L_base 1500

Constants

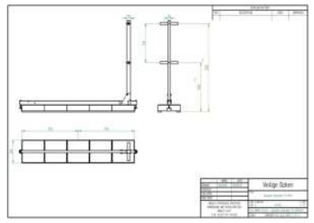
Formfactors	cf
rectangular tube	1,81
round tube	1,12

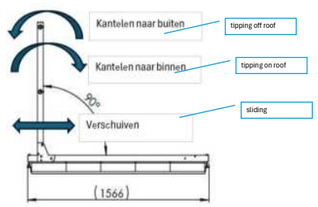
Safety factors

for weights,un favourable	γ_{sf}	1,3
for weights, favourable	γ_{sf}	0,9
for variable loads	γ_{sf}	1,5

Other

Friction coefficient	μ	0,8
gravitational constant	g	9,81
density of weights	rho	2,24E-03 kg/cm3





q	wind pressure	kN/m2	
R	resistance to loads	kN	
M	Resistance to tipping	kN/m2	

4m stanchion distance

Guardrail data

Component	l (m)	b,d (m)	hz (m)	h_exposed (m)	A_exposed (m2)	shape	weight (kg)	cf	Lever onto roof	lever off the roof	M_onroof	M_offroof	R_sliding	E_tipping per N/m2 (ex safety)	E_sliding per N/m2 (ex safety)	E_tipping_safe per N/m2 (including safety)	E_sliding_safe per N/m2 (including safety)
Stanchion	1,190	0,030	0,595	1,040	0,0312	rectangular tube	3,60	1,81	1,029	0,471	32,7061	14,9705	25,4275	0,0337	0,0566	0,0505	0,0849
Top rail	4,000	0,042	1,155	4,000	0,168	round tube	2,73	1,12	1,428	0,072	34,3773	1,7333	19,2590	0,2165	0,1875	0,3248	0,2812
Bottom rail	4,000	0,042	0,645	4,000	0,168	round tube	2,73	1,12	1,428	0,072	34,3773	1,7333	19,2590	0,1209	0,1875	0,1814	0,2812
Mid stanchion	0,600	0,030	0,900	0,516	0,01548	rectangular tube	0,46	1,81	1,428	0,072	5,8374	0,2943	3,2703	0,0253	0,0281	0,0379	0,0421
Total							**9,52**				**107**	**19**	**67**	**0,39641**	**0,45963**	**0,59461**	**0,68945**

Counterweightsystem

Name	b	d	h	mass per weight (kg)	amount of weights	Lever onto roof	lever off the roof	M_onroof	M_offroof	R_sliding	M_onroof_total	M_offroof_total	R_sliding_total	q_onroof (ex safety)	q_offroof (ex safety)	q_sliding (ex safety)	Max windload: q_onroof_safe (including safety)	Max windload: q_offroof_safe (including safety)	Max windload: q_sliding_safe (including safety)	Imposed loads on structure: local load per stanchion (kN) (ex safety)	Imposed loads on structure: average distributed load kN/m (ex safety)	Imposed loads on structure: Pressure on surface (N/cm2) (ex safety)
1500L - 30x30x6	30	30	6	12,1	5	0,75	0,75	401	401	428	509	420	495	1.283 N/m2	1.060 N/m2	1.077 N/m2	855 N/m2	706 N/m2	718 N/m2	0,69	0,17	0,23
1500L - 30x30x6 (stacked)	30	30	6	12,1	10	0,75	0,75	803	803	856	910	821	923	2.295 N/m2	2.072 N/m2	2.009 N/m2	1.530 N/m2	1.381 N/m2	1.339 N/m2	1,28	0,32	0,43
1500L - 30x30x8	30	30	8	16,2	5	0,75	0,75	535	535	571	642	554	638	1.620 N/m2	1.397 N/m2	1.388 N/m2	1.080 N/m2	931 N/m2	925 N/m2	0,89	0,22	0,30
1500L - 30x30x8 (stacked)	30	30	8	16,2	10	0,75	0,75	1070	1070	1141	1177	1089	1209	2.970 N/m2	2.747 N/m2	2.630 N/m2	1.980 N/m2	1.831 N/m2	1.753 N/m2	1,68	0,42	0,56
1500L - 50x50x5	50	50	5	28,1	3	0,75	0,75	557	557	594	665	576	662	1.677 N/m2	1.453 N/m2	1.440 N/m2	1.118 N/m2	969 N/m2	960 N/m2	0,92	0,23	0,31
1500L - 50x50x5 (stacked)	50	50	5	28,1	6	0,75	0,75	1115	1115	1189	1222	1133	1256	3.083 N/m2	2.898 N/m2	2.733 N/m2	2.055 N/m2	1.906 N/m2	1.822 N/m2	1,74	0,44	0,58
1500L - 15x30x6	15	30	6	6,1	5	0,75	0,75	201	201	214	308	219	281	777 N/m2	553 N/m2	612 N/m2	518 N/m2	369 N/m2	408 N/m2	0,39	0,10	0,13
1500L - 15x30x6 (Stacked)	15	30	6	6,1	10	0,75	0,75	401	401	428	509	420	495	1.283 N/m2	1.060 N/m2	1.077 N/m2	855 N/m2	706 N/m2	718 N/m2	0,69	0,17	0,23
1500L - 15x30x8	15	30	8	8,1	5	0,75	0,75	268	268	285	375	286	353	946 N/m2	722 N/m2	767 N/m2	630 N/m2	481 N/m2	511 N/m2	0,49	0,12	0,16
1500L - 15x30x8 (Stacked)	15	30	8	8,1	10	0,75	0,75	535	535	571	642	554	638	1.620 N/m2	1.397 N/m2	1.388 N/m2	1.080 N/m2	931 N/m2	925 N/m2	0,89	0,22	0,30

