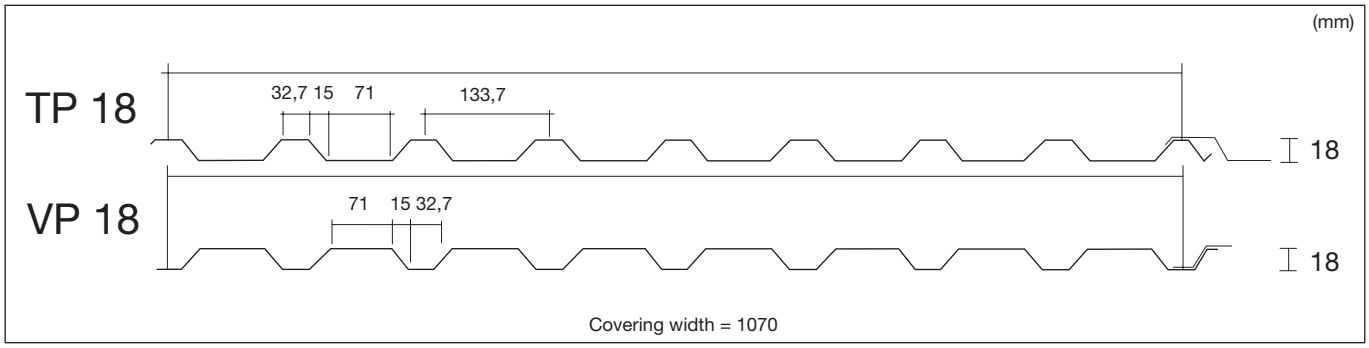
areco

TP/VP 18

Date 000101



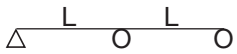
Cross sectional data – calculated for safety class 1

Table 1

Sheet thickness, nominall	t_{nom}	mm	0,40	0,50	0,60	0,65	0,70
Sheet thickness in calculation	t_{ber}	mm	0,332	0,441	0,538	0,587	0,636
Tensile yield stress	f_{ty}	Mpa	250	250	350	350	350
Mass	m	kg/m	3,90	4,60	5,45	5,90	6,40
Selfweight including overlap	g	kN/m^2	0,04	0,05	0,06	0,06	0,07
Bearing resistance l_s=45 mm	R_d	kN/m	7,29	12,22	20,67	24,17	27,89
Bearing resistance l_s=100 mm	R_d	kN/m	10,04	16,66	27,99	32,61	37,53
Moment narrow flange	M_d	kNm/m	0,32	0,48	0,83	0,94	1,06
Moment of inertia in compression	I_{efd}	mm^4/mm	18	26	32	36	40
Moment broad flange	M_d	kNm/m	0,30	0,47	0,82	0,94	1,06
Moment of inertia in compression	I_{efd}	mm^4/mm	14	21	26	29	32

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

Table 2



Rapid design has been done for snow load +Tp.
Roof pitch 0 degrees.
Other span, see table 3.

Specifies limited foot traffic.
See table 4 on reverse of this sheet.

Snow load S_o kN/m^2	Load reduction factor ψ	Maximum span (L) for different thicknesses and bearer witdth ls				
		t=0,40 L_s=45	t=0,50 L_s=45	t=0,60 L_s=45	t=0,65 L_s=45	t=0,70 L_s=45
1,0	0,6	1,55 m	1,94 m	2,57 m	2,75 m	2,93 m
1,5	0,7	1,26 m	1,59 m	2,10 m	2,25 m	2,40 m
2,0	0,7	1,08 m	1,37 m	1,82 m	1,95 m	2,08 m
2,5	0,7	0,96 m	1,22 m	1,62 m	1,74 m	1,86 m
3,0	0,8	0,87 m	1,11 m	1,48 m	1,59 m	1,70 m
4,0	0,8	0,75 m	0,95 m	1,27 m	1,37 m	1,46 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) $Q_d = 1,3 \times \mu \times q_k - 0,85 \times G$
Deflection 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.

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

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 45 and 100 mm, R_d is interpolated rectilinearly.
Deflection has been checked for L/90.For other deflection requirements, the specified maximum loads with respect to deflection can be obtained by proportion.

