Sommer Informatik GmbH

10.12.2021, hi

GLASGLOBAL® 16612

The software solution for the calculation of glass statics according to EN 16612

EN 16612 DIN 18008

Differences on the resistance side

- Partial safety factors γ_M
- Consideration of shear bond via omega values (EN 16612, Anhang D)
- Other coefficients for edge strength(k_e), Surface profile (k_{sp}) and hardening (k_v)

Differences on the impact side

- Partial safety factors γ_G resp.. γ_Q
- k_{mod} –Values

Validation

Validation by the
University of Munich

PROFESSUR FÜR BAUKONSTRUKTION UND BAUPHYSIK
VOM DIBT ANERKANNTE PRÜFSTELLE BAY40

der Bundeswehr Universität München

FAKULTÄT FÜR BAUINGENIEURWESEN UND UMWELTWISSENSCHAFTEN
INSTITUT FÜR KONSTRUKTIVEN INGENIEURBAU

Bericht- b-04-18-12c

Validierung der Berechnungssoftware „GLASGLOBAL“

Auftraggeber: Firma
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Neubiberg, den 25.10.2021

M.Sc. Alexander Pauli
- Sachbearbeiter -

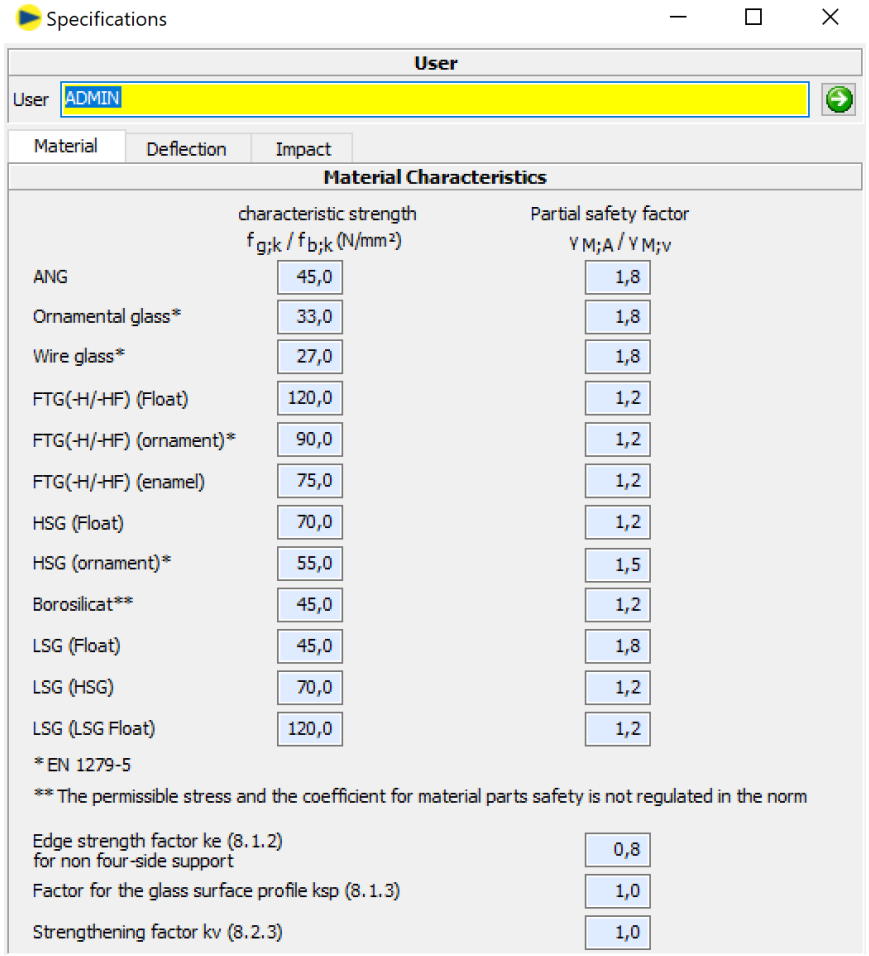
Univ.-Prof. Dr.-Ing. G. Siebert

Start GLASGLOBAL® 16612

GLASGLOBAL® 16612 is a component from the large product range of Sommer Informatik

