

Appendix 2 RR[®] and RD[®] piles

Design and installation manual

RR piles

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

Updated 12/2024

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DROP HAMMERS

Pile	Efficiency of the hammer 80 %			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]				
						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	
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

Pile	Efficiency of the hammer 80 %			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]				
						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

Pile	Efficiency of the hammer 80 %			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]				
						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

Pile	Efficiency of the hammer 80 %			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]				
						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				1.50 m 16 kNm	1.05 m 20 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 27 kNm	0.50 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	0.50 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	0.60 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	0.50 m (1275) 24 kNm
	30	7				1.50 m (1340) 20 kNm	0.85 m 38 kNm	1.20 m (1340) 35 kNm	0.90 m 35 kNm	0.70 m 35 kNm
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	0.40 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	0.50 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	0.50 m 27 kNm	
30	10				1.20 m 20 kNm	0.85 m 38 kNm	1.20 m 35 kNm	0.90 m 35 kNm	0.70 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 19 kNm	0.40 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	0.60 m 31 kNm	
30	7				1.20 m 22 kNm	0.95 m 38 kNm	1.20 m (1340) 41 kNm	1.05 m 41 kNm	0.80 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	0.40 m (1475) 20 kNm	
20	7				1.20 m (1580) 38 kNm	0.85 m (1520) 33 kNm	0.65 m (1520) 33 kNm	0.50 m (1520) 33 kNm	0.40 m (1520) 33 kNm	
30	7				1.15 m 27 kNm	0.95 m 47 kNm	1.20 m (1575) 47 kNm	1.05 m 47 kNm	0.80 m 47 kNm	

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

DROP HAMMERS

Pile	Efficiency of the hammer 80 %			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]				
						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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Pile	Efficiency of the hammer 80 %			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]				
						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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Pile	Efficiency of the hammer 80 %			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]				
						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				
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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Pile	Efficiency of the hammer 80 %			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]				
						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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Pile	Efficiency of the hammer 80 %			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]				
						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	1.20 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) 47 kNm	1.20 m (2495) 57 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	1.20 m (2930) 47 kNm	1.10 m 52 kNm	1.10 m 52 kNm	
	30	7				1.20 m (2700) 57 kNm	1.20 m (2700) 57 kNm	1.20 m (2700) 57 kNm	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	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	1.20 m (3235) 57 kNm	1.20 m (3235) 57 kNm	1.20 m (3235) 57 kNm	
	30	7				1.20 m (3235) 57 kNm	1.20 m (3235) 57 kNm	1.20 m (3235) 57 kNm	1.20 m (3235) 57 kNm	
	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 (2480) 38 kNm	1.20 m 47 kNm	1.00 m 47 kNm	
30		10				1.20 m (2635) 57 kNm	1.20 m (2635) 57 kNm	1.20 m (2635) 57 kNm	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	1.20 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 (2835) 47 kNm	1.20 m (2835) 47 kNm	1.20 m (2835) 47 kNm	
30		10				1.20 m (2835) 47 kNm	1.20 m (2835) 47 kNm	1.20 m (2835) 47 kNm	1.20 m (2835) 47 kNm	
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 (3325) 38 kNm	1.20 m 47 kNm	1.00 m 47 kNm	
20		7				1.20 m (3235) 57 kNm	1.20 m (3235) 57 kNm	1.20 m (3235) 57 kNm	1.20 m (3235) 57 kNm	
30		7				1.20 m (3235) 57 kNm	1.20 m (3235) 57 kNm	1.20 m (3235) 57 kNm	1.20 m (3235) 57 kNm	
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	1.20 m (3650) 47 kNm	1.20 m (3650) 47 kNm	1.00 m (3645) 47 kNm	
20		7				1.20 m (3650) 47 kNm	1.20 m (3650) 47 kNm	1.20 m (3650) 47 kNm	1.20 m (3650) 47 kNm	
30		7				1.20 m (3650) 47 kNm	1.20 m (3650) 47 kNm	1.20 m (3650) 47 kNm	1.20 m (3650) 47 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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Pile	Efficiency of the hammer 80 %			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]				
						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	0.45 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	0.70 m 33 kNm	
	30	10				1.20 m (1990) 38 kNm	1.15 m 45 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	0.90 m 42 kNm	
	30	10				1.20 m (2230) 47 kNm	1.20 m 57 kNm	1.20 m 57 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	1.05 m 49 kNm	1.05 m 49 kNm		
30	7				1.20 m (2540) 57 kNm	1.20 m (2540) 57 kNm	1.20 m (2540) 57 kNm	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	0.70 m (2747) 33 kNm		
20	7				1.15 m (2935) 54 kNm	1.15 m (2935) 54 kNm	1.15 m (2935) 54 kNm	1.15 m (2935) 54 kNm		
30	7				1.15 m (2935) 54 kNm	1.15 m (2935) 54 kNm	1.15 m (2935) 54 kNm	1.15 m (2935) 54 kNm		
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	1.10 m 52 kNm	
	30	10				1.20 m (2230) 47 kNm	1.20 m (2300) 57 kNm	1.20 m (2300) 57 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	0.85 m 40 kNm	
	20	10				1.20 m (2635) 47 kNm	1.20 m (2735) 57 kNm	1.20 m (2735) 57 kNm	1.20 m (2735) 57 kNm	
	30	10				1.20 m (2635) 47 kNm	1.20 m (2735) 57 kNm	1.20 m (2735) 57 kNm	1.20 m (2735) 57 kNm	
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	1.00 m 47 kNm		
20	7				1.15 m (3285) 27 kNm	0.85 m (3285) 27 kNm	0.70 m (3285) 27 kNm	0.70 m (3285) 33 kNm		
30	7				1.15 m (3285) 27 kNm	0.85 m (3285) 27 kNm	0.70 m (3285) 27 kNm	0.70 m (3285) 33 kNm		
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) 27 kNm	0.85 m (3285) 27 kNm	0.70 m (3285) 27 kNm	0.70 m (3285) 33 kNm		
20	7				1.15 m (3285) 27 kNm	0.85 m (3285) 27 kNm	0.70 m (3285) 27 kNm	0.70 m (3285) 33 kNm		
30	7				1.15 m (3285) 27 kNm	0.85 m (3285) 27 kNm	0.70 m (3285) 27 kNm	0.70 m (3285) 33 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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Pile	Efficiency of the hammer 80 %			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]				
						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	0.55 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	0.75 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	0.75 m 49 kNm	0.55 m 49 kNm
	30	10				1.20 m (2975) 66 kNm	1.15 m 66 kNm	0.90 m 66 kNm	0.75 m 66 kNm	0.55 m 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	0.55 m 41 kNm	
20	7				1.20 m (3025) 47 kNm	1.20 m (3210) 57 kNm	1.05 m 58 kNm	0.85 m 58 kNm	0.65 m 58 kNm	
30	7				1.20 m (3050) 66 kNm	1.20 m (3050) 66 kNm	1.05 m 66 kNm	0.85 m 66 kNm	0.65 m 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	0.60 m (3398) 28 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	0.55 m (3398) 41 kNm	
20	7				1.20 m (3645) 66 kNm	1.20 m (3645) 66 kNm	1.05 m 66 kNm	0.85 m 66 kNm	0.65 m 66 kNm	
30	7				1.20 m (3645) 66 kNm	1.20 m (3645) 66 kNm	1.05 m 66 kNm	0.85 m 66 kNm	0.65 m 66 kNm	
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 (2920) 47 kNm	1.20 m (2995) 57 kNm	1.00 m 55 kNm	0.75 m 55 kNm
	30	10				1.20 m (2975) 66 kNm	1.20 m (2975) 66 kNm	1.00 m 66 kNm	0.75 m 66 kNm	0.55 m 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	0.65 m 47 kNm
	20	10				1.00 m (3160) 55 kNm	1.00 m (3160) 55 kNm	0.85 m 55 kNm	0.65 m 55 kNm	0.45 m 55 kNm
	30	10				1.00 m (3160) 55 kNm	1.00 m (3160) 55 kNm	0.85 m 55 kNm	0.65 m 55 kNm	0.45 m 55 kNm
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	0.75 m 55 kNm	0.55 m 55 kNm	
20	7				1.20 m (3645) 66 kNm	1.20 m (3645) 66 kNm	1.05 m 66 kNm	0.85 m 66 kNm	0.65 m 66 kNm	
30	7				1.20 m (3645) 66 kNm	1.20 m (3645) 66 kNm	1.05 m 66 kNm	0.85 m 66 kNm	0.65 m 66 kNm	
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	0.45 m (4135) 33 kNm	
10	7				1.00 m (4120) 55 kNm	1.00 m (4120) 55 kNm	0.85 m 55 kNm	0.65 m 55 kNm	0.45 m 55 kNm	
20	7				1.00 m (4120) 55 kNm	1.00 m (4120) 55 kNm	0.85 m 55 kNm	0.65 m 55 kNm	0.45 m 55 kNm	
30	7				1.00 m (4120) 55 kNm	1.00 m (4120) 55 kNm	0.85 m 55 kNm	0.65 m 55 kNm	0.45 m 55 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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Pile	Efficiency of the hammer 80 %			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]				
						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	0.55 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	0.70 m 40 m
	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	0.70 m 49 kNm	0.55 m 66 kNm
	30	10				1.20 m (2495) 66 kNm	1.15 m 66 kNm	0.90 m 66 kNm	0.70 m 66 kNm	0.55 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	0.55 m 38 kNm	
20	7				1.20 m (2820) 47 kNm	1.20 m (2950) 57 kNm	1.05 m 58 kNm	0.85 m 58 kNm	0.60 m 66 kNm	
30	7				1.20 m (2865) 66 kNm	1.20 m (2865) 66 kNm	1.05 m 66 kNm	0.85 m 66 kNm	0.60 m 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	0.55 m (3190) 42 kNm	0.45 m (3079) 25 kNm	
10	7				1.15 m (3100) 36 kNm	0.95 m (3125) 37 kNm	0.80 m (3190) 42 kNm	0.70 m (3079) 38 kNm	0.55 m (3079) 38 kNm	
20	7				1.10 m (3220) 60 kNm	1.10 m (3220) 60 kNm	0.90 m (3220) 60 kNm	0.70 m (3220) 60 kNm	0.55 m (3220) 60 kNm	
30	7				1.10 m (3220) 60 kNm	1.10 m (3220) 60 kNm	0.90 m (3220) 60 kNm	0.70 m (3220) 60 kNm	0.55 m (3220) 60 kNm	
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	0.45 m 36 kNm
	20	10				1.20 m (2710) 47 kNm	1.20 m (2825) 57 kNm	0.95 m 52 kNm	0.70 m 52 kNm	0.55 m 52 kNm
	30	10				1.20 m (2780) 66 kNm	1.20 m (2780) 66 kNm	0.95 m 66 kNm	0.70 m 66 kNm	0.55 m 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	0.65 m 44 kNm
	20	10				1.20 m (3260) 66 kNm	1.20 m (3260) 66 kNm	0.95 m 66 kNm	0.70 m 66 kNm	0.55 m 66 kNm
	30	10				1.20 m (3260) 66 kNm	1.20 m (3260) 66 kNm	0.95 m 66 kNm	0.70 m 66 kNm	0.55 m 66 kNm
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	0.45 m 30 kNm	
10	7				1.20 m (3560) 47 kNm	1.15 m 54 kNm	0.95 m 52 kNm	0.75 m 52 kNm	0.55 m 52 kNm	
20	7				1.20 m (3375) 66 kNm	1.20 m (3375) 66 kNm	0.95 m 66 kNm	0.75 m 66 kNm	0.55 m 66 kNm	
30	7				1.20 m (3375) 66 kNm	1.20 m (3375) 66 kNm	0.95 m 66 kNm	0.75 m 66 kNm	0.55 m 66 kNm	
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	0.45 m (3685) 30 kNm	
10	7				1.20 m (3780) 57 kNm	1.15 m (3681) 57 kNm	0.95 m (3681) 52 kNm	0.75 m (3681) 52 kNm	0.55 m (3681) 52 kNm	
20	7				1.20 m (3780) 57 kNm	1.15 m (3681) 57 kNm	0.95 m (3681) 52 kNm	0.75 m (3681) 52 kNm	0.55 m (3681) 52 kNm	
30	7				1.20 m (3780) 57 kNm	1.15 m (3681) 57 kNm	0.95 m (3681) 52 kNm	0.75 m (3681) 52 kNm	0.55 m (3681) 52 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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Pile	Efficiency of the hammer 80 %			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	0.55 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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Pile	Efficiency of the hammer 80 %			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	0.60 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.

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Pile	Efficiency of the hammer 80 %			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	0.70 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.

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Pile	Efficiency of the hammer 80 %			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	0.65 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	1.20 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				0.75 m (3581) 41 kNm	
	10	7								
	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.

