# Working with SOLIDWORKS

This is a brief how-to for creating material data files with the MPDB software (<u>https://www.jahm.com/</u>) and accessing these material data files within SOLIDWORKS.

**Step 1**: On your hard drive create the directory where the materials.xml files created in the MPDB software will be saved for use in SOLIDWORKS.

a) Do this in Windows explorer.

**Step 2**: In SOLIDWORKS add the directory created in Step 1 where your materials.xml files will be saved to SOLIDWORKS.

- a) Start SOLIDWORKS.
- b) Click the menu item "Tools->Options" (Figure 1.)
- c) Click the "File Locations" in the "System Options General" dialog (Figure 2.)
- d) Select "Material Databases" from the drop-down menu (Figure 3.)
- e) Click the "Add" button (Figure 4) and navigate to the folder where your materials.xml files will be saved, the directory you created in Step 1.
- f) You should now see your directory with your material.xml files listed (Figure 5.)

**<u>Step 3</u>**: Create your database using the MPDB software.

#### a) Creating a new database.

- I. Start the MPDB software.
- II. Click the "SOLIDWORKS /ANSYS->Create/Edit a new SOLIDWORKS XML database" menu item (Figure 6.)
- III. A new window will appear (Figure 7.)
- IV. Change the "Data type" options if desired. If the "Use material name from database" is checked the materials you add will have the name they have in the MPDB software. If this is not checked you will be prompted to enter a name for each material.
- V. Click the "Start DB" button to begin to define a new database. Once this button is clicked its label will change to "Start Mat". You can cancel the current database at any time by clicking the "Cancel DB" button.
- VI. Click the "Start Mat" to begin to define a material to be added to the database. You will be prompted to pick a color for the material.
- VII. Select the material you want to add to the database in the normal way. Click the "Add to database" button (Figure 8.)
- VIII. The window shown in Figure 9 will pop-up and you can select the properties you want to add. You can combine (mix-and-match) properties from more than one material in the MPDB database to a single material in your XML database. If the

desired material does not have all of the properties you need, you can select a similar material which has the missing properties and only select the properties you need. If you add the same property more than once for a material, the last property assigned will be used.

- IX. When you have defined all of the properties you need for a given material click the "Finish Mat" button to finalize the current material.
- X. Repeat steps VI through IX to add as many materials as desired (up to 1000) to the XML database.
- XI. Click the "Save DB" to save the current database to your hard drive. If you save the database in the directory you added in SOLIDWORKS (Step 2 above) the XML file will appear then next time you start SOLIDWORKS. The file will have the ".sldmat" extension.
- XII. You can check the "Remove" column of a material(s) then click the 'Remove" button to remove a material(s) from the database.
- XIII. You can see the material definitions by clicking the "Display" button. If no materials are checked all of the materials will be displayed. Otherwise, only the checked materials will be displayed. Only the material definitions will be display, other information needed for the XML file will not be shown. You can also look at the XML database in a text editor, such as Notepad, if desired.
- XIV. You can also rename a material by selecting its name in the table then clicking the "rename" button.

### b) Adding on to an existing database.

- I. Click the "Open Existing" button to open an existing database for editing. You can add, deleted and rename materials.
- II. The procedure is similar as described above except than the commands are now "Append Mat" and "Finish Append".
- III. Individual properties cannot be added to an existing material, the entire material must be defined at once.
- IV. When you open an existing database a copy of the original will be automatically be made with a "\_bak" added to the name.

#### Other Notes:

The only way to see the temperature dependent material property curves in the XML database from within SOLIDWORKS is to use the "SOLIDWORKS Simulation" add-in. You must have a license for this add-in.

- I. If you have a license for this add-in you can select the "Office Products" tab then click the "SOLIDWORKS Simulation" tab (Figure 10.)
- II. Then right-click "Material <not specified>" and then "Edit Material" (Figure 11.)

- III. You will see a list of the default SOLIDWORKS material files and any databases that you have added to the directory you defined in Step 2 above. Click on a database to see the materials in that database (Figure 12.)
- IV. Click the "Table & Curves" tab to see the curve representing a particular property.



Figure 1.



Figure 2.