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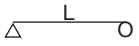
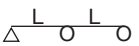
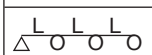
ROOF/WALL

Maximum loads in kN/m²

Table 3

Bearing combination	Thick-ness mm	Limitations	Span L (m)											
			0,60	0,80	1,00	1,20	1,40	1,60	1,80	2,00	2,20	2,40	2,60	2,80
	0,40	Moment	7,04	3,96	2,54	1,76	1,29	0,99	0,78	0,63	0,52	0,44	0,38	0,32
		Deflection					1,18	0,79	0,56	0,41	0,31	0,24	0,19	0,15
		Wind suction	7,04	3,96	2,54	1,76	1,29	0,99	0,78	0,63	0,52	0,44	0,38	0,32
	0,50	Moment	10,64	5,99	3,83	2,66	1,96	1,50	1,18	0,96	0,79	0,67	0,57	0,49
		Deflection					0,71	1,15	0,80	0,59	0,44	0,34	0,27	0,21
		Wind suction	10,64	5,99	3,83	2,66	1,96	1,50	1,18	0,96	0,79	0,67	0,57	0,49
	0,60	Moment	18,44	10,38	6,64	4,61	3,39	2,59	2,05	1,66	1,37	1,15	0,98	0,85
		Deflection			5,57	3,34	2,10	1,41	0,99	0,72	0,54	0,42	0,33	0,26
		Wind suction	18,44	10,38	6,64	4,61	3,39	2,59	2,05	1,66	1,37	1,15	0,98	0,85
	0,65	Moment	20,96	11,79	7,54	5,24	3,85	2,95	2,33	1,89	1,56	1,31	1,12	0,96
		Deflection			6,49	3,76	2,37	1,59	1,11	0,81	0,61	0,47	0,37	0,30
		Wind suction	20,96	11,79	7,54	5,24	3,85	2,95	2,33	1,89	1,56	1,31	1,12	0,96
	0,70	Moment	23,58	13,26	8,49	5,89	4,33	3,32	2,62	2,12	1,75	1,47	1,26	1,08
		Deflection			7,21	4,17	2,63	1,76	1,24	0,90	0,68	0,52	0,41	0,33
		Wind suction	23,58	13,26	8,49	5,89	4,33	3,32	2,62	2,12	1,75	1,47	1,26	1,08
	0,40	Bearer 45	6,50	3,85	2,55	1,77	1,29	0,99	0,78	0,63	0,52	0,43	0,37	0,32
		Bearer 100	8,53	4,50	2,78	1,89	1,36	1,03	0,81	0,65	0,53	0,45	0,38	0,33
		Deflection												
		Wind suction	6,76	3,80	2,43	1,69	1,24	0,95	0,75	0,61	0,50	0,42	0,36	0,31
	0,50	Bearer 45	10,10	5,95	3,92	2,74	2,00	1,52	1,20	0,97	0,80	0,67	0,57	0,49
		Bearer 100	13,19	6,96	4,30	2,92	2,11	1,59	1,25	1,00	0,82	0,69	0,58	0,50
		Deflection												0,48
		Wind suction	10,44	5,88	3,76	2,61	1,92	1,47	1,16	0,94	0,78	0,65	0,56	0,48
	0,60	Bearer 45	17,34	10,24	6,75	4,76	3,47	2,65	2,08	1,68	1,39	1,16	0,99	0,85
		Bearer 100	22,93	12,10	7,47	5,07	3,66	2,77	2,17	1,74	1,43	1,20	1,02	0,87
		Deflection								1,63	1,22	0,94	0,74	0,59
		Wind suction	18,16	10,21	6,54	4,54	3,34	2,55	2,02	1,63	1,35	1,14	0,97	0,83
	0,65	Bearer 45	19,83	11,69	7,71	5,46	3,99	3,04	2,39	1,93	1,59	1,33	1,13	0,98
		Bearer 100	26,30	13,88	8,57	5,81	4,20	3,18	2,49	2,00	1,64	1,37	1,17	1,00
		Deflection								1,83	1,37	1,06	0,83	0,67
		Wind suction	20,82	11,71	7,50	5,21	3,82	2,93	2,31	1,87	1,55	1,30	1,11	0,96
	0,70	Bearer 45	22,44	13,21	8,70	6,16	4,52	3,44	2,71	2,19	1,80	1,51	1,29	1,11
		Bearer 100	29,84	15,75	9,72	6,59	4,76	3,60	2,82	2,27	1,86	1,56	1,32	1,14
