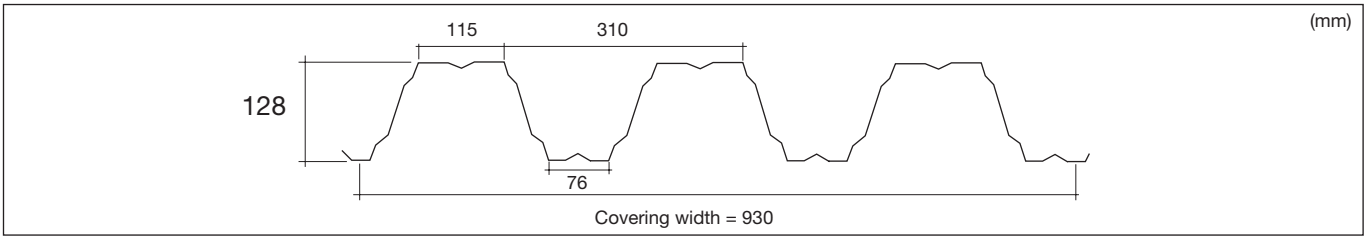
TP 128

ROOF Isolated L/150



Cross sectional data – calculated for safety class 1

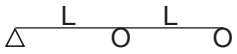
Table 1

Sheet thickness, nominal	t_{nom}	mm	0,7	0,8	0,90	1,00	1,20
Sheet thickness in calculation	t_{ber}	mm	0,655	0,750	0,855	0,940	1,13
Tensile yield stress	f_{ty}	Mpa	350	350	350	350	350
Mass	m	kg/m	8,40	9,60	10,80	12,00	14,40
Selfweight including overlap	g	kN/m²	0,09	0,10	0,12	0,13	0,15
Bearing resistance l_s=100 mm	R_d	kN/m	21,99	28,59	36,68	43,86	61,78
Bearing resistance l_s=200 mm	R_d	kN/m	29,07	37,66	48,11	57,36	80,37
Moment narrow flange	M_d	kNm/m	11,88	14,26	16,66	18,46	22,19
Moment of inertia in compression	I_{efd}	mm⁴/mm	2549	2919	3328	3659	4398
Moment broad flange	M_d	kNm/m	9,19	11,46	14,03	16,20	21,30
Moment of inertia in compression	I_{efd}	mm⁴/mm	2550	2920	3328	3659	4399

TP 128 web perforated has a 4% lower moment and moment of inertia value as well as a 12% lower bearing resistance value – multiply by 0.96 and 0.88 respectively.

Rapid design – Two section sheeting of safety class 1 and 2

Table 2



Rapid design has been done for snow load and selfweight 0.30 kN/m² + T_p. Roof pitch 0 degrees.

Snow load S_o kN/m²	Load reduction factor ψ	Maximum span m (L) for different thicknesses and bearer width ls				
		t = 0,70 L_s = 150	t = 0,80 L_s = 150	t = 0,90 L_s = 150	t = 1,00 L_s = 150	t = 1,20 L_s = 150
1,0	0,6	7,58 m	8,47 m	9,28 m	9,86 m	10,70 m
1,5	0,7	6,33 m	7,11 m	7,83 m	8,35 m	9,34 m
2,0	0,7	5,51 m	6,21 m	6,87 m	7,34 m	8,25 m
2,5	0,7	4,91 m	5,56 m	6,16 m	6,60 m	7,45 m
3,0	0,8	4,45 m	5,06 m	5,63 m	6,04 m	6,83 m
4,0	0,8	3,79 m	4,33 m	4,84 m	5,21 m	5,92 m

Explanatory notes to calculations

All data are based on Swedish Board of Housing,Building and Planning design regulations BKR 99 and StBK-N5.

The sheeting should be checked for the following load combinations.

Loadbearing capacity Snow + Selfweight: (1) $Q_d = 1,3 \times \mu \times S_o + G$

Wind suction + Selfweight: (2) $Q_d = 1,3 \times \mu \times q_k - 0,85 \times G$

Deflextion Ord. snow + Selfweight: (3) $Q_n = 1,0 \times \mu \times \psi \times S_o + G$

μ = shape factor for snow load and wind load

S_o = basic value of snow load

G = selfweight

q_k = caracteristic value of wind load

ψ = load reduction factor for ordinary load (See table 2)

At pitches greater than 20°, load combinations with wind pressure should also be considered. Accumulation of snow should be considered.