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Pile	Efficiency of the hammer 80 %			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	0.75 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	1.00 m 66 kNm	
	30	10				1.20 m (3105) 47 kNm	1.20 m (3320) 57 kNm	1.20 m (3320) 57 kNm	1.20 m (3475) 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	0.80 m 44 kNm	
	20	10				1.20 m (3555) 57 kNm	1.20 m (3885) 66 kNm	1.20 m (3885) 66 kNm	1.20 m (3885) 66 kNm	
	30	10				1.20 m (3475) 66 kNm	1.20 m (3475) 66 kNm	1.20 m (3475) 66 kNm	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	0.85 m (4330) 47 kNm	
	20	7				1.20 m (4030) 66 kNm	1.20 m (4030) 66 kNm	1.20 m (4030) 66 kNm	1.20 m (4030) 66 kNm	
	30	7				1.20 m (4030) 66 kNm	1.20 m (4030) 66 kNm	1.20 m (4030) 66 kNm	1.20 m (4030) 66 kNm	
	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	0.90 m 49 kNm	
	20	10				1.20 m (3885) 66 kNm	1.20 m (3885) 66 kNm	1.20 m (3885) 66 kNm	1.20 m (3885) 66 kNm	
	30	10				1.20 m (3885) 66 kNm	1.20 m (3885) 66 kNm	1.20 m (3885) 66 kNm	1.20 m (3885) 66 kNm	
	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	1.15 m 63 kNm	1.15 m 63 kNm	
	20	10				1.20 m (4495) 57 kNm	1.20 m (4495) 57 kNm	1.20 m (4495) 57 kNm	1.20 m (4495) 57 kNm	
	30	10				1.20 m (4495) 57 kNm	1.20 m (4495) 57 kNm	1.20 m (4495) 57 kNm	1.20 m (4495) 57 kNm	
	5	7	PTL3	5513	3125	1.20 m 47 kNm	0.95 m (5405) 45 kNm	0.85 m 47 kNm	0.85 m 47 kNm	
	10	7				1.20 m (4905) 57 kNm	1.20 m (5385) 66 kNm	1.20 m (5385) 66 kNm	1.20 m (5385) 66 kNm	
	20	7				1.20 m (5385) 66 kNm	1.20 m (5385) 66 kNm	1.20 m (5385) 66 kNm	1.20 m (5385) 66 kNm	
	30	7				1.20 m (5385) 66 kNm	1.20 m (5385) 66 kNm	1.20 m (5385) 66 kNm	1.20 m (5385) 66 kNm	
	5	7	PTL3	6125	3472	1.20 m (5513) 47 kNm	0.85 m (5513) 47 kNm	0.85 m (5513) 47 kNm	0.85 m (5513) 47 kNm	
	10	7				1.20 m (5513) 47 kNm	1.20 m (5513) 47 kNm	1.20 m (5513) 47 kNm	1.20 m (5513) 47 kNm	
	20	7				1.20 m (5513) 47 kNm	1.20 m (5513) 47 kNm	1.20 m (5513) 47 kNm	1.20 m (5513) 47 kNm	
	30	7				1.20 m (5513) 47 kNm	1.20 m (5513) 47 kNm	1.20 m (5513) 47 kNm	1.20 m (5513) 47 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]				
						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 28 kNm	0.40 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	0.40 m 23 kNm	
	30	7				1.50 m (1200) 26 kNm	1.10 m 26 kNm	0.80 m 17 kNm	0.65 m 34 kNm	0.50 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	0.40 m (1233) 23 kNm	
	30	7				1.50 m (1290) 21 kNm	1.20 m (1290) 25 kNm	0.90 m (1315) 28 kNm	0.75 m (1355) 28 kNm	0.50 m (1270) 23 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	0.45 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	0.45 m 28 kNm	
30		10				1.50 m (1175) 26 kNm	1.20 m 34 kNm	0.90 m 39 kNm	0.75 m 39 kNm	0.55 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	0.50 m 33 kNm	
30		7				1.80 m 22 kNm	1.50 m 45 kNm	1.20 m (1460) 45 kNm	0.90 m 42 kNm	0.70 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	0.30 m (1475) 19 kNm	
20		7				1.20 m (1540) 34 kNm	0.90 m (1540) 39 kNm	0.75 m (1595) 39 kNm	0.55 m (1555) 35 kNm	0.40 m (1500) 35 kNm	
30		7				1.50 m (1540) 34 kNm	1.20 m (1540) 39 kNm	0.90 m (1595) 39 kNm	0.75 m (1555) 35 kNm	0.55 m (1500) 35 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
	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 [kJNm] 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	1.20 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	1.20 m (2085) 45 kNm	1.05 m 49 kNm	0.90 m 49 kNm	0.70 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	1.15 m 43 kNm	0.90 m 42 kNm	0.80 m 45 kNm	0.60 m 45 kNm	
30	7				1.20 m (2395) 56 kNm	1.20 m (2395) 56 kNm	1.05 m 59 kNm	0.90 m 59 kNm	0.70 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 (2448) 19 kNm	0.20 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	0.40 m (2470) 28 kNm	
20	7				1.15 m (2485) 43 kNm	1.15 m (2485) 43 kNm	1.00 m (2495) 47 kNm	0.85 m (2495) 48 kNm	0.70 m (2495) 48 kNm	
30	7				1.15 m (2495) 64 kNm	1.15 m (2495) 64 kNm	1.00 m (2495) 64 kNm	0.85 m (2495) 64 kNm	0.70 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	1.20 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	1.20 m (2085) 45 kNm	1.15 m 54 kNm	0.95 m 54 kNm	0.75 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	1.20 m (2460) 45 kNm	1.10 m 51 kNm	0.90 m 50 kNm	0.70 m 50 kNm
	30	10				1.20 m (2335) 56 kNm	1.20 m (2335) 56 kNm	1.10 m (2495) 67 kNm	0.90 m (2495) 67 kNm	0.70 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	0.50 m 39 kNm	
20	7				1.20 m (2865) 56 kNm	1.20 m (2865) 56 kNm	1.10 m 62 kNm	0.90 m 62 kNm	0.70 m 62 kNm	
30	7				1.20 m (2660) 67 kNm	1.20 m (2660) 67 kNm	1.10 m (2660) 67 kNm	0.90 m (2660) 67 kNm	0.70 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	1.05 m (2970) 39 kNm	0.85 m (2927) 40 kNm	0.70 m (2980) 39 kNm	0.50 m (2980) 39 kNm	
20	7				1.20 m (3110) 67 kNm	1.20 m (3110) 67 kNm	1.10 m (3110) 67 kNm	0.90 m (3110) 67 kNm	0.70 m (3110) 67 kNm	
30	7				1.20 m (3110) 67 kNm	1.20 m (3110) 67 kNm	1.10 m (3110) 67 kNm	0.90 m (3110) 67 kNm	0.70 m (3110) 67 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	
RR220/12.5	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 [kJNm] 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	0.45 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	0.80 m 52 kNm	
	30	10				1.20 m (2765) 56 kNm	1.20 m (2995) 67 kNm	1.05 m 68 kNm	1.05 m 68 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	0.90 m 59 kNm	0.90 m 59 kNm	
	30	7				1.20 m (3085) 67 kNm	1.20 m (3330) 78 kNm	1.20 m (3330) 78 kNm	1.20 m (3330) 78 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	0.50 m (3485) 45 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	0.60 m (3420) 39 kNm	
	20	7				1.10 m (3535) 62 kNm	1.00 m (3625) 65 kNm	1.00 m (3625) 65 kNm	1.00 m (3625) 65 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	0.85 m 55 kNm	
30		10				1.20 m (2765) 56 kNm	1.20 m (2995) 67 kNm	1.15 m 75 kNm	1.15 m 75 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	0.70 m 46 kNm	
20		10				1.20 m (3160) 56 kNm	0.95 m (3160) 53 kNm	1.10 m 72 kNm	1.10 m 72 kNm	1.10 m 72 kNm	
30		10				1.15 m (3160) 75 kNm	1.15 m (3160) 75 kNm	1.15 m (3160) 75 kNm	1.15 m (3160) 75 kNm	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	0.85 m 55 kNm	
20		7				1.20 m (3700) 67 kNm	1.20 m (3990) 78 kNm	1.20 m (3990) 78 kNm	1.20 m (3990) 78 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	0.85 m (4062) 55 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	0.60 m 49 kNm
	30	10				1.20 m (2495) 56 kNm	1.15 m 64 kNm	1.00 m 65 kNm	0.85 m 65 kNm	0.75 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	0.75 m 59 kNm	0.65 m 59 kNm	
30	7				1.20 m (2875) 67 kNm	1.10 m 78 kNm	0.95 m 78 kNm	0.80 m 78 kNm	0.70 m 78 kNm	
5	7	PTL3	3421	1939	0.50 m (3125) 23 kNm	0.40 m (3079) 23 kNm	0.35 m (3125) 23 kNm	0.30 m (3095) 23 kNm	0.25 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	0.50 m (3079) 39 kNm	
20	7				1.20 m (3100) 56 kNm	1.05 m (3205) 59 kNm	0.95 m (3265) 62 kNm	0.85 m (3265) 62 kNm	0.75 m (3265) 62 kNm	
30	7				1.20 m (3135) 78 kNm	1.10 m (3135) 78 kNm	0.95 m (3135) 78 kNm	0.80 m (3135) 78 kNm	0.70 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	0.70 m 52 kNm
	30	10				1.20 m (2550) 56 kNm	1.10 m (2805) 67 kNm	1.00 m (2805) 67 kNm	0.85 m (2805) 72 kNm	0.75 m (2805) 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	1.10 m 67 kNm	0.95 m 67 kNm	0.80 m 68 kNm	0.70 m 68 kNm
	30	10				1.20 m (3045) 78 kNm	1.10 m (3045) 78 kNm	0.95 m (3045) 78 kNm	0.80 m (3045) 78 kNm	0.70 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	0.70 m 52 kNm	
20	7				1.20 m (3440) 67 kNm	1.10 m (3440) 67 kNm	0.95 m (3440) 67 kNm	0.80 m (3440) 67 kNm	0.70 m (3440) 67 kNm	
30	7				1.20 m (3440) 67 kNm	1.10 m (3440) 67 kNm	0.95 m (3440) 67 kNm	0.80 m (3440) 67 kNm	0.70 m (3440) 67 kNm	
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	1.10 m (3735) 51 kNm	0.90 m (3705) 50 kNm	0.80 m (3681) 52 kNm	0.70 m (3681) 52 kNm	
20	7				1.20 m (3695) 78 kNm	1.10 m (3695) 78 kNm	0.95 m (3695) 78 kNm	0.80 m (3695) 78 kNm	0.70 m (3695) 78 kNm	
30	7				1.20 m (3695) 78 kNm	1.10 m (3695) 78 kNm	0.95 m (3695) 78 kNm	0.80 m (3695) 78 kNm	0.70 m (3695) 78 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]				
						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	0.80 m 59 kNm	
	30	10				1.20 m (3160) 67 kNm	1.05 m 78 kNm	0.90 m 78 kNm	0.80 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	0.90 m 68 kNm	
	30	7				1.20 m (3485) 78 kNm	1.20 m (3485) 78 kNm	1.10 m (3485) 78 kNm	1.00 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	1.00 m (3985) 72 kNm	0.90 m (3985) 72 kNm	
	30	7				1.20 m (3835) 67 kNm	1.10 m (3985) 72 kNm	1.00 m (3985) 72 kNm	0.90 m (3985) 72 kNm	
	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	0.90 m 68 kNm	
30		10				1.20 m (3160) 67 kNm	1.20 m (3195) 78 kNm	1.10 m (3195) 78 kNm	1.00 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	1.10 m (3885) 78 kNm	1.00 m (3885) 78 kNm	
30		10				1.20 m (3705) 67 kNm	1.20 m (3885) 78 kNm	1.10 m (3885) 78 kNm	1.00 m (3885) 78 kNm	
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	0.90 m 65 kNm	
20		7				1.20 m (4455) 56 kNm	1.10 m 62 kNm	1.00 m 65 kNm	0.90 m 65 kNm	
30		7				1.20 m (4455) 56 kNm	1.10 m 62 kNm	1.00 m 65 kNm	0.90 m 65 kNm	
5		7	PTL3	5064	2871	1.05 m (4557) 39 kNm	0.85 m (4557) 40 kNm	0.70 m (4557) 39 kNm	0.65 m (4557) 39 kNm	
10		7				1.10 m (4557) 62 kNm	1.00 m (4557) 65 kNm	0.90 m (4557) 65 kNm	0.80 m (4557) 65 kNm	
20		7				1.10 m (4557) 62 kNm	1.00 m (4557) 65 kNm	0.90 m (4557) 65 kNm	0.80 m (4557) 65 kNm	
30		7				1.10 m (4557) 62 kNm	1.00 m (4557) 65 kNm	0.90 m (4557) 65 kNm	0.80 m (4557) 65 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]				
						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	1.10 m 62 kNm	0.95 m 62 kNm	
	30	10				1.20 m (2965) 67 kNm	1.20 m (3210) 78 kNm	1.20 m (3210) 78 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	1.10 m 72 kNm	1.10 m 72 kNm		
30	7				1.20 m (3295) 78 kNm	1.20 m (3295) 78 kNm	1.20 m (3295) 78 kNm	1.20 m (3295) 78 kNm		
5	7	PTL3	4083	2315	0.65 m (3674) 30 kNm	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	0.70 m (3700) 46 kNm		
20	7				1.15 m (3855) 75 kNm	1.15 m (3855) 75 kNm	1.15 m (3855) 75 kNm	1.15 m (3855) 75 kNm		
30	7				1.15 m (3855) 75 kNm	1.15 m (3855) 75 kNm	1.15 m (3855) 75 kNm	1.15 m (3855) 75 kNm		
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	1.20 m 67 kNm	1.00 m 65 kNm	
	30	10				1.20 m (2965) 67 kNm	1.20 m (3210) 78 kNm	1.20 m (3210) 78 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	1.20 m (3800) 78 kNm	1.20 m (3800) 78 kNm	
	30	10				1.20 m (3475) 67 kNm	1.20 m (3800) 78 kNm	1.20 m (3800) 78 kNm	1.20 m (3800) 78 kNm	
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	1.15 m 64 kNm	0.95 m 62 kNm		
20	7				1.20 m (3945) 78 kNm	1.20 m (3945) 78 kNm	1.20 m (3945) 78 kNm	1.20 m (3945) 78 kNm		
30	7				1.20 m (3945) 78 kNm	1.20 m (3945) 78 kNm	1.20 m (3945) 78 kNm	1.20 m (3945) 78 kNm		
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	1.15 m (4495) 64 kNm	1.15 m (4495) 64 kNm	0.95 m (4400) 62 kNm		
20	7				1.15 m (4495) 64 kNm	1.15 m (4495) 64 kNm	1.15 m (4495) 64 kNm	1.15 m (4495) 64 kNm		
30	7				1.15 m (4495) 64 kNm	1.15 m (4495) 64 kNm	1.15 m (4495) 64 kNm	1.15 m (4495) 64 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]				
						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	1.00 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	1.20 m (3630) 78 kNm		
	30	10								
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				0.90 m (4495) 59 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]				
						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				1.05 m (5513) 68 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.

ACCELERATED HAMMERS (>1 g)

(for example Junttan SHK series)

Pile	Efficiency of the hammer 120 %			R _c [kN]	R _d [kN]	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			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 %			R _c [kN]	R _d [kN]	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			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)

Pile	Efficiency of the hammer 120 %			R _c [kN]	R _d [kN]	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			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)

Pile	Efficiency of the hammer 120 %			R _c [kN]	R _d [kN]	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			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	0.60 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	0.85 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)

Pile	Efficiency of the hammer 120 %			R _c [kN]	R _d [kN]	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			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	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]				
						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)

Pile	Efficiency of the hammer 120 %			R _c [kN]	R _d [kN]	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			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)

Pile	Efficiency of the hammer 120 %			R _c [kN]	R _d [kN]	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			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 %			R _c [kN]	R _d [kN]	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			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 %			R _c [kN]	R _d [kN]	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			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 %			R _c [kN]	R _d [kN]	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			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 %			R _c [kN]	R _d [kN]	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			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	1.20 m (3690) 71 kNm	1.05 m 74 kNm	0.90 m 74 kNm
	30	10				1.20 m (3990) 71 kNm	1.20 m (3865) 85 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	1.20 m (4235) 99 kNm
	30	7				1.20 m (4235) 99 kNm	1.20 m (4235) 99 kNm	1.20 m (4235) 99 kNm	1.20 m (4235) 99 kNm
	5	7	PTL3	5063	2870	0.80 m (4556) 38 kNm	0.80 m (4556) 35 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	1.05 m (4635) 87 kNm	1.05 m (4635) 87 kNm	1.05 m (4635) 87 kNm
	30	7				1.05 m (4635) 87 kNm	1.05 m (4635) 87 kNm	1.05 m (4635) 87 kNm	1.05 m (4635) 87 kNm
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	1.20 m (3690) 71 kNm	1.15 m 81 kNm	1.00 m 82 kNm
	30	10				1.20 m (3990) 71 kNm	1.20 m (3865) 85 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 (4380) 85 kNm	1.20 m (4380) 85 kNm	1.20 m (4820) 99 kNm
	30	10				1.20 m (4380) 85 kNm	1.20 m (4380) 85 kNm	1.20 m (4380) 85 kNm	1.20 m (4820) 99 kNm
	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 71 kNm	0.95 m 74 kNm	0.85 m 78 kNm
	20	7				1.20 m (4990) 99 kNm	1.20 m (4990) 99 kNm	1.20 m (4990) 99 kNm	1.20 m (4990) 99 kNm
	30	7				1.20 m (4990) 99 kNm	1.20 m (4990) 99 kNm	1.20 m (4990) 99 kNm	1.20 m (4990) 99 kNm
	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	1.10 m (5650) 78 kNm	1.10 m (5650) 78 kNm	1.00 m (5745) 82 kNm
	20	7				1.10 m (5650) 78 kNm	1.10 m (5650) 78 kNm	1.10 m (5650) 78 kNm	1.10 m (5650) 78 kNm
	30	7				1.10 m (5650) 78 kNm	1.10 m (5650) 78 kNm	1.10 m (5650) 78 kNm	1.10 m (5650) 78 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 %			R _c [kN]	R _d [kN]	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			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				0.50 m (3581) 41 kNm
	10	7							
	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				0.70 m (4460) 58 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.

ACCELERATED HAMMERS (>1 g)

(for example Junttan SHK series)

Pile	Efficiency of the hammer 120 %			R _c [kN]	R _d [kN]	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			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				1.20 m (3990) 57 kNm	1.15 m (4080) 68 kNm	0.95 m (4060) 67 kNm	0.80 m (4030) 66 kNm
	30	7				1.20 m (4310) 71 kNm	1.20 m 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
	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	1.20 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) 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

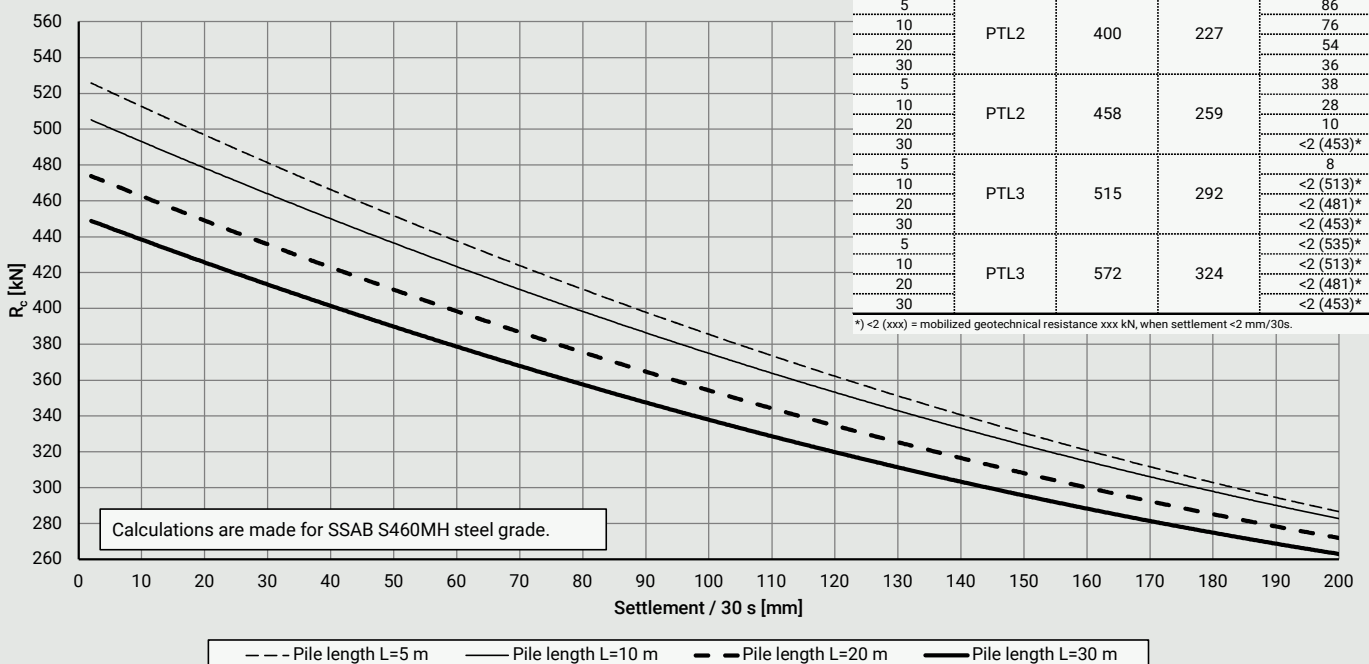
Diameter of the tool [mm]	D_t	80
Height of the tool [mm]	L_t	900
Tool weight [kg]	m_t	35

