Appendix 2 RR® and RD® piles
Design and installation manual

RR piles
End-of-driving tables and curves for different pile driving equipment

Updated 3/2025

CONTENT

DROP HAMMERS

Efficiency of the hammer 80 %						Drop height [m] and impact energy [kNm] to achieve R_c and R_d values			
Pile	Pile length [m]	Settlement s_{10} [mm]	Piling work class	R_c [kN]	R_d [kN]	Weight of the ram block [kg]			
						500	1000	1360	1500
RR75	5	10	PTL1	343	194	0.45 m 2 kNm	0.25 m 2 kNm	0.20 m 2 kNm	0.15 m 2 kNm
	10	10				0.65 m 3 kNm	0.35 m 3 kNm	0.25 m 3 kNm	0.25 m 3 kNm
	20	10				1.00 m 4 kNm	0.50 m 4 kNm	0.40 m 4 kNm	0.35 m 4 kNm
	30	10				1.10 m 4 kNm	0.70 m 5 kNm	0.50 m 5 kNm	0.45 m 5 kNm
	5	10	PTL2	400	227	0.55 m 2 kNm	0.30 m 2 kNm	0.20 m 2 kNm	0.20 m 2 kNm
	10	10				0.80 m 3 kNm	0.45 m 4 kNm	0.35 m 4 kNm	0.30 m 4 kNm
	20	10				1.30 m 5 kNm	0.65 m 5 kNm	0.50 m 5 kNm	0.50 m 6 kNm
	30	10				1.50 m 6 kNm	0.90 m 7 kNm	0.65 m 7 kNm	0.60 m 7 kNm
	5	10	PTL2	458	260	0.70 m 3 kNm	0.35 m 3 kNm	0.25 m 3 kNm	0.25 m 3 kNm
	10	10				1.00 m 4 kNm	0.55 m 4 kNm	0.40 m 4 kNm	0.40 m 5 kNm
	20	10				1.50 m (430) 6 kNm	0.85 m 7 kNm	0.65 m 7 kNm	0.65 m 8 kNm
	30	10				1.50 m (405) 6 kNm	1.20 m 9 kNm	0.85 m 9 kNm	0.80 m 9 kNm
	5	7	PTL3	515	292	0.80 m 3 kNm	0.40 m 3 kNm	0.30 m 3 kNm	0.25 m 3 kNm
	10	7				1.15 m 5 kNm	0.65 m 5 kNm	0.50 m 5 kNm	0.45 m 5 kNm
	20	7					1.00 m 8 kNm	0.75 m 8 kNm	0.75 m 9 kNm
	30	7					1.45 m 11 kNm	1.00 m 11 kNm	0.95 m 11 kNm
	5	7	PTL3	572	324	0.80 m (515) 3 kNm	0.40 m (515) 3 kNm	0.30 m (515) 3 kNm	0.25 m (515) 3 kNm
	10	7				1.20 m (530) 5 kNm	0.65 m (515) 5 kNm	0.50 m (515) 5 kNm	0.45 m (530) 5 kNm
	20	7					1.20 m (565) 9 kNm	0.90 m (565) 10 kNm	0.85 m (560) 10 kNm
	30	7					1.50 m (525) 12 kNm	1.20 m (565) 13 kNm	1.15 m 14 kNm
RR90	5	10	PTL1	406	230	0.55 m 2 kNm	0.25 m 2 kNm	0.20 m 2 kNm	0.20 m 2 kNm
	10	10				0.75 m 3 kNm	0.40 m 3 kNm	0.30 m 3 kNm	0.30 m 4 kNm
	20	10				1.15 m 5 kNm	0.60 m 5 kNm	0.45 m 5 kNm	0.45 m 5 kNm
	30	10				1.25 m 5 kNm	0.85 m 7 kNm	0.60 m 6 kNm	0.55 m 6 kNm
	5	10	PTL2	474	269	0.65 m 3 kNm	0.35 m 3 kNm	0.25 m 3 kNm	0.25 m 3 kNm
	10	10				1.00 m 4 kNm	0.55 m 4 kNm	0.40 m 4 kNm	0.35 m 4 kNm
	20	10				1.50 m (465) 6 kNm	0.80 m 6 kNm	0.60 m 6 kNm	0.55 m 6 kNm
	30	10				1.50 m (455) 6 kNm	1.10 m 9 kNm	0.80 m 9 kNm	0.75 m 9 kNm
	5	10	PTL2	541	307	0.80 m 3 kNm	0.40 m 3 kNm	0.30 m 3 kNm	0.30 m 4 kNm
	10	10				1.25 m 5 kNm	0.70 m 5 kNm	0.50 m 5 kNm	0.45 m 5 kNm
	20	10					1.00 m 8 kNm	0.75 m 8 kNm	0.70 m 8 kNm
	30	10					1.45 m 11 kNm	1.00 m 11 kNm	0.95 m 11 kNm
	5	7	PTL3	609	345	0.95 m 4 kNm	0.50 m 4 kNm	0.35 m 4 kNm	0.30 m 4 kNm
	10	7				1.35 m (605) 5 kNm	0.80 m 6 kNm	0.60 m 6 kNm	0.55 m 6 kNm
	20	7					1.20 m 9 kNm	0.90 m 10 kNm	0.85 m 10 kNm
	30	7					1.50 m (565) 12 kNm	1.20 m (605) 13 kNm	1.10 m 13 kNm
	5	7	PTL3	677	384	0.95 m (609) 4 kNm	0.50 m (609) 4 kNm	0.35 m (609) 4 kNm	0.30 m (610) 4 kNm
	10	7					0.80 m (620) 6 kNm	0.60 m (609) 6 kNm	0.55 m (609) 6 kNm
	20	7					1.30 m (640) 10 kNm	1.00 m (655) 11 kNm	0.95 m (650) 11 kNm
	30	7							1.30 m (660) 15 kNm

Values in brackets (xxxx) represent the maximum achievable R_c value with particular pile size, pile length and hammer size.

DROP HAMMERS

Efficiency of the hammer 80 %						Drop height [m] and impact energy [kNm] to achieve R_c and R_d values				
Pile	Pile length [m]	Settlement s_{10} [mm]	Piling work class	R_c [kN]	R_d [kN]	Weight of the ram block [kg]				
						500	1000	1360	1500	2000
RR115/6.3	5	10	PTL1	531	301	0.75 m 3 kNm	0.35 m 3 kNm	0.30 m 3 kNm	0.25 m 3 kNm	0.20 m 3 kNm
	10	10				1.05 m 4 kNm	0.55 m 4 kNm	0.40 m 4 kNm	0.35 m 4 kNm	0.30 m 5 kNm
	20	10				1.40 m 5 kNm	0.85 m 7 kNm	0.60 m 6 kNm	0.55 m 6 kNm	0.45 m 7 kNm
	30	10				1.45 m 6 kNm	1.05 m 8 kNm	0.80 m 9 kNm	0.75 m 9 kNm	0.55 m 9 kNm
	5	10	PTL2	619	351	0.90 m 4 kNm	0.45 m 4 kNm	0.35 m 4 kNm	0.30 m 4 kNm	0.25 m 4 kNm
	10	10				1.35 m 5 kNm	0.70 m 5 kNm	0.55 m 6 kNm	0.50 m 6 kNm	0.35 m 5 kNm
	20	10				1.50 m (560) 6 kNm	1.10 m 9 kNm	0.80 m 9 kNm	0.70 m 8 kNm	0.55 m 9 kNm
	30	10				1.50 m (540) 6 kNm	1.40 m 11 kNm	1.05 m 11 kNm	1.00 m 12 kNm	0.75 m 12 kNm
	5	10	PTL2	708	401	1.15 m 5 kNm	0.55 m 4 kNm	0.40 m 4 kNm	0.40 m 5 kNm	0.30 m 5 kNm
	10	10				1.50 m (660) 6 kNm	0.90 m 7 kNm	0.65 m 7 kNm	0.60 m 7 kNm	0.45 m 7 kNm
	20	10					1.40 m 11 kNm	1.00 m 11 kNm	0.90 m 11 kNm	0.70 m 11 kNm
	30	10					1.50 m (640) 12 kNm	1.20 m (660) 13 kNm	1.25 m 15 kNm	0.95 m 15 kNm
	5	7	PTL3	796	451	1.20 m (785) 5 kNm	0.65 m 5 kNm	0.45 m (790) 5 kNm	0.45 m 5 kNm	0.30 m 5 kNm
	10	7					1.00 m 8 kNm	0.80 m 9 kNm	0.70 m 8 kNm	0.55 m 9 kNm
	20	7					1.50 m (765) 12 kNm	1.15 m 12 kNm	1.05 m 12 kNm	0.85 m 13 kNm
	30	7							1.50 m (790) 18 kNm	1.10 m 17 kNm
	5	7	PTL3	885	502		0.65 m (796) 5 kNm		0.45 m (796) 5 kNm	0.30 m (796) 5 kNm
	10	7					1.00 m (805) 8 kNm	0.80 m (796) 9 kNm	0.70 m (796) 8 kNm	0.55 m (796) 9 kNm
	20	7						1.20 m (815) 13 kNm	1.20 m (850) 14 kNm	0.95 m (855) 15 kNm
	30	7								1.30 m (865) 20 kNm

Values in brackets (xxxx) represent the maximum achievable R_c value with particular pile size, pile length and hammer size.

DROP HAMMERS

Efficiency of the hammer 80 %						Drop height [m] and impact energy [kNm] to achieve R_c and R_d values				
Pile	Pile length [m]	Settlement s_{10} [mm]	Piling work class	R_c [kN]	R_d [kN]	Weight of the ram block [kg]				
						1000	1360	1500	2000	3000
RR115/8	5	10	PTL1	664	376	0.45 m 4 kNm	0.35 m 4 kNm	0.30 m 4 kNm	0.25 m 4 kNm	0.20 m 5 kNm
	10	10				0.65 m 5 kNm	0.50 m 5 kNm	0.45 m 5 kNm	0.35 m 5 kNm	0.30 m 7 kNm
	20	10				1.00 m 8 kNm	0.75 m 8 kNm	0.65 m 8 kNm	0.50 m 8 kNm	0.40 m 9 kNm
	30	10				1.15 m 9 kNm	0.95 m 10 kNm	0.90 m 11 kNm	0.70 m 11 kNm	0.25 m 6 kNm
	5	10	PTL2	774	439	0.55 m 4 kNm	0.40 m 4 kNm	0.40 m 5 kNm	0.30 m 5 kNm	0.25 m 6 kNm
	10	10				0.85 m 7 kNm	0.65 m 7 kNm	0.60 m 7 kNm	0.45 m 7 kNm	0.35 m 8 kNm
	20	10				1.35 m 11 kNm	0.95 m 10 kNm	0.90 m 11 kNm	0.65 m 10 kNm	
	30	10				1.50 m 12 kNm	1.20 m (750) 13 kNm	1.20 m 14 kNm	0.90 m 14 kNm	0.30 m 7 kNm
	5	10	PTL2	885	502	0.70 m 5 kNm	0.50 m 5 kNm	0.45 m 5 kNm	0.35 m 5 kNm	0.30 m 7 kNm
	10	10				1.05 m 8 kNm	0.80 m 9 kNm	0.75 m 9 kNm	0.55 m 9 kNm	0.45 m 11 kNm
	20	10				1.50 m (830) 12 kNm	1.20 m (880) 13 kNm	1.10 m 13 kNm	0.85 m 13 kNm	
	30	10				1.50 m (775) 12 kNm		1.50 m (870) 18 kNm	1.15 m 18 kNm	0.30 m 7 kNm
	5	7	PTL3	995	564	0.80 m 6 kNm	0.60 m 6 kNm	0.55 m 6 kNm	0.40 m 6 kNm	0.35 m 8 kNm
	10	7				1.15 m 9 kNm	0.90 m 10 kNm	0.85 m 10 kNm	0.65 m 10 kNm	0.50 m 12 kNm
	20	7					1.20 m (905) 13 kNm	1.30 m 15 kNm	1.00 m 16 kNm	0.35 m 8 kNm
	30	7						1.50 m (890) 18 kNm	1.40 m 22 kNm	0.35 m 8 kNm
	5	7	PTL3	1106	627	0.80 m (995) 6 kNm	0.60 m (995) 6 kNm	0.55 m (995) 6 kNm	0.40 m (995) 6 kNm	0.35 m (995) 8 kNm
	10	7				1.20 m (1015) 9 kNm	0.95 m (1030) 10 kNm	0.90 m (1035) 11 kNm	0.65 m (995) 10 kNm	0.50 m (995) 12 kNm
	20	7						1.40 m (1035) 16 kNm	1.15 m (1085) 18 kNm	0.40 m 9 kNm
	30	7							1.50 m (1030) 24 kNm	0.45 m 11 kNm
RRs115/8	5	10	PTL1	793	450	0.60 m 5 kNm	0.45 m 5 kNm	0.40 m 5 kNm	0.30 m 5 kNm	0.25 m 6 kNm
	10	10				0.85 m 7 kNm	0.65 m 7 kNm	0.60 m 7 kNm	0.45 m 7 kNm	0.35 m 8 kNm
	20	10				1.40 m 11 kNm	1.00 m 11 kNm	0.90 m 11 kNm	0.70 m 11 kNm	
	30	10				1.50 m (775) 12 kNm	1.20 m (750) 13 kNm	1.25 m 15 kNm	0.95 m 15 kNm	0.30 m 7 kNm
	5	10	PTL2	926	525	0.75 m 6 kNm	0.55 m 6 kNm	0.50 m 6 kNm	0.40 m 6 kNm	0.30 m 7 kNm
	10	10				1.10 m 9 kNm	0.85 m 9 kNm	0.80 m 9 kNm	0.60 m 9 kNm	0.45 m 11 kNm
	20	10				1.50 m (830) 12 kNm	1.20 m (880) 13 kNm	1.20 m 14 kNm	0.90 m 14 kNm	0.40 m 9 kNm
	30	10						1.50 m (870) 18 kNm	1.30 m 20 kNm	0.35 m 8 kNm
	5	10	PTL2	1058	600	0.90 m 7 kNm	0.70 m 7 kNm	0.60 m 7 kNm	0.45 m 7 kNm	0.40 m 9 kNm
	10	10				1.40 m 11 kNm	1.10 m 12 kNm	1.00 m 12 kNm	0.75 m 12 kNm	0.60 m 14 kNm
	20	10						1.50 m (1040) 18 kNm	1.20 m 19 kNm	0.45 m 11 kNm
	30	10							1.50 m (1010) 24 kNm	0.45 m 11 kNm
	5	7	PTL3	1190	675	1.05 m 8 kNm	0.80 m 9 kNm	0.70 m 8 kNm	0.55 m 9 kNm	0.45 m 11 kNm
	10	7				1.50 m (1150) 12 kNm	1.20 m (1170) 13 kNm	1.20 m 14 kNm	0.90 m 14 kNm	0.65 m 15 kNm
	20	7						1.50 m (1070) 18 kNm	1.40 m 22 kNm	0.45 m 11 kNm
	30	7								0.55 m 13 kNm
	5	7	PTL3	1322	749	1.05 m (1190) 8 kNm	0.80 m (1190) 9 kNm	0.70 m (1195) 8 kNm	0.55 m (1190) 9 kNm	0.45 m (1190) 11 kNm
	10	7						1.30 m (1265) 15 kNm	0.90 m (1205) 14 kNm	0.65 m (1200) 15 kNm
	20	7							1.50 m (1240) 24 kNm	0.50 m 12 kNm
	30	7								0.70 m 16 kNm

Values in brackets (xxxx) represent the maximum achievable R_c value with particular pile size, pile length and hammer size.

DROP HAMMERS

Efficiency of the hammer 80 %						Drop height [m] and impact energy [kNm] to achieve R_c and R_d values				
Pile	Pile length [m]	Settlement s_{10} [mm]	Piling work class	R_c [kN]	R_d [kN]	Weight of the ram block [kg] 1360	2000	3000	4000	5000
RR140/8	5	10	PTL1	822	466	0.45 m 5 kNm	0.30 m 5 kNm	0.25 m 6 kNm	0.20 m 6 kNm	0.15 m 6 kNm
	10	10				0.60 m 6 kNm	0.45 m 7 kNm	0.35 m 8 kNm	0.25 m 8 kNm	0.20 m 8 kNm
	20	10				0.95 m 10 kNm	0.65 m 10 kNm	0.50 m 12 kNm	0.40 m 13 kNm	0.30 m 12 kNm
	30	10				1.10 m 12 kNm	0.85 m 13 kNm	0.65 m 15 kNm	0.50 m 16 kNm	0.35 m 14 kNm
	5	10	PTL2	959	544	0.55 m 6 kNm	0.35 m 5 kNm	0.30 m 7 kNm	0.25 m 8 kNm	0.15 m 6 kNm
	10	10				0.80 m 9 kNm	0.55 m 9 kNm	0.45 m 11 kNm	0.30 m 9 kNm	0.25 m 10 kNm
	20	10				1.20 m (950) 13 kNm	0.85 m 13 kNm	0.65 m 15 kNm	0.50 m 16 kNm	0.40 m 16 kNm
	30	10				1.20 m (865) 13 kNm	1.15 m 18 kNm	0.80 m 19 kNm	0.70 m 22 kNm	0.50 m 20 kNm
	5	10	PTL2	1096	621	0.65 m 7 kNm	0.45 m 7 kNm	0.40 m 9 kNm	0.30 m 9 kNm	0.20 m 8 kNm
	10	10				1.00 m 11 kNm	0.70 m 11 kNm	0.55 m 13 kNm	0.40 m 13 kNm	0.30 m 12 kNm
	20	10					1.05 m 16 kNm	0.85 m 20 kNm	0.65 m 20 kNm	0.50 m 20 kNm
	30	10					1.50 m 24 kNm	1.00 m 24 kNm	0.85 m 27 kNm	0.65 m 26 kNm
	5	7	PTL3	1233	699	0.75 m 8 kNm	0.50 m 8 kNm	0.45 m 11 kNm	0.30 m 9 kNm	0.20 m 8 kNm
	10	7				1.15 m 12 kNm	0.85 m 13 kNm	0.60 m 14 kNm	0.45 m 14 kNm	0.35 m 14 kNm
	20	7					1.25 m 20 kNm	0.95 m 22 kNm	0.75 m 24 kNm	0.60 m 24 kNm
	30	7					1.50 m (1130) 24 kNm	0.70 m 16 kNm	1.05 m 33 kNm	0.75 m 29 kNm
	5	7	PTL3	1370	777	0.75 m (1233) 8 kNm	0.50 m (1255) 8 kNm	0.45 m (1233) 11 kNm	0.30 m (1255) 9 kNm	0.20 m (1233) 8 kNm
	10	7				1.15 m (1260) 12 kNm	0.85 m (1265) 13 kNm	0.60 m (1250) 14 kNm	0.45 m (1260) 14 kNm	0.35 m (1275) 14 kNm
	20	7					1.35 m (1290) 21 kNm	1.10 m (1260) 26 kNm	0.85 m (1325) 27 kNm	0.60 m (1275) 24 kNm
	30	7						0.85 m 20 kNm	1.20 m (1340) 38 kNm	0.90 m 35 kNm
RRs140/8	5	10	PTL1	983	557	0.55 m 6 kNm	0.40 m 6 kNm	0.35 m 8 kNm	0.25 m 8 kNm	0.15 m 6 kNm
	10	10				0.85 m 9 kNm	0.60 m 9 kNm	0.45 m 11 kNm	0.35 m 11 kNm	0.25 m 10 kNm
	20	10				1.20 m (950) 13 kNm	0.90 m 14 kNm	0.70 m 16 kNm	0.55 m 17 kNm	0.40 m 16 kNm
	30	10				1.20 m (865) 13 kNm	1.20 m 19 kNm	0.85 m 20 kNm	0.70 m 22 kNm	0.50 m 20 kNm
	5	10	PTL2	1147	650	0.70 m 7 kNm	0.50 m 8 kNm	0.40 m 9 kNm	0.30 m 9 kNm	0.20 m 8 kNm
	10	10				1.10 m 12 kNm	0.75 m 12 kNm	0.55 m 13 kNm	0.45 m 14 kNm	0.30 m 12 kNm
	20	10					1.15 m 18 kNm	0.90 m 21 kNm	0.70 m 22 kNm	0.55 m 22 kNm
	30	10					1.50 m (1095) 24 kNm	1.10 m 26 kNm	0.95 m 30 kNm	0.70 m 27 kNm
	5	10	PTL2	1311	743	0.90 m 10 kNm	0.60 m 9 kNm	0.50 m 12 kNm	0.35 m 11 kNm	0.25 m 10 kNm
	10	10				1.20 m (1230) 13 kNm	1.00 m 16 kNm	0.70 m 16 kNm	0.55 m 17 kNm	0.40 m 16 kNm
	20	10					1.50 m 24 kNm	1.15 m 27 kNm	0.90 m 28 kNm	0.70 m 27 kNm
	30	10						0.85 m 20 kNm	1.20 m 38 kNm	0.90 m 35 kNm
	5	7	PTL3	1475	836	1.00 m 11 kNm	0.70 m 11 kNm	0.55 m 13 kNm	0.40 m 13 kNm	0.30 m 12 kNm
	10	7					1.15 m 18 kNm	0.80 m 19 kNm	0.60 m 19 kNm	0.50 m 20 kNm
	20	7					1.50 m (1365) 24 kNm	1.20 m (1405) 28 kNm	1.05 m 33 kNm	0.80 m 31 kNm
	30	7						0.95 m 22 kNm	1.20 m (1340) 38 kNm	1.05 m 41 kNm
	5	7	PTL3	1638	929	1.00 m (1475) 11 kNm	0.70 m (1525) 11 kNm	0.60 m (1560) 14 kNm	0.40 m (1490) 13 kNm	0.30 m (1475) 12 kNm
	10	7					1.20 m (1520) 19 kNm	0.85 m (1535) 20 kNm	0.65 m (1550) 20 kNm	0.50 m (1475) 20 kNm
	20	7							1.20 m (1580) 38 kNm	0.85 m (1520) 33 kNm
	30	7						1.15 m 27 kNm		1.20 m (1575) 47 kNm

Values in brackets (xxxx) represent the maximum achievable R_c value with particular pile size, pile length and hammer size.

DROP HAMMERS

Efficiency of the hammer 80 %						Drop height [m] and impact energy [kNm] to achieve R_c and R_d values				
Pile	Pile length [m]	Settlement s_{10} [mm]	Piling work class	R_c [kN]	R_d [kN]	Weight of the ram block [kg] 1360	2000	3000	4000	5000
RR140/10	5	10	PTL1	1012	574	0.50 m 5 kNm	0.35 m 5 kNm	0.30 m 7 kNm	0.20 m 6 kNm	0.15 m 6 kNm
	10	10				0.75 m 8 kNm	0.50 m 8 kNm	0.40 m 9 kNm	0.30 m 9 kNm	0.25 m 10 kNm
	20	10				1.10 m 12 kNm	0.75 m 12 kNm	0.55 m 13 kNm	0.45 m 14 kNm	0.35 m 14 kNm
	30	10				1.20 m 13 kNm	1.00 m 16 kNm	0.75 m 18 kNm	0.60 m 19 kNm	0.40 m 16 kNm
	5	10	PTL2	1181	670	0.65 m 7 kNm	0.45 m 7 kNm	0.40 m 9 kNm	0.30 m 9 kNm	0.20 m 8 kNm
	10	10				0.95 m 10 kNm	0.65 m 10 kNm	0.50 m 12 kNm	0.40 m 13 kNm	0.30 m 12 kNm
	20	10				1.20 m (1065) 13 kNm	1.00 m 16 kNm	0.75 m 18 kNm	0.60 m 19 kNm	0.45 m 18 kNm
	30	10				1.20 m (1030) 13 kNm	1.00 m (1015) 16 kNm	0.85 m 20 kNm	0.85 m 27 kNm	0.55 m 22 kNm
	5	10	PTL2	1350	765	0.80 m 9 kNm	0.55 m 9 kNm	0.45 m 11 kNm	0.35 m 11 kNm	0.25 m 10 kNm
	10	10				1.20 m 13 kNm	0.85 m 13 kNm	0.65 m 15 kNm	0.45 m 14 kNm	0.35 m 14 kNm
	20	10					1.30 m 20 kNm	0.90 m 21 kNm	0.75 m 24 kNm	0.60 m 24 kNm
	30	10					1.50 m (1250) 24 kNm	0.50 m 12 kNm	1.05 m 33 kNm	0.75 m 29 kNm
	5	7	PTL3	1518	861	0.90 m 10 kNm	0.60 m 9 kNm	0.50 m 12 kNm	0.40 m 13 kNm	0.25 m 10 kNm
	10	7				1.20 m (1445) 13 kNm	0.95 m 15 kNm	0.75 m 18 kNm	0.55 m 17 kNm	0.45 m 18 kNm
	20	7					1.50 m (1505) 24 kNm	0.55 m 13 kNm	0.90 m 28 kNm	0.70 m 27 kNm
	30	7						0.60 m 14 kNm	1.20 m (1480) 38 kNm	0.85 m 33 kNm
	5	7	PTL3	1687	956	0.90 m (1518) 10 kNm	0.60 m (1518) 9 kNm	0.50 m (1545) 12 kNm	0.40 m (1630) 13 kNm	0.25 m (1555) 10 kNm
	10	7					1.00 m (1580) 16 kNm	0.80 m (1630) 19 kNm	0.55 m (1575) 17 kNm	0.45 m (1518) 18 kNm
	20	7						0.65 m 15 kNm	1.00 m (1635) 31 kNm	0.80 m (1655) 31 kNm
	30	7						0.70 m 16 kNm		1.05 m (1685) 41 kNm
RRs140/10	5	10	PTL1	1210	686	0.70 m 7 kNm	0.45 m 7 kNm	0.40 m 9 kNm	0.30 m 9 kNm	0.20 m 8 kNm
	10	10				1.00 m 11 kNm	0.70 m 11 kNm	0.55 m 13 kNm	0.40 m 13 kNm	0.30 m 12 kNm
	20	10				1.20 m (1065) 13 kNm	1.05 m 16 kNm	0.75 m 18 kNm	0.65 m 20 kNm	0.50 m 20 kNm
	30	10				1.20 m (1030) 13 kNm	1.45 m 23 kNm	0.65 m 15 kNm	0.85 m 27 kNm	0.60 m 24 kNm
	5	10	PTL2	1412	800	0.85 m 9 kNm	0.60 m 9 kNm	0.50 m 12 kNm	0.35 m 11 kNm	0.25 m 10 kNm
	10	10				1.20 m (1375) 13 kNm	0.90 m 14 kNm	0.70 m 16 kNm	0.50 m 16 kNm	0.40 m 16 kNm
	20	10					1.40 m 22 kNm	1.00 m 24 kNm	0.85 m 27 kNm	0.65 m 26 kNm
	30	10					1.50 m (1250) 24 kNm	0.60 m 14 kNm	1.15 m 36 kNm	0.80 m 31 kNm
	5	10	PTL2	1614	915	1.05 m 11 kNm	0.70 m 11 kNm	0.60 m 14 kNm	0.45 m 14 kNm	0.30 m 12 kNm
	10	10					1.15 m 18 kNm	0.85 m 20 kNm	0.65 m 20 kNm	0.50 m 20 kNm
	20	10					1.50 m (1465) 24 kNm	0.65 m 15 kNm	1.05 m 33 kNm	0.85 m 33 kNm
	30	10						0.70 m 16 kNm	1.20 m (1445) 38 kNm	1.05 m 41 kNm
	5	7	PTL3	1815	1029	1.20 m (1795) 13 kNm	0.85 m 13 kNm	0.70 m 16 kNm	0.50 m 16 kNm	0.35 m 14 kNm
	10	7					1.30 m 20 kNm	1.00 m 24 kNm	0.75 m 24 kNm	0.60 m 24 kNm
	20	7						0.65 m 15 kNm	1.20 m (1805) 38 kNm	1.00 m 39 kNm
	30	7						0.80 m 19 kNm		1.20 m (1795) 47 kNm
	5	7	PTL3	2017	1143		0.85 m (1815) 13 kNm	0.70 m (1815) 16 kNm	0.55 m (1970) 17 kNm	0.35 m (1890) 14 kNm
	10	7					1.45 m (1935) 23 kNm	1.15 m 27 kNm	0.75 m (1870) 24 kNm	0.60 m (1880) 24 kNm
	20	7						0.75 m 18 kNm		1.20 m 47 kNm
	30	7						0.95 m 22 kNm		

Values in brackets (xxxx) represent the maximum achievable R_c value with particular pile size, pile length and hammer size.

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Efficiency of the hammer 80 %						Drop height [m] and impact energy [kNm] to achieve R_c and R_d values			
Pile	Pile length [m]	Settlement s_{10} [mm]	Piling work class	R_c [kN]	R_d [kN]	Weight of the ram block [kg] 2000	3000	4000	5000
RR170/10	5	10	PTL1	1235	700	0.45 m 7 kNm	0.40 m 9 kNm	0.30 m 9 kNm	0.20 m 8 kNm
	10	10				0.65 m 10 kNm	0.50 m 12 kNm	0.40 m 13 kNm	0.30 m 12 kNm
	20	10				1.00 m 16 kNm	0.70 m 16 kNm	0.55 m 17 kNm	0.40 m 16 kNm
	30	10				1.15 m 18 kNm	1.00 m 24 kNm	0.75 m 24 kNm	0.55 m 22 kNm
	5	10	PTL2	1441	817	0.55 m 9 kNm	0.45 m 11 kNm	0.35 m 11 kNm	0.25 m 10 kNm
	10	10				0.85 m 13 kNm	0.65 m 15 kNm	0.50 m 16 kNm	0.35 m 14 kNm
	20	10				1.30 m 20 kNm	0.95 m 22 kNm	0.75 m 24 kNm	0.55 m 22 kNm
	30	10				1.50 m 24 kNm	1.20 m (1395) 28 kNm	1.00 m 31 kNm	0.70 m 27 kNm
	5	10	PTL2	1647	934	0.70 m 11 kNm	0.55 m 13 kNm	0.45 m 14 kNm	0.30 m 12 kNm
	10	10				1.05 m 16 kNm	0.80 m 19 kNm	0.60 m 19 kNm	0.45 m 18 kNm
	20	10				1.50 m (1575) 24 kNm	1.15 m 27 kNm	0.95 m 30 kNm	0.70 m 27 kNm
	30	10				1.50 m (1445) 24 kNm		1.20 m (1590) 38 kNm	0.90 m 35 kNm
	5	7	PTL3	1853	1050	0.80 m 13 kNm	0.65 m 15 kNm	0.50 m 16 kNm	0.35 m 14 kNm
	10	7				1.15 m 18 kNm	0.90 m 21 kNm	0.70 m 22 kNm	0.55 m 22 kNm
	20	7					1.20 m (1740) 28 kNm	1.10 m 35 kNm	0.80 m 31 kNm
	30	7							1.05 m 41 kNm
	5	7	PTL3	2059	1167	0.80 m (1853) 13 kNm	0.65 m (1853) 15 kNm	0.50 m (1853) 16 kNm	0.35 m (1853) 14 kNm
	10	7				1.20 m (1905) 19 kNm	0.90 m (1870) 21 kNm	0.75 m (1980) 24 kNm	0.55 m (1853) 22 kNm
	20	7						1.15 m (1925) 36 kNm	0.95 m (2030) 37 kNm
	30	7					1.00 m 24 kNm		1.20 m (1980) 47 kNm
RRs170/10	5	10	PTL1	1477	837	0.60 m 9 kNm	0.50 m 12 kNm	0.35 m 11 kNm	0.25 m 10 kNm
	10	10				0.85 m 13 kNm	0.65 m 15 kNm	0.50 m 16 kNm	0.40 m 16 kNm
	20	10				1.35 m 21 kNm	0.95 m 22 kNm	0.75 m 24 kNm	0.55 m 22 kNm
	30	10				1.50 m (1445) 24 kNm	1.20 m (1395) 28 kNm	1.05 m 33 kNm	0.75 m 29 kNm
	5	10	PTL2	1723	977	0.75 m 12 kNm	0.60 m 14 kNm	0.45 m 14 kNm	0.30 m 12 kNm
	10	10				1.10 m 17 kNm	0.85 m 20 kNm	0.65 m 20 kNm	0.50 m 20 kNm
	20	10				1.50 m (1575) 24 kNm	1.20 m (1685) 28 kNm	1.00 m 31 kNm	0.75 m 29 kNm
	30	10						1.20 m (1590) 38 kNm	1.00 m 39 kNm
	5	10	PTL2	1969	1116	0.90 m 14 kNm	0.75 m 18 kNm	0.55 m 17 kNm	0.40 m 16 kNm
	10	10				1.40 m 22 kNm	1.10 m 26 kNm	0.80 m 25 kNm	0.60 m 24 kNm
	20	10						1.20 m (1905) 38 kNm	0.95 m 37 kNm
	30	10							1.20 m (1930) 47 kNm
	5	7	PTL3	2216	1256	1.05 m 16 kNm	0.85 m 20 kNm	0.65 m 20 kNm	0.45 m 18 kNm
	10	7				1.50 m (2160) 24 kNm	1.20 m (2210) 28 kNm	0.95 m 30 kNm	0.70 m 27 kNm
	20	7						1.20 m (1970) 38 kNm	1.15 m 45 kNm
	30	7					1.05 m 25 kNm		1.20 m (1980) 47 kNm
	5	7	PTL3	2462	1396	1.05 m (2216) 16 kNm	0.85 m (2216) 20 kNm	0.65 m (2305) 20 kNm	0.45 m (2216) 18 kNm
	10	7						1.00 m (2340) 31 kNm	0.70 m (2220) 27 kNm
	20	7					1.20 m (2430) 28 kNm		1.20 m (2285) 47 kNm
	30	7					1.20 m (2455) 28 kNm		

Values in brackets (xxxx) represent the maximum achievable R_c value with particular pile size, pile length and hammer size.

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Efficiency of the hammer 80 %						Drop height [m] and impact energy [kNm] to achieve R_c and R_d values			
Pile	Pile length [m]	Settlement s_{10} [mm]	Piling work class	R_c [kN]	R_d [kN]	Weight of the ram block [kg] 2000	3000	4000	5000
RR170/12.5	5	10	PTL1	1520	862	0.55 m 9 kNm	0.45 m 11 kNm	0.35 m 11 kNm	0.25 m 10 kNm
	10	10				0.75 m 12 kNm	0.60 m 14 kNm	0.45 m 14 kNm	0.35 m 14 kNm
	20	10				1.15 m 18 kNm	0.85 m 20 kNm	0.65 m 20 kNm	0.50 m 20 kNm
	30	10				1.20 m 19 kNm	1.15 m 27 kNm	0.90 m 28 kNm	0.65 m 26 kNm
	5	10	PTL2	1773	1005	0.70 m 11 kNm	0.55 m 13 kNm	0.40 m 13 kNm	0.30 m 12 kNm
	10	10				1.00 m 16 kNm	0.75 m 18 kNm	0.60 m 19 kNm	0.45 m 18 kNm
	20	10				1.50 m 24 kNm	1.10 m 26 kNm	0.85 m 27 kNm	0.65 m 26 kNm
	30	10				1.50 m (1725) 24 kNm	1.20 m (1560) 28 kNm	1.20 m 38 kNm	0.85 m 33 kNm
	5	10	PTL2	2026	1149	0.85 m 13 kNm	0.65 m 15 kNm	0.50 m 16 kNm	0.35 m 14 kNm
	10	10				1.20 m 19 kNm	0.95 m 22 kNm	0.75 m 24 kNm	0.55 m 22 kNm
	20	10				1.50 m (1780) 24 kNm	1.20 m (1905) 28 kNm	1.10 m 35 kNm	0.80 m 31 kNm
	30	10						1.20 m (1780) 38 kNm	1.10 m 43 kNm
	5	7	PTL3	2280	1293	0.95 m 15 kNm	0.75 m 18 kNm	0.55 m 17 kNm	0.40 m 16 kNm
	10	7				1.35 m 21 kNm	1.05 m (2270) 25 kNm	0.85 m 27 kNm	0.65 m 26 kNm
	20	7						1.20 m (2195) 38 kNm	0.95 m 37 kNm
	30	7					0.90 m 21 kNm		1.20 m (2190) 47 kNm
	5	7	PTL3	2533	1436	0.95 m (2280) 15 kNm	0.75 m (2350) 18 kNm	0.55 m (2290) 17 kNm	0.40 m (2280) 16 kNm
	10	7				1.35 m (2280) 21 kNm		0.90 m (2390) 28 kNm	0.65 m (2280) 26 kNm
	20	7							1.10 m (2495) 43 kNm
	30	7					1.10 m 26 kNm		
RRs170/12.5	5	10	PTL1	1817	1030	0.70 m 11 kNm	0.55 m 13 kNm	0.45 m 14 kNm	0.30 m 12 kNm
	10	10				1.00 m 16 kNm	0.80 m 19 kNm	0.60 m 19 kNm	0.45 m 18 kNm
	20	10				1.50 m (1780) 24 kNm	1.10 m 26 kNm	0.90 m 28 kNm	0.65 m 26 kNm
	30	10				1.50 m (1725) 24 kNm	1.20 m (1690) 28 kNm	1.20 m (1780) 38 kNm	0.90 m 35 kNm
	5	10	PTL2	2120	1202	0.90 m 14 kNm	0.70 m 16 kNm	0.55 m 17 kNm	0.35 m 14 kNm
	10	10				1.30 m 20 kNm	1.00 m 24 kNm	0.80 m 25 kNm	0.60 m 24 kNm
	20	10					1.20 m (1905) 28 kNm	1.20 m 38 kNm	0.85 m 33 kNm
	30	10							1.20 m 47 kNm
	5	10	PTL2	2423	1374	1.10 m 17 kNm	0.90 m 21 kNm	0.65 m 20 kNm	0.45 m 18 kNm
	10	10				1.50 m (2310) 24 kNm	1.20 m (2355) 28 kNm	1.00 m 31 kNm	0.75 m 29 kNm
	20	10						1.20 m (2135) 38 kNm	1.10 m 43 kNm
	30	10							1.20 m (2140) 47 kNm
	5	7	PTL3	2726	1545	1.30 m 20 kNm	1.00 m 24 kNm	0.75 m 24 kNm	0.55 m 22 kNm
	10	7					1.20 m (2445) 28 kNm	1.15 m 36 kNm	0.85 m 33 kNm
	20	7							1.20 m (2610) 47 kNm
	30	7							
	5	7	PTL3	3029	1717	1.30 m (2726) 20 kNm	1.05 m (2870) 25 kNm	0.80 m (2870) 25 kNm	0.55 m (2726) 22 kNm
	10	7						1.20 m (2820) 38 kNm	0.85 m (2730) 33 kNm
	20	7					1.00 m 24 kNm		
	30	7							

Values in brackets (xxxx) represent the maximum achievable R_c value with particular pile size, pile length and hammer size.

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Efficiency of the hammer 80 %						Drop height [m] and impact energy [kNm] to achieve R_c and R_d values			
Pile	Pile length [m]	Settlement s_{10} [mm]	Piling work class	R_c [kN]	R_d [kN]	Weight of the ram block [kg] 3000	4000	5000	6000
RR220/10	5	10	PTL1	1632	925	0.45 m 11 kNm	0.35 m 11 kNm	0.25 m 10 kNm	0.20 m 9 kNm
	10	10				0.60 m 14 kNm	0.50 m 16 kNm	0.40 m 16 kNm	0.30 m 14 kNm
	20	10				0.95 m 22 kNm	0.70 m 22 kNm	0.55 m 22 kNm	0.50 m 24 kNm
	30	10				1.15 m 27 kNm	0.90 m 28 kNm	0.75 m 29 kNm	0.60 m 28 kNm
	5	10	PTL2	1904	1079	0.55 m 13 kNm	0.40 m 13 kNm	0.35 m 14 kNm	0.30 m 14 kNm
	10	10				0.80 m 19 kNm	0.60 m 19 kNm	0.50 m 20 kNm	0.40 m 19 kNm
	20	10				1.20 m 28 kNm	0.90 m 28 kNm	0.75 m 29 kNm	0.65 m 31 kNm
	30	10				1.20 m (1695) 28 kNm	1.20 m 38 kNm	1.00 m 39 kNm	0.80 m 38 kNm
	5	10	PTL2	2176	1234	0.65 m 15 kNm	0.50 m 16 kNm	0.40 m 16 kNm	0.35 m 16 kNm
	10	10				1.00 m 24 kNm	0.75 m 24 kNm	0.60 m 24 kNm	0.50 m 24 kNm
	20	10				1.20 m (1905) 28 kNm	1.15 m 36 kNm	0.95 m 37 kNm	0.80 m 38 kNm
	30	10					1.20 m (1905) 38 kNm	1.20 m (2140) 47 kNm	1.05 m 49 kNm
	5	7	PTL3	2448	1388	0.75 m 18 kNm	0.55 m 17 kNm	0.45 m 18 kNm	0.40 m 19 kNm
	10	7				1.15 m 27 kNm	0.90 m 28 kNm	0.70 m 27 kNm	0.60 m 28 kNm
	20	7					1.20 m (2320) 38 kNm	1.10 m 43 kNm	0.90 m 42 kNm
	30	7						1.20 m (2195) 47 kNm	1.20 m (2440) 57 kNm
	5	7	PTL3	2720	1542	0.75 m (2448) 18 kNm	0.55 m (2465) 17 kNm	0.45 m (2448) 18 kNm	0.40 m (2448) 19 kNm
	10	7				1.15 m (2495) 27 kNm	0.90 m (2480) 28 kNm	0.70 m (2448) 27 kNm	0.60 m (2448) 28 kNm
	20	7						1.20 m (2495) 47 kNm	1.00 m (2495) 47 kNm
	30	7							
RRs220/10	5	10	PTL1	1951	1106	0.55 m 13 kNm	0.45 m 14 kNm	0.35 m 14 kNm	0.30 m 14 kNm
	10	10				0.85 m 20 kNm	0.65 m 20 kNm	0.50 m 20 kNm	0.45 m 21 kNm
	20	10				1.20 m (1905) 28 kNm	0.95 m 30 kNm	0.75 m 29 kNm	0.65 m 31 kNm
	30	10				1.20 m (1695) 28 kNm	1.20 m (1905) 38 kNm	1.05 m 41 kNm	0.85 m 40 kNm
	5	10	PTL2	2276	1290	0.70 m 16 kNm	0.55 m 17 kNm	0.45 m 18 kNm	0.35 m 16 kNm
	10	10				1.05 m 25 kNm	0.85 m 27 kNm	0.65 m 26 kNm	0.55 m 26 kNm
	20	10					1.20 m (2240) 38 kNm	1.00 m 39 kNm	0.85 m 40 kNm
	30	10						1.20 m (2140) 47 kNm	1.15 m 54 kNm
	5	10	PTL2	2601	1474	0.85 m 20 kNm	0.65 m 20 kNm	0.50 m 20 kNm	0.45 m 21 kNm
	10	10				1.20 m (2470) 28 kNm	1.05 m 33 kNm	0.85 m 33 kNm	0.70 m 33 kNm
	20	10						1.20 m (2495) 47 kNm	1.10 m 52 kNm
	30	10							1.20 m (2375) 57 kNm
	5	7	PTL3	2927	1659	1.00 m 24 kNm	0.75 m 24 kNm	0.60 m 24 kNm	0.50 m 24 kNm
	10	7					1.20 m (2910) 38 kNm	1.00 m 39 kNm	0.85 m 40 kNm
	20	7						1.20 m (2620) 47 kNm	1.20 m (2850) 57 kNm
	30	7							
	5	7	PTL3	3252	1844	1.00 m (2927) 24 kNm	0.75 m (2970) 24 kNm	0.60 m (2927) 24 kNm	0.50 m (3005) 24 kNm
	10	7						1.00 m (2927) 39 kNm	0.85 m (2927) 40 kNm
	20	7							
	30	7							

Values in brackets (xxxx) represent the maximum achievable R_c value with particular pile size, pile length and hammer size.

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Efficiency of the hammer 80 %						Drop height [m] and impact energy [kNm] to achieve R_c and R_d values			
Pile	Pile length [m]	Settlement s_{10} [mm]	Piling work class	R_c [kN]	R_d [kN]	Weight of the ram block [kg] 3000	4000	5000	6000
RR220/12.5	5	10	PTL1	2015	1142	0.50 m 12 kNm	0.40 m 13 kNm	0.30 m 12 kNm	0.25 m 12 kNm
	10	10				0.75 m 18 kNm	0.55 m 17 kNm	0.45 m 18 kNm	0.40 m 19 kNm
	20	10				1.10 m 26 kNm	0.85 m 27 kNm	0.65 m 26 kNm	0.55 m 26 kNm
	30	10				1.20 m 28 kNm	1.05 m 33 kNm	0.90 m 35 kNm	0.75 m 35 kNm
	5	10	PTL2	2351	1333	0.65 m 15 kNm	0.50 m 16 kNm	0.40 m 16 kNm	0.35 m 16 kNm
	10	10				0.95 m 22 kNm	0.75 m 24 kNm	0.60 m 24 kNm	0.50 m 24 kNm
	20	10				1.20 m (2130) 28 kNm	1.10 m 35 kNm	0.90 m 35 kNm	0.75 m 35 kNm
	30	10				1.20 m (2045) 28 kNm	1.20 m (2175) 38 kNm	1.20 m 47 kNm	1.00 m 47 kNm
	5	10	PTL2	2687	1523	0.80 m 19 kNm	0.60 m 19 kNm	0.50 m 20 kNm	0.40 m 19 kNm
	10	10				1.15 m 27 kNm	0.90 m 28 kNm	0.75 m 29 kNm	0.60 m 28 kNm
	20	10					1.20 m (2480) 38 kNm	1.10 m 43 kNm	0.90 m 42 kNm
	30	10						1.20 m (2400) 47 kNm	1.20 m (2495) 57 kNm
	5	7	PTL3	3023	1714	0.90 m 21 kNm	0.70 m 22 kNm	0.55 m 22 kNm	0.45 m 21 kNm
	10	7				1.20 m (2890) 28 kNm	1.05 m 33 kNm	0.90 m 35 kNm	0.75 m 35 kNm
	20	7						1.20 m (2930) 47 kNm	1.10 m 52 kNm
	30	7							1.20 m (2700) 57 kNm
	5	7	PTL3	3359	1904	0.90 m (3023) 21 kNm	0.70 m (3023) 22 kNm	0.55 m (3100) 22 kNm	0.45 m (3090) 21 kNm
	10	7					1.10 m (3165) 35 kNm	0.90 m (3115) 35 kNm	0.75 m (3023) 35 kNm
	20	7							1.20 m (3235) 57 kNm
	30	7							
RRs220/12.5	5	10	PTL1	2410	1366	0.65 m 15 kNm	0.50 m 16 kNm	0.40 m 16 kNm	0.35 m 16 kNm
	10	10				1.00 m 24 kNm	0.75 m 24 kNm	0.60 m 24 kNm	0.50 m 24 kNm
	20	10				1.20 m (2130) 28 kNm	1.15 m 36 kNm	0.90 m 35 kNm	0.75 m 35 kNm
	30	10				1.20 m (2045) 28 kNm	1.20 m (2175) 38 kNm	1.20 m (2400) 47 kNm	1.05 m 49 kNm
	5	10	PTL2	2811	1594	0.85 m 20 kNm	0.65 m 20 kNm	0.50 m 20 kNm	0.45 m 21 kNm
	10	10				1.20 m (2760) 28 kNm	1.00 m 31 kNm	0.80 m 31 kNm	0.65 m 31 kNm
	20	10					1.20 m (2480) 38 kNm	1.20 m 47 kNm	1.00 m 47 kNm
	30	10							1.20 m (2635) 57 kNm
	5	10	PTL2	3213	1821	1.05 m 25 kNm	0.80 m 25 kNm	0.65 m 26 kNm	0.55 m 26 kNm
	10	10					1.20 m (2995) 38 kNm	1.00 m 39 kNm	0.85 m 40 kNm
	20	10						1.20 m (2835) 47 kNm	1.20 m (2995) 57 kNm
	30	10							
	5	7	PTL3	3614	2049	1.20 m 28 kNm	0.90 m 28 kNm	0.75 m 29 kNm	0.60 m 28 kNm
	10	7					1.20 m (3325) 38 kNm	1.20 m 47 kNm	1.00 m 47 kNm
	20	7							1.20 m (3235) 57 kNm
	30	7							
	5	7	PTL3	4016	2277	1.20 m (3614) 28 kNm	0.90 m (3625) 28 kNm	0.75 m (3730) 29 kNm	0.60 m (3670) 28 kNm
	10	7						1.20 m (3650) 47 kNm	1.00 m (3645) 47 kNm
	20	7							
	30	7							

Values in brackets (xxxx) represent the maximum achievable R_c value with particular pile size, pile length and hammer size.

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Efficiency of the hammer 80 %						Drop height [m] and impact energy [kNm] to achieve R_c and R_d values			
Pile	Pile length [m]	Settlement s_{10} [mm]	Piling work class	R_c [kN]	R_d [kN]	Weight of the ram block [kg] 3000	4000	5000	6000
RR245/10	5	10	PTL1	1832	1039	0.50 m 12 kNm	0.40 m 13 kNm	0.30 m 12 kNm	0.25 m 12 kNm
	10	10				0.75 m 18 kNm	0.55 m 17 kNm	0.45 m 18 kNm	0.35 m 16 kNm
	20	10				1.20 m (1815) 28 kNm	0.85 m 27 kNm	0.65 m 26 kNm	0.55 m 26 kNm
	30	10				1.20 m (1815) 28 kNm	1.05 m 33 kNm	0.85 m 33 kNm	0.70 m 33 kNm
	5	10	PTL2	2137	1211	0.65 m 15 kNm	0.50 m 16 kNm	0.40 m 16 kNm	0.30 m 14 kNm
	10	10				0.90 m 21 kNm	0.70 m 22 kNm	0.55 m 22 kNm	0.45 m 21 kNm
	20	10					1.10 m 35 kNm	0.85 m 33 kNm	0.70 m 33 kNm
	30	10					1.20 m (1990) 38 kNm	1.15 m 45 kNm	0.95 m 45 kNm
	5	10	PTL2	2442	1384	0.75 m 18 kNm	0.60 m 19 kNm	0.45 m 18 kNm	0.40 m 19 kNm
	10	10				1.15 m 27 kNm	0.90 m 28 kNm	0.70 m 27 kNm	0.60 m 28 kNm
	20	10					1.20 m (2295) 38 kNm	1.05 m 41 kNm	0.90 m 42 kNm
	30	10						1.20 m (2230) 47 kNm	1.20 m 57 kNm
	5	7	PTL3	2747	1557	0.85 m 20 kNm	0.65 m 20 kNm	0.50 m 20 kNm	0.45 m 21 kNm
	10	7				1.20 m (2655) 28 kNm	1.00 m 31 kNm	0.85 m 33 kNm	0.70 m 33 kNm
	20	7						1.20 m (2735) 47 kNm	1.05 m 49 kNm
	30	7							1.20 m (2540) 57 kNm
	5	7	PTL3	3053	1731	0.85 m (2747) 20 kNm	0.65 m (2747) 20 kNm	0.50 m (2755) 20 kNm	0.45 m (2747) 21 kNm
	10	7					1.05 m (2830) 33 kNm	0.85 m (2747) 33 kNm	0.70 m (2747) 33 kNm
	20	7							1.15 m (2935) 54 kNm
	30	7							
RRs245/10	5	10	PTL1	2190	1241	0.65 m 15 kNm	0.50 m 16 kNm	0.40 m 16 kNm	0.40 m 19 kNm
	10	10				0.95 m 22 kNm	0.75 m 24 kNm	0.60 m 24 kNm	0.55 m 26 kNm
	20	10				1.20 m (1815) 28 kNm	1.15 m 36 kNm	0.90 m 35 kNm	0.85 m 40 kNm
	30	10				1.20 m (1815) 28 kNm	1.20 m (1990) 38 kNm	1.20 m 47 kNm	1.10 m 52 kNm
	5	10	PTL2	2555	1448	0.80 m 19 kNm	0.60 m 19 kNm	0.50 m 20 kNm	0.50 m 24 kNm
	10	10				1.20 m (2540) 28 kNm	0.95 m 30 kNm	0.75 m 29 kNm	0.70 m 33 kNm
	20	10					1.20 m (2295) 38 kNm	1.15 m 45 kNm	1.10 m 52 kNm
	30	10						1.20 m (2230) 47 kNm	1.20 m (2300) 57 kNm
	5	10	PTL2	2920	1655	1.00 m 24 kNm	0.75 m 24 kNm	0.60 m 24 kNm	0.60 m 28 kNm
	10	10					1.20 m 38 kNm	0.95 m 37 kNm	0.85 m 40 kNm
	20	10						1.20 m (2635) 47 kNm	1.20 m (2735) 57 kNm
	30	10							
	5	7	PTL3	3285	1862	1.15 m 27 kNm	0.85 m 27 kNm	0.70 m 27 kNm	0.70 m 33 kNm
	10	7					1.20 m (3055) 38 kNm	1.15 m 45 kNm	1.00 m 47 kNm
	20	7							
	30	7							
	5	7	PTL3	3650	2069	1.15 m (3285) 27 kNm	0.85 m (3285) 27 kNm	0.70 m (3285) 27 kNm	0.70 m (3285) 33 kNm
	10	7						1.15 m (3285) 45 kNm	1.00 m (3285) 47 kNm
	20	7							
	30	7							

Values in brackets (xxxx) represent the maximum achievable R_c value with particular pile size, pile length and hammer size.

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Efficiency of the hammer 80 %						Drop height [m] and impact energy [kNm] to achieve R_c and R_d values				
Pile	Pile length [m]	Settlement s_{10} [mm]	Piling work class	R_c [kN]	R_d [kN]	Weight of the ram block [kg]				
						3000	4000	5000	6000	7000
RR245/12.5	5	10	PTL1	2265	1284	0.60 m 14 kNm	0.45 m 14 kNm	0.35 m 14 kNm	0.40 m 19 kNm	0.25 m 14 kNm
	10	10				0.90 m 21 kNm	0.65 m 20 kNm	0.55 m 22 kNm	0.50 m 24 kNm	0.40 m 22 kNm
	20	10				1.20 m (2200) 28 kNm	1.00 m 31 kNm	0.80 m 31 kNm	0.70 m 33 kNm	0.55 m 30 kNm
	30	10				1.20 m (2190) 28 kNm	1.15 m 36 kNm	1.00 m 39 kNm	0.95 m 45 kNm	0.75 m 41 kNm
	5	10	PTL2	2643	1498	0.75 m 18 kNm	0.55 m 17 kNm	0.45 m 18 kNm	0.45 m 21 kNm	0.35 m 19 kNm
	10	10				1.10 m 26 kNm	0.85 m 27 kNm	0.70 m 27 kNm	0.65 m 31 kNm	0.50 m 27 kNm
	20	10					1.20 m (2565) 38 kNm	1.05 m 41 kNm	0.95 m 45 kNm	0.75 m 41 kNm
	30	10					1.20 m (2340) 38 kNm	1.20 m (2520) 47 kNm	1.20 m (2580) 57 kNm	1.00 m 55 kNm
	5	10	PTL2	3020	1712	0.90 m 21 kNm	0.70 m 22 kNm	0.55 m 22 kNm	0.55 m 26 kNm	0.40 m 22 kNm
	10	10				1.20 m (2800) 28 kNm	1.05 m 33 kNm	0.85 m 33 kNm	0.80 m 38 kNm	0.60 m 33 kNm
	20	10						1.20 m (2920) 47 kNm	1.15 m 54 kNm	0.90 m 49 kNm
	30	10								1.20 m (2975) 66 kNm
	5	7	PTL3	3398	1926	1.05 m 25 kNm	0.80 m 25 kNm	0.65 m 26 kNm	0.60 m (3385) 28 kNm	0.45 m 25 kNm
	10	7					1.20 m 38 kNm	1.00 m 39 kNm	0.90 m 42 kNm	0.75 m 41 kNm
	20	7						1.20 m (3025) 47 kNm	1.20 m (3210) 57 kNm	1.05 m 58 kNm
	30	7								1.20 m (3050) 66 kNm
	5	7	PTL3	3775	2140	1.05 m (3398) 25 kNm	0.80 m (3398) 25 kNm	0.65 m (3398) 26 kNm		0.45 m (3398) 25 kNm
	10	7					1.20 m (3475) 38 kNm	1.00 m (3485) 39 kNm	0.95 m (3545) 45 kNm	0.75 m (3398) 41 kNm
	20	7								1.20 m (3645) 66 kNm
	30	7								
RRs245/12.5	5	10	PTL1	2708	1535	0.80 m 19 kNm	0.60 m 19 kNm	0.50 m 20 kNm	0.50 m 24 kNm	0.35 m 19 kNm
	10	10				1.15 m 27 kNm	0.85 m 27 kNm	0.70 m 27 kNm	0.65 m 31 kNm	0.50 m 27 kNm
	20	10				1.20 m (2200) 28 kNm	1.20 m (2560) 38 kNm	1.05 m 41 kNm	0.95 m 45 kNm	0.75 m 41 kNm
	30	10				1.20 m (2190) 28 kNm	1.20 m (2340) 38 kNm	1.20 m (2525) 47 kNm	1.20 m (2580) 57 kNm	1.05 m 58 kNm
	5	10	PTL2	3160	1791	1.00 m 24 kNm	0.75 m 24 kNm	0.60 m 24 kNm	0.60 m 28 kNm	0.45 m 25 kNm
	10	10				1.20 m (2800) 28 kNm	1.10 m 35 kNm	0.90 m 35 kNm	0.85 m 40 kNm	0.65 m 36 kNm
	20	10						1.20 m (2920) 47 kNm	1.20 m (2995) 57 kNm	1.00 m 55 kNm
	30	10								1.20 m (2975) 66 kNm
	5	10	PTL2	3611	2047	1.20 m 28 kNm	0.90 m 28 kNm	0.75 m 29 kNm	0.75 m 35 kNm	0.55 m 30 kNm
	10	10					1.10 m (3160) 35 kNm	1.15 m 45 kNm	1.05 m 49 kNm	0.85 m 47 kNm
	20	10								1.00 m (3160) 55 kNm
	30	10								
	5	7	PTL3	4062	2303	1.20 m (3750) 28 kNm	1.05 m 33 kNm	0.85 m 33 kNm	0.85 m 40 kNm	0.60 m 33 kNm
	10	7						1.20 m (3860) 47 kNm	1.20 m (4045) 57 kNm	1.00 m 55 kNm
	20	7								1.20 m (3645) 66 kNm
	30	7								
	5	7	PTL3	4514	2559		1.05 m (4105) 33 kNm	0.85 m (4135) 33 kNm	0.85 m (4062) 40 kNm	0.60 m (4135) 33 kNm
	10	7								1.00 m (4120) 55 kNm
	20	7								
	30	7								

Values in brackets (xxxx) represent the maximum achievable R_c value with particular pile size, pile length and hammer size.

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Efficiency of the hammer 80 %						Drop height [m] and impact energy [kNm] to achieve R_c and R_d values				
Pile	Pile length [m]	Settlement s_{10} [mm]	Piling work class	R_c [kN]	R_d [kN]	Weight of the ram block [kg] 3000	4000	5000	6000	7000
RR270/10	5	10	PTL1	2052	1163	0.60 m 14 kNm	0.45 m 14 kNm	0.35 m 14 kNm	0.35 m 16 kNm	0.25 m 14 kNm
	10	10				0.85 m 20 kNm	0.65 m 20 kNm	0.50 m 20 kNm	0.50 m 24 kNm	0.35 m 19 kNm
	20	10				1.20 m (1995) 28 kNm	1.00 m 31 kNm	0.75 m 29 kNm	0.70 m 33 kNm	0.55 m 30 kNm
	30	10				1.20 m (1920) 28 kNm	1.20 m 38 kNm	1.00 m 39 kNm	0.95 m 45 kNm	0.70 m 38 kNm
	5	10	PTL2	2394	1357	0.75 m 18 kNm	0.55 m 17 kNm	0.45 m 18 kNm	0.45 m 21 kNm	0.30 m 16 kNm
	10	10				1.10 m 26 kNm	0.80 m 25 kNm	0.65 m 26 kNm	0.60 m 28 kNm	0.45 m 25 kNm
	20	10					1.20 m (2350) 38 kNm	1.00 m 39 kNm	0.95 m 45 kNm	0.70 m 38 kNm
	30	10					1.20 m (2075) 38 kNm	1.20 m (2320) 47 kNm	1.20 m (2385) 57 kNm	0.95 m 52 kNm
	5	10	PTL2	2737	1552	0.90 m 21 kNm	0.65 m 20 kNm	0.55 m 22 kNm	0.55 m 26 kNm	0.40 m 22 kNm
	10	10				1.20 m (2495) 28 kNm	1.00 m 31 kNm	0.80 m 31 kNm	0.75 m 35 kNm	0.60 m 33 kNm
	20	10						1.20 m (2495) 47 kNm	1.15 m 54 kNm	0.90 m 49 kNm
	30	10								1.20 m 66 kNm
	5	7	PTL3	3079	1745	1.00 m 24 kNm	0.75 m 24 kNm	0.60 m 24 kNm	0.55 m (2950) 26 kNm	0.45 m 25 kNm
	10	7					1.15 m 36 kNm	0.95 m 37 kNm	0.85 m 40 kNm	0.70 m 38 kNm
	20	7						1.20 m (2820) 47 kNm	1.20 m (2950) 57 kNm	1.05 m 58 kNm
	30	7								1.20 m (2865) 66 kNm
	5	7	PTL3	3421	1939	1.00 m (3079) 24 kNm	0.75 m (3079) 24 kNm	0.60 m (3145) 24 kNm		0.45 m (3079) 25 kNm
	10	7					1.15 m (3100) 36 kNm	0.95 m (3125) 37 kNm	0.90 m (3190) 42 kNm	0.70 m (3079) 38 kNm
	20	7								1.10 m (3220) 60 kNm
	30	7								
RRs270/10	5	10	PTL1	2454	1391	0.95 m 22 kNm	0.60 m 19 kNm	0.45 m 18 kNm	0.35 m 16 kNm	0.35 m 19 kNm
	10	10				1.20 m (2350) 28 kNm	0.85 m 27 kNm	0.70 m 27 kNm	0.65 m 31 kNm	0.50 m 27 kNm
	20	10				1.20 m (1825) 28 kNm	1.20 m (2350) 38 kNm	1.05 m 41 kNm	0.95 m 45 kNm	0.75 m 41 kNm
	30	10				1.20 m (1920) 28 kNm	1.20 m (2110) 38 kNm	1.20 m (2320) 47 kNm	1.20 m (2385) 57 kNm	1.00 m 55 kNm
	5	10	PTL2	2863	1623	1.20 m 28 kNm	0.70 m 22 kNm	0.55 m 22 kNm	0.45 m 21 kNm	0.40 m 22 kNm
	10	10					1.10 m 35 kNm	0.90 m 35 kNm	0.80 m 38 kNm	0.65 m 36 kNm
	20	10						1.20 m (2710) 47 kNm	1.20 m (2825) 57 kNm	0.95 m 52 kNm
	30	10								1.20 m (2780) 66 kNm
	5	10	PTL2	3272	1855	1.20 m (2940) 28 kNm	0.90 m 28 kNm	0.70 m 27 kNm	0.55 m 26 kNm	0.50 m 27 kNm
	10	10					1.20 m (3065) 38 kNm	1.10 m 43 kNm	1.00 m 47 kNm	0.80 m 44 kNm
	20	10								1.20 m (3260) 66 kNm
	30	10								
	5	7	PTL3	3681	2087		1.00 m 31 kNm	0.80 m 31 kNm	0.65 m 31 kNm	0.55 m 30 kNm
	10	7						1.20 m (3560) 47 kNm	1.15 m 54 kNm	0.95 m 52 kNm
	20	7								1.20 m (3375) 66 kNm
	30	7								
	5	7	PTL3	4090	2319		1.00 m (3720) 31 kNm	0.80 m (3755) 31 kNm	0.65 m (3681) 31 kNm	0.55 m (3685) 30 kNm
	10	7							1.20 m (3780) 57 kNm	0.95 m (3681) 52 kNm
	20	7								
	30	7								

Values in brackets (xxxx) represent the maximum achievable R_c value with particular pile size, pile length and hammer size.

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Efficiency of the hammer 80 %						Drop height [m] and impact energy [kNm] to achieve R_c and R_d values			
Pile	Pile length [m]	Settlement s_{10} [mm]	Piling work class	R_c [kN]	R_d [kN]	Weight of the ram block [kg] 4000	5000	6000	7000
RR270/12.5	5	10	PTL1	2541	1440	0.55 m 17 kNm	0.45 m 18 kNm	0.45 m 21 kNm	0.30 m 16 kNm
	10	10				0.75 m 24 kNm	0.60 m 24 kNm	0.60 m 28 kNm	0.45 m 25 kNm
	20	10				1.15 m 36 kNm	0.95 m 37 kNm	0.85 m 40 kNm	0.65 m 36 kNm
	30	10				1.20 m (2505) 38 kNm	1.15 m 45 kNm	1.10 m 52 kNm	0.85 m 47 kNm
	5	10	PTL2	2965	1681	0.65 m 20 kNm	0.55 m 22 kNm	0.55 m 26 kNm	0.40 m 22 kNm
	10	10				0.95 m 30 kNm	0.80 m 31 kNm	0.75 m 35 kNm	0.55 m 30 kNm
	20	10				1.20 m (2625) 38 kNm	1.20 m 47 kNm	1.10 m 52 kNm	0.85 m 47 kNm
	30	10					1.20 m (2650) 47 kNm	1.20 m (2675) 57 kNm	1.10 m 60 kNm
	5	10	PTL2	3388	1921	0.80 m 25 kNm	0.65 m 26 kNm	0.65 m 31 kNm	0.45 m 25 kNm
	10	10				1.20 m 38 kNm	0.95 m 37 kNm	0.90 m 42 kNm	0.70 m 38 kNm
	20	10					1.20 m (3000) 47 kNm	1.20 m (3190) 57 kNm	1.05 m 58 kNm
	30	10							1.20 m (3105) 66 kNm
	5	7	PTL3	3812	2161	0.90 m 28 kNm	0.75 m 29 kNm	0.70 m 33 kNm	0.55 m 30 kNm
	10	7				1.20 m (3575) 38 kNm	1.10 m 43 kNm	1.05 m 49 kNm	0.85 m 47 kNm
	20	7							1.20 m (3805) 66 kNm
	30	7							
	5	7	PTL3	4235	2401	0.90 m (3812) 28 kNm	0.75 m (3812) 29 kNm	0.70 m (3812) 33 kNm	0.55 m (3812) 30 kNm
	10	7					1.15 m (3945) 45 kNm	1.05 m (3865) 49 kNm	0.85 m (3812) 47 kNm
	20	7							
	30	7							
RRs270/12.5	5	10	PTL1	3038	1722	0.70 m 22 kNm	0.55 m 22 kNm	0.55 m 26 kNm	0.50 m 27 kNm
	10	10				1.00 m 31 kNm	0.80 m 31 kNm	0.75 m 35 kNm	0.65 m 36 kNm
	20	10				1.20 m (2625) 38 kNm	1.20 m (3000) 47 kNm	1.10 m 52 kNm	0.95 m 52 kNm
	30	10				1.20 m (2505) 38 kNm	1.20 m (2670) 47 kNm	1.20 m (2675) 57 kNm	1.20 m (2915) 66 kNm
	5	10	PTL2	3545	2010	0.85 m 27 kNm	0.70 m 27 kNm	0.70 m 33 kNm	0.60 m 33 kNm
	10	10				1.20 m (3420) 38 kNm	1.05 m 41 kNm	1.00 m 47 kNm	0.85 m 47 kNm
	20	10						1.20 m (3190) 57 kNm	1.20 m (3525) 66 kNm
	30	10							
	5	10	PTL2	4051	2296	1.05 m 33 kNm	0.85 m 33 kNm	0.85 m 40 kNm	0.75 m 41 kNm
	10	10					1.20 m (3895) 47 kNm	1.20 m (4025) 57 kNm	1.05 m 58 kNm
	20	10							
	30	10							
	5	7	PTL3	4557	2583	1.20 m 38 kNm	1.00 m 39 kNm	0.95 m 45 kNm	0.80 m 44 kNm
	10	7						1.20 m (4170) 57 kNm	1.20 m 66 kNm
	20	7							
	30	7							
	5	7	PTL3	5064	2871	1.20 m (4557) 38 kNm	1.00 m (4557) 39 kNm	0.95 m (4557) 45 kNm	0.80 m (4557) 44 kNm
	10	7							1.20 m (4557) 66 kNm
	20	7							
	30	7							

Values in brackets (xxxx) represent the maximum achievable R_c value with particular pile size, pile length and hammer size.

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Efficiency of the hammer 80 %						Drop height [m] and impact energy [kNm] to achieve R_c and R_d values			
Pile	Pile length [m]	Settlement s_{10} [mm]	Piling work class	R_c [kN]	R_d [kN]	Weight of the ram block [kg] 4000	5000	6000	7000
RR320/10	5	10	PTL1	2450	1389	0.60 m 19 kNm	0.45 m 18 kNm	0.40 m 19 kNm	0.35 m 19 kNm
	10	10				0.80 m 25 kNm	0.65 m 26 kNm	0.55 m 26 kNm	0.45 m 25 kNm
	20	10				1.20 m 38 kNm	1.00 m 39 kNm	0.80 m 38 kNm	0.70 m 38 kNm
	30	10				1.20 m (2270) 38 kNm	1.20 m (2435) 47 kNm	1.05 m 49 kNm	0.90 m 49 kNm
	5	10	PTL2	2858	1620	0.70 m 22 kNm	0.55 m 22 kNm	0.45 m 21 kNm	0.40 m 22 kNm
	10	10				1.05 m 33 kNm	0.85 m 33 kNm	0.70 m 33 kNm	0.60 m 33 kNm
	20	10				1.20 m (2465) 38 kNm	1.20 m (2765) 47 kNm	1.05 m 49 kNm	0.90 m 49 kNm
	30	10						1.20 m (2690) 57 kNm	1.20 m 66 kNm
	5	10	PTL2	3266	1851	0.85 m 27 kNm	0.70 m 27 kNm	0.55 m 26 kNm	0.50 m 27 kNm
	10	10				1.20 m (3170) 38 kNm	1.05 m 41 kNm	0.85 m 40 kNm	0.70 m 38 kNm
	20	10						1.20 m (3145) 57 kNm	1.10 m 60 kNm
	30	10							1.20 m (2915) 66 kNm
	5	7	PTL3	3674	2083	0.90 m (3580) 28 kNm	0.75 m 29 kNm	0.65 m 31 kNm	0.55 m 30 kNm
	10	7				1.20 m (3315) 38 kNm	1.15 m 45 kNm	1.00 m 47 kNm	0.85 m 47 kNm
	20	7						1.20 m (3280) 57 kNm	1.20 m (3585) 66 kNm
	30	7							
	5	7	PTL3	4083	2315		0.75 m (3705) 29 kNm	0.65 m (3674) 31 kNm	0.55 m (3674) 30 kNm
	10	7					1.15 m (3675) 45 kNm	1.00 m (3674) 47 kNm	0.85 m (3750) 47 kNm
	20	7							
	30	7							
RRs320/10	5	10	PTL1	2929	1660	0.75 m 24 kNm	0.60 m 24 kNm	0.50 m 24 kNm	0.40 m 22 kNm
	10	10				1.10 m 35 kNm	0.85 m 33 kNm	0.70 m 33 kNm	0.60 m 33 kNm
	20	10				1.20 m (2405) 38 kNm	1.20 m (2765) 47 kNm	1.10 m 52 kNm	0.95 m 52 kNm
	30	10				1.20 m (2225) 38 kNm	1.20 m (2480) 47 kNm	1.20 m (2690) 57 kNm	1.20 m (2915) 66 kNm
	5	10	PTL2	3417	1937	0.90 m 28 kNm	0.75 m 29 kNm	0.60 m 28 kNm	0.50 m 27 kNm
	10	10				1.20 m (3170) 38 kNm	1.10 m 43 kNm	0.90 m 42 kNm	0.80 m 44 kNm
	20	10						1.20 m (3145) 57 kNm	1.20 m 66 kNm
	30	10							
	5	10	PTL2	3905	2214	1.10 m 35 kNm	0.90 m 35 kNm	0.75 m 35 kNm	0.65 m 36 kNm
	10	10					1.20 m (3630) 47 kNm	1.15 m 54 kNm	0.95 m 52 kNm
	20	10							1.20 m (3445) 66 kNm
	30	10							
	5	7	PTL3	4393	2490	1.20 m (4305) 38 kNm	1.00 m 39 kNm	0.85 m 40 kNm	0.70 m 38 kNm
	10	7						1.20 m (4180) 57 kNm	1.15 m 63 kNm
	20	7							
	30	7							
	5	7	PTL3	4881	2767		1.00 m (4440) 39 kNm	0.85 m (4393) 40 kNm	0.70 m (4435) 38 kNm
	10	7							1.15 m (4445) 63 kNm
	20	7							
	30	7							

Values in brackets (xxxx) represent the maximum achievable R_c value with particular pile size, pile length and hammer size.

DROP HAMMERS

Efficiency of the hammer 80 %						Drop height [m] and impact energy [kNm] to achieve R_c and R_d values			
Pile	Pile length [m]	Settlement s_{10} [mm]	Piling work class	R_c [kN]	R_d [kN]	Weight of the ram block [kg] 4000	5000	6000	7000
RR320/12.5	5	10	PTL1	3038	1722	0.70 m 22 kNm	0.55 m 22 kNm	0.45 m 21 kNm	0.40 m 22 kNm
	10	10				1.00 m 31 kNm	0.80 m 31 kNm	0.65 m 31 kNm	0.55 m 30 kNm
	20	10				1.20 m (2685) 38 kNm	1.20 m 47 kNm	1.00 m 47 kNm	0.85 m 47 kNm
	30	10				1.20 m (2715) 38 kNm	1.20 m (2905) 47 kNm	1.20 m 57 kNm	1.05 m 58 kNm
	5	10	PTL2	3544	2009	0.85 m 27 kNm	0.70 m 27 kNm	0.55 m 26 kNm	0.50 m 27 kNm
	10	10				1.20 m (3480) 38 kNm	1.00 m 39 kNm	0.85 m 40 kNm	0.70 m 38 kNm
	20	10					1.20 m (3085) 47 kNm	1.20 m (3460) 57 kNm	1.10 m 60 kNm
	30	10						1.20 m (3060) 57 kNm	1.20 m (3295) 66 kNm
	5	10	PTL2	4050	2296	1.05 m 33 kNm	0.80 m 31 kNm	0.70 m 33 kNm	0.60 m 33 kNm
	10	10					1.20 m 47 kNm	1.00 m 47 kNm	0.90 m 49 kNm
	20	10							1.20 m (3820) 66 kNm
	30	10							
	5	7	PTL3	4556	2583	1.15 m 36 kNm	0.95 m 37 kNm	0.75 m 35 kNm	0.65 m 36 kNm
	10	7					1.20 m (4235) 47 kNm	1.15 m 54 kNm	1.05 m 58 kNm
	20	7							
	30	7							
	5	7	PTL3	5063	2870	1.15 m (4556) 36 kNm	0.95 m (4556) 37 kNm	0.75 m (4556) 35 kNm	0.65 m (4556) 36 kNm
	10	7						1.15 m (4556) 54 kNm	1.05 m (4556) 58 kNm
	20	7							
	30	7							
RRs320/12.5	5	10	PTL1	3632	2059	0.90 m 28 kNm	0.70 m 27 kNm	0.60 m 28 kNm	0.50 m 27 kNm
	10	10				1.20 m (3480) 38 kNm	1.05 m 41 kNm	0.85 m 40 kNm	0.75 m 41 kNm
	20	10				1.20 m (2685) 38 kNm	1.20 m (3085) 47 kNm	1.20 m (3460) 57 kNm	1.15 m 63 kNm
	30	10				1.20 m (2715) 38 kNm	1.20 m (2905) 47 kNm	1.20 m (3060) 57 kNm	1.20 m (3295) 66 kNm
	5	10	PTL2	4237	2402	1.10 m 35 kNm	0.90 m 35 kNm	0.75 m 35 kNm	0.65 m 36 kNm
	10	10					1.20 m (4060) 47 kNm	1.10 m 52 kNm	0.95 m 52 kNm
	20	10							1.20 m (3820) 66 kNm
	30	10							
	5	10	PTL2	4843	2745	1.20 m (4495) 38 kNm	1.05 m 41 kNm	0.90 m 42 kNm	0.75 m 41 kNm
	10	10						1.20 m (4495) 57 kNm	1.20 m 66 kNm
	20	10							
	30	10							
	5	7	PTL3	5448	3088		1.20 m 47 kNm	1.00 m 47 kNm	0.85 m 47 kNm
	10	7							1.20 m (5055) 66 kNm
	20	7							
	30	7							
	5	7	PTL3	6053	3431		1.20 m (5455) 47 kNm	1.00 m (5475) 47 kNm	0.90 m (5645) 49 kNm
	10	7							
	20	7							
	30	7							

Values in brackets (xxxx) represent the maximum achievable R_c value with particular pile size, pile length and hammer size.

DROP HAMMERS

Efficiency of the hammer 80 %						Drop height [m] and impact energy [kNm] to achieve R_c and R_d values			
Pile	Pile length [m]	Settlement s_{10} [mm]	Piling work class	R_c [kN]	R_d [kN]	Weight of the ram block [kg] 4000	5000	6000	7000
RR400/10 S355J2H	5	10	PTL1	2387	1353	0.65 m 20 kNm	0.50 m 20 kNm	0.40 m 19 kNm	0.35 m 19 kNm
	10	10				0.80 m 25 kNm	0.65 m 26 kNm	0.50 m 24 kNm	0.45 m 25 kNm
	20	10				1.10 m 35 kNm	0.80 m 31 kNm	0.75 m 35 kNm	0.65 m 36 kNm
	30	10				1.20 m 38 kNm	1.15 m 45 kNm	0.95 m 45 kNm	0.85 m 47 kNm
	5	10	PTL2	2785	1579	0.75 m 24 kNm	0.60 m 24 kNm	0.50 m 24 kNm	0.40 m 22 kNm
	10	10				1.00 m 31 kNm	0.80 m 31 kNm	0.65 m 31 kNm	0.55 m 30 kNm
	20	10				1.20 m (2545) 38 kNm	1.05 m 41 kNm	1.00 m 47 kNm	0.85 m 47 kNm
	30	10				1.20 m (2430) 38 kNm	1.20 m (2520) 47 kNm	1.20 m 57 kNm	1.05 m 58 kNm
	5	10	PTL2	3183	1804	0.85 m (2995) 27 kNm	0.70 m 27 kNm	0.55 m 26 kNm	0.50 m 27 kNm
	10	10				1.15 m (2995) 36 kNm	0.95 m 37 kNm	0.80 m 38 kNm	0.65 m 36 kNm
	20	10					1.20 m (2995) 47 kNm	1.20 m 57 kNm	1.00 m 55 kNm
	30	10						1.20 m (2785) 57 kNm	1.20 m (2995) 66 kNm
	5	7	PTL3	3581	2030	0.80 m (3200) 25 kNm	0.65 m (3305) 26 kNm	0.55 m (3405) 26 kNm	0.45 m (3310) 25 kNm
	10	7				1.15 m (3260) 36 kNm	0.90 m (3255) 35 kNm	0.80 m (3405) 38 kNm	0.75 m 41 kNm
	20	7						1.15 m (3270) 54 kNm	1.00 m (3340) 55 kNm
	30	7							
	5	7	PTL3	3979	2256				
	10	7							0.75 m (3581) 41 kNm
	20	7							
	30	7							
RR400/10 S440J2H	5	10	PTL1	2959	1677	0.80 m 25 kNm	0.65 m 26 kNm	0.50 m 24 kNm	0.45 m 25 kNm
	10	10				1.10 m 35 kNm	0.85 m 33 kNm	0.70 m 33 kNm	0.60 m 33 kNm
	20	10				1.20 m (2440) 38 kNm	1.20 m (2845) 47 kNm	1.10 m 52 kNm	0.90 m 49 kNm
	30	10				1.20 m (2300) 38 kNm	1.20 m (2635) 47 kNm	1.20 m (2785) 57 kNm	1.15 m 63 kNm
	5	10	PTL2	3452	1957	1.00 m 31 kNm	0.75 m 29 kNm	0.65 m 31 kNm	0.55 m 30 kNm
	10	10				1.20 m (3185) 38 kNm	1.10 m 43 kNm	0.90 m 42 kNm	0.75 m 41 kNm
	20	10						1.20 m (3205) 57 kNm	1.15 m 63 kNm
	30	10							1.20 m (3040) 66 kNm
	5	10	PTL2	3945	2236	1.15 m 36 kNm	0.90 m 35 kNm	0.75 m 35 kNm	0.65 m 36 kNm
	10	10					1.20 m (3745) 47 kNm	1.10 m 52 kNm	0.90 m 49 kNm
	20	10							1.20 m (3565) 66 kNm
	30	10							
	5	7	PTL3	4438	2516	1.15 m (4180) 36 kNm	0.95 m (4340) 37 kNm	0.80 m (4435) 38 kNm	0.70 m 38 kNm
	10	7						1.20 m (4395) 57 kNm	1.05 m 58 kNm
	20	7							
	30	7							
	5	7	PTL3	4931	2795				0.70 m (4438) 38 kNm
	10	7							1.05 m (4460) 58 kNm
	20	7							
	30	7							

Values in brackets (xxxx) represent the maximum achievable R_c value with particular pile size, pile length and hammer size.

DROP HAMMERS

Efficiency of the hammer 80 %						Drop height [m] and impact energy [kNm] to achieve R_c and R_d values			
Pile	Pile length [m]	Settlement s_{10} [mm]	Piling work class	R_c [kN]	R_d [kN]	Weight of the ram block [kg]			
						4000	5000	6000	7000
RR400/12.5 S355J2H	5	10	PTL1	2965	1681	0.75 m 24 kNm	0.60 m 24 kNm	0.50 m 24 kNm	0.40 m 22 kNm
	10	10				1.00 m 31 kNm	0.75 m 29 kNm	0.65 m 31 kNm	0.55 m 30 kNm
	20	10				1.20 m (2755) 38 kNm	1.10 m 43 kNm	0.90 m 42 kNm	0.80 m 44 kNm
	30	10				1.20 m (2820) 38 kNm	1.15 m 45 kNm	1.05 m 49 kNm	0.95 m 52 kNm
	5	10	PTL2	3460	1961	0.90 m 28 kNm	0.70 m 27 kNm	0.60 m 28 kNm	0.50 m 27 kNm
	10	10				1.20 m (3445) 38 kNm	0.95 m 37 kNm	0.80 m 38 kNm	0.65 m 36 kNm
	20	10					1.20 m (3150) 47 kNm	1.15 m 54 kNm	1.00 m 55 kNm
	30	10					1.20 m (3105) 47 kNm	1.20 m (3320) 57 kNm	1.20 m 66 kNm
	5	10	PTL2	3954	2241	1.05 m 33 kNm	0.85 m 33 kNm	0.70 m 33 kNm	0.60 m 33 kNm
	10	10					1.15 m 45 kNm	0.95 m 45 kNm	0.80 m 44 kNm
	20	10						1.20 m (3555) 57 kNm	1.20 m (3885) 66 kNm
	30	10							1.20 m (3475) 66 kNm
	5	7	PTL3	4448	2522	1.05 m (4215) 33 kNm	0.85 m (4345) 33 kNm	0.70 m (4365) 33 kNm	0.60 m (4380) 33 kNm
	10	7					1.15 m (4200) 45 kNm	0.95 m (4225) 45 kNm	0.85 m (4330) 47 kNm
	20	7							1.20 m (4030) 66 kNm
	30	7							
	5	7	PTL3	4942	2802				
	10	7							
	20	7							
	30	7							
RR400/12.5 S440J2H	5	10	PTL1	3675	2083	0.95 m 30 kNm	0.75 m 29 kNm	0.60 m 28 kNm	0.55 m 30 kNm
	10	10				1.20 m (3445) 38 kNm	1.05 m 41 kNm	0.85 m 40 kNm	0.75 m 41 kNm
	20	10				1.20 m (2755) 38 kNm	1.20 m (3150) 47 kNm	1.20 m (3555) 57 kNm	1.10 m 60 kNm
	30	10				1.20 m (2820) 38 kNm	1.20 m (3105) 47 kNm	1.20 m (3320) 57 kNm	1.20 m (3475) 66 kNm
	5	10	PTL2	4288	2431	1.20 m 38 kNm	0.90 m 35 kNm	0.75 m 35 kNm	0.65 m 36 kNm
	10	10					1.20 m (4115) 47 kNm	1.05 m 49 kNm	0.90 m 49 kNm
	20	10							1.20 m (3885) 66 kNm
	30	10							
	5	10	PTL2	4900	2778	1.20 m (4420) 38 kNm	1.10 m 43 kNm	0.90 m 42 kNm	0.75 m 41 kNm
	10	10						1.20 m (4495) 57 kNm	1.15 m 63 kNm
	20	10							
	30	10							
	5	7	PTL3	5513	3125		1.20 m 47 kNm	0.95 m (5405) 45 kNm	0.85 m 47 kNm
	10	7						1.20 m (4905) 57 kNm	1.20 m (5385) 66 kNm
	20	7							
	30	7							
	5	7	PTL3	6125	3472		1.20 m (5513) 47 kNm		0.85 m (5513) 47 kNm
	10	7							
	20	7							
	30	7							

Values in brackets (xxxx) represent the maximum achievable R_c value with particular pile size, pile length and hammer size.

HYDRAULIC HAMMERS

(for example Junttan HHK A/S series)

Efficiency of the hammer 95 %, * = 90 %				Drop height [m] and impact energy [kNm] to achieve R_c and R_d values					
Pile	Pile length [m]	Settlement s_{10} [mm]	Piling work class	R_c [kN]	R_d [kN]	Weight of the ram block [kg] 500*	1000*	1360**	1500*
RR75	5	10	PTL1	343	194	0.40 m 2 kNm	0.20 m 2 kNm	0.15 m 2 kNm	0.15 m 2 kNm
	10	10				0.55 m 2 kNm	0.30 m 3 kNm	0.20 m 3 kNm	0.20 m 3 kNm
	20	10				0.90 m 4 kNm	0.45 m 4 kNm	0.30 m 4 kNm	0.35 m 5 kNm
	30	10				1.00 m 4 kNm	0.60 m 5 kNm	0.40 m 5 kNm	0.40 m 5 kNm
	5	10	PTL2	400	227	0.50 m 2 kNm	0.25 m 2 kNm	0.20 m 3 kNm	0.20 m 3 kNm
	10	10				0.70 m 3 kNm	0.40 m 4 kNm	0.30 m 4 kNm	0.25 m 3 kNm
	20	10				1.20 m 5 kNm	0.60 m 5 kNm	0.45 m 6 kNm	0.45 m 6 kNm
	30	10				1.30 m 6 kNm	0.80 m 7 kNm	0.55 m 7 kNm	0.55 m 7 kNm
	5	10	PTL2	458	260	0.60 m 3 kNm	0.30 m 3 kNm	0.25 m 3 kNm	0.20 m 3 kNm
	10	10				0.90 m 4 kNm	0.50 m 4 kNm	0.35 m 4 kNm	0.35 m 5 kNm
	20	10				1.50 m 7 kNm	0.75 m 7 kNm	0.55 m 7 kNm	0.55 m 7 kNm
	30	10				1.50 m (430) 7 kNm	1.05 m 9 kNm	0.70 m 9 kNm	0.70 m 9 kNm
	5	7	PTL3	515	292	0.70 m 3 kNm	0.35 m 3 kNm	0.25 m 3 kNm	0.25 m 3 kNm
	10	7				1.05 m 5 kNm	0.60 m 5 kNm	0.40 m 5 kNm	0.40 m 5 kNm
	20	7				1.50 m (470) 7 kNm	0.90 m 8 kNm	0.65 m 8 kNm	0.65 m 9 kNm
	30	7					1.30 m 11 kNm	0.85 m 11 kNm	0.85 m 11 kNm
	5	7	PTL3	572	324	0.70 m (515) 3 kNm	0.35 m (525) 3 kNm	0.25 m (515) 3 kNm	0.25 m (515) 3 kNm
	10	7				1.10 m (540) 5 kNm	0.60 m (515) 5 kNm	0.40 m (520) 5 kNm	0.40 m (530) 5 kNm
	20	7					1.05 m (565) 9 kNm	0.75 m (560) 10 kNm	0.75 m (555) 10 kNm
	30	7					1.40 m (520) 12 kNm	1.00 m (560) 13 kNm	1.05 m 14 kNm
RR90	5	10	PTL1	406	230	0.45 m 2 kNm	0.25 m 2 kNm	0.20 m 3 kNm	0.15 m 2 kNm
	10	10				0.70 m 3 kNm	0.35 m 3 kNm	0.25 m 3 kNm	0.25 m 3 kNm
	20	10				1.05 m 5 kNm	0.55 m 5 kNm	0.40 m 5 kNm	0.40 m 5 kNm
	30	10				1.10 m 5 kNm	0.75 m 7 kNm	0.50 m 6 kNm	0.50 m 7 kNm
	5	10	PTL2	474	269	0.60 m 3 kNm	0.30 m 3 kNm	0.20 m 3 kNm	0.20 m 3 kNm
	10	10				0.90 m 4 kNm	0.50 m 4 kNm	0.35 m 4 kNm	0.35 m 5 kNm
	20	10				1.40 m 6 kNm	0.70 m 6 kNm	0.50 m 6 kNm	0.50 m 7 kNm
	30	10				1.45 m 6 kNm	1.00 m 9 kNm	0.65 m 8 kNm	0.65 m 9 kNm
	5	10	PTL2	541	307	0.75 m 3 kNm	0.40 m 4 kNm	0.25 m 3 kNm	0.25 m 3 kNm
	10	10				1.10 m 5 kNm	0.60 m 5 kNm	0.40 m 5 kNm	0.40 m 5 kNm
	20	10				1.50 m (495) 7 kNm	0.90 m 8 kNm	0.65 m 8 kNm	0.65 m 9 kNm
	30	10				1.50 m (485) 7 kNm	1.30 m 11 kNm	0.85 m 11 kNm	0.85 m 11 kNm
	5	7	PTL3	609	345	0.85 m 4 kNm	0.45 m 4 kNm	0.30 m 4 kNm	0.30 m 4 kNm
	10	7				1.20 m (605) 5 kNm	0.70 m 6 kNm	0.50 m 6 kNm	0.45 m 6 kNm
	20	7					1.05 m 9 kNm	0.75 m 10 kNm	0.75 m 10 kNm
	30	7					1.50 m (600) 13 kNm	1.05 m 13 kNm	1.00 m 13 kNm
	5	7	PTL3	677	384	0.85 m (609) 4 kNm	0.45 m (609) 4 kNm	0.30 m (609) 4 kNm	0.30 m (609) 4 kNm
	10	7					0.70 m (615) 6 kNm	0.50 m (609) 6 kNm	0.45 m (610) 6 kNm
	20	7					1.15 m (635) 10 kNm	0.85 m (655) 11 kNm	0.85 m (660) 11 kNm
	30	7						1.15 m (645) 15 kNm	1.15 m (655) 15 kNm

Values in brackets (xxxx) represent the maximum achievable R_c value with particular pile size, pile length and hammer size.

**) Hammer with 1360 kg ram block has been analyzed using Movax DH-15 hammer model and 95 % efficiency.

HYDRAULIC HAMMERS

(for example Junttan HHK A/S series)

Efficiency of the hammer 95 %, * = 90 %				Drop height [m] and impact energy [kNm] to achieve R_c and R_d values						
Pile	Pile length [m]	Settlement s_{10} [mm]	Piling work class	R_c [kN]	R_d [kN]	Weight of the ram block [kg] 500*	1000*	1360**	1500*	2000*
RR115/6.3	5	10	PTL1	531	301	0.65 m 3 kNm	0.35 m 3 kNm	0.25 m 3 kNm	0.20 m 3 kNm	0.15 m 3 kNm
	10	10				0.95 m 4 kNm	0.50 m 4 kNm	0.35 m 4 kNm	0.35 m 5 kNm	0.25 m 4 kNm
	20	10				1.25 m 6 kNm	0.75 m 7 kNm	0.50 m 6 kNm	0.50 m 7 kNm	0.40 m 7 kNm
	30	10				1.30 m 6 kNm	0.95 m 8 kNm	0.65 m 8 kNm	0.65 m 9 kNm	0.50 m 9 kNm
	5	10	PTL2	619	351	0.80 m 4 kNm	0.40 m 4 kNm	0.30 m 4 kNm	0.30 m 4 kNm	0.20 m 4 kNm
	10	10				1.20 m 5 kNm	0.65 m 6 kNm	0.45 m 6 kNm	0.45 m 6 kNm	0.35 m 6 kNm
	20	10				1.50 m (595) 7 kNm	0.95 m 8 kNm	0.65 m 8 kNm	0.65 m 9 kNm	0.50 m 9 kNm
	30	10				1.50 m (575) 7 kNm	1.25 m 11 kNm	0.90 m 11 kNm	0.90 m 12 kNm	0.65 m 11 kNm
	5	10	PTL2	708	401	1.00 m 4 kNm	0.50 m 4 kNm	0.35 m 4 kNm	0.35 m 5 kNm	0.25 m 4 kNm
	10	10				1.50 m 7 kNm	0.80 m 7 kNm	0.55 m 7 kNm	0.55 m 7 kNm	0.40 m 7 kNm
	20	10					1.25 m 11 kNm	0.85 m 11 kNm	0.80 m 11 kNm	0.65 m 11 kNm
	30	10					1.50 m (680) 13 kNm	1.15 m 15 kNm	1.15 m 15 kNm	0.85 m 15 kNm
	5	7	PTL3	796	451	1.05 m (780) 5 kNm	0.55 m 5 kNm	0.40 m 5 kNm	0.40 m 5 kNm	0.30 m 5 kNm
	10	7				1.50 m (740) 7 kNm	0.90 m 8 kNm	0.65 m 8 kNm	0.65 m 9 kNm	0.45 m 8 kNm
	20	7					1.45 m 13 kNm	1.00 m 13 kNm	0.95 m 13 kNm	0.75 m 13 kNm
	30	7						1.20 m (740) 15 kNm	1.35 m 18 kNm	1.00 m 18 kNm
	5	7	PTL3	885	502		0.55 m (796) 5 kNm	0.40 m (815) 5 kNm	0.40 m (796) 5 kNm	0.30 m (796) 5 kNm
	10	7					0.90 m (810) 8 kNm	0.65 m (805) 8 kNm	0.65 m (796) 9 kNm	0.45 m (796) 8 kNm
	20	7					1.45 m (796) 13 kNm	1.05 m (830) 13 kNm	1.10 m (865) 15 kNm	0.85 m (860) 15 kNm
	30	7							1.40 m (810) 19 kNm	1.15 m (860) 20 kNm

Values in brackets (xxxx) represent the maximum achievable R_c value with particular pile size, pile length and hammer size.

**) Hammer with 1360 kg ram block has been analyzed using Movax DH-15 hammer model and 95 % efficiency.

HYDRAULIC HAMMERS

(for example Junttan HHK A/S series)

Efficiency of the hammer 95 %, * = 90 %				Drop height [m] and impact energy [kNm] to achieve R_c and R_d values						
Pile	Pile length [m]	Settlement s_{10} [mm]	Piling work class	R_c [kN]	R_d [kN]	Weight of the ram block [kg] 1000*	1360**	1500*	2000*	3000
RR115/8	5	10	PTL1	664	376	0.40 m 4 kNm	0.30 m 4 kNm	0.25 m 3 kNm	0.20 m 4 kNm	0.15 m 4 kNm
	10	10				0.60 m 5 kNm	0.40 m 5 kNm	0.40 m 5 kNm	0.30 m 5 kNm	0.25 m 7 kNm
	20	10				0.90 m 8 kNm	0.60 m 8 kNm	0.60 m 8 kNm	0.45 m 8 kNm	0.35 m 10 kNm
	30	10				1.00 m 9 kNm	0.80 m 10 kNm	0.80 m 11 kNm	0.60 m 11 kNm	0.25 m 7 kNm
	5	10	PTL2	774	439	0.50 m 4 kNm	0.35 m 4 kNm	0.35 m 5 kNm	0.25 m 4 kNm	0.20 m 6 kNm
	10	10				0.75 m 7 kNm	0.55 m 7 kNm	0.55 m 7 kNm	0.40 m 7 kNm	0.30 m 8 kNm
	20	10				1.20 m 11 kNm	0.80 m 10 kNm	0.80 m 11 kNm	0.60 m 11 kNm	0.45 m 13 kNm
	30	10				1.35 m 12 kNm	1.10 m 14 kNm	1.10 m 15 kNm	0.80 m 14 kNm	0.25 m 7 kNm
	5	10	PTL2	885	502	0.60 m 5 kNm	0.45 m 6 kNm	0.40 m 5 kNm	0.30 m 5 kNm	0.25 m 7 kNm
	10	10				0.90 m 8 kNm	0.70 m 9 kNm	0.65 m 9 kNm	0.50 m 9 kNm	0.35 m 10 kNm
	20	10				1.50 m 13 kNm	1.05 m 13 kNm	1.00 m 13 kNm	0.75 m 13 kNm	0.55 m 15 kNm
	30	10				1.50 m (825) 13 kNm	1.20 m (820) 15 kNm	1.40 m 19 kNm	1.05 m 19 kNm	0.30 m 8 kNm
	5	7	PTL3	995	564	0.70 m 6 kNm	0.50 m 6 kNm	0.45 m 6 kNm	0.35 m 6 kNm	0.30 m 8 kNm
	10	7				1.05 m 9 kNm	0.75 m 10 kNm	0.75 m 10 kNm	0.60 m 11 kNm	0.40 m 11 kNm
	20	7				1.50 m (910) 13 kNm	1.20 m (985) 15 kNm	1.20 m 16 kNm	0.90 m 16 kNm	0.25 m 7 kNm
	30	7						1.50 m (945) 20 kNm	1.25 m 22 kNm	0.30 m 8 kNm
	5	7	PTL3	1106	627	0.70 m (995) 6 kNm	0.50 m (995) 6 kNm	0.45 m (995) 6 kNm	0.35 m (995) 6 kNm	0.30 m (995) 8 kNm
	10	7				1.10 m (1035) 10 kNm	0.80 m (1030) 10 kNm	0.80 m (1035) 11 kNm	0.60 m (995) 11 kNm	0.40 m (995) 11 kNm
	20	7						1.25 m (1035) 17 kNm	1.00 m (1075) 18 kNm	0.30 m 8 kNm
	30	7							1.35 m (1040) 24 kNm	0.40 m 11 kNm
RRs115/8	5	10	PTL1	793	450	0.50 m 4 kNm	0.35 m 4 kNm	0.35 m 5 kNm	0.25 m 4 kNm	0.20 m 6 kNm
	10	10				0.75 m 7 kNm	0.55 m 7 kNm	0.55 m 7 kNm	0.40 m 7 kNm	0.30 m 8 kNm
	20	10				1.25 m 11 kNm	0.85 m 11 kNm	0.80 m 11 kNm	0.60 m 11 kNm	0.45 m 13 kNm
	30	10				1.40 m 12 kNm	1.15 m 15 kNm	1.15 m 15 kNm	0.85 m 15 kNm	0.55 m 15 kNm
	5	10	PTL2	926	525	0.65 m 6 kNm	0.45 m 6 kNm	0.45 m 6 kNm	0.35 m 6 kNm	0.25 m 7 kNm
	10	10				1.00 m 9 kNm	0.75 m 10 kNm	0.70 m 9 kNm	0.55 m 10 kNm	0.40 m 11 kNm
	20	10				1.50 m (885) 13 kNm	1.15 m 15 kNm	1.10 m 15 kNm	0.80 m 14 kNm	0.60 m 17 kNm
	30	10				1.50 m (825) 13 kNm	1.20 m (820) 15 kNm	1.50 m (925) 20 kNm	1.15 m 20 kNm	0.30 m 8 kNm
	5	10	PTL2	1058	600	0.80 m 7 kNm	0.60 m 8 kNm	0.55 m 7 kNm	0.40 m 7 kNm	0.35 m 10 kNm
	10	10				1.25 m 11 kNm	0.95 m 12 kNm	0.90 m 12 kNm	0.70 m 12 kNm	0.50 m 14 kNm
	20	10					1.20 m (960) 15 kNm	1.40 m 19 kNm	1.05 m 19 kNm	0.30 m 8 kNm
	30	10							1.50 m 26 kNm	0.40 m 11 kNm
	5	7	PTL3	1190	675	0.95 m 8 kNm	0.65 m 8 kNm	0.65 m 9 kNm	0.50 m 9 kNm	0.40 m 11 kNm
	10	7				1.45 m 13 kNm	1.05 m 13 kNm	1.05 m 14 kNm	0.80 m 14 kNm	0.55 m 15 kNm
	20	7						1.50 m (1135) 20 kNm	1.25 m 22 kNm	0.35 m 10 kNm
	30	7							1.50 m (1095) 26 kNm	0.45 m 13 kNm
	5	7	PTL3	1322	749	0.95 m (1190) 8 kNm	0.65 m (1190) 8 kNm	0.65 m (1190) 9 kNm	0.50 m (1190) 9 kNm	0.40 m (1190) 11 kNm
	10	7				1.50 m (1225) 13 kNm	1.15 m (1250) 15 kNm	1.15 m (1260) 15 kNm	0.80 m (1205) 14 kNm	0.55 m (1205) 15 kNm
	20	7							1.50 m (1295) 26 kNm	0.45 m 13 kNm
	30	7								0.60 m 17 kNm

Values in brackets (xxxx) represent the maximum achievable R_c value with particular pile size, pile length and hammer size.

**) Hammer with 1360 kg ram block has been analyzed using Movax DH-15 hammer model and 95 % efficiency.

HYDRAULIC HAMMERS

(for example Junttan HHK A/S series)

Efficiency of the hammer 95 %, * = 90 %				Drop height [m] and impact energy [kNm] to achieve R_c and R_d values						
Pile	Pile length [m]	Settlement s_{10} [mm]	Piling work class	R_c [kN]	R_d [kN]	Weight of the ram block [kg] 1360**	2000*	3000	4000	5000
RR140/8	5	10	PTL1	822	466	0.35 m 4 kNm	0.25 m 4 kNm	0.20 m 6 kNm	0.15 m 6 kNm	0.10 m 5 kNm
	10	10				0.55 m 7 kNm	0.40 m 7 kNm	0.30 m 8 kNm	0.20 m 7 kNm	0.15 m 7 kNm
	20	10				0.80 m 10 kNm	0.55 m 10 kNm	0.45 m 13 kNm	0.35 m 13 kNm	0.25 m 12 kNm
	30	10				0.95 m 12 kNm	0.75 m 13 kNm	0.55 m 15 kNm	0.45 m 17 kNm	0.30 m 14 kNm
	5	10	PTL2	959	544	0.45 m 6 kNm	0.35 m 6 kNm	0.25 m 7 kNm	0.20 m 7 kNm	0.15 m 7 kNm
	10	10				0.70 m 9 kNm	0.50 m 9 kNm	0.35 m 10 kNm	0.30 m 11 kNm	0.20 m 9 kNm
	20	10				1.05 m 13 kNm	0.75 m 13 kNm	0.55 m 15 kNm	0.45 m 17 kNm	0.35 m 16 kNm
	30	10				1.20 m (950) 15 kNm	1.05 m 19 kNm	0.70 m 20 kNm	0.60 m 22 kNm	0.40 m 19 kNm
	5	10	PTL2	1096	621	0.55 m 7 kNm	0.40 m 7 kNm	0.35 m 10 kNm	0.25 m 9 kNm	0.15 m 7 kNm
	10	10				0.85 m 11 kNm	0.65 m 11 kNm	0.45 m 13 kNm	0.35 m 13 kNm	0.25 m 12 kNm
	20	10				1.20 m (1040) 15 kNm	0.95 m 17 kNm	0.70 m 20 kNm	0.55 m 21 kNm	0.40 m 19 kNm
	30	10					1.35 m 24 kNm	0.85 m 24 kNm	0.75 m 28 kNm	0.55 m 26 kNm
	5	7	PTL3	1233	699	0.65 m 8 kNm	0.45 m 8 kNm	0.35 m 10 kNm	0.25 m 9 kNm	0.20 m 9 kNm
	10	7				0.95 m 12 kNm	0.75 m 13 kNm	0.50 m 14 kNm	0.40 m 15 kNm	0.30 m 14 kNm
	20	7					1.10 m 19 kNm	0.80 m 22 kNm	0.65 m 24 kNm	0.50 m 23 kNm
	30	7					1.50 m (1200) 26 kNm	0.60 m 17 kNm	0.90 m 34 kNm	0.65 m 30 kNm
	5	7	PTL3	1370	777	0.65 m (1233) 8 kNm	0.45 m (1265) 8 kNm	0.35 m (1250) 10 kNm	0.25 m (1245) 9 kNm	0.20 m (1233) 9 kNm
	10	7				0.95 m (1245) 12 kNm	0.75 m (1260) 13 kNm	0.50 m (1240) 14 kNm	0.40 m (1233) 15 kNm	0.30 m (1233) 14 kNm
	20	7					1.20 m (1290) 21 kNm	0.90 m (1315) 25 kNm	0.75 m (1355) 28 kNm	0.50 m (1270) 23 kNm
	30	7						0.60 m (1233) 17 kNm	1.05 m (1365) 39 kNm	0.75 m (1360) 35 kNm
RRs140/8	5	10	PTL1	983	557	0.50 m 6 kNm	0.35 m 6 kNm	0.30 m 8 kNm	0.20 m 7 kNm	0.15 m 7 kNm
	10	10				0.70 m 9 kNm	0.55 m 10 kNm	0.40 m 11 kNm	0.30 m 11 kNm	0.20 m 9 kNm
	20	10				1.10 m 14 kNm	0.80 m 14 kNm	0.60 m 17 kNm	0.45 m 17 kNm	0.35 m 16 kNm
	30	10				1.20 m (950) 15 kNm	1.10 m 19 kNm	0.70 m 20 kNm	0.60 m 22 kNm	0.45 m 21 kNm
	5	10	PTL2	1147	650	0.60 m 8 kNm	0.45 m 8 kNm	0.35 m 10 kNm	0.25 m 9 kNm	0.20 m 9 kNm
	10	10				0.90 m 11 kNm	0.70 m 12 kNm	0.50 m 14 kNm	0.35 m 13 kNm	0.30 m 14 kNm
	20	10				1.20 m (1040) 15 kNm	1.05 m 19 kNm	0.75 m 21 kNm	0.60 m 22 kNm	0.45 m 21 kNm
	30	10					1.45 m 26 kNm	0.90 m 25 kNm	0.80 m 30 kNm	0.60 m 28 kNm
	5	10	PTL2	1311	743	0.75 m 10 kNm	0.55 m 10 kNm	0.45 m 13 kNm	0.30 m 11 kNm	0.20 m 9 kNm
	10	10				1.15 m 15 kNm	0.85 m 15 kNm	0.60 m 17 kNm	0.45 m 17 kNm	0.35 m 16 kNm
	20	10					1.35 m 24 kNm	0.95 m 27 kNm	0.75 m 28 kNm	0.60 m 28 kNm
	30	10					1.50 m (1175) 26 kNm	1.20 m 34 kNm	1.05 m 39 kNm	0.75 m 35 kNm
	5	7	PTL3	1475	836	0.85 m 11 kNm	0.60 m 11 kNm	0.50 m 14 kNm	0.35 m 13 kNm	0.25 m 12 kNm
	10	7				1.20 m (1420) 15 kNm	1.05 m 19 kNm	0.70 m 20 kNm	0.50 m 19 kNm	0.40 m 19 kNm
	20	7					1.50 m (1450) 26 kNm	1.15 m 32 kNm	0.90 m 34 kNm	0.70 m 33 kNm
	30	7						0.80 m 22 kNm	1.20 m (1460) 45 kNm	0.90 m 42 kNm
	5	7	PTL3	1638	929	0.85 m (1475) 11 kNm	0.60 m (1495) 11 kNm	0.50 m (1550) 14 kNm	0.35 m (1525) 13 kNm	0.25 m (1475) 12 kNm
	10	7					1.05 m (1510) 19 kNm	0.70 m (1515) 20 kNm	0.50 m (1475) 19 kNm	0.40 m (1500) 19 kNm
	20	7						1.20 m (1540) 34 kNm	1.05 m (1595) 39 kNm	0.75 m (1555) 35 kNm
	30	7						1.00 m 28 kNm		1.10 m 51 kNm

Values in brackets (xxxx) represent the maximum achievable R_c value with particular pile size, pile length and hammer size.

**) Hammer with 1360 kg ram block has been analyzed using Movax DH-15 hammer model and 95 % efficiency.

HYDRAULIC HAMMERS

(for example Junttan HHK A/S series)

Efficiency of the hammer 95 %, * = 90 %				Drop height [m] and impact energy [kNm] to achieve R_c and R_d values						
Pile	Pile length [m]	Settlement s_{10} [mm]	Piling work class	R_c [kN]	R_d [kN]	Weight of the ram block [kg] 1360**	2000*	3000	4000	5000
RR140/10	5	10	PTL1	1012	574	0.45 m 6 kNm	0.30 m 5 kNm	0.25 m 7 kNm	0.20 m 7 kNm	0.15 m 7 kNm
	10	10				0.65 m 8 kNm	0.45 m 8 kNm	0.35 m 10 kNm	0.25 m 9 kNm	0.20 m 9 kNm
	20	10				0.95 m 12 kNm	0.70 m 12 kNm	0.50 m 14 kNm	0.40 m 15 kNm	0.30 m 14 kNm
	30	10				1.00 m 13 kNm	0.90 m 16 kNm	0.65 m 18 kNm	0.50 m 19 kNm	0.35 m 16 kNm
	5	10	PTL2	1181	670	0.55 m 7 kNm	0.40 m 7 kNm	0.30 m 8 kNm	0.25 m 9 kNm	0.15 m 7 kNm
	10	10				0.80 m 10 kNm	0.60 m 11 kNm	0.45 m 13 kNm	0.35 m 13 kNm	0.25 m 12 kNm
	20	10				1.20 m (1165) 15 kNm	0.90 m 16 kNm	0.60 m 17 kNm	0.50 m 19 kNm	0.40 m 19 kNm
	30	10				1.20 m (1130) 15 kNm	1.20 m 21 kNm	0.75 m 21 kNm	0.70 m 26 kNm	0.50 m 23 kNm
	5	10	PTL2	1350	765	0.70 m 9 kNm	0.50 m 9 kNm	0.40 m 11 kNm	0.30 m 11 kNm	0.20 m 9 kNm
	10	10				1.00 m 13 kNm	0.75 m 13 kNm	0.55 m 15 kNm	0.40 m 15 kNm	0.30 m 14 kNm
	20	10					1.15 m 20 kNm	0.75 m 21 kNm	0.65 m 24 kNm	0.50 m 23 kNm
	30	10					1.50 m (1330) 26 kNm	0.45 m 13 kNm	0.90 m 34 kNm	0.60 m 28 kNm
	5	7	PTL3	1518	861	0.80 m 10 kNm	0.55 m 10 kNm	0.45 m 13 kNm	0.30 m 11 kNm	0.25 m 12 kNm
	10	7				1.10 m (1515) 14 kNm	0.85 m 15 kNm	0.60 m 17 kNm	0.45 m 17 kNm	0.35 m 16 kNm
	20	7					1.40 m 25 kNm	0.45 m 13 kNm	0.75 m 28 kNm	0.60 m 28 kNm
	30	7					1.50 m (1370) 26 kNm	0.50 m 14 kNm	1.10 m 41 kNm	0.75 m 35 kNm
	5	7	PTL3	1687	956	0.80 m (1518) 10 kNm	0.55 m (1518) 10 kNm	0.45 m (1518) 13 kNm	0.30 m (1520) 11 kNm	0.25 m (1518) 12 kNm
	10	7					0.90 m (1595) 16 kNm	0.70 m (1670) 20 kNm	0.45 m (1545) 17 kNm	0.35 m (1540) 16 kNm
	20	7					1.40 m (1545) 25 kNm	0.55 m 15 kNm	0.85 m (1645) 32 kNm	0.65 m (1625) 30 kNm
	30	7						0.60 m 17 kNm	1.15 m (1575) 43 kNm	0.90 m 42 kNm
RRs140/10	5	10	PTL1	1210	686	0.60 m 8 kNm	0.40 m 7 kNm	0.35 m 10 kNm	0.25 m 9 kNm	0.15 m 7 kNm
	10	10				0.85 m 11 kNm	0.60 m 11 kNm	0.45 m 13 kNm	0.35 m 13 kNm	0.25 m 12 kNm
	20	10				1.20 m (1165) 15 kNm	0.95 m 17 kNm	0.65 m 18 kNm	0.55 m 21 kNm	0.40 m 19 kNm
	30	10				1.20 m (1130) 15 kNm	1.25 m 22 kNm	0.55 m 15 kNm	0.75 m 28 kNm	0.50 m 23 kNm
	5	10	PTL2	1412	800	0.75 m 10 kNm	0.50 m 9 kNm	0.40 m 11 kNm	0.30 m 11 kNm	0.20 m 9 kNm
	10	10				1.10 m 14 kNm	0.80 m 14 kNm	0.60 m 17 kNm	0.45 m 17 kNm	0.35 m 16 kNm
	20	10					1.25 m 22 kNm	0.85 m 24 kNm	0.70 m 26 kNm	0.55 m 26 kNm
	30	10					1.50 m (1330) 26 kNm	0.50 m 14 kNm	1.00 m 37 kNm	0.65 m 30 kNm
	5	10	PTL2	1614	915	0.90 m 11 kNm	0.65 m 11 kNm	0.50 m 14 kNm	0.40 m 15 kNm	0.25 m 12 kNm
	10	10				1.20 m (1515) 15 kNm	1.00 m 18 kNm	0.75 m 21 kNm	0.55 m 21 kNm	0.40 m 19 kNm
	20	10					1.50 m (1555) 26 kNm	0.55 m 15 kNm	0.90 m 34 kNm	0.70 m 33 kNm
	30	10						0.60 m 17 kNm	1.20 m (1575) 45 kNm	0.85 m 40 kNm
	5	7	PTL3	1815	1029	1.05 m 13 kNm	0.75 m 13 kNm	0.55 m 15 kNm	0.45 m 17 kNm	0.30 m 14 kNm
	10	7					1.15 m 20 kNm	0.85 m 24 kNm	0.60 m 22 kNm	0.50 m 23 kNm
	20	7						0.55 m 15 kNm	1.05 m 39 kNm	0.85 m 40 kNm
	30	7						0.70 m 20 kNm		1.05 m 49 kNm
	5	7	PTL3	2017	1143	1.05 m (1815) 13 kNm	0.75 m (1815) 13 kNm	0.55 m (1815) 15 kNm	0.45 m (1935) 17 kNm	0.30 m (1815) 14 kNm
	10	7					1.30 m (1945) 23 kNm	0.95 m (1990) 27 kNm	0.65 m (1900) 24 kNm	0.50 m (1865) 23 kNm
	20	7						0.60 m 17 kNm	1.20 m (1975) 45 kNm	1.00 m 47 kNm
	30	7						0.80 m 22 kNm		1.20 m (1955) 56 kNm

Values in brackets (xxxx) represent the maximum achievable R_c value with particular pile size, pile length and hammer size.

**) Hammer with 1360 kg ram block has been analyzed using Movax DH-15 hammer model and 95 % efficiency.

HYDRAULIC HAMMERS

(for example Junttan HHK A/S series)

Efficiency of the hammer 95 %, * = 90 %						Drop height [m] and impact energy [kNm] to achieve R_c and R_d values			
Pile	Pile length [m]	Settlement s_{10} [mm]	Piling work class	R_c [kN]	R_d [kN]	Weight of the ram block [kg] 2000*	3000	4000	5000
RR170/10	5	10	PTL1	1235	700	0.40 m 7 kNm	0.30 m 8 kNm	0.25 m 9 kNm	0.15 m 7 kNm
	10	10				0.60 m 11 kNm	0.45 m 13 kNm	0.35 m 13 kNm	0.25 m 12 kNm
	20	10				0.90 m 16 kNm	0.60 m 17 kNm	0.50 m 19 kNm	0.35 m 16 kNm
	30	10				1.00 m 18 kNm	0.85 m 24 kNm	0.65 m 24 kNm	0.45 m 21 kNm
	5	10	PTL2	1441	817	0.50 m 9 kNm	0.40 m 11 kNm	0.30 m 11 kNm	0.20 m 9 kNm
	10	10				0.75 m 13 kNm	0.55 m 15 kNm	0.40 m 15 kNm	0.30 m 14 kNm
	20	10				1.15 m 20 kNm	0.80 m 22 kNm	0.65 m 24 kNm	0.45 m 21 kNm
	30	10				1.35 m 24 kNm	1.10 m 31 kNm	0.85 m 32 kNm	0.60 m 28 kNm
	5	10	PTL2	1647	934	0.60 m 11 kNm	0.50 m 14 kNm	0.35 m 13 kNm	0.25 m 12 kNm
	10	10				0.90 m 16 kNm	0.70 m 20 kNm	0.50 m 19 kNm	0.40 m 19 kNm
	20	10				1.45 m 26 kNm	1.00 m 28 kNm	0.80 m 30 kNm	0.60 m 28 kNm
	30	10				1.50 m (1540) 26 kNm	1.20 m (1565) 34 kNm	1.10 m 41 kNm	0.75 m 35 kNm
	5	7	PTL3	1853	1050	0.70 m 12 kNm	0.55 m 15 kNm	0.40 m 15 kNm	0.30 m 14 kNm
	10	7				1.05 m 19 kNm	0.75 m 21 kNm	0.60 m 22 kNm	0.45 m 21 kNm
	20	7				1.50 m (1725) 26 kNm	1.15 m 32 kNm	0.90 m 34 kNm	0.70 m 33 kNm
	30	7						1.20 m (1785) 45 kNm	0.90 m 42 kNm
	5	7	PTL3	2059	1167	0.70 m (1853) 12 kNm	0.55 m (1853) 15 kNm	0.40 m (1905) 15 kNm	0.30 m (1853) 14 kNm
	10	7				1.05 m (1890) 19 kNm	0.75 m (1855) 21 kNm	0.65 m (2015) 24 kNm	0.45 m (1853) 21 kNm
	20	7					1.20 m (1900) 34 kNm	1.00 m (1955) 37 kNm	0.80 m (2030) 37 kNm
	30	7							1.05 m (2015) 49 kNm
RRs170/10	5	10	PTL1	1477	837	0.50 m 9 kNm	0.40 m 11 kNm	0.30 m 11 kNm	0.20 m 9 kNm
	10	10				0.75 m 13 kNm	0.55 m 15 kNm	0.45 m 17 kNm	0.30 m 14 kNm
	20	10				1.20 m 21 kNm	0.80 m 22 kNm	0.65 m 24 kNm	0.50 m 23 kNm
	30	10				1.40 m 25 kNm	1.10 m 31 kNm	0.90 m 34 kNm	0.60 m 28 kNm
	5	10	PTL2	1723	977	0.65 m 11 kNm	0.50 m 14 kNm	0.40 m 15 kNm	0.25 m 12 kNm
	10	10				1.00 m 18 kNm	0.75 m 21 kNm	0.55 m 21 kNm	0.40 m 19 kNm
	20	10				1.50 m (1675) 26 kNm	1.05 m 29 kNm	0.85 m 32 kNm	0.65 m 30 kNm
	30	10				1.50 m (1540) 26 kNm	1.20 m (1565) 34 kNm	1.20 m 45 kNm	0.85 m 40 kNm
	5	10	PTL2	1969	1116	0.80 m 14 kNm	0.65 m 18 kNm	0.45 m 17 kNm	0.30 m 14 kNm
	10	10				1.25 m 22 kNm	0.90 m 25 kNm	0.70 m 26 kNm	0.50 m 23 kNm
	20	10					1.20 m (1850) 34 kNm	1.10 m 41 kNm	0.80 m 37 kNm
	30	10						1.20 m (1740) 45 kNm	1.05 m 49 kNm
	5	7	PTL3	2216	1256	0.95 m 17 kNm	0.70 m 20 kNm	0.55 m 21 kNm	0.35 m 16 kNm
	10	7				1.40 m 25 kNm	1.05 m 29 kNm	0.80 m 30 kNm	0.60 m 28 kNm
	20	7						1.20 m (2150) 45 kNm	0.95 m 44 kNm
	30	7					0.90 m 25 kNm		1.20 m (2155) 56 kNm
	5	7	PTL3	2462	1396	0.95 m (2216) 17 kNm	0.70 m (2240) 20 kNm	0.55 m (2310) 21 kNm	0.35 m (2225) 16 kNm
	10	7				1.50 m (2305) 26 kNm	1.05 m (2260) 29 kNm	0.85 m (2350) 32 kNm	0.60 m (2240) 28 kNm
	20	7					1.05 m 29 kNm		1.15 m (2440) 54 kNm
	30	7					1.05 m 29 kNm		

Values in brackets (xxxx) represent the maximum achievable R_c value with particular pile size, pile length and hammer size.

HYDRAULIC HAMMERS

(for example Junttan HHK A/S series)

Efficiency of the hammer 95 %, * = 90 %						Drop height [m] and impact energy [kNm] to achieve R_c and R_d values			
Pile	Pile length [m]	Settlement s_{10} [mm]	Piling work class	R_c [kN]	R_d [kN]	Weight of the ram block [kg] 2000*	3000	4000	5000
RR170/12.5	5	10	PTL1	1520	862	0.50 m 9 kNm	0.35 m 10 kNm	0.30 m 11 kNm	0.20 m 9 kNm
	10	10				0.70 m 12 kNm	0.50 m 14 kNm	0.40 m 15 kNm	0.30 m 14 kNm
	20	10				1.05 m 19 kNm	0.70 m 20 kNm	0.55 m 21 kNm	0.40 m 19 kNm
	30	10				1.05 m 19 kNm	1.00 m 28 kNm	0.75 m 28 kNm	0.55 m 26 kNm
	5	10	PTL2	1773	1005	0.60 m 11 kNm	0.45 m 13 kNm	0.35 m 13 kNm	0.25 m 12 kNm
	10	10				0.85 m 15 kNm	0.65 m 18 kNm	0.50 m 19 kNm	0.35 m 16 kNm
	20	10				1.35 m 24 kNm	0.90 m 25 kNm	0.75 m 28 kNm	0.55 m 26 kNm
	30	10				1.40 m 25 kNm	1.20 m (1755) 34 kNm	1.05 m 39 kNm	0.70 m 33 kNm
	5	10	PTL2	2026	1149	0.75 m 13 kNm	0.55 m 15 kNm	0.45 m 17 kNm	0.30 m 14 kNm
	10	10				1.10 m 19 kNm	0.80 m 22 kNm	0.60 m 22 kNm	0.45 m 21 kNm
	20	10				1.50 m (1895) 26 kNm	1.15 m 32 kNm	0.95 m 35 kNm	0.70 m 33 kNm
	30	10				1.50 m (1840) 26 kNm		1.20 m (1945) 45 kNm	0.95 m 44 kNm
	5	7	PTL3	2280	1293	0.85 m 15 kNm	0.60 m 17 kNm	0.50 m 19 kNm	0.35 m 16 kNm
	10	7				1.20 m 21 kNm	0.85 m (2220) 24 kNm	0.70 m 26 kNm	0.55 m 26 kNm
	20	7					1.20 m (2155) 34 kNm	1.10 m 41 kNm	0.80 m 37 kNm
	30	7					0.75 m 21 kNm		1.10 m 51 kNm
	5	7	PTL3	2533	1436	0.85 m (2280) 15 kNm	0.60 m (2280) 17 kNm	0.50 m (2280) 19 kNm	0.35 m (2280) 16 kNm
	10	7				1.20 m (2280) 21 kNm		0.75 m (2375) 28 kNm	0.55 m (2280) 26 kNm
	20	7					1.10 m 31 kNm	1.20 m (2395) 45 kNm	0.90 m (2460) 42 kNm
	30	7					0.95 m 27 kNm		1.20 m (2385) 56 kNm
RRs170/12.5	5	10	PTL1	1817	1030	0.65 m 11 kNm	0.50 m 14 kNm	0.35 m 13 kNm	0.25 m 12 kNm
	10	10				0.90 m 16 kNm	0.65 m 18 kNm	0.50 m 19 kNm	0.40 m 19 kNm
	20	10				1.40 m 25 kNm	0.95 m 27 kNm	0.75 m 28 kNm	0.55 m 26 kNm
	30	10				1.50 m 26 kNm	1.20 m (1760) 34 kNm	1.05 m 39 kNm	0.75 m 35 kNm
	5	10	PTL2	2120	1202	0.80 m 14 kNm	0.60 m 17 kNm	0.45 m 17 kNm	0.30 m 14 kNm
	10	10				1.15 m 20 kNm	0.85 m 24 kNm	0.65 m 24 kNm	0.50 m 23 kNm
	20	10				1.50 m (1895) 26 kNm	1.20 m (2090) 34 kNm	1.00 m 37 kNm	0.75 m 35 kNm
	30	10				1.50 m (1840) 26 kNm		1.20 m (1945) 45 kNm	1.00 m 47 kNm
	5	10	PTL2	2423	1374	1.00 m 18 kNm	0.75 m 21 kNm	0.55 m 21 kNm	0.40 m 19 kNm
	10	10				1.45 m 26 kNm	1.10 m 31 kNm	0.85 m 32 kNm	0.65 m 30 kNm
	20	10						1.20 m (2330) 45 kNm	0.95 m 44 kNm
	30	10					1.00 m 28 kNm		1.20 m (2335) 56 kNm
	5	7	PTL3	2726	1545	1.15 m 20 kNm	0.85 m 24 kNm	0.65 m 24 kNm	0.45 m 21 kNm
	10	7				1.50 m (2580) 26 kNm	1.20 m (2690) 34 kNm	1.00 m 37 kNm	0.75 m 35 kNm
	20	7					1.20 m 34 kNm		1.10 m 51 kNm
	30	7					1.10 m 31 kNm		
	5	7	PTL3	3029	1717	1.15 m (2726) 20 kNm	0.85 m (2805) 24 kNm	0.65 m (2810) 24 kNm	0.45 m (2726) 21 kNm
	10	7						1.05 m (2885) 39 kNm	0.75 m (2726) 35 kNm
	20	7					0.85 m 24 kNm		1.20 m (2845) 56 kNm
	30	7					1.20 m (2840) 34 kNm		

Values in brackets (xxxx) represent the maximum achievable R_c value with particular pile size, pile length and hammer size.

HYDRAULIC HAMMERS

(for example Junttan HHK A/S series)

Efficiency of the hammer 95 %, * = 90 %				Drop height [m] and impact energy [kNm] to achieve R_c and R_d values						
Pile	Pile length [m]	Settlement s_{10} [mm]	Piling work class	R_c [kN]	R_d [kN]	Weight of the ram block [kg] 2000*	3000	4000	5000	6000
RR220/10	5	10	PTL1	1632	925	0.55 m 10 kNm	0.35 m 10 kNm	0.30 m 11 kNm	0.25 m 12 kNm	0.20 m 11 kNm
	10	10				0.85 m 15 kNm	0.55 m 15 kNm	0.40 m 15 kNm	0.35 m 16 kNm	0.30 m 17 kNm
	20	10				1.20 m 21 kNm	0.80 m 22 kNm	0.60 m 22 kNm	0.50 m 23 kNm	0.40 m 22 kNm
	30	10				1.25 m 22 kNm	0.95 m 27 kNm	0.80 m 30 kNm	0.65 m 30 kNm	0.50 m 28 kNm
	5	10	PTL2	1904	1079	0.70 m 12 kNm	0.45 m 13 kNm	0.35 m 13 kNm	0.30 m 14 kNm	0.25 m 14 kNm
	10	10				1.10 m 19 kNm	0.65 m 18 kNm	0.50 m 19 kNm	0.40 m 19 kNm	0.35 m 20 kNm
	20	10				1.50 m (1860) 26 kNm	1.05 m 29 kNm	0.80 m 30 kNm	0.60 m 28 kNm	0.55 m 31 kNm
	30	10				1.50 m (1845) 26 kNm	1.20 m (1865) 34 kNm	1.05 m 39 kNm	0.85 m 40 kNm	0.70 m 39 kNm
	5	10	PTL2	2176	1234	0.85 m 15 kNm	0.55 m 15 kNm	0.45 m 17 kNm	0.35 m 16 kNm	0.30 m 17 kNm
	10	10				1.35 m 24 kNm	0.85 m 24 kNm	0.65 m 24 kNm	0.50 m 23 kNm	0.45 m 25 kNm
	20	10					1.20 m (2100) 34 kNm	1.00 m 37 kNm	0.80 m 37 kNm	0.65 m 36 kNm
	30	10						1.20 m (2085) 45 kNm	1.05 m 49 kNm	0.90 m 50 kNm
	5	7	PTL3	2448	1388	1.00 m 18 kNm	0.60 m (2395) 17 kNm	0.50 m 19 kNm	0.40 m 19 kNm	0.30 m 17 kNm
	10	7				1.40 m (2385) 25 kNm	0.95 m 27 kNm	0.75 m 28 kNm	0.60 m 28 kNm	0.50 m 28 kNm
	20	7						1.15 m 43 kNm	0.90 m 42 kNm	0.80 m 45 kNm
	30	7							1.20 m (2395) 56 kNm	1.05 m 59 kNm
	5	7	PTL3	2720	1542	1.00 m (2448) 18 kNm		0.50 m (2448) 19 kNm	0.40 m (2448) 19 kNm	0.30 m (2455) 17 kNm
	10	7					0.95 m (2480) 27 kNm	0.75 m (2465) 28 kNm	0.60 m (2448) 28 kNm	0.50 m (2470) 28 kNm
	20	7						1.15 m (2485) 43 kNm	1.00 m (2495) 47 kNm	0.85 m (2495) 48 kNm
	30	7								1.15 m (2495) 64 kNm
RRs220/10	5	10	PTL1	1951	1106	0.75 m 13 kNm	0.45 m 13 kNm	0.35 m 13 kNm	0.30 m 14 kNm	0.25 m 14 kNm
	10	10				1.10 m 19 kNm	0.70 m 20 kNm	0.55 m 21 kNm	0.45 m 21 kNm	0.35 m 20 kNm
	20	10				1.50 m (1860) 26 kNm	1.05 m 29 kNm	0.80 m 30 kNm	0.65 m 30 kNm	0.55 m 31 kNm
	30	10				1.50 m (1845) 26 kNm	1.20 m (1865) 34 kNm	1.10 m 41 kNm	0.85 m 40 kNm	0.70 m 39 kNm
	5	10	PTL2	2276	1290	0.95 m 17 kNm	0.60 m 17 kNm	0.45 m 17 kNm	0.35 m 16 kNm	0.30 m 17 kNm
	10	10				1.45 m 26 kNm	0.90 m 25 kNm	0.70 m 26 kNm	0.55 m 26 kNm	0.45 m 25 kNm
	20	10					1.20 m (2100) 34 kNm	1.05 m 39 kNm	0.85 m 40 kNm	0.75 m 42 kNm
	30	10						1.20 m (2085) 45 kNm	1.15 m 54 kNm	0.95 m 53 kNm
	5	10	PTL2	2601	1474	1.15 m 20 kNm	0.75 m 21 kNm	0.55 m 21 kNm	0.45 m 21 kNm	0.35 m 20 kNm
	10	10				1.50 m (2365) 26 kNm	1.15 m 32 kNm	0.90 m 34 kNm	0.70 m 33 kNm	0.60 m 34 kNm
	20	10						1.20 m (2460) 45 kNm	1.10 m 51 kNm	0.90 m 50 kNm
	30	10							1.20 m (2335) 56 kNm	1.20 m (2495) 67 kNm
	5	7	PTL3	2927	1659	1.30 m 23 kNm	0.85 m 24 kNm	0.65 m 24 kNm	0.50 m 23 kNm	0.45 m 25 kNm
	10	7					1.20 m (2830) 34 kNm	1.05 m 39 kNm	0.85 m 40 kNm	0.70 m 39 kNm
	20	7							1.20 m (2865) 56 kNm	1.10 m 62 kNm
	30	7								1.20 m (2660) 67 kNm
	5	7	PTL3	3252	1844	1.30 m (2940) 23 kNm	0.85 m (2927) 24 kNm	0.65 m (3025) 24 kNm	0.50 m (2975) 23 kNm	0.45 m (2927) 25 kNm
	10	7						1.05 m (2970) 39 kNm	0.85 m (2927) 40 kNm	0.70 m (2980) 39 kNm
	20	7								1.20 m (3110) 67 kNm
	30	7								

Values in brackets (xxxx) represent the maximum achievable R_c value with particular pile size, pile length and hammer size.

