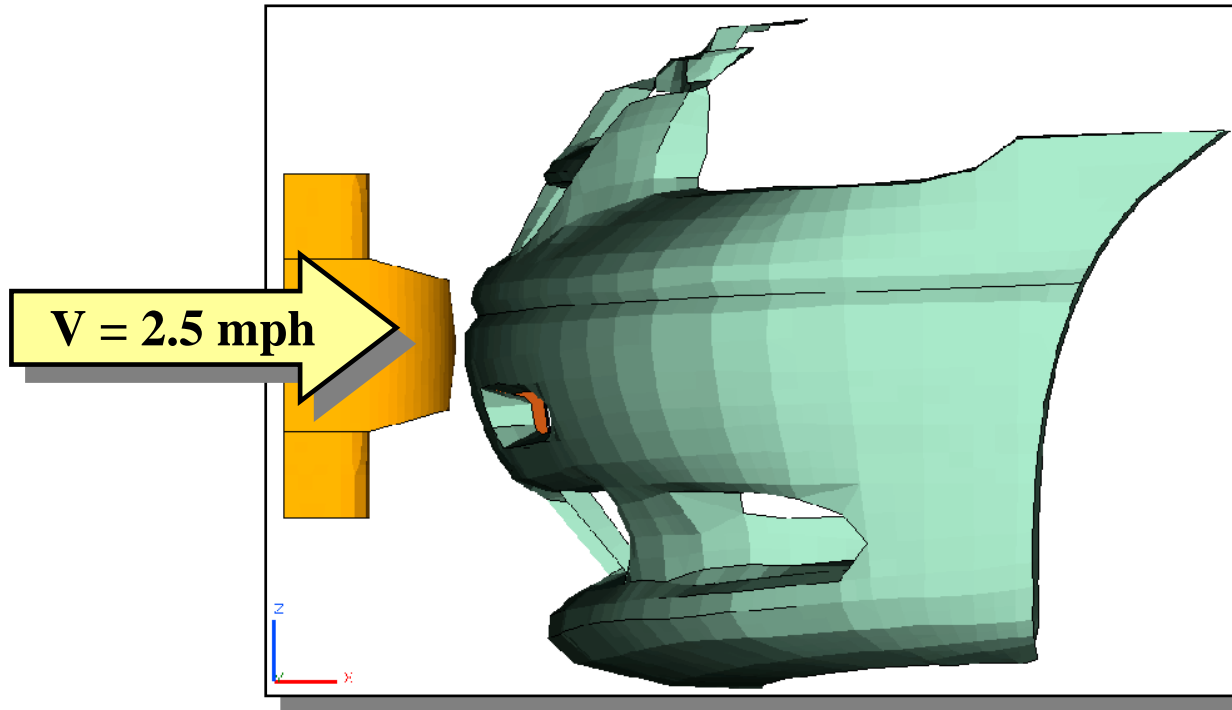


Design Stage 1: Definition of part load

Example of application: “Automotive Bumper Fascia”



Question: Will the bumper resist a minor parking bump without suffering permanent deformation?

Design Stage 2: Selecting the material, e.g. Makroblend KU2-7912

Click on Design module

Design and Processing Properties

File Navigation Extras Contact ?

Bayer MaterialScience

Material: Apec®, Bayblend®, Makroblend®, Makrolon®

Type: DP 7665, DP2-7665, KU2-7609, **KU2-7912**, KU2-7915, KU2-7916

Color: 900000

Processing Conditions for:

- Wall thickness
- Melt temperature
- Mold temperature

Humidity

Design Properties

Graphic

	Min.	Max.	Auto
x-Axis	0.00	160.00	✓
y-Axis	0.00	11000.00	✓

Save Export Pin

Stress [lb/in²]

Strain [%]