3m stanchion distance

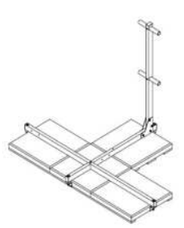
Guardrail data

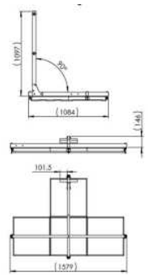
Component	l (m)	b,d (m)	hz (m)	h_exposed (m)	A_exposed (m2)	shape	weight (kg)	cf	Lever onto roof	lever off the roof	M_onroof	M_offroof	R_sliding	E_tipping per N/m2 (ex safety)	E_sliding per N/m2 (ex safety)	E_tipping_safe per N/m2 (including safety)	E_sliding_safe per N/m2 (including safety)
Stanchion	1,190	0,030	0,595	1,040	0,0312	rectangular tube	3,60	1,81	1,029	0,471	32,7061	14,9705	25,4275	0,0337	0,0566	0,0505	0,0849
Top rail	3,000	0,042	1,155	3,000	0,126	round tube	2,05	1,12	1,428	0,072	25,7830	1,3000	14,4442	0,1624	0,1406	0,2436	0,2109
Bottom rail	3,000	0,042	0,645	3,000	0,126	round tube	2,05	1,12	1,428	0,072	25,7830	1,3000	14,4442	0,0907	0,1406	0,1360	0,2109
Mid stanchion	0,600	0,030	0,900	0,516	0,01548	rectangular tube	0,46	1,81	1,428	0,072	5,8374	0,2943	3,2703	0,0253	0,0281	0,0379	0,0421
Total							**8,1530**				**90,1095**	**17,8647**	**57,5863**	**0,3120**	**0,3659**	**0,4681**	**0,5488**