HYDRAULIC HAMMERS

(for example Junttan HHK A/S series)

Efficiency of the hammer 95 %, * = 90 %				Drop height [m] and impact energy [kNm] to achieve R_c and R_d values						
Pile	Pile length [m]	Settlement s_{10} [mm]	Piling work class	R_c [kN]	R_d [kN]	Weight of the ram block [kg] 2000*	3000	4000	5000	6000
RR220/12.5	5	10	PTL1	2015	1142	0.70 m 12 kNm	0.45 m 13 kNm	0.35 m 13 kNm	0.25 m 12 kNm	0.25 m 14 kNm
	10	10				1.00 m 18 kNm	0.65 m 18 kNm	0.50 m 19 kNm	0.40 m 19 kNm	0.35 m 20 kNm
	20	10				1.25 m 22 kNm	0.95 m 27 kNm	0.70 m 26 kNm	0.55 m 26 kNm	0.45 m 25 kNm
	30	10				1.30 m 23 kNm	1.00 m 28 kNm	0.90 m 34 kNm	0.75 m 35 kNm	0.65 m 36 kNm
	5	10	PTL2	2351	1333	0.85 m 15 kNm	0.55 m 15 kNm	0.40 m 15 kNm	0.35 m 16 kNm	0.30 m 17 kNm
	10	10				1.30 m 23 kNm	0.80 m 22 kNm	0.60 m 22 kNm	0.50 m 23 kNm	0.40 m 22 kNm
	20	10				1.50 m (2250) 26 kNm	1.20 m (2335) 34 kNm	0.95 m 35 kNm	0.75 m 35 kNm	0.60 m 34 kNm
	30	10				1.50 m (2200) 26 kNm	1.20 m (2245) 34 kNm	1.20 m 45 kNm	1.00 m 47 kNm	0.85 m 48 kNm
	5	10	PTL2	2687	1523	1.05 m 19 kNm	0.65 m 18 kNm	0.50 m 19 kNm	0.40 m 19 kNm	0.35 m 20 kNm
	10	10				1.50 m (2495) 26 kNm	1.00 m 28 kNm	0.75 m 28 kNm	0.65 m 30 kNm	0.55 m 31 kNm
	20	10						1.20 m 45 kNm	0.95 m 44 kNm	0.80 m 45 kNm
	30	10						1.20 m (2385) 45 kNm	1.20 m (2490) 56 kNm	1.05 m 59 kNm
	5	7	PTL3	3023	1714	1.20 m 21 kNm	0.75 m 21 kNm	0.60 m 22 kNm	0.45 m 21 kNm	0.40 m 22 kNm
	10	7				1.50 m (2715) 26 kNm	1.10 m 31 kNm	0.90 m 34 kNm	0.75 m 35 kNm	0.60 m 34 kNm
	20	7						1.20 m (2805) 45 kNm	1.10 m 51 kNm	0.90 m 50 kNm
	30	7								1.20 m (2940) 67 kNm
	5	7	PTL3	3359	1904	1.20 m (3023) 21 kNm	0.75 m (3023) 21 kNm	0.60 m (3023) 22 kNm	0.45 m (3045) 21 kNm	0.40 m (3023) 22 kNm
	10	7					1.15 m (3115) 32 kNm	0.90 m (3115) 34 kNm	0.75 m (3100) 35 kNm	0.60 m (3025) 34 kNm
	20	7							1.15 m (3135) 54 kNm	1.05 m (3300) 59 kNm
	30	7								
RRs220/12.5	5	10	PTL1	2410	1366	0.90 m 16 kNm	0.55 m 15 kNm	0.45 m 17 kNm	0.35 m 16 kNm	0.30 m 17 kNm
	10	10				1.35 m 24 kNm	0.85 m 24 kNm	0.65 m 24 kNm	0.55 m 26 kNm	0.45 m 25 kNm
	20	10				1.50 m (2250) 26 kNm	1.20 m (2345) 34 kNm	1.00 m 37 kNm	0.80 m 37 kNm	0.65 m 36 kNm
	30	10				1.50 m (2200) 26 kNm	1.20 m (2245) 34 kNm	1.20 m (2385) 45 kNm	1.05 m 49 kNm	0.85 m 48 kNm
	5	10	PTL2	2811	1594	1.15 m 20 kNm	0.70 m 20 kNm	0.55 m 21 kNm	0.45 m 21 kNm	0.35 m 20 kNm
	10	10				1.50 m (2600) 26 kNm	1.05 m 29 kNm	0.85 m 32 kNm	0.70 m 33 kNm	0.55 m 31 kNm
	20	10						1.20 m (2725) 45 kNm	1.00 m 47 kNm	0.85 m 48 kNm
	30	10							1.20 m (2620) 56 kNm	1.15 m 64 kNm
	5	10	PTL2	3213	1821	1.40 m 25 kNm	0.90 m 25 kNm	0.70 m 26 kNm	0.55 m 26 kNm	0.45 m 25 kNm
	10	10					1.20 m (2995) 34 kNm	1.05 m 39 kNm	0.85 m 40 kNm	0.70 m 39 kNm
	20	10							1.20 m (2995) 56 kNm	1.10 m 62 kNm
	30	10								1.20 m (2880) 67 kNm
	5	7	PTL3	3614	2049	1.50 m (3550) 26 kNm	1.00 m 28 kNm	0.80 m 30 kNm	0.60 m 28 kNm	0.50 m 28 kNm
	10	7						1.20 m 45 kNm	1.00 m 47 kNm	0.85 m 48 kNm
	20	7								1.20 m (3535) 67 kNm
	30	7								
	5	7	PTL3	4016	2277		1.00 m (3614) 28 kNm	0.80 m (3614) 30 kNm	0.65 m (3795) 30 kNm	0.50 m (3645) 28 kNm
	10	7						1.20 m (3660) 45 kNm	1.05 m (3695) 49 kNm	0.85 m (3665) 48 kNm
	20	7								
	30	7								

Values in brackets (xxxx) represent the maximum achievable R_c value with particular pile size, pile length and hammer size.

HYDRAULIC HAMMERS

(for example Junttan HHK A/S series)

Efficiency of the hammer 95 %, * = 90 %				Drop height [m] and impact energy [kNm] to achieve R_c and R_d values						
Pile	Pile length [m]	Settlement s_{10} [mm]	Piling work class	R_c [kN]	R_d [kN]	Weight of the ram block [kg] 2000*	3000	4000	5000	6000
RR245/10	5	10	PTL1	1832	1039	0.70 m 12 kNm	0.45 m 13 kNm	0.35 m 13 kNm	0.25 m 12 kNm	0.20 m 11 kNm
	10	10				1.00 m 18 kNm	0.60 m 17 kNm	0.45 m 17 kNm	0.40 m 19 kNm	0.30 m 17 kNm
	20	10				1.35 m 24 kNm	1.05 m 29 kNm	0.70 m 26 kNm	0.55 m 26 kNm	0.45 m 25 kNm
	30	10				1.35 m 24 kNm	1.05 m 29 kNm	0.90 m 34 kNm	0.75 m 35 kNm	0.75 m 42 kNm
	5	10	PTL2	2137	1211	0.85 m 15 kNm	0.55 m 15 kNm	0.40 m 15 kNm	0.35 m 16 kNm	0.25 m 14 kNm
	10	10				1.30 m 23 kNm	0.80 m 22 kNm	0.60 m 22 kNm	0.50 m 23 kNm	0.40 m 22 kNm
	20	10				1.50 m (1965) 26 kNm	1.20 m (2015) 34 kNm	0.90 m 34 kNm	0.70 m 33 kNm	0.60 m 34 kNm
	30	10				1.50 m (1965) 26 kNm	1.20 m (2025) 34 kNm	1.15 m 43 kNm	0.95 m 44 kNm	0.80 m 45 kNm
	5	10	PTL2	2442	1384	1.00 m 18 kNm	0.65 m 18 kNm	0.50 m 19 kNm	0.40 m 19 kNm	0.35 m 20 kNm
	10	10				1.50 m (2380) 26 kNm	0.95 m 27 kNm	0.75 m 28 kNm	0.60 m 28 kNm	0.50 m 28 kNm
	20	10						1.15 m 43 kNm	0.90 m 42 kNm	0.75 m 42 kNm
	30	10						1.20 m (2200) 45 kNm	1.20 m 56 kNm	1.00 m 56 kNm
	5	7	PTL3	2747	1557	1.15 m 20 kNm	0.65 m (2615) 18 kNm	0.55 m 21 kNm	0.45 m 21 kNm	0.35 m 20 kNm
	10	7				1.50 m (2510) 26 kNm	1.10 m 31 kNm	0.85 m 32 kNm	0.70 m 33 kNm	0.60 m 34 kNm
	20	7						1.20 m (2620) 45 kNm	1.05 m 49 kNm	0.90 m 50 kNm
	30	7							1.20 m (2505) 56 kNm	1.20 m 67 kNm
	5	7	PTL3	3053	1731	1.15 m (2747) 20 kNm		0.55 m (2747) 21 kNm	0.45 m (2747) 21 kNm	0.35 m (2765) 20 kNm
	10	7					1.10 m (2747) 31 kNm	0.85 m (2770) 32 kNm	0.70 m (2747) 33 kNm	0.60 m (2747) 34 kNm
	20	7							1.10 m (2860) 51 kNm	0.90 m (2747) 50 kNm
	30	7								1.20 m (2770) 67 kNm
RRs245/10	5	10	PTL1	2190	1241	0.85 m 15 kNm	0.55 m 15 kNm	0.40 m 15 kNm	0.35 m 16 kNm	0.35 m 20 kNm
	10	10				1.35 m 24 kNm	0.80 m 22 kNm	0.65 m 24 kNm	0.50 m 23 kNm	0.40 m 22 kNm
	20	10				1.50 m (1965) 26 kNm	1.20 m (2010) 34 kNm	0.95 m 35 kNm	0.75 m 35 kNm	0.65 m 36 kNm
	30	10				1.50 m (1965) 26 kNm	1.20 m (2000) 34 kNm	1.20 m 45 kNm	1.00 m 47 kNm	0.85 m 48 kNm
	5	10	PTL2	2555	1448	1.10 m 19 kNm	0.70 m 20 kNm	0.55 m 21 kNm	0.40 m 19 kNm	0.75 m (2490) 42 kNm
	10	10				1.50 m (2380) 26 kNm	1.05 m 29 kNm	0.80 m 30 kNm	0.65 m 30 kNm	0.55 m 31 kNm
	20	10						1.20 m (2525) 45 kNm	1.00 m 47 kNm	0.80 m 45 kNm
	30	10							1.20 m (2445) 56 kNm	1.10 m 62 kNm
	5	10	PTL2	2920	1655	1.35 m 24 kNm	0.85 m 24 kNm	0.65 m 24 kNm	0.50 m 23 kNm	0.50 m 28 kNm
	10	10					1.20 m (2810) 34 kNm	1.00 m 37 kNm	0.80 m 37 kNm	0.70 m 39 kNm
	20	10							1.20 m (2895) 56 kNm	1.05 m 59 kNm
	30	10								1.20 m (2695) 67 kNm
	5	7	PTL3	3285	1862	1.50 m (3275) 26 kNm	0.95 m 27 kNm	0.75 m 28 kNm	0.60 m 28 kNm	0.60 m 34 kNm
	10	7					1.20 m (2935) 34 kNm	1.15 m 43 kNm	0.95 m 44 kNm	0.80 m 45 kNm
	20	7							1.20 m (2995) 56 kNm	1.20 m 67 kNm
	30	7								
	5	7	PTL3	3650	2069		0.95 m (3285) 27 kNm	0.75 m (3285) 28 kNm	0.60 m (3285) 28 kNm	0.60 m (3285) 34 kNm
	10	7						1.15 m (3285) 43 kNm	0.95 m (3285) 44 kNm	0.80 m (3285) 45 kNm
	20	7								1.20 m (3285) 67 kNm
	30	7								

Values in brackets (xxxx) represent the maximum achievable R_c value with particular pile size, pile length and hammer size.

HYDRAULIC HAMMERS

(for example Junttan HHK A/S series)

Efficiency of the hammer 95 %, * = 90 %				Drop height [m] and impact energy [kNm] to achieve R_c and R_d values						
Pile	Pile length [m]	Settlement s_{10} [mm]	Piling work class	R_c [kN]	R_d [kN]	Weight of the ram block [kg] 3000	4000	5000	6000	7000
RR245/12.5	5	10	PTL1	2265	1284	0.50 m 14 kNm	0.40 m 15 kNm	0.30 m 14 kNm	0.30 m 17 kNm	0.25 m 16 kNm
	10	10				0.75 m 21 kNm	0.55 m 21 kNm	0.45 m 21 kNm	0.45 m 25 kNm	0.35 m 23 kNm
	20	10				1.05 m 29 kNm	0.85 m 32 kNm	0.65 m 30 kNm	0.55 m 31 kNm	0.50 m 33 kNm
	30	10				1.10 m 31 kNm	1.00 m 37 kNm	0.85 m 40 kNm	0.70 m 39 kNm	0.65 m 42 kNm
	5	10	PTL2	2643	1498	0.65 m 18 kNm	0.50 m 19 kNm	0.40 m 19 kNm	0.40 m 22 kNm	0.30 m 20 kNm
	10	10				0.95 m 27 kNm	0.70 m 26 kNm	0.60 m 28 kNm	0.55 m 31 kNm	0.40 m 26 kNm
	20	10				1.20 m (2455) 34 kNm	1.10 m 41 kNm	0.85 m 40 kNm	0.70 m 39 kNm	0.60 m 39 kNm
	30	10				1.20 m (2410) 34 kNm	1.20 m (2575) 45 kNm	1.10 m 51 kNm	0.95 m 53 kNm	0.85 m 55 kNm
	5	10	PTL2	3020	1712	0.80 m 22 kNm	0.60 m 22 kNm	0.50 m 23 kNm	0.50 m 28 kNm	0.35 m 23 kNm
	10	10				1.15 m 32 kNm	0.90 m 34 kNm	0.70 m 33 kNm	0.65 m 36 kNm	0.50 m 33 kNm
	20	10					1.20 m (2820) 45 kNm	1.10 m 51 kNm	0.90 m 50 kNm	0.80 m 52 kNm
	30	10						1.20 m (2765) 56 kNm	1.20 m (2995) 67 kNm	1.05 m 68 kNm
	5	7	PTL3	3398	1926	0.90 m 25 kNm	0.65 m 24 kNm	0.55 m 26 kNm	0.50 m (3020) 28 kNm	0.40 m 26 kNm
	10	7				1.20 m (3265) 34 kNm	1.00 m 37 kNm	0.85 m 40 kNm	0.75 m 42 kNm	0.60 m 39 kNm
	20	7						1.20 m (3320) 56 kNm	1.05 m 59 kNm	0.90 m 59 kNm
	30	7							1.20 m (3085) 67 kNm	1.20 m (3330) 78 kNm
	5	7	PTL3	3775	2140	0.90 m (3398) 25 kNm	0.65 m (3398) 24 kNm	0.55 m (3398) 26 kNm		0.40 m (3398) 26 kNm
	10	7					1.00 m (3450) 37 kNm	0.85 m (3505) 40 kNm	0.80 m (3485) 45 kNm	0.60 m (3420) 39 kNm
	20	7							1.10 m (3535) 62 kNm	1.00 m (3625) 65 kNm
	30	7								
RRs245/12.5	5	10	PTL1	2708	1535	0.65 m 18 kNm	0.50 m 19 kNm	0.40 m 19 kNm	0.35 m 20 kNm	0.30 m 20 kNm
	10	10				1.00 m 28 kNm	0.75 m 28 kNm	0.60 m 28 kNm	0.50 m 28 kNm	0.45 m 29 kNm
	20	10				1.20 m (2435) 34 kNm	1.15 m 43 kNm	0.90 m 42 kNm	0.75 m 42 kNm	0.65 m 42 kNm
	30	10				1.20 m (2410) 34 kNm	1.20 m (2575) 45 kNm	1.20 m 56 kNm	1.00 m 56 kNm	0.85 m 55 kNm
	5	10	PTL2	3160	1791	0.85 m 24 kNm	0.65 m 24 kNm	0.50 m 23 kNm	0.40 m 22 kNm	0.35 m 23 kNm
	10	10				1.20 m (2995) 34 kNm	0.95 m 35 kNm	0.80 m 37 kNm	0.65 m 36 kNm	0.55 m 36 kNm
	20	10					1.20 m (2820) 45 kNm	1.20 m 56 kNm	0.95 m 53 kNm	0.85 m 55 kNm
	30	10						1.20 m (2765) 56 kNm	1.20 m (2995) 67 kNm	1.15 m 75 kNm
	5	10	PTL2	3611	2047	1.05 m 29 kNm	0.80 m 30 kNm	0.60 m 28 kNm	0.50 m 28 kNm	0.45 m 29 kNm
	10	10					1.20 m 45 kNm	0.95 m 44 kNm	0.80 m 45 kNm	0.70 m 46 kNm
	20	10						1.20 m (3160) 56 kNm	0.95 m (3160) 53 kNm	1.10 m 72 kNm
	30	10								1.15 m (3160) 75 kNm
	5	7	PTL3	4062	2303	1.20 m 34 kNm	0.90 m 34 kNm	0.70 m 33 kNm	0.60 m 34 kNm	0.50 m 33 kNm
	10	7					1.20 m (3835) 45 kNm	1.15 m 54 kNm	0.95 m 53 kNm	0.85 m 55 kNm
	20	7							1.20 m (3700) 67 kNm	1.20 m (3990) 78 kNm
	30	7								
	5	7	PTL3	4514	2559	1.20 m (4062) 34 kNm	0.90 m (4062) 34 kNm	0.70 m (4085) 33 kNm	0.60 m (4185) 34 kNm	0.50 m (4110) 33 kNm
	10	7						1.20 m (4245) 56 kNm	0.95 m (4065) 53 kNm	0.85 m (4062) 55 kNm
	20	7								
	30	7								

Values in brackets (xxxx) represent the maximum achievable R_c value with particular pile size, pile length and hammer size.

HYDRAULIC HAMMERS

(for example Junttan HHK A/S series)

Efficiency of the hammer 95 %, * = 90 %				Drop height [m] and impact energy [kNm] to achieve R_c and R_d values						
Pile	Pile length [m]	Settlement s_{10} [mm]	Piling work class	R_c [kN]	R_d [kN]	Weight of the ram block [kg] 3000	4000	5000	6000	7000
RR270/10	5	10	PTL1	2052	1163	0.50 m 14 kNm	0.40 m 15 kNm	0.30 m 14 kNm	0.25 m 14 kNm	0.20 m 13 kNm
	10	10				0.70 m 20 kNm	0.55 m 21 kNm	0.45 m 21 kNm	0.35 m 20 kNm	0.30 m 20 kNm
	20	10				1.10 m 31 kNm	0.85 m 32 kNm	0.65 m 30 kNm	0.55 m 31 kNm	0.45 m 29 kNm
	30	10				1.15 m 32 kNm	1.00 m 37 kNm	0.85 m 40 kNm	0.70 m 39 kNm	0.60 m 39 kNm
	5	10	PTL2	2394	1357	0.60 m 17 kNm	0.45 m 17 kNm	0.40 m 19 kNm	0.30 m 17 kNm	0.25 m 16 kNm
	10	10				0.90 m 25 kNm	0.70 m 26 kNm	0.55 m 26 kNm	0.45 m 25 kNm	0.40 m 26 kNm
	20	10				1.20 m (2210) 34 kNm	1.05 m 39 kNm	0.85 m 40 kNm	0.70 m 39 kNm	0.60 m 39 kNm
	30	10				1.20 m (2155) 34 kNm	1.20 m (2290) 45 kNm	1.10 m 51 kNm	0.90 m 50 kNm	0.80 m 52 kNm
	5	10	PTL2	2737	1552	0.75 m 21 kNm	0.55 m 21 kNm	0.45 m 21 kNm	0.40 m 22 kNm	0.35 m 23 kNm
	10	10				1.15 m 32 kNm	0.85 m 32 kNm	0.70 m 33 kNm	0.55 m 31 kNm	0.50 m 33 kNm
	20	10					1.20 m (2495) 45 kNm	1.05 m 49 kNm	0.85 m 48 kNm	0.75 m 49 kNm
	30	10						1.20 m (2495) 56 kNm	1.15 m 64 kNm	1.00 m 65 kNm
	5	7	PTL3	3079	1745	0.80 m (3030) 22 kNm	0.60 m (3020) 22 kNm	0.50 m 23 kNm	0.40 m (3075) 22 kNm	0.35 m 23 kNm
	10	7				1.20 m (3005) 34 kNm	1.00 m 37 kNm	0.80 m 37 kNm	0.65 m 36 kNm	0.60 m 39 kNm
	20	7						1.20 m 56 kNm	1.00 m 56 kNm	0.90 m 59 kNm
	30	7							1.20 m (2875) 67 kNm	1.20 m 78 kNm
	5	7	PTL3	3421	1939			0.50 m (3125) 23 kNm		0.35 m (3079) 23 kNm
	10	7					1.00 m (3079) 37 kNm	0.80 m (3125) 37 kNm	0.65 m (3095) 36 kNm	0.60 m (3079) 39 kNm
	20	7						1.20 m (3100) 56 kNm	1.05 m (3205) 59 kNm	0.95 m (3265) 62 kNm
	30	7								1.20 m (3135) 78 kNm
RRs270/10	5	10	PTL1	2454	1391	0.65 m 18 kNm	0.50 m 19 kNm	0.40 m 19 kNm	0.30 m 17 kNm	0.30 m 20 kNm
	10	10				0.95 m 27 kNm	0.70 m 26 kNm	0.60 m 28 kNm	0.50 m 28 kNm	0.40 m 26 kNm
	20	10				1.20 m (2210) 34 kNm	1.10 m 41 kNm	0.85 m 40 kNm	0.70 m 39 kNm	0.65 m 42 kNm
	30	10				1.20 m (2125) 34 kNm	1.20 m (2290) 45 kNm	1.15 m 54 kNm	0.95 m 53 kNm	0.85 m 55 kNm
	5	10	PTL2	2863	1623	0.80 m 22 kNm	0.60 m 22 kNm	0.50 m 23 kNm	0.40 m 22 kNm	0.35 m 23 kNm
	10	10				1.20 m 34 kNm	0.95 m 35 kNm	0.75 m 35 kNm	0.60 m 34 kNm	0.55 m 36 kNm
	20	10					1.20 m (2595) 45 kNm	1.15 m 54 kNm	0.95 m 53 kNm	0.80 m 52 kNm
	30	10						1.20 m (2550) 56 kNm	1.20 m (2805) 67 kNm	1.10 m 72 kNm
	5	10	PTL2	3272	1855	1.00 m 28 kNm	0.75 m 28 kNm	0.60 m 28 kNm	0.50 m 28 kNm	0.45 m 29 kNm
	10	10				1.20 m (2870) 34 kNm	1.15 m 43 kNm	0.95 m 44 kNm	0.75 m 42 kNm	0.65 m 42 kNm
	20	10						1.20 m (2985) 56 kNm	1.20 m 67 kNm	1.05 m 68 kNm
	30	10								1.20 m (3045) 78 kNm
	5	7	PTL3	3681	2087	1.10 m 31 kNm	0.85 m 32 kNm	0.70 m 33 kNm	0.55 m 31 kNm	0.50 m 33 kNm
	10	7					1.20 m (3510) 45 kNm	1.10 m 51 kNm	0.90 m 50 kNm	0.80 m 52 kNm
	20	7							1.20 m (3440) 67 kNm	1.20 m 78 kNm
	30	7								
	5	7	PTL3	4090	2319	1.10 m (3681) 31 kNm	0.85 m (3681) 32 kNm	0.70 m (3681) 33 kNm	0.55 m (3735) 31 kNm	0.50 m (3681) 33 kNm
	10	7						1.10 m (3735) 51 kNm	0.90 m (3705) 50 kNm	0.80 m (3681) 52 kNm
	20	7								1.20 m (3695) 78 kNm
	30	7								

Values in brackets (xxxx) represent the maximum achievable R_c value with particular pile size, pile length and hammer size.

HYDRAULIC HAMMERS

(for example Junttan HHK A/S series)

Efficiency of the hammer 95 %, * = 90 %				Drop height [m] and impact energy [kNm] to achieve R_c and R_d values					
Pile	Pile length [m]	Settlement s_{10} [mm]	Piling work class	R_c [kN]	R_d [kN]	Weight of the ram block [kg] 4000	5000	6000	7000
RR270/12.5	5	10	PTL1	2541	1440	0.45 m 17 kNm	0.35 m 16 kNm	0.30 m 17 kNm	0.25 m 16 kNm
	10	10				0.65 m 24 kNm	0.50 m 23 kNm	0.45 m 25 kNm	0.40 m 26 kNm
	20	10				0.95 m 35 kNm	0.80 m 37 kNm	0.65 m 36 kNm	0.55 m 36 kNm
	30	10				1.05 m 39 kNm	0.95 m 44 kNm	0.85 m 48 kNm	0.70 m 46 kNm
	5	10	PTL2	2965	1681	0.55 m 21 kNm	0.45 m 21 kNm	0.40 m 22 kNm	0.35 m 23 kNm
	10	10				0.80 m 30 kNm	0.65 m 30 kNm	0.55 m 31 kNm	0.50 m 33 kNm
	20	10				1.20 m (2935) 45 kNm	1.00 m 47 kNm	0.85 m 48 kNm	0.70 m 46 kNm
	30	10				1.20 m (2810) 45 kNm	1.20 m (2915) 56 kNm	1.10 m 62 kNm	0.95 m 62 kNm
	5	10	PTL2	3388	1921	0.70 m 26 kNm	0.55 m 26 kNm	0.45 m 25 kNm	0.40 m 26 kNm
	10	10				1.00 m 37 kNm	0.80 m 37 kNm	0.70 m 39 kNm	0.60 m 39 kNm
	20	10					1.20 m (3310) 56 kNm	1.05 m 59 kNm	0.90 m 59 kNm
	30	10						1.20 m (3160) 67 kNm	1.20 m 78 kNm
	5	7	PTL3	3812	2161	0.75 m 28 kNm	0.60 m 28 kNm	0.50 m 28 kNm	0.45 m 29 kNm
	10	7				1.15 m 43 kNm	0.95 m 44 kNm	0.80 m 45 kNm	0.70 m 46 kNm
	20	7					1.20 m (3415) 56 kNm	1.20 m 67 kNm	1.05 m 68 kNm
	30	7							1.20 m (3485) 78 kNm
	5	7	PTL3	4235	2401	0.75 m (3812) 28 kNm	0.60 m (3820) 28 kNm	0.50 m (3835) 28 kNm	0.45 m (3812) 29 kNm
	10	7				1.15 m (3860) 43 kNm	0.95 m (3900) 44 kNm	0.85 m (3990) 48 kNm	0.70 m (3875) 46 kNm
	20	7						1.20 m (3835) 67 kNm	1.10 m (3985) 72 kNm
	30	7							
RRs270/12.5	5	10	PTL1	3038	1722	0.60 m 22 kNm	0.45 m 21 kNm	0.40 m 22 kNm	0.40 m 26 kNm
	10	10				0.85 m 32 kNm	0.70 m 33 kNm	0.60 m 34 kNm	0.55 m 36 kNm
	20	10				1.20 m (2905) 45 kNm	1.05 m 49 kNm	0.85 m 48 kNm	0.80 m 52 kNm
	30	10				1.20 m (2760) 45 kNm	1.20 m (2915) 56 kNm	1.15 m 64 kNm	1.10 m 72 kNm
	5	10	PTL2	3545	2010	0.75 m 28 kNm	0.60 m 28 kNm	0.50 m 28 kNm	0.50 m 33 kNm
	10	10				1.10 m 41 kNm	0.90 m 42 kNm	0.75 m 42 kNm	0.70 m 46 kNm
	20	10					1.20 m (3310) 56 kNm	1.15 m 64 kNm	1.05 m 68 kNm
	30	10						1.20 m (3160) 67 kNm	1.20 m (3195) 78 kNm
	5	10	PTL2	4051	2296	0.90 m 34 kNm	0.70 m 33 kNm	0.60 m 34 kNm	0.60 m 39 kNm
	10	10				1.20 m (3790) 45 kNm	1.10 m 51 kNm	0.95 m 53 kNm	0.85 m 55 kNm
	20	10						1.20 m (3705) 67 kNm	1.20 m (3885) 78 kNm
	30	10							
	5	7	PTL3	4557	2583	1.05 m 39 kNm	0.85 m 40 kNm	0.70 m 39 kNm	0.65 m (4480) 42 kNm
	10	7					1.20 m (4455) 56 kNm	1.10 m 62 kNm	1.00 m 65 kNm
	20	7							
	30	7							
	5	7	PTL3	5064	2871	1.05 m (4557) 39 kNm	0.85 m (4557) 40 kNm	0.70 m (4557) 39 kNm	
	10	7						1.10 m (4557) 62 kNm	1.00 m (4557) 65 kNm
	20	7							
	30	7							

Values in brackets (xxxx) represent the maximum achievable R_c value with particular pile size, pile length and hammer size.

HYDRAULIC HAMMERS

(for example Junttan HHK A/S series)

Efficiency of the hammer 95 %, * = 90 %				Drop height [m] and impact energy [kNm] to achieve R_c and R_d values					
Pile	Pile length [m]	Settlement s_{10} [mm]	Piling work class	R_c [kN]	R_d [kN]	Weight of the ram block [kg] 4000	5000	6000	7000
RR320/10	5	10	PTL1	2450	1389	0.50 m 19 kNm	0.40 m 19 kNm	0.30 m 17 kNm	0.30 m 20 kNm
	10	10				0.70 m 26 kNm	0.55 m 26 kNm	0.45 m 25 kNm	0.40 m 26 kNm
	20	10				1.05 m 39 kNm	0.85 m 40 kNm	0.70 m 39 kNm	0.60 m 39 kNm
	30	10				1.15 m 43 kNm	1.05 m 49 kNm	0.90 m 50 kNm	0.75 m 49 kNm
	5	10	PTL2	2858	1620	0.60 m 22 kNm	0.50 m 23 kNm	0.40 m 22 kNm	0.35 m 23 kNm
	10	10				0.90 m 34 kNm	0.70 m 33 kNm	0.60 m 34 kNm	0.50 m 33 kNm
	20	10				1.20 m (2730) 45 kNm	1.10 m 51 kNm	0.90 m 50 kNm	0.75 m 49 kNm
	30	10				1.20 m (2520) 45 kNm	1.20 m (2695) 56 kNm	1.15 m 64 kNm	1.00 m 65 kNm
	5	10	PTL2	3266	1851	0.75 m 28 kNm	0.60 m 28 kNm	0.50 m 28 kNm	0.40 m 26 kNm
	10	10				1.10 m 41 kNm	0.85 m 40 kNm	0.70 m 39 kNm	0.60 m 39 kNm
	20	10					1.20 m (3065) 56 kNm	1.10 m 62 kNm	0.95 m 62 kNm
	30	10						1.20 m (2965) 67 kNm	1.20 m (3210) 78 kNm
	5	7	PTL3	3674	2083	0.75 m (3555) 28 kNm	0.65 m 30 kNm	0.55 m 31 kNm	0.45 m 29 kNm
	10	7				1.15 m (3585) 43 kNm	1.00 m 47 kNm	0.85 m 48 kNm	0.70 m 46 kNm
	20	7						1.20 m (3615) 67 kNm	1.10 m 72 kNm
	30	7							1.20 m (3295) 78 kNm
	5	7	PTL3	4083	2315		0.65 m (3674) 30 kNm	0.55 m (3674) 31 kNm	0.45 m (3674) 29 kNm
	10	7					1.00 m (3674) 47 kNm	0.85 m (3674) 48 kNm	0.70 m (3700) 46 kNm
	20	7							1.15 m (3855) 75 kNm
	30	7							
RRs320/10	5	10	PTL1	2929	1660	0.65 m 24 kNm	0.50 m 23 kNm	0.40 m 22 kNm	0.35 m 23 kNm
	10	10				0.90 m 34 kNm	0.75 m 35 kNm	0.60 m 34 kNm	0.50 m 33 kNm
	20	10				1.20 m (2670) 45 kNm	1.15 m 54 kNm	0.90 m 50 kNm	0.80 m 52 kNm
	30	10				1.20 m (2480) 45 kNm	1.20 m (2695) 56 kNm	1.20 m 67 kNm	1.05 m 68 kNm
	5	10	PTL2	3417	1937	0.80 m 30 kNm	0.60 m 28 kNm	0.50 m 28 kNm	0.45 m 29 kNm
	10	10				1.15 m 43 kNm	0.95 m 44 kNm	0.75 m 42 kNm	0.65 m 42 kNm
	20	10					1.20 m (3065) 56 kNm	1.20 m 67 kNm	1.00 m 65 kNm
	30	10						1.20 m (2965) 67 kNm	1.20 m (3210) 78 kNm
	5	10	PTL2	3905	2214	0.95 m 35 kNm	0.75 m 35 kNm	0.60 m 34 kNm	0.55 m 36 kNm
	10	10				1.20 m (3525) 45 kNm	1.15 m 54 kNm	0.95 m 53 kNm	0.80 m 52 kNm
	20	10						1.20 m (3475) 67 kNm	1.20 m (3800) 78 kNm
	30	10							
	5	7	PTL3	4393	2490	1.05 m 39 kNm	0.85 m 40 kNm	0.70 m 39 kNm	0.60 m 39 kNm
	10	7					1.20 m (4170) 56 kNm	1.15 m 64 kNm	0.95 m 62 kNm
	20	7							1.20 m (3945) 78 kNm
	30	7							
	5	7	PTL3	4881	2767	1.05 m (4393) 39 kNm	0.85 m (4470) 40 kNm	0.70 m (4480) 39 kNm	0.60 m (4480) 39 kNm
	10	7						1.15 m (4495) 64 kNm	0.95 m (4400) 62 kNm
	20	7							
	30	7							

Values in brackets (xxxx) represent the maximum achievable R_c value with particular pile size, pile length and hammer size.

HYDRAULIC HAMMERS

(for example Junttan HHK A/S series)

Efficiency of the hammer 95 %, * = 90 %				Drop height [m] and impact energy [kNm] to achieve R_c and R_d values					
Pile	Pile length [m]	Settlement s_{10} [mm]	Piling work class	R_c [kN]	R_d [kN]	Weight of the ram block [kg] 4000	5000	6000	7000
RR320/12.5	5	10	PTL1	3038	1722	0.60 m 22 kNm	0.45 m 21 kNm	0.40 m 22 kNm	0.35 m 23 kNm
	10	10				0.85 m 32 kNm	0.65 m 30 kNm	0.55 m 31 kNm	0.50 m 33 kNm
	20	10				1.20 m (2990) 45 kNm	1.00 m 47 kNm	0.85 m 48 kNm	0.70 m 46 kNm
	30	10				1.20 m 45 kNm	1.10 m 51 kNm	1.00 m 56 kNm	0.90 m 59 kNm
	5	10	PTL2	3544	2009	0.75 m 28 kNm	0.60 m 28 kNm	0.50 m 28 kNm	0.40 m 26 kNm
	10	10				1.05 m 39 kNm	0.85 m 40 kNm	0.70 m 39 kNm	0.60 m 39 kNm
	20	10					1.20 m (3425) 56 kNm	1.10 m 62 kNm	0.90 m 59 kNm
	30	10				1.20 m (3090) 45 kNm	1.20 m (3215) 56 kNm	1.20 m (3385) 67 kNm	1.15 m 75 kNm
	5	10	PTL2	4050	2296	0.90 m 34 kNm	0.70 m 33 kNm	0.60 m 34 kNm	0.50 m 33 kNm
	10	10				1.20 m (3875) 45 kNm	1.05 m 49 kNm	0.85 m 48 kNm	0.75 m 49 kNm
	20	10						1.20 m (3830) 67 kNm	1.15 m 75 kNm
	30	10							1.20 m (3630) 78 kNm
	5	7	PTL3	4556	2583	1.00 m 37 kNm	0.80 m 37 kNm	0.65 m 36 kNm	0.55 m 36 kNm
	10	7				1.20 m (4065) 45 kNm	1.15 m 54 kNm	1.00 m 56 kNm	0.85 m 55 kNm
	20	7							1.20 m (4385) 78 kNm
	30	7							
	5	7	PTL3	5063	2870	1.00 m (4556) 37 kNm	0.80 m (4556) 37 kNm	0.65 m (4556) 36 kNm	0.55 m (4556) 36 kNm
	10	7					1.15 m (4556) 54 kNm	1.00 m (4556) 56 kNm	0.85 m (4556) 55 kNm
	20	7							
	30	7							
RRs320/12.5	5	10	PTL1	3632	2059	0.75 m 28 kNm	0.60 m 28 kNm	0.50 m 28 kNm	0.45 m 29 kNm
	10	10				1.10 m 41 kNm	0.85 m 40 kNm	0.75 m 42 kNm	0.65 m 42 kNm
	20	10				1.20 m (2990) 45 kNm	1.20 m (3425) 56 kNm	1.10 m 62 kNm	0.95 m 62 kNm
	30	10				1.20 m (3020) 45 kNm	1.20 m (3215) 56 kNm	1.20 m (3385) 67 kNm	1.20 m (3630) 78 kNm
	5	10	PTL2	4237	2402	0.95 m 35 kNm	0.75 m 35 kNm	0.60 m 34 kNm	0.55 m 36 kNm
	10	10				1.20 m (3875) 45 kNm	1.10 m 51 kNm	0.95 m 53 kNm	0.80 m 52 kNm
	20	10						1.20 m (3830) 67 kNm	1.20 m (4220) 78 kNm
	30	10							
	5	10	PTL2	4843	2745	1.15 m 43 kNm	0.90 m 42 kNm	0.75 m 42 kNm	0.65 m 42 kNm
	10	10					1.20 m (4495) 56 kNm	1.15 m 64 kNm	1.00 m 65 kNm
	20	10							
	30	10							
	5	7	PTL3	5448	3088	1.20 m (5250) 45 kNm	1.05 m 49 kNm	0.85 m 48 kNm	0.75 m 49 kNm
	10	7						1.20 m (5195) 67 kNm	1.15 m 75 kNm
	20	7							
	30	7							
	5	7	PTL3	6053	3431		1.05 m (5448) 49 kNm	0.85 m (5505) 48 kNm	0.75 m (5605) 49 kNm
	10	7							1.20 m (5580) 78 kNm
	20	7							
	30	7							

Values in brackets (xxxx) represent the maximum achievable R_c value with particular pile size, pile length and hammer size.

HYDRAULIC HAMMERS

(for example Junttan HHK A/S series)

Efficiency of the hammer 95 %, * = 90 %						Drop height [m] and impact energy [kNm] to achieve R_c and R_d values			
Pile	Pile length [m]	Settlement s_{10} [mm]	Piling work class	R_c [kN]	R_d [kN]	Weight of the ram block [kg] 4000	5000	6000	7000
RR400/10 S355J2H	5	10	PTL1	2387	1353		0.40 m 19 kNm	0.35 m 20 kNm	0.30 m 20 kNm
	10	10				0.70 m 26 kNm	0.55 m 26 kNm	0.45 m 25 kNm	0.40 m 26 kNm
	20	10				0.95 m 35 kNm	0.70 m 33 kNm	0.65 m 36 kNm	0.55 m 36 kNm
	30	10				1.00 m 37 kNm	0.95 m 44 kNm	0.80 m 45 kNm	0.70 m 46 kNm
	5	10	PTL2	2785	1579	0.65 m 24 kNm	0.50 m 23 kNm	0.40 m 22 kNm	0.35 m 23 kNm
	10	10				0.85 m 32 kNm	0.70 m 33 kNm	0.55 m 31 kNm	0.45 m 29 kNm
	20	10				1.20 m 45 kNm	0.90 m 42 kNm	0.85 m 48 kNm	0.70 m 46 kNm
	30	10				1.20 m (2735) 45 kNm	1.20 m 56 kNm	1.05 m 59 kNm	0.90 m 59 kNm
	5	10	PTL2	3183	1804	0.70 m (2995) 26 kNm	0.55 m (2995) 26 kNm	0.50 m 28 kNm	0.40 m 26 kNm
	10	10				1.00 m (2995) 37 kNm	0.80 m 37 kNm	0.65 m 36 kNm	0.55 m 36 kNm
	20	10				1.20 m (2835) 45 kNm	1.05 m (2995) 49 kNm	1.00 m 56 kNm	0.85 m 55 kNm
	30	10					1.20 m (2835) 56 kNm	1.20 m (2995) 67 kNm	1.10 m 72 kNm
	5	7	PTL3	3581	2030			0.45 m (3335) 25 kNm	0.40 m (3445) 26 kNm
	10	7				0.95 m (3210) 35 kNm	0.75 m (3230) 35 kNm	0.65 m (3330) 36 kNm	0.60 m (3520) 39 kNm
	20	7						0.95 m (3230) 53 kNm	0.85 m (3360) 55 kNm
	30	7						1.20 m (3210) 67 kNm	1.10 m (3305) 72 kNm
	5	7	PTL3	3979	2256				
	10	7							
	20	7							
	30	7							
RR400/10 S440J2H	5	10	PTL1	2959	1677	0.70 m 26 kNm	0.55 m 26 kNm	0.45 m 25 kNm	0.40 m 26 kNm
	10	10				0.95 m 35 kNm	0.75 m 35 kNm	0.60 m 34 kNm	0.50 m 33 kNm
	20	10				1.20 m (2725) 45 kNm	1.10 m 51 kNm	0.90 m 50 kNm	0.75 m 49 kNm
	30	10				1.20 m (2610) 45 kNm	1.20 m (2835) 56 kNm	1.15 m 64 kNm	1.00 m 65 kNm
	5	10	PTL2	3452	1957	0.85 m 32 kNm	0.65 m 30 kNm	0.55 m 31 kNm	0.45 m 29 kNm
	10	10				1.15 m 43 kNm	0.90 m 42 kNm	0.75 m 42 kNm	0.65 m 42 kNm
	20	10					1.20 m (3160) 56 kNm	1.15 m 64 kNm	1.00 m 65 kNm
	30	10						1.20 m (3100) 67 kNm	1.20 m (3375) 78 kNm
	5	10	PTL2	3945	2236	1.00 m 37 kNm	0.75 m 35 kNm	0.65 m 36 kNm	0.55 m 36 kNm
	10	10				1.20 m (3570) 45 kNm	1.10 m 51 kNm	0.90 m 50 kNm	0.80 m 52 kNm
	20	10						1.20 m (3555) 67 kNm	1.20 m 78 kNm
	30	10							
	5	7	PTL3	4438	2516	1.00 m (4275) 37 kNm	0.80 m (4340) 37 kNm	0.65 m (4330) 36 kNm	0.55 m (4310) 36 kNm
	10	7					1.15 m (4255) 54 kNm	1.00 m (4365) 56 kNm	0.90 m 59 kNm
	20	7							1.20 m (4125) 78 kNm
	30	7							
	5	7	PTL3	4931	2795				
	10	7							0.90 m (4495) 59 kNm
	20	7							
	30	7							

Values in brackets (xxxx) represent the maximum achievable R_c value with particular pile size, pile length and hammer size.

HYDRAULIC HAMMERS

(for example Junttan HHK A/S series)

Efficiency of the hammer 95 %, * = 90 %						Drop height [m] and impact energy [kNm] to achieve R_c and R_d values			
Pile	Pile length [m]	Settlement s_{10} [mm]	Piling work class	R_c [kN]	R_d [kN]	Weight of the ram block [kg] 4000	5000	6000	7000
RR400/12.5 S355J2H	5	10	PTL1	2965	1681	0.65 m 24 kNm	0.50 m 23 kNm	0.40 m 22 kNm	0.35 m 23 kNm
	10	10				0.85 m 32 kNm	0.65 m 30 kNm	0.55 m 31 kNm	0.45 m 29 kNm
	20	10				1.15 m 43 kNm	0.95 m 44 kNm	0.80 m 45 kNm	0.65 m 42 kNm
	30	10				1.10 m 41 kNm	0.95 m 44 kNm	0.90 m 50 kNm	0.80 m 52 kNm
	5	10	PTL2	3460	1961	0.75 m 28 kNm	0.60 m 28 kNm	0.50 m 28 kNm	0.40 m 26 kNm
	10	10				1.05 m 39 kNm	0.80 m 37 kNm	0.65 m 36 kNm	0.55 m 36 kNm
	20	10				1.20 m (3105) 45 kNm	1.20 m 56 kNm	1.00 m 56 kNm	0.85 m 55 kNm
	30	10				1.20 m (3190) 45 kNm	1.20 m 56 kNm	1.10 m 62 kNm	1.05 m 68 kNm
	5	10	PTL2	3954	2241	0.90 m 34 kNm	0.70 m 33 kNm	0.60 m 34 kNm	0.50 m 33 kNm
	10	10				1.20 m (3855) 45 kNm	1.00 m 47 kNm	0.80 m 45 kNm	0.70 m 46 kNm
	20	10					1.20 m (3515) 56 kNm	1.20 m (3945) 67 kNm	1.05 m 68 kNm
	30	10					1.20 m (3495) 56 kNm	1.20 m (3715) 67 kNm	1.20 m (3880) 78 kNm
	5	7	PTL3	4448	2522	0.85 m (4095) 32 kNm	0.70 m (4275) 33 kNm	0.55 m (4150) 31 kNm	0.50 m (4345) 33 kNm
	10	7				1.20 m (4080) 45 kNm	0.95 m (4150) 44 kNm	0.80 m (4225) 45 kNm	0.70 m (4265) 46 kNm
	20	7						1.20 m (4060) 67 kNm	1.05 m (4125) 68 kNm
	30	7							1.20 m (4090) 78 kNm
	5	7	PTL3	4942	2802				
	10	7							
	20	7							
	30	7							
RR400/12.5 S440J2H	5	10	PTL1	3675	2083	0.80 m 30 kNm	0.65 m 30 kNm	0.55 m 31 kNm	0.45 m 29 kNm
	10	10				1.15 m 43 kNm	0.90 m 42 kNm	0.70 m 39 kNm	0.60 m 39 kNm
	20	10				1.20 m (3105) 45 kNm	1.20 m (3515) 56 kNm	1.10 m 62 kNm	0.95 m 62 kNm
	30	10				1.20 m (3190) 45 kNm	1.20 m (3495) 56 kNm	1.20 m 67 kNm	1.15 m 75 kNm
	5	10	PTL2	4288	2431	1.00 m 37 kNm	0.80 m 37 kNm	0.65 m 36 kNm	0.55 m 36 kNm
	10	10				1.20 m (3870) 45 kNm	1.10 m 51 kNm	0.90 m 50 kNm	0.80 m 52 kNm
	20	10						1.20 m (3945) 67 kNm	1.20 m 78 kNm
	30	10						1.20 m (3715) 67 kNm	1.20 m (3880) 78 kNm
	5	10	PTL2	4900	2778	1.20 m 45 kNm	0.95 m 44 kNm	0.75 m 42 kNm	0.65 m 42 kNm
	10	10					1.20 m (4495) 56 kNm	1.10 m 62 kNm	0.95 m 62 kNm
	20	10							1.20 m (4315) 78 kNm
	30	10							
	5	7	PTL3	5513	3125	1.20 m (5250) 45 kNm	1.00 m (5495) 47 kNm	0.80 m (5405) 45 kNm	0.70 m (5495) 46 kNm
	10	7						1.20 m (5460) 67 kNm	1.05 m 68 kNm
	20	7							
	30	7							
	5	7	PTL3	6125	3472				
	10	7							1.05 m (5513) 68 kNm
	20	7							
	30	7							

Values in brackets (xxxx) represent the maximum achievable R_c value with particular pile size, pile length and hammer size.

ACCELERATED HAMMERS (>1 g)

(for example Junttan SHK series)

Efficiency of the hammer 120 %						Drop height [m] and impact energy [kNm] to achieve R_c and R_d values				
Pile	Pile length [m]	Settlement s_{10} [mm]	Piling work class	R_c [kN]	R_d [kN]	Weight of the ram block [kg] 3000	4000	5000		
RR140/8	5	10	PTL1	822	466	0.20 m 7 kNm	0.15 m 7 kNm	0.10 m 6 kNm		
	10	10				0.25 m 9 kNm	0.20 m 9 kNm	0.15 m 9 kNm		
	20	10				0.35 m 12 kNm	0.25 m 12 kNm	0.20 m 12 kNm		
	30	10				0.45 m 16 kNm	0.35 m 16 kNm	0.25 m 15 kNm		
	5	10	PTL2	959	544	0.20 m 7 kNm	0.15 m 7 kNm	0.10 m 6 kNm		
	10	10				0.30 m 11 kNm	0.20 m 9 kNm	0.15 m 9 kNm		
	20	10				0.45 m 16 kNm	0.35 m 16 kNm	0.25 m 15 kNm		
	30	10				0.55 m 19 kNm	0.45 m 21 kNm	0.35 m 21 kNm		
	5	10	PTL2	1096	621	0.25 m 9 kNm	0.20 m 9 kNm	0.15 m 9 kNm		
	10	10				0.35 m 12 kNm	0.25 m 12 kNm	0.20 m 12 kNm		
	20	10				0.55 m 19 kNm	0.45 m 21 kNm	0.35 m 21 kNm		
	30	10				0.55 m (959) 19 kNm	0.60 m 28 kNm	0.45 m 26 kNm		
	5	7	PTL3	1233	699	0.30 m 11 kNm	0.20 m (1096) 9 kNm	0.15 m 9 kNm		
	10	7				0.40 m 14 kNm	0.25 m (1096) 12 kNm	0.25 m 15 kNm		
	20	7				0.65 m 23 kNm	0.50 m 24 kNm	0.40 m 24 kNm		
	30	7				0.35 m 12 kNm	0.70 m 33 kNm	0.50 m 29 kNm		
	5	7	PTL3	1370	777	0.30 m (1233) 11 kNm		0.15 m (1233) 9 kNm		
	10	7				0.40 m (1250) 14 kNm		0.25 m (1233) 15 kNm		
	20	7				0.65 m (1233) 23 kNm	0.55 m (1300) 26 kNm	0.40 m (1275) 24 kNm		
	30	7				0.35 m (1233) 12 kNm	0.80 m (1340) 38 kNm	0.60 m 35 kNm		
RRs140/8	5	10	PTL1	983	557	0.20 m 7 kNm	0.15 m 7 kNm	0.10 m 6 kNm		
	10	10				0.30 m 11 kNm	0.25 m 12 kNm	0.20 m 12 kNm		
	20	10				0.45 m 16 kNm	0.35 m 16 kNm	0.30 m 18 kNm		
	30	10				0.55 m 19 kNm	0.50 m 24 kNm	0.35 m 21 kNm		
	5	10	PTL2	1147	650	0.30 m 11 kNm	0.20 m 9 kNm	0.15 m 9 kNm		
	10	10				0.40 m 14 kNm	0.30 m 14 kNm	0.20 m 12 kNm		
	20	10				0.60 m 21 kNm	0.50 m 24 kNm	0.35 m 21 kNm		
	30	10				0.55 m 19 kNm	0.65 m 31 kNm	0.45 m 26 kNm		
	5	10	PTL2	1311	743	0.35 m 12 kNm	0.25 m 12 kNm	0.20 m 12 kNm		
	10	10				0.50 m 18 kNm	0.35 m 16 kNm	0.30 m 18 kNm		
	20	10				0.75 m 26 kNm	0.60 m 28 kNm	0.45 m 26 kNm		
	30	10				0.65 m 23 kNm	0.85 m 40 kNm	0.60 m 35 kNm		
	5	7	PTL3	1475	836	0.40 m 14 kNm	0.25 m (1311) 12 kNm	0.20 m 12 kNm		
	10	7				0.55 m 19 kNm	0.35 m (1311) 16 kNm	0.35 m 21 kNm		
	20	7				0.75 m (1311) 26 kNm	0.70 m 33 kNm	0.55 m 32 kNm		
	30	7				0.65 m 23 kNm	1.00 m 47 kNm	0.70 m 41 kNm		
	5	7	PTL3	1638	929	0.40 m (1560) 14 kNm		0.20 m (1475) 12 kNm		
	10	7				0.55 m (1510) 19 kNm		0.35 m (1475) 21 kNm		
	20	7				0.70 m 25 kNm	0.80 m (1580) 38 kNm	0.55 m (1495) 32 kNm		
	30	7				0.80 m 28 kNm	1.20 m (1595) 57 kNm	0.85 m (1595) 50 kNm		

Values in brackets (xxxx) represent the maximum achievable R_c value with particular pile size, pile length and hammer size.

ACCELERATED HAMMERS (>1 g)

(for example Junttan SHK series)

Pile	Efficiency of the hammer 120 % Pile length [m]	Settlement s_{10} [mm]	Piling work class	R_c [kN]	R_d [kN]	Drop height [m] and impact energy [kNm] to achieve R_c and R_d values Weight of the ram block [kg] 3000	4000	5000		
RR140/10	5	10	PTL1	1012	574	0.20 m 7 kNm	0.15 m 7 kNm	0.10 m 6 kNm		
	10	10				0.30 m 11 kNm	0.20 m 9 kNm	0.15 m 9 kNm		
	20	10				0.40 m 14 kNm	0.30 m 14 kNm	0.25 m 15 kNm		
	30	10				0.50 m 18 kNm	0.40 m 19 kNm	0.30 m 18 kNm		
	5	10	PTL2	1181	670	0.25 m 9 kNm	0.20 m 9 kNm	0.15 m 9 kNm		
	10	10				0.35 m 12 kNm	0.25 m 12 kNm	0.20 m 12 kNm		
	20	10				0.50 m 18 kNm	0.40 m 19 kNm	0.30 m 18 kNm		
	30	10				0.60 m 21 kNm	0.55 m 26 kNm	0.40 m 24 kNm		
	5	10	PTL2	1350	765	0.30 m 11 kNm	0.25 m 12 kNm	0.15 m 9 kNm		
	10	10				0.45 m 16 kNm	0.30 m 14 kNm	0.25 m 15 kNm		
	20	10				0.60 m 21 kNm	0.50 m 24 kNm	0.40 m 24 kNm		
	30	10				0.35 m 12 kNm	0.70 m 33 kNm	0.50 m 29 kNm		
	5	7	PTL3	1518	861	0.35 m 12 kNm	0.25 m 12 kNm	0.20 m 12 kNm		
	10	7				0.50 m 18 kNm	0.35 m 16 kNm	0.30 m 18 kNm		
	20	7				0.40 m 14 kNm	0.50 m (1350) 24 kNm	0.45 m 26 kNm		
	30	7				0.40 m 14 kNm	0.70 m (1350) 33 kNm	0.60 m 35 kNm		
	5	7	PTL3	1687	956	0.35 m (1518) 12 kNm	0.25 m (1570) 12 kNm	0.20 m (1518) 12 kNm		
	10	7				0.55 m (1660) 19 kNm	0.35 m (1530) 16 kNm	0.30 m (1518) 18 kNm		
	20	7				0.45 m 16 kNm		0.55 m (1680) 32 kNm		
	30	7				0.50 m 18 kNm		0.70 m (1685) 41 kNm		
RRs140/10	5	10	PTL1	1210	686	0.25 m 9 kNm	0.20 m 9 kNm	0.15 m 9 kNm		
	10	10				0.35 m 12 kNm	0.25 m 12 kNm	0.20 m 12 kNm		
	20	10				0.50 m 18 kNm	0.45 m 21 kNm	0.35 m 21 kNm		
	30	10				0.60 m 21 kNm	0.60 m 28 kNm	0.40 m 24 kNm		
	5	10	PTL2	1412	800	0.35 m 12 kNm	0.25 m 12 kNm	0.20 m 12 kNm		
	10	10				0.45 m 16 kNm	0.35 m 16 kNm	0.25 m 15 kNm		
	20	10				0.65 m 23 kNm	0.55 m 26 kNm	0.45 m 26 kNm		
	30	10				0.40 m 14 kNm	0.80 m 38 kNm	0.55 m 32 kNm		
	5	10	PTL2	1614	915	0.40 m 14 kNm	0.30 m 14 kNm	0.20 m 12 kNm		
	10	10				0.60 m 21 kNm	0.45 m 21 kNm	0.35 m 21 kNm		
	20	10				0.45 m 16 kNm	0.70 m 33 kNm	0.55 m 32 kNm		
	30	10				0.45 m 16 kNm	1.00 m 47 kNm	0.70 m 41 kNm		
	5	7	PTL3	1815	1029	0.45 m 16 kNm	0.35 m 16 kNm	0.25 m 15 kNm		
	10	7				0.65 m 23 kNm	0.50 m 24 kNm	0.40 m 24 kNm		
	20	7				0.45 m 16 kNm	0.70 m (1614) 33 kNm	0.65 m 38 kNm		
	30	7				0.55 m 19 kNm	1.00 m (1614) 47 kNm	0.85 m 50 kNm		
	5	7	PTL3	2017	1143	0.45 m (1855) 16 kNm	0.35 m (1915) 16 kNm	0.25 m (1815) 15 kNm		
	10	7				0.75 m (1990) 26 kNm	0.50 m (1870) 24 kNm	0.40 m (1875) 24 kNm		
	20	7				0.50 m 18 kNm		0.80 m 47 kNm		
	30	7				0.65 m 23 kNm		1.05 m 62 kNm		

Values in brackets (xxxx) represent the maximum achievable R_c value with particular pile size, pile length and hammer size.

ACCELERATED HAMMERS (>1 g)

(for example Junttan SHK series)

Efficiency of the hammer 120 %				Drop height [m] and impact energy [kNm] to achieve R_c and R_d values						
Pile	Pile length [m]	Settlement s_{10} [mm]	Piling work class	R_c [kN]	R_d [kN]	Weight of the ram block [kg] 3000	4000	5000		
RR170/10	5	10	PTL1	1235	700	0.25 m 9 kNm	0.20 m 9 kNm	0.15 m 9 kNm		
	10	10				0.35 m 12 kNm	0.25 m 12 kNm	0.20 m 12 kNm		
	20	10				0.50 m 18 kNm	0.40 m 19 kNm	0.30 m 18 kNm		
	30	10				0.65 m 23 kNm	0.50 m 24 kNm	0.35 m 21 kNm		
	5	10	PTL2	1441	817	0.30 m 11 kNm	0.25 m 12 kNm	0.15 m 9 kNm		
	10	10				0.45 m 16 kNm	0.35 m 16 kNm	0.25 m 15 kNm		
	20	10				0.65 m 23 kNm	0.50 m 24 kNm	0.35 m 21 kNm		
	30	10				0.85 m 30 kNm	0.70 m 33 kNm	0.45 m 26 kNm		
	5	10	PTL2	1647	934	0.40 m 14 kNm	0.30 m 14 kNm	0.20 m 12 kNm		
	10	10				0.55 m 19 kNm	0.40 m 19 kNm	0.30 m 18 kNm		
	20	10				0.80 m 28 kNm	0.65 m 31 kNm	0.45 m 26 kNm		
	30	10				1.05 m 37 kNm	0.90 m 42 kNm	0.60 m 35 kNm		
	5	7	PTL3	1853	1050	0.40 m (1840) 14 kNm	0.30 m (1845) 14 kNm	0.25 m 15 kNm		
	10	7				0.60 m 21 kNm	0.45 m 21 kNm	0.35 m 21 kNm		
	20	7				0.90 m 32 kNm	0.65 m (1647) 31 kNm	0.55 m 32 kNm		
	30	7				1.20 m 42 kNm	0.90 m (1647) 42 kNm	0.70 m 41 kNm		
	5	7	PTL3	2059	1167			0.25 m (1853) 15 kNm		
	10	7				0.60 m (1870) 21 kNm	0.50 m (1980) 24 kNm	0.35 m (1895) 21 kNm		
	20	7				0.95 m (1900) 34 kNm		0.60 m (1975) 35 kNm		
	30	7				1.20 m (1853) 42 kNm		0.80 m (1980) 47 kNm		
RRs170/10	5	10	PTL1	1477	837	0.35 m 12 kNm	0.25 m 12 kNm	0.15 m 9 kNm		
	10	10				0.45 m 16 kNm	0.35 m 16 kNm	0.25 m 15 kNm		
	20	10				0.65 m 23 kNm	0.50 m 24 kNm	0.40 m 24 kNm		
	30	10				0.90 m 32 kNm	0.70 m 33 kNm	0.50 m 29 kNm		
	5	10	PTL2	1723	977	0.40 m 14 kNm	0.30 m 14 kNm	0.20 m 12 kNm		
	10	10				0.60 m 21 kNm	0.45 m 21 kNm	0.35 m 21 kNm		
	20	10				0.85 m 30 kNm	0.70 m 33 kNm	0.50 m 29 kNm		
	30	10				1.10 m 39 kNm	0.95 m 45 kNm	0.65 m 38 kNm		
	5	10	PTL2	1969	1116	0.50 m 18 kNm	0.40 m 19 kNm	0.25 m 15 kNm		
	10	10				0.75 m 26 kNm	0.55 m 26 kNm	0.40 m 24 kNm		
	20	10				1.10 m 39 kNm	0.85 m 40 kNm	0.65 m 38 kNm		
	30	10				1.20 m (1815) 42 kNm	1.20 m (1960) 57 kNm	0.85 m 50 kNm		
	5	7	PTL3	2216	1256	0.55 m 19 kNm	0.45 m 21 kNm	0.30 m 18 kNm		
	10	7				0.80 m 28 kNm	0.65 m 31 kNm	0.50 m 29 kNm		
	20	7				1.20 m (2155) 42 kNm	0.85 m (1969) 40 kNm	0.75 m 44 kNm		
	30	7				0.85 m 30 kNm		1.05 m 62 kNm		
	5	7	PTL3	2462	1396	0.55 m (2235) 19 kNm	0.45 m (2216) 21 kNm	0.30 m (2216) 18 kNm		
	10	7				0.85 m (2295) 30 kNm	0.65 m (2305) 31 kNm	0.50 m (2216) 29 kNm		
	20	7				0.85 m 30 kNm		0.90 m (2420) 53 kNm		
	30	7				0.85 m 30 kNm		1.20 m (2415) 71 kNm		

Values in brackets (xxxx) represent the maximum achievable R_c value with particular pile size, pile length and hammer size.

ACCELERATED HAMMERS (>1 g)

(for example Junttan SHK series)

Efficiency of the hammer 120 %				Drop height [m] and impact energy [kNm] to achieve R_c and R_d values						
Pile	Pile length [m]	Settlement s_{10} [mm]	Piling work class	R_c [kN]	R_d [kN]	Weight of the ram block [kg] 3000	4000	5000		
RR170/12.5	5	10	PTL1	1520	862	0.30 m 11 kNm	0.25 m 12 kNm	0.15 m 9 kNm		
	10	10				0.40 m 14 kNm	0.30 m 14 kNm	0.25 m 15 kNm		
	20	10				0.55 m 19 kNm	0.45 m 21 kNm	0.35 m 21 kNm		
	30	10				0.80 m 28 kNm	0.60 m 28 kNm	0.45 m 26 kNm		
	5	10	PTL2	1773	1005	0.35 m 12 kNm	0.30 m 14 kNm	0.20 m 12 kNm		
	10	10				0.50 m 18 kNm	0.40 m 19 kNm	0.30 m 18 kNm		
	20	10				0.75 m 26 kNm	0.60 m 28 kNm	0.45 m 26 kNm		
	30	10				1.00 m 35 kNm	0.80 m 38 kNm	0.55 m 32 kNm		
	5	10	PTL2	2026	1149	0.45 m 16 kNm	0.35 m 16 kNm	0.25 m 15 kNm		
	10	10				0.65 m 23 kNm	0.50 m 24 kNm	0.35 m 21 kNm		
	20	10				0.90 m 32 kNm	0.75 m 35 kNm	0.55 m 32 kNm		
	30	10				1.10 m 39 kNm	1.05 m 49 kNm	0.75 m 44 kNm		
	5	7	PTL3	2280	1293	0.50 m 18 kNm	0.40 m 19 kNm	0.25 m 15 kNm		
	10	7				0.70 m (2275) 25 kNm	0.60 m 28 kNm	0.45 m 26 kNm		
	20	7				1.05 m 37 kNm	0.75 m (2026) 35 kNm	0.65 m 38 kNm		
	30	7				0.60 m 21 kNm	1.05 m (2026) 49 kNm	0.90 m 53 kNm		
	5	7	PTL3	2533	1436	0.50 m (2355) 18 kNm	0.40 m (2280) 19 kNm	0.25 m (2290) 15 kNm		
	10	7					0.60 m (2390) 28 kNm	0.45 m (2280) 26 kNm		
	20	7				1.05 m (2280) 37 kNm		0.70 m (2440) 41 kNm		
	30	7				0.75 m 26 kNm		0.95 m (2385) 56 kNm		
RRs170/12.5	5	10	PTL1	1817	1030	0.40 m 14 kNm	0.30 m 14 kNm	0.20 m 12 kNm		
	10	10				0.55 m 19 kNm	0.40 m 19 kNm	0.30 m 18 kNm		
	20	10				0.75 m 26 kNm	0.60 m 28 kNm	0.45 m 26 kNm		
	30	10				1.00 m 35 kNm	0.85 m 40 kNm	0.60 m 35 kNm		
	5	10	PTL2	2120	1202	0.50 m 18 kNm	0.35 m 16 kNm	0.25 m 15 kNm		
	10	10				0.70 m 25 kNm	0.55 m 26 kNm	0.40 m 24 kNm		
	20	10				1.00 m 35 kNm	0.80 m 38 kNm	0.60 m 35 kNm		
	30	10				1.15 m 41 kNm	1.15 m 54 kNm	0.80 m 47 kNm		
	5	10	PTL2	2423	1374	0.60 m 21 kNm	0.45 m 21 kNm	0.30 m 18 kNm		
	10	10				0.85 m 30 kNm	0.65 m 31 kNm	0.50 m 29 kNm		
	20	10				1.20 m (2390) 42 kNm	1.05 m 49 kNm	0.75 m 44 kNm		
	30	10				0.80 m 28 kNm	1.20 m (2190) 57 kNm	1.05 m 62 kNm		
	5	7	PTL3	2726	1545	0.65 m 23 kNm	0.50 m 24 kNm	0.35 m 21 kNm		
	10	7				0.95 m (2695) 34 kNm	0.80 m 38 kNm	0.60 m 35 kNm		
	20	7				1.00 m 35 kNm	1.05 m (2423) 49 kNm	0.90 m 53 kNm		
	30	7				0.90 m 32 kNm		1.20 m (2675) 71 kNm		
	5	7	PTL3	3029	1717	0.65 m (2726) 23 kNm	0.50 m (2765) 24 kNm	0.35 m (2726) 21 kNm		
	10	7					0.85 m (2920) 40 kNm	0.60 m (2726) 35 kNm		
	20	7				0.70 m 25 kNm		1.05 m (2990) 62 kNm		
	30	7				1.05 m 37 kNm				

Values in brackets (xxxx) represent the maximum achievable R_c value with particular pile size, pile length and hammer size.

ACCELERATED HAMMERS (>1 g)

(for example Junttan SHK series)

Efficiency of the hammer 120 %						Drop height [m] and impact energy [kNm] to achieve R_c and R_d values				
Pile	Pile length [m]	Settlement s_{10} [mm]	Piling work class	R_c [kN]	R_d [kN]	Weight of the ram block [kg] 3000	4000	5000		
RR220/10	5	10	PTL1	1632	925	0.30 m 11 kNm	0.25 m 12 kNm	0.20 m 12 kNm		
	10	10				0.40 m 14 kNm	0.35 m 16 kNm	0.25 m 15 kNm		
	20	10				0.65 m 23 kNm	0.50 m 24 kNm	0.40 m 24 kNm		
	30	10				0.75 m 26 kNm	0.60 m 28 kNm	0.50 m 29 kNm		
	5	10	PTL2	1904	1079	0.35 m 12 kNm	0.30 m 14 kNm	0.25 m 15 kNm		
	10	10				0.55 m 19 kNm	0.40 m 19 kNm	0.35 m 21 kNm		
	20	10				0.80 m 28 kNm	0.60 m 28 kNm	0.50 m 29 kNm		
	30	10				1.00 m 35 kNm	0.80 m 38 kNm	0.65 m 38 kNm		
	5	10	PTL2	2176	1234	0.45 m 16 kNm	0.35 m 16 kNm	0.30 m 18 kNm		
	10	10				0.65 m 23 kNm	0.50 m 24 kNm	0.40 m 24 kNm		
	20	10				1.05 m 37 kNm	0.80 m 38 kNm	0.65 m 38 kNm		
	30	10				1.20 m (2120) 42 kNm	1.05 m 49 kNm	0.85 m 50 kNm		
	5	7	PTL3	2448	1388	0.50 m 18 kNm	0.35 m (2390) 16 kNm	0.30 m 18 kNm		
	10	7				0.75 m 26 kNm	0.60 m 28 kNm	0.50 m 29 kNm		
	20	7				1.15 m (2400) 41 kNm	0.90 m 42 kNm	0.75 m 44 kNm		
	30	7				1.20 m (2200) 42 kNm	1.20 m (2410) 57 kNm	1.00 m 59 kNm		
	5	7	PTL3	2720	1542	0.50 m (2448) 18 kNm		0.30 m (2448) 18 kNm		
	10	7				0.75 m (2475) 26 kNm	0.60 m (2480) 28 kNm	0.50 m (2448) 29 kNm		
	20	7					0.90 m (2470) 42 kNm	0.80 m (2620) 47 kNm		
	30	7						1.00 m (2460) 59 kNm		
RRs220/10	5	10	PTL1	1951	1106	0.40 m 14 kNm	0.30 m 14 kNm	0.25 m 15 kNm		
	10	10				0.55 m 19 kNm	0.45 m 21 kNm	0.35 m 21 kNm		
	20	10				0.85 m 30 kNm	0.65 m 31 kNm	0.50 m 29 kNm		
	30	10				1.05 m 37 kNm	0.85 m 40 kNm	0.70 m 41 kNm		
	5	10	PTL2	2276	1290	0.50 m 18 kNm	0.35 m 16 kNm	0.30 m 18 kNm		
	10	10				0.70 m 25 kNm	0.55 m 26 kNm	0.45 m 26 kNm		
	20	10				1.10 m 39 kNm	0.85 m 40 kNm	0.70 m 41 kNm		
	30	10				1.20 m (2120) 42 kNm	1.15 m 54 kNm	0.90 m 53 kNm		
	5	10	PTL2	2601	1474	0.60 m 21 kNm	0.45 m 21 kNm	0.35 m 21 kNm		
	10	10				0.90 m 32 kNm	0.70 m 33 kNm	0.55 m 32 kNm		
	20	10				1.20 m (2380) 42 kNm	1.10 m 52 kNm	0.85 m 50 kNm		
	30	10					1.20 m (2355) 57 kNm	1.20 m 71 kNm		
	5	7	PTL3	2927	1659	0.65 m 23 kNm	0.50 m 24 kNm	0.40 m 24 kNm		
	10	7				1.05 m 37 kNm	0.85 m 40 kNm	0.65 m 38 kNm		
	20	7					1.20 m (2875) 57 kNm	1.00 m 59 kNm		
	30	7						1.20 m (2695) 71 kNm		
	5	7	PTL3	3252	1844	0.65 m (2930) 23 kNm	0.50 m (2965) 24 kNm	0.40 m (2927) 24 kNm		
	10	7				1.05 m (2990) 37 kNm	0.85 m (3005) 40 kNm	0.65 m (2930) 38 kNm		
	20	7						1.15 m (3165) 68 kNm		
	30	7								

Values in brackets (xxxx) represent the maximum achievable R_c value with particular pile size, pile length and hammer size.

ACCELERATED HAMMERS (>1 g)

(for example Junttan SHK series)

Pile	Pile length [m]	Settlement s_{10} [mm]	Piling work class	R_c [kN]	R_d [kN]	Drop height [m] and impact energy [kNm] to achieve R_c and R_d values Weight of the ram block [kg] 3000	4000	5000	6000
RR220/12.5	5	10	PTL1	2015	1142	0.35 m 12 kNm	0.25 m 12 kNm	0.20 m 12 kNm	0.20 m 14 kNm
	10	10				0.50 m 18 kNm	0.40 m 19 kNm	0.30 m 18 kNm	0.25 m 18 kNm
	20	10				0.75 m 26 kNm	0.60 m 28 kNm	0.45 m 26 kNm	0.40 m 28 kNm
	30	10				0.80 m 28 kNm	0.70 m 33 kNm	0.60 m 35 kNm	0.50 m 35 kNm
	5	10	PTL2	2351	1333	0.45 m 16 kNm	0.35 m 16 kNm	0.25 m 15 kNm	0.25 m 18 kNm
	10	10				0.65 m 23 kNm	0.50 m 24 kNm	0.40 m 24 kNm	0.35 m 25 kNm
	20	10				0.95 m 34 kNm	0.75 m 35 kNm	0.60 m 35 kNm	0.50 m 35 kNm
	30	10				1.05 m 37 kNm	0.95 m 45 kNm	0.80 m 47 kNm	0.65 m 46 kNm
	5	10	PTL2	2687	1523	0.55 m 19 kNm	0.40 m 19 kNm	0.35 m 21 kNm	0.30 m 21 kNm
	10	10				0.80 m 28 kNm	0.60 m 28 kNm	0.50 m 29 kNm	0.40 m 28 kNm
	20	10				1.20 m (2495) 42 kNm	0.95 m 45 kNm	0.75 m 44 kNm	0.60 m 42 kNm
	30	10				1.20 m (2495) 42 kNm	1.20 m 57 kNm	1.00 m 59 kNm	0.85 m 60 kNm
	5	7	PTL3	3023	1714	0.60 m 21 kNm	0.45 m 21 kNm	0.35 m (3010) 21 kNm	0.30 m 21 kNm
	10	7				0.90 m 32 kNm	0.70 m 33 kNm	0.60 m 35 kNm	0.50 m 35 kNm
	20	7				1.20 m (2755) 42 kNm	1.10 m 52 kNm	0.85 m 50 kNm	0.75 m 53 kNm
	30	7					1.20 m (2790) 57 kNm	1.20 m (3015) 71 kNm	1.05 m 74 kNm
	5	7	PTL3	3359	1904	0.60 m (3023) 21 kNm	0.45 m (3023) 21 kNm		0.30 m (3085) 21 kNm
	10	7				0.90 m (3090) 32 kNm	0.70 m (3085) 33 kNm	0.60 m (3115) 35 kNm	0.50 m (3023) 35 kNm
	20	7					1.10 m (3023) 52 kNm	0.90 m (3120) 53 kNm	0.80 m (3235) 57 kNm
	30	7							1.05 m (3095) 74 kNm
RRs220/12.5	5	10	PTL1	2410	1366	0.45 m 16 kNm	0.35 m 16 kNm	0.30 m 18 kNm	0.25 m 18 kNm
	10	10				0.65 m 23 kNm	0.50 m 24 kNm	0.40 m 24 kNm	0.35 m 25 kNm
	20	10				1.00 m 35 kNm	0.80 m 38 kNm	0.60 m 35 kNm	0.50 m 35 kNm
	30	10				1.10 m 39 kNm	1.00 m 47 kNm	0.85 m 50 kNm	0.70 m 49 kNm
	5	10	PTL2	2811	1594	0.60 m 21 kNm	0.45 m 21 kNm	0.35 m 21 kNm	0.30 m 21 kNm
	10	10				0.85 m 30 kNm	0.65 m 31 kNm	0.55 m 32 kNm	0.45 m 32 kNm
	20	10				1.20 m (2670) 42 kNm	1.05 m 49 kNm	0.80 m 47 kNm	0.70 m 49 kNm
	30	10				1.20 m (2550) 42 kNm	1.20 m (2700) 57 kNm	1.10 m 65 kNm	0.95 m 67 kNm
	5	10	PTL2	3213	1821	0.70 m 25 kNm	0.55 m 26 kNm	0.45 m 26 kNm	0.35 m 25 kNm
	10	10				1.05 m 37 kNm	0.85 m 40 kNm	0.70 m 41 kNm	0.55 m 39 kNm
	20	10					1.20 m (2995) 57 kNm	1.05 m 62 kNm	0.85 m 60 kNm
	30	10						1.20 m (2955) 71 kNm	1.20 m 85 kNm
	5	7	PTL3	3614	2049	0.80 m 28 kNm	0.60 m 28 kNm	0.50 m 29 kNm	0.40 m 28 kNm
	10	7				1.20 m 42 kNm	0.95 m 45 kNm	0.80 m 47 kNm	0.70 m 49 kNm
	20	7						1.20 m 71 kNm	1.00 m 71 kNm
	30	7							1.20 m (3305) 85 kNm
	5	7	PTL3	4016	2277	0.80 m (3614) 28 kNm	0.60 m (3620) 28 kNm	0.50 m (3730) 29 kNm	0.40 m (3665) 28 kNm
	10	7				1.20 m (3640) 42 kNm	1.00 m (3765) 47 kNm	0.85 m (3770) 50 kNm	0.70 m (3614) 49 kNm
	20	7						1.20 m (3620) 71 kNm	1.00 m (3614) 71 kNm
	30	7							

Values in brackets (xxxx) represent the maximum achievable R_c value with particular pile size, pile length and hammer size.

ACCELERATED HAMMERS (>1 g)

(for example Junttan SHK series)

Efficiency of the hammer 120 %				Drop height [m] and impact energy [kNm] to achieve R_c and R_d values					
Pile	Pile length [m]	Settlement s_{10} [mm]	Piling work class	R_c [kN]	R_d [kN]	Weight of the ram block [kg] 3000	4000	5000	6000
RR245/10	5	10	PTL1	1832	1039	0.35 m 12 kNm	0.25 m 12 kNm	0.20 m 12 kNm	0.20 m 14 kNm
	10	10				0.50 m 18 kNm	0.40 m 19 kNm	0.30 m 18 kNm	0.25 m 18 kNm
	20	10				0.70 m 25 kNm	0.55 m 26 kNm	0.45 m 26 kNm	0.40 m 28 kNm
	30	10				0.80 m 28 kNm	0.70 m 33 kNm	0.60 m 35 kNm	0.50 m 35 kNm
	5	10	PTL2	2137	1211	0.45 m 16 kNm	0.35 m 16 kNm	0.25 m 15 kNm	0.20 m 14 kNm
	10	10				0.65 m 23 kNm	0.50 m 24 kNm	0.40 m 24 kNm	0.30 m 21 kNm
	20	10				0.95 m 34 kNm	0.75 m 35 kNm	0.55 m 32 kNm	0.50 m 35 kNm
	30	10				1.05 m 37 kNm	0.95 m 45 kNm	0.75 m 44 kNm	0.65 m 46 kNm
	5	10	PTL2	2442	1384	0.50 m 18 kNm	0.40 m 19 kNm	0.30 m 18 kNm	0.25 m 18 kNm
	10	10				0.75 m 26 kNm	0.60 m 28 kNm	0.50 m 29 kNm	0.40 m 28 kNm
	20	10				1.20 m 42 kNm	0.90 m 42 kNm	0.70 m 41 kNm	0.60 m 42 kNm
	30	10				1.20 m (2310) 42 kNm	1.20 m 57 kNm	0.95 m 56 kNm	0.80 m 57 kNm
	5	7	PTL3	2747	1557	0.50 m (2560) 18 kNm	0.45 m 21 kNm	0.35 m 21 kNm	0.30 m 21 kNm
	10	7				0.85 m 30 kNm	0.70 m 33 kNm	0.55 m 32 kNm	0.45 m 32 kNm
	20	7				1.20 m (2565) 42 kNm	1.00 m (2695) 47 kNm	0.85 m 50 kNm	0.70 m 49 kNm
	30	7					1.20 m (2545) 57 kNm	1.15 m 68 kNm	0.95 m 67 kNm
	5	7	PTL3	3053	1731		0.45 m (2747) 21 kNm	0.35 m (2747) 21 kNm	0.30 m (2747) 21 kNm
	10	7				0.85 m (2747) 30 kNm	0.70 m (2830) 33 kNm	0.55 m (2747) 32 kNm	0.45 m (2760) 32 kNm
	20	7						0.85 m (2825) 50 kNm	0.75 m (2905) 53 kNm
	30	7						1.15 m (2760) 68 kNm	1.00 m (2845) 71 kNm
RRs245/10	5	10	PTL1	2190	1241	0.45 m 16 kNm	0.35 m 16 kNm	0.25 m 15 kNm	0.25 m 18 kNm
	10	10				0.65 m 23 kNm	0.50 m 24 kNm	0.40 m 24 kNm	0.40 m 28 kNm
	20	10				1.00 m 35 kNm	0.75 m 35 kNm	0.60 m 35 kNm	0.55 m 39 kNm
	30	10				1.15 m 41 kNm	0.95 m 45 kNm	0.80 m 47 kNm	0.75 m 53 kNm
	5	10	PTL2	2555	1448	0.55 m 19 kNm	0.40 m 19 kNm	0.35 m 21 kNm	0.35 m 25 kNm
	10	10				0.85 m 30 kNm	0.65 m 31 kNm	0.50 m 29 kNm	0.50 m 35 kNm
	20	10				1.20 m (2465) 42 kNm	1.00 m 47 kNm	0.80 m 47 kNm	0.75 m 53 kNm
	30	10				1.20 m (2285) 42 kNm	1.20 m (2480) 57 kNm	1.05 m 62 kNm	1.00 m 71 kNm
	5	10	PTL2	2920	1655	0.70 m 25 kNm	0.50 m 24 kNm	0.40 m 24 kNm	0.40 m 28 kNm
	10	10				1.05 m 37 kNm	0.80 m 38 kNm	0.65 m 38 kNm	0.60 m 42 kNm
	20	10					1.20 m (2875) 57 kNm	1.00 m 59 kNm	0.95 m 67 kNm
	30	10						1.20 m (2760) 71 kNm	1.20 m (2835) 85 kNm
	5	7	PTL3	3285	1862	0.75 m 26 kNm	0.60 m 28 kNm	0.45 m 26 kNm	0.45 m 32 kNm
	10	7				1.20 m 42 kNm	0.95 m 45 kNm	0.75 m 44 kNm	0.70 m 49 kNm
	20	7					1.20 m (2970) 57 kNm	1.15 m 68 kNm	1.10 m 78 kNm
	30	7							
	5	7	PTL3	3650	2069	0.75 m (3285) 26 kNm	0.60 m (3285) 28 kNm	0.45 m (3300) 26 kNm	0.45 m (3285) 32 kNm
	10	7				1.20 m (3285) 42 kNm	0.95 m (3285) 45 kNm	0.75 m (3305) 44 kNm	0.70 m (3285) 49 kNm
	20	7						1.20 m (3390) 71 kNm	1.10 m (3285) 78 kNm
	30	7							

Values in brackets (xxxx) represent the maximum achievable R_c value with particular pile size, pile length and hammer size.

ACCELERATED HAMMERS (>1 g)

(for example Junttan SHK series)

Efficiency of the hammer 120 %						Drop height [m] and impact energy [kNm] to achieve R_c and R_d values				
Pile	Pile length [m]	Settlement s_{10} [mm]	Piling work class	R_c [kN]	R_d [kN]	Weight of the ram block [kg]				
						3000	4000	5000	6000	7000
RR245/12.5	5	10	PTL1	2265	1284	0.40 m 14 kNm	0.30 m 14 kNm	0.25 m 15 kNm	0.25 m 18 kNm	0.20 m 16 kNm
	10	10				0.60 m 21 kNm	0.45 m 21 kNm	0.35 m 21 kNm	0.35 m 25 kNm	0.25 m 21 kNm
	20	10				0.85 m 30 kNm	0.65 m 31 kNm	0.55 m 32 kNm	0.50 m 35 kNm	0.40 m 33 kNm
	30	10				0.85 m 30 kNm	0.80 m 38 kNm	0.70 m 41 kNm	0.65 m 46 kNm	0.50 m 41 kNm
	5	10	PTL2	2643	1498	0.50 m 18 kNm	0.40 m 19 kNm	0.30 m 18 kNm	0.30 m 21 kNm	0.25 m 21 kNm
	10	10				0.75 m 26 kNm	0.55 m 26 kNm	0.45 m 26 kNm	0.45 m 32 kNm	0.35 m 29 kNm
	20	10				1.10 m 39 kNm	0.85 m 40 kNm	0.70 m 41 kNm	0.65 m 46 kNm	0.50 m 41 kNm
	30	10				1.15 m 41 kNm	1.00 m 47 kNm	0.90 m 53 kNm	0.90 m 64 kNm	0.65 m 54 kNm
	5	10	PTL2	3020	1712	0.60 m 21 kNm	0.50 m 24 kNm	0.40 m 24 kNm	0.40 m 28 kNm	0.30 m 25 kNm
	10	10				0.95 m 34 kNm	0.70 m 33 kNm	0.60 m 35 kNm	0.55 m 39 kNm	0.40 m 33 kNm
	20	10				1.20 m (2790) 42 kNm	1.10 m 52 kNm	0.85 m 50 kNm	0.80 m 57 kNm	0.85 m (2995) 70 kNm
	30	10				1.20 m (2745) 42 kNm	1.20 m (2925) 57 kNm	1.15 m 68 kNm	1.15 m 81 kNm	0.85 m 70 kNm
	5	7	PTL3	3398	1926	0.70 m 25 kNm	0.55 m 26 kNm	0.40 m (3350) 24 kNm	0.45 m 32 kNm	0.30 m 25 kNm
	10	7				1.00 m (3365) 35 kNm	0.80 m 38 kNm	0.65 m 38 kNm	0.60 m 42 kNm	0.50 m 41 kNm
	20	7					1.20 m (3300) 57 kNm	1.00 m 59 kNm	0.90 m 64 kNm	0.70 m 58 kNm
	30	7					1.20 m (3035) 57 kNm	1.20 m (3205) 71 kNm	1.20 m (3220) 85 kNm	1.00 m 82 kNm
	5	7	PTL3	3775	2140	0.70 m (3398) 25 kNm	0.55 m (3398) 26 kNm		0.45 m (3398) 32 kNm	0.30 m (3398) 25 kNm
	10	7					0.80 m (3470) 38 kNm	0.65 m (3435) 38 kNm	0.65 m (3555) 46 kNm	0.50 m (3398) 41 kNm
	20	7						1.00 m (3415) 59 kNm	1.05 m (3695) 74 kNm	0.80 m (3650) 66 kNm
	30	7								1.05 m (3505) 87 kNm
RRs245/12.5	5	10	PTL1	2708	1535	0.55 m 19 kNm	0.40 m 19 kNm	0.35 m 21 kNm	0.30 m 21 kNm	0.25 m 21 kNm
	10	10				0.80 m 28 kNm	0.60 m 28 kNm	0.50 m 29 kNm	0.45 m 32 kNm	0.35 m 29 kNm
	20	10				1.15 m 41 kNm	0.90 m 42 kNm	0.70 m 41 kNm	0.65 m 46 kNm	0.50 m 41 kNm
	30	10				1.20 m 42 kNm	1.05 m 49 kNm	0.95 m 56 kNm	0.95 m 67 kNm	0.70 m 58 kNm
	5	10	PTL2	3160	1791	0.65 m 23 kNm	0.50 m 24 kNm	0.40 m 24 kNm	0.40 m 28 kNm	0.30 m 25 kNm
	10	10				1.00 m 35 kNm	0.75 m 35 kNm	0.60 m 35 kNm	0.60 m 42 kNm	0.45 m 37 kNm
	20	10				1.20 m (2790) 42 kNm	1.20 m 57 kNm	0.95 m 56 kNm	0.85 m 60 kNm	0.65 m 54 kNm
	30	10				1.20 m (2745) 42 kNm	1.20 m (2925) 57 kNm	1.20 m (3125) 71 kNm	1.20 m (2995) 85 kNm	0.90 m 74 kNm
	5	10	PTL2	3611	2047	0.80 m 28 kNm	0.60 m 28 kNm	0.50 m 29 kNm	0.50 m 35 kNm	0.35 m 29 kNm
	10	10				1.00 m (3160) 35 kNm	0.95 m 45 kNm	0.80 m 47 kNm	0.75 m 53 kNm	0.55 m 45 kNm
	20	10					1.20 m (3160) 57 kNm	1.20 m 71 kNm	1.10 m 78 kNm	0.85 m 70 kNm
	30	10								1.20 m 99 kNm
	5	7	PTL3	4062	2303	0.95 m 34 kNm	0.70 m 33 kNm	0.55 m 32 kNm	0.55 m 39 kNm	0.40 m 33 kNm
	10	7				1.20 m (3740) 42 kNm	1.10 m 52 kNm	0.90 m 53 kNm	0.85 m 60 kNm	0.65 m 54 kNm
	20	7						1.20 m (3760) 71 kNm	1.20 m (3955) 85 kNm	1.00 m 82 kNm
	30	7								1.20 m (3745) 99 kNm
	5	7	PTL3	4514	2559	0.95 m (4062) 34 kNm	0.70 m (4100) 33 kNm	0.55 m (4062) 32 kNm	0.55 m (4095) 39 kNm	0.40 m (4135) 33 kNm
	10	7					1.15 m (4265) 54 kNm	0.95 m (4245) 56 kNm	0.90 m (4255) 64 kNm	0.65 m (4062) 54 kNm
	20	7								1.15 m (4405) 95 kNm
	30	7								

Values in brackets (xxxx) represent the maximum achievable R_c value with particular pile size, pile length and hammer size.

ACCELERATED HAMMERS (>1 g)

(for example Junttan SHK series)

Pile	Efficiency of the hammer 120 % Pile length [m]	Settlement s_{10} [mm]	Piling work class	R_c [kN]	R_d [kN]	Drop height [m] and impact energy [kNm] to achieve R_c and R_d values Weight of the ram block [kg] 3000	4000	5000	6000	7000
RR270/10	5	10	PTL1	2052	1163	0.40 m 14 kNm	0.30 m 14 kNm	0.25 m 15 kNm	0.25 m 18 kNm	0.20 m 16 kNm
	10	10				0.60 m 21 kNm	0.45 m 21 kNm	0.35 m 21 kNm	0.35 m 25 kNm	0.25 m 21 kNm
	20	10				0.85 m 30 kNm	0.65 m 31 kNm	0.50 m 29 kNm	0.50 m 35 kNm	0.40 m 33 kNm
	30	10				0.90 m 32 kNm	0.80 m 38 kNm	0.65 m 38 kNm	0.65 m 46 kNm	0.50 m 41 kNm
	5	10	PTL2	2394	1357	0.50 m 18 kNm	0.40 m 19 kNm	0.30 m 18 kNm	0.30 m 21 kNm	0.20 m 16 kNm
	10	10				0.75 m 26 kNm	0.55 m 26 kNm	0.45 m 26 kNm	0.40 m 28 kNm	0.30 m 25 kNm
	20	10				1.10 m 39 kNm	0.85 m 40 kNm	0.65 m 38 kNm	0.60 m 42 kNm	0.50 m 41 kNm
	30	10				1.15 m 41 kNm	1.05 m 49 kNm	0.85 m 50 kNm	0.85 m 60 kNm	0.65 m 54 kNm
	5	10	PTL2	2737	1552	0.60 m 21 kNm	0.45 m 21 kNm	0.35 m 21 kNm	0.35 m 25 kNm	0.25 m 21 kNm
	10	10				0.90 m 32 kNm	0.70 m 33 kNm	0.55 m 32 kNm	0.50 m 35 kNm	0.40 m 33 kNm
	20	10				1.20 m (2495) 42 kNm	1.05 m 49 kNm	0.85 m 50 kNm	0.80 m 57 kNm	0.60 m 49 kNm
	30	10				1.20 m (2465) 42 kNm	1.20 m (2495) 57 kNm	1.10 m 65 kNm	1.10 m 78 kNm	0.80 m 66 kNm
	5	7	PTL3	3079	1745	0.65 m (2995) 23 kNm	0.50 m 24 kNm	0.40 m 24 kNm	0.40 m 28 kNm	0.30 m 25 kNm
	10	7				0.95 m (3005) 34 kNm	0.75 m (3060) 35 kNm	0.65 m 38 kNm	0.60 m 42 kNm	0.45 m 37 kNm
	20	7					1.15 m (2985) 54 kNm	0.95 m 56 kNm	0.90 m 64 kNm	0.70 m 58 kNm
	30	7						1.20 m (2960) 71 kNm	1.20 m (3025) 85 kNm	0.95 m 78 kNm
	5	7	PTL3	3421	1939		0.50 m (3079) 24 kNm	0.40 m (3145) 24 kNm	0.40 m (3079) 28 kNm	0.30 m (3079) 25 kNm
	10	7						0.65 m (3079) 38 kNm	0.60 m (3079) 42 kNm	0.45 m (3105) 37 kNm
	20	7						0.95 m (3100) 56 kNm	0.95 m (3230) 67 kNm	0.75 m (3260) 62 kNm
	30	7								0.95 m (3135) 78 kNm
RRs270/10	5	10	PTL1	2454	1391	0.50 m 18 kNm	0.40 m 19 kNm	0.30 m 18 kNm	0.30 m 21 kNm	0.25 m 21 kNm
	10	10				0.75 m 26 kNm	0.60 m 28 kNm	0.45 m 26 kNm	0.45 m 32 kNm	0.35 m 29 kNm
	20	10				1.15 m 41 kNm	0.90 m 42 kNm	0.70 m 41 kNm	0.65 m 46 kNm	0.50 m 41 kNm
	30	10				1.20 m 42 kNm	1.10 m 52 kNm	0.90 m 53 kNm	0.90 m 64 kNm	0.65 m 54 kNm
	5	10	PTL2	2863	1623	0.65 m 23 kNm	0.50 m 24 kNm	0.40 m 24 kNm	0.40 m 28 kNm	0.30 m 25 kNm
	10	10				0.95 m 34 kNm	0.75 m 35 kNm	0.60 m 35 kNm	0.55 m 39 kNm	0.45 m 37 kNm
	20	10				1.20 m (2540) 42 kNm	1.15 m 54 kNm	0.90 m 53 kNm	0.85 m 60 kNm	0.65 m 54 kNm
	30	10				1.20 m (2480) 42 kNm	1.20 m (2610) 57 kNm	1.20 m 71 kNm	1.15 m 81 kNm	0.85 m 70 kNm
	5	10	PTL2	3272	1855	0.80 m 28 kNm	0.60 m 28 kNm	0.50 m 29 kNm	0.45 m 32 kNm	0.35 m 29 kNm
	10	10				1.20 m 42 kNm	0.90 m 42 kNm	0.75 m 44 kNm	0.70 m 49 kNm	0.55 m 45 kNm
	20	10					1.20 m (2965) 57 kNm	1.15 m 68 kNm	1.05 m 74 kNm	0.85 m 70 kNm
	30	10						1.20 m (2890) 71 kNm	1.20 m (2935) 85 kNm	1.10 m 91 kNm
	5	7	PTL3	3681	2087	0.90 m 32 kNm	0.65 m (3660) 31 kNm	0.55 m 32 kNm	0.55 m 39 kNm	0.40 m 33 kNm
	10	7				1.20 m (3445) 42 kNm	1.05 m 49 kNm	0.85 m 50 kNm	0.80 m 57 kNm	0.65 m 54 kNm
	20	7						1.20 m (3515) 71 kNm	1.20 m (3660) 85 kNm	0.95 m 78 kNm
	30	7								1.20 m (3545) 99 kNm
	5	7	PTL3	4090	2319	0.90 m (3681) 32 kNm		0.55 m (3681) 32 kNm	0.55 m (3681) 39 kNm	0.40 m (3681) 33 kNm
	10	7					1.05 m (3715) 49 kNm	0.85 m (3681) 50 kNm	0.80 m (3720) 57 kNm	0.65 m (3681) 54 kNm
	20	7								1.05 m (3895) 87 kNm
	30	7								

Values in brackets (xxxx) represent the maximum achievable R_c value with particular pile size, pile length and hammer size.

ACCELERATED HAMMERS (>1 g)

(for example Junttan SHK series)

Pile	Efficiency of the hammer 120 %			Drop height [m] and impact energy [kNm] to achieve R_c and R_d values					
	Pile length [m]	Settlement s_{10} [mm]	Piling work class	R_c [kN]	R_d [kN]	Weight of the ram block [kg]			
						4000	5000	6000	7000
RR270/12.5	5	10	PTL1	2541	1440	0.35 m 16 kNm	0.30 m 18 kNm	0.30 m 21 kNm	0.20 m 16 kNm
	10	10				0.50 m 24 kNm	0.40 m 24 kNm	0.40 m 28 kNm	0.30 m 25 kNm
	20	10				0.80 m 38 kNm	0.65 m 38 kNm	0.60 m 42 kNm	0.45 m 37 kNm
	30	10				0.85 m 40 kNm	0.75 m 44 kNm	0.75 m 53 kNm	0.60 m 49 kNm
	5	10	PTL2	2965	1681	0.45 m 21 kNm	0.35 m 21 kNm	0.35 m 25 kNm	0.25 m 21 kNm
	10	10				0.65 m 31 kNm	0.55 m 32 kNm	0.50 m 35 kNm	0.40 m 33 kNm
	20	10				1.00 m 47 kNm	0.80 m 47 kNm	0.75 m 53 kNm	0.55 m 45 kNm
	30	10				1.10 m 52 kNm	1.00 m 59 kNm	1.00 m 71 kNm	0.75 m 62 kNm
	5	10	PTL2	3388	1921	0.55 m 26 kNm	0.45 m 26 kNm	0.45 m 32 kNm	0.30 m 25 kNm
	10	10				0.80 m 38 kNm	0.65 m 38 kNm	0.65 m 46 kNm	0.50 m 41 kNm
	20	10				1.20 m (3325) 57 kNm	1.00 m 59 kNm	0.90 m 64 kNm	0.70 m 58 kNm
	30	10				1.20 m (3150) 57 kNm	1.20 m (3310) 71 kNm	1.20 m (3295) 85 kNm	0.95 m 78 kNm
	5	7	PTL3	3812	2161	0.60 m 28 kNm	0.50 m 29 kNm	0.50 m 35 kNm	0.35 m 29 kNm
	10	7				0.90 m 42 kNm	0.75 m 44 kNm	0.70 m 49 kNm	0.55 m 45 kNm
	20	7				1.20 m (3430) 57 kNm	1.15 m (3790) 68 kNm	1.05 m 74 kNm	0.85 m 70 kNm
	30	7					1.20 m (3430) 71 kNm		1.15 m 95 kNm
	5	7	PTL3	4235	2401	0.60 m (3812) 28 kNm	0.50 m (3812) 29 kNm	0.50 m (3812) 35 kNm	0.35 m (3915) 29 kNm
	10	7				0.90 m (3835) 42 kNm	0.75 m (3890) 44 kNm	0.75 m (3990) 53 kNm	0.55 m (3855) 45 kNm
	20	7						1.20 m (4130) 85 kNm	0.90 m (4055) 74 kNm
	30	7							1.15 m (3840) 95 kNm
RRs270/12.5	5	10	PTL1	3038	1722	0.45 m 21 kNm	0.40 m 24 kNm	0.35 m 25 kNm	0.30 m 25 kNm
	10	10				0.70 m 33 kNm	0.55 m 32 kNm	0.55 m 39 kNm	0.45 m 37 kNm
	20	10				1.05 m 49 kNm	0.85 m 50 kNm	0.75 m 53 kNm	0.65 m 54 kNm
	30	10				1.15 m 54 kNm	1.05 m 62 kNm	1.05 m 74 kNm	0.90 m 74 kNm
	5	10	PTL2	3545	2010	0.60 m 28 kNm	0.45 m 26 kNm	0.45 m 32 kNm	0.40 m 33 kNm
	10	10				0.85 m 40 kNm	0.70 m 41 kNm	0.70 m 49 kNm	0.60 m 49 kNm
	20	10				1.20 m (3325) 57 kNm	1.10 m 65 kNm	1.00 m 71 kNm	0.85 m 70 kNm
	30	10				1.20 m (3150) 57 kNm	1.20 m (3310) 71 kNm	1.20 m (3285) 85 kNm	1.20 m 99 kNm
	5	10	PTL2	4051	2296	0.70 m 33 kNm	0.60 m 35 kNm	0.60 m 42 kNm	0.50 m 41 kNm
	10	10				1.10 m 52 kNm	0.90 m 53 kNm	0.85 m 60 kNm	0.70 m 58 kNm
	20	10					1.20 m (3765) 71 kNm	1.20 m (3985) 85 kNm	1.10 m 91 kNm
	30	10							1.20 m (3585) 99 kNm
	5	7	PTL3	4557	2583	0.80 m 38 kNm	0.65 m 38 kNm	0.65 m 46 kNm	0.55 m 45 kNm
	10	7				1.20 m (4495) 57 kNm	1.00 m 59 kNm	1.00 m 71 kNm	0.85 m 70 kNm
	20	7						1.20 m (4130) 85 kNm	1.20 m (4495) 99 kNm
	30	7							
	5	7	PTL3	5064	2871	0.80 m (4557) 38 kNm	0.65 m (4620) 38 kNm	0.65 m (4557) 46 kNm	0.55 m (4557) 45 kNm
	10	7					1.05 m (4715) 62 kNm	1.00 m (4557) 71 kNm	0.85 m (4557) 70 kNm
	20	7							
	30	7							

Values in brackets (xxxx) represent the maximum achievable R_c value with particular pile size, pile length and hammer size.

ACCELERATED HAMMERS (>1 g)

(for example Junttan SHK series)

Pile	Efficiency of the hammer 120 %			Drop height [m] and impact energy [kNm] to achieve R_c and R_d values					
	Pile length [m]	Settlement s_{10} [mm]	Piling work class	R_c [kN]	R_d [kN]	Weight of the ram block [kg] 4000	5000	6000	7000
RR320/10	5	10	PTL1	2450	1389	0.40 m 19 kNm	0.30 m 18 kNm	0.30 m 21 kNm	0.25 m 21 kNm
	10	10				0.55 m 26 kNm	0.45 m 26 kNm	0.40 m 28 kNm	0.30 m 25 kNm
	20	10				0.85 m 40 kNm	0.70 m 41 kNm	0.60 m 42 kNm	0.45 m 37 kNm
	30	10				0.95 m 45 kNm	0.85 m 50 kNm	0.85 m 60 kNm	0.60 m 49 kNm
	5	10	PTL2	2858	1620	0.50 m 24 kNm	0.40 m 24 kNm	0.40 m 28 kNm	0.30 m 25 kNm
	10	10				0.70 m 33 kNm	0.55 m 32 kNm	0.55 m 39 kNm	0.40 m 33 kNm
	20	10				1.10 m 52 kNm	0.85 m 50 kNm	0.80 m 57 kNm	0.60 m 49 kNm
	30	10				1.20 m 57 kNm	1.05 m 62 kNm	1.05 m 74 kNm	0.80 m 66 kNm
	5	10	PTL2	3266	1851	0.60 m 28 kNm	0.45 m 26 kNm	0.40 m 28 kNm	0.35 m 29 kNm
	10	10				0.85 m 40 kNm	0.70 m 41 kNm	0.65 m 46 kNm	0.50 m 41 kNm
	20	10				1.20 m (3075) 57 kNm	1.10 m 65 kNm	1.00 m 71 kNm	0.75 m 62 kNm
	30	10				1.20 m (2860) 57 kNm	1.20 m (3080) 71 kNm	1.20 m (3095) 85 kNm	1.00 m 82 kNm
	5	7	PTL3	3674	2083	0.60 m (3575) 28 kNm	0.50 m 29 kNm	0.50 m 35 kNm	0.35 m 29 kNm
	10	7				0.90 m (3555) 42 kNm	0.75 m (3625) 44 kNm	0.75 m 53 kNm	0.55 m 45 kNm
	20	7					1.15 m (3565) 68 kNm	1.10 m 78 kNm	0.85 m 70 kNm
	30	7							1.15 m (3655) 95 kNm
	5	7	PTL3	4083	2315		0.50 m (3705) 29 kNm	0.50 m (3674) 35 kNm	0.35 m (3695) 29 kNm
	10	7						0.75 m (3720) 53 kNm	0.55 m (3685) 45 kNm
	20	7						1.15 m (3795) 81 kNm	0.90 m (3830) 74 kNm
	30	7							
RRs320/10	5	10	PTL1	2929	1660	0.50 m 24 kNm	0.40 m 24 kNm	0.40 m 28 kNm	0.30 m 25 kNm
	10	10				0.75 m 35 kNm	0.60 m 35 kNm	0.50 m 35 kNm	0.40 m 33 kNm
	20	10				1.15 m 54 kNm	0.90 m 53 kNm	0.75 m 53 kNm	0.65 m 54 kNm
	30	10				1.20 m (2860) 57 kNm	1.10 m 65 kNm	0.95 m 67 kNm	0.85 m 70 kNm
	5	10	PTL2	3417	1937	0.60 m 28 kNm	0.50 m 29 kNm	0.50 m 35 kNm	0.35 m 29 kNm
	10	10				0.95 m 45 kNm	0.75 m 44 kNm	0.60 m 42 kNm	0.55 m 45 kNm
	20	10				1.20 m (3075) 57 kNm	1.15 m 68 kNm	0.95 m 67 kNm	0.80 m 66 kNm
	30	10					1.20 m (3080) 71 kNm	1.20 m (3375) 85 kNm	1.10 m 91 kNm
	5	10	PTL2	3905	2214	0.75 m 35 kNm	0.60 m 35 kNm	0.60 m 42 kNm	0.45 m 37 kNm
	10	10				1.15 m 54 kNm	0.95 m 56 kNm	0.75 m 53 kNm	0.65 m 54 kNm
	20	10					1.20 m (3515) 71 kNm	1.20 m 85 kNm	1.00 m 82 kNm
	30	10							1.20 m (3645) 99 kNm
	5	7	PTL3	4393	2490	0.85 m 40 kNm	0.70 m 41 kNm	0.65 m 46 kNm	0.50 m 41 kNm
	10	7				1.20 m (4220) 57 kNm	1.05 m 62 kNm	0.90 m 64 kNm	0.75 m 62 kNm
	20	7						1.20 m (4120) 85 kNm	1.20 m 99 kNm
	30	7							
	5	7	PTL3	4881	2767	0.85 m (4393) 40 kNm	0.70 m (4393) 41 kNm	0.65 m (4393) 46 kNm	0.50 m (4393) 41 kNm
	10	7					1.10 m (4495) 65 kNm	0.90 m (4460) 64 kNm	0.75 m (4393) 62 kNm
	20	7							1.20 m (4485) 99 kNm
	30	7							

Values in brackets (xxxx) represent the maximum achievable R_c value with particular pile size, pile length and hammer size.

ACCELERATED HAMMERS (>1 g)

(for example Junttan SHK series)

Pile	Efficiency of the hammer 120 %			Drop height [m] and impact energy [kNm] to achieve R_c and R_d values					
	Pile length [m]	Settlement s_{10} [mm]	Piling work class	R_c [kN]	R_d [kN]	Weight of the ram block [kg] 4000	5000	6000	7000
RR320/12.5	5	10	PTL1	3038	1722	0.45 m 21 kNm	0.40 m 24 kNm	0.30 m 21 kNm	0.25 m 21 kNm
	10	10				0.65 m 31 kNm	0.55 m 32 kNm	0.45 m 32 kNm	0.40 m 33 kNm
	20	10				1.00 m 47 kNm	0.80 m 47 kNm	0.65 m 46 kNm	0.55 m 45 kNm
	30	10				1.00 m 47 kNm	0.90 m 53 kNm	0.80 m 57 kNm	0.70 m 58 kNm
	5	10	PTL2	3544	2009	0.60 m 28 kNm	0.45 m 26 kNm	0.40 m 28 kNm	0.35 m 29 kNm
	10	10				0.85 m 40 kNm	0.65 m 38 kNm	0.55 m 39 kNm	0.50 m 41 kNm
	20	10				1.20 m (3460) 57 kNm	1.05 m 62 kNm	0.85 m 60 kNm	0.75 m 62 kNm
	30	10				1.20 m (3480) 57 kNm	1.15 m 68 kNm	1.05 m 74 kNm	0.95 m 78 kNm
	5	10	PTL2	4050	2296	0.70 m 33 kNm	0.55 m 32 kNm	0.45 m 32 kNm	0.40 m 33 kNm
	10	10				1.05 m 49 kNm	0.80 m 47 kNm	0.70 m 49 kNm	0.60 m 49 kNm
	20	10					1.20 m (3935) 71 kNm	1.05 m 74 kNm	0.90 m 74 kNm
	30	10					1.20 m (3690) 71 kNm	1.20 m (3865) 85 kNm	1.20 m 99 kNm
	5	7	PTL3	4556	2583	0.80 m 38 kNm	0.60 m (4495) 35 kNm	0.50 m 35 kNm	0.45 m 37 kNm
	10	7				1.15 m 54 kNm	0.95 m 56 kNm	0.80 m 57 kNm	0.70 m 58 kNm
	20	7					1.20 m (4060) 71 kNm	1.15 m (4415) 81 kNm	1.05 m 87 kNm
	30	7							1.20 m (4235) 99 kNm
	5	7	PTL3	5063	2870	0.80 m (4556) 38 kNm		0.50 m (4556) 35 kNm	0.45 m (4556) 37 kNm
	10	7				1.15 m (4556) 54 kNm	0.95 m (4556) 56 kNm	0.80 m (4556) 57 kNm	0.70 m (4680) 58 kNm
	20	7							1.05 m (4635) 87 kNm
	30	7							
RRs320/12.5	5	10	PTL1	3632	2059	0.60 m 28 kNm	0.50 m 29 kNm	0.40 m 28 kNm	0.35 m 29 kNm
	10	10				0.90 m 42 kNm	0.70 m 41 kNm	0.60 m 42 kNm	0.50 m 41 kNm
	20	10				1.20 m (3460) 57 kNm	1.05 m 62 kNm	0.90 m 64 kNm	0.75 m 62 kNm
	30	10				1.20 m (3480) 57 kNm	1.20 m 71 kNm	1.10 m 78 kNm	1.00 m 82 kNm
	5	10	PTL2	4237	2402	0.75 m 35 kNm	0.60 m 35 kNm	0.50 m 35 kNm	0.45 m 37 kNm
	10	10				1.10 m 52 kNm	0.90 m 53 kNm	0.75 m 53 kNm	0.65 m 54 kNm
	20	10					1.20 m (3935) 71 kNm	1.15 m 81 kNm	1.00 m 82 kNm
	30	10					1.20 m (3690) 71 kNm	1.20 m (3865) 85 kNm	1.20 m (4130) 99 kNm
	5	10	PTL2	4843	2745	0.90 m 42 kNm	0.70 m 41 kNm	0.60 m 42 kNm	0.50 m 41 kNm
	10	10				1.20 m (4475) 57 kNm	1.10 m 65 kNm	0.90 m 64 kNm	0.80 m 66 kNm
	20	10						1.20 m (4380) 85 kNm	1.20 m (4820) 99 kNm
	30	10							
	5	7	PTL3	5448	3088	1.05 m 49 kNm	0.80 m 47 kNm	0.70 m 49 kNm	0.60 m 49 kNm
	10	7					1.20 m (5390) 71 kNm	1.05 m 74 kNm	0.95 m 78 kNm
	20	7							1.20 m (4990) 99 kNm
	30	7							
	5	7	PTL3	6053	3431	1.05 m (5448) 49 kNm	0.80 m (5450) 47 kNm	0.70 m (5448) 49 kNm	0.60 m (5640) 49 kNm
	10	7						1.10 m (5650) 78 kNm	1.00 m (5745) 82 kNm
	20	7							
	30	7							

Values in brackets (xxxx) represent the maximum achievable R_c value with particular pile size, pile length and hammer size.

ACCELERATED HAMMERS (>1 g)

(for example Junttan SHK series)

Pile	Efficiency of the hammer 120 %			Drop height [m] and impact energy [kNm] to achieve R_c and R_d values					
	Pile length [m]	Settlement s_{10} [mm]	Piling work class	R_c [kN]	R_d [kN]	Weight of the ram block [kg]			
						4000	5000	6000	7000
RR400/10 S355J2H	5	10	PTL1	2387	1353	0.45 m 21 kNm	0.35 m 21 kNm	0.25 m 18 kNm	0.25 m 21 kNm
	10	10				0.55 m 26 kNm	0.45 m 26 kNm	0.35 m 25 kNm	0.30 m 25 kNm
	20	10				0.80 m 38 kNm	0.65 m 38 kNm	0.50 m 35 kNm	0.45 m 37 kNm
	30	10				0.85 m 40 kNm	0.75 m 44 kNm	0.65 m 46 kNm	0.55 m 45 kNm
	5	10	PTL2	2785	1579	0.50 m 24 kNm	0.40 m 24 kNm	0.35 m 25 kNm	0.30 m 25 kNm
	10	10				0.70 m 33 kNm	0.55 m 32 kNm	0.45 m 32 kNm	0.40 m 33 kNm
	20	10				1.00 m 47 kNm	0.80 m 47 kNm	0.65 m 46 kNm	0.55 m 45 kNm
	30	10				1.05 m 49 kNm	0.95 m 56 kNm	0.80 m 57 kNm	0.70 m 58 kNm
	5	10	PTL2	3183	1804	0.55 m (2995) 26 kNm	0.45 m 26 kNm	0.35 m (2995) 25 kNm	0.35 m 29 kNm
	10	10				0.75 m (2995) 35 kNm	0.60 m (2995) 35 kNm	0.55 m 39 kNm	0.45 m 37 kNm
	20	10				1.20 m (2995) 57 kNm	0.95 m (2995) 56 kNm	0.80 m 57 kNm	0.70 m 58 kNm
	30	10				1.20 m (2995) 57 kNm	1.15 m 68 kNm	1.00 m 71 kNm	0.90 m 74 kNm
	5	7	PTL3	3581	2030		0.45 m (3183) 26 kNm	0.35 m (3290) 25 kNm	0.30 m (3310) 25 kNm
	10	7				0.75 m (3215) 35 kNm	0.60 m (3250) 35 kNm	0.50 m (3265) 35 kNm	0.50 m 41 kNm
	20	7						0.75 m (3225) 53 kNm	0.70 m (3440) 58 kNm
	30	7				1.20 m (3275) 57 kNm	1.15 m (3415) 68 kNm	1.00 m (3310) 71 kNm	0.90 m (3375) 74 kNm
	5	7	PTL3	3979	2256				
	10	7							0.50 m (3581) 41 kNm
	20	7							
	30	7							
RR400/10 S440J2H	5	10	PTL1	2959	1677	0.55 m 26 kNm	0.45 m 26 kNm	0.35 m 25 kNm	0.30 m 25 kNm
	10	10				0.75 m 35 kNm	0.60 m 35 kNm	0.50 m 35 kNm	0.40 m 33 kNm
	20	10				1.10 m 52 kNm	0.90 m 53 kNm	0.75 m 53 kNm	0.60 m 49 kNm
	30	10				1.15 m 54 kNm	1.05 m 62 kNm	0.90 m 64 kNm	0.80 m 66 kNm
	5	10	PTL2	3452	1957	0.65 m 31 kNm	0.50 m 29 kNm	0.45 m 32 kNm	0.35 m 29 kNm
	10	10				0.95 m 45 kNm	0.75 m 44 kNm	0.60 m 42 kNm	0.50 m 41 kNm
	20	10				1.20 m (3160) 57 kNm	1.10 m 65 kNm	0.95 m 67 kNm	0.80 m 66 kNm
	30	10				1.20 m (3195) 57 kNm	1.20 m (3315) 71 kNm	1.15 m 81 kNm	1.00 m 82 kNm
	5	10	PTL2	3945	2236	0.80 m 38 kNm	0.60 m 35 kNm	0.50 m 35 kNm	0.45 m 37 kNm
	10	10				1.15 m 54 kNm	0.90 m 53 kNm	0.75 m 53 kNm	0.65 m 54 kNm
	20	10					1.20 m (3635) 71 kNm	1.15 m 81 kNm	0.95 m 78 kNm
	30	10						1.20 m (3575) 85 kNm	1.20 m (3880) 99 kNm
	5	7	PTL3	4438	2516	0.75 m (4110) 35 kNm	0.60 m (4175) 35 kNm	0.50 m (4240) 35 kNm	0.45 m (4410) 37 kNm
	10	7				1.10 m (4120) 52 kNm	0.90 m (4225) 53 kNm	0.80 m (4390) 57 kNm	0.70 m 58 kNm
	20	7						1.15 m (4155) 81 kNm	1.05 m (4375) 87 kNm
	30	7							1.20 m (3995) 99 kNm
	5	7	PTL3	4931	2795				
	10	7							0.70 m (4460) 58 kNm
	20	7							
	30	7							

Values in brackets (xxxx) represent the maximum achievable R_c value with particular pile size, pile length and hammer size.

ACCELERATED HAMMERS (>1 g)

(for example Junttan SHK series)

Pile	Efficiency of the hammer 120 %			Drop height [m] and impact energy [kNm] to achieve R_c and R_d values					
	Pile length [m]	Settlement s_{10} [mm]	Piling work class	R_c [kN]	R_d [kN]	Weight of the ram block [kg]			
						4000	5000	6000	7000
RR400/12.5 S355J2H	5	10	PTL1	2965	1681	0.50 m 24 kNm	0.40 m 24 kNm	0.35 m 25 kNm	0.30 m 25 kNm
	10	10				0.65 m 31 kNm	0.50 m 29 kNm	0.45 m 32 kNm	0.35 m 29 kNm
	20	10				0.90 m 42 kNm	0.75 m 44 kNm	0.60 m 42 kNm	0.55 m 45 kNm
	30	10				0.90 m 42 kNm	0.75 m 44 kNm	0.70 m 49 kNm	0.65 m 54 kNm
	5	10	PTL2	3460	1961	0.60 m 28 kNm	0.50 m 29 kNm	0.40 m 28 kNm	0.35 m 29 kNm
	10	10				0.85 m 40 kNm	0.65 m 38 kNm	0.55 m 39 kNm	0.45 m 37 kNm
	20	10				1.15 m 54 kNm	0.95 m 56 kNm	0.80 m 57 kNm	0.70 m 58 kNm
	30	10				1.10 m 52 kNm	0.95 m 56 kNm	0.90 m 64 kNm	0.80 m 66 kNm
	5	10	PTL2	3954	2241	0.70 m 33 kNm	0.55 m 32 kNm	0.45 m 32 kNm	0.40 m 33 kNm
	10	10				1.00 m 47 kNm	0.80 m 47 kNm	0.65 m 46 kNm	0.55 m 45 kNm
	20	10				1.20 m (3625) 57 kNm	1.15 m 68 kNm	1.00 m 71 kNm	0.85 m 70 kNm
	30	10				1.20 m (3755) 57 kNm	1.15 m 68 kNm	1.05 m 74 kNm	1.00 m 82 kNm
	5	7	PTL3	4448	2522	0.70 m (4210) 33 kNm	0.55 m (4245) 32 kNm	0.45 m (4245) 32 kNm	0.40 m (4380) 33 kNm
	10	7				0.95 m (4080) 45 kNm	0.75 m (4140) 44 kNm	0.65 m (4295) 46 kNm	0.55 m (4245) 45 kNm
	20	7					1.15 m (4080) 68 kNm	0.95 m (4060) 67 kNm	0.80 m (4030) 66 kNm
	30	7				1.20 m (3990) 57 kNm	1.20 m (4310) 71 kNm	1.20 m 85 kNm	1.10 m 91 kNm
	5	7	PTL3	4942	2802				
	10	7							
	20	7							
	30	7						1.20 m (4495) 85 kNm	1.10 m (4475) 91 kNm
RR400/12.5 S440J2H	5	10	PTL1	3675	2083	0.65 m 31 kNm	0.50 m 29 kNm	0.40 m 28 kNm	0.35 m 29 kNm
	10	10				0.90 m 42 kNm	0.70 m 41 kNm	0.60 m 42 kNm	0.50 m 41 kNm
	20	10				1.20 m (3625) 57 kNm	1.05 m 62 kNm	0.85 m 60 kNm	0.75 m 62 kNm
	30	10				1.20 m 57 kNm	1.05 m 62 kNm	0.95 m 67 kNm	0.90 m 74 kNm
	5	10	PTL2	4288	2431	0.80 m 38 kNm	0.60 m 35 kNm	0.50 m 35 kNm	0.45 m 37 kNm
	10	10				1.15 m 54 kNm	0.90 m 53 kNm	0.70 m 49 kNm	0.60 m 49 kNm
	20	10					1.20 m (4065) 71 kNm	1.10 m 78 kNm	0.95 m 78 kNm
	30	10				1.20 m (3755) 57 kNm	1.20 m (4080) 71 kNm	1.20 m 85 kNm	1.15 m 95 kNm
	5	10	PTL2	4900	2778	0.95 m 45 kNm	0.75 m 44 kNm	0.60 m 42 kNm	0.50 m 41 kNm
	10	10				1.20 m (4495) 57 kNm	1.05 m 62 kNm	0.90 m 64 kNm	0.75 m 62 kNm
	20	10						1.20 m (4495) 85 kNm	1.20 m 99 kNm
	30	10						1.20 m (4315) 85 kNm	1.20 m (4490) 99 kNm
	5	7	PTL3	5513	3125	0.95 m (5245) 45 kNm	0.80 m 47 kNm	0.65 m (5495) 46 kNm	0.55 m (5465) 45 kNm
	10	7					1.15 m (5435) 68 kNm	0.95 m (5460) 67 kNm	0.85 m 70 kNm
	20	7							1.20 m (5140) 99 kNm
	30	7							
	5	7	PTL3	6125	3472		0.80 m (5513) 47 kNm		
	10	7							0.85 m (5513) 70 kNm
	20	7							
	30	7							

Values in brackets (xxxx) represent the maximum achievable R_c value with particular pile size, pile length and hammer size.

Rammer S52

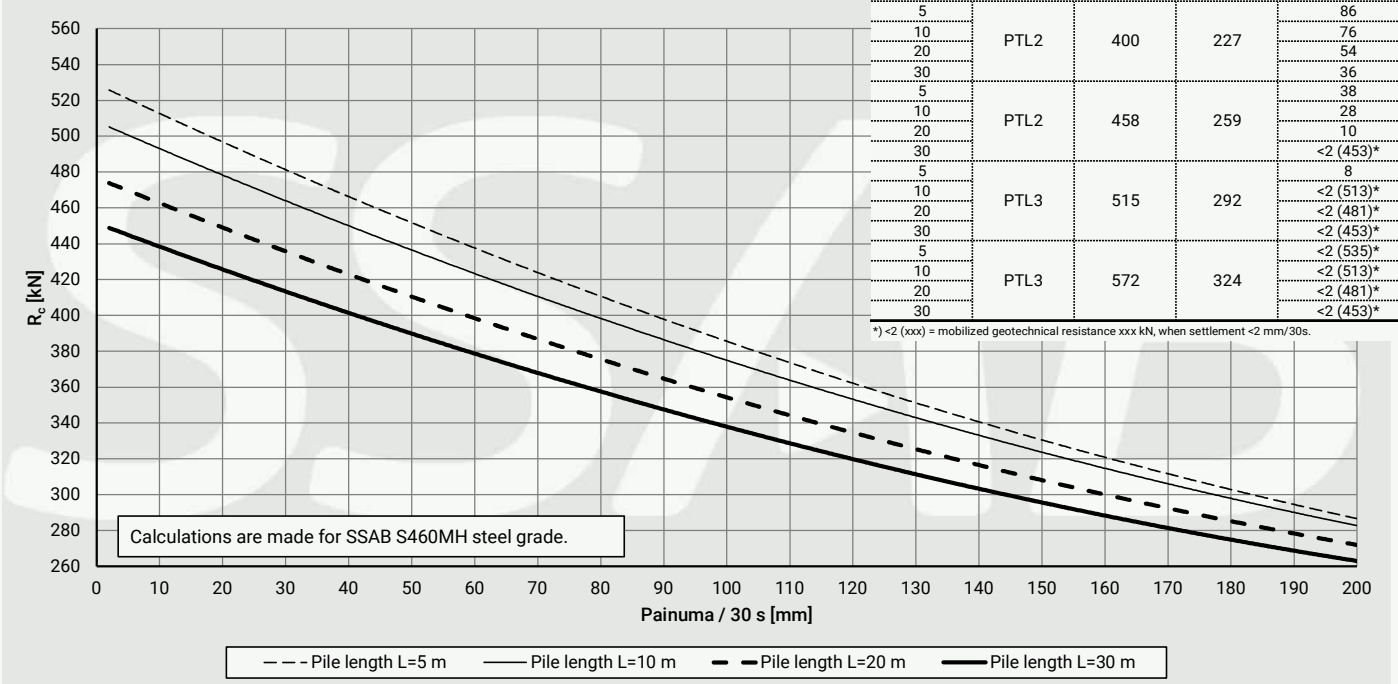
Piston		
Piston weight [kg]	m_r	33
Diameter of the piston [mm]	D_r	80
Length of the piston [mm]	L_r	840
Theoretical impact energy [J]	E_{rated}	1500
Efficiency of the piston [%]	HE	80
Equivalent drop height [m]	H_{ekv}	4.63
Theoretical impact rate [blows/min]	BPM	400-500
Actual impact rate vrs theoretical [%]	η	70
Measured / in analysis used impact rate [blows/min]	BPM_m	400
Impact tool		
Diameter of the tool [mm]	D_t	80
Height of the tool [mm]	L_t	900
Tool weight [kg]	m_t	35

Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	343	195	100
10				100
20				100
30				94
5	PTL2	400	227	86
10				76
20				54
30				36
5	PTL2	458	259	38
10				28
20				10
30				<2 (453)*
5	PTL3	515	292	8
10				<2 (513)*
20				<2 (481)*
30				<2 (453)*
5	PTL3	572	324	<2 (535)*
10				<2 (513)*
20				<2 (481)*
30				<2 (453)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Rammer S52 - RR75

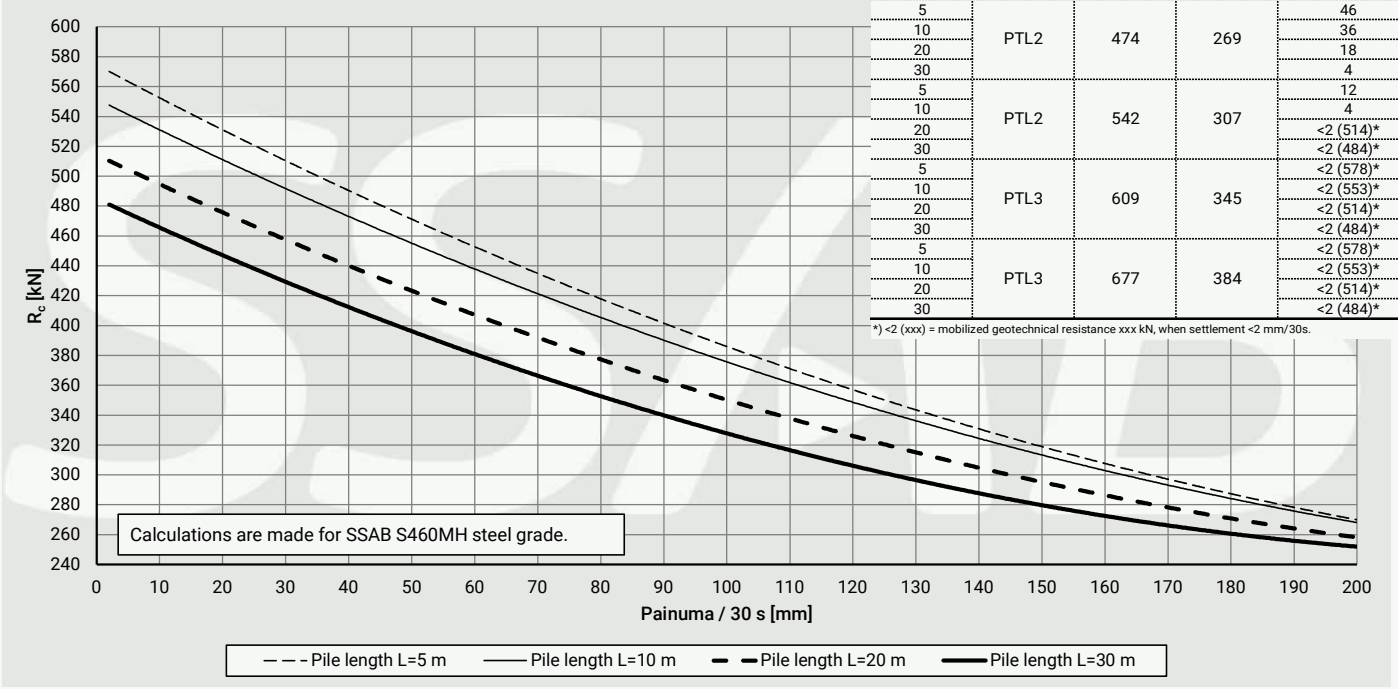


Rammer S52 - RR90

Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	406	230	90
10				82
20				62
30				44
5	PTL2	474	269	46
10				36
20				18
30				4
5	PTL2	542	307	12
10				4
20				<2 (514)*
30				<2 (484)*
5	PTL3	609	345	<2 (578)*
10				<2 (553)*
20				<2 (514)*
30				<2 (484)*
5	PTL3	677	384	<2 (578)*
10				<2 (553)*
20				<2 (514)*
30				<2 (484)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

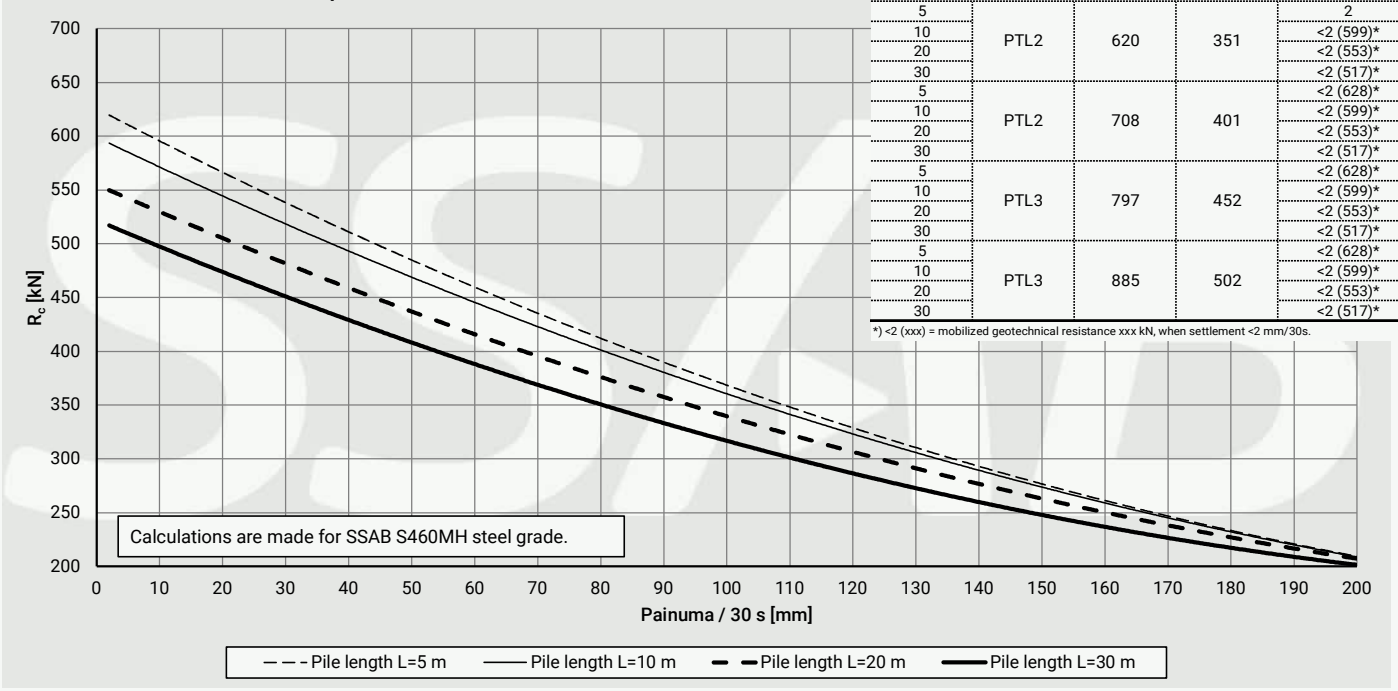


Rammer S52 - RR115/6.3

Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	531	301	28
10				22
20				8
30				<2 (517)*
5	PTL2	620	351	2
10				<2 (599)*
20				<2 (553)*
30				<2 (517)*
5	PTL2	708	401	<2 (628)*
10				<2 (599)*
20				<2 (553)*
30				<2 (517)*
5	PTL3	797	452	<2 (628)*
10				<2 (599)*
20				<2 (553)*
30				<2 (517)*
5	PTL3	885	502	<2 (628)*
10				<2 (599)*
20				<2 (553)*
30				<2 (517)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

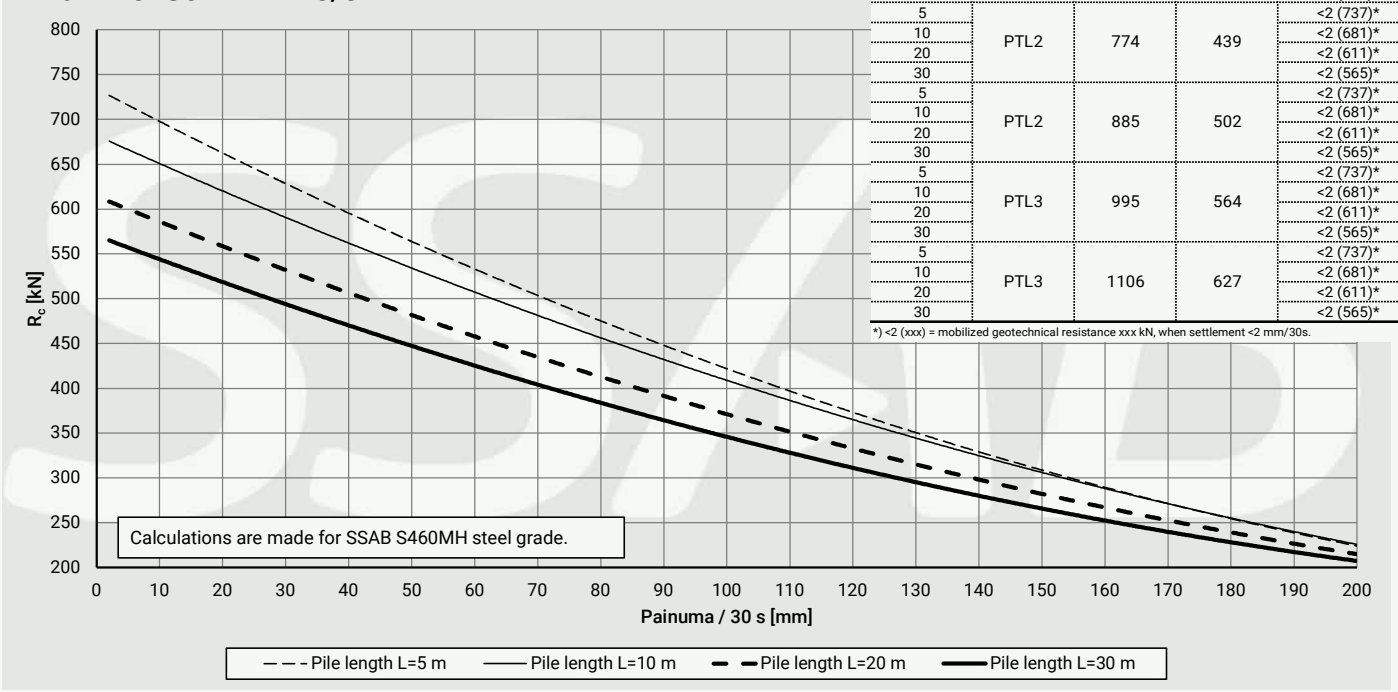


Rammer S52 - RR115/8

Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	664	376	16
10				4
20				<2 (611)*
30				<2 (565)*
5	PTL2	774	439	<2 (737)*
10				<2 (681)*
20				<2 (611)*
30				<2 (565)*
5	PTL2	885	502	<2 (737)*
10				<2 (681)*
20				<2 (611)*
30				<2 (565)*
5	PTL3	995	564	<2 (737)*
10				<2 (681)*
20				<2 (611)*
30				<2 (565)*
5	PTL3	1106	627	<2 (737)*
10				<2 (681)*
20				<2 (611)*
30				<2 (565)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

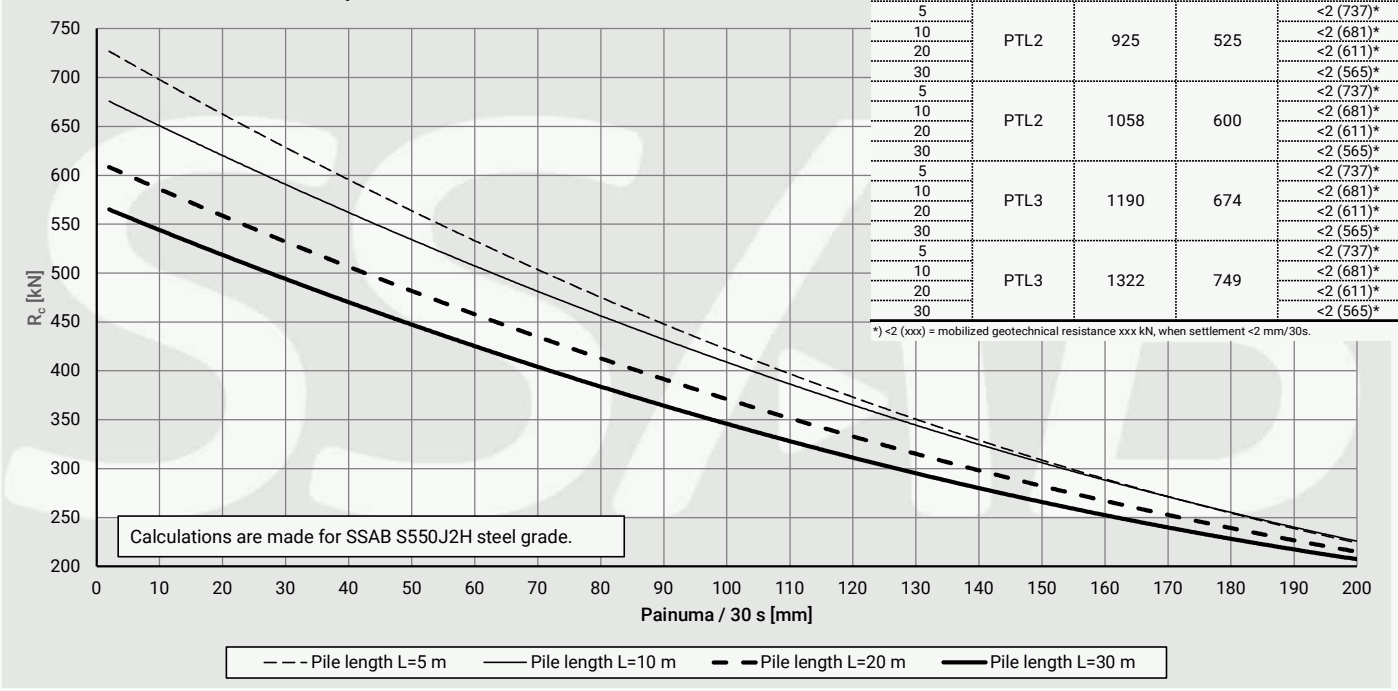


Rammer S52 - RRs115/8

Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	793	450	<2 (737)*
10				<2 (681)*
20				<2 (611)*
30				<2 (565)*
5	PTL2	925	525	<2 (737)*
10				<2 (681)*
20				<2 (611)*
30				<2 (565)*
5	PTL2	1058	600	<2 (737)*
10				<2 (681)*
20				<2 (611)*
30				<2 (565)*
5	PTL3	1190	674	<2 (737)*
10				<2 (681)*
20				<2 (611)*
30				<2 (565)*
5	PTL3	1322	749	<2 (737)*
10				<2 (681)*
20				<2 (611)*
30				<2 (565)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.