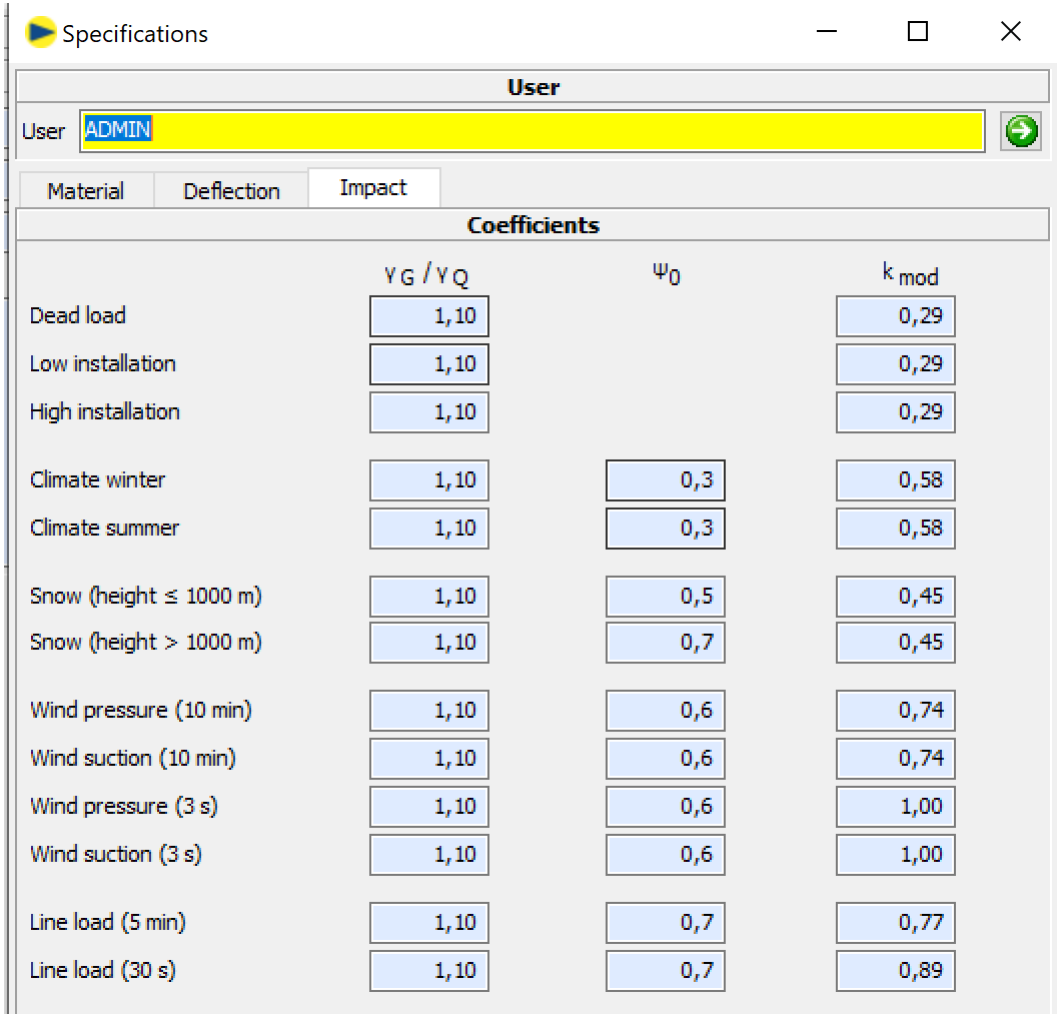
Specifications - Material

The settings for strengths and partial safety factors allow adaptation to any country-specific specifications for EN 16612.



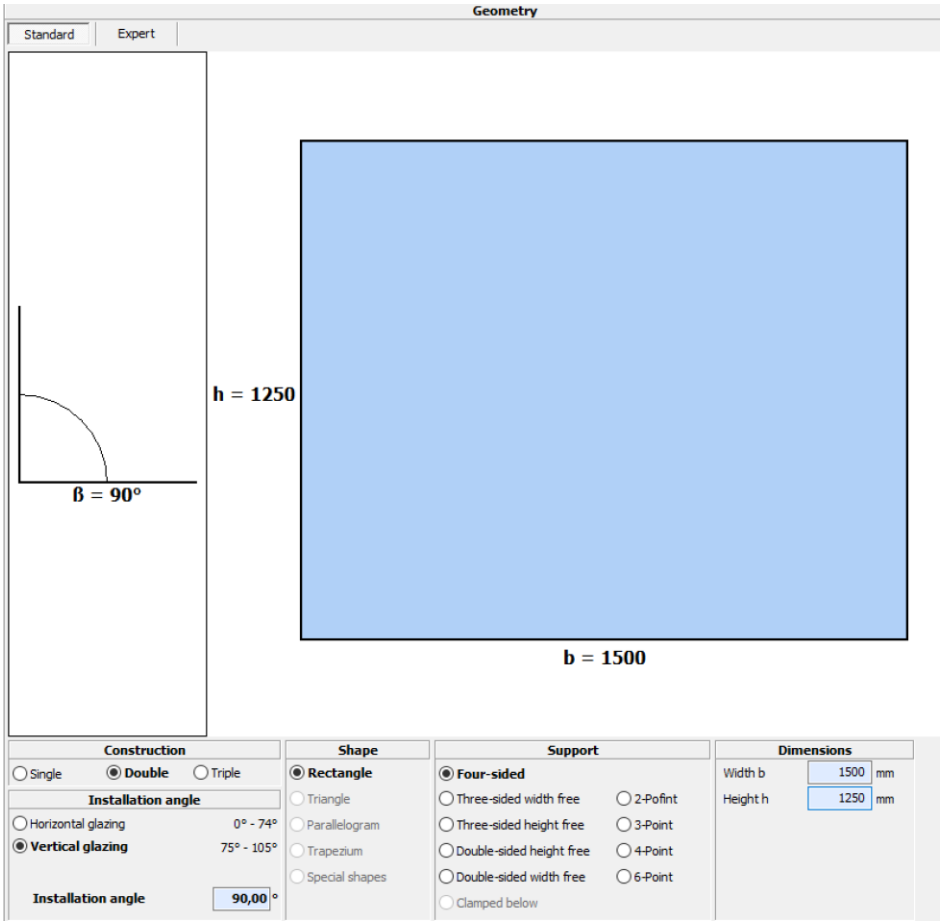
Specifications - Actions

The same applies to the coefficients on the action side.



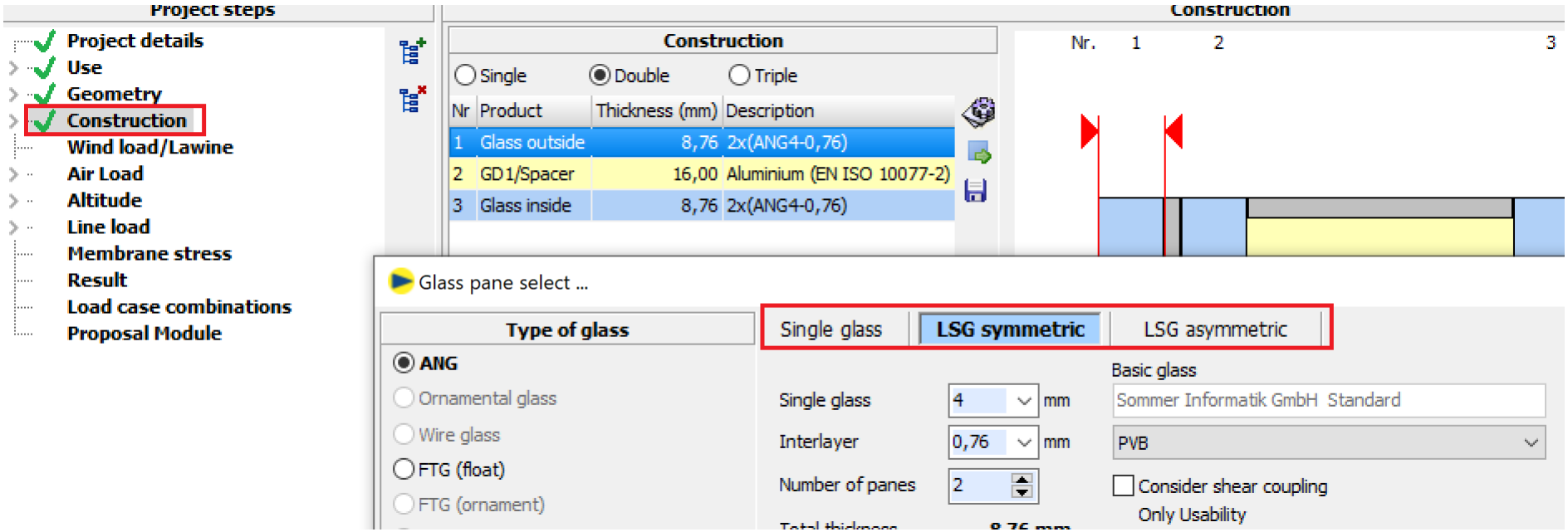
	γ_G / γ_Q	Ψ_0	k_{mod}
Dead load	1,10		0,29
Low installation	1,10		0,29
High installation	1,10		0,29
Climate winter	1,10	0,3	0,58
Climate summer	1,10	0,3	0,58
Snow (height ≤ 1000 m)	1,10	0,5	0,45
Snow (height > 1000 m)	1,10	0,7	0,45
Wind pressure (10 min)	1,10	0,6	0,74
Wind suction (10 min)	1,10	0,6	0,74
Wind pressure (3 s)	1,10	0,6	1,00
Wind suction (3 s)	1,10	0,6	1,00
Line load (5 min)	1,10	0,7	0,77
Line load (30 s)	1,10	0,7	0,89