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

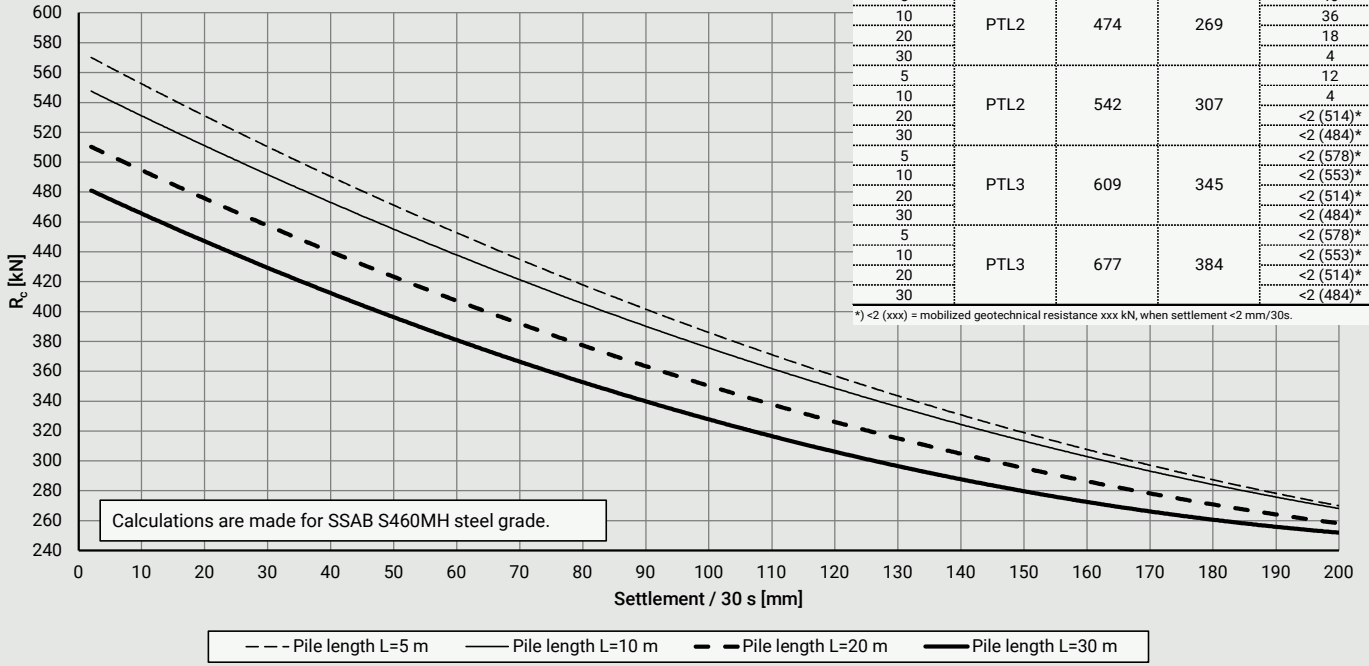


Hammer efficiency 80 %

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

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

Rammer S52 - RR90

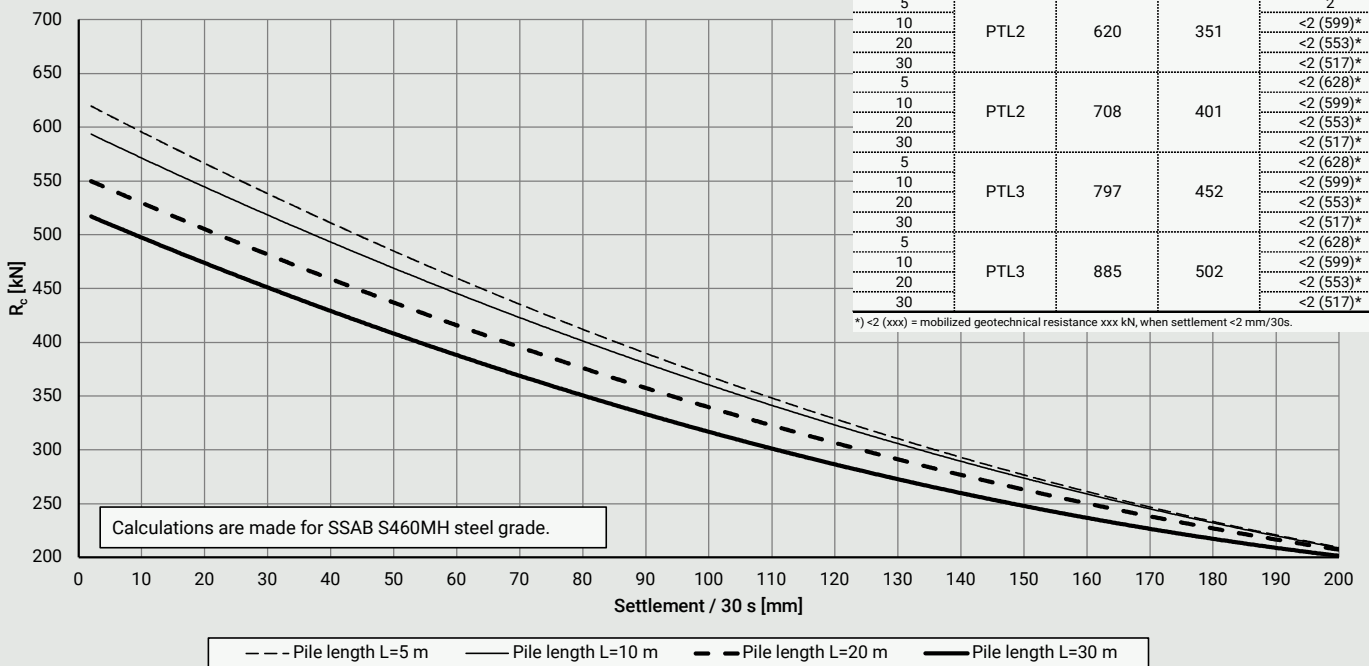


Hammer efficiency 80 %

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

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

Rammer S52 - RR115/6.3

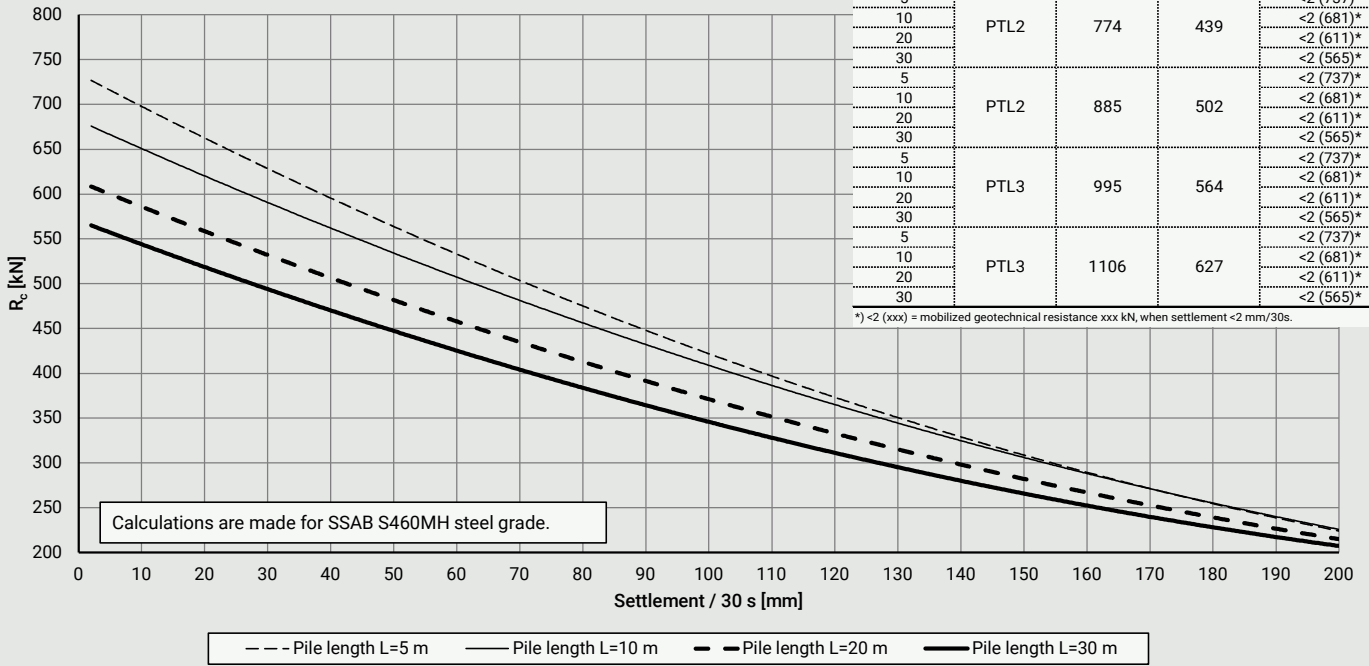


Hammer efficiency 80 %

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

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

Rammer S52 - RR115/8

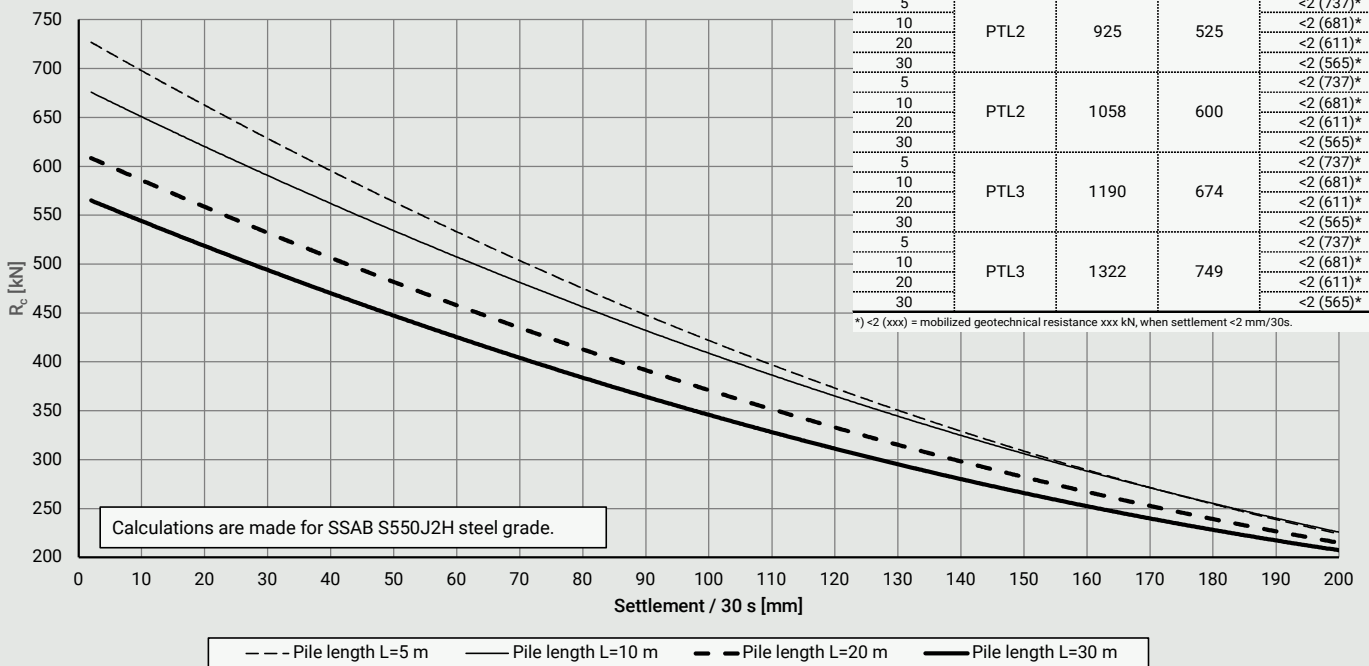


Hammer efficiency 80 %

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

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

Rammer S52 - RRs115/8



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

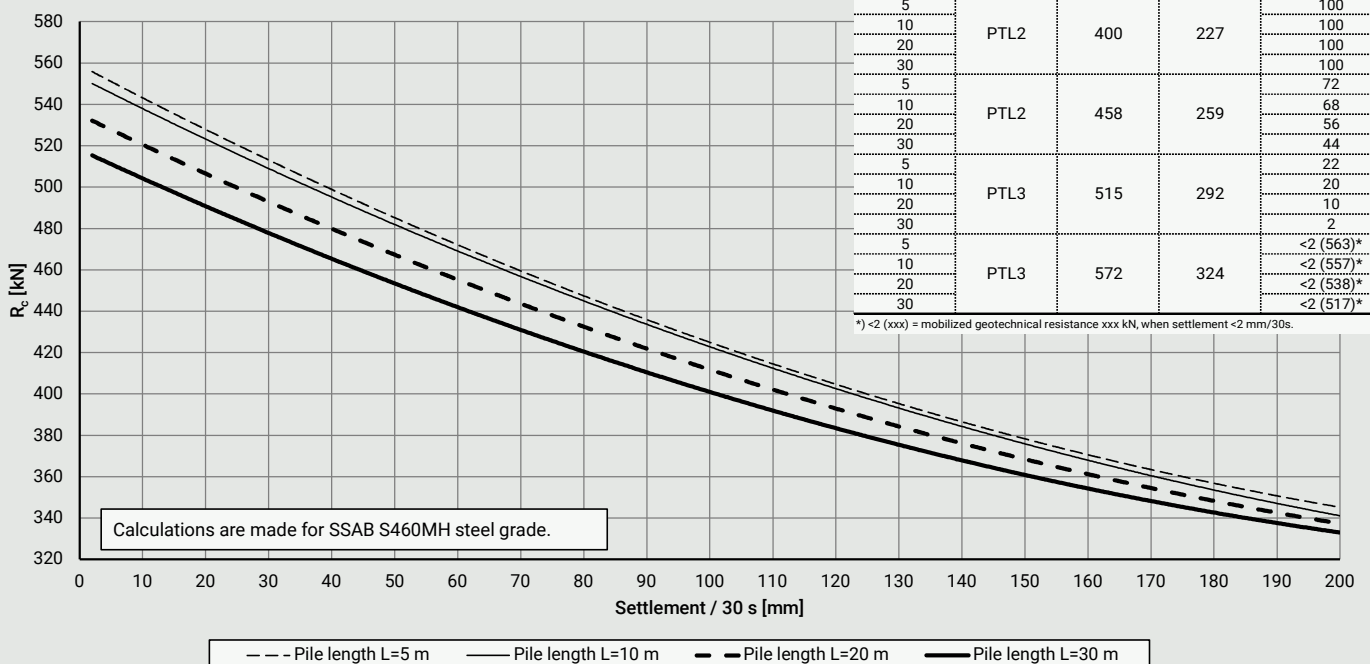
Diameter of the tool [mm]	D_t	115
Height of the tool [mm]	L_t	850
Tool weight [kg]	m_t	58

