

Working with the "GrafCompounder" Program

July 2018

www.grafcompounder.com



- The "GrafCompounder" is a software program, which enables you to create recipes using any recipe database of: e.g. Rubber, TPE, TP and similar compounds.
 - Database must contain formulas with ingredients, their proportions and measured properties of the compounds.
- This software helps you save time and effort in recipe development by:
 - λ Elimination of Reinvention
 - λ Allowing faster and more accurate decisions on starting formulas
 - λ Creation of better ideas about further compound development
 - λ Useage of historic data in compound development

Designed to support the plant chemist



- The GrafCompounder uses a <u>Multiple</u> <u>Linear Iteration Method [MLI]</u> to calculate a recipe according to target or specification.
- The GrafCompounder enables to analyze a happenstance database.
- It is displaying the ratio of contribution of each compound recipe on the final formulation. This helps to identify faulty compound data.
 - If your confirmation experiment does not match the prediction inside confidence intervall, it is possible to track back all data used for the calculated compound.



- This tutorial familiarizes you with the advantage, potential and the best way to use the "GrafCompounder 3.211"
 - It shows all program features.
 - Explains this "easy to use" program
 - Guides you step wise through the program features



Import of Data from other sources

- Any Table Calculation Program
 - Excel®

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Open Office Calc



Start Grafcompounder

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Insert the license Dongle into a USB port on your PC/Laptop computer

Once the dongle is in place, open the GrafCompounder program.

If you try to do this in the reverse order an error message will be displayed.

Click ok and the Program is closing



Data Transfer

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After insertion of the dongle and start of the GrafCompounder program the screen should appear as shown



Data format

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24	DVR -26°C /24h	22,00	28.00	30,00	17.00	19.00	35,00	29.00	27,00	77,00				
25	DVR 0°C /24h	10,00	14,00	14,00	8,00	12,00	16,00	13,00	12,00	16,00				
26	DVR 23°C /72h	8,00	10,00	14,00	9,00	13,00	16,00	10,00	17,00	18,00				
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The spreadsheet should contain formulas (minimum 3) with their properties.

- The first column cell named "Ingredients:" with the list of ingredients underneath,
- A cell "Properties:" with the list of properties.
 - There is no limitation: Whatever can be turned into a number can be listed.
- The next columns first cell named "Recipes:"
 - Please insert the required cell names exactly as shown.
 The above example shows how to format any data table.
 - The program will not work without this cells highlighted in yellow



Data format and transfer

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With copy / paste

this table can be inserted in GrafCompounder



Data Insertion

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Transfer the data into the GrafCompounder program. There are three options to assign the data:

 Paste the information from the table calculation sheet: Click first cell, then right click.
 Select "Paste cell here" from Pull Down Menue



Data Insertion

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S [Mpa] 25.00 21.00 15.00 25.00 20.00 TS [Mpa] B [%] 785.00 725.00 690.00 715.00 705.00 EB [%] Set -26°C /24h [%] 22.00 28.00 30.00 17.00 19.00 C-Set -26°C /24h EB [%] Set -26°C /24h [%] 10.00 14.00 8.00 12.00 C-Set -26°C /24h C-Set -26°C /24h Set 23°C /72h [%] 39.00 50.00 61.00 44.00 50.00 C-Set 23°C /72h C-Set 23°C /72h Set 10°C /24h [%] 39.00 50.00 61.00 44.00 50.00 C-Set 23°C /72h C-Set 23°C /72h Set 10°C /24h [%] 39.00 50.00 61.00 44.00 50.00 C-Set 23°C /72h C-Set 23°C /72h Set 10°C /24h [%] 39.00 50.00 61.00 44.00 50.00 C-Set 23°C /72h C-Set 23°C /72h Set 10°C /24h [%] Set 23°C /72h C-Set 23°C /	1300 [Mpa]	1.8	0 3.00	3.00	4.40	4.60	0	M300 [Mpa]								
EB (%) 785.00 725.00 690.00 715.00 705.00 >>Set -26*C (24h (%) 22.00 28.00 30.00 17.00 19.00 >>Set 23*C /72h (%) 10.00 14.00 9.00 13.00 C-Set -26*C /24h C-Set 23*C /72h >>Set 23*C /72h (%) 8.00 10.00 14.00 9.00 13.00 C-Set 25*C /72h C-Set 25*C /72h >>Set 33*C /72h (%) 39.00 50.00 61.00 44.00 50.00 C-Set 25*C /72h C-Set 25*C /72h C-Set 25*C /72h C-Set 25*C /72h C-Set 25*C /72h C-Set 25*C /72h C-Set 25*C /72h C-Set	'S [Mpa]	25.0	0 21.0	0 15.00	25.00	20.00	0	TS [Mpa]								
Set - 26*C / 24h (%) 22.00 28.00 30.00 17.00 19.00 Set - 26*C / 24h (%) 10.00 14.00 8.00 12.00 C.Set - 26*C / 24h Set 23*C / 72h (%) 8.00 10.00 14.00 9.00 13.00 Set 23*C / 72h (%) 39.00 50.00 61.00 44.00 50.00 Set 23*C / 72h (%) 39.00 50.00 61.00 44.00 50.00 Cost (per vol) Cost (per mass) Cost (per vol) Cost (per vol) Cost (per vol) Sum of recipe ratios (should be 11 Number format 12.345.67 Import input data from clipboard Auto mix (overwrite mixture) Auto mix (new mixture)	B [%]	785.0	0 725.0	0 690.00	715.00	0 705.00	0	EB [%]								
Set 0° C /24h [%] 10.00 14.00 8.00 12.00 Set 2° C /24h [%] 8.00 10.00 14.00 9.00 13.00 Set 2° C /24h [%] 39.00 50.00 61.00 44.00 50.00 Set 70° C /24h [%] 39.00 50.00 61.00 44.00 50.00 Cost (per vol) Cost (per vol) Cost (per vol) 0 0 Sott (per mass) Cost (per vol) Cost (per vol) Cost (per mass) Sum of recipe ratios (should be 11 Number format 12.45.67 Import input data from clipboard Auto mix (overwrite mixture) Auto mix (new mixture)	C-Set -26°C /24h [%]	22.0	0 28.0	0 30.00	0 17.00	0 19.00	D	C-Set -26°C /24h								
Set 23°C //2h (%) 8.00 10.00 14.00 9.00 13.00 Set 23°C //2h (%) 39.00 50.00 61.00 44.00 50.00 Set 70°C //2h (%) 39.00 50.00 61.00 44.00 50.00 Image: Set 70°C //2h (%) 39.00 50.00 61.00 44.00 50.00 Image: Set 70°C //2h (%) 39.00 50.00 61.00 44.00 50.00 Image: Set 70°C //2h (%) Set 70°C //2h (%) Set 70°C //2h (%) Image: Set 70°C //2h (%) Image: Set 70°C //2h (%) Image: Set 70°C //2h (%) Set 70°C //2h (%) Image: Set 70°C //2h (%) Image: Set 70°C //2h (%) Image: Set 70°C //2h (%) Set 70°C //2h (%) Set 70°C //2h (%) Image: Set 70°C //2h (%) Image: Set 70°C //2h (%) Image: Set 70°C //2h (%) Set 70°C //2h (%) Set 70°C //2h (%) Set 70°C //2h (%) Image: Set 70°C //2h (%) Image: Set 70°C //2h (%) Image: Set 70°C //2h (%) Set (per vol) Set 70°C //2h (%) Set 70°C //2h (%) Set 70°C //2h (%) Image: Set 70°C //2h (%) Set 70°C //2h (%) Set (per vol) Set 70°C //2h (%) Set 70°C //2h (%) Set 70°C //2h (%) Set 70°C /	C-Set 0°C /24h [%]	10.0	0 14.0	0 14.00	0.8	0 12.00	0	C-Set 0°C /24h								
Set 70°C /24h [%] 39.00 50.00 81.00 44.00 50.00 Control ingredients	-Set 23°C /72h [%]	8.0	0 10.0	0 14.00	9.00	0 13.0	0	C-Set 23°C /72h								
Total ingredients Total ingredients Pensity Density Doot (per vol) Density Doot (per mass) Cost (per vol) Recipe ratios in %: Sum of recipe ratios (should be 11 0	C-Set 70°C /24h [%]	39.0	0 50.0	0 61.00	0 44.00	0 50.00	0	C-Set 70°C /24h								
Total ingredients 0 Density Density Cost (per vol) Cost (per vol) Cost (per vol) Cost (per vol) Cost (per mass) Sum of recipe ratios (should be 11 Number format. 12345.67	•)			7.	4	_	-	_	_	7 H	4		
Density Density Cost (per vol) Cost (per vol) Cost (per vol) Cost (per vol) Cost (per mass) Cost (per mass) Sum of recipe ratios (should be 11 Number format: 12345.67	otal ingredients							Total ingredients							0	
Dost (per vol) Cost (per vol) Cost (per vol) Sum of recipe ratios (should be 1) Cost (per mass) Cost (per mass) Sum of recipe ratios (should be 1) Number format: 12345.67 Import input data from clipboard Auto mix (overwrite mixture)	Density							Density								
Cost (per mass) Cost (per mass) Sum of recipe ratios (should be 10 0 Number format: 12345.67 V Import input data from clipboard Auto mix (overwrite mixture)	Cost (per vol)							Cost (per vol)								
Number format: 12345.67 Import input data from clipboard Auto mix (overwrite mixture) Auto mix (new mixture)	Cost (per mass)							Cost (per mass)								
Number format 12345.67 Import input data from clipboard Auto mix (overwrite mixture) Auto mix (new mixture)	Recipe ratios in %:													Sum of reci	pe ratios (shoul	d be 100%)
Number format: 12345.67														0		
		Num	ber format:	12345,67 💌		Import inp	ut data	from clipboard	Auto	mix (ov	erwrite n	nixture)	Auto mix (n	ew mixture)		

Program screen would look like shown.

- The yellow cells indicate, that the number format is different from the pre set format.GC program will not work.
 - Min & Max rows in "Criteria" window are empty

Choose the number format in the example select "komma"

in the example select "komma" instead of point



Data Insertion



Program screen would now look like shown above.

- Ingredients and Property named in blue
- Recipe numbers are in red
- Property numbers are in green

In the area next to "Input data"

- "Criteria" window
 - 1. Column: Ingredients & Property names
 - 2. Column: Minimum values
 - 3. Column: Maximum Values



Data Transfer

👑 GrafCompounder ve	ersion 2.00	3	1																		a X
File Edit Help																					
Input data:											Criteria:								Output:		
	50AL51	50AL512	50AL513	50AL514	50AL515	50AL516	50AL517	50AL518	50AL542		Name	Min	Max	From	То	Wei	Trdoff	F			
Testdateien										1											4
	Recipes:																				- P
Ingredients:	50AL511	50AL512	50AL513	50AL514	50AL515	50AL516	50AL517	50AL518	50AL542										Mixture1		
NR (SMR - 10)	100,00	100,00	100,00	100,00	100,00	100,00	100,00	100,00	100,00		NR (SMR - 10)	100	100								
N330	10,00	30,00	50,00	25,00	45,00	75,00	45,00	65,00	50,00		N330	10	75								
CaCO3	20,00	20,00	20,00	20,00	20,00	20,00	20,00	20,00			CaCO3	0	20								
Naphtenic Oil	5,00	25,00	45,00	5,00	25,00	45,00	5,00	25,00	10,00		Naphtenic Oil	5	45								
ZnO	5,00	5,00	5,00	5,00	5,00	5,00	5,00	5,00	5,00		ZnO	5	5								
Stearic Acid	2,00	2,00	2,00	2,00	2,00	2,00	2,00	2,00	2,00		Stearic Acid	2	2								
IPPD	2,00	2,00	2,00	2,00	2,00	2,00	2,00	2,00	2,00		IPPD	2	2								
S	1,50	1,50	1,50	1,50	1,50	1,50	1,50	1,50	0,25		S	0,25	1,5								
TMTD - 80									1,00		TMTD - 80	0	1								
CBS - 80	0,65	0,65	0,65	0,65	0,65	0,65	0,65	0,65	2,10		CBS - 80	0,65	2,1								
Total	146,15	186,15	226,15	161,15	201,15	251,15	181,15	221,15	172,35		Total	146,15	5 251,15								
Properties:																					
MooneyML(1+4) 100°C	32,00	36,00	31,00	34,00	30,00	42,00	60,00	39,00	41,00		MooneyML(1+4)	30	60					In			
Mooney t5 / 120°C	28,00	28,00	32,00	28,00	32,00	22,00	20,00	25,00	11,00		Mooney t5 / 120°0	C11	32								
Density	1,08	1,12	1,16	1,13	1,16	1,19	1,19	1,20	1,11		Density	1,08	1,2								
Hardness	42,00	41,00	40,00	48,00	48,00	52,00	61,00	61,00	59,00		Hardness	40	61								
M300	1,80	3,00	3,00	4,40	4,60	5,30	8,00	7,60	9,40		M300	1,8	9,4								
TS	25,00	21,00	15,00	25,00	20,00	15,30	23,00	18,00	23,00		TS	15	25								
EB	785,00	725,00	690,00	715,00	705,00	615,00	560,00	590,00	540,00		EB	540	785								
DVR -26°C /24h	22,00	28,00	30,00	17,00	19,00	35,00	29,00	27,00	77,00		DVR -26°C /24h	17	77								
DVR 0°C /24h	10,00	14,00	14,00	8,00	12,00	16,00	13,00	12,00	16,00		DVR 0°C /24h	8	16								
DVR 23°C /72h	8,00	10,00	14,00	9,00	13,00	16,00	10,00	17,00	18,00		DVR 23°C /72h	8	18								
DVR 70°C /24h	39,00	50,00	61,00	44,00	50,00	54,00	44,00	50,00	17,00		DVR 70°C /24h	17	61								
4									,	*	-				_		_,	•	•		7.
Recipe ratios in %:																			Sum of recipe r 0	atios (should	be 100%
		Nu	mber forr	nat: 123	45,67 🔻			mport inp	ut data from	lipb	oard Auto mix	(overwr	ite mixtur	e)	Auto n	nix (new	mixture)				

Once the "Number format" is adjusted to accommodate the comma:

- The recipes now appear red and the properties show as green
- The Min and Max columns show the highest and lowest numbers of the related row.

Now you are ready for calculation, if you choose this option and want to move on

Dr. Hans-Joachim Graf



👑 GrafCompou	inder versi	on 3.211	- demo d	ata			(and)	-			
File Edit Help											
Clear All Data							Criteria:				Output:
Load Demo Data (S	imple)	0AL512	50AL513	50AL514	50AL515	50AL516 50	Name	Min	Max From To	Wei Trdoff	
Load Demo Data (0	duoneed)										Ă
Load Denio Dala (A	uvanceu)	-									
Open File		0AL512	50AL513	50AL514	50AL515	50AL516 50					Mixture1
Save As		100.00	100.00	100.00	100.00	0 100.00	NR (SMR - 10)	100	100		
Merge in Recipes fro	om Clipboard	30.00	50.00	25.00	45.00	0 75.00	N330	10	75		
Merge in Recipes fro	om File	20.00	20.00	20.00	20.00	20.00	CaCO3	0	20		
Exit		25.00	45.00	5.00	25.00	45.00	Naphtenic Oil	5	45		
Chaoria Aoid	0.00	5.00	5.00	5.00	5.00	5.00	ZhO Staaria Aaid	5	0		
Steand Acid	2.00	2.00	2.00	2.00	2.00	2.00	Stearic Acid	2	2		
0	2.00	2.00	2.00	2.00	2.00	2.00	IFFD S	0.25	15		
5 TMTD - 90	1.50	1.50	/ 1.50	1.50	/ 1.50	1.50	5 TMTD - 80	0.20	1.0		
CBS - 80	0.65	0.65	0.65	0.65	0.64	5 0.65	CBS - 80	0.65	21		
000 00	0.00	0.00	0.00	0.00	, 0.0.	0.00	000 00	0.00	2.7		
Properties:											
MooneyML(1+4) 100°C	32.00	36.00	31.00	34.00	30.00	42.00	MooneyML(1+4	30	60		0
Mooney t5 / 120°C	28.00	28.00	32.00	28.00	32.00	22.00	Mooney t5 /	11	32		
Density [g/ccm]	1.08	1.12	1.16	1.13	1.10	5 1.19	Density [g/ccm]	1.08	1.2		
Hardness [°ShA]	42.00	41.00	40.00	48.00	48.00	0 52.00	Hardness	40	61		
M300 [Mpa]	1.80	3.00	3.00	4.40	4.60	0 5.30	M300 [Mpa]	1.8	9.4		
TS [Mpa]	25.00	21.00	15.00	25.00	20.00	0 15.30	TS [Mpa]	15	25		
EB [%]	785.00	725.00	690.00	715.00	705.00	0 615.00	EB [%]	540	785		
C-Set -26°C /24h [%]	22.00	28.00	30.00	17.00	19.00	0 35.00	C-Set -26°C	17	77		
C-Set 0°C /24h [%]	10.00	14.00	14.00	8.00	12.00	0 16.00	C-Set 0°C	8	16		
C-Set 23°C //2h [%]	8.00	10.00	14.00	9.00	13.00	0 16.00	C-Set 23°C	8	18		
C-Set 70°C /24h [%]	39.00	50.00	01.00	44.00	50.00	J 54.00	C-Set 70°C	1/	61		
•)	7 F	4	_			
Total ingredients Density Cost (per vol) Cost (per mass)	146.15	186.15	226.15	161.15	201.15	5 251.15	Total Density Cost (per vol) Cost (per	146.1	251.11		0
Recipe ratios in %:											Sum of recipe ratios (should be 100%)
											0
	Numbe	er format: 🔤	12345.67 💌		Import inp	ut data from clipbo	ard Auto mix	(overv	vrite mixture)	Auto mix (new r	nixture)

Other options for adding data:

As a second option you can open the GrafCompounder program

- Click "File"
- and "LoadDemo Data (simple)" in the pull down menu.



👑 Graf(Compounder	version	3.211 - demo data	a		-	-		Gast					-					X
File Edit	Help																		
Clear All	Data										Criteria:						Output:		
Load Der	no Data (Simple)			50AL511	50AL512	50AL513	50AL514	50AL515	50AL516	50AL51	Name	Min	Max	From To	Wei	. Trdoff			
Load Der	no Data (Advanced)																	A
Open File			la ses disertes	Recipes:	5041 540	5041540	5041 544	FOAL FAE	5041 540	50AL 54							Minkung d		
Save As		2	NR (SMR - 10)	50AL511	50AL512	50AL513 100.00	50AL514	50AL515 100.00	50AL510 100.00	SUALS I	NR (SMR - 10	100	100	0			Mixture I		
Morgo in	Recipes from Clink	oord 0	N330	10 00	30.00	50.00	25.00	45.00	75.00		N330	10	7	5					
Margelin	Recipes from Clipe	1	CaCO3	20.00	20.00	20.00	20.00	20.00	20.00		CaCO3	0	20	0					
merge in	Recipes from File	9	Naphtenic Oil	5.00	25.00	45.00	5.00	25.00	45.00		Naphtenic Oil	5	5 43	5					
Exit		0	ZnO	5.00	5.00	5.00	5.00	5.00	5.00		ZnO	5	5 5	5					
F001	165.00	0.92	Stearic Acid	2.00	2.00	2.00	2.00	2.00	2.00		Stearic Acid	2	2 2	2					
G001	924.00	1.15	IPPD	2.00	2.00	2.00	2.00	2.00	2.00		IPPD	2	2 2	2					
H001	158.00	1.80	S	1.50	1.50	1.50	1.50) 1.50	1.50		S	0.25	5 1.5	5					
K001	396.00	1.11	TMTD - 80								TMTD - 80	0	1	1					
K005	708.00	1.28	CBS - 80	0.65	0.65	0.65	0.65	0.68	0.65		CBS - 80	0.65	2.1	1		-			
Code:			Properties:																
PR001			MoonevML(1+4) 100°C	32.00	36.00	31.00	34.00	30.00	42.00		MoonevML(1+	4 30	60	0					
PR002			Mooney t5 / 120°C	28.00	28.00	32.00	28.00	32.00	22.00		Mooney t5 /	11	32	2					
PR003			Density [g/ccm]	1.08	1.12	1.16	1.13	1.16	1.19		Density [g/ccn	n] 1.08	1.2	2					
PR004			Hardness [°ShA]	42.00	41.00	40.00	48.00	48.00	52.00		Hardness	40	61	1					
PR007			M300 [Mpa]	1.80	3.00	3.00) 4.40	4.60	5.30		M300 [Mpa]	1.8	9.4	4					
PR008			TS [Mpa]	25.00	21.00	15.00	25.00	20.00	15.30		TS [Mpa]	15	5 25	5					
PR009			EB [%]	785.00	725.00	690.00	715.00	705.00	615.00	5	EB [%]	540	785	5					
PR010			C-Set -26°C /24h [%]	22.00	28.00	30.00	17.00	19.00	35.00		C-Set -26*C	17		7					
PR011			C-Set 0°C /24h [%]	10.00	14.00	14.00	8.00	12.00	16.00		C-Set 0°C	0	10	0					
PR012			C-Set Z3 C // 2/1 [%]	39.00	50.00	61.00	9.00	50.00	54.00		C-Set 70°C	17	6	1					
									. 01.00										
		_								<i>y</i> •	14						4		7 Þ
Total ingred	ients			146.15	186.15	226.15	161.15	201.15	251.15	18	Total	146.1	251.1	(0		
Density Open (page 4	0			1.096	1.115	1.128	1.137	1.147	1.171	05	Density	1.096	1.186	5					
Cost (per vo	()			262.347	237.377	220.712	209.187	230.816	219.724	20	Cost (per Vol)	187.6	203.0	4					
Recipe ratio	s in %:			239.00	212.094	193.007	221.931	200.094	107.030	21	Cost (per	107.0	.209.0	N.			Sum of recipe	e ratios (shi	ould be 100%
																	0		
			Number for	mat: 12345.	67 🔻	Im	port input data	from clipboa	rd Auto m	nix (overw	rite mixture)	Auto r	nix (ne	w mixture)]				

Other options for adding data:

As a second option you can open the GrafCompounder program

- Click "File"
- and "LoadDemo Data (advanced)" in the pull down menu.



