FAQ – How to make complete allowable span tables with SandStat?

SandStat has the ability to calculate complete allowable span tables. This module is not included in the basic version of SandStat and must be activated in the licence file.

Allgemeine Vorgehensweise


Definition of design procedure (depending on the licence)


Selection of the sandwich panel


Definition of static system *)


Determination of loads *)

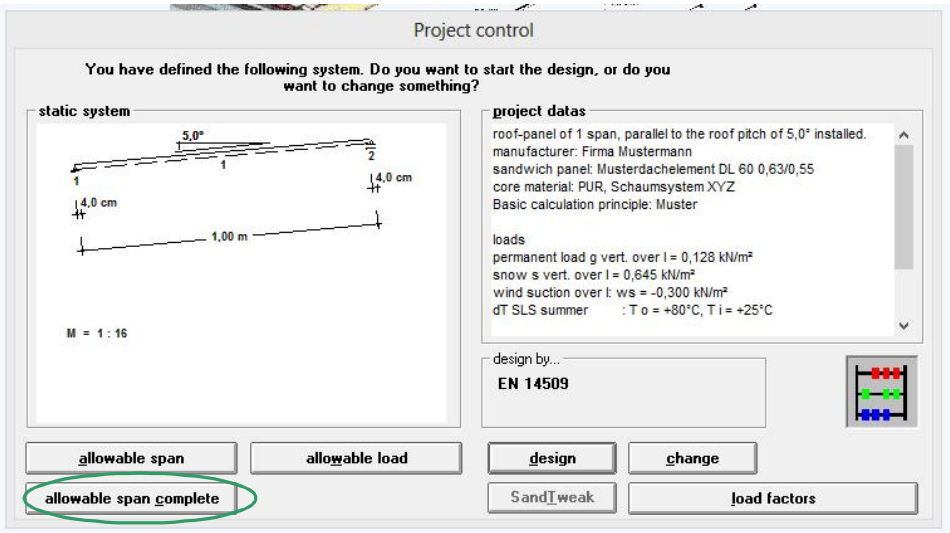

Starting iteration in menu „design“

*) Note: the inputs in those masks will not be considered at the span table iteration because the static system and the loads will be generated new.

Important note: the results will be written as txt-file. For the file name the actual date and time is used. At certain date formats (f.ex. „dd/mm/yyyy“) at Microsoft Windows, it may be possible that there are error messages. The preferred format is “dd.mm.yyyy”.

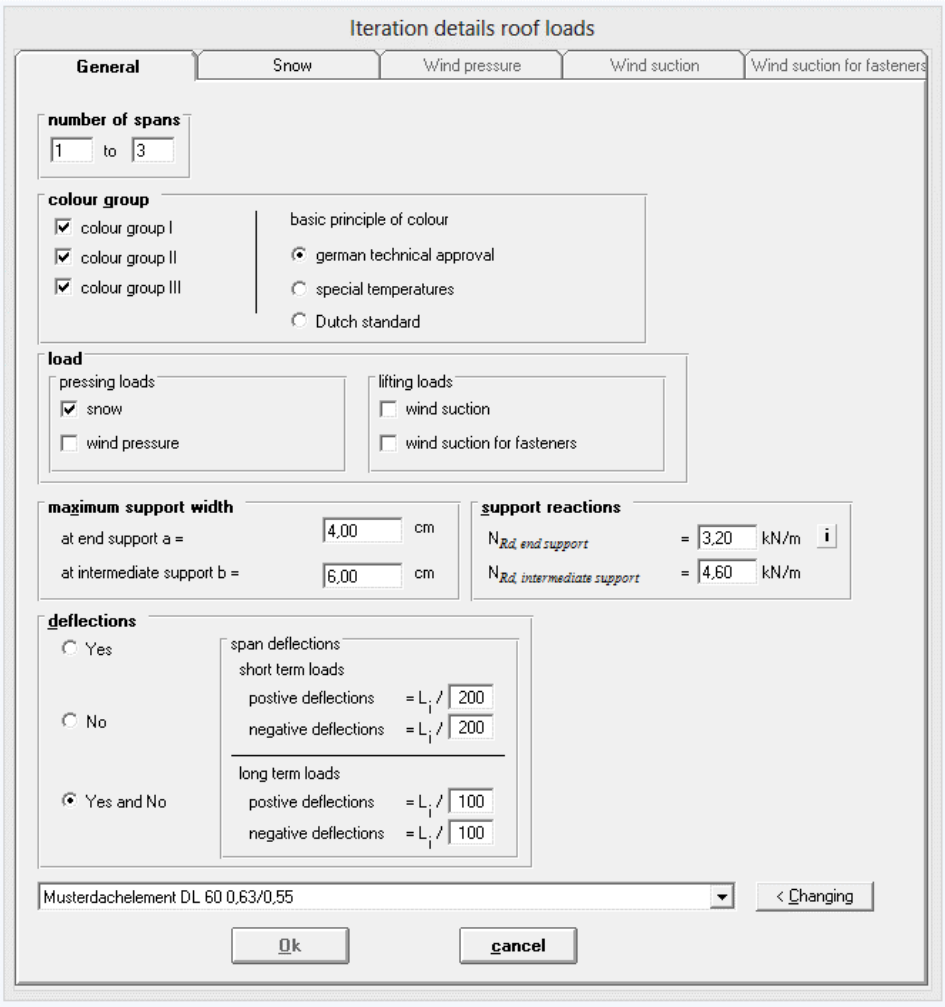
Comment

After choosing the sandwich panel and definitionof the static system and loads, you can choose at the menue „design“ the iteration menue with button „allowable span complete“ (perhaps after definition of the load factors at design procedure EN 14509).