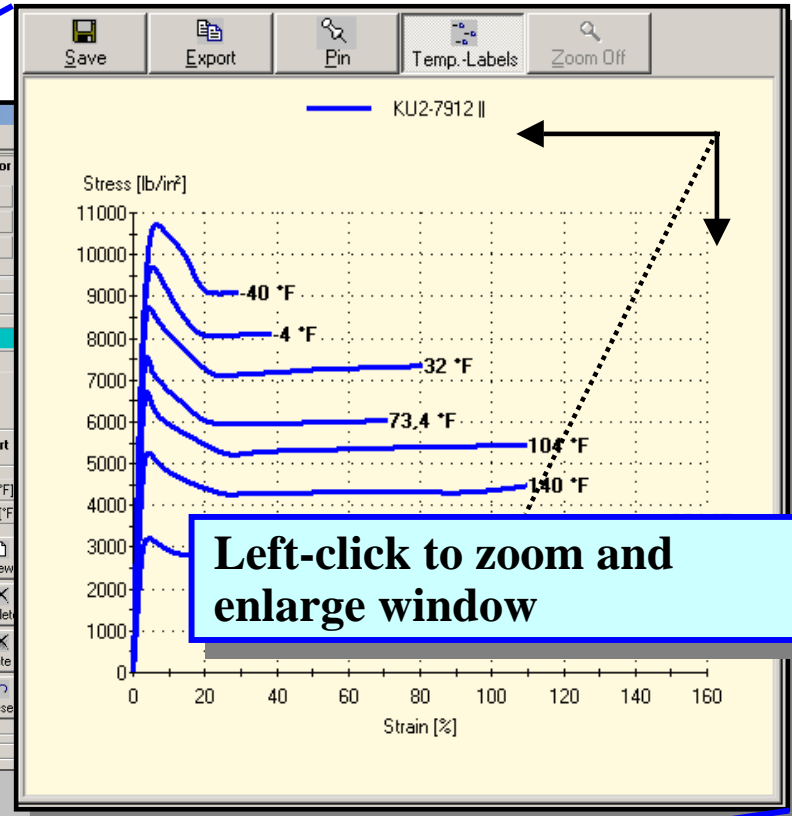
Temperatures

- 40.00 min. Temp. [°F]
- 212.00 max. Temp. [°F]
- 194.00

Testing: -40.00, -4.00, 32.00, 73.40, 104.00, 140.00, 194.00

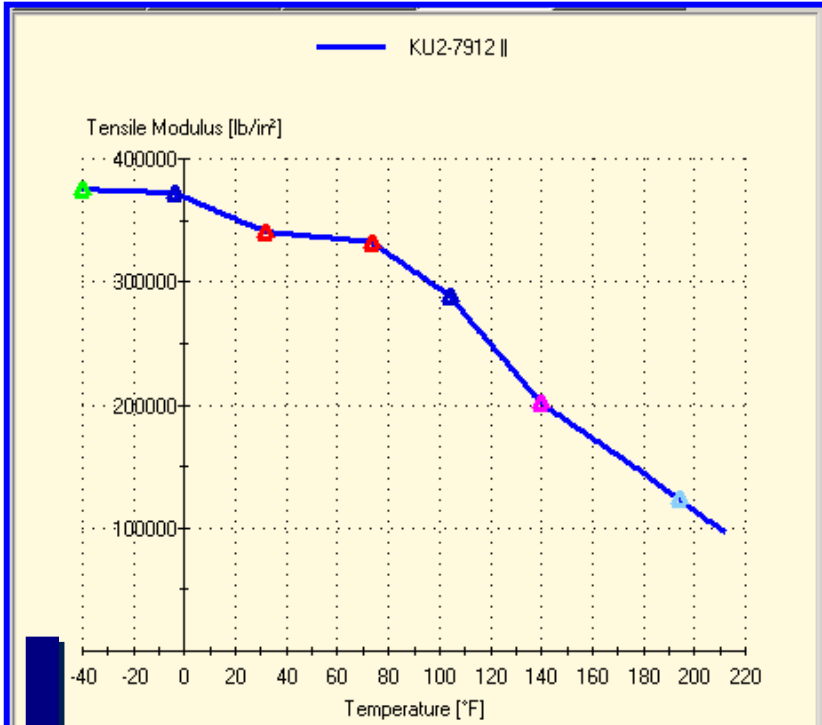
Pin: Display, Color, Legend, Display, Type, Wall thickness [in], Melt temperature [°F]