File Edit Help																			
put data:											Criteria:						Output:		
				5041 511	5041 512	5041 513	5041 514	5041 515	50AL 516	5041 51	Name	Min I	Max	From To	Wei	Trdoff			
aat Data (Adv				SUMESTI	50AE512	50AL515	50AL514	50/AE515	30AL310	SUMEST	rvanie		Max		****	muon			
est Data (Auv				Pocines:															
ode:	Cost	Density	Ingredients:	50AL 511	50AL 512	50AL 513	50AL 514	50AL 515	50AL 516	50AL 51							Mixture 1	_	
001	280.00	0.92	NR (SMR - 10)	100.00	100.00	100 00	100 00	100 00	100 00	1	NR (SMR - 10)	100	100				initiation of t		
003	115.00	1.80	N330	10.00	30.00	50.00	25.00	45.00	75.00		N330	10	75						
010	24.00	2.71	CaC03	20.00	20.00	20.00	20.00	20.00	20.00		CaCO3	0	20						
002	116.00	0.89	Nanhtenic Oil	5.00	25.00	45.00	5.00	25.00	45.00		Naphtenic Oil	5	45						
001	385.00	5.60	ZnO	5.00	5.00	5.00	5.00	5.00	5.00		ZnO	5							
01	165.00	0.92	Stearic Acid	2.00	2.00	2.00	2.00	2.00	2.00		Stearic Acid	2	2						
01	924.00	1 15	IPPD	2.00	2.00	2.00	2.00	2.00	2.00		IPPD	2	2						
01	159.00	1.10	9	1.50	1.50	1.50	1.50	1.50	1.50		\$	0.25	15						
01	396.00	1.00	TMTD - 80	1.50	1.50	1.50	1.50	1.50	1.50		TMTD - 80	0.20	1.0						
05	709.00	1.11	CBS 00	0.65	0.65	0.65	0.65	0.65	0.65		CPS 80	0.65	21						
105	700.00	1.20	000-00	0.00	0.05	0.05	0.03	0.05	0.03		003-00	0.00	2.1					_	
ado:			Droportion:															_	
2001		4	MoopovML (1+4) 100°C	22.00	26.00	21.00	24.00	20.00	42.00		MoonovMI (1+4	20	60					_	
2002	A		Mooney#E (194) 100 C	22.00	30.00	31.00	34.00	30.00	42.00		Mooney/t5 /	30	20						
002	<u> </u>	-	Density [g/com]	20.00	20.00	1.16	20.00	1.16	22.00		Doppity [g/com]	4 00	4.2						
1003		1	Lierdeese (ChA)	1.00	1.12	1.10	1.13	1.10	50.00		Lerdness	1.00	1.2						
		- /	Maruness [ShAj	42.00	41.00	40.00	46.00	48.00	52.00		Mardness M200 Missi	40	01						
hoop		1	moou (mpaj	1.00	3.00	3.00	4.40	4.00	0.30		MSUU [Mpa]	1.0	9.4						
COOR		1	r S (Mpa)	25.00	21.00	15.00	25.00	20.00	15.30		TS [IMpa]	75	20						
009		1	EB [%]	785.00	725.00	690.00	/ 15.00	705.00	615.00		EB [%]	540	700						
010		1	C-Set-20 C/2411[%]	22.00	28.00	30.00	17.00	19.00	35.00		0.0-1020	- 17							
2011		1	C-Set 0 C /24h [%]	10.00	14.00	14.00	8.00	12.00	10.00		C-Set 0°C	0	10						
KU 12		/	C-Set 23 C // 2h [%]	8.00	10.00	14.00	9.00	13.00	16.00		C-Sel 23 C		10						
R013		/	C-Set 70°C /24h [%]	39.00	50.00	61.00	44.00	50.00	54.00		C-Set 70°C	1/	61						
1																			
1	/																		
	/																		
										7 F	4					7 F	4		
tal ingredients				146.15	186.15	226.15	161.15	201.15	251.15	11	Total	46.122	251.1					0	
ensity				1.096	1.115	1.128	1.137	1.147	1.171		Density	1.096	1.186						
st (per vol)				262.547	237.377	220.712	259.187	235.816	219.724	25	Cost (per vol)	219.722	263.87						
st (per mass)				239.55	212.894	195.667	227.957	205.594	187.638	21	Cost (per	87.612	239.5						
cipe ratios in	- /																Sum of re	cine ratios (should be 1
	T /																0	cipe ratios (a	Should be 1
	/																U		
1			Number for	nat 12345	67 🔻	Imr	ort input data	from clinboar	Auto m		rite mixture)	uto mi	iv (nev	v mivture))				
1	1 /			12040.	07 .		on input data	nom cipboar				Nuto III	IX (ITOV	(THIXIDIE)	J				

"LoadDemo Data (advanced)"

This Data File has additional columns

- Density:
- Cost:

Code:



	-	-	000.14			1	0.01					_								
tt GrafCom	nounde	r version 3	211 - demo data														_		X	
Glarcom	ipoundei	r version :	.zii ucmo uuu	4																۲
File Edit Help																				
Input data:											Criteria:					0	utput:			
				50AL511	50AL512	50AL513	50AL514	50AL515	50AL516	50AL51	Name	Min	Max From	To	Wei Trdoff					
Test Data (Adv																				Ā
				Recipes:																A.
Code:	Cost:	Density:	Ingredients:	50AL511	50AL512	50AL513	50AL514	50AL515	50AL516	50AL51						Mi	ixture1			
A001	280.00	0.92	NR (SMR - 10)	100.00	100.00	100.00	100.00	100.00	100.00	1	NR (SMR - 10)	100	100							
8003	115.00	1.80	N330	10.00	30.00	50.00	25.00	45.00	75.00		N330	10	75							
C010	24.00	2.71	CaCO3	20.00	20.00	20.00	20.00	20.00	20.00		CaCO3	0	20							
5002	116.00	0.89	Naphtenic Oli	5.00	25.00	45.00	5.00	25.00	45.00		Naphtenic Oli	5	45							
E001	385.00	5.60	ZhU Steorio Aoid	5.00	5.00	5.00	5.00	5.00	5.00		ZhU Stearie Aeid	0	5							
C001	024.00	0.92	IDDD	2.00	2.00	2.00	2.00	2.00	2.00		IPPO	2	2							
	924.00	1.15	0	2.00	2.00	2.00	2.00	2.00	2.00		IFFU S	0.25	4.5							
K001	396.00	1.00	5 TMTD - 80	1.50	1.50	1.50	1.50	1.50	1.50		JMTD - 80	0.20	1.5							
K005	708.00	1.28	CBS - 80	0.65	0.65	0.65	0.65	0.65	0.65		CBS - 80	0.65	2.1							
Code:			Properties:													-				
PR001			MooneyML(1+4) 100°C	32.00	36.00	31.00	34.00	30.00	42.00		MooneyML(1+	4 30	60							
PR002			Mooney t5 / 120°C	28.00	28.00	32.00	28.00	32.00	22.00		Mooney t5 /	11	32							
PR003			Density [g/ccm]	1.08	1.12	1.16	1.13	1.16	1.19		Density [g/ccm	1.08	1.2							
PR004			Hardness [*ShA]	42.00	41.00	40.00	48.00	48.00	52.00		Hardness	40	61							
PR007			M300 [Mpa]	1.80	3.00	3.00	4.40	4.60	5.30		M300 [Mpa]	1.8	9.4							
PR008			TS [Mpa]	25.00	21.00	15.00	25.00	20.00	15.30		TS [Mpa]	15	25							
PR009			EB [%]	785.00	725.00	690.00	715.00	705.00	615.00	5	EB [%]	540	785							
PR010			C-Set -26°C /24h [%]	22.00	28.00	30.00	17.00	19.00	35.00		C-Set -26°C	17	77							
PR011			C-Set 0°C /24h [%]	10.00	14.00	14.00	8.00	12.00	16.00		C-Set 0°C	8	16							
PR012			C-Set 23°C /72h [%]	8.00	10.00	14.00	9.00	13.00	16.00		C-Set 23°C	8	18							
PR013			C-Set 70°C /24h [%]	39.00	50.00	61.00	44.00	50.00	54.00		C-Set 70°C	1/	61							
•										7.	4								7.6	1
Total ingredients				146.15	186.15	226.15	161.15	201.15	251.15	18	Total	146.1	251.1				0			
Density				1.096	1.115	1.128	1.137	1.147	1.171		Density	1.096	1.186							
Cost (per vol)				262.547	237.377	220.712	259.187	235.816	219.724	25	Cost (per vol)	219.72	263.87							
Cost (per mass)				239.55	212.894	195.667	227.957	205.594	187.638	21	Cost (per	187.63	239.58							
Recipe ratios in 9	%:															Su	um of recipe	ratios (sho	ould be 100%	ة): (ة
			•													0				_
			Number for	mat: 12345.	67 🔻	Imp	oort input data	from clipboar	d Auto m	nix (overw	rite mixture)	Auto n	nx (new mixtu	ure)						
L			/							_		_	<u> </u>	_		_				

"LoadDemo Data (advanced)"

The columns are necessary to calculate

Compound density

Cost per Volume

Cost per mass

The criteria Window shows the spread of data regarding denisty, cost per volume and cost per mass



Data analysis (Demo Data Simple)

GrafCompou	nder vers	ion 3.211	- demo d	ata											_		×
File Edit Help																	
nput data:										Criteria:					Output:		
	50AL511	50AL512	50AL513	50AL514	50AL515	50AL516	50AL517	50AL518	50AL542	Name	Min	Max I	From To	Weig Trdoff			
Test Data (Simple)																	
	Recipes:																
Ingredients:	50AL511	50AL512	50AL513	50AL514	50AL515	50AL516	50AL517	50AL518	50AL542						Mixture 1		
NR (SMR - 10)	100.00	100.0	0 100.00	100.0	0 100.00	0 100.00	100.0	0 100.00	100.00	NR (SMR - 10)	100	100			10)	
N330	10.00	30.0	0 50.00	25.0	0 45.00	0 75.00	45.0	0 65.00	50.00	N330	10	75	20	25	19.987	5	
CaCO3	20.00	20.0	20.00	20.0	0 20.00	20.00	20.0	0 20.00)	CaCO3	0	20			2)	
Naphtenic Oil	5.00	25.0	0 45.00	5.0	0 25.00	0 45.00	5.0	0 25.00	0 10.00	Naphtenic Oil	5	i 45			11.3	3	
ZnO	5.00	5.0	5.00	5.0	0 5.00	5.00	5.0	0 5.00	5.00	ZnO	5	5				5	
Stearic Acid	2.00	2.0	0 2.00	2.0	0 2.00	2.00	2.0	0 2.00	2.00	Stearic Acid	2	2				2	
IPPD	2.00	2.0	0 2.00	2.0	0 2.00	0 2.00	2.0	0 2.00	2.00	IPPD	2	2	/	/	:	2	
S	1.50	1.5	0 1.50	1.5	0 1.50	0 1.50	1.5	0 1.50	0.25	S	0.25	1.5			1.	5	
TMTD - 80									1.00	TMTD - 80	0	1					
CBS - 80	0.65	0.6	5 0.65	0.6	5 0.68	5 0.65	0.6	5 0.68	5 2.10	CBS - 80	0.65	2.1	_		0.6	5	
Properties:																	
MooneyML(1+4) 100°C	32.00	36.0	0 31.00	34.0	0 30.00	0 42.00	60.0	0 39.00	41.00	MooneyML(1+4) 30	60			33.46	5	
Mooney t5 / 120°C	28.00	28.0	32.00	28.0	0 32.00	22.00	20.0	0 25.00	11.00	Mooney t5 /	11	32			27.15	5	
Density [g/ccm]	1.08	1.1	2 1.16	1.1	3 1.16	5 1.19	1.1	9 1.20	1.11	Density [g/ccm]	1.08	1.2			1.09702	5	
Hardness (°ShA)	42.00	41.0	0 40.00	48.0	0 48.00	0 52.00	61.0	0 61.00	59.00	Hardness [°ShA	lj 40	61			43.45	5	
M300 [Mpa]	1.80	3.0	3.00	4.4	0 4.60	5.30	8.0	0 7.60	9.40	M300 [Mpa]	1.8	9.4			2.3282	5	
TS [Mpa]	25.00	21.0	0 15.00	25.0	0 20.00	0 15.30	23.0	0 18.00	23.00	TS [Mpa]	15	25			23.4692	5	
EB [%]	785.00	725.0	690.00	715.0	0 705.00	0 615.00	560.0	0 590.00	540.00	EB [%]	540	785			758.97	5	
C-Set -26°C /24h [%]	22.00	28.0	30.00	17.0	0 19.00	35.00	29.0	0 27.00	77.00	C-Set -26°C	17	77			23.997	5	
C-Set 0°C /24h [%]	10.00	14.0	0 14.00	8.0	0 12.00	0 16.00	13.0	0 12.00	16.00	C-Set 0°C /24h	8	16			10.92	5	
C-Set 23°C /72h [%]	8.00	10.0	0 14.00	9.0	0 13.00	0 16.00	10.0	0 17.00	18.00	C-Set 23°C /72	1 8	18			9.24	1	
C-Set 70°C /24h [%]	39.00	50.0	0 61.00	44.0	0 50.00	54.00	44.0	0 50.00	17.00	C-Set 70°C /24	h 17	61			41.432	5	
4														٦Þ		-	7.
Total ingredients Density Cost (per vol) Cost (per mass)	146.15	186.15	5 226.15	161.15	5 201.15	5 251.15	181.13	5 221.15	172.35	Total ingredient Density Cost (per vol) Cost (per mass	s 146.15	251.15			162.4375	5	
Recipe ratios in %:															Sum of recip	e ratios (sh	ould be 100
	84.25		1			14.75									100		
			Number	format: 12	345.67 🔻	(Import input	data from clipi	oard Auto mi	x (overwrite mixture)	Au	to mix (n	ew mixture)			

To start, enter values in the "From" "To" columns Example: Ingredients

- A minimum amount "From" 20 phr
- A target amount "From" 20 phr "To" 25 phr
- A maximum amount "To" 25 phr
- The calculated compound has N330 19.98 phr
 - As soon as the lower limit reached, program stops further calculation – as a general rule
 - (Comment: it would make sense only for larger datasets)



Data analysis (Demo Data Simple)

_																		_		
👑 GrafCompou	nder vers	ion 3.211	- demo d	lata															X	
File Edit Help																				
Input data:										Criteria:							Output			
	50AL511	50AL512	50AL513	50AL514	50AL515	50AL516	50AL517	50AL518	50AL542	Name	Min	Max	From	То	Weig1	Frdoff				
Test Data (Simple)																		Í.		
	Recipes:																			
Ingredients:	50AL511	50AL512	50AL513	50AL514	50AL515	50AL516	50AL517	50AL518	50AL542								Mixture1			
NR (SMR - 10)	100.00	100.00	100.00	0 100.00	100.00	100.00	100.00	100.00	100.00	NR (SMR - 10)	100	100)							
N330	10.00	30.00	50.00	25.00	45.00	75.00	45.00	65.00	50.00	N330	10	75	5							
CaCO3	20.00	20.00	20.00	0 20.00	20.00	20.00	20.00	20.00		CaCO3	0	20	2							
Naphtenic Oil	5.00	25.00	0 45.00	5.00	25.00	45.00	5.00	25.00	10.00	Naphtenic Oil	5	45	2							
ZnO	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	ZnO	5	5	2							
Stearic Acid	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	Stearic Acid	2	2	-							
IPPD	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	IPPD	2	2	1							
S TUTD 00	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	0.25	5	0.25	1.0	2							
IMID-80	0.65	0.65	0.65	0.00	0.65	0.65	0.65	0.65	1.00	IMID-00	0.65	24								
CB3-00	0.00	0.0:	0.00	0.00	0.05	0.0:	0.05	0.05	2.10	003-00	0.00	2.1								
Properties:																				
MoonevML(1+4) 100°C	32.00	36.00	31.00	34.00	30.00	42.00	60.00	39.00	41.00	MoonevML(1+4)	30	60	2							
Mooney t5 / 120°C	28.00	28.00	32.00	28.00	32.00	22.00	20.00	25.00	11.00	Mooney t5 /	11	32								
Density [g/ccm]	1.08	1.12	2 1.16	5 1.13	1.16	1.19	1.19	1.20	1.11	Density [q/ccm]	1.08	1.2	/							
Hardness [*ShA]	42.00	41.00	40.00	48.00	48.00	52.00	61.00	61.00	59.00	Hardness [°ShA]	40	61	45	5 50						
M300 [Mpa]	1.80	3.00	3.00	4.40	4.60	5.30	8.00	7.60	9.40	M300 [Mpa]	1.8	/9.4	1							
TS [Mpa]	25.00	21.00	15.00	25.00	20.00	15.30	23.00	18.00	23.00	TS [Mpa]	15	/ 25	5 20)						
EB [%]	785.00	725.00	690.00	715.00	705.00	615.00	560.00	590.00	540.00	EB [%]	540	785	5							
C-Set -26°C /24h [%]	22.00	28.00	30.00	0 17.00) 19.00	35.00	29.00	27.00	77.00	C-Set -26°C	17	77	7							
C-Set 0°C /24h [%]	10.00	14.00	0 14.00	0.800) 12.00	16.00	13.00	12.00	16.00	C-Set 0°C /24h	8	16	5							
C-Set 23°C /72h [%]	8.00	0 10.00	0 14.00	9.00) 13.00	16.00	10.00	17.00	18.00	C-Set 23°C /72h	8	18	3							
C-Set 70°C /24h [%]	39.00	50.00	0 61.00	0 44.00	50.00	54.00	44.00	50.00	17.00	C-Set 70°C /24h	17	61	1	25	i /					
																				Ļ
<u>مر</u>									7.	4						7.			7.	
Total ingredients	146 15	186 15	226.15	161 15	201 15	251.15	181 15	221.15	172 35	Total ingredients	146 15	251 15	5				(-
Density	110.70				201.10	201.10		22		Density	110.10	201.10	1							
Cost (per vol)										Cost (per vol)										
Cost (per mass)										Cost (per mass)										
Recipe ratios in %																	Sum of recin	a ratine (ch	ould be 100	961
																	0	s rauva (SII	ouru be 100	<i>//J</i> .
			Number	r format: 123	345.67 💌		Import input o	lata from clipb	ooard Auto mix	(overwrite mixture)	Aut	o mix (new mi	xture))		-			

- To start more realistic: Enter values in the "From" "To" columns in the
 - criteria indow / Property section
- •The example shows the following criteria:
 - Target Hardness "From" 45 ShA "To" 50 ShA
 - Maximum C-Set (70°C/24h) "To" 25 %
 - Minimum Tensile "From" 20 MPa



(Demo Data Simple)

																				1	_	
😃 GrafCompounde	er version 3	211 - demo	o data					-														×
File Edit Help																						
Input data:											Criteria:								Output:			
	50AL511	50AL512	50AL513	50AL514	50AL515	50AL516	50AL517	50AL518	50AL542		Name	Min	Max	Fron	n To	We	iaht T	rdoff				
Test Data (Simple)										_												
rest Data (omple)	Pecines:																					12
Ingredients:	50AL 511	50AL 512	50AL 513	50AL 514	50AL 515	50AL 516	50AL 517	50AL 518	50AL 542										Mixture 1			
NR (SMR - 10)	100.00	100.00	100.00	100.00	100.00	100.00	100.0	100 0	100	00	NR (SMR - 10)	1	00	100					initiation of the			
N330	10.00	30.00	50.00	25.00	45.00	75.00	45.0	65.0	0 50	00	N330		10	75								
CaC03	20.00	20.00	20.00	20.00	20.00	20.00	20.0	20.0	0		CaCO3		0	20								
Nanhtenic Oil	5.00	25.00	45.0	5 00	25.00	45.00	5.0	25.0	0 10	00	Nanhtenic Oil		5	45								
ZnO	5.00	5.00	5.0	5.00	5.00	5.00	5.0	5 50	0 5	00	7n0		5	5								
Stearic Acid	2.00	2.00	200	200	2.00	2.00	20	20	0 2	00	Stearic Acid		2	2								
IPPD	2.00	2.00	2.0	200	2.00	2.00	20	20	0 2	00	IPPD		2	2								
S	1.50	1.50	150	150	1.50	1.50	15	15	0 0	25	s	0	25	15								
TMTD - 80									1	00	TMTD - 80		0	1								
CBS - 80	0.65	0.65	0.65	5 0.65	5 0.6 5	0.65	0.6	5 0.6	5 2	.10	CBS - 80	0.	65	2.1								
Properties:																						
MooneyML(1+4) 100°C	32.00	36.00	31.00	34.00	30.00	42.00	60.0	1 30.0	0 41	00	MoonevMI (1+4) 100°C	:	30	60								
Mooney t5 / 120°C	28.00	28.00	32.00	28.00	32.00	22.00		tomatic mixi	na in proces				11	32								
Density [g/ccm]	1.08	1.12	2 1.10	3 1.13	1.16	1.19		contract maxi	ing in proces			1.	08	1.2								
Hardness ["ShA]	42.00	41.00	40.00	48.00	48.00	52.00		< <u> </u>					40	61	40	50						
M300 [Mpa]	1.80	3.00	3.00	0 4.40	4.60	5.30		core of heet	mixture eo fe	r (lower is hett	or): 92,9996		1.8	9.4								
TS [Mpa]	25.00	21.00) 15.00	25.00	20.00	15.30		score or beat	mixture so it	ii (iowei is beu	61). 02.0000		15	25	20							
EB [%]	785.00	725.00	690.00	715.00	705.00	615.00	5					5	40	785								
C-Set -26°C /24h [%]	22.00	28.00	30.00	0 17.00) 19.00	35.00		Take	best mixture	so far	Cancel 67		17	77								
C-Set 0°C /24h [%]	10.00	14.00	14.00	0.8	12.00	16.00							8	16								
C-Set 23°C /72h [%]	8.00	10.00	14.00	9.00	13.00	16.00	10.0	J 17.0	0 18	.00	C-Set 23 C772h [%]		8	18								
C-Set 70°C /24h [%]	39.00	50.00	61.00	0 44.00	50.00	54.00	44.0	50.0	0 17	.00	C-Set 70°C /24h [%]		17	61		25						
Total ingredients	146.15	186.15	226.15	5 161.15	i 201.15	251.15	181.11	5 221.1	5 172	35	Total ingredients	146.	15 25	1.15				7.	0		,	4
Density Cost (per vol) Cost (per mass) Recipe ratios in %:										-	Density Cost (per vol) Cost (per mass)								Sum of recipe	ratios (should b	e 100%):	
				Nu	mber format	12345.67	•	Import	input data fr	om clipboard	Auto mix (overwrite mix	ture)	Auto m	ix (new m	nixture)							

Click on "auto mix (overwrite mixture)"

- This tells the program to mix and to place the result in the highlighted column in the output window.
- The mixture is calculated,
 - But with a score of 82: No 100% match of the target is achieved
 - If all criteria are met the "Score of best mixture so far (lower is better)" will equal 0
 - Otherwise the score will be a number greater than 0.



