

Version 17.12.0
REI Company



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 500 350 350 350 350 350 350 350 350 350 350 500
no. of screws L S O C 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

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

☒ Narrow trough down

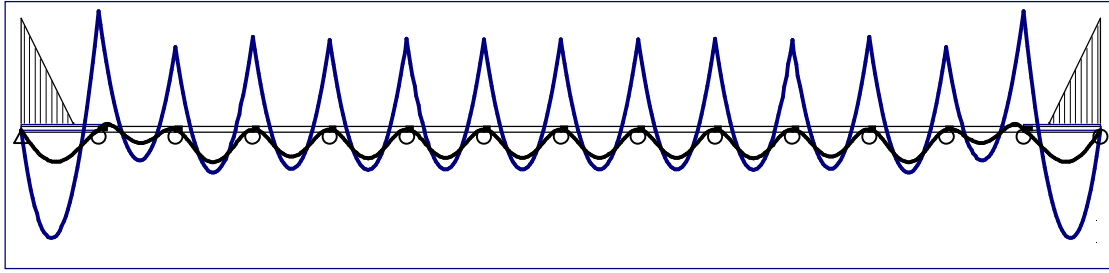
☐ Wide trough down

Perforated webs

Deflection limit

$L / 200$

Result transverse load
Diaphragm



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

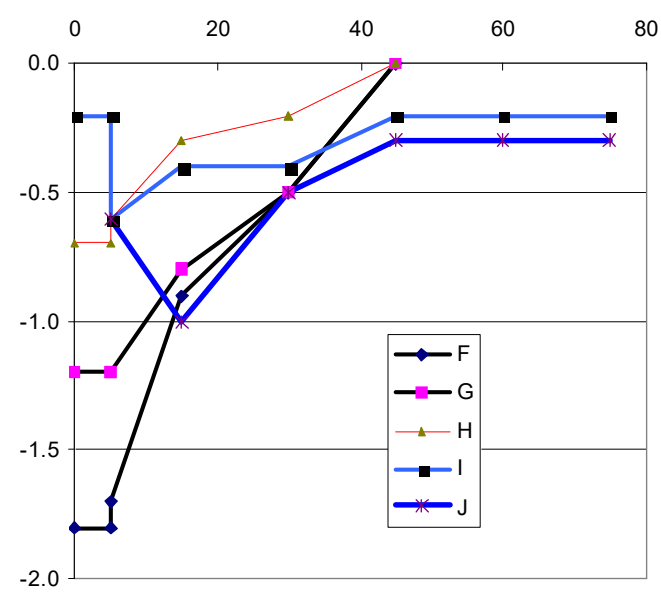
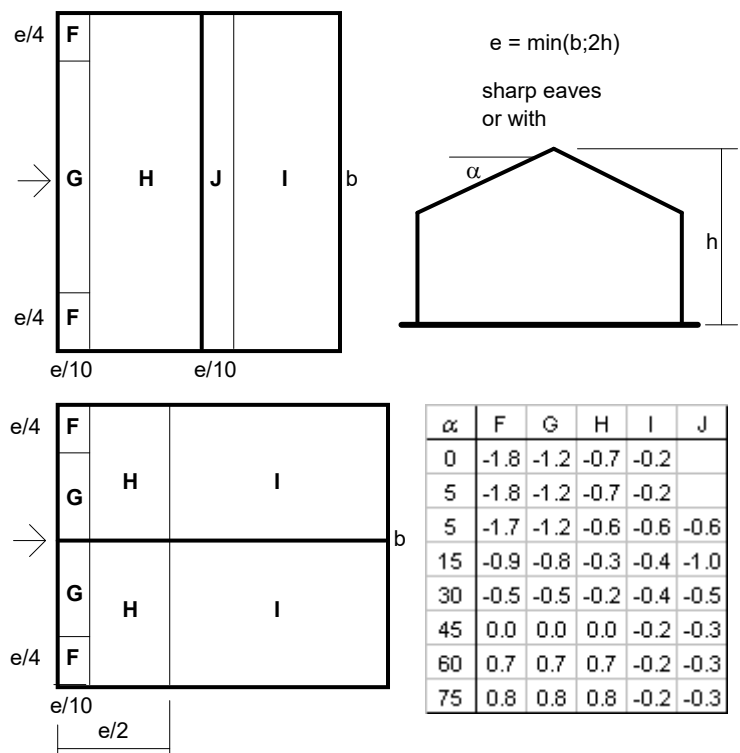
Consequence Class 2 $\gamma_d = 1,00$