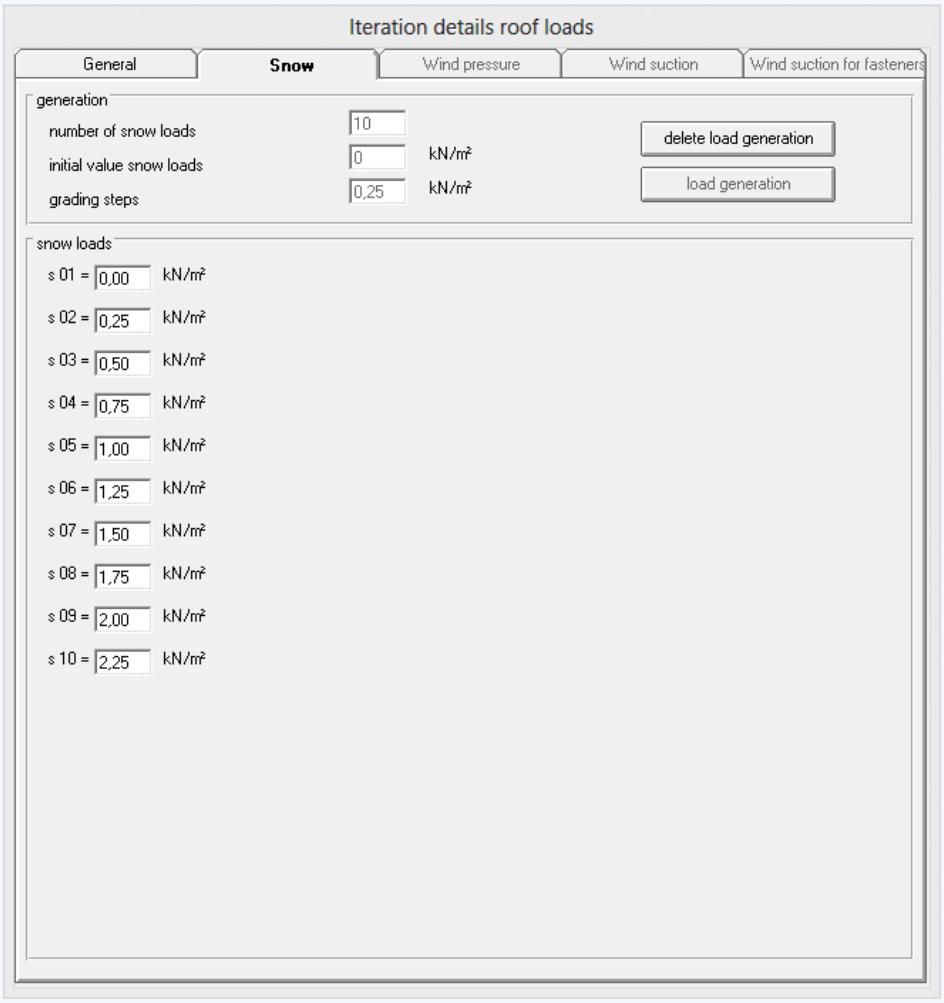
In the following template, you can define the iteration parameters:

- Number of span(s)
- Regulation of the colour group and the basis (see page 7)
- What kind of loads shall be arranged (wind pressure, wind suction, wind suction for fasteners as well as snow loads at roof panels)
- Possibly deflault maximum support width at pressing loads (see notes at page 7)
- Possibly default maximum tension strength at connection with the subconstruction at suction loads (see notes at page 7)
- Selection of calculating sandwich panels

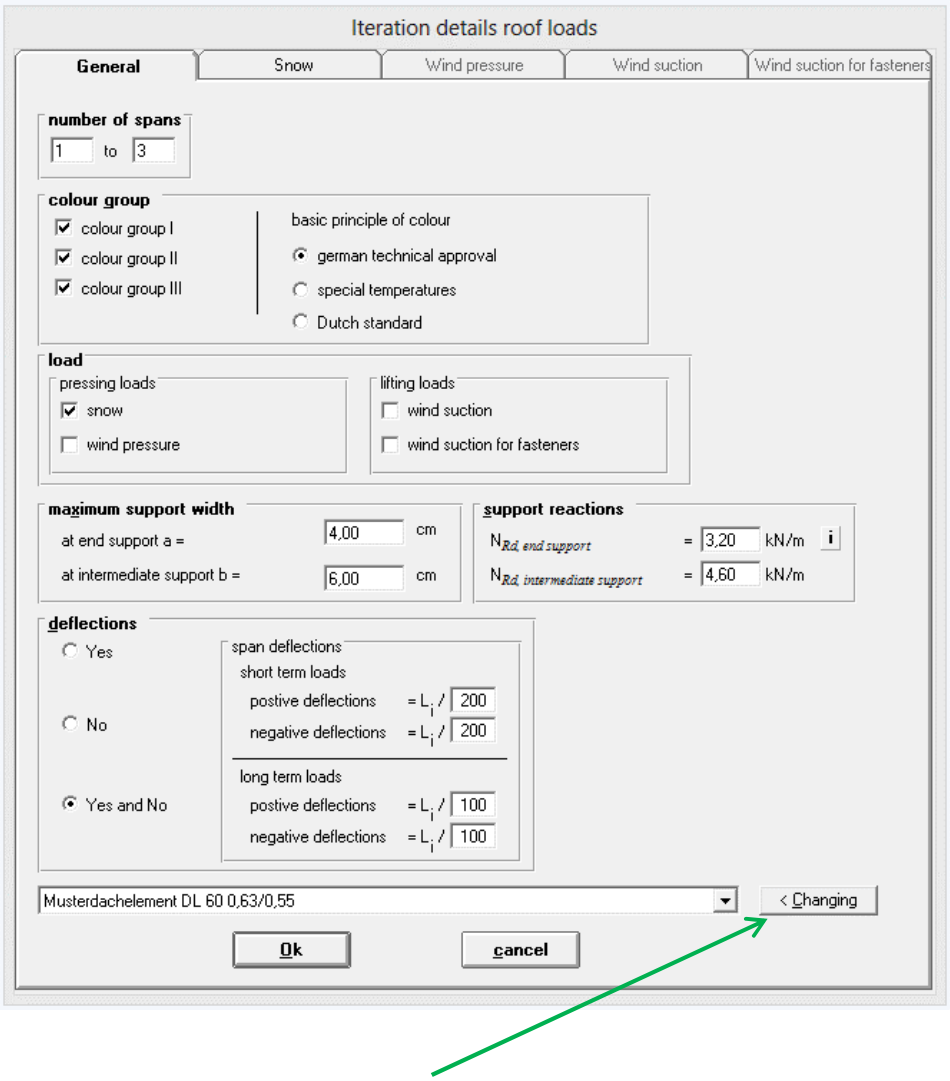


When the load type is selected at the first slide, the accordant slide for input of the values is unlocked.