(Demo Data Simple)

U GrafCompounde	er version 3	.211 - demo	o data																
File Edit Help																			
Input data:											Criteria:							Output	
	50AL511	50AL512	50AL513	50AL514	50AL515	50AL516	50AL517	50AL518	50AL 542		Name	Min	Max	From	n To	We	ight Trdoff		
Test Data (Simple)																			
reere and (omple)	Recipes:																		E.
Ingredients:	50AL511	50AL512	50AL513	50AL514	50AL515	50AL516	50AL517	50AL518	50AL542									Mixture 1	
NR (SMR - 10)	100.00	100.00	0 100.0	0 100.00	100.00	100.00	100.00	100.0	0 100.00		NR (SMR - 10)	1	00	100				100	
N330	10.00	30.00	0 50.0	0 25.00	45.00	75.00	45.00	65.0	0 50.00		N330		10	75				28.8	
CaCO3	20.00	20.00	0 20.0	0 20.00	20.00	20.00	20.00	20.0	0		CaCO3		0	20				10.6	
Naphtenic Oil	5.00	25.00	0 45.0	0 5.00	25.00	45.00	5.00	25.0	0 10.00		Naphtenic Oil		5	45				7.35	
ZnO	5.00	5.00	0 5.0	0 5.00	5.00	5.00	5.00) 5.0	0 5.00		ZnO		5	5				5	
Stearic Acid	2.00	2.00	0 2.0	0 2.00	2.00	2.00	2.00	2.0	0 2.00		Stearic Acid		2	2				2	
IPPD	2.00	2.00	0 2.0	0 2.00	2.00	2.00	2.00	2.0	0 2.00		IPPD		2	2				2	
S	1.50	0 1.50) 1.5	0 1.50	1.50	1.50	0 1.50) 1.5	0 0.25		S	0.	25	1.5				0.9125	
TMTD - 80									1.00		TMTD - 80		0	1				0.47	
CBS - 80	0.65	0.65	0.6	5 0.65	0.65	0.65	0.65	0.6	5 2.10		CBS - 80	0.	65	2.1				1.3315	
Descritions																			
Properties:	22.00	26.00	210	0 24.00	20.00	42.00	60.00	20.0	41.00		Maanavilli (4 + 4) 400°C		20	60				26.02	
Mooney/t5 (120°C	22.00	30.00	31.0	0 34.00	30.00	42.00	20.00	39.0	0 41.00		Mooney 15 / 120°C		11	22				20.01	
Density [g/ccm]	1.00	20.00	2 11	6 112	1.16	1 10	1 10	12	0 111		Donsity [a/ccm]	4	08	12				1 0041	
Hardness (*Shå)	42.00	41.00	40.0	0 48.00	48.00	52.00	61.00	610	0 59.00		Hardness (*ShA)	1.	40	61	40	50		40.00	
M300 (Mpa)	1.80	3.00	3.0	0 440	4 60	5 30	8.00	7.6	0 940		M300 (Mna)		1.8	9.4				5 372	
TS (Mpa)	25.00	2100	15.0	0 25.00	20.00	15.30	23.00	18.0	0 23.00		TS (Moal		15	25	20			24.06	
FB (%)	785.00	725.00	690.0	0 715.00	705.00	615.00	560.00	590.0	540.00		EB (%)	5	40	785				669.85	
C-Set -26°C /24h [%]	22.00	28.00	30.0	0 17.00	19.00	35.00	29.00	27.0	0 77.00		C-Set -26°C /24h [%]		17	77				47.85	
C-Set 0°C /24h [%]	10.00	14.00	0 14.0	0 8.00	12.00	16.00	13.00	12.0	0 16.00		C-Set 0°C /24h [%]		8	16				12.82	
C-Set 23*C /72h [%]	8.00	10.00	14.0	0 9.00	13.00	16.00	10.00	17.0	0 18.00		C-Set 23*C /72h [%]		8	18				12.7	
C-Set 70°C /24h [%]	39.00	50.00	61.0	0 44.00	50.00	54.00	44.00	50.0	0 17.00		C-Set 70°C /24h [%]		17	61		25		28.66	
																			Ļ
- C										J.F.	4						,		7 H.
Total ingredients Density Cost (per vol) Cost (per mass) Recine ratios in %:	146.15	186.15	226.1	5 161.15	201.15	251.15	181.15	221.13	5 172.35		Total ingredients Density Cost (per vol) Cost (per mass)	146.	15 25	1.15				158.464	tion (chould be 100%):
A A A A A A A A A A A A A A A A A A A	53								47									100	aus (snould be 100%).
		.1		Nu	mber format: (12345.67	•	Import i	nput data from	clipboard	Auto mix (overwrite mix	tture)	Auto m	ix (new n	nixture)				

Click on "take this mixture"

- Because we chose "Auto mix (overwrite mixture)", the application has placed it in the highlighted column and automatically assigned the name "Mixture1" to it.
- This mixture is a combination of several compounds. The ratios the formula is made of can be seen from the line at the bottom of the page: "Recipe ratios in %"
- The line sum should always equal 100%



Naming the mixture

File Edit Help	er version 5.	.211 - demo	uala										
out data:						1. <u>1</u> .							
ui uala.										Criteria		Output	
	5011544	5041540	5011510	5041544	5041545	5011 540	5011 517	5041540	5011510	cinena.		Output	
	50AL511	50AL512	50AL513	50AL514	50AL515	50AL516	50AL517	50AL518	50AL542	Name Min Max From	To Weight Trdoff		
st Data (Simple)													
	Recipes:												
gredients:	50AL511	50AL512	50AL513	50AL514	50AL515	50AL516	50AL517	50AL518	50AL542			50AL45 Test	
(SMR - 10)	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	NR (SMR - 10) 100 100		100	
30	10.00	30.00	50.00	25.00	45.00	75.00	45.00	65.00	50.00	N330 10 /5		28.8	
03	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00)	CaCO3 0 20		10.6	
phtenic Oil	5.00	25.00	45.00	5.00	25.00	45.00	5.00	25.00	10.00	Naphtenic Oil 5 45		7.35	
5	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	2nO 5 5		5	
earic Acid	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	Stearic Acid 2 2		2	
PD	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	IPPD 2 2		2	
	1.50	1.50	1.50) 1.50	0 1.50	1.50	1.50	1.50	0.25	S 0.25 1.5		0.9125	
1TD - 80									1.00	TMTD - 80 0 1		0.47	
IS - 80	0.65	0.65	0.65	5 0.65	5 0.65	0.65	0.65	0.65	5 2.10	CBS - 80 0.65 2.1		1.3315	
operties:													
onevML(1+4) 100°C	32.00	36.00	31.00	34.00	30.00	42.00	60.00	39.00	41.00	MoonevML(1+4) 100°C 30 60		36.23	
onev t5 / 120°C	28.00	28.00	32.00	28.00	32.00	22.00	20.00	25.00	11.00	Mooney t5 / 120°C 11 32		20.01	
nsity [a/ccm]	1.08	1.12	1.16	11	1 16	1 19	1 19	120	1 11	Density la/ccml 1 08 1 2		1 0941	
rdness (*ShAl	42.00	41.00	40.00	48.00	48.00	52.00	61.00	61.00	59.00	Hardness I°ShAl 40 61 40	50	49.99	
00 (Mpa)	1.80	3.00	3.00	4 40	4 60	5.30	8.00	7.60	9.40	M300 [Moal 1.8 9.4		5 372	
(Mna)	25.00	21.00	15.00	25.00	20.00	15 30	23.00	18.00	23.00	TS (Moa) 15 25 20		24.06	
[96]	785.00	725.00	690.00	715.00	705.00	615.00	560.00	590.00	540.00	FB (%) 540 785		669.85	
2 of -26°C /24b (%)	22.00	29.00	20.00	17.00	10.00	25.00	20.00	27.00	77.00	C-Sot-26°C /24b /041 47 77		47.95	
Set -20 C /24h [/6]	10.00	14.00	14.00	9.00	12.00	16.00	12.00	12.00	16.00	C-Set 0°C /24h [24] 8 16		12.02	
Sot 22*C /72b (%)	9.00	10.00	14.00	0.00	12.00	16.00	10.00	17.00	19.00	C. Sof 22°C (72b (%) 8 48		12.7	
Sof 70°C /24b [%]	20.00	50.00	61.00	44.00	50.00	54.00	44.00	50.00	17.00	C. Sot 70°C /24b /961 47 64	25	29.66	
												1	
(_	-		4.	
tal ingredients insity st (per vol) ost (per mass)	146.15	186.15	226.15	161.15	201.15	251.15	181.15	221.15	172.35	Total ingredients 146.15 251.15 Density 2000 2000 Cost (per vol) 2000 2000 Cost (per mass) 2000 2000		158.464	
ecipe ratios in %:											/	Sum of recipe ratios (s	hould be 100
	53								47		/	100	
				Nu	mber format:	12345.67	•	Import in	nput data from cl	Auto mix (overwrite mixture) Auto mix (new mixture	9)		

You can double-click the cell "Mixture 1" to rename it

- In the example above, the cell is being renamed to "50 AL45Test"
- In the example taget for C-Set is not met. All other values in target.
- You can take this mixture and do confirmation experiment.



U GrafCompound	er version 3.	211 - demo	data																
File Edit Help																			
Input data:											Criteria:							Output	
	50AL511	50AL 512	50AL513	50AL514	50AL 515	50AL516	50AL517	50AL518	50AL 5	42	Name	Min	Max	Fron	n To	We	eight Trdoff		
Test Data (Simple)																			
(ompro)	Recipes:									Copy input table									E.
Ingredients:	50AL511	50AL512	50AL513	50AL514	50AL515	50AL516	50AL517	50AL518	50AL5	Copy marked ce	lls							50AL45 Test	
NR (SMR - 10)	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	D	Paeta calle har		1	00	100				100	
N330	10.00	30.00	50.00	25.00	45.00	75.00	45.00	65.00	D	Paste cells liefe			10	75				28.8	
CaCO3	20.00	20.00	20.00	0 20.00	20.00	20.00	20.00	20.00	D	Delete marked	ows		0	20				10.6	
Naphtenic Oil	5.00	25.00	45.00	5.00	25.00	45.00	5.00	25.00	D	Delete marked	columns		5	45				7.35	
ZnO	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00		Insert empty rov	·		5	5				5	
Stearic Acid	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00		Insert empty col	umn		2	2				2	
IPPD	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00		Append empty o	olumn		2	2				2	
S DO	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	' [Clear marked o	ells	0.3	25	1.5				0.9125	
IMID - 80	0.65	0.65	0.64	0.00	0.65	0.65	0.65	0.65		Round values to	two decimal places		0	24				1 2215	
000-00	0.05	0.05	0.0:	0.05	0.05	0.05	0.05	0.0:	<u> </u>	Tround values to	wo decimal places	0.1	00	2.1				1.5515	
Properties:																			
MooneyMI (1+4) 100°C	32.00	36.00	31.0	34.00	30.00	42.00	60.00	39.00	1	41.00	MoonevMI (1+4) 100	°C :	30	60				36.23	
Mooney t5 / 120°C	28.00	28.00	32.00	28.00	32.00	22.00	20.00	25.00	5	11.00	Mooney 15 / 120°C		11	32				20.01	
Density [g/ccm]	1.08	1.12	1.10	5 1.13	1.16	1.19	1.19	1.20	0	1.11	Density [a/ccm]	1.0	08	1.2				1.0941	
Hardness [*ShA]	42.00	41.00	40.00	48.00	48.00	52.00	61.00	61.00	0	59.00	Hardness ["ShA]		40	61	40	50		49.99	
M300 [Mpa]	1.80	3.00	3.00	0 4.40	4.60	5.30	8.00	7.60	0	9.40	M300 [Mpa]	1	1.8	9.4				5.372	
TS [Mpa]	25.00	21.00	15.00	25.00	20.00	15.30	23.00	18.00	0	23.00	TS [Mpa]		15	25	20			24.06	
EB [%]	785.00	725.00	690.00	715.00	705.00	615.00	560.00	590.00	0 8	540.00	EB [%]	5-	40	785				669.85	
C-Set -26°C /24h [%]	22.00	28.00	30.00	0 17.00	19.00	35.00	29.00	27.00	0	77.00	C-Set -26°C /24h [%	J	17	77				47.85	
C-Set 0°C /24h [%]	10.00	14.00	14.00	0.800	12.00	16.00	13.00	12.00	0	16.00	C-Set 0°C /24h [%]		8	16				12.82	
C-Set 23°C /72h [%]	8.00	10.00	14.00	9.00	13.00	16.00	10.00	17.00	0	18.00	C-Set 23°C /72h [%]		8	18				12.7	
C-Set /0°C /24h [%]	39.00	50.00	61.00	44.00	50.00	54.00	44.00	50.00	J	17.00	C-Set /0°C /24h [%]		17	61		25		28.66	
-										,							,		
Total ingredients	146.15	186.15	226.15	161.15	201.15	251.15	181.15	221.15	5 1	172.35	Total ingredients	146.	15 25	1.15				158.464	
Density											Density								
Cost (per vol)											Cost (per vol)								
Cost (per mass)											Cost (per mass)								
Recipe ratios in %:	53									47								Sum of recipe rati	os (should be 100%):
				Nu	mber format:	12345.67	•	Import in	nput dat	a from clipboard	Auto mix (overwrite i	mixture)	Auto m	ix (new m	nixture)				

Before the confirmation experiment you can work on the compound.

- Click first cell in Data Tabel
- Make a right click
- Pull Down Menue select "Append empty column"
 - Comment: If you click on theh fist cell in another column than the last you get "Insert empty column"



👑 GrafCompour	nder version	3.211 - den	no data			14		•													X
File Edit Help																					
Input data:											Criteria:								Output:		
	50AL511	50AL512	50AL513	50AL514	50AL515	50AL516	50AL517	50AL518	50AL542	50AL45 Test	Name	Min	Max	Fror	n To)	Weight	Trdoff			
est Data (Simple)													-								
	Recipes:																				
igredients:	50AL511	50AL512	50AL513	50AL514	50AL515	50AL516	50AL517	50AL518	50AL542	50AL45 Test									50AL45 Test		
R (SMR - 10)	100.00	100.0	0 100.00	0 100.00	0 100.00	100.00	100.00	100.00	100.00	100	NR (SMR - 10)	10	0	100					100		
330	10.00	30.0	0 50.00	25.00	45.00	75.00	45.00	65.00	50.00	28.8	N330	1	0	75					28.8		
aCO3	20.00	20.0	0 20.00	0 20.00	0 20.00	20.00	20.00	20.00)	10.6	CaCO3		0	20					10.6		
aphtenic Oil	5.00	25.0	0 45.00	5.00	25.00	45.00	5.00	25.00	10.00	7.35	Naphtenic Oil		5	45					7.35		
nO	5.00	5.0	0 5.00	5.00	5.00	5.00	5.00	5.00	5.00	5	ZnO		5	5					5		
tearic Acid	2.00	2.0	0 2.00	2.00	2.00	2.00	2.00	2.00	2.00	2	Stearic Acid		2	2					2		
190	2.00	2.0	0 2.00	2.00	2.00	2.00	2.00	2.00	2.00	0.0125	IPPU o	0.2	2	4.5					0.0105		
MTD - 90	1.00	1.5	0 1.50	1.50	1.50	1.50	1.50	1.50	1.00	0.9125	3 TMTD - 80	0.2	0	1.5					0.9125		
BS-80	0.65	0.6	5 0.64	0.64	0.65	0.65	0.64	0.65	2 10	1 3315	CBS-80	0.6	5	21					1 3315		
00 00	0.00	0.0	0.00	0.00	0.00	0.00	0.0.	0.00	2.10	1.0010	000 00	0.0							1.0010		
roperties:																					
ooneyML(1+4) 100*0	C 32.00	36.0	0 31.00	34.00	30.00	42.00	60.00	39.00	41.00	36.23	MooneyML(1+4) 100°C	3	0	60					36.23		
ooney t5 / 120°C	28.00	28.0	0 32.00	28.00	32.00	22.00	20.00	25.00	11.00	20.01	Mooney t5 / 120°C	1	1	32					20.01		
ensity [g/ccm]	1.08	1.1	2 1.10	5 1.13	3 1.16	1.19	1.19	1.20	1.11	1.0941	Density [g/ccm]	1.0	18	1.2					1.0941		
ardness ["ShA]	42.00	41.0	0 40.00	48.00	48.00	52.00	61.00	61.00	59.00	49.99	Hardness ["ShA]	4	10	61	40	50			49.99		
300 [Mpa]	1.80	3.0	0 3.00	0 4.40	4.60	5.30	8.00	7.60	9.40	5.372	M300 [Mpa]	1.	8	9.4					5.372		
S [Mpa]	25.00	21.0	0 15.00	0 25.00	0 20.00	15.30	23.00	0 18.00	23.00	24.06	TS [Mpa]	1	5	25	20				24.06		
B [%]	785.00	725.0	0 690.00	715.00	705.00	615.00	560.00	590.00	540.00	669.85	EB (%)	54	0	785					669.85		
-Set -26°C /24h [%]	22.00	28.0	0 30.00	17.00	19.00	35.00	29.00	27.00	//.00	47.85	C-Set -26°C /24h [%]	1	·	11					47.85		
-Set 0 C /2411 [%]	10.00	14.0	0 14.00	0.00	12.00	16.00	10.00	12.00	10.00	12.82	C-Set 0 C /24/1 [76]		0	10					12.82		
-Set 23 C // 20 [%]	30.00	50.0	0 61.00	9.00	50.00	54.00	44.00	50.00	17.00	29.66	C-Set 23 C //2/1 [%]		7	10 61		25			29.66		
-38170 C /2411 [76]	39.00	50.0	0 01.00	44.00	50.00	54.00	44.00	0.00	17.00	20.00	C-36170 C724/1[70]	,	/	07		20			20.00		- 11
- 11											45							,⊾	4		7.
otal ingredients	146 15	186 12	5 226.15	161 15	201 15	251.15	181 15	221 15	172.35	158 464	Total ingredients	146 1	5 25	1 15					158 464		
ensity ost (per vol) ost (per mass)	140.10	100.10	220.70		201.10	201.10	101.10	227.70	112.00	700.404	Density Cost (per vol) Cost (per mass)	140.1	0 20						100.404		
Recipe ratios in %:																			Sum of recipe ratio	os (should be 100	%):
	53								47										100		
				N	umber format	12345.67	•	Import	input data fro	m clipboard	Auto mix (overwrite mixt	ure)	Auto m	ix (new n	nixture))					

Continue with right click into output column

- Select "Copy mixture to clippboard"
- Click first cell in appended empty data column
- Make right click, select: "Paste cells here"
- Test compound is now tranferred in the data table with it name
 - Review and straight out odd numbers





After elimination of all odd numbers Total ingredients is automatically recalculated

- Highlight Compound data
- Make right click and choose "Round values to two decimal places"
 - · You can do same with property values