Counterweightsystem

Name	b	d	h	mass per weight (kg)	amount of weights	Lever onto roof	lever off the roof	M_onroof	M_offroof	R_sliding	M_onroof_total	M_offroof_total	R_sliding_total	q_onroof (ex safety)	q_offroof (ex safety)	q_sliding (ex safety)	Max windload: q_onroof_safe (including safety)	Max windload: q_offroof_safe (including safety)	Max windload: q_sliding_safe (including safety)	Imposed loads on structure: local load per stanchion (kN) (ex safety)	Imposed loads on structure: average distributed load kN/m (ex safety)	Imposed loads on structure: Pressure on surface (N/cm2) (ex safety)
1500L - 30x30x6	30	30	6	12,1	5	0,75	0,75	401	401	428	491	419	486	1.575 N/m2	1.343 N/m2	1.327 N/m2	1.050 N/m2	895 N/m2	885 N/m2	0,69	0,23	0,23
1500L - 30x30x6 (stacked)	30	30	6	12,1	10	0,75	0,75	803	803	856	893	820	914	2.861 N/m2	2.629 N/m2	2.497 N/m2	1.907 N/m2	1.753 N/m2	1.665 N/m2	1,28	0,43	0,43
1500L - 30x30x8	30	30	8	16,2	5	0,75	0,75	535	535	571	625	553	628	2.003 N/m2	1.772 N/m2	1.717 N/m2	1.336 N/m2	1.181 N/m2	1.145 N/m2	0,89	0,30	0,30
1500L - 30x30x8 (stacked)	30	30	8	16,2	10	0,75	0,75	1070	1070	1141	1160	1088	1199	3.718 N/m2	3.487 N/m2	3.277 N/m2	2.479 N/m2	2.324 N/m2	2.185 N/m2	1,68	0,56	0,56
1500L - 50x50x5	50	50	5	28,1	3	0,75	0,75	557	557	594	647	575	652	2.075 N/m2	1.843 N/m2	1.782 N/m2	1.383 N/m2	1.229 N/m2	1.188 N/m2	0,92	0,31	0,31
1500L - 50x50x5 (stacked)	50	50	5	28,1	6	0,75	0,75	1115	1115	1189	1205	1133	1247	3.861 N/m2	3.629 N/m2	3.407 N/m2	2.574 N/m2	2.420 N/m2	2.271 N/m2	1,74	0,58	0,58
1500L - 15x30x6	15	30	6	6,1	5	0,75	0,75	201	201	214	291	272	332	932 N/m2	700 N/m2	742 N/m2	621 N/m2	467 N/m2	495 N/m2	0,39	0,13	0,13
1500L - 15x30x6 (Stacked)	15	30	6	6,1	10	0,75	0,75	401	401	428	491	419	486	1.575 N/m2	1.343 N/m2	1.327 N/m2	1.050 N/m2	895 N/m2	885 N/m2	0,69	0,23	0,23
1500L - 15x30x8	15	30	8	8,1	5	0,75	0,75	268	268	285	358	285	343	1.146 N/m2	915 N/m2	937 N/m2	764 N/m2	610 N/m2	625 N/m2	0,49	0,16	0,16
1500L - 15x30x8 (Stacked)	15	30	8	8,1	10	0,75	0,75	535	535	571	625	553	628	2.003 N/m2	1.772 N/m2	1.717 N/m2	1.336 N/m2	1.181 N/m2	1.145 N/m2	0,89	0,30	0,30

T-Base 1000





4m stanchion distance

Guardrail data

													ex safety	ex safety	including safety	including safety
Component	**l (m)**	**b,d (m)**	**hz (m)**	**h_exposed (m)**	**A_exposed (m2)**	**shape**	**weight (kg)**	**cf**	**Lever onto roof**	**lever off the roof**	**M_onroof**	**M_offroof**	**R_sliding**	**E_tipping per N/m2**	**E_sliding per N/m2**	**E_tipping_safe per N/m2**	**E_sliding_safe per N/m2**
Stanchion	1,190	0,030	0,595	1,040	0,0312	rectangular tube	5,00	1,81	0,616	0,384	27,1770	16,9415	35,2948	0,0337	0,0566	0,0505	0,0849
Top rail	4,000	0,042	1,155	4,000	0,168	round tube	2,73	1,12	0,928	0,072	22,3404	1,7333	19,2590	0,2165	0,1875	0,3248	0,2812
Bottom rail	4,000	0,042	0,645	4,000	0,168	round tube	2,73	1,12	0,928	0,072	22,3404	1,7333	19,2590	0,1209	0,1875	0,1814	0,2812
Mid stanchion	0,600	0,030	0,900	0,516	0,01548	rectangular tube	0,46	1,81	0,928	0,072	3,7935	0,2943	3,2703	0,0253	0,0281	0,0379	0,0421
Total							**10,91**				**76**	**21**	**77**	**0,39641**	**0,45963**	**0,59461**	**0,68945**

Counterweightsystem

													ex safety	ex safety	ex safety	**Max windload** including safety	including safety	including safety	**Imposed loads on structure** ex safety	ex safety	ex safety
Name	**b**	**d**	**h**	**mass per weight (kg)**	**amount of weigths**	**Lever onto roof**	**lever off the roof**	**M_onroof**	**M_offroof**	**R_sliding**	**M_onroof_total**	**M_offroof_total**	**R_sliding_total**	**q_onroof**	**q_offroof**	**q_sliding**	**q_onroof_safe**	**q_offroof_safe**	**q_sliding_safe**	**local load per stanchion (kN)**	**average distributed load kN/m**	**Pressure on surface (N/cm2)**
1500T-1000 - 50x50x5	50	50	5	28,1	4	0,375	0,625	372	619	793	447	640	870	1.128 N/m2	1.614 N/m2	1.892 N/m2	752 N/m2	1.076 N/m2	1.261 N/m2	1,21	0,30	0,30
1500T-1000 - 50x50x5 (stacked)	50	50	5	28,1	8	0,375	0,625	743	1239	1585	819	1259	1662	2.065 N/m2	3.177 N/m2	3.617 N/m2	1.377 N/m2	2.118 N/m2	2.411 N/m2	2,31	0,58	0,58