Rammer S54

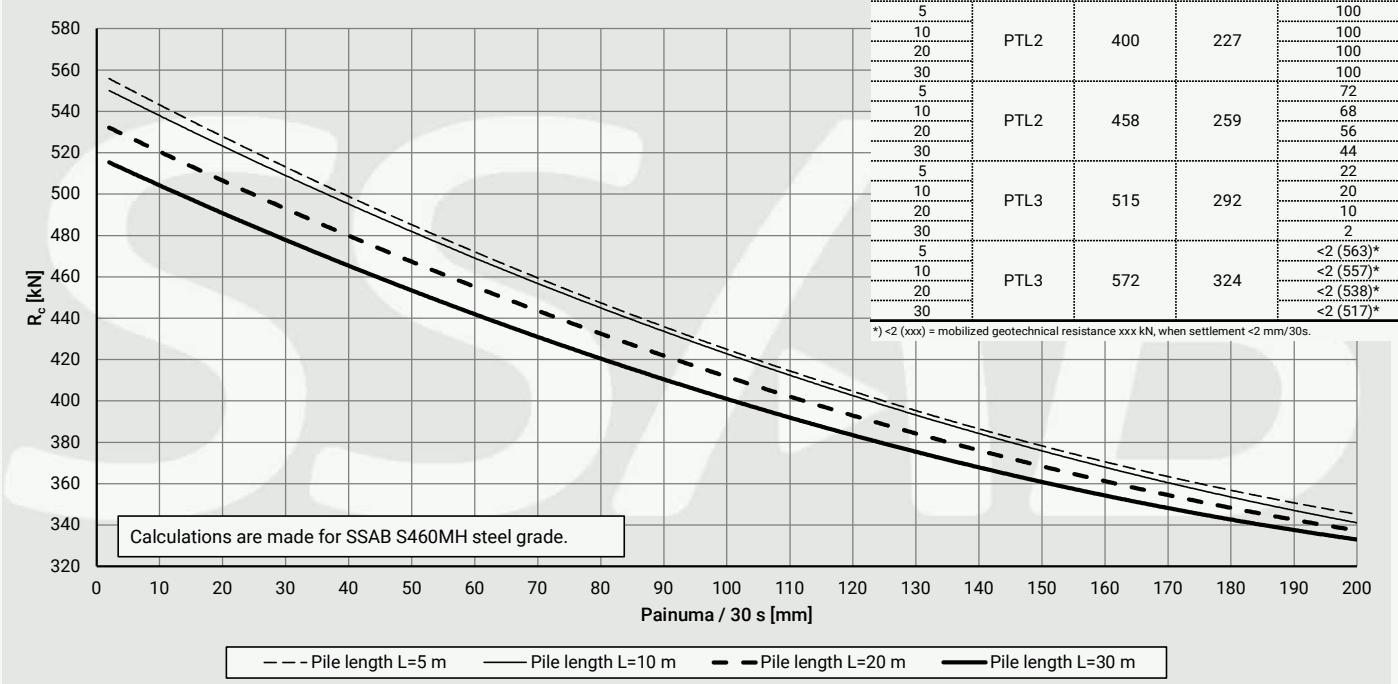
Piston		
Piston weight [kg]	m_r	37
Diameter of the piston [mm]	D_r	115
Length of the piston [mm]	L_r	450
Theoretical impact energy [J]	E_{rated}	2200
Efficiency of the piston [%]	HE	80
Equivalent drop height [m]	H_{ekv}	5.95
Theoretical impact rate [blows/min]	BPM	350-550
Actual impact rate vrs theoretical [%]	η	73
Measured / in analysis used impact rate [blows/min]	BPM_m	400
Impact tool		
Diameter of the tool [mm]	D_t	115
Height of the tool [mm]	L_t	850
Tool weight [kg]	m_t	58

Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	343	195	100
10				100
20				100
30				100
5	PTL2	400	227	100
10				100
20				100
30				100
5	PTL2	458	259	72
10				68
20				56
30				44
5	PTL3	515	292	22
10				20
20				10
30				2
5	PTL3	572	324	<2 (563)*
10				<2 (557)*
20				<2 (538)*
30				<2 (517)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Rammer S54 - RR75

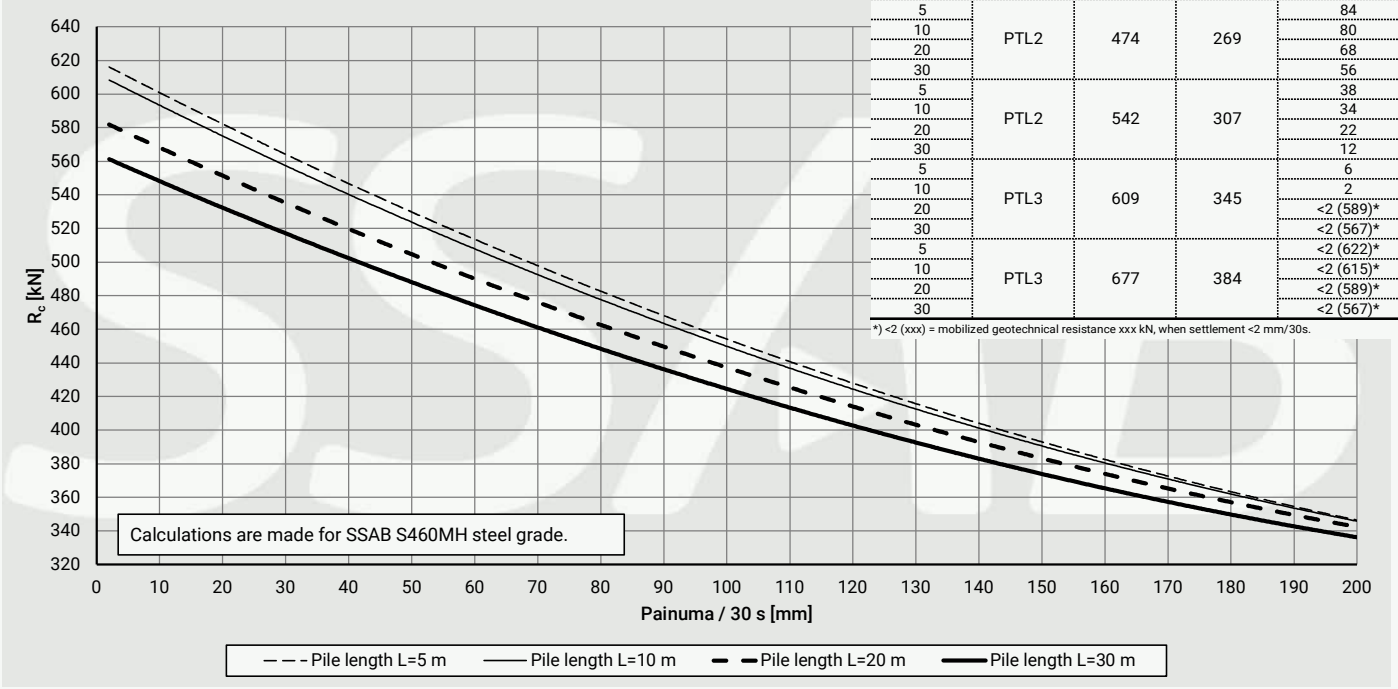


Rammer S54 - RR90

Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	406	230	100
10				100
20				100
30				100
5	PTL2	474	269	84
10				80
20				68
30				56
5	PTL2	542	307	38
10				34
20				22
30				12
5	PTL3	609	345	6
10				2
20				<2 (589)*
30				<2 (567)*
5	PTL3	677	384	<2 (622)*
10				<2 (615)*
20				<2 (589)*
30				<2 (567)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

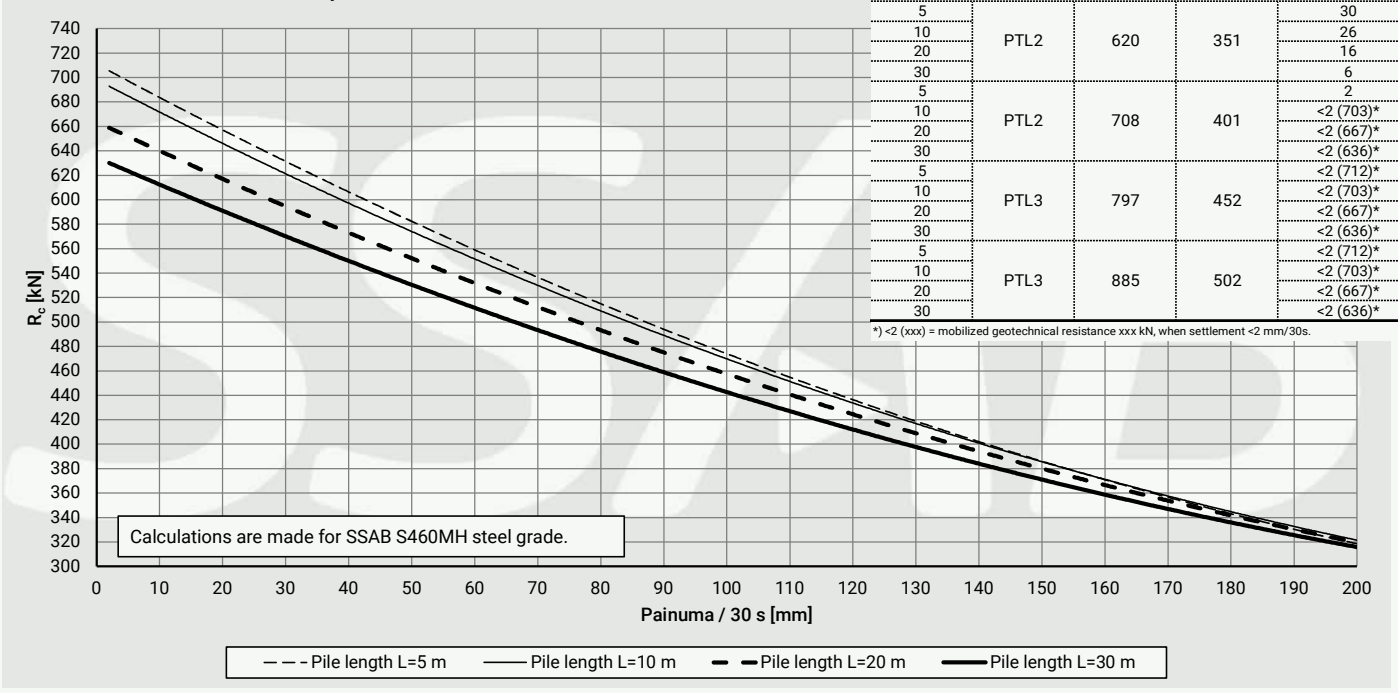


Rammer S54 - RR115/6.3

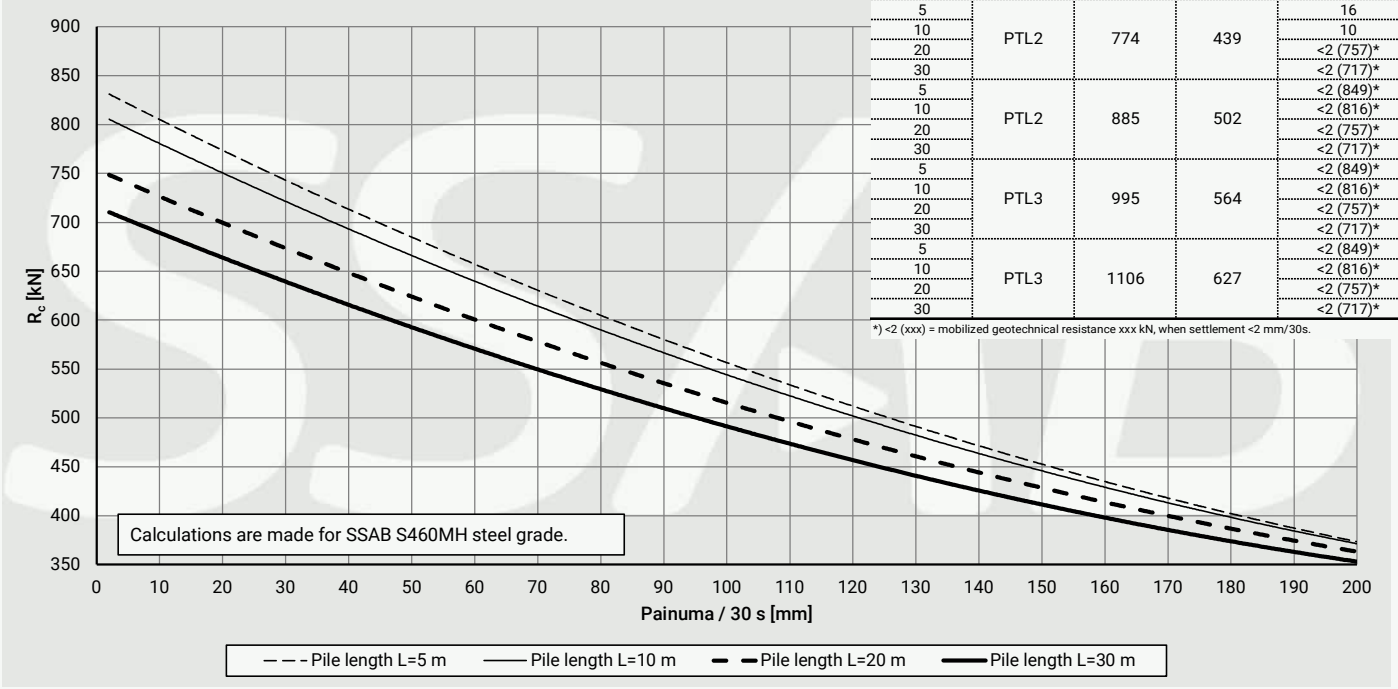
Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	531	301	72
10				68
20				58
30				46
5	PTL2	620	351	30
10				26
20				16
30				6
5	PTL2	708	401	2
10				<2 (703)*
20				<2 (667)*
30				<2 (636)*
5	PTL3	797	452	<2 (712)*
10				<2 (703)*
20				<2 (667)*
30				<2 (636)*
5	PTL3	885	502	<2 (712)*
10				<2 (703)*
20				<2 (667)*
30				<2 (636)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.



Rammer S54 - RR115/8

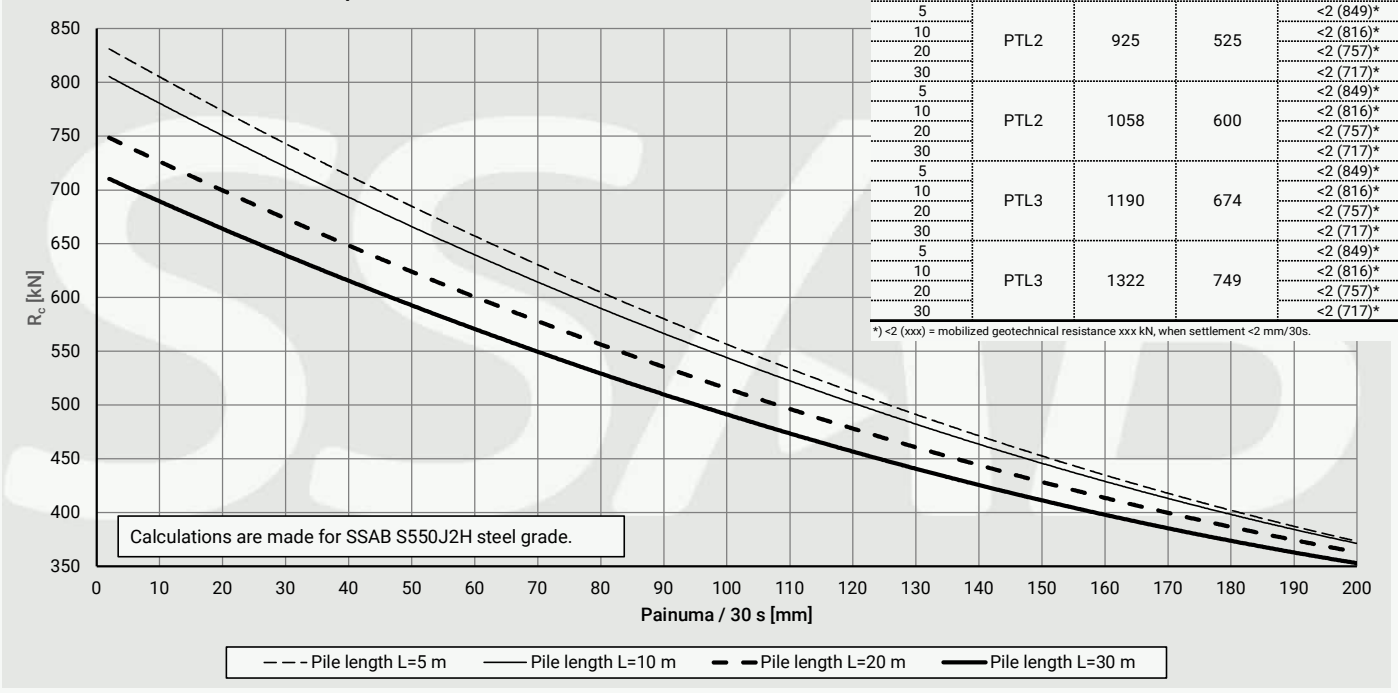


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	664	376	56
10				48
20				30
30				18
5	PTL2	774	439	16
10				10
20				<2 (757)*
30				<2 (717)*
5	PTL2	885	502	<2 (849)*
10				<2 (816)*
20				<2 (757)*
30				<2 (717)*
5	PTL3	995	564	<2 (849)*
10				<2 (816)*
20				<2 (757)*
30				<2 (717)*
5	PTL3	1106	627	<2 (849)*
10				<2 (816)*
20				<2 (757)*
30				<2 (717)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Rammer S54 - RRs115/8



Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	793	450	12
10				6
20				<2 (757)*
30				<2 (717)*
5	PTL2	925	525	<2 (849)*
10				<2 (816)*
20				<2 (757)*
30				<2 (717)*
5	PTL2	1058	600	<2 (849)*
10				<2 (816)*
20				<2 (757)*
30				<2 (717)*
5	PTL3	1190	674	<2 (849)*
10				<2 (816)*
20				<2 (757)*
30				<2 (717)*
5	PTL3	1322	749	<2 (849)*
10				<2 (816)*
20				<2 (757)*
30				<2 (717)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

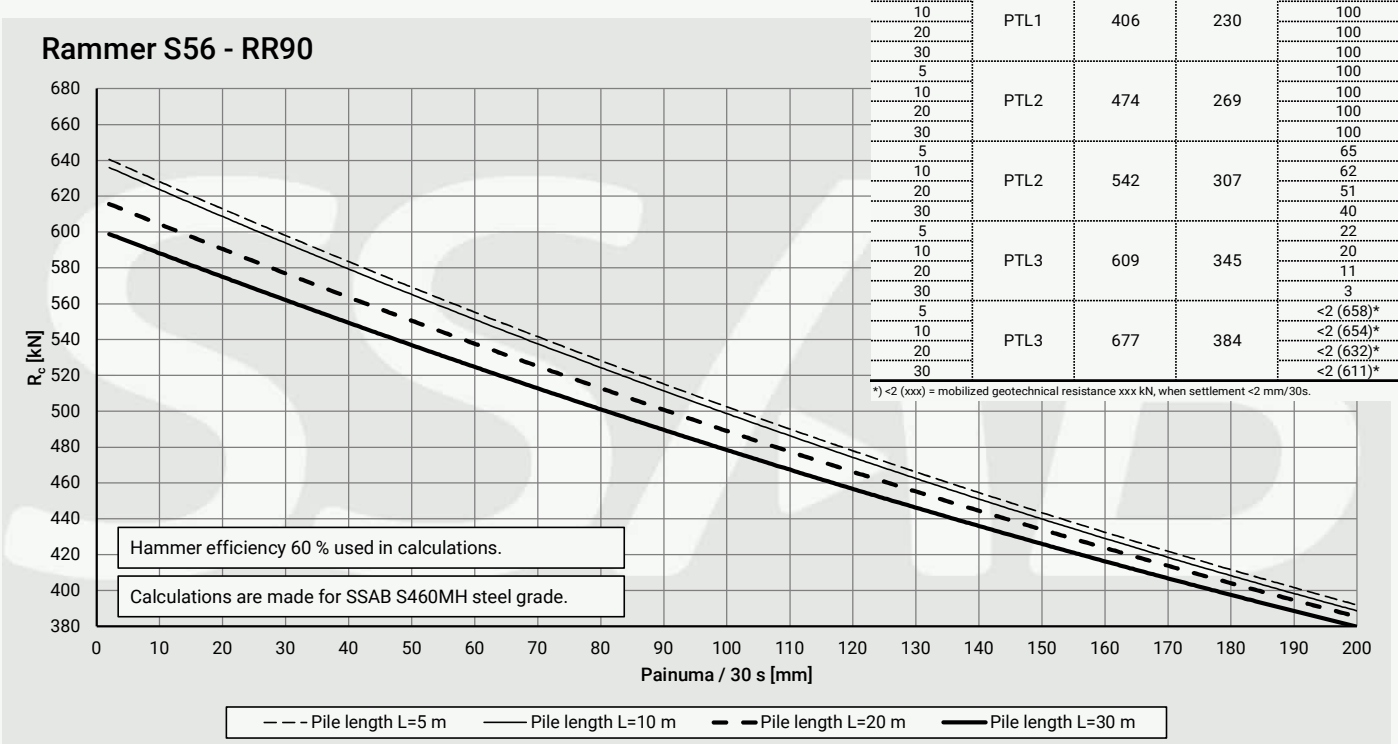
Rammer S56

Piston		
Piston weight [kg]	m_r	73.8
Diameter of the piston [mm]	D_r	119.5
Length of the piston [mm]	L_r	840
Theoretical impact energy [J]	E_{rated}	3500
Efficiency of the piston [%]	HE	80
Equivalent drop height [m]	H_{ekv}	4.83
Theoretical impact rate [blows/min]	BPM	350-500
Actual impact rate vrs theoretical [%]	η	80
Measured / in analysis used impact rate [blows/min]	BPM_m	400
Impact tool		
Diameter of the tool [mm]	D_t	130
Height of the tool [mm]	L_t	700
Tool weight [kg]	m_t	70

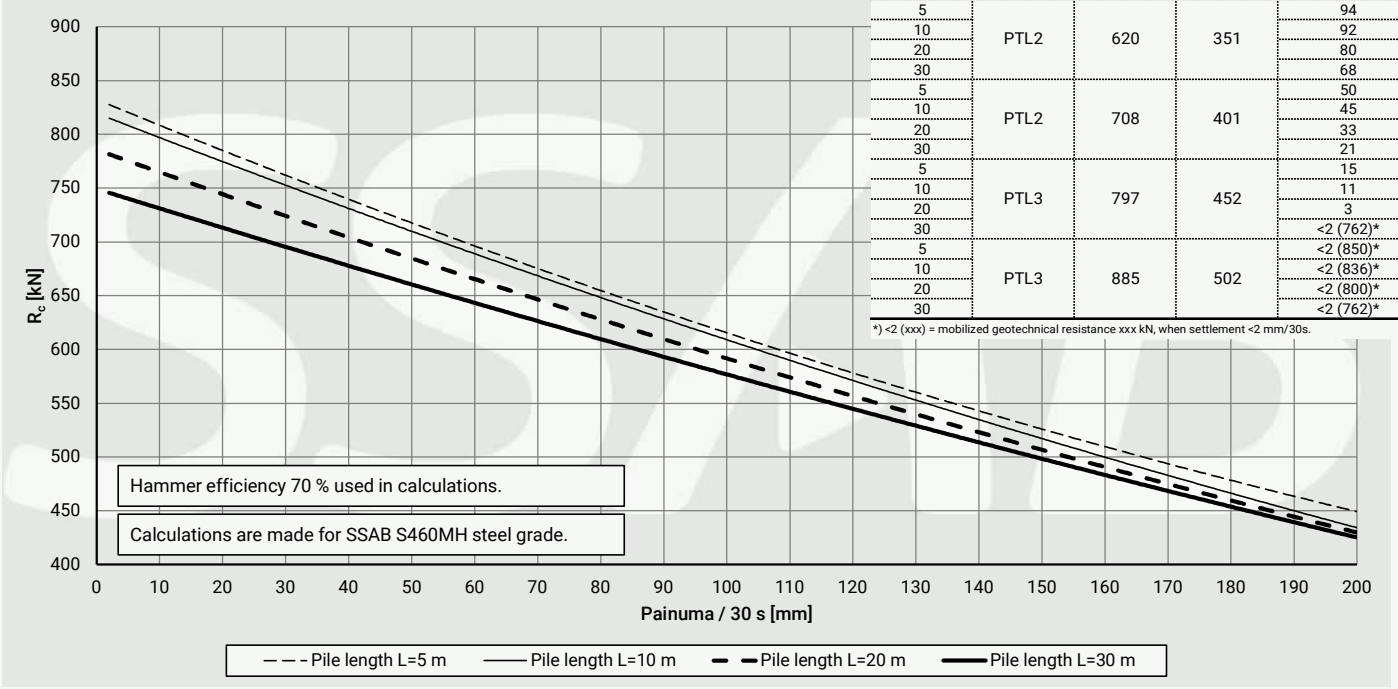
Hammer efficiency 60 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	406	230	100
10				100
20				100
30				100
5	PTL2	474	269	100
10				100
20				100
30				100
5	PTL2	542	307	65
10				62
20				51
30				40
5	PTL3	609	345	22
10				20
20				11
30				3
5	PTL3	677	384	<2 (658)*
10				<2 (654)*
20				<2 (632)*
30				<2 (611)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.



Rammer S56 - RR115/6.3

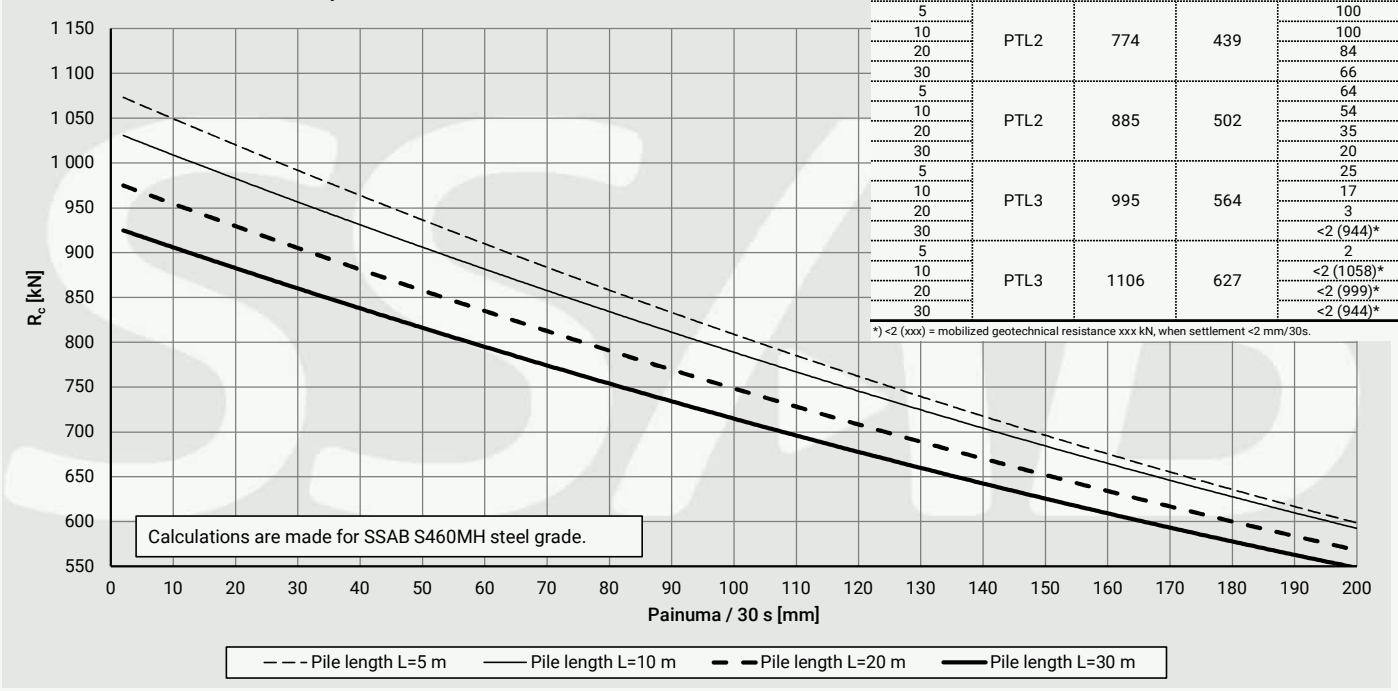


Hammer efficiency 70 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	531	301	100
10				100
20				100
30				100
5	PTL2	620	351	94
10				92
20				80
30				68
5	PTL2	708	401	50
10				45
20				33
30				21
5	PTL3	797	452	15
10				11
20				3
30				<2 (762)*
5	PTL3	885	502	<2 (850)*
10				<2 (836)*
20				<2 (800)*
30				<2 (762)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Rammer S56 - RR115/8

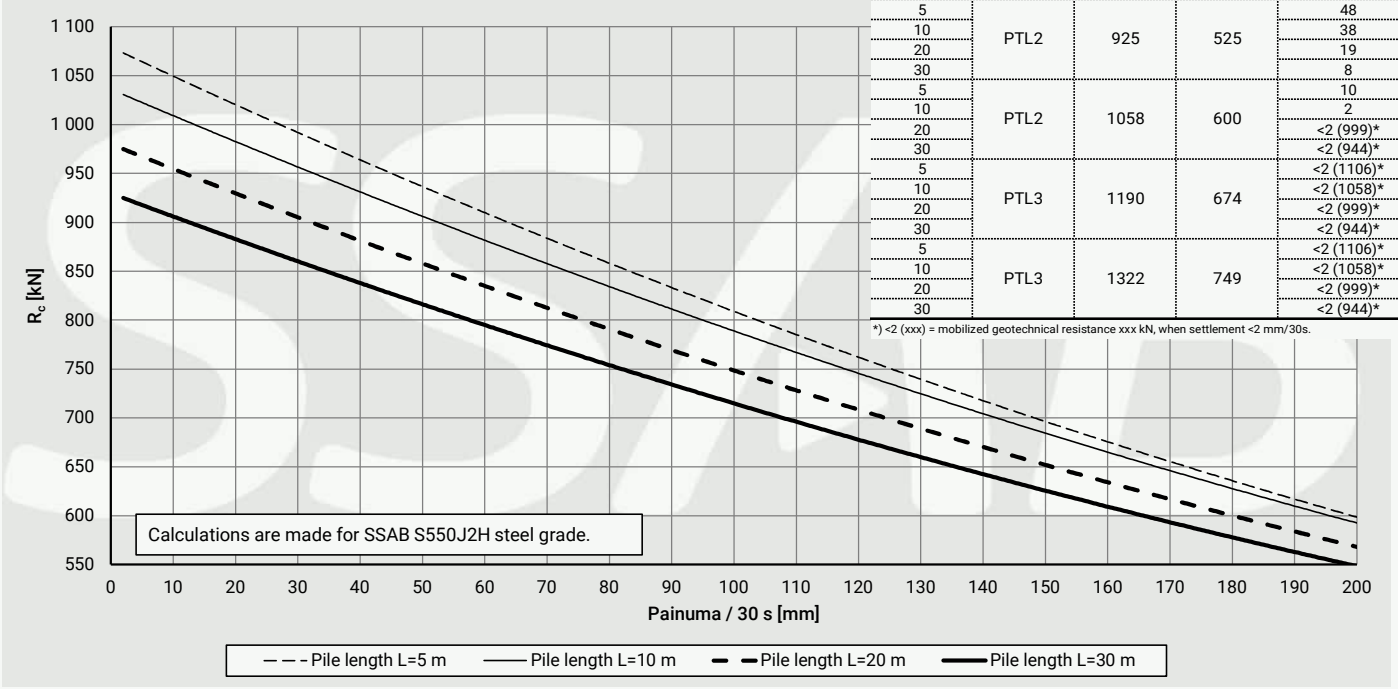


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	664	376	100
10				100
20				100
30				100
5	PTL2	774	439	100
10				100
20				84
30				66
5	PTL2	885	502	64
10				54
20				35
30				20
5	PTL3	995	564	25
10				17
20				3
30				<2 (944)*
5	PTL3	1106	627	2
10				<2 (1058)*
20				<2 (999)*
30				<2 (944)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Rammer S56 - RRs115/8

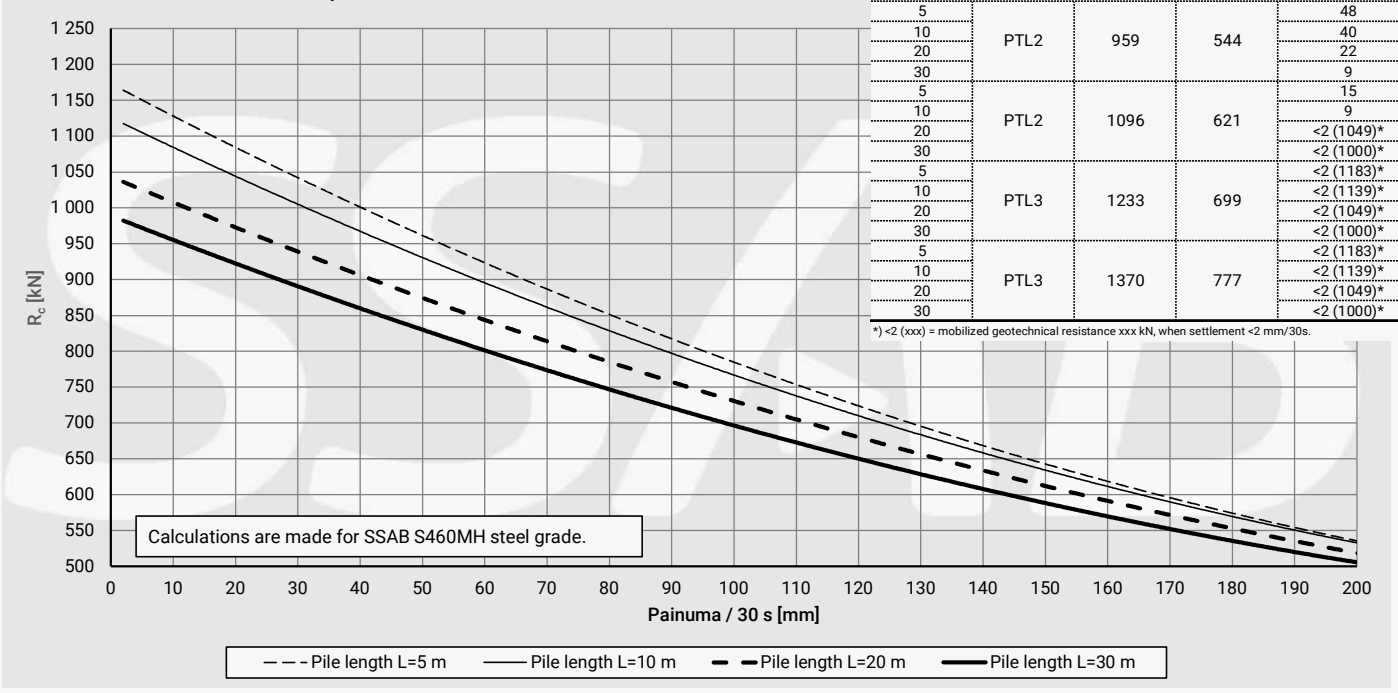


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	793	450	100
10				96
20				74
30				56
5	PTL2	925	525	48
10				38
20				19
30				8
5	PTL2	1058	600	10
10				2
20				<2 (999)*
30				<2 (944)*
5	PTL3	1190	674	<2 (1106)*
10				<2 (1058)*
20				<2 (999)*
30				<2 (944)*
5	PTL3	1322	749	<2 (1106)*
10				<2 (1058)*
20				<2 (999)*
30				<2 (944)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Rammer S56 - RR140/8

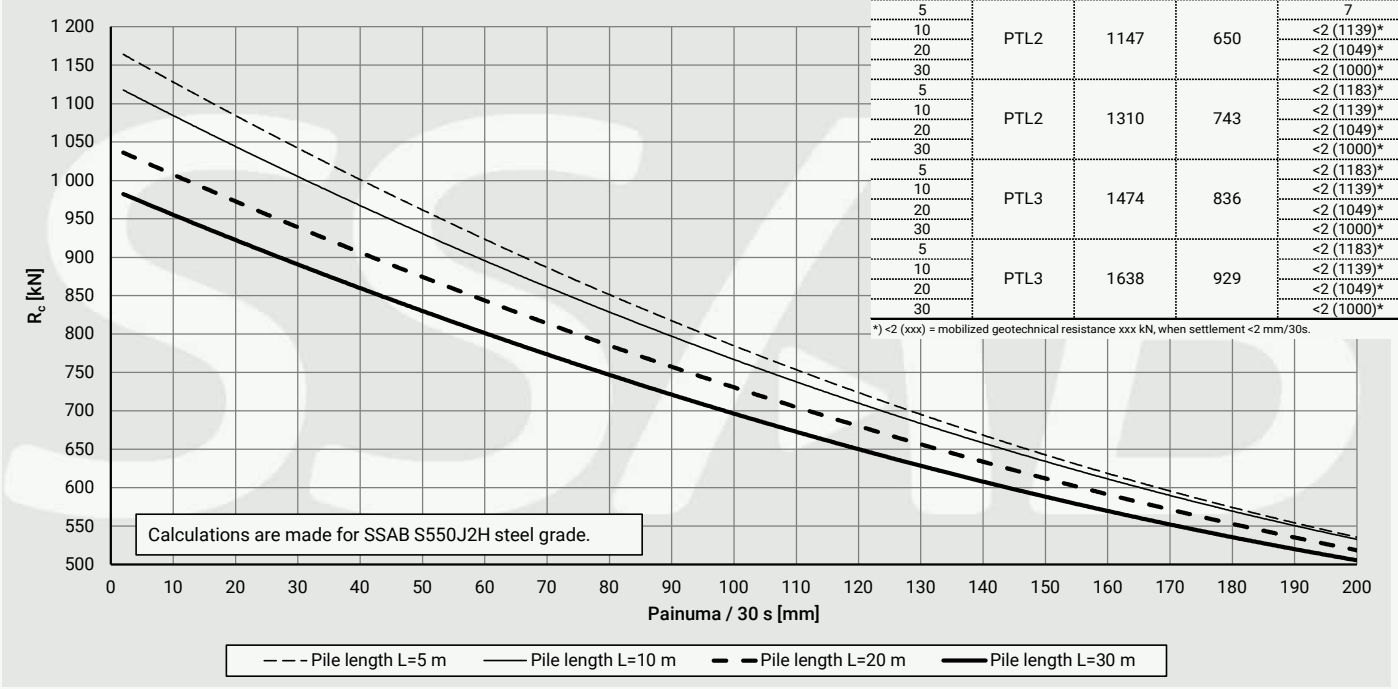


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	822	466	90
10				83
20				67
30				51
5	PTL2	959	544	48
10				40
20				22
30				9
5	PTL2	1096	621	15
10				9
20				<2 (1049)*
30				<2 (1000)*
5	PTL3	1233	699	<2 (1183)*
10				<2 (1139)*
20				<2 (1049)*
30				<2 (1000)*
5	PTL3	1370	777	<2 (1183)*
10				<2 (1139)*
20				<2 (1049)*
30				<2 (1000)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Rammer S56 - RRs140/8

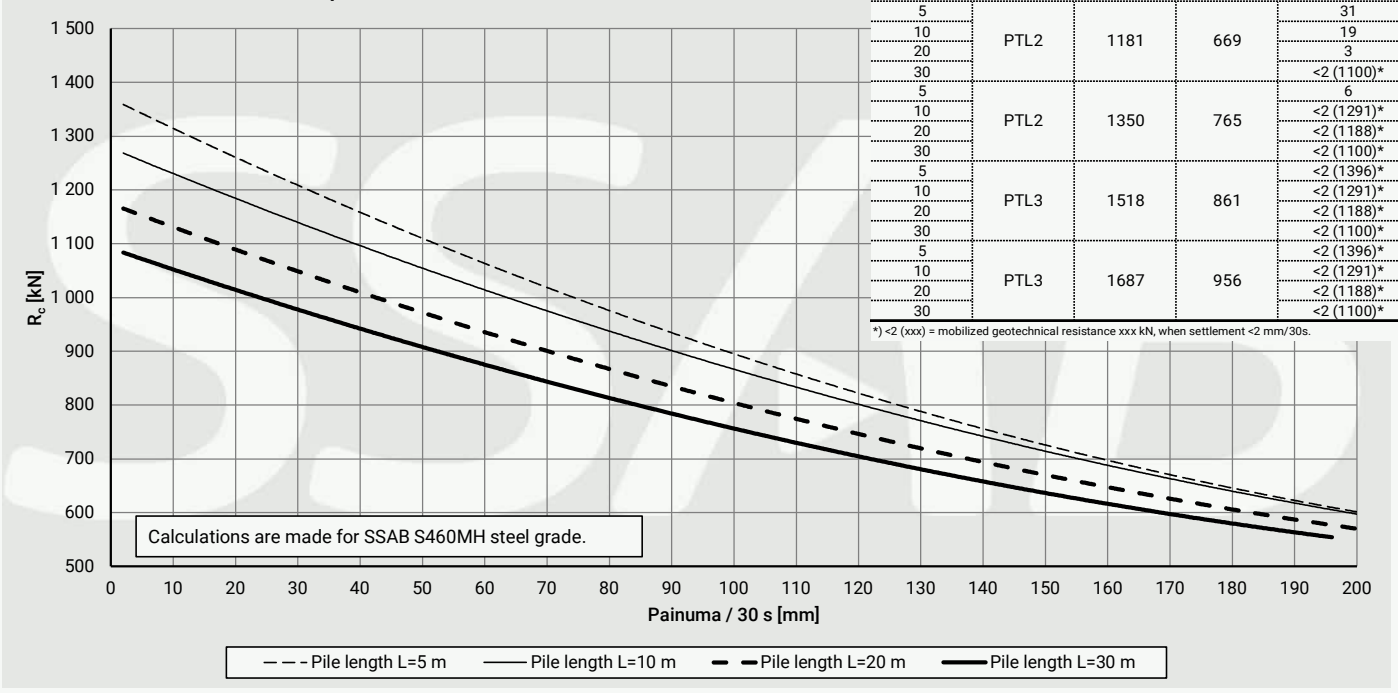


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	983	557	41
10				33
20				16
30				5
5	PTL2	1147	650	7
10				<2 (1139)*
20				<2 (1049)*
30				<2 (1000)*
5	PTL2	1310	743	<2 (1183)*
10				<2 (1139)*
20				<2 (1049)*
30				<2 (1000)*
5	PTL3	1474	836	<2 (1183)*
10				<2 (1139)*
20				<2 (1049)*
30				<2 (1000)*
5	PTL3	1638	929	<2 (1183)*
10				<2 (1139)*
20				<2 (1049)*
30				<2 (1000)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Rammer S56 - RR140/10

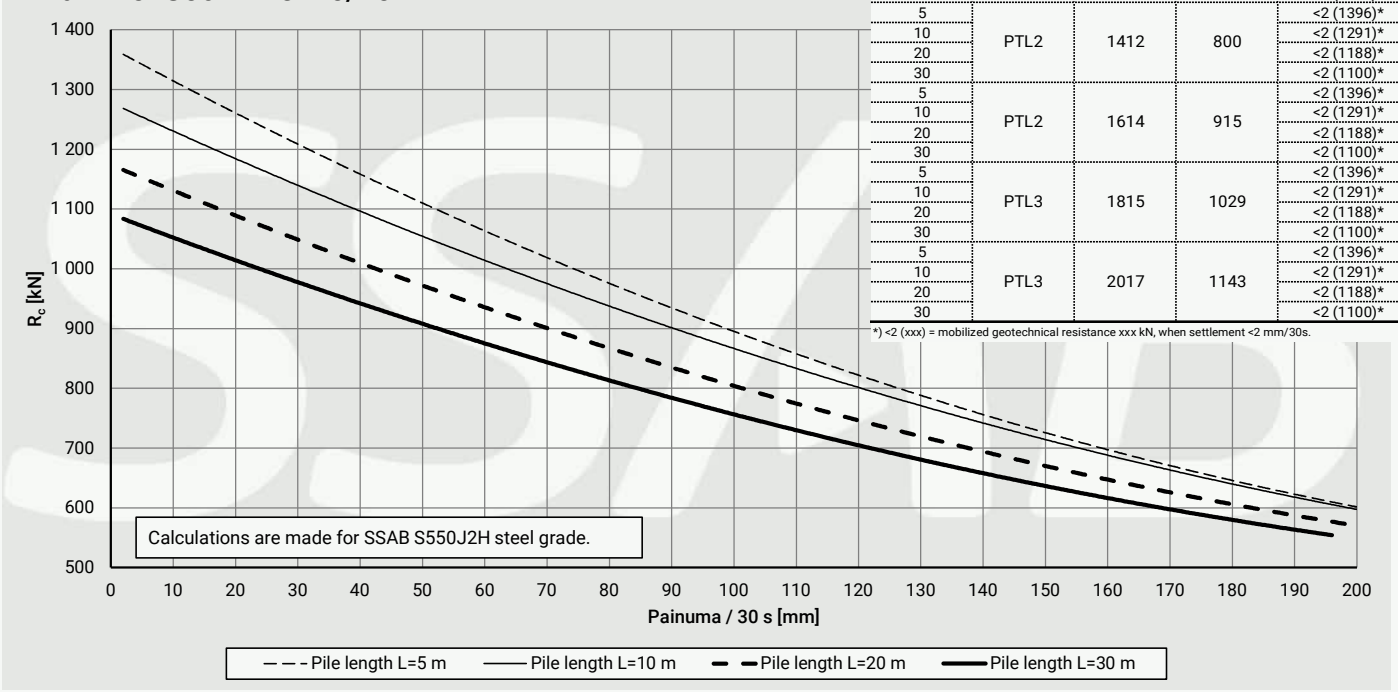


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1012	574	71
10				57
20				35
30				19
5	PTL2	1181	669	31
10				19
20				3
30				<2 (1100)*
5	PTL2	1350	765	6
10				<2 (1291)*
20				<2 (1188)*
30				<2 (1100)*
5	PTL3	1518	861	<2 (1396)*
10				<2 (1291)*
20				<2 (1188)*
30				<2 (1100)*
5	PTL3	1687	956	<2 (1396)*
10				<2 (1291)*
20				<2 (1188)*
30				<2 (1100)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Rammer S56 - RRs140/10

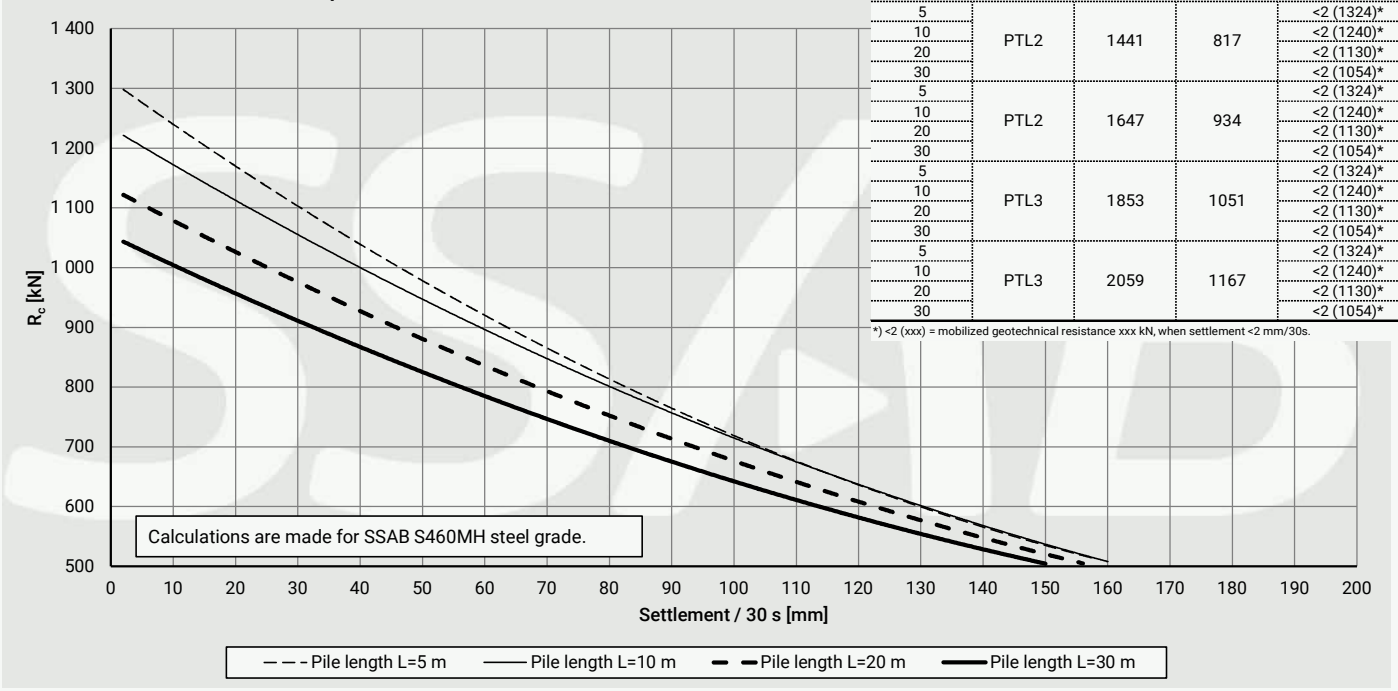


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1210	686	26
10				14
20				<2 (1188)*
30				<2 (1100)*
5	PTL2	1412	800	<2 (1396)*
10				<2 (1291)*
20				<2 (1188)*
30				<2 (1100)*
5	PTL2	1614	915	<2 (1396)*
10				<2 (1291)*
20				<2 (1188)*
30				<2 (1100)*
5	PTL3	1815	1029	<2 (1396)*
10				<2 (1291)*
20				<2 (1188)*
30				<2 (1100)*
5	PTL3	2017	1143	<2 (1396)*
10				<2 (1291)*
20				<2 (1188)*
30				<2 (1100)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Rammer S56 - RR170/10

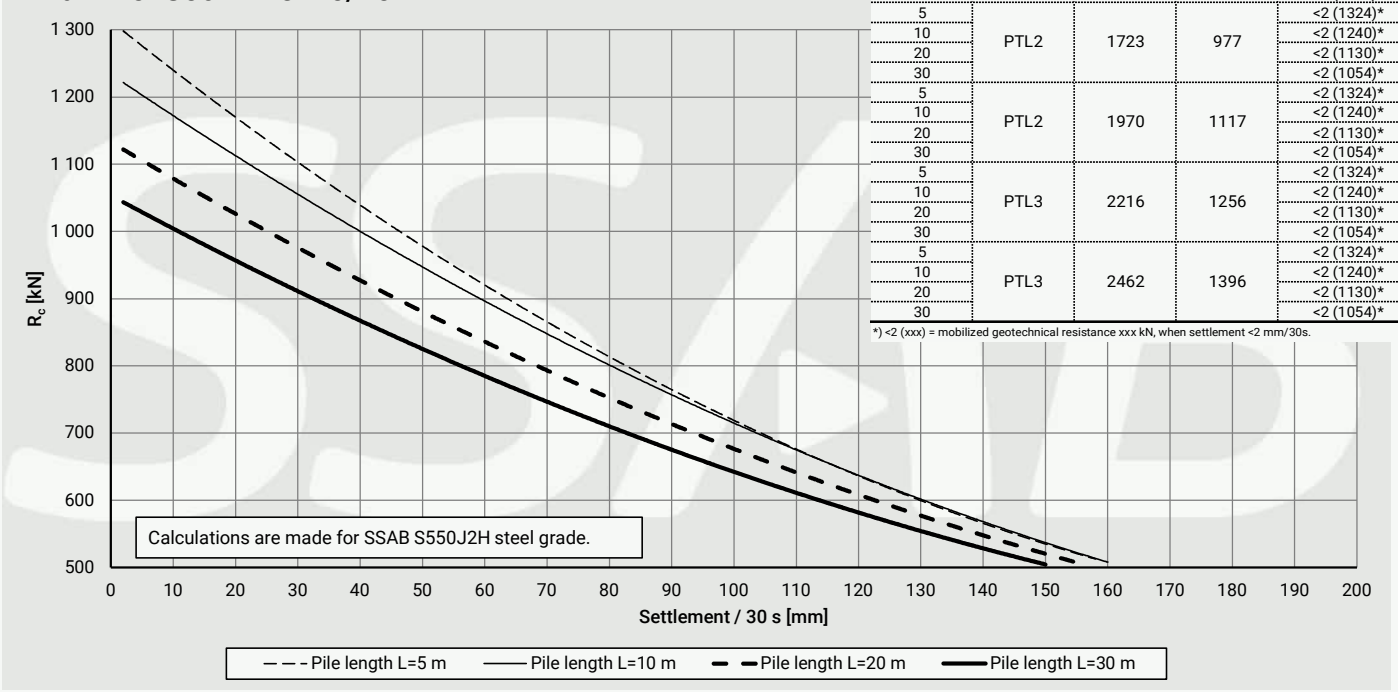


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1235	700	10
10				2
20				<2 (1130)*
30				<2 (1054)*
5	PTL2	1441	817	<2 (1324)*
10				<2 (1240)*
20				<2 (1130)*
30				<2 (1054)*
5	PTL2	1647	934	<2 (1324)*
10				<2 (1240)*
20				<2 (1130)*
30				<2 (1054)*
5	PTL3	1853	1051	<2 (1324)*
10				<2 (1240)*
20				<2 (1130)*
30				<2 (1054)*
5	PTL3	2059	1167	<2 (1324)*
10				<2 (1240)*
20				<2 (1130)*
30				<2 (1054)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Rammer S56 - RRs170/10

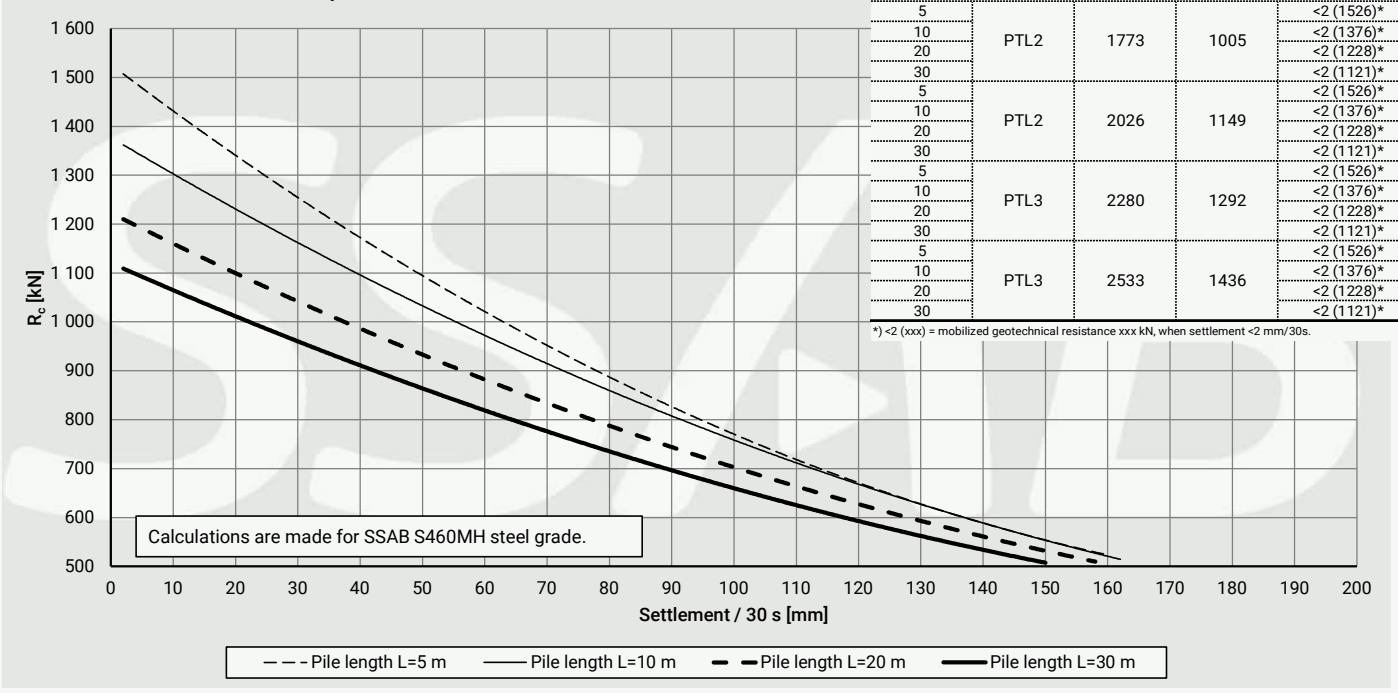


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1477	837	<2 (1324)*
10				<2 (1240)*
20				<2 (1130)*
30				<2 (1054)*
5	PTL2	1723	977	<2 (1324)*
10				<2 (1240)*
20				<2 (1130)*
30				<2 (1054)*
5	PTL2	1970	1117	<2 (1324)*
10				<2 (1240)*
20				<2 (1130)*
30				<2 (1054)*
5	PTL3	2216	1256	<2 (1324)*
10				<2 (1240)*
20				<2 (1130)*
30				<2 (1054)*
5	PTL3	2462	1396	<2 (1324)*
10				<2 (1240)*
20				<2 (1130)*
30				<2 (1054)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Rammer S56 - RR170/12.5



Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1520	862	2
10				<2 (1376)*
20				<2 (1228)*
30				<2 (1121)*
5	PTL2	1773	1005	<2 (1526)*
10				<2 (1376)*
20				<2 (1228)*
30				<2 (1121)*
5	PTL2	2026	1149	<2 (1526)*
10				<2 (1376)*
20				<2 (1228)*
30				<2 (1121)*
5	PTL3	2280	1292	<2 (1526)*
10				<2 (1376)*
20				<2 (1228)*
30				<2 (1121)*
5	PTL3	2533	1436	<2 (1526)*
10				<2 (1376)*
20				<2 (1228)*
30				<2 (1121)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

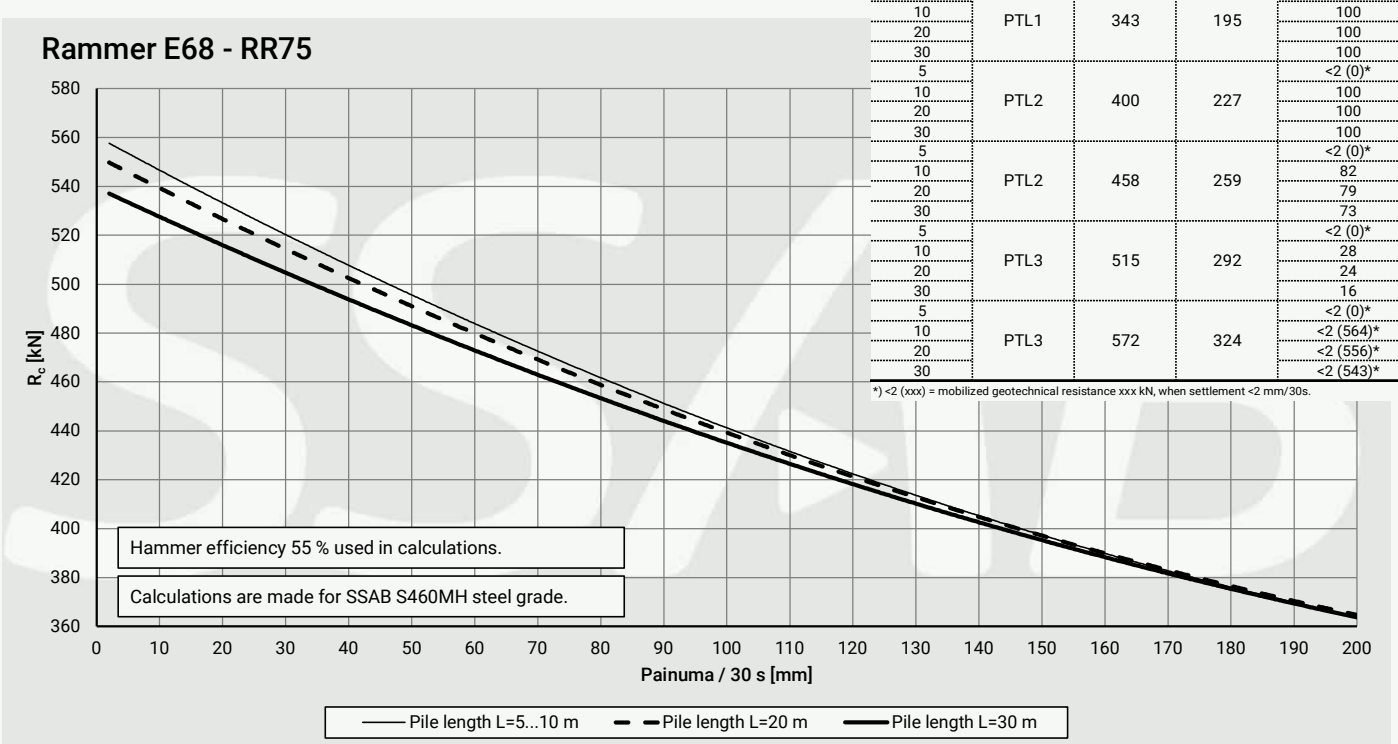
Rammer E68

Piston		
Piston weight [kg]	m_r	79
Diameter of the piston [mm]	D_r	130
Length of the piston [mm]	L_r	760
Theoretical impact energy [J]	E_{rated}	4000
Efficiency of the piston [%]	HE	80
Equivalent drop height [m]	H_{ekv}	5.17
Theoretical impact rate [blows/min]	BPM	330-580
Actual impact rate vrs theoretical [%]	η	70
Measured / in analysis used impact rate [blows/min]	BPM_m	400
Impact tool		
Diameter of the tool [mm]	D_t	130
Height of the tool [mm]	L_t	900
Tool weight [kg]	m_t	90

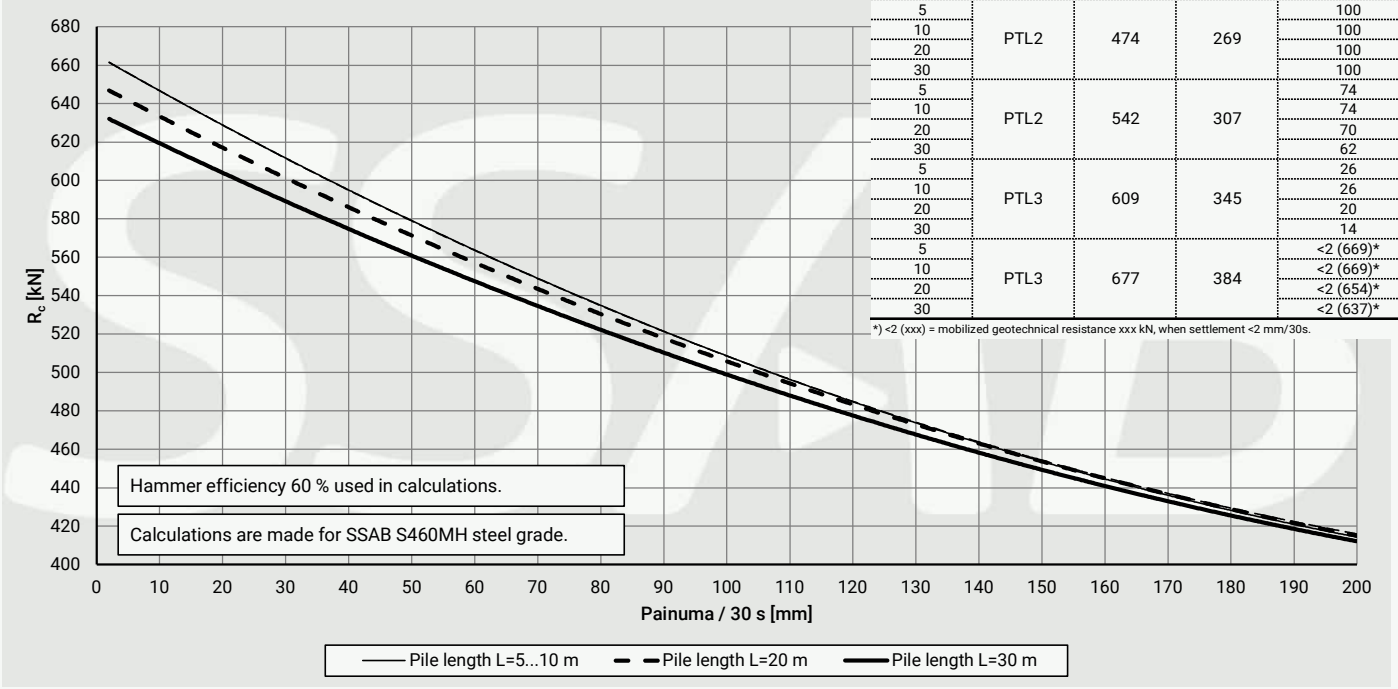
Hammer efficiency 55 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	343	195	<2 (0)*
10				100
20				100
30				100
5	PTL2	400	227	<2 (0)*
10				100
20				100
30				100
5	PTL2	458	259	<2 (0)*
10				82
20				79
30				73
5	PTL3	515	292	<2 (0)*
10				28
20				24
30				16
5	PTL3	572	324	<2 (0)*
10				<2 (564)*
20				<2 (556)*
30				<2 (543)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.



Rammer E68 - RR90

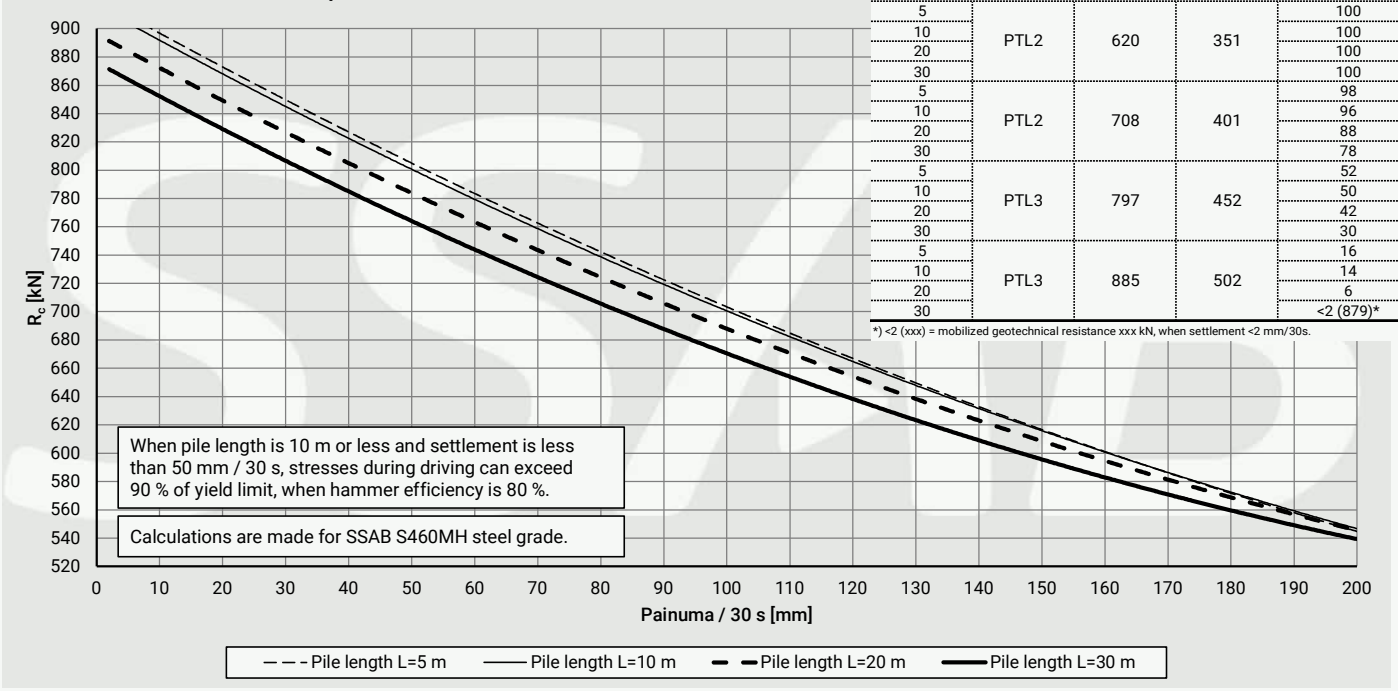


Hammer efficiency 60 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	406	230	100
10				100
20				100
30				100
5	PTL2	474	269	100
10				100
20				100
30				100
5	PTL2	542	307	74
10				74
20				70
30				62
5	PTL3	609	345	26
10				26
20				20
30				14
5	PTL3	677	384	<2 (669)*
10				<2 (669)*
20				<2 (654)*
30				<2 (637)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Rammer E68 - RR115/6.3

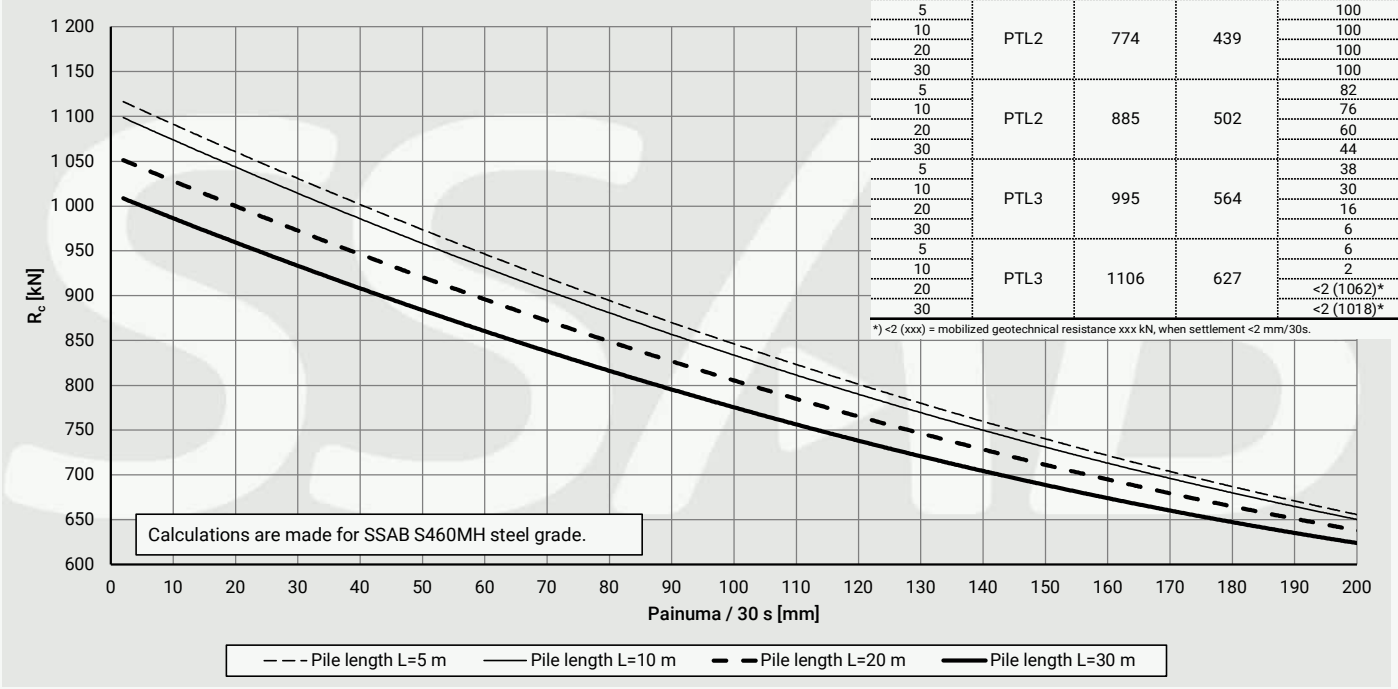


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	531	301	100
10				100
20				100
30				100
5	PTL2	620	351	100
10				100
20				100
30				100
5	PTL2	708	401	98
10				96
20				88
30				78
5	PTL3	797	452	52
10				50
20				42
30				30
5	PTL3	885	502	16
10				14
20				6
30				<2 (879)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Rammer E68 - RR115/8

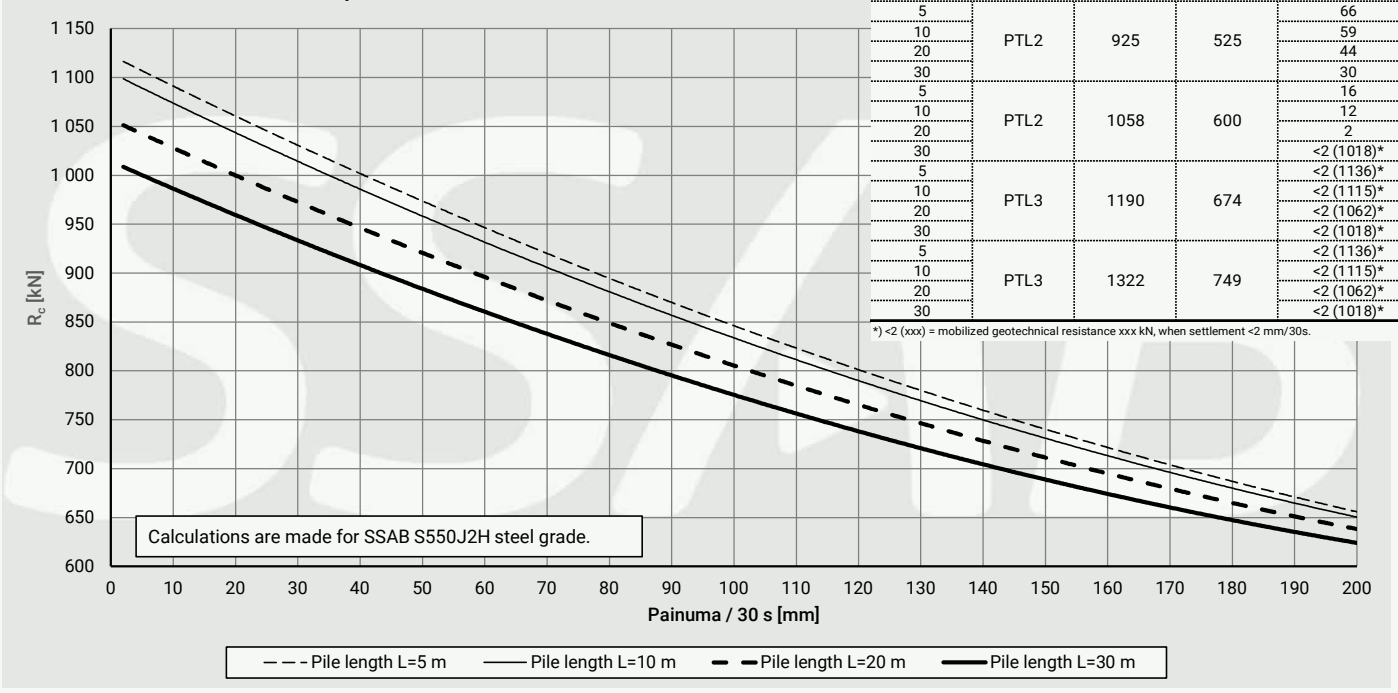


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	664	376	100
10				100
20				100
30				100
5	PTL2	774	439	100
10				100
20				100
30				100
5	PTL2	885	502	82
10				76
20				60
30				44
5	PTL3	995	564	38
10				30
20				16
30				6
5	PTL3	1106	627	6
10				2
20				<2 (1062)*
30				<2 (1018)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Rammer E68 - RRs115/8

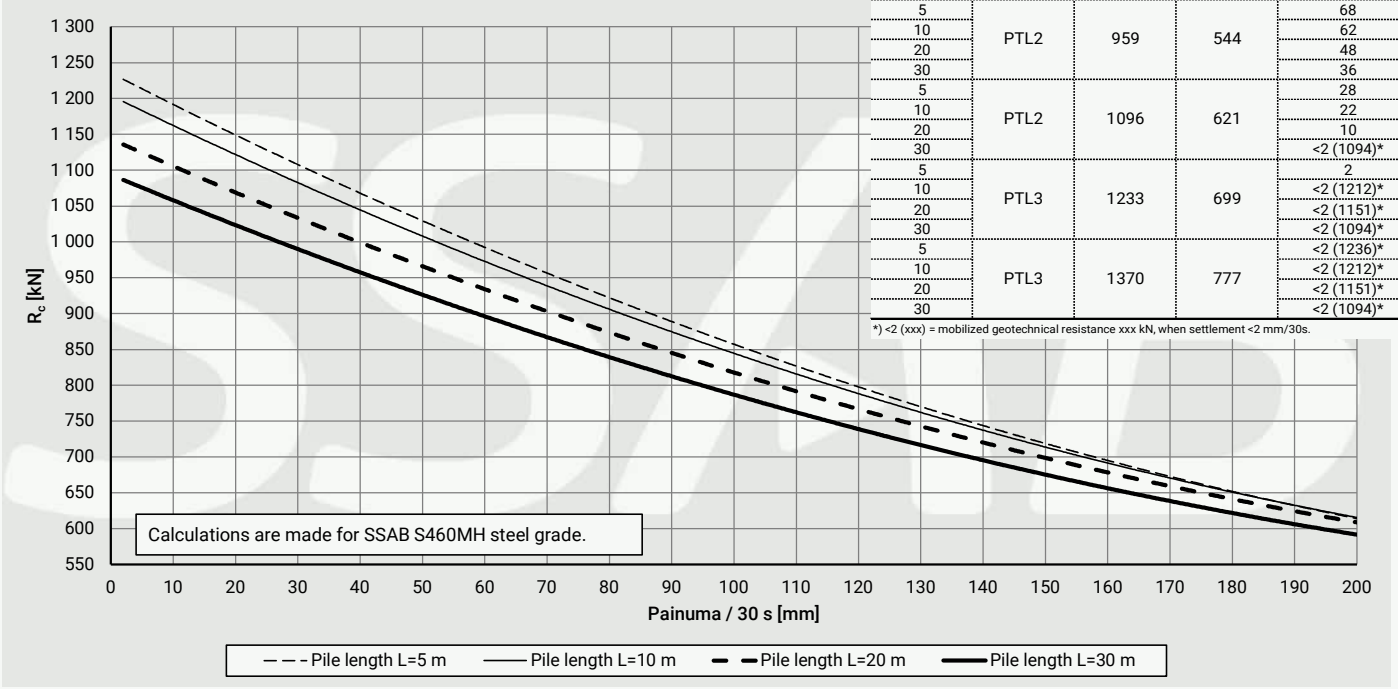


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	793	450	100
10				100
20				100
30				92
5	PTL2	925	525	66
10				59
20				44
30				30
5	PTL2	1058	600	16
10				12
20				2
30				<2 (1018)*
5	PTL3	1190	674	<2 (1136)*
10				<2 (1115)*
20				<2 (1062)*
30				<2 (1018)*
5	PTL3	1322	749	<2 (1136)*
10				<2 (1115)*
20				<2 (1062)*
30				<2 (1018)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Rammer E68 - RR140/8

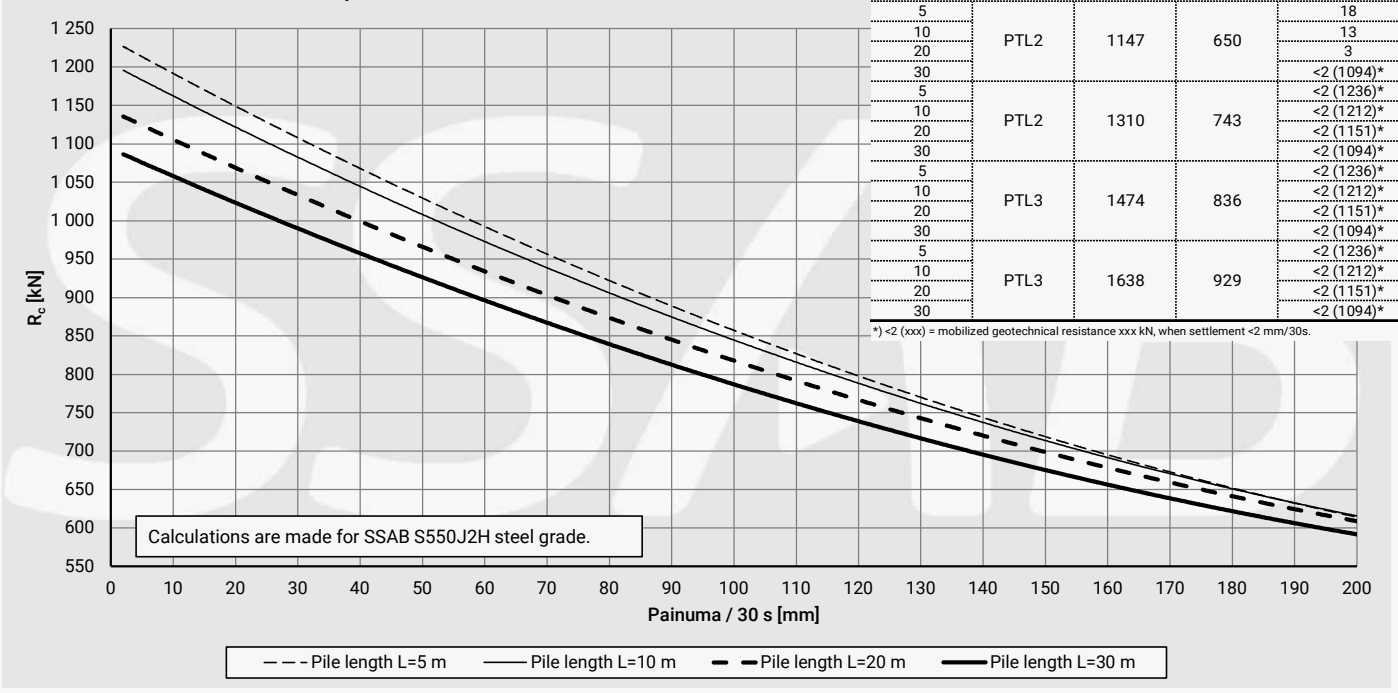


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	822	466	100
10				100
20				100
30				86
5	PTL2	959	544	68
10				62
20				48
30				36
5	PTL2	1096	621	28
10				22
20				10
30				<2 (1094)*
5	PTL3	1233	699	2
10				<2 (1212)*
20				<2 (1151)*
30				<2 (1094)*
5	PTL3	1370	777	<2 (1236)*
10				<2 (1212)*
20				<2 (1151)*
30				<2 (1094)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Rammer E68 - RRs140/8

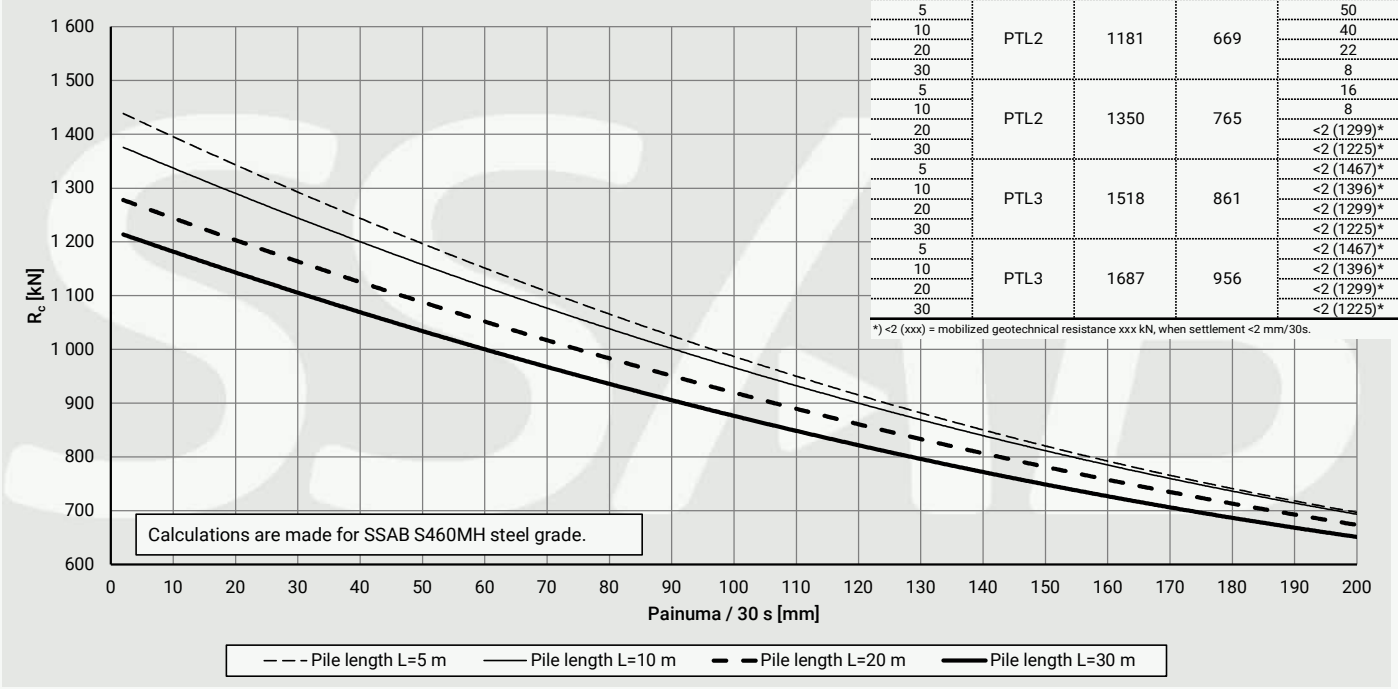


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	983	557	61
10				55
20				41
30				30
5	PTL2	1147	650	18
10				13
20				3
30				<2 (1094)*
5	PTL2	1310	743	<2 (1236)*
10				<2 (1212)*
20				<2 (1151)*
30				<2 (1094)*
5	PTL3	1474	836	<2 (1236)*
10				<2 (1212)*
20				<2 (1151)*
30				<2 (1094)*
5	PTL3	1638	929	<2 (1236)*
10				<2 (1212)*
20				<2 (1151)*
30				<2 (1094)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Rammer E68 - RR140/10

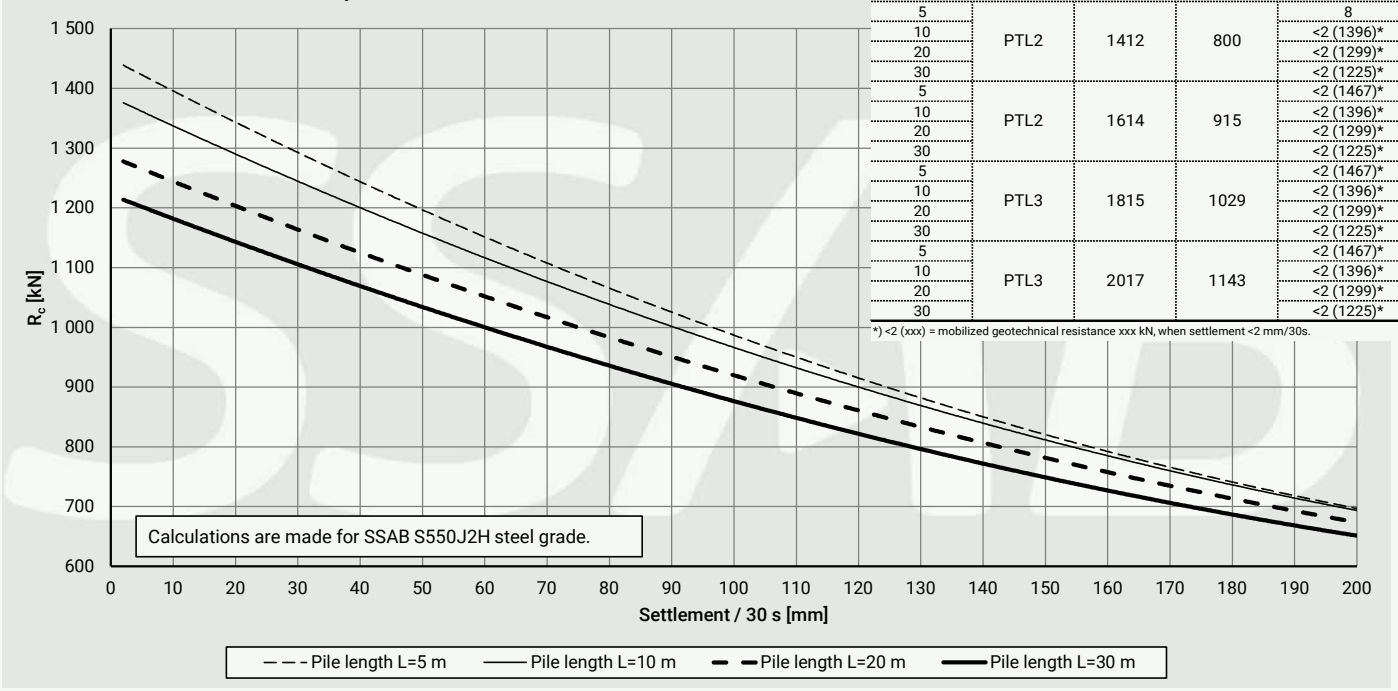


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1012	574	96
10				88
20				70
30				52
5	PTL2	1181	669	50
10				40
20				22
30				8
5	PTL2	1350	765	16
10				8
20				<2 (1299)*
30				<2 (1225)*
5	PTL3	1518	861	<2 (1467)*
10				<2 (1396)*
20				<2 (1299)*
30				<2 (1225)*
5	PTL3	1687	956	<2 (1467)*
10				<2 (1396)*
20				<2 (1299)*
30				<2 (1225)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Rammer E68 - RRs140/10

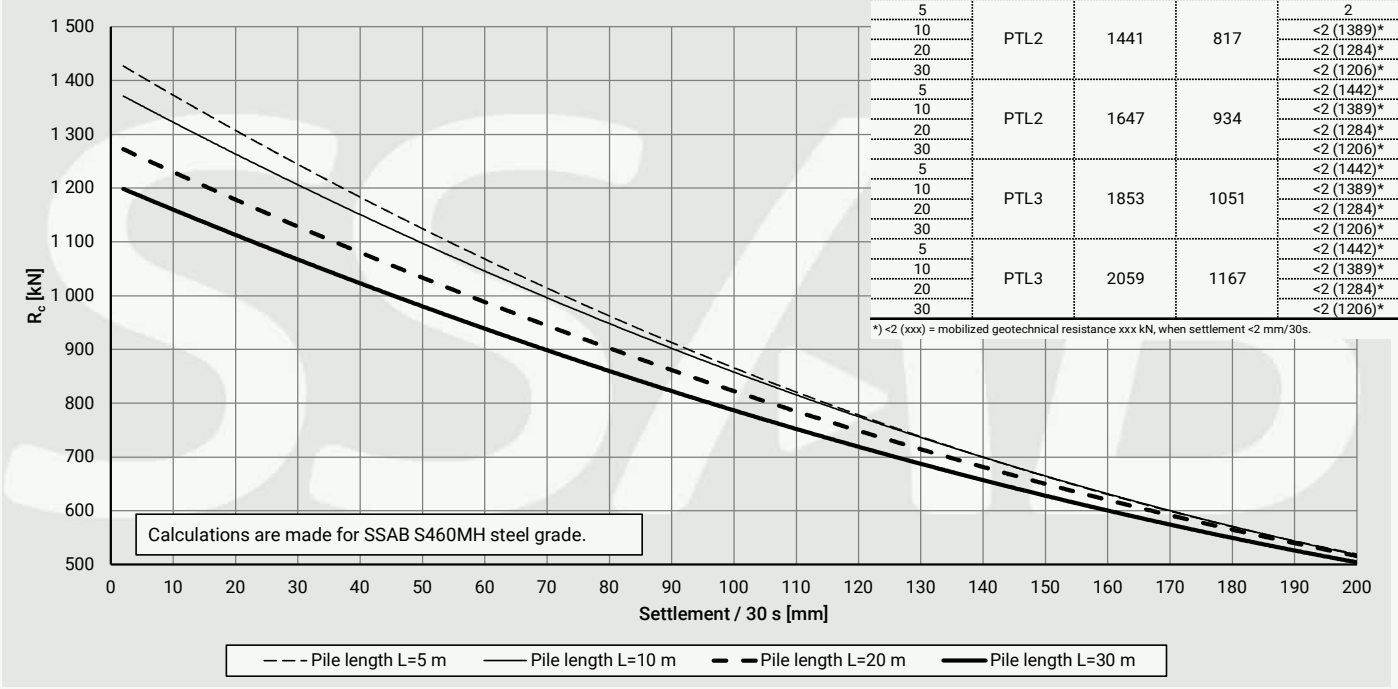


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1210	686	42
10				34
20				16
30				4
5	PTL2	1412	800	8
10				<2 (1396)*
20				<2 (1299)*
30				<2 (1225)*
5	PTL2	1614	915	<2 (1467)*
10				<2 (1396)*
20				<2 (1299)*
30				<2 (1225)*
5	PTL3	1815	1029	<2 (1467)*
10				<2 (1396)*
20				<2 (1299)*
30				<2 (1225)*
5	PTL3	2017	1143	<2 (1467)*
10				<2 (1396)*
20				<2 (1299)*
30				<2 (1225)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Rammer E68 - RR170/10

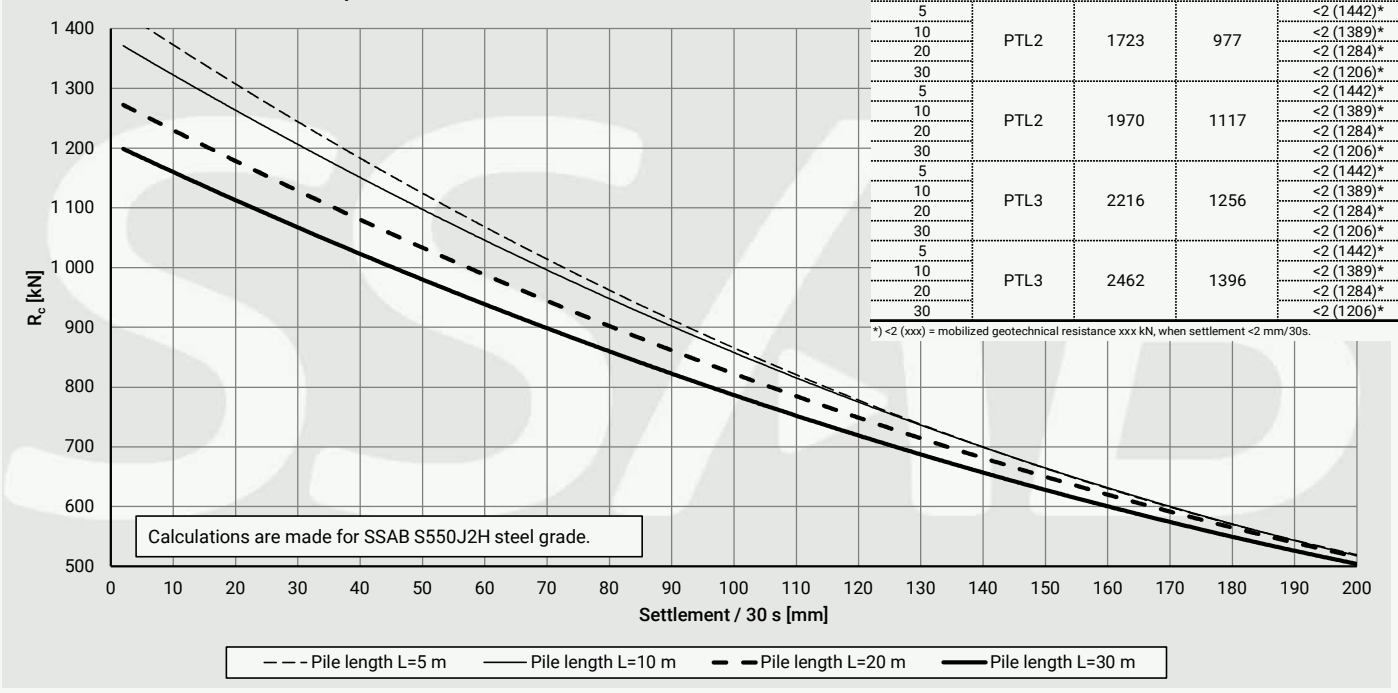


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1235	700	26
10				22
20				8
30				<2 (1206)*
5	PTL2	1441	817	2
10				<2 (1389)*
20				<2 (1284)*
30				<2 (1206)*
5	PTL2	1647	934	<2 (1442)*
10				<2 (1389)*
20				<2 (1284)*
30				<2 (1206)*
5	PTL3	1853	1051	<2 (1442)*
10				<2 (1389)*
20				<2 (1284)*
30				<2 (1206)*
5	PTL3	2059	1167	<2 (1442)*
10				<2 (1389)*
20				<2 (1284)*
30				<2 (1206)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Rammer E68 - RRs170/10



Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1477	837	<2 (1442)*
10				<2 (1389)*
20				<2 (1284)*
30				<2 (1206)*
5	PTL2	1723	977	<2 (1442)*
10				<2 (1389)*
20				<2 (1284)*
30				<2 (1206)*
5	PTL2	1970	1117	<2 (1442)*
10				<2 (1389)*
20				<2 (1284)*
30				<2 (1206)*
5	PTL3	2216	1256	<2 (1442)*
10				<2 (1389)*
20				<2 (1284)*
30				<2 (1206)*
5	PTL3	2462	1396	<2 (1442)*
10				<2 (1389)*
20				<2 (1284)*
30				<2 (1206)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Rammer G80

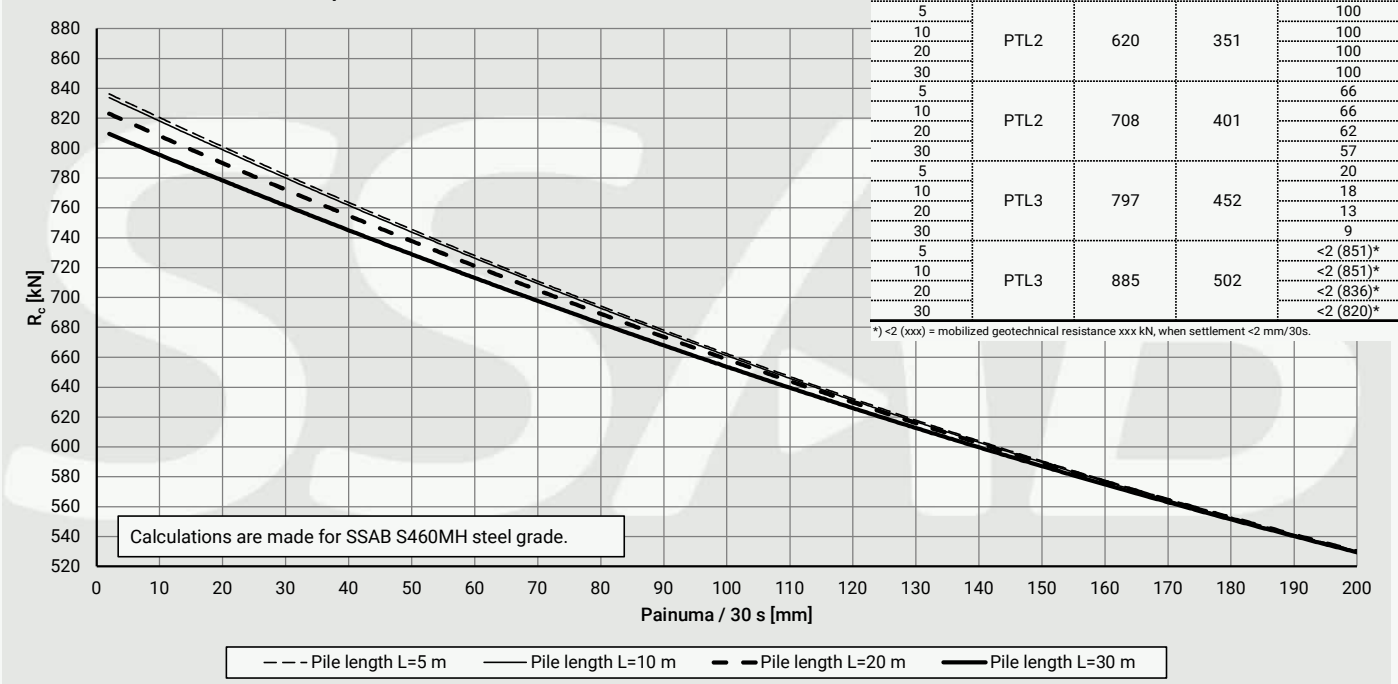
Piston		
Piston weight [kg]	m_r	105
Diameter of the piston [mm]	D_r	153
Length of the piston [mm]	L_r	978
Theoretical impact energy [J]	E_{rated}	4191
Efficiency of the piston [%]	HE	80
Equivalent drop height [m]	H_{ekv}	4.07
Theoretical impact rate [blows/min]	BPM	300-625
Actual impact rate vrs theoretical [%]	η	70
Measured / in analysis used impact rate [blows/min]	BPM_m	440
Impact tool		
Diameter of the tool [mm]	D_t	140
Height of the tool [mm]	L_t	1200
Tool weight [kg]	m_t	127

Hammer efficiency 80 %

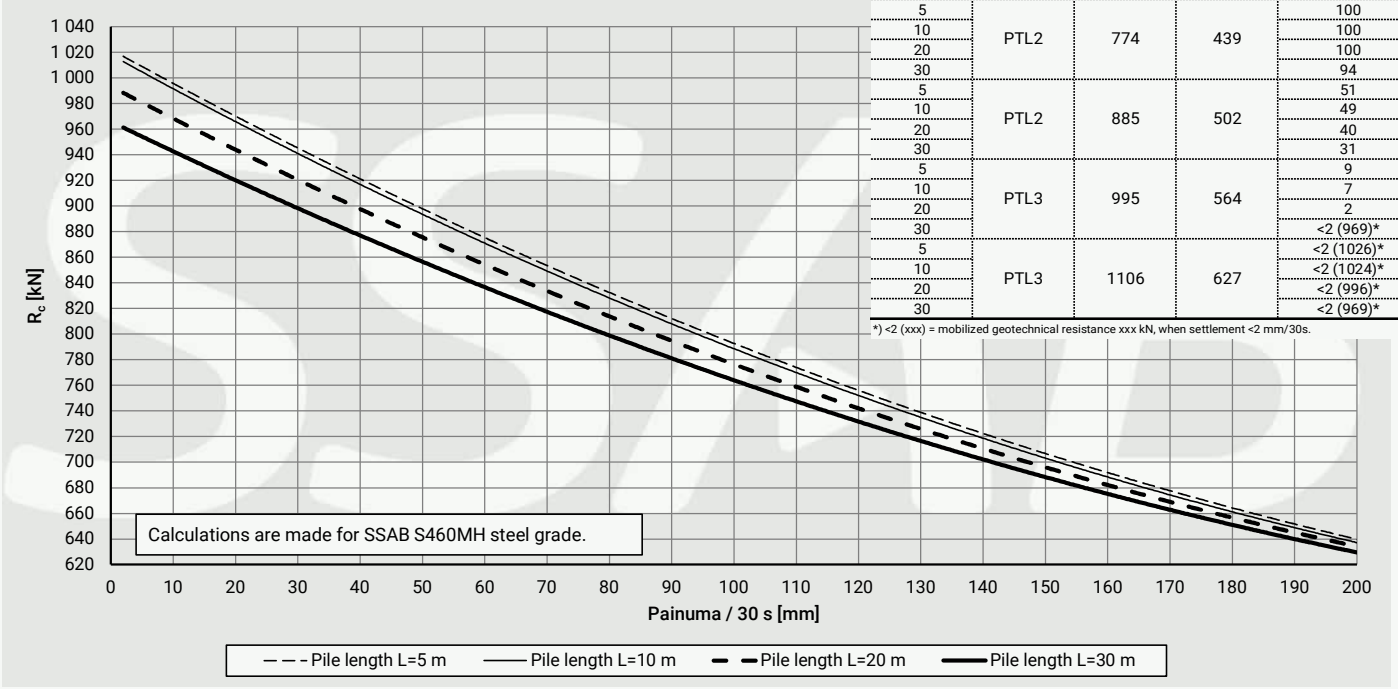
Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	531	301	100
10				100
20				100
30				100
5	PTL2	620	351	100
10				100
20				100
30				100
5	PTL2	708	401	66
10				66
20				62
30				57
5	PTL3	797	452	20
10				18
20				13
30				9
5	PTL3	885	502	<2 (851)*
10				<2 (851)*
20				<2 (836)*
30				<2 (820)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Rammer G80 - RR115/6.3



Rammer G80 - RR115/8

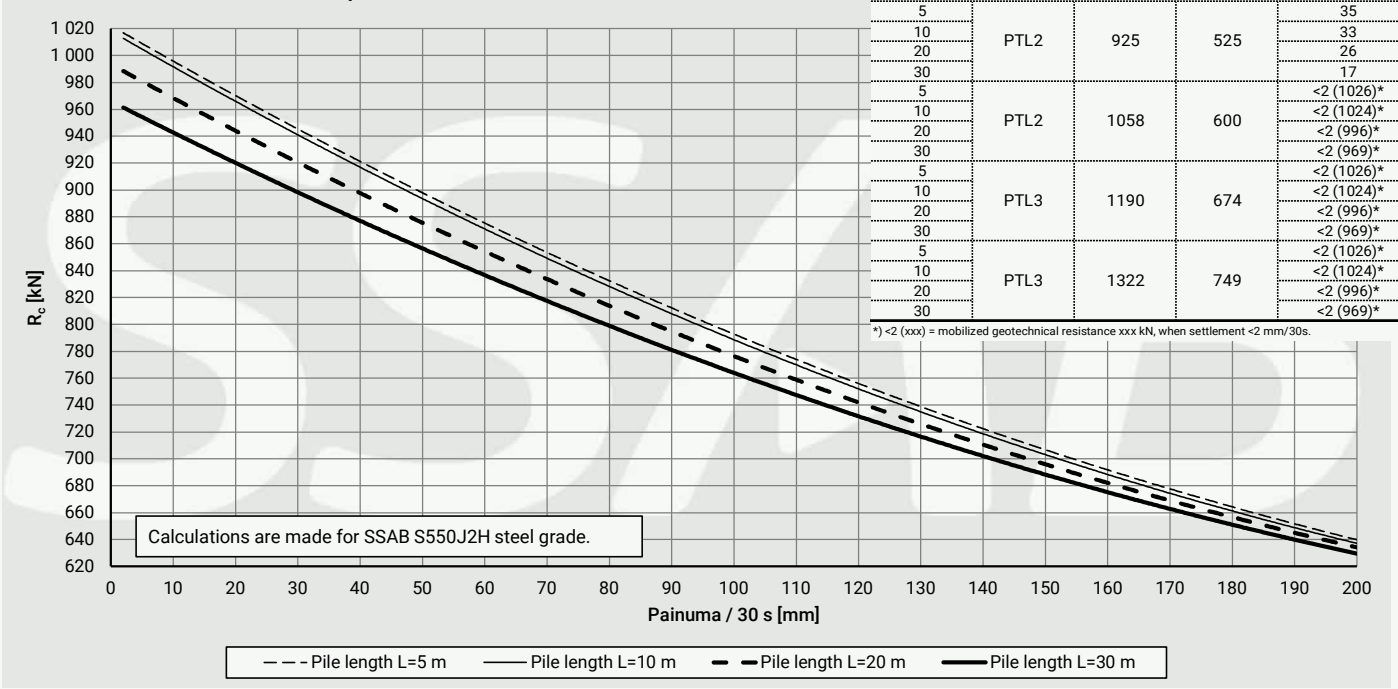


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	664	376	100
10				100
20				100
30				100
5	PTL2	774	439	100
10				100
20				100
30				94
5	PTL2	885	502	51
10				49
20				40
30				31
5	PTL3	995	564	9
10				7
20				2
30				<2 (969)*
5	PTL3	1106	627	<2 (1026)*
10				<2 (1024)*
20				<2 (996)*
30				<2 (969)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Rammer G80 - RRs115/8



Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	793	450	100
10				99
20				92
30				84
5	PTL2	925	525	35
10				33
20				26
30				17
5	PTL2	1058	600	<2 (1026)*
10				<2 (1024)*
20				<2 (996)*
30				<2 (969)*
5	PTL3	1190	674	<2 (1026)*
10				<2 (1024)*
20				<2 (996)*
30				<2 (969)*
5	PTL3	1322	749	<2 (1026)*
10				<2 (1024)*
20				<2 (996)*
30				<2 (969)*

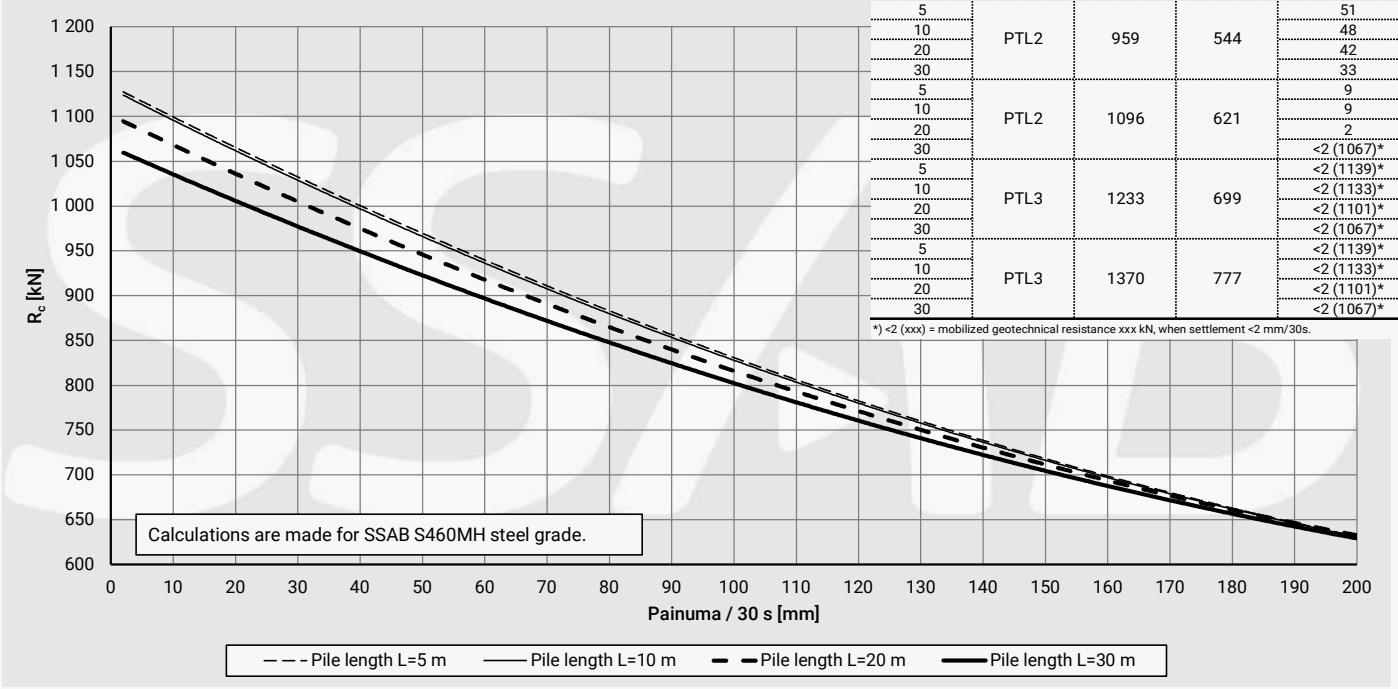
*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Rammer G80 - RR140/8

Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	822	466	100
10				100
20				99
30				92
5	PTL2	959	544	51
10				48
20				42
30				33
5	PTL2	1096	621	9
10				9
20				2
30				<2 (1067)*
5	PTL3	1233	699	<2 (1139)*
10				<2 (1133)*
20				<2 (1101)*
30				<2 (1067)*
5	PTL3	1370	777	<2 (1139)*
10				<2 (1133)*
20				<2 (1101)*
30				<2 (1067)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

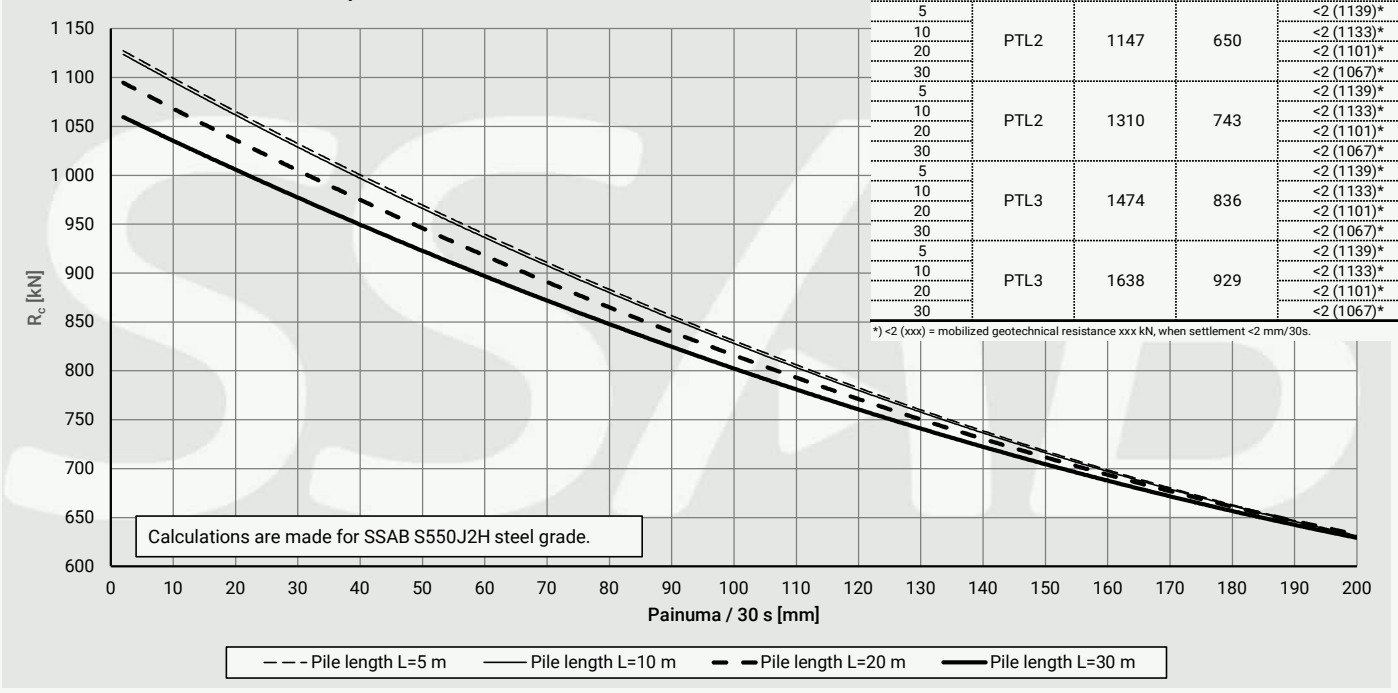


Rammer G80 - RRs140/8

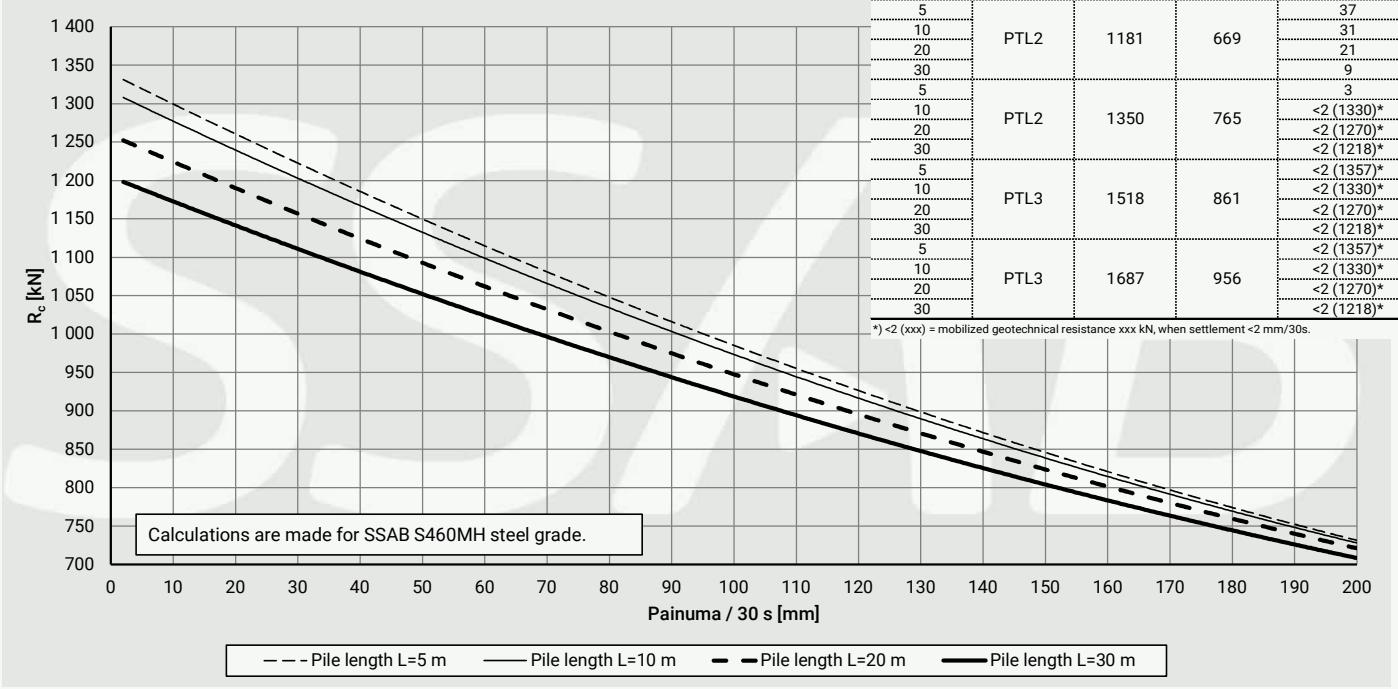
Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	983	557	43
10				42
20				35
30				26
5	PTL2	1147	650	<2 (1139)*
10				<2 (1133)*
20				<2 (1101)*
30				<2 (1067)*
5	PTL2	1310	743	<2 (1139)*
10				<2 (1133)*
20				<2 (1101)*
30				<2 (1067)*
5	PTL3	1474	836	<2 (1139)*
10				<2 (1133)*
20				<2 (1101)*
30				<2 (1067)*
5	PTL3	1638	929	<2 (1139)*
10				<2 (1133)*
20				<2 (1101)*
30				<2 (1067)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.



