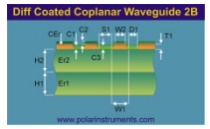


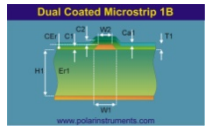
Thank you

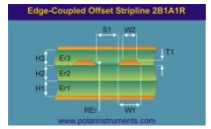


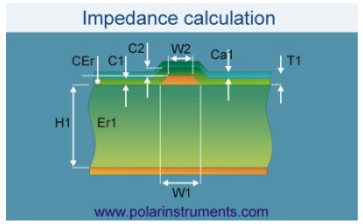


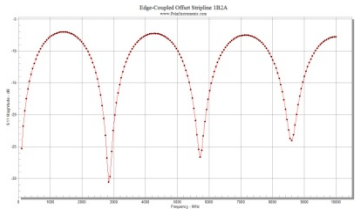


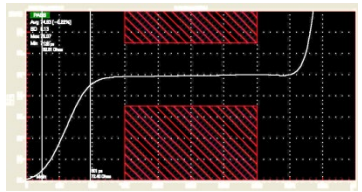


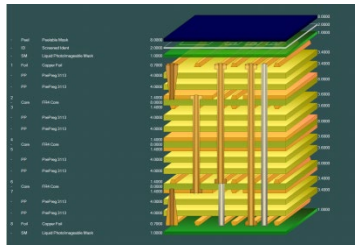


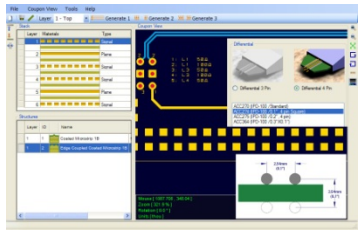












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