3m stanchion distance

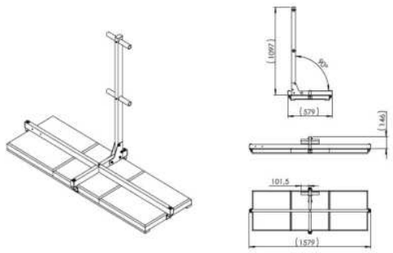
Guardrail data

													ex safety	ex safety	including safety	including safety
Component	**l (m)**	**b,d (m)**	**hz (m)**	**h_exposed (m)**	**A_exposed (m2)**	**shape**	**weight (kg)**	**cf**	**Lever onto roof**	**lever off the roof**	**M_onroof**	**M_offroof**	**R_sliding**	**E_tipping per N/m2**	**E_sliding per N/m2**	**E_tipping_safe per N/m2**	**E_sliding_safe per N/m2**
Stanchion	1,190	0,030	0,595	1,040	0,0312	rectangular tube	5,00	1,81	0,616	0,384	27,1770	16,9415	35,2948	0,0337	0,0566	0,0505	0,0849
Top rail	3,000	0,042	1,155	3,000	0,126	round tube	2,05	1,12	0,928	0,072	16,7553	1,3000	14,4442	0,1624	0,1406	0,2436	0,2109
Bottom rail	3,000	0,042	0,645	3,000	0,126	round tube	2,05	1,12	0,928	0,072	16,7553	1,3000	14,4442	0,0907	0,1406	0,1360	0,2109
Mid stanchion	0,600	0,030	0,900	0,516	0,01548	rectangular tube	0,46	1,81	0,928	0,072	3,7935	0,2943	3,2703	0,0253	0,0281	0,0379	0,0421
Total							**9,55**				**64**	**20**	**67**	**0,31204**	**0,36589**	**0,46806**	**0,54883**

Counterweightsystem

													ex safety	ex safety	ex safety	**Max windload** including safety	including safety	including safety	**Imposed loads on structure** ex safety	ex safety	ex safety
Name	**b**	**d**	**h**	**mass per weight (kg)**	**amount of weigths**	**Lever onto roof**	**lever off the roof**	**M_onroof**	**M_offroof**	**R_sliding**	**M_onroof_total**	**M_offroof_total**	**R_sliding_total**	**q_onroof**	**q_offroof**	**q_sliding**	**q_onroof_safe**	**q_offroof_safe**	**q_sliding_safe**	**local load per stanchion (kN)**	**average distributed load kN/m**	**Pressure on surface (N/cm2)**
1500T-1000 - 50x50x5	50	50	5	28,1	4	0,375	0,625	372	619	793	436	639	860	1.397 N/m2	2.048 N/m2	2.351 N/m2	932 N/m2	1.365 N/m2	1.567 N/m2	1,21	0,40	0,30
1500T-1000 - 50x50x5 (stacked)	50	50	5	28,1	8	0,375	0,625	743	1239	1585	808	1258	1653	2.588 N/m2	4.033 N/m2	4.517 N/m2	1.725 N/m2	2.688 N/m2	3.011 N/m2	2,31	0,77	0,58

T_base 500



4m stanchion distance

Guardrail data

													ex safety	ex safety	including safety	including safety
Component	**l (m)**	**b,d (m)**	**hz (m)**	**h_exposed (m)**	**A_exposed (m2)**	**shape**	**weight (kg)**	**cf**	**Lever onto roof**	**lever off the roof**	**M_onroof**	**M_offroof**	**R_sliding**	**E_tipping per N/m2**	**E_sliding per N/m2**	**E_tipping_safe per N/m2**	**E_sliding_safe per N/m23**
Stanchion	1,190	0,030	0,595	1,040	0,0312	rectangular tube	5,00	1,81	0,116	0,384	5,1177	16,9415	35,2948	0,0337	0,0566	0,0505	0,0849
Top rail	4,000	0,042	1,155	4,000	0,168	round tube	2,73	1,12	0,428	0,072	10,3036	1,7333	19,2590	0,2165	0,1875	0,3248	0,2812
Bottom rail	4,000	0,042	0,645	4,000	0,168	round tube	2,73	1,12	0,428	0,072	10,3036	1,7333	19,2590	0,1209	0,1875	0,1814	0,2812
Mid stanchion	0,600	0,030	0,900	0,516	0,01548	rectangular tube	0,46	1,81	0,428	0,072	1,7496	0,2943	3,2703	0,0253	0,0281	0,0379	0,0421
Total							**10,91**				**27**	**21**	**77**	**0,39641**	**0,45963**	**0,59461**	**0,68945**