Rammer G80 - RR140/10

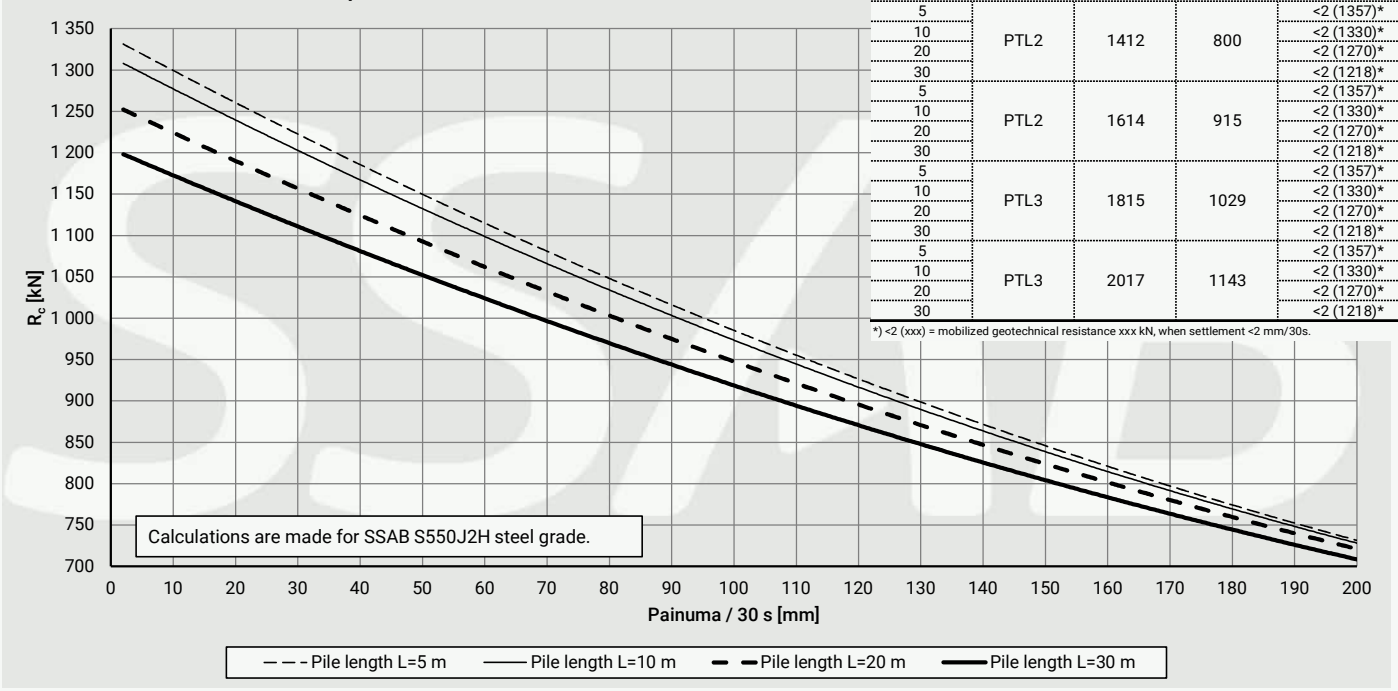


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1012	574	90
10				86
20				74
30				61
5	PTL2	1181	669	37
10				31
20				21
30				9
5	PTL2	1350	765	3
10				<2 (1330)*
20				<2 (1270)*
30				<2 (1218)*
5	PTL3	1518	861	<2 (1357)*
10				<2 (1330)*
20				<2 (1270)*
30				<2 (1218)*
5	PTL3	1687	956	<2 (1357)*
10				<2 (1330)*
20				<2 (1270)*
30				<2 (1218)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Rammer G80 - RRs140/10



Hammer efficiency 80 %

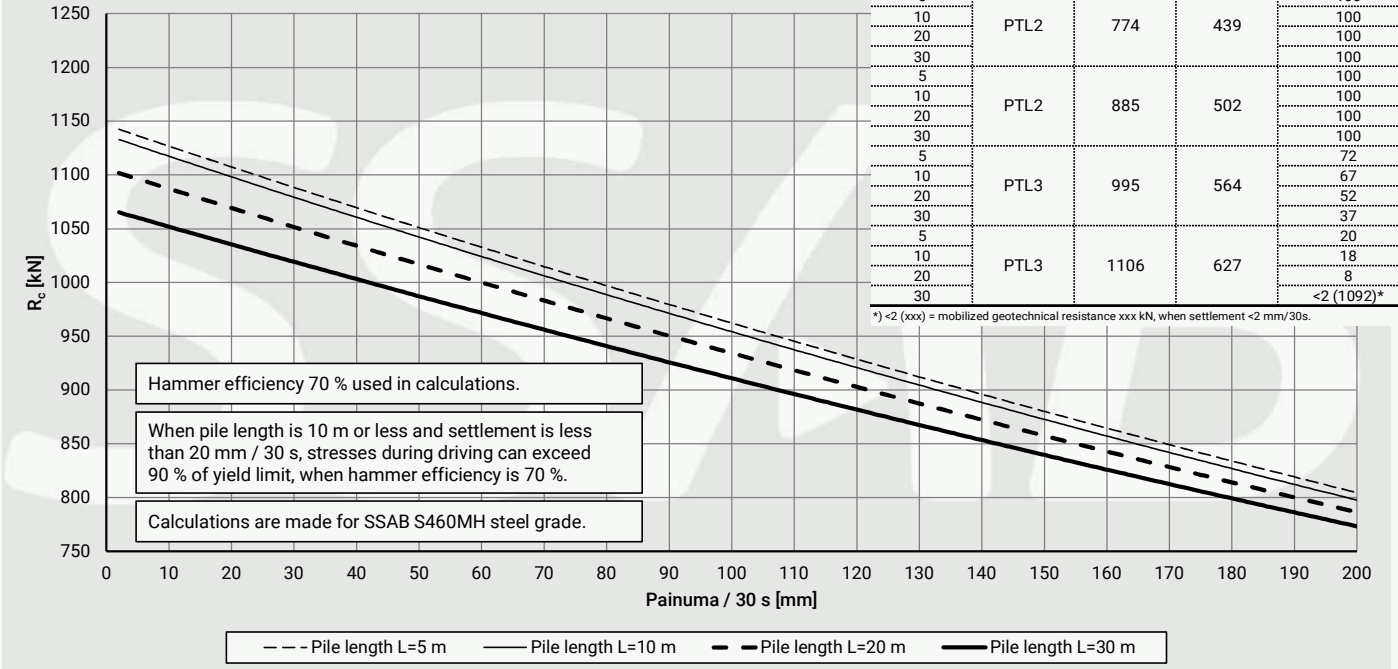
Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1210	686	28
10				23
20				14
30				4
5	PTL2	1412	800	<2 (1357)*
10				<2 (1330)*
20				<2 (1270)*
30				<2 (1218)*
5	PTL2	1614	915	<2 (1357)*
10				<2 (1330)*
20				<2 (1270)*
30				<2 (1218)*
5	PTL3	1815	1029	<2 (1357)*
10				<2 (1330)*
20				<2 (1270)*
30				<2 (1218)*
5	PTL3	2017	1143	<2 (1357)*
10				<2 (1330)*
20				<2 (1270)*
30				<2 (1218)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Rammer M18

Piston		
Piston weight [kg]	m_r	120
Diameter of the piston [mm]	D_r	140
Length of the piston [mm]	L_r	1050
Theoretical impact energy [J]	E_{rated}	5800
Efficiency of the piston [%]	HE	80
Equivalent drop height [m]	H_{ekv}	4.93
Theoretical impact rate [blows/min]	BPM	450-800
Actual impact rate vrs theoretical [%]	η	63
Measured / in analysis used impact rate [blows/min]	BPM_m	500
Impact tool		
Diameter of the tool [mm]	D_t	140
Height of the tool [mm]	L_t	1050
Tool weight [kg]	m_t	120

Rammer M18 - RR115/8

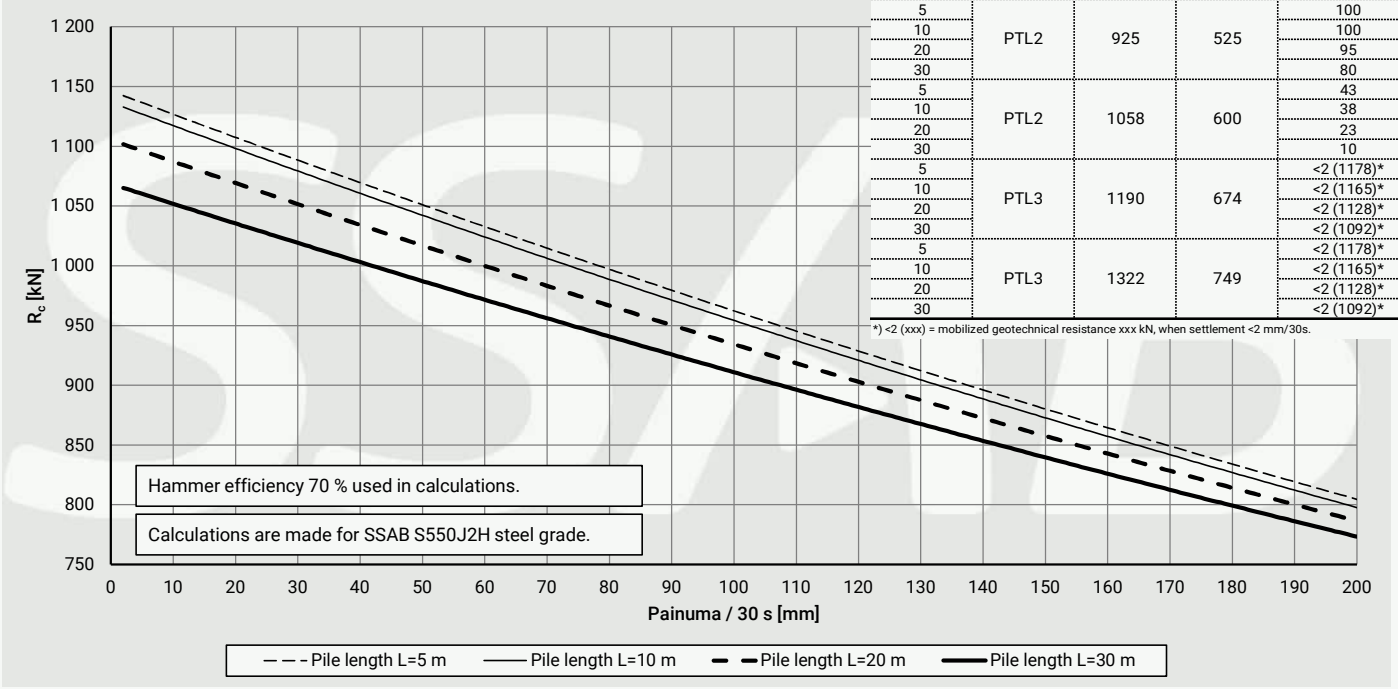


Hammer efficiency 70 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	664	376	100
10				100
20				100
30				100
5	PTL2	774	439	100
10				100
20				100
30				100
5	PTL2	885	502	100
10				100
20				100
30				100
5	PTL3	995	564	72
10				67
20				52
30				37
5	PTL3	1106	627	20
10				18
20				8
30				<2 (1092)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Rammer M18 - RRs115/8

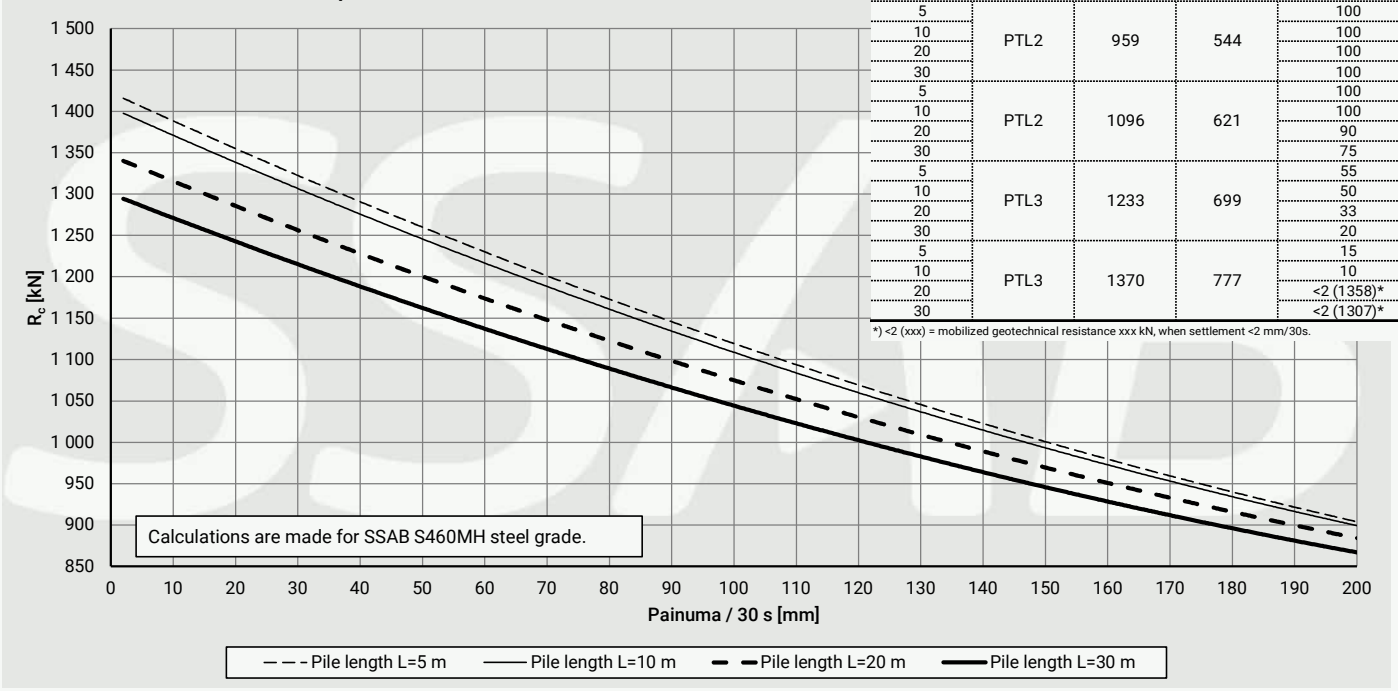


Hammer efficiency 70 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	793	450	100
10				100
20				100
30				100
5	PTL2	925	525	100
10				100
20				95
30				80
5	PTL2	1058	600	43
10				38
20				23
30				10
5	PTL3	1190	674	<2 (1178)*
10				<2 (1165)*
20				<2 (1128)*
30				<2 (1092)*
5	PTL3	1322	749	<2 (1178)*
10				<2 (1165)*
20				<2 (1128)*
30				<2 (1092)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Rammer M18 - RR140/8



Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	822	466	100
10				100
20				100
30				100
5	PTL2	959	544	100
10				100
20				100
30				100
5	PTL2	1096	621	100
10				100
20				90
30				75
5	PTL3	1233	699	55
10				50
20				33
30				20
5	PTL3	1370	777	15
10				10
20				<2 (1358)*
30				<2 (1307)*

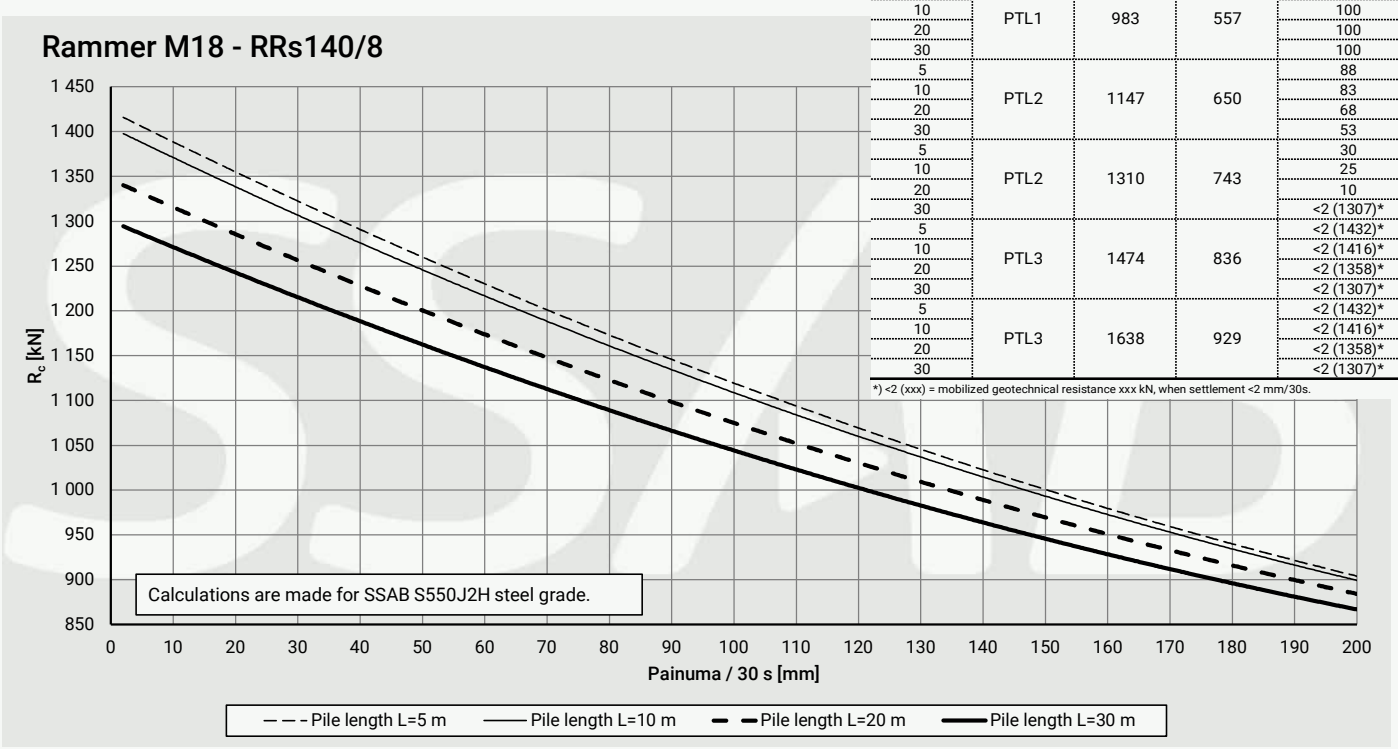
*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Rammer M18 - RRs140/8

Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	983	557	100
10				100
20				100
30				100
5	PTL2	1147	650	88
10				83
20				68
30				53
5	PTL2	1310	743	30
10				25
20				10
30				<2 (1307)*
5	PTL3	1474	836	<2 (1432)*
10				<2 (1416)*
20				<2 (1358)*
30				<2 (1307)*
5	PTL3	1638	929	<2 (1432)*
10				<2 (1416)*
20				<2 (1358)*
30				<2 (1307)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

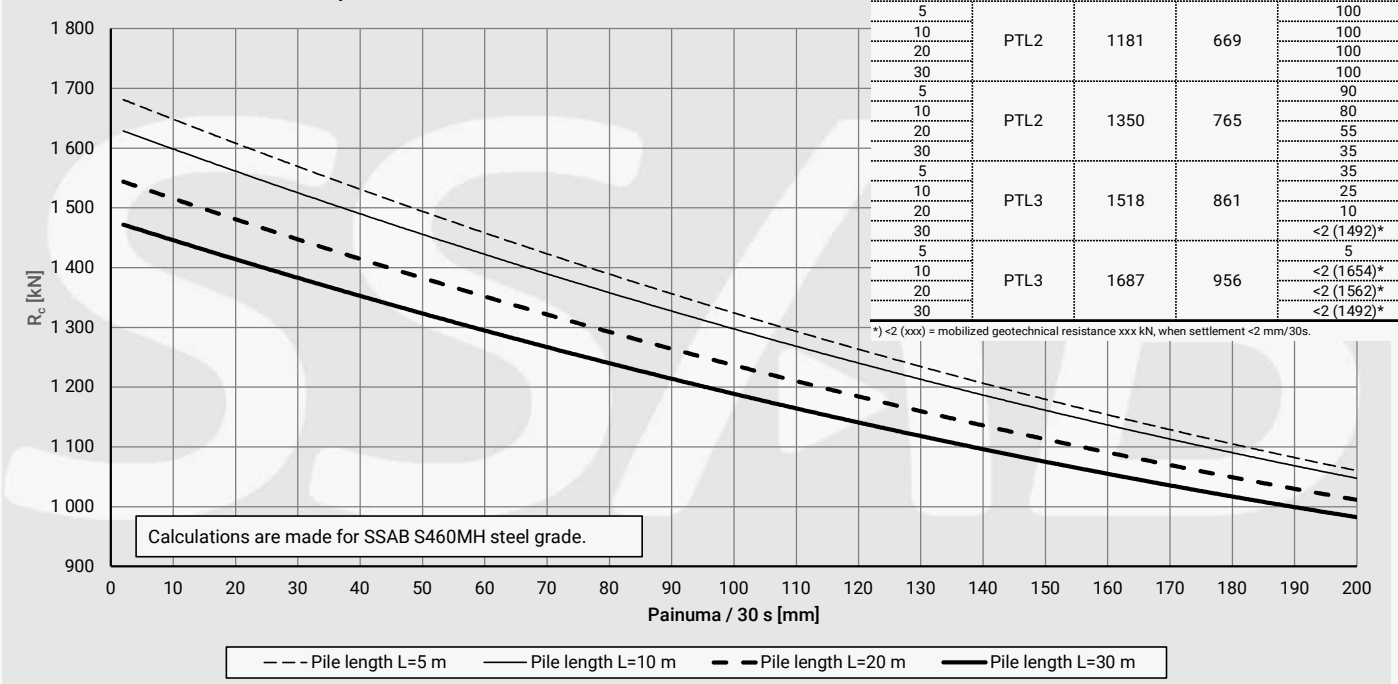


Rammer M18 - RR140/10

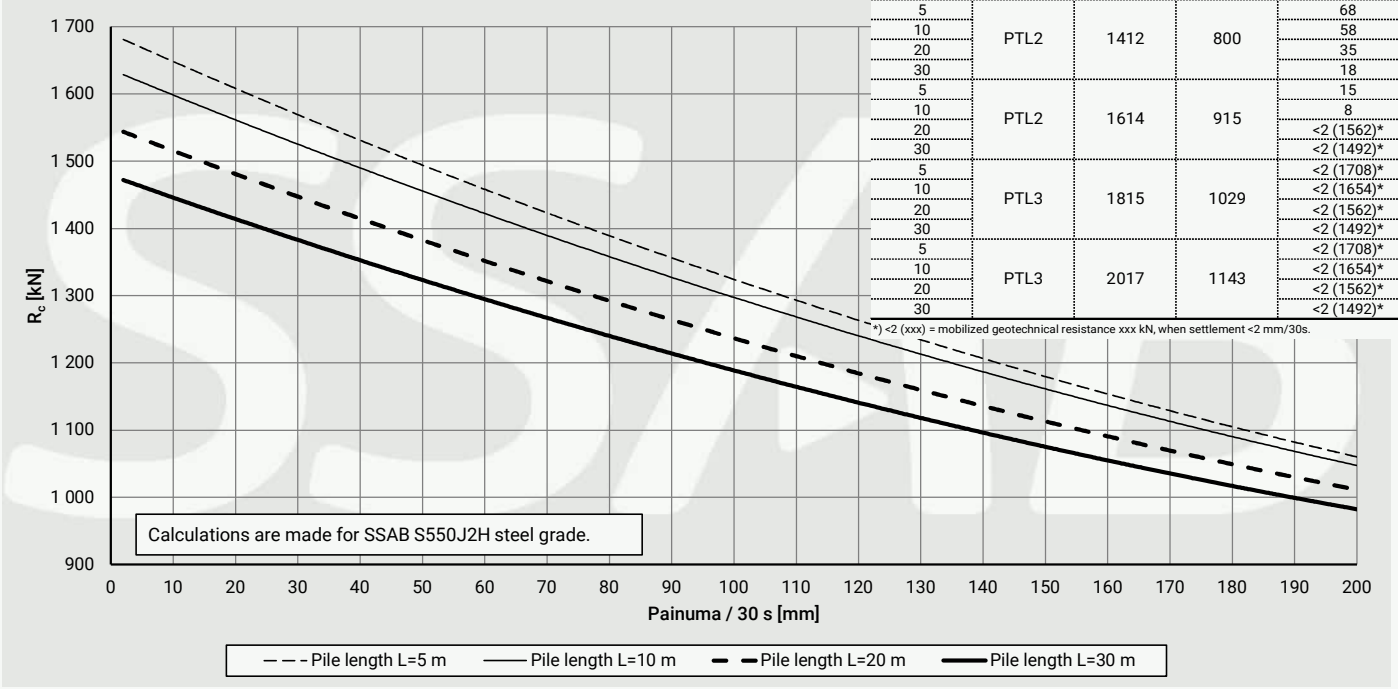
Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1012	574	100
10				100
20				100
30				100
5	PTL2	1181	669	100
10				100
20				100
30				100
5	PTL2	1350	765	90
10				80
20				55
30				35
5	PTL3	1518	861	35
10				25
20				10
30				<2 (1492)*
5	PTL3	1687	956	5
10				<2 (1654)*
20				<2 (1562)*
30				<2 (1492)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.



Rammer M18 - RRs140/10

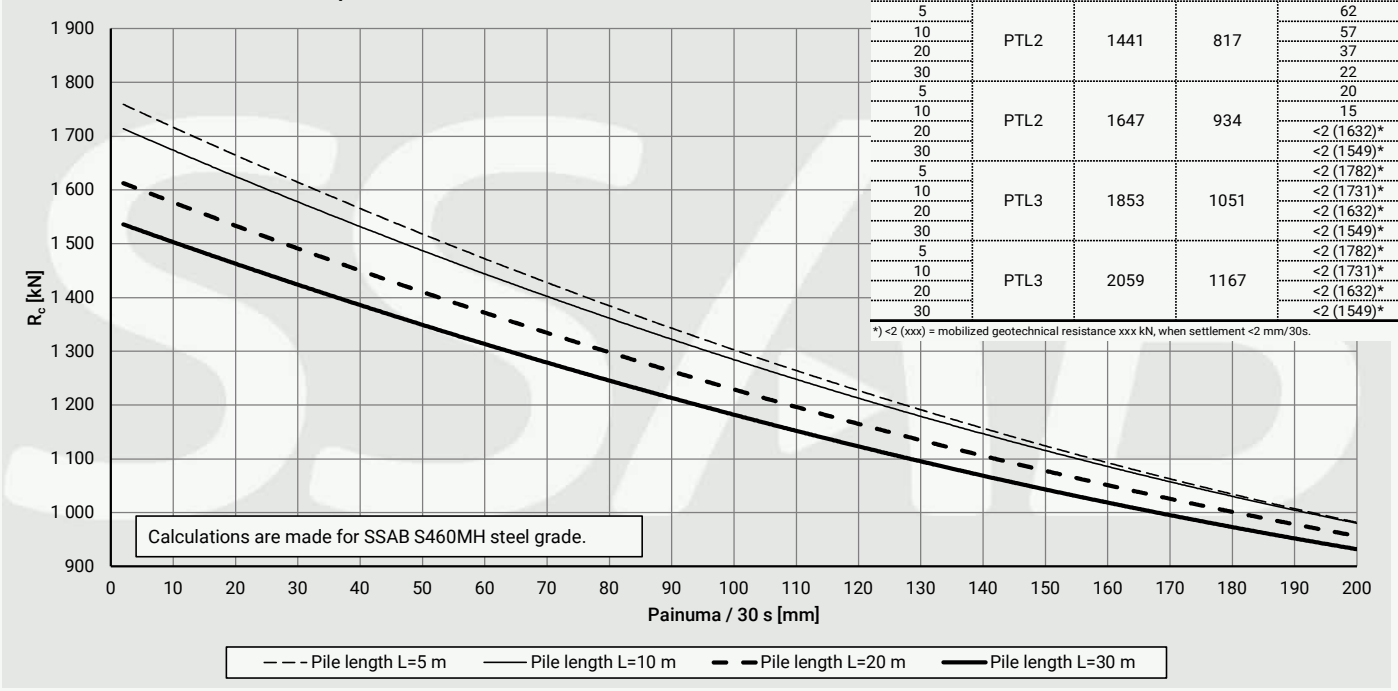


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1210	686	100
10				100
20				100
30				90
5	PTL2	1412	800	68
10				58
20				35
30				18
5	PTL2	1614	915	15
10				8
20				<2 (1562)*
30				<2 (1492)*
5	PTL3	1815	1029	<2 (1708)*
10				<2 (1654)*
20				<2 (1562)*
30				<2 (1492)*
5	PTL3	2017	1143	<2 (1708)*
10				<2 (1654)*
20				<2 (1562)*
30				<2 (1492)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Rammer M18 - RR170/10



Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1235	700	100
10				100
20				100
30				82
5	PTL2	1441	817	62
10				57
20				37
30				22
5	PTL2	1647	934	20
10				15
20				<2 (1632)*
30				<2 (1549)*
5	PTL3	1853	1051	<2 (1782)*
10				<2 (1731)*
20				<2 (1632)*
30				<2 (1549)*
5	PTL3	2059	1167	<2 (1782)*
10				<2 (1731)*
20				<2 (1632)*
30				<2 (1549)*

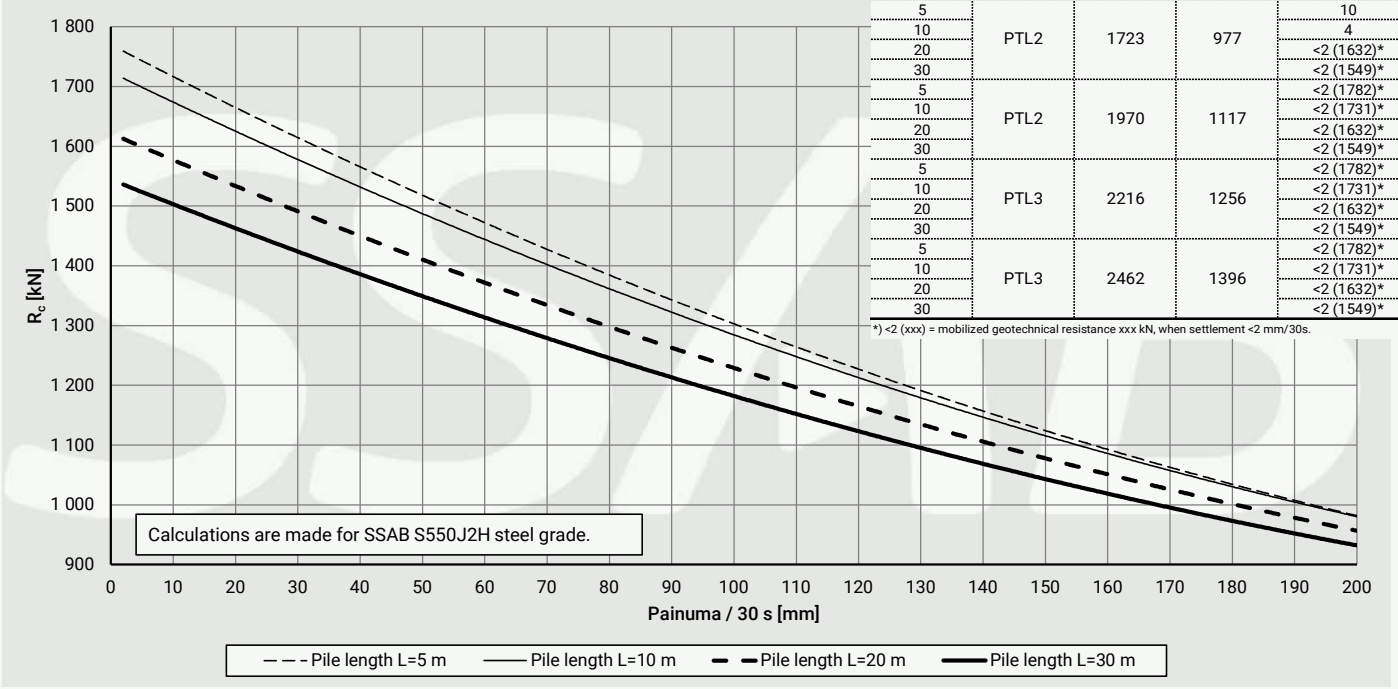
*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Rammer M18 - RRs170/10

Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1477	837	55
10				47
20				30
30				15
5	PTL2	1723	977	10
10				4
20				<2 (1632)*
30				<2 (1549)*
5	PTL2	1970	1117	<2 (1782)*
10				<2 (1731)*
20				<2 (1632)*
30				<2 (1549)*
5	PTL3	2216	1256	<2 (1782)*
10				<2 (1731)*
20				<2 (1632)*
30				<2 (1549)*
5	PTL3	2462	1396	<2 (1782)*
10				<2 (1731)*
20				<2 (1632)*
30				<2 (1549)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

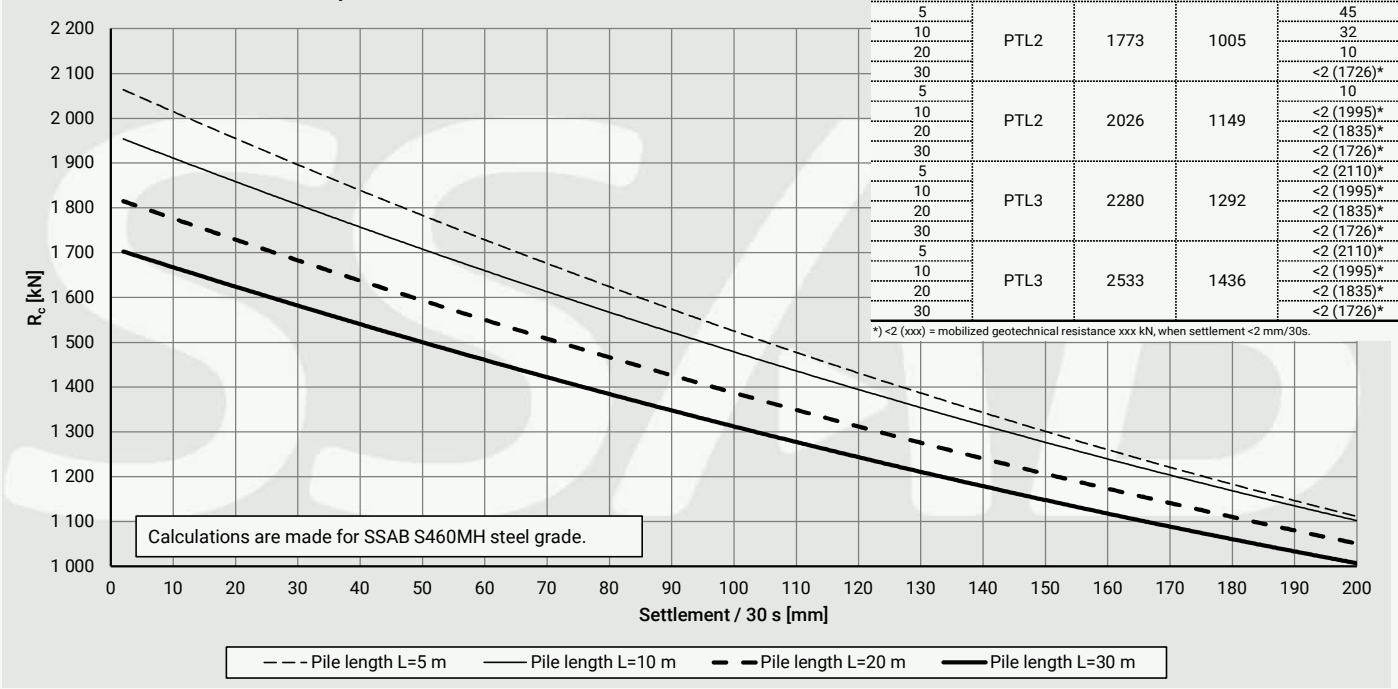


Rammer M18 - RR170/12.5

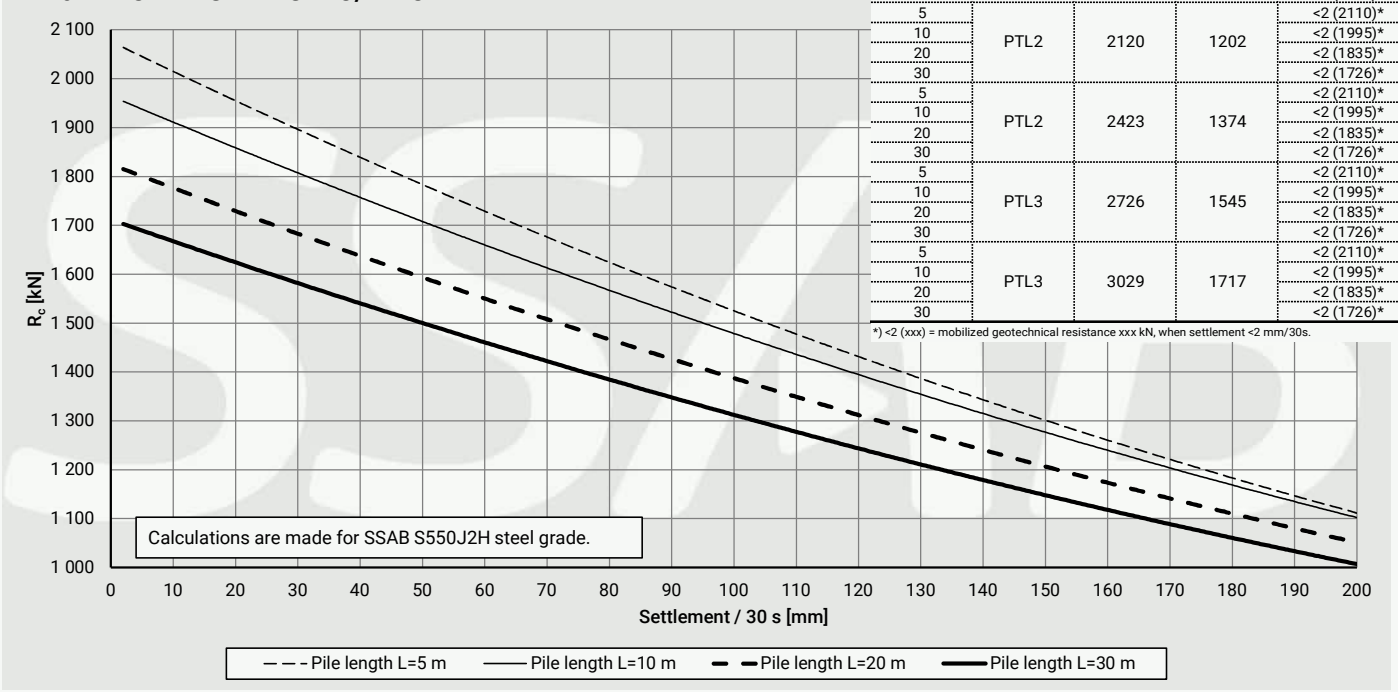
Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1520	862	98
10				85
20				60
30				40
5	PTL2	1773	1005	45
10				32
20				10
30				<2 (1726)*
5	PTL2	2026	1149	10
10				<2 (1995)*
20				<2 (1835)*
30				<2 (1726)*
5	PTL3	2280	1292	<2 (2110)*
10				<2 (1995)*
20				<2 (1835)*
30				<2 (1726)*
5	PTL3	2533	1436	<2 (2110)*
10				<2 (1995)*
20				<2 (1835)*
30				<2 (1726)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.



Rammer M18 - RRs170/12.5



Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1817	1030	37
10				25
20				3
30				<2 (1726)*
5	PTL2	2120	1202	<2 (2110)*
10				<2 (1995)*
20				<2 (1835)*
30				<2 (1726)*
5	PTL2	2423	1374	<2 (2110)*
10				<2 (1995)*
20				<2 (1835)*
30				<2 (1726)*
5	PTL3	2726	1545	<2 (2110)*
10				<2 (1995)*
20				<2 (1835)*
30				<2 (1726)*
5	PTL3	3029	1717	<2 (2110)*
10				<2 (1995)*
20				<2 (1835)*
30				<2 (1726)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

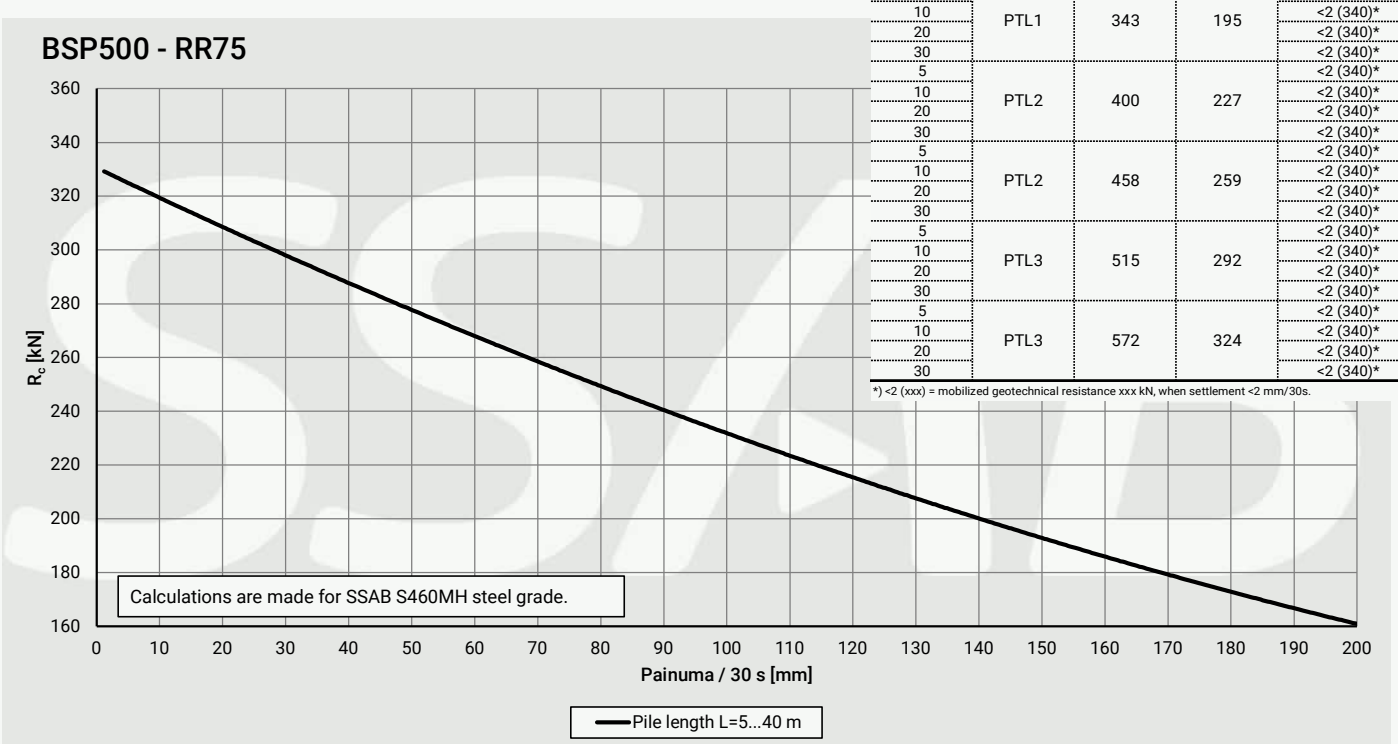
BSP500

Piston		
Piston weight [kg]	m_r	91
Diameter of the piston [mm]	D_r	127
Length of the piston [mm]	L_r	910
Theoretical impact energy [J]	E_{rated}	1375
Efficiency of the piston [%]	HE	80
Equivalent drop height [m]	H_{ekv}	1.54
Theoretical impact rate [blows/min]	BPM	300
Actual impact rate vrs theoretical [%]	η	80
Measured / in analysis used impact rate [blows/min]	BPM_m	240
Impact tool		
Diameter of the tool [mm]	D_t	250
Height of the tool [mm]	L_t	150
Tool weight [kg]	m_t	113

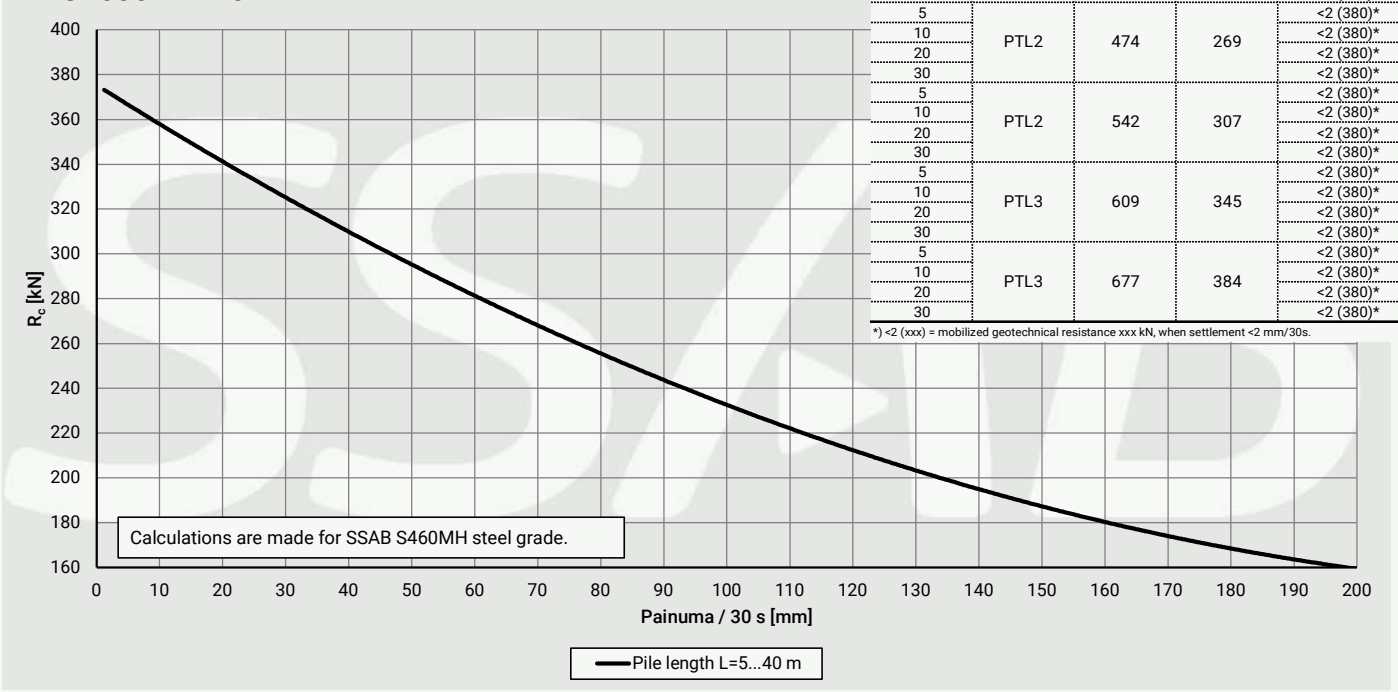
Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	343	195	<2 (340)*
10				<2 (340)*
20				<2 (340)*
30				<2 (340)*
5	PTL2	400	227	<2 (340)*
10				<2 (340)*
20				<2 (340)*
30				<2 (340)*
5	PTL2	458	259	<2 (340)*
10				<2 (340)*
20				<2 (340)*
30				<2 (340)*
5	PTL3	515	292	<2 (340)*
10				<2 (340)*
20				<2 (340)*
30				<2 (340)*
5	PTL3	572	324	<2 (340)*
10				<2 (340)*
20				<2 (340)*
30				<2 (340)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.



BSP500 - RR90

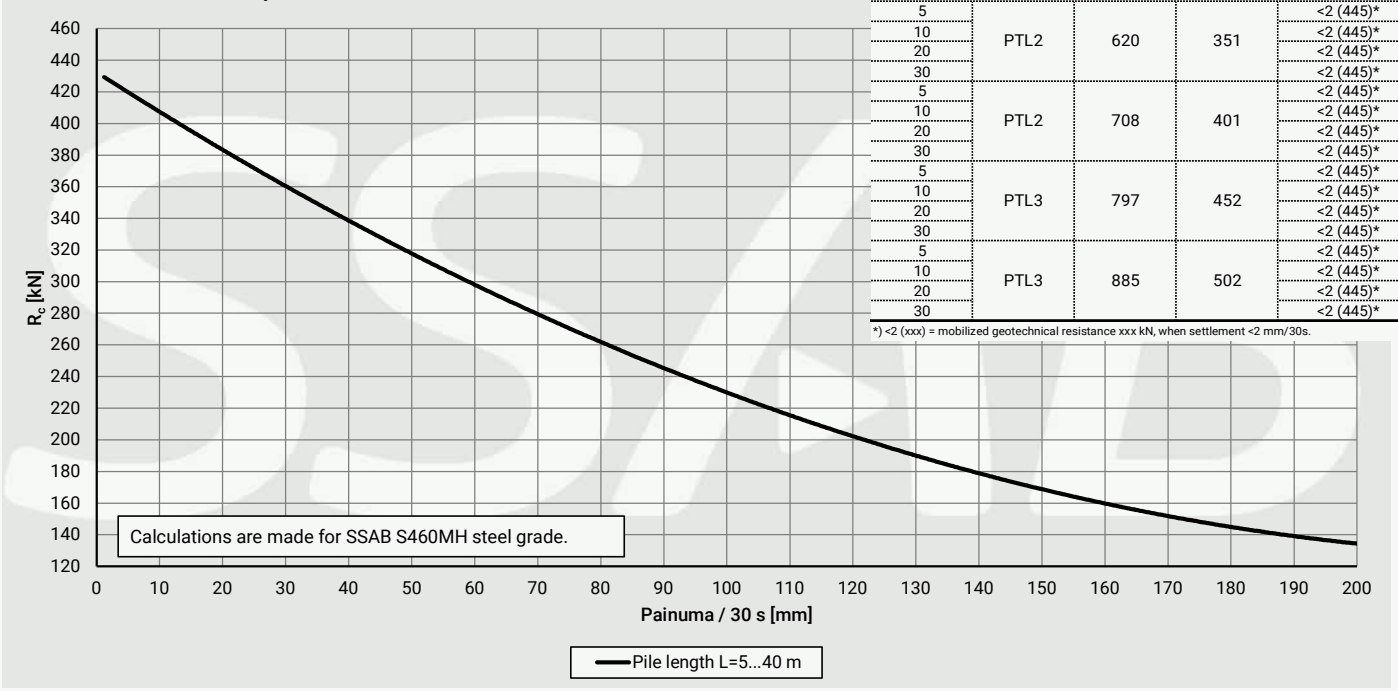


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	406	230	<2 (380)*
10				<2 (380)*
20				<2 (380)*
30				<2 (380)*
5	PTL2	474	269	<2 (380)*
10				<2 (380)*
20				<2 (380)*
30				<2 (380)*
5	PTL2	542	307	<2 (380)*
10				<2 (380)*
20				<2 (380)*
30				<2 (380)*
5	PTL3	609	345	<2 (380)*
10				<2 (380)*
20				<2 (380)*
30				<2 (380)*
5	PTL3	677	384	<2 (380)*
10				<2 (380)*
20				<2 (380)*
30				<2 (380)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

BSP500 - RR115/6.3



Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	531	301	<2 (445)*
10				<2 (445)*
20				<2 (445)*
30				<2 (445)*
5	PTL2	620	351	<2 (445)*
10				<2 (445)*
20				<2 (445)*
30				<2 (445)*
5	PTL2	708	401	<2 (445)*
10				<2 (445)*
20				<2 (445)*
30				<2 (445)*
5	PTL3	797	452	<2 (445)*
10				<2 (445)*
20				<2 (445)*
30				<2 (445)*
5	PTL3	885	502	<2 (445)*
10				<2 (445)*
20				<2 (445)*
30				<2 (445)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

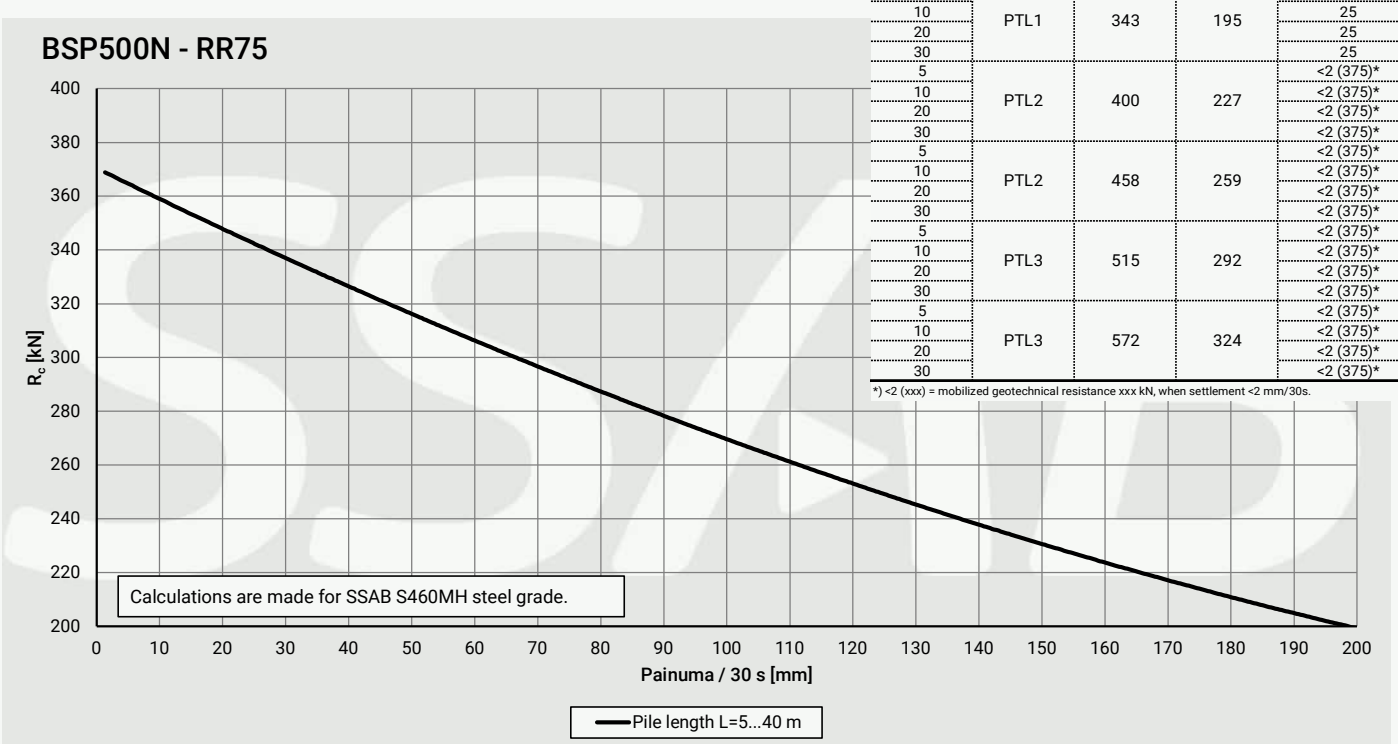
BSP500N

Piston		
Piston weight [kg]	m_r	90.7
Diameter of the piston [mm]	D_r	127
Length of the piston [mm]	L_r	910
Theoretical impact energy [J]	E_{rated}	1650
Efficiency of the piston [%]	HE	80
Equivalent drop height [m]	H_{ekv}	1.85
Theoretical impact rate [blows/min]	BPM	330
Actual impact rate vrs theoretical [%]	η	80
Measured / in analysis used impact rate [blows/min]	BPM_m	265
Impact tool		
Diameter of the tool [mm]	D_t	250
Height of the tool [mm]	L_t	150
Tool weight [kg]	m_t	113

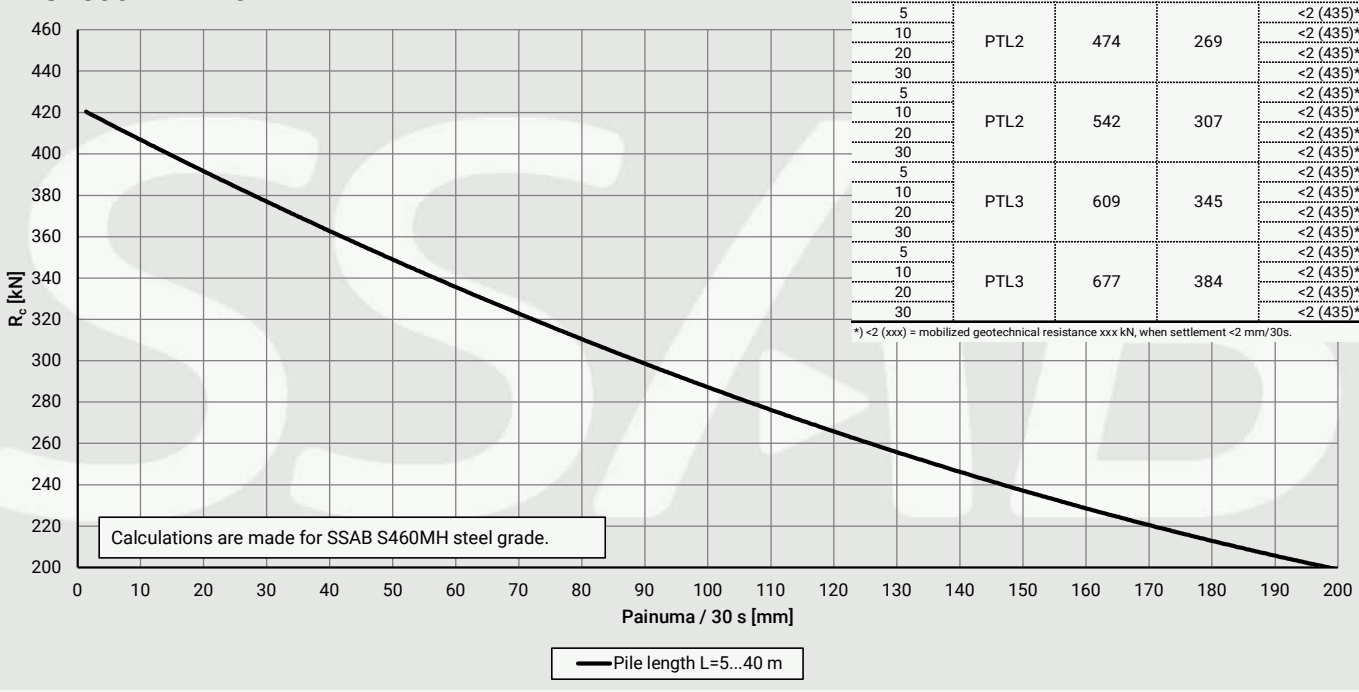
Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	343	195	25
10				25
20				25
30				25
5	PTL2	400	227	<2 (375)*
10				<2 (375)*
20				<2 (375)*
30				<2 (375)*
5	PTL2	458	259	<2 (375)*
10				<2 (375)*
20				<2 (375)*
30				<2 (375)*
5	PTL3	515	292	<2 (375)*
10				<2 (375)*
20				<2 (375)*
30				<2 (375)*
5	PTL3	572	324	<2 (375)*
10				<2 (375)*
20				<2 (375)*
30				<2 (375)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.



BSP500N - RR90

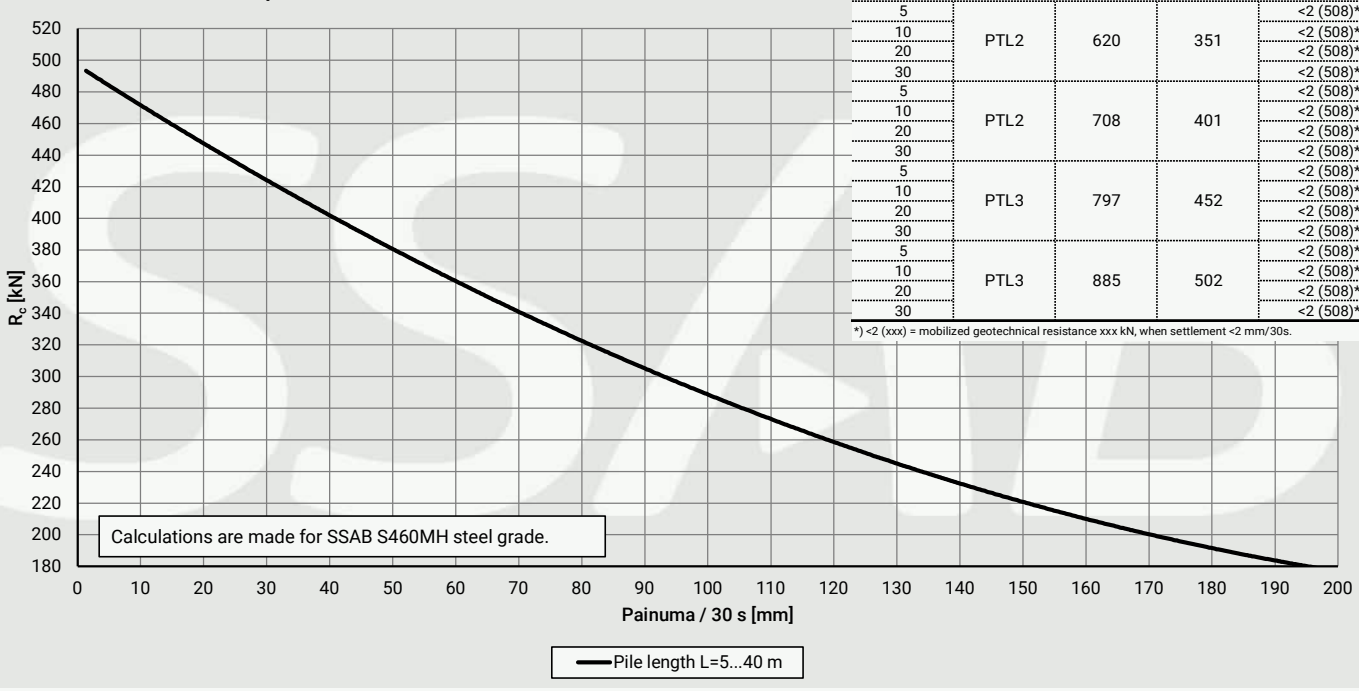


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	406	230	11
10				11
20				11
30				11
5	PTL2	474	269	<2 (435)*
10				<2 (435)*
20				<2 (435)*
30				<2 (435)*
5	PTL2	542	307	<2 (435)*
10				<2 (435)*
20				<2 (435)*
30				<2 (435)*
5	PTL3	609	345	<2 (435)*
10				<2 (435)*
20				<2 (435)*
30				<2 (435)*
5	PTL3	677	384	<2 (435)*
10				<2 (435)*
20				<2 (435)*
30				<2 (435)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

BSP500N - RR115/6.3



Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	531	301	<2 (508)*
10				<2 (508)*
20				<2 (508)*
30				<2 (508)*
5	PTL2	620	351	<2 (508)*
10				<2 (508)*
20				<2 (508)*
30				<2 (508)*
5	PTL2	708	401	<2 (508)*
10				<2 (508)*
20				<2 (508)*
30				<2 (508)*
5	PTL3	797	452	<2 (508)*
10				<2 (508)*
20				<2 (508)*
30				<2 (508)*
5	PTL3	885	502	<2 (508)*
10				<2 (508)*
20				<2 (508)*
30				<2 (508)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

BSP600

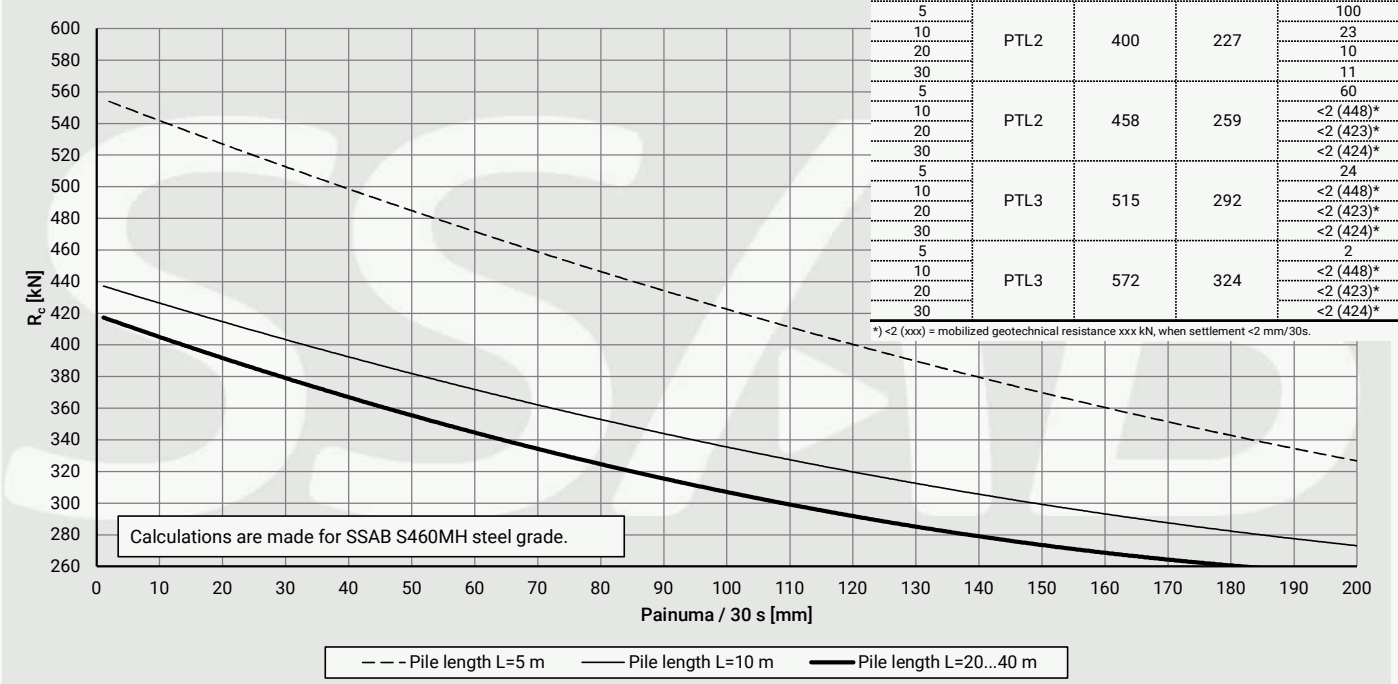
Piston		
Piston weight [kg]	m_r	181
Diameter of the piston [mm]	D_r	178
Length of the piston [mm]	L_r	864
Theoretical impact energy [J]	E_{rated}	3370
Efficiency of the piston [%]	HE	80
Equivalent drop height [m]	H_{ekv}	1.89
Theoretical impact rate [blows/min]	BPM	275
Actual impact rate vrs theoretical [%]	η	80
Measured / in analysis used impact rate [blows/min]	BPM_m	220
Impact tool		
Diameter of the tool [mm]	D_t	300
Height of the tool [mm]	L_t	150
Tool weight [kg]	m_t	227

Hammer efficiency 80 %

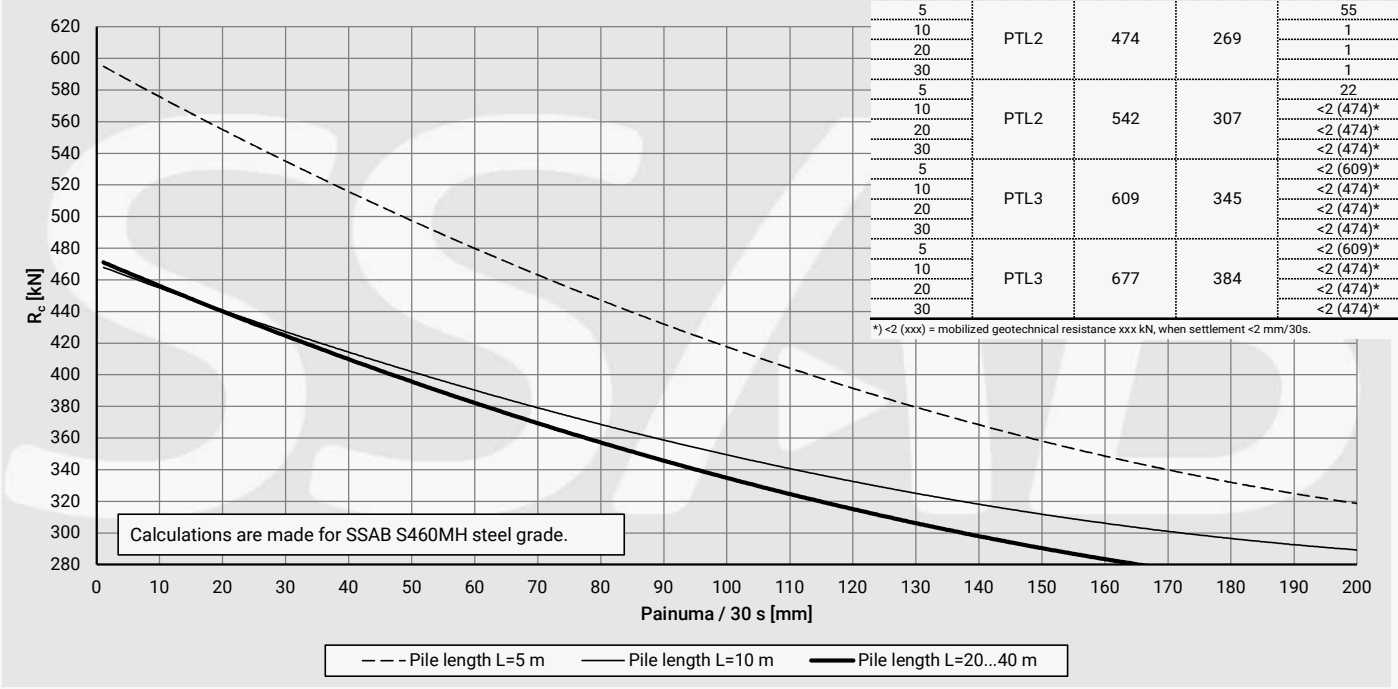
Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	343	195	100
10				84
20				52
30				54
5	PTL2	400	227	100
10				23
20				10
30				11
5	PTL2	458	259	60
10				<2 (448)*
20				<2 (423)*
30				<2 (424)*
5	PTL3	515	292	24
10				<2 (448)*
20				<2 (423)*
30				<2 (424)*
5	PTL3	572	324	2
10				<2 (448)*
20				<2 (423)*
30				<2 (424)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

BSP600 - RR75



BSP600 - RR90

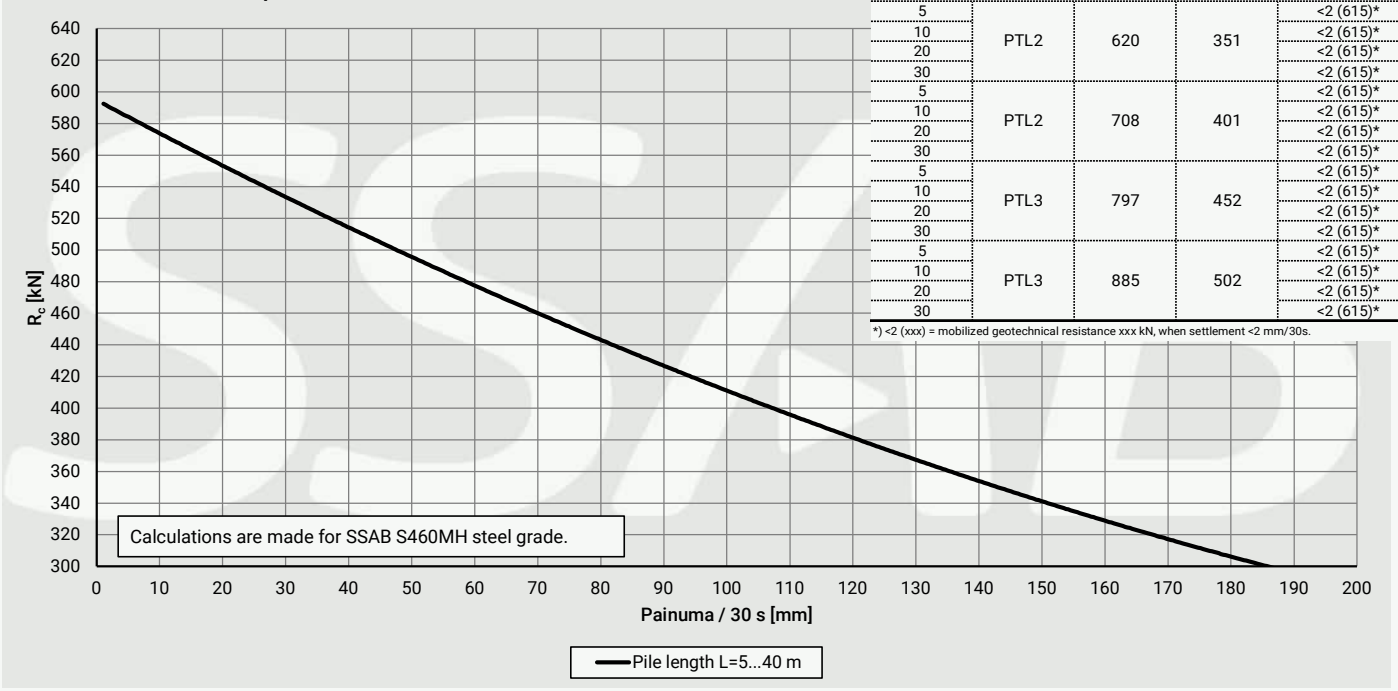


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	406	230	100
10				38
20				36
30				38
5	PTL2	474	269	55
10				1
20				1
30				1
5	PTL2	542	307	22
10				<2 (474)*
20				<2 (474)*
30				<2 (474)*
5	PTL3	609	345	<2 (609)*
10				<2 (474)*
20				<2 (474)*
30				<2 (474)*
5	PTL3	677	384	<2 (609)*
10				<2 (474)*
20				<2 (474)*
30				<2 (474)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

BSP600 - RR115/6.3

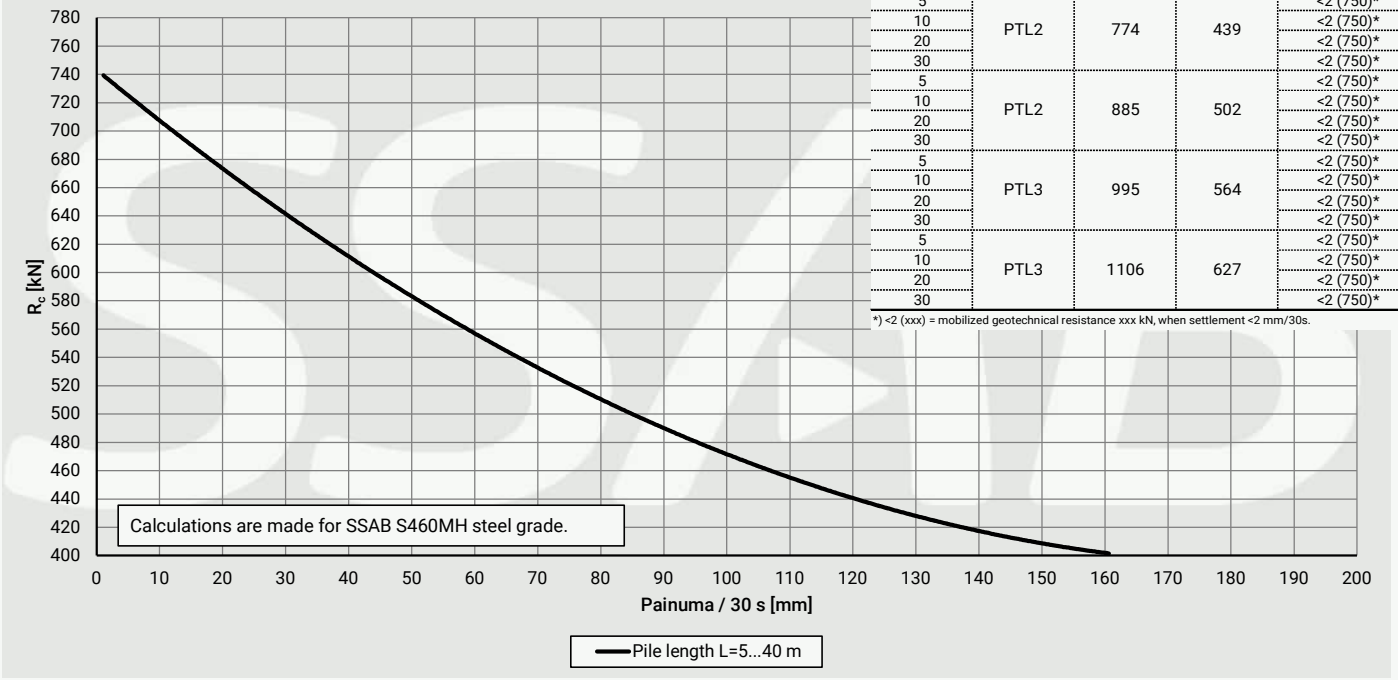


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	531	301	26
10				26
20				26
30				26
5	PTL2	620	351	<2 (615)*
10				<2 (615)*
20				<2 (615)*
30				<2 (615)*
5	PTL2	708	401	<2 (615)*
10				<2 (615)*
20				<2 (615)*
30				<2 (615)*
5	PTL3	797	452	<2 (615)*
10				<2 (615)*
20				<2 (615)*
30				<2 (615)*
5	PTL3	885	502	<2 (615)*
10				<2 (615)*
20				<2 (615)*
30				<2 (615)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

BSP600 - RR115/8



Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	664	376	20
10				20
20				21
30				21
5	PTL2	774	439	<2 (750)*
10				<2 (750)*
20				<2 (750)*
30				<2 (750)*
5	PTL2	885	502	<2 (750)*
10				<2 (750)*
20				<2 (750)*
30				<2 (750)*
5	PTL3	995	564	<2 (750)*
10				<2 (750)*
20				<2 (750)*
30				<2 (750)*
5	PTL3	1106	627	<2 (750)*
10				<2 (750)*
20				<2 (750)*
30				<2 (750)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

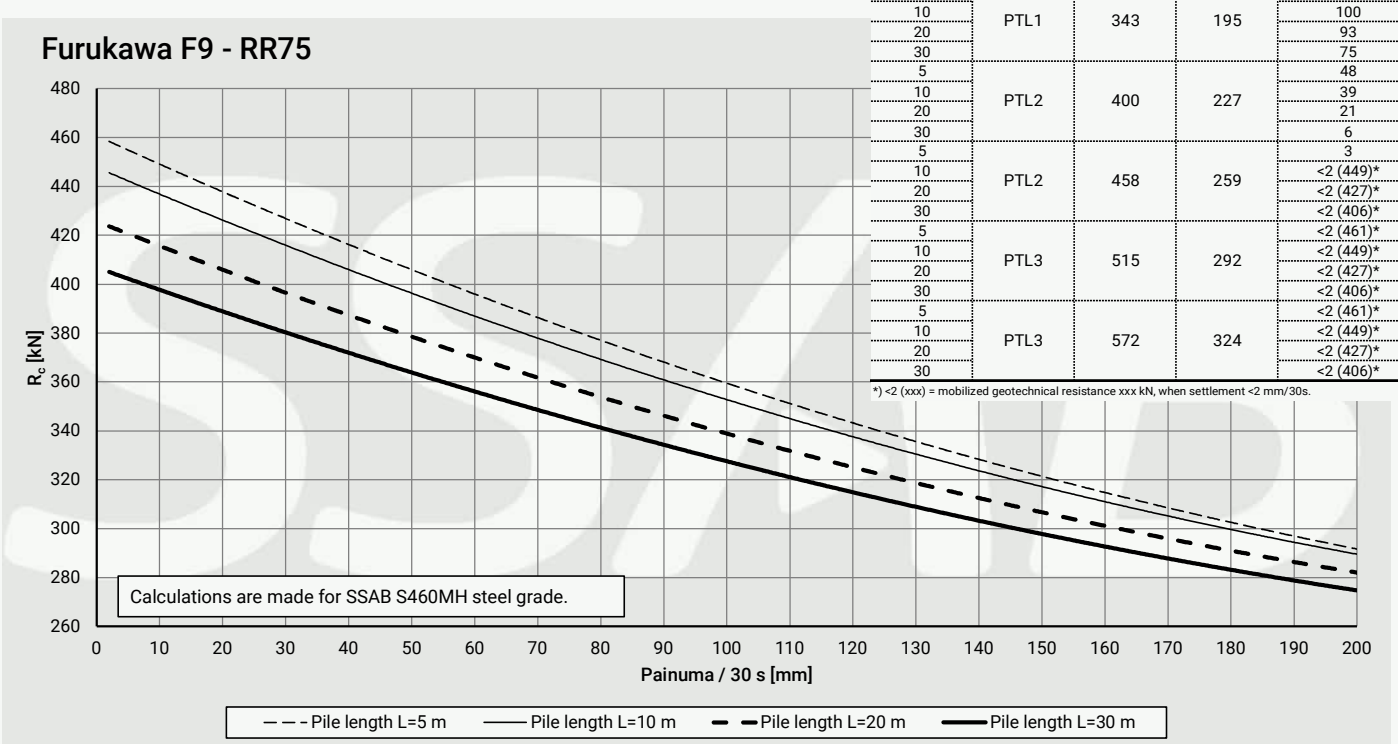
Furukawa F9

Piston		
Piston weight [kg]	m_r	31
Diameter of the piston [mm]	D_r	90
Length of the piston [mm]	L_r	620
Theoretical impact energy [J]	E_{rated}	1305
Efficiency of the piston [%]	HE	80
Equivalent drop height [m]	H_{ekv}	4.29
Theoretical impact rate [blows/min]	BPM	550-900
Actual impact rate vrs theoretical [%]	η	67
Measured / in analysis used impact rate [blows/min]	BPM_m	600
Impact tool		
Diameter of the tool [mm]	D_t	90
Height of the tool [mm]	L_t	840
Tool weight [kg]	m_t	42

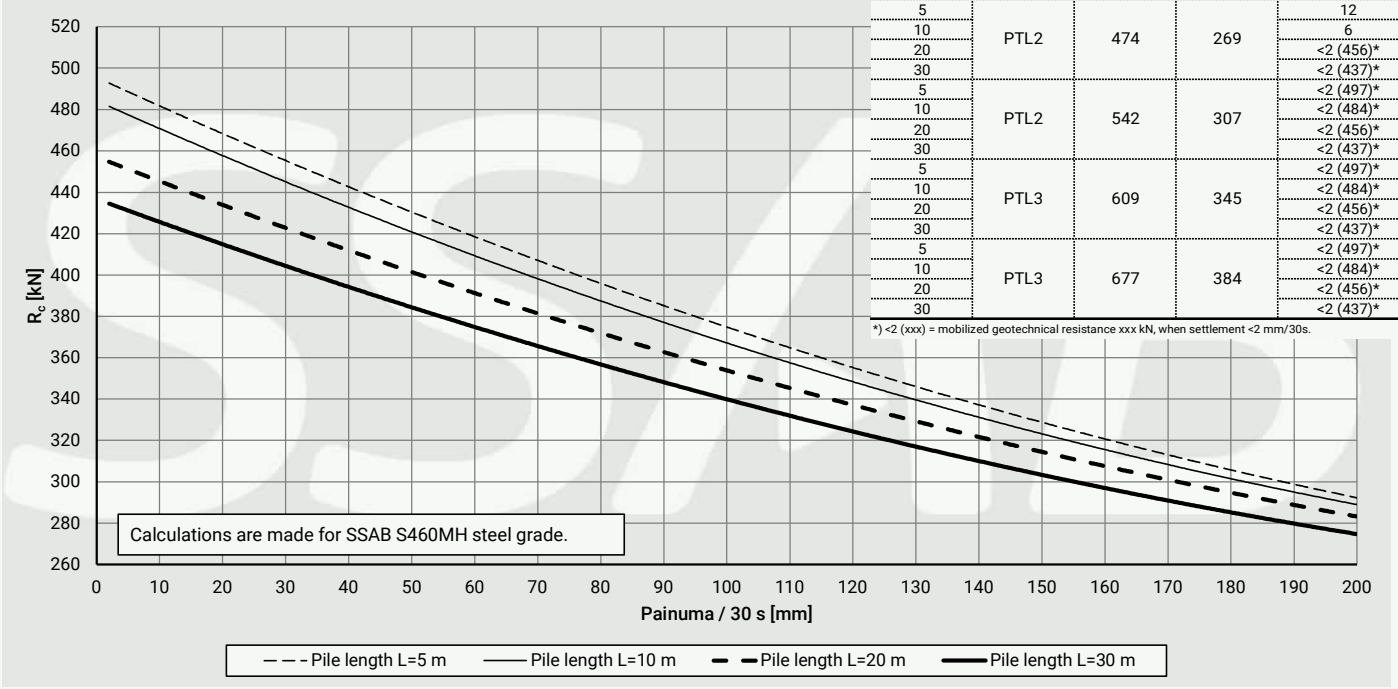
Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	343	195	100
10				100
20				93
30				75
5	PTL2	400	227	48
10				39
20				21
30				6
5	PTL2	458	259	3
10				<2 (449)*
20				<2 (427)*
30				<2 (406)*
5	PTL3	515	292	<2 (461)*
10				<2 (449)*
20				<2 (427)*
30				<2 (406)*
5	PTL3	572	324	<2 (461)*
10				<2 (449)*
20				<2 (427)*
30				<2 (406)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.



Furukawa F9 - RR90

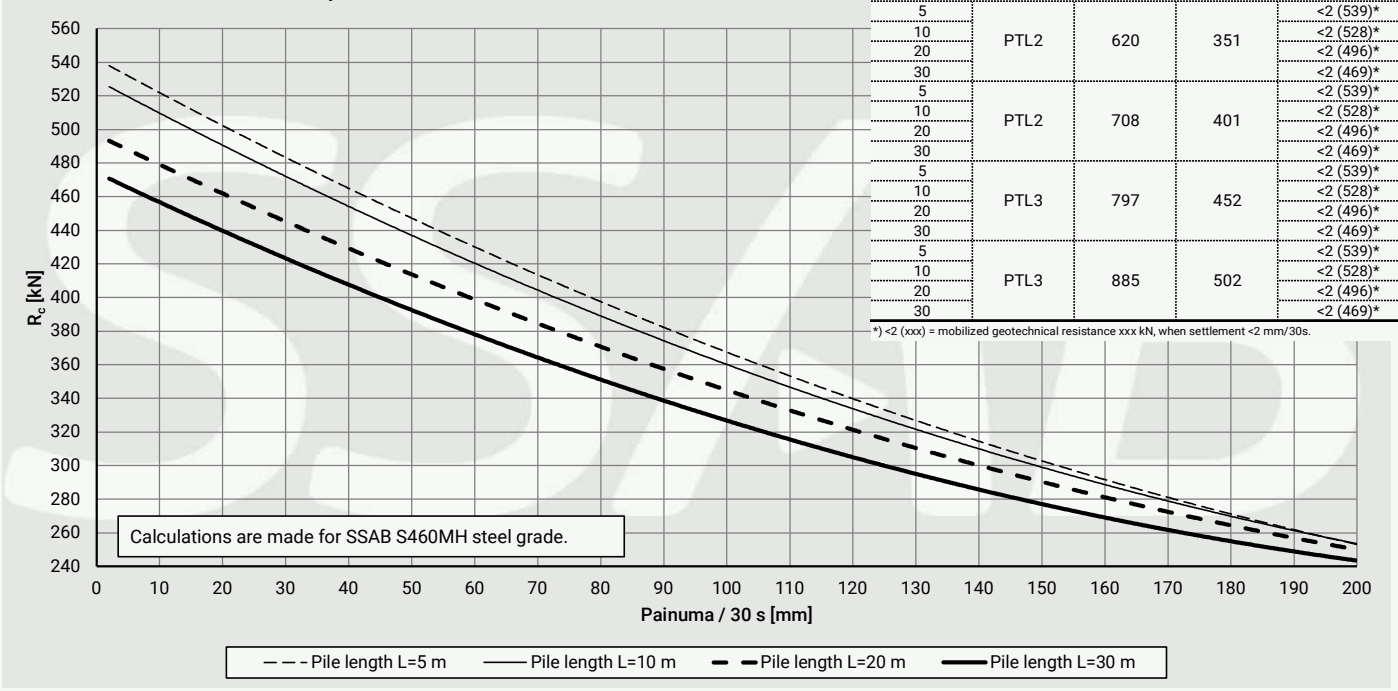


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	406	230	69
10				60
20				42
30				24
5	PTL2	474	269	12
10				6
20				<2 (456)*
30				<2 (437)*
5	PTL2	542	307	<2 (497)*
10				<2 (484)*
20				<2 (456)*
30				<2 (437)*
5	PTL3	609	345	<2 (497)*
10				<2 (484)*
20				<2 (456)*
30				<2 (437)*
5	PTL3	677	384	<2 (497)*
10				<2 (484)*
20				<2 (456)*
30				<2 (437)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa F9 - RR115/6.3



Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	531	301	6
10				<2 (528)*
20				<2 (496)*
30				<2 (469)*
5	PTL2	620	351	<2 (539)*
10				<2 (528)*
20				<2 (496)*
30				<2 (469)*
5	PTL2	708	401	<2 (539)*
10				<2 (528)*
20				<2 (496)*
30				<2 (469)*
5	PTL3	797	452	<2 (539)*
10				<2 (528)*
20				<2 (496)*
30				<2 (469)*
5	PTL3	885	502	<2 (539)*
10				<2 (528)*
20				<2 (496)*
30				<2 (469)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa F12

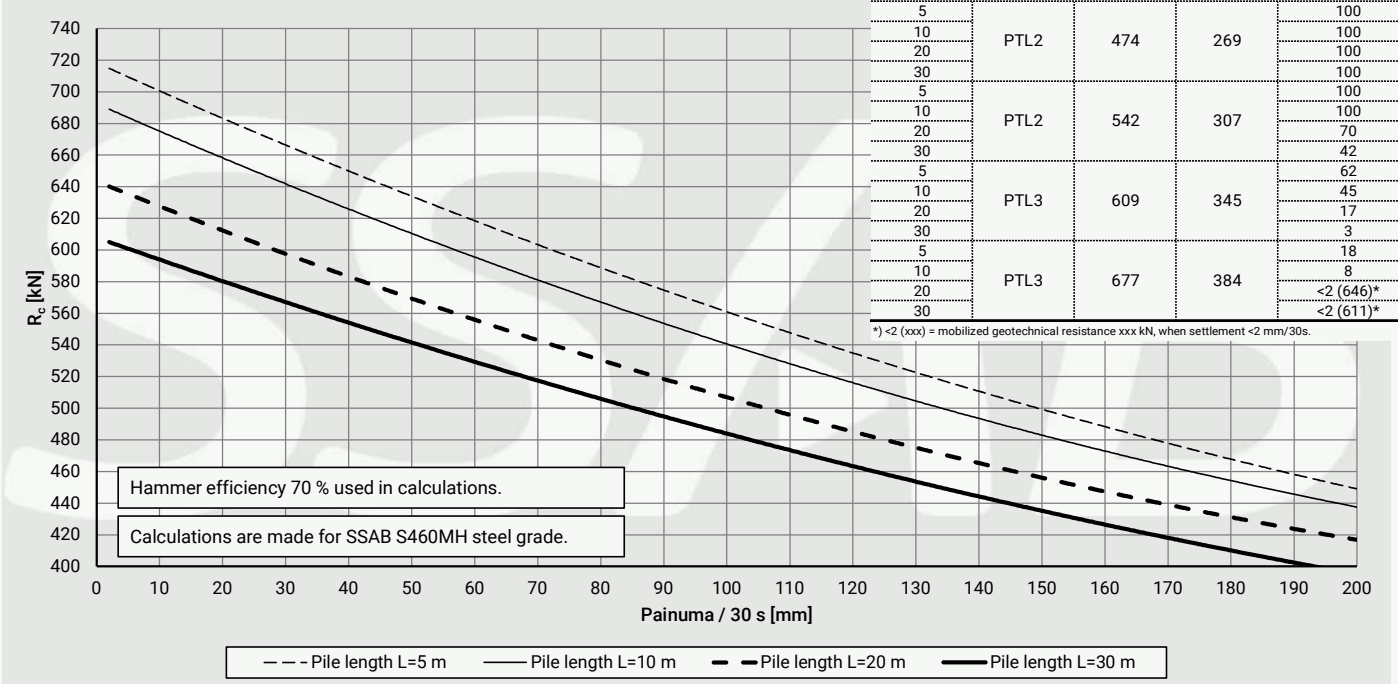
Piston		
Piston weight [kg]	m_r	47.5
Diameter of the piston [mm]	D_r	105
Length of the piston [mm]	L_r	700
Theoretical impact energy [J]	E_{rated}	2711
Efficiency of the piston [%]	HE	80
Equivalent drop height [m]	H_{ekv}	5.82
Theoretical impact rate [blows/min]	BPM	450-900
Actual impact rate vrs theoretical [%]	η	56
Measured / in analysis used impact rate [blows/min]	BPM_m	500
Impact tool		
Diameter of the tool [mm]	D_t	105
Height of the tool [mm]	L_t	600
Tool weight [kg]	m_t	41

Hammer efficiency 70 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	406	230	100
10				100
20				100
30				100
5	PTL2	474	269	100
10				100
20				100
30				100
5	PTL2	542	307	100
10				100
20				70
30				42
5	PTL3	609	345	62
10				45
20				17
30				3
5	PTL3	677	384	18
10				8
20				<2 (646)*
30				<2 (611)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa F12 - RR90

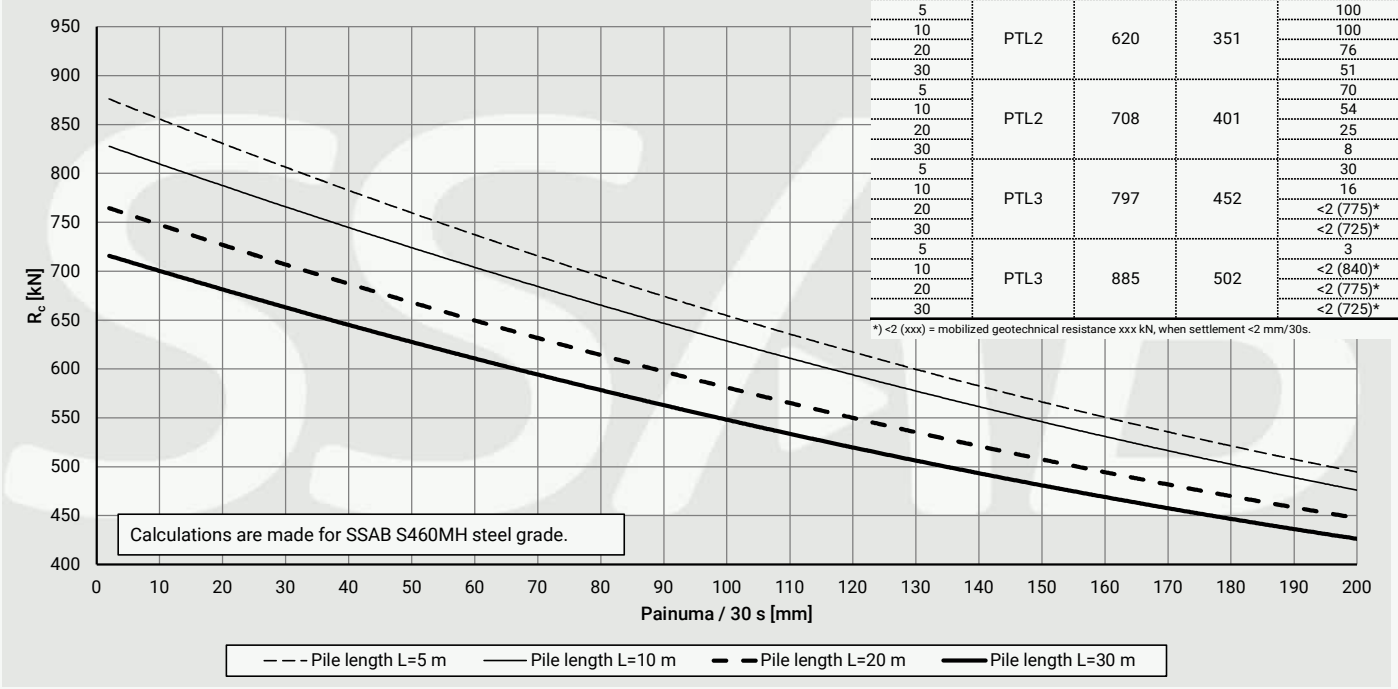


Furukawa F12 - RR115/6.3

Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	531	301	100
10				100
20				100
30				100
5	PTL2	620	351	100
10				100
20				76
30				51
5	PTL2	708	401	70
10				54
20				25
30				8
5	PTL3	797	452	30
10				16
20				<2 (775)*
30				<2 (725)*
5	PTL3	885	502	3
10				<2 (840)*
20				<2 (775)*
30				<2 (725)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

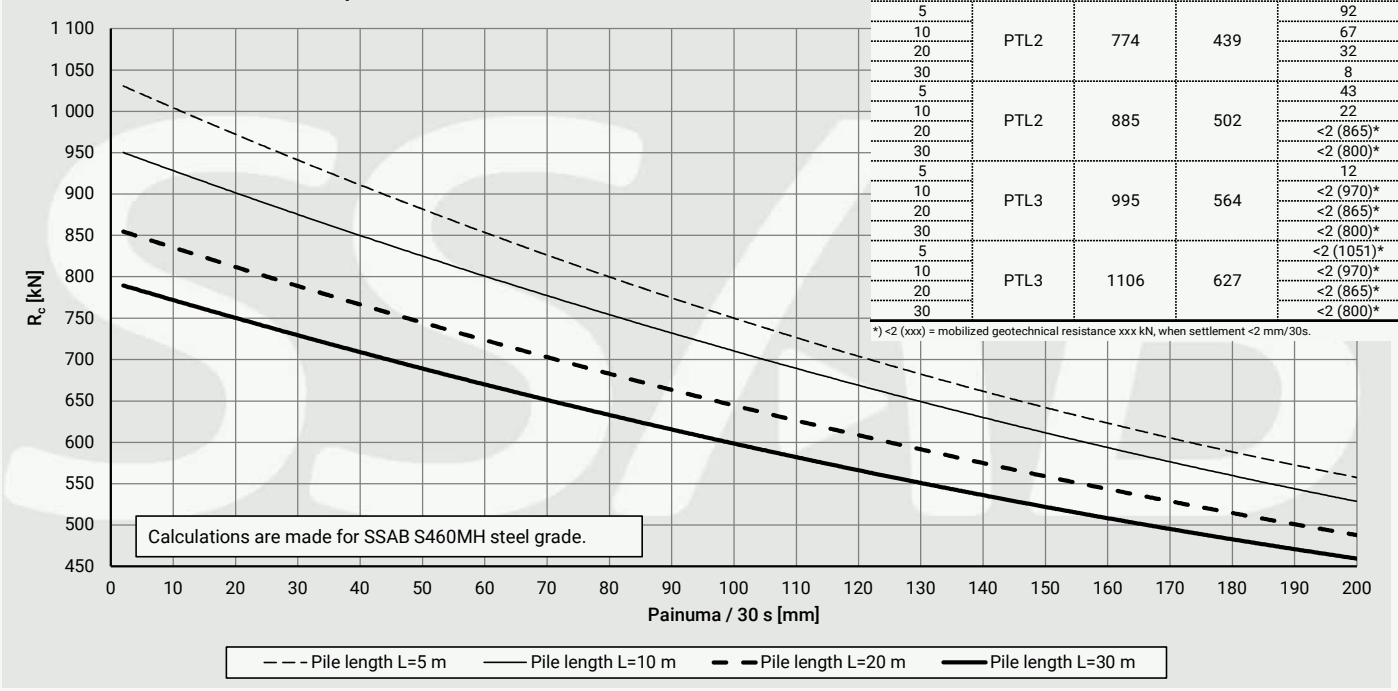


Furukawa F12 - RR115/8

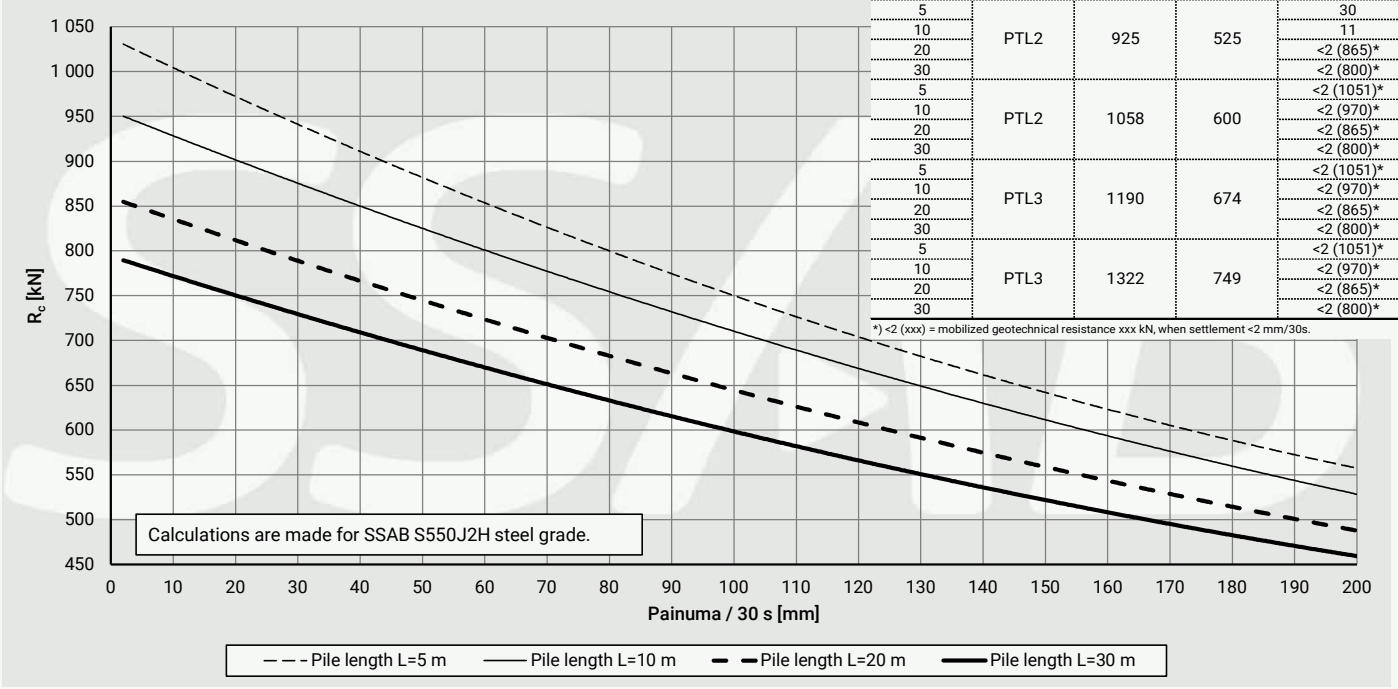
Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	664	376	100
10				100
20				90
30				61
5	PTL2	774	439	92
10				67
20				32
30				8
5	PTL2	885	502	43
10				22
20				<2 (865)*
30				<2 (800)*
5	PTL3	995	564	12
10				<2 (970)*
20				<2 (865)*
30				<2 (800)*
5	PTL3	1106	627	<2 (1051)*
10				<2 (970)*
20				<2 (865)*
30				<2 (800)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.



Furukawa F12 - RRs115/8



Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	793	450	82
10				58
20				25
30				4
5	PTL2	925	525	30
10				11
20				<2 (865)*
30				<2 (800)*
5	PTL2	1058	600	<2 (1051)*
10				<2 (970)*
20				<2 (865)*
30				<2 (800)*
5	PTL3	1190	674	<2 (1051)*
10				<2 (970)*
20				<2 (865)*
30				<2 (800)*
5	PTL3	1322	749	<2 (1051)*
10				<2 (970)*
20				<2 (865)*
30				<2 (800)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa F19

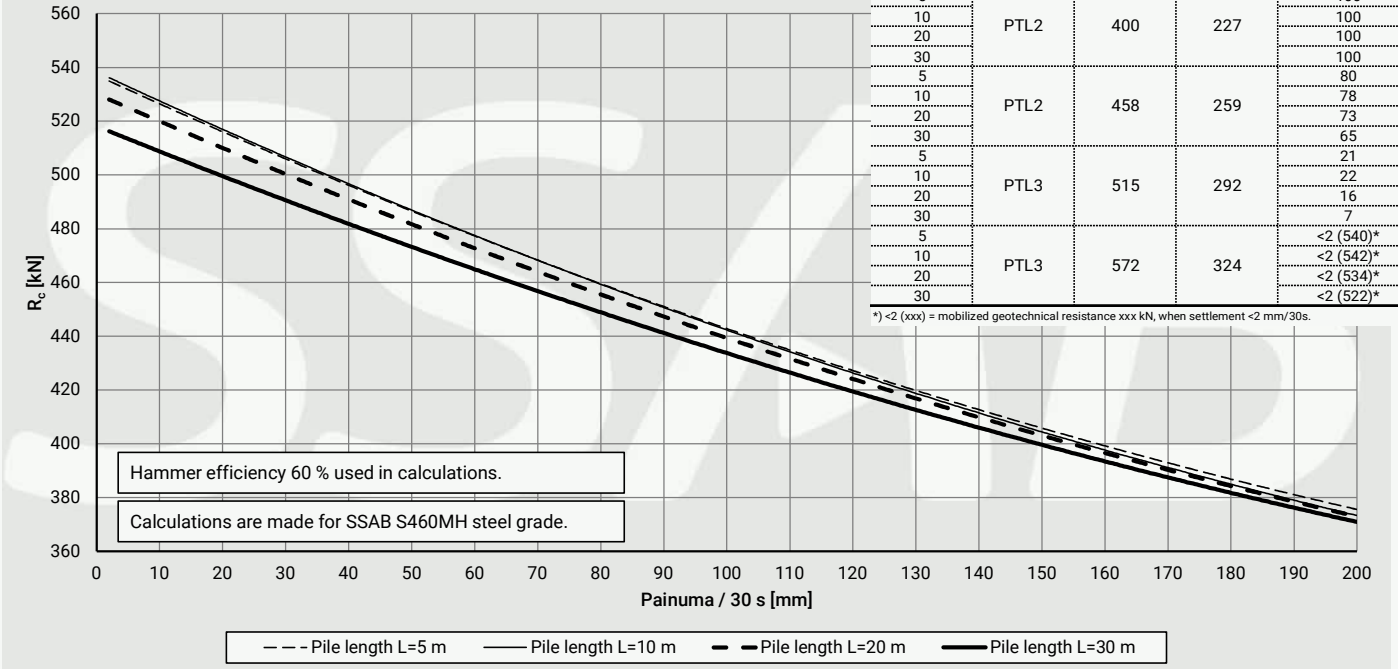
Piston		
Piston weight [kg]	m_r	64
Diameter of the piston [mm]	D_r	120
Length of the piston [mm]	L_r	720
Theoretical impact energy [J]	E_{rated}	3579
Efficiency of the piston [%]	HE	80
Equivalent drop height [m]	H_{ekv}	5.7
Theoretical impact rate [blows/min]	BPM	400-750
Actual impact rate vrs theoretical [%]	η	67
Measured / in analysis used impact rate [blows/min]	BPM_m	500
Impact tool		
Diameter of the tool [mm]	D_t	120
Height of the tool [mm]	L_t	1000
Tool weight [kg]	m_t	90

Hammer efficiency 60 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	343	195	100
10				100
20				100
30				100
5	PTL2	400	227	100
10				100
20				100
30				100
5	PTL2	458	259	80
10				78
20				73
30				65
5	PTL3	515	292	21
10				22
20				16
30				7
5	PTL3	572	324	<2 (540)*
10				<2 (542)*
20				<2 (534)*
30				<2 (522)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa F19 - RR75

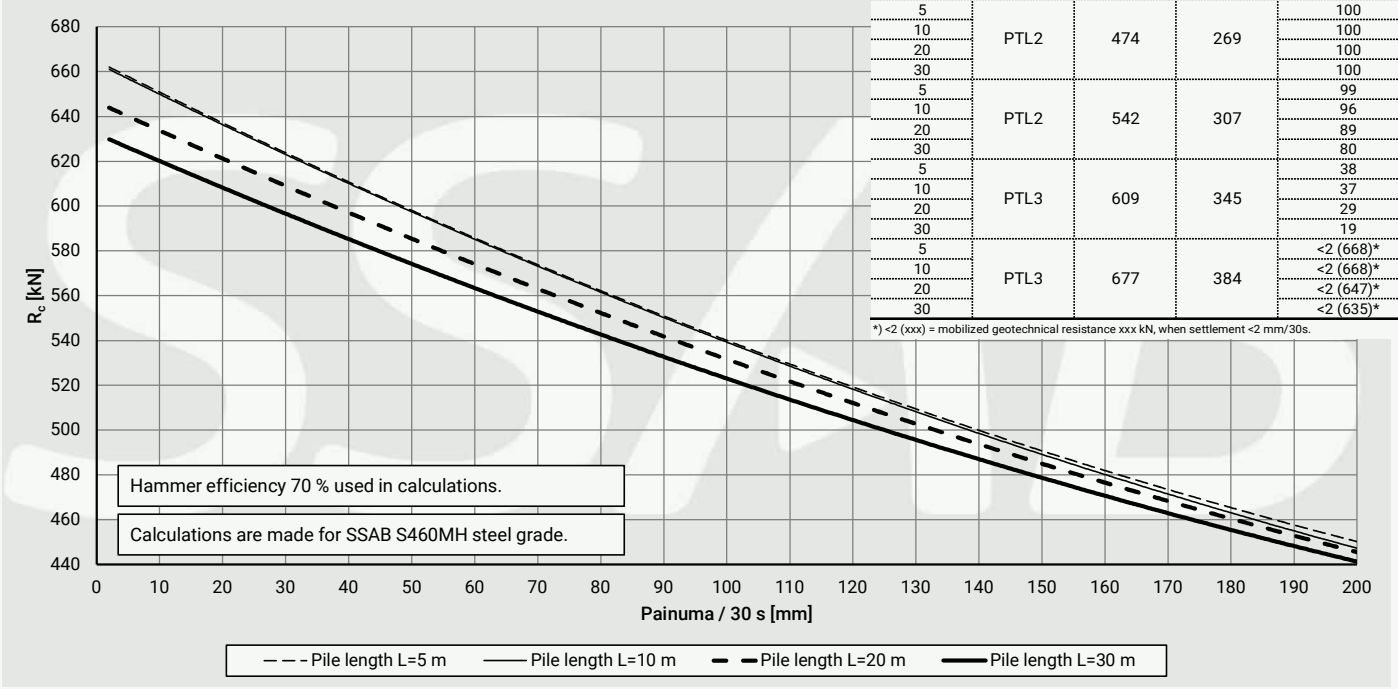


Furukawa F19 - RR90

Hammer efficiency 70 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	406	230	100
10				100
20				100
30				100
5	PTL2	474	269	100
10				100
20				100
30				100
5	PTL2	542	307	99
10				96
20				89
30				80
5	PTL3	609	345	38
10				37
20				29
30				19
5	PTL3	677	384	<2 (668)*
10				<2 (668)*
20				<2 (647)*
30				<2 (635)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

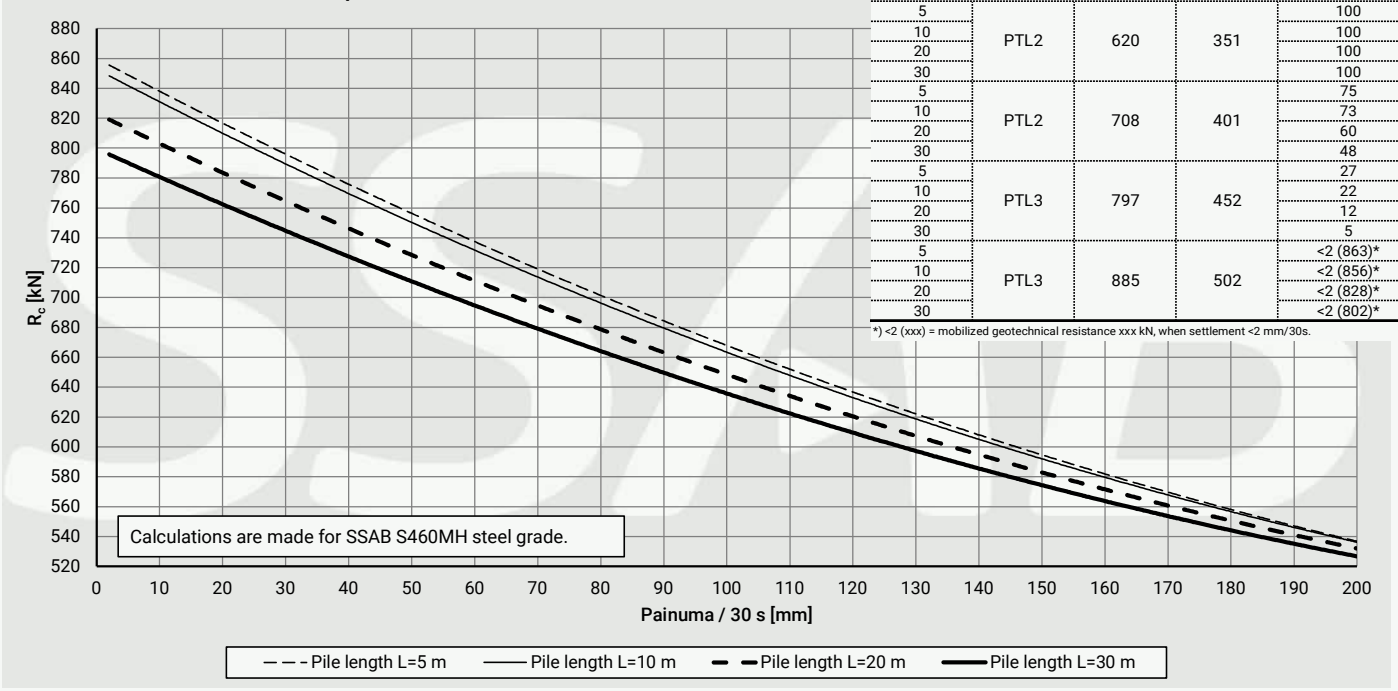


Furukawa F19 - RR115/6.3

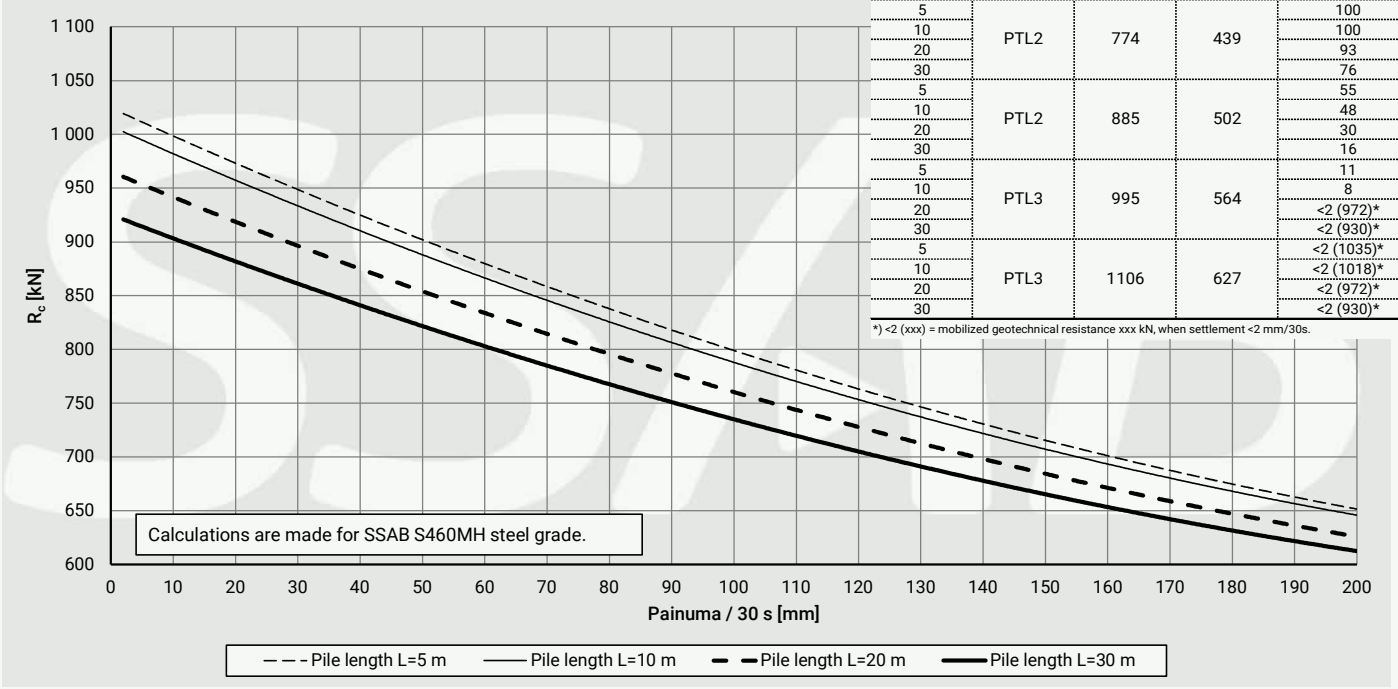
Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	531	301	100
10				100
20				100
30				100
5	PTL2	620	351	100
10				100
20				100
30				100
5	PTL2	708	401	75
10				73
20				60
30				48
5	PTL3	797	452	27
10				22
20				12
30				5
5	PTL3	885	502	<2 (863)*
10				<2 (856)*
20				<2 (828)*
30				<2 (802)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.



Furukawa F19 - RR115/8

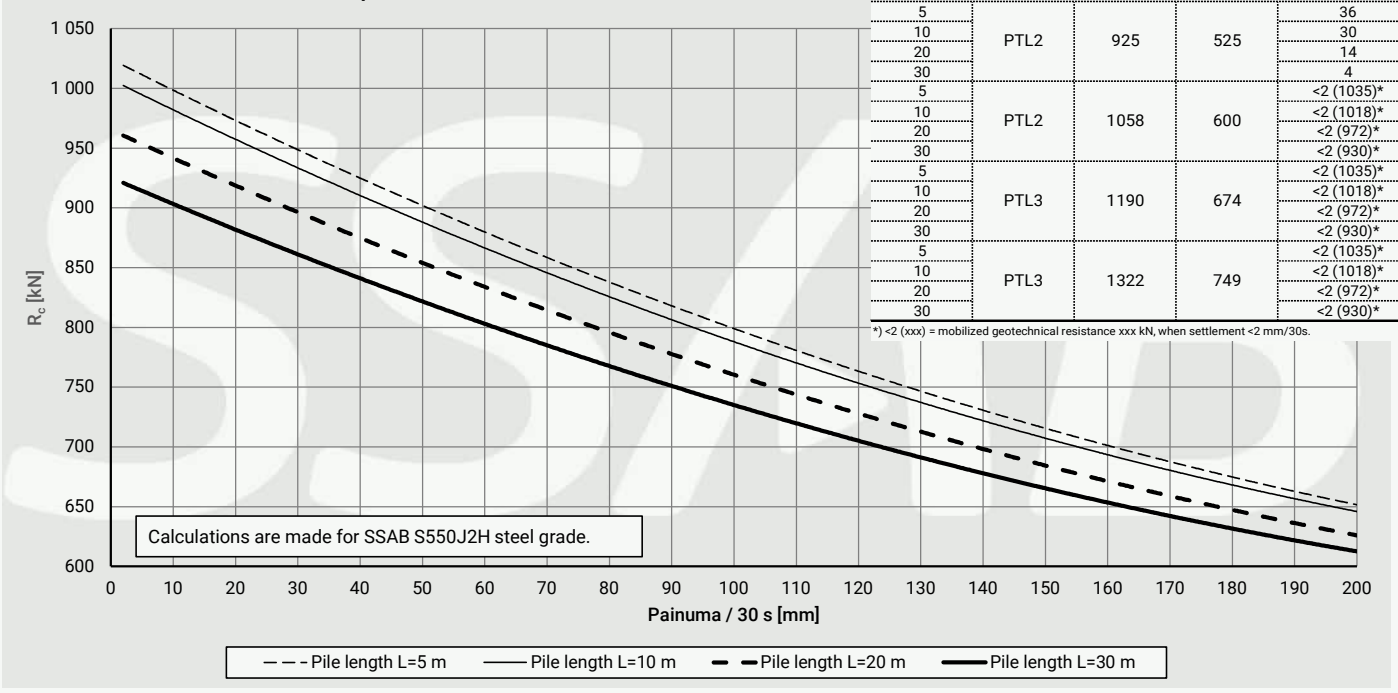


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	664	376	100
10				100
20				100
30				100
5	PTL2	774	439	100
10				100
20				93
30				76
5	PTL2	885	502	55
10				48
20				30
30				16
5	PTL3	995	564	11
10				8
20				<2 (972)*
30				<2 (930)*
5	PTL3	1106	627	<2 (1035)*
10				<2 (1018)*
20				<2 (972)*
30				<2 (930)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa F19 - RRs115/8

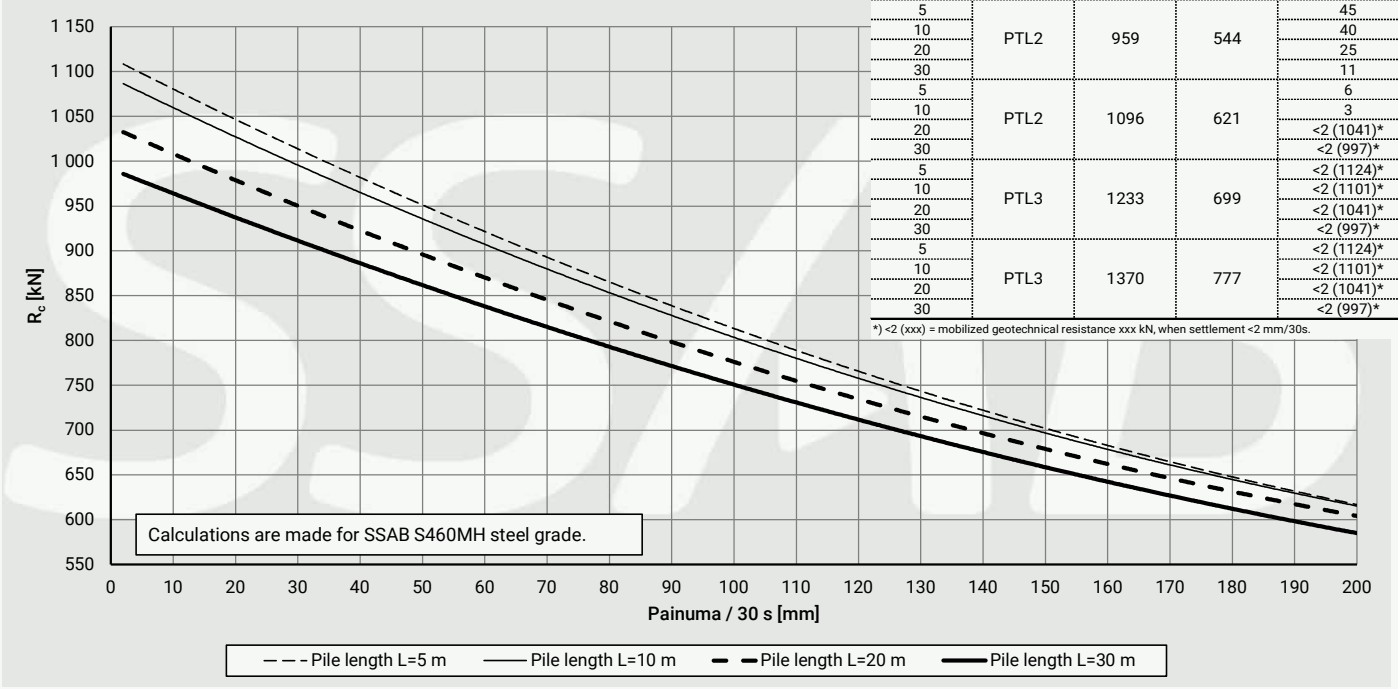


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	793	450	100
10				100
20				82
30				65
5	PTL2	925	525	36
10				30
20				14
30				4
5	PTL2	1058	600	<2 (1035)*
10				<2 (1018)*
20				<2 (972)*
30				<2 (930)*
5	PTL3	1190	674	<2 (1035)*
10				<2 (1018)*
20				<2 (972)*
30				<2 (930)*
5	PTL3	1322	749	<2 (1035)*
10				<2 (1018)*
20				<2 (972)*
30				<2 (930)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa F19 - RR140/8

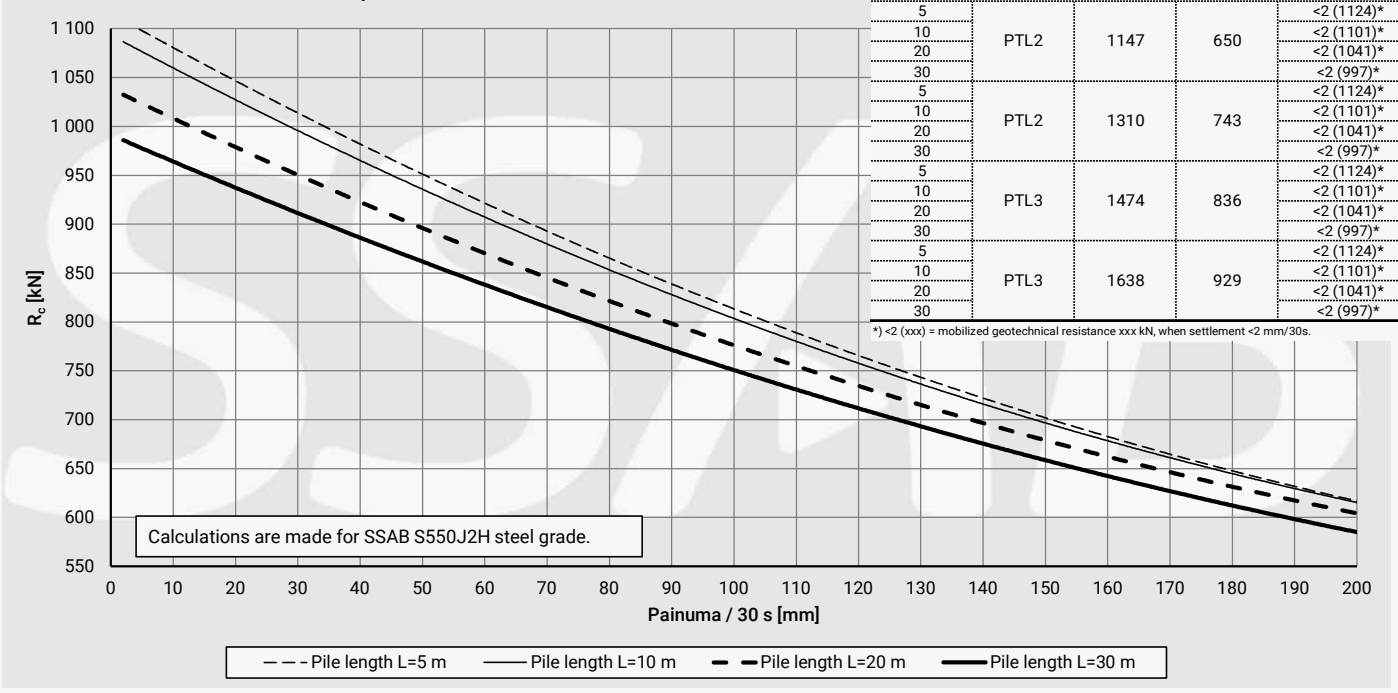


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	822	466	100
10				95
20				81
30				66
5	PTL2	959	544	45
10				40
20				25
30				11
5	PTL2	1096	621	6
10				3
20				<2 (1041)*
30				<2 (997)*
5	PTL3	1233	699	<2 (1124)*
10				<2 (1101)*
20				<2 (1041)*
30				<2 (997)*
5	PTL3	1370	777	<2 (1124)*
10				<2 (1101)*
20				<2 (1041)*
30				<2 (997)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa F19 - RRs140/8

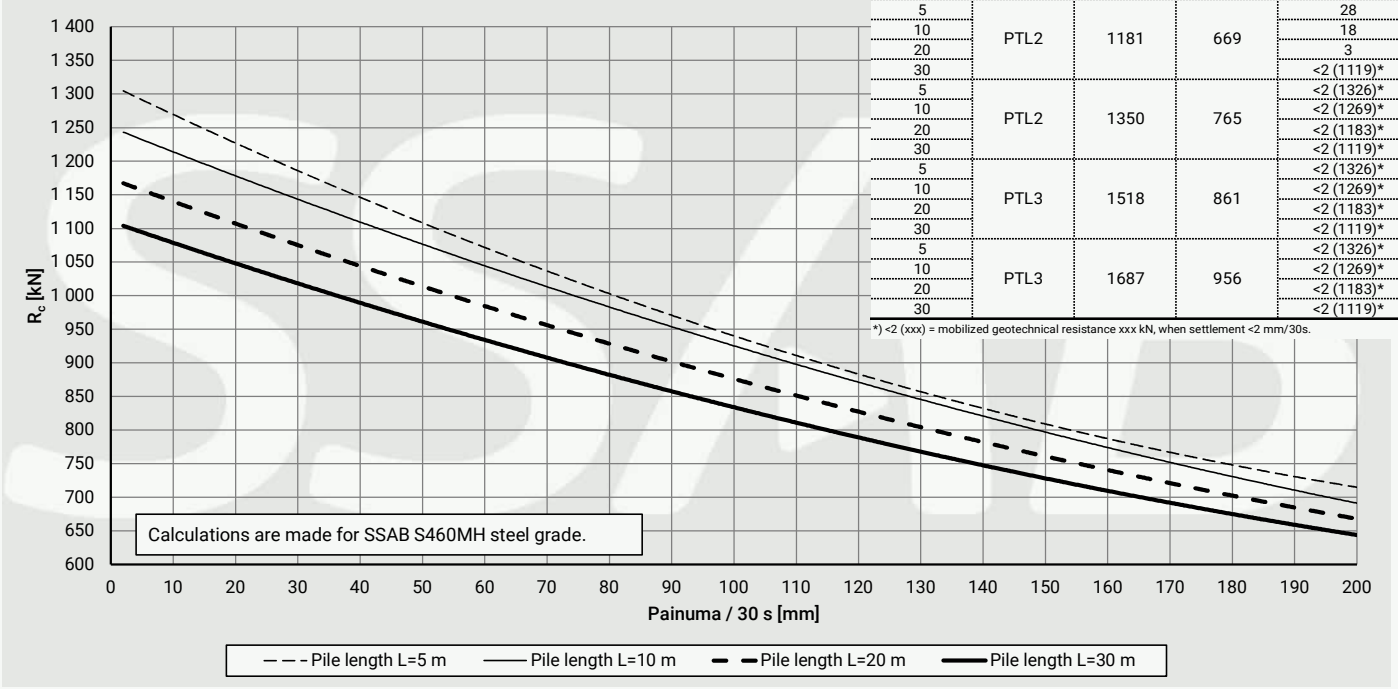


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	983	557	36
10				31
20				18
30				6
5	PTL2	1147	650	<2 (1124)*
10				<2 (1101)*
20				<2 (1041)*
30				<2 (997)*
5	PTL2	1310	743	<2 (1124)*
10				<2 (1101)*
20				<2 (1041)*
30				<2 (997)*
5	PTL3	1474	836	<2 (1124)*
10				<2 (1101)*
20				<2 (1041)*
30				<2 (997)*
5	PTL3	1638	929	<2 (1124)*
10				<2 (1101)*
20				<2 (1041)*
30				<2 (997)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa F19 - RR140/10

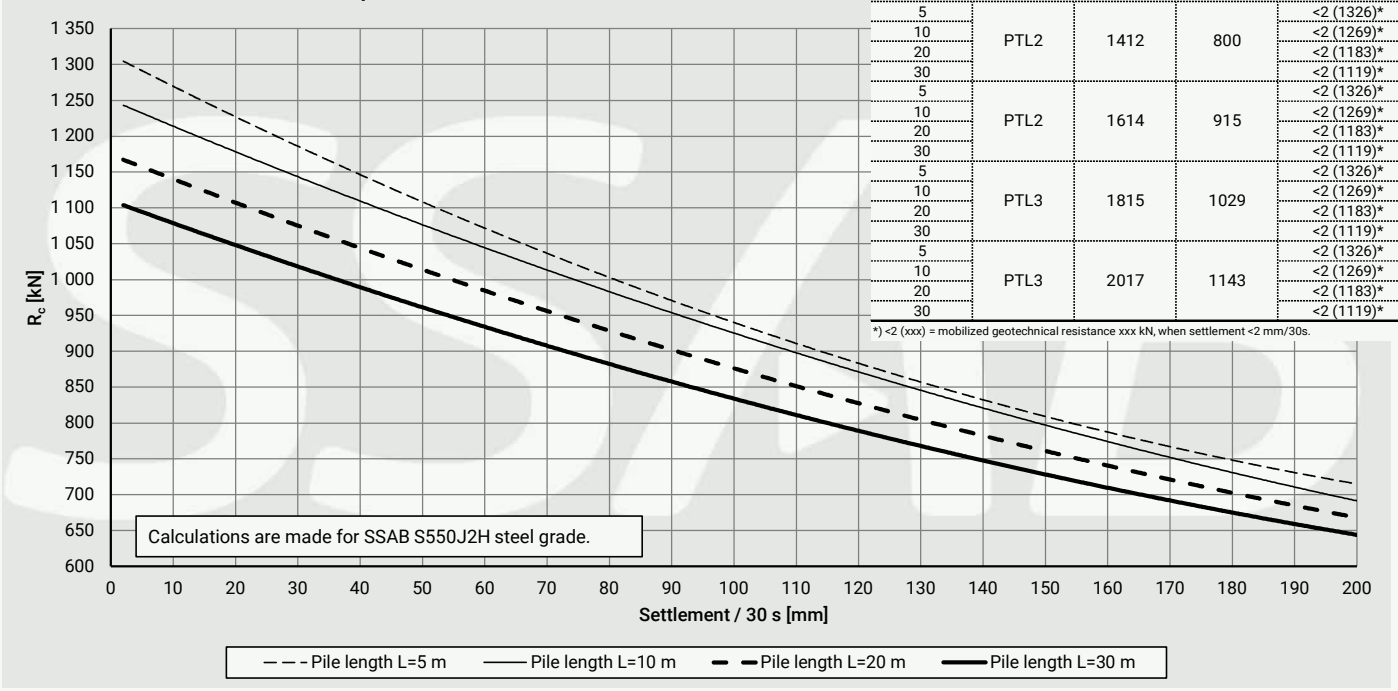


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1012	574	76
10				66
20				46
30				29
5	PTL2	1181	669	28
10				18
20				3
30				<2 (1119)*
5	PTL2	1350	765	<2 (1326)*
10				<2 (1269)*
20				<2 (1183)*
30				<2 (1119)*
5	PTL3	1518	861	<2 (1326)*
10				<2 (1269)*
20				<2 (1183)*
30				<2 (1119)*
5	PTL3	1687	956	<2 (1326)*
10				<2 (1269)*
20				<2 (1183)*
30				<2 (1119)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa F19 - RRs140/10

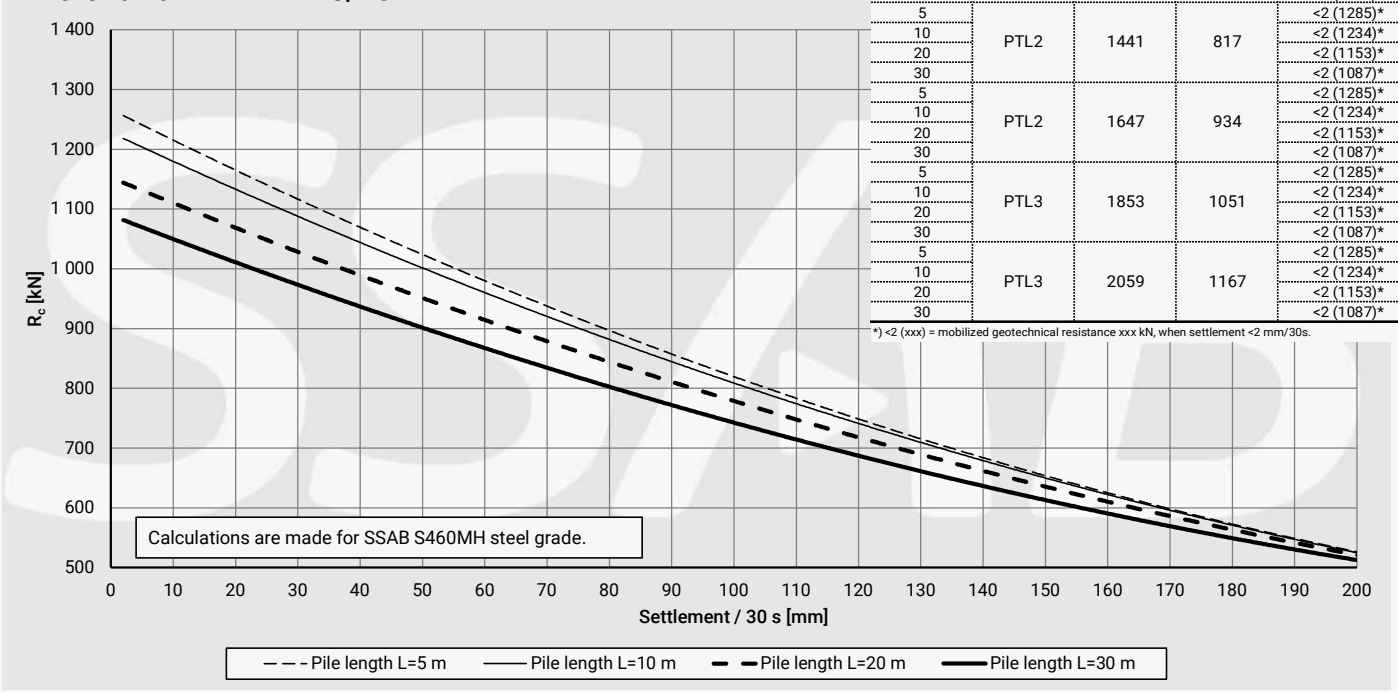


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1210	686	20
10				11
20				<2 (1183)*
30				<2 (1119)*
5	PTL2	1412	800	<2 (1326)*
10				<2 (1269)*
20				<2 (1183)*
30				<2 (1119)*
5	PTL2	1614	915	<2 (1326)*
10				<2 (1269)*
20				<2 (1183)*
30				<2 (1119)*
5	PTL3	1815	1029	<2 (1326)*
10				<2 (1269)*
20				<2 (1183)*
30				<2 (1119)*
5	PTL3	2017	1143	<2 (1326)*
10				<2 (1269)*
20				<2 (1183)*
30				<2 (1119)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa F19 - RR170/10



Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1235	700	7
10				<2 (1234)*
20				<2 (1153)*
30				<2 (1087)*
5	PTL2	1441	817	<2 (1285)*
10				<2 (1234)*
20				<2 (1153)*
30				<2 (1087)*
5	PTL2	1647	934	<2 (1285)*
10				<2 (1234)*
20				<2 (1153)*
30				<2 (1087)*
5	PTL3	1853	1051	<2 (1285)*
10				<2 (1234)*
20				<2 (1153)*
30				<2 (1087)*
5	PTL3	2059	1167	<2 (1285)*
10				<2 (1234)*
20				<2 (1153)*
30				<2 (1087)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa FXJ175

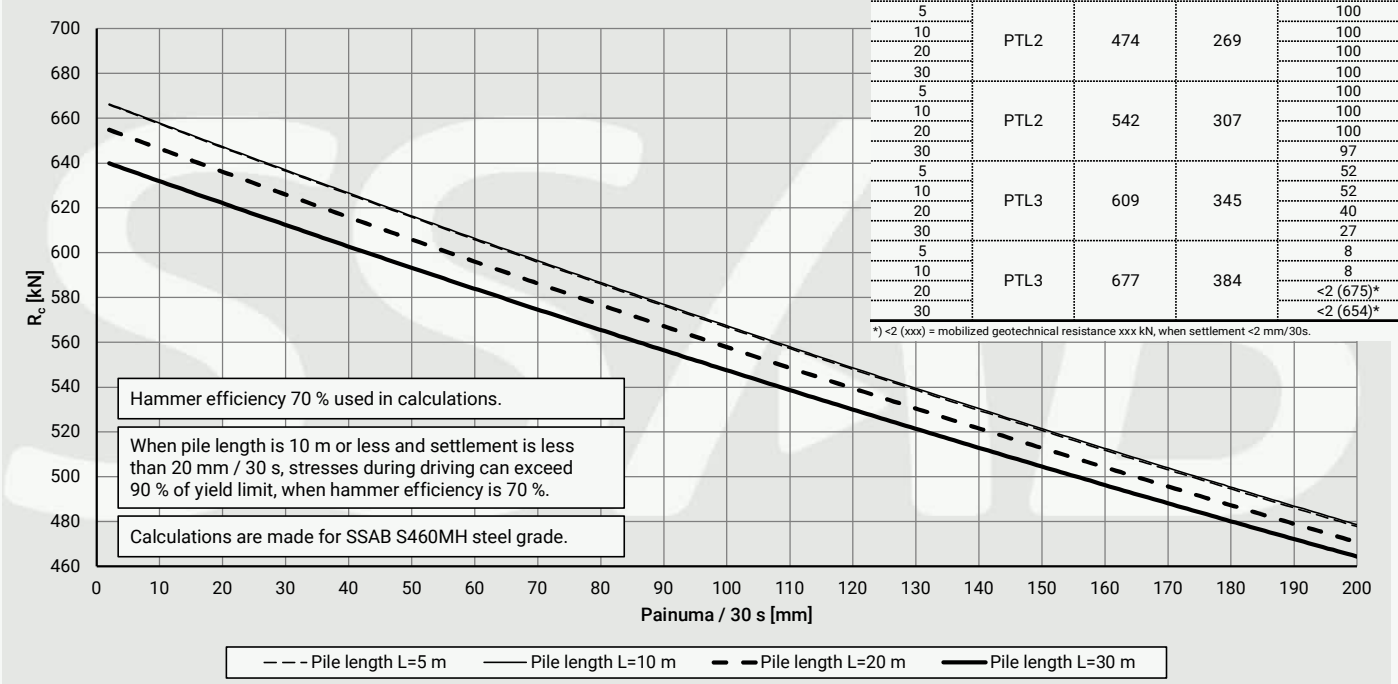
Piston		
Piston weight [kg]	m_r	58
Diameter of the piston [mm]	D_r	120
Length of the piston [mm]	L_r	650
Theoretical impact energy [J]	E_{rated}	3610
Efficiency of the piston [%]	HE	80
Equivalent drop height [m]	H_{ekv}	6.33
Theoretical impact rate [blows/min]	BPM	450-900
Actual impact rate vrs theoretical [%]	η	56
Measured / in analysis used impact rate [blows/min]	BPM_m	500
Impact tool		
Diameter of the tool [mm]	D_t	120
Height of the tool [mm]	L_t	800
Tool weight [kg]	m_t	71

