



Roof Dim

**A computer program for trapezoidal
sheeting, Z-beam and stressed skin
design of roofing**

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Partial coefficients
—
□
×

Country
Lithuania
STR/GEO Set B

Partial coefficients for loads

Gravity load	γ_G	1,35
Wind and snow	γ_Q	1,3
Factor in (6.10b)	ξ	1

Partial coefficients for

- Consequence Class 1	γ_d	0,9
- Consequence Class 2	γ_d	1
- Consequence Class 3	γ_d	1,1

Reduction factors for load combinations

	ψ_0
Snow load 3 and larger	1
Snow load 2 to 2,9	1
Snow load less than 2	1
Wind load	1

Partial coefficients for resistance

- sheeting and purlins	γ_{M1}	1,1
- net section failure	γ_{M2}	1,25
- fasteners	γ_{M2}	1,25

Wind maps of Europe
OK

[illegible]

Overlap
to the right of supp K N 500 350 350 350 350 350 350 350 350 350 350 350 500
no. of screws L S O C 3 3 3 3 3 3 3 3 3 3 3 3 3

Support width C A 100 100 100 100 100 100 100 100 100 100 100 100 100

Double overlap D ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓

Double (or 3) sheets D D D D D D D D D D D D D D D

[illegible]☐ New sheeting

End overlap
Screw in ☒ W ☐ F
Diameter

Side overlap

☒ No ☐ Ex ☐ Do

☐ 3 sheets in '3' span

Turn of sheeting

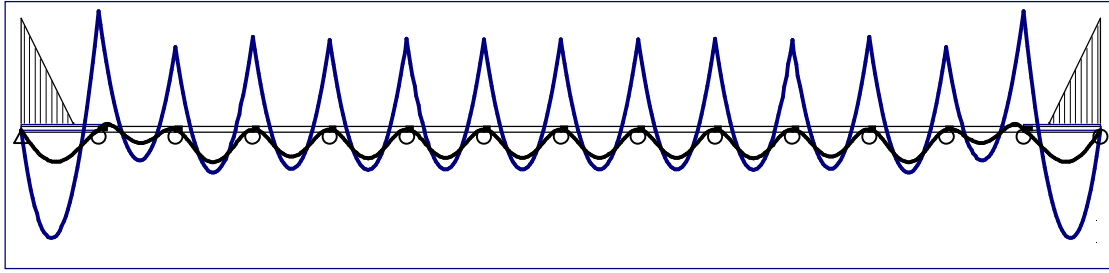
Perforated webs

Perforated webs

Deflection limit

$L / 200$

Result transverse loadDiaphragm



Roof Dim - Sheetting Version 17.12 (Lithuania)

15:02:13 03-23-2018

Input

Sheetting T60P

Project	Screws in the web														Narrow trough down	
Support no.	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Span	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500 mm	
Thickness ...	2,50du	0,70	0,70	0,70	0,70	0,70	0,70	0,70	0,70	0,70	0,70	0,70	0,70	0,70	2,50du mm	
Inertia, support	1,6E+3	441	441	441	441	441	441	441	441	441	441	441	441	441	mm ⁴	
Inertia, field	1616	441	441	441	441	441	441	441	441	441	441	441	441	441	1616 mm ⁴	
End overlap/screws	2:500/3	2:350/3	2:350/3	2:350/3	2:350/3	2:350/3	2:350/3	2:350/3	2:350/3	2:350/3	2:350/3	2:350/3	2:350/3	2:500/3	mm	
Bearing length	100	100	100	100	100	100	100	100	100	100	100	100	100	100	mm	
Distributed load	2,88	2,65	2,65	2,65	2,65	2,65	2,65	2,65	2,65	2,65	2,65	2,65	2,65	2,65	2,88 kN/m ²	
Dead load	0,40	kN/m ² ($\gamma_Q = 1,30$, $\xi\gamma_G = 1,35$)														
Varying load qv	1,21	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00 kN/m2	
Varying load qh	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	1,21 kN/m2	
Start a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1500 mm	
Load width b .	3000	0	0	0	0	0	0	0	0	0	0	0	0	0	3000 mm	
Snow	basic value	1,2	shape factor		1,00	shape factor 1,00		Sheet								
	top flange	66	web depth		60	profile pitch 250 mm										
	bottom flange .	66	yield stress ..		320	E-modulus 210000 N/mm ²										
Screws	dimension	6,3	position		W											