Select material



Left-click to zoom and enlarge window

Design Stage 3: Extracting material data for Makroblend KU 2-7912 to calculate part stresses



E.g. select Secant Modulus

Processing Conditions for molded parts

Wall thickness: 0.0591 to 0.1575 in (0.1575 in)

Melt temperature: 500.00 to 524.00 °F (600.00 °F)

Mold temperature: 140.00 to 176.00 °F (76.00 °F)

Humidity: dry, conditioned

Tensile Modulus: Secant Modulus 0,20 %

Anisotropy: parallel II, normal_L

Display Parameters Short Term

Temperatures: -40,00 min. Temp. [°F], 212,00 max. Temp. [°F]

Admissible Load: Admissible Load

Load Type / Reduction

Tensile Modulus: Secant Modulus 0,20 %

Anisotropy: parallel II, normal_L

Export to CAE application to identify maximum stress

Design Stage 4: Exporting stress-strain data

Click on "Export"

The screenshot shows the 'Design and Processing Properties' window with a stress-strain graph. The graph plots Stress [lb/in²] on the y-axis (0 to 8000) against Strain [%] on the x-axis (0 to 90). A blue curve shows a peak stress of approximately 7000 lb/in² at about 5% strain, followed by a yield point and a plateau. The temperature is set to 23 °F. The 'Export' button is highlighted with a blue box and a yellow arrow pointing to the 'Export' dialog box. The dialog box has 'Clipboard' selected and 'x, y - Values' chosen. A second yellow arrow points from the dialog box to the Excel spreadsheet.

Microsoft Excel - Maple1

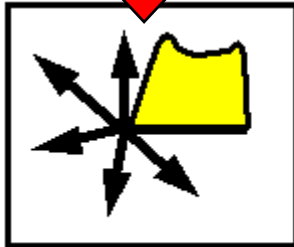
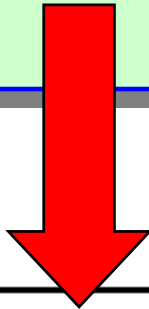
	A	B
1	Temperature: 23 °F	
2	Strain [%]	Stress [lb/in ²]
3	0,00	0,00
4	0,05	151,96
5	0,10	303,83
6	0,15	455,66
7	0,20	607,50
8	0,25	759,33
9	0,30	911,17
10	0,34	1059,41
11	0,39	1209,24
12	0,44	1358,45
13	0,48	1506,97
14	0,53	1654,73
15	0,58	1801,65
16	0,63	1947,66
17	0,68	2092,69

E.g. export to Excel

Alternative Stage 4: Extracting material data for Makroblend KU 2-7912 to calculate part stress – “Mechanical” .