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

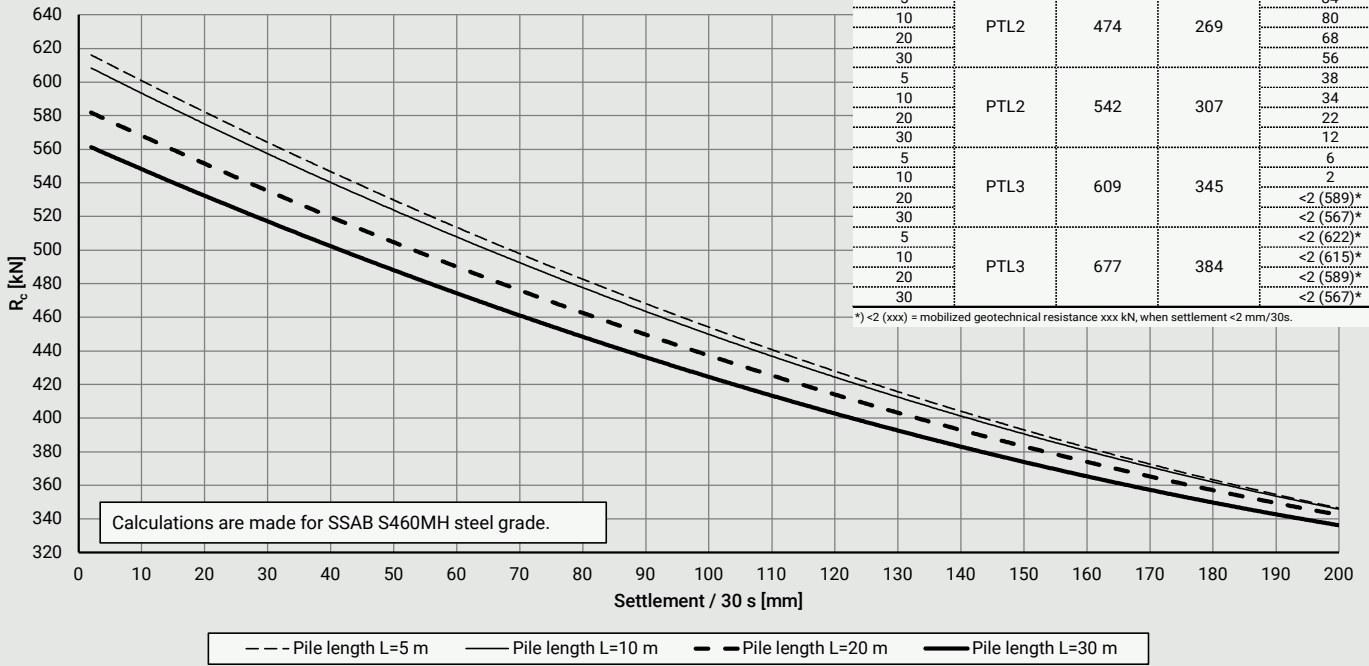


Hammer efficiency 80 %

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

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

Rammer S54 - RR90

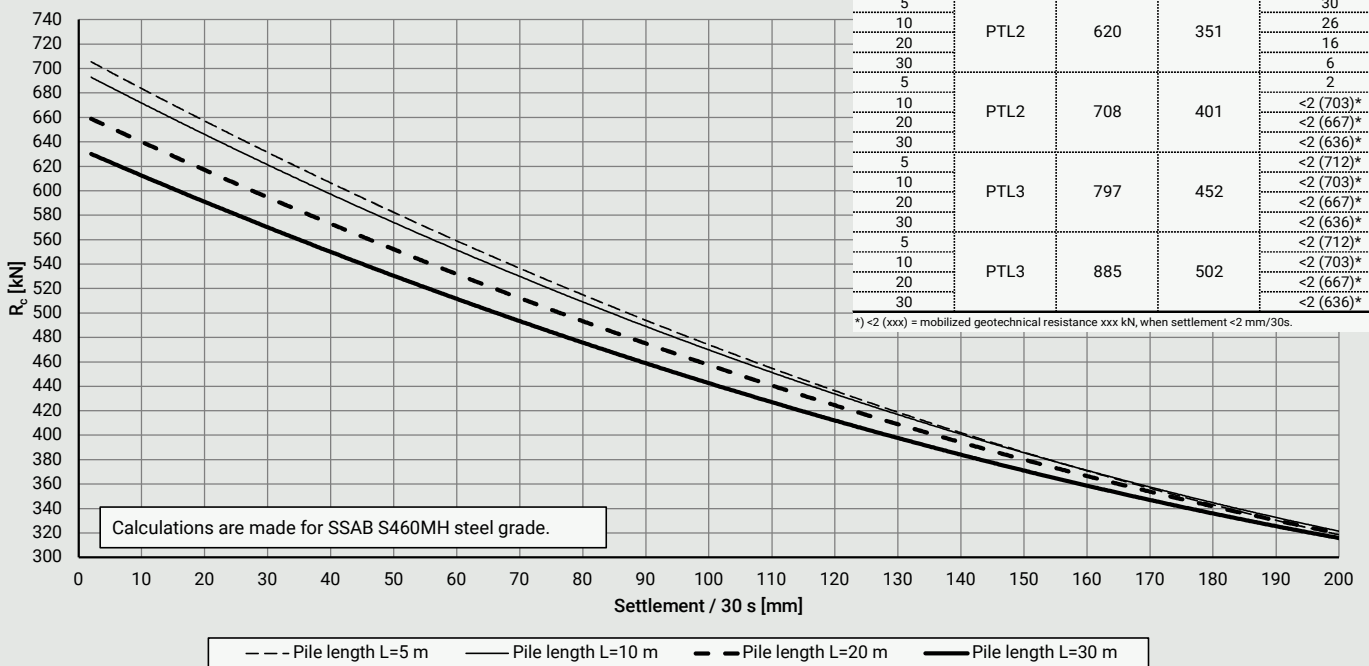


Hammer efficiency 80 %

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

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

Rammer S54 - RR115/6.3

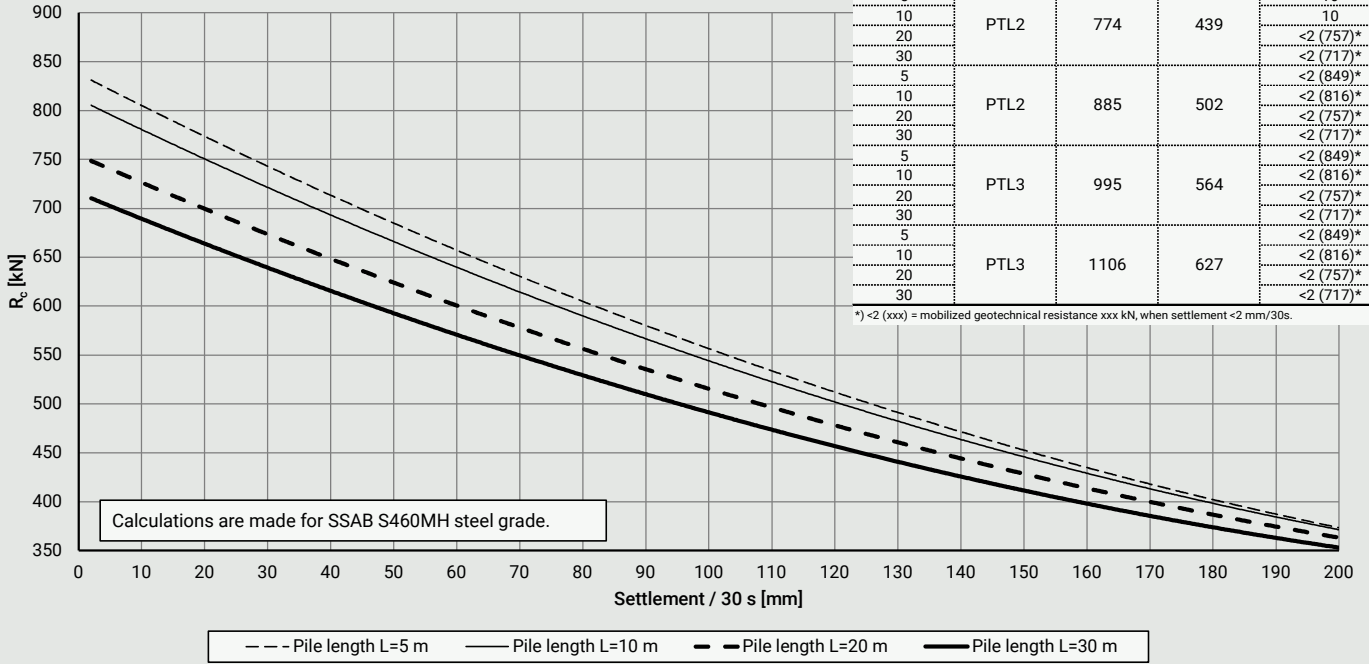


Hammer efficiency 80 %

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

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

Rammer S54 - RR115/8

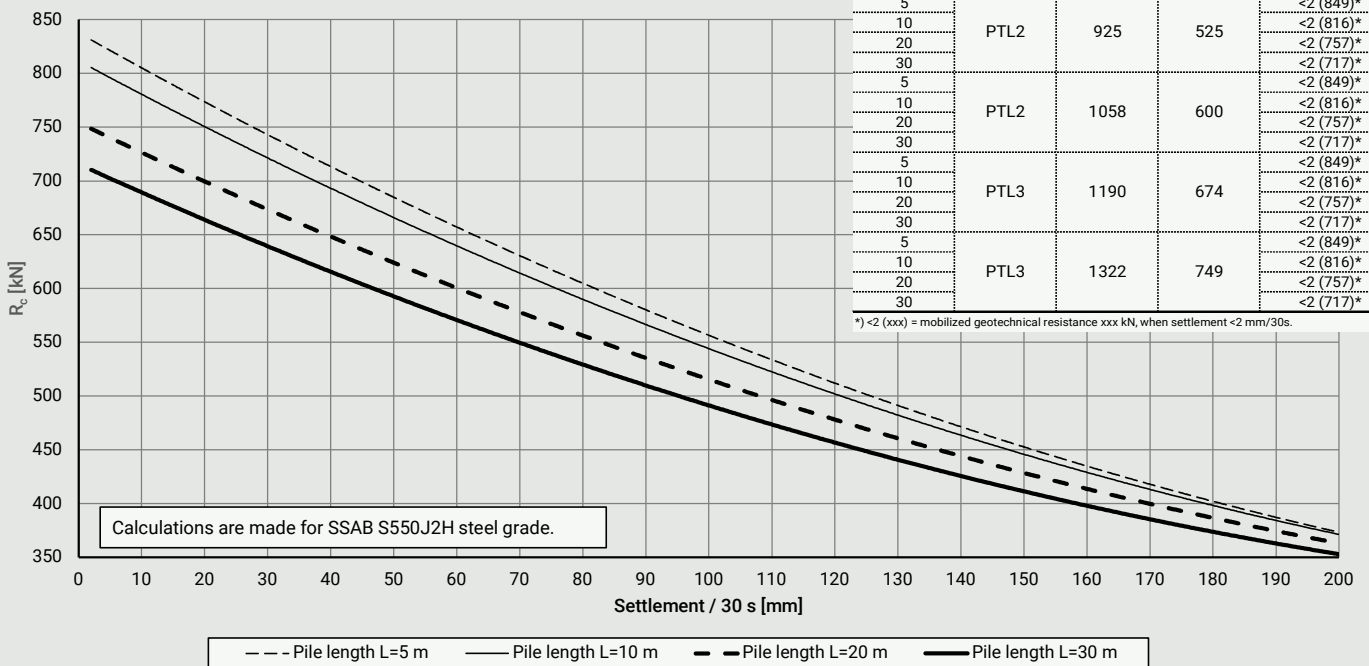


Hammer efficiency 80 %

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

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

Rammer S54 - RRs115/8



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

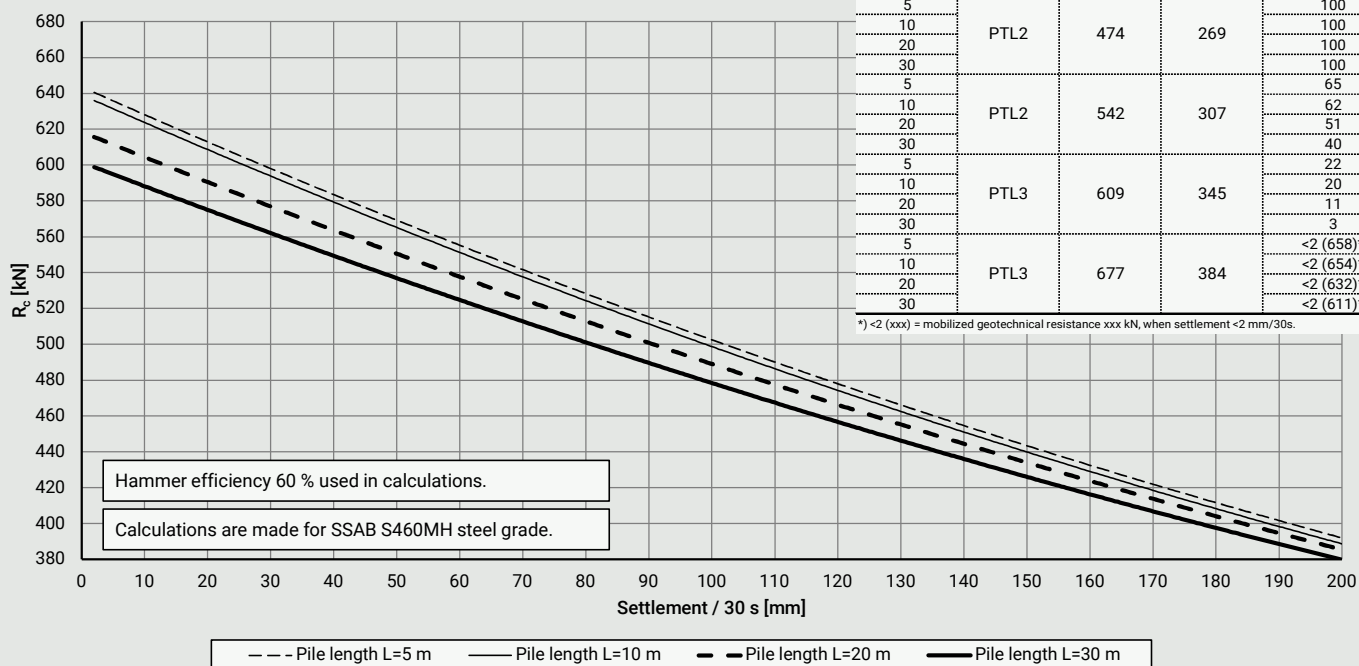
Diameter of the tool [mm]	D_t	130
Height of the tool [mm]	L_t	700
Tool weight [kg]	m_t	70

Hammer efficiency 60 %

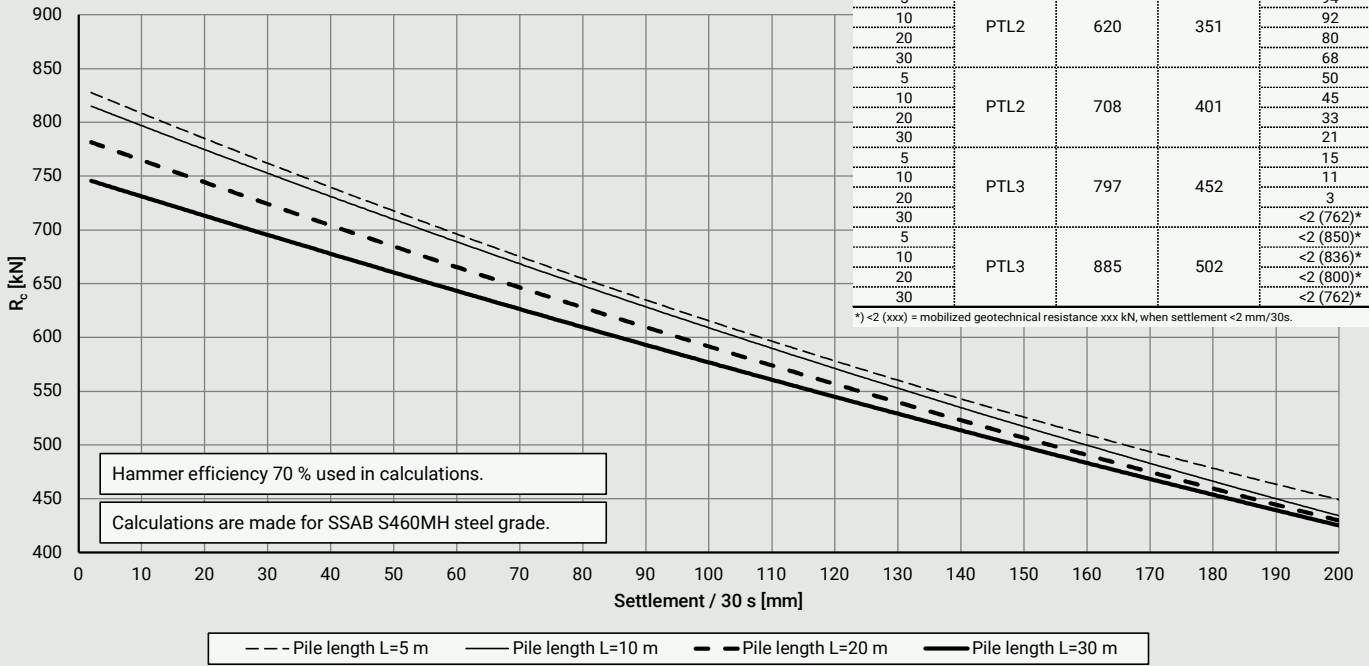
Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	406	230	100
10				100
20				100
30				100
5	PTL2	474	269	100
10				100
20				100
30				100
5	PTL2	542	307	65
10				62
20				51
30				40
5	PTL3	609	345	22
10				20
20				11
30				3
5	PTL3	677	384	<2 (658)*
10				<2 (654)*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

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

Rammer S56 - RR90



Rammer S56 - RR115/6.3

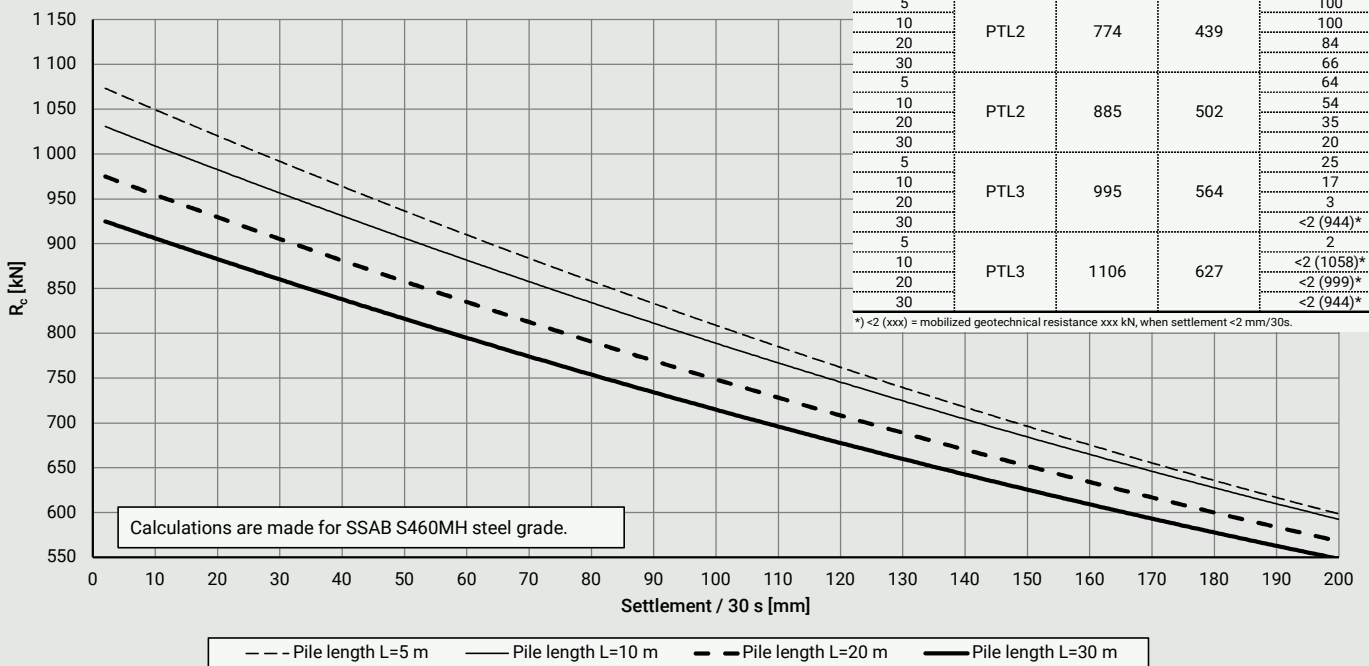


Hammer efficiency 70 %

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

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

Rammer S56 - RR115/8

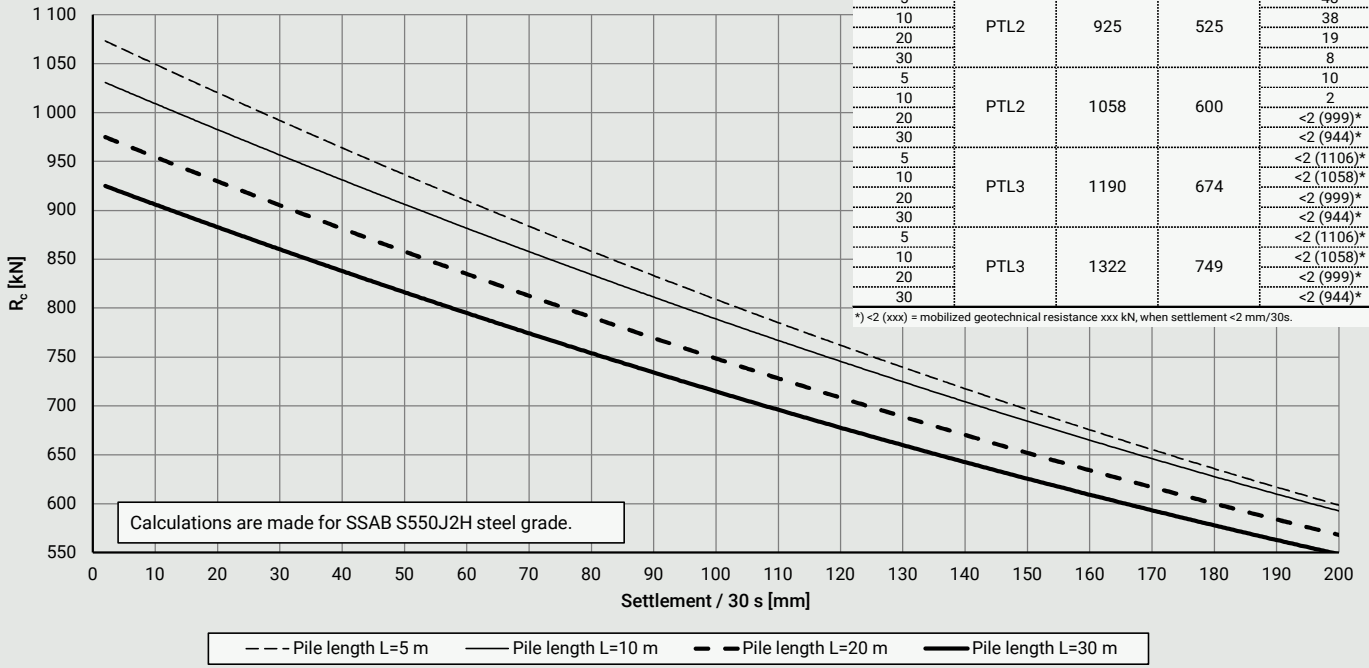


Hammer efficiency 80 %

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

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

Rammer S56 - RR115/8

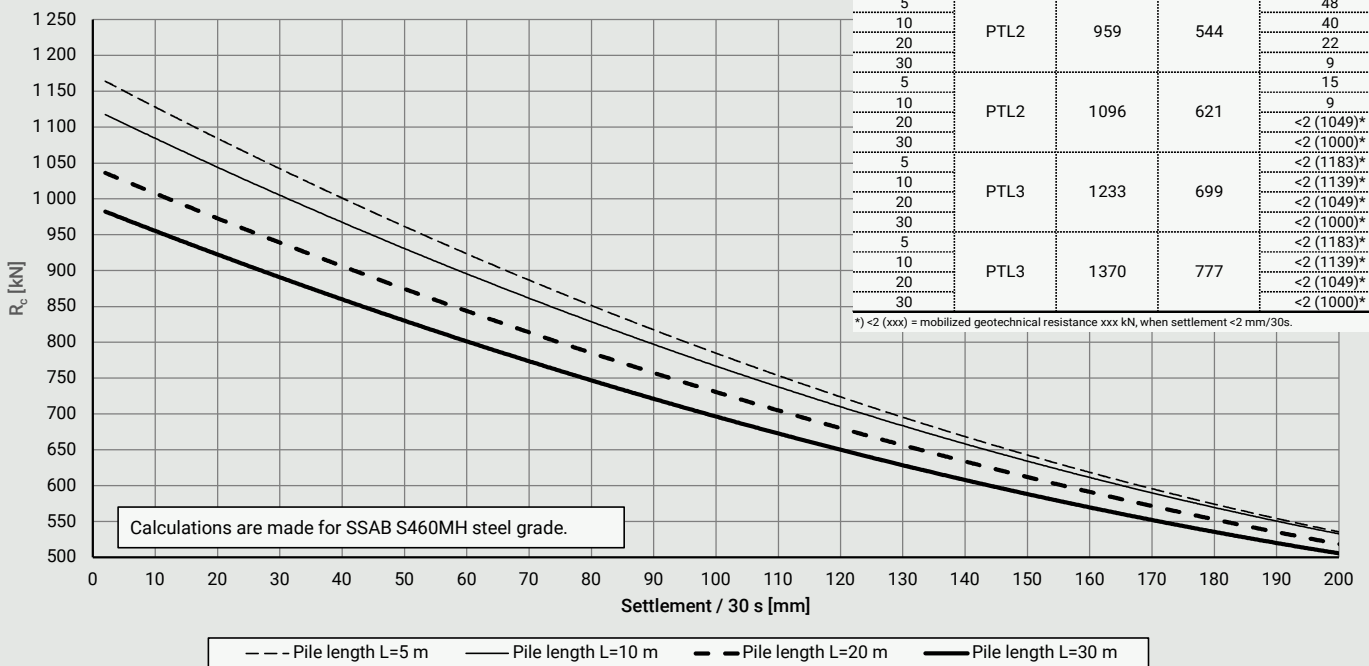


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5				100
10				96
20				74
30				56
5				48
10	PTL1	793	450	38
20				19
30				8
5				10
10	PTL2	925	525	2
20				<2 (999)*
30				<2 (944)*
5				<2 (1106)*
10	PTL3	1190	674	<2 (1058)*
20				<2 (999)*
30				<2 (944)*
5				<2 (1106)*
10	PTL3	1322	749	<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				90
10				83
20				67
30				51
5				48
10	PTL1	822	466	40
20				22
30				9
5				15
10	PTL2	959	544	9
20				9
30				<2 (1049)*
5				<2 (1000)*
10	PTL3	1233	699	<2 (1183)*
20				<2 (1139)*
30				<2 (1049)*
5				<2 (1183)*
10	PTL3	1370	777	<2 (1139)*
20				<2 (1049)*
30				<2 (1000)*