Hammer efficiency 70 %

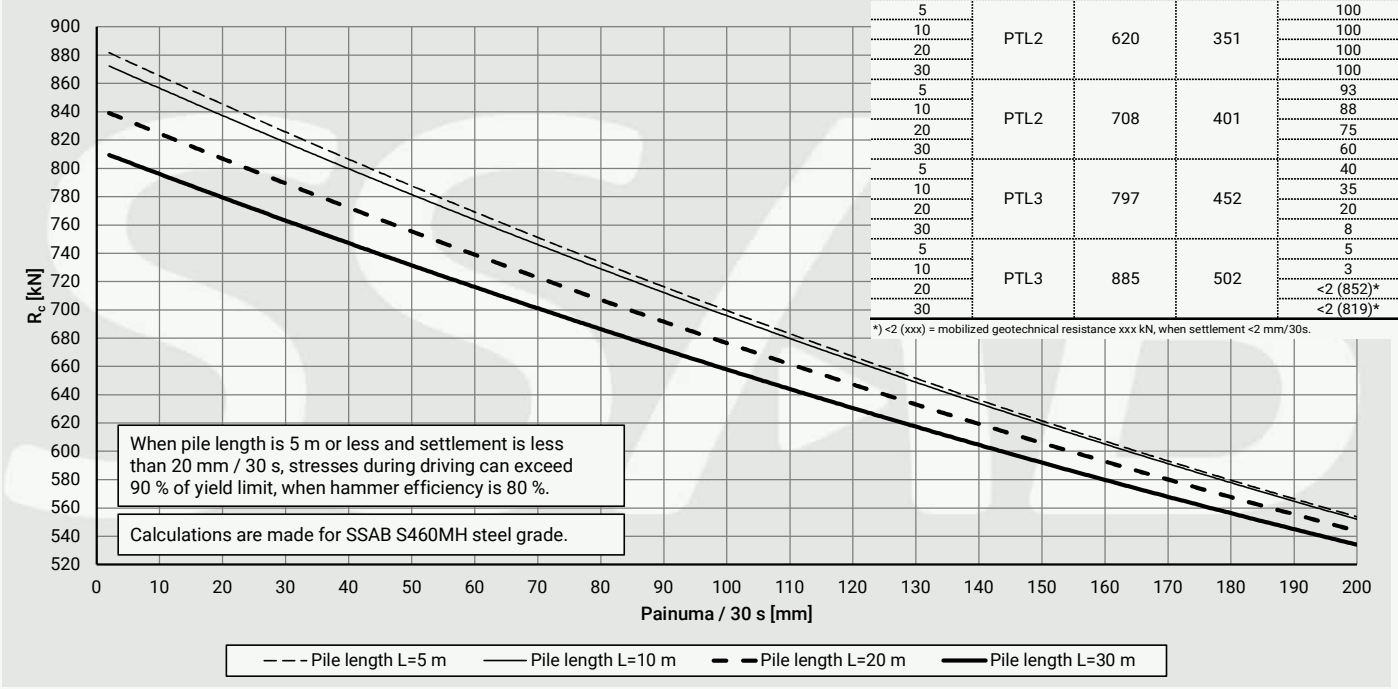
Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	406	230	100
10				100
20				100
30				100
5	PTL2	474	269	100
10				100
20				100
30				100
5	PTL2	542	307	100
10				100
20				100
30				97
5	PTL3	609	345	52
10				52
20				40
30				27
5	PTL3	677	384	8
10				8
20				<2 (675)*
30				<2 (654)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa FXJ175 - RR90



Furukawa FXJ175 - RR115/6.3

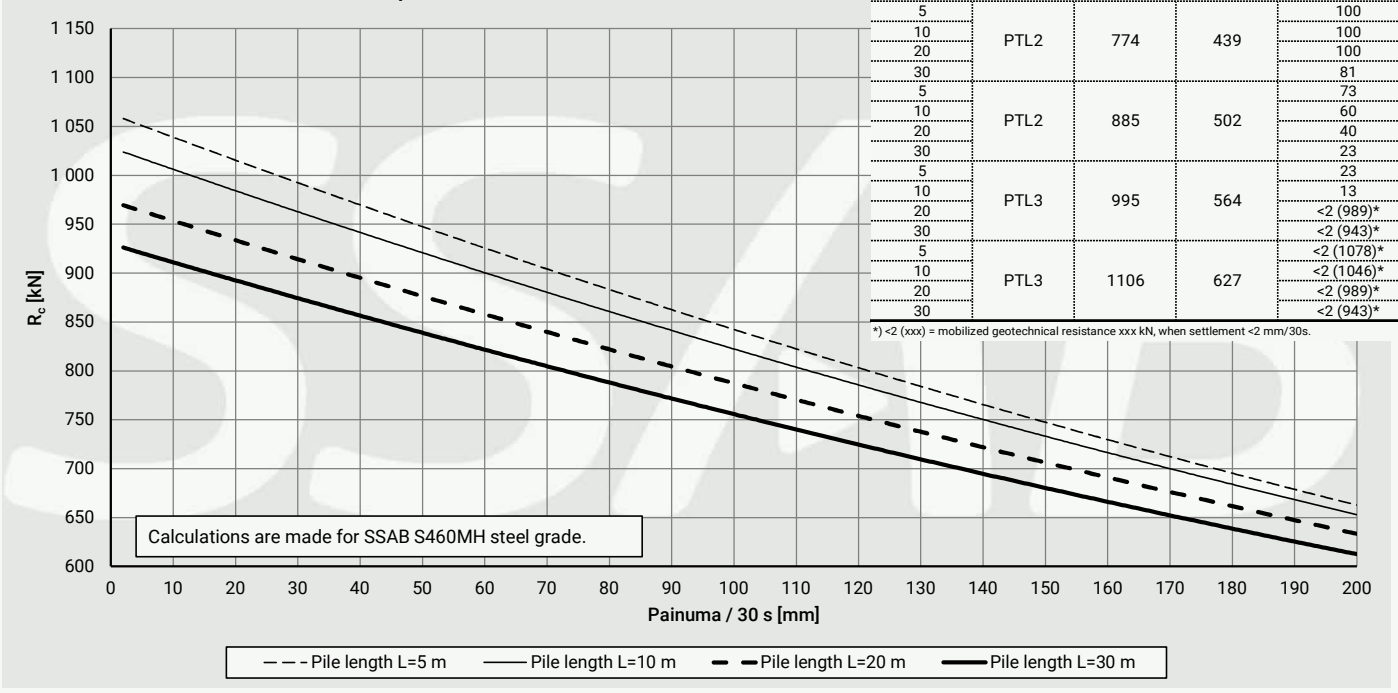


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	531	301	100
10				100
20				100
30				100
5	PTL2	620	351	100
10				100
20				100
30				100
5	PTL2	708	401	93
10				88
20				75
30				60
5	PTL3	797	452	40
10				35
20				20
30				8
5	PTL3	885	502	5
10				3
20				<2 (852)*
30				<2 (819)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa FXJ175 - RR115/8

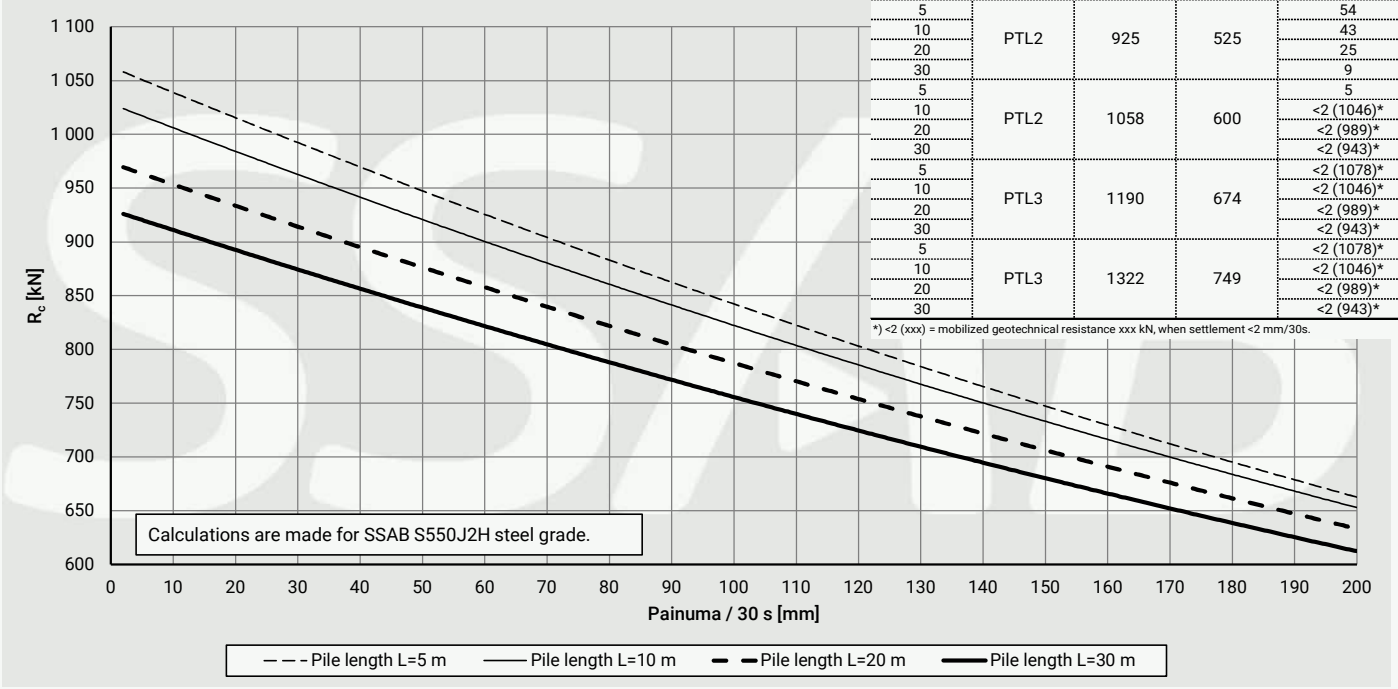


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	664	376	100
10				100
20				100
30				100
5	PTL2	774	439	100
10				100
20				100
30				81
5	PTL2	885	502	73
10				60
20				40
30				23
5	PTL3	995	564	23
10				13
20				<2 (989)*
30				<2 (943)*
5	PTL3	1106	627	<2 (1078)*
10				<2 (1046)*
20				<2 (989)*
30				<2 (943)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa FXJ175 - RRs115/8

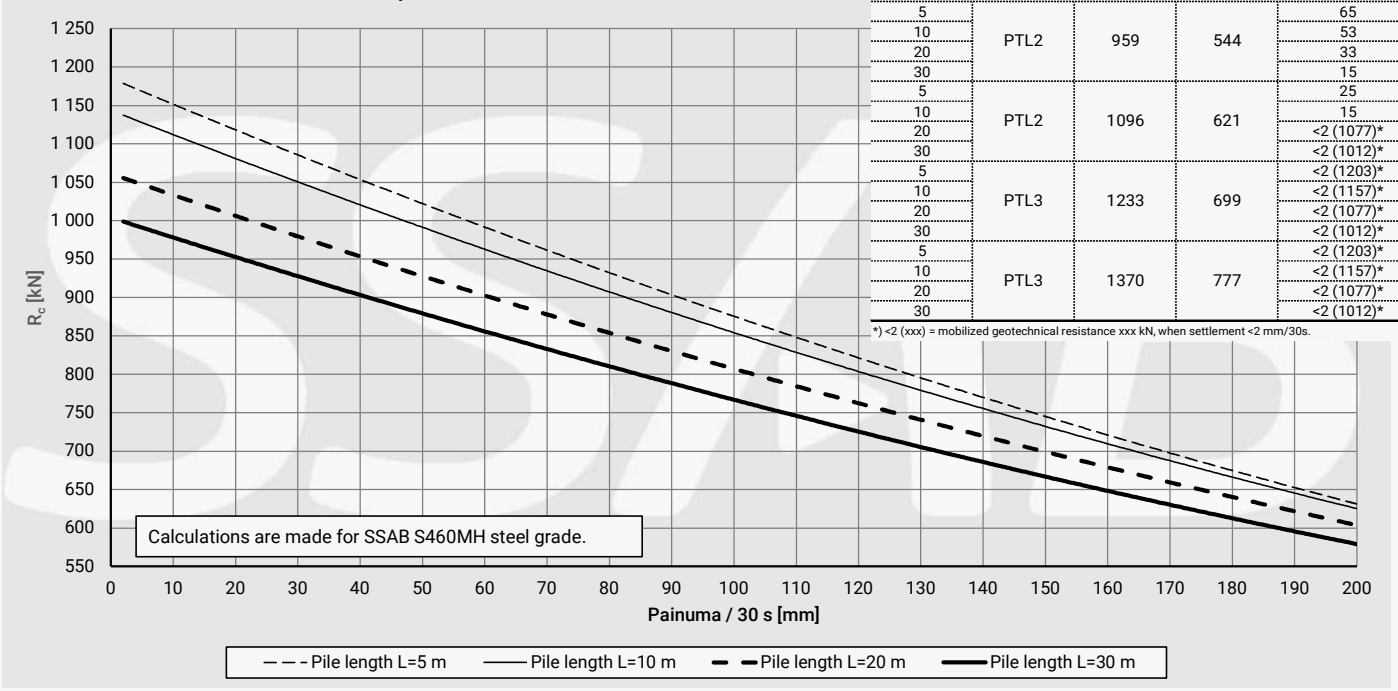


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	793	450	100
10				100
20				90
30				70
5	PTL2	925	525	54
10				43
20				25
30				9
5	PTL2	1058	600	5
10				<2 (1046)*
20				<2 (989)*
30				<2 (943)*
5	PTL3	1190	674	<2 (1078)*
10				<2 (1046)*
20				<2 (989)*
30				<2 (943)*
5	PTL3	1322	749	<2 (1078)*
10				<2 (1046)*
20				<2 (989)*
30				<2 (943)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa FXJ175 - RR140/8

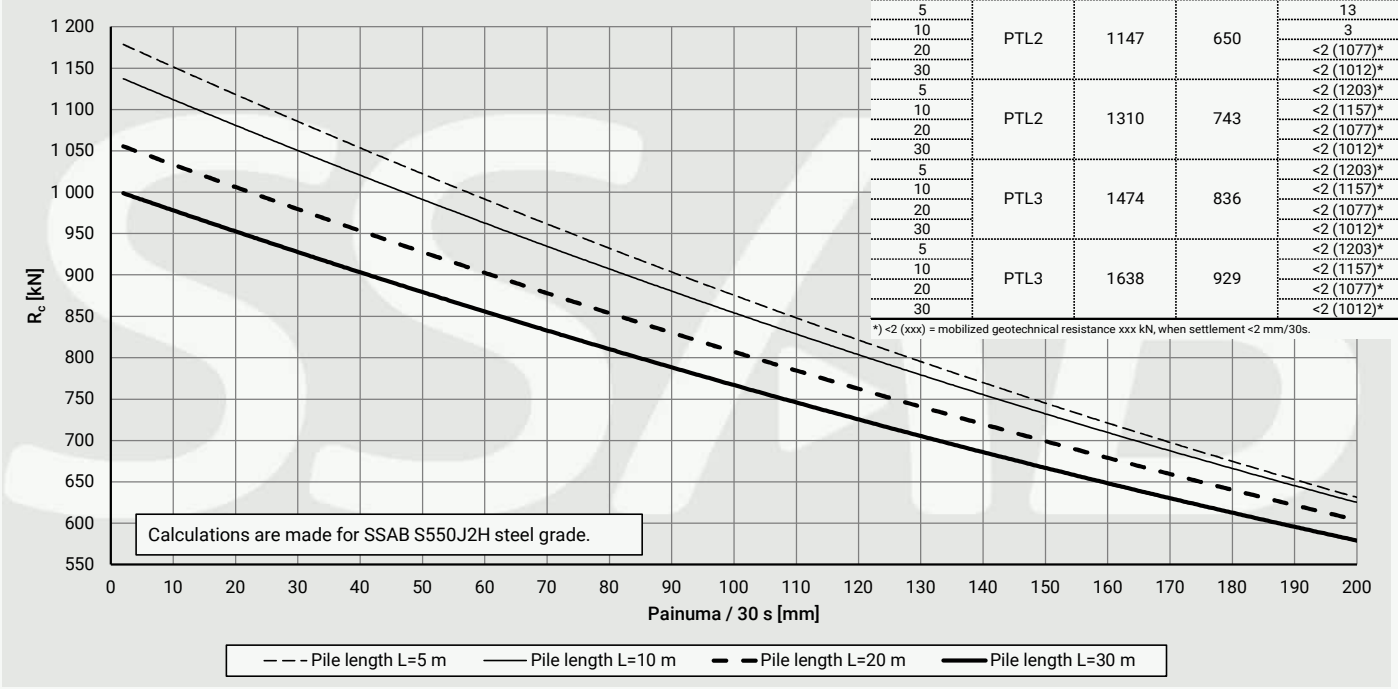


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	822	466	100
10				100
20				90
30				70
5	PTL2	959	544	65
10				53
20				33
30				15
5	PTL2	1096	621	25
10				15
20				<2 (1077)*
30				<2 (1012)*
5	PTL3	1233	699	<2 (1203)*
10				<2 (1157)*
20				<2 (1077)*
30				<2 (1012)*
5	PTL3	1370	777	<2 (1203)*
10				<2 (1157)*
20				<2 (1077)*
30				<2 (1012)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa FXJ175 - RRs140/8

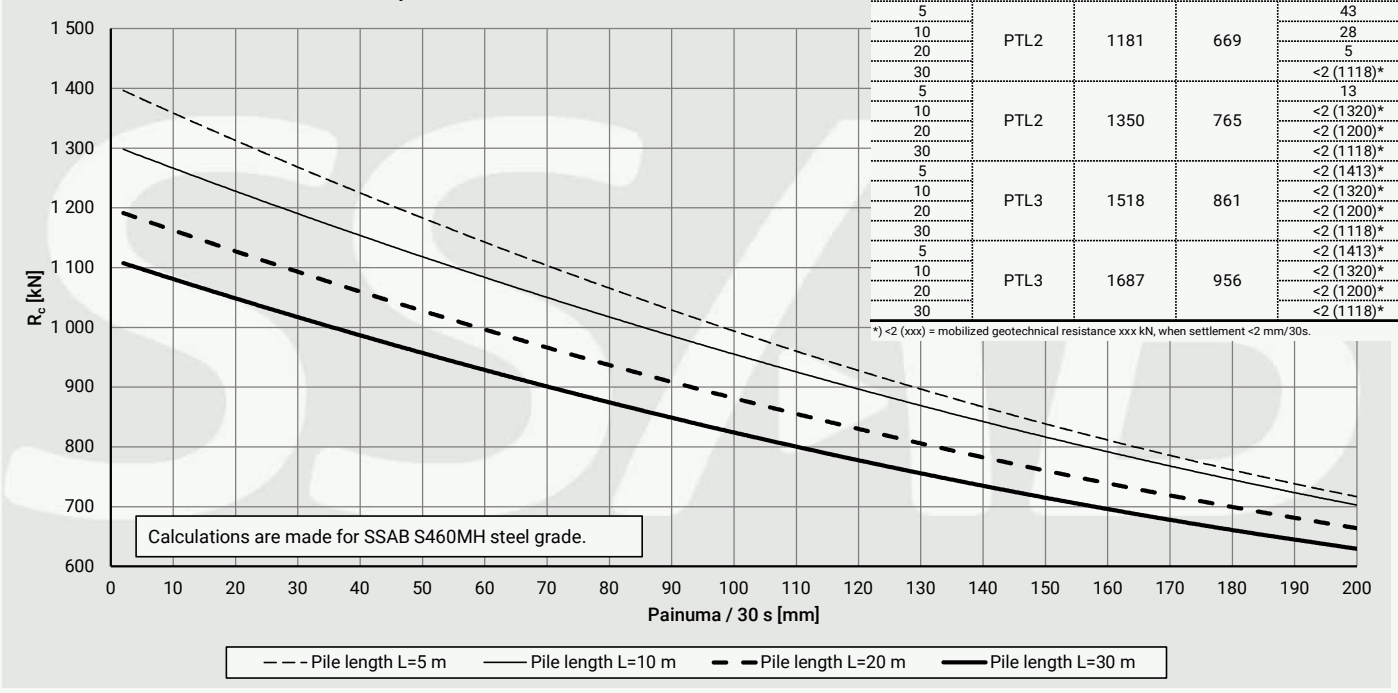


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	983	557	55
10				45
20				25
30				8
5	PTL2	1147	650	13
10				3
20				<2 (1077)*
30				<2 (1012)*
5	PTL2	1310	743	<2 (1203)*
10				<2 (1157)*
20				<2 (1077)*
30				<2 (1012)*
5	PTL3	1474	836	<2 (1203)*
10				<2 (1157)*
20				<2 (1077)*
30				<2 (1012)*
5	PTL3	1638	929	<2 (1203)*
10				<2 (1157)*
20				<2 (1077)*
30				<2 (1012)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa FXJ175 - RR140/10

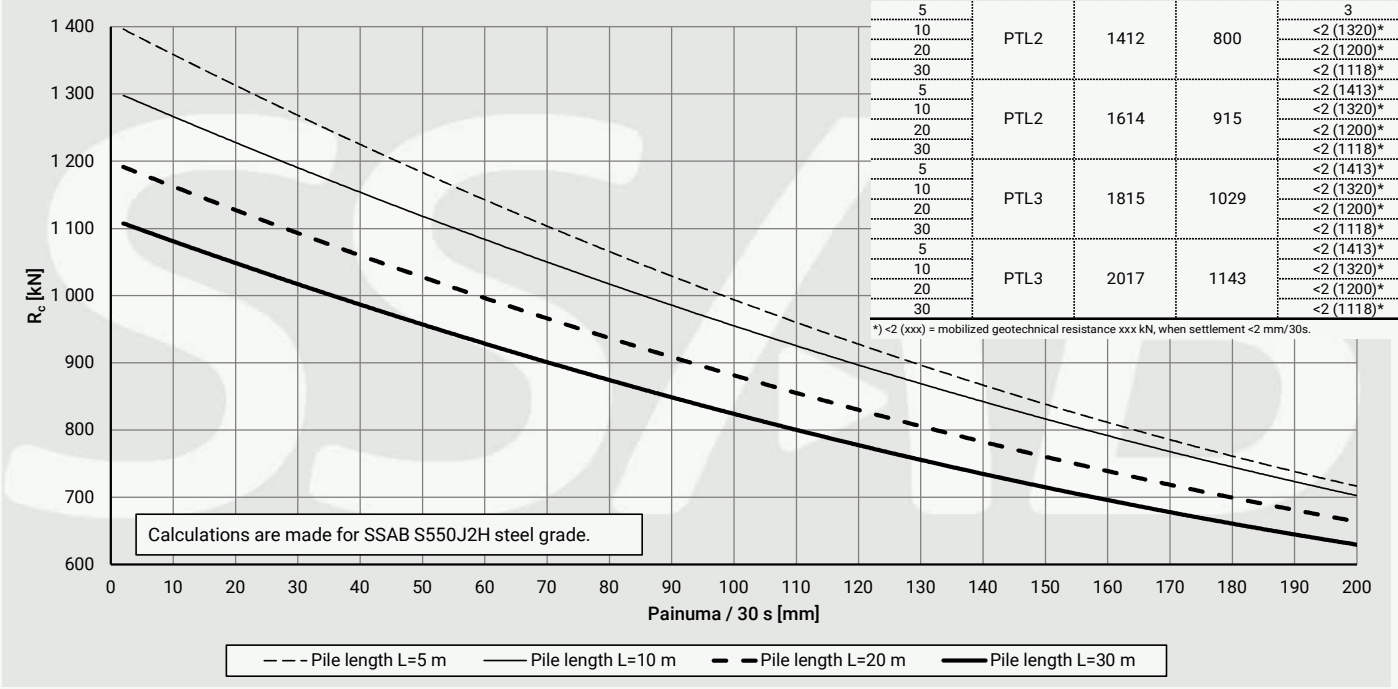


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1012	574	95
10				80
20				50
30				27
5	PTL2	1181	669	43
10				28
20				5
30				<2 (1118)*
5	PTL2	1350	765	13
10				<2 (1320)*
20				<2 (1200)*
30				<2 (1118)*
5	PTL3	1518	861	<2 (1413)*
10				<2 (1320)*
20				<2 (1200)*
30				<2 (1118)*
5	PTL3	1687	956	<2 (1413)*
10				<2 (1320)*
20				<2 (1200)*
30				<2 (1118)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa FXJ175 - RRs140/10

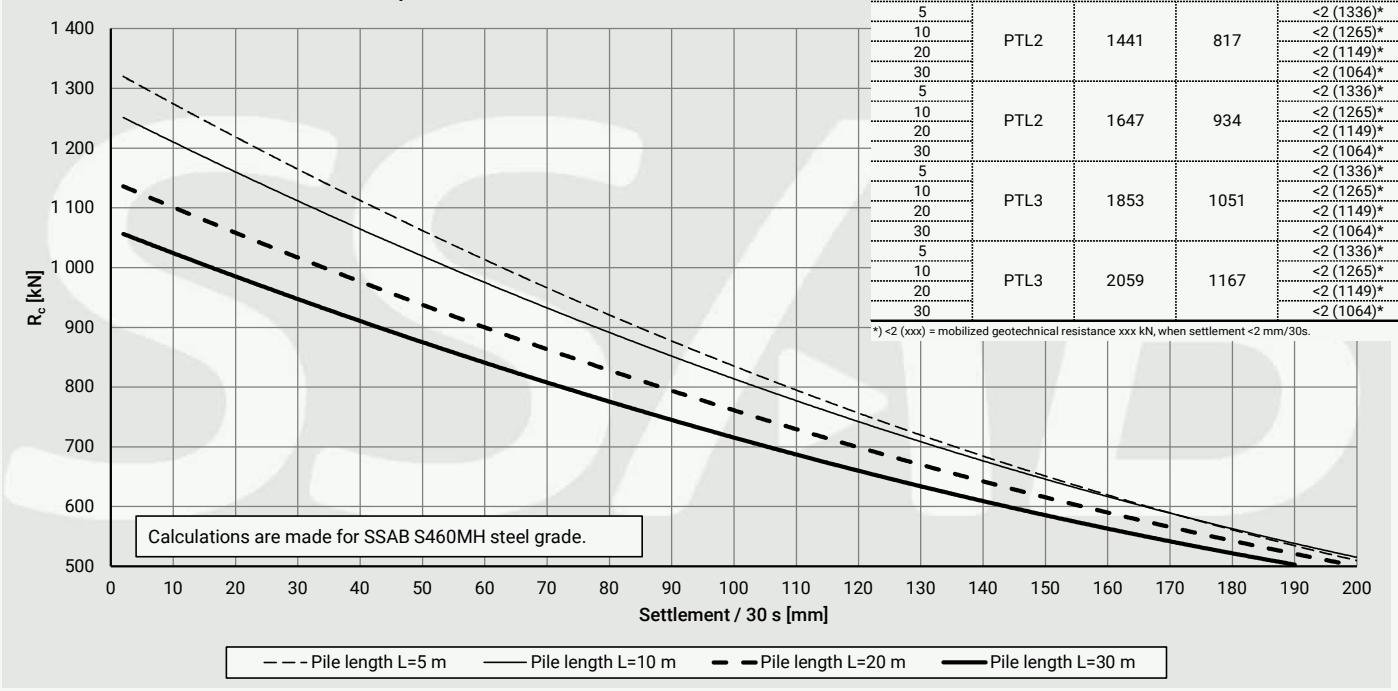


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1210	686	37
10				22
20				<2 (1200)*
30				<2 (1118)*
5	PTL2	1412	800	3
10				<2 (1320)*
20				<2 (1200)*
30				<2 (1118)*
5	PTL2	1614	915	<2 (1413)*
10				<2 (1320)*
20				<2 (1200)*
30				<2 (1118)*
5	PTL3	1815	1029	<2 (1413)*
10				<2 (1320)*
20				<2 (1200)*
30				<2 (1118)*
5	PTL3	2017	1143	<2 (1413)*
10				<2 (1320)*
20				<2 (1200)*
30				<2 (1118)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa FXJ175 - RR170/10



Hammer efficiency 80 %

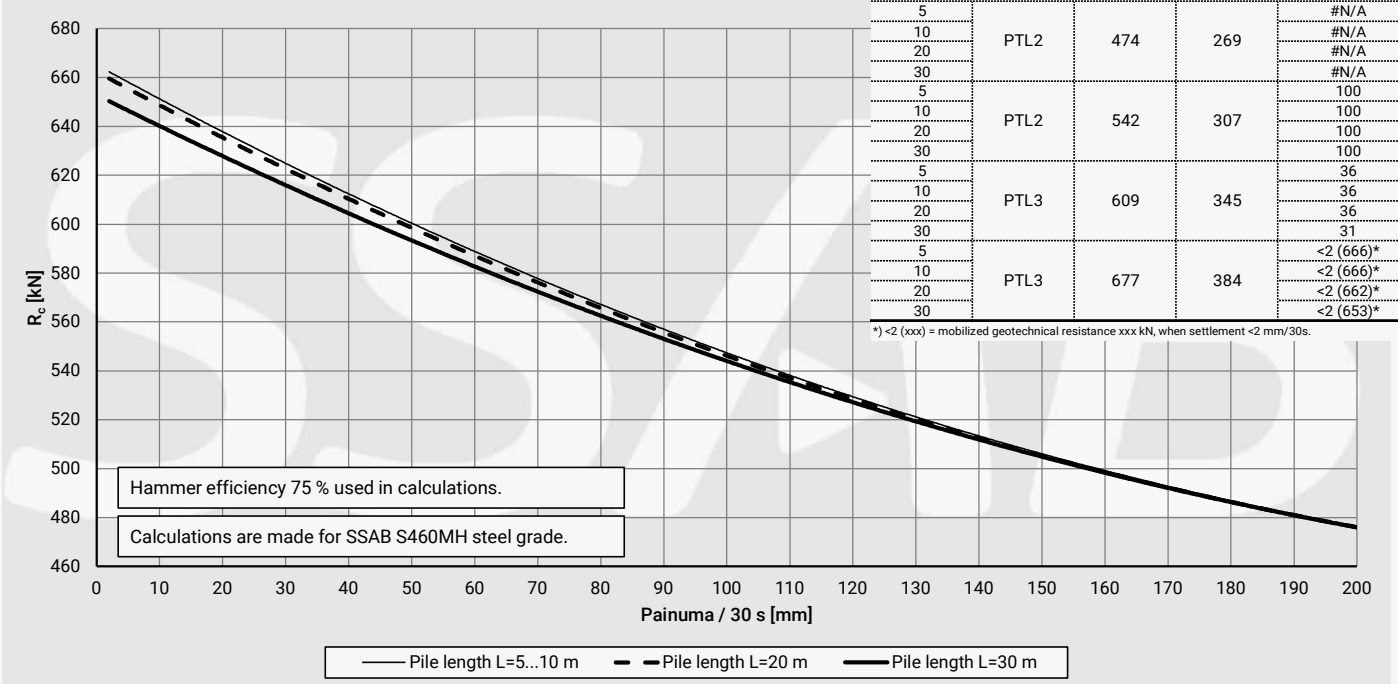
Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1235	700	16
10				5
20				<2 (1149)*
30				<2 (1064)*
5	PTL2	1441	817	<2 (1336)*
10				<2 (1265)*
20				<2 (1149)*
30				<2 (1064)*
5	PTL2	1647	934	<2 (1336)*
10				<2 (1265)*
20				<2 (1149)*
30				<2 (1064)*
5	PTL3	1853	1051	<2 (1336)*
10				<2 (1265)*
20				<2 (1149)*
30				<2 (1064)*
5	PTL3	2059	1167	<2 (1336)*
10				<2 (1265)*
20				<2 (1149)*
30				<2 (1064)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa HB20G

Piston		
Piston weight [kg]	m_r	101
Diameter of the piston [mm]	D_r	135
Length of the piston [mm]	L_r	900
Theoretical impact energy [J]	E_{rated}	4119
Efficiency of the piston [%]	HE	80
Equivalent drop height [m]	H_{ekv}	4.16
Theoretical impact rate [blows/min]	BPM	400/800
Actual impact rate vrs theoretical [%]	η	65
Measured / in analysis used impact rate [blows/min]	BPM_m	520
Impact tool		
Diameter of the tool [mm]	D_t	135
Height of the tool [mm]	L_t	1200
Tool weight [kg]	m_t	135

Furukawa HB20G - RR90

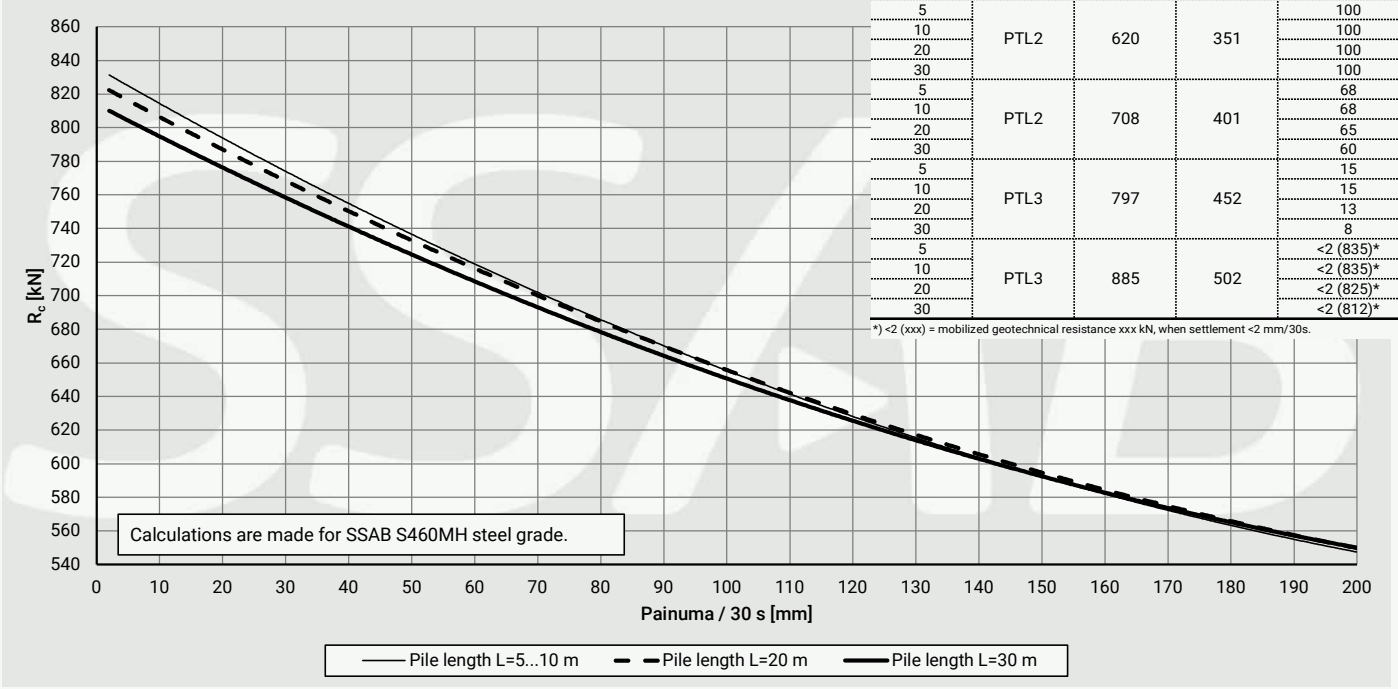


Hammer efficiency 75 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	406	230	100
10				100
20				100
30				100
5	PTL2	474	269	#N/A
10				#N/A
20				#N/A
30				#N/A
5	PTL2	542	307	100
10				100
20				100
30				100
5	PTL3	609	345	36
10				36
20				36
30				31
5	PTL3	677	384	<2 (666)*
10				<2 (666)*
20				<2 (662)*
30				<2 (653)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa HB20G - RR115/6.3

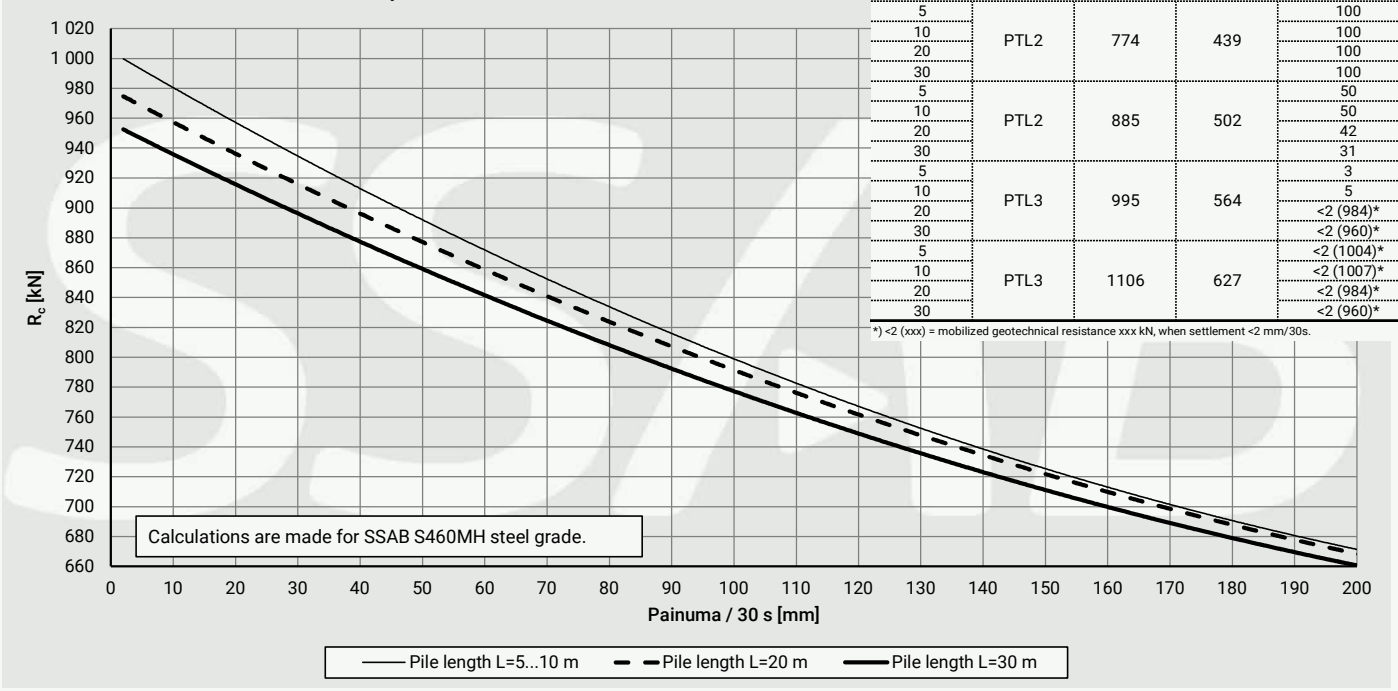


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	531	301	100
10				100
20				100
30				100
5	PTL2	620	351	100
10				100
20				100
30				100
5	PTL2	708	401	68
10				68
20				65
30				60
5	PTL3	797	452	15
10				15
20				13
30				8
5	PTL3	885	502	<2 (835)*
10				<2 (835)*
20				<2 (825)*
30				<2 (812)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa HB20G - RR115/8

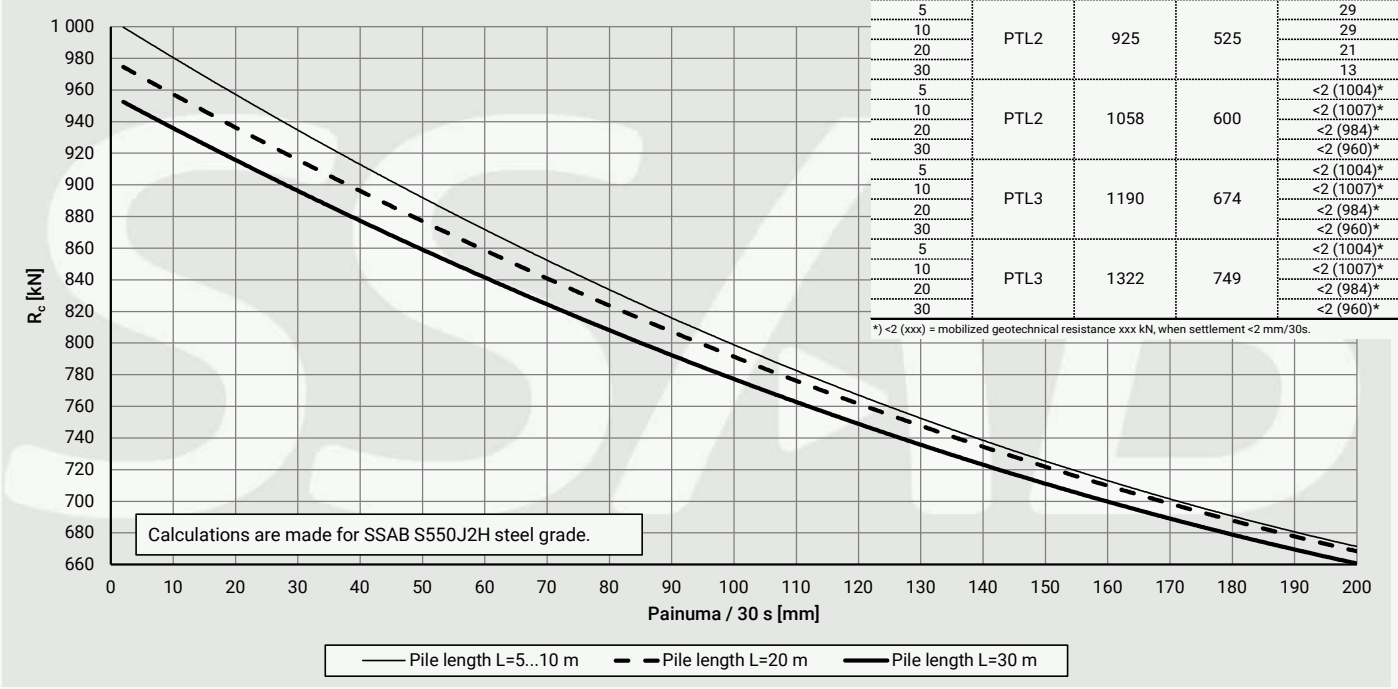


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	664	376	100
10				100
20				100
30				100
5	PTL2	774	439	100
10				100
20				100
30				100
5	PTL2	885	502	50
10				50
20				42
30				31
5	PTL3	995	564	3
10				5
20				<2 (984)*
30				<2 (960)*
5	PTL3	1106	627	<2 (1004)*
10				<2 (1007)*
20				<2 (984)*
30				<2 (960)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa HB20G - RRs115/8

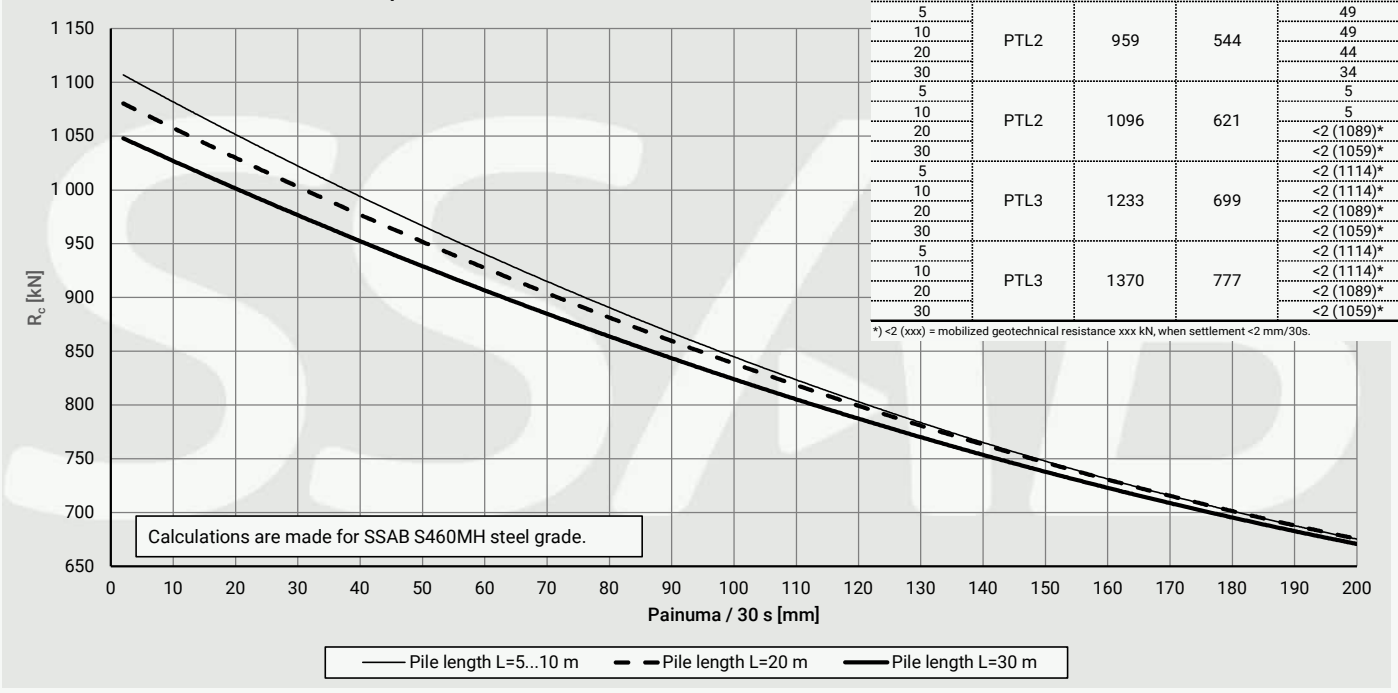


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	793	450	100
10				100
20				100
30				91
5	PTL2	925	525	29
10				29
20				21
30				13
5	PTL2	1058	600	<2 (1004)*
10				<2 (1007)*
20				<2 (984)*
30				<2 (960)*
5	PTL3	1190	674	<2 (1004)*
10				<2 (1007)*
20				<2 (984)*
30				<2 (960)*
5	PTL3	1322	749	<2 (1004)*
10				<2 (1007)*
20				<2 (984)*
30				<2 (960)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa HB20G - RR140/8

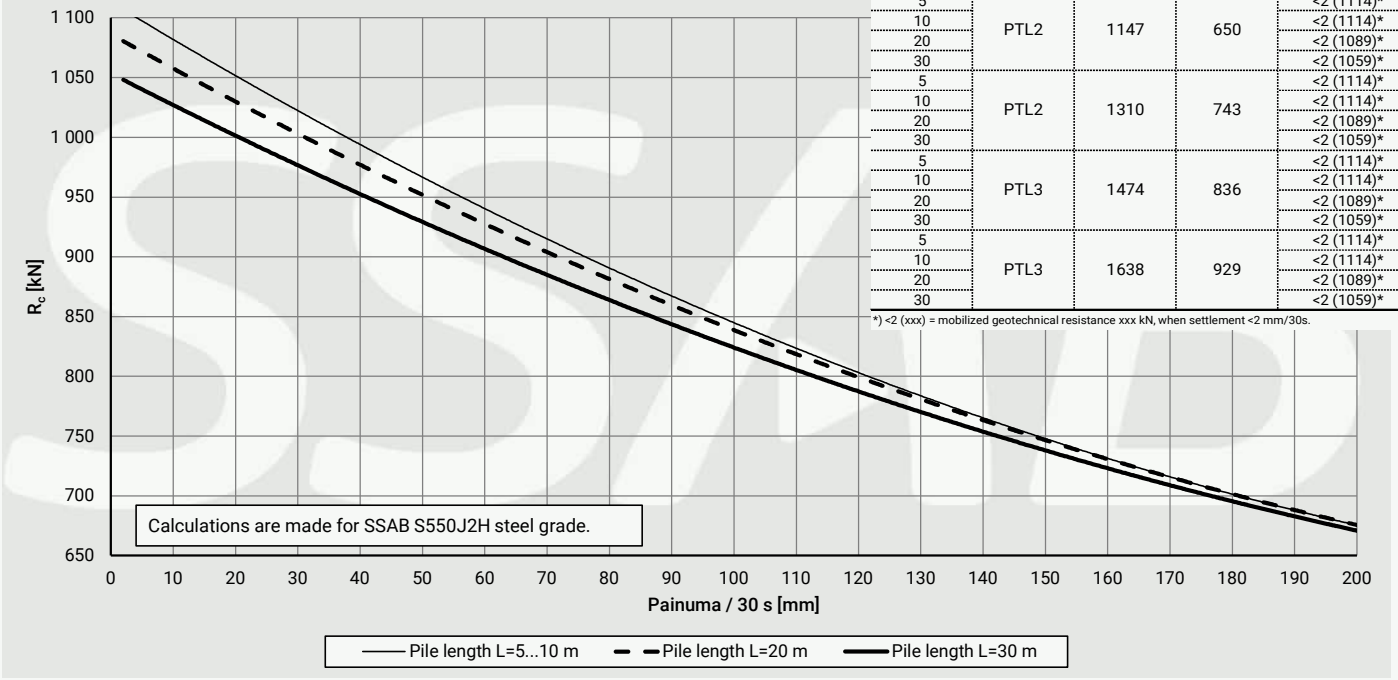


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	822	466	100
10				100
20				100
30				100
5	PTL2	959	544	49
10				49
20				44
30				34
5	PTL2	1096	621	5
10				5
20				<2 (1089)*
30				<2 (1059)*
5	PTL3	1233	699	<2 (1114)*
10				<2 (1114)*
20				<2 (1089)*
30				<2 (1059)*
5	PTL3	1370	777	<2 (1114)*
10				<2 (1114)*
20				<2 (1089)*
30				<2 (1059)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa HB20G - RRs140/8

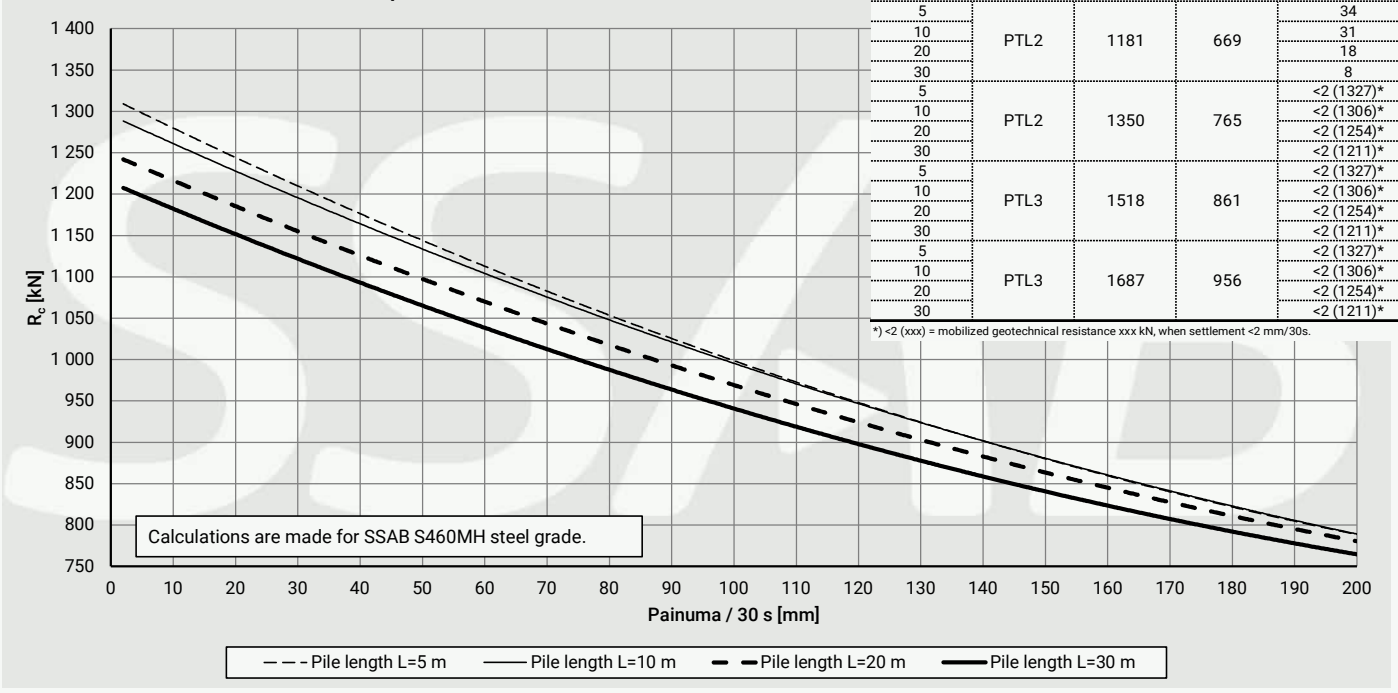


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	983	557	42
10				42
20				34
30				23
5	PTL2	1147	650	<2 (1114)*
10				<2 (1114)*
20				<2 (1089)*
30				<2 (1059)*
5	PTL2	1310	743	<2 (1114)*
10				<2 (1114)*
20				<2 (1089)*
30				<2 (1059)*
5	PTL3	1474	836	<2 (1114)*
10				<2 (1114)*
20				<2 (1089)*
30				<2 (1059)*
5	PTL3	1638	929	<2 (1114)*
10				<2 (1114)*
20				<2 (1089)*
30				<2 (1059)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa HB20G - RR140/10

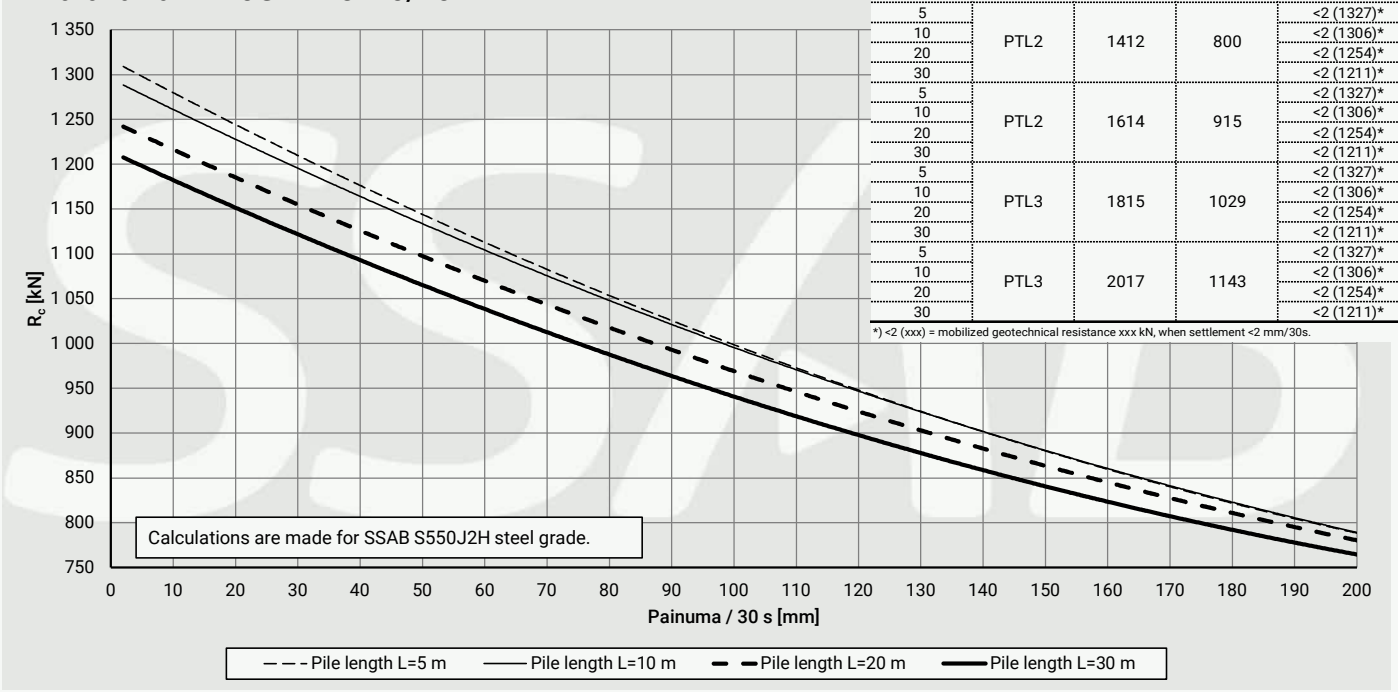


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1012	574	96
10				94
20				81
30				68
5	PTL2	1181	669	34
10				31
20				18
30				8
5	PTL2	1350	765	<2 (1327)*
10				<2 (1306)*
20				<2 (1254)*
30				<2 (1211)*
5	PTL3	1518	861	<2 (1327)*
10				<2 (1306)*
20				<2 (1254)*
30				<2 (1211)*
5	PTL3	1687	956	<2 (1327)*
10				<2 (1306)*
20				<2 (1254)*
30				<2 (1211)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa HB20G - RRs140/10

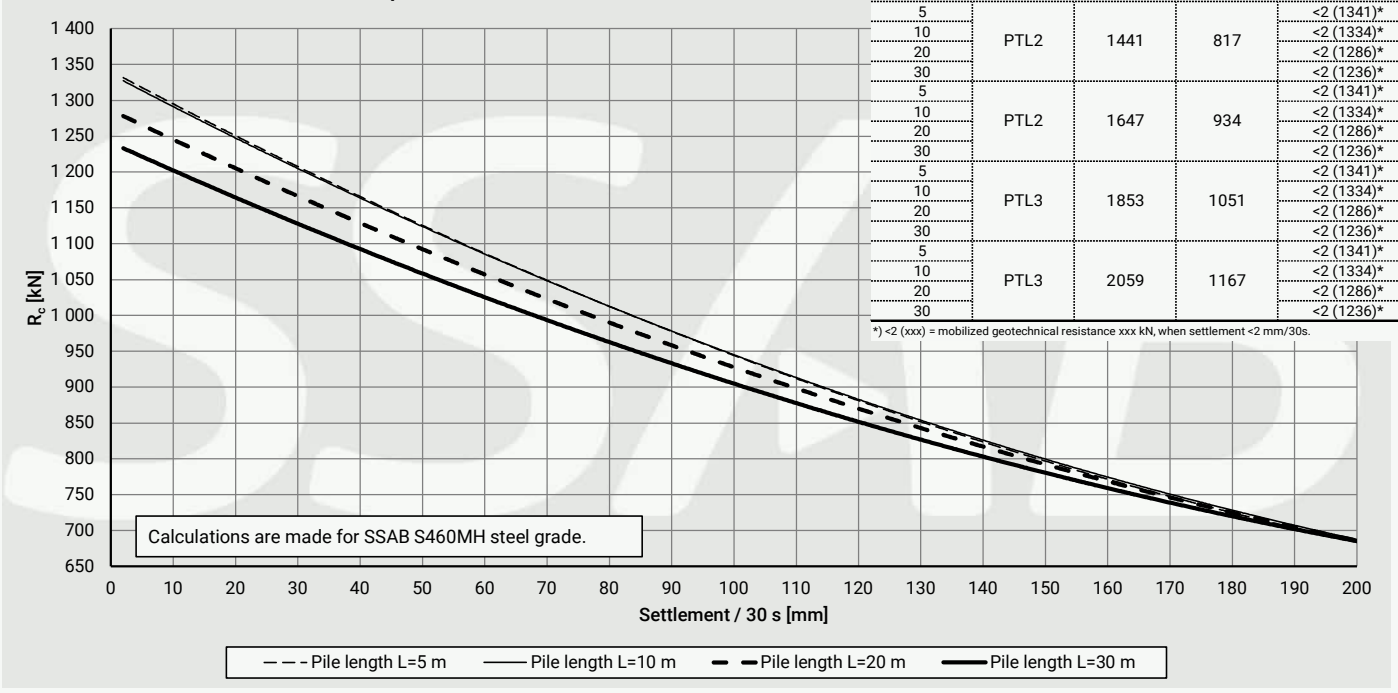


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1210	686	26
10				21
20				10
30				3
5	PTL2	1412	800	<2 (1327)*
10				<2 (1306)*
20				<2 (1254)*
30				<2 (1211)*
5	PTL2	1614	915	<2 (1327)*
10				<2 (1306)*
20				<2 (1254)*
30				<2 (1211)*
5	PTL3	1815	1029	<2 (1327)*
10				<2 (1306)*
20				<2 (1254)*
30				<2 (1211)*
5	PTL3	2017	1143	<2 (1327)*
10				<2 (1306)*
20				<2 (1254)*
30				<2 (1211)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa HB20G - RR170/10

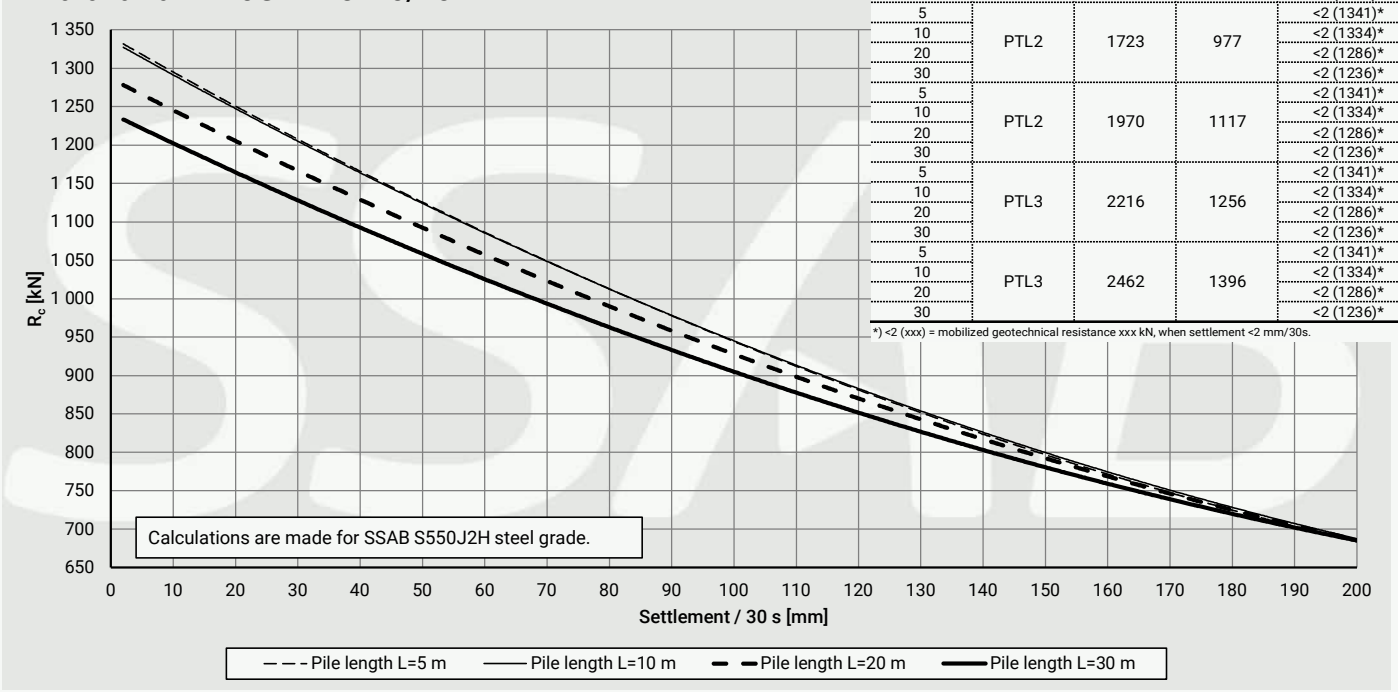


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1235	700	21
10				21
20				10
30				3
5	PTL2	1441	817	<2 (1341)*
10				<2 (1334)*
20				<2 (1286)*
30				<2 (1236)*
5	PTL2	1647	934	<2 (1341)*
10				<2 (1334)*
20				<2 (1286)*
30				<2 (1236)*
5	PTL3	1853	1051	<2 (1341)*
10				<2 (1334)*
20				<2 (1286)*
30				<2 (1236)*
5	PTL3	2059	1167	<2 (1341)*
10				<2 (1334)*
20				<2 (1286)*
30				<2 (1236)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa HB20G - RRs170/10

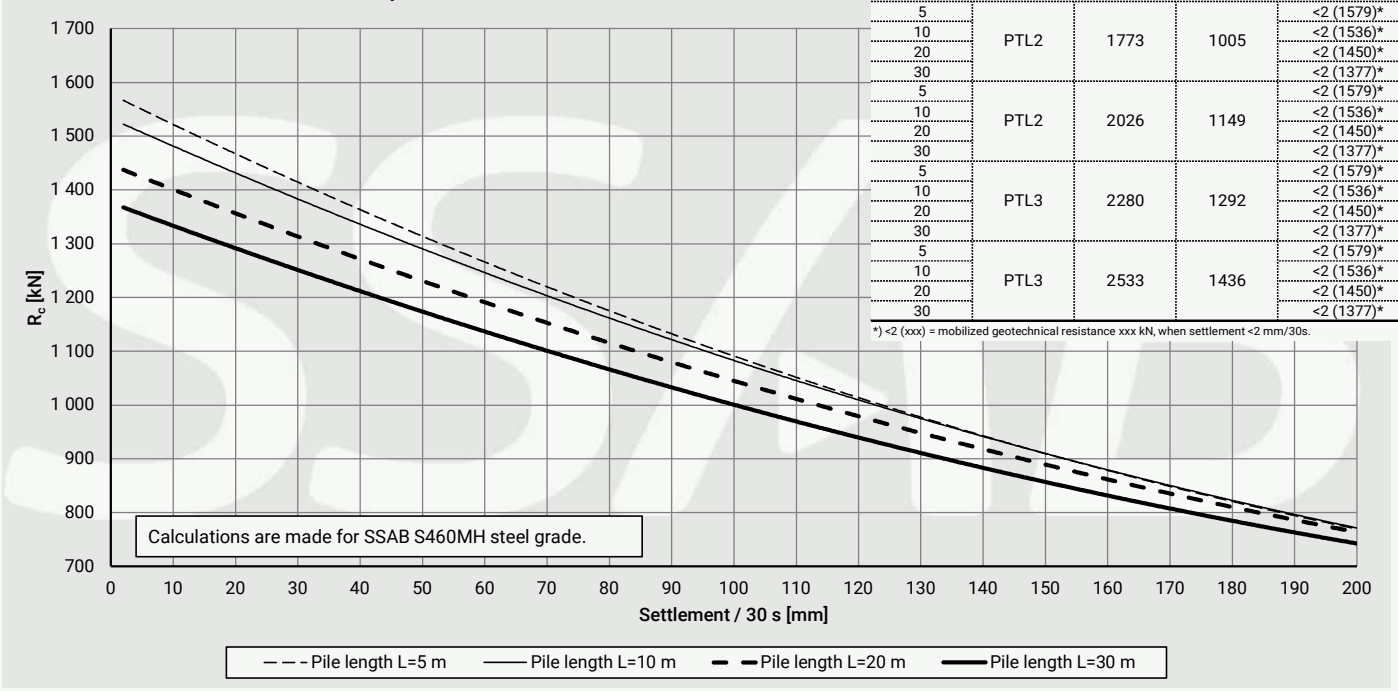


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1477	837	<2 (1341)*
10				<2 (1334)*
20				<2 (1286)*
30				<2 (1236)*
5	PTL2	1723	977	<2 (1341)*
10				<2 (1334)*
20				<2 (1286)*
30				<2 (1236)*
5	PTL2	1970	1117	<2 (1341)*
10				<2 (1334)*
20				<2 (1286)*
30				<2 (1236)*
5	PTL3	2216	1256	<2 (1341)*
10				<2 (1334)*
20				<2 (1286)*
30				<2 (1236)*
5	PTL3	2462	1396	<2 (1341)*
10				<2 (1334)*
20				<2 (1286)*
30				<2 (1236)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa HB20G - RR170/12.5



Hammer efficiency 80 %

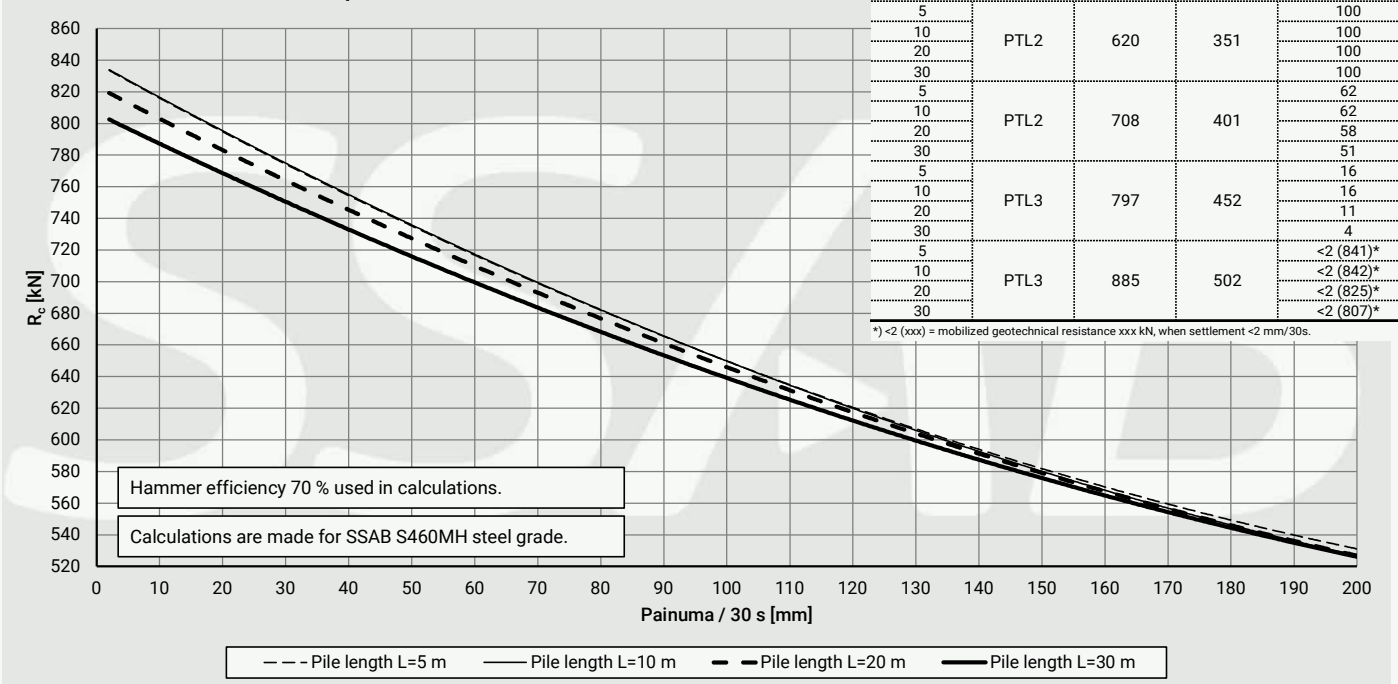
Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1520	862	10
10				3
20				<2 (1450)*
30				<2 (1377)*
5	PTL2	1773	1005	<2 (1579)*
10				<2 (1536)*
20				<2 (1450)*
30				<2 (1377)*
5	PTL2	2026	1149	<2 (1579)*
10				<2 (1536)*
20				<2 (1450)*
30				<2 (1377)*
5	PTL3	2280	1292	<2 (1579)*
10				<2 (1536)*
20				<2 (1450)*
30				<2 (1377)*
5	PTL3	2533	1436	<2 (1579)*
10				<2 (1536)*
20				<2 (1450)*
30				<2 (1377)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa F22

Piston		
Piston weight [kg]	m_r	95
Diameter of the piston [mm]	D_r	135
Length of the piston [mm]	L_r	840
Theoretical impact energy [J]	E_{rated}	4572
Efficiency of the piston [%]	HE	80
Equivalent drop height [m]	H_{ekv}	4.92
Theoretical impact rate [blows/min]	BPM	370-700
Actual impact rate vrs theoretical [%]	η	67
Measured / in analysis used impact rate [blows/min]	BPM_m	460
Impact tool		
Diameter of the tool [mm]	D_t	135
Height of the tool [mm]	L_t	1100
Tool weight [kg]	m_t	120

Furukawa F22 - RR115/6.3

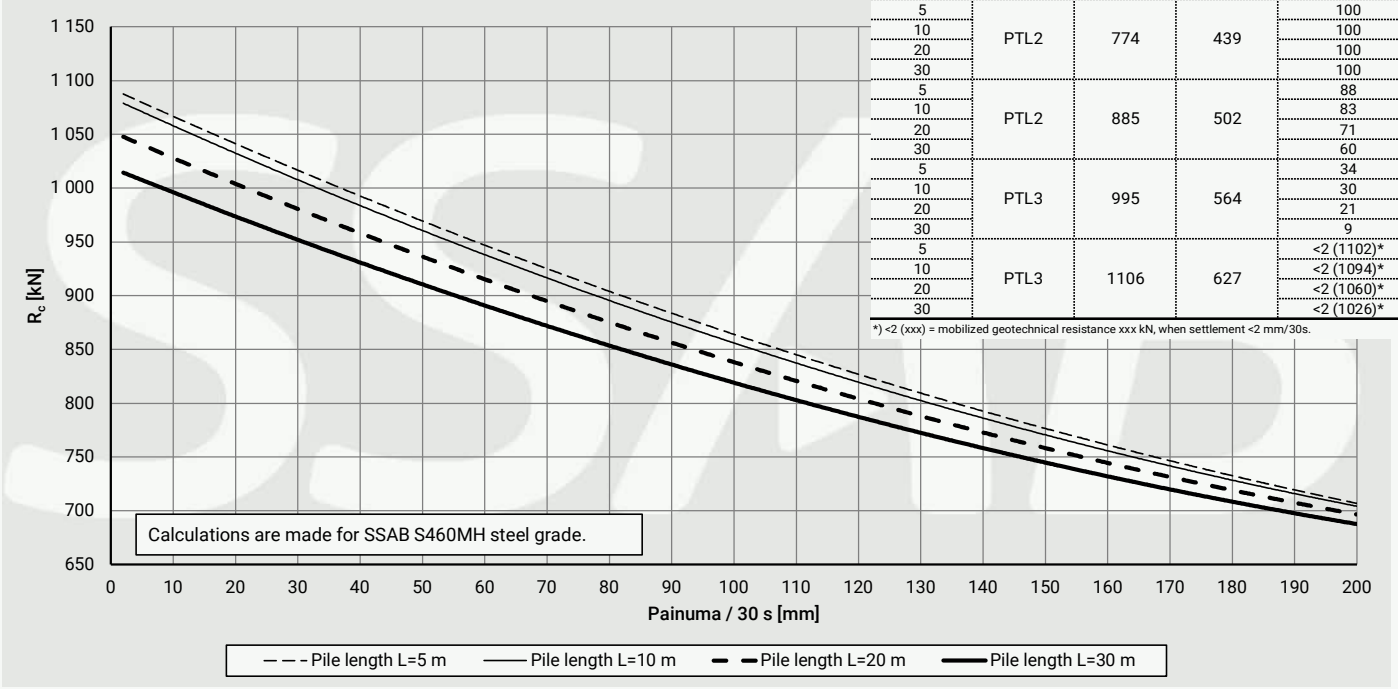


Hammer efficiency 70 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	531	301	100
10				100
20				100
30				100
5	PTL2	620	351	100
10				100
20				100
30				100
5	PTL2	708	401	62
10				62
20				58
30				51
5	PTL3	797	452	16
10				16
20				11
30				4
5	PTL3	885	502	<2 (841)*
10				<2 (842)*
20				<2 (825)*
30				<2 (807)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa F22 - RR115/8

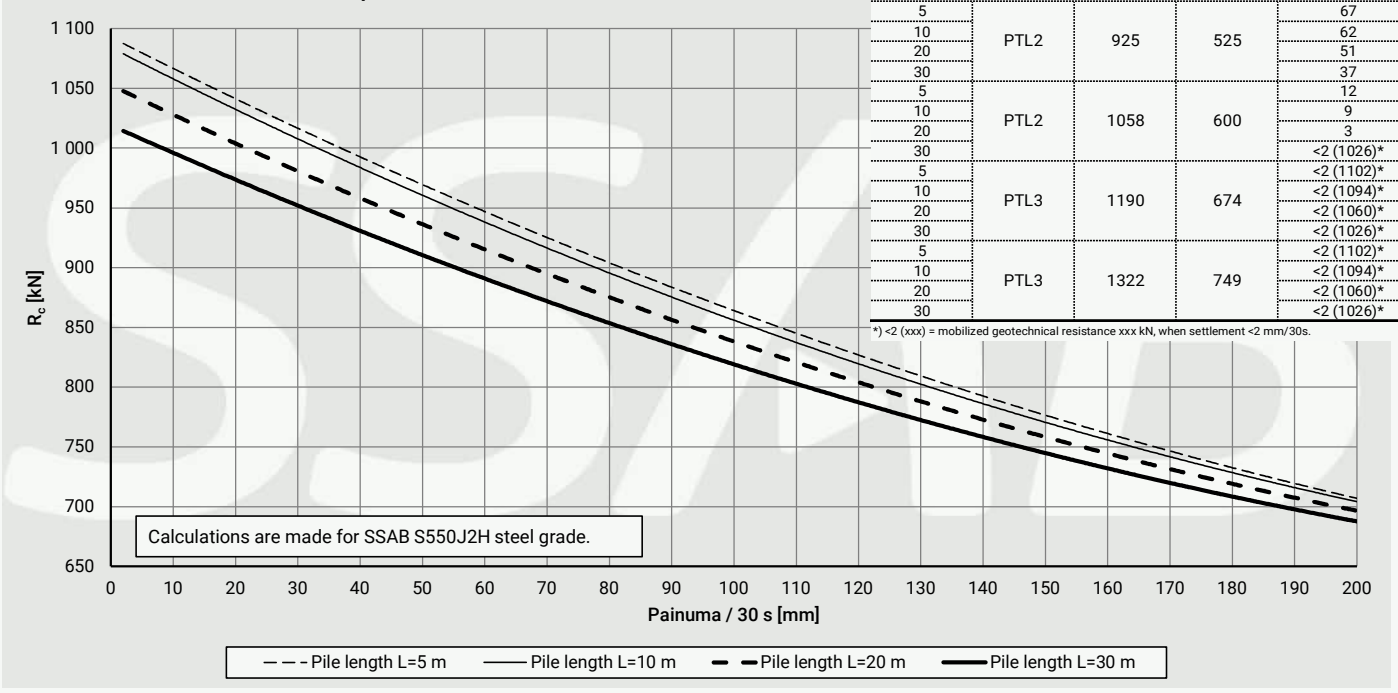


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	664	376	100
10				100
20				100
30				100
5	PTL2	774	439	100
10				100
20				100
30				100
5	PTL2	885	502	88
10				83
20				71
30				60
5	PTL3	995	564	34
10				30
20				21
30				9
5	PTL3	1106	627	<2 (1102)*
10				<2 (1094)*
20				<2 (1060)*
30				<2 (1026)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa F22 - RRs115/8

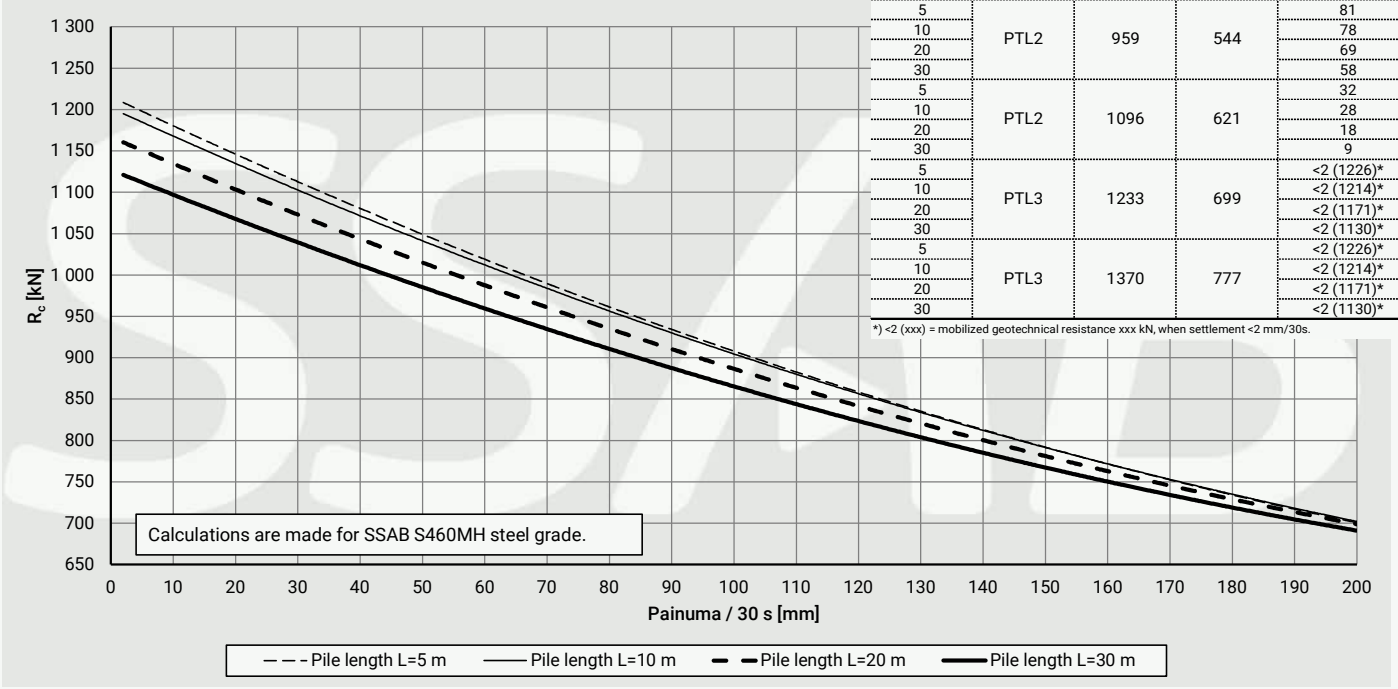


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	793	450	100
10				100
20				100
30				100
5	PTL2	925	525	67
10				62
20				51
30				37
5	PTL2	1058	600	12
10				9
20				3
30				<2 (1026)*
5	PTL3	1190	674	<2 (1102)*
10				<2 (1094)*
20				<2 (1060)*
30				<2 (1026)*
5	PTL3	1322	749	<2 (1102)*
10				<2 (1094)*
20				<2 (1060)*
30				<2 (1026)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa F22 - RR140/8

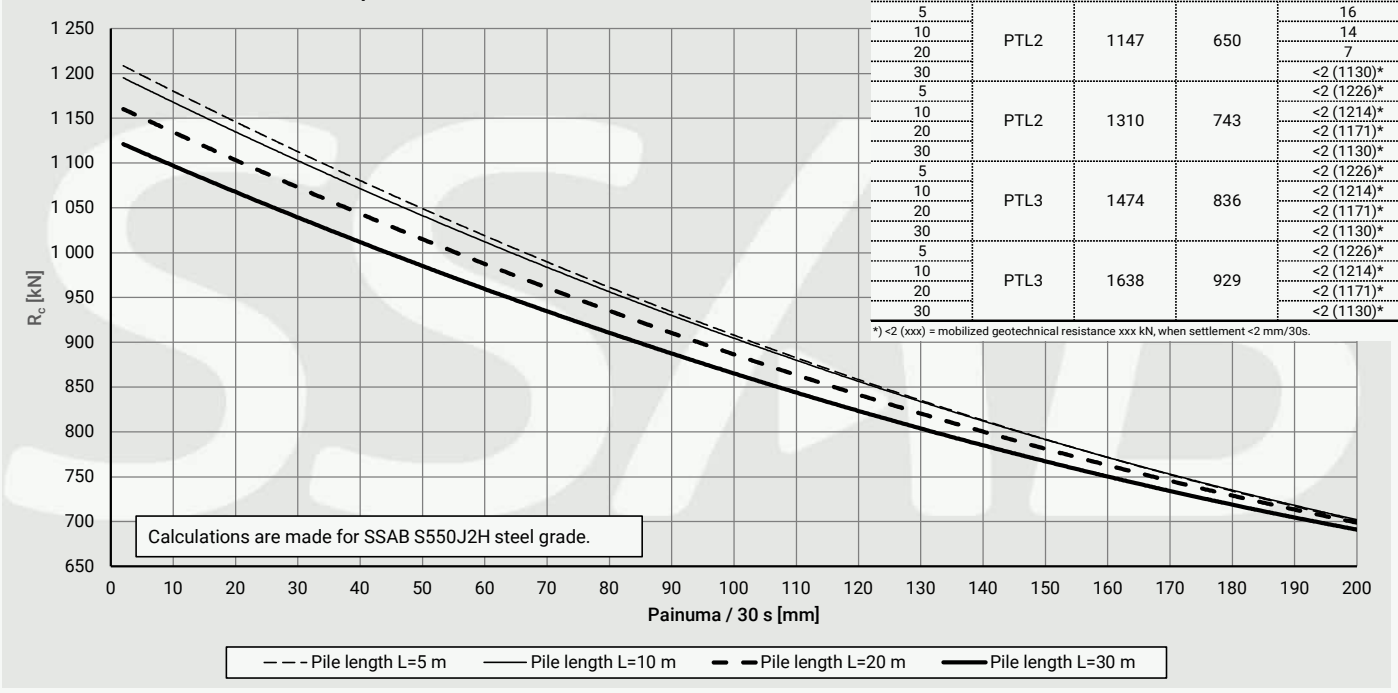


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	822	466	100
10				100
20				100
30				100
5	PTL2	959	544	81
10				78
20				69
30				58
5	PTL2	1096	621	32
10				28
20				18
30				9
5	PTL3	1233	699	<2 (1226)*
10				<2 (1214)*
20				<2 (1171)*
30				<2 (1130)*
5	PTL3	1370	777	<2 (1226)*
10				<2 (1214)*
20				<2 (1171)*
30				<2 (1130)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa F22 - RRs140/8

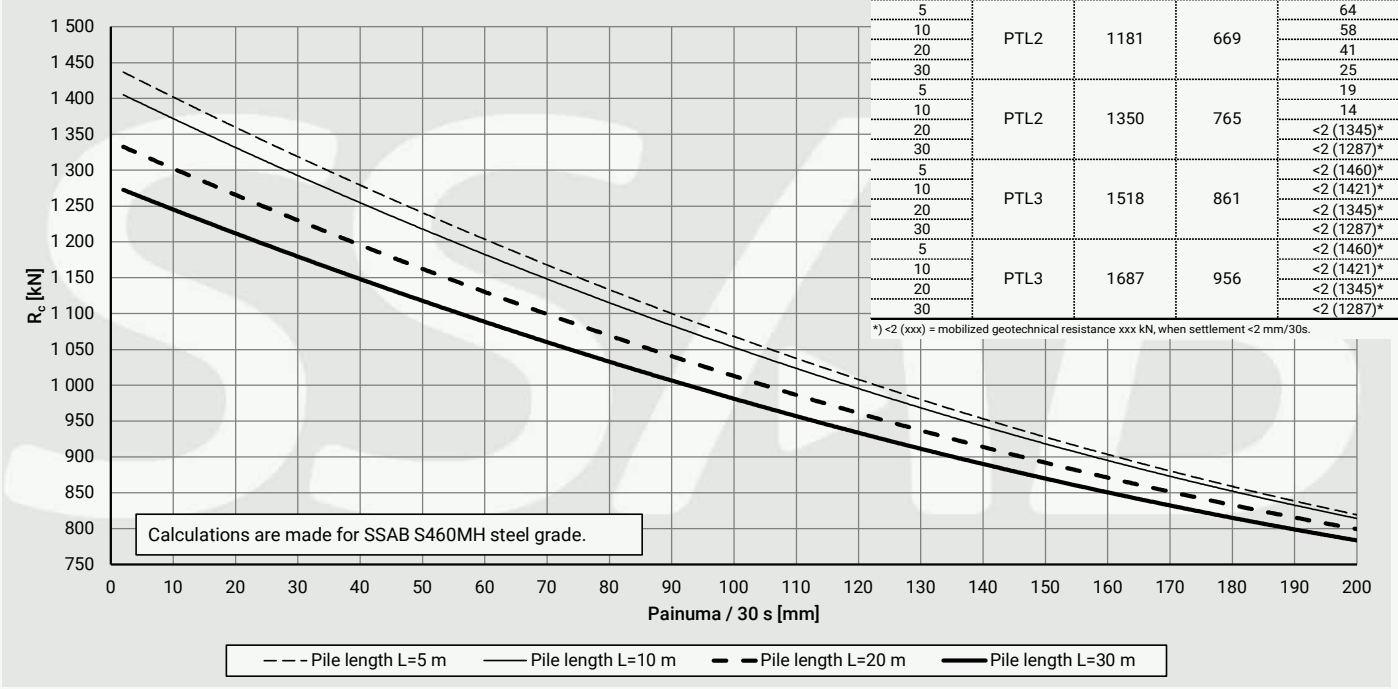


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	983	557	71
10				69
20				60
30				48
5	PTL2	1147	650	16
10				14
20				7
30				<2 (1130)*
5	PTL2	1310	743	<2 (1226)*
10				<2 (1214)*
20				<2 (1171)*
30				<2 (1130)*
5	PTL3	1474	836	<2 (1226)*
10				<2 (1214)*
20				<2 (1171)*
30				<2 (1130)*
5	PTL3	1638	929	<2 (1226)*
10				<2 (1214)*
20				<2 (1171)*
30				<2 (1130)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa F22 - RR140/10

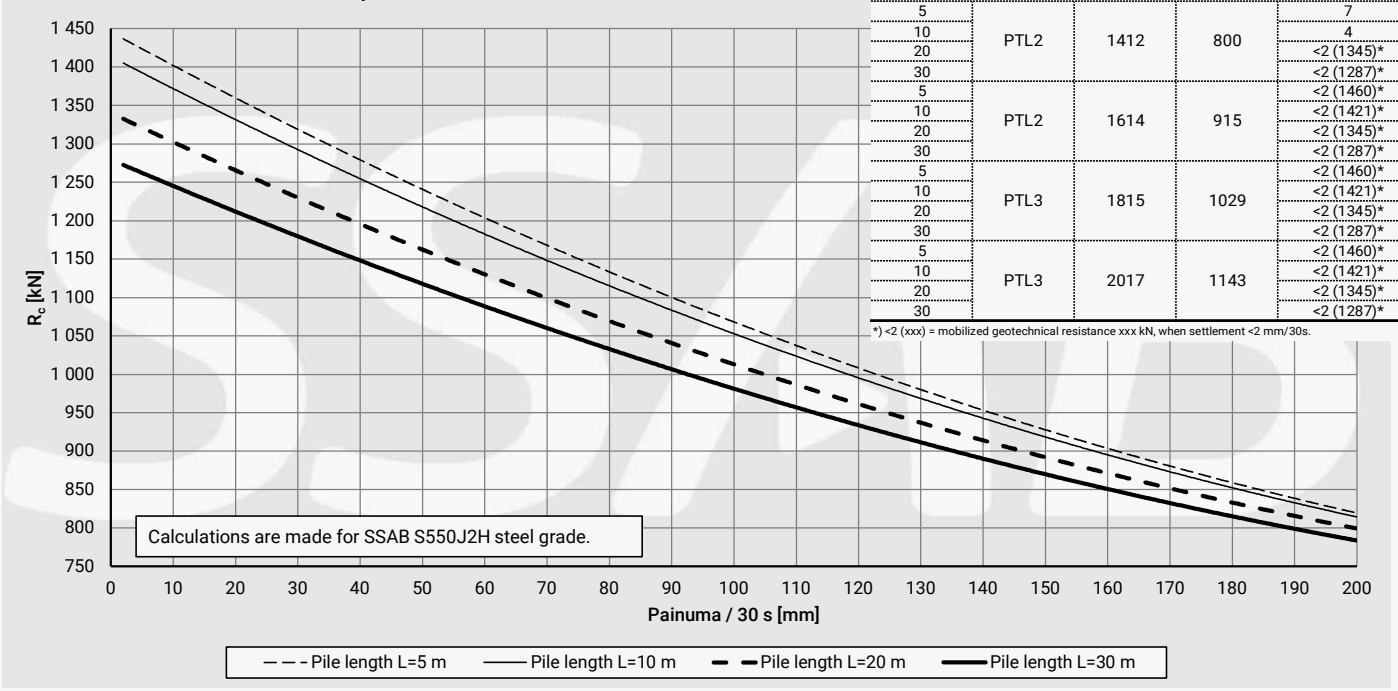


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1012	574	100
10				100
20				100
30				90
5	PTL2	1181	669	64
10				58
20				41
30				25
5	PTL2	1350	765	19
10				14
20				<2 (1345)*
30				<2 (1287)*
5	PTL3	1518	861	<2 (1460)*
10				<2 (1421)*
20				<2 (1345)*
30				<2 (1287)*
5	PTL3	1687	956	<2 (1460)*
10				<2 (1421)*
20				<2 (1345)*
30				<2 (1287)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa F22 - RRs140/10

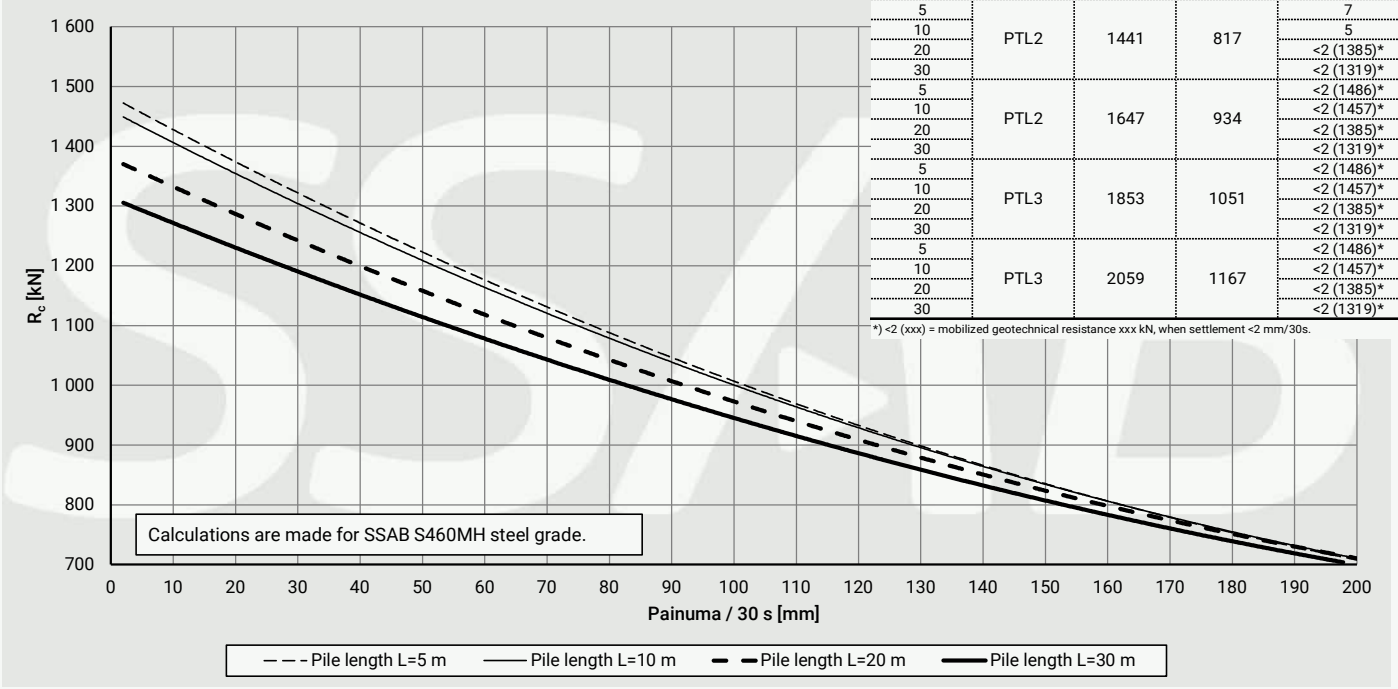


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1210	686	55
10				48
20				32
30				18
5	PTL2	1412	800	7
10				4
20				<2 (1345)*
30				<2 (1287)*
5	PTL2	1614	915	<2 (1460)*
10				<2 (1421)*
20				<2 (1345)*
30				<2 (1287)*
5	PTL3	1815	1029	<2 (1460)*
10				<2 (1421)*
20				<2 (1345)*
30				<2 (1287)*
5	PTL3	2017	1143	<2 (1460)*
10				<2 (1421)*
20				<2 (1345)*
30				<2 (1287)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa F22 - RR170/10

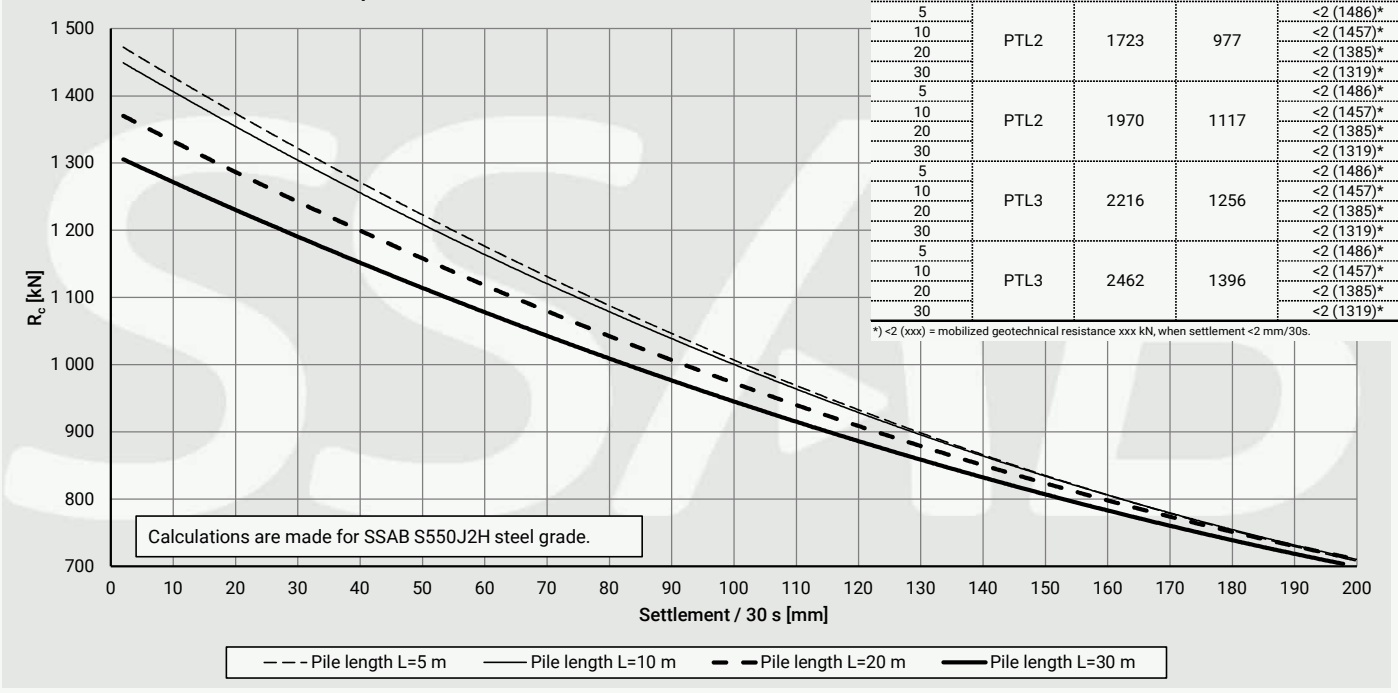


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1235	700	44
10				41
20				28
30				16
5	PTL2	1441	817	7
10				5
20				<2 (1385)*
30				<2 (1319)*
5	PTL2	1647	934	<2 (1486)*
10				<2 (1457)*
20				<2 (1385)*
30				<2 (1319)*
5	PTL3	1853	1051	<2 (1486)*
10				<2 (1457)*
20				<2 (1385)*
30				<2 (1319)*
5	PTL3	2059	1167	<2 (1486)*
10				<2 (1457)*
20				<2 (1385)*
30				<2 (1319)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa F22 - RRs170/10

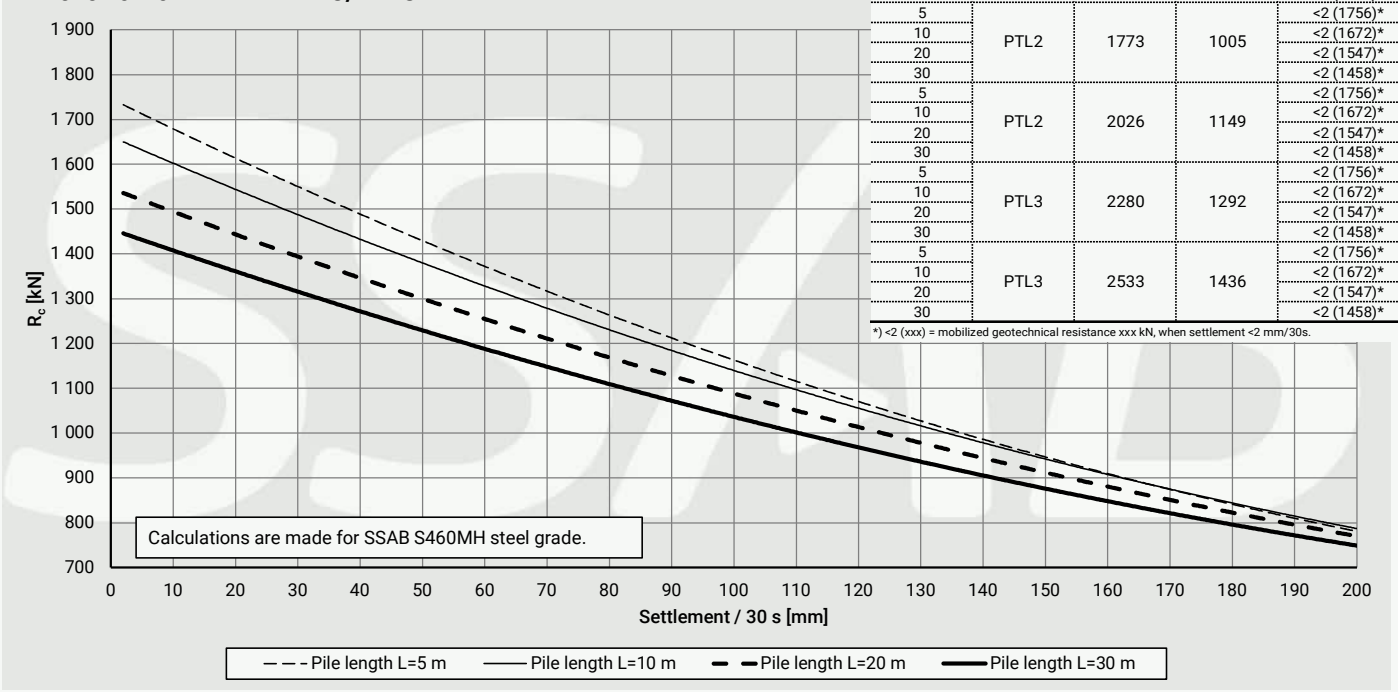


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1477	837	3
10				<2 (1457)*
20				<2 (1385)*
30				<2 (1319)*
5	PTL2	1723	977	<2 (1486)*
10				<2 (1457)*
20				<2 (1385)*
30				<2 (1319)*
5	PTL2	1970	1117	<2 (1486)*
10				<2 (1457)*
20				<2 (1385)*
30				<2 (1319)*
5	PTL3	2216	1256	<2 (1486)*
10				<2 (1457)*
20				<2 (1385)*
30				<2 (1319)*
5	PTL3	2462	1396	<2 (1486)*
10				<2 (1457)*
20				<2 (1385)*
30				<2 (1319)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa F22 - RR170/12.5



Hammer efficiency 80 %

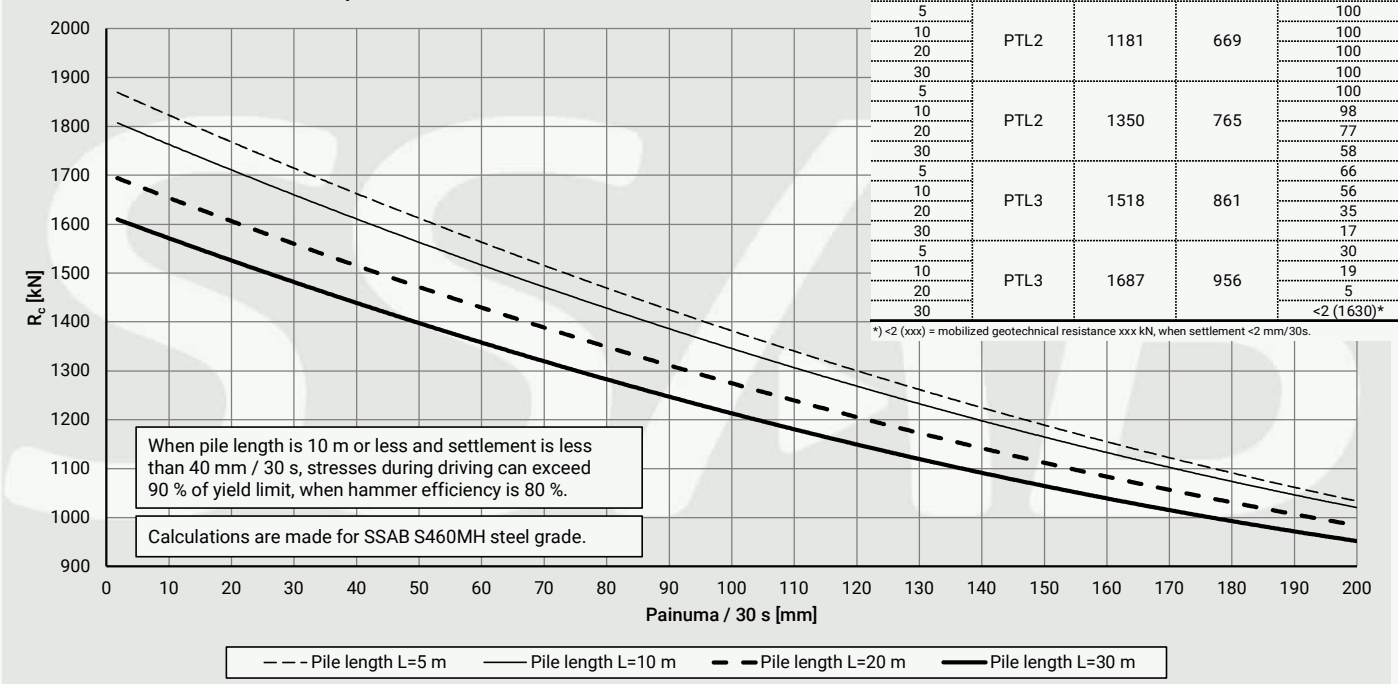
Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1520	862	30
10				21
20				5
30				<2 (1458)*
5	PTL2	1773	1005	<2 (1756)*
10				<2 (1672)*
20				<2 (1547)*
30				<2 (1458)*
5	PTL2	2026	1149	<2 (1756)*
10				<2 (1672)*
20				<2 (1547)*
30				<2 (1458)*
5	PTL3	2280	1292	<2 (1756)*
10				<2 (1672)*
20				<2 (1547)*
30				<2 (1458)*
5	PTL3	2533	1436	<2 (1756)*
10				<2 (1672)*
20				<2 (1547)*
30				<2 (1458)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa F27

Piston		
Piston weight [kg]	m_r	107
Diameter of the piston [mm]	D_r	145
Length of the piston [mm]	L_r	825
Theoretical impact energy [J]	E_{rated}	6779
Efficiency of the piston [%]	HE	80
Equivalent drop height [m]	H_{ekv}	6.46
Theoretical impact rate [blows/min]	BPM	340-440
Actual impact rate vrs theoretical [%]	η	80
Measured / in analysis used impact rate [blows/min]	BPM_m	350
Impact tool		
Diameter of the tool [mm]	D_t	140
Height of the tool [mm]	L_t	900
Tool weight [kg]	m_t	110

Furukawa F27 - RR140/10

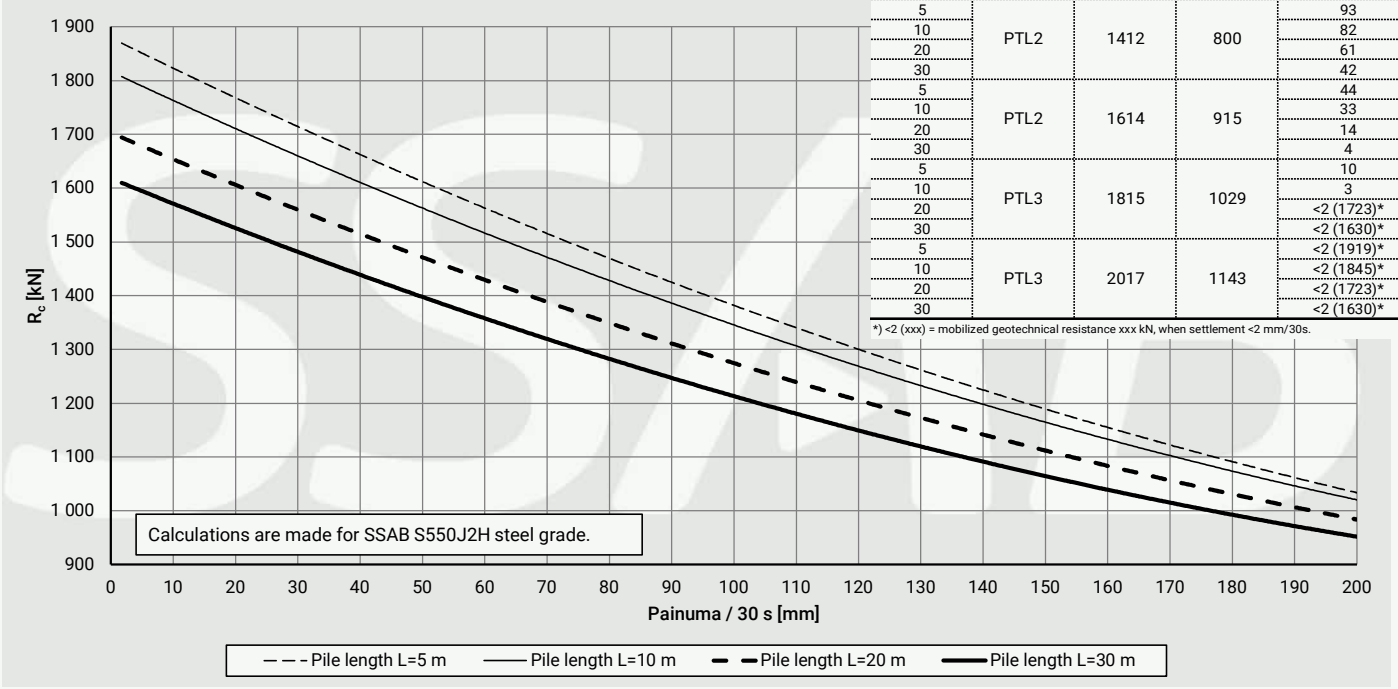


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1012	574	100
10				100
20				100
30				100
5	PTL2	1181	669	100
10				100
20				100
30				100
5	PTL2	1350	765	100
10				98
20				77
30				58
5	PTL3	1518	861	66
10				56
20				35
30				17
5	PTL3	1687	956	30
10				19
20				5
30				<2 (1630)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa F27 - RRs140/10

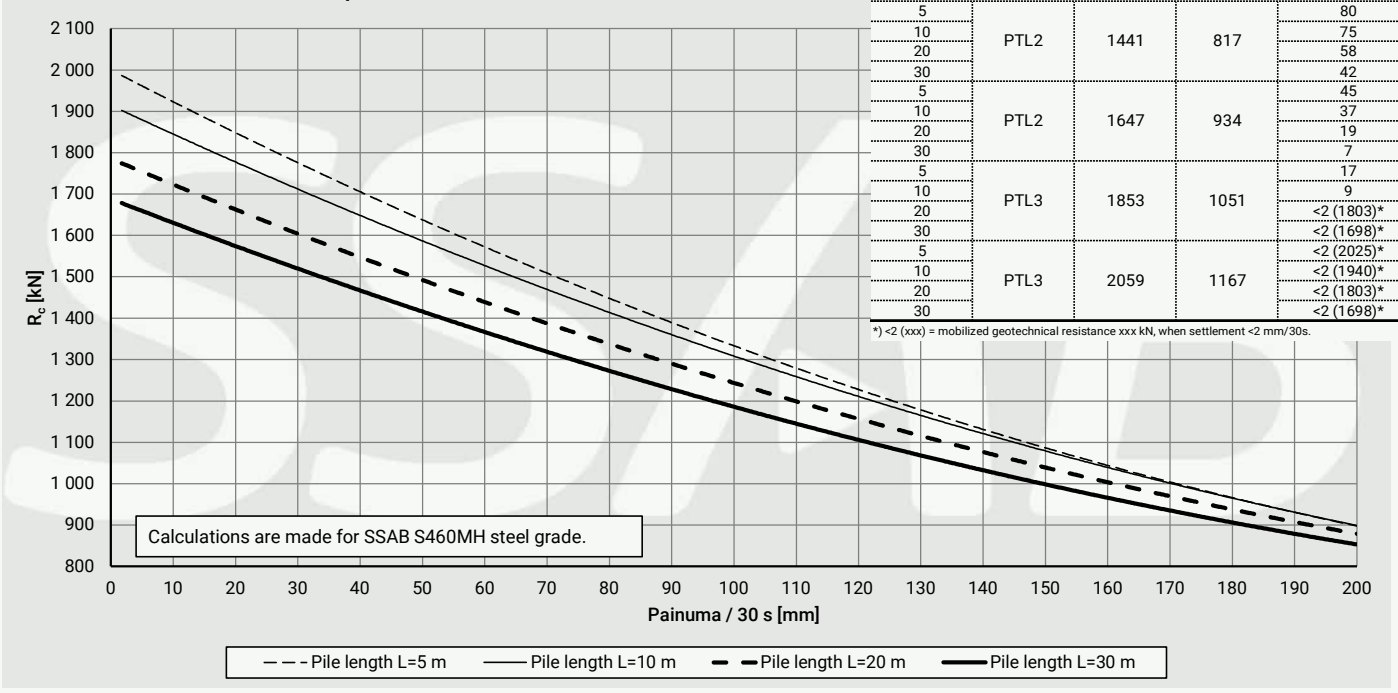


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1210	686	100
10				100
20				100
30				100
5	PTL2	1412	800	93
10				82
20				61
30				42
5	PTL2	1614	915	44
10				33
20				14
30				4
5	PTL3	1815	1029	10
10				3
20				<2 (1723)*
30				<2 (1630)*
5	PTL3	2017	1143	<2 (1919)*
10				<2 (1845)*
20				<2 (1723)*
30				<2 (1630)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa F27 - RR170/10

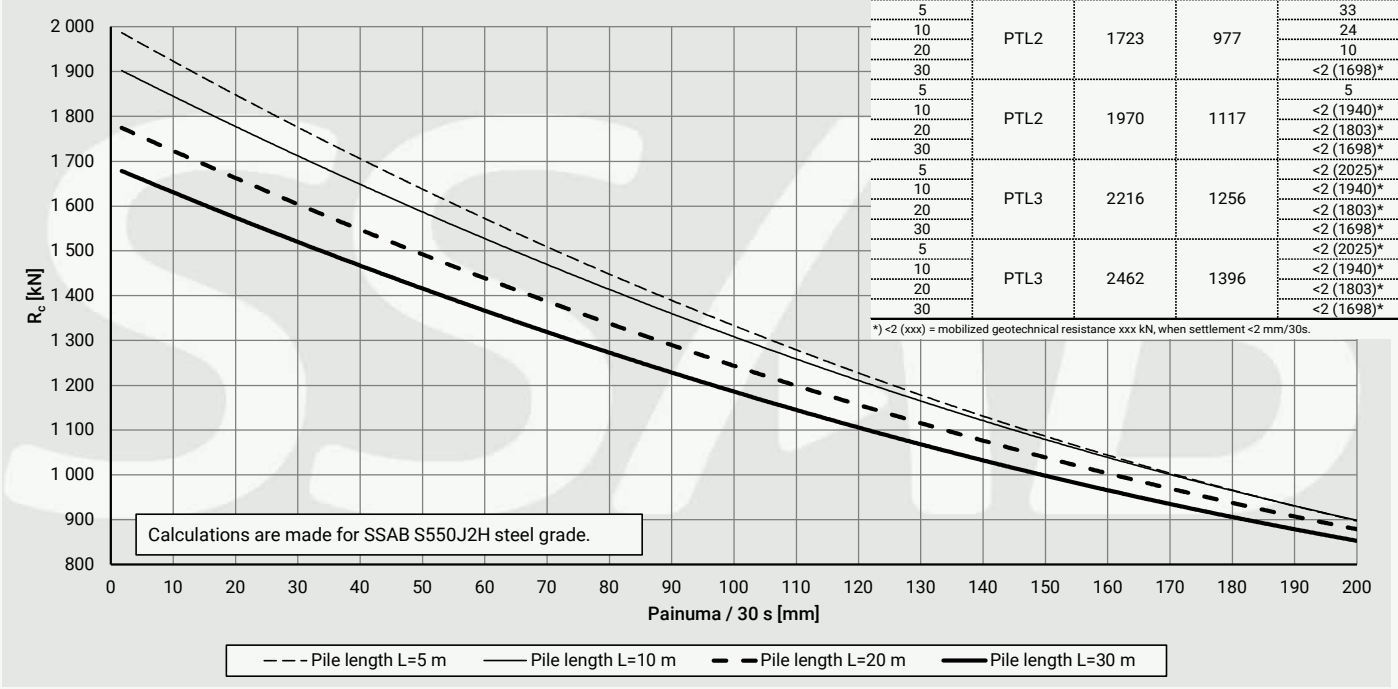


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1235	700	100
10				100
20				100
30				89
5	PTL2	1441	817	80
10				75
20				58
30				42
5	PTL2	1647	934	45
10				37
20				19
30				7
5	PTL3	1853	1051	17
10				9
20				<2 (1803)*
30				<2 (1698)*
5	PTL3	2059	1167	<2 (2025)*
10				<2 (1940)*
20				<2 (1803)*
30				<2 (1698)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa F27 - RRs170/10

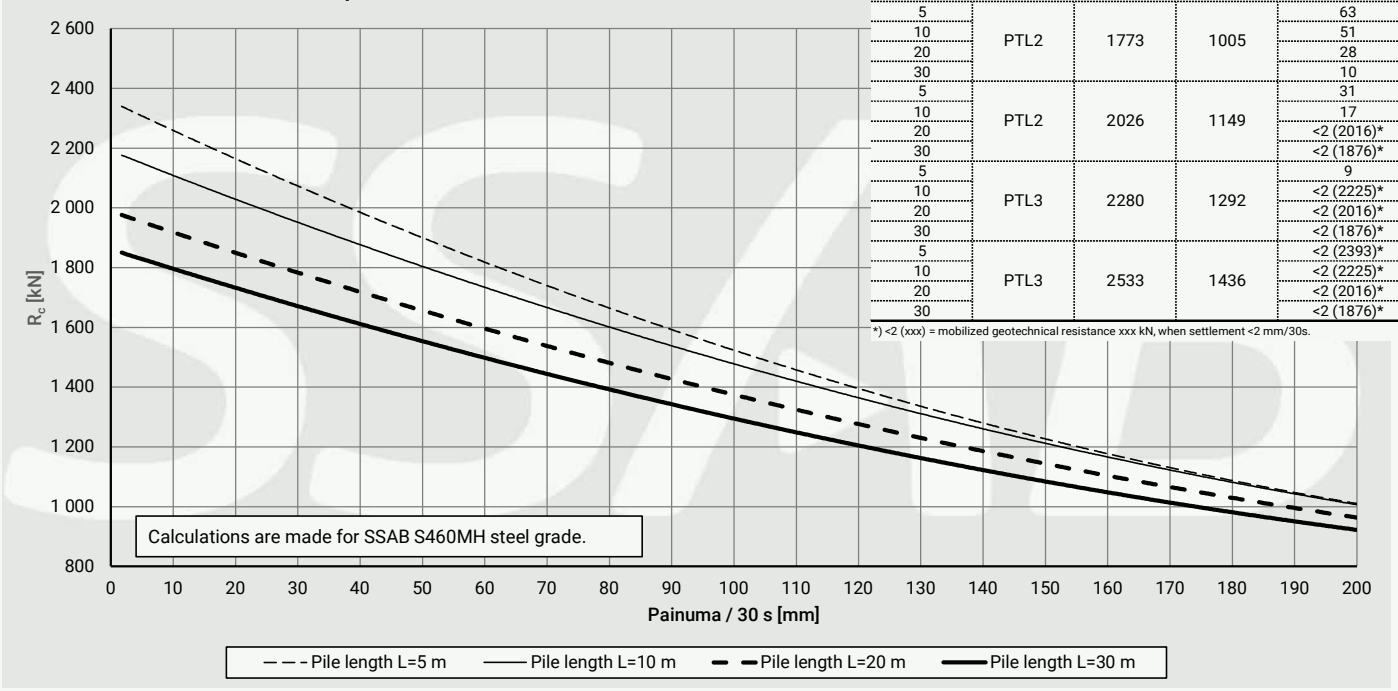


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1477	837	73
10				66
20				49
30				35
5	PTL2	1723	977	33
10				24
20				10
30				<2 (1698)*
5	PTL2	1970	1117	5
10				<2 (1940)*
20				<2 (1803)*
30				<2 (1698)*
5	PTL3	2216	1256	<2 (2025)*
10				<2 (1940)*
20				<2 (1803)*
30				<2 (1698)*
5	PTL3	2462	1396	<2 (2025)*
10				<2 (1940)*
20				<2 (1803)*
30				<2 (1698)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa F27 - RR170/12.5

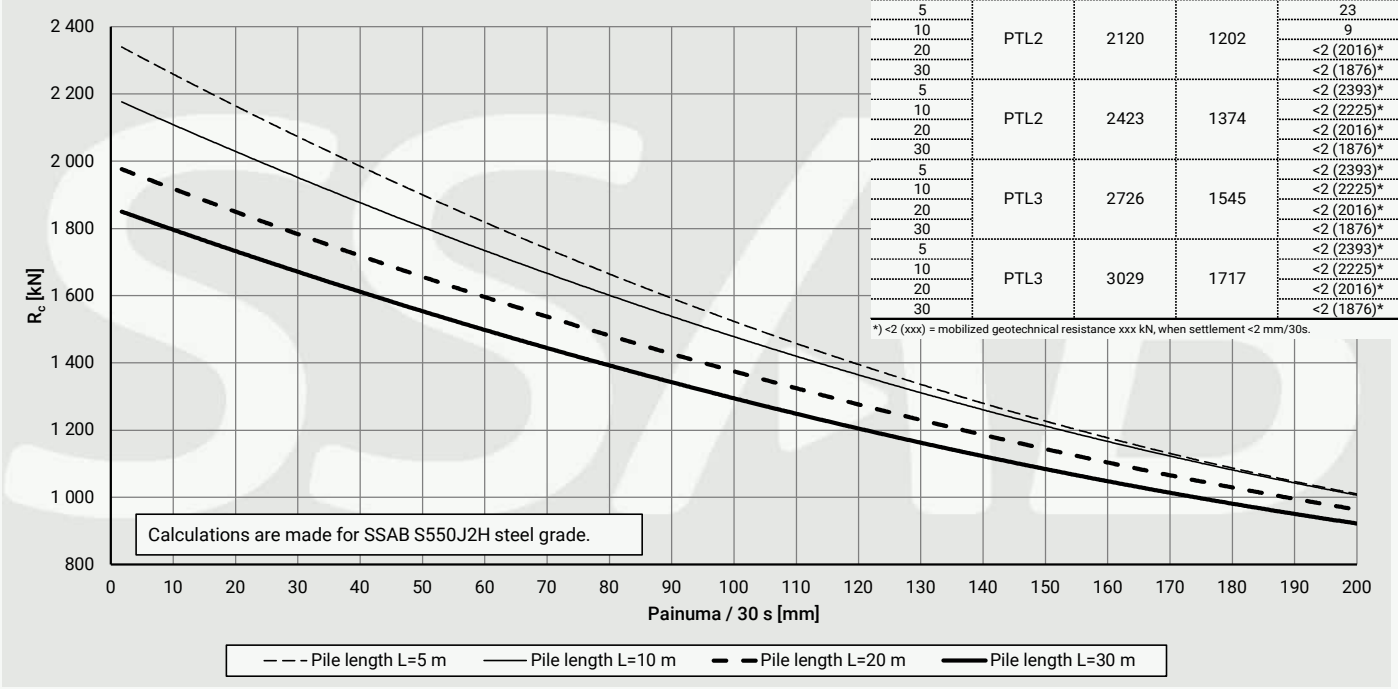


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1520	862	100
10				95
20				72
30				53
5	PTL2	1773	1005	63
10				51
20				28
30				10
5	PTL2	2026	1149	31
10				17
20				<2 (2016)*
30				<2 (1876)*
5	PTL3	2280	1292	9
10				<2 (2225)*
20				<2 (2016)*
30				<2 (1876)*
5	PTL3	2533	1436	<2 (2393)*
10				<2 (2225)*
20				<2 (2016)*
30				<2 (1876)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa F27 - RRs170/12.5



Hammer efficiency 80 %

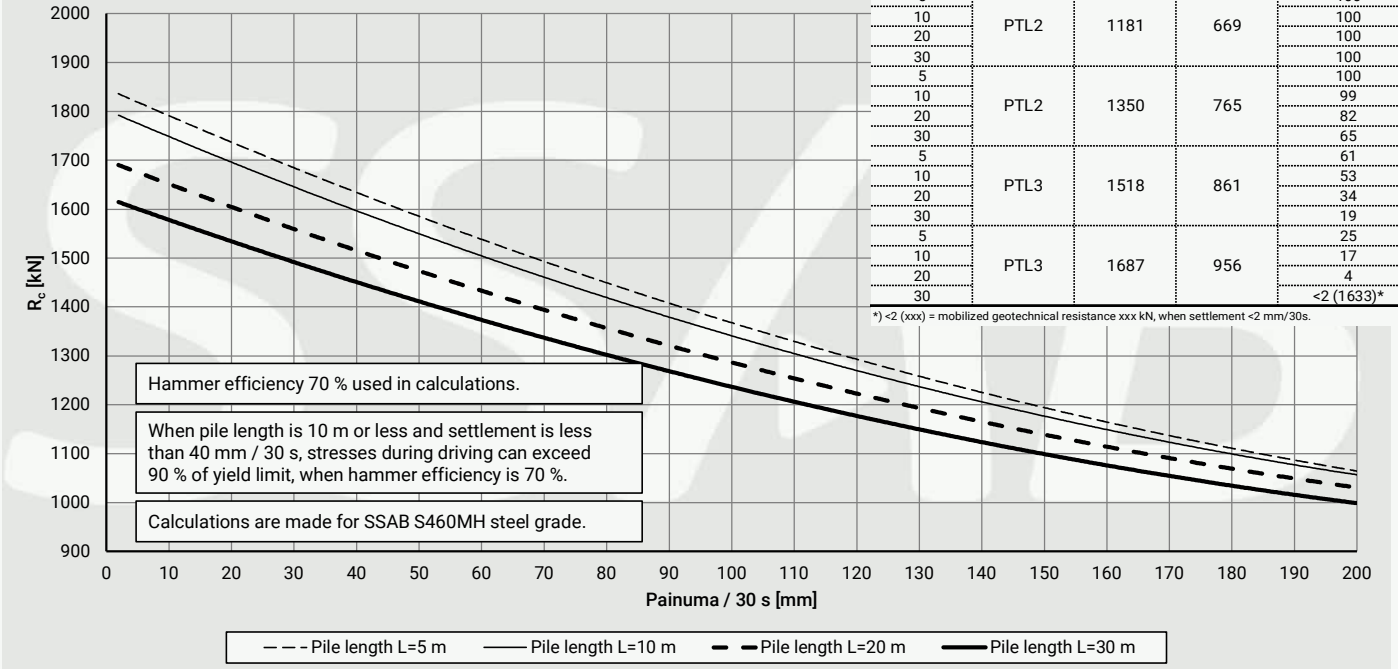
Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1817	1030	56
10				44
20				21
30				7
5	PTL2	2120	1202	23
10				9
20				<2 (2016)*
30				<2 (1876)*
5	PTL2	2423	1374	<2 (2393)*
10				<2 (2225)*
20				<2 (2016)*
30				<2 (1876)*
5	PTL3	2726	1545	<2 (2393)*
10				<2 (2225)*
20				<2 (2016)*
30				<2 (1876)*
5	PTL3	3029	1717	<2 (2393)*
10				<2 (2225)*
20				<2 (2016)*
30				<2 (1876)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa FXJ375

Piston		
Piston weight [kg]	m_r	135
Diameter of the piston [mm]	D_r	155
Length of the piston [mm]	L_r	916
Theoretical impact energy [J]	E_{rated}	7310
Efficiency of the piston [%]	HE	80
Equivalent drop height [m]	H_{ekv}	5.52
Theoretical impact rate [blows/min]	BPM	350-550
Actual impact rate vrs theoretical [%]	η	70
Measured / in analysis used impact rate [blows/min]	BPM_m	380
Impact tool		
Diameter of the tool [mm]	D_t	155
Height of the tool [mm]	L_t	800
Tool weight [kg]	m_t	119

Furukawa FXJ375 - RR140/10

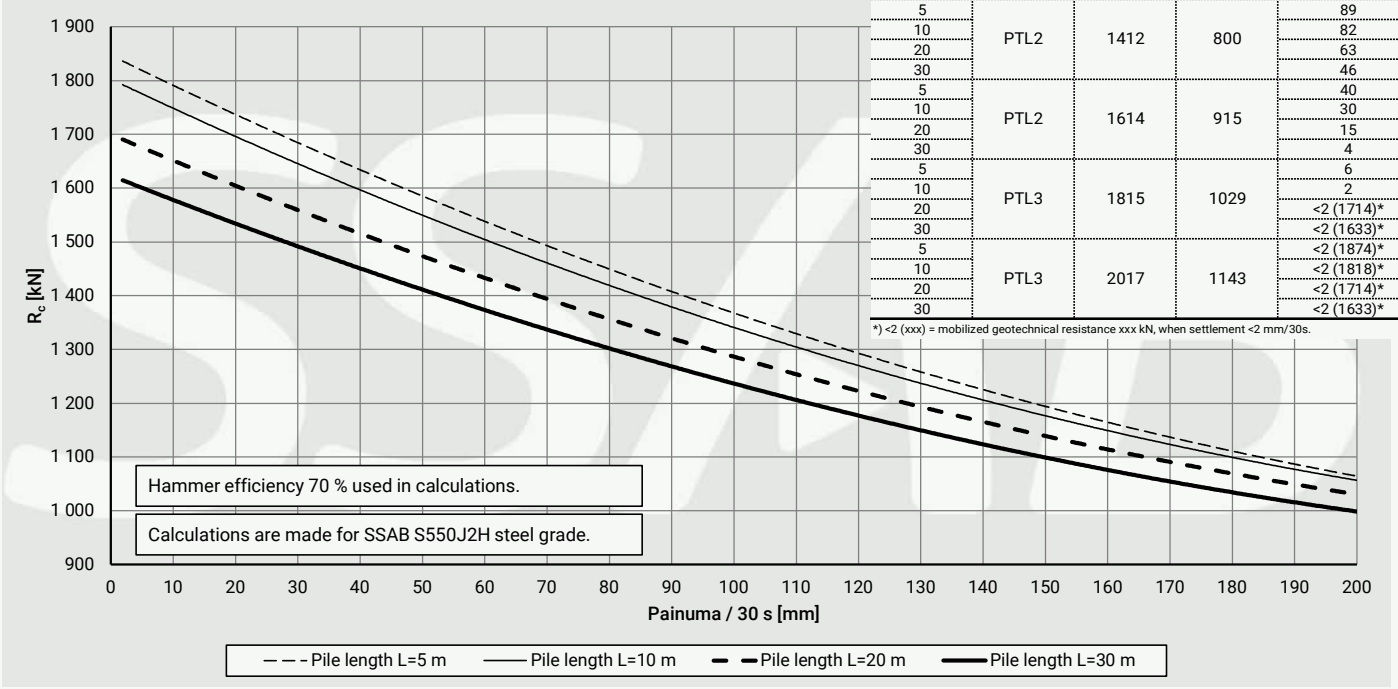


Hammer efficiency 70 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1012	574	100
10				100
20				100
30				100
5	PTL2	1181	669	100
10				100
20				100
30				100
5	PTL2	1350	765	100
10				99
20				82
30				65
5	PTL3	1518	861	61
10				53
20				34
30				19
5	PTL3	1687	956	25
10				17
20				4
30				<2 (1633)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa FXJ375 - RRs140/10