Result

Support no.	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
M at support	-6,000	-4,000	-5,000	-5,000	-5,000	-5,000	-5,000	-5,000	-5,000	-5,000	-5,000	-5,000	-4,000	-6,000	kNm
Moment in span .	5,585	1,733	2,208	1,700	1,700	1,700	1,700	1,700	1,700	1,700	1,700	1,700	2,208	1,733	5,585 kNm
Support react.	6,56	14,63	11,24	12,13	11,91	11,91	11,91	11,91	11,91	11,91	11,91	11,91	12,13	11,24	14,63 6,56
Deflection	22,1	12,5	22,6	12,1	12,1	12,1	12,1	12,1	12,1	12,1	12,1	12,1	22,6	12,5	22,1 mm
M at overlap, left	-2,59	-2,29	-3,07	-3,14	-3,14	-3,14	-3,14	-3,14	-3,14	-3,14	-3,14	-3,14	-2,22	-3,39	kNm/m
M overlap, right ..	-3,39	-2,22	-3,14	-3,14	-3,14	-3,14	-3,14	-3,14	-3,14	-3,14	-3,14	-3,07	-2,29	-2,59	kNm/m
Force between sheet .	7,20	6,86	8,57	8,57	8,57	8,57	8,57	8,57	8,57	8,57	8,57	8,57	6,86	7,20	kN/m
Force in screws ...	3,92	3,99	5,83	5,83	5,83	5,83	5,83	5,83	5,83	5,83	5,83	5,83	4,14	2,93	kN/m
Force per screw	0,327	0,332	0,486	0,486	0,486	0,486	0,486	0,486	0,486	0,486	0,486	0,473	0,345	0,244	kN

Utilization

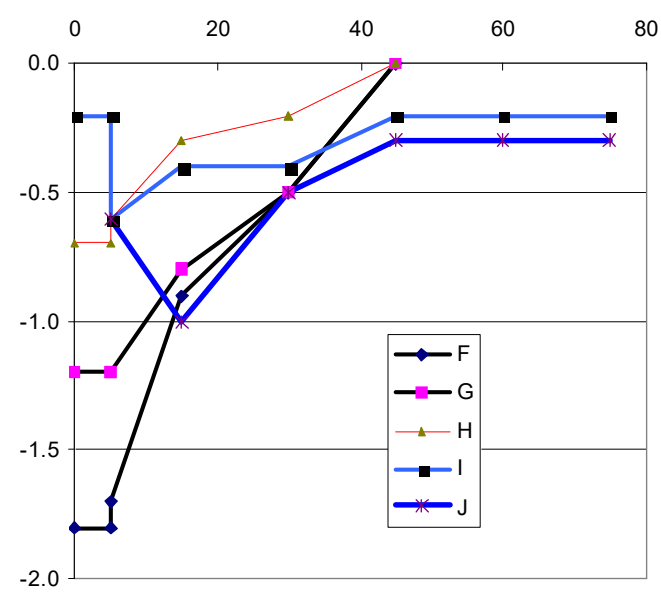
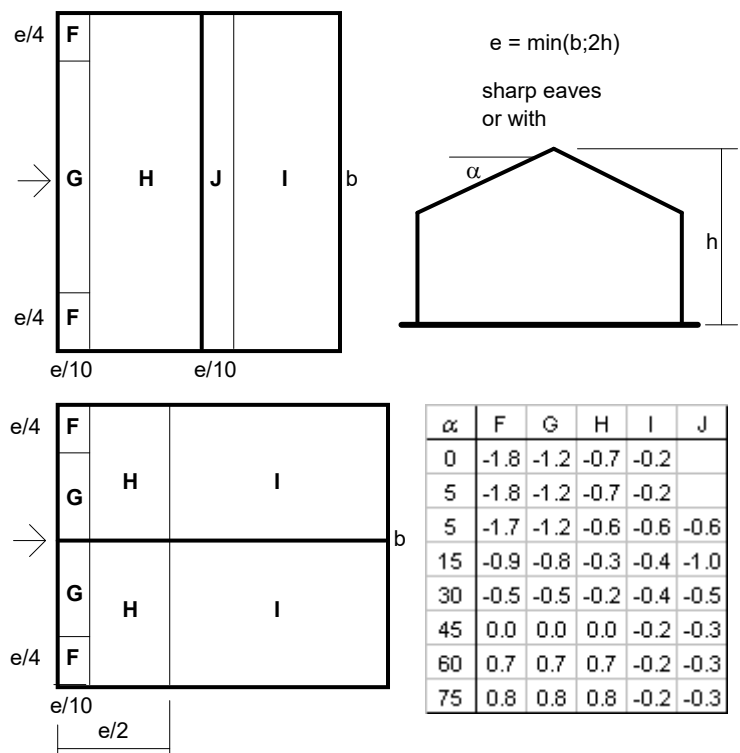
Consequence Class 2 $\gamma_d = 1,00$