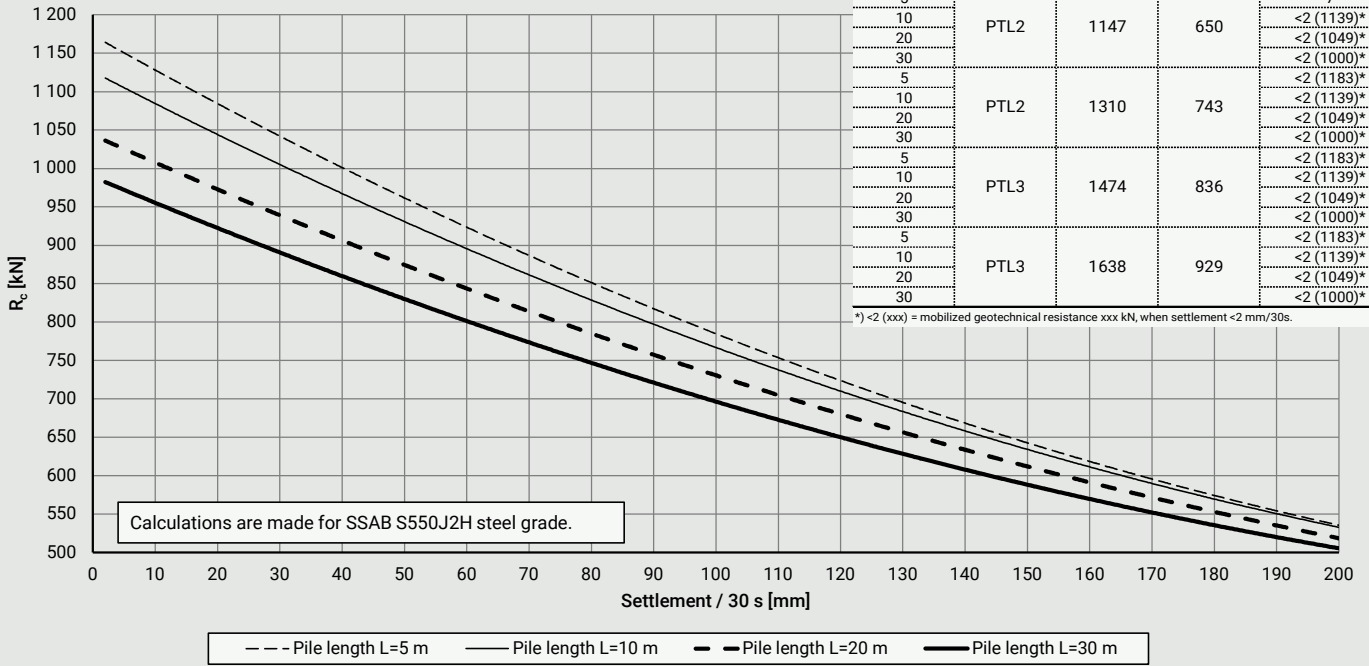
*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Hammer efficiency 80 %

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

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

Rammer S56 - RRs140/8

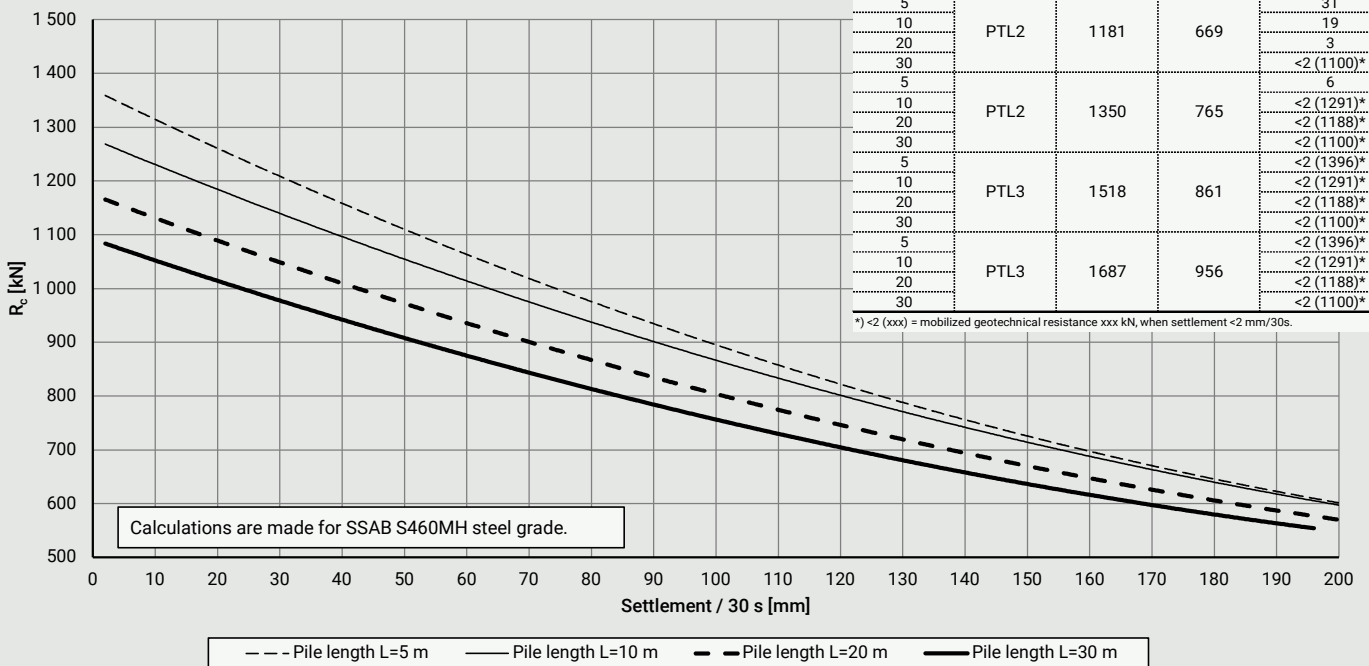


Hammer efficiency 80 %

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

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

Rammer S56 - RR140/10

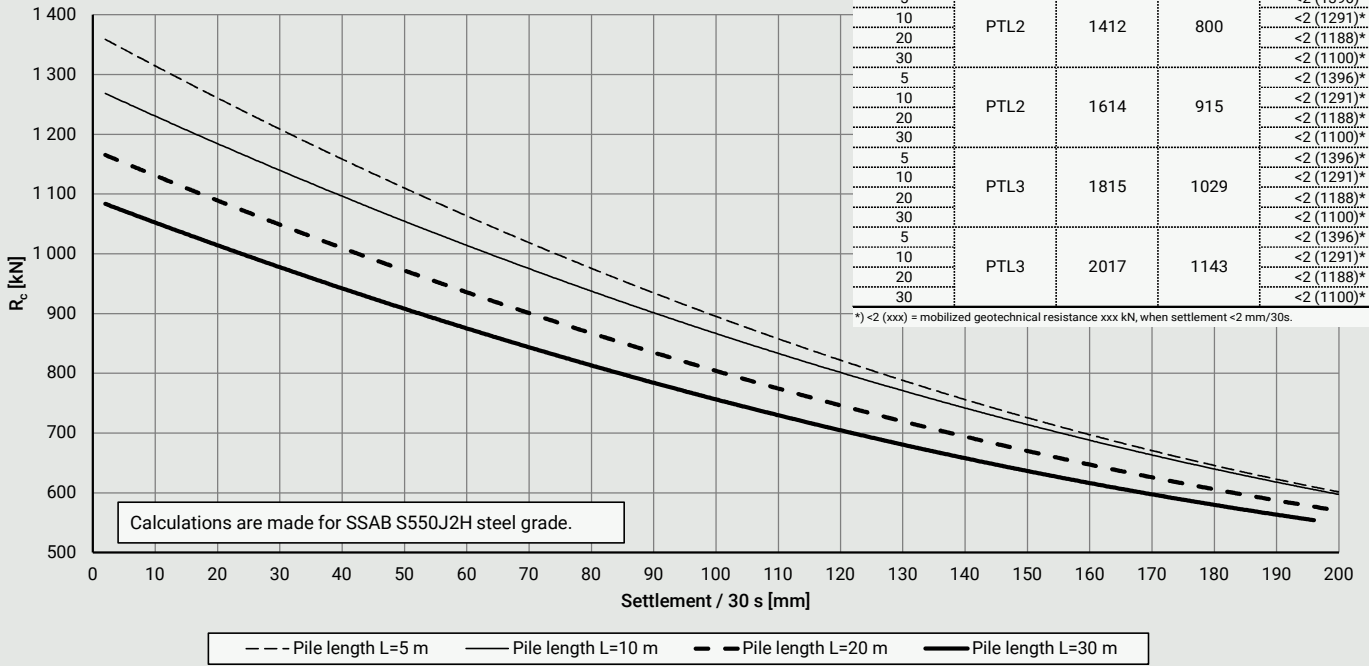


Hammer efficiency 80 %

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

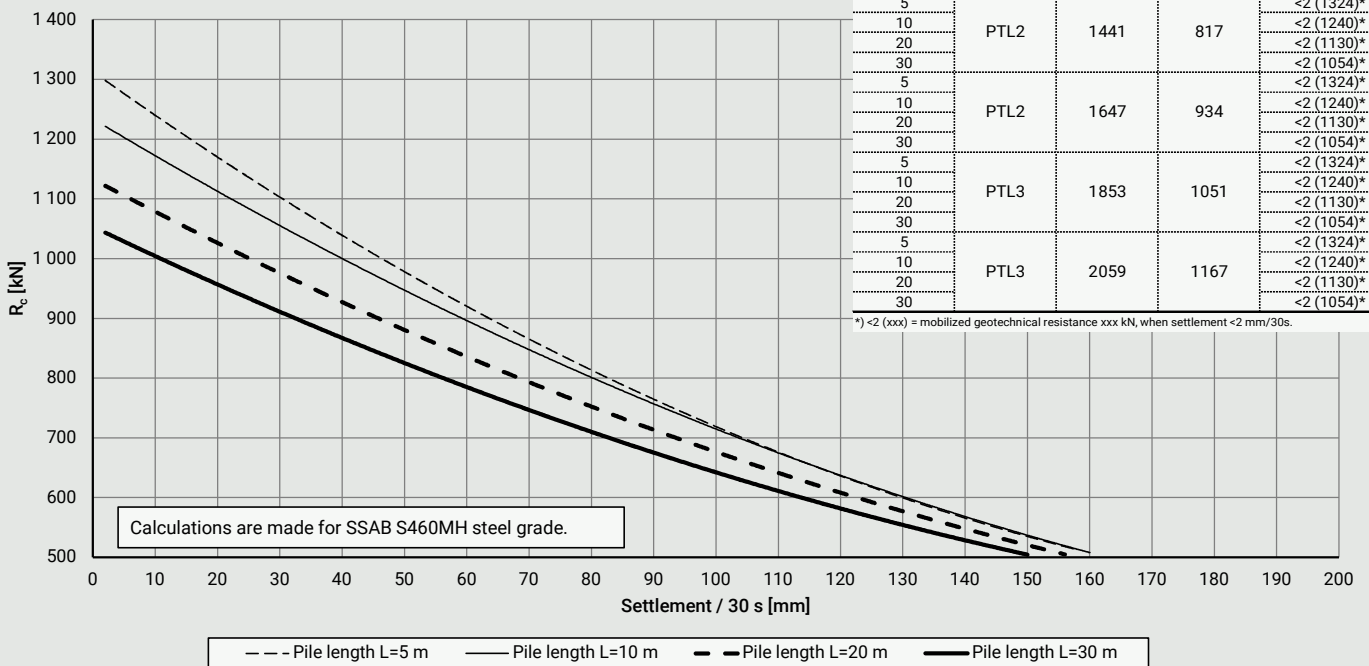


Hammer efficiency 80 %

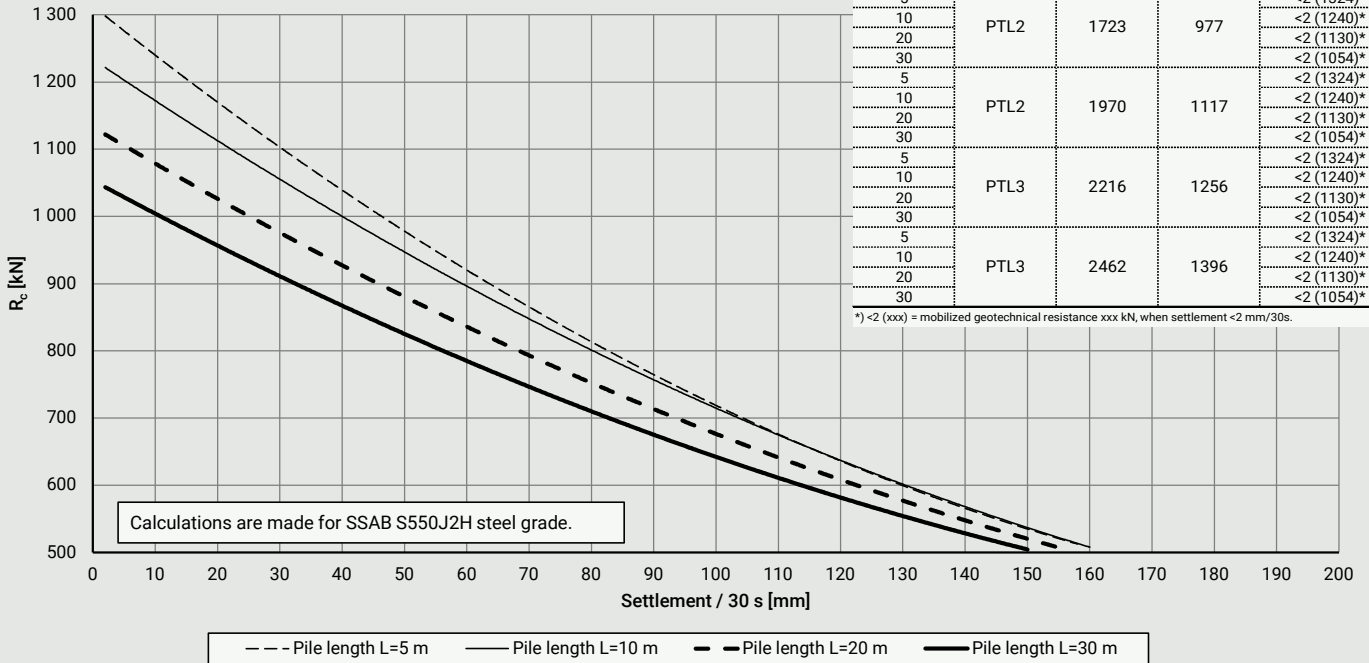
Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5				10
10				2
20	PTL1	1235	700	<2 (1130)*
30				<2 (1054)*
5				<2 (1324)*
10	PTL2	1441	817	<2 (1240)*
20				<2 (1130)*
30				<2 (1054)*
5	PTL2	1647	934	<2 (1324)*
10				<2 (1240)*
20				<2 (1130)*
30	PTL3	1853	1051	<2 (1054)*
5				<2 (1324)*
10				<2 (1240)*
20	PTL3	2059	1167	<2 (1130)*
30				<2 (1054)*
5				<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 - RR170/10



Rammer S56 - RR_s170/10

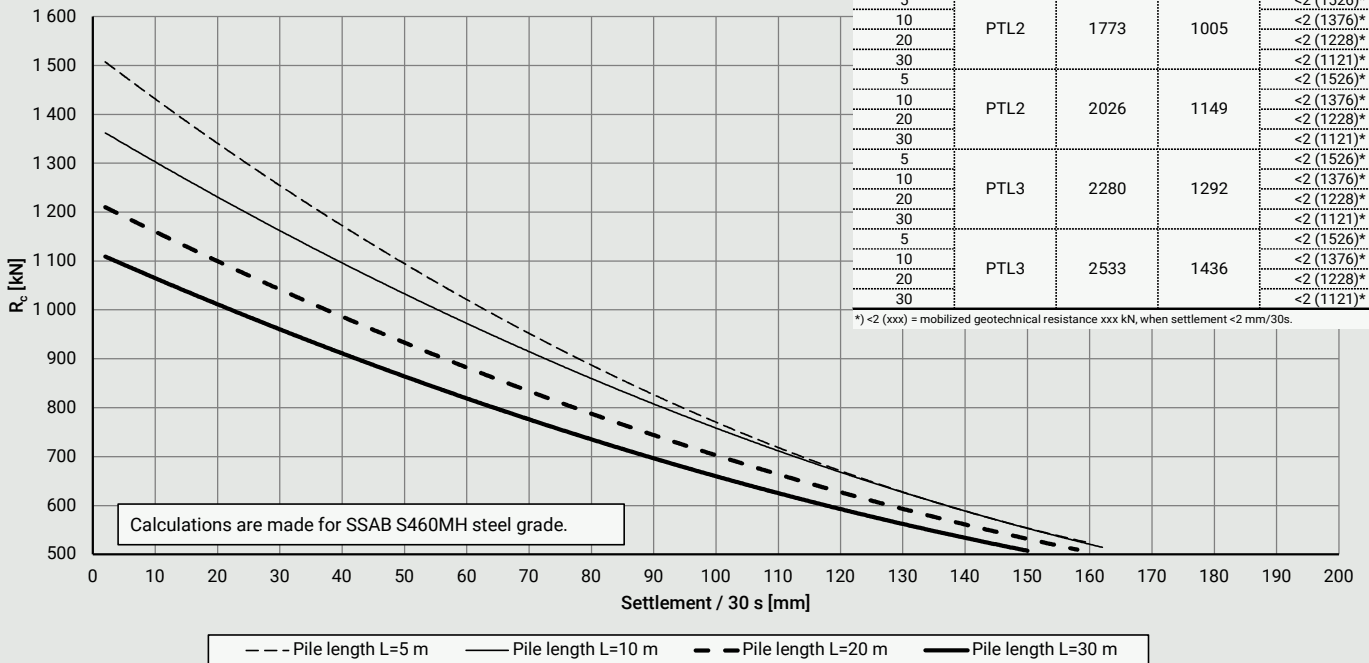


Hammer efficiency 80 %

Pile length [m]	Piling work class	R _c [kN]	R _d [kN]	Settlement / 30 s [mm]
5				<2 (1324)*
10				<2 (1240)*
20				<2 (1130)*
30				<2 (1054)*
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				2
10				<2 (1376)*
20				<2 (1228)*
30				<2 (1121)*
5	PTL1	1520	862	<2 (1526)*
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