Geometry


Geometry
Standard
Expert
h = 1250
ß = 90°
b = 1500
Construction
Single
Double
Triple
Installation angle
Horizontal glazing
0° - 74°
Vertical glazing
75° - 105°
Installation angle
90,00
°
Shape
Rectangle
Triangle
Parallelogram
Trapezium
Special shapes
Support
Four-sided
Three-sided width free
Three-sided height free
Double-sided height free
Double-sided width free
Clamped below
2-Pofint
3-Point
4-Point
6-Point
Dimensions
Width b
1500
mm
Height h
1250
mm

Pane structure

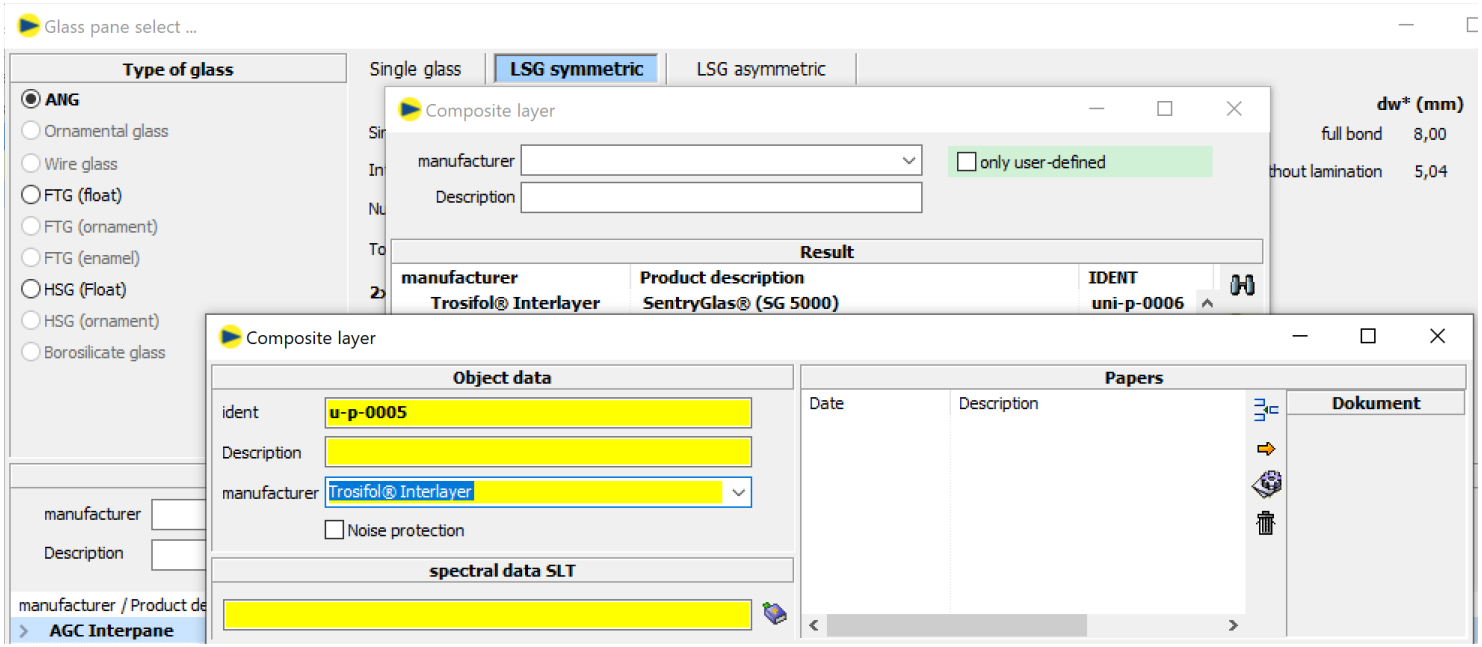
- Single glass, LSG symmetrical and asymmetrical



Shear connector

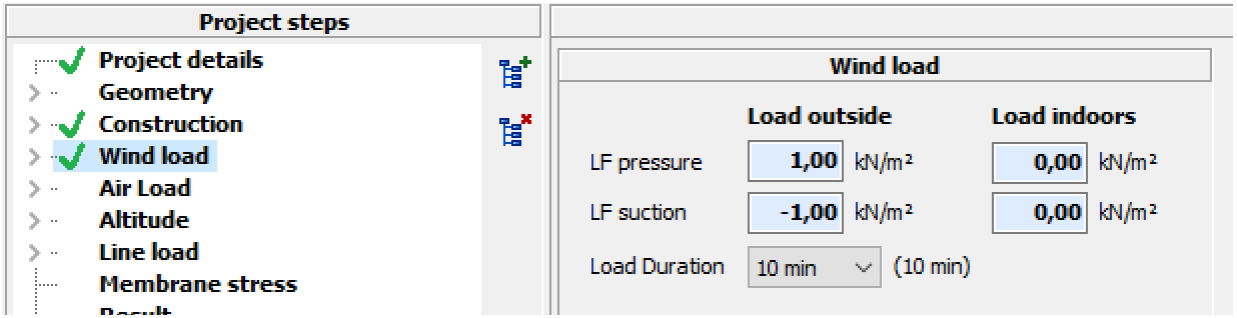
Omega method according to EN 16612, Annex D