Support no. .	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Moment in span	0,341	0,457	0,583	0,449	0,449	0,449	0,449	0,449	0,449	0,449	0,449	0,449	0,583	0,457	0,341
M at support	0,289	0,509	0,640	0,640	0,640	0,640	0,640	0,640	0,640	0,640	0,640	0,640	0,509	0,289	
Interaction at support	0,082	0,230	0,248	0,243	0,243	0,243	0,243	0,243	0,243	0,243	0,243	0,243	0,230	0,082	
Support react.	0,085	0,082	0,230	0,248	0,243	0,243	0,243	0,243	0,243	0,243	0,243	0,243	0,230	0,082	0,085
Deflection	0,981	0,554	1,003	0,539	0,539	0,539	0,539	0,539	0,539	0,539	0,539	0,539	1,003	0,554	0,981
Moment at end of overlap	0,894	0,604	0,829	0,829	0,829	0,829	0,829	0,829	0,829	0,829	0,829	0,829	0,604	0,894	
Shear force	0,193	0,184	0,230	0,230	0,230	0,230	0,230	0,230	0,230	0,230	0,230	0,230	0,184	0,193	
Screws in the web	0,148	0,247	0,362	0,362	0,362	0,362	0,362	0,362	0,362	0,362	0,362	0,352	0,257	0,111	

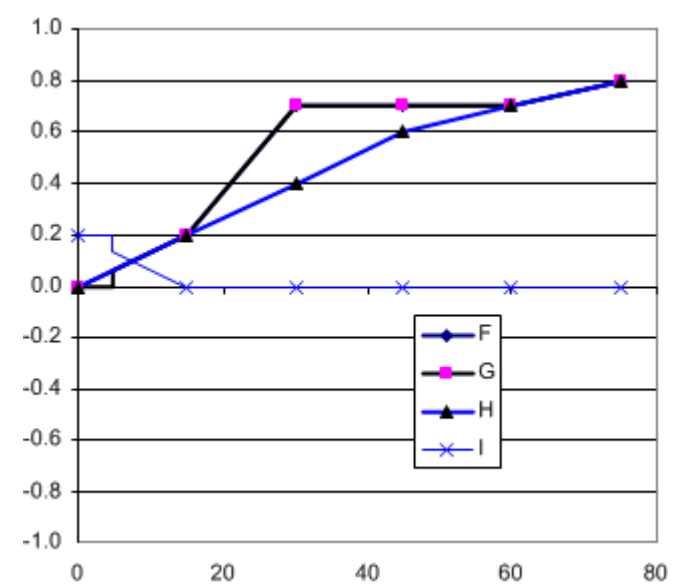
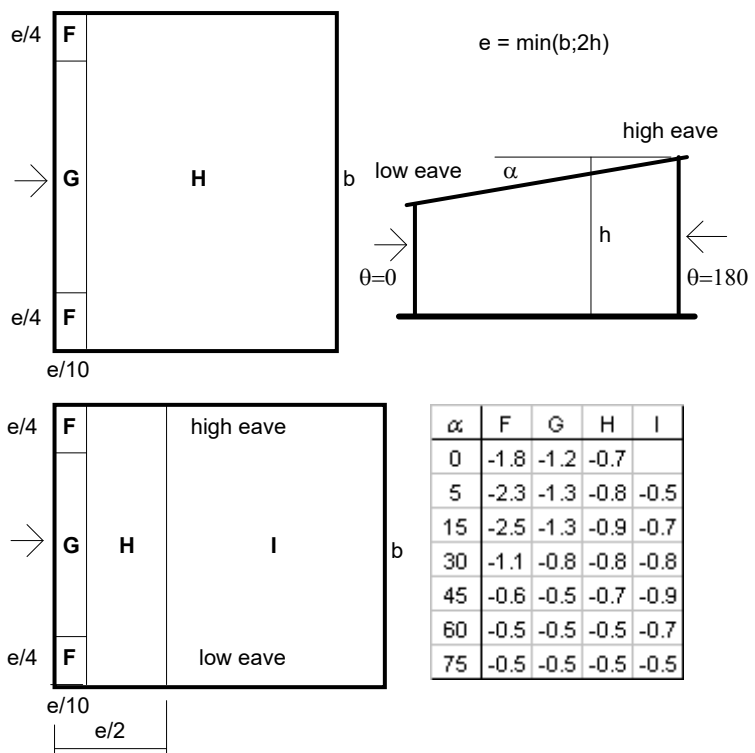
Max utilization, strength 0,894 OK deflection 1,003 OK