Currently there are four load types available (snow, wind pressure, wind suction and wind suction for fasteners). The snow load is only available at iteration of roof elements. The load type live load is in process.



At the relevant slide the load can be generated by defining the numbers of loads, the beginning value and the grading steps. With the click on “load generation” the single load values will be generated. Successively single values can be changed manually. It is also possible to delete the complete generated values by clicking on „delete load generation“.



If the load iteration tables shall be generated for several sandwich elements, you can choose those elements in the lower part of the mask.

Please notice, that there are only the sandwich panels available who are included at the manufacturer you have chosen before (here “Firma Mustermann”). It is not possible to calculate elements from different manufacturer in one calculation. For multiple selection please use the windows function with STRG-button (not succeeded) as well as the Shift-button (succeeded).

If all inputs are made at side „General“ you can start the calculation by clicking on button „Ok“. Please notice, that the calculation period may be very long especially when many options or sandwich panels are chosen. Depending on the performance of the computer the calculation can takes more than several hours while the computer may be too slow for other applications. Therefore please unlock only some options at the first time. Maybe it is also possible for you to make the calculation over night or to use computer who isn’t use otherwise.

SandStat starts at load iteration at the defined load. The span length will be increased depending on the maximum evaluation. When the maximum utilisation reaches 99,8% to 100,4%, the iteration will be stopped. When the condition (maximum utilisation between 99,8% to 100,4%) has not reached after 100 steps, the iteration will be cancelled and an equivalent remark will be made at the printout of the results.

After the end of each iteration step the next load will be applied and the iteration starts again until all loads are calculated.

Remarks to input datas

- It is only possible to calculate systems with equal span lengths.
- The load is constant over the span.
- At temperature loads the following bases are lodged:
  - German technical approval

Season	Insolation	Analysis of stability T_1 [°C]	Analysis of serviceability: Colour group*	R_G** [%]	R_G** T_1 [°C]
Winter	--	-20	all	90-8	-20
incl. snow load	--	0	all	90-8	0
Summer	direct	+80	I II III	90-75 74-40 39-8	+55 +65 +80
	indirect***	+40	all	90-8	+40

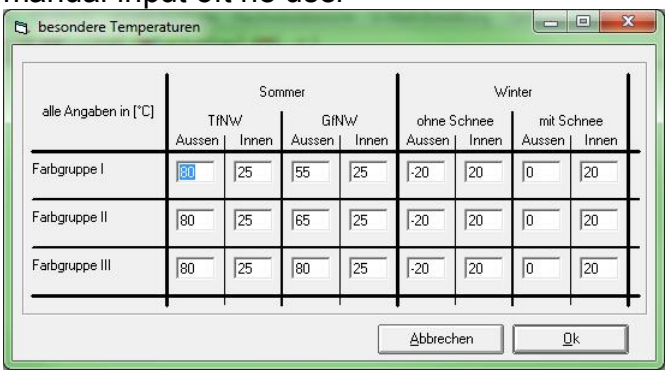
* I = very bright II = bright III = dark

** R_G: Reflection factor related to barium sulphate = 100%. (The stated brightness values are based on the Hunter-L·a·b method.)

*** Direct insolation" on a wall is understood to apply to the case of a curtain façade with rear ventilation in front of the sandwich wall (e.g. often applied for cold stores.

Temperature inside summer +25°C
winter +20°C

  - Special temperatures
    manual input oft he user



  - Dutch standard
    As german technical approval, but at summer at serviceability limit state::
    - Colour group I: 50°C
    - Colour group II: 60°C
    - Colour group III: 75°C
      temperature inside summer and winter + 20°C

- If there are multiple elements to calculate, the respective self-weight read out of the element database will be used.
- At the arrays concerning the support width the values for support widths can be given. This values will be considered at load case snow and wind pressure.
- The maximum support reactions are needed at iteration of wind suction for fasteners. At the equal arrays the maximum tension force for the connection with the sub-construction (depending on calculation principle as N_{Rd} or zul F_z) separated for end and intermediate support can be declared. If at the iteration no connection with the sub-construction shall be considered, the check mark at “wind suction for fasteners” has to be deactivated. If applicable the limitation of the span length can be made only because of the value at intermediate support or at end support.

Output of results

The output of results are carried out in several files, who are located at the SandStat-directory on your computer (mostly "C:\Program files (x86)\SandStat"):

- „*panel name* – parameters – *date of calculation*.txt"
- „StuetzW.mdb"
- „*Roof/Wall panel name* – Schnee.txt"
  (if snow was considered)
- „Roof/Wall *panel name* – Winddruck.txt"
  (if wind pressure was considered)
- „Roof*/Wall panel name* – Windsog.txt"
  (if wind suction was considered)
- „*Roof/Wall panel name* – Windsog Schrauben.txt"
  (if wind suction for fasteners was considered)

At following pages the single results files will be regarded and explained at an example calculation.

1) Parameters for calculation of allowable span table at file „*sandwich panel* – parameters – *date of calculation*.txt“

At text-file „*sandwich panel* – parameters – *date of calculation*.txt“ the basic values for the calculation as f.ex. the characteristics of the sandwich element are written. The file can be open with the windows program WordPad or with another general word processing program like Microsoft© Word.