Minimum fastening:

End bearer	2 screw in bottom of each profile
Intermediate, end overlap	1 screw in bottom of each profile
Side overlap	Maximum c/c 500 mm

Where the span tables are insufficient,the sheeting should be designd in accordance with the conditions set out below, whereby the dimensioning values for M_d and R_d as per table 1 are divided by partial coefficients specified below for the respective security classes.

		γv		
	Security class	1	2	3
Field	$M_f \leq M_d$	1,0	1,1	1,2
Intermediate	$M_s - R_s \times l_s/8 \leq M_d$	1,0	1,0	1,09
bearer	$(M_s - R_s \times l_s/4) / M_d + 0,64 \times R_s/R_d \leq 1,16$	1,0	1,0	1,09
	$R_s \leq R_d$	1,0	1,0	1,09
End bearer	$R_s \leq R_d$ eller $R^d/2$	1,0	1,1	1,2

For end bearers,the design value R_d is the same as for intermediate bearers if the distance from the end of the sheeting to the nearest purlin is greater than 65 mm; otherwise $R_d/2$ applies. For bearer widths of between 100 and 200 mm, R_d is interpolated rectilinearly. For web perforated sheeting, M_d and I_{efd} are multiplied by 0.96 and R_d by 0.88. For sheeting with an extra wave of overlap, M_d, R_d and Iefd are multiplied by 1.46. The deflection is checked for L/150. Pay attention to the connecting sections, etc. For other deflection requirements, the specified maximum loads can be adjusted proportionately.

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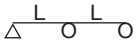
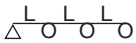
TP 128