😃 GrafCompoun	der version	3.211 - den	no data																	X
File Edit Help																				
Input data:											Criteria:							Output		
	50AL 511	50AL 512	50AL 512	50AL 514	50AL 515	5041 516	5041 517	50AL 519	50AL 542	50AL 45 Toot	Namo	Min	Max	Eron	a To	Moi	abt Trdoff			
aat Data (Simple)	JUNEJII	JUALUTZ	JUALUIS	JUALUTA	JUALUTU	JUALUTO	JUALUTI	JUALUTO	JUALJ42	JUAL4J TEST	Ivanie	min	max	rio		wei	igin muon			
est Data (Simple)	Pacinae:																			A
aredients:	5041 511	5041 512	5041 513	5041 514	5041 515	5041 516	5041 517	5041 518	5041 542	504L45 Test								504L45 Test		
B (SMB - 10)	100.00	100 0	100 0	100.00	100 00	100.00	100.00	100.00	100 0	100.00	NR (SMR - 10)	10	00	100				100		
330	10.00	30.0	50.0	0 25.00	45.00	75.00	45.00	65.00	50.0	0 29.00	N330	1	10	75				28.8		
aCO3	20.00	20.0	20.0	0 20.00	20.00	20.00	20.00	20.00)	10.00	CaCO3		0	20				10.6		
aphtenic Oil	5.00	25.0	45.0	0 5.00	25.00	45.00	5.00	25.00	0 10.0	0 7.00	Naphtenic Oil		5	45				7.35		
nÖ	5.00	5.0	5.0	0 5.00	0 5.00	5.00	5.00	5.00	5.0	0 5.00	ZnO		5	5				5		
tearic Acid	2.00	2.0	2.0	0 2.00	0 2.00	2.00	2.00	2.00	2.0	0 2.00	Stearic Acid		2	2				2		
PD	2.00	2.0	2.0	0 2.00	0 2.00	2.00	2.00	2.00	2.0	0 2.00	IPPD		2	2				2		
	1.50	0 1.5	0 1.5	0 1.50	0 1.50	1.50	0 1.50	0 1.50	0.2	5 1.00	S	0.2	25	1.5				0.9125		
MTD - 80									1.0	0 0.50	TMTD - 80		0	1				0.47		
BS - 80	0.65	5 0.6	5 0.6	5 0.65	5 0.65	0.65	5 0.65	5 0.65	5 2.1	0 1.35	CBS - 80	0.6	55	2.1				1.3315		
roperties:																		00.00		
00neyML(1+4) 100°C	32.00	30.0	31.0	0 34.00	30.00	42.00	0.00	39.00	41.0	0 36.23	MooneyML(1+4) 100°C		50	00				30.23		
operate [a/com]	20.00	20.0	32.0	0 20.00 B 1.11	32.00	22.00	20.00	25.00	11.0	1 1 00	Donnity [g/scm]	10	19	12				20.01		
ardness (*Sh41	42.00	41.0	40.0	0 49.00	49.00	52.00	61.0	61.00	59.0	1 1.09	Hardness (ShA)	7.0	10	61	40	50		1.0541		
300 [Mna]	1.80	3.0	3.0	0 440	460	5.30	8.0	7.60	9.4	0 537	M300 Moal	1	8	94	40	30		5 372		
S [Mpa]	25.00	210	15.0	25.00	20.00	15.30	23.0	18.00	23.0	0 24.06	TS (Moal	1	15	25	20			24.06		
B [%]	785.00	725.0	690.0	0 715.00	705.00	615.00	560.00	590.00	540.0	0 669.85	EB /%1	54	10	785				669.85		
-Set -26°C /24h [%]	22.00	28.0	30.0	0 17.00	0 19.00	35.00	29.00	27.00	77.0	0 47.85	C-Set -26°C /24h [%]	1	17	77				47.85		
-Set 0°C /24h [%]	10.00	14.0	14.0	0.8.00	0 12.00	16.00	13.00	12.00	16.0	0 12.82	C-Set 0°C /24h [%]		8	16				12.82		
-Set 23°C /72h [%]	8.00	0 10.0	0 14.0	9.00	0 13.00	16.00	0 10.00	0 17.00) 18.0	0 12.70	C-Set 23°C /72h [%]		8	18				12.7		
-Set 70°C /24h [%]	39.00	0 50.0	0 61.0	0 44.00	0 50.00	54.00	44.00	50.00	0 17.0	0 28.66	C-Set 70°C /24h [%]	1	17	61		25		28.66		
																				4
- ((<hr/>					,	> <		7 Þ.
otal ingredients ensity 'ost (per vol) 'ost (per mass) Recipe ratios in %:	146.15	186.13	226.13	5 161.15	5 201.15	251.15	181.15	5 221.15	172.3	5 157.85	Total ingredients Density Cost (per vol) Cost (per mass)	146.1	15 251	.15				158.464	ratios (should be 1)	10%)
	53	1							4	7				< l>				100	iaaoo (anoulu be it	··· ···
				N	lumber format	12345.67	•	Import	input data fro	m clipboard	Auto mix (overwrite mix	ture)	Auto mi	x (new q	nixture)					

After compound review go to confirmation experiment with the reviewed formula

- Replace property data with new measured data
- Result should be in 95% confidence intervall

Review the formula by analyzing it with the formulas it was compounded from.

 If result is sufficient close, leave compound in the dataset as new

'formula&property data colum' for further calculation

 You may rename the compound with double click in name cell

Dr. Hans-Joachim Graf



Op/ data	File Edit Help																			
Image: Second state Solution Solution </th <th>put data:</th> <th></th> <th>Criteria:</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>Output</th> <th></th>	put data:											Criteria:							Output	
I data (simple) Exclose: Solu_51 Solu_517 Solu_518 Solu_508 Solu_518 Solu_508		50AL511	50AL512	50AL513	50AL514	50AL515	50AL516	50AL517	50AL518	50AL 542	50AL45 Test	Name	Min	Max	From	To	Weight	Trdoff		
Construction Construction<	st Data (Simple)																			
Double 1 Solution	(cimpic)	Recipes:																		
(silk - 10) 100.00 </td <td>edients:</td> <td>50AL511</td> <td>0AL512</td> <td>50AL513</td> <td>50AL514</td> <td>50AL515</td> <td>50AL516</td> <td>50AL517</td> <td>50AL518</td> <td>50AL542</td> <td>50AL45 Test</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>50AL45 Test</td> <td></td>	edients:	50AL511	0AL512	50AL513	50AL514	50AL515	50AL516	50AL517	50AL518	50AL542	50AL45 Test								50AL45 Test	
0 10.00 00.00 250.00 42.00 42.00 20.00 20.00 20.00 1	(SMR - 10)	100.00	100.0	0 100.0	0 100.00	100.00	100.00	100.00	100.00	100.00	100.00	NR (SMR - 10)	10	0 1	00				100	
G3 20.00 20.00 20.00 20.00 20.00 10.00 CeC33 0 20 10.8 Heric OI 5.00	0	10.00	30.0	0 50.0	0 25.00	45.00	75.00	45.00	65.00	50.00	29.00	N330	2	5	75				28.8	
Interic Cil 5.00 25.00 45.00 5.00 25.00 5.00<	03	20.00	20,0	0 20.0	0 20.00	20.00	20.00	20.00	20.00	D	10.00	CaCO3		0	20				10.6	
fric/Add 5:00	htenic Oil	5.00	25.0	× 45.0	0 5.00	25.00	45.00	5.00	25.00	0 10.00	7.00	Naphtenic Oil		5	45				7.35	
ic.Add 2.00		5.00	5.0	0 5.0	0 5.00	5.00	5.00	5.00	5.00	5.00	5.00	ZnO		5	5				5	
0 2.00 <t< td=""><td>ric Acid</td><td>2.00</td><td>2.0</td><td>0 2.0</td><td>0 2.00</td><td>2.00</td><td>2.00</td><td>2.00</td><td>2.00</td><td>2.00</td><td>2.00</td><td>Stearic Acid</td><td></td><td>2</td><td>2</td><td></td><td></td><td></td><td>2</td><td></td></t<>	ric Acid	2.00	2.0	0 2.0	0 2.00	2.00	2.00	2.00	2.00	2.00	2.00	Stearic Acid		2	2				2	
- 80 150 150 150 150 150 150 150 150 150 0.00 25 1.00 8 0.23 1.5 0.01)	2.00	2.0	0 2.0	0 2.00	2.00	2.00	2.00	2.00	2.00	2.00	IPPD		2	2				2	
D-80 -80 -80 -80 -80 -80 -80 -80		1.50	1.5	0 ∖ 5	0 1.50	1.50	1.50	1.50	1.50	0.25	5 1.00	S	0.2	5	1.5				0.9125	
5 -90 0.65 0.55 0.65 0.65 0.65 0.65 0.65 0.6	D - 80									1.00	0.50	TMTD - 80		0	1				0.47	
perties: mery bit 10°C 3.00 3.00 4.00 6.00 3.00 4.00 6.00 3.00 4.00 6.00 3.00 4.00 6.00 3.00 4.00 6.00 3.00 4.00 5.00 3.00 4.00 5.00 3.00 4.00 5.00 3.00 4.00 5.00 3.00 4.00 5.00 4.00 5.00 4.00 5.00 4.00 5.00 4.00 5.00 4.00 5.00 4.00 5.00 4.00 4.00 5.00 4.00 5.00 4.00 4.00 5.00 4.00 5.00 4.00 5.00 4.00 5.00 4.00 5.00 4.00 5.00 4.00 5.00 4.00 5.00 4.00 5.00 4.00 5.00 4.00 5.00 4.00 5.00 4.00 5.00 4.00 5.00 4.00 5.00 4.00 5.00 7.00 4.00 5.00 7.00 4.00 5.00 7.00 4.00 7.00 7.0	- 80	0.65	0.6	5 0.6	5 0.65	0.65	0.65	0.65	0.65	5 2.10	0 1.35	CBS - 80	0.6	5	2.1				1.3315	
neyful (1+4) 100°C 32.00 36.00 31.00 34.00 30.00 42.00 60.00 39.00 41.00 36.23 Mooneyful (1+4) 100°C 30 60 36.23 32.01 22.00 11.00 20.01 20.01 10.09 12.0 10.09 12.0 10.09 12.0 10.09 12.0 10.09 12.0 10.09 13.00 3.04 40 51.0 52.00 70.00 14.00 23.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 10.00 12.00 16.00 12.00 16.00 12.00 16.00 12.00 16.00 12.00 16.00 12.00 16.00 12.00 16.00 12.00 16.00 12.00 </td <td>perties:</td> <td></td>	perties:																			
new 16 / 120°C 28 00 32 00 22 00 20 00 25 00 1100 20 01 Mooney 15 / 120°C 11 32 100 20 01 100 1	neyML(1+4) 100*	C 32.00	36.0	0 31.0	0 34,00	30.00	42.00	60.00	39.00	0 41.00	36.23	MooneyML(1+4) 100°C	3	0	60				36.23	
sh (piccm) 1.08 1.12 1.16 1.13 1.16 1.19 1.19 1.20 1.11 1.0 0 Penkly (piccm) 1.09 1.2 1.11 1.00 Penkly (piccm) 1.00 Penk	ney t5 / 120°C	28.00	28.0	0 32.0	0 28.00	32.00	22.00	20.00	25.00	0 11.00	0 20.01	Mooney t5 / 120°C	1	1	32				20.01	
Intest (Sh4) 42.00 41.00 40.00 48.00 48.00 52.00 61.00 59.00 49.99 Hardness (Sh4) 40 61 40 50 43.99 1p31 180 3.00 4.40 4.60 5.30 8.00 7.80 9.40 5.37 1p31 25.00 21.00 15.00 25.00 61.00 58.00 49.00 5.37 1p31 25.00 21.00 15.00 25.00 61.00 56.00 57.00 47.80 56.00 56.00 57.00 47.80 56.00 57.00 57.00 56.00	sity [g/ccm]	1.08	1.1	2 1.1	6 1.13	1.16	1.19	1.19	1.20	0 1.11	1 1.09	Density [g/ccm]	1.0	9	1.2				1.0941	
1 (hpa) 1.80 3.00 3.00 4.40 4.60 5.30 8.00 7.60 9.40 5.37 M000 (hpa) 3 9.4 3<	Iness (*ShA)	42.00	41.0	0 40.0	0 48.00	48.00	52.00	61.00	61.00	59.00	0 49.99	Hardness [*ShA]	4	0	61	40	50		49.99	
dpa] 22:00 2:00 2:00 2:	0 (Mpa)	1.80	3.0	0 3.0	0 4.40	4.60	5.30	8.00	7.60	9.40	5.37	M300 [Mpa]		3	9.4				5.372	
(m) (15)	//paj	25.00	21.0	0 15.0	0 25.00	20,00	15.30	23.00	18.00	23.00	24.06	TS [Mpa]	1	5	25	20			24.06	
at 20 0 (2xt) hgi 10 00 14 00 10 00 11 00 11 00 12 00 21 00 17 00 17 0	[%]	785.00	725.0	0 690.0	0 /15.00	705.06	615.00	560.00	590.00	540.00	009.85	EB [%]	54	7 1	25				009.85	
Ingredients 140.00 14.00 20.01 15.00 12.00 19.00 12.00 12.00 19.00 12.00	et -26°C /24h [%]	22.00	28.0	0 30.0	0 17.00	19.00	35.00	29.00	27.00	J 77.00	47.85	C-Set -26°C /24n [%]	1	/	10				47.85	
Introduction 1000<	et 0 C /24/1 [%]	10.00	14.0	0 14.0	0 8.00	12.00	16.00	10.00	12.00	10.00	12.82	C-Set 0 C /24/1 [%]		0	10				12.82	
Ingredients 146.15 186.15 226.15 161.15 201.15 181.15 221.13 172.35 157.85 257.15 158.464 Ingredients 153 157.85 257.15 100.10 100.10 100.10 100.10	at 70°C /24b [%]	20.00	50.0	0 61.0	0 44.00	50.00	50.00	44.00	50.00	17.00	22.66	C-Set 70°C /24b /941		7	61		25		29.66	
Ingredients 146.15 186.15 226.15 161.15 201.15 251.15 172.35 157.85 Denity Cost (per rol) 158.464 (per mass) oper ratios in %; 47 47 100 100																				
al ingredients 146 15 186 15 226 15 161 15 201 15 251 15 181 15 221 15 177 85 157 85 251 15 102 ingredients 157 85 251 15 102)+	4							-	
scipe ratios in %: 53 47 100	il ingredients isity it (per vol) st (per mass)	146.15	186.1	5 226.1	5 161.15	201.15	251.15	181.15	221.15	172.35	157.85	Total ingredients Density Cost (per vol) Cost (per mass)	157.8	5 251	.15				158.464	
53 47 100	acipe ratios in %:									/	<u> </u>								Sum of recipe rati	os (should be 100
		53								47									100	

Result of confirmation experiment was not sufficient:

- Assumption: First compound column has faulty data
- Disable formula with right click on name
- Name in cell turns 50AL511
- Compound will be excluded from calculation
 - You can reverse by right click again



4 GrafCompoun	der version	3.211 - dem	o data																	
File Edit Help											/									
Innut data:											Criteria							Output		
input data.	50AL 511	50AL 512	50AL 512	50AL 514	50AL 515	5041 516	50AL 517	5041 519	5041 542	50AL 45 Test	Name	Min	Max	From	То	Weight	Trdoff	- Colput		
act Data (Simple)	OUNCOTT	JUNESTZ	50AL515	50AL514	30/42313	SUALSTO	JUNEJII	30/42310	50/L042	OUNDALCO DOL	Inditio		max	TION	10	weight	Truon		_	
est Data (Simple)	Recines:																			-
aredients:	50AL511	50AL512	50AL513	50AL514	50AL515	50AL516	50AL517	50AL518	50AL542	50AL45 Test								50AL45 Test	Mixture2	
R (SMR - 10)	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.0	0 100.00	NR (SMR - 10)	10	10 1	00				100	100	
330	10.00	30.00	50.00	25.00	45.00	75.00	45.00	65.00	50.0	0 29.00	N330	2	5	75				28.8	40	
aCO3	20.00	0 20.00	20.00	20.00	20.00	20.00	20.00	20.00)	10.00	CaCO3		0	20				10.6	10	
aphtenic Oil	5.00	25.00	45.00	5.00	25.00	45.00	5.00	25.00	0 10.0	0 7.00	Naphtenic Oil		5	45				7.35	17.5	
nO	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.0	0 5.00	ZnO		5	5				5	5	
tearic Acid	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.0	0 2.00	Stearic Acid		2	2				2	2	
PD	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.0	0 2.00	IPPD		2	2				2 0.0405	0.075	
NTD 90	1.00	1.50	1.50	1.50	1.50	1.50	1.00	1.50	1.0	0.50	S THTO RO	0.2	0	1.0				0.9125	0.875	
BS - 80	0.64	0.65	0.65	0.65	0.65	0.65	0.65	0.65	2.1	0.30	CBS - 80	0.6	5	21				1 3315	1 375	
00-00	0.0.	0.00	0.00	0.03	0.00	0.03	0.00	0.00	2.1	1.55	000-00	0.0		2.1				1.5515	1.575	
roperties;																				
ooneyML(1+4) 100°C	32.00	36.00	31.00	34.00	30.00	42.00	60.00	39.00	41.0	0 36.23	MooneyML(1+4) 100°C	3	0	60				36.23	38.5	
ooney t5 / 120°C	28.00	28.00	32.00	28.00	32.00	22.00	20.00	25.00	11.0	0 20.01	Mooney t5 / 120°C	1	1	32				20.01	19.5	
ensity [g/ccm]	1.08	3 1.12	1.16	5 1.13	1.16	1.19	1.19	1.20) 1.1	1 1.09	Density [g/ccm]	1.1	1	1.2				1.0941	1.115	
ardness [°ShA]	42.00	0 41.00	40.00	48.00	48.00	52.00	61.00	61.00	59.0	0 49.99	Hardness [°ShA]	4	10	61	40	50		49.99	50	
300 [Mpa]	1.80	0 3.00	3.00	0 4.40	4.60	5.30	8.00	7.60	9.4	0 5.37	M300 [Mpa]		3	9.4				5.372	6.2	
S [Mpa]	25.00	21.00	15.00	25.00	20.00	15.30	23.00	18.00	23.0	0 24.06	TS [Mpa]	1	5	25	20			24.06	22	
B [%]	785.00	725.00	690.00	/15.00	705.00	615.00	560.00	590.00	540.0	0 669.85	EB [%]	04	0 1	20				669.85	632.5	
-Set -20°C /24h [%]	22.00	28.00	30.00	17.00	19.00	35.00	29.00	27.00	18.0	47.85	C-Set -20 °C /24/1 [%]		0	11				47.85	52.5	
-Set 0 C /2411 [76]	10.00	14.00	14.00	0.00	12.00	16.00	10.00	12.00	12.0	0 12.02	C-Set 0 C724/1[76]		0	18				12.02	10	
-Set 70*C /24b [%]	39.00	50.00	61.00	1 44.00	50.00	54.00	44.00	50.00	17.0	28.66	C-Set 70*C /2/h [96]		7	61		25		28.66	33.5	
otal ingredients ensity ost (per vol) ost (per mass) Recipe ratios in %:	146.12	5 186.15	226.13	161.15	201.15	251.15	181.15	221.13	172.3	5 157.85	Total ingredients Density Cost (per vol) Cost (per mass)	161.1	5 251	15			,,	108.464	179.25	e 100%):
		50		N	ımber format	12345.67	•	Import	50 input data fro) mclipboard	Auto mix (overwrite mixt	ture)	Auto mix	: (new mix	ture)		_/	100	racos (snodiu b	- 10078).

Recalculate using "Automix(new mixture)

- Allows to compare result of first with second run (50AL512 excluded)
- Warning: Do not forget to exclude Test compound as well (if not cnfirmed yet and physicals corrected with measrued ones)
- Compare results of fist with second run
 - If more acceptable replace test compound with mixture 2
 - In the example C-Set is farer off, which give higher score (192 instead of 82)



(Demo Data Advanced)

GrafCom	pounder version	on 3.211 - d	emo data		14		-												
File Edit He	lp																		
Input data:										Criteria:							Output:		
				50AL511	50AL512	50AL513	50AL514	50AL515	50AL516 50A	Name	Min	Max	From	То	Weight	Trdoff			
Test Data (anced)																		
				Recipes:															E E
Code:	Cost:	Density:	Ingredients:	50AL511	50AL512	50AL513	50AL514	50AL515	50AL516 50A								Mixture 1		
A001	280.00	0.92	NR (SMR - 10)	100.00	100.00	100.00	100.00	100.00	100.00	NR (SMR - 10)	1	100	100						
B003	115.00	0 1.80	N330	10.00	30.00	50.00	25.00	45.00	75.00	N330		10	75						
C010	24.00	2.71	CaCO3	20.00	20.00	20.00	20.00	20.00	20.00	CaCO3		0	20						
D002	116.00	0.89	Naphtenic Oil	5.00	25.00	45.00	5.00	25.00	45.00	Naphtenic Oil		5	45						
E001	385.00	5.60	ZnO	5.00	5.00	5.00	5.00	5.00	5.00	ZnO		5	5						
F001	165.00	0.92	Stearic Acid	2.00	2.00	2.00	2.00	2.00	2.00	Stearic Acid		2	2						
G001	924.00	0 1.15	IPPD	2.00	2.00	2.00	2.00	2.00	2.00	IPPD		2	2						
H001	158.00	0 1.80	S	1.50	1.50) 1.50	1.50	0 1.50	1.50	S	0	.25	1.5						
K001	396.00	0 1.11	TMTD - 80							TMTD - 80		0	1						
K005	708.00) 1.28	CBS - 80	0.65	0.65	5 0.6 5	0.65	5 0.65	0.65	CBS - 80	0	0.65	2.1						
Code:			Properties:																
PR001	1		MooneyML(1+4) 100°C	32.00	36.00	31.00	34.00	30.00	42.00	MooneyML(1+4) 100°C	2	30	60						
PR002	1		Mooney t5 / 120°C	28.00	28.00	32.00	28.00	32.00	22.00	Mooney t5 / 120°C		11	32						
PR003	1		Density (g/ccm)	1.08	1.12	1.10	1.13	1.16	1.19	Density [g/ccm]	1	.08	1.2						
PR004	1		Hardness ["ShAj	42.00	41.00	40.00	48.00	48.00	52.00	Hardness [*ShAj		40	61						
PR007			M300 [Mpa]	1.80	3.00	3.00	4.40	4.60	5.30	M300 [Mpa]		1.8	9.4				0		
PR008	-		TS [Mpa]	25.00	21.00	15.00	25.00	20.00	15.30	TS [Mpa]		15	25						
PR009			EB [%]	785.00	725.00	690.00	/15.00	705.00	615.00	EB [%]		540	785						
PR010			C-Set -26°C /24n [%]	22.00	28.00	30.00	17.00	19.00	35.00	C-Set -26°C /24h [%]		1/	11						
PR011			C-Set 0°C /24n [%]	10.00	14.00	14.00	8.00	12.00	16.00	C-Set 0*C /24h [%]		8	16						
PR012			C-Set 23°C //2h [%]	8.00	10.00	14.00	9.00	13.00	16.00	C-Set 23°C //2h [%]		8	18						
PR013			C-Set 70°C /24h [%]	39.00	50.00	0 61.00	44.00	50.00	54.00	C-Set 70°C /24n [%]		1/	61						
Total ingredien Density Cost (per vol) Cost (per mass Recipe ratios in	s) 9) 1 %:			146.15 1.096 262.547 239.55	186.15 1.115 237.377 212.894	226.10 1.126 220.712 195.667	161.10 1.137 259.187 227.957	201.15 1.147 235.816 205.594	201.15 1.171 219.724 187.638	Total ingredients Density Cost (per vol) Cost (per mass)	146 1.0 219.1 187.0	115 25 196 1 1724 263 538 23	1.15 186 877 9.55				0 Sum of recipe ra	lios (should be 10	00%):
																	0		· · ·
				Number for	mat 12345	.67 🔻	Im	port input data	from clipboard	Auto mix (overwrite mix	dure)	Auto m	ix (new mi	xture)					

Load Demo Data Advanced

- Click "File" and then "Clear all Data"
- Click "File", select "Load Demo data (advanced)" from Pull down Menue
- Screen appears with
 - Column Code: Ingredients are coded Physical properties with code as well
- Code is needed for the "Merger" of different set of data files.