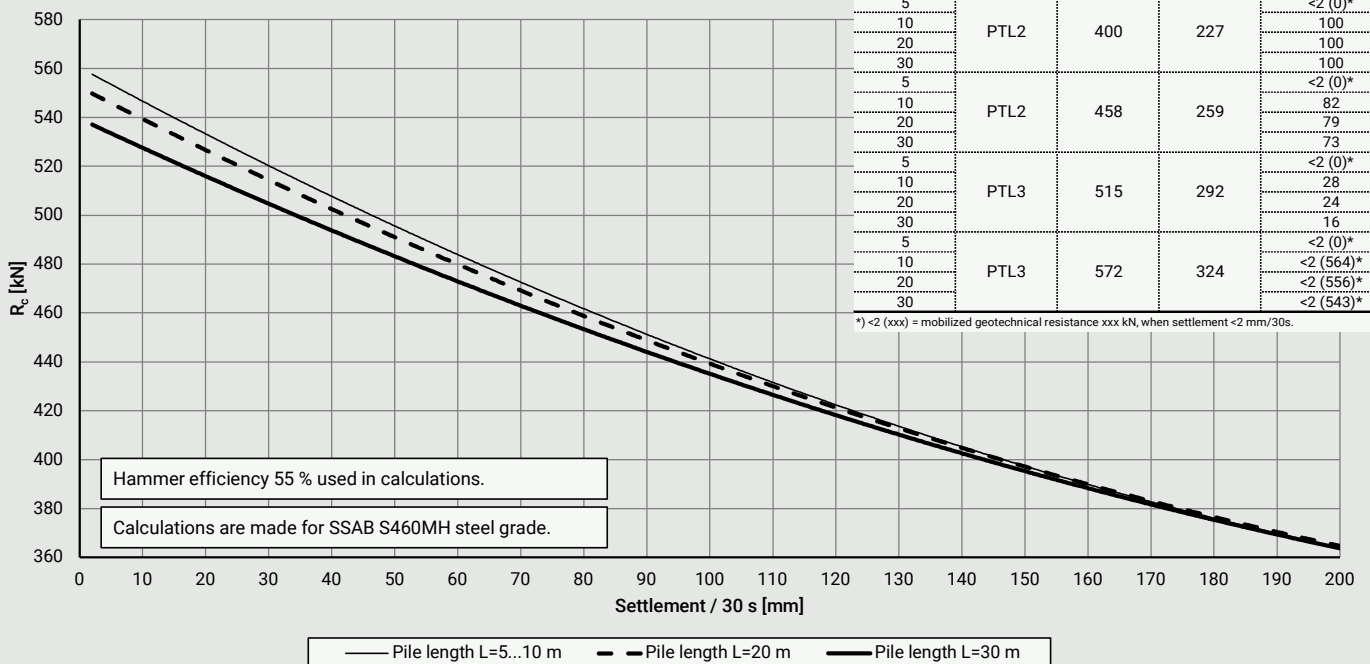
Diameter of the tool [mm]	D_t	130
Height of the tool [mm]	L_t	900
Tool weight [kg]	m_t	90

Hammer efficiency 55 %

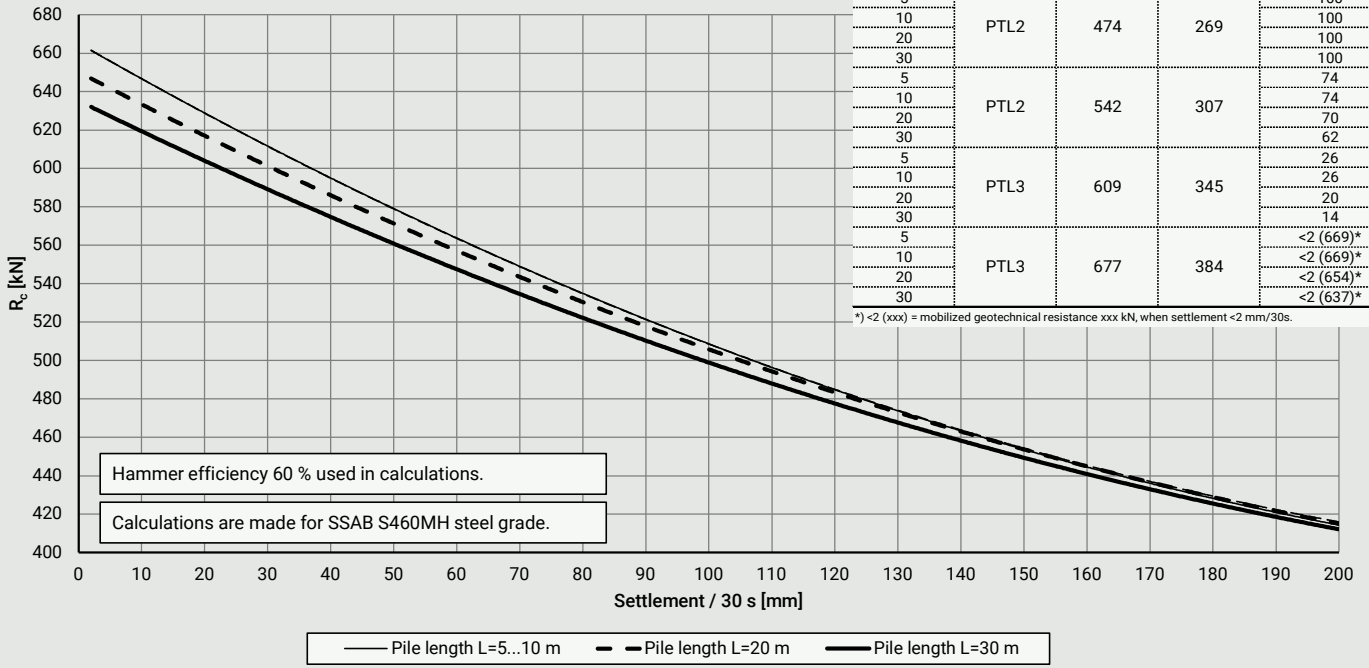
Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	343	195	<2 (0)*
10				100
20				100
30				100
5	PTL2	400	227	<2 (0)*
10				100
20				100
30				100
5	PTL2	458	259	<2 (0)*
10				82
20				79
30				73
5	PTL3	515	292	<2 (0)*
10				28
20				24
30				16
5	PTL3	572	324	<2 (0)*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

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

Rammer E68 - RR75



Rammer E68 - RR90

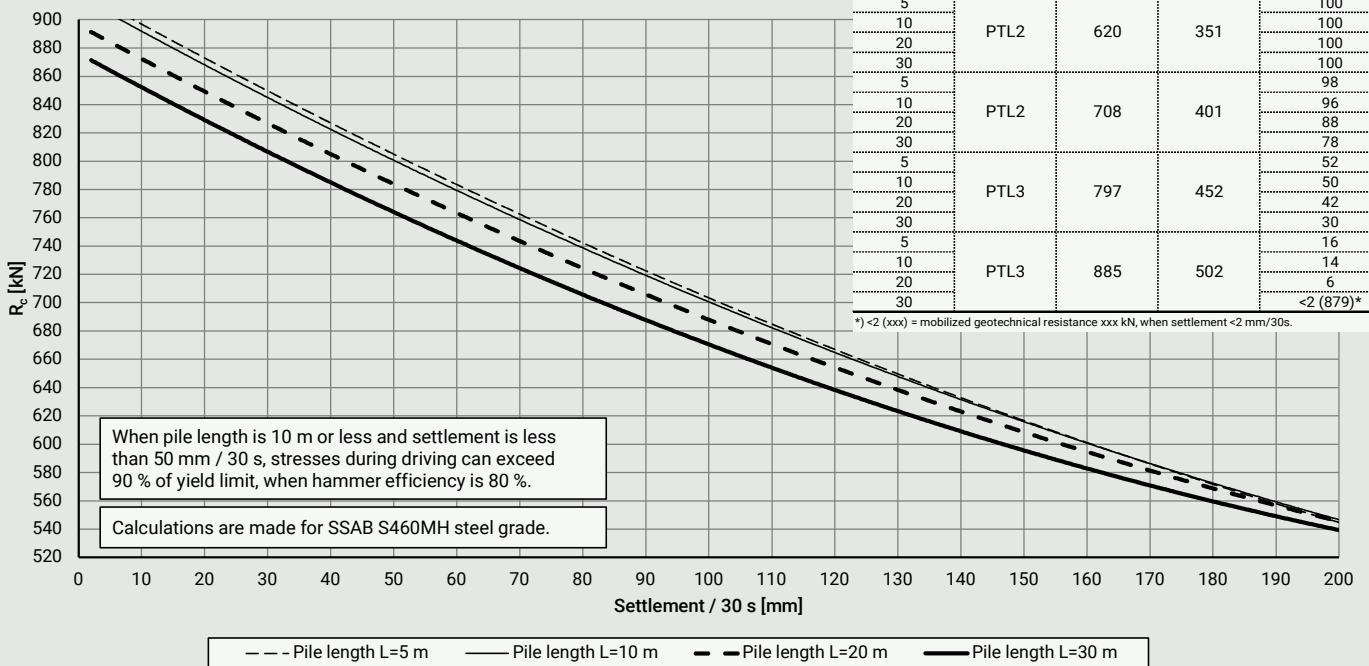


Hammer efficiency 60 %

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	PTL2	474	269	100
5				100
10				100
20	PTL2	542	307	74
5				74
10				70
20	PTL3	609	345	62
5				26
10				26
20	PTL3	677	384	20
5				14
10				<2 (669)*
20	<2 (669)*			
30	<2 (654)*			
				<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	PTL2	620	351	100
5				100
10				100
20	PTL2	708	401	98
5				96
10				88
20	PTL3	797	452	78
5				52
10				50
20	PTL3	885	502	42
5				30
10				16
20	14			
30	6			
				<2 (879)*

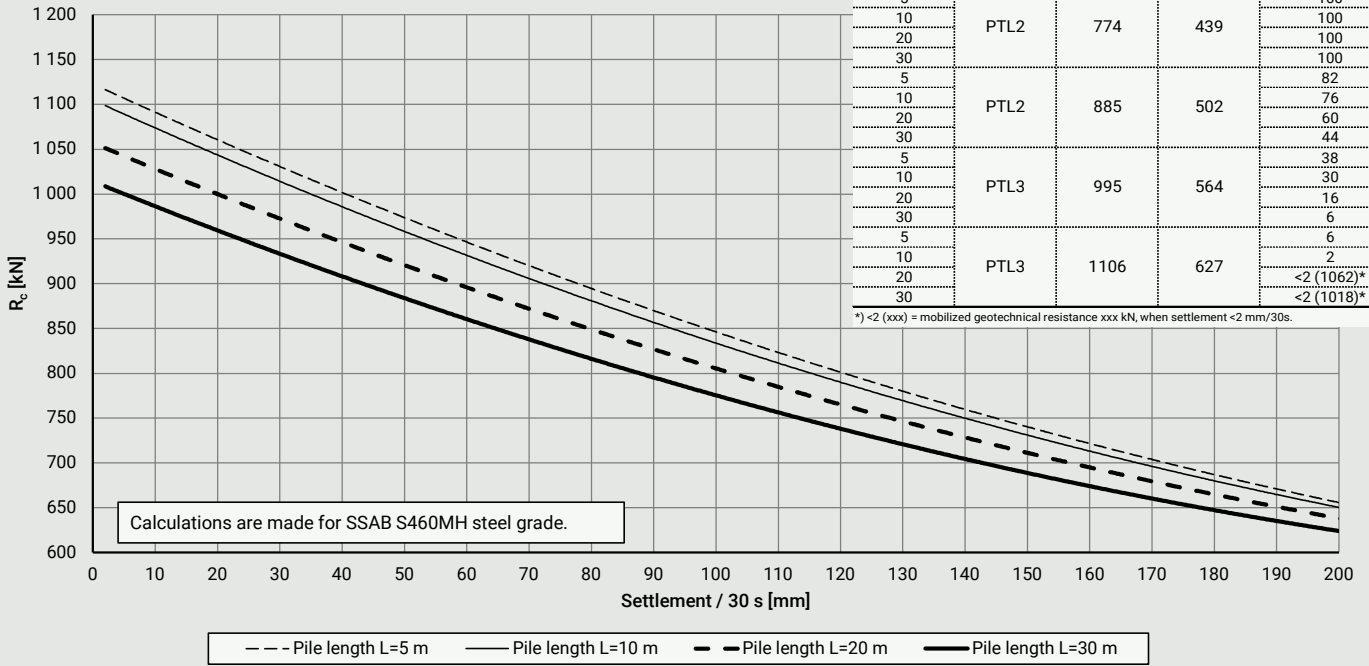
*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Hammer efficiency 80 %