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	

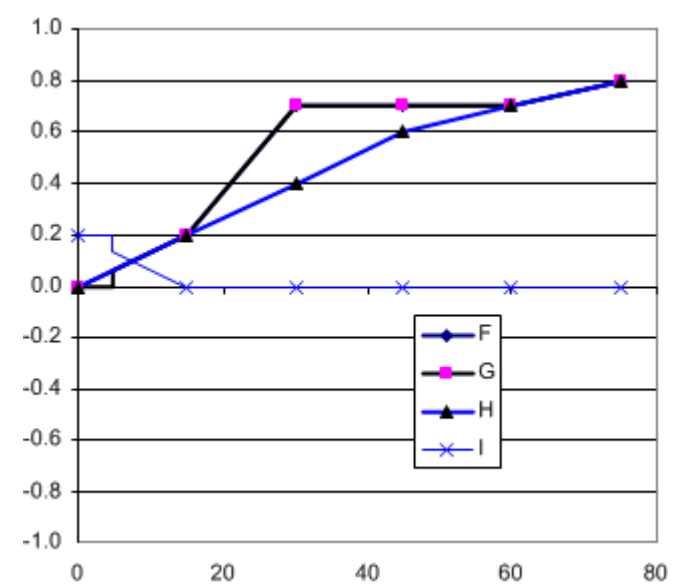
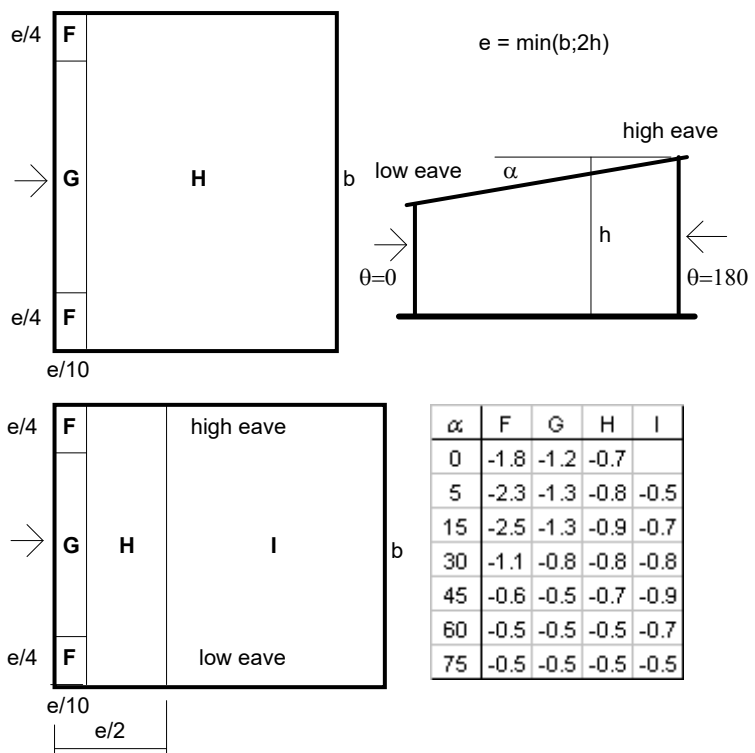
Max utilization, strength 0,894 OK deflection 1,003 OK