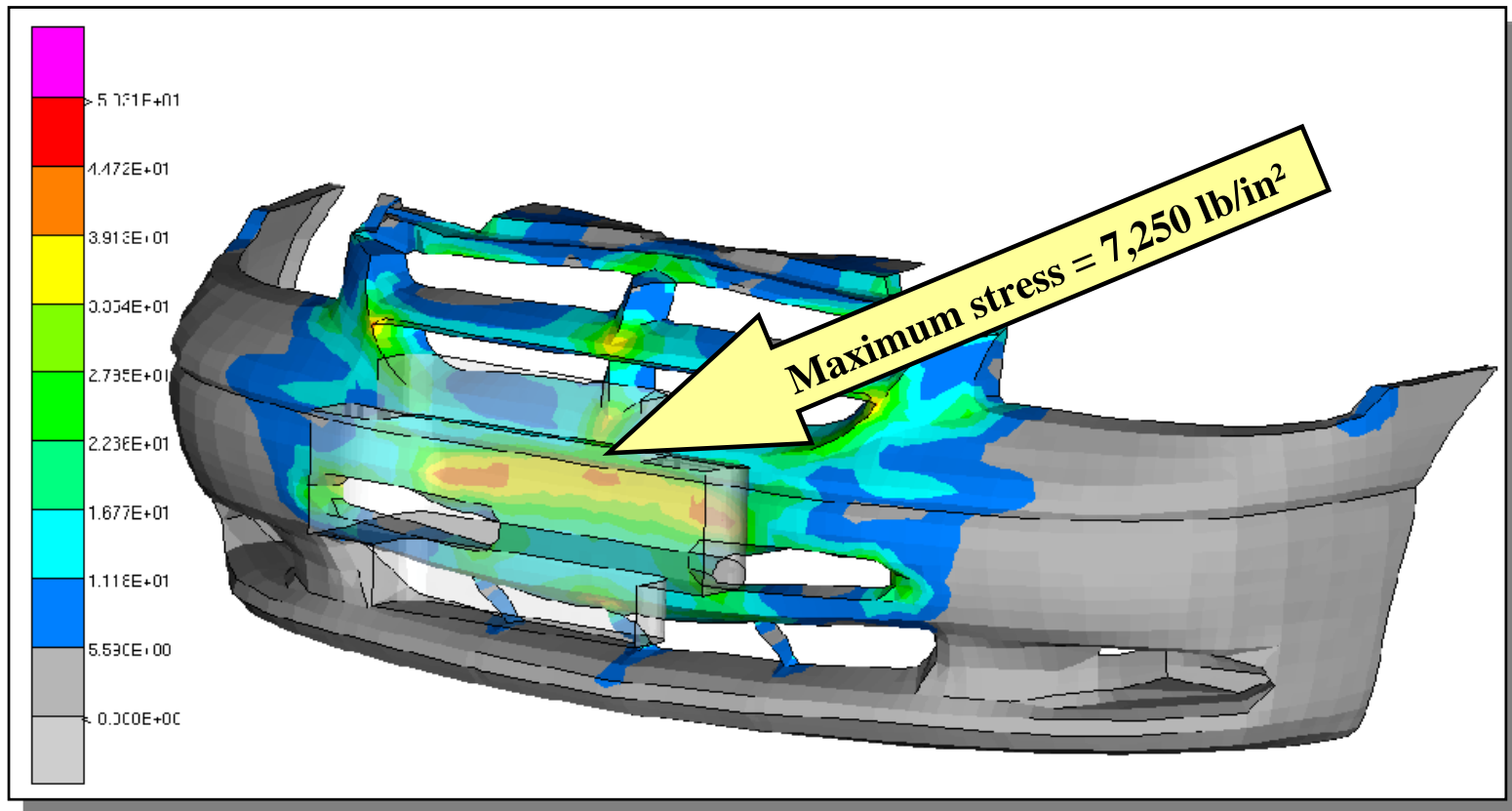
Part-specific mechanical properties at 23 °C (73.4 °F)

DPP Module 4: “Mechanical”



DPP Module 4: “Mechanical”