Database with manufacturer spec. omega values



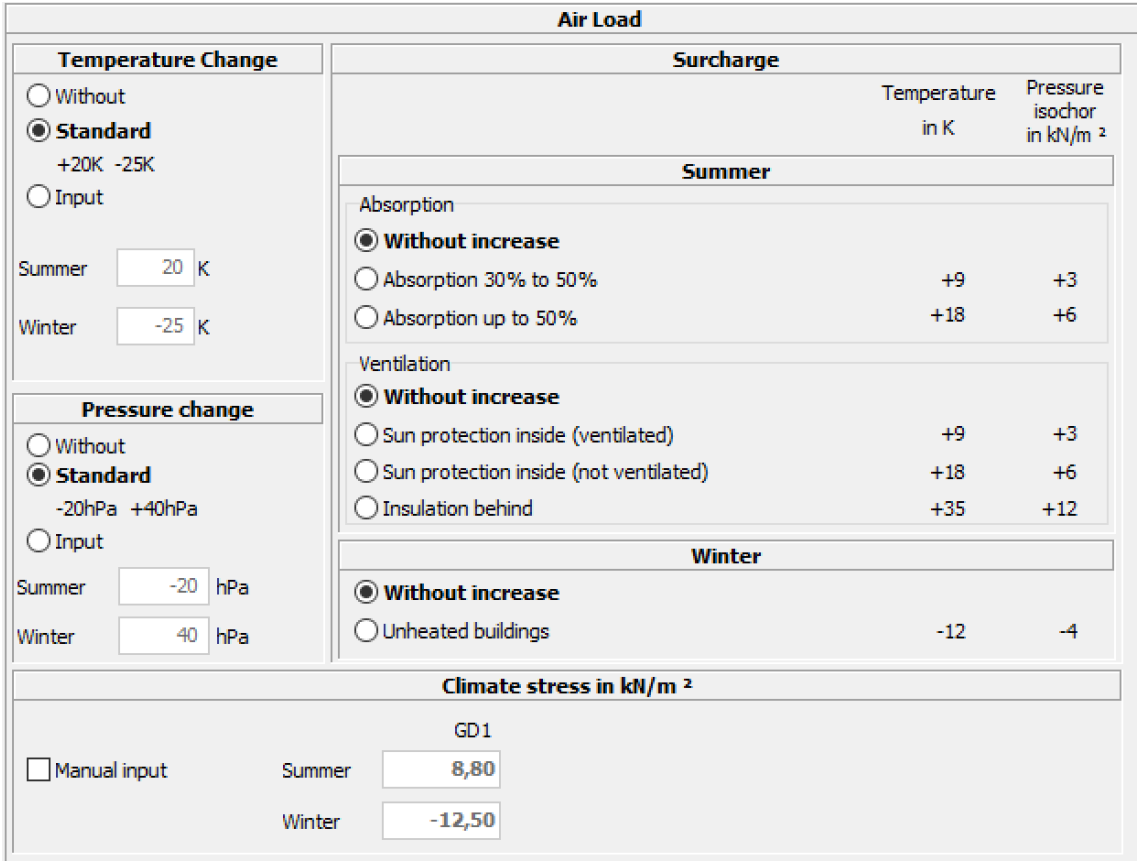
Wind/snow elasticity

- Free input of all loads



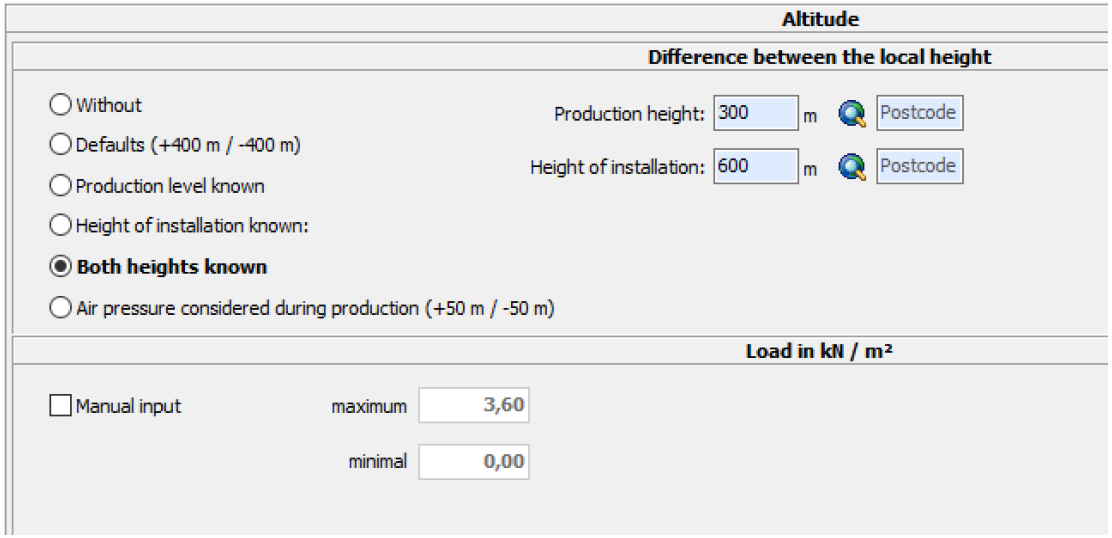
Climate load

- Climate loads are either calculated with default values or defined manually
- Temperature and air pressure changes, climate loads and surcharges for summer and winter can be included in the calculation