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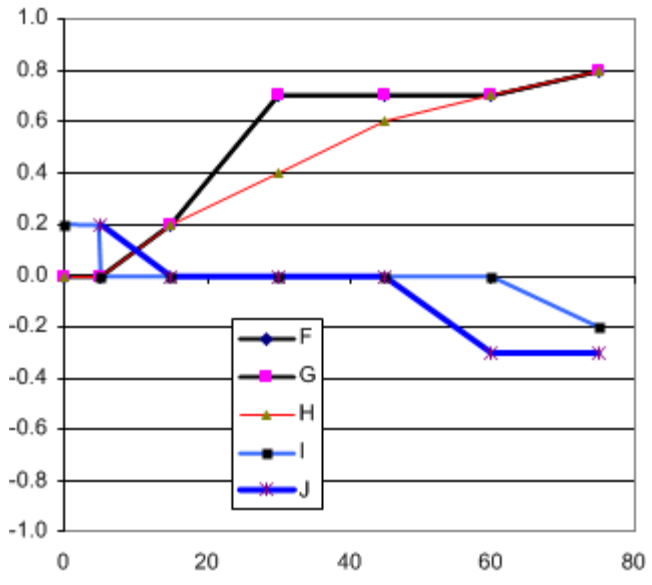
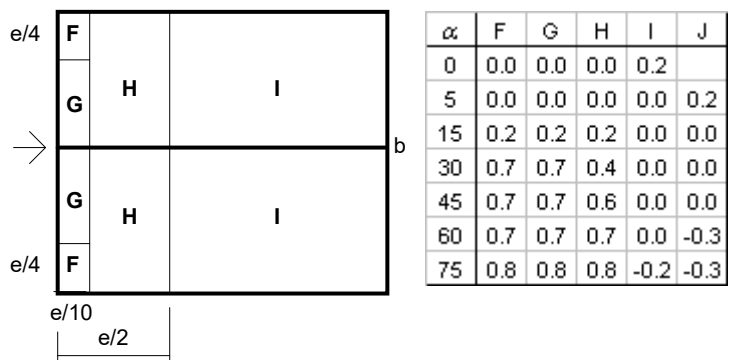
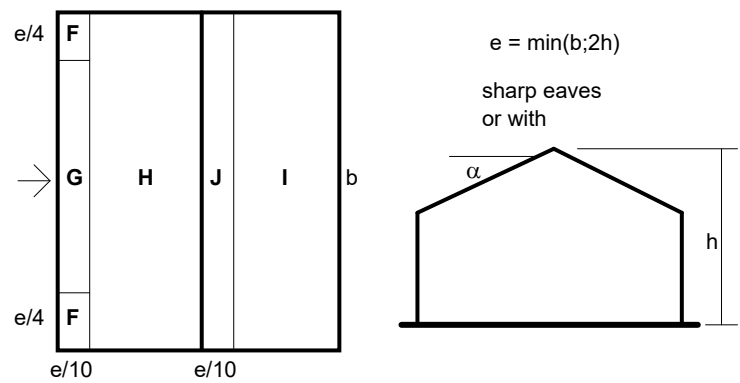
Pressure coefficient (suction) for duopitch roofs