Counterweightsystem

														ex safety	ex safety	ex safety	**Max windload**			**Imposed loads on structure**		
				mass per weight	amount of												including safety	including safety	including safety	ex safety	ex safety	ex safety
Name	**b**	**d**	**h**	**(kg)**	**weigths**	**Lever onto roof**	**lever off the roof**	**M_onroof**	**M_offroof**	**R_sliding**	**M_onroof_total**	**M_offroof_total**	**R_sliding_total**	**q_onroof**	**q_offroof**	**q_sliding**	**q_onroof_safe**	**q_offroof_safe**	**q_sliding_safe**	**local load per stanchion (kN)**	**average distributed load kN/m**	**Pressure on surface (N/cm2)**
1500T-500 - 50x50x5	50	50	5	28,1	3	0,25	0,25	186	186	594	213	206	672	538 N/m2	521 N/m2	1.461 N/m2	359 N/m2	347 N/m2	974 N/m2	0,93	0,23	0,31
1500T-500 - 50x50x5 (stacked)	50	50	5	28,1	6	0,25	0,25	372	372	1189	399	392	1266	1.007 N/m2	990 N/m2	2.755 N/m2	671 N/m2	660 N/m2	1.836 N/m2	1,76	0,44	0,59

3m stanchion distance

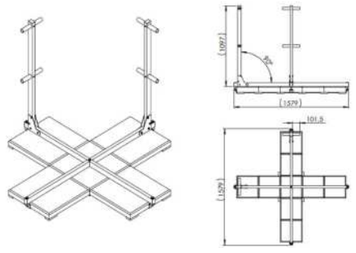
Guardrail data

													ex safety	ex safety	including safety	including safety
Component	**l (m)**	**b,d (m)**	**hz (m)**	**h_exposed (m)**	**A_exposed (m2)**	**shape**	**weight (kg)**	**cf**	**Lever onto roof**	**lever off the roof**	**M_onroof**	**M_offroof**	**R_sliding**	**E_tipping per N/m2**	**E_sliding per N/m2**	**E_tipping_safe per N/m2**	**E_sliding_safe per N/m23**
Stanchion	1,190	0,030	0,595	1,040	0,0312	rectangular tube	5,00	1,81	0,116	0,384	5,1177	16,9415	35,2948	0,0337	0,0566	0,0505	0,0849
Top rail	3,000	0,042	1,155	3,000	0,126	round tube	2,05	1,12	0,428	0,072	7,7277	1,3000	14,4442	0,1624	0,1406	0,2436	0,2109
Bottom rail	3,000	0,042	0,645	3,000	0,126	round tube	2,05	1,12	0,428	0,072	7,7277	1,3000	14,4442	0,0907	0,1406	0,1360	0,2109
Mid stanchion	0,600	0,030	0,900	0,516	0,01548	rectangular tube	0,46	1,81	0,428	0,072	1,7496	0,2943	3,2703	0,0253	0,0281	0,0379	0,0421
Total							**9,55**				**22**	**20**	**67**	**0,31204**	**0,36589**	**0,46806**	**0,54883**

Counterweightsystem

														ex safety	ex safety	ex safety	**Max windload**			**Imposed loads on structure**		
				mass per weight	amount of												including safety	including safety	including safety	ex safety	ex safety	ex safety
Name	**b**	**d**	**h**	**(kg)**	**weigths**	**Lever onto roof**	**lever off the roof**	**M_onroof**	**M_offroof**	**R_sliding**	**M_onroof_total**	**M_offroof_total**	**R_sliding_total**	**q_onroof**	**q_offroof**	**q_sliding**	**q_onroof_safe**	**q_offroof_safe**	**q_sliding_safe**	**local load per stanchion (kN)**	**average distributed load kN/m**	**Pressure on surface (N/cm2)**
1500T-500 - 50x50x5	50	50	5	28,1	3	0,25	0,25	186	186	594	208	206	662	667 N/m2	659 N/m2	1.809 N/m2	445 N/m2	439 N/m2	1.206 N/m2	0,92	0,31	0,31
1500T-500 - 50x50x5 (stacked)	50	50	5	28,1	6	0,25	0,25	372	372	1189	394	391	1256	1.262 N/m2	1.254 N/m2	3.434 N/m2	842 N/m2	836 N/m2	2.289 N/m2	1,75	0,58	0,58