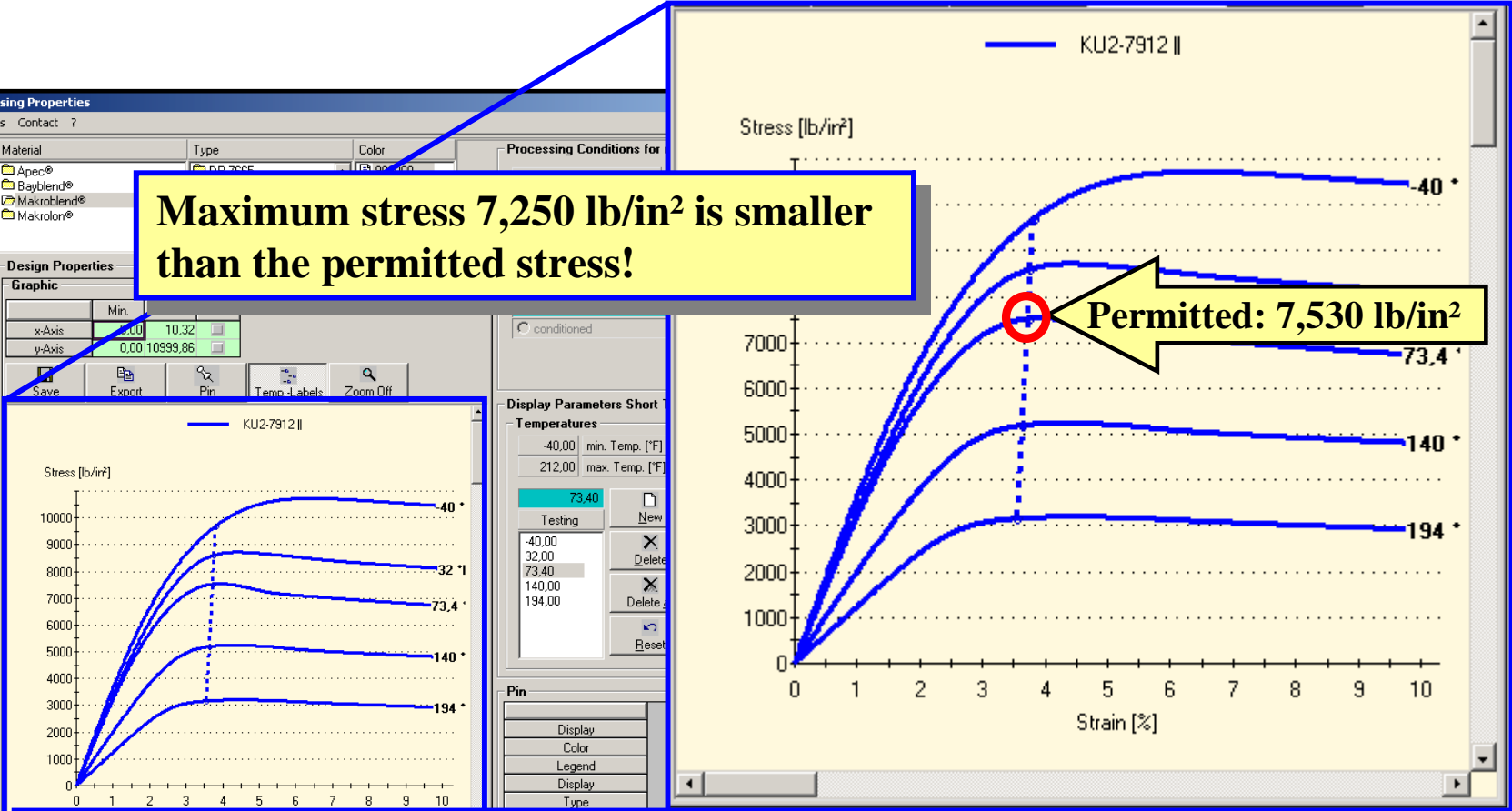
Design Stage 5: Analysing maximum load



Question: Is the impact load at 73.4 °F permitted under a maximum tensile strength of 7,250 lb/in²?

Design Stage 6: Comparing the calculated load with the permitted load for Makroblend KU 2-7912

Maximum stress 7,250 lb/in² is smaller than the permitted stress!