Consecutively an example with the file „Musterdachelement DL 60 0_630_55 – parameters – 16.05.2012.txt“:

```
iteration of allowable span length for panel Musterdachelement DL 60 0,63/0,55
manufacturer Firma Mustermann
technical approval/calculation principle Muster
usage as roof panel
beginning iteration at 16.05.2013
set point for fixings
at end support NRd = 3,20 kN
at intermediate support + NRd = 4,60 kN
set point for support width:
end support = 4,0 cm
intermediate support = 6,0 cm
calculation in accordance with EN 14509


PANEL SPECIFICATION
sandwich panel
overal depth of the panel D  = 100 mm
distance between centroids of faces e       =68,42 mm
upper lever arm R1            = 29,86477 mm
lower lever arm R2            = 38,55523 mm
self weight g   = 0,128 kN/m²

core material
material        PUR, Schaumsystem XYZ
shear modulus G_c             = 3,7 N/mm²
reduction coefficient psi_t self-weight       = 7
reduction coefficient psi_s snow              = 2,6
shear strength f_Cv           = 0,12 N/mm²
shear strength f_CV long term                 = 0,06 N/mm²
compression strength f_Cc   = 0,07 N/mm²
parameter of support reaction capacity k    = 0,5

upper face layer:
material        Stahl S350
modulus of elasticity E_F1    = 210000 N/mm²
yield strength f_Ft1          = 350 N/mm²
coefficient of thermal expansion alpha_F1  = 0,000012 1/°
nominal thickness of face sheet t_nom       = 0,63 mm
design thickness t_1          = 0,56 mm
cross-sectional area A_1      = 6,299526 mm²
moment of inertia I_1         = 14,27051mm^4
distance between centroids of faces d_11  = 30,67 mm
distance between centroids of faces d_12  = 0 mm
design resistance strength of the face layers
sigma_11_span_lower 20°C                  = 350 N/mm²
sigma_11_support_lower 20°C               = 350 N/mm²
sigma_11_span_higher 20°C                 = 350 N/mm²
sigma_11_support_higher 20°C              = 350 N/mm²
lower face layer:
material        Stahl S350
modulus of elasticity E_F2    = 210000 N/mm²
yield strength f_Ft2          = 350 N/mm²
coefficient of thermal expansion alpha_F2  = 0,000012 1/°
nominal thickness of face sheet t_nom       = 0,55 mm
design thickness t_2          = 0,485 mm
cross-sectional area A_2      = 4,88899 mm²
moment of inertia I_2         = 0mm^4
distance between centroids of faces d_21  = 0,36 mm
distance between centroids of faces d_22  = 0,36 mm
```

design resistance strength of the face layers
sigma_22_span_lower 20°C = 125 N/mm²
sigma_22_support_lower 20°C = 112 N/mm²
sigma_22_span_higher 20°C = 125 N/mm²
sigma_22_support_higher 20°C = 112 N/mm²

material safety factors:
at ultimate limit state
yielding of the upper face layer = 1,1
wrinkling of the upper face layer in span = 1,25
wrinkling of the upper face layer at an intermediate support = 1,25
yielding of the lower face layer = 1,1
wrinkling of the lower face layer in the span = 1,25
wrinkling of the lower face layer at an intermediate support = 1,25
shear of the core = 1,5
shear failure of a profiled face = 1,1
crushing of the core = 1,4
support reaction capacity of a profiled face = 1,1
at serviceability limit state
yielding of the upper face layer = 1
wrinkling of the upper face layer in span = 1,1
wrinkling of the upper face layer at an intermediate support = 1,1
yielding of the lower face layer = 1
wrinkling of the lower face layer in the span = 1,1
wrinkling of the lower face layer at an intermediate support = 1,1
shear of the core = 1,1
shear failure of a profiled face = 1
crushing of the core = 1,1
support reaction capacity of a profiled face = 1

combination coefficient EN 14509, Tab. E.6
psi_0 for snow = 0,6
psi_0 for wind = 0,6
psi_0 for temperature = 0,6
psi_0 for temperature with index b = 1
psi_0 for live load = 1
psi_1 for snow = 0,75
psi_1 for snow index b = 1
psi_1 for wind = 0,75
psi_1 for wind index b = 1
psi_1 for temperature = 1
psi_1 for temperature with index b = 1

load factors: EN 14509, Tab. E.8
ultimate limit state:
permanent action unfavorable = 1,35
permanent action favorable = 1
variable actions = 1,5
termperature actions = 1,5
creep effects = 1
serviceability limit state:
permanent actions = 1
variable actions = 1
termperature actions = 1
creep effects = 1

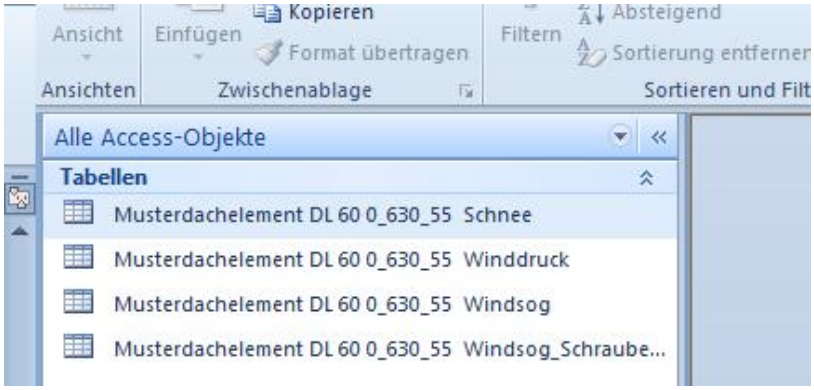
maximum deflection:
short term positive = L/200
short term negative = L/200
long term positive = L/100
short term negative = L/100

Please check this information critically.

2) Results of the single calculatin at „StuetzW.mdb“

At the result-file „StuetzW.mdb“ the single results are written. The database file can be open with an equal program as Microsoft© Access (starting Access 97).

For each load case (snow – „Schnee“, wind pressure – „Winddruck“, wind suction – „Windsog“ and wind suction for fasteners – „Windsog für Schrauben“) one table is in this file with the description „*panel name – load case*“.



At example snow at the calculated roof element, at the following page as cutout is printed.