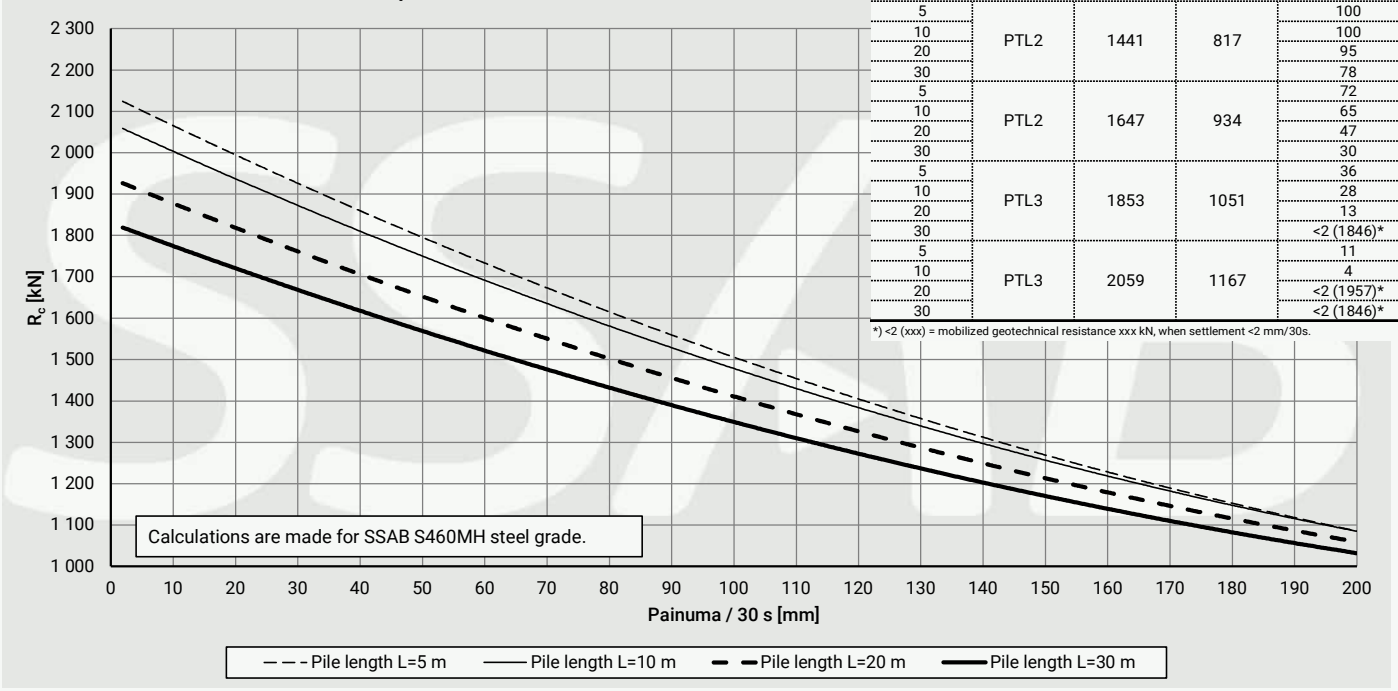


Hammer efficiency 70 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1210	686	100
10				100
20				100
30				100
5	PTL2	1412	800	89
10				82
20				63
30				46
5	PTL2	1614	915	40
10				30
20				15
30				4
5	PTL3	1815	1029	6
10				2
20				<2 (1714)*
30				<2 (1633)*
5	PTL3	2017	1143	<2 (1874)*
10				<2 (1818)*
20				<2 (1714)*
30				<2 (1633)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa FXJ375 - RR170/10

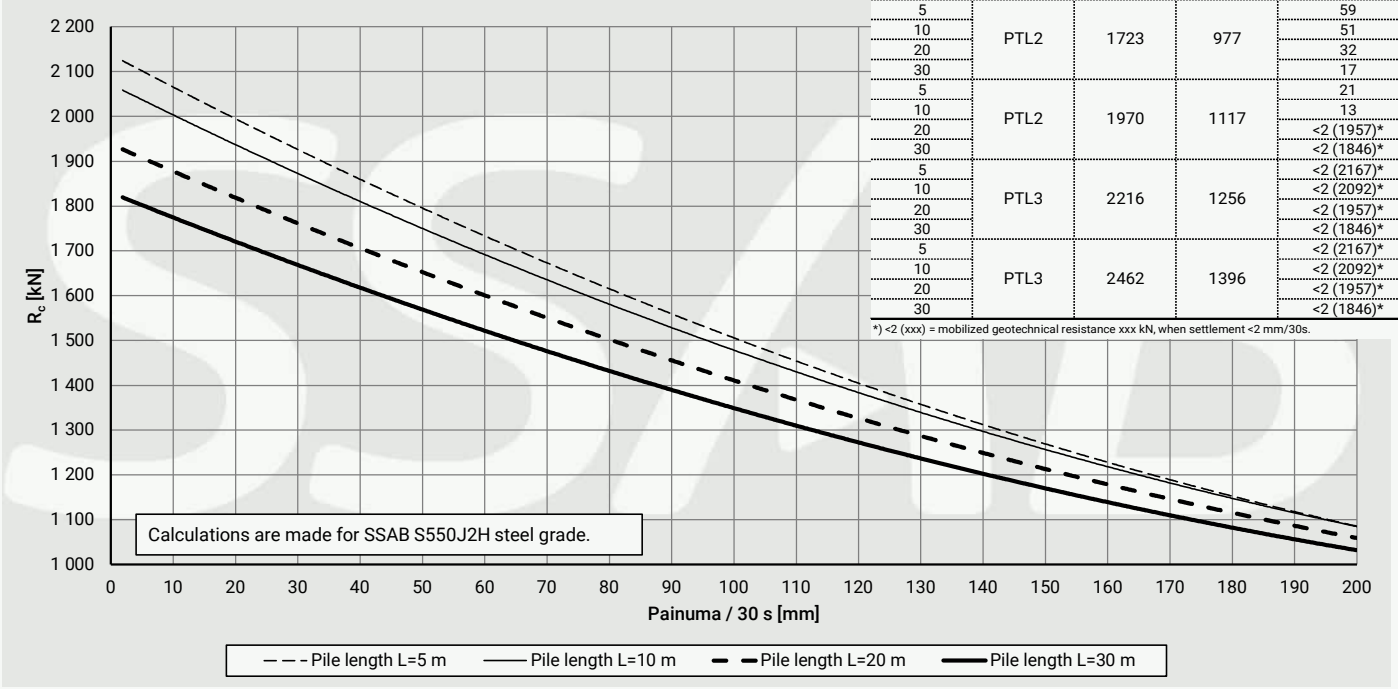


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1235	700	100
10				100
20				100
30				100
5	PTL2	1441	817	100
10				100
20				95
30				78
5	PTL2	1647	934	72
10				65
20				47
30				30
5	PTL3	1853	1051	36
10				28
20				13
30				<2 (1846)*
5	PTL3	2059	1167	11
10				4
20				<2 (1957)*
30				<2 (1846)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa FXJ375 - RRs170/10

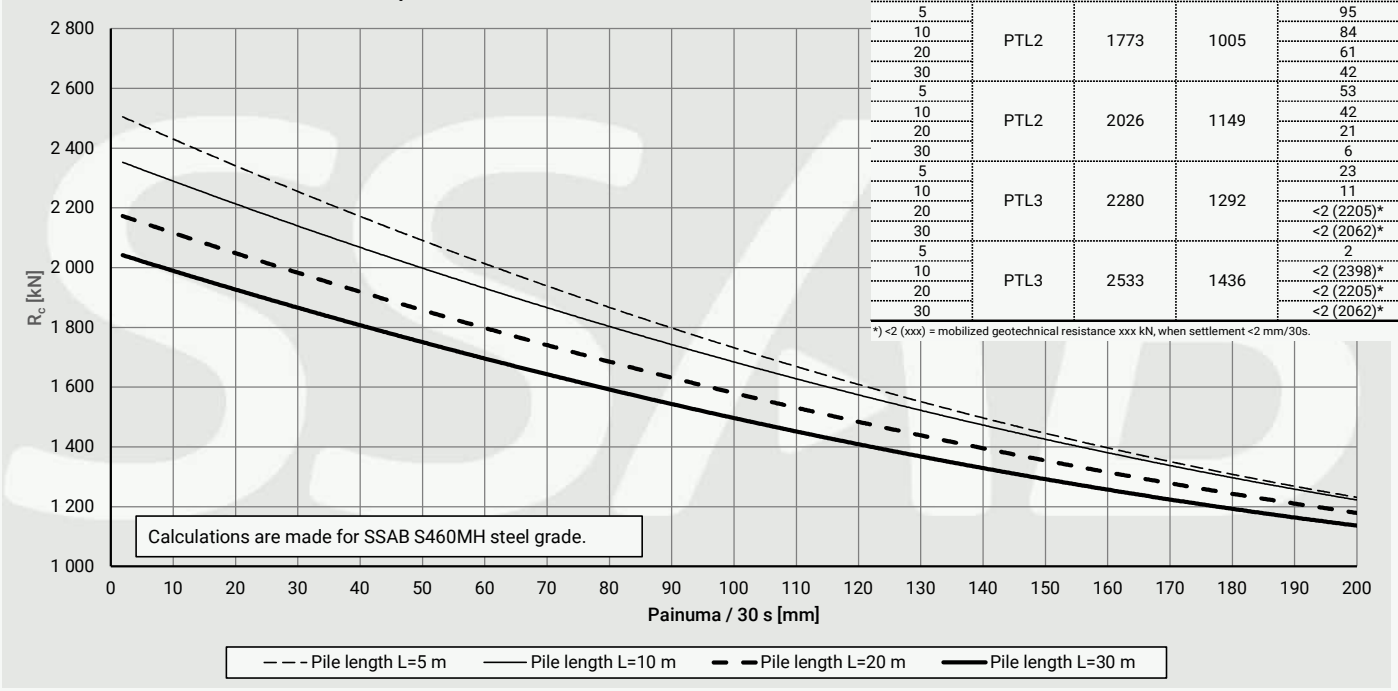


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1477	837	100
10				100
20				85
30				68
5	PTL2	1723	977	59
10				51
20				32
30				17
5	PTL2	1970	1117	21
10				13
20				<2 (1957)*
30				<2 (1846)*
5	PTL3	2216	1256	<2 (2167)*
10				<2 (2092)*
20				<2 (1957)*
30				<2 (1846)*
5	PTL3	2462	1396	<2 (2167)*
10				<2 (2092)*
20				<2 (1957)*
30				<2 (1846)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa FXJ375 - RR170/12.5

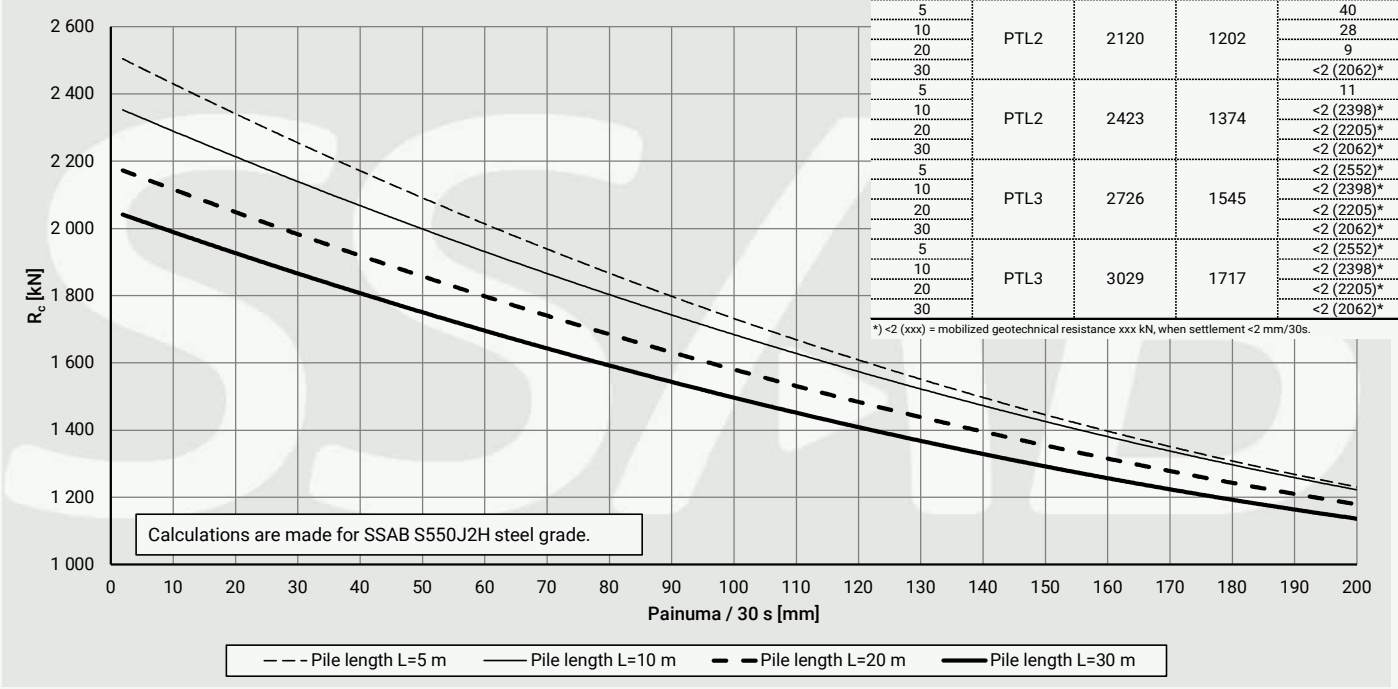


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1520	862	100
10				100
20				100
30				95
5	PTL2	1773	1005	95
10				84
20				61
30				42
5	PTL2	2026	1149	53
10				42
20				21
30				6
5	PTL3	2280	1292	23
10				11
20				<2 (2205)*
30				<2 (2062)*
5	PTL3	2533	1436	2
10				<2 (2398)*
20				<2 (2205)*
30				<2 (2062)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa FXJ375 - RRs170/12.5

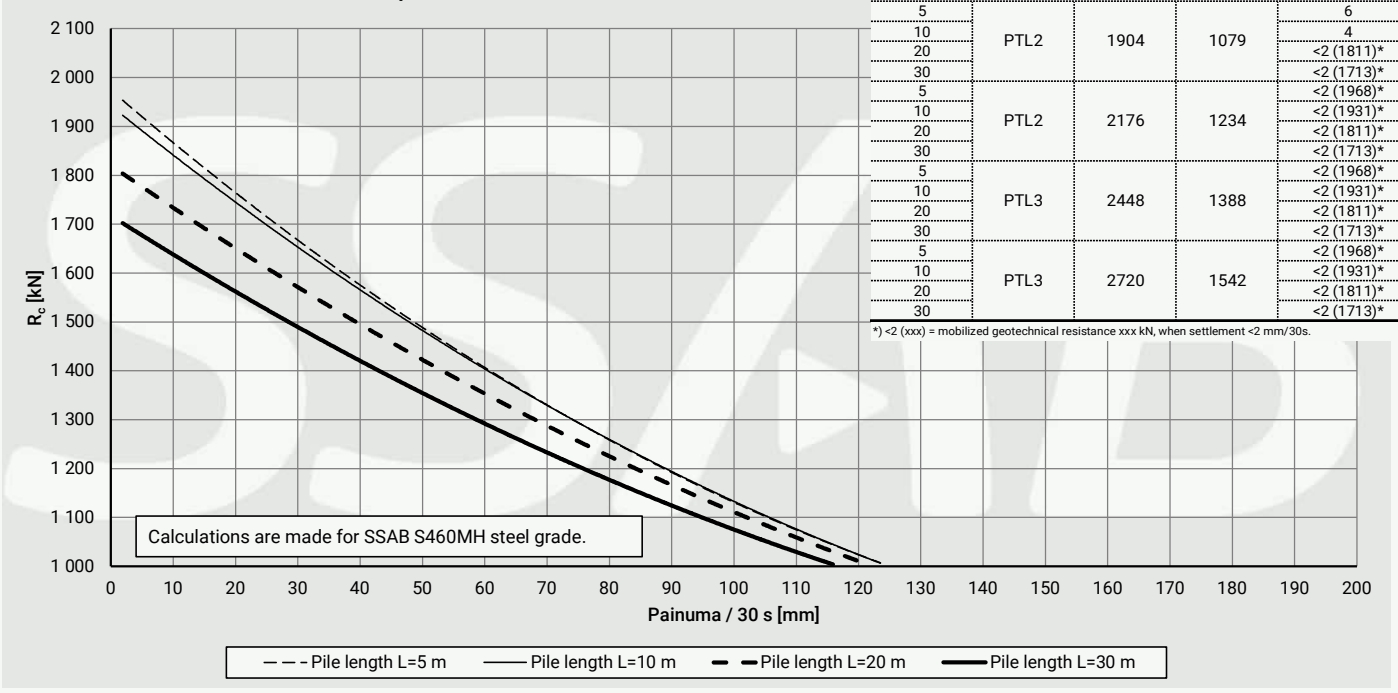


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1817	1030	87
10				76
20				53
30				34
5	PTL2	2120	1202	40
10				28
20				9
30				<2 (2062)*
5	PTL2	2423	1374	11
10				<2 (2398)*
20				<2 (2205)*
30				<2 (2062)*
5	PTL3	2726	1545	<2 (2552)*
10				<2 (2398)*
20				<2 (2205)*
30				<2 (2062)*
5	PTL3	3029	1717	<2 (2552)*
10				<2 (2398)*
20				<2 (2205)*
30				<2 (2062)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa FXJ375 - RR220/10

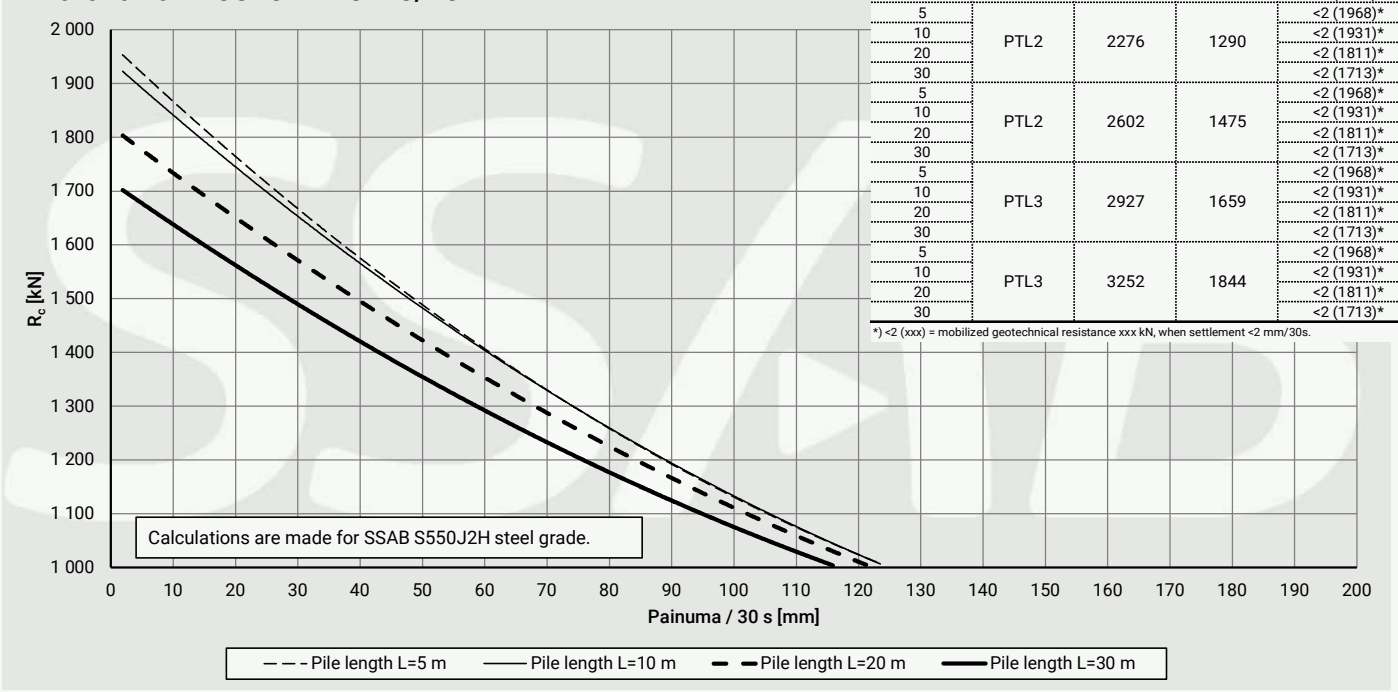


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1632	925	32
10				30
20				21
30				10
5	PTL2	1904	1079	6
10				4
20				<2 (1811)*
30				<2 (1713)*
5	PTL2	2176	1234	<2 (1968)*
10				<2 (1931)*
20				<2 (1811)*
30				<2 (1713)*
5	PTL3	2448	1388	<2 (1968)*
10				<2 (1931)*
20				<2 (1811)*
30				<2 (1713)*
5	PTL3	2720	1542	<2 (1968)*
10				<2 (1931)*
20				<2 (1811)*
30				<2 (1713)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Furukawa FXJ375 - RRs220/10



Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1951	1106	3
10				<2 (1931)*
20				<2 (1811)*
30				<2 (1713)*
5	PTL2	2276	1290	<2 (1968)*
10				<2 (1931)*
20				<2 (1811)*
30				<2 (1713)*
5	PTL2	2602	1475	<2 (1968)*
10				<2 (1931)*
20				<2 (1811)*
30				<2 (1713)*
5	PTL3	2927	1659	<2 (1968)*
10				<2 (1931)*
20				<2 (1811)*
30				<2 (1713)*
5	PTL3	3252	1844	<2 (1968)*
10				<2 (1931)*
20				<2 (1811)*
30				<2 (1713)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

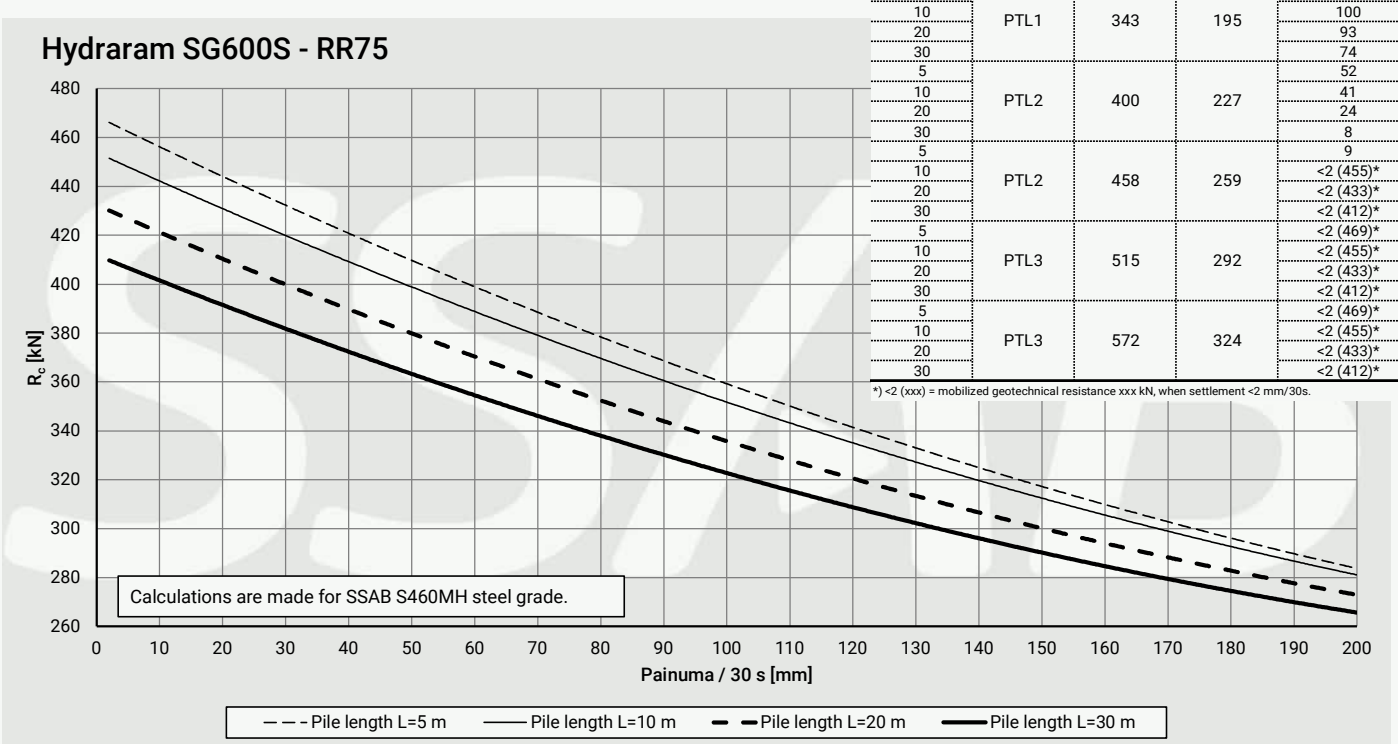
Hydraram SG600S

Piston		
Piston weight [kg]	m_r	25
Diameter of the piston [mm]	D_r	90
Length of the piston [mm]	L_r	500
Theoretical impact energy [J]	E_{rated}	1356
Efficiency of the piston [%]	HE	80
Equivalent drop height [m]	H_{ekv}	5.54
Theoretical impact rate [blows/min]	BPM	440-780
Actual impact rate vrs theoretical [%]	η	70
Measured / in analysis used impact rate [blows/min]	BPM_m	550
Impact tool		
Diameter of the tool [mm]	D_t	90
Height of the tool [mm]	L_t	800
Tool weight [kg]	m_t	40

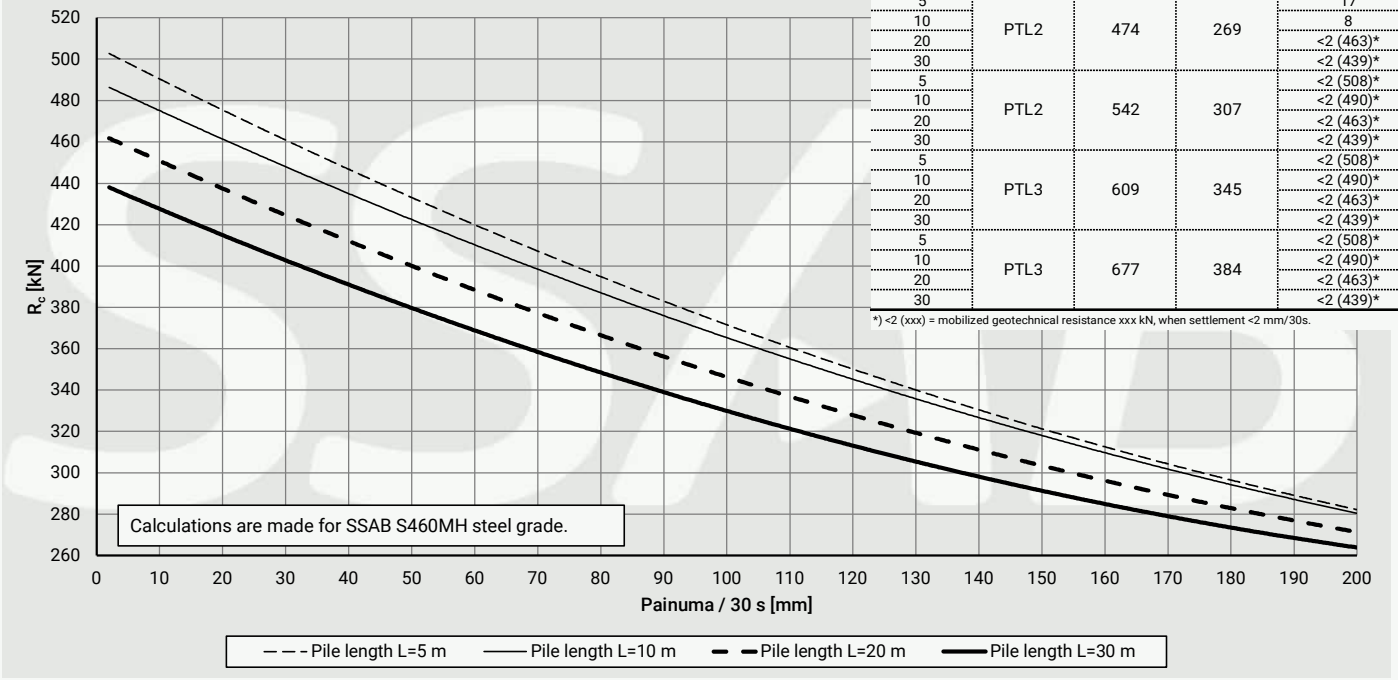
Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	343	195	100
10				100
20				93
30				74
5	PTL2	400	227	52
10				41
20				24
30				8
5	PTL2	458	259	9
10				<2 (455)*
20				<2 (433)*
30				<2 (412)*
5	PTL3	515	292	<2 (469)*
10				<2 (455)*
20				<2 (433)*
30				<2 (412)*
5	PTL3	572	324	<2 (469)*
10				<2 (455)*
20				<2 (433)*
30				<2 (412)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.



Hydraram SG600S - RR90

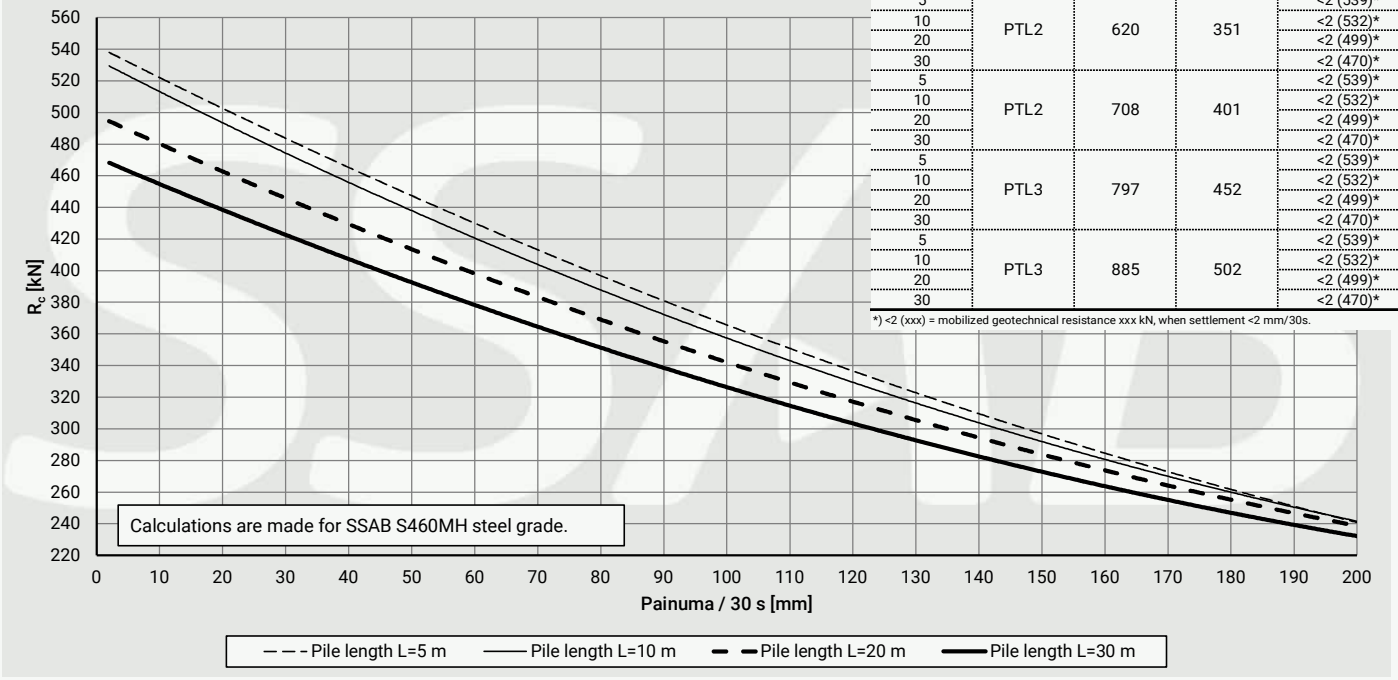


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	406	230	69
10				60
20				41
30				25
5	PTL2	474	269	17
10				8
20				<2 (463)*
30				<2 (439)*
5	PTL2	542	307	<2 (508)*
10				<2 (490)*
20				<2 (463)*
30				<2 (439)*
5	PTL3	609	345	<2 (508)*
10				<2 (490)*
20				<2 (463)*
30				<2 (439)*
5	PTL3	677	384	<2 (508)*
10				<2 (490)*
20				<2 (463)*
30				<2 (439)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Hydraram SG600S - RR115/6.3

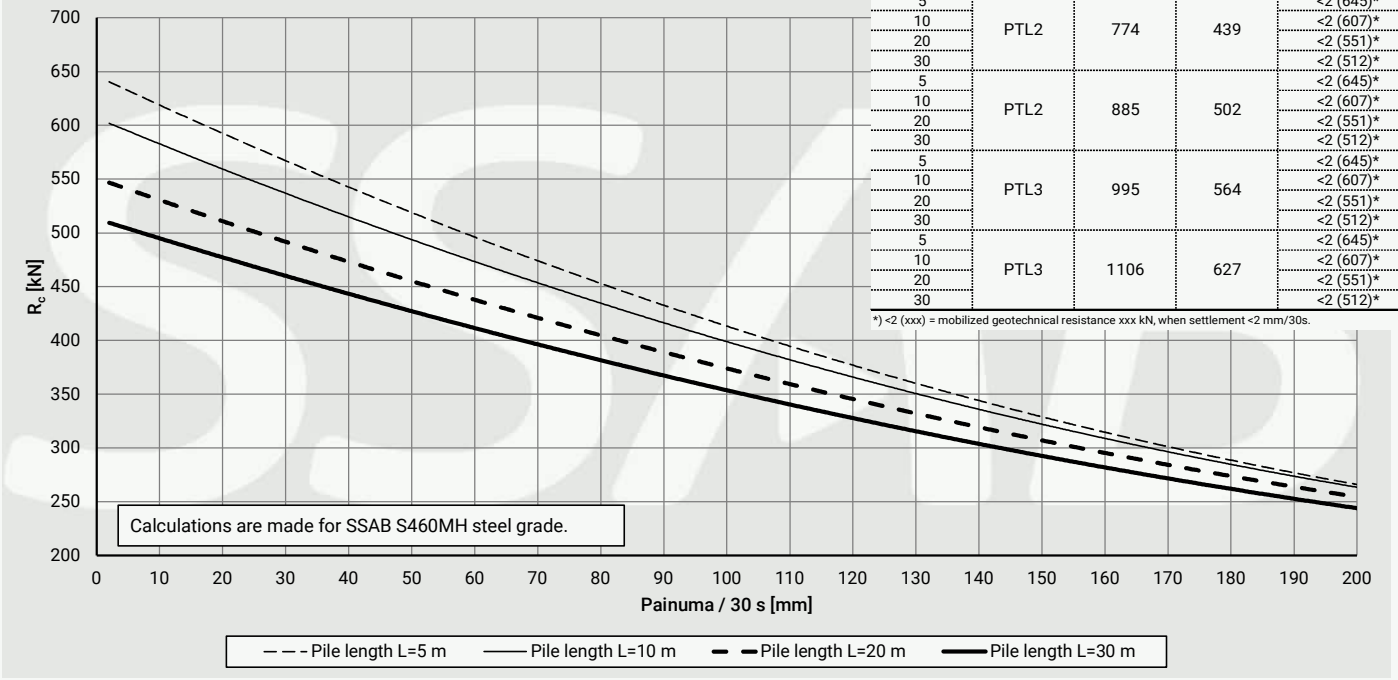


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	531	301	6
10				3
20				<2 (499)*
30				<2 (470)*
5	PTL2	620	351	<2 (539)*
10				<2 (532)*
20				<2 (499)*
30				<2 (470)*
5	PTL2	708	401	<2 (539)*
10				<2 (532)*
20				<2 (499)*
30				<2 (470)*
5	PTL3	797	452	<2 (539)*
10				<2 (532)*
20				<2 (499)*
30				<2 (470)*
5	PTL3	885	502	<2 (539)*
10				<2 (532)*
20				<2 (499)*
30				<2 (470)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Hydraram SG600S - RR115/8



Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	664	376	<2 (645)*
10				<2 (607)*
20				<2 (551)*
30				<2 (512)*
5	PTL2	774	439	<2 (645)*
10				<2 (607)*
20				<2 (551)*
30				<2 (512)*
5	PTL2	885	502	<2 (645)*
10				<2 (607)*
20				<2 (551)*
30				<2 (512)*
5	PTL3	995	564	<2 (645)*
10				<2 (607)*
20				<2 (551)*
30				<2 (512)*
5	PTL3	1106	627	<2 (645)*
10				<2 (607)*
20				<2 (551)*
30				<2 (512)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

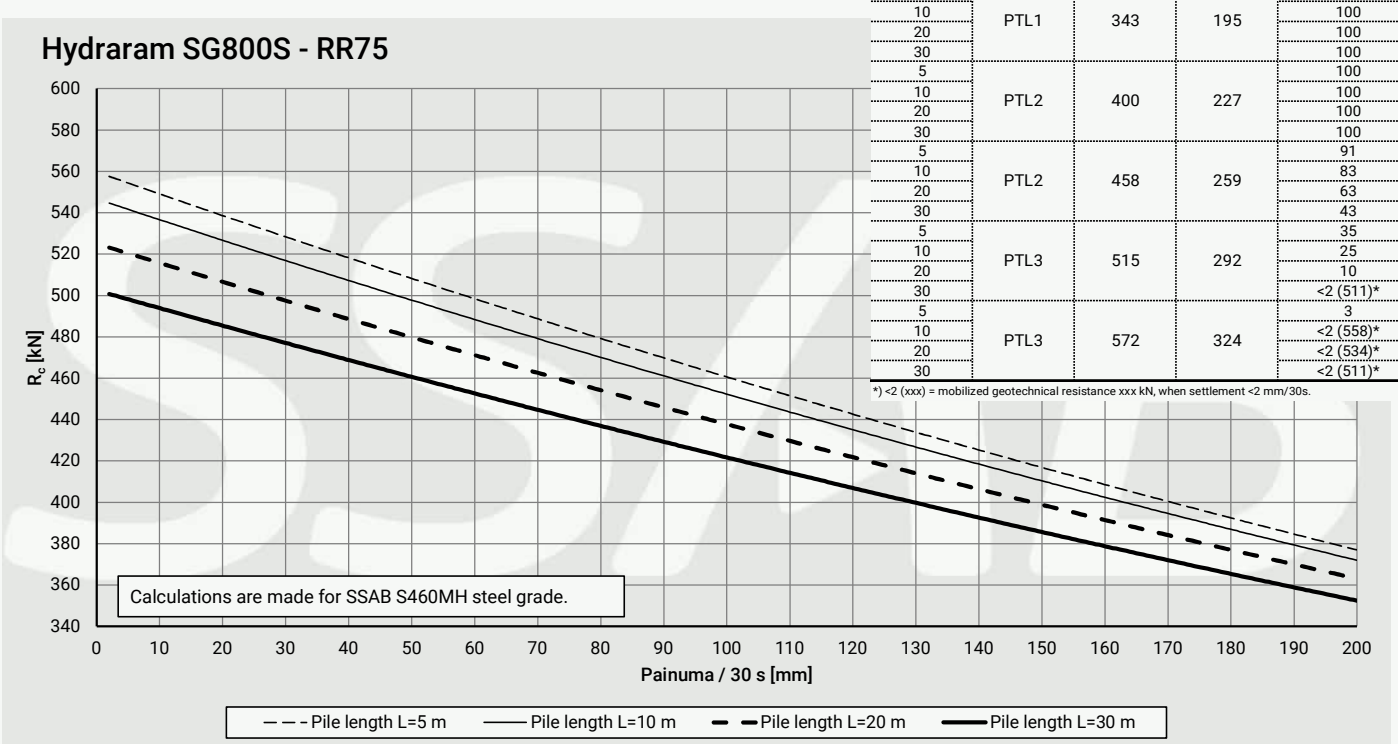
Hydraram SG800S

Piston		
Piston weight [kg]	m_r	42
Diameter of the piston [mm]	D_r	100
Length of the piston [mm]	L_r	800
Theoretical impact energy [J]	E_{rated}	2035
Efficiency of the piston [%]	HE	80
Equivalent drop height [m]	H_{ekv}	4.94
Theoretical impact rate [blows/min]	BPM	450-630
Actual impact rate vrs theoretical [%]	η	80
Measured / in analysis used impact rate [blows/min]	BPM_m	500
Impact tool		
Diameter of the tool [mm]	D_t	100
Height of the tool [mm]	L_t	800
Tool weight [kg]	m_t	50

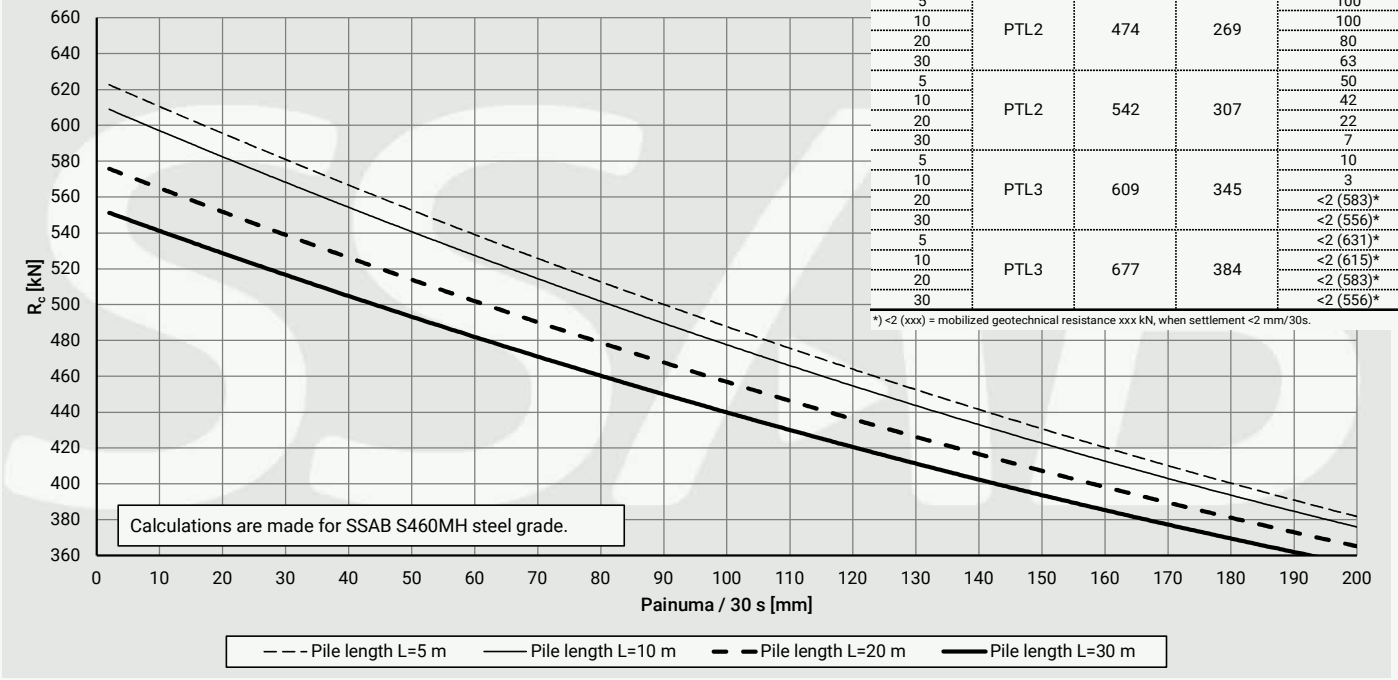
Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	343	195	100
10				100
20				100
30				100
5	PTL2	400	227	100
10				100
20				100
30				100
5	PTL2	458	259	91
10				83
20				63
30				43
5	PTL3	515	292	35
10				25
20				10
30				<2 (511)*
5	PTL3	572	324	3
10				<2 (558)*
20				<2 (534)*
30				<2 (511)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.



Hydraram SG800S - RR90

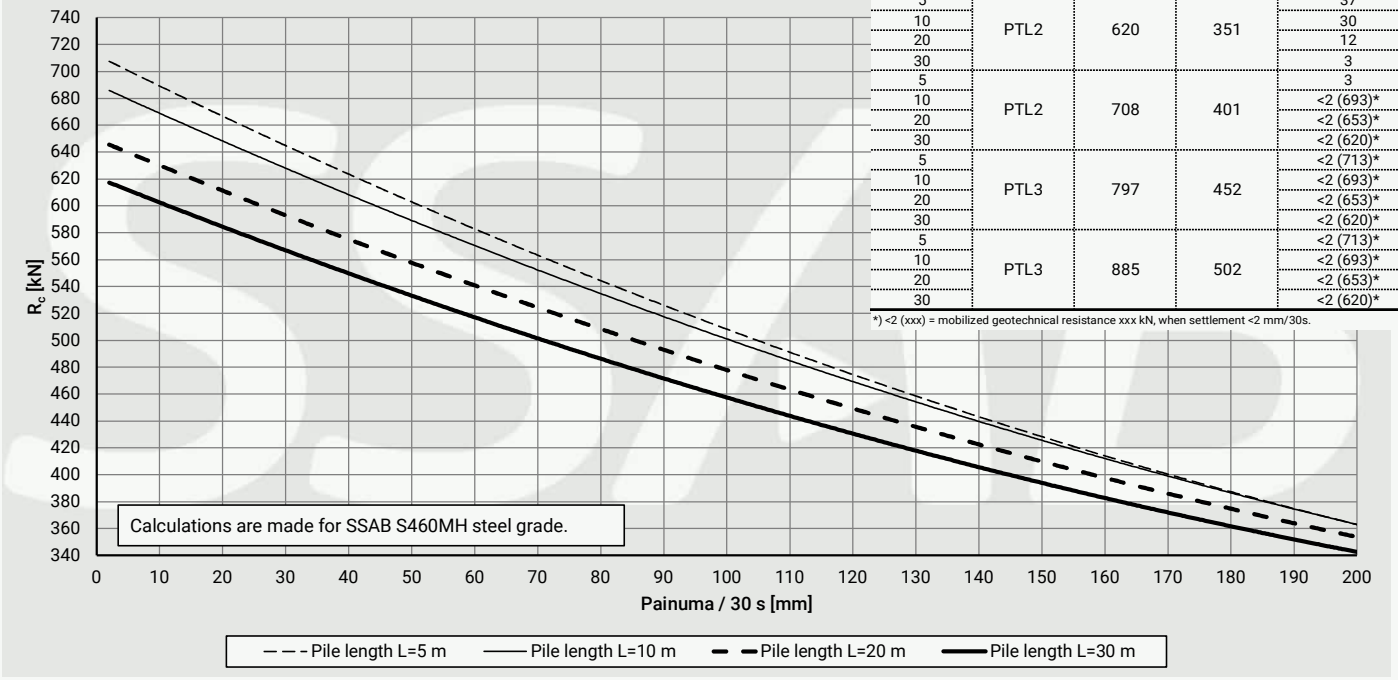


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	406	230	100
10				100
20				100
30				100
5	PTL2	474	269	100
10				100
20				80
30				63
5	PTL2	542	307	50
10				42
20				22
30				7
5	PTL3	609	345	10
10				3
20				<2 (583)*
30				<2 (556)*
5	PTL3	677	384	<2 (631)*
10				<2 (615)*
20				<2 (583)*
30				<2 (556)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Hydraram SG800S - RR115/6.3

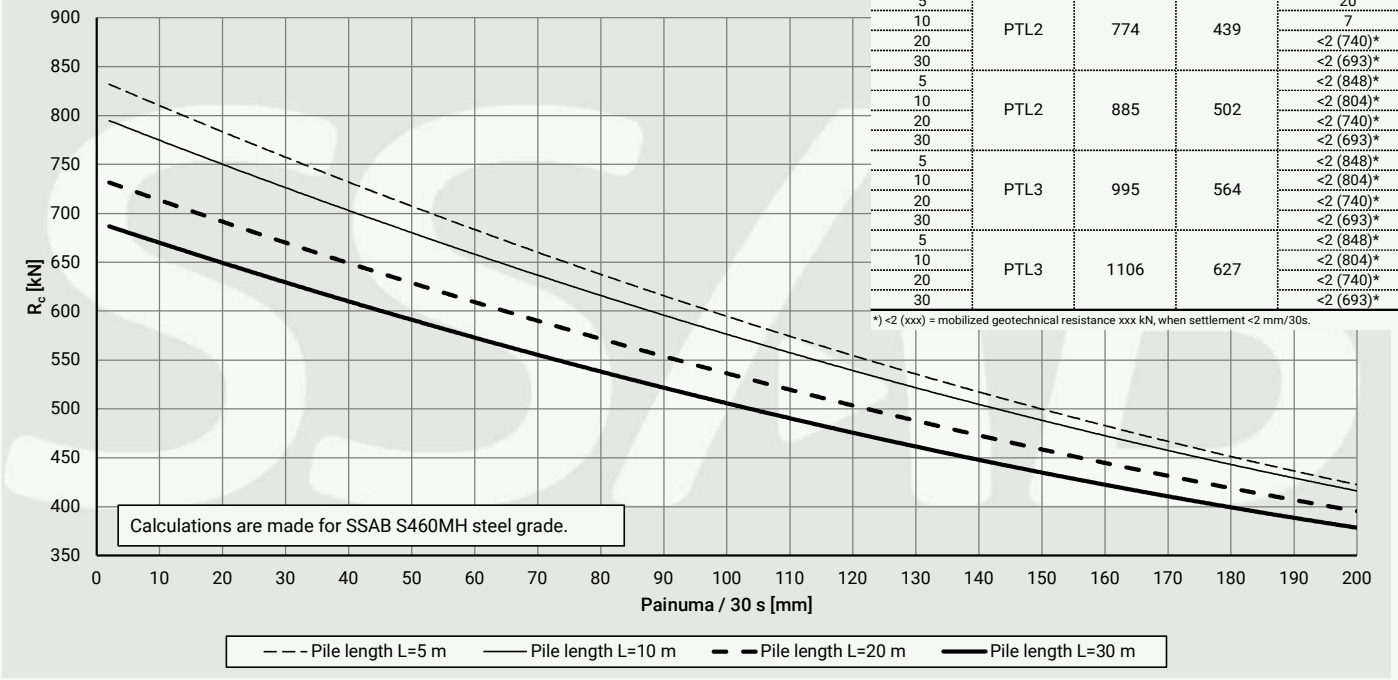


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	531	301	85
10				80
20				63
30				45
5	PTL2	620	351	37
10				30
20				12
30				3
5	PTL2	708	401	3
10				<2 (693)*
20				<2 (653)*
30				<2 (620)*
5	PTL3	797	452	<2 (713)*
10				<2 (693)*
20				<2 (653)*
30				<2 (620)*
5	PTL3	885	502	<2 (713)*
10				<2 (693)*
20				<2 (653)*
30				<2 (620)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Hydraram SG800S - RR115/8

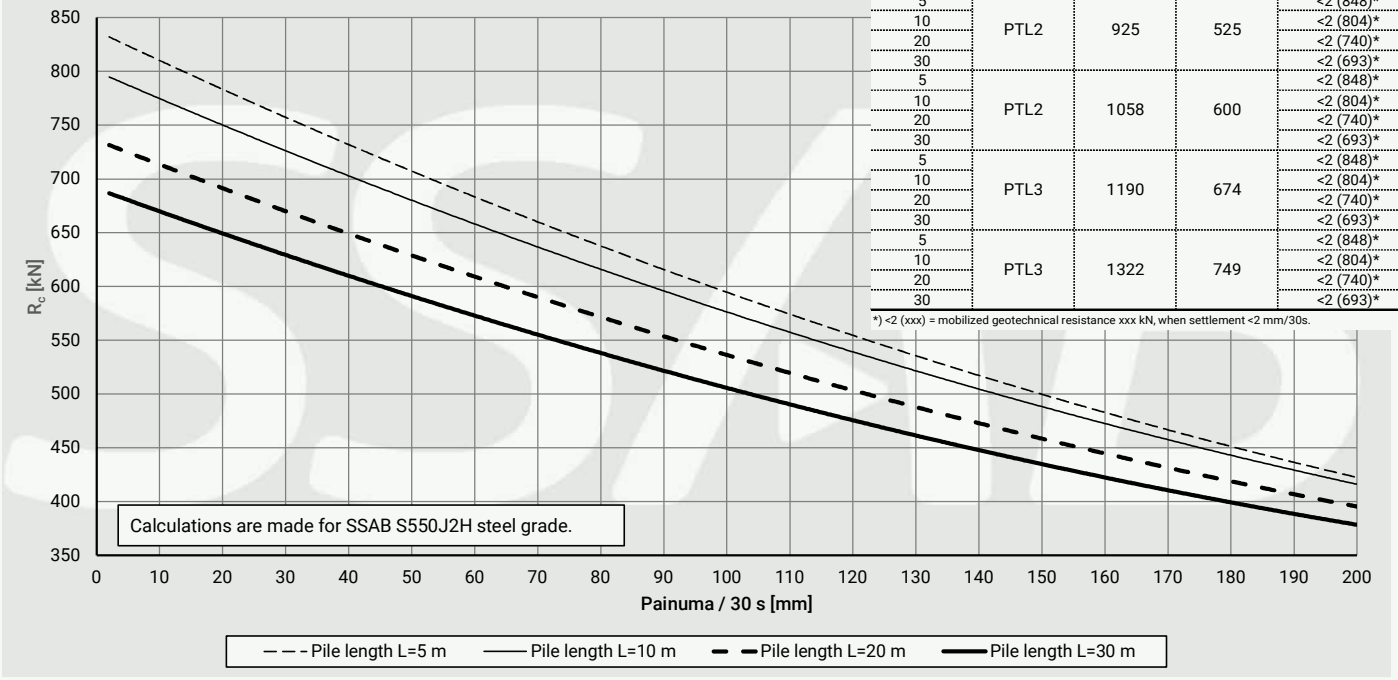


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	664	376	63
10				50
20				28
30				10
5	PTL2	774	439	20
10				7
20				<2 (740)*
30				<2 (693)*
5	PTL2	885	502	<2 (848)*
10				<2 (804)*
20				<2 (740)*
30				<2 (693)*
5	PTL3	995	564	<2 (848)*
10				<2 (804)*
20				<2 (740)*
30				<2 (693)*
5	PTL3	1106	627	<2 (848)*
10				<2 (804)*
20				<2 (740)*
30				<2 (693)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Hydraram SG800S - RRs115/8

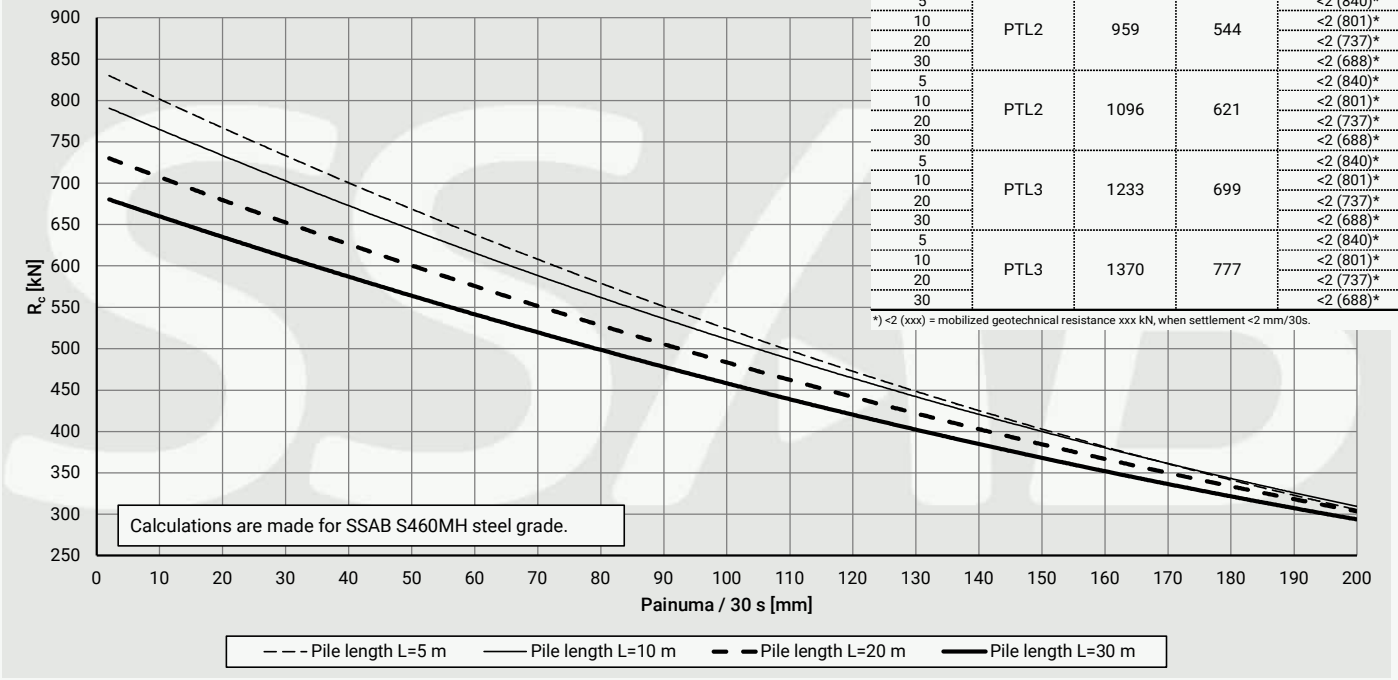


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	793	450	15
10				5
20				<2 (740)*
30				<2 (693)*
5	PTL2	925	525	<2 (848)*
10				<2 (804)*
20				<2 (740)*
30				<2 (693)*
5	PTL2	1058	600	<2 (848)*
10				<2 (804)*
20				<2 (740)*
30				<2 (693)*
5	PTL3	1190	674	<2 (848)*
10				<2 (804)*
20				<2 (740)*
30				<2 (693)*
5	PTL3	1322	749	<2 (848)*
10				<2 (804)*
20				<2 (740)*
30				<2 (693)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Hydraram SG800S - RR140/8



Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	822	466	5
10				<2 (801)*
20				<2 (737)*
30				<2 (688)*
5	PTL2	959	544	<2 (840)*
10				<2 (801)*
20				<2 (737)*
30				<2 (688)*
5	PTL2	1096	621	<2 (840)*
10				<2 (801)*
20				<2 (737)*
30				<2 (688)*
5	PTL3	1233	699	<2 (840)*
10				<2 (801)*
20				<2 (737)*
30				<2 (688)*
5	PTL3	1370	777	<2 (840)*
10				<2 (801)*
20				<2 (737)*
30				<2 (688)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

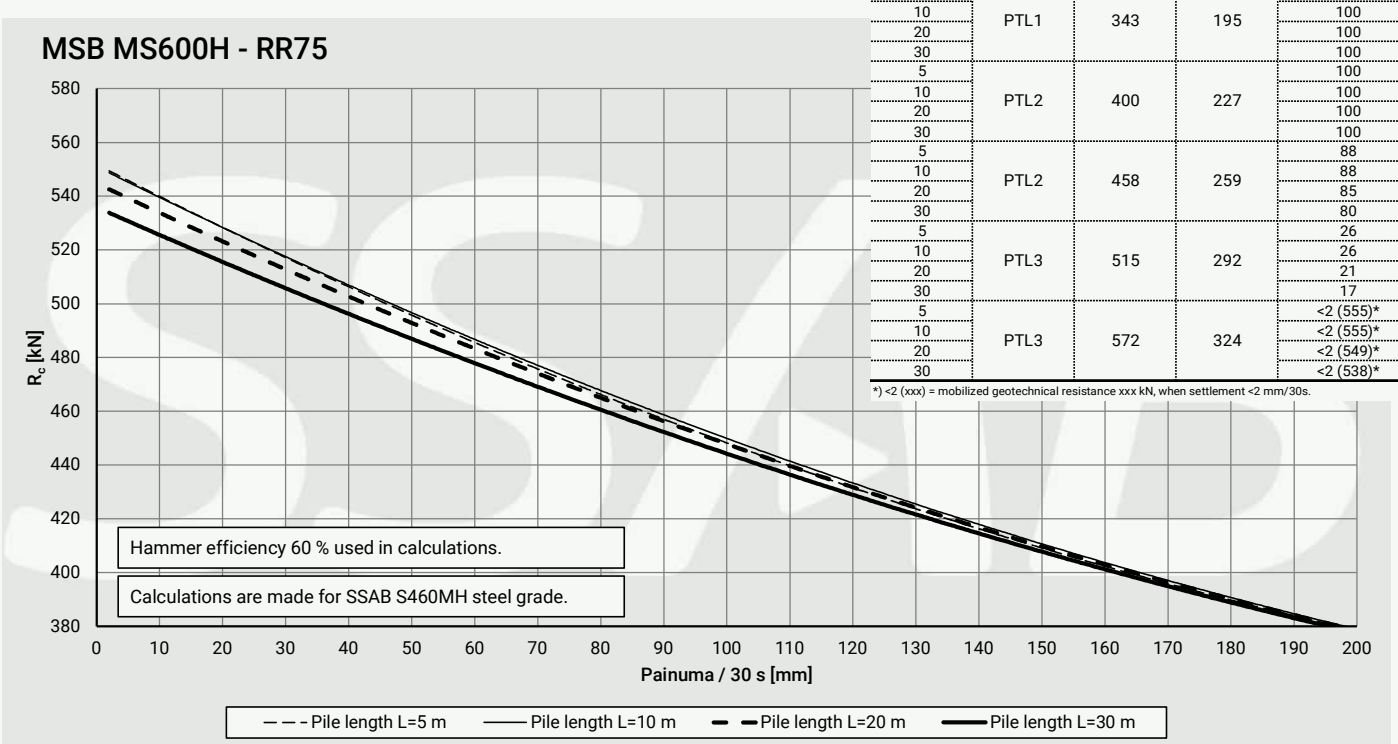
MSB MS600H

Piston		
Piston weight [kg]	m_r	75
Diameter of the piston [mm]	D_r	127
Length of the piston [mm]	L_r	839
Theoretical impact energy [J]	E_{rated}	3750
Efficiency of the piston [%]	HE	80
Equivalent drop height [m]	H_{ekv}	5.1
Theoretical impact rate [blows/min]	BPM	400-500
Actual impact rate vrs theoretical [%]	η	94
Measured / in analysis used impact rate [blows/min]	BPM_m	470
Impact tool		
Diameter of the tool [mm]	D_t	130
Height of the tool [mm]	L_t	920
Tool weight [kg]	m_t	96

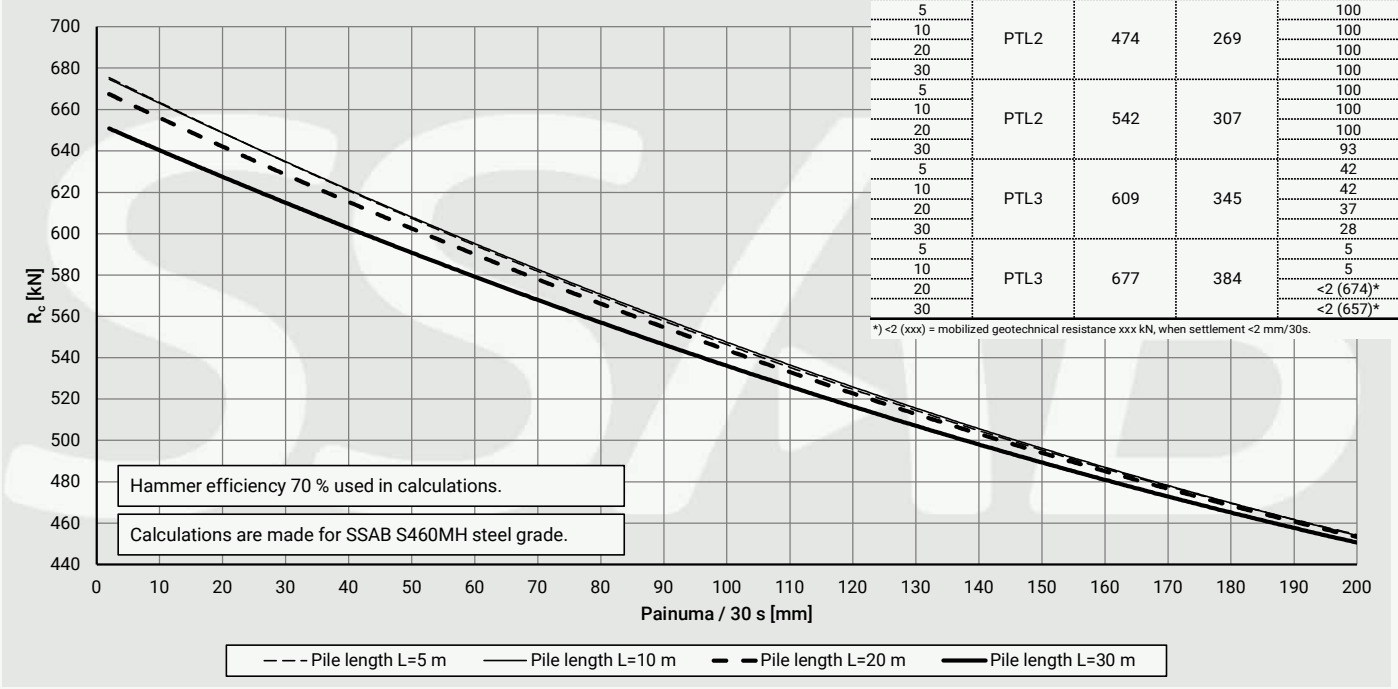
Hammer efficiency 60 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	343	195	100
10				100
20				100
30				100
5	PTL2	400	227	100
10				100
20				100
30				100
5	PTL2	458	259	88
10				88
20				85
30				80
5	PTL3	515	292	26
10				26
20				21
30				17
5	PTL3	572	324	<2 (555)*
10				<2 (555)*
20				<2 (549)*
30				<2 (538)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.



MSB MS600H - RR90

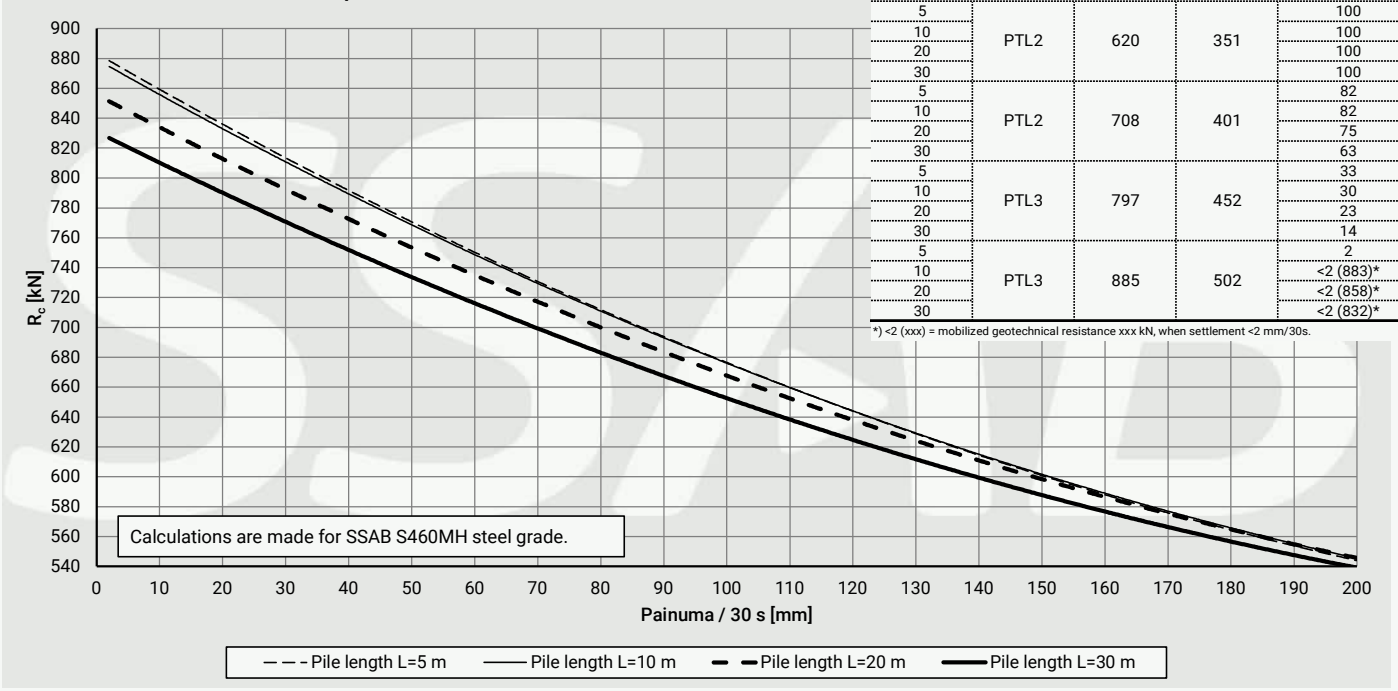


Hammer efficiency 70 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	406	230	100
10				100
20				100
30				100
5	PTL2	474	269	100
10				100
20				100
30				100
5	PTL2	542	307	100
10				100
20				100
30				93
5	PTL3	609	345	42
10				42
20				37
30				28
5	PTL3	677	384	5
10				5
20				<2 (674)*
30				<2 (657)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

MSB MS600H - RR115/6.3

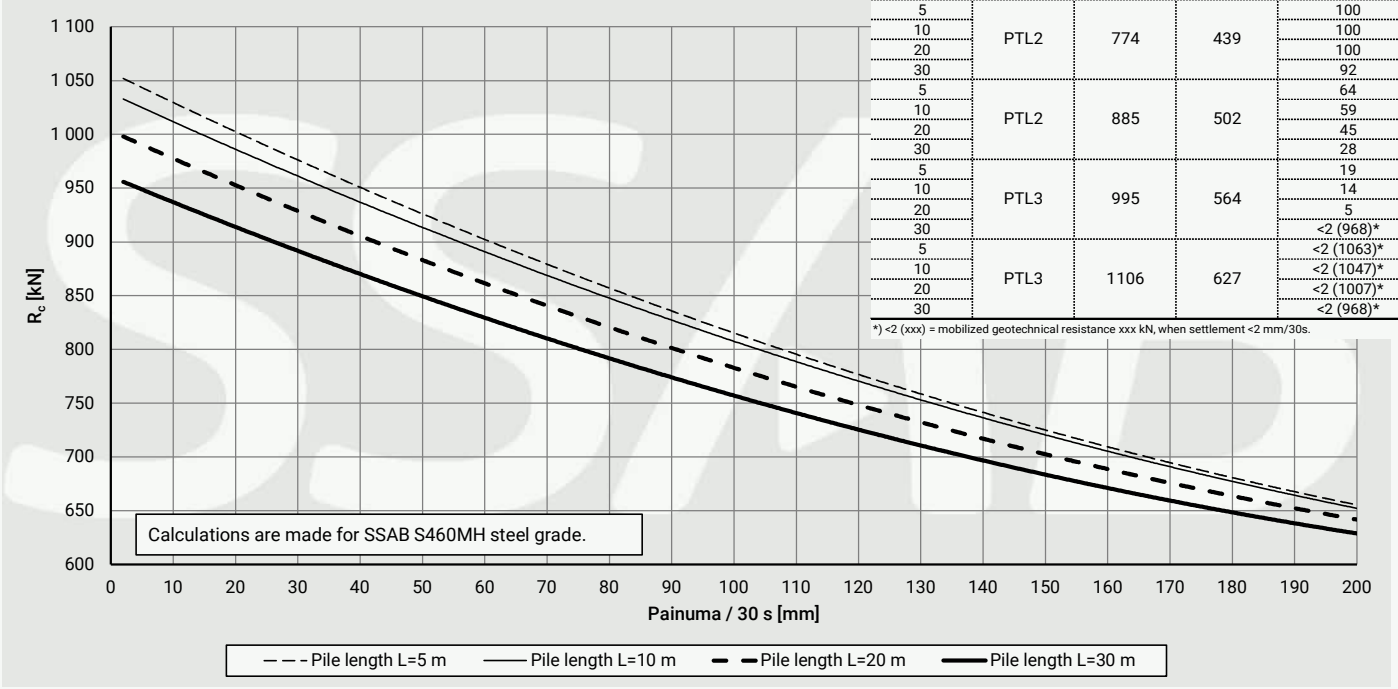


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	531	301	100
10				100
20				100
30				100
5	PTL2	620	351	100
10				100
20				100
30				100
5	PTL2	708	401	82
10				82
20				75
30				63
5	PTL3	797	452	33
10				30
20				23
30				14
5	PTL3	885	502	2
10				<2 (883)*
20				<2 (858)*
30				<2 (832)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

MSB MS600H - RR115/8

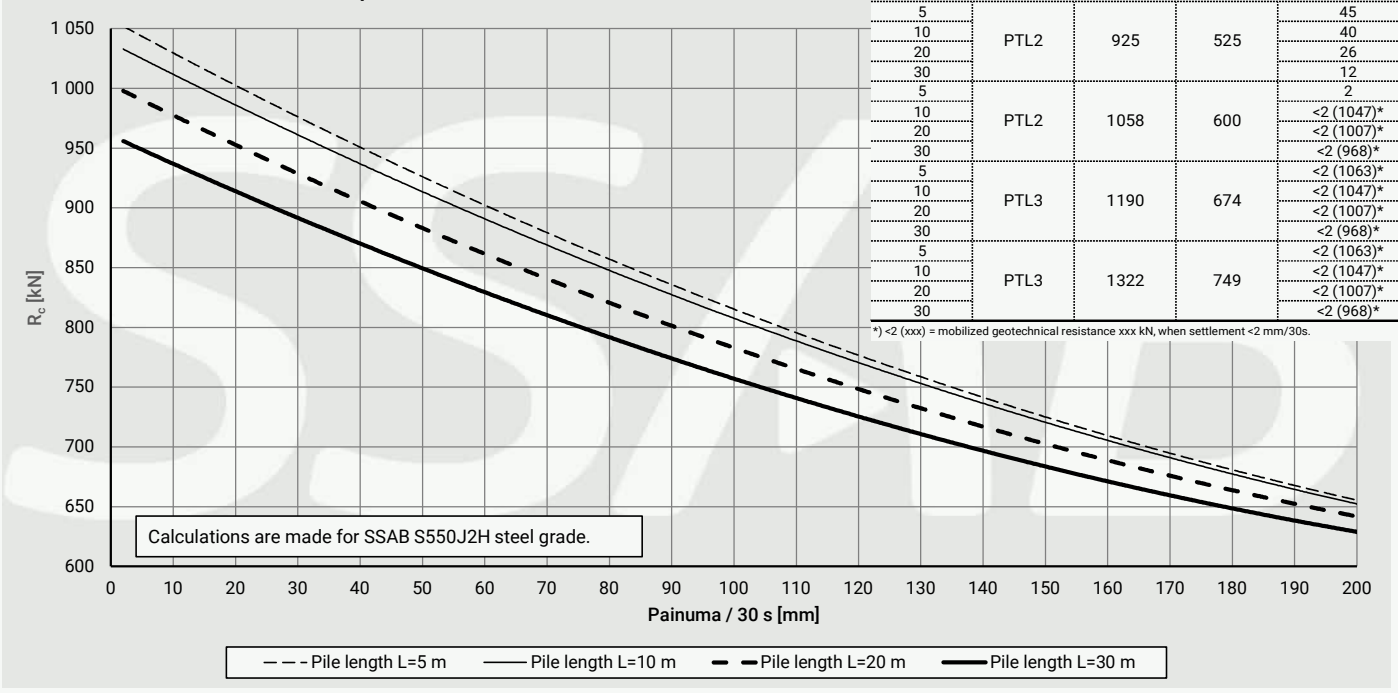


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	664	376	100
10				100
20				100
30				100
5	PTL2	774	439	100
10				100
20				100
30				92
5	PTL2	885	502	64
10				59
20				45
30				28
5	PTL3	995	564	19
10				14
20				5
30				<2 (968)*
5	PTL3	1106	627	<2 (1063)*
10				<2 (1047)*
20				<2 (1007)*
30				<2 (968)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

MSB MS600H - RRs115/8

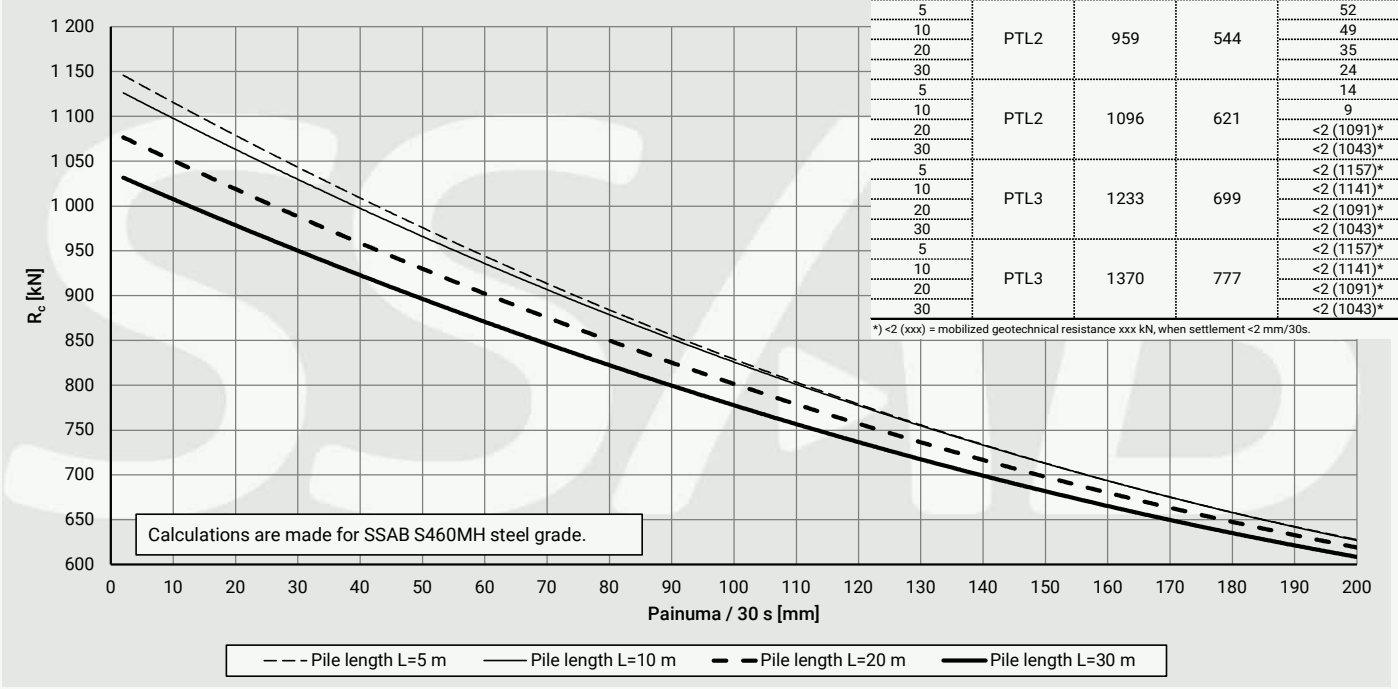


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	793	450	100
10				100
20				96
30				80
5	PTL2	925	525	45
10				40
20				26
30				12
5	PTL2	1058	600	2
10				<2 (1047)*
20				<2 (1007)*
30				<2 (968)*
5	PTL3	1190	674	<2 (1063)*
10				<2 (1047)*
20				<2 (1007)*
30				<2 (968)*
5	PTL3	1322	749	<2 (1063)*
10				<2 (1047)*
20				<2 (1007)*
30				<2 (968)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

MSB MS600H - RR140/8

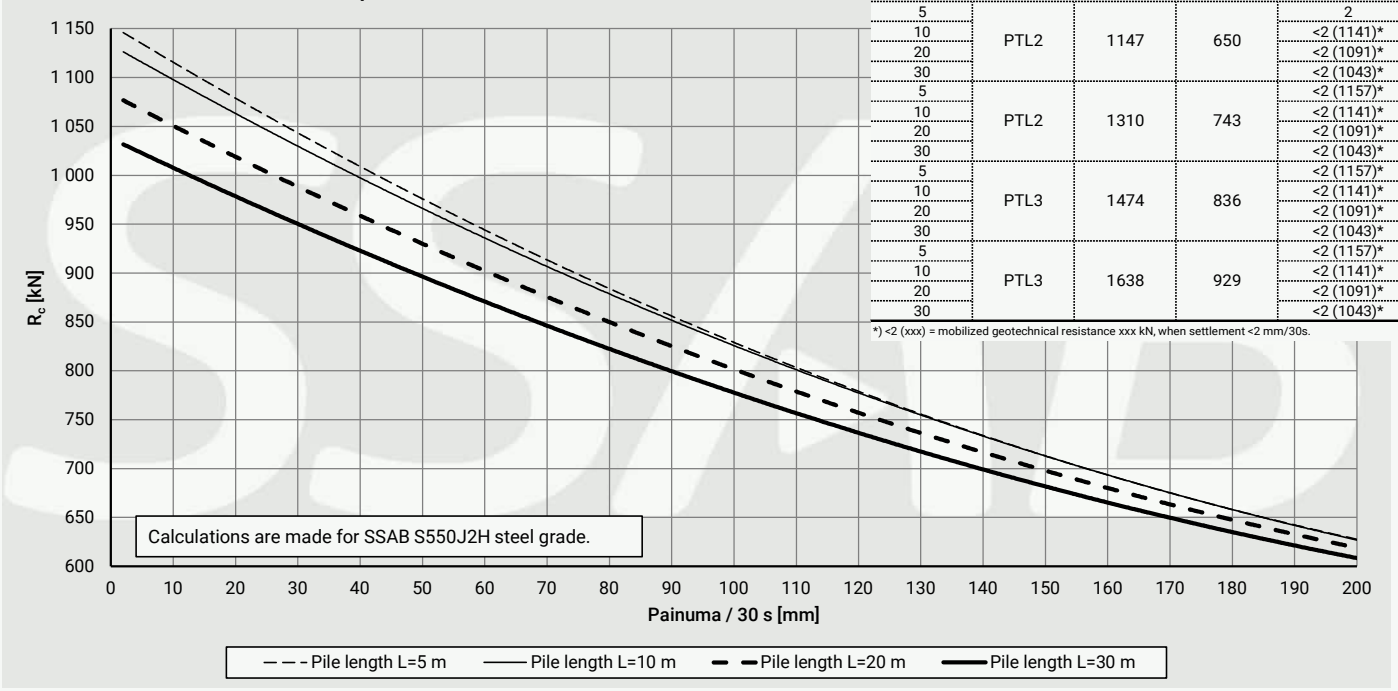


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	822	466	100
10				100
20				94
30				80
5	PTL2	959	544	52
10				49
20				35
30				24
5	PTL2	1096	621	14
10				9
20				<2 (1091)*
30				<2 (1043)*
5	PTL3	1233	699	<2 (1157)*
10				<2 (1141)*
20				<2 (1091)*
30				<2 (1043)*
5	PTL3	1370	777	<2 (1157)*
10				<2 (1141)*
20				<2 (1091)*
30				<2 (1043)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

MSB MS600H - RRs140/8

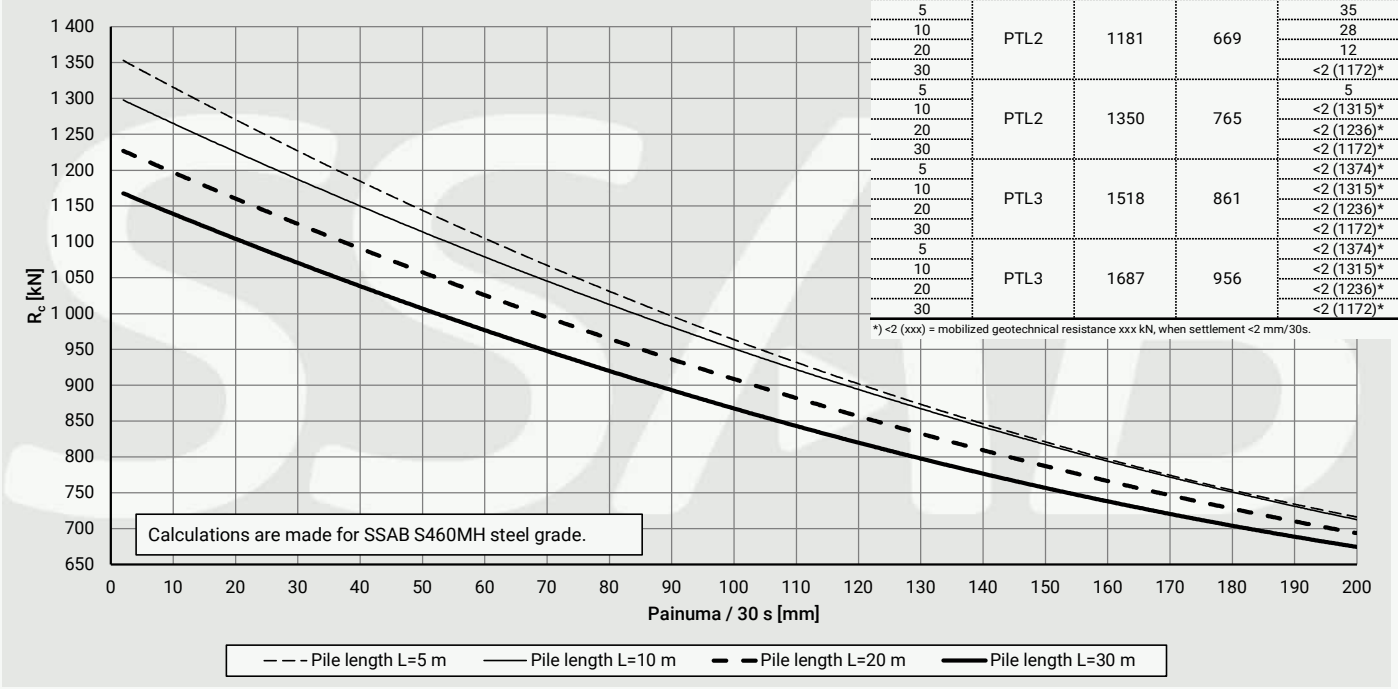


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	983	557	45
10				40
20				28
30				17
5	PTL2	1147	650	2
10				<2 (1141)*
20				<2 (1091)*
30				<2 (1043)*
5	PTL2	1310	743	<2 (1157)*
10				<2 (1141)*
20				<2 (1091)*
30				<2 (1043)*
5	PTL3	1474	836	<2 (1157)*
10				<2 (1141)*
20				<2 (1091)*
30				<2 (1043)*
5	PTL3	1638	929	<2 (1157)*
10				<2 (1141)*
20				<2 (1091)*
30				<2 (1043)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

MSB MS600H - RR140/10

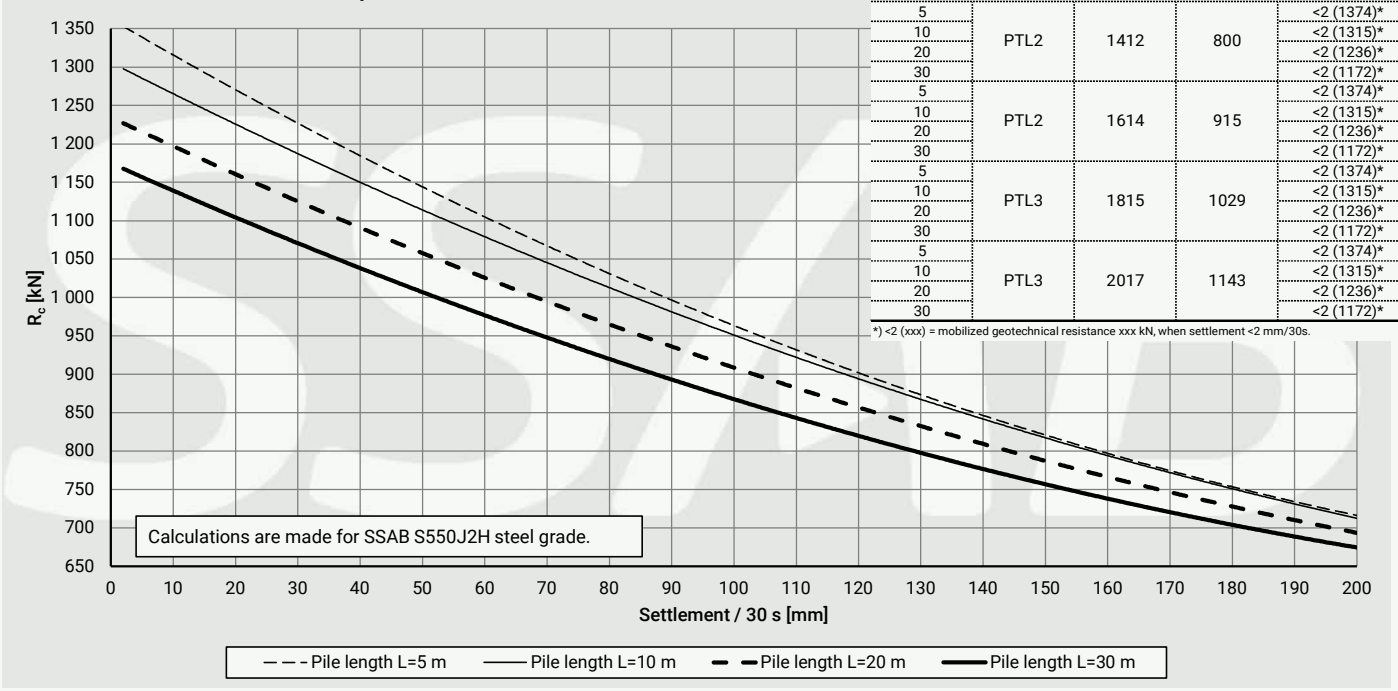


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1012	574	87
10				80
20				61
30				45
5	PTL2	1181	669	35
10				28
20				12
30				<2 (1172)*
5	PTL2	1350	765	5
10				<2 (1315)*
20				<2 (1236)*
30				<2 (1172)*
5	PTL3	1518	861	<2 (1374)*
10				<2 (1315)*
20				<2 (1236)*
30				<2 (1172)*
5	PTL3	1687	956	<2 (1374)*
10				<2 (1315)*
20				<2 (1236)*
30				<2 (1172)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

MSB MS600H - RRs140/10

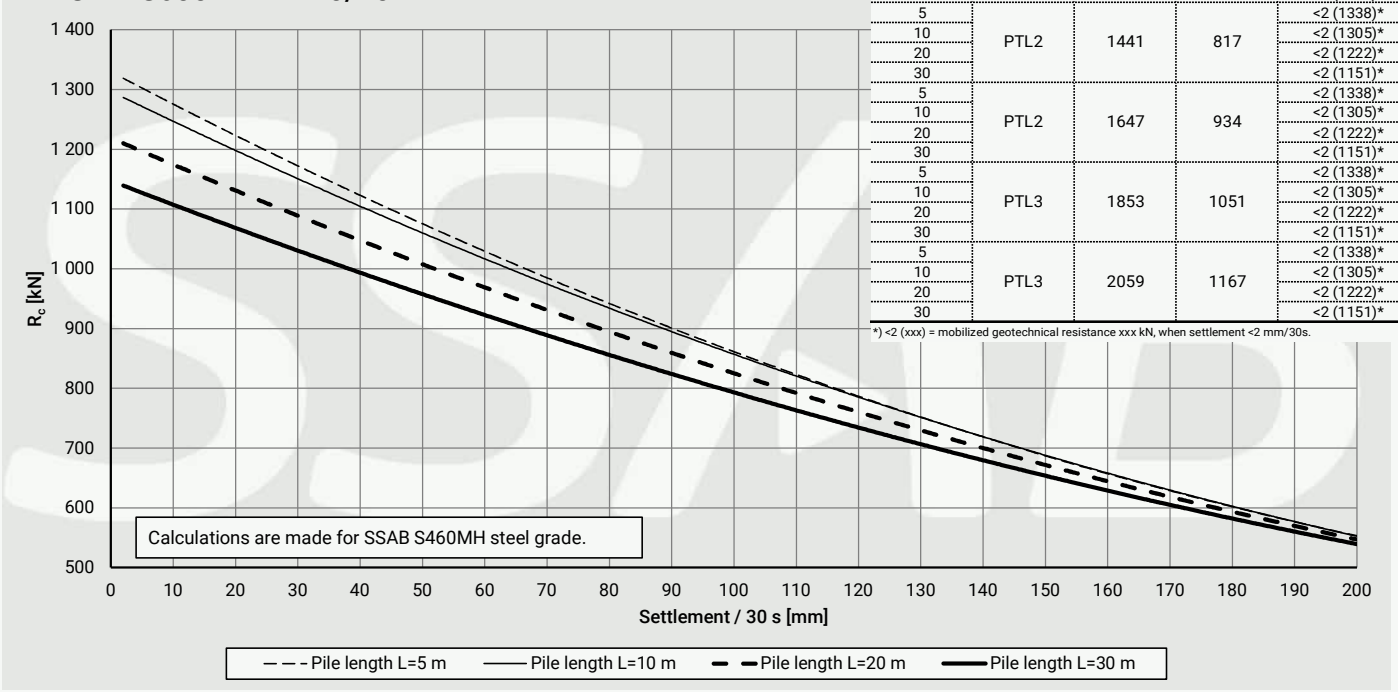


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1210	686	28
10				21
20				7
30				<2 (1172)*
5	PTL2	1412	800	<2 (1374)*
10				<2 (1315)*
20				<2 (1236)*
30				<2 (1172)*
5	PTL2	1614	915	<2 (1374)*
10				<2 (1315)*
20				<2 (1236)*
30				<2 (1172)*
5	PTL3	1815	1029	<2 (1374)*
10				<2 (1315)*
20				<2 (1236)*
30				<2 (1172)*
5	PTL3	2017	1143	<2 (1374)*
10				<2 (1315)*
20				<2 (1236)*
30				<2 (1172)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

MSB MS600H - RR170/10

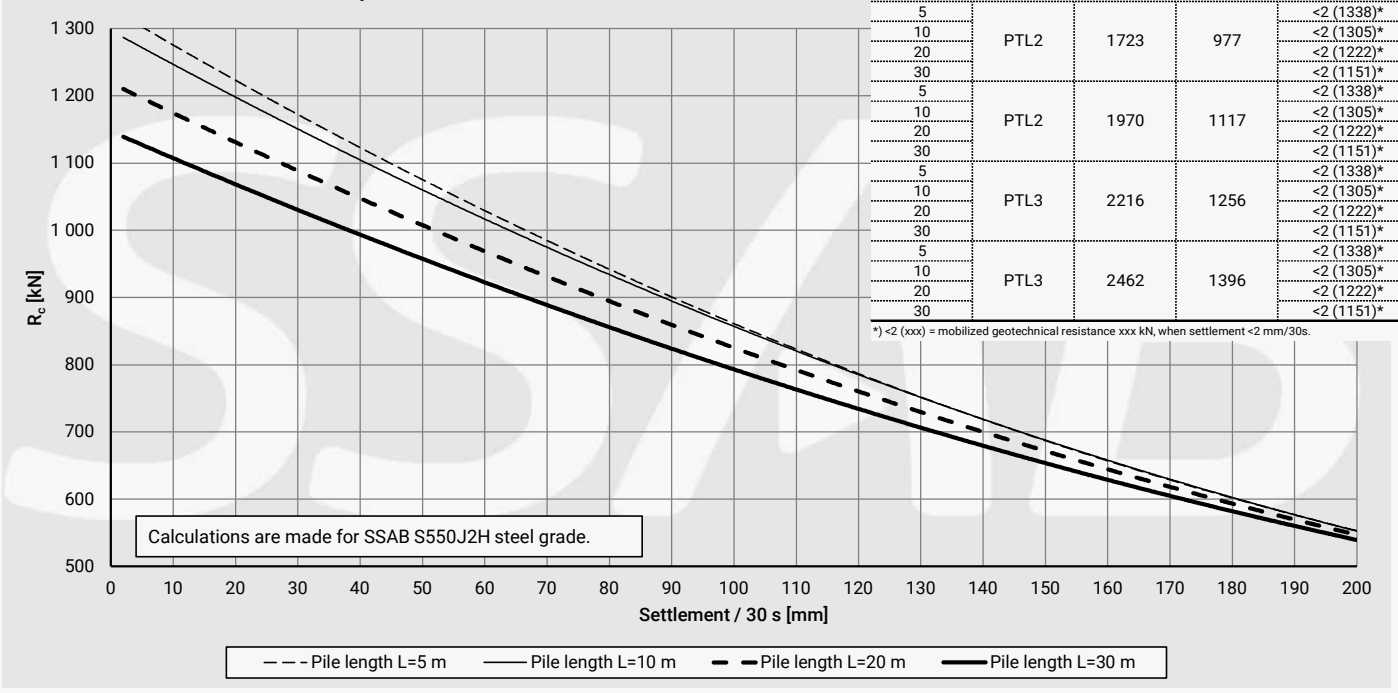


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1235	700	16
10				12
20				<2 (1222)*
30				<2 (1151)*
5	PTL2	1441	817	<2 (1338)*
10				<2 (1305)*
20				<2 (1222)*
30				<2 (1151)*
5	PTL2	1647	934	<2 (1338)*
10				<2 (1305)*
20				<2 (1222)*
30				<2 (1151)*
5	PTL3	1853	1051	<2 (1338)*
10				<2 (1305)*
20				<2 (1222)*
30				<2 (1151)*
5	PTL3	2059	1167	<2 (1338)*
10				<2 (1305)*
20				<2 (1222)*
30				<2 (1151)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

MSB MS600H - RRs170/10



Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1477	837	<2 (1338)*
10				<2 (1305)*
20				<2 (1222)*
30				<2 (1151)*
5	PTL2	1723	977	<2 (1338)*
10				<2 (1305)*
20				<2 (1222)*
30				<2 (1151)*
5	PTL2	1970	1117	<2 (1338)*
10				<2 (1305)*
20				<2 (1222)*
30				<2 (1151)*
5	PTL3	2216	1256	<2 (1338)*
10				<2 (1305)*
20				<2 (1222)*
30				<2 (1151)*
5	PTL3	2462	1396	<2 (1338)*
10				<2 (1305)*
20				<2 (1222)*
30				<2 (1151)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

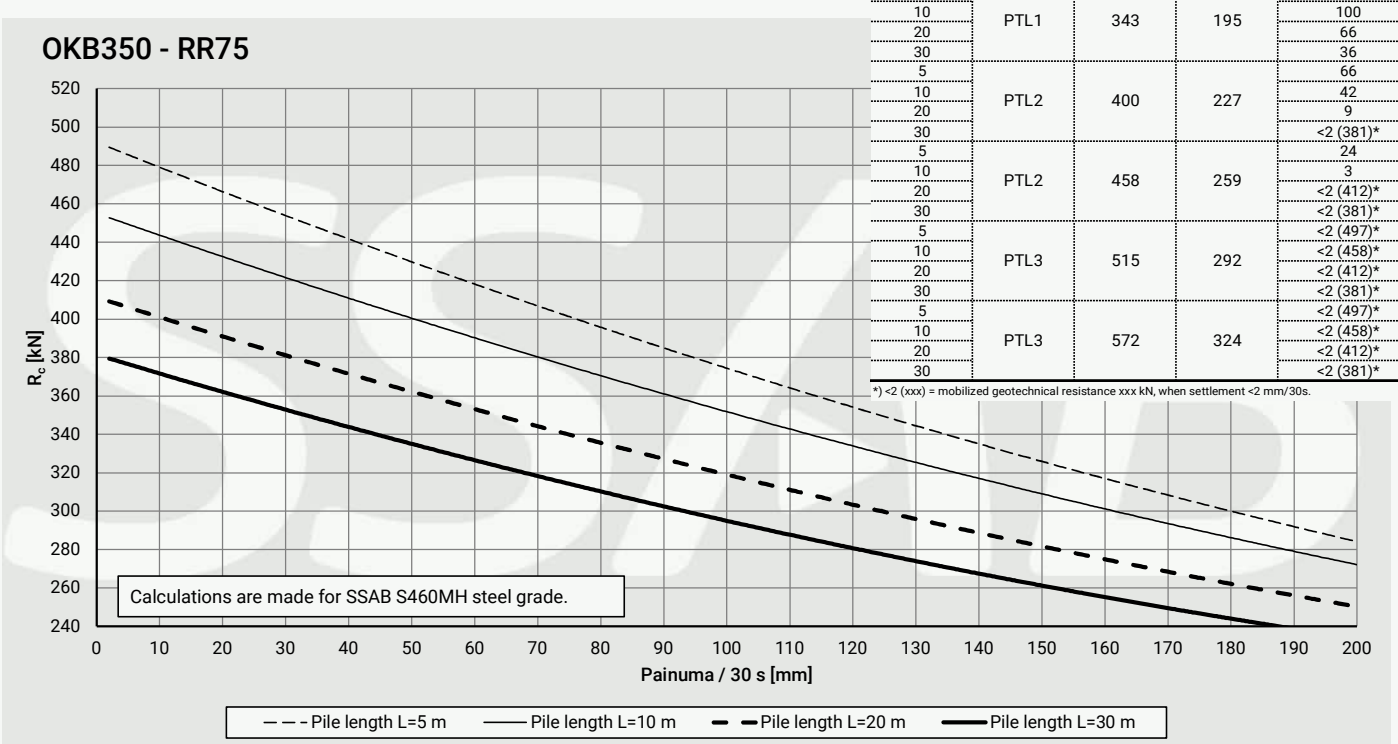
OKB350

Piston		
Piston weight [kg]	m_r	15
Diameter of the piston [mm]	D_r	80
Length of the piston [mm]	L_r	400
Theoretical impact energy [J]	E_{rated}	1210
Efficiency of the piston [%]	HE	80
Equivalent drop height [m]	H_{ekv}	8.23
Theoretical impact rate [blows/min]	BPM	450-900
Actual impact rate vrs theoretical [%]	η	67
Measured / in analysis used impact rate [blows/min]	BPM_m	600
Impact tool		
Diameter of the tool [mm]	D_t	75
Height of the tool [mm]	L_t	640
Tool weight [kg]	m_t	22

Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	343	195	100
10				100
20				66
30				36
5	PTL2	400	227	66
10				42
20				9
30				<2 (381)*
5	PTL2	458	259	24
10				3
20				<2 (412)*
30				<2 (381)*
5	PTL3	515	292	<2 (497)*
10				<2 (458)*
20				<2 (412)*
30				<2 (381)*
5	PTL3	572	324	<2 (497)*
10				<2 (458)*
20				<2 (412)*
30				<2 (381)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

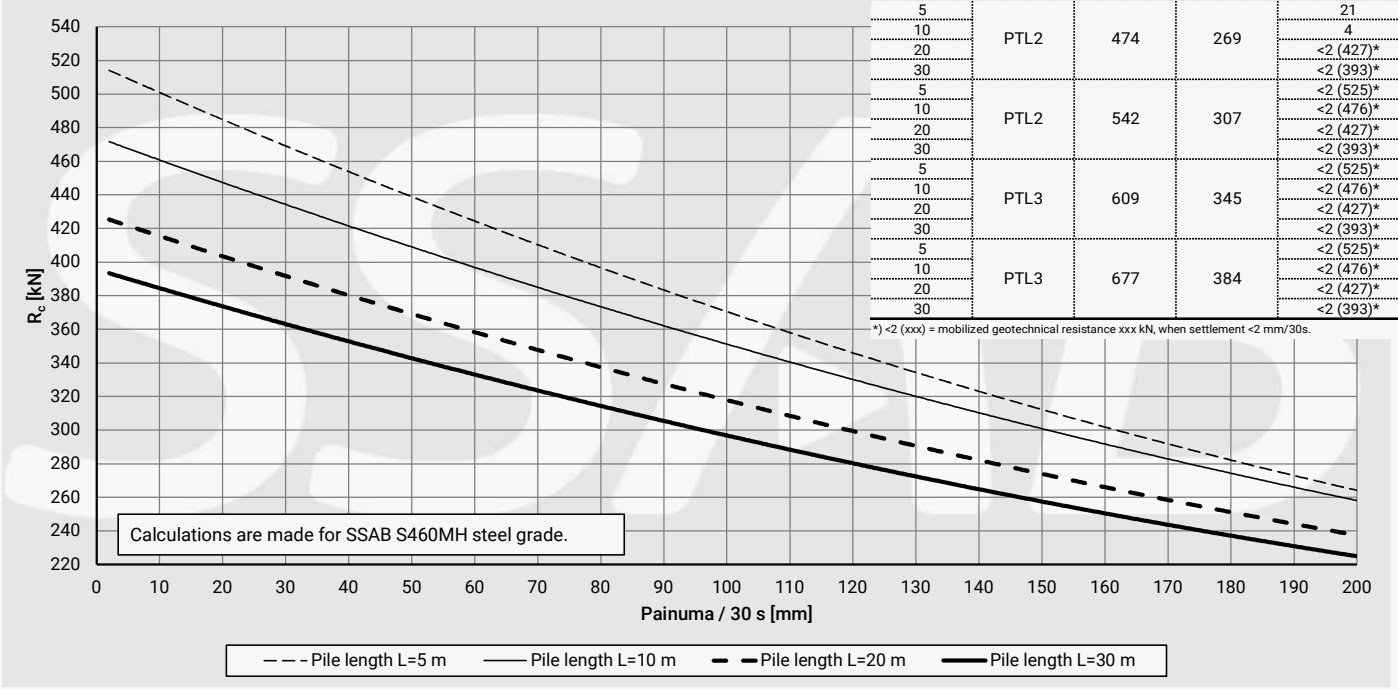


OKB350 - RR90

Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	406	230	66
10				45
20				15
30				<2 (393)*
5	PTL2	474	269	21
10				4
20				<2 (427)*
30				<2 (393)*
5	PTL2	542	307	<2 (525)*
10				<2 (476)*
20				<2 (427)*
30				<2 (393)*
5	PTL3	609	345	<2 (525)*
10				<2 (476)*
20				<2 (427)*
30				<2 (393)*
5	PTL3	677	384	<2 (525)*
10				<2 (476)*
20				<2 (427)*
30				<2 (393)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

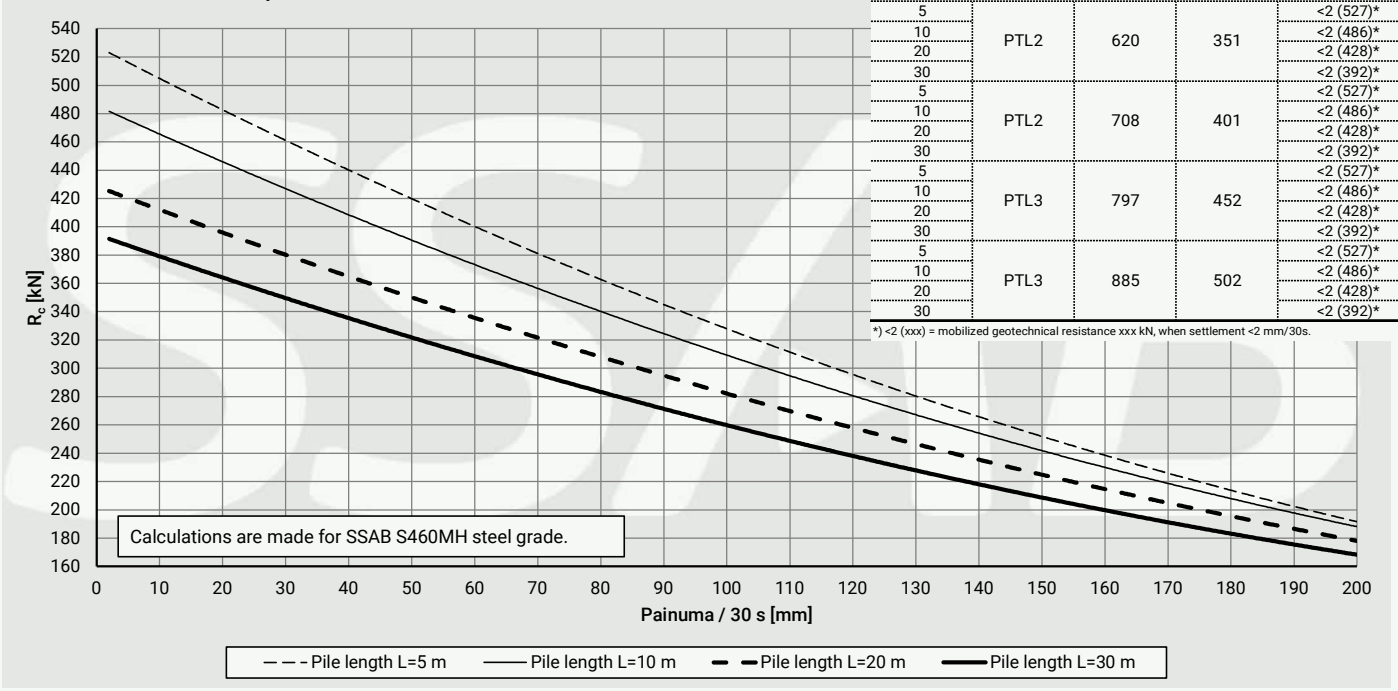


OKB350 - RR115/6.3

Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	531	301	<2 (527)*
10				<2 (486)*
20				<2 (428)*
30				<2 (392)*
5	PTL2	620	351	<2 (527)*
10				<2 (486)*
20				<2 (428)*
30				<2 (392)*
5	PTL2	708	401	<2 (527)*
10				<2 (486)*
20				<2 (428)*
30				<2 (392)*
5	PTL3	797	452	<2 (527)*
10				<2 (486)*
20				<2 (428)*
30				<2 (392)*
5	PTL3	885	502	<2 (527)*
10				<2 (486)*
20				<2 (428)*
30				<2 (392)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.



OKB1000 / SPD1000

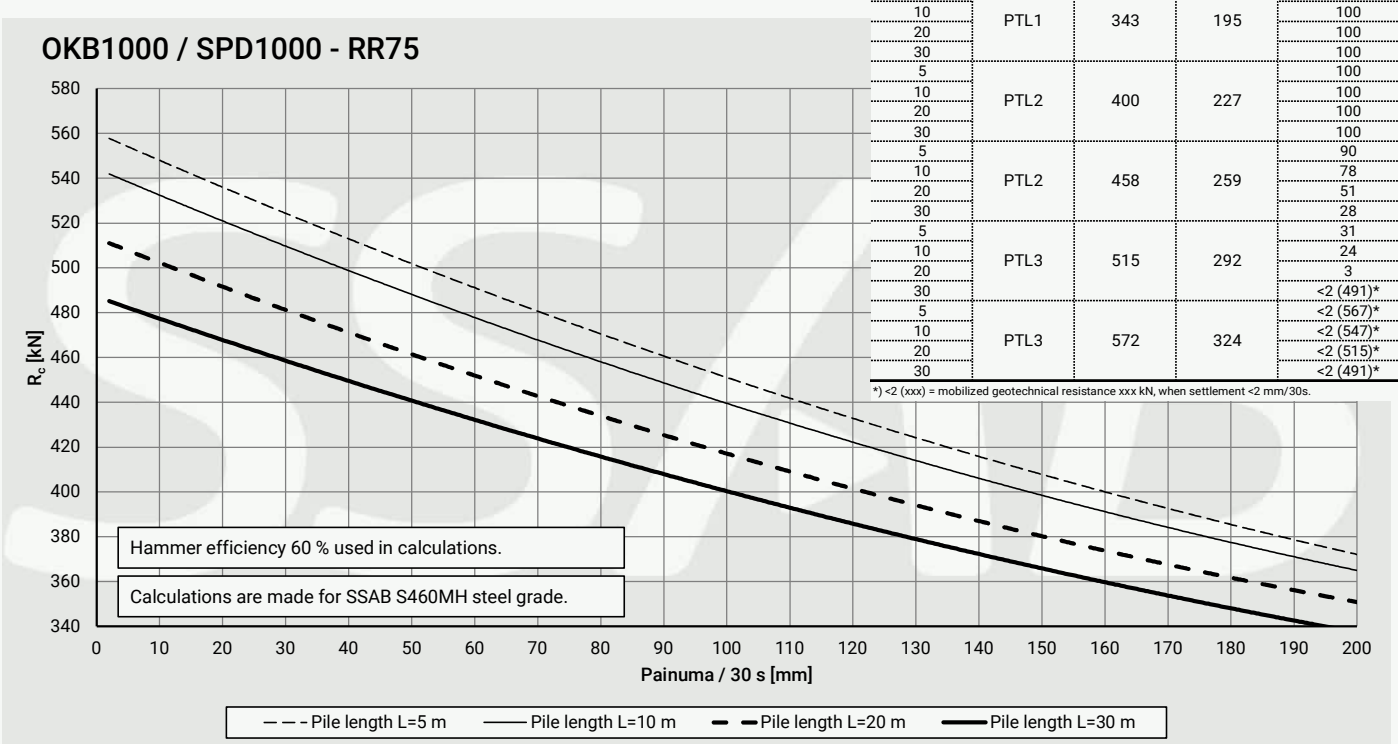
Piston		
Piston weight [kg]	m_r	42.4
Diameter of the piston [mm]	D_r	100
Length of the piston [mm]	L_r	700
Theoretical impact energy [J]	E_{rated}	2443
Efficiency of the piston [%]	HE	80
Equivalent drop height [m]	H_{ekv}	5.87
Theoretical impact rate [blows/min]	BPM	450-700
Actual impact rate vrs theoretical [%]	η	80
Measured / in analysis used impact rate [blows/min]	BPM_m	560
Impact tool		
Diameter of the tool [mm]	D_t	100
Height of the tool [mm]	L_t	679
Tool weight [kg]	m_t	42

Notice!
SPD uses technology of several different ram manufacturers. With SPD rams you need to consider also original manufacturer and type of the ram. These graphs and tables have been made for SPD1000 ram which is originally OKB1000 ram. For SPD rams where original ram is something else, you need to choose graphs and tables made for the original ram manufacturer and ram type.

Hammer efficiency 60 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	343	195	100
10				100
20				100
30				100
5	PTL2	400	227	100
10				100
20				100
30				100
5	PTL2	458	259	90
10				78
20				51
30				28
5	PTL3	515	292	31
10				24
20				3
30				<2 (491)*
5	PTL3	572	324	<2 (567)*
10				<2 (547)*
20				<2 (515)*
30				<2 (491)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

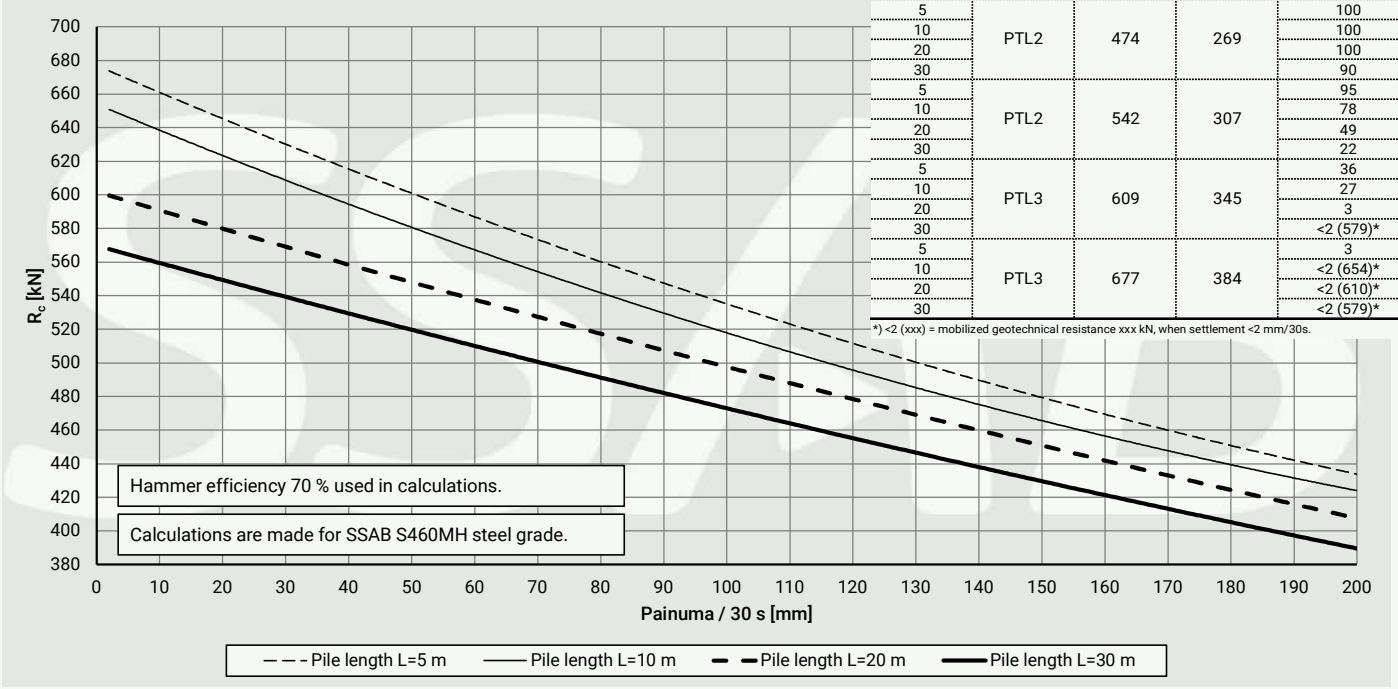


OKB1000 / SPD1000 - RR90

Hammer efficiency 70 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	406	230	100
10				100
20				100
30				100
5	PTL2	474	269	100
10				100
20				100
30				90
5	PTL2	542	307	95
10				78
20				49
30				22
5	PTL3	609	345	36
10				27
20				3
30				<2 (579)*
5	PTL3	677	384	3
10				<2 (654)*
20				<2 (610)*
30				<2 (579)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.



Notice!
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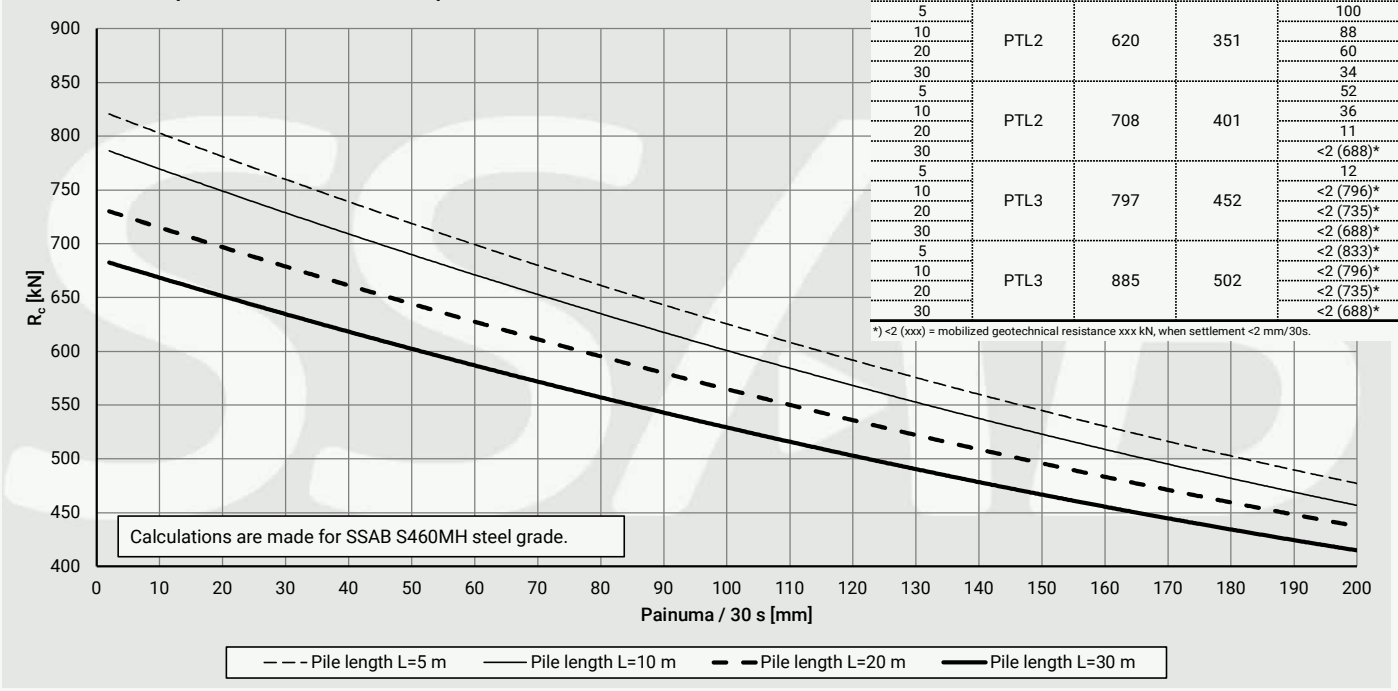
OKB1000 / SPD1000 - RR115/6.3

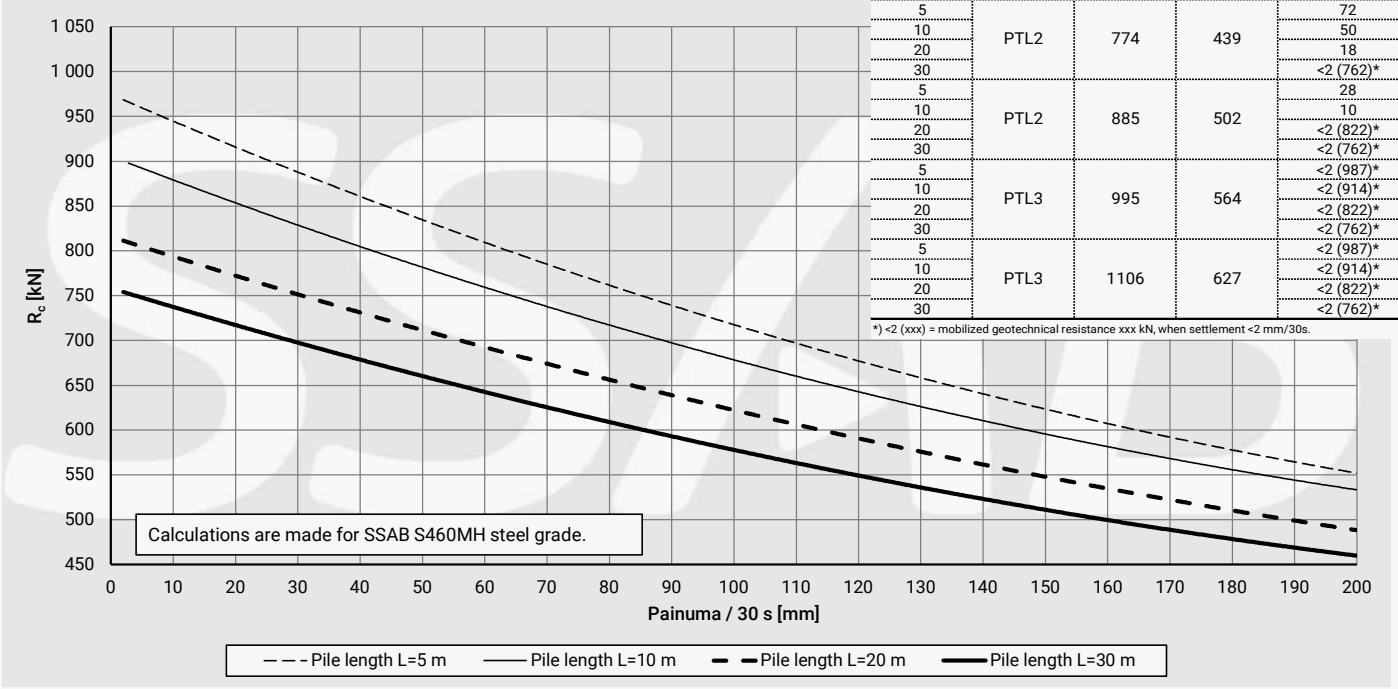
Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	531	301	100
10				100
20				100
30				99
5	PTL2	620	351	100
10				88
20				60
30				34
5	PTL2	708	401	52
10				36
20				11
30				<2 (688)*
5	PTL3	797	452	12
10				<2 (796)*
20				<2 (735)*
30				<2 (688)*
5	PTL3	885	502	<2 (833)*
10				<2 (796)*
20				<2 (735)*
30				<2 (688)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.