		Deflection							2,78	2,02	1,52	1,17	0,92	0,74
		Wind suction	23,62	13,29	8,50	5,91	4,34	3,32	2,63	2,13	1,76	1,48	1,26	1,09
	0,40	Bearer 45	7,40	4,43	2,95	2,11	1,58	1,23	0,97	0,78	0,64	0,54	0,46	0,40
		Bearer 100	9,91	5,51	3,42	2,32	1,68	1,28	1,00	0,80	0,66	0,55	0,47	0,40
		Deflection							0,98	0,72	0,54	0,42	0,33	0,26
		Wind suction	8,44	4,75	3,04	2,11	1,55	1,19	0,94	0,76	0,63	0,53	0,45	0,39
	0,50	Bearer 45	11,77	7,01	4,65	3,31	2,48	1,90	1,49	1,21	0,99	0,83	0,71	0,61
		Bearer 100	15,70	8,51	5,28	3,59	2,60	1,97	1,55	1,24	1,02	0,86	0,73	0,62
		Deflection							1,44	1,05	0,79	0,61	0,48	0,38
		Wind suction	13,06	7,34	4,70	3,26	2,40	1,84	1,45	1,18	0,97	0,82	0,70	0,60
	0,60	Bearer 45	20,27	12,10	8,04	5,73	4,29	3,29	2,59	2,09	1,73	1,45	1,23	1,06
		Bearer 100	26,98	14,80	9,18	6,25	4,52	3,43	2,69	2,16	1,78	1,49	1,26	1,09
		Deflection				5,97	3,76	2,52	1,77	1,29	0,97	0,75	0,59	0,47
		Wind suction	22,69	12,77	8,17	5,67	4,17	3,19	2,52	2,04	1,69	1,42	1,21	1,04
	0,65	Bearer 45	23,41	13,95	9,26	6,59	4,93	3,78	2,97	2,40	1,98	1,66	1,41	1,22
		Bearer 100	31,11	16,98	10,53	7,16	5,19	3,93	3,08	2,48	2,04	1,71	1,45	1,24
		Deflection				6,70	4,22	2,83	1,99	1,45	1,09	0,84	0,66	0,53
		Wind suction	26,03	14,64	9,37	6,51	4,78	3,66	2,89	2,34	1,94	1,63	1,39	1,20
	0,70	Bearer 45	26,71	15,90	10,55	7,50	5,61	4,29	3,37	2,73	2,25	1,88	1,60	1,38
		Bearer 100	35,47	19,26	11,94	8,13	5,89	4,46	3,49	2,81	2,31	1,93	1,64	1,41
		Deflection				7,43	4,68	3,14	2,20	1,61	1,21	0,93	0,73	0,59
		Wind suction	29,53	16,61	10,63	7,38	5,42	4,15	3,28	2,66	2,20	1,85	1,57	1,36

Foot traffic recommended by Areco

Table 4

Pitch	Division into sections	0,40	0,50	0,60	0,65	0,70
≤ 14°	Single section	–	0,4	1,0	1,2	1,4
	Multiple section	–	0,5	1,3	1,6	1,9
> 14°	Single section	–	0,6	1,4	1,7	1,9
	Multiple section	–	0,7	1,8	2,4	2,6

Explanations

Moment — Bearing capacity in field. Design load combination 1

Bearer 45 — Bearing capacity for intermediate bearer with ls = 45mm. Design load combination 1

Upplag 100 — Bearing capacity for intermediate bearer with ls = 100mm. esign load combination 1

Deflection — Deflextion L/150. Design load combination 3

Wind suction — Bearing capacity for upwardly directed wind load. Design load combination 2

Wind suction

When designing the sheeting for wind suction, check that M_{akt} is less than M_{dim}.

If the sheeting is fixed with only 1 screw/every other profile bottom, M_{akt} less than 0,75 x M_{dim}.

Wind load, se Swedish Board of Housing, snow and wind load BSV 97 edition 2 page 80.

***** Subject to alteration without notice *****