Felder	Bemerkung	Einzelstuetzweite	EnAuflBreite	ZwAuflBreite	g	delta_g	s	p	Windsog	WindsogS	Winddruck	Temp_außen	dTST	dTSG	dTW	dTWms	zul_f
1		15000	4	6	0,13	0	0		-0,1	0	0	3	55	55	-40	-20	0
1		12660	4	6	0,13	0	0		-0,2	0	0	3	55	55	-40	-20	0
1		9280	4	6	0,13	0	0		-0,3	0	0	3	55	55	-40	-20	0
1		7680	4	6	0,13	0	0		-0,4	0	0	3	55	55	-40	-20	0
1		6710	4	6	0,13	0	0		-0,5	0	0	3	55	55	-40	-20	0
1		5960	4	6	0,13	0	0		-0,6	0	0	3	55	55	-40	-20	0
1		4990	4	6	0,13	0	0		-0,7	0	0	3	55	55	-40	-20	0
1		4290	4	6	0,13	0	0		-0,8	0	0	3	55	55	-40	-20	0
1		3760	4	6	0,13	0	0		-0,9	0	0	3	55	55	-40	-20	0

TfNW_Sigma	TfNW_Tau	TfNW_Aufl_A	TfNW_Aufl_B	GfNW_Sigma	GfNW_Tau	GfNW_Aufl_A	GfNW_Aufl_B	GfNW_Ver	Bef_End	NRd_End	Bef_Zw	NRd_Zw
0,9990593	0,6203236	0,4539008	0	0,6519874	0,319273	0,2641751	0	0	0,0717391	2,3	0	4,6
0,9990802	0,5539984	0,3830922	0	0,5141721	0,2832354	0,2229637	0	0	0,4733739	2,3	0	4,6
0,9999278	0,4581475	0,2808132	0	0,4863442	0,2311584	0,1634363	0	0	0,6496	2,3	0	4,6
0,998779	0,4127668	0,2323972	0	0,5197918	0,2065063	0,1352576	0	0	0,7880348	2,3	0	4,6
0,9994024	0,4051359	0,2030449	0	0,5376036	0,1915764	0,1181743	0	0	0,9073088	2,3	0	4,6
0,9747304	0,4322504	0,1803499	0	0,5349053	0,1976655	0,1049656	0	0	1,000244	2,3	0	4,6
0,8186091	0,424178	0,1509976	0	0,4562629	0,1962152	0,08788223	0	0	1,00017	2,3	0	4,6
0,7038786	0,4159731	0,1298156	0	0,3966382	0,1940053	0,07555407	0	0	0,9997566	2,3	0	4,6
0,615178	0,4075797	0,1137778	0	0,3494502	0,1912657	0,06621988	0	0	0,9988524	2,3	0	4,6

Aufl1_TfNW	Aufl2_TfNW	Aufl3_TfNW	Aufl4_TfNW	Aufl1_GfNW	Aufl2_GfNW	Aufl3_GfNW	Aufl4_GfNW	NSd_End	NSd_Zw
0,8815002	0,8815002	0	0	-0,2019284	-0,2019284	0	0	0,165	0
0,4771482	0,4771482	0	0	-0,4372656	-0,4372656	0	0	1,08876	0
-0,1069159	-0,1069159	0	0	-0,777197	-0,777197	0	0	1,49408	0
-0,3833959	-0,3833959	0	0	-0,9381114	-0,9381114	0	0	1,81248	0
-0,5510119	-0,5510119	0	0	-1,035666	-1,035666	0	0	2,08681	0
-0,6806119	-0,6806119	0	0	-1,111094	-1,111094	0	0	2,30056	0
-0,8482279	-0,8482279	0	0	-1,208648	-1,208648	0	0	2,30039	0
-0,9691879	-0,9691879	0	0	-1,279048	-1,279048	0	0	2,29944	0
-1,060772	-1,060772	0	0	-1,332351	-1,332351	0	0	2,29736	0

Felder	Bemerkung	Einzelstuetzweite	EnAuflBreite	ZwAuflBreite	g	delta_g	s	p	Windsog	WindsogS	Winddruck	Temp_außen	dTST	dTSG	dTW	dTWms	zul_f
3		11180	4	6	0,13	0	0		-0,1	0	0	1	55	30	-40	-20	0
3		11180	4	6	0,13	0	0		-0,2	0	0	1	55	30	-40	-20	0
3		9280	4	6	0,13	0	0		-0,3	0	0	1	55	30	-40	-20	0
3		7680	4	6	0,13	0	0		-0,4	0	0	1	55	30	-40	-20	0
3		6380	4	6	0,13	0	0		-0,5	0	0	1	55	30	-40	-20	0
3		5080	4	6	0,13	0	0		-0,6	0	0	1	55	30	-40	-20	0
3		4200	4	6	0,13	0	0		-0,7	0	0	1	55	30	-40	-20	0
3		3580	4	6	0,13	0	0		-0,8000001	0	0	1	55	30	-40	-20	0
3		3100	4	6	0,13	0	0		-0,9000001	0	0	1	55	30	-40	-20	0

TfNW_Sigma	TfNW_Tau	TfNW_Aufl_A	TfNW_Aufl_B	GfNW_Sigma	GfNW_Tau	GfNW_Aufl_A	GfNW_Aufl_B	GfNW_Ver	Bef_End	NRd_End	Bef_Zw	NRd_Zw
0,6723223	0,5110003	0,3383074	0,4101272	0,9986465	0,1941415	0,2008287	0,2960356	0	0,1218075	2,3	0,0895	4,6
0,794835	0,5110003	0,3383074	0,4101272	0,9986465	0,1941415	0,2008287	0,2960356	0	0,4140273	2,3	0,4902	4,6
0,9999278	0,4574217	0,2808132	0,3404276	0,874366	0,1748425	0,1824504	0,2580956	0	0,6157851	2,3	0,7505	4,6
0,9987788	0,4122621	0,2323972	0,2817332	0,7877751	0,1600231	0,1699522	0,2285816	0	0,7464908	2,3	0,9094	4,6
0,9087044	0,3881632	0,1930591	0,234044	0,7261868	0,1720712	0,1631533	0,2073633	0	0,8293107	2,3	0,999	4,6
0,7209775	0,3763333	0,153721	0,1863547	0,6707068	0,1773662	0,1614919	0,1903865	0	0,8545811	2,3	0,9989	4,6
0,591305	0,3642489	0,1270922	0,1540728	0,6335204	0,187048	0,165214	0,1828938	0	0,8785051	2,3	0,9978	4,6
0,4996843	0,3533614	0,108331	0,1313287	0,6057848	0,1954	0,1715079	0,1806344	0	0,9028738	2,3	0,9994	4,6
0,4258522	0,3412383	0,09380616	0,1137204	0,5796849	0,2026512	0,1792731	0,1812549	0	0,9235769	2,3	0,9971	4,6

