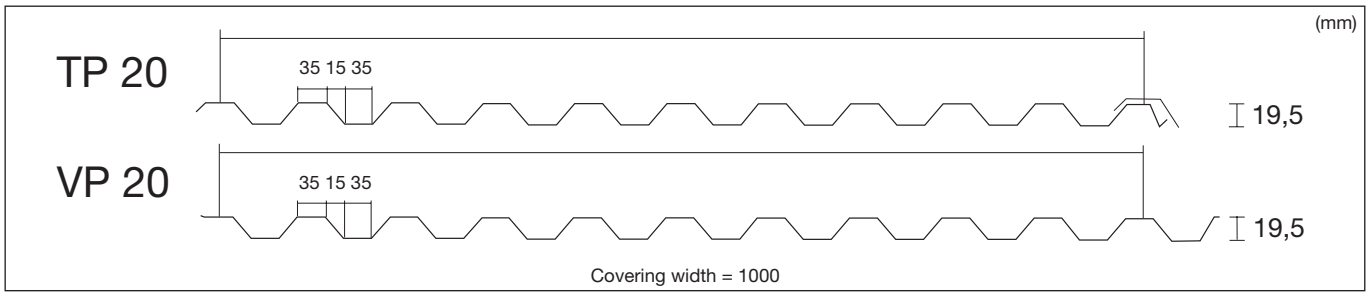
areco

TP/VP 20

Date 000101



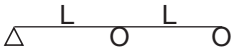
Cross sectional data – calculated for safety class 1

Table 1

Sheet thickness, nominal	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	9,85	16,51	29,94	32,66	37,69
Bearing resistance l_s=100 mm	R_d	kN/m	13,56	22,51	37,82	44,08	50,72
Moment narrow flange	M_d	kNm/m	0,44	0,66	1,15	1,30	1,47
Moment of inertia in compression	I_{efd}	mm^4/mm	22	32	40	44	49
Moment broad flange	M_d	kNm/m	0,44	0,66	1,15	1,30	1,47
Moment of inertia in compression	I_{efd}	mm^4/mm	22	32	40	44	49

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 m (L) for different thicknesses and bearer width 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	1,86 m	2,31 m	3,04 m	3,24 m	3,38 m
1,5	0,7	1,51 m	1,88 m	2,49 m	2,66 m	2,83 m
2,0	0,7	1,30 m	1,63 m	2,16 m	2,31 m	2,45 m
2,5	0,7	1,16 m	1,45 m	1,93 m	2,06 m	2,19 m
3,0	0,8	1,05 m	1,32 m	1,76 m	1,88 m	2,00 m
4,0	0,8	0,90 m	1,14 m	1,52 m	1,62 m	1,73 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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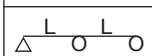
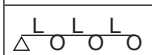
Maximum loads in kN/m²

Table 3

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

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 *****