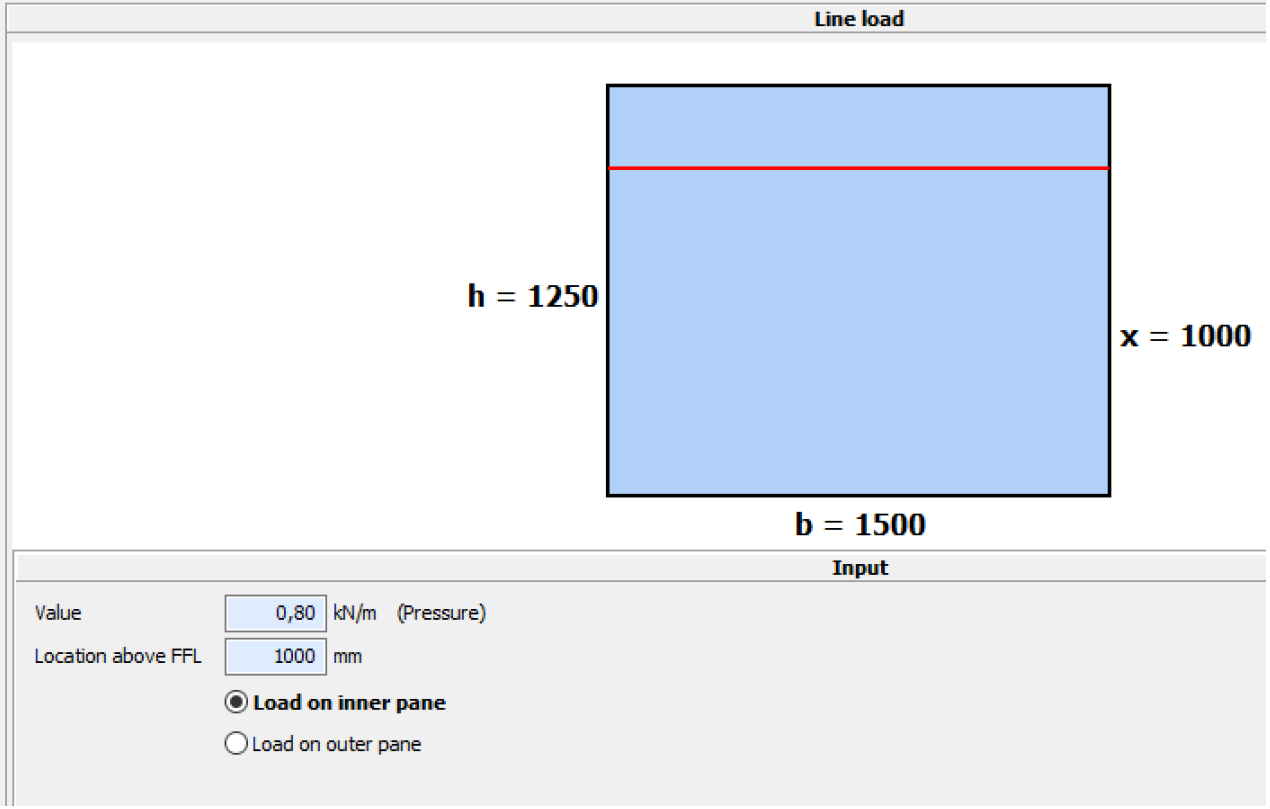
Location height

➢ The height difference between the production site and the installation site resulting in a load for insulating glass can be determined by entering the heights.



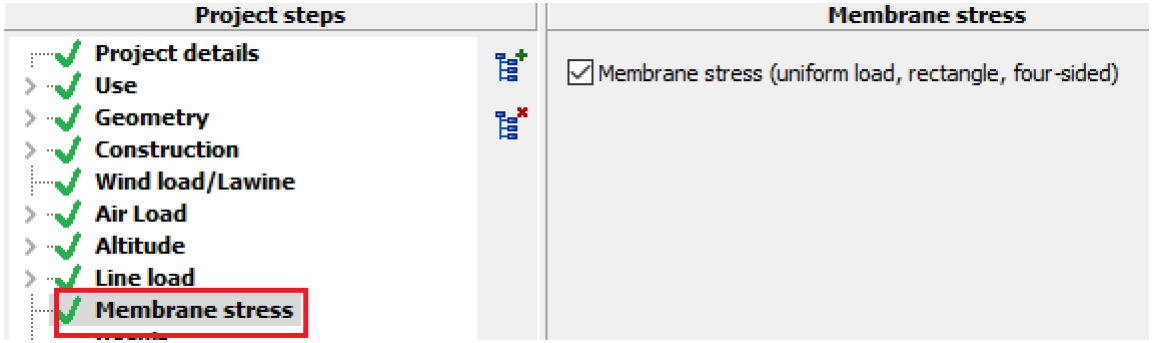
Line load

- Load in kN/m, attack height and load side for vertical glazing



Membrane voltage

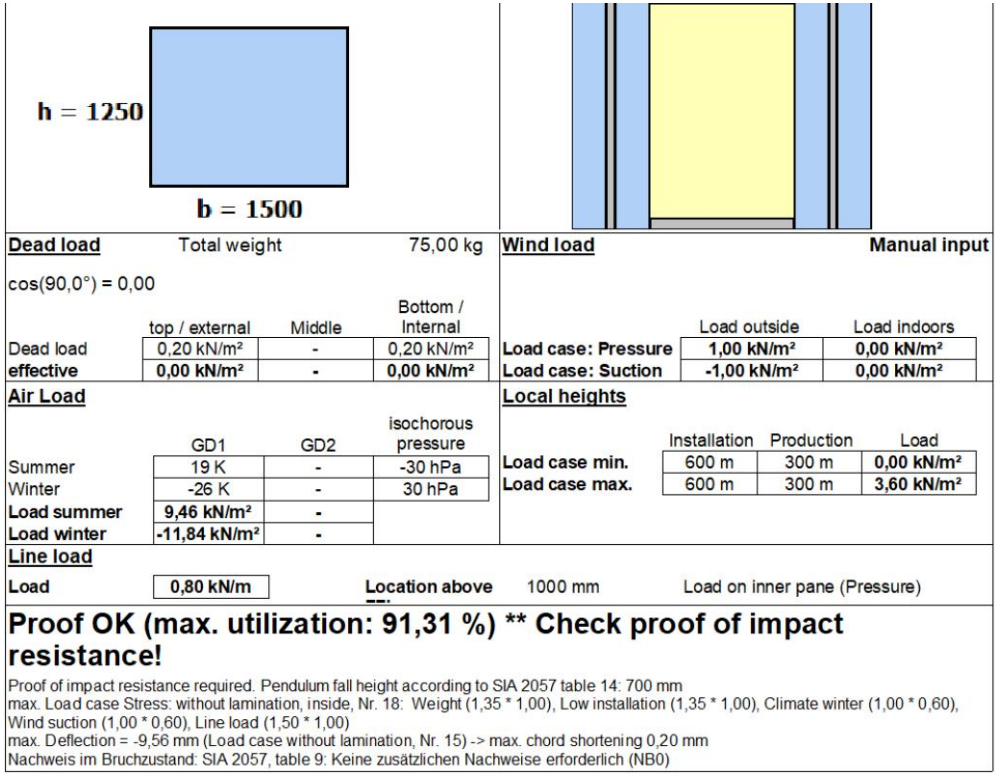
- by simply setting a check mark, the membrane stress can be taken into account in the calculation
- Nonlinear calculation