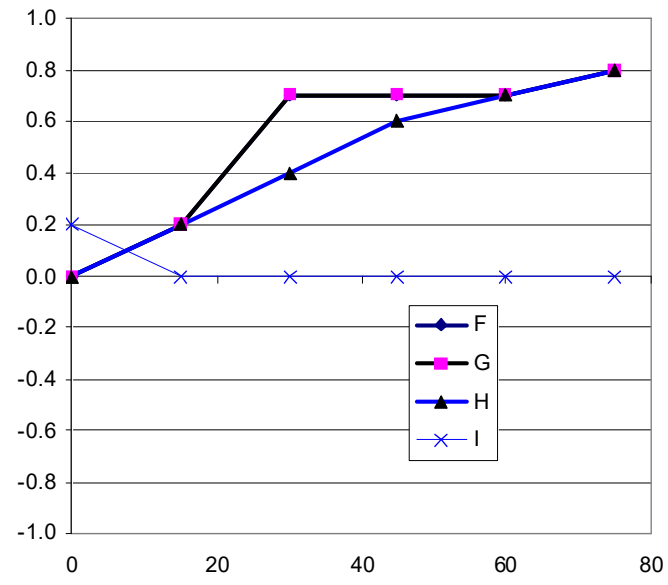
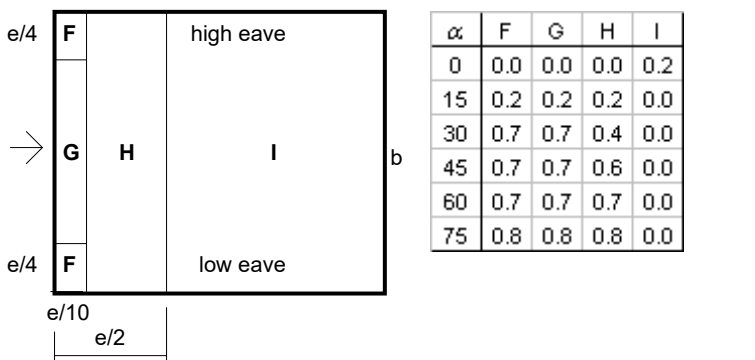
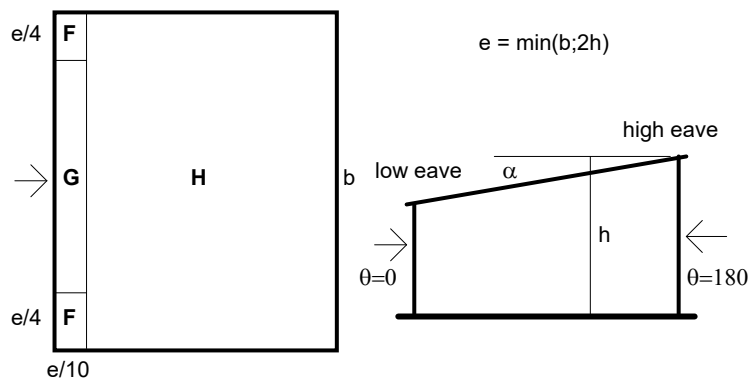
Pressure coefficient (suction) for monopitch roofs

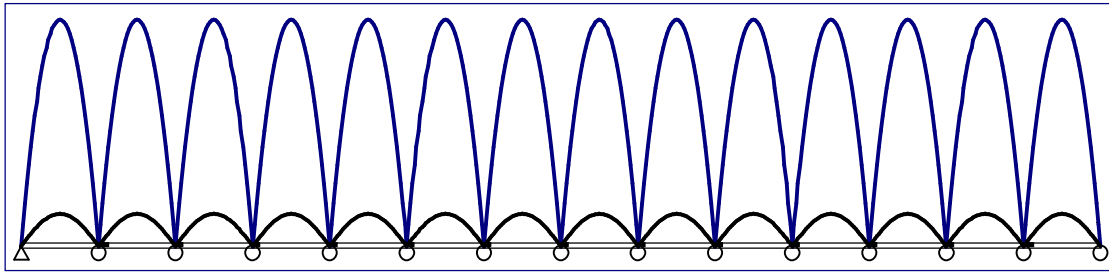


Pressure coefficient for duopitch roofs



Pressure coefficient for monopitch roofs





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	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	0,70	mm	
Inertia, support	441	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	441	mm ⁴	
End overlap/screws		L	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	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	-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 shape factor 0,70 / -0,90 ()														
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	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

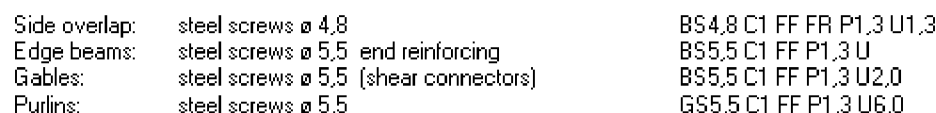
Utilization

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

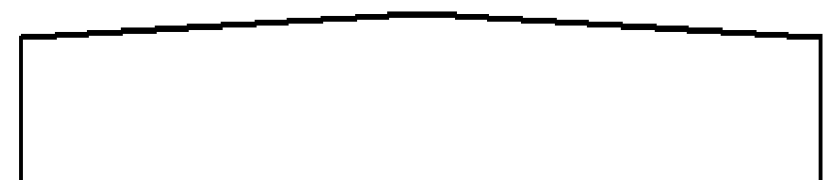
Max utilization, strength 0,147 OK deflection 0,314 OK