(Demo Data Advanced)

Mt GrafCompou	nder versio	n 3 211 - de	emo data				_												ı x
Eile Edit Help	nder versio	13,211 00			1.4														
Innut data:										Criteria:							Output		
input data.				5041511	E041 E40	E041 E12	E041 E14	E041 E1E	E041 E16 E04	Mama	Min	Max	From	To	Mojoht	Trdoff	Output.		
T 10 1 (11				SUALSTI	JUALD 12	SUALS 15	SUALS 14	SUALS IS	50AL510 50A	Name	MIII	max	FIOIII	10	weight	ITUOII			_
Test Data (Advance	(a)			Designed															
Codor	Conti	Donoitu	Ingradianta	Recipes:	041 510	E041 E12	E041 E14	E041 E1E	E041 E16 E04								Misture 1		
4001	200.00	Density.	ND (CMD 10)	100.00	100 00	100 00	100 00	100 00	100 00			00	400				MIXIOLET		
8001	280.00	1.92	NR (SMR - 10)	10.00	20.00	50.00	25.00	45.00	75.00	NR (SMR - 10)	,	40	75						
C010	24.00	2.71	00002	20.00	20.00	20.00	20.00	20.00	20.00	CaCO2		0	20						
0002	116.00	0.90	Nanhtonic Oil	20.00	25.00	45.00	5.00	26.00	45.00	Naphtonic Oil		5	45						
E001	295.00	5.60	ZnO	5.00	25.00	45.00	5.00	5.00	5.00	ZnO		5	5						
E001	165.00	0.92	Stearic Acid	2.00	2.00	2.00	2.00	2.00	2.00	Stearic Acid		2	2			-			
G001	924.00	1.15	IPPD	2.00	2.00	2.00	2.00	2.00	2.00	IPPD		2	2						
H001	158.00	1.10	8	1.50	1.50	1.50	1.50	1.50	1.50	S	0	25	15						
K001	396.00	1.00	TMTD - 80	1.50	1.50	1.50	1.50	1.00	1.00	TMTD - 80	U.	0	1						
K005	708.00	1.28	CBS - 80	0.65	0.65	0.65	0.65	0.65	0.65	CBS - 80	0.	65	2.1						
Code:			Properties:																
PR001			MooneyML (1+4) 100°C	32.00	36.00	31.00	34.00	30.00	42.00	MoonevMI (1+4) 100°C		30	60						
PR002			Mooney t5 / 120°C	28.00	28.00	32.00	28.00	32.00	22.00	Mooney t5 / 120°C		11	32						
PR003			Density [g/ccm]	1.08	1 12	1 16	1.13	1 16	1 19	Density [a/ccm]	1	08	12						
PR004			Hardness [*ShA]	42.00	41.00	40.00	48.00	48.00	52.00	Hardness (°ShAl		40	61						
PR007			M300 [Mpa]	1.80	3.00	3.00	4 40	4.60	5.30	M300 [Mpa]	1	18	94						
PR008			TS (Mpa)	25.00	21.00	15.00	25.00	20.00	15.30	TS (Moal		15	25						
PR009			EB [%]	785.00	725.00	690.00	715.00	705.00	615.00	EB (%)	5	40	785						
PR010			C-Set -26°C /24h [%]	22.00	28.00	30.00	17.00	19.00	35.00	C-Set -26°C /24h [%]		17	77						
PR011			C-Set 0°C /24h [%]	10.00	14.00	14.00	8.00	12.00	16.00	C-Set 0°C /24h /%1		8	16						
PR012			C-Set 23°C /72h [%]	8.00	10.00	14.00	9.00	13.00	16.00	C-Set 23°C /72h [%]		8	18						
PR013			C-Set 70°C /24h [%]	39.00	50.00	61.00	44.00	50.00	54.00	C-Set 70°C /24h [%]		17	61						
					100.48					•		18 05							7.
Density				140.15	700.10	220.10	101.10	201.15	201.10	Density	146.	10 20	100				0		
Cent (convol)				7.096	1.710	7.128	7.137	1.14/	7.7/7	Cost (cost well	7.0	90 1.	977						
Cost (per Vol)				202.047	237.377	220.712	209.107	230.010	219.724	Cost (per vol)	487.6	24 203.	077						
Recipe ratios in %:				239.00	212.094	193.007	221.937	203.394	107.030	Cost (per mass)	107.0	30 23:					Sum of recipe	atios (should be 1	00%):
				Number forn	nat 12345.	67 🔻	Im	oort input data	from clipboard	Auto mix (overwrite mixt	ure)	Auto m	x (new mix	ture)					

- Load Demo Data Advanced
 - From File Pull down Menue
- Cost Column

- It is neede to calculate volume & weight cost
- Denisty Column
 - Denisty value follows the ingredients ratio in percent (in terms of phr it is not linear and there fore need to be calulated separately



(Demo Data Advanced)

U GrafCompo	under versior	3.211 - de	mo data		14		-												X
File Edit Help																			
Input data:										Criteria:							Output:		
	_			50AL511	50AL512	50AL513	50AL514	50AL515	50AL516 50A	Name	Min	Max	From	n To	Weig	ht Trdoff			
Test Data (Advanc	ed)																		
				Recipes:															
Code:	Cost:	Density:	Ingredients:	50AL511	50AL512	50AL513	50AL514	50AL515	50AL516 50A								Mixture 1		
A001	280.00	0.92	NR (SMR - 10)	100.00	100.00	100.00	100.00	0 100.00	0 100.00	NR (SMR - 10)	10	00	100				100		
8003	115.00	1.80	N330	10.00	30.00	50.00	25.00	45.00	0 75.00	N330	1	0	/5				28.8		
0010	24.00	2.71	Lacus Nontronio Oil	20.00	20.00	20.00	20.00	20.00	20.00	CaCO3 Nonhtonia Oil		5	20				10.0		
E001	295.00	5.60	ZnO	5.00	25.00	45.00	5.00	5 25.00	45.00			5	40				7.55		
E001	165.00	0.92	Stearic Acid	2.00	2.00	2.00	2.00	2.00	2.00	Stearic Acid		2	2				2		
G001	924.00	1.15	IPPD	2.00	2.00	2.00	2.00	2.00	2.00	IPPD		2	2				2		
H001	158.00	1.80	S	1.50	1.50	1.50	1.50	0 1.50	0 1.50	S	0.2	25	1.5				0.9125		
K001	396.00	1.11	TMTD - 80							- TMTD - 80		0	1				0.47		
K005	708.00	1.28	CBS - 80	0.65	0.65	0.65	0.65	5 0.65	5 0.65	CBS - 80	0.6	55	2.1				1.3315		
Code:			Properties:																
PR001			MooneyML(1+4) 100°C	32.00	36.00	31.00	34.00	0 30.00	0 42.00	MooneyML(1+4) 100°C	3	30	60				36.23		
PR002			Mooney t5 / 120°C	28.00	28.00	32.00	28.00	0 32.00	0 22.00	Mooney t5 / 120°C	1	11	32				20.01		
PR003			Density [g/ccm]	1.08	1.12	1.16	1.13	3 1.16	5 1.19	Density [g/ccm]	1.0	08	1.2				1.0941		
PR004			Hardness (*ShA)	42.00	41.00	40.00	48.00	0 48.00	52.00	Hardness [*ShA]	4	40	61	45	50		49.99		1
PR007			M300 [Mpa]	1.80	3.00	3.00	4.40	4.60	5.30	M300 (Mpa)	1	.8	9.4				5.372		
PR008			TS [Mpa]	25.00	21.00	15.00	25.00	20.00	15.30	TS [Mpa]	-	15	25	20			24.06		
PR009			EB [%]	/85.00	/25.00	690.00	/15.00	0 705.00	0 015.00	EB [%]	04	10	785				009.85	/	/
PR010			C Rot 0°C /24H [%]	22.00	28.00	30.00	17.00	12.00	35.00	C-Sel-20 C/24/1[76]	1	0	16				47.00		
PR012			C-Set 23°C /72h [%]	8.00	10.00	14.00	0.00	12.00	16.00	C-Set 22°C /72h /%1		8	18				12.02		
PR013			C-Set 70°C /24h [%]	39.00	50.00	61.00	44.00	50.00	54.00	C-Set 70°C /24h [%]		17	61		25		28.66		
Total ingredients Density Cost (per vol)				146.15 1.096 262.547	186.15 1.115 237.377	226.15 1.128 220.712) 161.15 1.137 259.187	5 201.15 7 1.147 7 235.876	5 251.15 1.171 219.724	Total ingredients Density Cost (per vol)	146.1 1.05 219.72	15 25 96 1. 24 263.	1.15 186 877			,	158,464 1,103 263,074		7.
Cost (per mass)				239.55	212.894	195.667	227.957	205.594	187.638	Cost (per mass)	187.63	38 239	0.55				238.508		
Recipe ratios in %	:			53													Sum of recipe ratio	os (should be 100)%) :
				Number for	mat 12345.	67 💌	Im	iport input data	a from clipboard	Auto mix (overwrite mixt	ture)	Auto mi	x (new m	iixture)					

With same target values as in the previous example

- Hardness "From" 45 ShA "To" 50 ShA
- C-Set (70°C/24h) "To" 25 %
- Tensile "From" 20 Mpa

Create a new mixture with "Auto Mix (overwrite mixture)"

- Result comes with
 - Volume Cost
 - Weight Cost

Dr. Hans-Joachim Graf



(Demo Data Advanced)

ile Edit Help																		
out data:										Criteria:							Output:	
				50AL511	50AL512	50AL513	50AL514	50AL515	50AL516 50A	Name	Min	Max	From	То	Weight	Trdoff		
st Data (Advand	ed)																	
				Recipes:														
de:	Cost:	Density:	Ingredients:	50AL511	50AL512	50AL513	50AL514	50AL515	50AL516 50A								Mixture 1	
01	280.00	0.92	NR (SMR - 10)	100.00	100.00	100.00	100.00	100.00	100.00	NR (SMR - 10)	1	00	100				100	
03	115.00	1.80	N330	10.00	30.00	50.00	25.00	45.00	75.00	N330		10	75				28.8	
10	24.00	2.71	CaCO3	20.00	20.00	20.00	20.00	20.00	20.00	CaCO3		0	20				10.6	
02	116.00	0.89	Naphtenic Oil	5.00	25.00	45.00	5.00	25.00	45.00	Naphtenic Oil		5	45				7.35	
01	385.00	5.60	ZnO	5.00	5.00	5.00	5.00	5.00	5.00	ZnO		5	5				5	
01	165.00	0.92	Stearic Acid	2.00	2.00	2.00	2.00	2.00	2.00	Stearic Acid		2	2				2	
D1	924.00	1.15	IPPD	2.00	2.00	2.00	2.00	2.00	2.00	IPPD		2	2				2	
01	158.00	1.80	S	1.50	1.50	1.50	1.50	1.50	1.50	S	0.	25	1.5				0.9125	
01	396.00	1.11	TMTD - 80							TMTD - 80		0	1				0.47	
05	708.00	1.28	CBS - 80	0.65	0.65	0.65	0.65	0.65	0.65	CBS - 80	0.	65	2.1				1.3315	
de:			Properties:															
1001			MooneyML(1+4) 100°C	32.00	36.00	31.00	34.00	30.00	42.00	MooneyML(1+4) 100°C		30	60				36.23	
002			Mooney t5 / 120°C	28.00	28.00	32.00	28.00	32.00	22.00	Mooney t5/120°C		11	32				20.01	
003			Density [g/ccm]	1.08	1.12	1.16	1.13	1.16	1.19	Density [g/ccm]	1.	08	1.2				1.0941	
004			Hardness [*ShA]	42.00	41.00	40.00	48.00	48.00	52.00	Hardness [*ShA]		40	61	45	50		49.99	
007			M300 [Mpa]	1.80	3.00	3.00	4.40	4.60	5.30	M300 [Mpa]	1	.8	9.4				5.372	
800			TS [Mpa]	25.00	21.00	15.00	25.00	20.00	15.30	TS [Mpa]		15	25	20			24.06	
1009			EB [%]	785.00	725.00	690.00	/15.00	705.00	615.00	EB [%]	0	40	785				669.85	
1010			C-Set -26°C /24h [%]	22.00	28.00	30.00	17.00	19.00	35.00	C-Set -26°C /24n [%]		1/	11				47.85	
011			C-Set 0°C /24h [%]	10.00	14.00	14.00	8.00	12.00	16.00	C-Set 0°C /24h [%]		8	16				12.82	
R012			C-Set 23°C //2h [%]	8.00	10.00	14.00	9.00	13.00	16.00	C-Set 23°C //2n [%]		0	10		05		12.7	
(,			1		_						
al ingredients				146 15	186 15	226.15	161 15	201 15	251 15	Total ingredients	146	15 25	1 15				158 464	
nsitv				1.096	1.115	1.128	1.137	1.147	1.171	Density	1.0	96 1.	186				1.103	
st (per vol)				262,547	237.377	220,712	259,187	235,816	219.724	Cost (per vol)	2197	24 263	877				263.074	
st (per mass)				239.55	212,894	195,667	227,957	205,594	187.638	Cost (per mass)	187.6	38 23	9.55				238.508	
cine ratios in %				200.00	2.2.304		22	200.004		and the second second		200			2		Cum of regine rati	ee (ebouid he d0
operatos III %				53													100	us (snould be 10
				Number for	nat 12345	67 💌	Im	nort innut data	from clinboard	Auto mix (overwrite mixt		Auto m	ix (new mi	vture)				

Cost targets

- It is possible to put a "cost (per mass)" target in.
 - But not density: because formula is not created yet
 - And volume cost target is not possible due to same reason.



(Demo Data Advanced)

le Luit Help																			
out data:										Criteria:							Output:		
				50AL511	50AL512	50AL513	50AL514	50AL515	50AL516 50A	Name	Min	Max	From	То	Weight	Trdoff			
est Data (Advan	ed)																		
				Recipes:															
ode:	Cost:	Density:	Ingredients:	50AL511	50AL512	50AL513	50AL514	50AL515	50AL516 50A								Mixture1 I	lixture2	
01	280.00	0.92	NR (SMR - 10)	100.00	100.00	100.00	100.00	100.00	0 100.00	NR (SMR - 10)	1	00	100				100	100	
03	115.00	1.80	N330	10.00	30.00	50.00	25.00	45.00	75.00	N330		10	75				28.8	49.2	
10	24.00	2.71	CaCO3	20.00	20.00	20.00	20.00	20.00	20.00	CaCO3		0	20				10.6	14.45	
002	116.00	0.89	Naphtenic Oil	5.00	25.00	45.00	5.00	25.00	0 45.00	Naphtenic Oil		5	45				7.35	25.5875	
01	385.00	5.60	ZnO	5.00	5.00	5.00	5.00	5.00	0 5.00	ZnO		5	5				5	5	
01	165.00	0.92	Stearic Acid	2.00	2.00	2.00	2.00	2.00	0 2.00	Stearic Acid		2	2				2	2	
01	924.00	1.15	IPPD	2.00	2.00	2.00	2.00	2.00	0 2.00	IPPD		2	2				2	2	
01	158.00	1.80	S	1.50) 1.50	1.50	1.50	1.50	0 1.50	S	0.	25	1.5				0.9125	1.153125	
001	396.00	1.11	TMTD - 80							TMTD - 80		0	1				0.47	0.2775	
05	708.00	1.28	CBS - 80	0.65	0.65	0.65	0.65	0.6	5 0.65	CBS - 80	0.	65	2.1			_	1.3315	1.052375	
de:			Properties:									~~					00.00	07.0075	
001			MooneyML(1+4) 100°C	32.00	36.00	31.00	34.00	30.00	42.00	MooneyML(1+4) 100°C		30	60				36.23	37.6275	
002			Mooney t5 / 120°C	28.00	28.00	32.00	28.00	32.00	22.00	Mooney to / 120°C		11	32				20.01	22.6475	
003			Density (g/ccm)	1.00	41.00	1.10	49.00	49.00	5 1.19	Density (g/ccm)	7.0	40	1.2	46	50		1.0941	1.14175	
004			M200 [Mpo]	42.00	41.00	40.00	40.00	40.00	52.00	Maruness [Shaj		40	0.4	40	50		49.99	49.99	
007			TC Mpol	25.00	3.00	15.00	4.40	4.00	15.30	TC (Mool		.0	9.4	20			0.372	0.00025	
000			ED (%)	795.00	725.00	600.00	715.00	705.00	615.00	ED (%)	5	10	785	20			660.95	642 5975	
010			C Sof, 26*C (24b (%)	22.00	29.00	20.00	17.00	10.00	25.00	C Sof 26°C /24b /941		40	77				47.95	41 4925	
011			C Sot 0*C /24h (%)	10.00	14.00	14.00	8.00	12.00	16.00	C Sot 0*C (24h [94]		8	16				47.03	14 625	
012			C-Set 23*C /72h [%]	8.00	10.00	14.00	9.00	13.00	16.00	C-Set 23*C /72h /961		8	18				12.02	14 2375	
2013			C-Set 70°C /24h [%]	39.00	50.00	61.00	44.00	50.00	54.00	C-Set 70*C /2/h [96]		17	61		25		28.66	41 7925	
														/					
tal incredients				146 15	186.15	226 15	161.15	201.15	251.15	Total incredients	146	15 25	15			7.	158 464	200 7205	
asity				1.096	1 1 1 1 5	1 128	1 137	1 147	1 171	Density	1.0	96 1	186				1 103	1 136	
st (ner vol)				262.547	237 377	220 712	259 187	235.816	219 724	Cost (per vol)	219.7	24 263	877				263.074	238 344	
ist (per mass)				239.55	212.894	195.667	227.957	205.594	187.638	Cost (per mass)	187.6	38 239	0.55	2	00		238.508	209.81	
cipe ratios in %	i:											_	V	-			Sum of recipe	ratios (should b	e 100
					28.75			19.75	23.75		~						100		

Cost targets

- In the example we put in 200 as a "cost (per mass)" target in.
 - It can be any unit
 - In the example EU / 100 kg
 - Processing with "Auto mix (new mixture)" we are able to compoare influence of cost taget on results
- Cost per mass ist very close to target, consequently filler content is higher, but C-Set farer off. Score with 650 compared to 82 for Mixture 1



😃 GrafCompo	under version	n 3.211 - de	emo data															
File Edit Help																		
nnut data:										Criteria:							Output:	
				5041 511	5041 512	5041 513	5041 514	5041 515	5041 516	Name	Min	Max	From	To	Weight	Trdoff		
Ta ak Data (Aduan	(h. e.	-		JUALUTT	JUALJIZ	JUALDID	50AL514	50AL515	30AL310	Name	WIII	Max	TION	10	weight	muon		
rest Data (Advan	ced)			Decinos														
Code:	Cost	Doneity	Ingradiante:	FOAL 511	5041 512	50AL 512	5041 514	5041 515	50AL 516								Mixture 1	
001	280.00	0.92	NR (SMR - 10)	100.00	100.00	100.00	100.00	100.00	100.0	NR (SMR - 10)	100	100	0				100	
3003	115.00	1.80	N330	10.00	30.00	50.00	25.00	45.00	75.0	N330	10	7	5				41.8	
2010	24.00	2.71	CaC03	20.00	20.00	20.00	20.00	20.00	20.0	CaCO3	0	21	0				57	
002	116.00	0.89	Nanhtenic Oil	5.00	25.00	45.00	5.00	25.00	45.0	Nanhtenic Oil	5	4	5				11 775	
001	385.00	5.60	ZnO	5.00	5.00	5.00	5.00	5.00	5.0	7n0	5		5				5	
001	165.00	0.92	Stearic Acid	2.00	2.00	2.00	2.00	2.00	2.0	Stearic Acid	2		2				2	
5001	924.00	1.15	IPPD	2.00	2.00	2.00	2.00	2.00	2.0	IPPD	2		2				2	
1001	158.00	1.80	S	1.50	1.50	1.50	1.50	1 50	15	S	0.25	1	5				0.60625	
(001	396.00	1.11	TMTD - 80		1.00	1.00	1.00	1.00	1.5	TMTD - 80	0		1				0.715	
<005	708.00	1.28	CBS - 80	0.65	0.65	0.65	0.65	5 0 .65	0.6	CBS - 80	0.65	2.1	1				1.68675	
ode:			Properties:															
R001			MoonevML(1+4) 100°C	32.00	36.00	31.00	34.00	30.00	42.0	MoonevML(1+4)	30	60	0				39.075	
R002			Mooney t5 / 120°C	28.00	28.00	32.00	28.00	32.00	22.0	Moonev t5 / 120°C	11	3	2				15.845	
R003			Density [g/ccm]	1.08	1.12	1.16	1.13	1.16	1.1	Density [a/ccm]	1.08	1.3	2				1,10785	
R004			Hardness [*ShA]	42.00	41.00	40.00	48.00	48.00	52.0	Hardness [*ShA1	40	6	1 4	0 4	45		53.995	
R007			M300 [Mpa]	1.80	3.00	3.00	4.40	4.60	5.3	M300 [Mpa]	1.8	9.4	4				7.426	
R008			TS [Mpa]	25.00	21.00	15.00	25.00	20.00	15.3	TS IMpai	15	23	5 2	20			22.93	
R009			EB [%]	785.00	725.00	690.00	715.00	705.00	615.0	EB 1%1	540	78	5	60	00		600.225	
R010			C-Set -26°C /24h [%]	22.00	28.00	30.00	17.00	19.00	35.0	C-Set -26°C /24h [%]	17	77	7				62.285	
R011			C-Set 0°C /24h [%]	10.00	14.00	14.00	8.00	12.00	16.0	C-Set 0°C /24h [%]	8	10	6				14.93	
R012			C-Set 23°C /72h [%]	8.00	10.00	14.00	9.00	13.00	16.0	C-Set 23°C /72h [%]	8	10	8				15.47	
R013			C-Set 70°C /24h [%]	39.00	50.00	61.00	44.00	50.00	54.0	C-Set 70°C /24h [%]	17	6	1	1	25	/	25.03	
														/		/	-	
										-						y.		7.
otal ingredients				146.15	186.15	226.15	161.15	201.15	251.15	Total ingredients	146.15	251.13	5				171.283	
Density				1.096	1.115	1.128	1.137	1.147	1.171	Density	1.096	1.180	6				1.11	
Cost (per vol)				262.547	237.377	220.712	259.187	235.816	219.724	Cost (per vol)	219.724	263.87	7				259.128	
Cost (per mass)				239.55	212.894	195.667	227.957	205.594	187.638	Cost (per mass)	187.638	239.5	5				233.449	
tecipe ratios in %	5:			40.5													Sum of recipe ratios (shou	uld be 100%):
				12.5	16												100	
				Number form	nat: 12345.	67 🔻	Im	port input data	from clipboar	d Auto mix (overwr	ite mixture)] [AL	uto mix (r	new mixtu	ıre)			