Result

The output of the results is done by specifying the used parameters

- Overall result
- Indication of the existing utilization



Dead load Total weight 75,00 kg

cos(90,0°) = 0,00

	top / external	Middle	Bottom / Internal
Dead load	0,20 kN/m²	-	0,20 kN/m²
effective	**0,00 kN/m²**	**-**	**0,00 kN/m²**

Wind load **Manual input**

	Load outside	Load indoors
Load case: Pressure	**1,00 kN/m²**	**0,00 kN/m²**
Load case: Suction	**-1,00 kN/m²**	**0,00 kN/m²**

Air Load

	GD1	GD2	isochorous pressure
Summer	19 K	-	-30 hPa
Winter	-26 K	-	30 hPa
Load summer	**9,46 kN/m²**	**-**	
Load winter	**-11,84 kN/m²**	**-**	

Local heights

	Installation	Production	Load
Load case min.	600 m	300 m	**0,00 kN/m²**
Load case max.	600 m	300 m	**3,60 kN/m²**

Line load

Load **0,80 kN/m** **Location above** 1000 mm Load on inner pane (Pressure)

Proof OK (max. utilization: 91,31 %) ** Check proof of impact resistance!

Proof of impact resistance required. Pendulum fall height according to SIA 2057 table 14: 700 mm
max. Load case Stress: without lamination, inside, Nr. 18: Weight (1,35 * 1,00), Low installation (1,35 * 1,00), Climate winter (1,00 * 0,60), Wind suction (1,00 * 0,60), Line load (1,50 * 1,00)
max. Deflection = -9,56 mm (Load case without lamination, Nr. 15) -> max. chord shortening 0,20 mm
Nachweis im Bruchzustand: SIA 2057, table 9: Keine zusätzlichen Nachweise erforderlich (NB0)

Load combinations

- the decisive load cases are generated automatically

- there is also the possibility to define own load cases

Load case combinations (Gamma * Psi)

Temporarily (Other)	constantly (weight, installation)
User-defined	exceptionally

The load combinations listed are relevant generally.
In specific cases, other load cases are relevant.
For the definition of the load combinations of agents is responsible.

Nr	Weight	Low installation	High installation	Climate winter	Climate summer	Wind pressure	Wind suction	Line load	Print
1	1,35 * 1,00							1,50 * 1,00	Yes
2	1,35 * 1,00						1,50 * 1,00		Yes
3	1,35 * 1,00					1,50 * 1,00			Yes
4	1,35 * 1,00		1,00 * 1,00		1,50 * 1,00				Yes
5	1,35 * 1,00	1,00 * 1,00		1,50 * 1,00					Yes
6	1,35 * 1,00	1,00 * 1,00		1,50 * 0,60			1,50 * 0,60	1,50 * 1,00	Yes
7	1,35 * 1,00		1,00 * 1,00		1,50 * 0,60		1,50 * 0,60	1,50 * 1,00	Yes
8	1,35 * 1,00	1,00 * 1,00		1,50 * 0,60			1,50 * 1,00	1,50 * 0,70	Yes
9	1,35 * 1,00		1,00 * 1,00		1,50 * 0,60		1,50 * 1,00	1,50 * 0,70	Yes
10	1,35 * 1,00	1,00 * 1,00		1,50 * 1,00			1,50 * 0,60	1,50 * 0,70	Yes
11	1,35 * 1,00		1,00 * 1,00		1,50 * 1,00		1,50 * 0,60	1,50 * 0,70	Yes
12	1,35 * 1,00	1,00 * 1,00		1,50 * 0,60		1,50 * 0,60		1,50 * 1,00	Yes
13	1,35 * 1,00		1,00 * 1,00		1,50 * 0,60	1,50 * 0,60		1,50 * 1,00	Yes
14	1,35 * 1,00	1,00 * 1,00		1,50 * 0,60		1,50 * 1,00		1,50 * 0,70	Yes
15	1,35 * 1,00		1,00 * 1,00		1,50 * 0,60	1,50 * 1,00		1,50 * 0,70	Yes
16	1,35 * 1,00	1,00 * 1,00		1,50 * 1,00		1,50 * 0,60		1,50 * 0,70	Yes
17	1,35 * 1,00		1,00 * 1,00		1,50 * 1,00	1,50 * 0,60		1,50 * 0,70	Yes

Lastfall hinzufügen...