OKB1000 / SPD1000 - RR115/8



Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	664	376	100
10				100
20				72
30				44
5	PTL2	774	439	72
10				50
20				18
30				<2 (762)*
5	PTL2	885	502	28
10				10
20				<2 (822)*
30				<2 (762)*
5	PTL3	995	564	<2 (987)*
10				<2 (914)*
20				<2 (822)*
30				<2 (762)*
5	PTL3	1106	627	<2 (987)*
10				<2 (914)*
20				<2 (822)*
30				<2 (762)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Notice!
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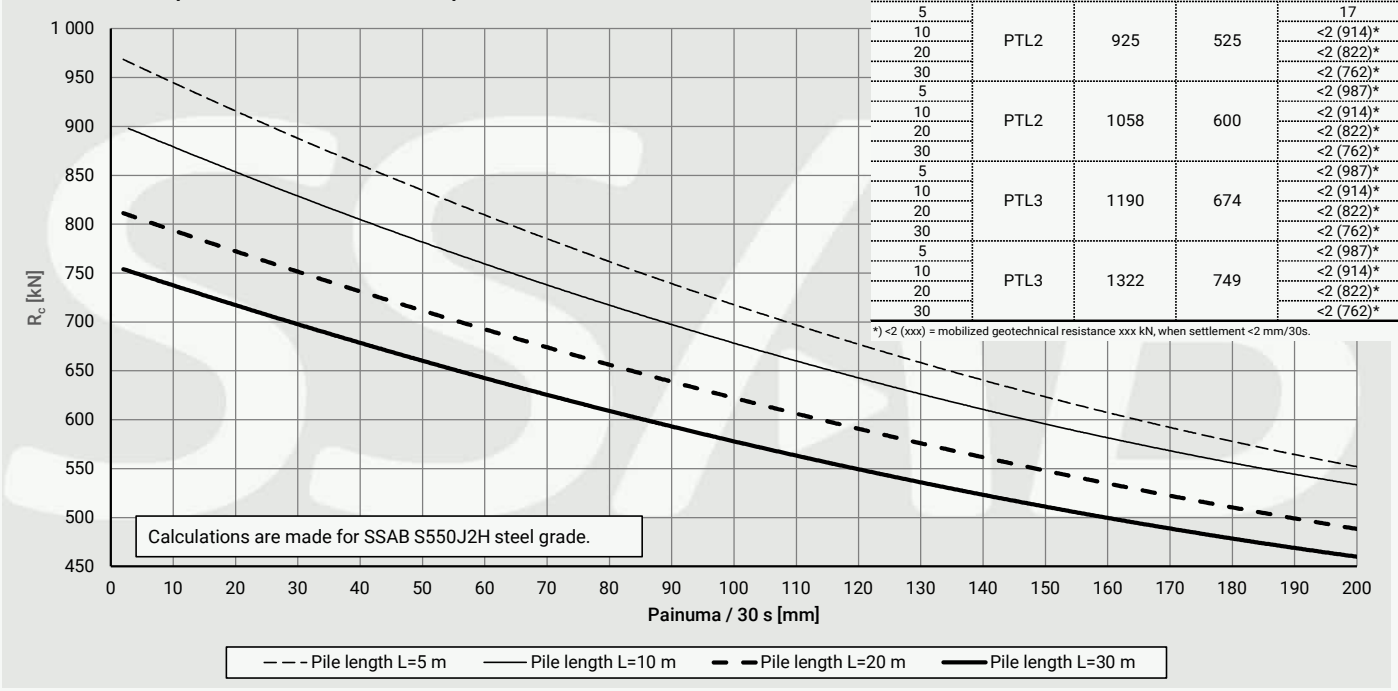
OKB1000 / SPD1000 - RRs115/8

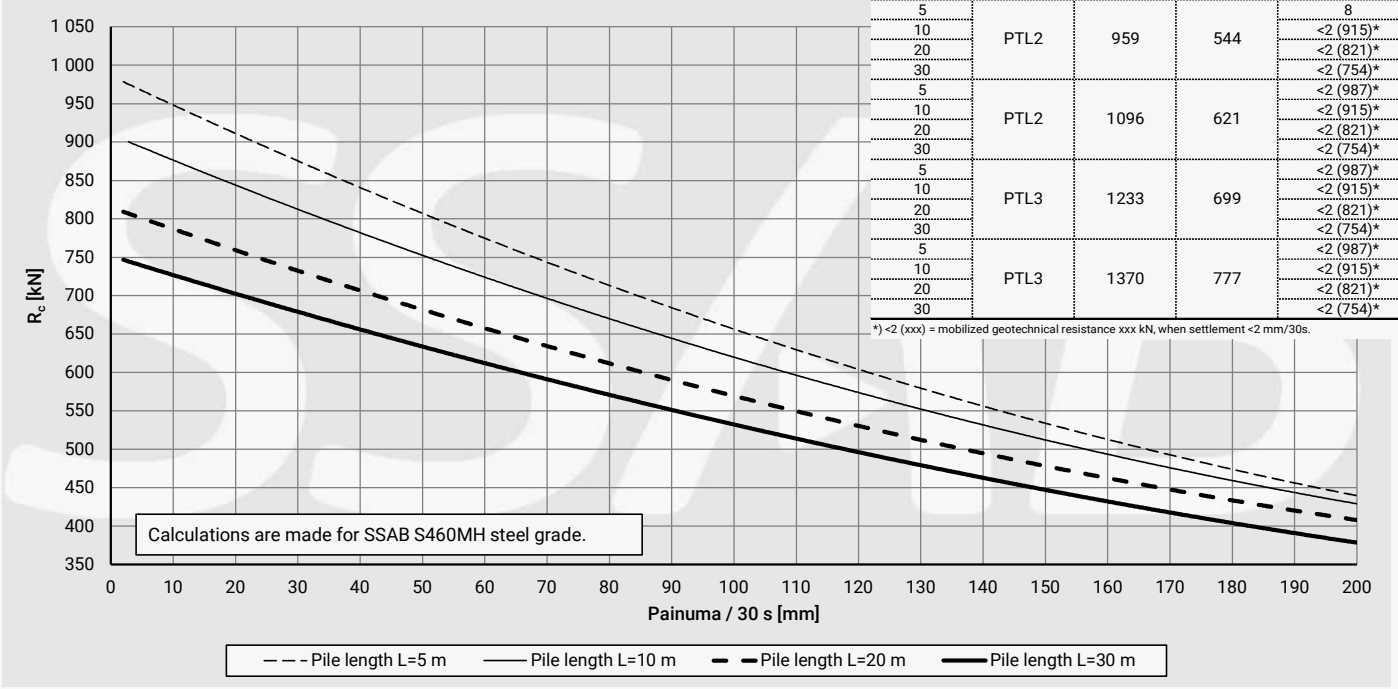


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	793	450	62
10				41
20				10
30				<2 (762)*
5	PTL2	925	525	17
10				<2 (914)*
20				<2 (822)*
30				<2 (762)*
5	PTL2	1058	600	<2 (987)*
10				<2 (914)*
20				<2 (822)*
30				<2 (762)*
5	PTL3	1190	674	<2 (987)*
10				<2 (914)*
20				<2 (822)*
30				<2 (762)*
5	PTL3	1322	749	<2 (987)*
10				<2 (914)*
20				<2 (822)*
30				<2 (762)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

OKB1000 / SPD1000 - RR140/8



Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	822	466	42
10				25
20				<2 (821)*
30				<2 (754)*
5	PTL2	959	544	8
10				<2 (915)*
20				<2 (821)*
30				<2 (754)*
5	PTL2	1096	621	<2 (987)*
10				<2 (915)*
20				<2 (821)*
30				<2 (754)*
5	PTL3	1233	699	<2 (987)*
10				<2 (915)*
20				<2 (821)*
30				<2 (754)*
5	PTL3	1370	777	<2 (987)*
10				<2 (915)*
20				<2 (821)*
30				<2 (754)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Notice!
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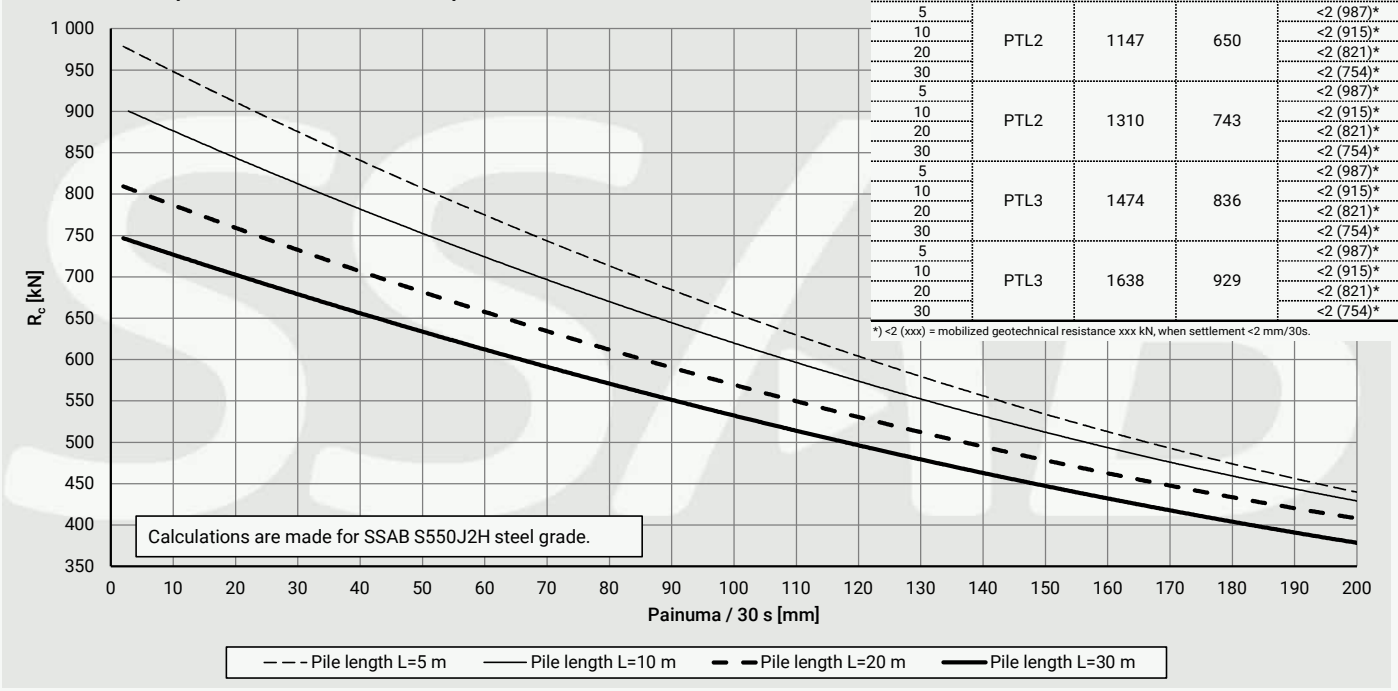
OKB1000 / SPD1000 - RRs140/8

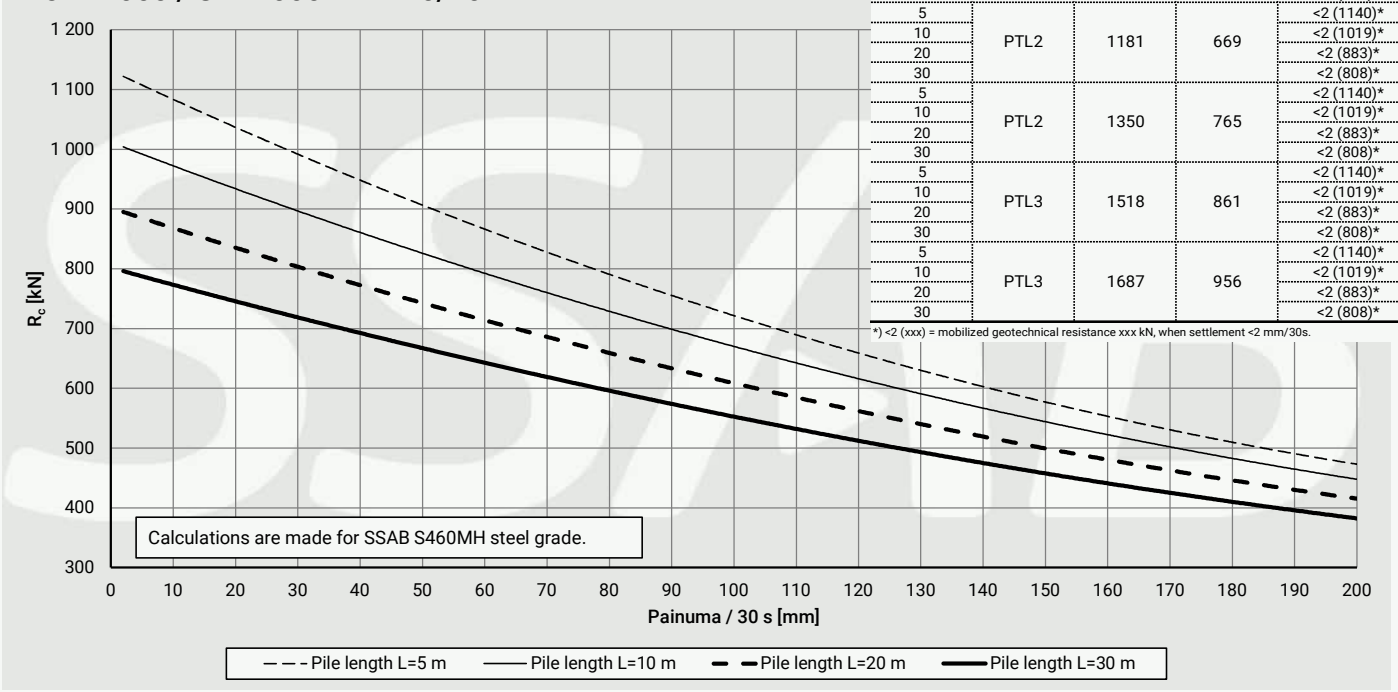


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	983	557	3
10				<2 (915)*
20				<2 (821)*
30				<2 (754)*
5	PTL2	1147	650	<2 (987)*
10				<2 (915)*
20				<2 (821)*
30				<2 (754)*
5	PTL2	1310	743	<2 (987)*
10				<2 (915)*
20				<2 (821)*
30				<2 (754)*
5	PTL3	1474	836	<2 (987)*
10				<2 (915)*
20				<2 (821)*
30				<2 (754)*
5	PTL3	1638	929	<2 (987)*
10				<2 (915)*
20				<2 (821)*
30				<2 (754)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

OKB1000 / SPD1000 - RR140/10



Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1012	574	25
10				4
20				<2 (883)*
30				<2 (808)*
5	PTL2	1181	669	<2 (1140)*
10				<2 (1019)*
20				<2 (883)*
30				<2 (808)*
5	PTL2	1350	765	<2 (1140)*
10				<2 (1019)*
20				<2 (883)*
30				<2 (808)*
5	PTL3	1518	861	<2 (1140)*
10				<2 (1019)*
20				<2 (883)*
30				<2 (808)*
5	PTL3	1687	956	<2 (1140)*
10				<2 (1019)*
20				<2 (883)*
30				<2 (808)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Notice!
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OKB1500 / SPD1500

Piston		
Piston weight [kg]	m_r	71
Diameter of the piston [mm]	D_r	124
Length of the piston [mm]	L_r	763
Theoretical impact energy [J]	E_{rated}	4234
Efficiency of the piston [%]	HE	80
Equivalent drop height [m]	H_{ekv}	4.85
Theoretical impact rate [blows/min]	BPM	400-900
Actual impact rate vrs theoretical [%]	η	67
Measured / in analysis used impact rate [blows/min]	BPM_m	400
Impact tool		
Diameter of the tool [mm]	D_t	118
Height of the tool [mm]	L_t	550
Tool weight [kg]	m_t	45.7

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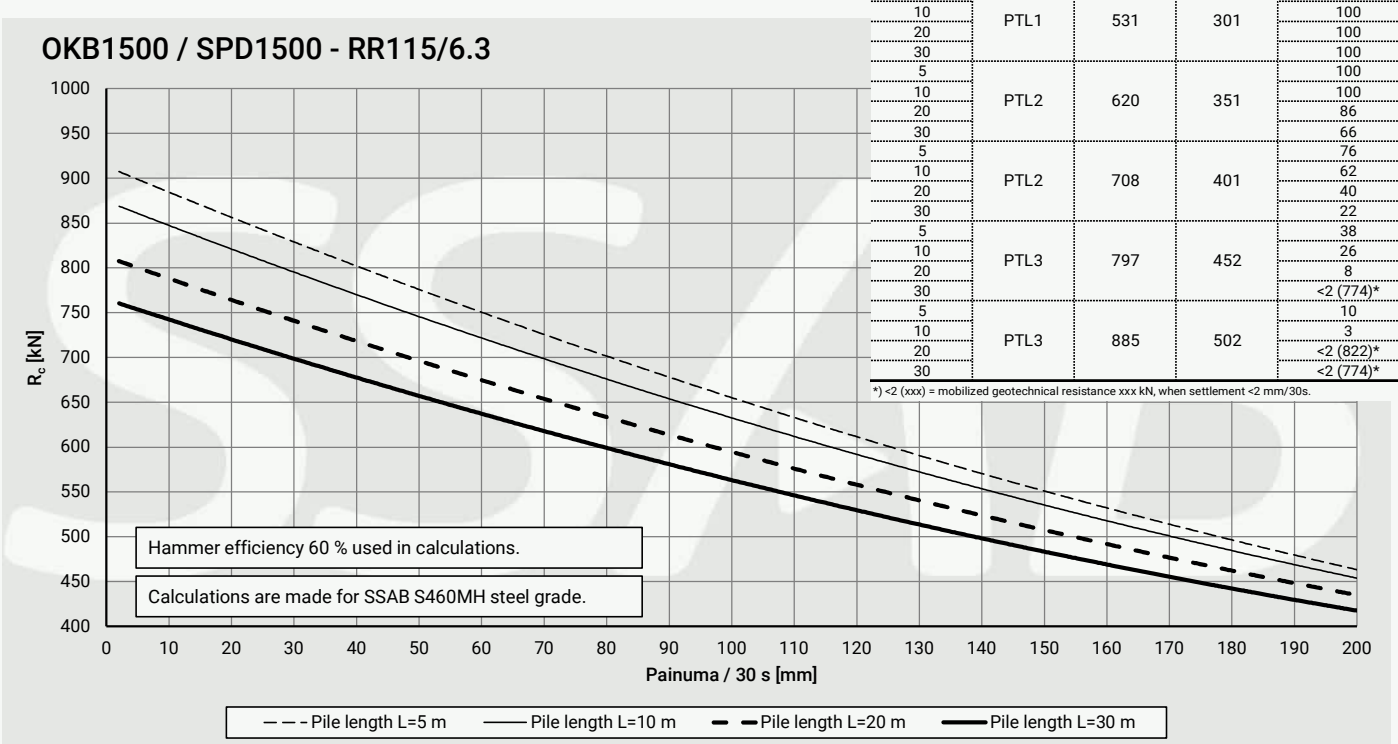
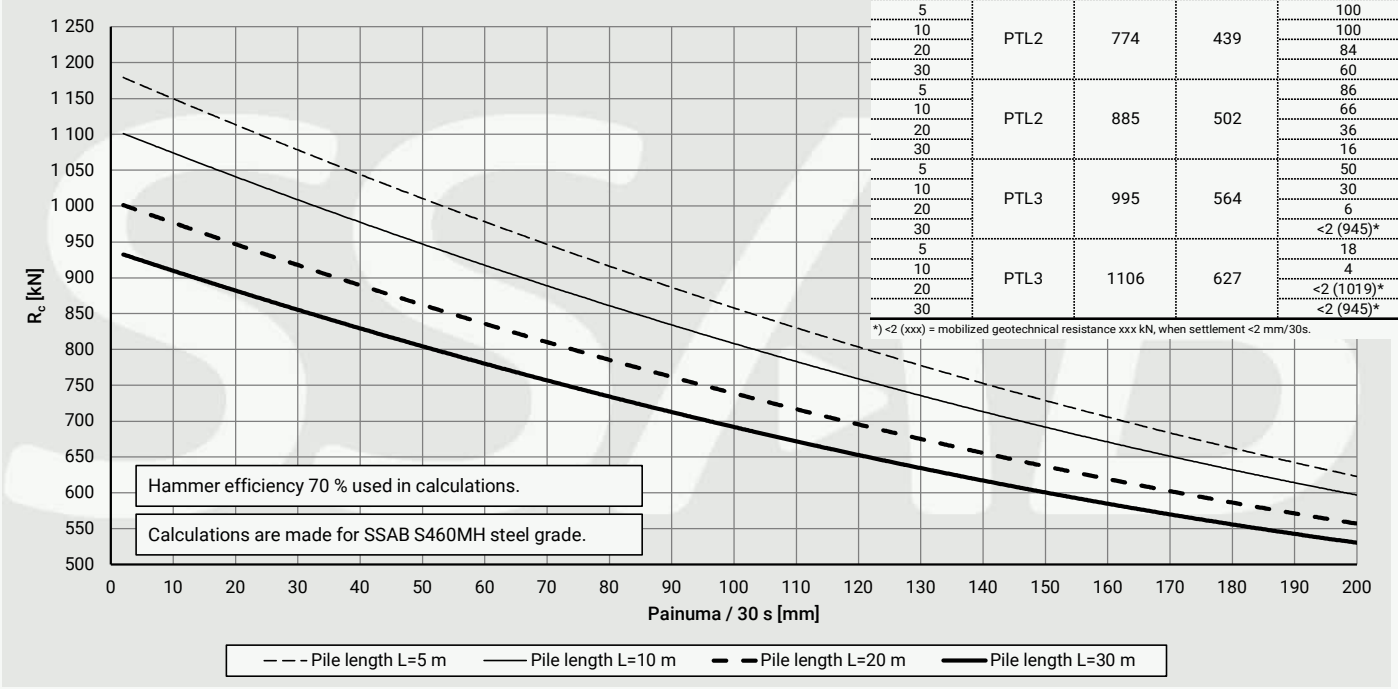
Hammer efficiency 60 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	531	301	100
10				100
20				100
30				100
5	PTL2	620	351	100
10				100
20				86
30				66
5	PTL2	708	401	76
10				62
20				40
30				22
5	PTL3	797	452	38
10				26
20				8
30				<2 (774)*
5	PTL3	885	502	10
10				3
20				<2 (822)*
30				<2 (774)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.



OKB1500 / SPD1500 - RR115/8



Hammer efficiency 70 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	664	376	100
10				100
20				100
30				100
5	PTL2	774	439	100
10				100
20				84
30				60
5	PTL2	885	502	86
10				66
20				36
30				16
5	PTL3	995	564	50
10				30
20				6
30				<2 (945)*
5	PTL3	1106	627	18
10				4
20				<2 (1019)*
30				<2 (945)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Notice!
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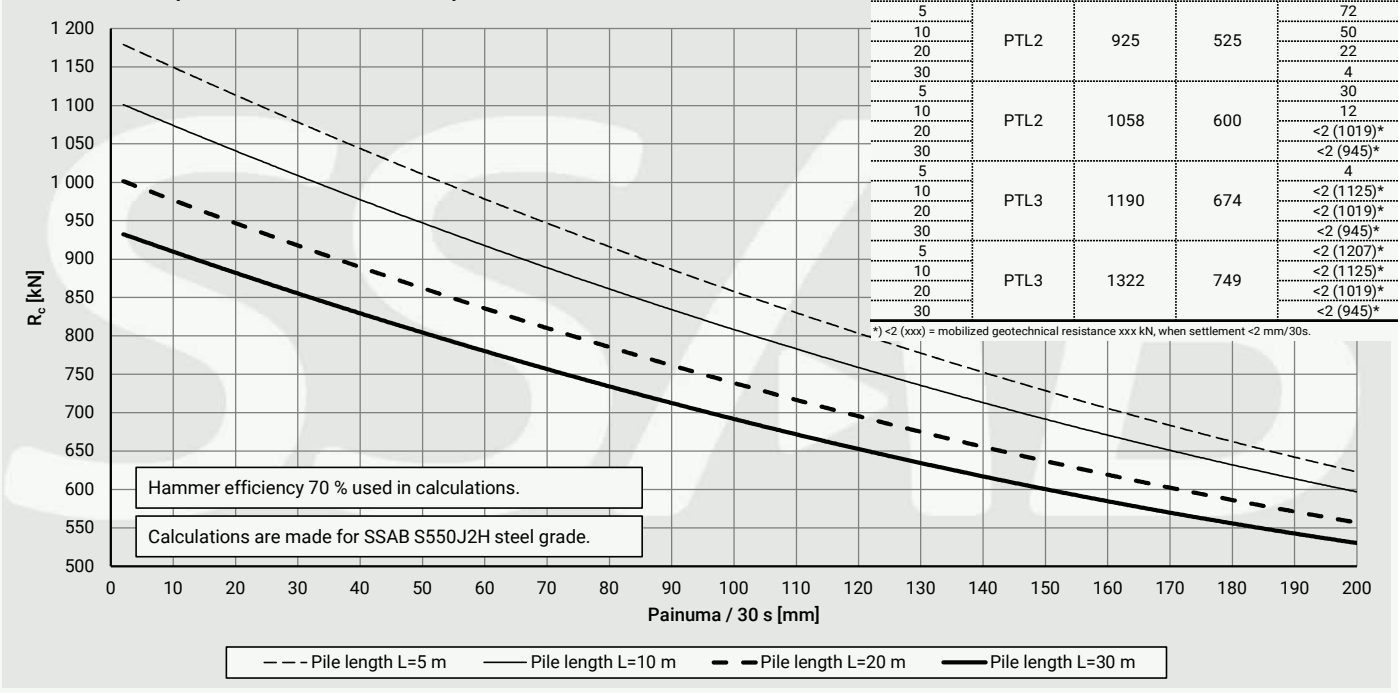
OKB1500 / SPD1500 - RRs115/8

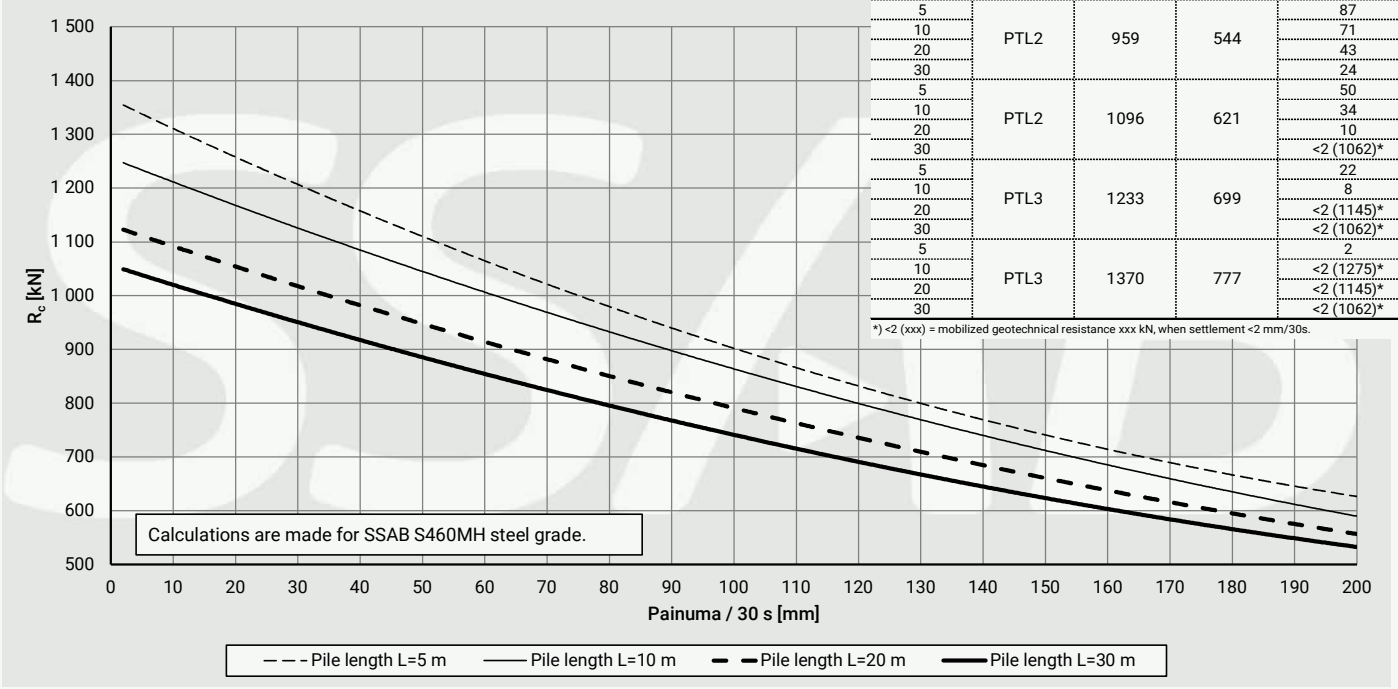


Hammer efficiency 70 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	793	450	100
10				100
20				76
30				52
5	PTL2	925	525	72
10				50
20				22
30				4
5	PTL2	1058	600	30
10				12
20				<2 (1019)*
30				<2 (945)*
5	PTL3	1190	674	4
10				<2 (1125)*
20				<2 (1019)*
30				<2 (945)*
5	PTL3	1322	749	<2 (1207)*
10				<2 (1125)*
20				<2 (1019)*
30				<2 (945)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

OKB1500 / SPD1500 - RR140/8



Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	822	466	100
10				100
20				88
30				68
5	PTL2	959	544	87
10				71
20				43
30				24
5	PTL2	1096	621	50
10				34
20				10
30				<2 (1062)*
5	PTL3	1233	699	22
10				8
20				<2 (1145)*
30				<2 (1062)*
5	PTL3	1370	777	2
10				<2 (1275)*
20				<2 (1145)*
30				<2 (1062)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Notice!
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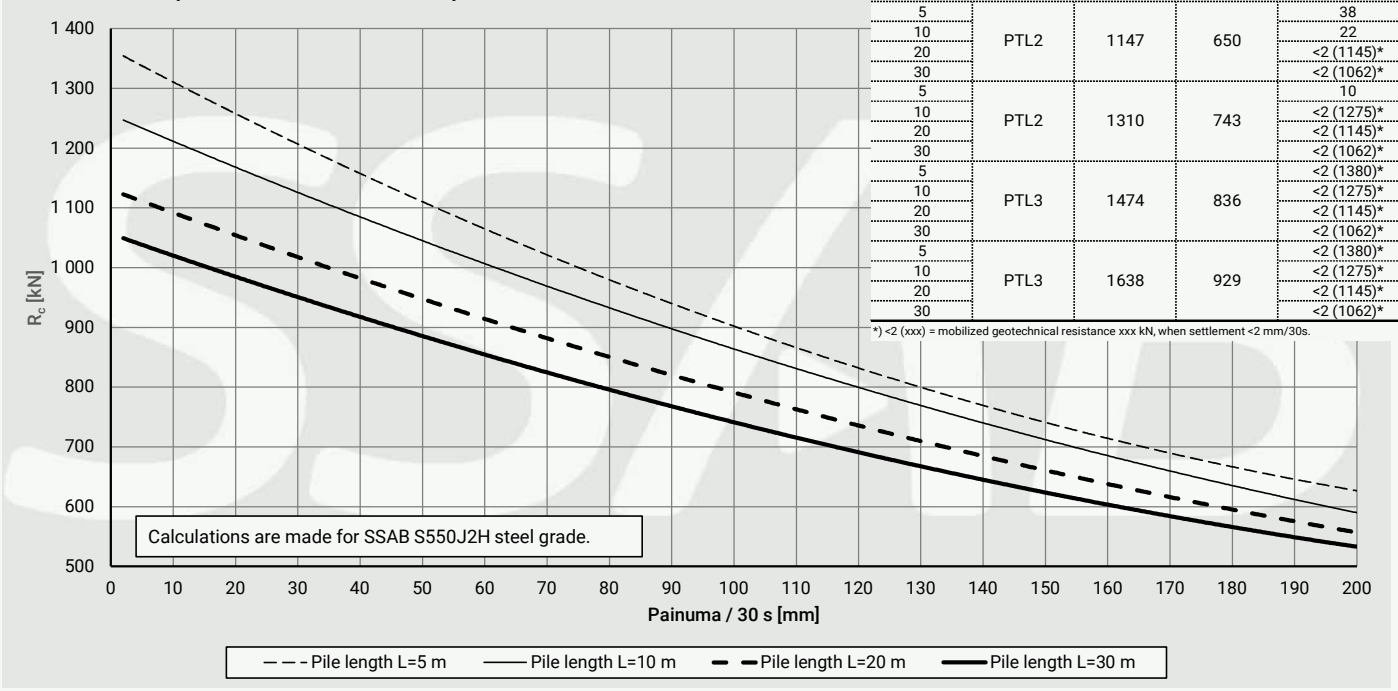
OKB1500 / SPD1500 - RRs140/8

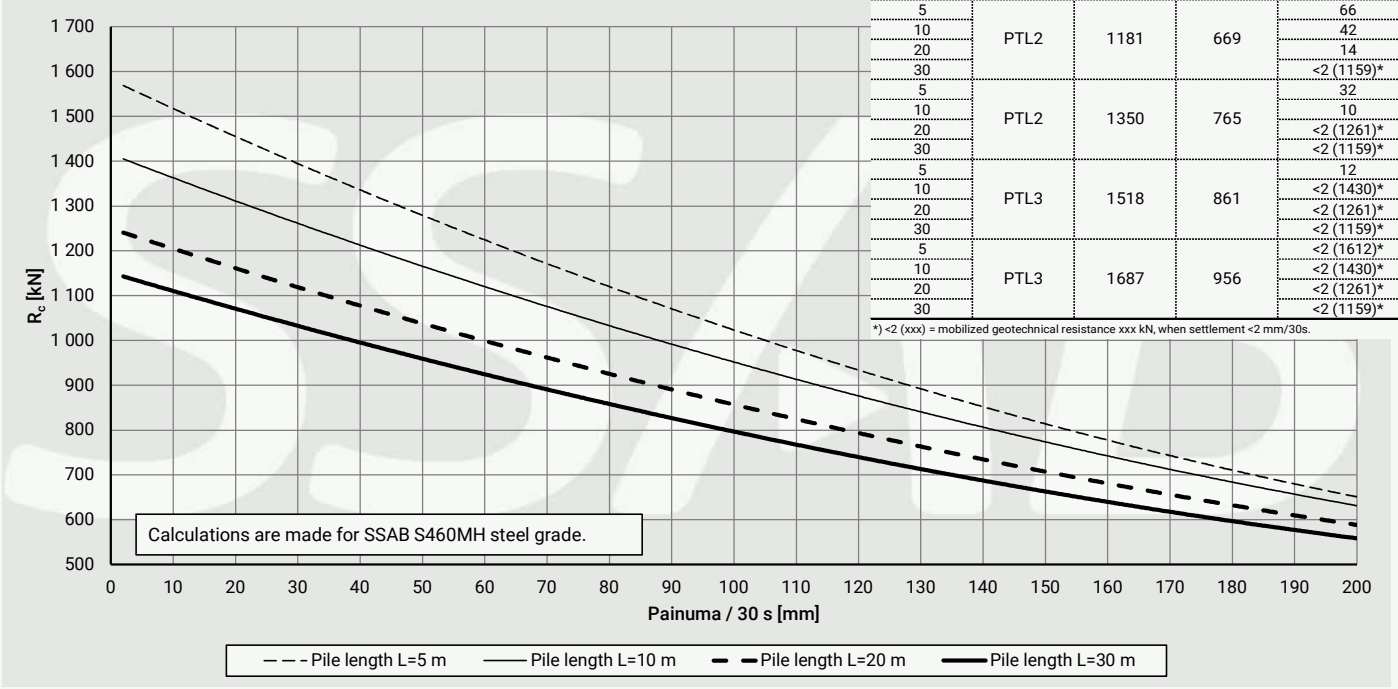


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	983	557	80
10				64
20				36
30				18
5	PTL2	1147	650	38
10				22
20				<2 (1145)*
30				<2 (1062)*
5	PTL2	1310	743	10
10				<2 (1275)*
20				<2 (1145)*
30				<2 (1062)*
5	PTL3	1474	836	<2 (1380)*
10				<2 (1275)*
20				<2 (1145)*
30				<2 (1062)*
5	PTL3	1638	929	<2 (1380)*
10				<2 (1275)*
20				<2 (1145)*
30				<2 (1062)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

OKB1500 / SPD1500 - RR140/10



Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1012	574	100
10				84
20				52
30				30
5	PTL2	1181	669	66
10				42
20				14
30				<2 (1159)*
5	PTL2	1350	765	32
10				10
20				<2 (1261)*
30				<2 (1159)*
5	PTL3	1518	861	12
10				<2 (1430)*
20				<2 (1261)*
30				<2 (1159)*
5	PTL3	1687	956	<2 (1612)*
10				<2 (1430)*
20				<2 (1261)*
30				<2 (1159)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Notice!
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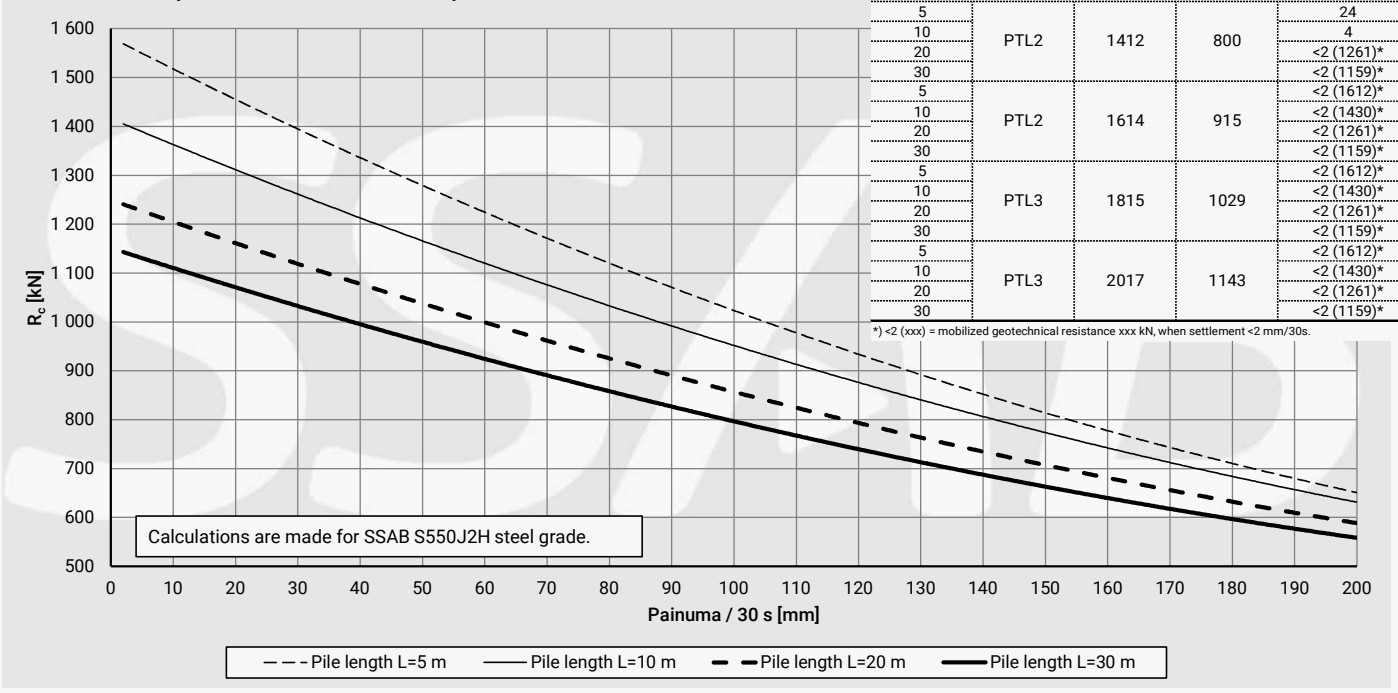
OKB1500 / SPD1500 - RRs140/10

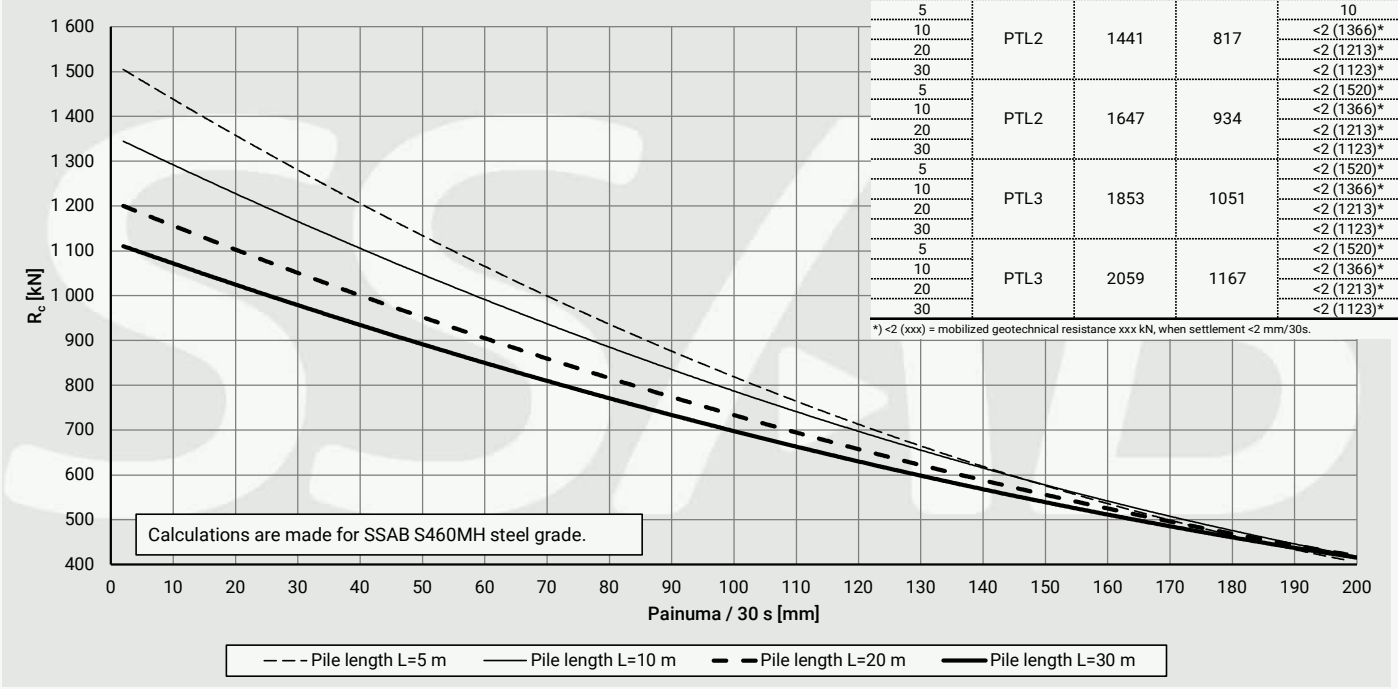


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1210	686	58
10				36
20				8
30				<2 (1159)*
5	PTL2	1412	800	24
10				4
20				<2 (1261)*
30				<2 (1159)*
5	PTL2	1614	915	<2 (1612)*
10				<2 (1430)*
20				<2 (1261)*
30				<2 (1159)*
5	PTL3	1815	1029	<2 (1612)*
10				<2 (1430)*
20				<2 (1261)*
30				<2 (1159)*
5	PTL3	2017	1143	<2 (1612)*
10				<2 (1430)*
20				<2 (1261)*
30				<2 (1159)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

OKB1500 / SPD1500 - RR170/10



Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1235	700	32
10				16
20				<2 (1213)*
30				<2 (1123)*
5	PTL2	1441	817	10
10				<2 (1366)*
20				<2 (1213)*
30				<2 (1123)*
5	PTL2	1647	934	<2 (1520)*
10				<2 (1366)*
20				<2 (1213)*
30				<2 (1123)*
5	PTL3	1853	1051	<2 (1520)*
10				<2 (1366)*
20				<2 (1213)*
30				<2 (1123)*
5	PTL3	2059	1167	<2 (1520)*
10				<2 (1366)*
20				<2 (1213)*
30				<2 (1123)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

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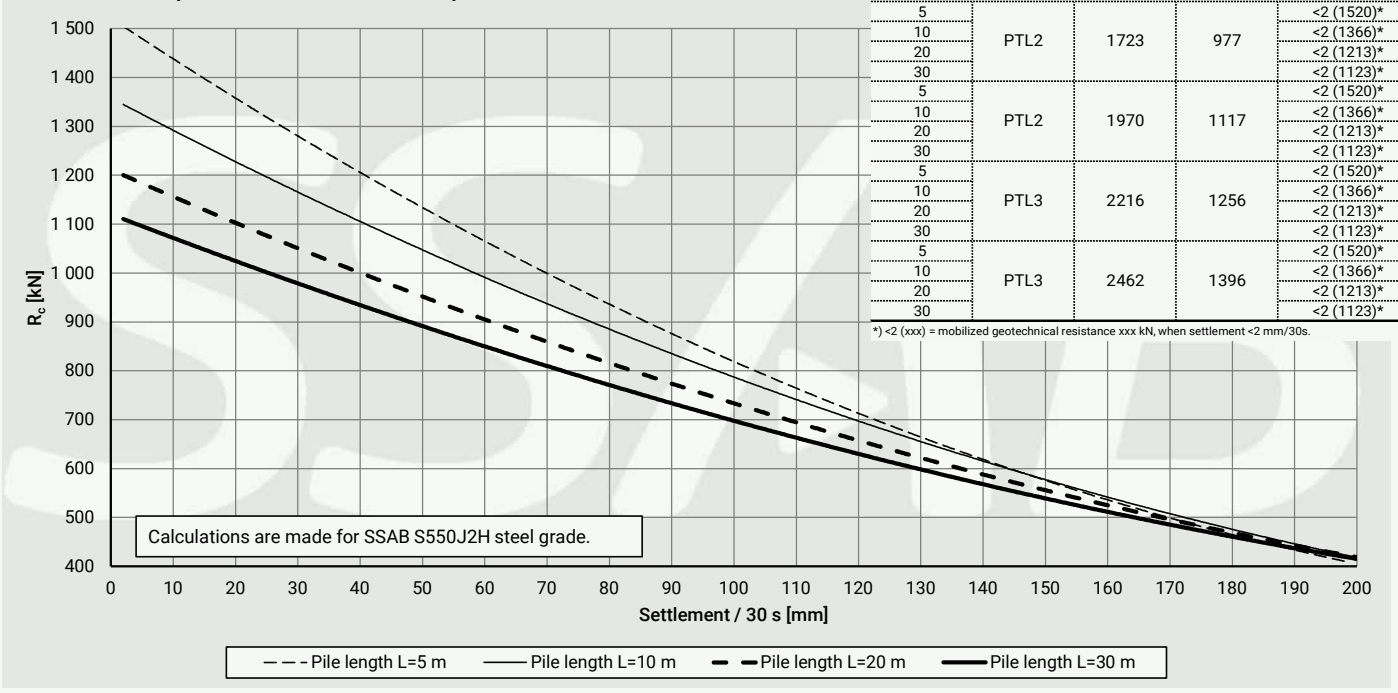
OKB1500 / SPD1500 - RRs170/10

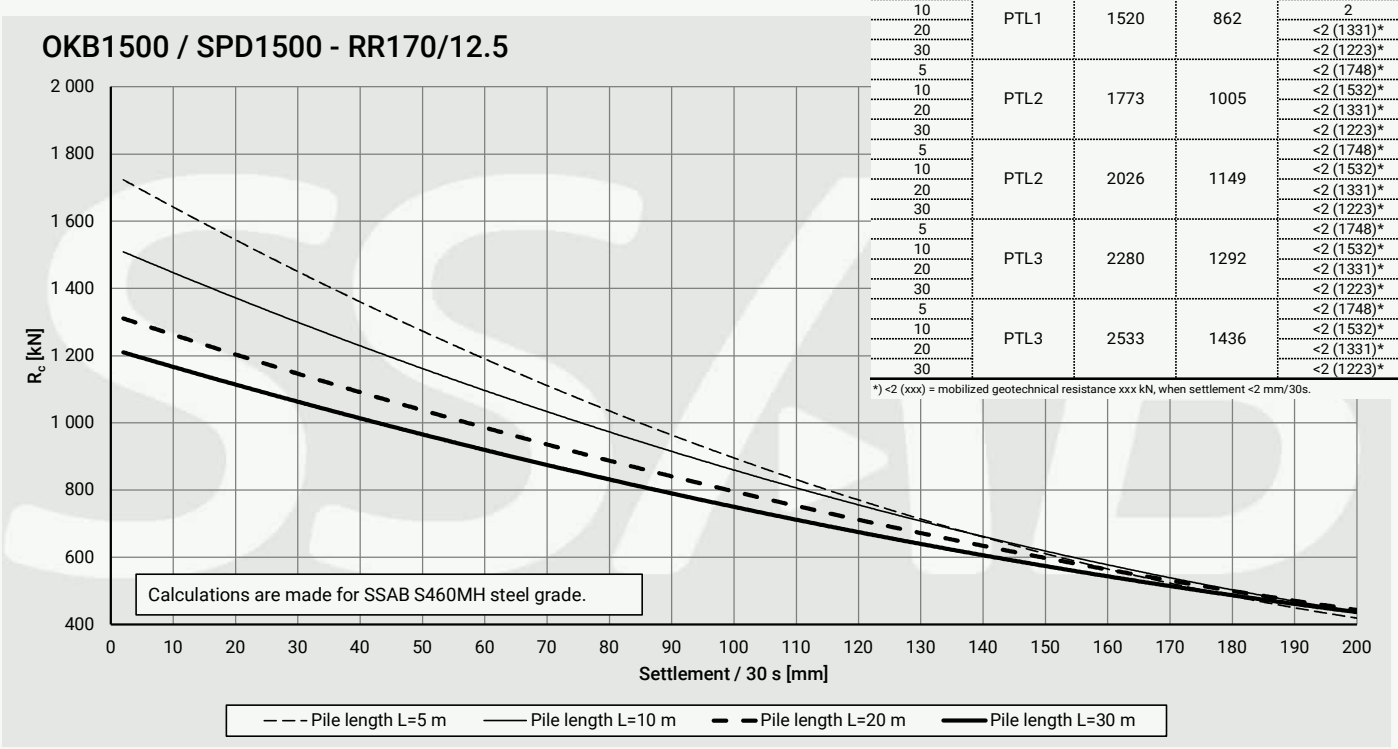


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1477	837	6
10				<2 (1366)*
20				<2 (1213)*
30				<2 (1123)*
5	PTL2	1723	977	<2 (1520)*
10				<2 (1366)*
20				<2 (1213)*
30				<2 (1123)*
5	PTL2	1970	1117	<2 (1520)*
10				<2 (1366)*
20				<2 (1213)*
30				<2 (1123)*
5	PTL3	2216	1256	<2 (1520)*
10				<2 (1366)*
20				<2 (1213)*
30				<2 (1123)*
5	PTL3	2462	1396	<2 (1520)*
10				<2 (1366)*
20				<2 (1213)*
30				<2 (1123)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

OKB1500 / SPD1500 - RR170/12.5



Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1520	862	22
10				2
20				<2 (1331)*
30				<2 (1223)*
5	PTL2	1773	1005	<2 (1748)*
10				<2 (1532)*
20				<2 (1331)*
30				<2 (1223)*
5	PTL2	2026	1149	<2 (1748)*
10				<2 (1532)*
20				<2 (1331)*
30				<2 (1223)*
5	PTL3	2280	1292	<2 (1748)*
10				<2 (1532)*
20				<2 (1331)*
30				<2 (1223)*
5	PTL3	2533	1436	<2 (1748)*
10				<2 (1532)*
20				<2 (1331)*
30				<2 (1223)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Notice!
SPD uses technology of several different ram manufacturers. With SPD rams you need to consider also original manufacturer and type of the ram. These graphs and tables have been made for SPD1500 ram which is originally OKB1500 ram. For SPD rams where original ram is something else, you need to choose graphs and tables made for the original ram manufacturer and ram type.

OKB2000 / SPD2000

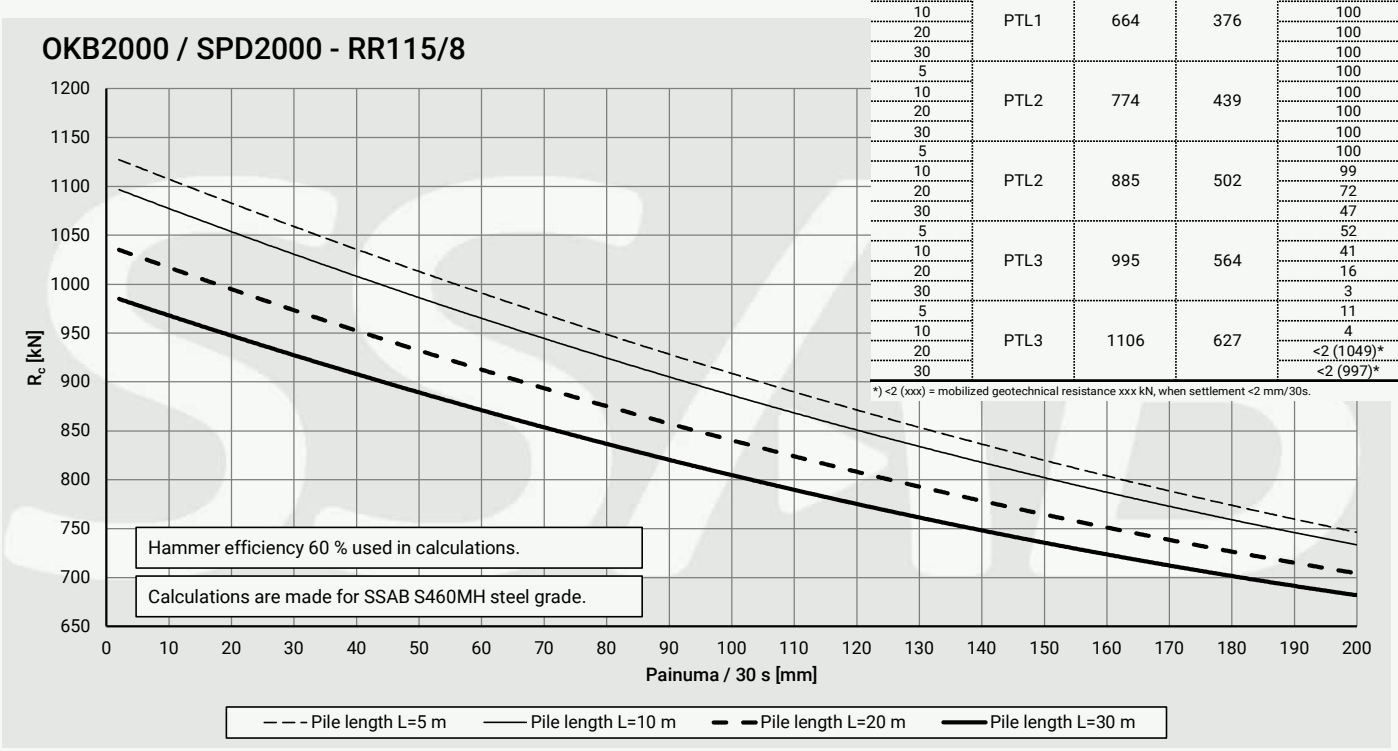
Piston		
Piston weight [kg]	m_r	106
Diameter of the piston [mm]	D_r	140
Length of the piston [mm]	L_r	1320
Theoretical impact energy [J]	E_{rated}	5290
Efficiency of the piston [%]	HE	80
Equivalent drop height [m]	H_{ekv}	5.39
Theoretical impact rate [blows/min]	BPM	400-800
Actual impact rate vrs theoretical [%]	η	69
Measured / in analysis used impact rate [blows/min]	BPM_m	550
Impact tool		
Diameter of the tool [mm]	D_t	135
Height of the tool [mm]	L_t	700
Tool weight [kg]	m_t	77

Notice!
SPD uses technology of several different ram manufacturers. With SPD rams you need to consider also original manufacturer and type of the ram. These graphs and tables have been made for SPD2000 ram which is originally OKB2000 ram. For SPD rams where original ram is something else, you need to choose graphs and tables made for the original ram manufacturer and ram type.

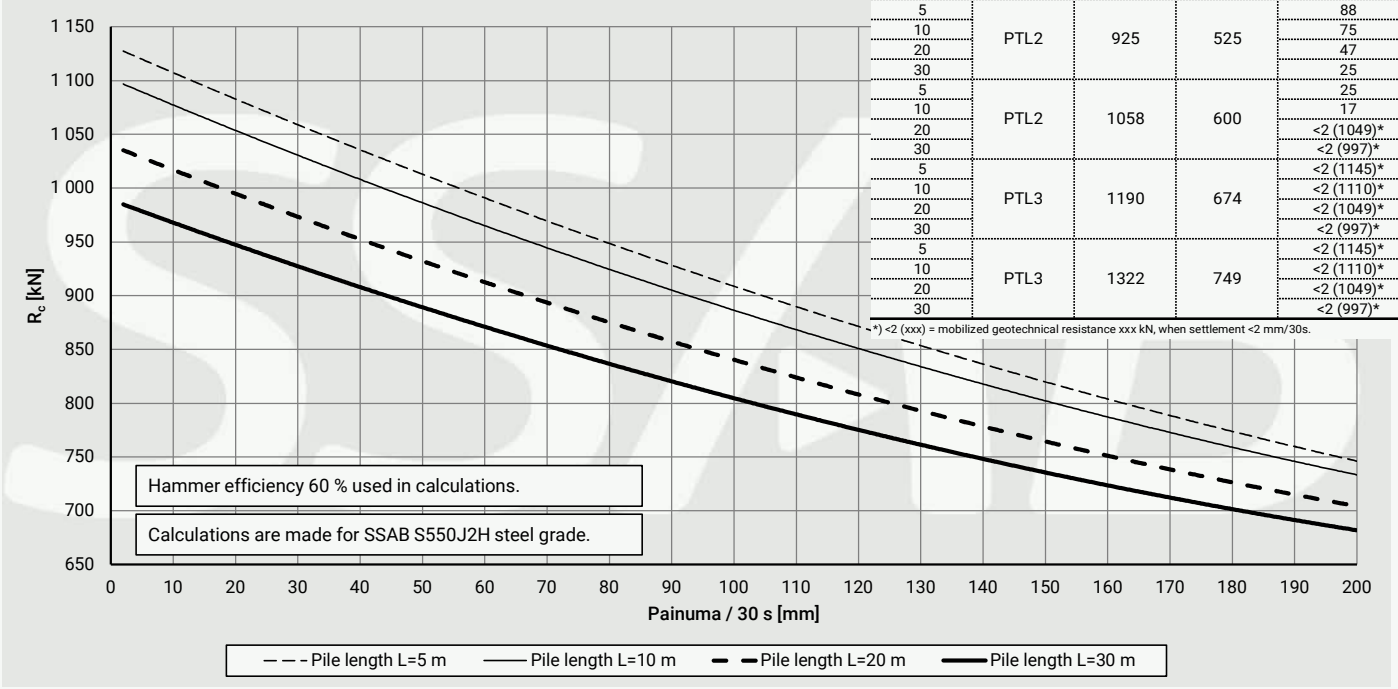
Hammer efficiency 60 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	664	376	100
10				100
20				100
30				100
5	PTL2	774	439	100
10				100
20				100
30				100
5	PTL2	885	502	100
10				99
20				72
30				47
5	PTL3	995	564	52
10				41
20				16
30				3
5	PTL3	1106	627	11
10				4
20				<2 (1049)*
30				<2 (997)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.



OKB2000 / SPD2000 - RRs115/8



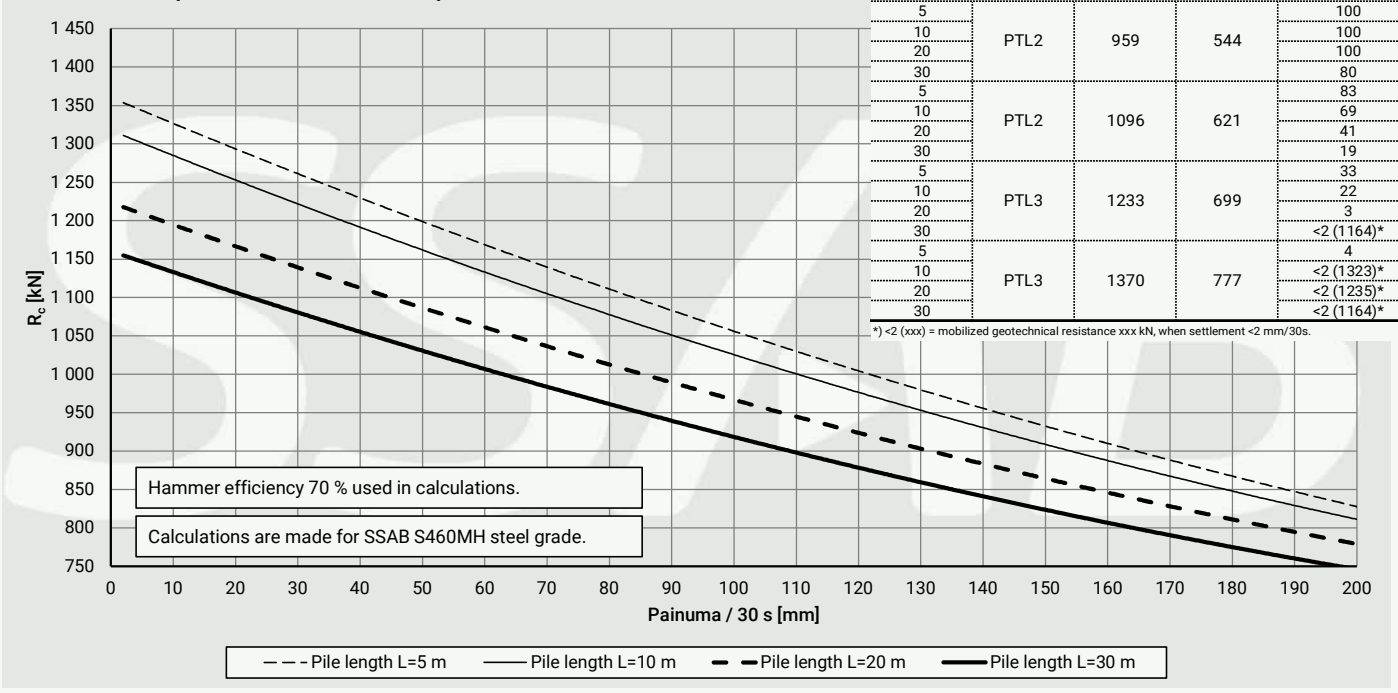
Hammer efficiency 60 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	793	450	100
10				100
20				100
30				100
5	PTL2	925	525	88
10				75
20				47
30				25
5	PTL2	1058	600	25
10				17
20				<2 (1049)*
30				<2 (997)*
5	PTL3	1190	674	<2 (1145)*
10				<2 (1110)*
20				<2 (1049)*
30				<2 (997)*
5	PTL3	1322	749	<2 (1145)*
10				<2 (1110)*
20				<2 (1049)*
30				<2 (997)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Notice!
SPD uses technology of several different ram manufacturers. With SPD rams you need to consider also original manufacturer and type of the ram. These graphs and tables have been made for SPD2000 ram which is originally OKB2000 ram. For SPD rams where original ram is something else, you need to choose graphs and tables made for the original ram manufacturer and ram type.

OKB2000 / SPD2000 - RR140/8

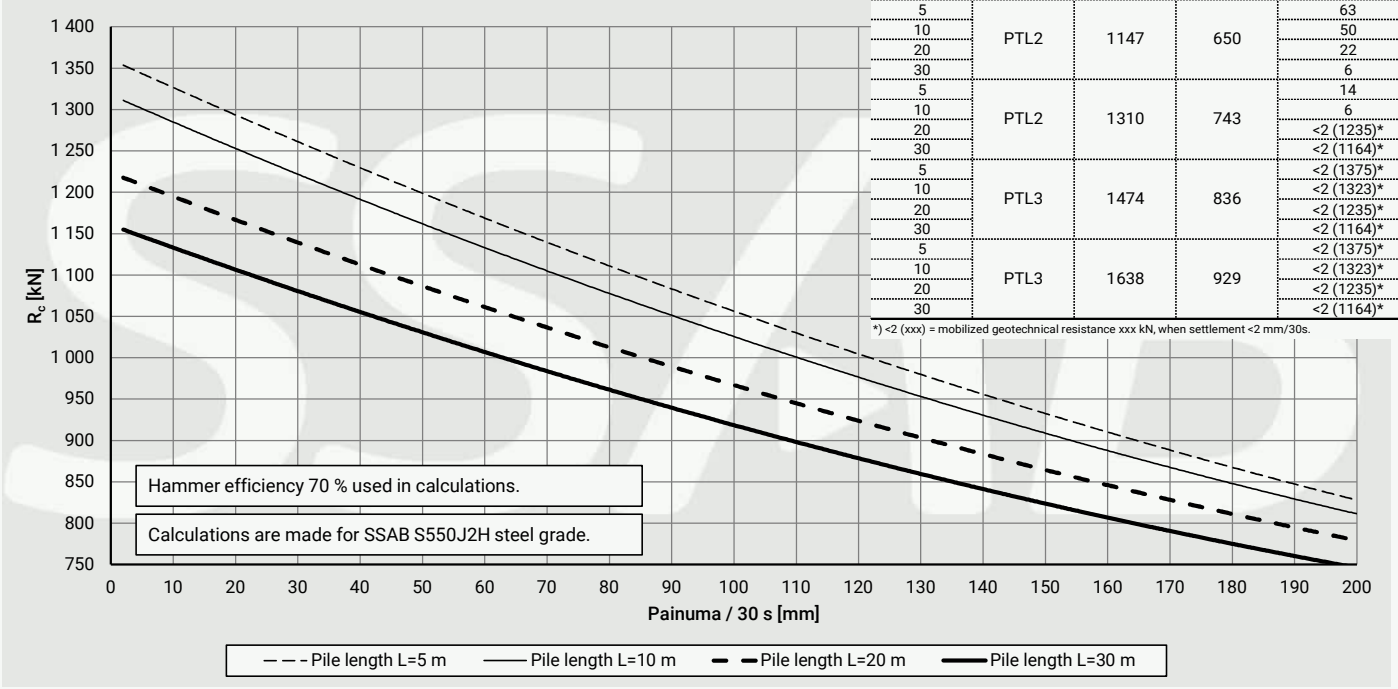


Hammer efficiency 70 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	822	466	100
10				100
20				100
30				100
5	PTL2	959	544	100
10				100
20				100
30				80
5	PTL2	1096	621	83
10				69
20				41
30				19
5	PTL3	1233	699	33
10				22
20				3
30				<2 (1164)*
5	PTL3	1370	777	4
10				<2 (1323)*
20				<2 (1235)*
30				<2 (1164)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

OKB2000 / SPD2000 - RRs140/8



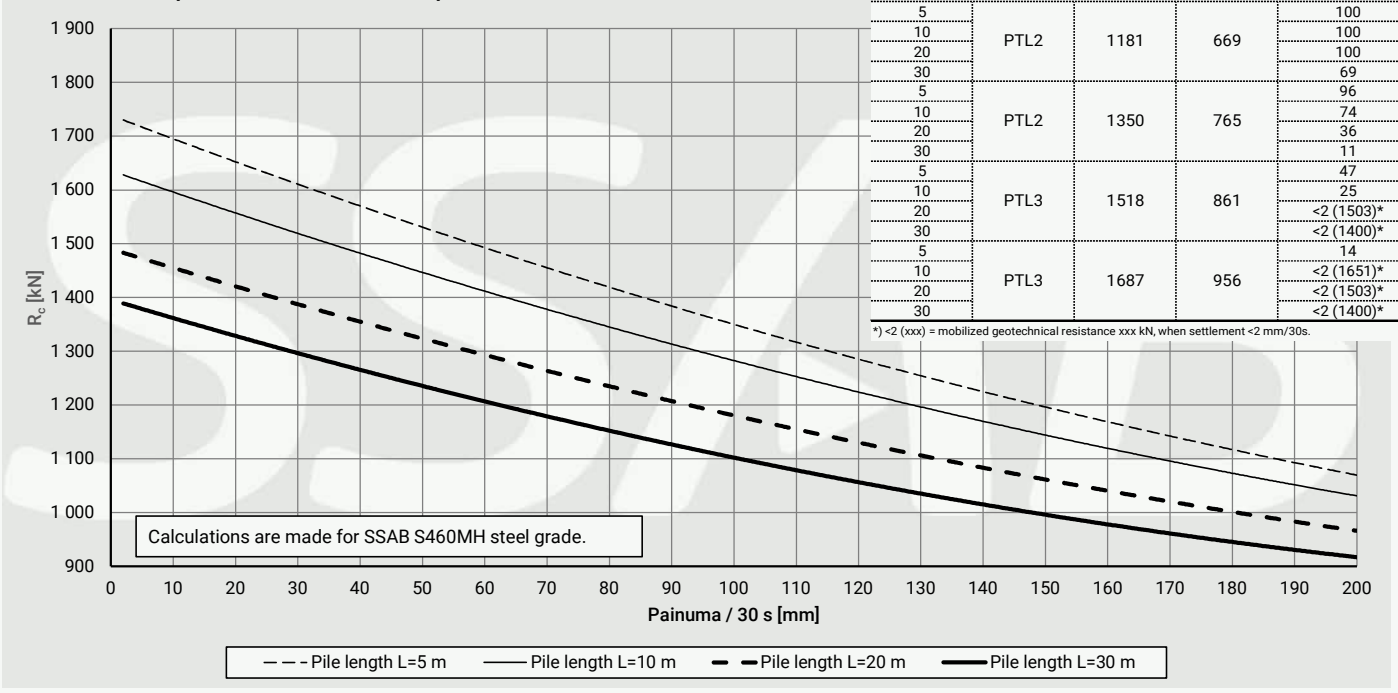
Hammer efficiency 70 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	983	557	100
10				100
20				94
30				69
5	PTL2	1147	650	63
10				50
20				22
30				6
5	PTL2	1310	743	14
10				6
20				<2 (1235)*
30				<2 (1164)*
5	PTL3	1474	836	<2 (1375)*
10				<2 (1323)*
20				<2 (1235)*
30				<2 (1164)*
5	PTL3	1638	929	<2 (1375)*
10				<2 (1323)*
20				<2 (1235)*
30				<2 (1164)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Notice!
SPD uses technology of several different ram manufacturers. With SPD rams you need to consider also original manufacturer and type of the ram. These graphs and tables have been made for SPD2000 ram which is originally OKB2000 ram. For SPD rams where original ram is something else, you need to choose graphs and tables made for the original ram manufacturer and ram type.

OKB2000 / SPD2000 - RR140/10

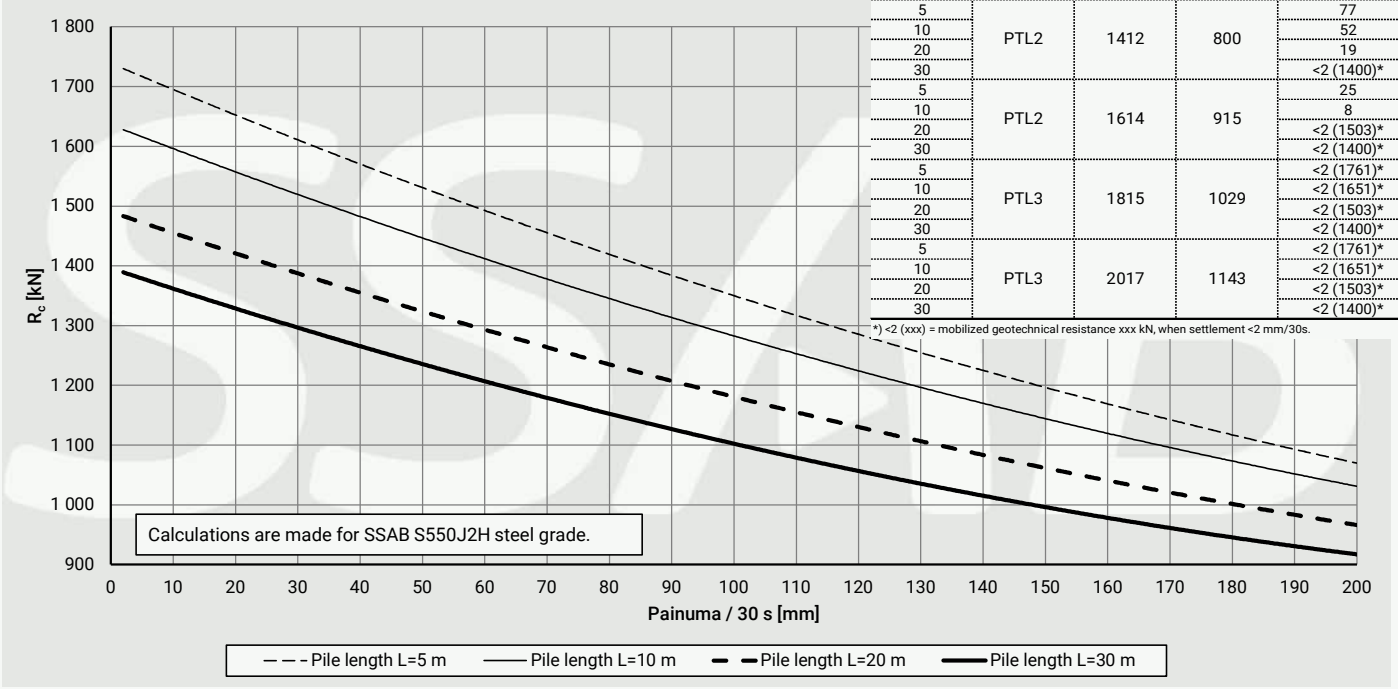


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1012	574	100
10				100
20				100
30				100
5	PTL2	1181	669	100
10				100
20				100
30				69
5	PTL2	1350	765	96
10				74
20				36
30				11
5	PTL3	1518	861	47
10				25
20				<2 (1503)*
30				<2 (1400)*
5	PTL3	1687	956	14
10				<2 (1651)*
20				<2 (1503)*
30				<2 (1400)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

OKB2000 / SPD2000 - RRs140/10



Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1210	686	100
10				100
20				88
30				55
5	PTL2	1412	800	77
10				52
20				19
30				<2 (1400)*
5	PTL2	1614	915	25
10				8
20				<2 (1503)*
30				<2 (1400)*
5	PTL3	1815	1029	<2 (1761)*
10				<2 (1651)*
20				<2 (1503)*
30				<2 (1400)*
5	PTL3	2017	1143	<2 (1761)*
10				<2 (1651)*
20				<2 (1503)*
30				<2 (1400)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

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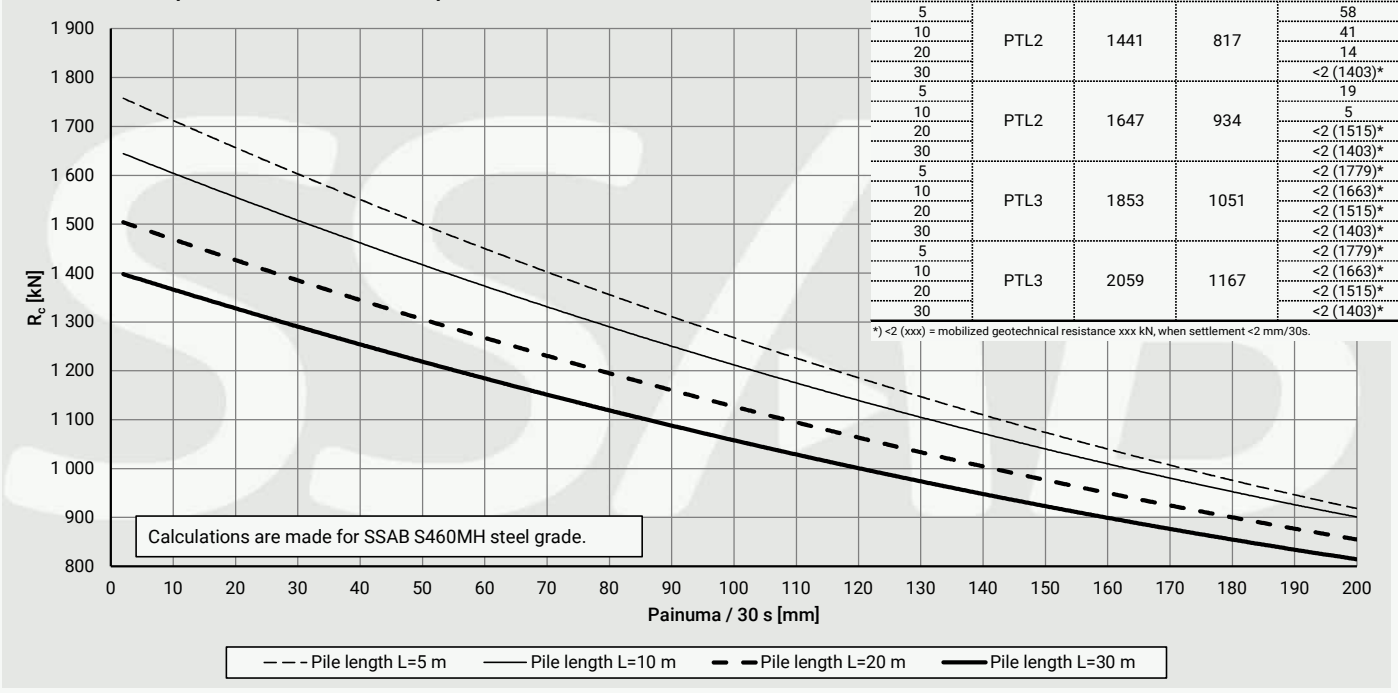
OKB2000 / SPD2000 - RR170/10

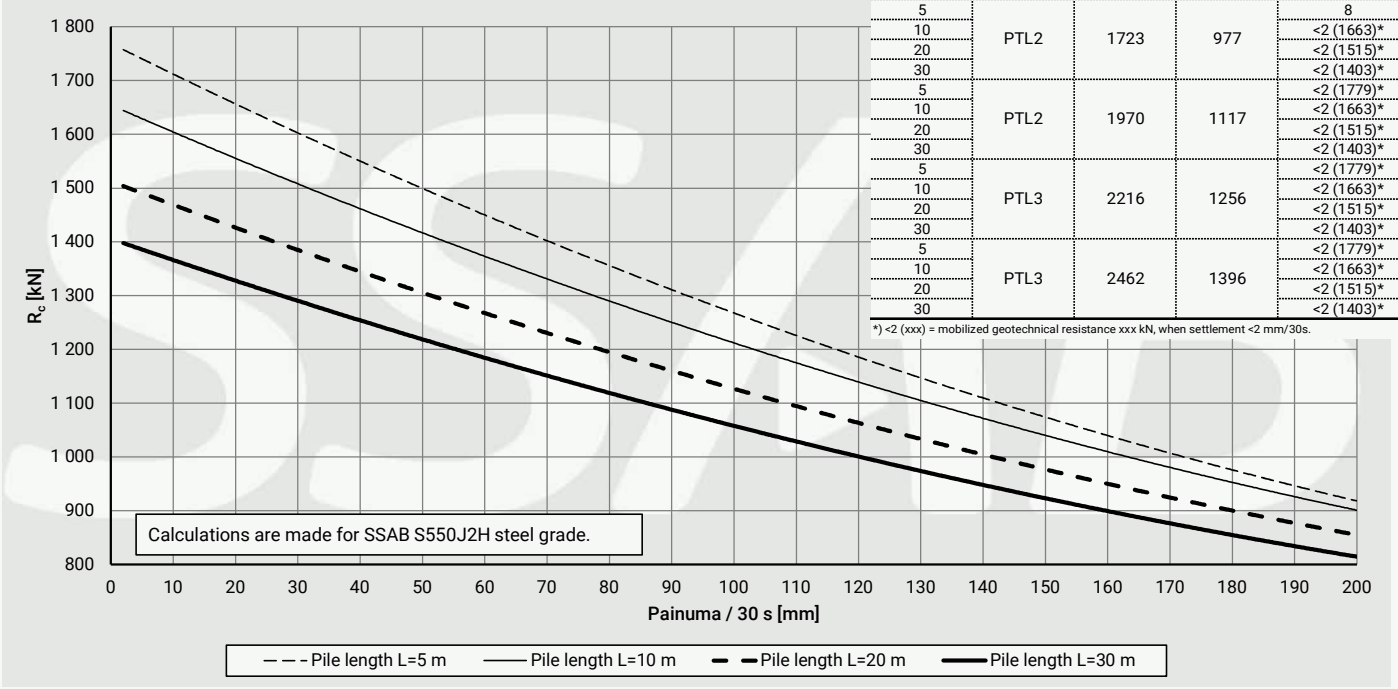


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1235	700	100
10				93
20				66
30				41
5	PTL2	1441	817	58
10				41
20				14
30				<2 (1403)*
5	PTL2	1647	934	19
10				5
20				<2 (1515)*
30				<2 (1403)*
5	PTL3	1853	1051	<2 (1779)*
10				<2 (1663)*
20				<2 (1515)*
30				<2 (1403)*
5	PTL3	2059	1167	<2 (1779)*
10				<2 (1663)*
20				<2 (1515)*
30				<2 (1403)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

OKB2000 / SPD2000 - RRs170/10



Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1477	837	52
10				33
20				8
30				<2 (1403)*
5	PTL2	1723	977	8
10				<2 (1663)*
20				<2 (1515)*
30				<2 (1403)*
5	PTL2	1970	1117	<2 (1779)*
10				<2 (1663)*
20				<2 (1515)*
30				<2 (1403)*
5	PTL3	2216	1256	<2 (1779)*
10				<2 (1663)*
20				<2 (1515)*
30				<2 (1403)*
5	PTL3	2462	1396	<2 (1779)*
10				<2 (1663)*
20				<2 (1515)*
30				<2 (1403)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

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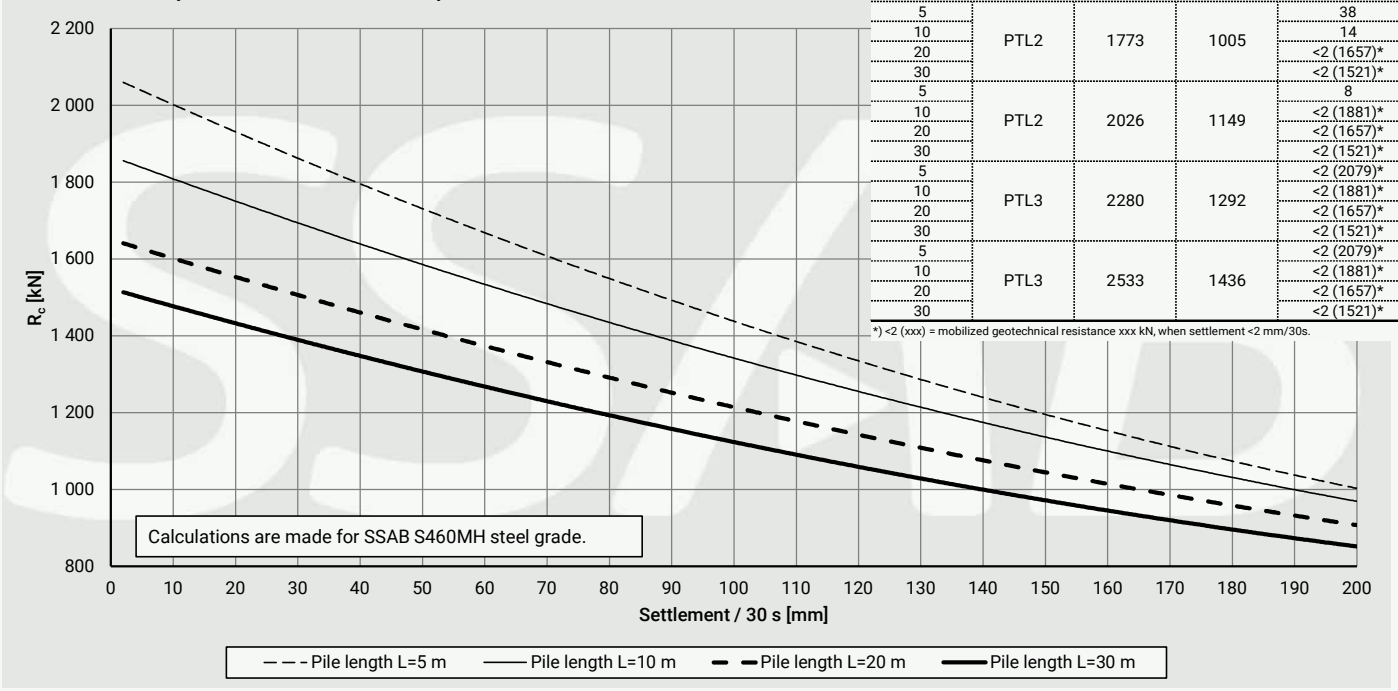
OKB2000 / SPD2000 - RR170/12.5

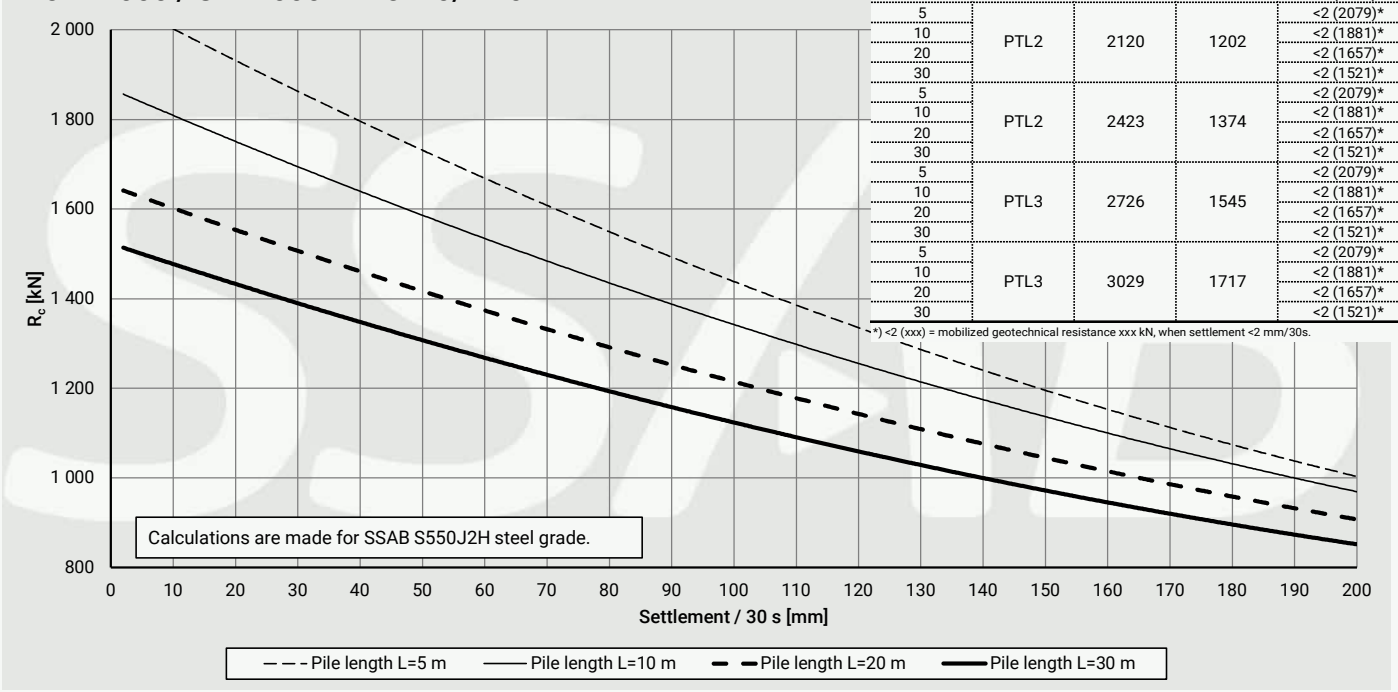


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1520	862	80
10				58
20				25
30				3
5	PTL2	1773	1005	38
10				14
20				<2 (1657)*
30				<2 (1521)*
5	PTL2	2026	1149	8
10				<2 (1881)*
20				<2 (1657)*
30				<2 (1521)*
5	PTL3	2280	1292	<2 (2079)*
10				<2 (1881)*
20				<2 (1657)*
30				<2 (1521)*
5	PTL3	2533	1436	<2 (2079)*
10				<2 (1881)*
20				<2 (1657)*
30				<2 (1521)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

OKB2000 / SPD2000 - RRs170/12.5



Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1817	1030	33
10				9
20				<2 (1657)*
30				<2 (1521)*
5	PTL2	2120	1202	<2 (2079)*
10				<2 (1881)*
20				<2 (1657)*
30				<2 (1521)*
5	PTL2	2423	1374	<2 (2079)*
10				<2 (1881)*
20				<2 (1657)*
30				<2 (1521)*
5	PTL3	2726	1545	<2 (2079)*
10				<2 (1881)*
20				<2 (1657)*
30				<2 (1521)*
5	PTL3	3029	1717	<2 (2079)*
10				<2 (1881)*
20				<2 (1657)*
30				<2 (1521)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Notice!
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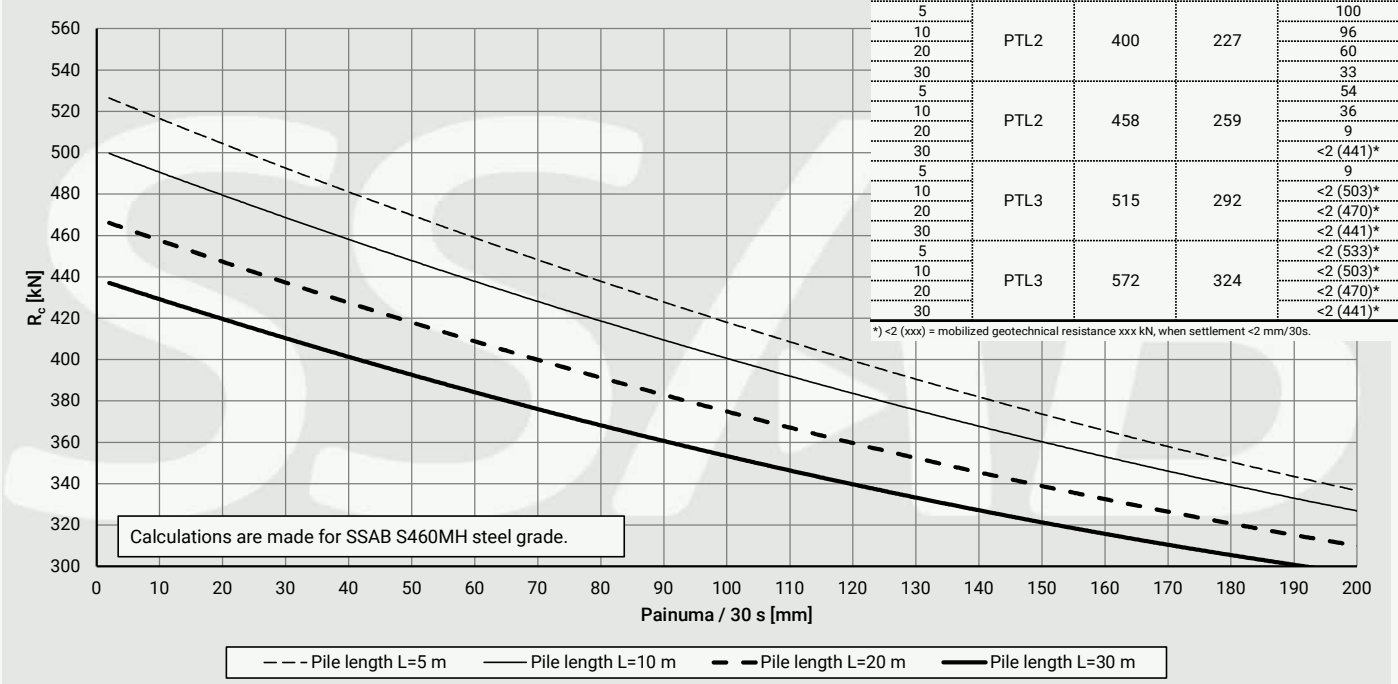
Hammer HS450

Piston		
Piston weight [kg]	m_r	24
Diameter of the piston [mm]	D_r	95
Length of the piston [mm]	L_r	800
Theoretical impact energy [J]	E_{rated}	1500
Efficiency of the piston [%]	HE	80
Equivalent drop height [m]	H_{ekv}	6.37
Theoretical impact rate [blows/min]	BPM	550-1000
Actual impact rate vrs theoretical [%]	η	60
Measured / in analysis used impact rate [blows/min]	BPM_m	600
Impact tool		
Diameter of the tool [mm]	D_t	95
Height of the tool [mm]	L_t	600
Tool weight [kg]	m_t	33

Hammer HS450 - RR75



Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	343	195	100
10				100
20				100
30				100
5	PTL2	400	227	100
10				96
20				60
30				33
5	PTL2	458	259	54
10				36
20				9
30				<2 (441)*
5	PTL3	515	292	9
10				<2 (503)*
20				<2 (470)*
30				<2 (441)*
5	PTL3	572	324	<2 (533)*
10				<2 (503)*
20				<2 (470)*
30				<2 (441)*

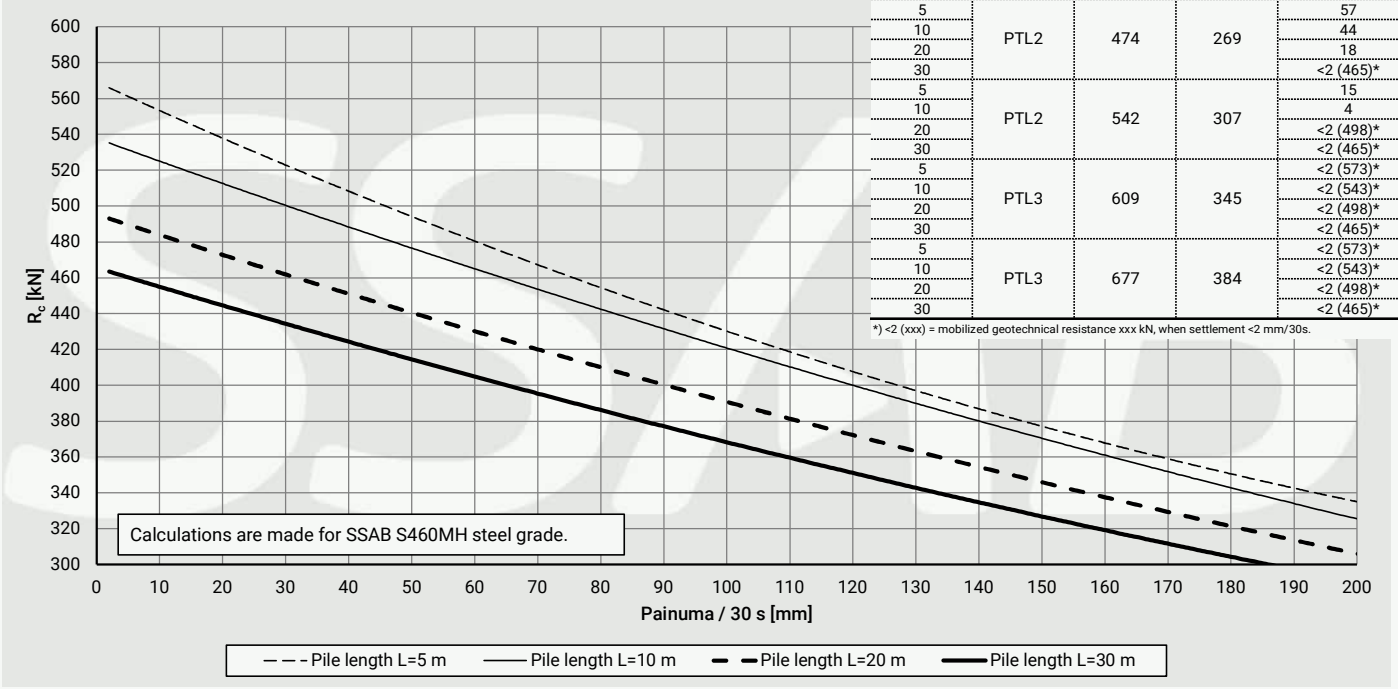
*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Hammer HS450 - RR90

Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	406	230	100
10				100
20				81
30				55
5	PTL2	474	269	57
10				44
20				18
30				<2 (465)*
5	PTL2	542	307	15
10				4
20				<2 (498)*
30				<2 (465)*
5	PTL3	609	345	<2 (573)*
10				<2 (543)*
20				<2 (498)*
30				<2 (465)*
5	PTL3	677	384	<2 (573)*
10				<2 (543)*
20				<2 (498)*
30				<2 (465)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

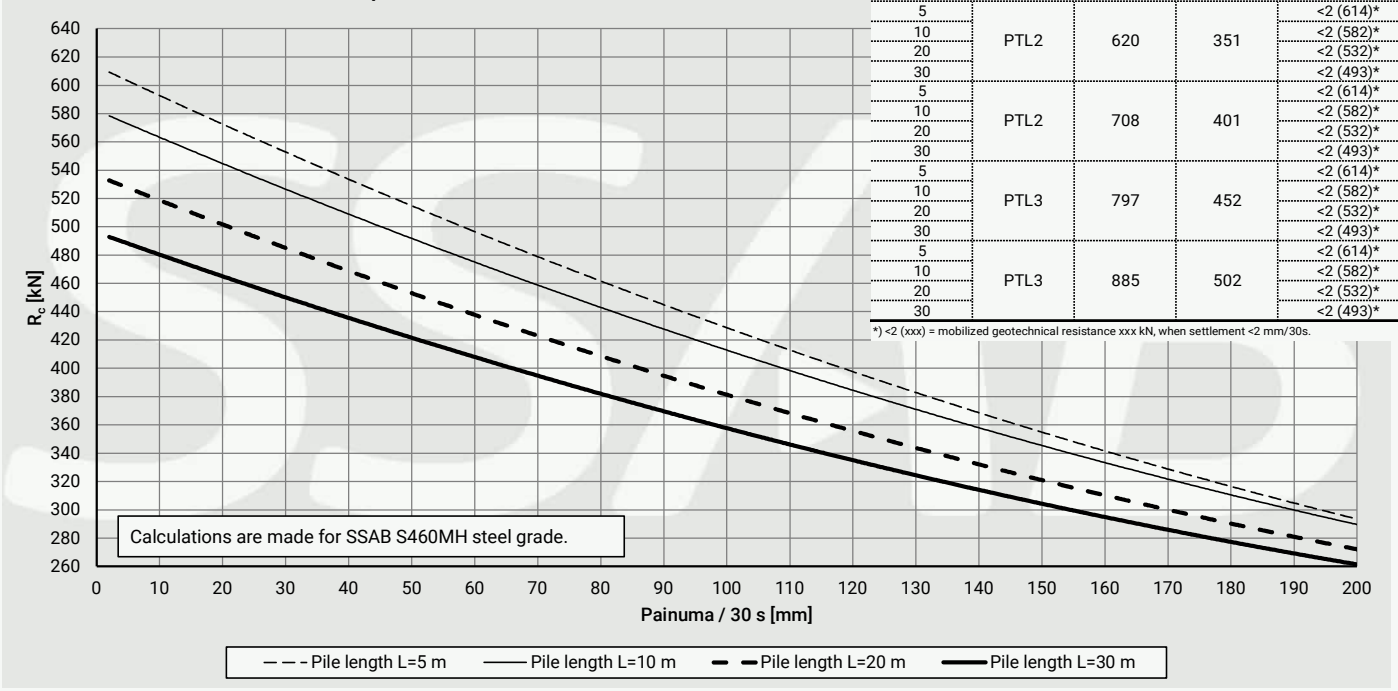


Hammer HS450 - RR115/6.3

Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	531	301	36
10				24
20				4
30				<2 (493)*
5	PTL2	620	351	<2 (614)*
10				<2 (582)*
20				<2 (532)*
30				<2 (493)*
5	PTL2	708	401	<2 (614)*
10				<2 (582)*
20				<2 (532)*
30				<2 (493)*
5	PTL3	797	452	<2 (614)*
10				<2 (582)*
20				<2 (532)*
30				<2 (493)*
5	PTL3	885	502	<2 (614)*
10				<2 (582)*
20				<2 (532)*
30				<2 (493)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.



Hammer HS700

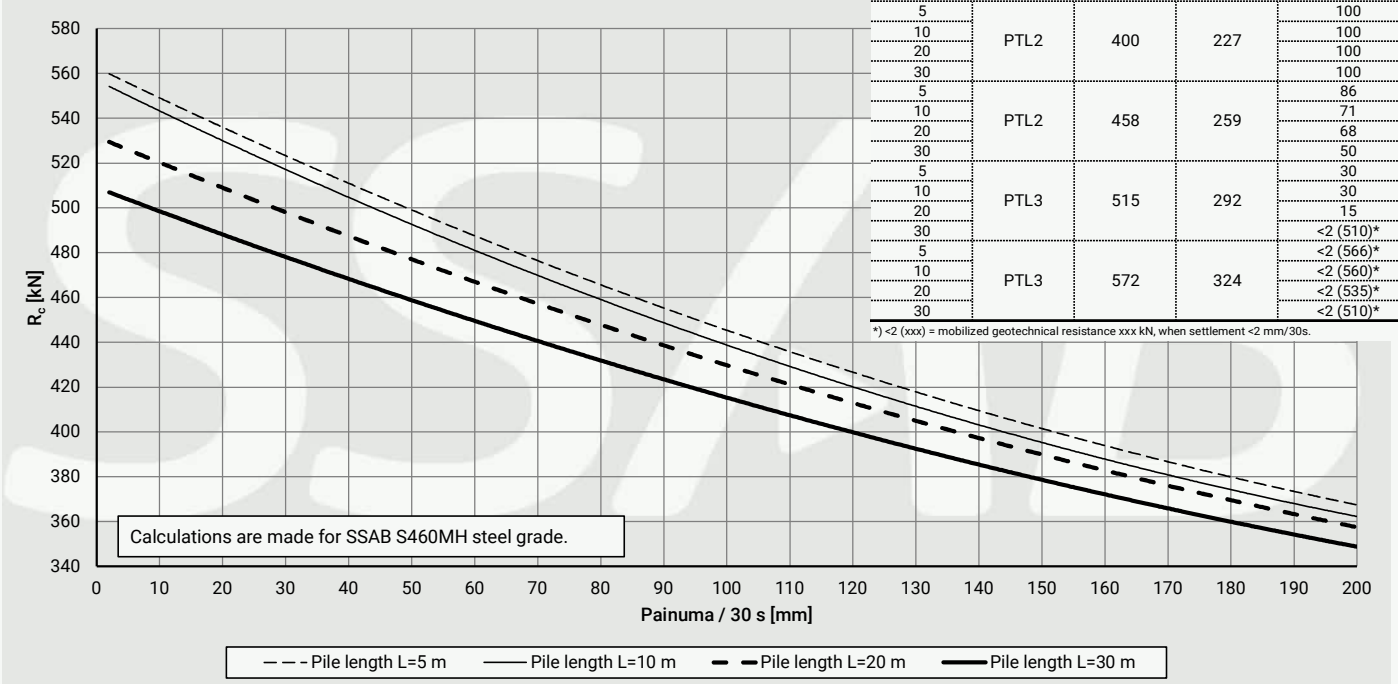
Piston		
Piston weight [kg]	m_r	50
Diameter of the piston [mm]	D_r	110
Length of the piston [mm]	L_r	650
Theoretical impact energy [J]	E_{rated}	2000
Efficiency of the piston [%]	HE	80
Equivalent drop height [m]	H_{ekv}	4.08
Theoretical impact rate [blows/min]	BPM	600-900
Actual impact rate vrs theoretical [%]	η	80
Measured / in analysis used impact rate [blows/min]	BPM_m	500
Impact tool		
Diameter of the tool [mm]	D_t	100
Height of the tool [mm]	L_t	800
Tool weight [kg]	m_t	50

Hammer efficiency 80 %

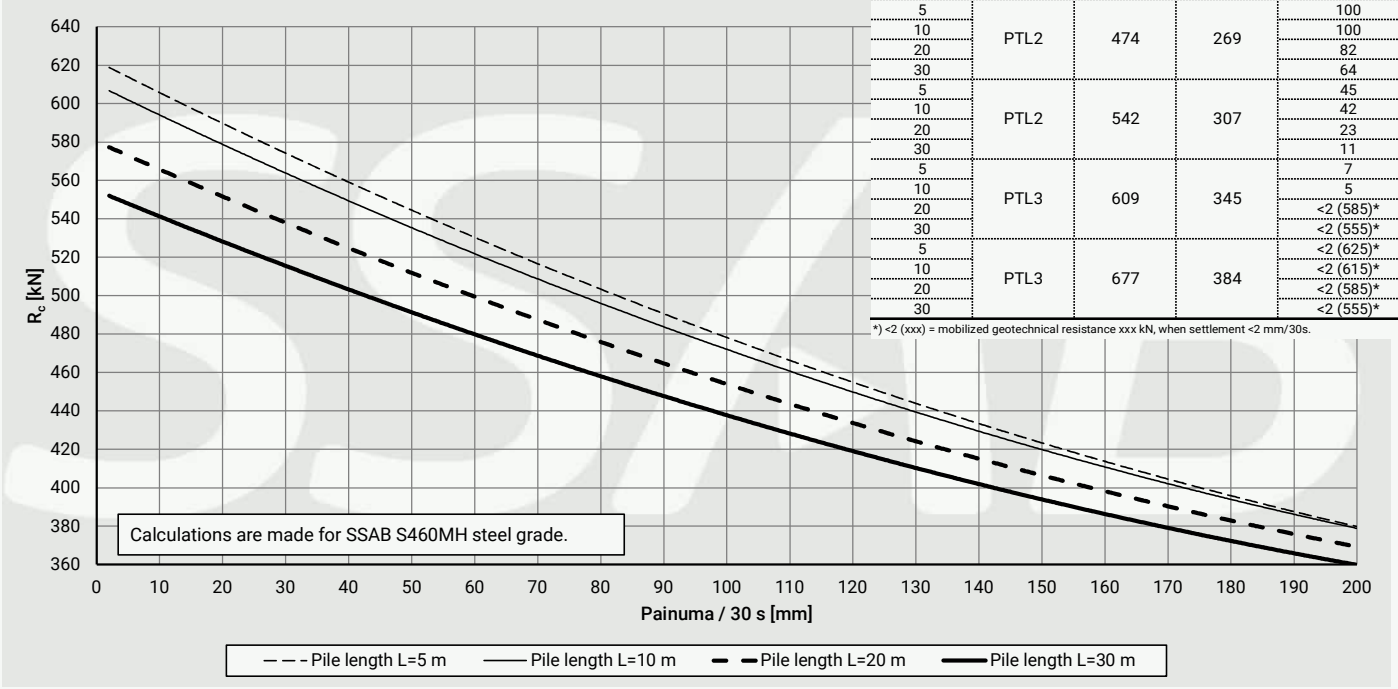
Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	343	195	100
10				100
20				100
30				100
5	PTL2	400	227	100
10				100
20				100
30				100
5	PTL2	458	259	86
10				71
20				68
30				50
5	PTL3	515	292	30
10				30
20				15
30				<2 (510)*
5	PTL3	572	324	<2 (566)*
10				<2 (560)*
20				<2 (535)*
30				<2 (510)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Hammer HS700 - RR75



Hammer HS700 - RR90

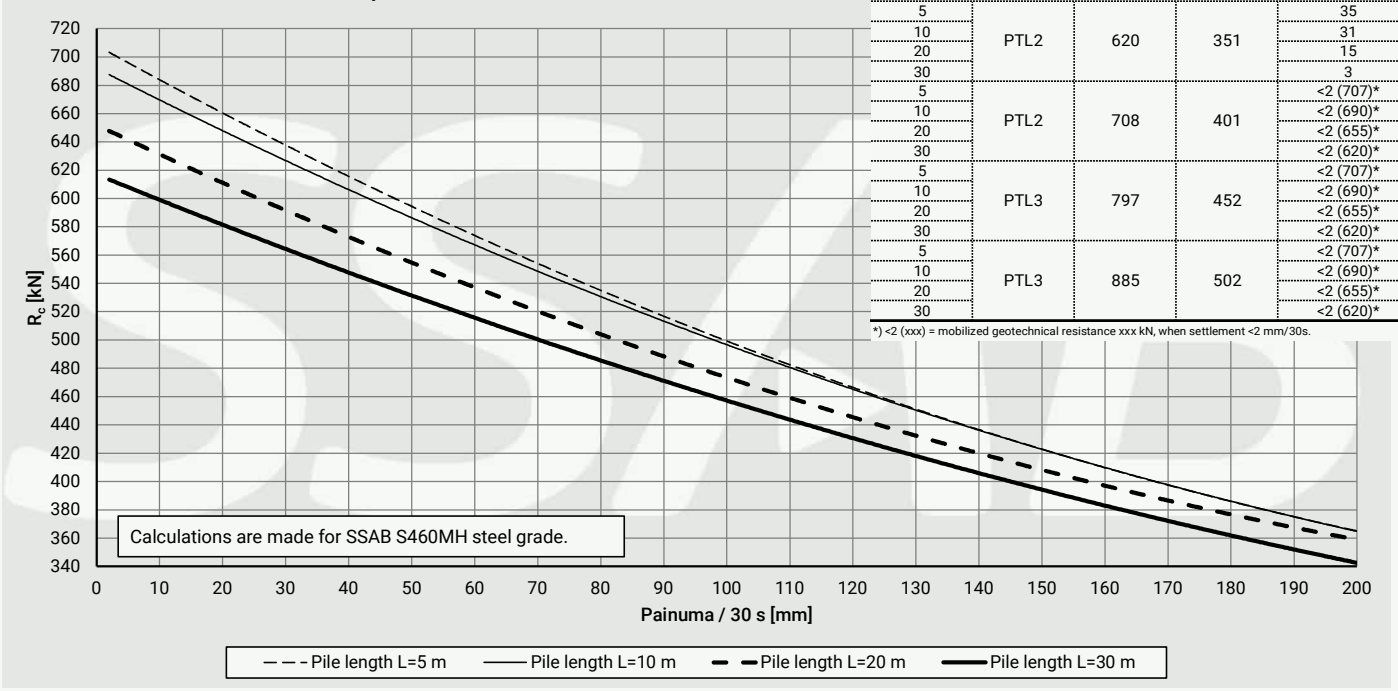


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	406	230	100
10				100
20				100
30				100
5	PTL2	474	269	100
10				100
20				82
30				64
5	PTL2	542	307	45
10				42
20				23
30				11
5	PTL3	609	345	7
10				5
20				<2 (585)*
30				<2 (555)*
5	PTL3	677	384	<2 (625)*
10				<2 (615)*
20				<2 (585)*
30				<2 (555)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Hammer HS700 - RR115/6.3

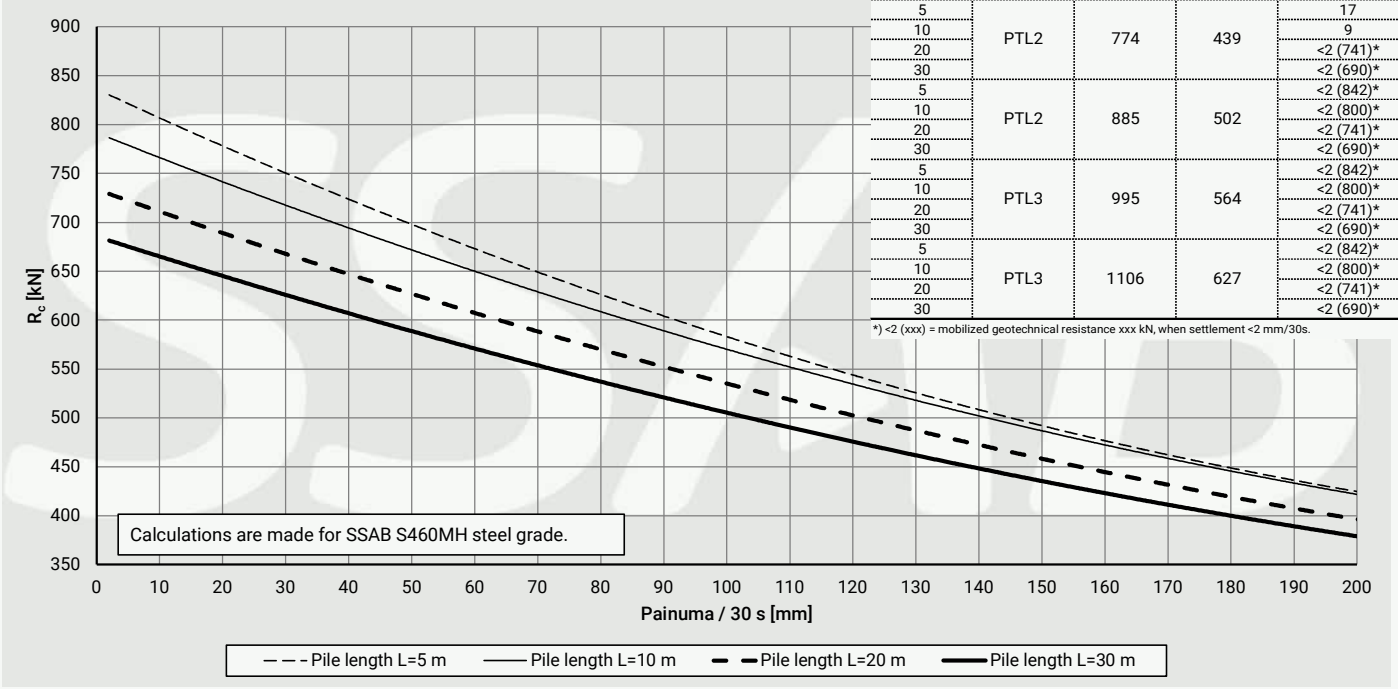


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	531	301	83
10				80
20				62
30				47
5	PTL2	620	351	35
10				31
20				15
30				3
5	PTL2	708	401	<2 (707)*
10				<2 (690)*
20				<2 (655)*
30				<2 (620)*
5	PTL3	797	452	<2 (707)*
10				<2 (690)*
20				<2 (655)*
30				<2 (620)*
5	PTL3	885	502	<2 (707)*
10				<2 (690)*
20				<2 (655)*
30				<2 (620)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Hammer HS700 - RR115/8

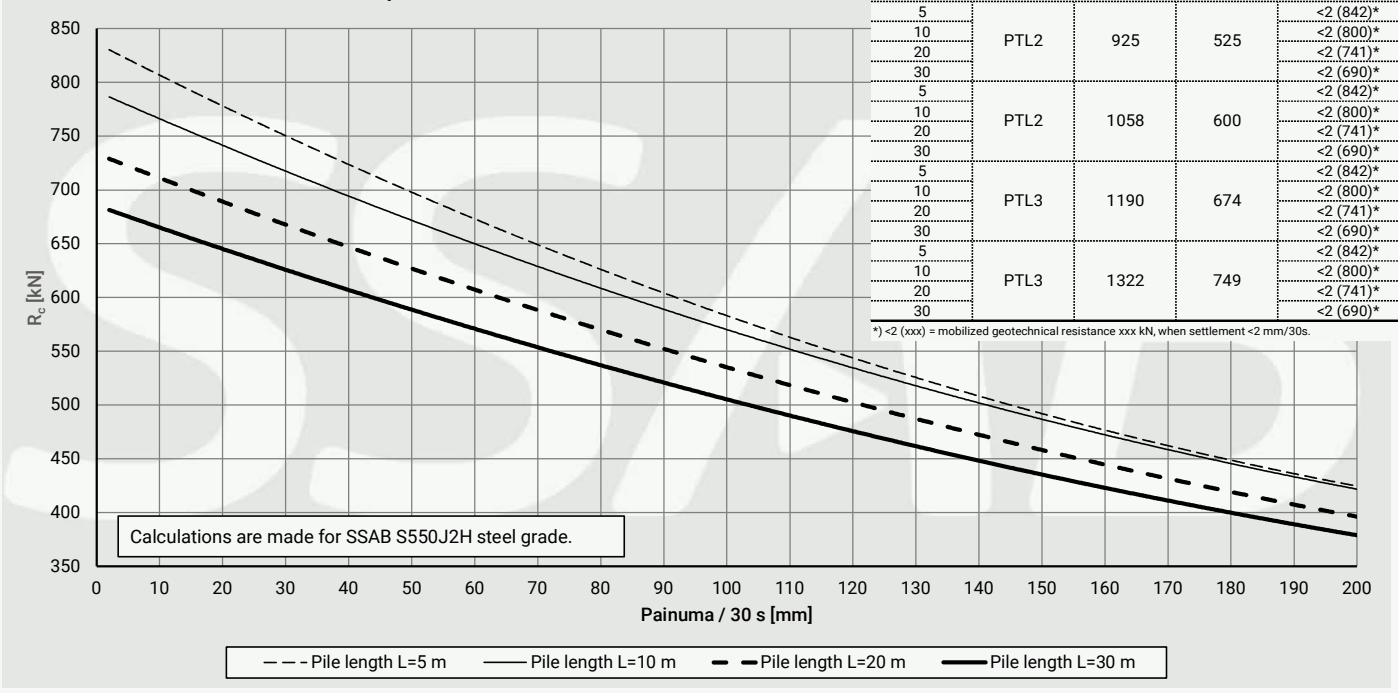


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	664	376	60
10				51
20				29
30				12
5	PTL2	774	439	17
10				9
20				<2 (741)*
30				<2 (690)*
5	PTL2	885	502	<2 (842)*
10				<2 (800)*
20				<2 (741)*
30				<2 (690)*
5	PTL3	995	564	<2 (842)*
10				<2 (800)*
20				<2 (741)*
30				<2 (690)*
5	PTL3	1106	627	<2 (842)*
10				<2 (800)*
20				<2 (741)*
30				<2 (690)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Hammer HS700 - RRs115/8

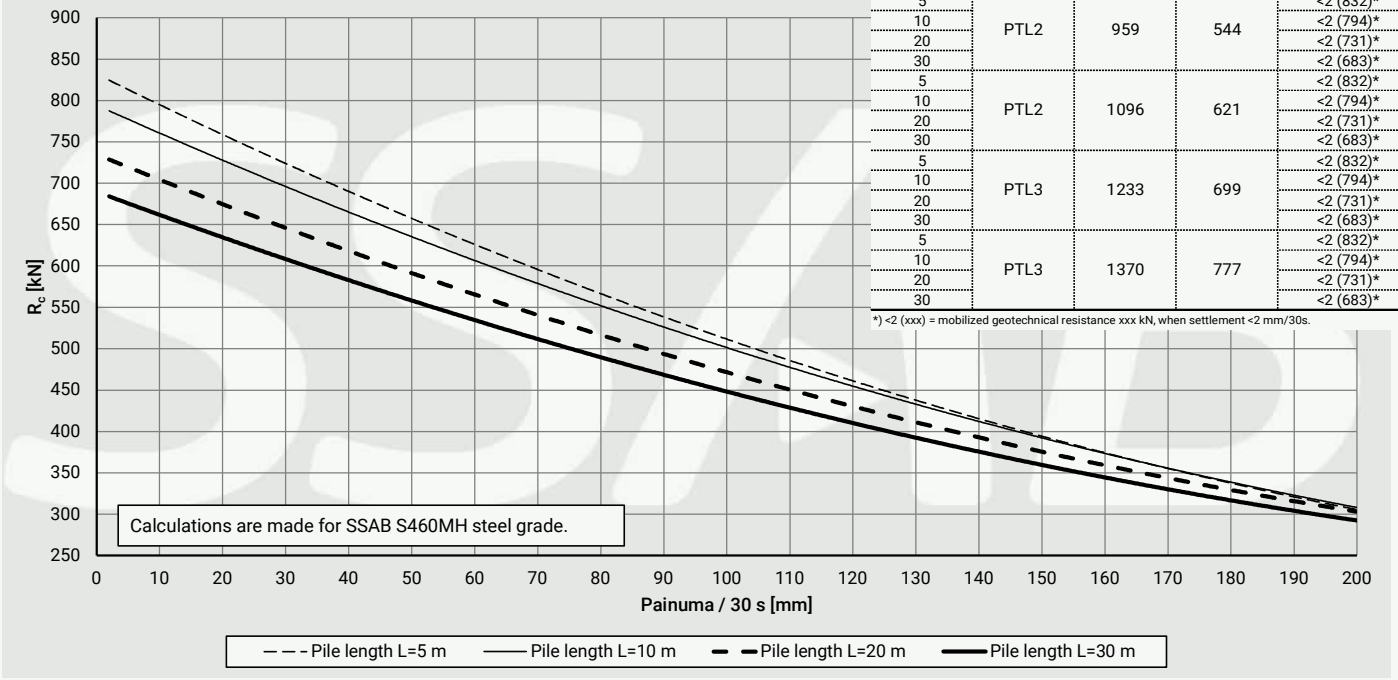


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	793	450	13
10				4
20				<2 (741)*
30				<2 (690)*
5	PTL2	925	525	<2 (842)*
10				<2 (800)*
20				<2 (741)*
30				<2 (690)*
5	PTL2	1058	600	<2 (842)*
10				<2 (800)*
20				<2 (741)*
30				<2 (690)*
5	PTL3	1190	674	<2 (842)*
10				<2 (800)*
20				<2 (741)*
30				<2 (690)*
5	PTL3	1322	749	<2 (842)*
10				<2 (800)*
20				<2 (741)*
30				<2 (690)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Hammer HS700 - RR140/8



Hammer efficiency 80 %

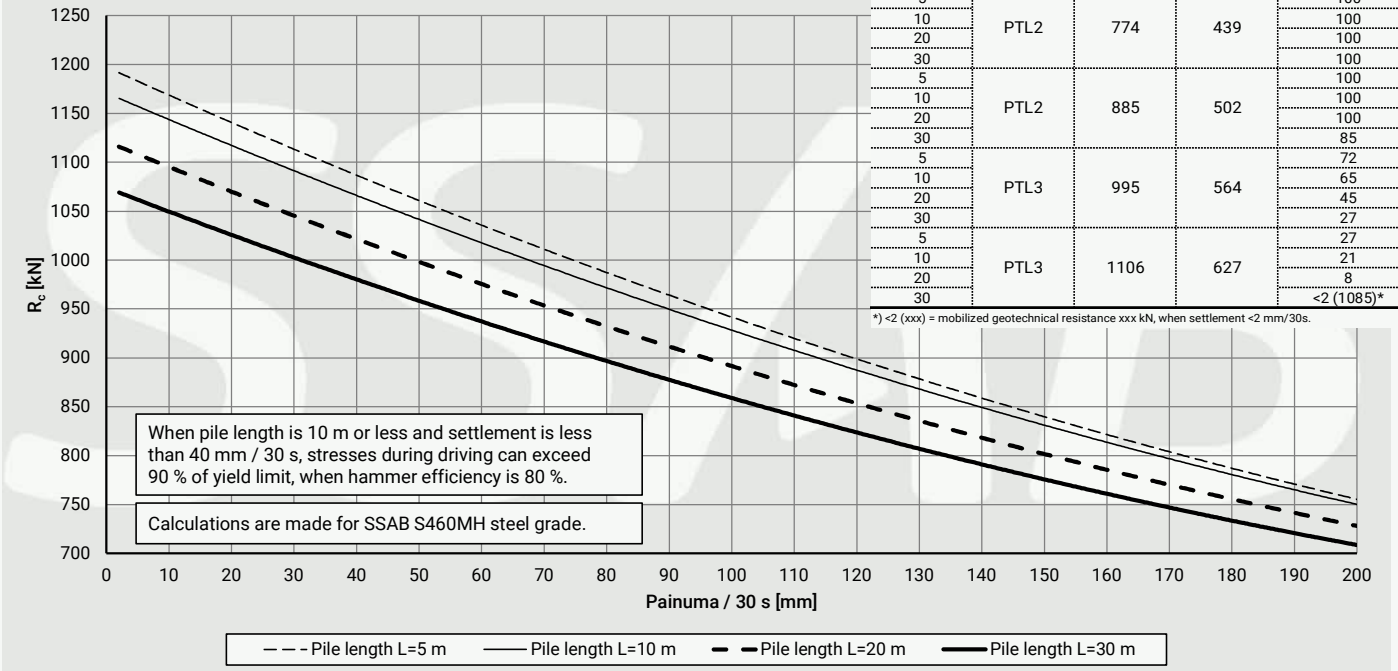
Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	822	466	5
10				<2 (794)*
20				<2 (731)*
30				<2 (683)*
5	PTL2	959	544	<2 (832)*
10				<2 (794)*
20				<2 (731)*
30				<2 (683)*
5	PTL2	1096	621	<2 (832)*
10				<2 (794)*
20				<2 (731)*
30				<2 (683)*
5	PTL3	1233	699	<2 (832)*
10				<2 (794)*
20				<2 (731)*
30				<2 (683)*
5	PTL3	1370	777	<2 (832)*
10				<2 (794)*
20				<2 (731)*
30				<2 (683)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

General Breaker GB8 (AT/AF)

Piston		
Piston weight [kg]	m_r	100
Diameter of the piston [mm]	D_r	135
Length of the piston [mm]	L_r	900
Theoretical impact energy [J]	E_{rated}	4500
Efficiency of the piston [%]	HE	80
Equivalent drop height [m]	H_{ekv}	4.59
Theoretical impact rate [blows/min]	BPM	350-600
Actual impact rate vrs theoretical [%]	η	75
Measured / in analysis used impact rate [blows/min]	BPM_m	450
Impact tool		
Diameter of the tool [mm]	D_t	135
Height of the tool [mm]	L_t	800
Tool weight [kg]	m_t	90

General Breaker GB8 (AT/AF) - RR115/8

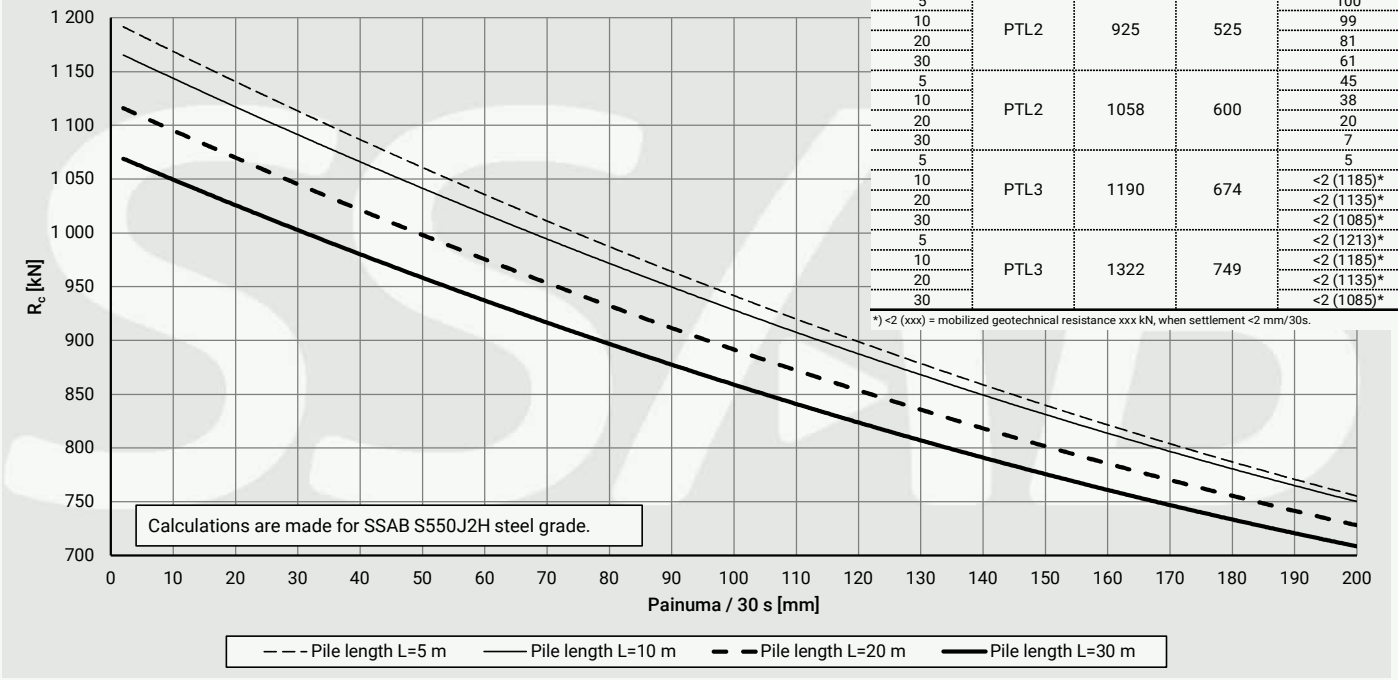


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	664	376	100
10				100
20				100
30				100
5	PTL2	774	439	100
10				100
20				100
30				100
5	PTL2	885	502	100
10				100
20				100
30				85
5	PTL3	995	564	72
10				65
20				45
30				27
5	PTL3	1106	627	27
10				21
20				8
30				<2 (1085)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

General Breaker GB8 (AT/AF) - RRs115/8

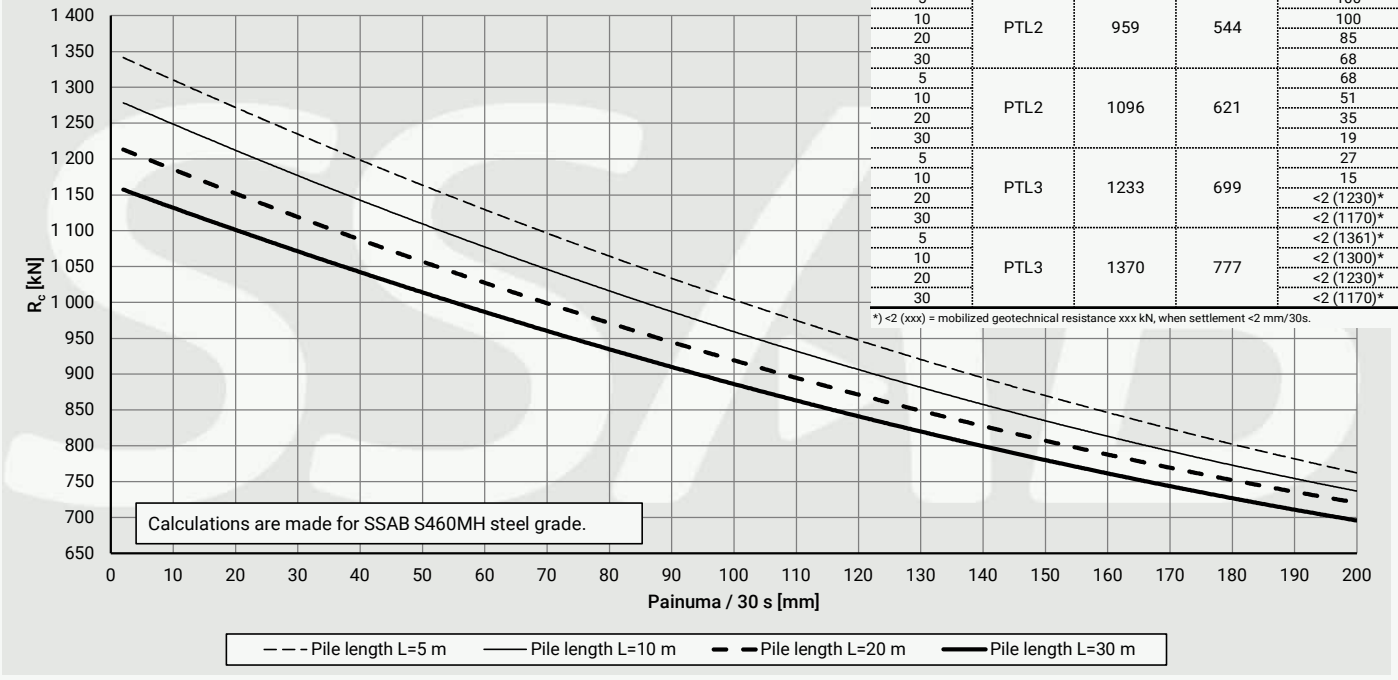


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	793	450	100
10				100
20				100
30				100
5	PTL2	925	525	100
10				99
20				81
30				61
5	PTL2	1058	600	45
10				38
20				20
30				7
5	PTL3	1190	674	5
10				<2 (1185)*
20				<2 (1135)*
30				<2 (1085)*
5	PTL3	1322	749	<2 (1213)*
10				<2 (1185)*
20				<2 (1135)*
30				<2 (1085)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

General Breaker GB8 (AT/AF) - RR140/8

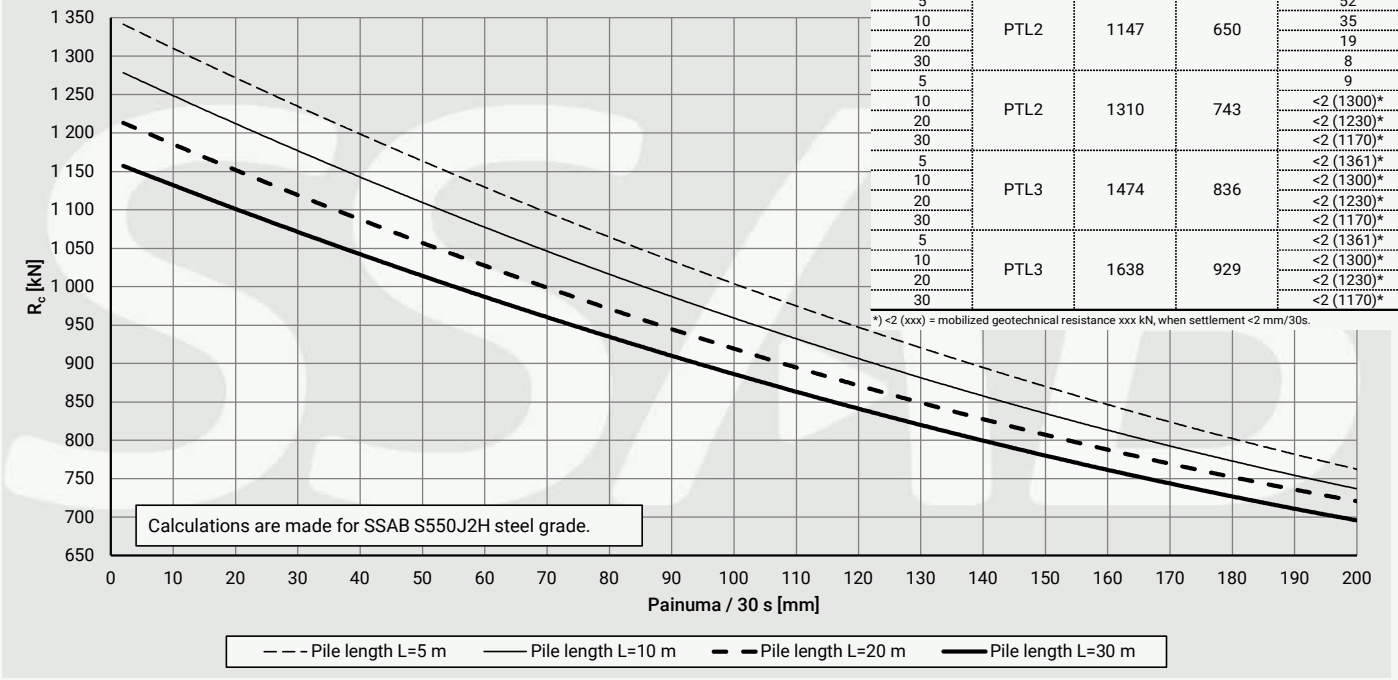


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	822	466	100
10				100
20				100
30				100
5	PTL2	959	544	100
10				100
20				85
30				68
5	PTL2	1096	621	68
10				51
20				35
30				19
5	PTL3	1233	699	27
10				15
20				<2 (1230)*
30				<2 (1170)*
5	PTL3	1370	777	<2 (1361)*
10				<2 (1300)*
20				<2 (1230)*
30				<2 (1170)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

General Breaker GB8 (AT/AF) - RRs140/8

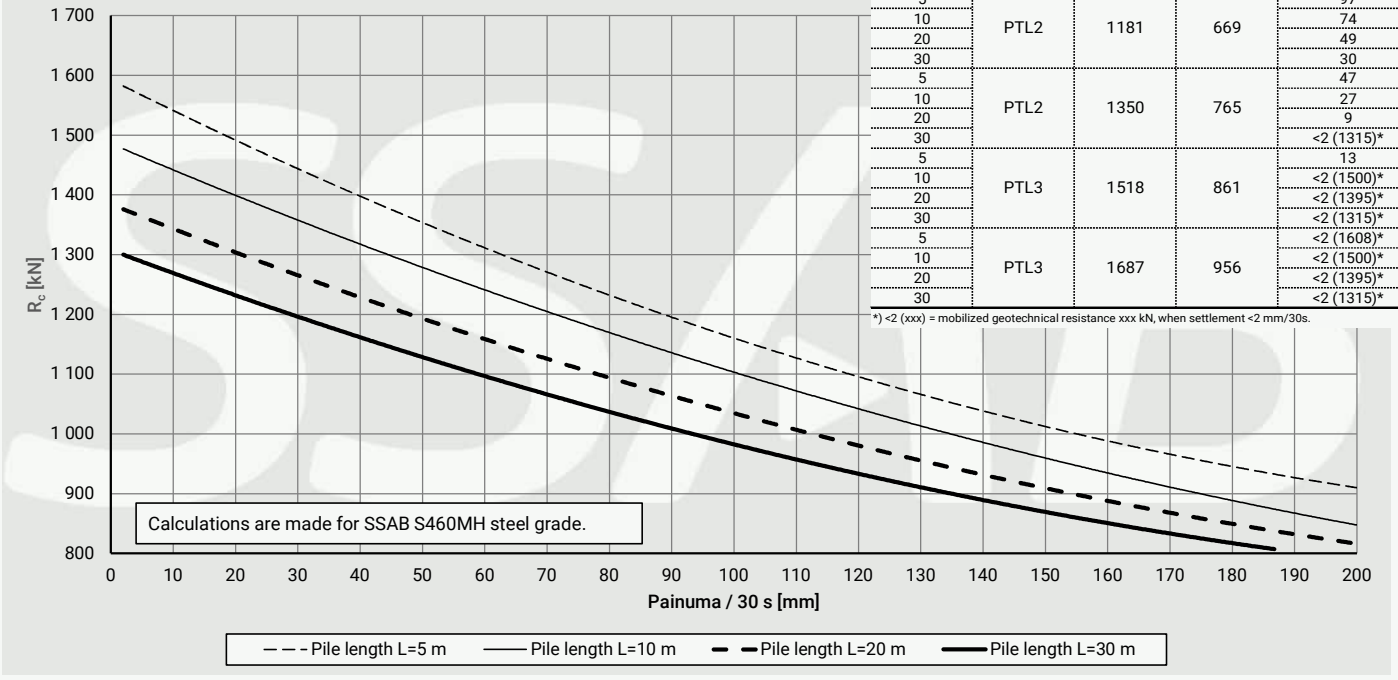


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	983	557	100
10				92
20				76
30				59
5	PTL2	1147	650	52
10				35
20				19
30				8
5	PTL2	1310	743	9
10				<2 (1300)*
20				<2 (1230)*
30				<2 (1170)*
5	PTL3	1474	836	<2 (1361)*
10				<2 (1300)*
20				<2 (1230)*
30				<2 (1170)*
5	PTL3	1638	929	<2 (1361)*
10				<2 (1300)*
20				<2 (1230)*
30				<2 (1170)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

General Breaker GB8 (AT/AF) - RR140/10

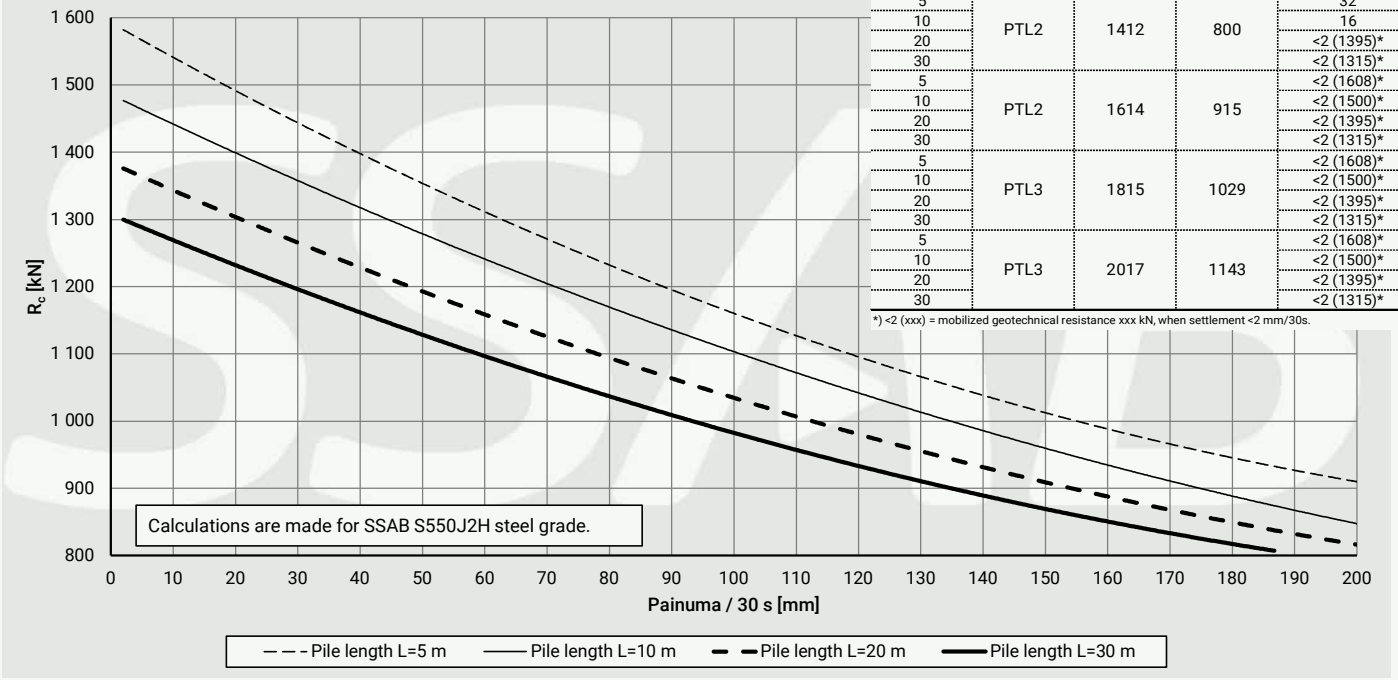


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1012	574	100
10				100
20				100
30				90
5	PTL2	1181	669	97
10				74
20				49
30				30
5	PTL2	1350	765	47
10				27
20				9
30				<2 (1315)*
5	PTL3	1518	861	13
10				<2 (1500)*
20				<2 (1395)*
30				<2 (1315)*
5	PTL3	1687	956	<2 (1608)*
10				<2 (1500)*
20				<2 (1395)*
30				<2 (1315)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