- To show the use of "weight" and "Trd off" it is helpful to create a conflicting target:
 - Hardness: 40 45°ShA !
 - Tensile > 20 Mpa
 - Elongation < 600 %
 - C-set < 25%

With Auto mix (Over write mixture) we calculate a new formula

 Score is around 430 Due to mismatch of Hardness: 54°ShA



😃 GrafCompo	under versio	n 3.211 - de	mo data		14		-												
File Edit Help																			
Input data:										Criteria:							Output:		
				50AL511	50AL512	50AL513	50AL514	50AL515	50AL516 50A	Name	Min	Max	From	То	Weight	Trdoff			
Test Data (Advanc	ed)														-				
				Recipes:															
Code:	Cost:	Density:	Ingredients:	50AL511	50AL512	50AL513	50AL514	50AL515	50AL516 50A								Mixture1 M	lixture3	
A001	280.00	0.92	NR (SMR - 10)	100.00	100.00	100.00	100.00	100.00	100.00	NR (SMR - 10)	1	00 ·	100				100	100	
B003	115.00	1.80	N330	10.00	30.00	50.00	25.00	45.00	75.00	N330		10	75				49.5	39.6	
C010	24.00	2.71	CaCO3	20.00	20.00	20.00	20.00	20.00	20.00	CaCO3		0	20				7.85	15.3	
D002	116.00	0.89	Naphtenic Oil	5.00	25.00	45.00	5.00	25.00	45.00	Naphtenic Oil		5	45				23.2375	26.375	
E001	385.00	5.60	ZnO	5.00	5.00	5.00	5.00	5.00	5.00	ZnO		5	5				5	5	
F001	165.00	0.92	Stearic Acid	2.00	2.00	2.00	2.00	2.00	2.00	Stearic Acid		2	2				2	2	
G001	924.00	1.15	IPPD	2.00	2.00	2.00	2.00	2.00	2.00	IPPD		2	2				2	2	
H001	158.00	1.80	S	1.50	1.50	1.50	1.50	1.50	1.50	S	0.	25	1.5				0.740625	1.20625	
K001	396.00	1.11	TMTD - 80							TMTD - 80		0	1				0.6075	0.235	
K005	708.00	1.28	CBS - 80	0.65	0.65	0.65	0.65	0.65	0.65	CBS - 80	0.	65	2.1				1.530875	0.99075	
Code:			Properties:																
PR001			MooneyML(1+4) 100°	C 32.00	36.00	31.00	34.00	30.00	42.00	MooneyML(1+4) 100°C		30	60				37.2	35.95	
PR002			Mooney t5 / 120°C	28.00	28.00	32.00	28.00	32.00	22.00	Mooney t5 / 120°C		11	32				19.1425	24.985	
PR003			Density [g/ccm]	1.08	1.12	1.16	1.13	1.16	1.19	Density [g/ccm]	1.	08	1.2				1.128625	1.12745	
PR004			Hardness (*ShA)	42.00	41.00	40.00	48.00	48.00	52.00	Hardness [*ShA]		40	61	40 4	15 1	0	51.5675	44.985	
PR007			M300 [Mpa]	1.80	3.00	3.00	4.40	4.60	5.30	M300 [Mpa]		1.8	9.4				6.888	4.504	
PR008			TS [Mpa]	25.00	21.00	15.00	25.00	20.00	15.30	TS [Mpa]		15	25	20			20.01	20	
PR009			EB [%]	785.00	725.00	690.00	715.00	705.00	615.00	EB [%]	5	40	785	60	10		599.75	672.95	
PR010			C-Set -26°C /24h [%]	22.00	28.00	30.00	17.00	19.00	35.00	C-Set -26*C /24h [%]		17	77				58.5025	40.005	
PR011			C-Set 0*C /24h [%]	10.00	14.00	14.00	8.00	12.00	16.00	C-Set 0*C /24h [%]		8	16				15.215	14.47	
PR012			C-Set 23°C /72h [%]	8.00	10.00	14.00	9.00	13.00	16.00	C-Set 23*C /72h [%]		8	18		-		16.33	12.86	
PR013			C-Set 70°C /24h [%]	39.00	50.00	61.00	44.00	50.00	54.00	C-Set 70*C /24h [%]		17	61	2	25		33.995	44.94	
Total ingredients Density				146.15 1.096	186.15	226.15 1.128	161.15 1.137 250.457	201.15 1.147	251.15 1.171 200 724	Total ingredients Density Cert density	146. 1.0	15 251 96 1.	.15 186				192.4665 1.118 0.416.70	192.707 1.118 208.052	
Cost (per voi) Cost (per mass)				202.047	237.377	220.712	209.187	235.616	187,638	Cost (per voi) Cost (per mass)	279.7	24 203.0	55	20	0		244.672	230.203	
Recipe ratios in %	:			200.00	52	24.5		200.001									Sum of recipe	ratios (should b	e 100%):
				Number for	mat 12345	67 🔻	Im	port input data	from clipboard	Auto mix (overwrite mix	ture)	Auto mi	x (new mix	ture)					

- In our example we noticed that Hardness is out of target
 - But Hardness is the first property in any specification
 - To get result into hardness specification we put a "weight" of 10 in the criteria column (Any other number > 0 will do)
 - Choose "Auto mix (new mixture)" to follow changes
 - Hardenss is now 45°ShA in target
 - C-Set is farer off target with 42 %
 - Elongation is off with 683 %
 - Score point with 744 higher as well



GrafComp	oounder ve	rsion 3.2	LO		-			-													
File Edit Help																					
nput data:	1											Criteria:						Output:			
				50AL511	50AL512	50AL513	50AL514	50AL515	50AL516	50AL517	50AL518	Name	Min	Max	From	То	Weight Trdoff				
Fest Data (Advance	ed)			Beeleen																	
"ode:	Cost	Density	Ingradiants:	SOAL 511	504L512	5041 513	50AL 514	5041 515	5041 516	5041 517	5041 518							Mixture1 I	livture3 M	livture/	
001	280.00	0.92	NR (SMR - 10)	100.00	100.00	100 00	100.00	100 0	0 100.0	100 00	100.00	NR (SMR - 10)	10	0 10	0			100	100	100	
3003	115.00	1.80	N330	10.00	30.00	50.00	25.00	45.0	0 75.0	45.00	65.00	N330	1	0 7	5			41.8	34.45	17.1	
2010	24.00	2.71	CaCO3	20.00	20.00	20.00	20.00	20.0	0 20.00	20.00	20.00	CaCO3		0 2	0			5.7	15.55	16.45	
0002	116.00	0.89	Naphtenic Oil	5.00	25.00	45.00	5.00	25.0	0 45.0	5.00	25.00	Naphtenic Oil		5 4	5			11.775	21.6625	5.8875	
E001	385.00	5.60	ZnO	5.00	5.00	5.00	5.00	5.0	0 5.0	5.00	5.00	ZnO		5	5			5	5	5	
F001	165.00	0.92	Stearic Acid	2.00	2.00	2.00	2.00	2.0	0 2.0	2.00	2.00	Stearic Acid		2	2			2	2	2	
3001	924.00	1.15	IPPD	2.00	2.00	2.00	2.00	2.0	0 2.0	2.00	2.00	IPPD		2	2			2	2	2	
1001	158.00	1.80	S TUTD 00	1.50	1.50	1.50	1.50	1.5	u 1.5	1.50	1.50	S RATE RO	0.2	o 1.	0			0.60625	1.221875	1.278125	
(005	396.00	1.11	CBS - 90	0.65	0.65	0.65	0.65	0.6	5 0.64	0.65	0.65	CPS - 80	0.6	5 2	1			1 69675	0.2225	0.07275	
000	708.00	1.28	000-00	0.05	0.00	0.00	0.00	0.0	0.00	0.05	0.05	003-00	0.0	J 2.	,			1.08075	0.872025	0.907375	
Code:			Properties:																		
R001			MoonevML(1+4) 100°C	32.00	36.00	31.00	34.00	30.0	0 42.0	60.00	39.00	MoonevML(1+4)	3	0 6	0			39,075	37,1125	33.5975	
R002			Mooney t5 / 120°C	28.00	28.00	32.00	28.00	32.0	0 22.0	20.00	25.00	Mooney t5 / 120°C	1	1 3	2			15.845	24.2175	24.9825	
R003			Density [g/ccm]	1.08	1.12	1.16	1.13	1.1	6 1.19	9 1.19	1.20	Density [g/ccm]	1.0	8 1.	2			1.10785	1.117775	1.085325	
PR004			Hardness [*ShA]	42.00	41.00	40.00	48.00	48.0	0 52.0	61.00	61.00	Hardness ["ShA]	4	0 6	1 40) 45	10	53.995	45.005	45.0175	
PR007			M300 (Mpa)	1.80	3.00	3.00	4.40	4.6	0 5.3	00.8	7.60	M300 [Mpa]	1.	8 9.	4			7.426	4.424	3.149	
PR008			TS [Mpa]	25.00	21.00	0 15.00	25.00	20.0	0 15.3	0 23.00	18.00	TS [Mpa]	1	5 2	5 20)		22.93	21.445	24.645	
PR009			EB [%]	785.00	725.00	690.00	715.00	705.0	0 615.0	560.00	590.00	EB [%]	54	0 78	5	600		600.225	683.8375	741.5125	
PR010			C-Set -26°C /24h [%]	22.00	28.00	30.00	17.00	19.0	0 35.0	29.00	27.00	C-Set -26°C /24h (%)] 1	7 7	7			62.285	38.9025	31.7625	
PR011			C-Set 0°C /24h [%]	10.00	14.00	14.00	8.00	12.0	0 16.0	13.00	12.00	C-Set 0*C /24n [%]		8 1	6			14.93	14.445	11.065	
78012			C-Set 23 C // 2/1 [%]	30.00	50.00	14.00	9.00	50.0	0 54.0	10.00	50.00	C-Set 23 C//2/1 [76]		0 1	0	06	40	10.47	40.6575	9.775	
RUIS			G-Set / 0 G /2411 [76]	39.00	50.00	01.00	44.00	50.0	0 54.01	44.00	50.00	C-36170 C72411[70]	1	/ 0	2	23	10	25.05	42.0070	35.095	
•												-					J.	4			
Total ingredients				146.15	186.15	226.15	161.15	201.15	5 251.15	181.15	221.15	Total ingredients	146.1	5 251.1	5			171.283	183.0795	150.8005	
Density				1.096	1.115	1.128	1.137	1.14	7 1.171	1.185	1.186	Density	1.09	6 1.18	6			1.11	1.114	1.099	
Cost (per vol)				262.547	237.377	220.712	259.187	235.816	5 219.724	255.351	234.118	Cost (per vol)	219.72	4 263.87	7			259.128	242.909	262.812	
Cost (per mass)				239.55	212.894	195.667	227.957	205.594	4 187.638	215.486	197.401	Cost (per mass)	187.63	8 239.5	5			233.449	218.051	239.137	
Recipe ratios in %:																		Sum of recipe	ratios (should	l be 100%):	
				82.25														100			
					Number fo	irmat 12345	5.67 💌		mport input da	ta from clipboa	rd Auto r	nix (overwrite mixture)	Auto	mix (nev	v mixture)	٦					

- While Hardness is close to upper limit:
 - We do not want C-Set that high.
- How to find the best compromise?
 - We leave the "weight" on Hardness
 - Put an additional "weight" on C-Cet (example 10)
- **Result:**

C-Set now from 42% down to 35% while hardness is in specification (notice that elongaton has increased further)

Consequently we have higher score 2878



👑 GrafCompou	under versio	n 3.211 - de	mo data		14		-												_	D X
File Edit Help																				
Input data:										Criteria:							Output			
				50AL511	50AL512	50AL 513	50AL514	50AL 515	50AL516	Name	Min	Ma	From	To	Wei	abt Trdoff				
Test Data (Advance	ed)																			
	,			Recipes:																-
Code:	Cost:	Density:	Ingredients:	50AL511 8	50AL512	50AL513	50AL514	50AL515	50AL516								Mixture 1	Mixture4	Mixture5	Mixture6
A001	280.00	0.92	NR (SMR - 10)	100.00	100.00	100.00	100.00	100.00	100.0	NR (SMR - 10)	10	00	100				10	0 100	100) 10
B003	115.00	1.80	N330	10.00	30.00	50.00	25.00	45.00	75.0	N330	1	10	75				41	8 34.45	17.:	29.
C010	24.00	2.71	CaCO3	20.00	20.00	20.00	20.00	20.00	20.0	CaCO3		0	20				5	7 15.55	16.45	5 10.:
D002	116.00	0.89	Naphtenic Oil	5.00	25.00	45.00	5.00	25.00	45.0	Naphtenic Oil		5	45				11.77	5 21.6625	5.8875	7.4
E001	385.00	5.60	ZnO	5.00	5.00	5.00	5.00	5.00	5.0	ZnO		5	5					5 5		
F001	165.00	0.92	Stearic Acid	2.00	2.00	2.00	2.00	2.00	2.0	Stearic Acid		2	2					2 2		
G001	924.00	1.15	0	2.00	2.00	2.00	2.00	2.00	2.0	IPPD	0.0	2	2				0.6067	2 2 2	4 070408	0.007
K001	206.00	1.00	TMTD 90	1.50	1.50	1.50	1.50	1.50	1.51		0.2	0	1.5				0.0002	5 1.221075	0.177	0.007
K005	708.00	1.28	CBS - 80	0.65	0.65	0.65	0.65	0.65	0.6	CBS - 80	0.6	55	2.1				1.6867	5 0.972625	0.907375	1.360
Code:			Properties:																	
PR001			MooneyML(1+4) 100°C	32.00	36.00	31.00	34.00	30.00	42.0	MooneyML(1+4)	3	30	60				39.07	5 37.1125	33.5975	5 36.4
PR002			Mooney t5 / 120°C	28.00	28.00	32.00	28.00	32.00	22.0	Mooney t5 / 120°C	1	11	32				15.84	5 24.2175	24.9825	5 19.6
PR003			Density [g/ccm]	1.08	1.12	1.16	1.13	1.16	1.1	Density [g/ccm]	1.0	08	1.2				1.1078	5 1.117775	1.085325	5 1.094
PR004			Hardness [°ShA]	42.00	41.00	40.00	48.00	48.00	52.0	Hardness [°ShA]	4	10	61	40	45	10	53.99	5 45.005	45.0175	50.3
PR007			M300 [Mpa]	1.80	3.00	3.00	4.40	4.60	5.3	M300 [Mpa]	1	.8	9.4				7.42	6 4.424	3.149	5.52
PR008			TS [Mpa]	25.00	21.00	15.00	25.00	20.00	15.3	TS [Mpa]	1	15	25	20			22.9	3 21.445	24.64	24.0
PR009			EB [%]	785.00	725.00	690.00	715.00	705.00	615.0	EB [%]	54	40	785		600		600.22	5 683.8375	741.512	664.9
PR010			C-Set -20 C /24h [%]	22.00	28.00	30.00	17.00	19.00	35.0	C-Set -20°C /24/1 [%]	7	0	11				02.28	5 38.9025	31.7023	48.9
PR011			C-Set 0 C /2411 [76]	8.00	10.00	14.00	0.00	12.00	16.0	C-Set 0 C724/1[70]		8	18				14.5	7 11.440	0.77	12.9
PR013			C-Set 70°C /24h [%]	39.00	50.00	61.00	44.00	50.00	54.0	C-Set 70°C /24h [%]	1	17	61		25	10	25.0	3 42 6575	35.09	28.2
																				×
									7 F.	4						y +	1			
Total ingredients				146.15	186.15	226.15	161.15	201.15	251.15	Total ingredients	146.1	15 2	51.15				171.28	3 183.0795	150.8005	158.988
Density				1.096	1.115	1.128	1.137	1.147	1.17:	Density	1.09	96	1.186				1.1	1 1.114	1.099	1.103
Cost (per vol)				262.547	237.377	220.712	259.187	235.816	219.724	Cost (per vol)	219.72	24 26	3.877				259.12	8 242.909	262.812	263.03
Cost (per mass)				239.55	212.894	195.667	227.957	205.594	187.638	Cost (per mass)	187.63	38 2	39.00				233.44	9 218.051	239.137	238.468
Recipe ratios in %:				51													Sum of recip 100	oe ratios (shou	d be 100%):	
				Number forn	nat 12345.	67 🔻	Im	oort input data	from clipboar	d Auto mix (overwr	ite mixtur	re)	Auto mix	inew mi	ixture)					

Result: C-Set now from 42% down to 35% while hardness is in specification (notice that elongaton has increased further)

We want still better compression set with the chance to get hardness only a few points out of upper limit.

- We want a preference on C-Set putting a "trdoff" of 5, while leaving both "weights"
- Result:

- C-Set with 28% closer to upper limit and acceptable
- Hardness has increased to 50°ShA
- Elongation now at 665% lower than before

Tentatively this results acceptable and will take in confirmation experiment.



GrafCompou	inder versior	n 3.211 - de	mo data																_	□ X
Crarcompet		TOILETT GO																		
File Edit Help																_				
Input data:										Criteria:							Output			
				50AL511	50AL512	50AL513	50AL514	50AL515	50AL516	Name	Min M	lax Fro	m To	N	/eight Trd	loff				
Test Data (Advance	ed)																			A
				Recipes:																
Code:	Cost:	Density:	Ingredients:	50AL511	50AL512	50AL513	50AL514	50AL515	50AL516								Mixture1 M	ixture4 M	/lixture5	Mixture6
A001	280.00	0.92	NR (SMR - 10)	100.00	100.00	100.00	100.00	100.00	100.0	NR (SMR - 10)	100	100					100	100	100	10
B003	115.00	1.80	N330	10.00	30.00	50.00	25.00	45.00	75.0	N330	10	75					41.8	34.45	17.1	29.
C010	24.00	2.71	CaCO3	20.00	20.00	20.00	20.00	20.00	20.0	CaCO3	0	20					5.7	15.55	16.45	10_
D002	116.00	0.89	Naphtenic Oil	5.00	25.00	45.00	5.00	25.00	45.0	Naphtenic Oil	5	45					11.775	21.6625	5.8875	7.4
E001	385.00	5.60	ZnO	5.00	5.00	5.00	5.00	5.00	5.0	ZnO	5	5					5	5	5	
F001	165.00	0.92	Stearic Acid	2.00	2.00	2.00	2.00	2.00	2.0	Stearic Acid	2	2					2	2	2	
G001	924.00	1.15	IPPD	2.00	2.00	2.00	2.00	2.00	2.0	IPPD	2	2					2	2	2	0.007
HUUT	158.00	1.80	S COL	1.50	1.50	1.50	1.50	1.50	1.5	5	0.25	1.0					0.60625	1.221875	1.2/8125	0.887
K001	396.00	1.11	IMID - 80	0.05	0.05	0.05	0.05	0.00	0.01	TMTD - 80	0	1					0./15	0.2225	0.1775	0.4
KUUS	708.00	1.28	CBS - 80	0.00	0.05	0.00	0.00	0.00	0.0	CBS - 00	0.65	2.1		_		_	1.08075	0.972025	0.907375	1.300
Coder			Droportion																	
Code.			Moonautill (1) 4) 100°C	22.00	26.00	21.00	24.00	20.00	42.01	Maanaud III (4 + 4)	20	60					20.075	27 1125	22 5075	26.4
PR001			Mooney#E (120*C	22.00	30.00	31.00	34.00	30.00	42.0	Moonov (5 / 120°C	30	22					15 945	24 2175	24 0925	10.6
PP002			Doneity Information	20.00	1.12	1.16	20.00	1 16	22.0	Donsity [a/ccm]	1.08	1.2					1 10795	1 117775	1 095225	1.004
PR003			Hordnoce (*ShA)	42.00	41.00	40.00	49.00	49.00	52.0	Hordnoss (ShA)	1.00	64	40	45	10		52,005	45.005	45.0175	50.2
PR004			M300 [Mps]	42.00	41.00	3.00	40.00	46.00	5.3	M300 (Moel	1.8	9.4	40	40	10		7 426	4.424	3 1/9	5.52
PR008			TS [Mna]	25.00	21.00	15.00	25.00	20.00	15.3	TS (Moel	15	25	20				22.03	21.445	24.645	24.0
PR000			EB (%)	785.00	725.00	690.00	715.00	705.00	615.0	EB (961	540	785	20	600			600 225	693 9375	741 5125	664.9
PR010			C-Set -26°C /24h [%]	22.00	28.00	30.00	17.00	19.00	35.0	C-Set -26°C /24h [%]	17	77		000			62 285	38 9025	31 7625	48.9
PR011			C-Set 0°C /24h [%]	10.00	14.00	14.00	8.00	12.00	16.0	C-Set 0°C /24h [%]		16					14.93	14 445	11 065	12.9
PR012			C-Set 23°C /72h [%]	8.00	10.00	14.00	9.00	13.00	16.0	C-Set 23°C /72h [%]	8	18					15.47	11.78	9 775	12
PR013			C-Set 70°C /24h [%]	39.00	50.00	61.00	44.00	50.00	54.0	C-Set 70°C /24h [%]	17	61		25	10	5	25.03	42 6575	35 095	28.2
4										4						7.	- 11			7
Total ingredients				146.15	186 15	226 15	161 15	201 15	251.15	Total ingredients	146,15	251.15					171,283	183.0795	150.8005	158.988
Density				1.096	1.115	1.128	1.137	1.147	1.17:	Density	1.096	1.186					1.11	1.114	1.099	1.103
Cost (per vol)				262.547	237.377	220.712	259.187	235.816	219.724	Cost (per vol)	219.724	263.877					259.128	242.909	262.812	263.03
Cost (per mass)				239.55	212.894	195.667	227.957	205.594	187.638	Cost (per mass)	187.638	239.55				_	233.449	218.051	239.137	238.468
Recipe ratios in %:																	Sum of recipe r	atios (should	t be 100%):	
				51													100			
				Number forn	nat 12345.	67 🔻	Im	port input data	ı from clipboar	d Auto mix (overwr	ite mixture)	Autom	ix (new n	nixture)						

As demonstrated

- "weight" helps to give a preference to properties, we have the freedom to select
- In case of confliciting targets "trdoff" shifts the preference towards one of the weighted properties.
- The search for the best compromise in case of conflicting properties in specification can be done with the "trdoff" command.