Aufl1_TfNW	Aufl2_TfNW	Aufl3_TfNW	Aufl4_TfNW	Aufl1_GfNW	Aufl2_GfNW	Aufl3_GfNW	Aufl4_GfNW	NSd_End	NSd_Zw
0,2214042	0,4428084	0,4428084	0,2214042	-0,563668	-0,6320481	-0,6320481	-0,563668	0,280157	0,4115
0,2214042	0,4428084	0,4428084	0,2214042	-0,563668	-0,6320481	-0,6320481	-0,563668	0,952263	2,2549
-0,1069159	-0,2138318	-0,2138318	-0,1069159	-0,6686171	-0,9894814	-0,9894814	-0,6686171	1,416306	3,45217
-0,3833959	-0,7667917	-0,7667917	-0,3833959	-0,7399881	-1,267532	-1,267532	-0,7399881	1,716929	4,1831
-0,6080359	-1,216072	-1,216072	-0,6080359	-0,7788128	-1,46743	-1,46743	-0,7788128	1,907414	4,59559
-0,8326759	-1,665352	-1,665352	-0,8326759	-0,7883003	-1,627368	-1,627368	-0,7883003	1,965536	4,59509
-0,9847399	-1,96948	-1,96948	-0,9847399	-0,7670456	-1,697958	-1,697958	-0,7670456	2,020562	4,58974
-1,091876	-2,183752	-2,183752	-1,091876	-0,7311039	-1,719243	-1,719243	-0,7311039	2,07661	4,59717
-1,17482	-2,34964	-2,34964	-1,17482	-0,686761	-1,713398	-1,713398	-0,686761	2,124227	4,58682

Comment to the name of columns:

Felder	-	number of span (static system)
Einzelstützweite	-	allowable support witdth at following loads [mm]
g	-	self-weight of sandwich panel [kN/m²]
delta_g	-	extra self-weigth [kN/m²]
s	-	snow load [kN/m²]
p	-	live load [kN/m²]
Windsog	-	wind suction for sandwich panel [kN/m²]
WindsogS	-	wind suction for fasteners [kN/m²]
Winddruck	-	wind pressure [kN/m²]
Temp_außen	-	temperature outside for SLS at summer
zul_f	-	limit of deflection
Tfnw_Sigma	-	course of evaluation at ULS for normal stresses at face layers
Tfnw_Tau	-	course of evaluation at ULS for shear stresses at core
Tfnw_Aufl_A	-	course of evaluation at ULS for pressure at end support
Tfnw_Aufl_B	-	course of evaluation at ULS for prssure at intermediate support
Gfnw_Sigma	-	course of evaluation at SLS for normal stresses at face layers
Gfnw_Tau	-	course of evaluation at SLS for shear stresses at core
Gfnw_Aufl_A	-	course of evaluation at SLS for pressure at end support
Gfnw_Aufl_B	-	course of evaluation at SLS for pressure at interm. support
Gfnw_Ver	-	course of evaluation delfections
BefEnd	-	course of evaluation for fasteners at end support
NRd_End	-	design value for support reactions at end support
BefZw	-	course of evaluation for fasteners at intermediate support
NRd_Zw	-	design value for support reactions at intermediate support
Aufl1_Tfnw	-	required support width at 1st support for ULS [cm]
Aufl2_Tfnw	-	required support width at 2nd support for ULS [cm]
Aufl3_Tfnw	-	required support width at 3rd support for ULS [cm]
Aufl4_Tfnw	-	required support width at 4th support for ULS [cm]
Aufl1_Gfnw	-	required support width at 1st support for SLS [cm
Aufl2_Gfnw	-	required support width at 2nd support for SLS [cm
Aufl3_Gfnw	-	required support width at 3rd support for SLS [cm
Aufl4_Gfnw	-	required support width at th1st support for SLS [cm
NSd_End	-	exist. γ_F-time support reaction for fixing at end support
NSd_Zw	-	exist. γ_F-time support reaction for fixing at interm. support

3) Allowable span tables at file „Roof/Wall – *panel name* – *load case*.txt“

The allowable span tables are written as results at text-files „Roof/Wall – *panel name* – *load case*.txt“, divided into the load cases snow – “Schnee”, wind pressure – “Winddruck”, wind suction – “Windsog” and wind suction for fasteners – “Windsog Schrauben”).

The file can be opened with the windows program WordPad or with another general word processing program like Microsoft© Word.

The results are written in table form with the value for load at column and the span, colour group (“CG”) and deflection information as row. The span length as results is in unit [m].

At load case snow and wind pressure there are printed out additionally the required support widths. Above the allowable span there is the required support width for end support, below the allowable span there is the required support width for intermediate support, in each as unit [mm].

The column „CG“ declares the colour group. If after this colour group the notation “(f)” is printed, the results in this row are with the regard of the deflection.