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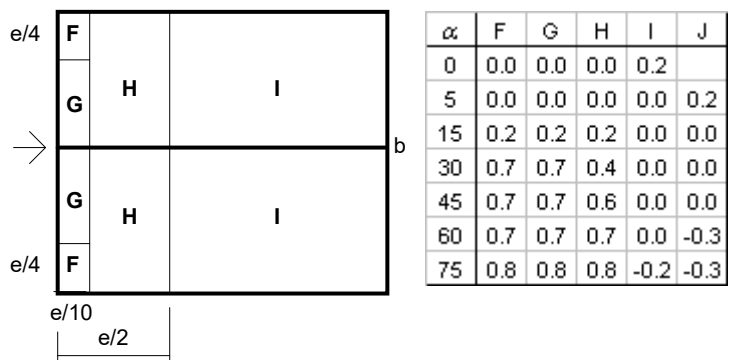
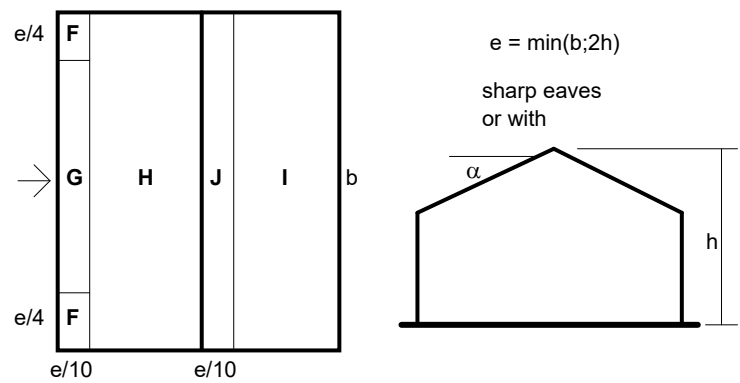
Pressure coefficient (suction) for duopitch roofs



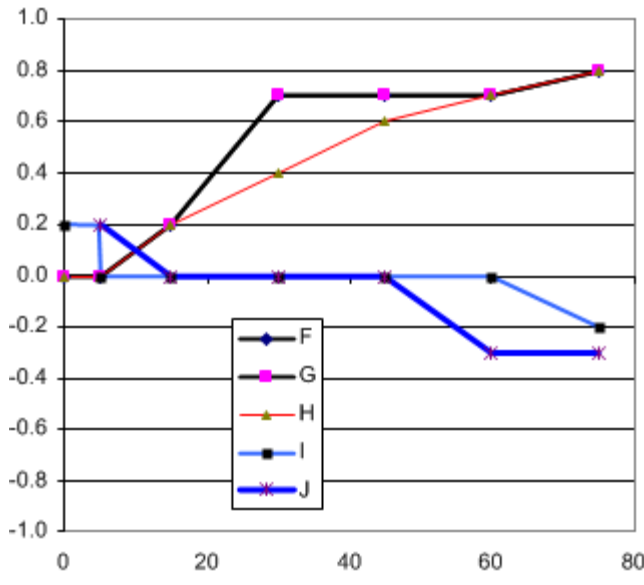
Pressure coefficient (suction) for monopitch roofs