X-Base 1500



4m stanchion distance

Guardrail data

Component	l (m)	b,d (m)	hz (m)	h_exposed (m)	A_exposed (m2)	shape	weight (kg)	cf	Lever onto roof	lever off the roof	M_onroof	M_offroof	R_sliding	E_tipping per N/m2	E_sliding per N/m2	E_tipping_safe per N/m2	E_sliding_safe per N/m23
														ex safety	ex safety	including safety	including safety
Stanchion	1,190	0,030	0,595	1,040	0,0312	rectangular tube	9,82	1,81	0,996	0,504	86,3716	43,7061	69,3748	0,0337	0,0566	0,0505	0,0849
Top rail	4,000	0,042	1,155	4,000	0,168	round tube	2,73	1,12	1,428	0,072	34,3773	1,7333	19,2590	0,2165	0,1875	0,3248	0,2812
Bottom rail	4,000	0,042	0,645	4,000	0,168	round tube	2,73	1,12	1,428	0,072	34,3773	1,7333	19,2590	0,1209	0,1875	0,1814	0,2812
Mid stanchion	0,600	0,030	0,900	0,516	0,01548	rectangular tube	0,46	1,81	1,428	0,072	5,8374	0,2943	3,2703	0,0253	0,0281	0,0379	0,0421
Total							**15,74**				**161**	**47**	**111**	**0,39641**	**0,45963**	**0,59461**	**0,68945**

Counterweightsystem

Name	b	d	h	mass per weight (kg)	amount of weigths	Lever onto roof	lever off the roof	M_onroof	M_offroof	R_sliding	M_onroof_total	M_offroof_total	R_sliding_total	q_onroof	q_offroof	q_sliding	q_onroof_safe	q_offroof_safe	q_sliding_safe	local load per stanchion (kN)	average distributed load kN/m	Pressure on surface (N/cm2)
														ex safety	ex safety	ex safety	including safety	including safety	including safety			
1500X - 30x30x6	30	30	6	12,1	9	0,75	0,75	722	722	770	883	770	882	2.228 N/m2	1.942 N/m2	1.918 N/m2	1.485 N/m2	1.295 N/m2	1.279 N/m2	1,22	0,31	0,41
1500X - 30x30x6 (stacked)	30	30	6	12,1	18	0,75	0,75	1445	1445	1541	1606	1492	1652	4.050 N/m2	3.764 N/m2	3.594 N/m2	2.700 N/m2	2.509 N/m2	2.396 N/m2	2,29	0,57	0,76
1500X - 30x30x8	30	30	8	16,2	9	0,75	0,75	963	963	1027	1124	1011	1138	2.836 N/m2	2.549 N/m2	2.477 N/m2	1.890 N/m2	1.699 N/m2	1.651 N/m2	1,58	0,40	0,53
1500X - 30x30x8 (stacked)	30	30	8	16,2	18	0,75	0,75	1926	1926	2055	2087	1974	2166	5.265 N/m2	4.979 N/m2	4.712 N/m2	3.510 N/m2	3.319 N/m2	3.141 N/m2	3,01	0,75	1,00
1500X - 50x50x5	50	50	5	28,1	5	0,75	0,75	929	929	991	1090	976	1102	2.749 N/m2	2.463 N/m2	2.398 N/m2	1.833 N/m2	1.642 N/m2	1.598 N/m2	1,53	0,38	0,51
1500X - 50x50x5 (stacked)	50	50	5	28,1	10	0,75	0,75	1858	1858	1982	2019	1905	2093	5.093 N/m2	4.806 N/m2	4.553 N/m2	3.395 N/m2	3.204 N/m2	3.035 N/m2	2,91	0,73	0,97