ROOF Isolated L/150

Maximum loads in kN/m²

Table 3

Bearing combination	Thick-ness mm	Limitations	Span L (m)												
		Bearer 100	4,20	4,50	4,80	5,10	5,40	5,70	6,0	6,30	6,60	6,90	7,20	7,50	
	0,70	Moment	4,17	3,63	3,19	2,83	2,52	2,26	2,04	1,85	1,69	1,54	1,42	1,31	*Security class 1*
		Deflection	3,84	3,11	2,56	2,13	1,79	1,52	1,30	1,12	0,98	0,85	0,75	0,66	
		Wind suction	5,39	4,69	4,13	3,65	3,26	2,93	2,64	2,39	2,18	2,00	1,83	1,69	
	0,80	Moment	5,20	4,53	3,98	3,52	3,14	2,82	2,55	2,31	2,10	1,93	1,77	1,63	
		Deflection	4,39	3,56	2,93	2,44	2,05	1,74	1,49	1,29	1,12	0,98	0,86	0,76	
		Wind suction	6,47	5,63	4,95	4,39	3,91	3,51	3,17	2,87	2,62	2,40	2,20	2,03	
	0,90	Moment	6,36	5,54	4,87	4,32	3,85	3,45	3,12	2,83	2,58	2,36	2,17	2,00	
		Deflection	5,01	4,06	3,34	2,78	2,34	1,98	1,70	1,47	1,27	1,11	0,98	0,87	
		Wind suction	7,56	6,58	5,78	5,12	4,57	4,10	3,70	3,36	3,06	2,80	2,57	2,37	
	1,00	Moment	7,35	6,40	5,63	4,98	4,44	3,99	3,60	3,27	2,98	2,72	2,50	2,30	
		Deflection	5,50	4,46	3,67	3,05	2,57	2,18	1,87	1,61	1,40	1,22	1,08	0,95	
		Wind suction	8,37	7,29	6,41	5,68	5,06	4,55	4,10	3,72	3,39	3,10	2,85	2,63	
	1,20	Moment	9,66	8,41	7,40	6,55	5,84	5,24	4,73	4,29	3,91	3,58	3,29	3,03	
		Deflection	6,62	5,37	4,41	3,67	3,09	2,62	2,25	1,94	1,68	1,47	1,29	1,14	
		Wind suction	10,06	8,77	7,70	6,83	6,09	5,46	4,93	4,47	4,08	3,73	3,42	3,16	
	0,70	Bearer 100	3,54	3,18	2,87	2,60	2,37	2,17	2,00	1,84	1,70	1,58	1,47	1,37	*Security class 1 and 2*
		Bearer 200	4,16	3,70	3,32	3,00	2,72	2,48	2,26	2,08	1,92	1,77	1,64	1,53	
		Deflection													
		Wind suction	4,17	3,63	3,19	2,83	2,52	2,26	2,04	1,85	1,69	1,54	1,42	1,31	
	0,80	Bearer 100	4,41	3,95	3,56	3,23	2,94	2,69	2,47	2,27	2,10	1,95	1,81	1,69	
		Bearer 200	5,15	4,58	4,10	3,69	3,35	3,05	2,78	2,55	2,35	2,17	2,01	1,87	
		Deflection													
		Wind suction	5,20	4,53	3,98	3,52	3,14	2,82	2,55	2,31	2,10	1,93	1,77	1,63	
	0,90	Bearer 100	5,37	4,80	4,32	3,91	3,55	3,25	2,98	2,74	2,53	2,35	2,18	2,03	
		Bearer 200	6,22	5,53	4,94	4,45	4,02	3,66	3,34	3,06	2,82	2,60	2,41	2,24	
		Deflection													
		Wind suction	6,36	5,54	4,87	4,32	3,85	3,45	3,12	2,83	2,58	2,36	2,17	2,00	
	1,00	Bearer 100	6,14	5,48	4,93	4,45	4,05	3,69	3,38	3,11	2,87	2,66	2,47	2,30	
		Bearer 200	7,08	6,28	5,61	5,04	4,56	4,14	3,78	3,46	3,18	2,94	2,72	2,52	
		Deflection													
		Wind suction	7,35	6,40	5,63	4,98	4,44	3,99	3,60	3,27	2,98	2,72	2,50	2,30	
	1,20	Bearer 100	7,85	6,99	6,27	5,65	5,12	4,66	4,27	3,92	3,61	3,34	3,09	2,88	
		Bearer 200	8,97	7,93	7,07	6,34	5,72	5,19	4,72	4,32	3,97	3,65	3,38	3,13	
		Deflection													
		Wind suction	9,66	8,41	7,40	6,55	5,84	5,24	4,73	4,29	3,91	3,58	3,29	3,03	
	0,70	Bearer 100	4,25	3,81	3,44	3,13	2,86	2,62	2,41	2,23	2,06	1,92	1,78	1,67	*Security class 1 and 2*
		Bearer 200	5,03	4,49	4,03	3,64	3,30	3,01	2,76	2,54	2,34	2,16	2,01	1,87	
		Deflection													
		Wind suction	5,21	4,54	3,99	3,53	3,15	2,83	2,55	2,32	2,11	1,93	1,77	1,63	
	0,80	Bearer 100	5,30	4,75	4,29	3,89	3,55	3,25	2,98	2,75	2,55	2,37	2,20	2,05	
		Bearer 200	6,24	5,56	4,98	4,50	4,08	3,71	3,40	3,12	2,88	2,66	2,47	2,29	
		Deflection													
		Wind suction	6,50	5,66	4,97	4,41	3,93	3,53	3,13	2,89	2,63	2,41	2,21	2,04	
	0,90	Bearer 100	6,49	5,79	5,21	4,72	4,30	3,93	3,61	3,33	3,07	2,85	2,65	2,47	
		Bearer 200	7,56	6,72	6,02	5,42	4,91	4,47	4,08	3,75	3,45	3,19	2,95	2,75	
		Deflection												1,60	
		Wind suction	7,95	6,93	6,09	5,39	4,81	4,32	3,90	3,53	3,22	2,95	2,71	2,49	
	1,00	Bearer 100	7,41	6,62	5,96	5,39	4,90	4,48	4,11	3,78	3,49	3,24	3,01	2,80	
		Bearer 200	8,62	7,66	6,85	6,16	5,57	5,07	4,63	4,24	3,90	3,60	3,34	3,10	
		Deflection										2,26	2,00	1,77	
		Wind suction	9,18	8,00	7,03	6,23	5,56	4,99	4,50	4,08	3,72	3,40	3,13	2,88	
	1,20	Bearer 100	9,50	8,47	7,60	6,86	6,23	5,68	5,20	4,78	4,41	4,08	3,78	3,52	
		Bearer 200	10,96	9,71	8,66	7,77	7,02	6,37	5,80	5,31	4,88	4,50	4,16	3,86	
		Deflection									3,11	2,73	2,40	2,12	
		Wind suction	12,07	10,52	9,24	8,19	7,30	6,56	5,92	5,37	4,89	4,47	4,11	3,79	

Explanations

Moment	Loadbearing capacity in field. Dimensioning load case 1.
Bearer 100	Loadbearing capacity at intermediate bearer with ls = 100 mm. Dimensioning load case 1.
Bearer 200	Loadbearing capacity at intermediate bearer with ls = 200 mm. Dimensioning load case 1.
Deflection	Deflection L/150. Dimensioning load case 3.
Wind suction	Loadbearing capacity for vertical wind load. Dimensioning load case 2.

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