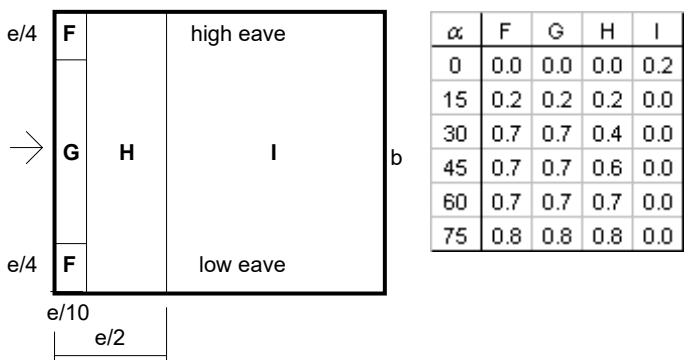
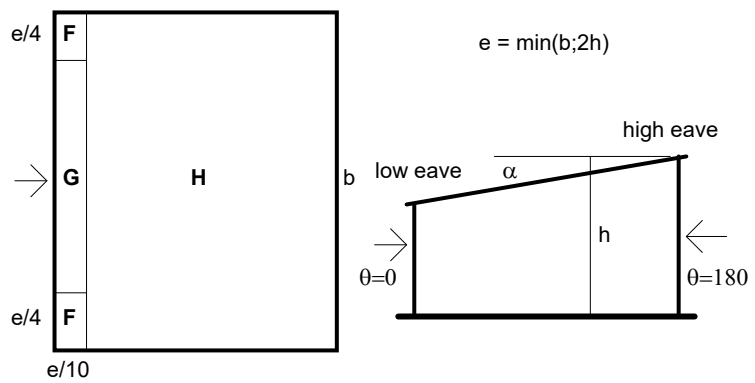
Pressure coefficient for duopitch roofs



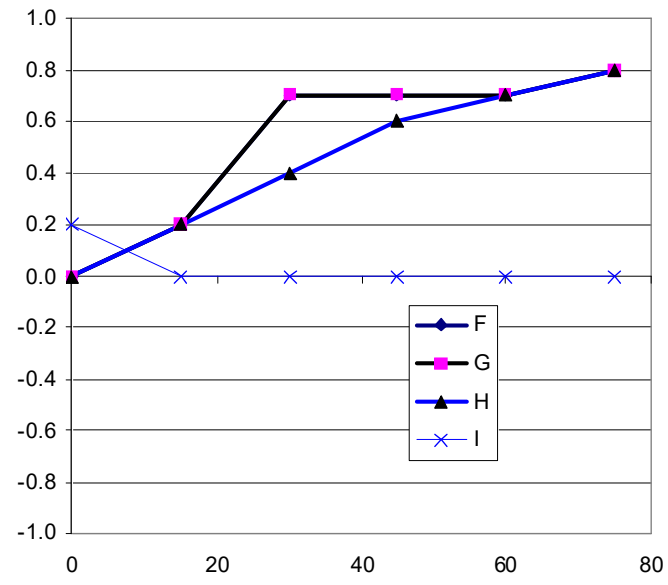
α	F	G	H	I	J
0	0.0	0.0	0.0	0.2	
5	0.0	0.0	0.0	0.0	0.2
15	0.2	0.2	0.2	0.0	0.0
30	0.7	0.7	0.4	0.0	0.0
45	0.7	0.7	0.6	0.0	0.0
60	0.7	0.7	0.7	0.0	-0.3
75	0.8	0.8	0.8	-0.2	-0.3

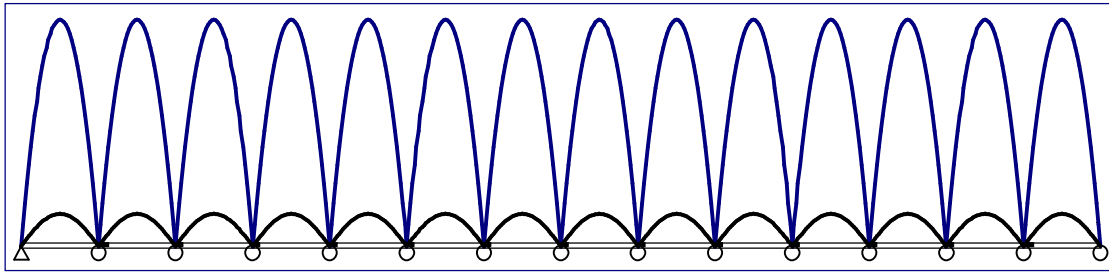


Pressure coefficient for monopitch roofs



α	F	G	H	I
0	0.0	0.0	0.0	0.2
15	0.2	0.2	0.2	0.0
30	0.7	0.7	0.4	0.0
45	0.7	0.7	0.6	0.0
60	0.7	0.7	0.7	0.0
75	0.8	0.8	0.8	0.0





Roof Dim - Sheeting Version 17.12 (Lithuania)