#### System Options - File Locations

## System Options Document Properties

General	Show folders for:	_	_	
Drawings	Document Templates	$\sim$		Edit All
Display Style	Document Templates	^		
Area Hatch/Fill	Referenced Documents		emplates\	Add
Performance	Blocks		S\lang\english\Tutoria	
Colors	BOM Templates			Delete
Sketch	Color Swatches			
Relations/Snaps	Costing Report Template Folder			Move Up
Display	Costing templates			Mova Down
Selection	Custom - Appearances			MOVE DOWN
Performance	Custom - Decals			
Assemblies	Custom Property Files			
External References	Design Checker Files			
Default Templates	Design Journal Template			
File Locations	Design Library			
FeatureManager	Dimension/Annotation Favorites			
Spin Box Increments	Drafting Standards			
View	Function Builder Segment Type Definitions			
Backup/Recover	Hole Callout Format File			
Hole Wizard/Toolbox	Hole Table Templates			
File Explorer	Hole Wizard Favorites Database			
Search	Line Style Definitions			
Collaboration	Macro Feature Files			
Messages/Errors/Warnings	Material Databases		>	
Import	Punch Table Template	¥		
Export				
Export				

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Figure 3.

System Options - File Locations		
System Options Document Pro	perties	¢
General Drawings Display Style Area Hatch/Fill Performance Colors Sketch Relations/Snaps Display Selection	Show folders for: Material Databases Folders: C:\Program Files\SOLIDWORKS Corp\SOLIDWORKS\lang\english\sldmate	Edit All Add Delete Move Up Move Down



System Options - File Locations						
System Options Document P	roperties	3				
General	Show folders for:					
Drawings	Material Databases 🗸 🗸 🗸	Edit All				
Display Style	Folders:					
Area Hatch/Fill	C:\Program Files\SOLIDWORKS Corp\SOLIDWORKS\lang\english\sIdmate	Add				
Performance	C:\Users\jhs1\Documents\JAHM\SolidWorks					
Colors		Delete				
Sketch		Maria Ha				
Relations/Snaps		Move Up				
Display		Move Down				
Selection						
Performance						



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File Materials Options User	Materials	SOLIDWORKS/ANSYS Help	
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		Create/Edit an ANSYS Workbench 12+ (MatML 3.1) database	
Elements	Fe & N	Create a new ANSYS database	ide
Carbidas Carmats & Taol staals Carbons &		Add to an existing database	
Carbides, Cermets & Tool steels	insul	Close database	
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Figure 6.

R SolidWorks XML Database X						
	Material	Remove	Display	Properties		<b>_</b>
1						
2						_
3						
5						
6						
7						
8						
<u>9</u> 10						
11						
12						
13						-1
14	1	1	I	1		
Exist	ing Databases	New Databases				
	Open Existing	Start D	DB	Finish Mat		Cancel DB
A	Append Mat Finish Append	Data type				
	Cancel append					
0 materials in database Vise material name from database						
Number of materials to remove: 0						
	Display Re	move	Re	name Save	DB	Close

Figure 7.



Figure 8.

Relect properties to write to file			– 🗆 X	
r linear expansion (dL/L)	mean CTE	thermal expansion	density	
T include	□ include solid □	🗆 include	include solid 💌 💌	
thermal conductivity	specific heat	heat capacity	thermal diffusivity	
└ include solid	└ include solid	🗖 include 🔽 💌	🗖 include 🗨 💌	
electrical resistivity	electrical conductivity	vapor pressure	viscosity	
└ include solid	🗆 include	🗖 include 🔽 💌	🗖 include 🔽 💌	
elastic modulus	shear modulus	Poisson's ratio	bulk modulus	
└ include solid	T include	🗖 include 🔽 🔽	🗖 include 🔽 🔽	
C Use program Poisson's 🕫 Use constant Poisson's				
true stress-strain (tension)	true stress-strain (compression)	hemispherical total emissivity normal total emissivity		
└ include bar aged at 593C	🗆 include	T include	🗖 include 🔽 💌	
tensile strength	yield strength (tension)	yield strength (compression) – elongation		
└ include solid   rod - annealed & aged	└ include solid ▼ rod - annealed & aged ▼	🗖 include 🔽 💌	🗖 include 🗨 💌	
fatigue (S-N curve)	fatigue (e-N curve)	stress-rupture	creep strength	
└ include sheet	T include	🗖 include 🔽 💌	🗖 include 📃 💌	
relative permeability	absolute permeability	r magnetization curve B-H	magnetization curve H-B	
T include	T include	🗆 include	🗖 include 🔽	
Close Write data Select all De-sel	ect all			

Figure 9.



Figure 10.



Figure 11.



Figure 12.