👑 GrafCompo	ounder version	3.211 - dei	mo data																
File Edit Help																			
Innut data:										Criteria:						Output			
input data.				50AL 511	041 510	5041 512	E041 E14	5041 545	5041 518	Mama	Min I	Hoy From	To	Mole	ht Trdoff	Culput			
T 10 1 (1)				JUALSTT 5	UALSIZ	SUALS 15	JUALD 14	50AL515	SUALSTO	Indiffe	MILL	Max FIO	1 10	weig	nt muon				
Test Data (Advan	cea)			Regineer															A
Code:	Cost	Density:	Ingredients:	504L511 5	DAI 512	50AL 513	50AL 514	50AL 515	50AL 516							Mixture 1	Aixture4 N	lixture5	Mixture6
A001	280.00	0.92	NR (SMR - 10)	100.00	100 00	100.00	100.00	100.00	100.00	NR (SMR - 10)	100	100				100	100	100	10
B003	115.00	1.80	N330	10.00		50.00	25.00	45.00	75.0	N330	10	75				41.8	34.45	17.1	29.
C010	24.00	2.71	CaC Copy input tab	le	0.00	20.00	20.00	20.00	20.00	CaCO3	0	20				5.7	15.55	16.45	10.
D002	116.00	0.89	Naph Copy marked	cells	5.00	45.00	5.00	25.00	45.0	Naphtenic Oil	5	45				11.775	21.6625	5.8875	7.4
E001	385.00	5.60	ZnO Pasta colle ha	10	5.00	5.00	5.00	5.00	5.0	ZnO	5	5				5	5	5	
F001	165.00	0.92	Steal Dalate cells he		2.00	2.00	2.00	2.00	2.0	Stearic Acid	2	2				2	2	2	
G001	924.00	1.15	IPPD Delete market	TOWS	2.00	2.00	2.00	2.00	2.0	IPPD	2	2				2	2	2	
H001	158.00	1.80	S Delete marked	1 columns	1.50	1.50	1.50	1.50	1.5	S	0.25	1.5				0.60625	1.221875	1.278125	0.887
K001	396.00	1.11	TMTC Insert empty re	w						TMTD - 80	0	1				0.715	0.2225	0.1775	0.4
K005	708.00	1.28	CBS Insert empty c	olumn	0.65	0.65	0.65	0.65	0.6	CBS - 80	0.65	2.1	_			1.68675	0.972625	0.907375	1.360
			Clear marked	cells															
Code:			Round values	to two decimal pl	aces e oo	21.00	24.00	20.00	42.01	Maanavil II (4 + 4)	20	60				20.075	27 1125	22 5075	26.4
PR001			Moor Show frequency	distribution for r	W 9.00	31.00	29.00	30.00	42.0	Moonov t5 / 120°C	30	22				15 9.075	24.2175	24 0925	10.6
PR003			Density Informu	1.08	1 12	1 16	1 13	1 16	1 1	Density [a/ccm]	1.08	12				1 10785	1 117775	1 085325	1 094
PR004			Hardness (*ShA)	42.00	41.00	40.00	48.00	48.00	52.0	Hardness (*ShA1	40	61	40	45	10	53,995	45 005	45 0175	50.3
PR007			M300 (Mpa)	1.80	3.00	3.00	4 40	4 60	53	M300 (Mpa)	1.8	94	40	40	10	7 426	4 4 2 4	3 149	5.52
PR008			TS (Mpa)	25.00	21.00	15.00	25.00	20.00	15.3	TS [Mpa]	15	25	20			22.93	21.445	24.645	24.0
PR009			EB [%]	785.00	725.00	690.00	715.00	705.00	615.0	EB /%1	540	785		600		600.225	683.8375	741.5125	664.9
PR010			C-Set -26°C /24h [%]	22.00	28.00	30.00	17.00	19.00	35.0	C-Set -26°C /24h [%]	17	77				62.285	38.9025	31.7625	48.9
PR011			C-Set 0°C /24h [%]	10.00	14.00	14.00	8.00	12.00	16.0	C-Set 0°C /24h [%]	8	16				14.93	14.445	11.065	12.9
PR012			C-Set 23*C /72h [%]	8.00	10.00	14.00	9.00	13.00	16.0	C-Set 23*C /72h [%]	8	18				15.47	11.78	9.775	12.
PR013			C-Set 70°C /24h [%]	39.00	50.00	61.00	44.00	50.00	54.0	C-Set 70*C /24h [%]	17	61		25	10 5	25.03	42.6575	35.095	28.2
Total ingredients Density Cost (per voi) Cost (per mass) Recipe ratios in 9	6:			146.15 1.096 262.547 239.55	186.15 1.115 237.377 212.894	226.15 1.128 220.712 195.667	161.15 1.137 259.187 227.957	201.15 1.147 235.816 205.594	251.15 1.17: 219.724 187.638	Total ingredients Density Cost (per vol) Cost (per mass)	146.15 1.096 219.724 187.638	251.15 1.186 263.877 239.55			,.	171.283 1.11 259.128 233.449 Sum of recipe	183.0795 1.114 242.909 218.051 ratios (should	150.8005 1.099 262.812 239.137 I be 100%):	158.988 1.103 263.03 238.468
				51												100			
				Number form	at: 12345.	67 💌	Im	port input data	ı from clipboar	d Auto mix (overwr	ite mixture)	Auto mi	(new mi	kture)					

Criteria window shows the Min / Max values for any ingredient and property

- In case you want more information about the distribution of any ingredient or property
 - Click mouse pointer in Cell: Example N 330
 - Right click to get into pull down menue select "fruequency distributio for row"



																			-
U GrafCompour	der version	n 3.211 - de	mo data		14		-												
File Edit Help																			
Innut data:										Criteria:						Output:			
input data.				E041 E14	5041 512	E0.41 E42	E041 E14	E041 E1E	E041 E16	Nomo.	Min	Hoy From	To	Weight	Trdoff	output.			
Teal Data (Advances	0			SUALSTT	SUALS 12	JUAED 15	SUALS 14	SUALS IS	SUALS TO	Name	WIII	max Prom	10	weight	Truon				
Test Data (Advanced	0			Paginag:															A
Code	Cost	Density:	Ingredients:	50AL511 F	50AL512	0AL 513	50AL 514	50AL 515	50AL 516							Mixture1 M	lixture4 M	lixture5	lixture6
A001	280.00	0.92	NR (SMR - 10)	100.00	100.00	100.00	100.00	100.00	100.0	NR (SMR - 10)	100	100				100	100	100	10
B003	115.00	1.80	N330	10.00	30.00	50.00	25.00	45.00	75.0	N330	10	75				41.8	34.45	17.1	29.
C010	24.00	2.71	CaCO3	20.00	20.00	20.00	20.00	20.00	20.0	CaCO3	0	20				5.7	15.55	16.45	10.
D002	116.00	0.89	Naphtenic Oil	5.00	25.00	45.00	5.00	25.00	45.0	Naphtenic Oil	5	45				11.775	21.6625	5.8875	7.4
E001	385.00	5.60	ZnO	5.00	5.00	5.00	5.00	5.00	5.0	ZnO	5	5				5	5	5	
F001	165.00	0.92	Stearic Acid	2.00	2.00	2.00	2.00	2.00	2.0	Stearic Acid	2	2				2	2	2	
G001	924.00	1.15	IPPD	2.00	2.00	2.00	2.00	2.00	2.0	IPPD	2	2				2	2	2	
H001	158.00	1.80	S		Fraguianau	istribution					2.25	1.5				0.60625	1.221875	1.278125	0.887
K001	396.00	1.11	TMTD - 80		Frequency L	istribution					~ 0	1				0.715	0.2225	0.1775	0.4
K005	708.00	1.28	CBS - 80	Dist	ribution for in	aredient N33	N:				A 1.65	2.1	_			1.68675	0.972625	0.907375	1.360
Contra			Desmantines	24		,													
Code:			Properties:					2	2		20	60				20.075	27 1125	22 5075	26.4
PR001			Mooney t5 (120°C	·							30	22				15 945	24 2175	24 0925	10.6
PR003			Density In/ccm]		_1	_1	_1				1.08	12				1 10785	1 117775	1 085325	1 094
PR004			Hardness (*ShA)								40	61	40	45 10		53,995	45 005	45 0175	50.3
PR007			M300 (Mpa)								1.8	9.4				7.426	4.424	3.149	5.52
PR008			TS [Mpa]			بل ار				وبلط بابلط ب	+ 15	25	20			22.93	21.445	24.645	24.0
PR009			EB [%]	7 10	16.5	23 29	.5 36	42.5 49	9 55.5	62 68.5 75	540	785	6	00		600.225	683.8375	741.5125	664.9
PR010			C-Set -26°C /24h [%]								17	77				62.285	38.9025	31.7625	48.9
PR011			C-Set 0°C /24h [%]								۷ 8	16				14.93	14.445	11.065	12.9
PR012			C-Set 23*C /72h [%]	0.00	10.00	14.00	9.00	15.00	10.01	C-38123 C/12/1[70]	8	18				15.47	11.78	9.775	12.
PR013			C-Set 70°C /24h [%]	39.00	50.00	61.00	44.00	50.00	54.0	C-Set 70°C /24h [%]	17	61		25 10	5	25.03	42.6575	35.095	28.2
-									7.6	4					7.	7	_		7.
Total ingredients				146 15	186 15	226 15	161 15	201 15	251 1	Total ingredients	146 15	251 15				171 283	183 0795	150 8005	158 988
Density				1.096	1 1 1 5	1 128	1 137	1 147	1 17:	Density	1 096	1 186				1 11	1 1 1 4	1 099	1 103
Cost (per vol)				262 547	237.377	220.712	259.187	235.816	219.724	Cost (per vol)	219.724	263.877				259.128	242,909	262 812	263.03
Cost (per mass)				239.55	212.894	195.667	227.957	205.594	187.638	Cost (per mass)	187.638	239.55				233.449	218.051	239.137	238.468
Recipe ratios in %:																Sum of recipe	ratios (should	be 100%):	
				51												100			
				Number form	nat: 12345.6	7 💌	Imp	oort input data	from clipboar	d Auto mix (overw	rite mixture) Auto mix	(new mixtu	ure)					

"fruequency distributio for row"

- Example N330 fruequency distribution is shown.
- For ingredients with larger phr value the bar diagram is made of 10 steps starting with lowest value to max value





"fruequency distribution for x rows"

- Example fruequency distribution for more than on ingredient:
- Highlight all ingredients you want to see: Example: N330, CaCO3 and Naphtenic Oil
- Pull Down menue with right click
- Select "fruequency distribuion for 3 rows"





"fruequency distribution for x rows"

- Example fruequency distribution for more than on Property:
- Highlight all properties you want to see: Example: Mooney, Hardness, TS-Tensile, EB-Elongation
- Pull Down menue with right click
- Select "fruequency distribuion for 4 rows"
- As in our previous example distributions are uneven (what is expected with a small sample database)



😃 GrafCompound	er version 3.	211 - dei	mo data																
File Edit Help																			
Clear All Data										Criteria:								Output:	
Lood Dama Data (6	(imple)	-		50AL511	50AL512	50AL513	50AL514	50AL515	50AL51	Name	Min	Max	Fro	m To	v د	Neight 1	Trdoff		
Load Demo Data (s	ampie)																		
Load Demo Data (A	dvanced)	_		Recipes:															E E
Open File		nsity:	Ingredients:	50AL511	50AL512	50AL513	50AL514	50AL515	50AL516									Mixture 1	
Save As		0.92	NR (SMR - 10)	100.00	100.00	100.00	100.00	100.00	10	NR (SMR - 10)	10	00	100						
Merge in Recipes fr	om Clipboard	1.80	N330	10.00	30.00	50.00	25.00	45.00	1	N330	1	10	75						
Merge in Recipes fr	om File	2.71	CaCO3	20.00	20.00	20.00	20.00	20.00	- 1	CaCO3		0	20						
Evit		0.89	Naphtenic Oil	5.00	25.00	45.00	5.00	25.00	4	Naphtenic Oil		5	45						
EAR		5.60	ZnO	5.00	5.00	5.00	5.00	5.00		ZnO		5	5						
F001	165.00	0.92	Stearic Acid	2.00	2.00	2.00	2.00	2.00		Stearic Acid		2	2						
G001	924.00	1.15		2.00	2.00	2.00	2.00	2.00		IPPD S	0.0	2	4.5						
K001	206.00	1.00	THTD 90	1.50	1.50	1.50	1.50	1.50		JUTO 80	0.2	20	1.0						
K001	708.00	1.11	CBS-80	0.65	0.65	0.65	0.65	0.65		CBS - 80	0.6	65	21						
1005	100.00	1.20	000 00	0.00	0.00	0.00	0.00	0.00		000 00	0.0		6 . /						
Code:			Properties:																
PR001			MoonevML(1+4) 100°C	32.00	36.00	31.00	34.00	30.00	4	MoonevML(1+4)	3	30	60						
PR002			Mooney t5 / 120°C	28.00	28.00	32.00	28.00	32.00	1	Mooney t5 / 120°C	1	11	32						
PR003			Density [g/ccm]	1.08	1.12	2 1.16	1.13	1.16		Density [g/ccm]	1.0	08	1.2						
PR004			Hardness [°ShA]	42.00	41.00	40.00	48.00	48.00		Hardness [°ShA]	4	40	61	40	45	10			
PR007			M300 [Mpa]	1.80	3.00	3.00	4.40	4.60		M300 [Mpa]	1	1.8	9.4					0	
PR008			TS [Mpa]	25.00	21.00) 15.00	25.00	20.00		TS [Mpa]	1	15	25	20					
PR009			EB [%]	785.00	725.00	690.00	715.00	705.00	6	EB [%]	. 54	40	785		600				
PR010			C-Set -26°C /24h [%]	22.00	28.00	30.00	17.00	19.00		C-Set -26*C /24h [%]	1 1	17	77						
PR011			C-Set 0°C /24h [%]	10.00	14.00	14.00	8.00	12.00		C-Set 0°C /24h [%]		8	16						
PR012			C-Set 23 C // 2h [%]	8.00	10.00	14.00	9.00	13.00		C-Set 23 C // 2// [%]		0	10		05	10			
PR013			C-Set 70°C /24h [%]	39.00	50.00	01.00	44.00	50.00	· · · · ·	C-Set 70°C /24n [%]	1	17	07		25	10	5		
				146.15 1.096 262.547	186.15 1.115 237.377	226.15 1.128 220.712	161.15 1.137 259.857	201.15 1.147 235.816	25 1 215	Total ingredients Density Cast (per vol)	146.1 1.05 219.72	15 251 96 1. 24 263.	1.15 186 877					0	¥
Cost (per mass)				239.55	212.894	190.667	227.957	200.094	181	Cost (per mass)	187.63	36 239	9.00						
Recipe ratios in %:	_																	Sum of recipe	ratios (should be 100%):
			Number for	rmat: 12345	.67 💌	Im	iport input dat	a from clipboa	ird A	uto mix (overwrite mixtu	ire)	Auto r	mix (new	mixtur	e)			U	



- Click File
 - Right click pull down menue:
 - Option 1: Merge in Recipes from Clipboard
 - If you have copied Data from any other Table Data sheet
 - Option 2: Merge in Recipes from File If you have stored a File in GC format
- We take Option 2



City Cold Links	-					
File Edit Help			Criteria:		Output	
Clear All Data	Disculat	50al 511 50al 512 50al	513 5041 514 5041 515 5041 511 Name	Min Max From To Wei	aht Trdoff	
Load Demo Data (Simple) Advanced)	Merge In		X		
Open File	(avance a)				Mixture 1	1
Save As		CMPD_Dateien Tutorial DATA	2018-02 - Tut	torial DATA 2018-02 👂	Mixture I	
Merge in Recipes f	rom Clipboard	Organisieren 🛪 Neuer Ordner				
Merge in Recipes f	rom File	Neder Orditer				
Exit	165.00		 Name 	Änderungsdat		
G001	924.00	Heimnetzgruppe	N ND Date Carda Cart Dialta	10.02.2010.10		
4001	158.00		NR-Data-Code Cost Dichte	10.02.2018 19:		
K001 K005	708.00	S Computer	NR-SBR Tutorial Dens-Cost Merger	23.06.2018 14:		
		Lekalar Datanträger (Ci)	NR-Tutorial Dens-Cost	10.02.2018 13:		
Code: PR001			WR-Tutorial	10.02.2018 13:		- I
PR002		Wy Passport (E:)	SBR Dens-Cost	10.02.2018 14:		
PR003 PR004		⊲ Volume (F:)	SBR Tutorial Dens-Cost	23.06.2018 13: 45	10	
PR007		ISBSTORAGE (\\EPSON69949A) (Y:)	Tast Data Advanced	10.02.2018.01		
PR008 PR009		🚎 MEMORYCARD (\\EPSON69949A) (Z:)		10.02.2018 01.		
PR010			Test Data Basic	10.02.2018 01:		
PR011 PR012		Netzwerk				
PR013				25	10 5	
		Dateiname: SBR Tutorial Dens-C	Cost GrafCom	npounder Files 👻		
			Ött			
			Offne	Abbrechen		
						The second se
•						7.
Total ingredients		146.15 186.15	226.15 161.15 201.15 25 Total ingredient	s 146.15 251.15		0
Cost (per vol)		262.547 237.377 2	1.120 1.137 1.147 1 Density 220.712 259.187 235.816 219 Cost (per vol)	219.724 263.877		
Cost (per mass)		239.55 212.894 1	195.667 227.957 205.594 187 Cost (per mass,	187.638 239.55		
Recipe ratios in %:	_				Sum of recip	pe ratios (should be 100%)
		Number format 12345.67	Import input data from clipboard Auto mix (overwrite	mixture) Auto mix (new mixture)		



- We take Option 2
 - Load Demo Data Advanced which is a set of NR Formulas
 - Click File
 - Select from Pull Down Menue:
 - Merge in Recipes from File
 - Example: SBR Tutorial Dens-Cost
 - Click Open