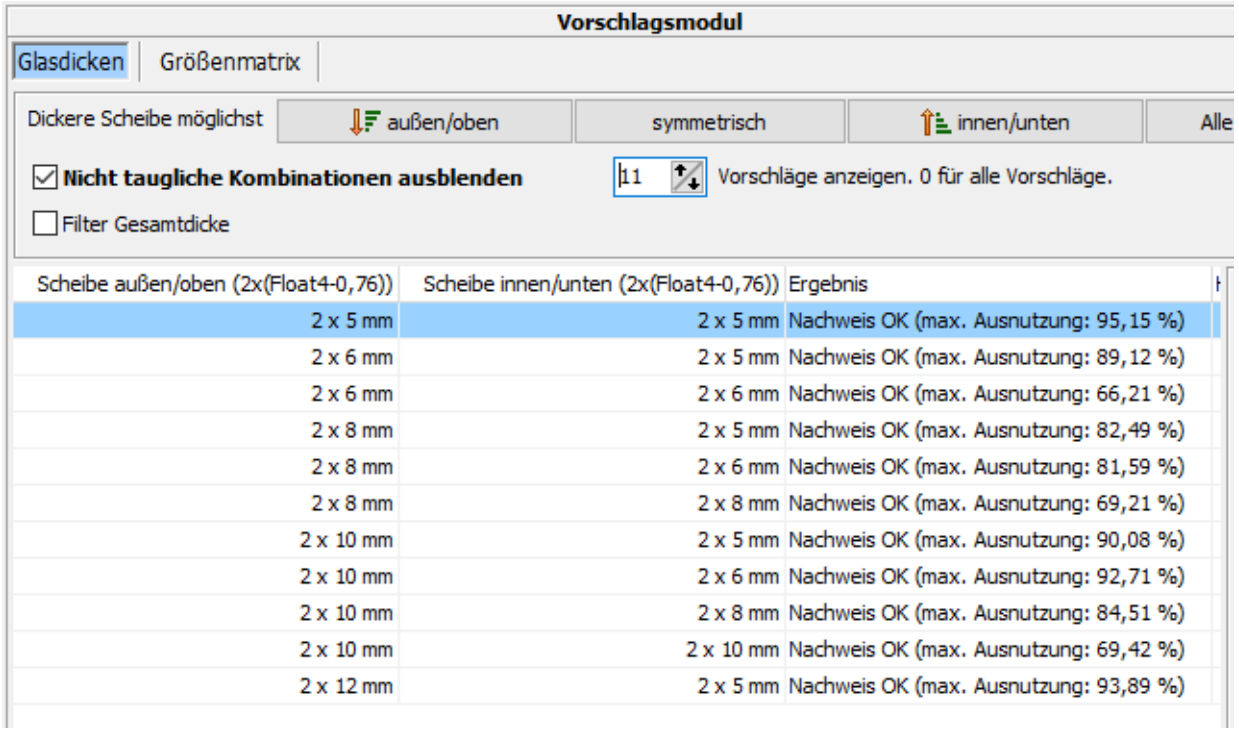
Lastfall

	γG, γQ	Ψ
Gewicht	1,10	1,00
Winddruck	1,10	1,00
Windsog		
Streckenlast	1,10	0,70

Abbrechen OK

Suggestion module - glass thicknesses

The Glass *Thicknesses* module lists different thicknesses for the outer and inner pane, which fulfill the verification, and indicates the degree of utilization for each combination



Scheibe außen/oben (2x(Float4-0,76))	Scheibe innen/unten (2x(Float4-0,76))	Ergebnis
2 x 5 mm	2 x 5 mm	Nachweis OK (max. Ausnutzung: 95,15 %)
2 x 6 mm	2 x 5 mm	Nachweis OK (max. Ausnutzung: 89,12 %)
2 x 6 mm	2 x 6 mm	Nachweis OK (max. Ausnutzung: 66,21 %)
2 x 8 mm	2 x 5 mm	Nachweis OK (max. Ausnutzung: 82,49 %)
2 x 8 mm	2 x 6 mm	Nachweis OK (max. Ausnutzung: 81,59 %)
2 x 8 mm	2 x 8 mm	Nachweis OK (max. Ausnutzung: 69,21 %)
2 x 10 mm	2 x 5 mm	Nachweis OK (max. Ausnutzung: 90,08 %)
2 x 10 mm	2 x 6 mm	Nachweis OK (max. Ausnutzung: 92,71 %)
2 x 10 mm	2 x 8 mm	Nachweis OK (max. Ausnutzung: 84,51 %)
2 x 10 mm	2 x 10 mm	Nachweis OK (max. Ausnutzung: 69,42 %)
2 x 12 mm	2 x 5 mm	Nachweis OK (max. Ausnutzung: 93,89 %)

Suggestion module - size matrix

The size matrix represents the results of the current setup as a function of any dimensions.

Vorschlagsmodul

Glasdicken | Größenmatrix

Breite b: 500 mm bis 2000 mm Schrittweite 100 mm
Höhe h: 500 mm bis 2000 mm Schrittweite 100 mm

(●) **Spannung Ausnutzung in %**
( ) Durchbiegung Ausnutzung in %
[ ] Farbverlauf

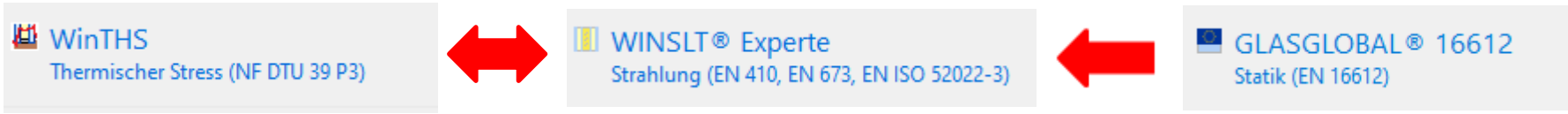
Σ Vorschläge berechnen

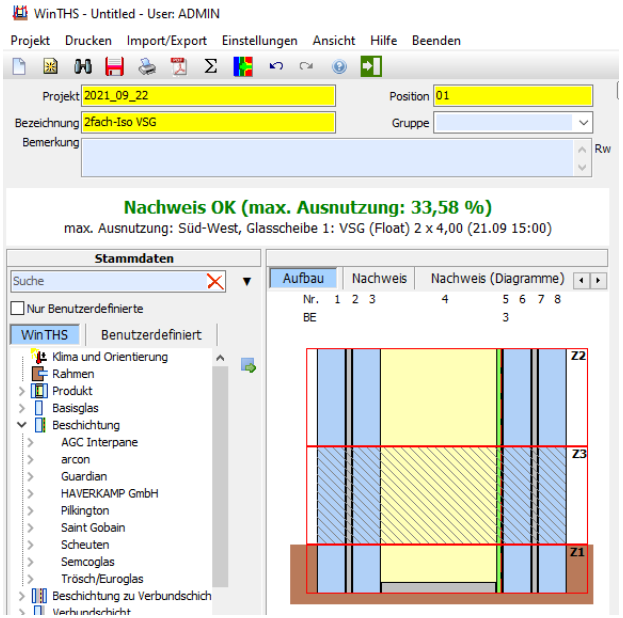
Aufbau	**2x(Float4-0,76) | SZR 16 | 2x(Float4-0,76)**
Winddruck/-sog	**500 mm x 500 mm: 0,54 / -0,67 kN/m²**
	2000 mm x 2000 mm: 0,54 / -0,67 kN/m²
Schnee	---
Klimalast	**8,80 / -12,50 kN/m²**
Ortshöhe	**7,20 / 3,60 kN/m²**
Streckenlast	**1,00 kN/m; x = 1000 mm**
Membranspannung	**Nein**