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

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

Rammer E68 - RR115/8

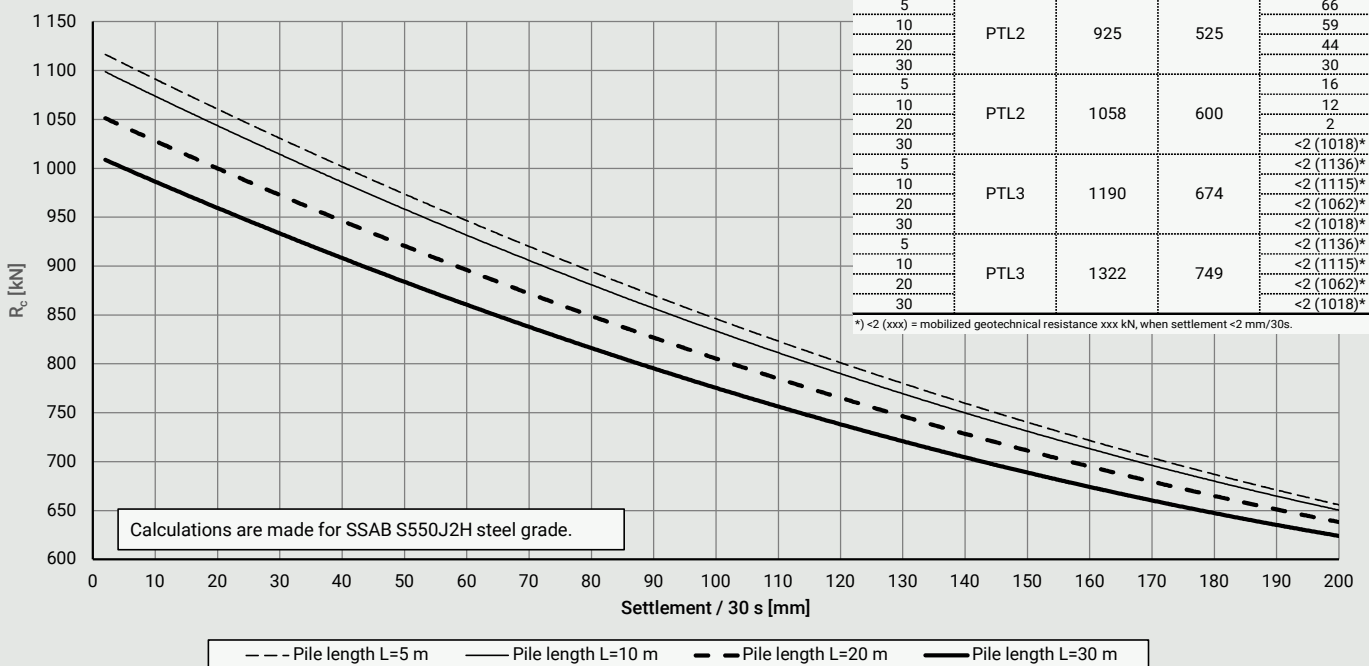


Hammer efficiency 80 %

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

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

Rammer E68 - RRs115/8

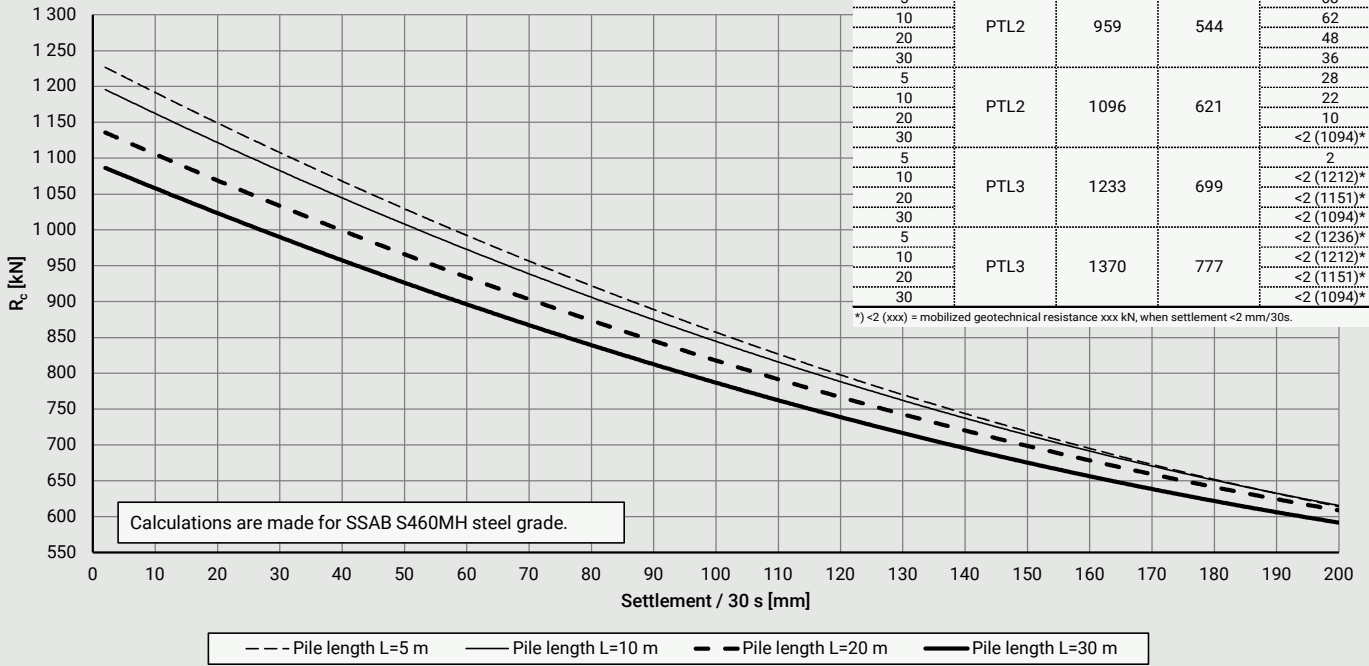


Hammer efficiency 80 %

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

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

Rammer E68 - RR140/8

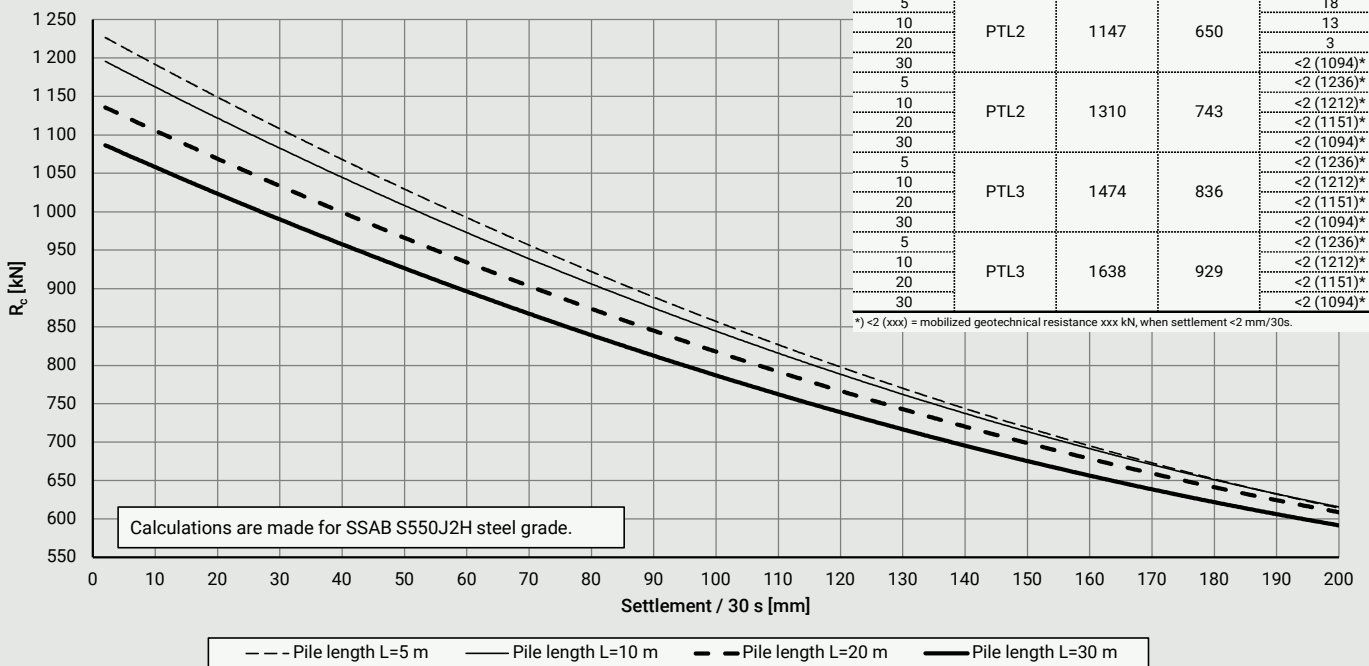


Hammer efficiency 80 %

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

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

Rammer E68 - RRs140/8

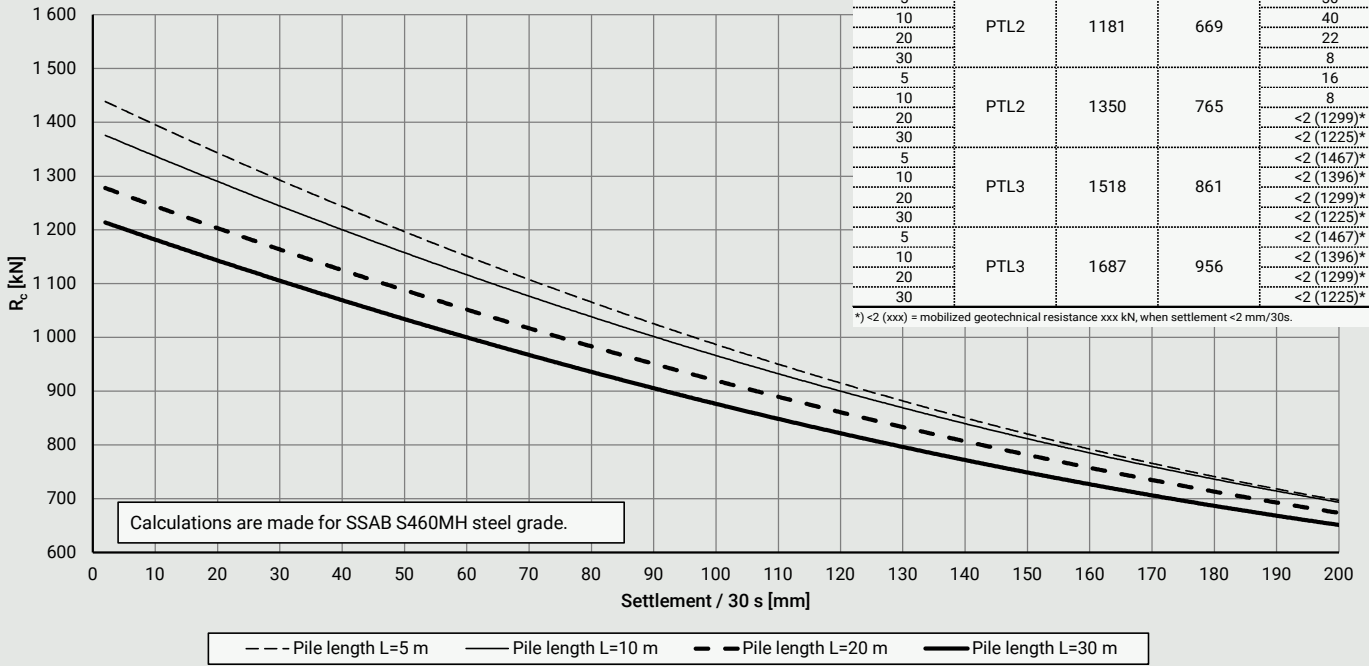


Hammer efficiency 80 %

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

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

Rammer E68 - RR140/10

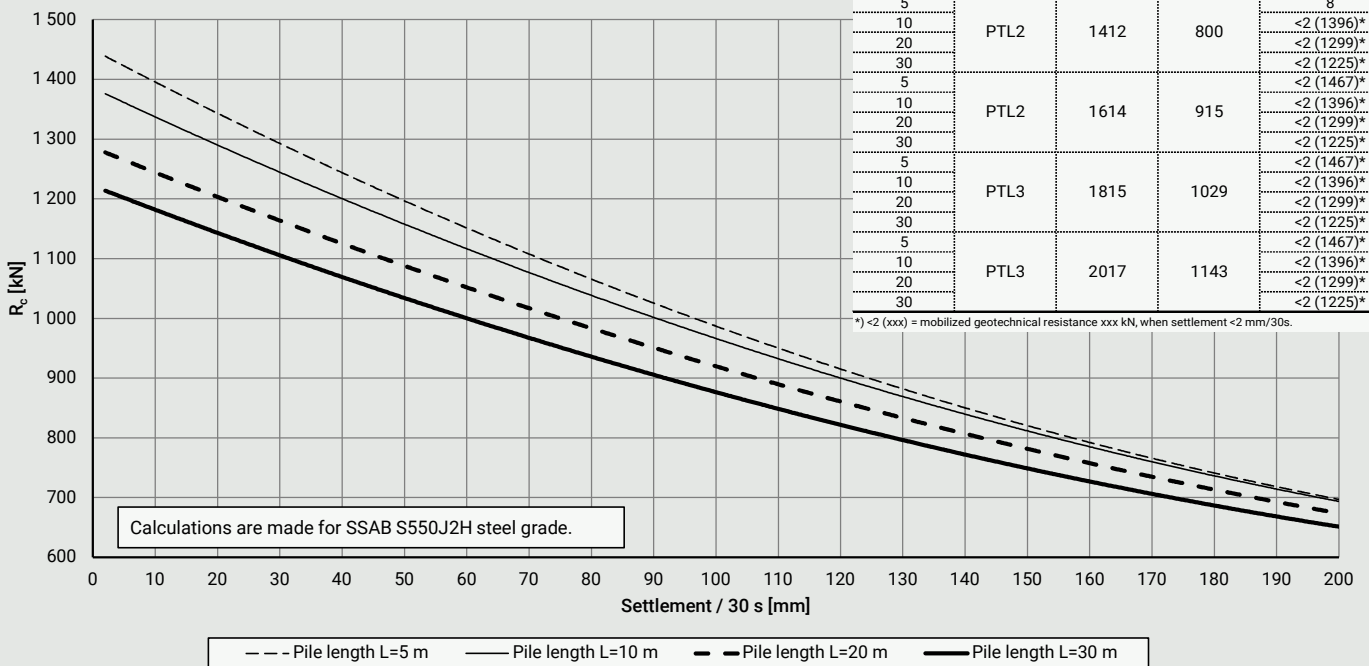


Hammer efficiency 80 %

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

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

Rammer E68 - RRs140/10

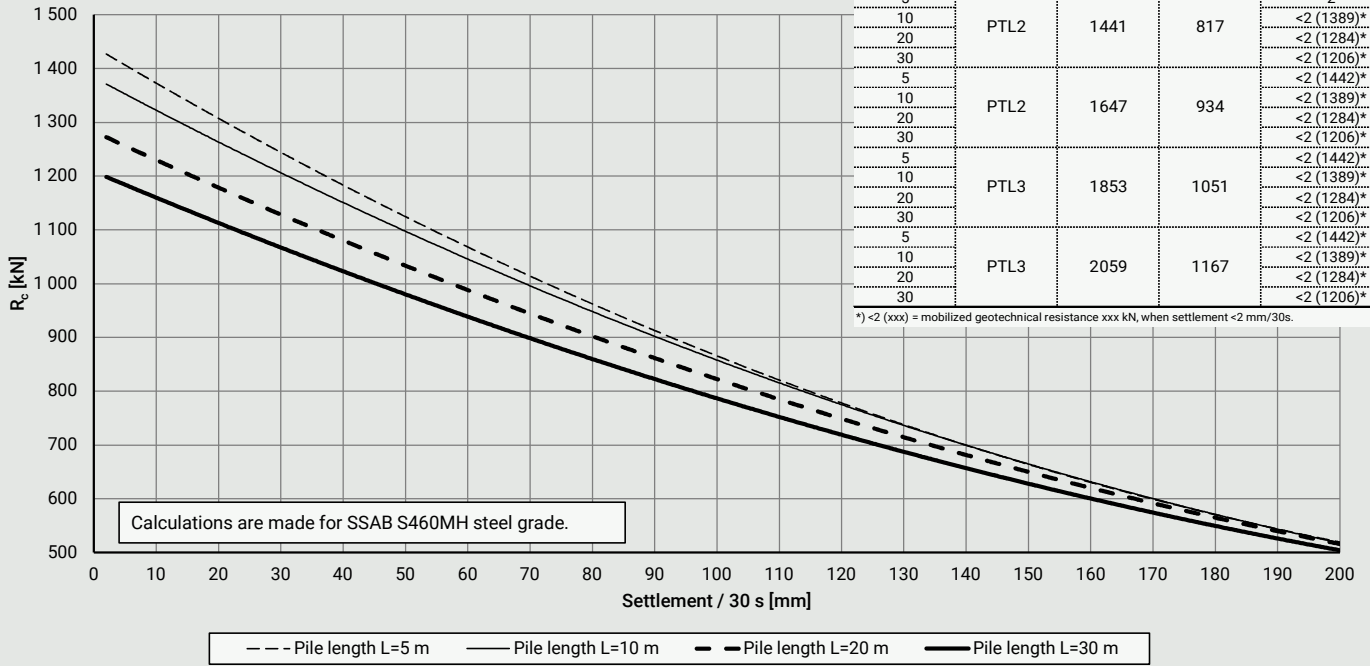


Hammer efficiency 80 %

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

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

Rammer E68 - RR170/10

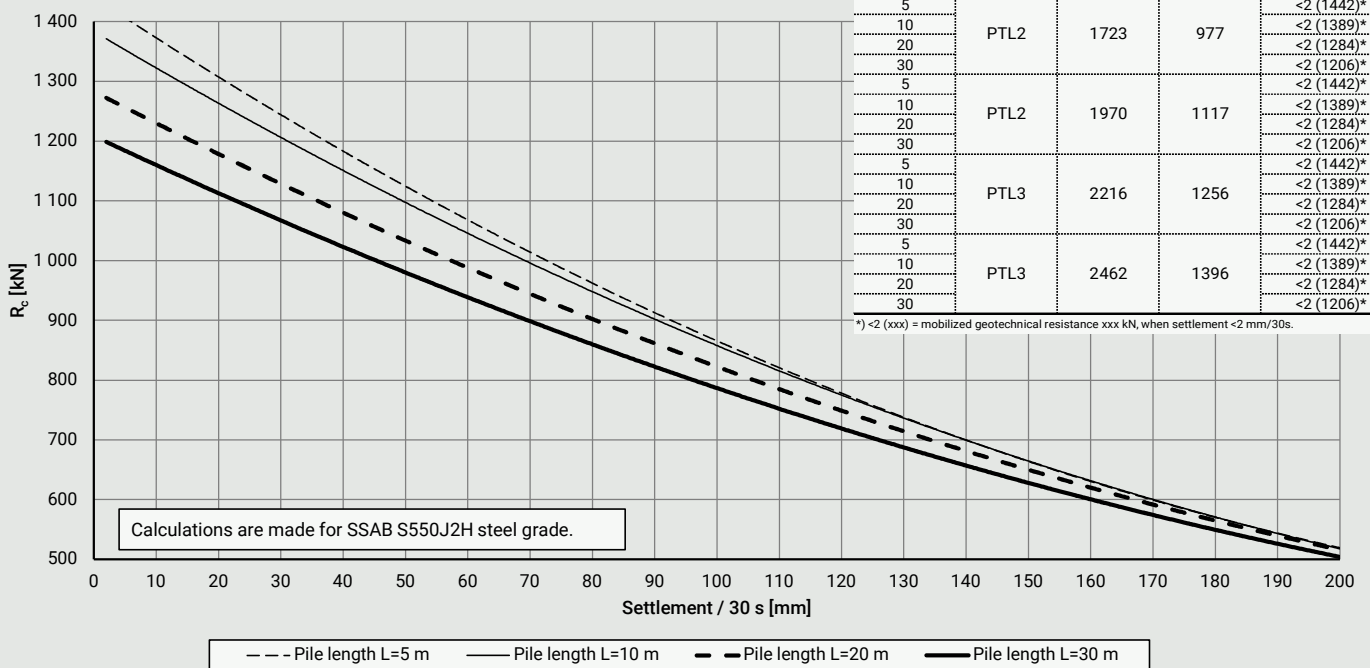


Hammer efficiency 80 %

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

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

Rammer E68 - RRs170/10



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

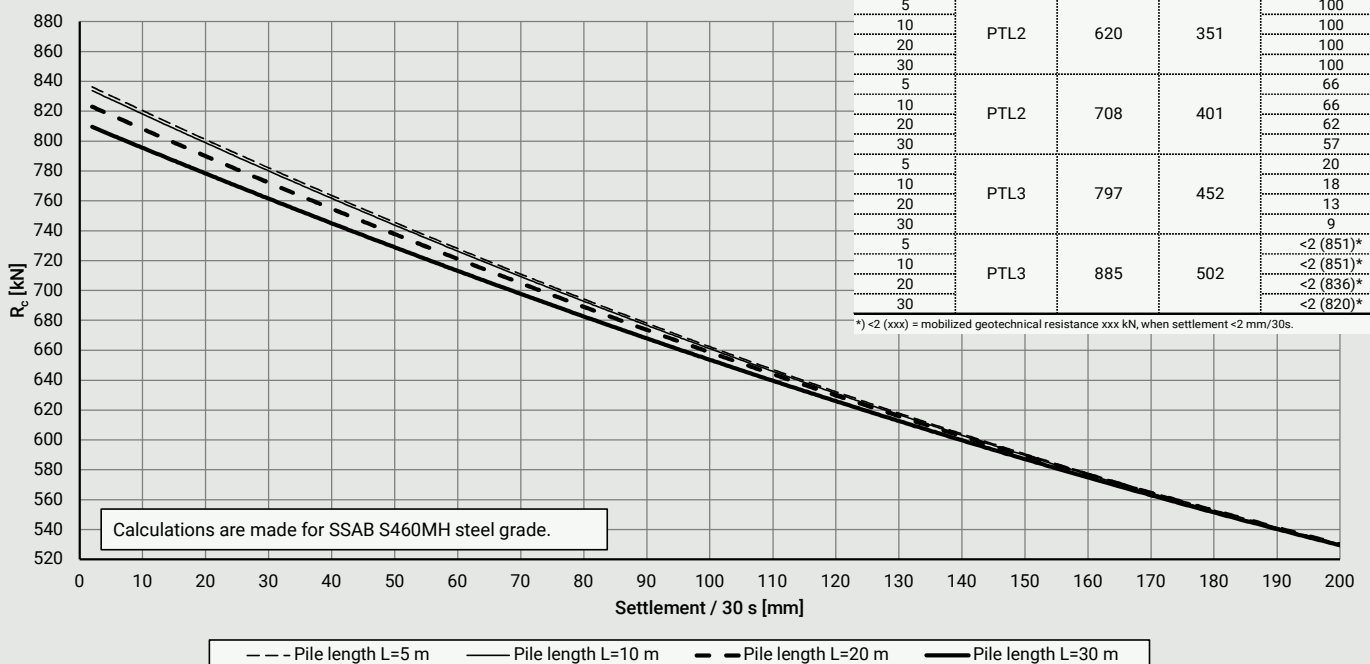
Diameter of the tool [mm]	D_t	140
Height of the tool [mm]	L_t	1200
Tool weight [kg]	m_t	127