General Breaker GB8 (AT/AF) - RRs140/10

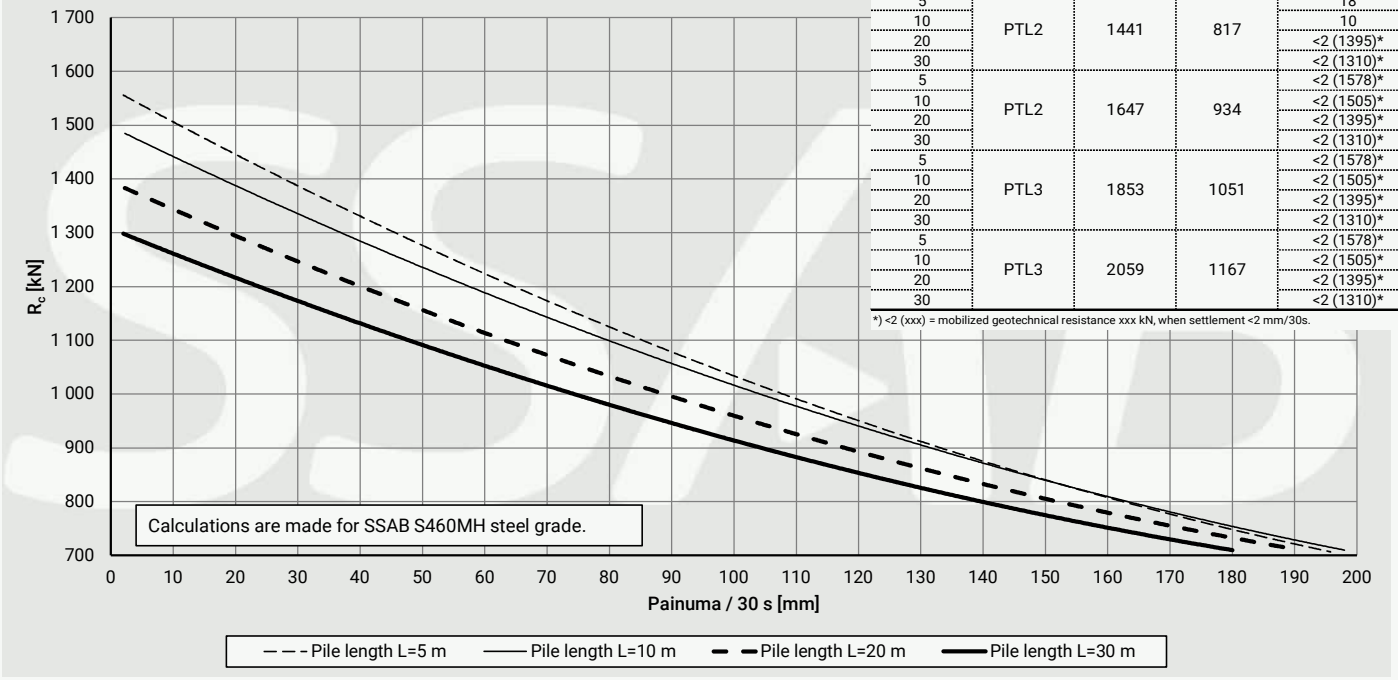


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1210	686	88
10				65
20				40
30				22
5	PTL2	1412	800	32
10				16
20				<2 (1395)*
30				<2 (1315)*
5	PTL2	1614	915	<2 (1608)*
10				<2 (1500)*
20				<2 (1395)*
30				<2 (1315)*
5	PTL3	1815	1029	<2 (1608)*
10				<2 (1500)*
20				<2 (1395)*
30				<2 (1315)*
5	PTL3	2017	1143	<2 (1608)*
10				<2 (1500)*
20				<2 (1395)*
30				<2 (1315)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

General Breaker GB8 (AT/AF) - RR170/10

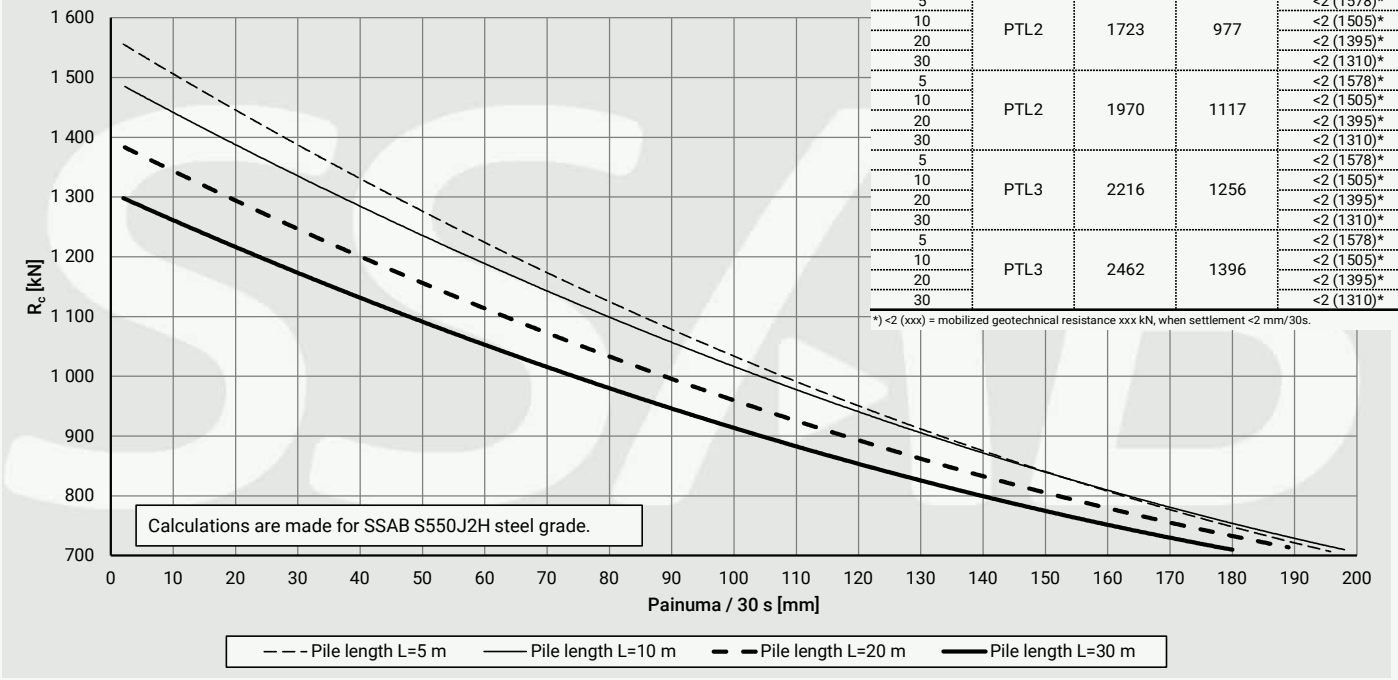


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1235	700	56
10				48
20				30
30				15
5	PTL2	1441	817	18
10				10
20				<2 (1395)*
30				<2 (1310)*
5	PTL2	1647	934	<2 (1578)*
10				<2 (1505)*
20				<2 (1395)*
30				<2 (1310)*
5	PTL3	1853	1051	<2 (1578)*
10				<2 (1505)*
20				<2 (1395)*
30				<2 (1310)*
5	PTL3	2059	1167	<2 (1578)*
10				<2 (1505)*
20				<2 (1395)*
30				<2 (1310)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

General Breaker GB8 (AT/AF) - RRs170/10



Hammer efficiency 80 %

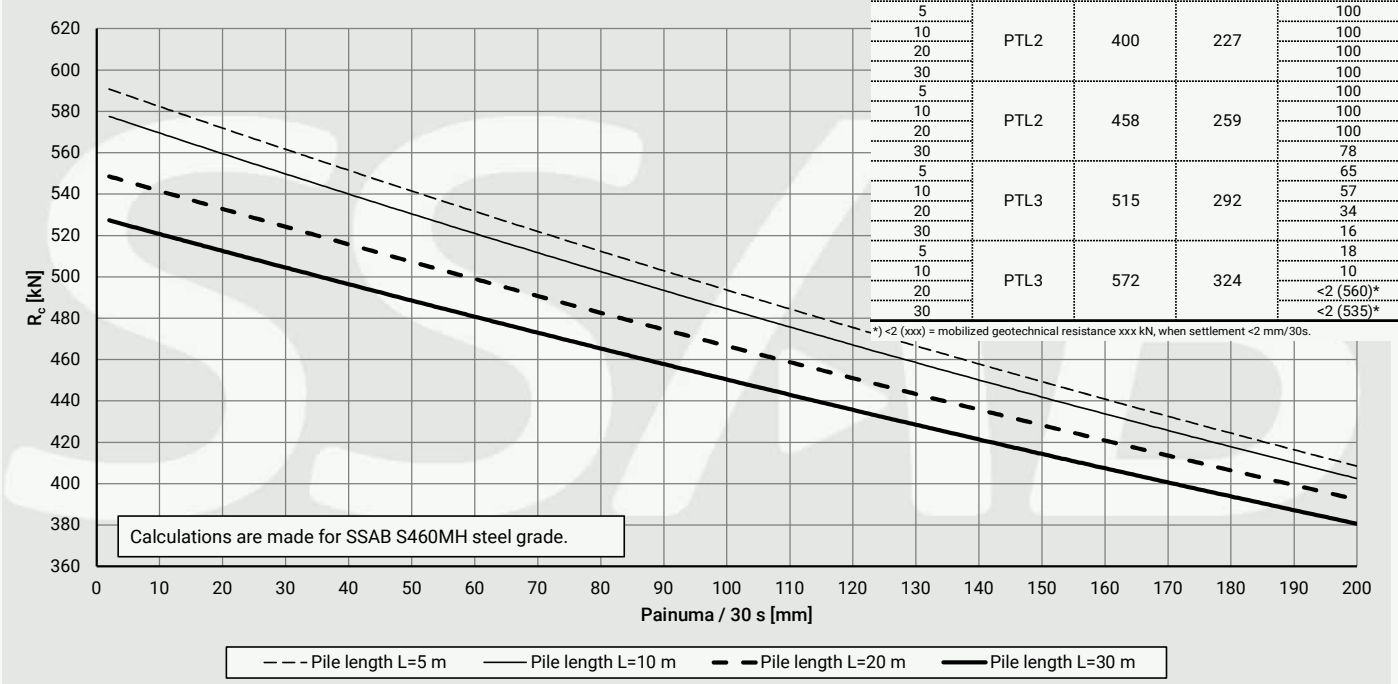
Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1477	837	13
10				6
20				<2 (1395)*
30				<2 (1310)*
5	PTL2	1723	977	<2 (1578)*
10				<2 (1505)*
20				<2 (1395)*
30				<2 (1310)*
5	PTL2	1970	1117	<2 (1578)*
10				<2 (1505)*
20				<2 (1395)*
30				<2 (1310)*
5	PTL3	2216	1256	<2 (1578)*
10				<2 (1505)*
20				<2 (1395)*
30				<2 (1310)*
5	PTL3	2462	1396	<2 (1578)*
10				<2 (1505)*
20				<2 (1395)*
30				<2 (1310)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

D&A 130V

Piston		
Piston weight [kg]	m_r	43.9
Diameter of the piston [mm]	D_r	100
Length of the piston [mm]	L_r	697
Theoretical impact energy [J]	E_{rated}	2247
Efficiency of the piston [%]	HE	80
Equivalent drop height [m]	H_{ekv}	5.21
Theoretical impact rate [blows/min]	BPM	350-600
Actual impact rate vrs theoretical [%]	η	80
Measured / in analysis used impact rate [blows/min]	BPM_m	500
Impact tool		
Diameter of the tool [mm]	D_t	105
Height of the tool [mm]	L_t	800
Tool weight [kg]	m_t	50

D&A 130V - RR75



Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	343	195	100
10				100
20				100
30				100
5	PTL2	400	227	100
10				100
20				100
30				100
5	PTL2	458	259	100
10				100
20				100
30				78
5	PTL3	515	292	65
10				57
20				34
30				16
5	PTL3	572	324	18
10				10
20				<2 (560)*
30				<2 (535)*

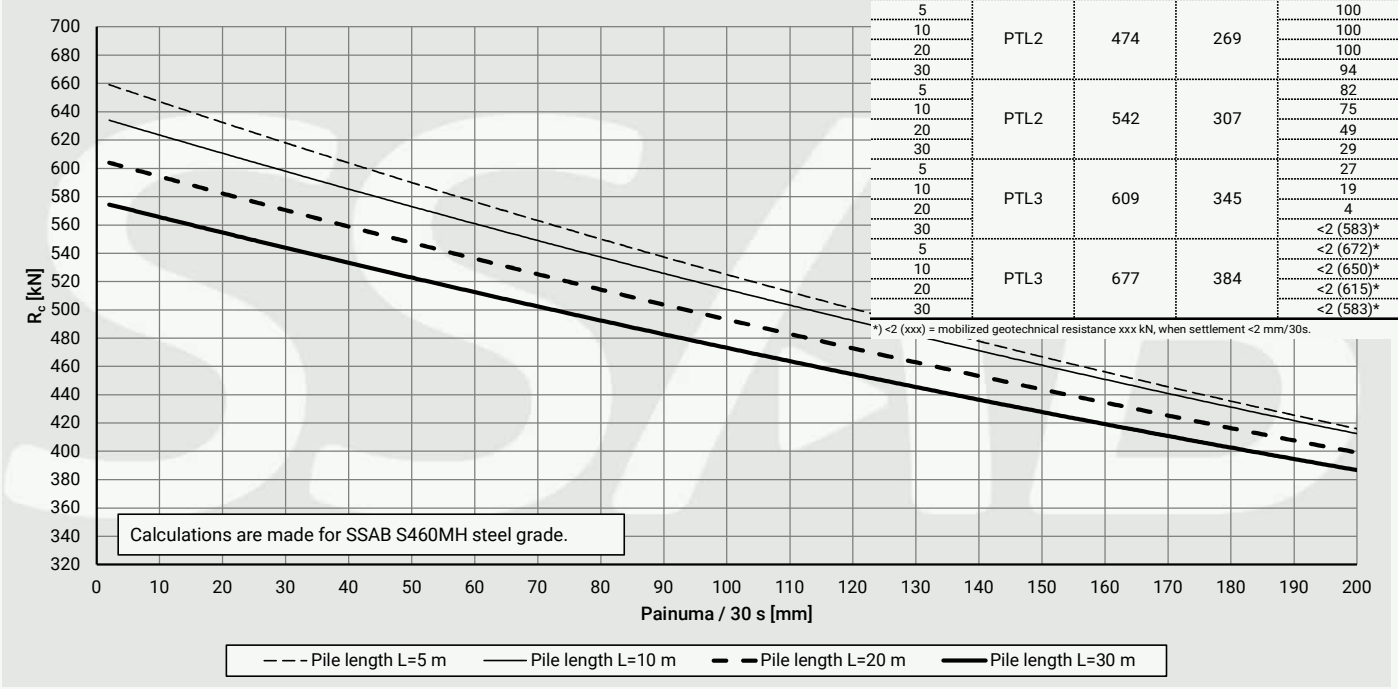
*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

D&A 130V - RR90

Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	406	230	100
10				100
20				100
30				100
5	PTL2	474	269	100
10				100
20				100
30				94
5	PTL2	542	307	82
10				75
20				49
30				29
5	PTL3	609	345	27
10				19
20				4
30				<2 (583)*
5	PTL3	677	384	<2 (672)*
10				<2 (650)*
20				<2 (615)*
30				<2 (583)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

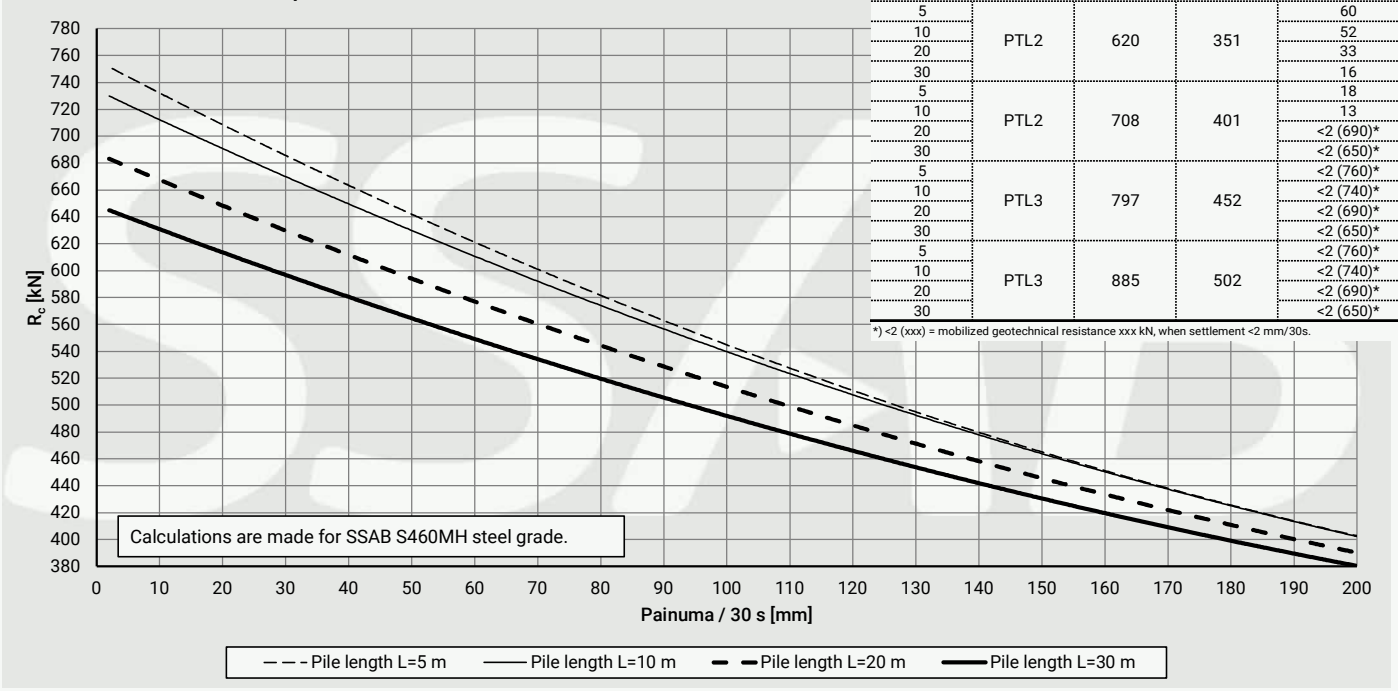


D&A 130V - RR115/6.3

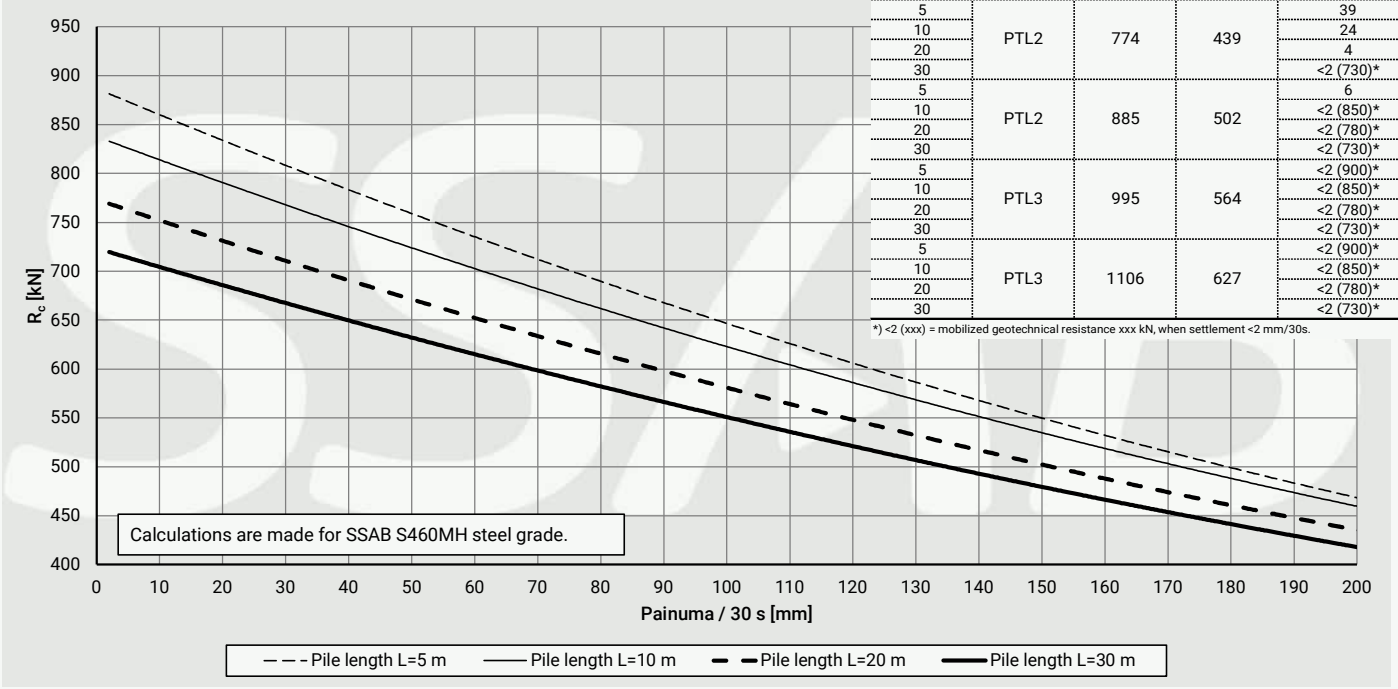
Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	531	301	100
10				100
20				88
30				71
5	PTL2	620	351	60
10				52
20				33
30				16
5	PTL2	708	401	18
10				13
20				<2 (690)*
30				<2 (650)*
5	PTL3	797	452	<2 (760)*
10				<2 (740)*
20				<2 (690)*
30				<2 (650)*
5	PTL3	885	502	<2 (760)*
10				<2 (740)*
20				<2 (690)*
30				<2 (650)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.



D&A 130V - RR115/8

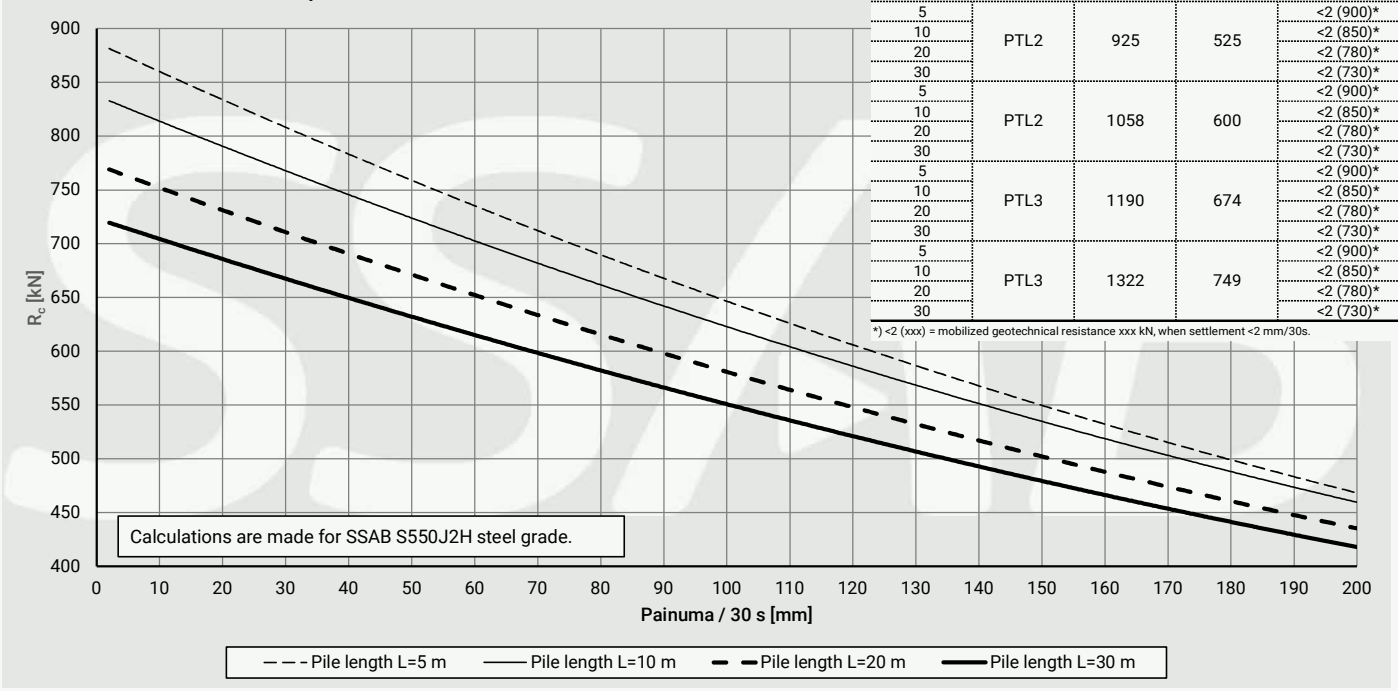


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	664	376	90
10				76
20				51
30				29
5	PTL2	774	439	39
10				24
20				4
30				<2 (730)*
5	PTL2	885	502	6
10				<2 (850)*
20				<2 (780)*
30				<2 (730)*
5	PTL3	995	564	<2 (900)*
10				<2 (850)*
20				<2 (780)*
30				<2 (730)*
5	PTL3	1106	627	<2 (900)*
10				<2 (850)*
20				<2 (780)*
30				<2 (730)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

D&A 130V - RRs115/8

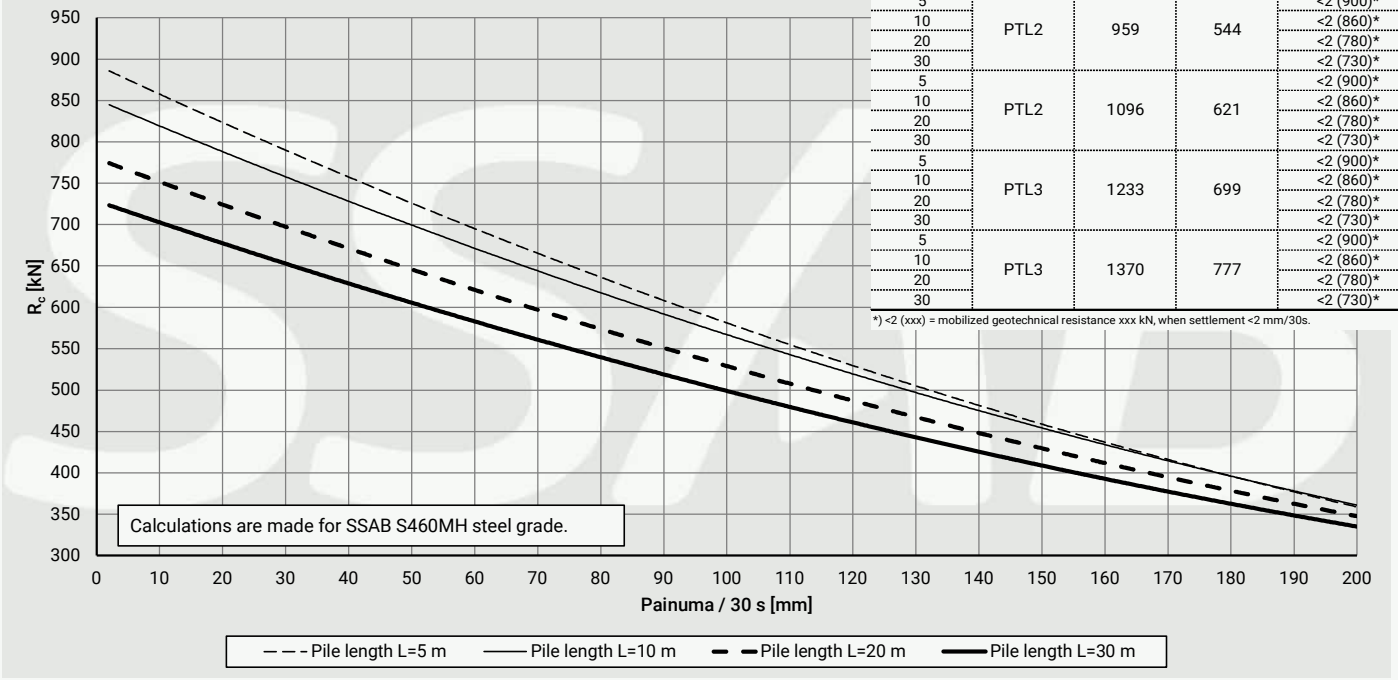


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	793	450	32
10				17
20				<2 (780)*
30				<2 (730)*
5	PTL2	925	525	<2 (900)*
10				<2 (850)*
20				<2 (780)*
30				<2 (730)*
5	PTL2	1058	600	<2 (900)*
10				<2 (850)*
20				<2 (780)*
30				<2 (730)*
5	PTL3	1190	674	<2 (900)*
10				<2 (850)*
20				<2 (780)*
30				<2 (730)*
5	PTL3	1322	749	<2 (900)*
10				<2 (850)*
20				<2 (780)*
30				<2 (730)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

D&A 130V - RR140/8

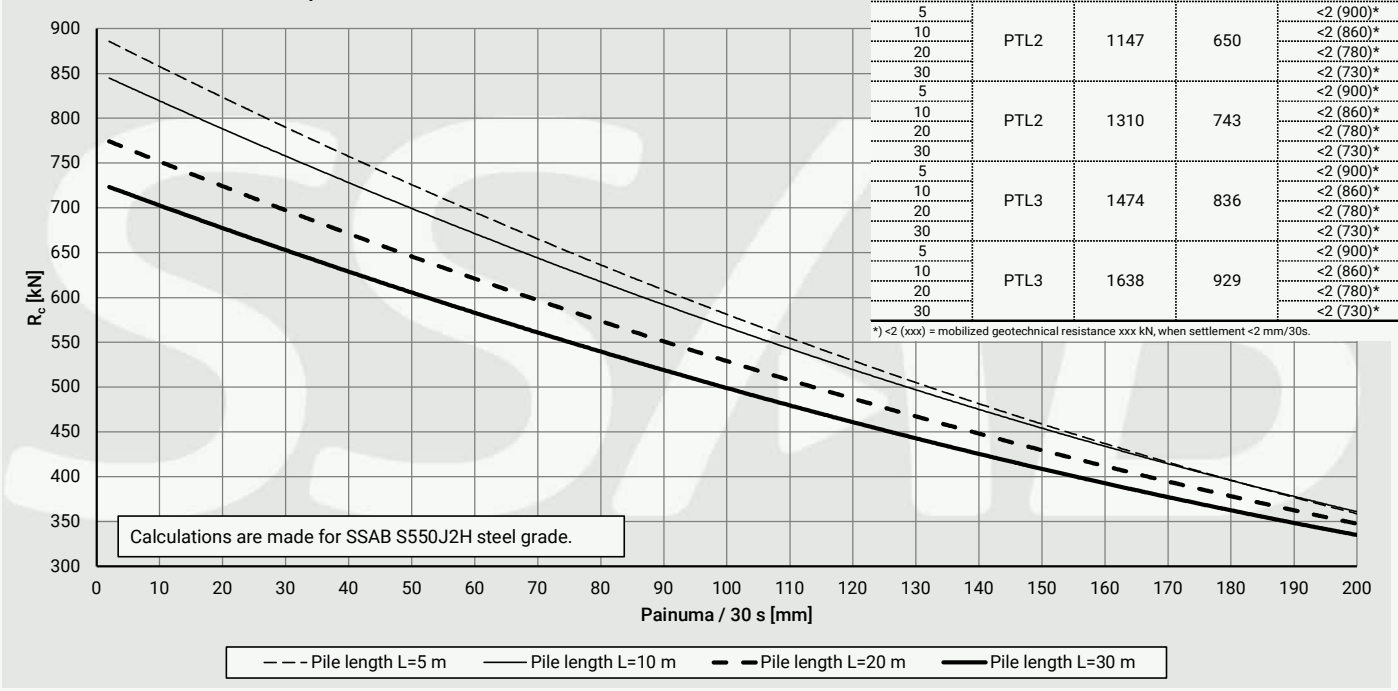


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	822	466	20
10				10
20				<2 (780)*
30				<2 (730)*
5	PTL2	959	544	<2 (900)*
10				<2 (860)*
20				<2 (780)*
30				<2 (730)*
5	PTL2	1096	621	<2 (900)*
10				<2 (860)*
20				<2 (780)*
30				<2 (730)*
5	PTL3	1233	699	<2 (900)*
10				<2 (860)*
20				<2 (780)*
30				<2 (730)*
5	PTL3	1370	777	<2 (900)*
10				<2 (860)*
20				<2 (780)*
30				<2 (730)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

D&A 130V - RRs140/8



Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	983	557	<2 (900)*
10				<2 (860)*
20				<2 (780)*
30				<2 (730)*
5	PTL2	1147	650	<2 (900)*
10				<2 (860)*
20				<2 (780)*
30				<2 (730)*
5	PTL2	1310	743	<2 (900)*
10				<2 (860)*
20				<2 (780)*
30				<2 (730)*
5	PTL3	1474	836	<2 (900)*
10				<2 (860)*
20				<2 (780)*
30				<2 (730)*
5	PTL3	1638	929	<2 (900)*
10				<2 (860)*
20				<2 (780)*
30				<2 (730)*

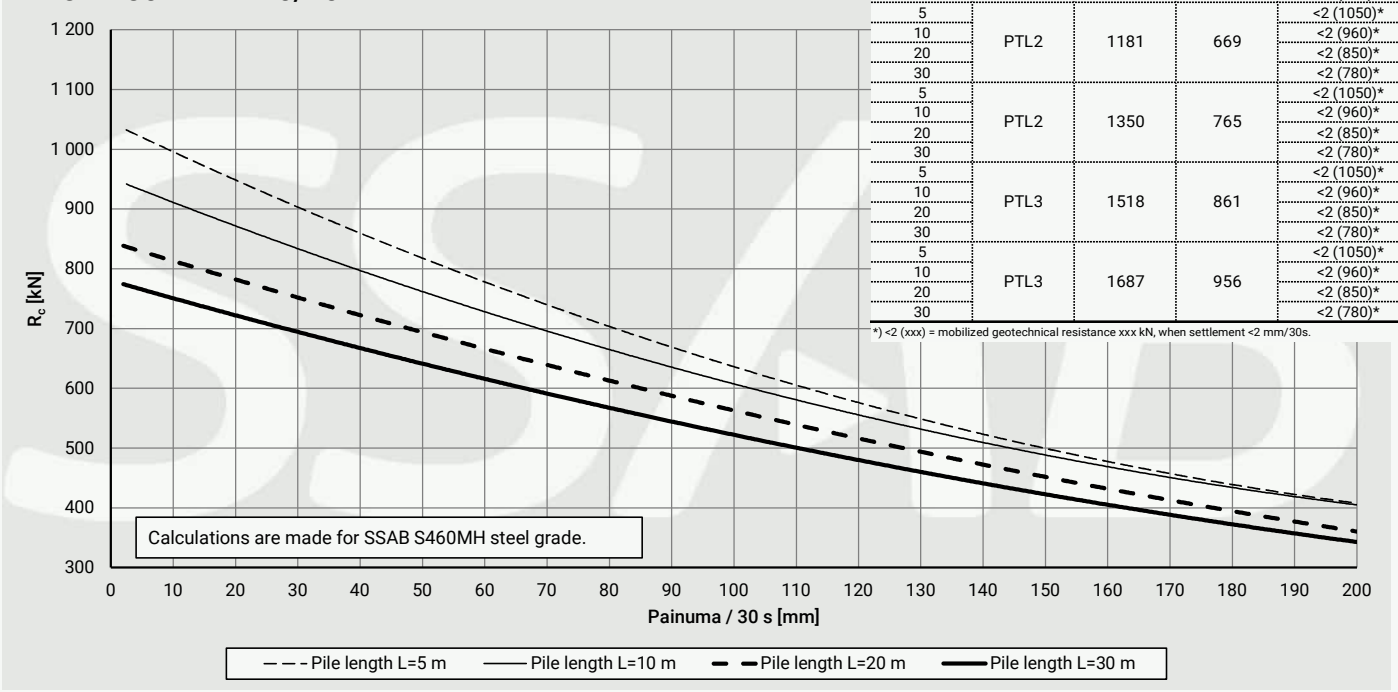
*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

D&A 130V - RR140/10

Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1012	574	8
10				<2 (960)*
20				<2 (850)*
30				<2 (780)*
5	PTL2	1181	669	<2 (1050)*
10				<2 (960)*
20				<2 (850)*
30				<2 (780)*
5	PTL2	1350	765	<2 (1050)*
10				<2 (960)*
20				<2 (850)*
30				<2 (780)*
5	PTL3	1518	861	<2 (1050)*
10				<2 (960)*
20				<2 (850)*
30				<2 (780)*
5	PTL3	1687	956	<2 (1050)*
10				<2 (960)*
20				<2 (850)*
30				<2 (780)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

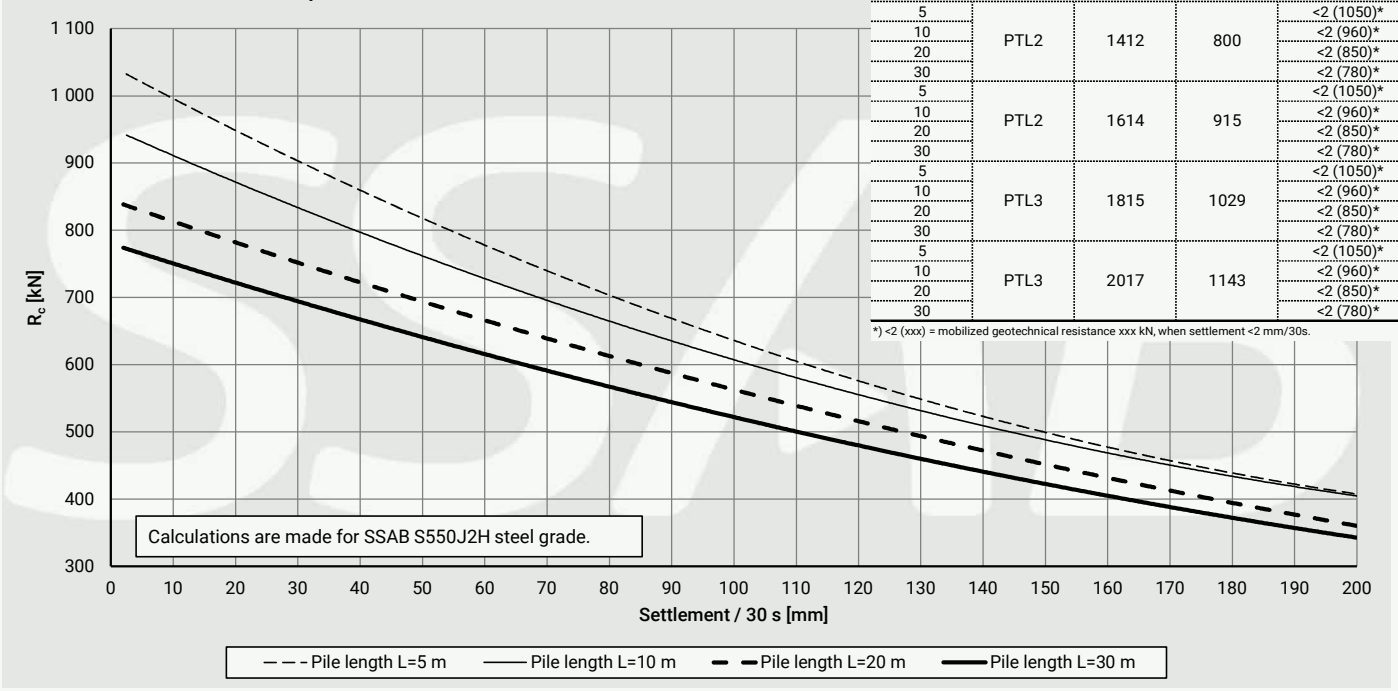


D&A 130V - RRs140/10

Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1210	686	<2 (1050)*
10				<2 (960)*
20				<2 (850)*
30				<2 (780)*
5	PTL2	1412	800	<2 (1050)*
10				<2 (960)*
20				<2 (850)*
30				<2 (780)*
5	PTL2	1614	915	<2 (1050)*
10				<2 (960)*
20				<2 (850)*
30				<2 (780)*
5	PTL3	1815	1029	<2 (1050)*
10				<2 (960)*
20				<2 (850)*
30				<2 (780)*
5	PTL3	2017	1143	<2 (1050)*
10				<2 (960)*
20				<2 (850)*
30				<2 (780)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.



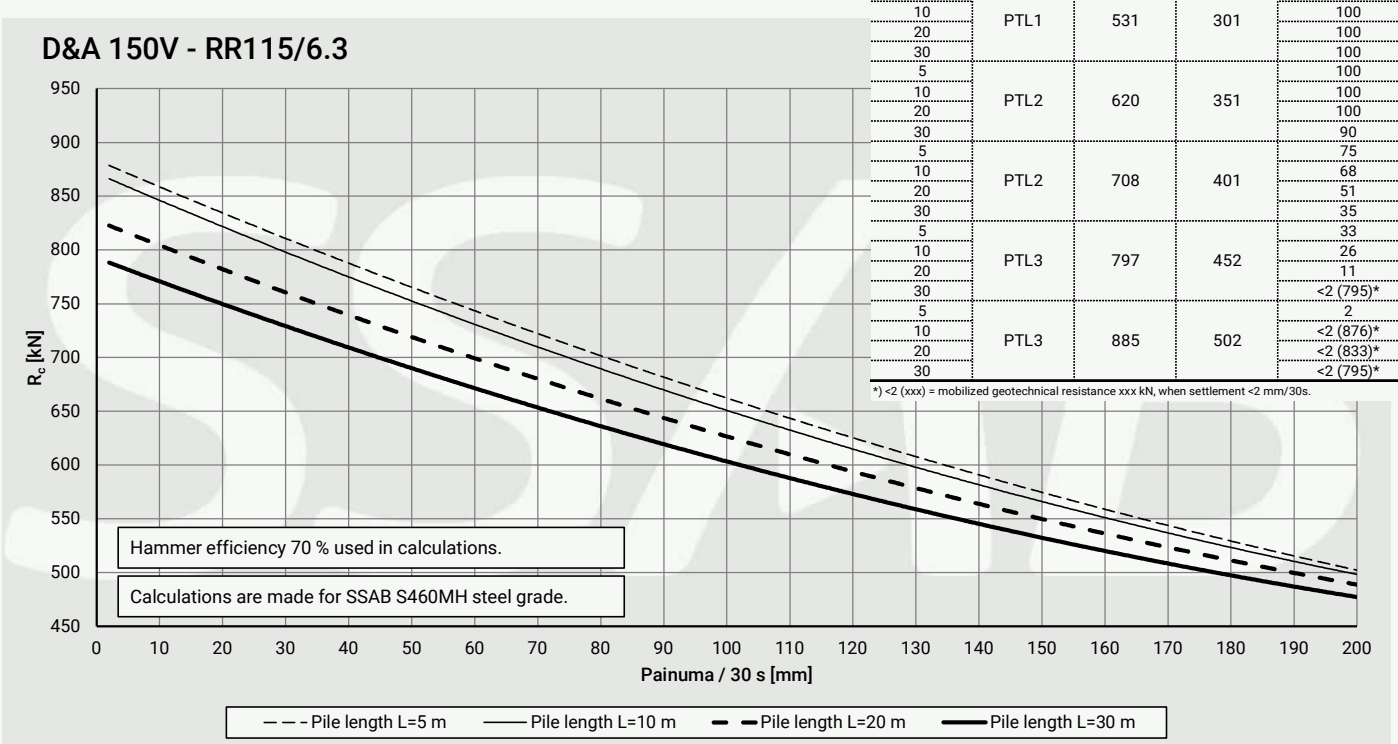
D&A 150V

Piston		
Piston weight [kg]	m_r	63.9
Diameter of the piston [mm]	D_r	120
Length of the piston [mm]	L_r	720
Theoretical impact energy [J]	E_{rated}	3665
Efficiency of the piston [%]	HE	80
Equivalent drop height [m]	H_{ekv}	6.46
Theoretical impact rate [blows/min]	BPM	320-550
Actual impact rate vrs theoretical [%]	η	80
Measured / in analysis used impact rate [blows/min]	BPM_m	440
Impact tool		
Diameter of the tool [mm]	D_t	115
Height of the tool [mm]	L_t	800
Tool weight [kg]	m_t	65

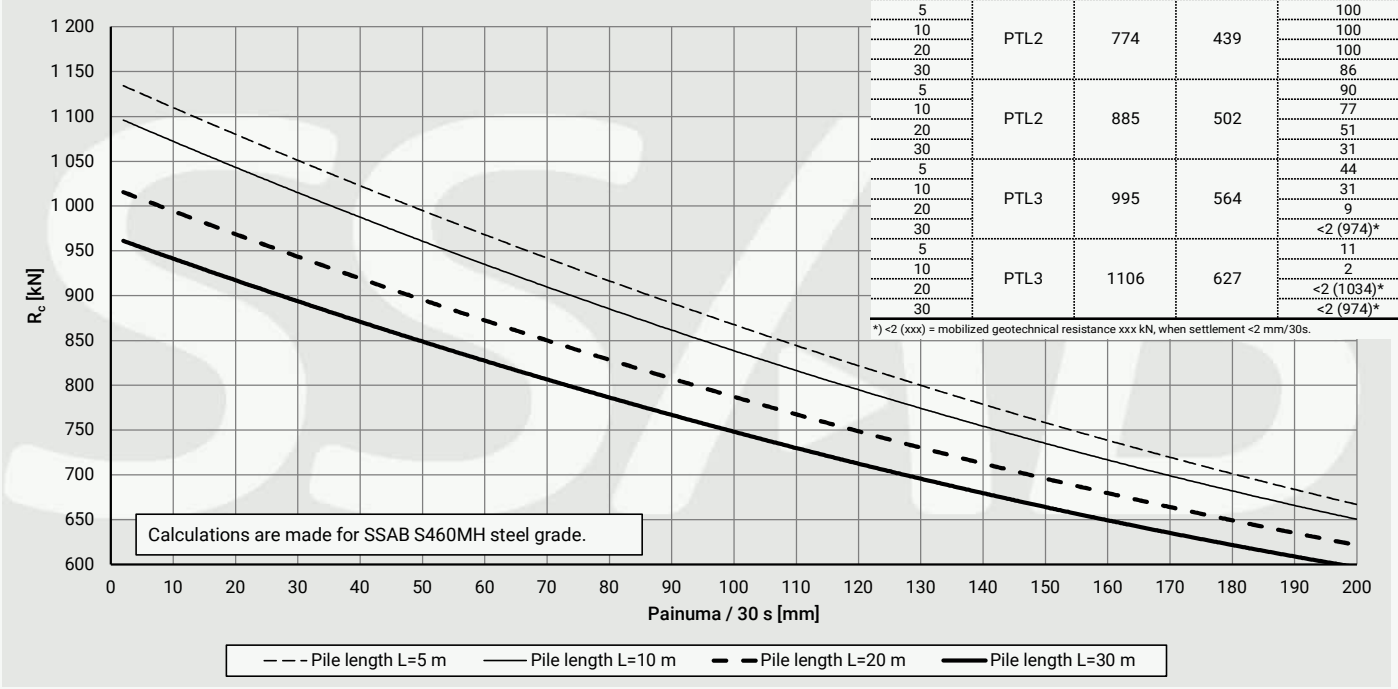
Hammer efficiency 70 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	531	301	100
10				100
20				100
30				100
5	PTL2	620	351	100
10				100
20				100
30				90
5	PTL2	708	401	75
10				68
20				51
30				35
5	PTL3	797	452	33
10				26
20				11
30				<2 (795)*
5	PTL3	885	502	2
10				<2 (876)*
20				<2 (833)*
30				<2 (795)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.



D&A 150V - RR115/8

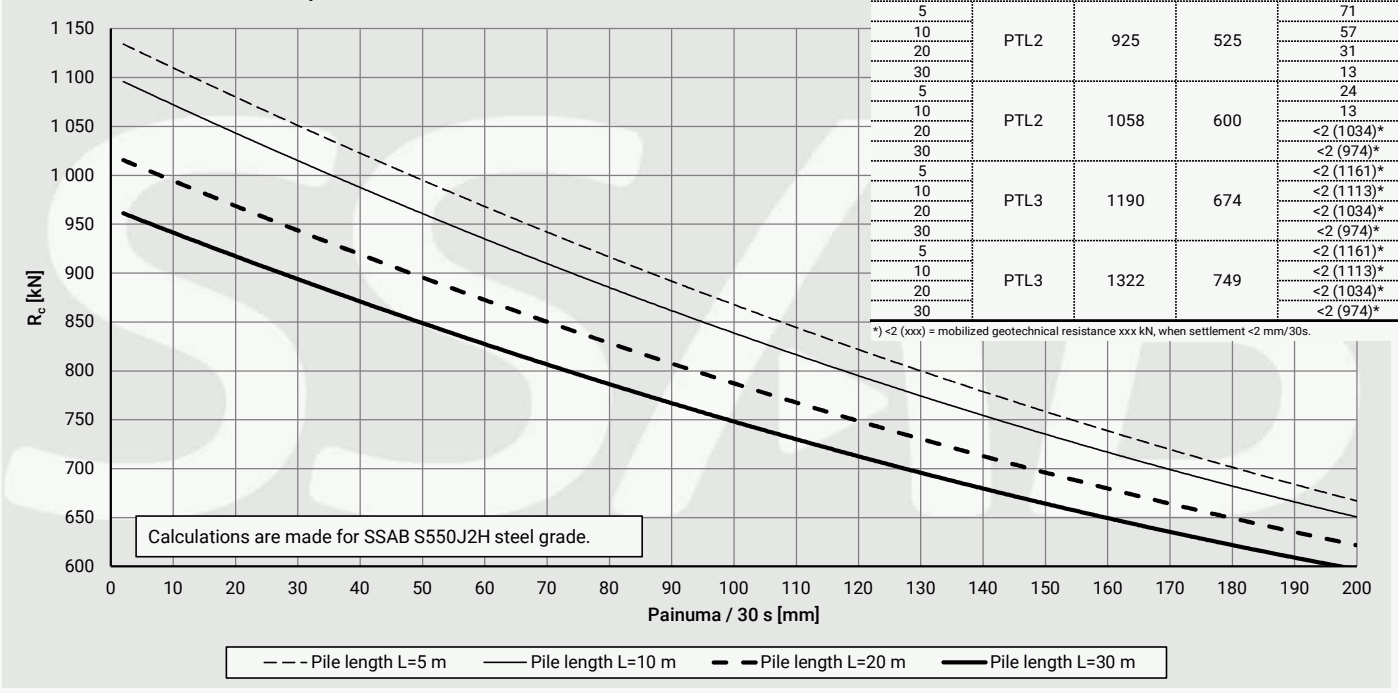


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	664	376	100
10				100
20				100
30				100
5	PTL2	774	439	100
10				100
20				100
30				86
5	PTL2	885	502	90
10				77
20				51
30				31
5	PTL3	995	564	44
10				31
20				9
30				<2 (974)*
5	PTL3	1106	627	11
10				2
20				<2 (1034)*
30				<2 (974)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

D&A 150V - RRs115/8

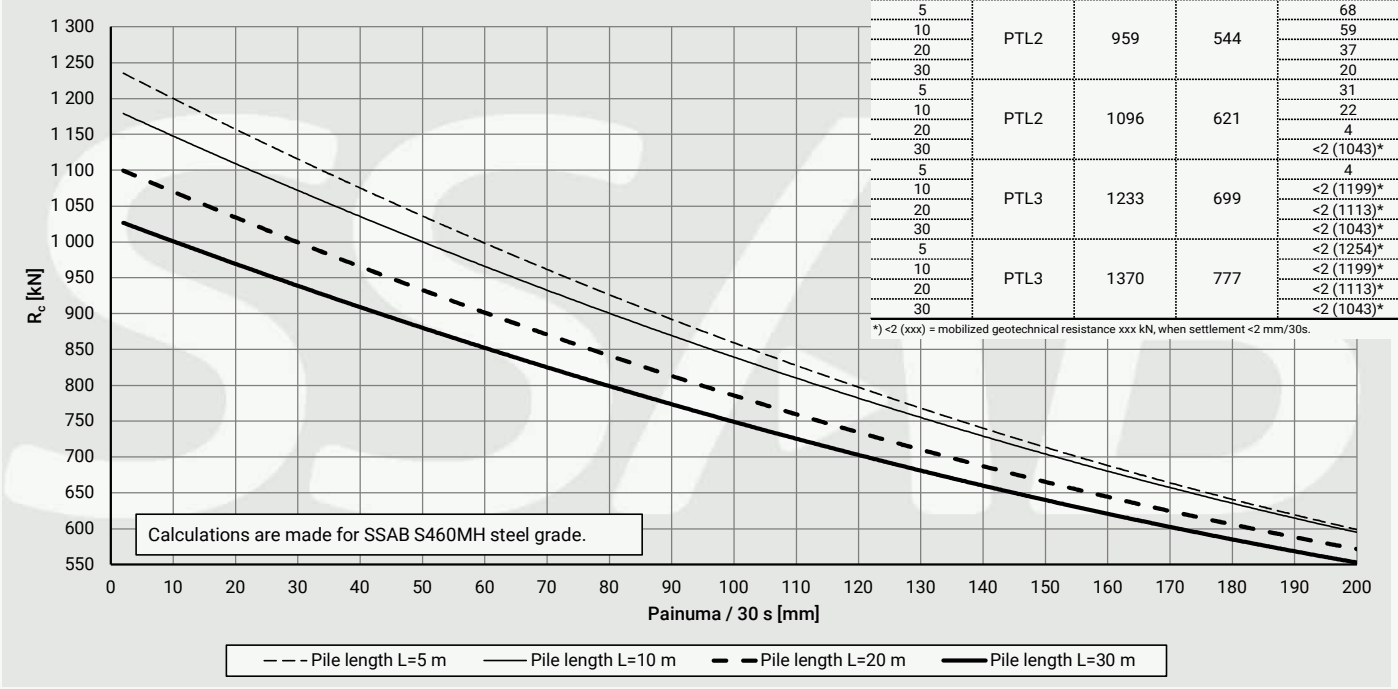


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	793	450	100
10				100
20				97
30				75
5	PTL2	925	525	71
10				57
20				31
30				13
5	PTL2	1058	600	24
10				13
20				<2 (1034)*
30				<2 (974)*
5	PTL3	1190	674	<2 (1161)*
10				<2 (1113)*
20				<2 (1034)*
30				<2 (974)*
5	PTL3	1322	749	<2 (1161)*
10				<2 (1113)*
20				<2 (1034)*
30				<2 (974)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

D&A 150V - RR140/8

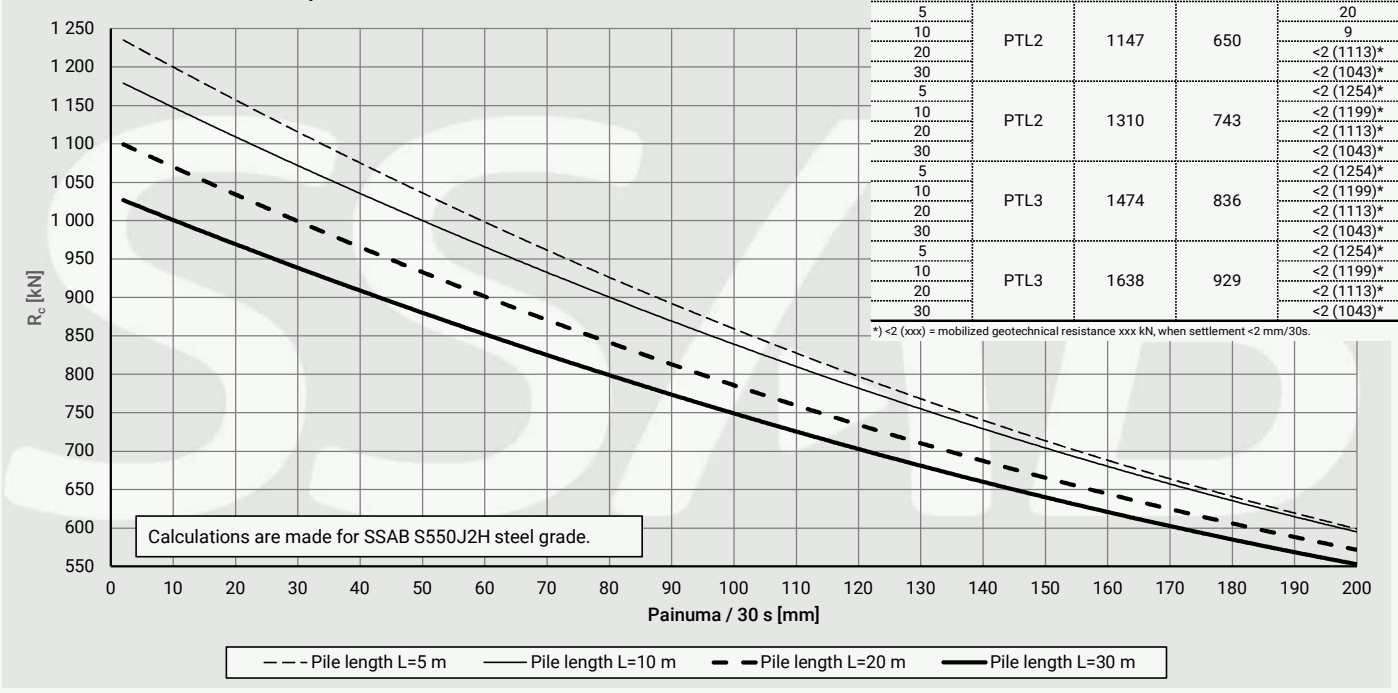


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	822	466	100
10				100
20				88
30				70
5	PTL2	959	544	68
10				59
20				37
30				20
5	PTL2	1096	621	31
10				22
20				4
30				<2 (1043)*
5	PTL3	1233	699	4
10				<2 (1199)*
20				<2 (1113)*
30				<2 (1043)*
5	PTL3	1370	777	<2 (1254)*
10				<2 (1199)*
20				<2 (1113)*
30				<2 (1043)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

D&A 150V - RRs140/8

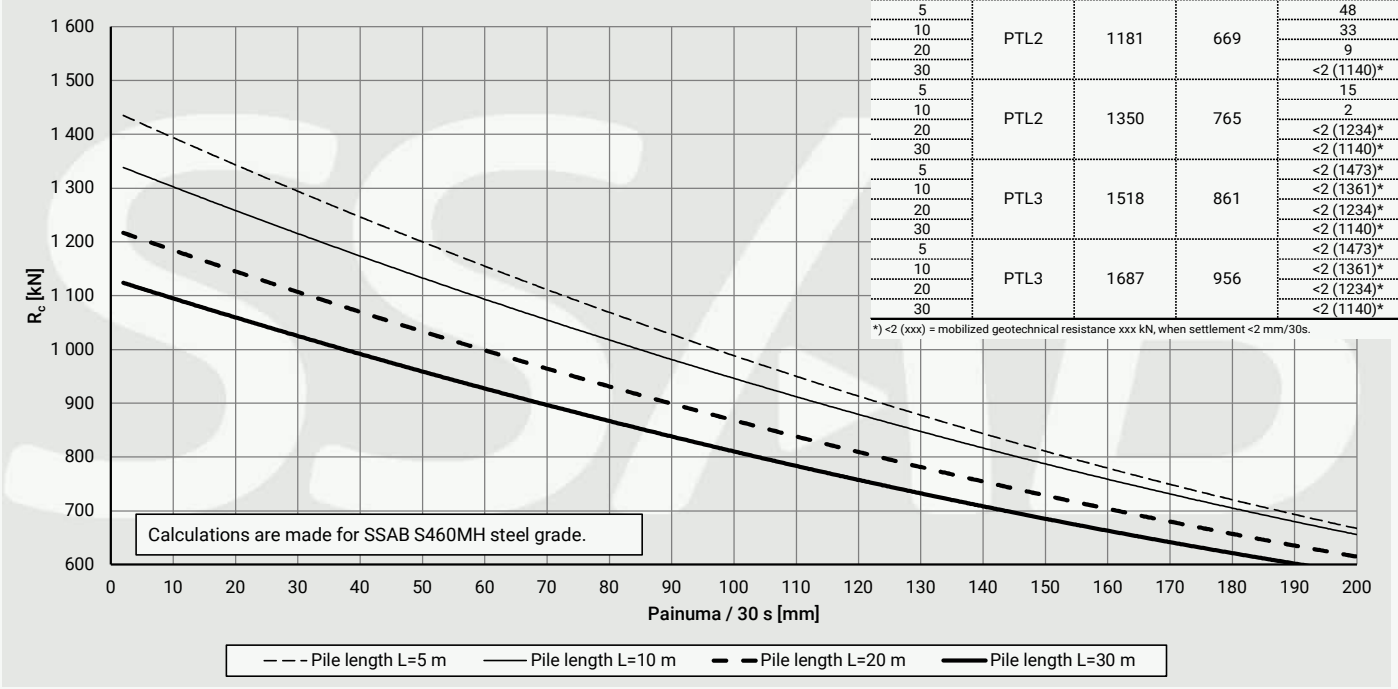


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	983	557	62
10				51
20				31
30				13
5	PTL2	1147	650	20
10				9
20				<2 (1113)*
30				<2 (1043)*
5	PTL2	1310	743	<2 (1254)*
10				<2 (1199)*
20				<2 (1113)*
30				<2 (1043)*
5	PTL3	1474	836	<2 (1254)*
10				<2 (1199)*
20				<2 (1113)*
30				<2 (1043)*
5	PTL3	1638	929	<2 (1254)*
10				<2 (1199)*
20				<2 (1113)*
30				<2 (1043)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

D&A 150V - RR140/10

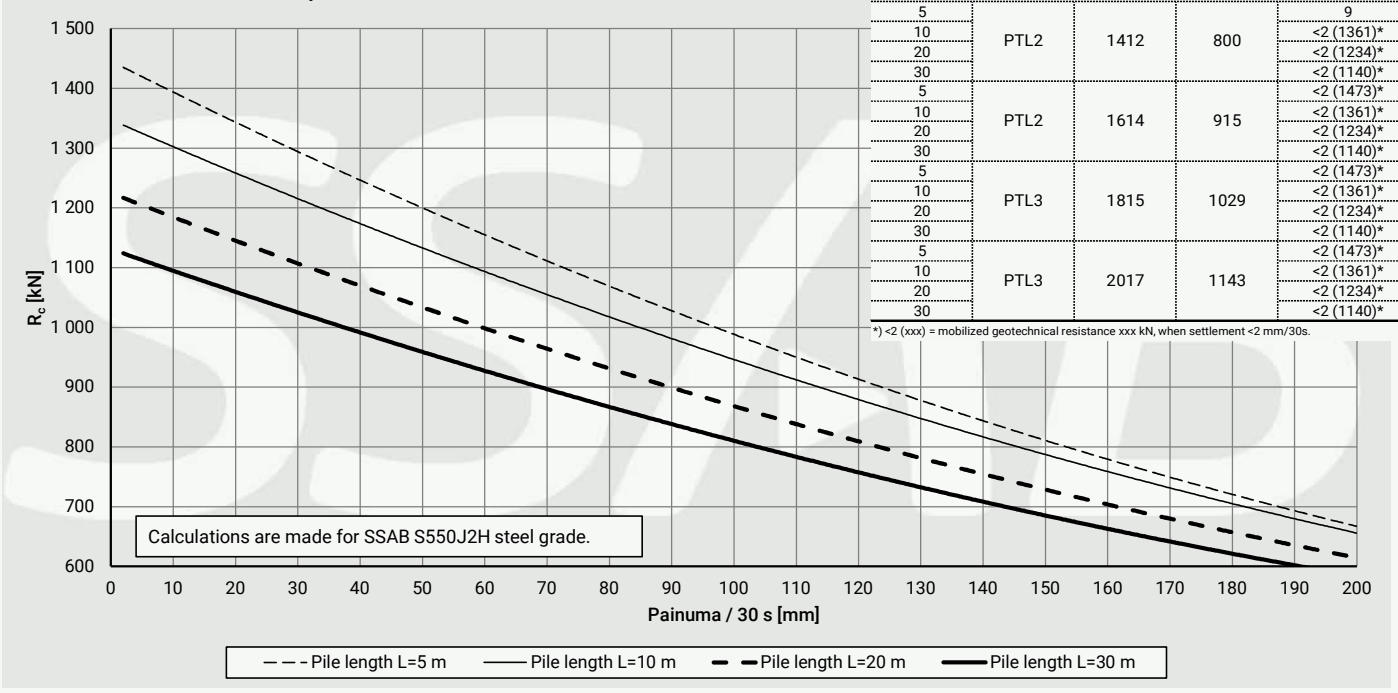


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1012	574	92
10				79
20				51
30				29
5	PTL2	1181	669	48
10				33
20				9
30				<2 (1140)*
5	PTL2	1350	765	15
10				2
20				<2 (1234)*
30				<2 (1140)*
5	PTL3	1518	861	<2 (1473)*
10				<2 (1361)*
20				<2 (1234)*
30				<2 (1140)*
5	PTL3	1687	956	<2 (1473)*
10				<2 (1361)*
20				<2 (1234)*
30				<2 (1140)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

D&A 150V - RRs140/10



Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1210	686	42
10				26
20				4
30				<2 (1140)*
5	PTL2	1412	800	9
10				<2 (1361)*
20				<2 (1234)*
30				<2 (1140)*
5	PTL2	1614	915	<2 (1473)*
10				<2 (1361)*
20				<2 (1234)*
30				<2 (1140)*
5	PTL3	1815	1029	<2 (1473)*
10				<2 (1361)*
20				<2 (1234)*
30				<2 (1140)*
5	PTL3	2017	1143	<2 (1473)*
10				<2 (1361)*
20				<2 (1234)*
30				<2 (1140)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

D&A 180V

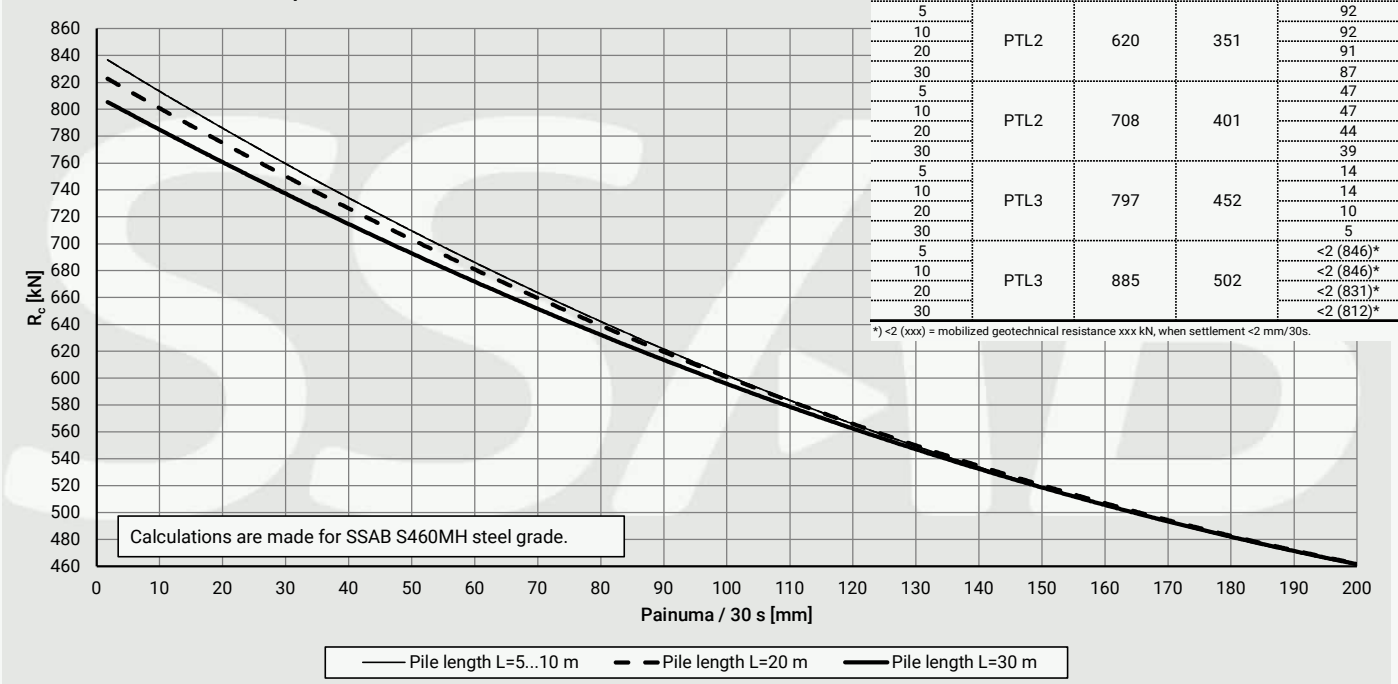
Piston		
Piston weight [kg]	m_r	70.2
Diameter of the piston [mm]	D_r	124
Length of the piston [mm]	L_r	745
Theoretical impact energy [J]	E_{rated}	3880
Efficiency of the piston [%]	HE	80
Equivalent drop height [m]	H_{ekv}	5.63
Theoretical impact rate [blows/min]	BPM	340-440
Actual impact rate vrs theoretical [%]	η	80
Measured / in analysis used impact rate [blows/min]	BPM_m	350
Impact tool		
Diameter of the tool [mm]	D_t	140
Height of the tool [mm]	L_t	900
Tool weight [kg]	m_t	110

Hammer efficiency 80 %

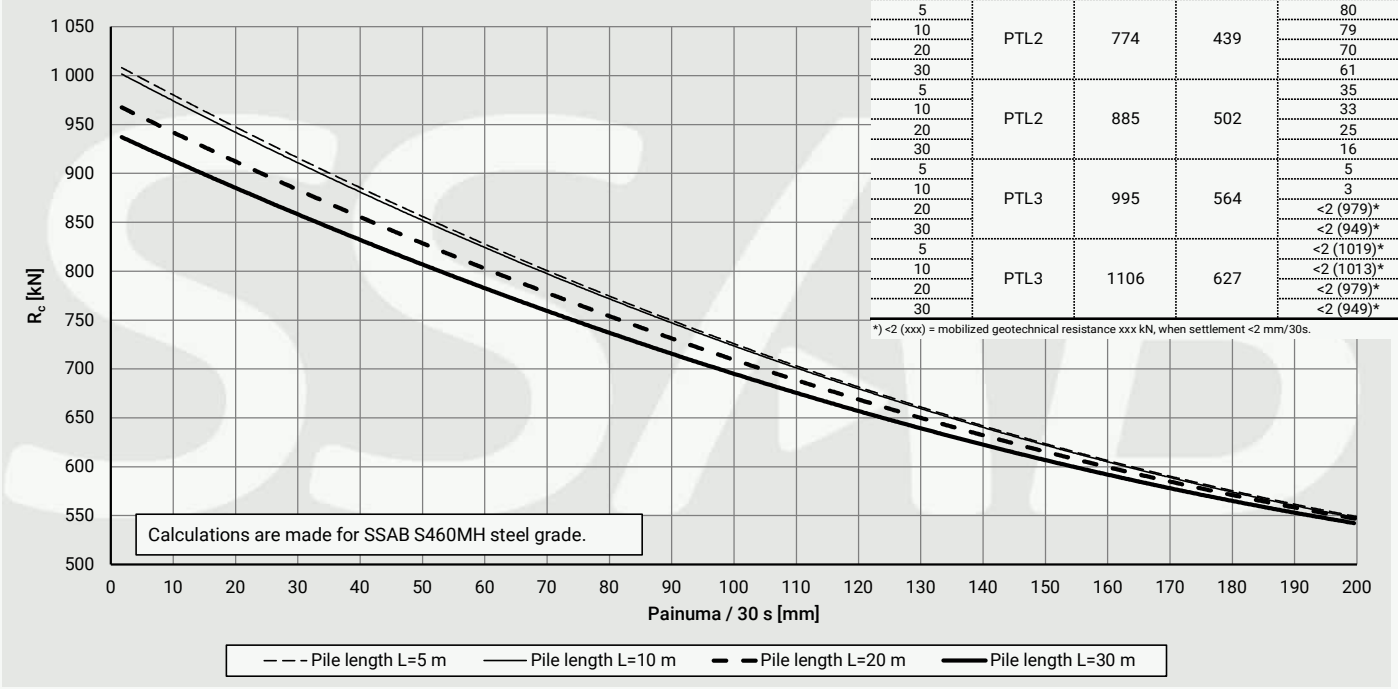
Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	531	301	100
10				100
20				100
30				100
5	PTL2	620	351	92
10				92
20				91
30				87
5	PTL2	708	401	47
10				47
20				44
30				39
5	PTL3	797	452	14
10				14
20				10
30				5
5	PTL3	885	502	<2 (846)*
10				<2 (846)*
20				<2 (831)*
30				<2 (812)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

D&A 180V - RR115/6.3



D&A 180V - RR115/8

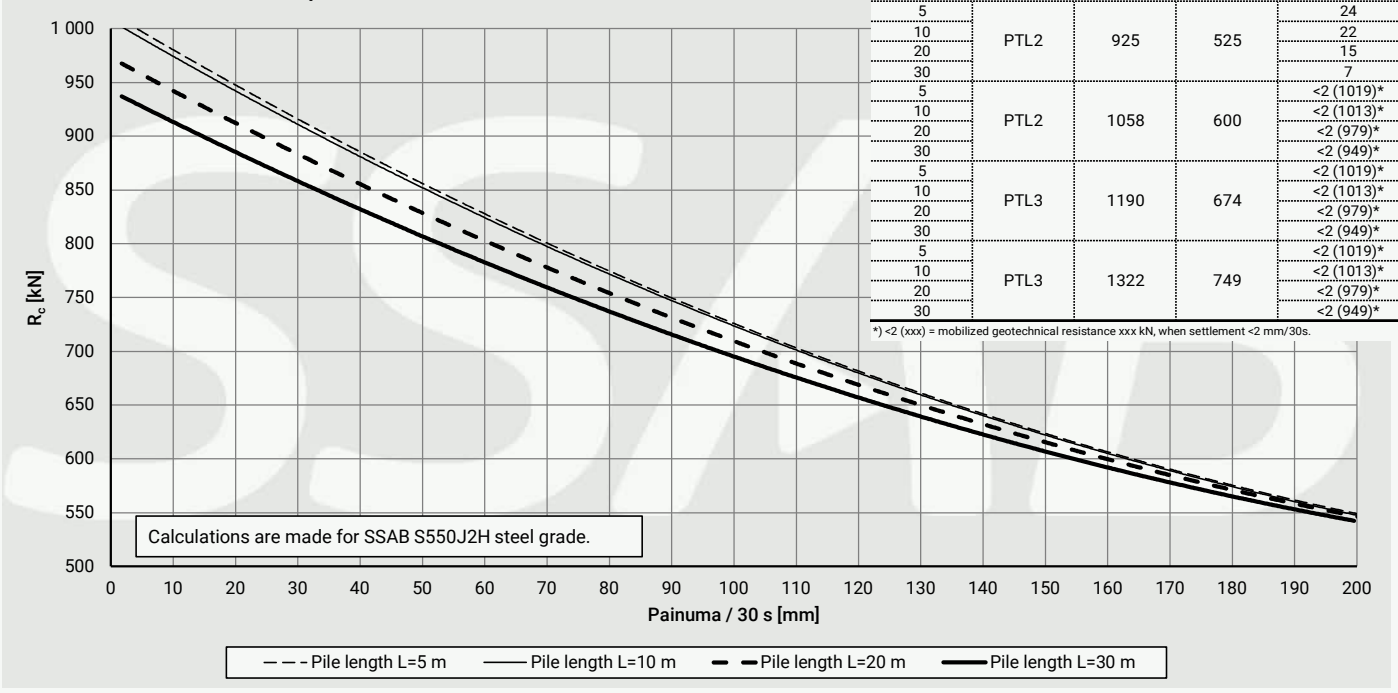


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	664	376	100
10				100
20				100
30				100
5	PTL2	774	439	80
10				79
20				70
30				61
5	PTL2	885	502	35
10				33
20				25
30				16
5	PTL3	995	564	5
10				3
20				<2 (979)*
30				<2 (949)*
5	PTL3	1106	627	<2 (1019)*
10				<2 (1013)*
20				<2 (979)*
30				<2 (949)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

D&A 180V - RRs115/8

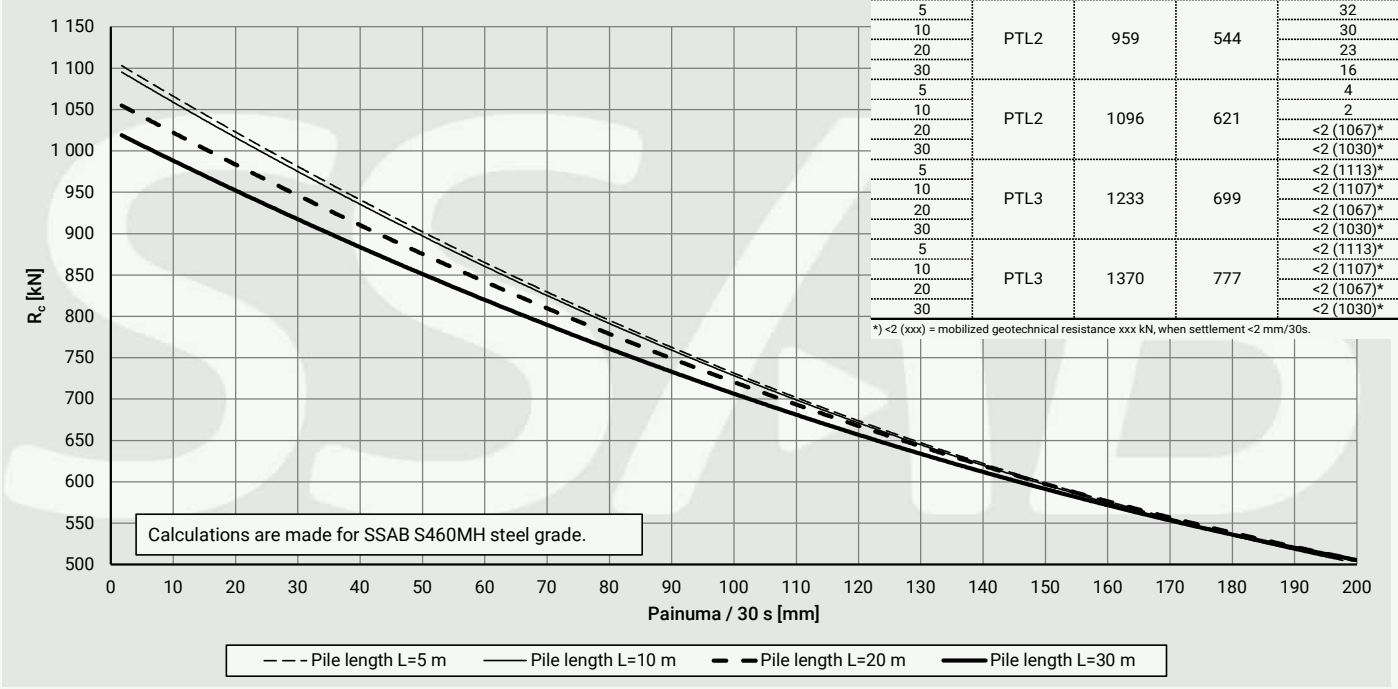


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	793	450	73
10				71
20				62
30				53
5	PTL2	925	525	24
10				22
20				15
30				7
5	PTL2	1058	600	<2 (1019)*
10				<2 (1013)*
20				<2 (979)*
30				<2 (949)*
5	PTL3	1190	674	<2 (1019)*
10				<2 (1013)*
20				<2 (979)*
30				<2 (949)*
5	PTL3	1322	749	<2 (1019)*
10				<2 (1013)*
20				<2 (979)*
30				<2 (949)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

D&A 180V - RR140/8

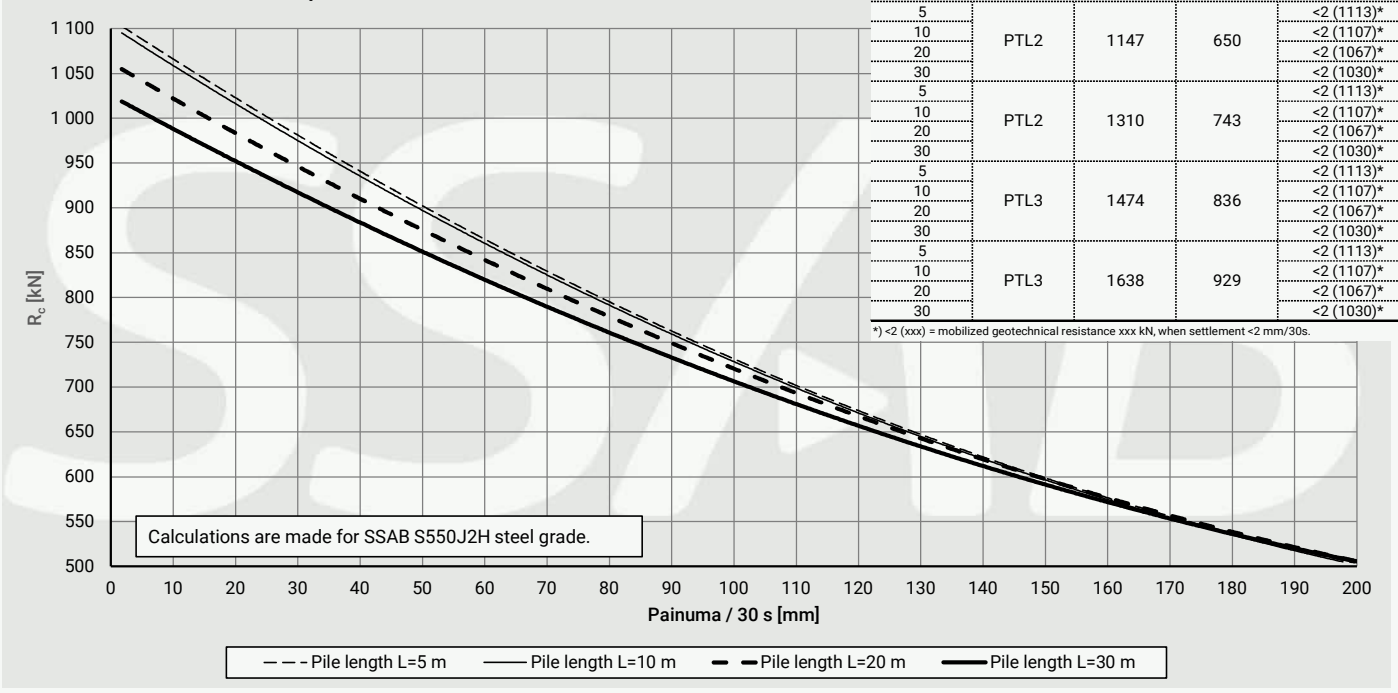


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	822	466	72
10				70
20				65
30				56
5	PTL2	959	544	32
10				30
20				23
30				16
5	PTL2	1096	621	4
10				2
20				<2 (1067)*
30				<2 (1030)*
5	PTL3	1233	699	<2 (1113)*
10				<2 (1107)*
20				<2 (1067)*
30				<2 (1030)*
5	PTL3	1370	777	<2 (1113)*
10				<2 (1107)*
20				<2 (1067)*
30				<2 (1030)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

D&A 180V - RRs140/8

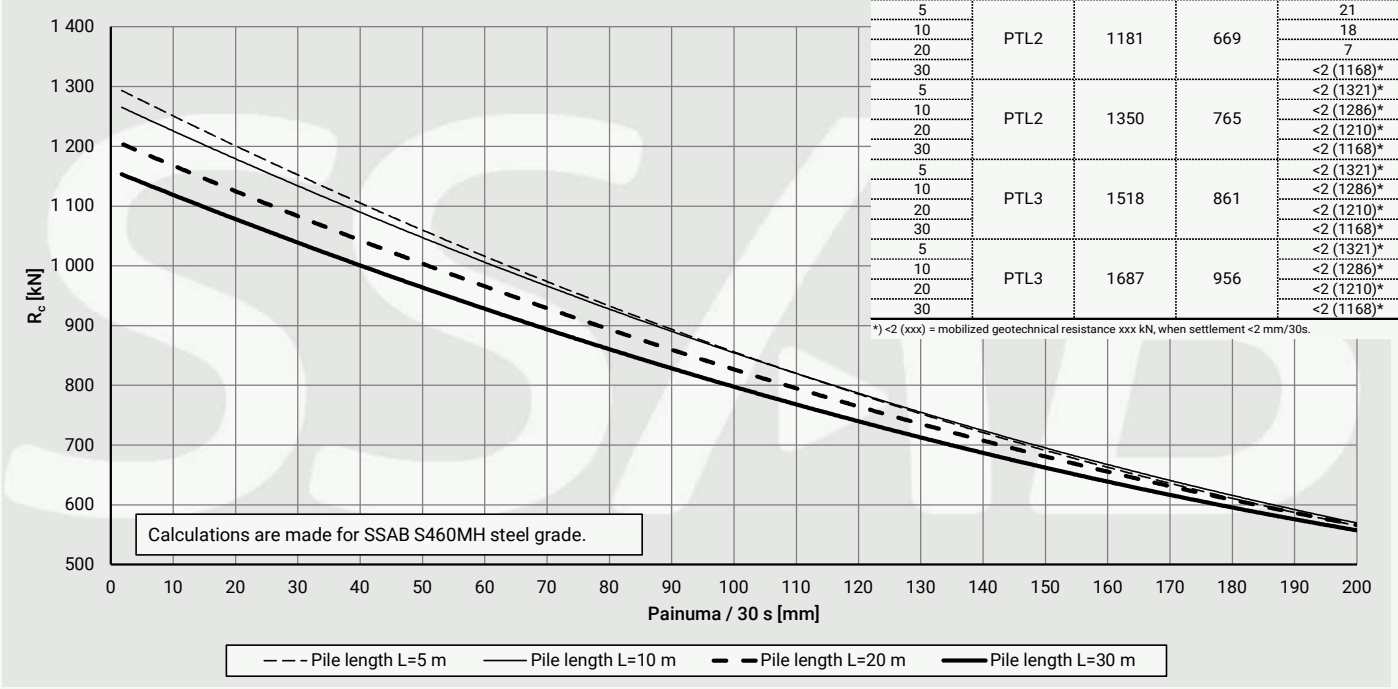


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	983	557	27
10				25
20				18
30				11
5	PTL2	1147	650	<2 (1113)*
10				<2 (1107)*
20				<2 (1067)*
30				<2 (1030)*
5	PTL2	1310	743	<2 (1113)*
10				<2 (1107)*
20				<2 (1067)*
30				<2 (1030)*
5	PTL3	1474	836	<2 (1113)*
10				<2 (1107)*
20				<2 (1067)*
30				<2 (1030)*
5	PTL3	1638	929	<2 (1113)*
10				<2 (1107)*
20				<2 (1067)*
30				<2 (1030)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

D&A 180V - RR140/10

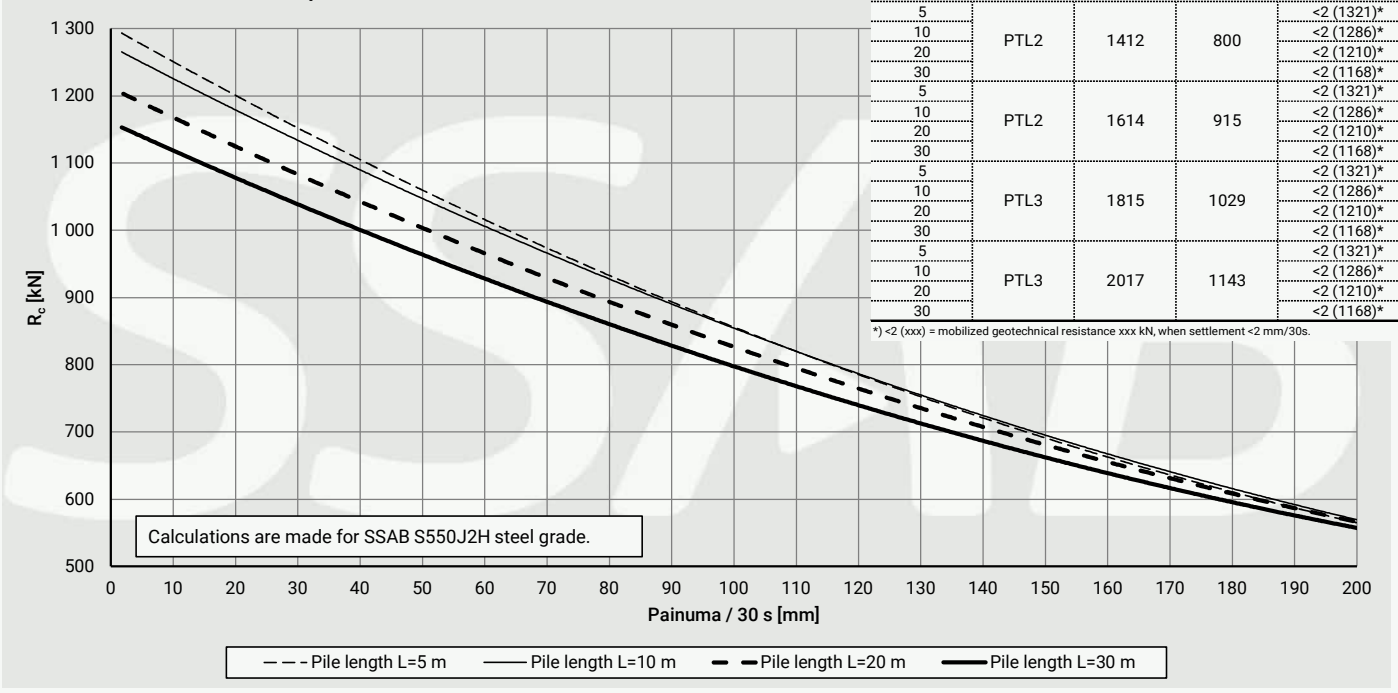


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1012	574	58
10				54
20				42
30				31
5	PTL2	1181	669	21
10				18
20				7
30				<2 (1168)*
5	PTL2	1350	765	<2 (1321)*
10				<2 (1286)*
20				<2 (1210)*
30				<2 (1168)*
5	PTL3	1518	861	<2 (1321)*
10				<2 (1286)*
20				<2 (1210)*
30				<2 (1168)*
5	PTL3	1687	956	<2 (1321)*
10				<2 (1286)*
20				<2 (1210)*
30				<2 (1168)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

D&A 180V - RRs140/10

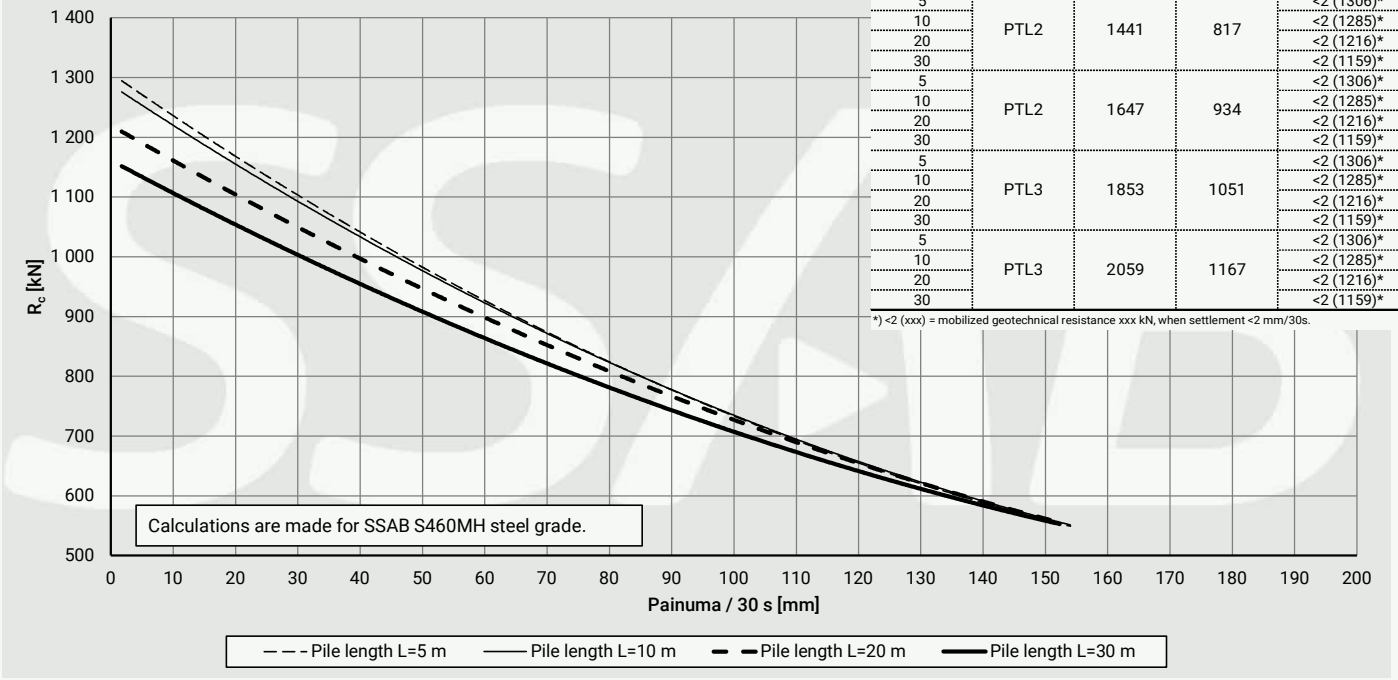


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1210	686	16
10				12
20				<2 (1210)*
30				<2 (1168)*
5	PTL2	1412	800	<2 (1321)*
10				<2 (1286)*
20				<2 (1210)*
30				<2 (1168)*
5	PTL2	1614	915	<2 (1321)*
10				<2 (1286)*
20				<2 (1210)*
30				<2 (1168)*
5	PTL3	1815	1029	<2 (1321)*
10				<2 (1286)*
20				<2 (1210)*
30				<2 (1168)*
5	PTL3	2017	1143	<2 (1321)*
10				<2 (1286)*
20				<2 (1210)*
30				<2 (1168)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

D&A 180V - RR170/10



Hammer efficiency 80 %

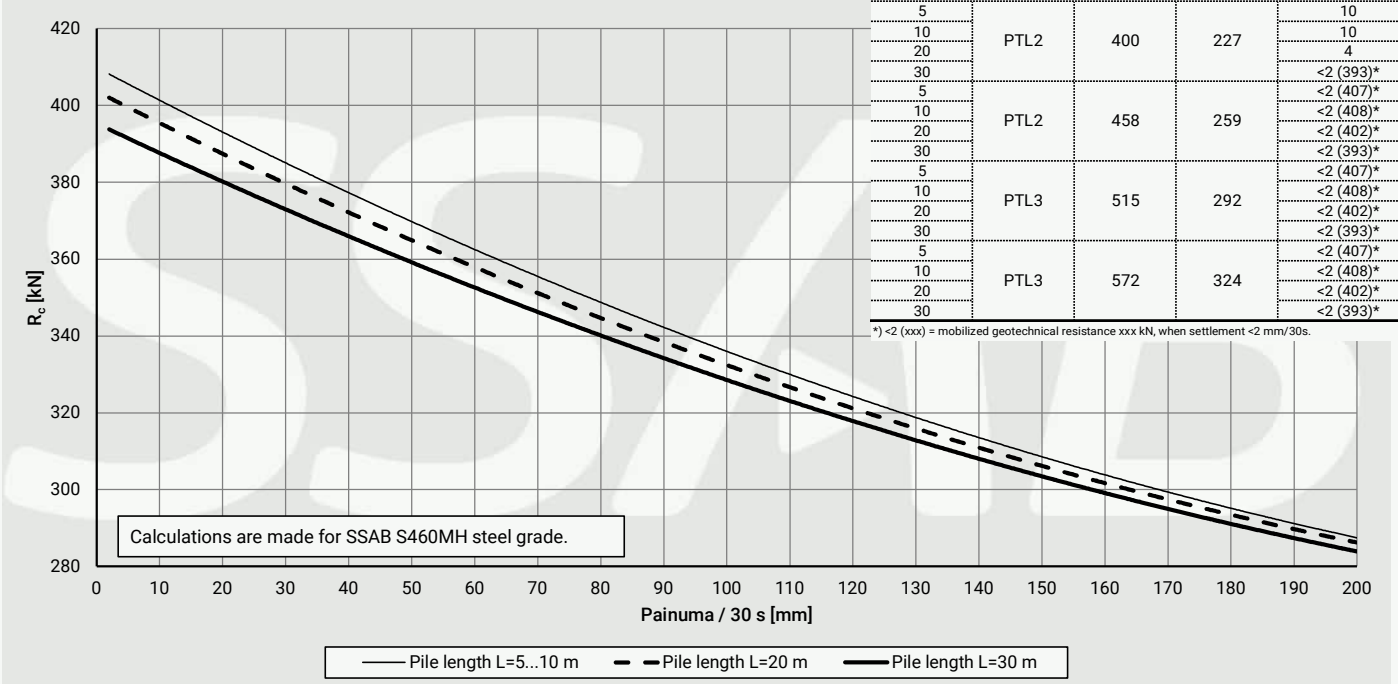
Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1235	700	9
10				7
20				<2 (1216)*
30				<2 (1159)*
5	PTL2	1441	817	<2 (1306)*
10				<2 (1285)*
20				<2 (1216)*
30				<2 (1159)*
5	PTL2	1647	934	<2 (1306)*
10				<2 (1285)*
20				<2 (1216)*
30				<2 (1159)*
5	PTL3	1853	1051	<2 (1306)*
10				<2 (1285)*
20				<2 (1216)*
30				<2 (1159)*
5	PTL3	2059	1167	<2 (1306)*
10				<2 (1285)*
20				<2 (1216)*
30				<2 (1159)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Brokk BHB 705

Piston		
Piston weight [kg]	m_r	39
Diameter of the piston [mm]	D_r	105
Length of the piston [mm]	L_r	570
Theoretical impact energy [J]	E_{rated}	1472
Efficiency of the piston [%]	HE	80
Equivalent drop height [m]	H_{ekv}	3.84
Theoretical impact rate [blows/min]	BPM	600-1050
Actual impact rate vrs theoretical [%]	η	70
Measured / in analysis used impact rate [blows/min]	BPM_m	700
Impact tool		
Diameter of the tool [mm]	D_t	105
Height of the tool [mm]	L_t	1000
Tool weight [kg]	m_t	68

Brokk BHB 705 - RR75



Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	343	195	87
10				87
20				80
30				73
5	PTL2	400	227	10
10				10
20				4
30				<2 (393)*
5	PTL2	458	259	<2 (407)*
10				<2 (408)*
20				<2 (402)*
30				<2 (393)*
5	PTL3	515	292	<2 (407)*
10				<2 (408)*
20				<2 (402)*
30				<2 (393)*
5	PTL3	572	324	<2 (407)*
10				<2 (408)*
20				<2 (402)*
30				<2 (393)*

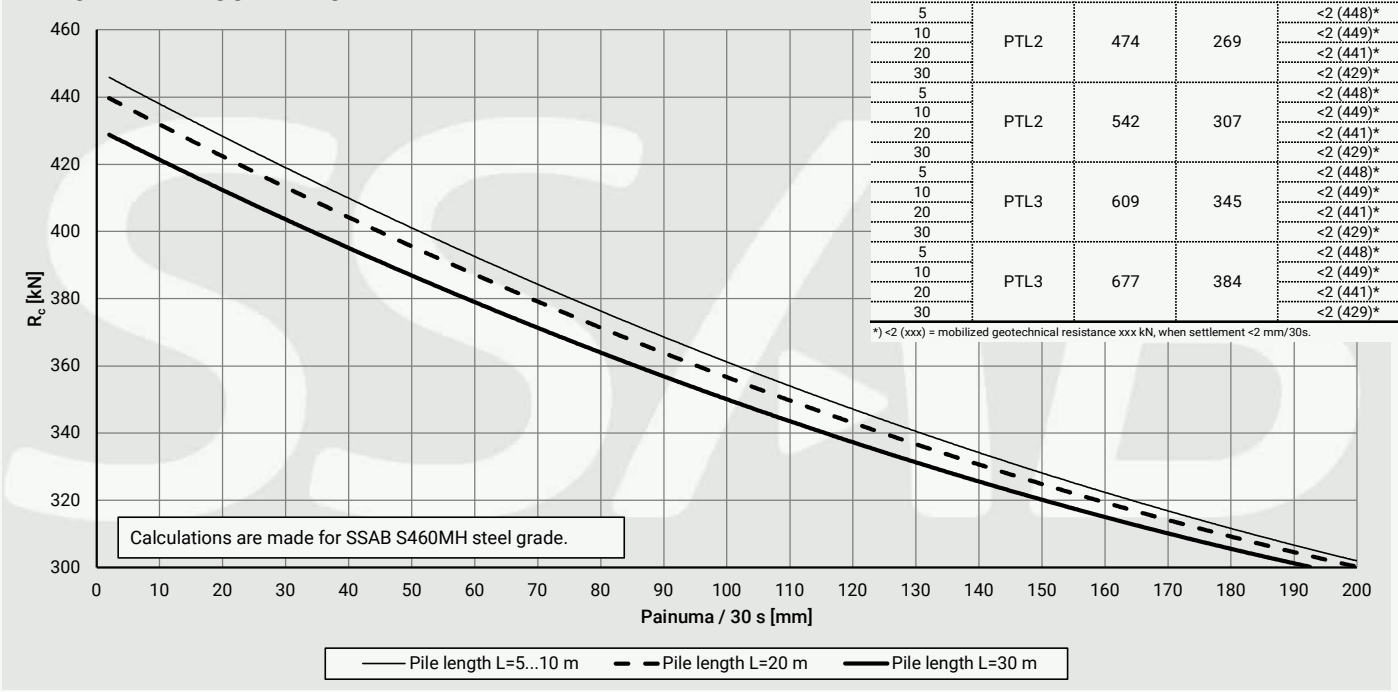
*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Brokk BHB 705 - RR90

Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	406	230	42
10				42
20				35
30				24
5	PTL2	474	269	<2 (448)*
10				<2 (449)*
20				<2 (441)*
30				<2 (429)*
5	PTL2	542	307	<2 (448)*
10				<2 (449)*
20				<2 (441)*
30				<2 (429)*
5	PTL3	609	345	<2 (448)*
10				<2 (449)*
20				<2 (441)*
30				<2 (429)*
5	PTL3	677	384	<2 (448)*
10				<2 (449)*
20				<2 (441)*
30				<2 (429)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

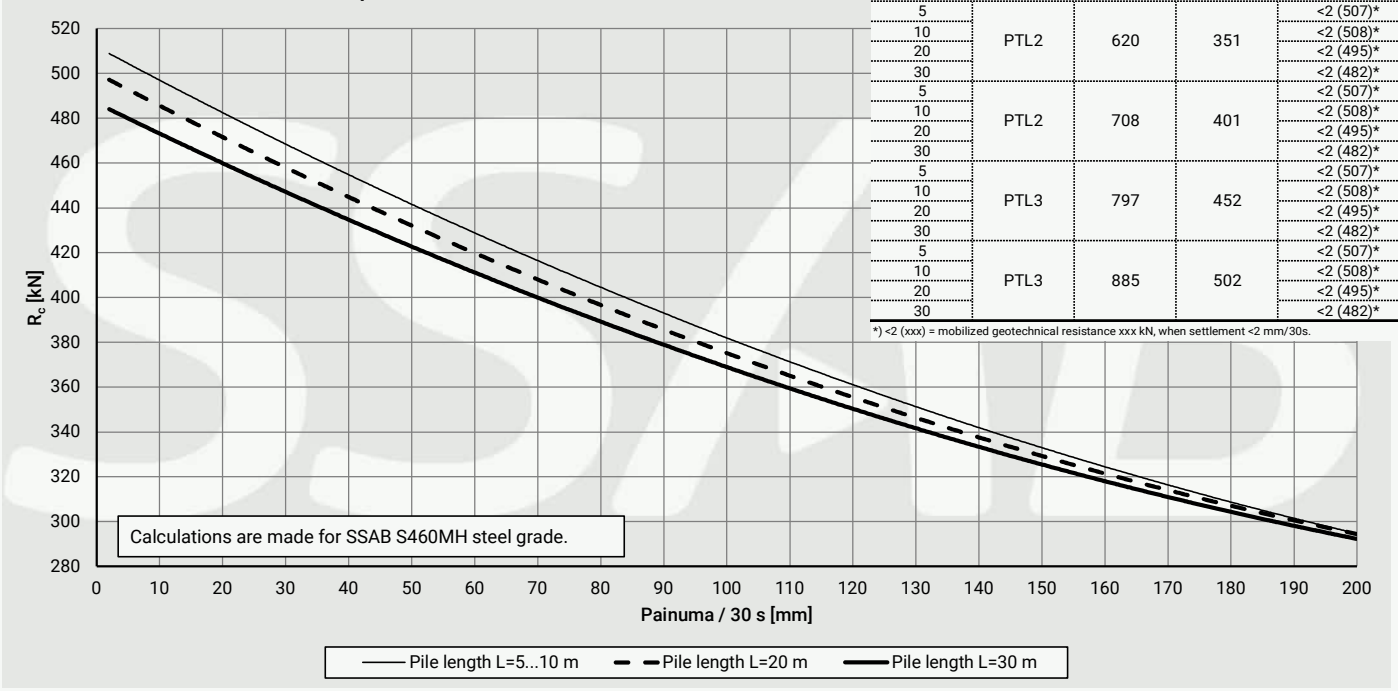


Brokk BHB 705 - RR115/6.3

Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	531	301	<2 (507)*
10				<2 (508)*
20				<2 (495)*
30				<2 (482)*
5	PTL2	620	351	<2 (507)*
10				<2 (508)*
20				<2 (495)*
30				<2 (482)*
5	PTL2	708	401	<2 (507)*
10				<2 (508)*
20				<2 (495)*
30				<2 (482)*
5	PTL3	797	452	<2 (507)*
10				<2 (508)*
20				<2 (495)*
30				<2 (482)*
5	PTL3	885	502	<2 (507)*
10				<2 (508)*
20				<2 (495)*
30				<2 (482)*

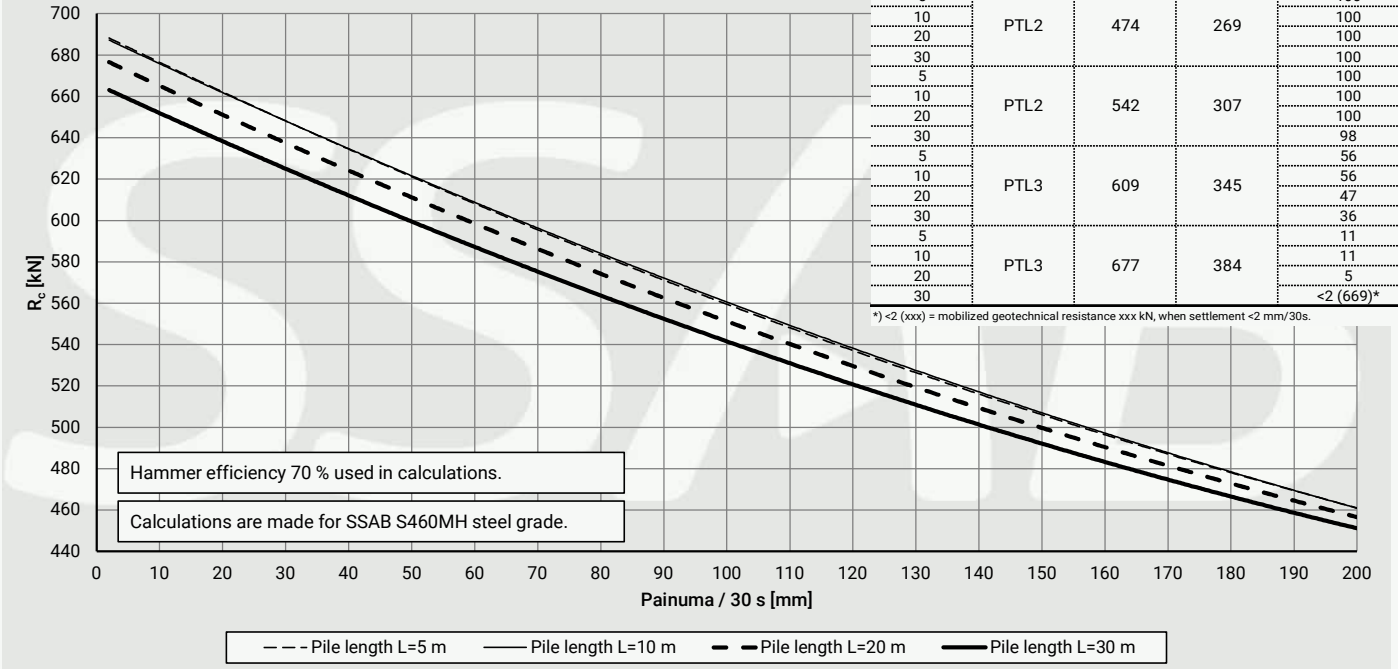
*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.



Epiroc MB1700

Piston		
Piston weight [kg]	m_r	97
Diameter of the piston [mm]	D_r	140
Length of the piston [mm]	L_r	760
Theoretical impact energy [J]	E_{rated}	3700
Efficiency of the piston [%]	HE	80
Equivalent drop height [m]	H_{ekv}	3.89
Theoretical impact rate [blows/min]	BPM	320-600
Actual impact rate vrs theoretical [%]	η	75
Measured / in analysis used impact rate [blows/min]	BPM_m	450
Impact tool		
Diameter of the tool [mm]	D_t	140
Height of the tool [mm]	L_t	700
Tool weight [kg]	m_t	85

Epiroc MB1700 - RR90

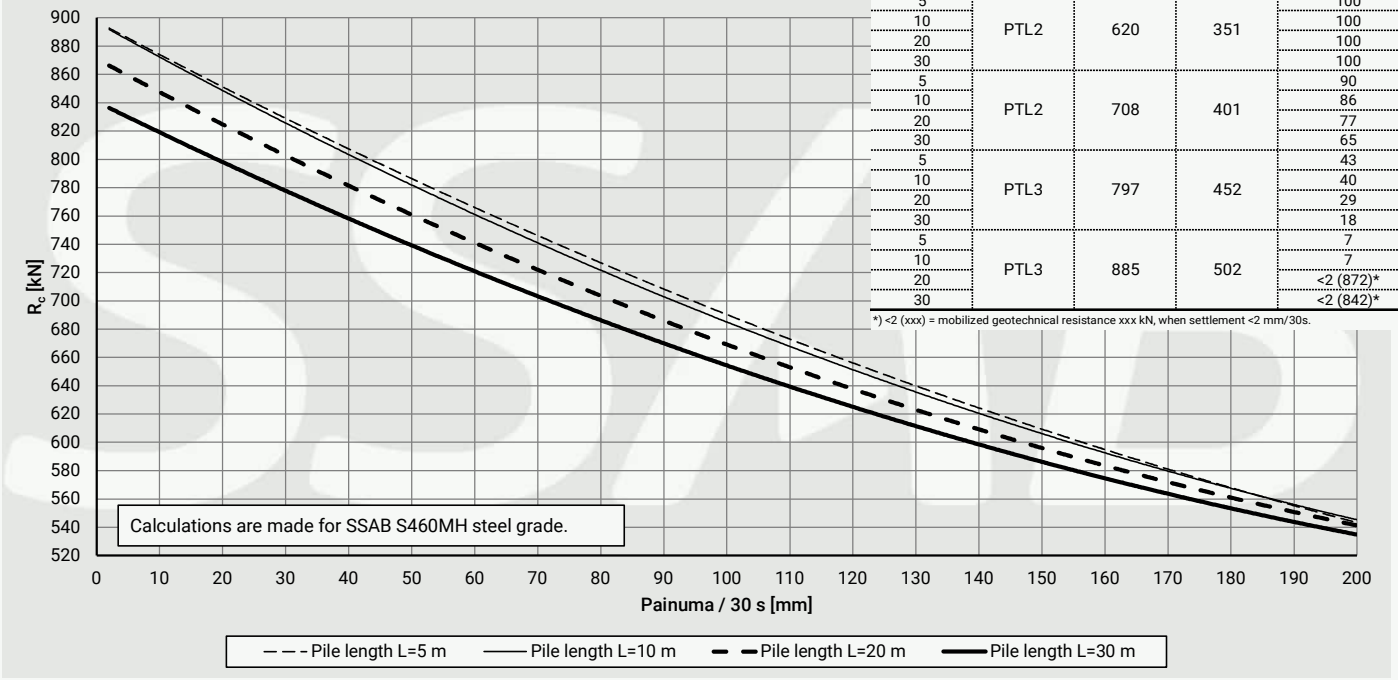


Hammer efficiency 70 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	406	230	100
10				100
20				100
30				100
5	PTL2	474	269	100
10				100
20				100
30				100
5	PTL2	542	307	100
10				100
20				100
30				98
5	PTL3	609	345	56
10				56
20				47
30				36
5	PTL3	677	384	11
10				11
20				5
30				<2 (669)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Epiroc MB1700 - RR115/6.3

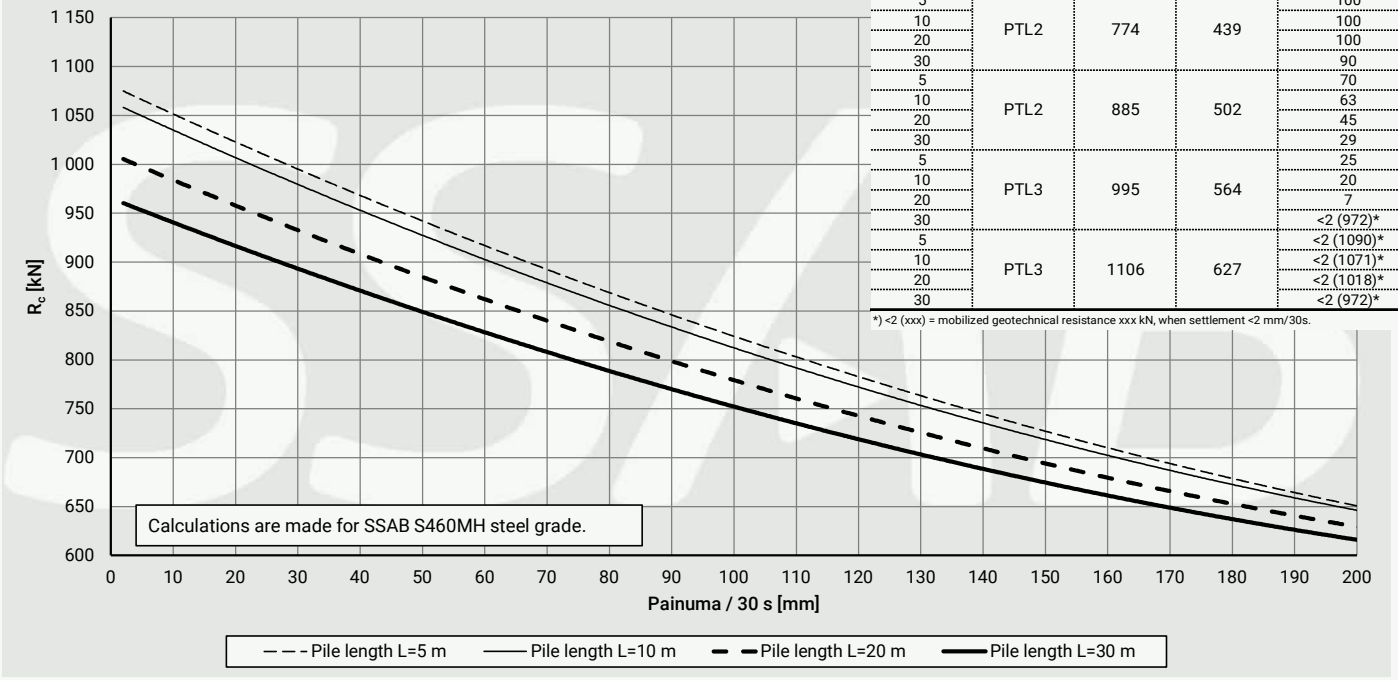


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	531	301	100
10				100
20				100
30				100
5	PTL2	620	351	100
10				100
20				100
30				100
5	PTL2	708	401	90
10				86
20				77
30				65
5	PTL3	797	452	43
10				40
20				29
30				18
5	PTL3	885	502	7
10				7
20				<2 (872)*
30				<2 (842)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Epiroc MB1700 - RR115/8

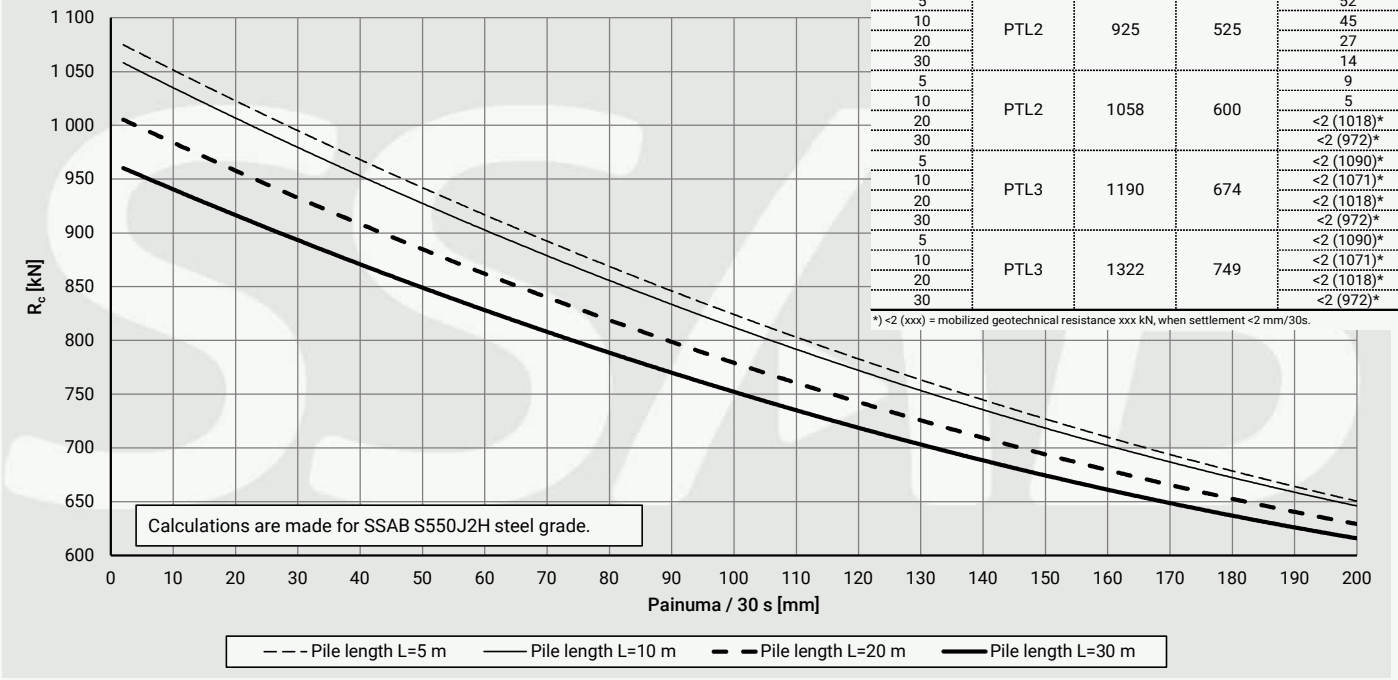


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	664	376	100
10				100
20				100
30				100
5	PTL2	774	439	100
10				100
20				100
30				90
5	PTL2	885	502	70
10				63
20				45
30				29
5	PTL3	995	564	25
10				20
20				7
30				<2 (972)*
5	PTL3	1106	627	<2 (1090)*
10				<2 (1071)*
20				<2 (1018)*
30				<2 (972)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Epiroc MB1700 - RRs115/8

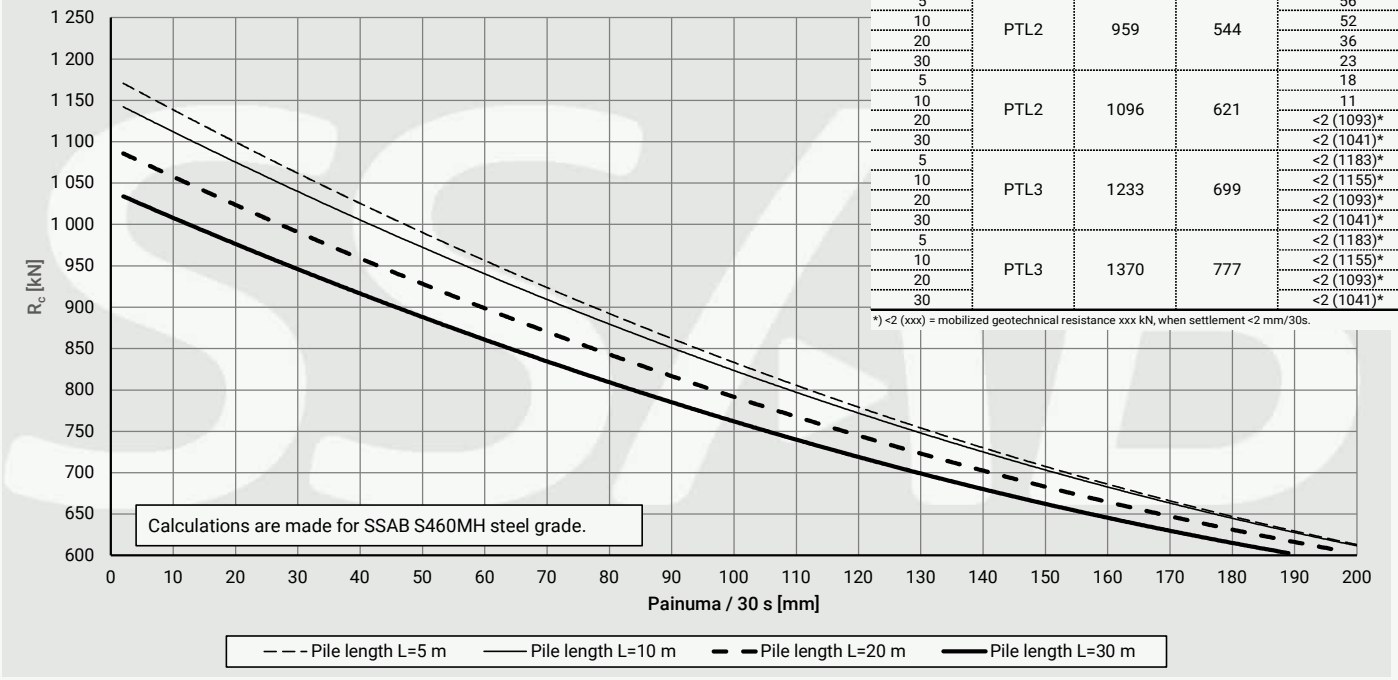


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	793	450	100
10				100
20				94
30				76
5	PTL2	925	525	52
10				45
20				27
30				14
5	PTL2	1058	600	9
10				5
20				<2 (1018)*
30				<2 (972)*
5	PTL3	1190	674	<2 (1090)*
10				<2 (1071)*
20				<2 (1018)*
30				<2 (972)*
5	PTL3	1322	749	<2 (1090)*
10				<2 (1071)*
20				<2 (1018)*
30				<2 (972)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Epiroc MB1700 - RR140/8

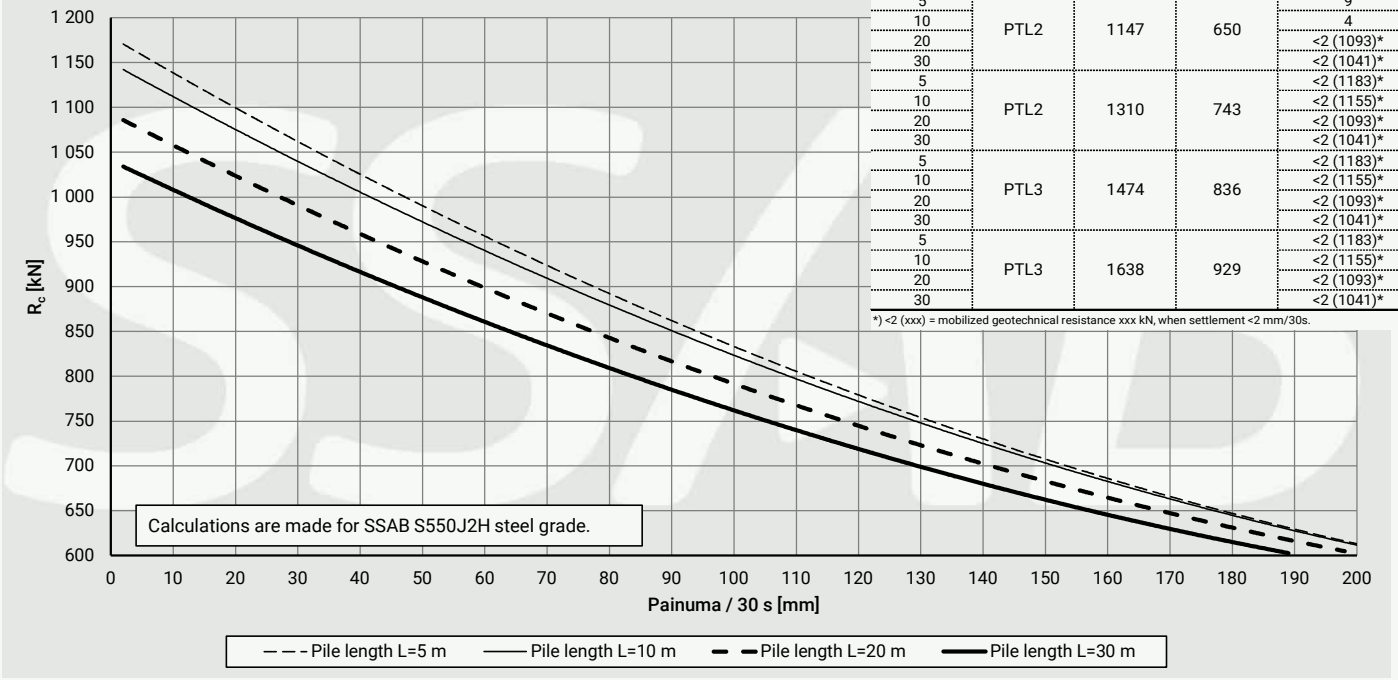


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	822	466	100
10				100
20				88
30				74
5	PTL2	959	544	56
10				52
20				36
30				23
5	PTL2	1096	621	18
10				11
20				<2 (1093)*
30				<2 (1041)*
5	PTL3	1233	699	<2 (1183)*
10				<2 (1155)*
20				<2 (1093)*
30				<2 (1041)*
5	PTL3	1370	777	<2 (1183)*
10				<2 (1155)*
20				<2 (1093)*
30				<2 (1041)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Epiroc MB1700 - RRs140/8

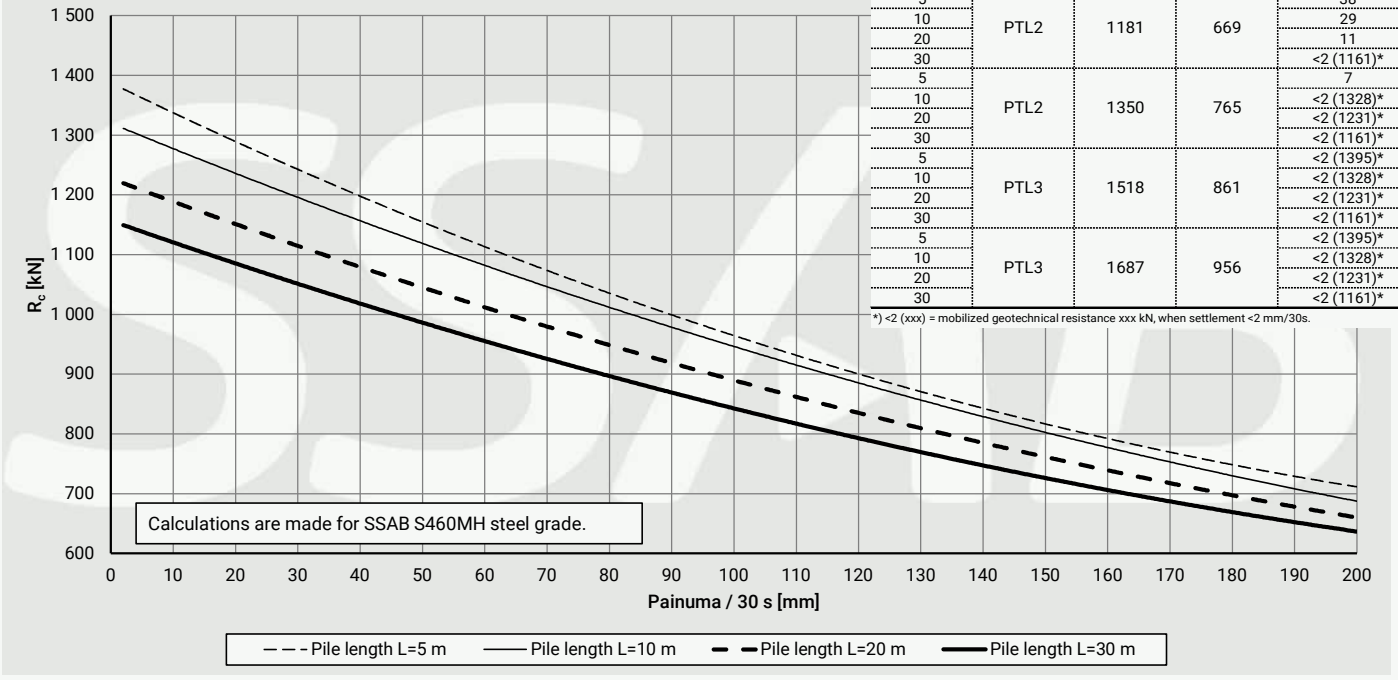


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	983	557	50
10				45
20				30
30				17
5	PTL2	1147	650	9
10				4
20				<2 (1093)*
30				<2 (1041)*
5	PTL2	1310	743	<2 (1183)*
10				<2 (1155)*
20				<2 (1093)*
30				<2 (1041)*
5	PTL3	1474	836	<2 (1183)*
10				<2 (1155)*
20				<2 (1093)*
30				<2 (1041)*
5	PTL3	1638	929	<2 (1183)*
10				<2 (1155)*
20				<2 (1093)*
30				<2 (1041)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Epiroc MB1700 - RR140/10

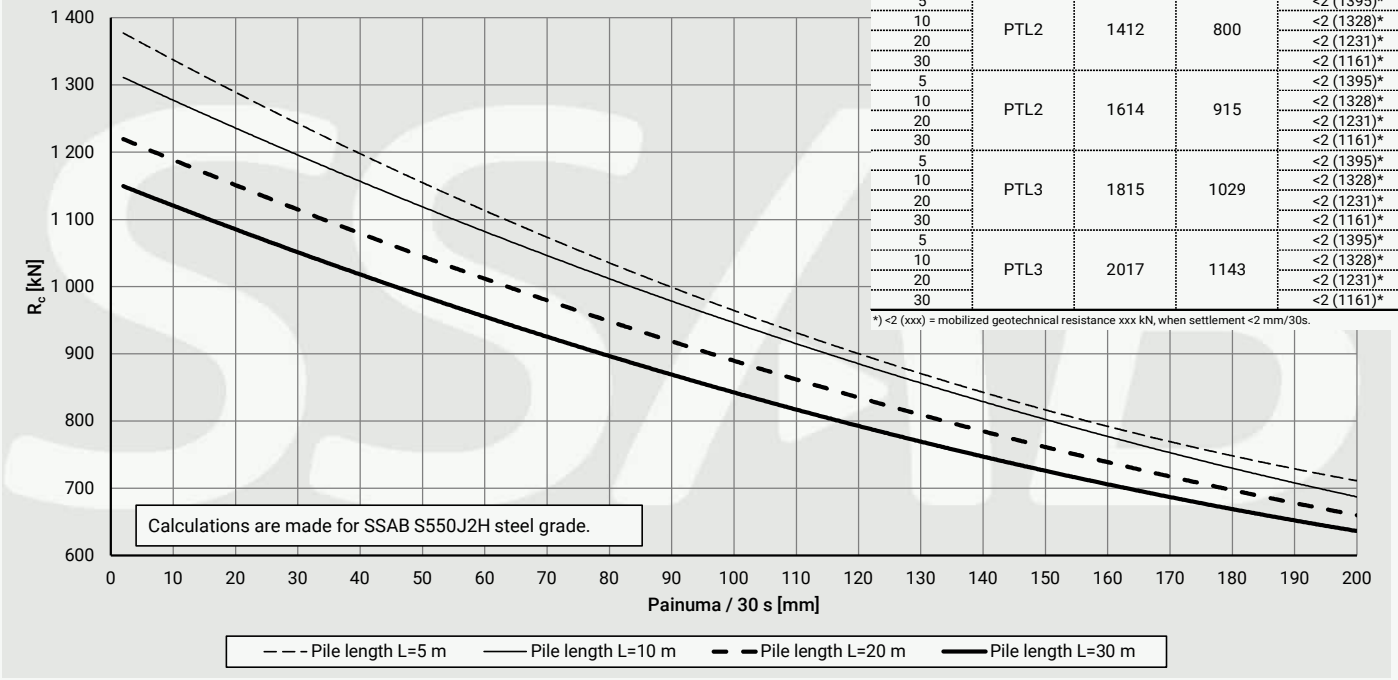


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1012	574	85
10				76
20				54
30				36
5	PTL2	1181	669	38
10				29
20				11
30				<2 (1161)*
5	PTL2	1350	765	7
10				<2 (1328)*
20				<2 (1231)*
30				<2 (1161)*
5	PTL3	1518	861	<2 (1395)*
10				<2 (1328)*
20				<2 (1231)*
30				<2 (1161)*
5	PTL3	1687	956	<2 (1395)*
10				<2 (1328)*
20				<2 (1231)*
30				<2 (1161)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Epiroc MB1700 - RRs140/10



Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1210	686	33
10				24
20				6
30				<2 (1161)*
5	PTL2	1412	800	<2 (1395)*
10				<2 (1328)*
20				<2 (1231)*
30				<2 (1161)*
5	PTL2	1614	915	<2 (1395)*
10				<2 (1328)*
20				<2 (1231)*
30				<2 (1161)*
5	PTL3	1815	1029	<2 (1395)*
10				<2 (1328)*
20				<2 (1231)*
30				<2 (1161)*
5	PTL3	2017	1143	<2 (1395)*
10				<2 (1328)*
20				<2 (1231)*
30				<2 (1161)*

*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

NOTES

NOTES

SSAB is a Nordic and US-based steel company that builds a stronger, lighter and more sustainable world through value added steel products and services. Working with our partners, SSAB has developed SSAB Fossil-free™ steel and plans to reinvent the value chain from the mine to the end customer, largely eliminating carbon dioxide emissions from our own operations. SSAB Zero™, a largely carbon emission-free steel based on recycled steel, further strengthens SSAB's leadership position and our comprehensive, sustainable offering independent of the raw material. SSAB has employees in over 50 countries and production facilities in Sweden, Finland and the US. SSAB is listed on Nasdaq Stockholm and has a secondary listing on Nasdaq Helsinki. Join us on our journey!
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