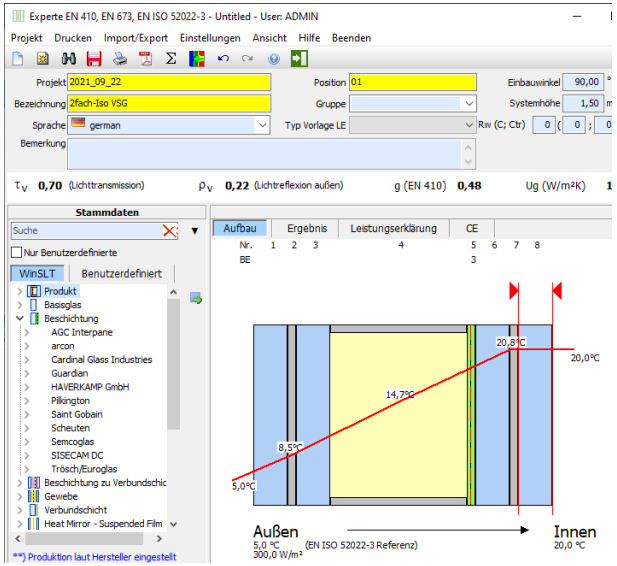
h \ b	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	
500	95,9%	108,0%	120,0%	128,0%	133,3%	136,7%	138,7%	139,8%	140,3%	140,3%	139,9%	139,4%	138,8%	138,0%	13
600	108,0%	99,0%	109,6%	116,5%	121,0%	123,7%	125,3%	126,2%	126,4%	126,3%	125,9%	125,3%	124,6%	123,8%	12
700	120,0%	109,6%	96,4%	101,7%	104,8%	106,7%	107,7%	108,1%	108,1%	107,9%	107,5%	106,9%	106,2%	105,5%	10
800	128,0%	116,5%	101,7%	87,7%	89,7%	90,8%	91,2%	91,3%	91,1%	90,8%	90,3%	89,8%	89,2%	88,5%	8
900	133,3%	121,0%	104,8%	89,7%	76,9%	77,4%	77,4%	77,3%	76,9%	76,5%	76,0%	75,5%	74,9%	74,4%	7
1000	136,7%	123,7%	106,7%	90,8%	77,4%	66,5%	66,3%	65,9%	65,5%	65,0%	64,5%	64,0%	63,5%	62,9%	6
1100	138,7%	125,3%	107,7%	91,2%	77,4%	78,4%	80,8%	82,8%	84,5%	86,0%	87,4%	88,5%	89,4%	90,2%	9
1200	139,8%	126,2%	108,1%	93,2%	101,6%	109,2%	116,0%	122,1%	126,9%	131,2%	134,9%	138,2%	141,0%	143,5%	14
1300	140,3%	126,4%	108,1%	94,2%	105,4%	116,0%	126,0%	135,5%	144,4%	151,2%	157,5%	163,1%	168,1%	172,7%	17
1400	140,3%	126,3%	107,9%	90,8%	102,3%	114,0%	125,6%	137,0%	148,0%	158,6%	166,8%	174,4%	181,3%	187,7%	19
1500	139,9%	125,9%	107,5%	90,3%	98,5%	110,2%	122,1%	134,2%	146,3%	158,2%	169,9%	178,9%	187,3%	195,2%	20
1600	139,4%	125,3%	106,9%	89,8%	95,8%	107,0%	118,7%	130,8%	143,2%	155,7%	168,1%	180,5%	190,0%	198,9%	20
1700	138,8%	124,6%	106,2%	90,1%	98,1%	105,2%	116,4%	128,2%	140,4%	153,0%	165,8%	178,6%	191,4%	201,1%	21
1800	138,0%	123,8%	105,5%	91,8%	100,6%	108,3%	115,4%	126,8%	138,7%	151,1%	163,9%	176,8%	189,8%	202,9%	21
1900	137,2%	122,9%	104,7%	92,9%	102,4%	110,9%	118,3%	126,5%	138,1%	150,2%	162,8%	175,7%	188,8%	201,9%	21
2000	136,4%	122,1%	103,9%	93,8%	103,7%	112,9%	121,0%	128,0%	138,5%	150,4%	162,7%	175,5%	188,5%	201,6%	21

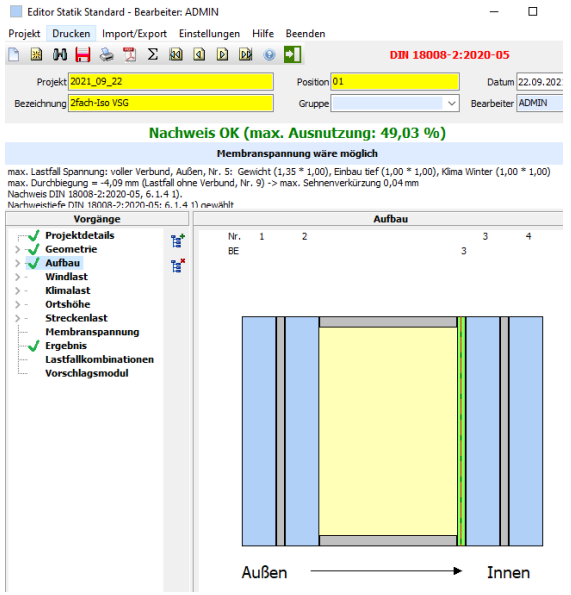
Interfaces

The exchange of projects is possible between all modules









More information

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