11:53:46 03-22-2018

Input

Sheeting T60P

Project	Narrow trough down														
Support no.	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Span	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	mm
Thickness ...	0,70	0,70	0,70	0,70	0,70	0,70	0,70	0,70	0,70	0,70	0,70	0,70	0,70	0,70	mm
Inertia, support	441	441	441	441	441	441	441	441	441	441	441	441	441	441	mm ⁴
Inertia, field	441	441	441	441	441	441	441	441	441	441	441	441	441	441	mm ⁴
End overlap/screws		L	L	L	L	L	L	L	L	L	L	L	L	L	mm
Bearing length		100	100	100	100	100	100	100	100	100	100	100	100	100	mm
Distributed load		-0,28	-0,28	-0,28	-0,28	-0,28	-0,28	-0,28	-0,28	-0,28	-0,28	-0,28	-0,28	-0,28	-0,28 kN/m ²
Dead load		0,40	kN/m ² ($\gamma_Q = 1,30, \xi\gamma_G = 1,35$)												
Wind terrain		II	referens wind . 24												
Sheet top flange		66	web depth 60												
bottom flange .		66	yield stress .. 320												
Screws dimension		6,3	position W												
			shape factor 0,70 / -0,90 ()												
			profile pitch 250 mm												
			E-modulus 210000 N/mm ²												

Result

Support no.	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
M at support	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	kNm
Moment in span .	-0,558	-0,558	-0,558	-0,558	-0,558	-0,558	-0,558	-0,558	-0,558	-0,558	-0,558	-0,558	-0,558	-0,558	kNm
Support react.	-0,56	-1,12	-1,12	-1,12	-1,12	-1,12	-1,12	-1,12	-1,12	-1,12	-1,12	-1,12	-1,12	-1,12	-0,56
Deflection	-6,29	-6,29	-6,29	-6,29	-6,29	-6,29	-6,29	-6,29	-6,29	-6,29	-6,29	-6,29	-6,29	-6,29	mm
M at overlap	L	L	L	L	L	L	L	L	L	L	L	L	L	L	kNm/m
Force between sheet .	L	L	L	L	L	L	L	L	L	L	L	L	L	L	kN/m
Force in screws ...	L	L	L	L	L	L	L	L	L	L	L	L	L	L	kN/m
Force per screw	L	L	L	L	L	L	L	L	L	L	L	L	L	L	kN