😃 GrafCompound	der version	3.211 - de	mo data															X	
File Edit Help																			
Input data:										Criteria:						Output:			
				50AL 511	50AL 512	50AL 513	50AL 514	50AL 515	50AL 51	Name	Min Ma	ex From	To	Weight	Trdoff				
Test Data (Advanced)				00/12011	00/12012	00/12010	00/12014	00/12010	CONLON					morgin	maon				
rest Data (Advanced)	,			Recines:															5
Code:	Cost:	Density:	Ingredients:	50AL 511	50AL 512	50AL 513	50AL514	50AL 515	50AL 516							Mixture 1			
A001	280.00	0.92	NR (SMR - 10)	100.00	100.00	100.00	100.00	100.00	10	NR (SMR - 10)	0	100							
B003	115.00	1.80	N330	10.00	30.00	50.00	25.00	45.00		N330	ō	80							
C010	24.00	2.71	CaCO3	20.00	20.00	20.00	20.00	20.00) 2	CaCO3	0	20							
D002	116.00	0.89	Naphtenic Oil	5.00	25.00	45.00	5.00	25.00) 4	Naphtenic Oil	0	45							
E001	385.00	5.60	ZnO	5.00	5.00	5.00	5.00	5.00)	ZnO	1	7							
F001	165.00	0.92	Stearic Acid	2.00	2.00	2.00	2.00	2.00)	Stearic Acid	0	3							
G001	924.00	1.15	IPPD	2.00	0 2.00	2.00	2.00	2.00)	IPPD	0	2							
H001	158.00	1.80	S	1.50	0 1.50) 1.50	1.50	1.50)	S	0	2.4							
K001	396.00	1.11	TMTD - 80							TMTD - 80	0	4							
K005	708.00	1.28	CBS - 80	0.6	5 0.65	i 0.65	0.65	0.65	5	CBS - 80	0	2.1							
A015	176.00	0.94	SBR 1711 (37,50il/							SBR 1711	0	100							
A021	200.00	0.92	Buna CB 10							Buna CB 10	0	20							
D003	128.00	0.98	Aromatic Oil			Merge	in Recines I	From File		X	0	25							
F101	130.00	0.90	Paraffin Wax			merge	milleopesi	Tomme			0	5							
G002	891.00	1.15	PBN								0	3							
K004	772.00	1.24	DPG				22 recip	es have been	n added.		0	1							
K003	708.00	1.28	CBS				26 new	ingredient rov	vs have b	een added.	0	2							
8901	55.00	1.25	Ground Rubber							per	0	20							
A902	570.00	1.20	TMO								0	90							
4010	176.00	1.33	SDD 1942 (150)//10							OK	0	140							
C022	125.00	2.00	SBR 1845 (1501/10 Silitin N								0	50							
C021	172.00	2.00	Clay						_	Clay	0	100							
E002	250.00	0.98	Benzoic Acid							Benzoic Acid	0	0.5							
F103	187.00	1 10	Cumar Resin							Cumar Resin	0	0.0							
K002	321.00	1.10	MBTS							MBTS	ő	1.5							
A013	176.00	1.12	SBR 1618 (50il/50CB)							SBR 1618	ő	155							
F105	125.00	1.40	Struktol 40 MS							Struktol 40 MS	0	20							
F102	280.00	1.05	Koresin							Koresin	ō	5							
A018	176.00	1.14	SBR 1808 (47,50il/7							SBR 1808	0	223.5							
F106	2.20	1.20	Strukto W 33							Strukto W 33	0	7.5							
A011	176.00	0.94	SBR 1500							SBR 1500	0	100							N.
100	**** ***	· · · · 7	NICCO.						7.6	1				-	7.6	4			£1.
Total ingradiante				146.45	496 48	00645	464.45	204.45		Total ingradiante	44645 0	26.08				0			-
Donsity				140.10	100.10	220.10	1 1 27	201.13	20	Donsity	140.13 3	4.46				0			
Cost (per vol)				262.547	237 377	220 742	250 187	225.846	240	Cost (per vol)	178 088 26	2.877							
Cost (per mass)				230 55	1 212 804	195.667	203.107	205 594	187	Cost (per mass)	145 959 2	20.55							
Bocing ratios in %:				200.00	212.034	100.007	221.301	200.034	,01	Sect (per made)	140.000 2	00.00				Our of a size			
recipe ratios in %:																Sum of recipe	rauos (snoulo	01 90 t	J%):
			Number fo	rmat 1234	5.67 💌	In	nport input dat	a from clipboa	ard A	uto mix (overwrite miz	xture) Aut	o mix (new i	mixture)						





ht a sa																	
GrafCon	pounder version	3.211 - de	mo data	- N.		-											
File Edit H	elp																
Input data:										Criteria:						Output:	
				50AL511	50AL512	50AL513	50AL514	50AL515	50AL51	Name	Min Max	From	То	Weight	Trdoff		
Test Data (Ad	/anced)																
	-			Recipes:													
Code:	Cost:	Density:	Ingredients:	50AL511	50AL512	50AL513	50AL514	50AL515	50AL516							Mixture1	
A001 R002	280.00	0.92	NR (SMR - 10)	100.0	0 100.00	0 100.00	0 100.00	100.00	10	NR (SMR - 10)	0	100					
C010	24.00	2.71	CaC03	20.0	0 20.00	20.00	20.00	20.00		CaCO3	0	20					
D002	116.00	0.89	Naphtenic Oil	5.0	0 25.0	45.00	5 00	25.00	1	Naphtenic Oil	ő	45					
E001	385.00	5.60	ZnO	5.0	0 5.00	5.00	5.00	5.00		ZnO	1	7					
F001	165.00	0.92	Stearic Acid	2.0	0 2.00	2.00	2.00	2.00)	Stearic Acid	0	3					
G001	924.00	1.15	IPPD	2.0	0 2.00	2.00	2.00	2.00)	IPPD	0	2					
H001	158.00	1.80	S	1.5	0 1.50	0 1.50	0 1.50	0 1.50)	S	0	2.4					
K001	Convinnuttable		B0							TMTD - 80	0	4					
K005	Copy input table		P	0.6	5 0.6	5 0.65	5 0.65	5 0.65		CBS - 80	0	2.1					
A015	Copy marked cells		P 10							SBR 1711 Bung CP 10	0	100					
D003	Paste cells here		D OIL							Aromatic Oil	0	25					
F101	Delete marked row	S	Wax							Paraffin Wax	ő	5					
G002	Delete marked colu	imns								PBN	0	3					
K004	Insert empty row									DPG	0	1					
K003	Insert empty colum	n								CBS	0	2				0	
B901	Clear marked cells		Rubber							Ground Rubber	0	20					
A902	Round values to tw	o decimal pl	d Tread							Recycled Tread	0	90					
G011	Show frequency dis	tribution for	36 rows to userius							TMQ	0	3					
A019	Sort colocted ingra	diant rowe	43 (1501/10							SBR 1843	0	140					
0022	Son Selected Ingre	dientrows								Clay	0	100					
E002	250.00	0.98	Benzoic Acid							Benzoic Acid	0	0.5					
F103	187.00	1.10	Cumar Resin							Cumar Resin	ő	9					
K002	321.00	1.44	MBTS							MBTS	0	1.5					
A013	176.00	1.12	SBR 1618 (50il/50C	B)						SBR 1618	0	155					
F105	125.00	1.40	Struktol 40 MS							Struktol 40 MS	0	20					
F102	280.00	1.05	Koresin							Koresin	0	5					
A018	176.00	1.14	SBR 1808 (47,50il/i	·						SBR 1808	0 2	23.5					
F 105	2.20	1.20	SILUKTO W 33							SITUKIO W 33	0	1.0					
AUTT COPE	176.00	0.94	SBR 1500						_	SDR 1500		100			_		V
•									Y ►	4					7 •	40	y ►
Total ingredie	nts			146.1	5 186.15	226.15	5 161.15	201.15	25	Total ingredients	146.15 33	6.98				0	
Density				1.09	5 1.115	1.128	1.137	1.147	1	Density	1.042	1.46					
Cost (per vol)	al			262.04	237.377	220.712	209.18/	235.816	215	Cost (per Vol)	1/0.088 263	0.077					
Desing refine	o)			239.0	212.094	190.007	221.931	200.094	10/	Cost (per mass)	140.909 23	19.00					
Recipe radios	11 70.															Sum of recipe	ratios (should be 100%):
			Number	format: 1234	5.67 💌	In	nport input dat	ta from clipboa	ard A	uto mix (overwrite mix	kture) Auto	mix (new m	ixture)				

Expanding the Data base with "Merger"
 Option 2
 After the merger of files organization of data is necessary to have a table in the standard way
 Polymer
 Carbon Black
 Whitingbeside all other ingredients
 Properties as well
 Click on all Ingredient Code: cells
 Right Click, Select "Sort by selected ingredient rows"



U GrafCompoun	der version	3.211 - de	mo data			-												
File Edit Help																		
Input data:										Criteria:							Output	
				5041 511	5041 512	5041 513	5041 514	5041 515	5041 51	Name	Min	Max	From	To	Weight	Trdoff		
Test Data (Advanced	2			SUALSTI	50AL512	SUALSTS	50AL514	SUALSTS	JUNEDI	Ivanie	WIIII	Max	TION	10	weight	muon		-
Test Data (Advanced)			Decincol														
Codo:	Cost	Doncity	Ingradiante:	FOAL 511	5041 512	6041 612	5041 514	5041 515	5041 516								Mixture 1	
4001	200.00	Density.	ND (OND 40)	100.00	100.00	100.00	100.00	100.00	30/12310			0 4	00				MIXIUIEI	
A011	176.00	0.92	SPD 1500	100.00	100.00	100.00	100.00	100.00	'	SPD 1500		0 1	00					
A013	176.00	1 12	SBR 1619 (50)//50CB)							SBR 1618		0 1	55					
4015	176.00	0.94	SBR 1711 (37 50il/s							SBR 1711		0 1	00					
A016	176.00	0.94	SBR 1707 (37 50il/-C							SBR 1707		0 13	7.5					
A018	176.00	1 14	SBR 1808 (47 50il/7							SBR 1808		0 22	2.5					
A019	176.00	1.14	SBR 1843 (150il/10							SBR 1843		0 1	40					
A021	200.00	0.92	Buna CB 10							Buna CB 10		0	20					
A902	105.00	1.25	Recycled Tread							Recycled Tread		õ	90					
B002	115.00	1.80	N 220							N 220		0	60					
B003	115.00	1.80	N330	10.00	30.00	50.00	25.00	45.00		N330		0	80					
B005	115.00	1.80	N550							N550		0	50					
B901	55.00	1.25	Ground Rubber							Ground Rubber		0	20					
C010	24.00	2.71	CaCO3	20.00	20.00	20.00	20.00	20.00		CaCO3		0	20					
C021	172.00	2.70	Clav							Clav		0 1	00					
C022	125.00	2.00	Silitin N							Silitin N		0	50					
D002	116.00	0.89	Naphtenic Oil	5.00	25.00	45.00	5.00	25.00) 4	Naphtenic Oil		0	45					
D003	128.00	0.98	Aromatic Oil							Aromatic Oil		0	25				0	
E001	385.00	5.60	ZnO	5.00	5.00	5.00	5.00	5.00)	ZnO		1	7					
F001	165.00	0.92	Stearic Acid	2.00	2.00	2.00	2.00	2.00)	Stearic Acid		0	3					
F002	250.00	0.98	Benzoic Acid							Benzoic Acid		0 (0.5					
F101	130.00	0.90	Paraffin Wax							Paraffin Wax		0	5					
F102	280.00	1.05	Koresin							Koresin		0	5					
F103	187.00	1.10	Cumar Resin							Cumar Resin		0	9					
F104	55.00	1.30	Duranit B							Duranit B		0	10					
F105	125.00	1.40	Struktol 40 MS							Struktol 40 MS		0	20					
F106	2.20	1.20	Strukto W 33							Strukto W 33		0 7	7.5					
G001	924.00	1.15	IPPD	2.00	2.00	2.00	2.00	2.00)	IPPD		0	2					
G002	891.00	1.15	PBN							PBN		0	3					
G011	579.00	1.33	TMQ							TMQ		0	3					
H001	158.00	1.80	S	1.50	1.50) 1.50) 1.50) 1.50)	S		0 2	2.4					
K001	396.00	1.11	TMTD - 80							TMTD - 80		0	4					T,
1		· · · · ,	11070						7.6	1	_	-		_	_	7.6	4	7.6
Tatal in our disute				110.15	400.45	000.45		004.45		Total in our dis sta	4.40	45 000	0.0					
l otal ingredients				146.13	186.13	226.13	161.13	201.13	20	Total ingredients	146	10 336.	98				0	
Density Opert (persual)				1.090	1.113	1.120	0 1.137	1.14/	1	Density	1.0	42 1.	40 77					
Cost (per voi)				202.047	237.377	220.712	209.107	230.010	275	Cost (per voi)	1/0.0	00 203.0	// ==					
Cost (per mass)				239.00	212.094	190.007	221.901	200.094	10/	Cost (per mass)	140.9	109 239.	00					
Recipe ratios in %:							195.667 (this i	s a value calci	ulated fror	n input data of recipe	50AL51	3)					Sum of recipe	e ratios (should be 100%):
			hlumbert	- rmat: [400.11		·		a farma alian										
			Number fo	rmat: 1234	0.67	LIN	nport input dat	a trom clipboa	ard A	uto mix (overwrite mix	ture)	Auto m	ix (new n	nixture)				

Expanding the Data base with "Merger"

- With Option 2:
 - After "Sort by selected ingredient rows" Ingredients in the table are organized in the standard way.
 - Reminder: Sort properties separately.
 - Proceed with analysis and simulation

Consideration:

- Merge data sets with soluble polymers only
 Insolubility cause second order effects None
 - linearity) due to morphology influence of physicals
- Data sets need <u>same number format</u> (dot, comma) for merger



GrafCompounder Data Storage

U GrafCompoun	der version	3.211 - dei	mo data	1.1		-															x
File Edit Help																					<u> </u>
Input data:										Criteria:							-	Output	_		
Input data.				FOALE44	E041 E40	E041 E42	E041 E44	EQALE45	EQAL E4	Mama	Min I	Mary 1		Te	10/010	ht Teda	."	Culput			
1004	000.00	0.00	Dura OD 40	SUALSTI	SUALS 12	SUALS 13	SUALS 14	SUALS 15	SUALS II	Name Runs OR 40	MIN	Max 00	FIOM	10	weig	ni maa					
A021	200.00	0.92	Buria CB TU Desveled Treed							Buna CB 10	0	20									
R002	115.00	1.20	N 220							Necycled Head	0	90									
8002	115.00	1.00	N220	10.00	20.00	50.00	25.00	45.00		N 220	0	80									
8005	115.00	1.00	NS50	10.00	30.00	50.00	25.00	40.00		N550	0	50									
B005	55.00	1.00	Cround Pubbor							Ground Pubbor	0	20									
C010	24.00	2.71	Ground Rubber	20.00	20.00	20.00	20.00	20.00		CoCO2	0	20									
C021	172.00	2.71	Clav	20.00	20.00	20.00	20.00	20.00	- 1	Clav	0	100									
0021	125.00	2.70	Cildy Cilitin M							Silitin M	0	50									
D002	116.00	0.90	Nanhtenic Oil	5.00	25.00	45.00	5.00	25.00		Nanhtenic Oil	0	45									
D002	128.00	0.03	Aromatic Oil	5.00	20.00	40.00	5.00	20.00		Aromatic Oil	0	25									
E001	385.00	5.60	700	5.00	5.00	5.00	5.00	5.00		ZnO	1	7									
E001	165.00	0.92	Stearic Acid	2.00	2.00	2.00	2.00	2.00		Stearic Acid	0	3									
F002	250.00	0.92	Benzoic Acid	2.00	2.00	2.00	2.00	2.00		Benzoic Acid	ő	0.5									
F101	130.00	0.00	Paraffin Wax							Paraffin Way	0	5									
F102	280.00	1.05	Koresin			C					ő	5									
F103	187.00	1 10	Cumar Resin			Ex	it Confirmat	ion		Resin	Ő	9									
F104	55.00	1.30	Duranit B							B	ő	10									
F105	125.00	1.00	Struktol 40 MS							40 MS	ő	20									
F106	2 20	1.20	Strukto W 33				🕗 на	we you saved	your data	2 W.33	ő	7.5									
G001	924.00	1.15	IPPD	2.00	2.00			ine you ourou	your dute		0	2									
G002	891.00	1 15	PBN				$\overline{}$				0	3									
G011	579.00	1.33	TMQ				C	V 5-1	No. 000		0	3									
H001	158.00	1.80	S	1.50	1.50			res, Exit	No, Car	cei	0	24									
K001	396.00	1.11	TMTD - 80							80	0	4									
K002	321.00	1.44	MBTS			_			_	MBTS	0	1.5									
K003	708.00	1.28	CBS							CBS	0	2									
K004	772.00	1.24	DPG							DPG	0	1									
K005	708.00	1.28	CBS - 80	0.65	0.65	0.65	0.65	0.65		CBS - 80	0	2.1									
Code:			Properties:																		
PR001			MooneyML(1+4) 100°C	32.00	36.00	31.00	34.00	30.00	4	MooneyML(1+4)	30	60									
PR002			Mooney t5 / 120°C	28.00	28.00	32.00	28.00	32.00		Mooney t5 / 120°C	11	61									
PR003			Density [g/ccm]	1.08	1.13	2 1.16	1.13	1.16		Density [g/ccm]	1.04	1.43									
PR004			Hardness [*ShA]	42.00	41.00	0 40.00	48.00	48.00		Hardness [°ShA]	35	90	4(0 4	45	10					
00007		7	U200 [Upo]	4.00	2.00	2.00		4.60		1000 /1 /mol	* 2	17	_	-	-	_	1.1	-	_		1.0
																	-				_
Total ingredients				146.15	186.15	226.15	161.15	201.15	25	Total ingredients	146.15	336.98						0			
Density				1.096	1.115	1.128	1.137	1.14/	1	Density	1.042	1.46									
Cost (per vol)				262.547	237.377	220.712	259.187	235.816	215	Cost (per vol)	1/8.0882	263.877									
Cost (per mass)				239.55	212.894	195.667	227.957	205.594	18/	Cost (per mass)	140.909	239.00									
Recipe ratios in %:																		Sum of recipe	ratios (sh	ould be	100%):
			Number for	mat: 12345	.67 🔻	Im	iport input data	a from clipboa	rd 🖌	uto mix (overwrite mixt	ure) A	uto mix (r	new mb	dure)							
					_									_			_		_		

Store your results before closing the program

- Click on x in upper right corner
- Window appears: have you saved your data
 - There are two options:

1) Copy the data table and paste it into your table calculation spread sheet

2.) Store as ...gc (GrafCompounder) Format



GrafCompounder Data Storage

du GrafCompound	ler version 3.2	211 - der	mo data	а	14														X
File Edit Help																			
Clear All Data											Criteria:						Output:		
Load Dama Data (Simple)	-			50AL511 5	0AL512 5	0AL513 5	50AL514 5	50AL515	50AL51	Name	Min	Max F	rom To	Weig	ht Trdoff			
Load Demo Data (3	simple)	0.92	Buna	CB 10							Buna CB 10		0 20		-				
Load Demo Data (A	led Tread							Recycled Tread		0 90									
Open File		1.80	N 220								N 220	_	0 60		~	D			
Save As		1.80	N33 S	Save As											X				
Merge in Recipes from Clipboard 1.8			N55	~							-								
Merge in Recipes fr	om File	1.25	Gro	(G)(G) -	📙 « CMPD	Dateien 🕨	Tutorial D.	ATA 2018-0	02			· ++	Tutorial DA	TA 2018-0)2 🔎				
Exit		2.71	Clau								-								
C022	125.00	2.00	Siliti	Organisiere	en 🔻 Nei	ier Ordner								-	0				
D002	116.00	0.89	Nan	Organisiere	en ve	der Oruner								3== .	•				
D003	128.00	0.98	Aron	📕 Video	ns					• NI		^	×						
E001	385.00	5.60	ZnO	- Hace						IN	anne								
F001	165.00	0.92	Stea																
F002	250.00	0.98	Ben	🚜 Heimn	etzarunne						NR-Data-Cod	e Cost D	lichte						
F101	130.00	0.90	Para		eargrappe					4	NR-SBR Tutor	ial Dens	-Cost Mera	er					
F102	280.00	1.05	Kore										. 2						
F103	187.00	1.10	Cun	🚺 Compi	iter					4	NR-Tutorial D	ens-Cos	t		=	-			
F104	125.00	1.30	Stru	and compo	atter					- 4	NR-Tutorial								
F105	2.20	1.20	Stru	🥾 Lokal	er Datenträg	er (C:)													
G001	924.00	1.15	IPPI	- My D	account (E)				3	= 4	SBR Dens-Cos		1						
G002	891.00	1.15	PBN		assport (L.)					4	SBR Tutorial E								
G011	579.00	1.33	TMC	🥪 Volur	me (F:)				L										
H001	158.00	1.80	S							2	Iest Data Adv	anced							
K001	396.00	1.11	TMT	X 0303		F301103545	A) (1.)			2	Test Data Bas	ic			*				
K002	321.00	1.44	MBT	I MEM	ORYCARD (\'	EPSON6994	19A) (Z:)								P.	-			
K003	708.00	1.28	CBS																
K004	708.00	1.24	CBS	Da	teiname: de	emo data									-				
1005	700.00	1.20																	J
Code:			Pro	[Dateityp: Gr	afCompoun	der Files								•				
PR001			Mod																
PR002			Moo																
PR003			Den	Ordner a	ushlandan							Spei	ichern	Abbrec	hen				
PR004			Han	Under au	uspienden											0			- T
															.44	.	4		7.6
Total ingredients					146.15	186.15	226.15	161.15	201.15	25	Total ingredients	146	15 336.98	_)	
Density					1.096	1.115	1.128	1.137	1.147	1	Density	1.0	042 1.46						
Cost (per vol)					262.547	237.377	220.712	259.187	235.816	219	Cost (per vol)	178.0	088 263.877						
Cost (per mass)					239.55	212.894	195.667	227.957	205.594	187	Cost (per mass)	145.9	959 239.55						
Recipe ratios in %:																	Sum of recip	e ratios (should l	be 100%):
																	0		
				Number for	rmat 12345.6	57 💌	Imp	ort input data	from clipboa	rd A	uto mix (overwrite m	nixture)	Auto mix (n	ew mixture)					
			_							_									

- With 2nd option:

- Select "No, Cancel"
- Click "File"
- Select: Folder
- Name the File
- Select "Store"

Note that this format can be opened by the GrafCompounder only



- With the GrafCompounder you have a newly created tool, which allows you to analyse a compound database using:
 - Limits,
 - "Weight" and
 - "Trade off"
 - It is a formula simulation tool.
 - "Weight" and "Trade off" allow to fine tune the simulation in case of conflicting targets
- Diagnose Tools show the spread / distribution of ingredients / physicals in the database
 - Min and Max Values are shown as well
- It is possible to merge different data sets from different sources
 - It is recommended to merge data with soluble polymers only



- With the GrafCompounder you can see the influence of each formula on the result.
 - Helps to track back to failure in the data base
- Cost of compound (Mass / Volume) are calculated.
 - Cost per mass can be used as a criteria in addition to physicals
- Quick analysis of the compounds, which are the result of different criteria and formulation inputs, enables you to make fast and accurate decisions, saving you time and money



GrafCompounder recommendation

Never ever go without a confirmation experiment

- Analyze the difference between measured and calculated data
 - If deviation out of confidence intervall
 - Look after faulty data in the database
 - Precision in Laboratory
 - Investigate other sources for failure
- Use the calculated Formula as a start in a "Statistic Experimental Design" (DoE)

Use DoE for process optimization in Scale up

Visit www.grafcompounder.com FAQ page



- The formulas produced due to the selection criteria correspond to the general rules of compounding.
- These formulas will show property scores larger than the 95% confidence interval compared to those seen in the confirmation experiment as long as measurement errors in similar range.