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15:06:39 03-23-2018

Bracing	4	Sway imperfection	0.005	Safety class diaphragm	3
Wind/snow	Pressure 0.85 windward 0.7 leeward 0.31 internal 0.3 friction 0.02 Snow zone 1.2				



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Input**Project****Roof****Sheeting T60P**

Screws in webs Narrow trough on supporting structure

Length 48000 width 126000 column height 11500 slope 3,58 beam height 200 beam distance 6857
Safety class, diaphragm 3 ($\gamma_Q = 1,50$, $\gamma_d = 1,00$) number of wind bracing 4 sway imperfection 0,005**Wind**

Load 0,71 Shape factors: windward 0,7 leeward 0,31 internal 0,3 friction 0,02 Ref. wind 22 Terrain II

field
length1 2 3 4 5 6 7
6857 6857 6857 6857 6857 6857 6857**Wind towards long side** Loads of wind and sway imperfection 8,17

shear flow 1,53 1,02 0,51 0,00 -0,51 -1,02 -1,53

buckling of web 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 OK!

buckling of flange 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 OK!

global buckling 0,03 0,02 0,01 0,00 0,01 0,02 0,03 0,03 OK!

support resist. 0,03 0,05 0,05 0,05 0,05 0,05 0,05 0,05 0,05 OK!

Wind on gableLoad 6,25 gable beam force 172,3 shear flow 5,47 reaction force in long side 3380
column dist. 6000/6000 moment in gable beam 23,9 force in purlin 34,5 purlin area**Sheet at gable**

vtemp 0,00 k2=0,8 no. screws 50 Distance 147 diameter 5,5 Vw 0,0 Vf 0,0

Web buckl. 0,31 / 0,41 flange buckl. 0,02 / 0,14 global buckling 0,07 / 0,36 0,41 OK!

Joint Ftemp 0,00 Fkomb 3,36 FhRd 3,53 Fkomb / FhRd = 0,95 0,95 OK!

Shear connector, gable: Shear connector plate L = 7500 h = 200 t = 1,91 fyk = 350

Side overlap

Screw, steel d = 4,8

Shear strength 2,91 2,91 2,91 2,91 2,91 2,91 2,91

Spacing 500 500 500 500 500 500 500

1:st overlap 632 (at shear connector plate)

Edge beam

Screw, steel d = 5,5 end reinforcement

Shear strength 3,53 3,53 3,53 3,53 3,53 3,53 3,53

Distance fastener 250 250 250 250 250 250 250

Axial force kN 3,4 5,6 6,7 6,7 5,6 3,4 (wind towards long side)

Shear force 168,0 112,0 56,0 0,0 -56,0 -112,0 -168,0

Shear flexibility 0,012 0,012 0,012 0,012 0,012 0,012 0,012

Deflection 4,0 K = 0,010 (ultimate limit state) 0,02 OK!

Sheetings

field	1	2	3	4	5	6	7	8	9	10	11	12	13	14
number	252	252	252	252	252	252	252	252	252	252	252	252	252	252
thickness	2,5	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	0,7	2,5
length	5100du	5350	5200	5200	5200	5200	5200	5200	5200	5200	5200	5200	5350	5000du
sum sheeting area	4593	sum weight 425 sheeting width 1000												

Side overlap 1728 1728 1728 1728 1728 1728 1728 total 12096 steel screws, d 4,8**End overlap** 1152 1152 1152 1152 1152 1152 1152 1152 1152 1152 1152 1152 1152 1152

total 14976 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 55 55 55 55 55 55 55 total 385 steel screws, d 5,5

(fixing of end reinforcing not included)

Gables 2 shear connectors L = 7500 total 100 steel screws, d 5,5**Purlins** 1 steel screws d 5,5 in every trough, total 2496 st. Overlap 7488 st screws d 4,8 in the webs**Beams** Purlin support 168 (double purlins at ridge) (Edge beams not included)

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