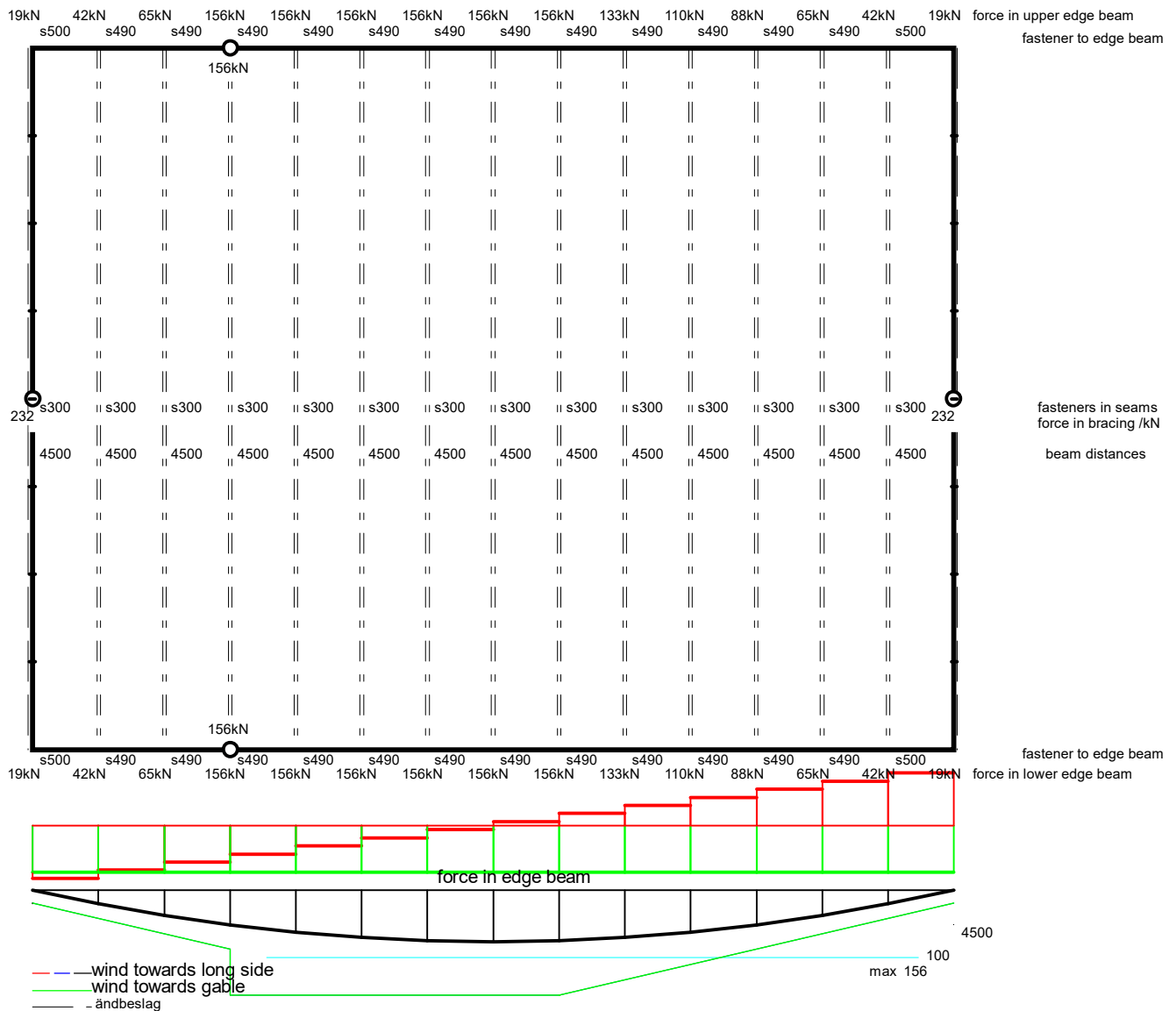
Utilization

Consequence Class 2 $\gamma_d = 1,00$

Support no. .	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Moment in span	0,147	0,147	0,147	0,147	0,147	0,147	0,147	0,147	0,147	0,147	0,147	0,147	0,147	0,147	0,147
M at support	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
Interaction at support	0,046	0,046	0,046	0,046	0,046	0,046	0,046	0,046	0,046	0,046	0,046	0,046	0,046	0,046	0,046
Support react.	0,046	0,046	0,046	0,046	0,046	0,046	0,046	0,046	0,046	0,046	0,046	0,046	0,046	0,046	0,046
Deflection	0,314	0,314	0,314	0,314	0,314	0,314	0,314	0,314	0,314	0,314	0,314	0,314	0,314	0,314	0,314
Moment at end of overlap	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Shear force	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L
Screws in the web	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L

Max utilization, strength 0,147 OK deflection 0,314 OK

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Side overlap: steel screw $\varnothing$ 5,5
 Edge beams: steel screw $\varnothing$ 5,5
 Gables: Ändbeslag. 3 steel screw $\varnothing$ 5,5 in every trough
 Main beams: 2 steel screw $\varnothing$ 5,5 in every trough

BS5,5 C1 FF FR P1,3 U1,3
 BS5,5 C1 FF P1,3 U2,5
 BS5,5 C1 FF P1,3 U17,6
 GS5,5 C1 FF P1,3 U6,0

Krön 60*0*2,5
 fyk 350
 Gavelbalk HEB 260

RoofDim -Version 17.12 (Lithuania) Sheeting on beams

12:53:00 04-01-2018

Project

Sheeting T60P

Roof Length 63000 width 48000 column h. 11500 beam height 200

Safety class sheeting 2

Bracing Number 4 Sway imperfection 0,005

roof inclination 3,6

Wind/snow Pressure 0,85 windward 0,7 leeward 0,31 inside 0,3 friction 0,02

Safety class diaphragm 3

Snow zone 1,2

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Input

Project

Roof

Wind

field
length

Sheeting T60P

Screws in webs Narrow trough on supporting structure
Length 63000 width 48000 column height 11500 slope 3,58 beam height 200
Safety class, diaphragm 3 ($\gamma_Q = 1,30$, $\gamma_d = 1,10$) number of wind bracing 4 sway imperfection 0,005

Load 0,85 Shape factors: windward 0,7 leeward 0,31 internal 0,3 friction 0,02 Ref. wind 24 Terrain II

1 2 3 4 5 6 7 8 9 10 11 12 13 14
4500 4500 4500 4500 4500 4500 4500 4500 4500 4500 4500 4500 4500 4500

Wind towards long side Loads of wind and sway imperfection 7,38

shear flow	4,50	3,80	3,11	2,42	1,73	1,04	0,35	-0,35	-1,04	-1,73	-2,42	-3,11	-3,80	-4,50	
buckling of web	0,01	0,06	0,05	0,04	0,03	0,02	0,01	0,01	0,02	0,03	0,04	0,05	0,06	0,01	0,06 OK!
buckling of flange	0,01	0,05	0,04	0,03	0,02	0,01	0,00	0,00	0,01	0,02	0,03	0,04	0,05	0,01	0,05 OK!
global buckling	0,09	0,38	0,31	0,24	0,17	0,10	0,03	0,03	0,10	0,17	0,24	0,31	0,38	0,09	0,38 OK!
support resist.	0,04	0,06	0,14	0,15	0,14	0,14	0,14	0,14	0,14	0,14	0,14	0,15	0,14	0,06	0,04 0,15 OK!