Consecutively the allowable span table for the example with load case snow:

roof panel Musterdachelement DL 60 0,63/0,55 - Schnee -

spans	CG	snow									
		0	0,25	0,5	0,75	1	1,25	1,5	1,75	2	2,25
		40	40	40	40	40	40	40	40	40	40
1	1	15,00	8,60	6,18	4,40	3,41	2,79	2,35	2,04	1,80	1,61
		60	60	60	60	60	60	60	60	60	60
		40	40	40	40	40	40	40	40	40	40
1	1(f)	5,19	5,19	4,72	4,24	3,41	2,79	2,35	2,04	1,80	1,61
		60	60	60	60	60	60	60	60	60	60
		40	40	40	40	40	40	40	40	40	40
1	2	14,99	8,60	6,18	4,40	3,41	2,78	2,35	2,04	1,80	1,61
		60	60	60	60	60	60	60	60	60	60
		40	40	40	40	40	40	40	40	40	40
1	2(f)	5,19	5,19	4,72	4,24	3,41	2,78	2,35	2,04	1,80	1,61
		60	60	60	60	60	60	60	60	60	60
		40	40	40	40	40	40	40	40	40	40
1	3	15,00	8,60	6,18	4,39	3,41	2,79	2,35	2,04	1,80	1,61
		60	60	60	60	60	60	60	60	60	60
		40	40	40	40	40	40	40	40	40	40
1	3(f)	5,19	5,19	4,72	4,24	3,41	2,79	2,35	2,04	1,80	1,61
		60	60	60	60	60	60	60	60	60	60
		40	40	40	40	40	40	40	40	40	40
2	1	8,59	7,87	5,10	3,63	2,81	2,30	1,94	1,68	1,48	1,33
		60	60	60	60	60	60	60	60	60	60
		40	40	40	40	40	40	40	40	40	40
2	1(f)	8,59	7,87	5,10	3,63	2,81	2,30	1,94	1,68	1,48	1,33
		60	60	60	60	60	60	60	60	60	60
		40	40	40	40	40	40	40	40	40	40
2	2	8,59	7,87	5,10	3,63	2,81	2,30	1,94	1,68	1,48	1,33
		60	60	60	60	60	60	60	60	60	60
		40	40	40	40	40	40	40	40	40	40
2	2(f)	8,59	7,87	5,10	3,63	2,81	2,30	1,94	1,68	1,48	1,33
		60	60	60	60	60	60	60	60	60	60
		40	40	40	40	40	40	40	40	40	40
2	3	8,59	7,87	5,10	3,62	2,81	2,30	1,94	1,68	1,48	1,33
		60	60	60	60	60	60	60	60	60	60
		40	40	40	40	40	40	40	40	40	40
2	3(f)	8,59	7,87	5,10	3,62	2,81	2,30	1,94	1,68	1,48	1,33
		60	60	60	60	60	60	60	60	60	60
		40	40	40	40	40	40	40	40	40	40
3	1	11,18	8,59	5,10	3,63	2,81	2,30	1,94	1,68	1,48	1,33
		60	60	60	60	60	60	60	60	60	60
		40	40	40	40	40	40	40	40	40	40
3	1(f)	8,46	7,38	5,10	3,63	2,81	2,30	1,94	1,68	1,48	1,33
		60	60	60	60	60	60	60	60	60	60
		40	40	40	40	40	40	40	40	40	40
3	2	11,18	8,59	5,10	3,63	2,81	2,30	1,94	1,68	1,48	1,33
		60	60	60	60	60	60	60	60	60	60
		40	40	40	40	40	40	40	40	40	40
3	2(f)	8,46	7,38	5,10	3,63	2,81	2,30	1,94	1,68	1,48	1,33
		60	60	60	60	60	60	60	60	60	60
		40	40	40	40	40	40	40	40	40	40
3	3	11,18	8,59	5,10	3,62	2,81	2,30	1,94	1,68	1,48	1,33
		60	60	60	60	60	60	60	60	60	60
		40	40	40	40	40	40	40	40	40	40
3	3(f)	8,46	7,39	5,10	3,62	2,81	2,30	1,94	1,68	1,48	1,33
		60	60	60	60	60	60	60	60	60	60

Consecutively the allowable span table for the example with load case wind pressure:

roof panel Musterdachelement DL 60 0,63/0,55 - Winddruck -

spans	CG	wind pressure									
		0	0,1	0,2	0,3	0,4	0,5	0,6	0,7	0,8	0,9
		40	40	40	40	40	45	49	53	57	60
1	1	15,00	11,47	9,43	8,16	7,29	6,63	6,11	5,69	5,34	5,04
		60	60	60	60	60	60	60	60	60	60
		40	40	40	40	40	40	40	40	40	40
1	1(f)	5,19	4,94	4,74	4,56	4,41	4,28	4,16	4,06	3,96	3,75
		60	60	60	60	60	60	60	60	60	60
		40	40	40	40	40	44	49	53	57	60
1	2	14,99	11,48	9,42	8,16	7,29	6,62	6,12	5,70	5,35	5,04
		60	60	60	60	60	60	60	60	60	60
		40	40	40	40	40	40	40	40	40	40
1	2(f)	5,19	4,94	4,74	4,56	4,41	4,28	4,16	4,06	3,96	3,75
		60	60	60	60	60	60	60	60	60	60
		40	40	40	40	40	41	49	53	57	60
1	3	15,00	11,47	9,42	8,16	7,29	6,21	6,11	5,70	5,35	5,05
		60	60	60	60	60	60	60	60	60	60
		40	40	40	40	40	40	40	40	40	42
1	3(f)	5,19	4,94	4,74	4,56	4,41	4,28	4,16	4,06	3,96	3,87
		60	60	60	60	60	60	60	60	60	60
		40	40	40	40	40	40	40	46	51	57
2	1	8,59	7,43	6,72	6,23	5,86	5,57	5,32	5,13	4,95	4,81
		60	60	60	60	60	69	80	92	102	113
		40	40	40	40	40	40	40	46	51	57
2	1(f)	8,59	7,43	6,72	6,23	5,86	5,57	5,32	5,13	4,95	4,81
		60	60	60	60	60	69	80	92	102	113
		40	40	40	40	40	40	41	46	51	57
2	2	8,59	7,43	6,72	6,23	5,86	5,57	5,33	5,13	4,95	4,81
		60	60	60	60	60	69	81	92	102	113
		40	40	40	40	40	40	41	46	51	57
2	2(f)	8,59	7,43	6,72	6,23	5,86	5,57	5,33	5,13	4,95	4,81
		60	60	60	60	60	69	81	92	102	113
		40	40	40	40	40	40	41	40	51	57
2	3	8,59	7,43	6,72	6,23	5,86	5,56	5,33	3,85	4,95	4,81
		60	60	60	60	60	69	81	60	102	113
		40	40	40	40	40	40	41	40	51	57
2	3(f)	8,59	7,43	6,72	6,23	5,86	5,56	5,33	3,85	4,95	4,81
		60	60	60	60	60	69	81	60	102	113
		40	40	40	40	40	44	49	40	57	60
3	1	11,18	9,44	8,38	7,57	7,09	6,62	6,11	3,85	5,34	5,05
		60	60	60	61	76	88	97	60	113	120
		40	40	40	40	40	40	46	40	57	60
3	1(f)	8,46	7,81	7,33	6,94	6,49	6,12	5,83	3,85	5,34	5,05
		60	60	60	60	67	79	91	60	113	120
		40	40	40	40	40	45	49	53	57	60
3	2	11,18	9,44	8,38	7,58	7,08	6,63	6,12	5,69	5,34	5,04
		60	60	60	61	76	89	98	105	113	120
		40	40	40	40	40	40	46	51	57	60
3	2(f)	8,46	7,81	7,33	6,94	6,50	6,12	5,82	5,56	5,34	5,04
		60	60	60	60	67	79	91	102	113	120
		40	40	40	40	40	45	49	53	57	60
3	3	11,18	9,44	8,38	7,58	7,08	6,63	6,12	5,69	5,34	5,05
		60	60	60	61	76	89	98	105	113	120
		40	40	40	40	40	40	46	52	57	60
3	3(f)	8,46	7,82	7,33	6,94	6,50	6,12	5,83	5,57	5,34	5,05
		60	60	60	60	67	79	91	103	113	120