Permitted stress: 7,530 lb/in²: Makroblend KU2-7912 is suitable

Design Stage 7: Alternative material, defining any temperatures and anchoring the selected curves

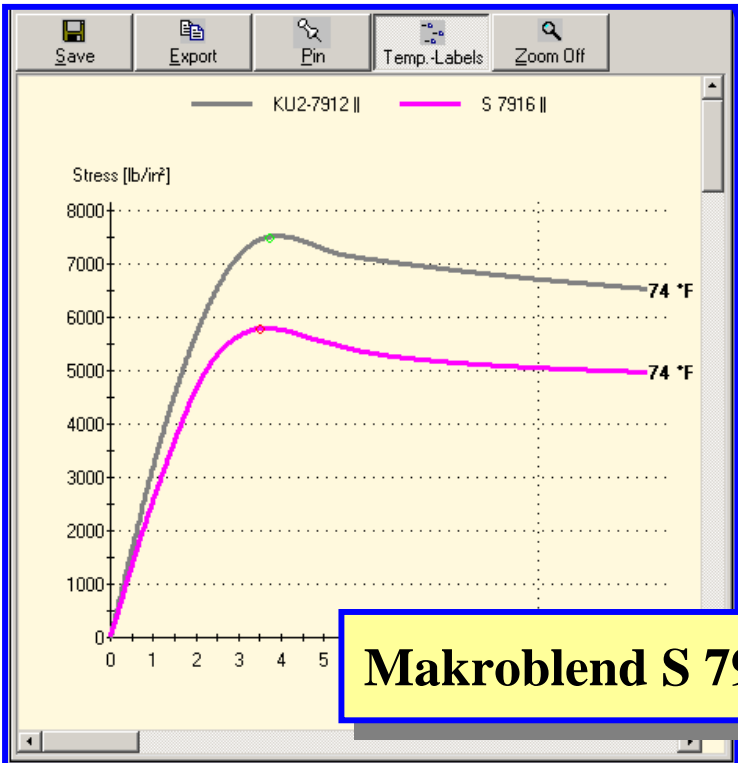
3. Anchor the curve

Test temperature: "new" 55 °F

- New
- Delete all

The screenshot shows the 'Design and Processing Properties' software interface. The main window displays a stress-strain graph for material KU2-7912 II. The y-axis is Stress [lb/in²] ranging from 0 to 9000, and the x-axis is Strain [%] ranging from 0 to 80. The graph shows a peak stress of approximately 8000 lb/in² at about 5% strain, followed by a yield point and a plateau. A callout box labeled '3. Anchor the curve' points to a 'Pin' icon in the 'Graphic' panel. Another callout box labeled 'Test temperature: "new" 55 °F' points to a 'New' button in the 'Display Parameters Short Term Temperatures' panel, which has a value of 55.00. A third callout box containing a list of actions ('New' and 'Delete all') points to the 'New' and 'Delete all' buttons in the same panel. The interface also shows material selection options, processing conditions, and various material property parameters.

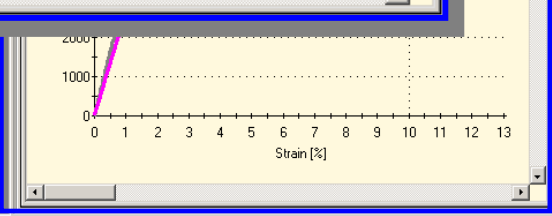
Design Stage 8: Alternative material, overlapping anchored stress-strain curves at 74 °F for KU2-7912 vs. S 7916



- Change curve color
- Remove anchoring

	1	2
Display	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Color	grey	magenta
Legend	KU2-7912 II	S 7916 II
Display	Makroblend®	Makroblend®
Type	KU2-7912 900000	S 7916 900000
Wall thickness [in]	0,1575	0,1575
Melt temperature [°F]	500,00	500,00

Makroblend S 7916 is not a suitable option



	1	2
Darstellen	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Farbe	grau	violett
Legende	KU2-7912 II	S 7916 II
Darstellen	Makroblend®	Makroblend®
Typ	KU2-7912 900000	S 7916 900000
Wanddicke [mm]	4,0	4,0
Massetemperatur [°C]	260	260