Wind on gable

Load 7,55 gable beam force 48,2 shear flow 3,96 reaction force in long side 156
column distance 6000/6000 screws per trough 3 beam width 260 second moment of area 5,13E+7at field 1 Axial force 20,13 force in screws 0,77 Axial force capacity 1,42E+2
Utilization grade axial force + moment 0,52 Axial force + moment + shear force 0,35 and 0,33 0,52 OK!at field 14 Axial force 20,13 force in screws 0,77 Axial force capacity 1,42E+2
Utilization grade axial force + moment 0,52 Axial force + moment + shear force 0,33 and 0,31 0,52 OK!

Side overlap

Screw, steel d = 4,8
Shear strength 2,91 1,17 1,17 1,17 1,17 1,17 1,17 1,17 1,17 1,17 1,17 1,17 1,17 1,17 2,91
Spacing 300 300 300 300 300 300 300 300 300 300 300 300 300 300 300

Edge beam

Screw, steel d = 5,5 Top beam, h 60, bt 0, bb 329, c 0, d -38, sa 0, bsa 0, hsa 5, f 0, k 31, t 3
Shear strength 3,53 1,93 1,93 1,93 1,93 1,93 1,93 1,93 1,93 1,93 1,93 1,93 1,93 1,93 3,53
Distance fastener 500 490 490 490 490 490 490 490 490 490 490 490 490 490 500
Axial force kN 20,2 37,3 51,4 62,2 70,0 74,7 76,3 74,7 70,0 62,2 51,4 37,3 20,2 (wind towards l
Edge beam Krön60°0*2,5 A = 575 I = 1,50E+07 fy = 350 curve = c Fmax = 155,6 NbRd = 201 0,77 OK!
Shear force 215,8 182,6 149,4 116,2 83,0 49,8 16,6 -16,6 -49,8 -83,0 -116,2 -149,4 -182,6 -215,8

Gable beam

Screw, steel d = 4,8 in trough 3 end reinforcement
 $\bar{F}_{Rd}$ (b, p, v, o) 3,08 1,85 4,16 6,40 3,08 1,85 4,16 6,40
wind towards side 0,57 0,57 OK!
wind towards gable 0,72 0,72 OK!

Main beam

Screw, steel d = 5,5 in trough 2, $t_{sup}/s \geq 1$
 $\bar{F}_{Rd}$ (b, p, v, o) 1,93 1,01 5,76 5,11
wind towards long side 0,70 0,63 0,55 0,48 0,41 0,34 0,31 0,34 0,41 0,48 0,55 0,63 0,70
0,70 OK!Shear flexibility 0,012 0,011 0,011 0,011 0,011 0,011 0,011 0,011 0,011 0,011 0,011 0,011 0,011 0,012
Deflection 9,3 K = 0,096 (ultimate limit state) 0,03 OK!

Sheetings

field	1	2	3	4	5	6	7	8	9	10	11	12	13	14
number/thick	48/2,5	48/0,7	48/0,7	48/0,7	48/0,7	48/0,7	48/0,7	48/0,7	48/0,7	48/0,7	48/0,7	48/0,7	48/0,7	48/2,5
length	5100du	5350	5250	5250	5200	5200	5200	5200	5200	5200	5250	5250	5350	5000du
sum sheeting area	3504													
sum weight	323													
sheeting width	1000													

Side overlap 705 705 705 705 705 705 705 705 705 705 705 705 705 705 705
total 9870 steel screws, d 4,8End overlap 576 576 576 576 576 576 576 576 576 576 576 576 576 576
total 7488 screws, d 4,8 (fixing to support not included)

If wind suction is designing, consider setting screws in the webs at both ends of the double overlap

Edge beams 18 18 18 18 18 18 18 18 18 18 18 18 18 18 18

total 252 steel screws, d 5,5

Gable beams 3 steel screws d 4,8 in every trough, total 1152 screws at end reinforcing not included

Main beams 2 steel screws d 5,5 in every trough, total 4992

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