3m stanchion distance

Guardrail data

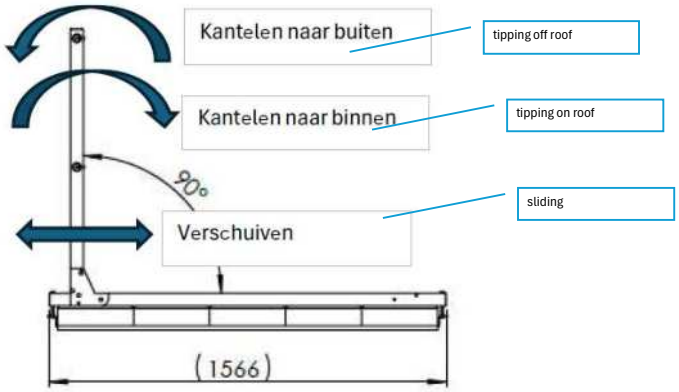
Component	l (m)	b,d (m)	hz (m)	h_exposed (m)	A_exposed (m2)	shape	weight (kg)	cf	Lever onto roof	lever off the roof	M_onroof	M_offroof	R_sliding	E_tipping per N/m2	E_sliding per N/m2	E_tipping_safe per N/m2	E_sliding_safe per N/m23
														ex safety	ex safety	including safety	including safety
Stanchion	1,190	0,030	0,595	1,040	0,0312	rectangular tube	9,82	1,81	0,996	0,504	86,3716	43,7061	69,3748	0,0337	0,0566	0,0505	0,0849
Top rail	3,000	0,042	1,155	3,000	0,126	round tube	2,05	1,12	1,428	0,072	25,7830	1,3000	14,4442	0,1624	0,1406	0,2436	0,2109
Bottom rail	3,000	0,042	0,645	3,000	0,126	round tube	2,05	1,12	1,428	0,072	25,7830	1,3000	14,4442	0,0907	0,1406	0,1360	0,2109
Mid stanchion	0,600	0,030	0,900	0,516	0,01548	rectangular tube	0,46	1,81	1,428	0,072	5,8374	0,2943	3,2703	0,0253	0,0281	0,0379	0,0421
Total							**14,38**				**144**	**47**	**102**	**0,31204**	**0,36589**	**0,46806**	**0,54883**

Counterweightsystem

Name	b	d	h	mass per weight (kg)	amount of weigths	Lever onto roof	lever off the roof	M_onroof	M_offroof	R_sliding	M_onroof_total	M_offroof_total	R_sliding_total	q_onroof	q_offroof	q_sliding	q_onroof_safe	q_offroof_safe	q_sliding_safe	local load per stanchion (kN)	average distributed load kN/m	Pressure on surface (N/cm2)
														ex safety	ex safety	ex safety	including safety	including safety	including safety			
1500X - 30x30x6	30	30	6	12,1	9	0,75	0,75	722	722	770	866	769	872	2.776 N/m2	2.464 N/m2	2.383 N/m2	1.850 N/m2	1.643 N/m2	1.589 N/m2	1,21	0,40	0,40
1500X - 30x30x6 (stacked)	30	30	6	12,1	18	0,75	0,75	1445	1445	1541	1588	1491	1642	5.090 N/m2	4.779 N/m2	4.489 N/m2	3.394 N/m2	3.186 N/m2	2.993 N/m2	2,28	0,76	0,76
1500X - 30x30x8	30	30	8	16,2	9	0,75	0,75	963	963	1027	1107	1010	1129	3.547 N/m2	3.236 N/m2	3.085 N/m2	2.365 N/m2	2.157 N/m2	2.057 N/m2	1,57	0,52	0,52
1500X - 30x30x8 (stacked)	30	30	8	16,2	18	0,75	0,75	1926	1926	2055	2070	1973	2156	6.633 N/m2	6.322 N/m2	5.893 N/m2	4.422 N/m2	4.215 N/m2	3.929 N/m2	2,99	1,00	1,00
1500X - 50x50x5	50	50	5	28,1	5	0,75	0,75	929	929	991	1073	975	1092	3.438 N/m2	3.126 N/m2	2.985 N/m2	2.292 N/m2	2.084 N/m2	1.990 N/m2	1,52	0,51	0,51
1500X - 50x50x5 (stacked)	50	50	5	28,1	10	0,75	0,75	1858	1858	1982	2002	1904	2083	6.414 N/m2	6.103 N/m2	5.693 N/m2	4.276 N/m2	4.069 N/m2	3.796 N/m2	2,89	0,96	0,96

Summary of results

Stanchion type	Stanchion distance	Counterweight system	Max q_onroof_safe	Max q_offroof_safe	Max q_sliding_safe
1500L	**3m**	15x30x6	621	467	495
		15x30x6 (Stacked)	1050	895	885
		15x30x8	764	610	625
		15x30x8 (Stacked)	1336	1181	1145
		30x30x6	1050	895	885
		30x30x6 (stacked)	1907	1753	1665
		30x30x8	1336	1181	1145
		30x30x8 (stacked)	2479	2324	2185
		50x50x5	1383	1229	1188
		50x50x5 (stacked)	2574	2420	2271
	4m	15x30x6	518	369	408
		15x30x6 (Stacked)	855	706	718
		15x30x8	630	481	511
		15x30x8 (Stacked)	1080	931	925
		30x30x6	855	706	718
		30x30x6 (stacked)	1530	1381	1339
		30x30x8	1080	931	925
		30x30x8 (stacked)	1980	1831	1753
		50x50x5	1118	969	960
		50x50x5 (stacked)	2055	1906	1822
1500T-1000	**3m**	50x50x5	932	1365	1567
		50x50x5 (stacked)	1725	2688	3011
	4m	50x50x5	752	1076	1261
		50x50x5 (stacked)	1377	2118	2411
1500T-500	**3m**	50x50x5	445	439	1206
		50x50x5 (stacked)	842	836	2289
	4m	50x50x5	359	347	974
		50x50x5 (stacked)	671	660	1836
1500X	**3m**	30x30x6	1850	1643	1589
		30x30x6 (stacked)	3394	3186	2993
		30x30x8	2365	2157	2057
		30x30x8 (stacked)	4422	4215	3929
		50x50x5	2292	2084	1990
		50x50x5 (stacked)	4276	4069	3796
	4m	30x30x6	1485	1295	1279
		30x30x6 (stacked)	2700	2509	2396
		30x30x8	1890	1699	1651
		30x30x8 (stacked)	3510	3319	3141
		50x50x5	1833	1642	1598
		50x50x5 (stacked)	3395	3204	3035