Consecutively the allowable span table for the example with load case wind suction:

roof panel Musterdachelement DL 60 0,63/0,55 - Windsog -

spans	CG	wind suction									
		0	-0,1	-0,2	-0,3	-0,4	-0,5	-0,6	-0,7	-0,80	-0,9
1	1	15,00	15,00	12,66	9,28	7,68	6,71	5,96	4,99	4,29	3,76
1	1(f)	5,19	5,19	5,19	5,19	5,19	5,19	5,19	4,99	4,29	3,76
1	2	14,99	14,99	12,66	9,28	7,68	6,71	5,96	4,99	4,29	3,76
1	2(f)	5,19	5,19	5,19	5,19	5,19	5,19	5,10	4,87	4,29	3,76
1	3	15,00	15,00	12,66	9,28	7,68	6,71	5,96	4,99	4,29	3,76
1	3(f)	5,19	5,19	5,03	4,74	4,52	4,34	4,18	4,05	3,94	3,76
2	1	8,59	8,59	8,59	8,59	6,92	5,08	3,98	3,26	2,75	2,38
2	1(f)	8,59	8,59	8,59	8,59	6,92	5,08	3,98	3,26	2,75	2,38
2	2	8,59	8,59	8,59	8,59	6,57	4,73	3,63	2,92	2,44	2,10
2	2(f)	8,59	8,59	8,59	8,59	6,57	4,73	3,63	2,92	2,44	2,10
2	3	8,59	8,59	8,59	8,59	5,97	4,08	2,98	1,70	1,46	1,32
2	3(f)	8,59	8,59	8,59	8,59	5,97	4,08	2,98	1,70	1,46	1,32
3	1	11,18	11,18	11,18	9,28	7,68	6,38	5,08	4,20	3,58	3,10
3	1(f)	8,46	8,46	8,46	8,46	7,68	6,38	5,08	4,20	3,58	3,10
3	2	11,18	11,18	11,18	9,28	7,68	6,26	4,96	4,08	3,45	2,98
3	2(f)	8,46	8,46	8,46	8,46	7,68	6,26	4,96	4,08	3,45	2,98
3	3	11,18	11,18	11,18	9,28	7,68	6,06	4,76	3,88	3,25	2,78
3	3(f)	8,46	8,46	8,46	8,46	7,68	6,06	4,76	3,88	3,25	2,78

Consecutively the allowable span table for the example with load case wind suction for fasteners:

roof panel Musterdachelement DL 60 0,63/0,55 - Windsog für Schrauben-

spans	CG	wind suction for fasteners									
		0	-0,2	-0,4	-0,6	-0,8	-1	-1,2	-1,4	-1,6	-1,8
1	1	15,00	15,00	9,75	5,96	4,29	3,35	2,75	2,33	2,02	1,79
1	1(f)	5,19	5,19	5,19	5,19	4,29	3,35	2,75	2,33	2,02	1,79
1	2	14,99	14,99	9,75	5,96	4,29	3,35	2,75	2,33	2,02	1,79
1	2(f)	5,19	5,19	5,19	5,19	4,29	3,35	2,75	2,33	2,02	1,79
1	3	15,00	15,00	9,75	5,96	4,29	3,35	2,75	2,33	2,02	1,79
1	3(f)	5,19	5,19	5,19	5,19	4,29	3,35	2,75	2,33	2,02	1,79
2	1	8,59	8,59	6,92	3,98	2,75	2,09	1,70	1,44	1,26	1,12
2	1(f)	8,59	8,59	6,92	3,98	2,75	2,09	1,70	1,44	1,26	1,12
2	2	8,59	8,59	6,57	3,63	2,44	1,84	1,50	1,28	1,13	1,01
2	2(f)	8,59	8,59	6,57	3,63	2,44	1,84	1,50	1,28	1,13	1,01
2	3	8,59	8,59	5,97	2,98	1,46	1,22	1,08	1,00	0,94	0,88
2	3(f)	8,59	8,59	5,97	2,98	1,46	1,22	1,08	1,00	0,94	0,88
3	1	11,18	11,18	8,50	5,08	3,58	2,74	2,20	1,82	1,51	1,20
3	1(f)	8,46	8,46	8,46	5,08	3,58	2,74	2,20	1,82	1,51	1,20
3	2	11,18	11,18	8,38	4,96	3,45	2,62	2,09	1,74	1,49	1,20
3	2(f)	8,46	8,46	8,38	4,96	3,45	2,62	2,09	1,74	1,49	1,20
3	3	11,18	11,18	8,20	4,76	3,25	2,42	1,90	1,56	1,34	1,17
3	3(f)	8,46	8,46	8,20	4,76	3,25	2,42	1,90	1,56	1,34	1,17