q	wind pressure	kN/m2
R	resistance to loads	kN
M	Resistance to tipping	kN/m2

Stanchion type	Stanchion distance	Counterweight system	Applied local load per stanchion (kN)	Applied average distributed load kN/m	Applied Pressure on surface (N/cm2)
1500L	**3m**	15x30x6	0,39	0,13	0,13
		15x30x6 (Stacked)	0,69	0,23	0,23
		15x30x8	0,49	0,16	0,16
		15x30x8 (Stacked)	0,89	0,30	0,30
		30x30x6	0,69	0,23	0,23
		30x30x6 (stacked)	1,28	0,43	0,43
		30x30x8	0,89	0,30	0,30
		30x30x8 (stacked)	1,68	0,56	0,56
		50x50x5	0,92	0,31	0,31
		50x50x5 (stacked)	1,74	0,58	0,58
	4m	15x30x6	0,39	0,10	0,13
		15x30x6 (Stacked)	0,69	0,17	0,23
		15x30x8	0,49	0,12	0,16
		15x30x8 (Stacked)	0,89	0,22	0,30
		30x30x6	0,69	0,17	0,23
		30x30x6 (stacked)	1,28	0,32	0,43
		30x30x8	0,89	0,22	0,30
		30x30x8 (stacked)	1,68	0,42	0,56
		50x50x5	0,92	0,23	0,31
		50x50x5 (stacked)	1,74	0,44	0,58
1500T-1000	**3m**	50x50x5	1,21	0,40	0,30
		50x50x5 (stacked)	2,31	0,77	0,58
	4m	50x50x5	1,21	0,30	0,30
		50x50x5 (stacked)	2,31	0,58	0,58
1500T-500	**3m**	50x50x5	0,92	0,31	0,31
		50x50x5 (stacked)	1,75	0,58	0,58
	4m	50x50x5	0,93	0,23	0,31
		50x50x5 (stacked)	1,76	0,44	0,59
1500X	**3m**	30x30x6	1,21	0,40	0,40
		30x30x6 (stacked)	2,28	0,76	0,76
		30x30x8	1,57	0,52	0,52
		30x30x8 (stacked)	2,99	1,00	1,00
		50x50x5	1,52	0,51	0,51
		50x50x5 (stacked)	2,89	0,96	0,96
	4m	30x30x6	1,22	0,31	0,41
		30x30x6 (stacked)	2,29	0,57	0,76
		30x30x8	1,58	0,40	0,53
		30x30x8 (stacked)	3,01	0,75	1,00
		50x50x5	1,53	0,38	0,51
		50x50x5 (stacked)	2,91	0,73	0,97

Windpressure in N/m^2

Combined Max windload combined incl safety	Column Labels	
Row Labels	**3m**	**4m**
1500L		
15x30x6	467	369
15x30x6 (Stacked)	885	706
15x30x8	610	481
15x30x8 (Stacked)	1.145	925
30x30x6	885	706
30x30x6 (stacked)	1.665	1.339
30x30x8	1.145	925
30x30x8 (stacked)	2.185	1.753
50x50x5	1.188	960
50x50x5 (stacked)	2.271	1.822
1500T-1000		
50x50x5	932	752
50x50x5 (stacked)	1.725	1.377
1500T-500		
50x50x5	439	347
50x50x5 (stacked)	836	660
1500X		
30x30x6	1.589	1.279
30x30x6 (stacked)	2.993	2.396
30x30x8	2.057	1.651
30x30x8 (stacked)	3.929	3.141
50x50x5	1.990	1.598
50x50x5 (stacked)	3.796	3.035