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

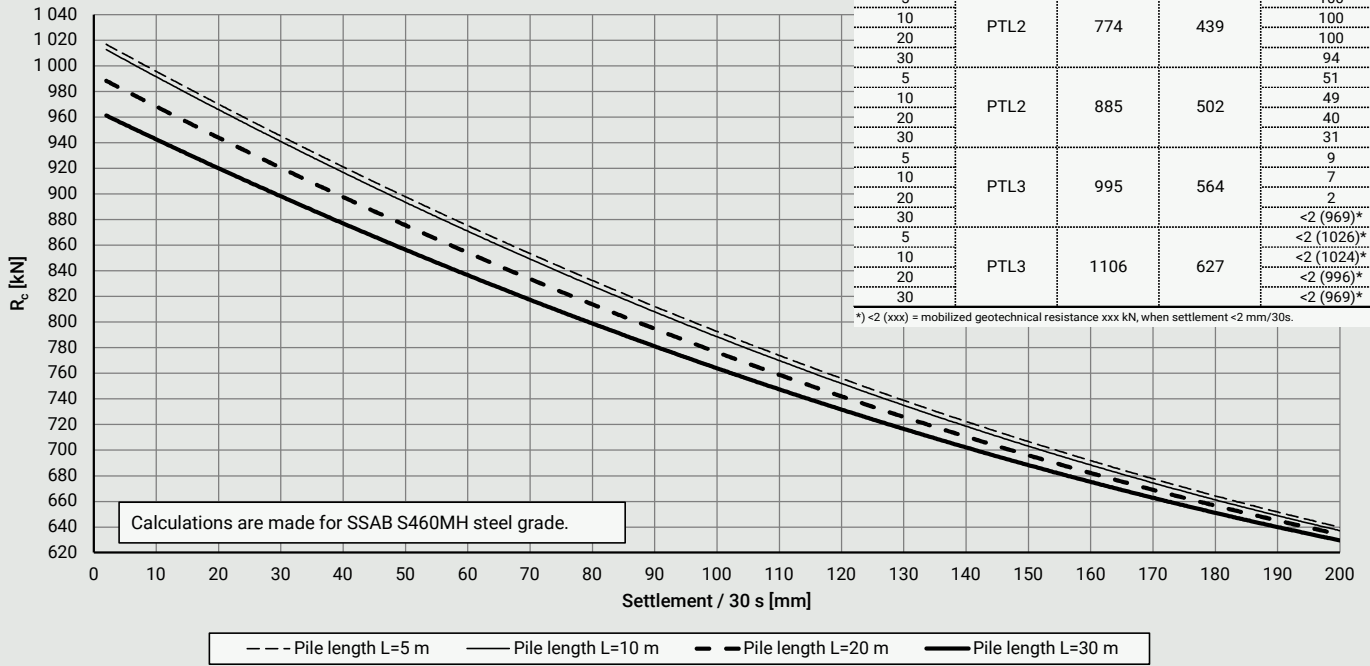


Hammer efficiency 80 %

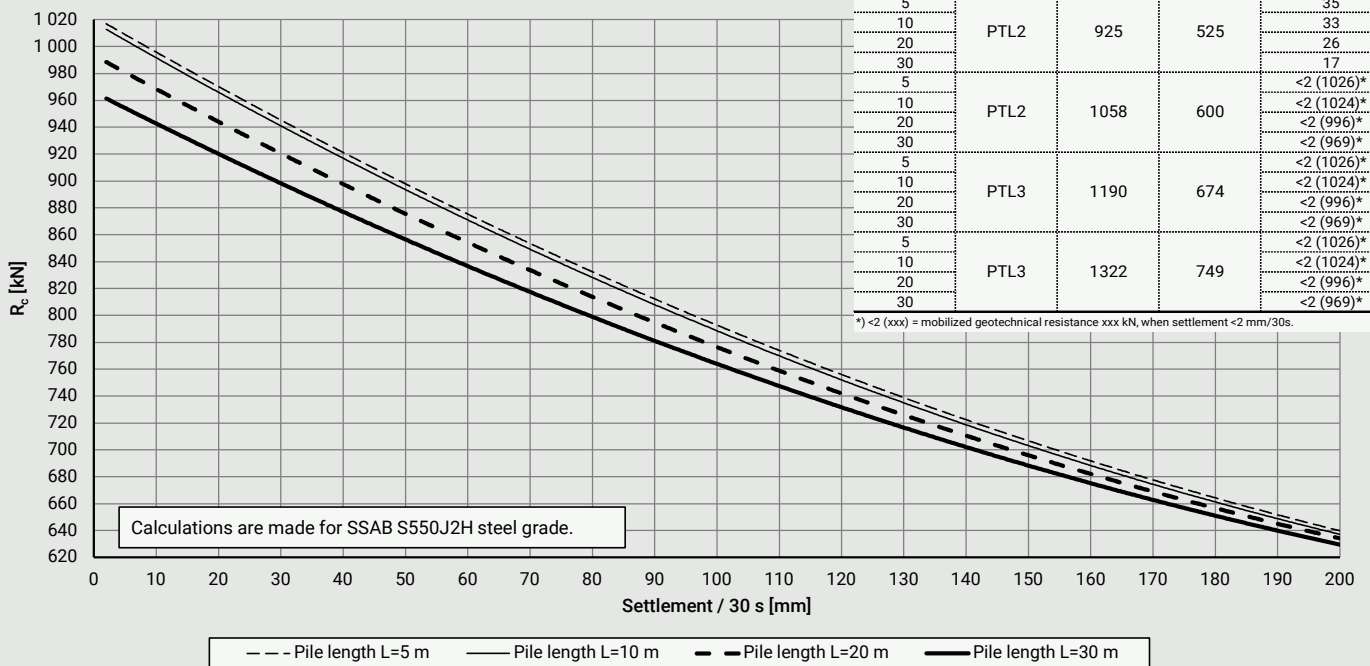
Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5				100
10				100
20	PTL1	664	376	100
30				100
5				100
10				100
20	PTL2	774	439	100
30				94
5				51
10				49
20	PTL2	885	502	40
30				31
5				9
10				7
20	PTL3	995	564	2
30				<2 (969)*
5				<2 (1026)*
10				<2 (1024)*
20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

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

Rammer G80 - RR115/8



Rammer G80 - RRs115/8

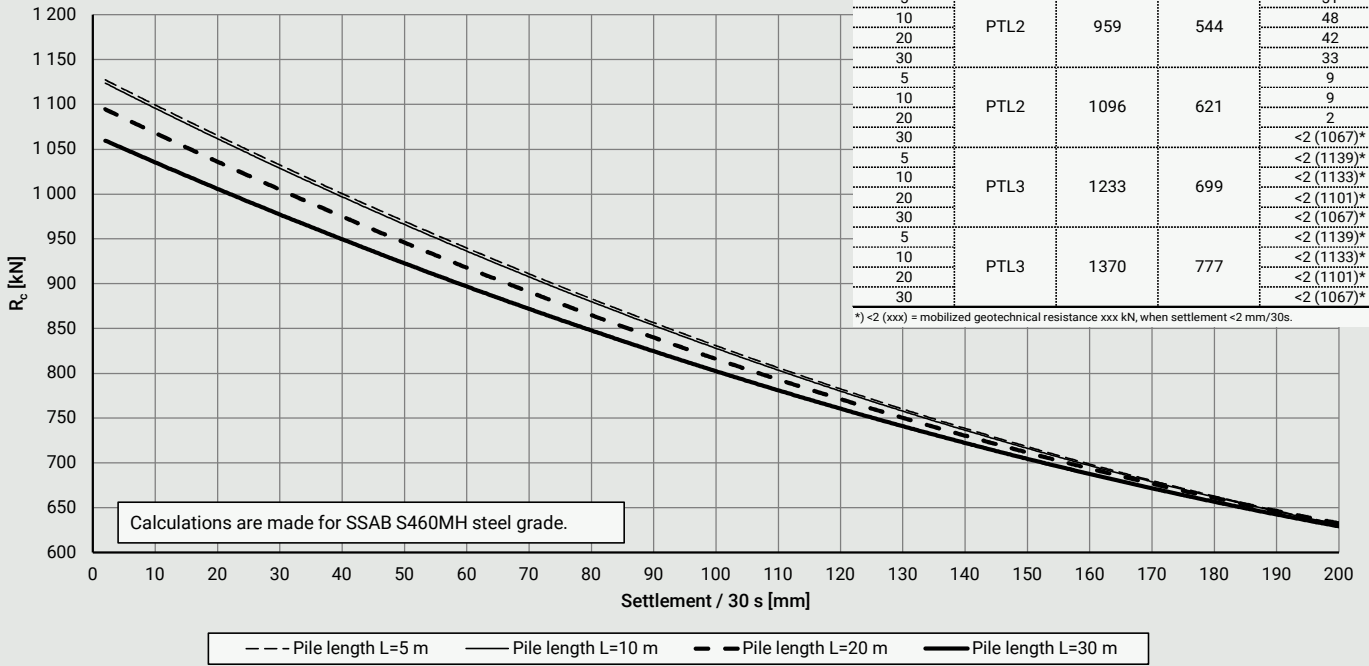


Hammer efficiency 80 %

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

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

Rammer G80 - RR140/8

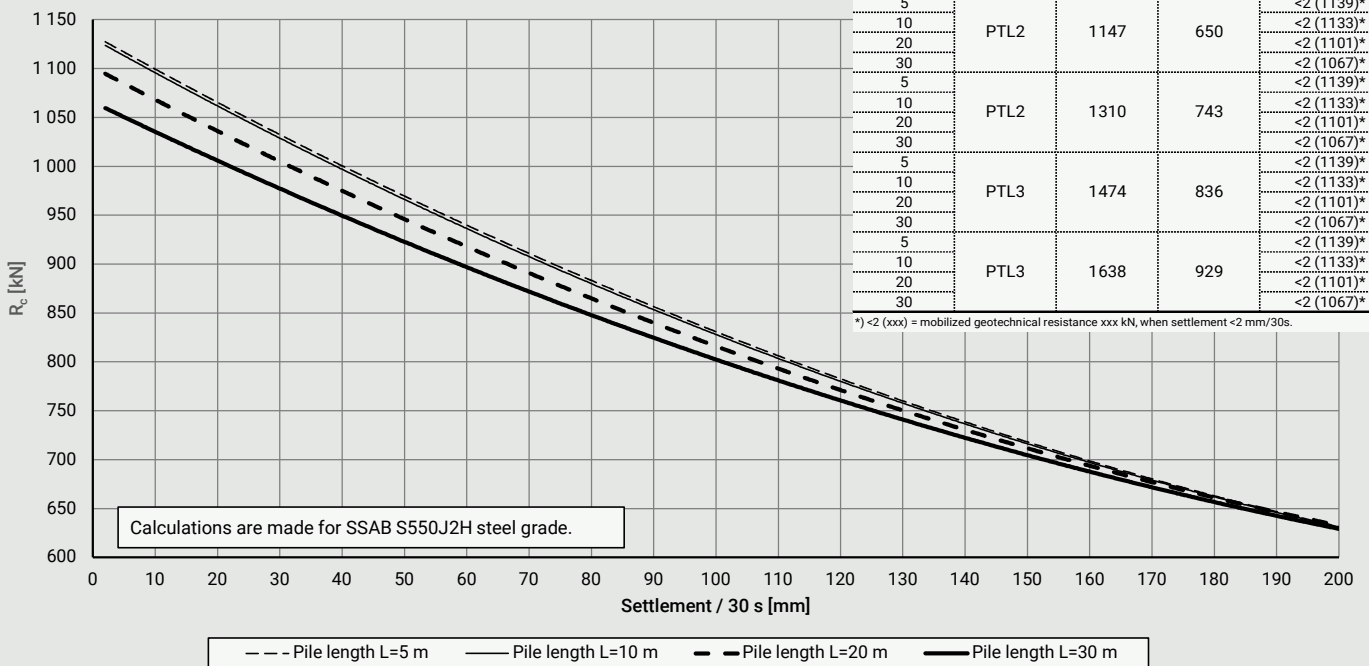


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5				100
10				100
20	PTL1	822	466	99
30				92
5				51
10				48
20	PTL2	959	544	42
30				33
5				9
10				9
20	PTL2	1096	621	2
30				<2 (1067)*
5				<2 (1139)*
10				<2 (1133)*
20	PTL3	1233	699	<2 (1101)*
30				<2 (1067)*
5				<2 (1139)*
10				<2 (1133)*
20	PTL3	1370	777	<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				43
10				42
20	PTL1	983	557	35
30				26
5				<2 (1139)*
10				<2 (1133)*
20	PTL2	1147	650	<2 (1101)*
30				<2 (1067)*
5				<2 (1139)*
10				<2 (1133)*
20	PTL2	1310	743	<2 (1101)*
30				<2 (1067)*
5				<2 (1139)*
10				<2 (1133)*
20	PTL3	1474	836	<2 (1101)*
30				<2 (1067)*
5				<2 (1139)*
10				<2 (1133)*
20	PTL3	1638	929	<2 (1101)*
30				<2 (1067)*

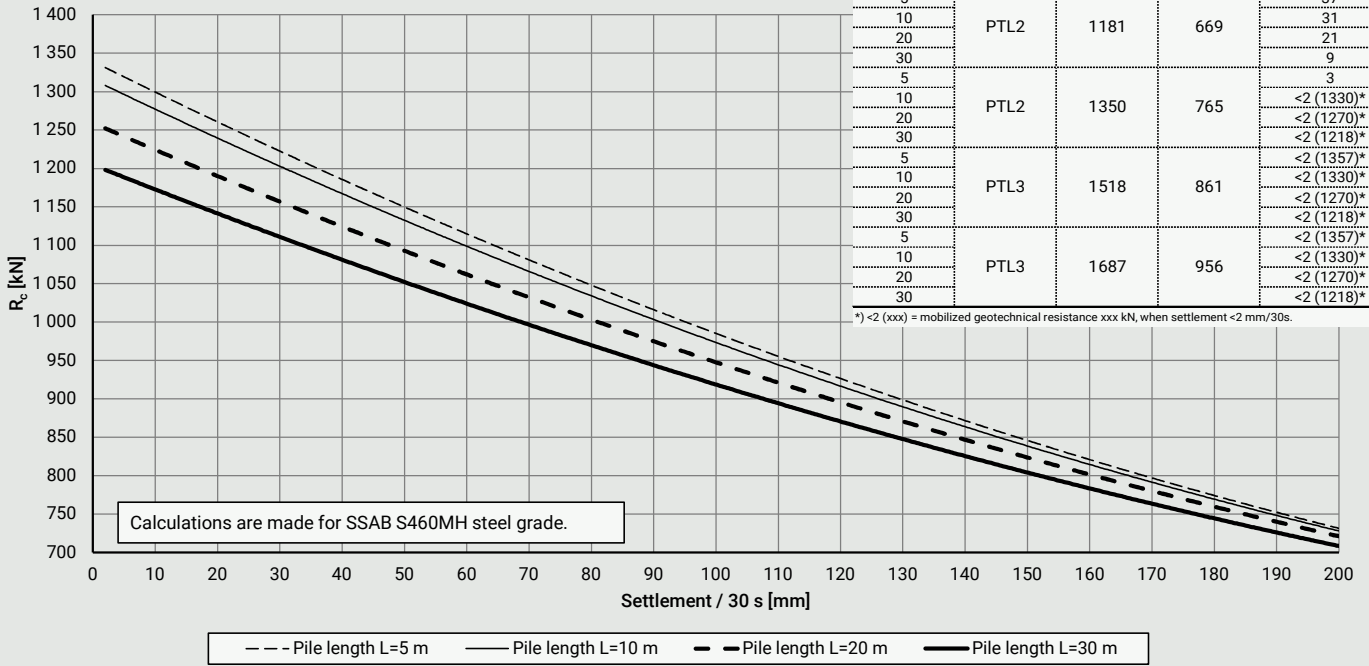
*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Hammer efficiency 80 %

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

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

Rammer G80 - RR140/10

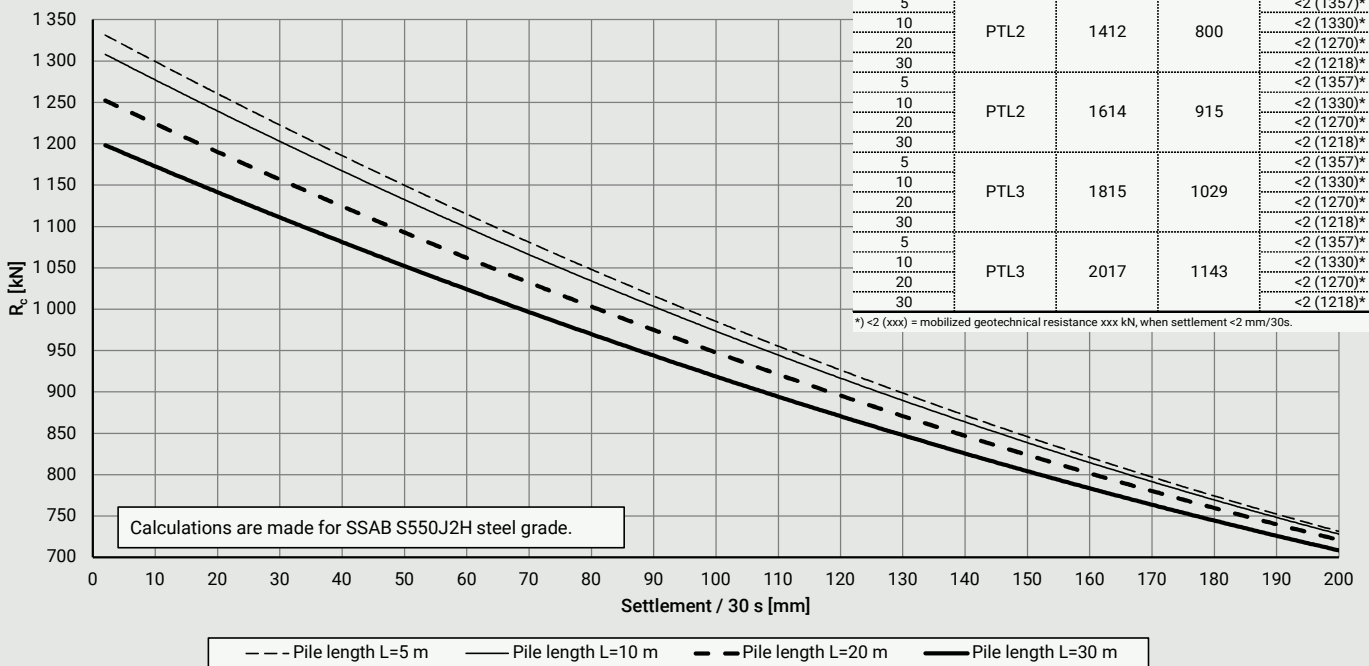


Hammer efficiency 80 %

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

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

Rammer G80 - RRs140/10



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

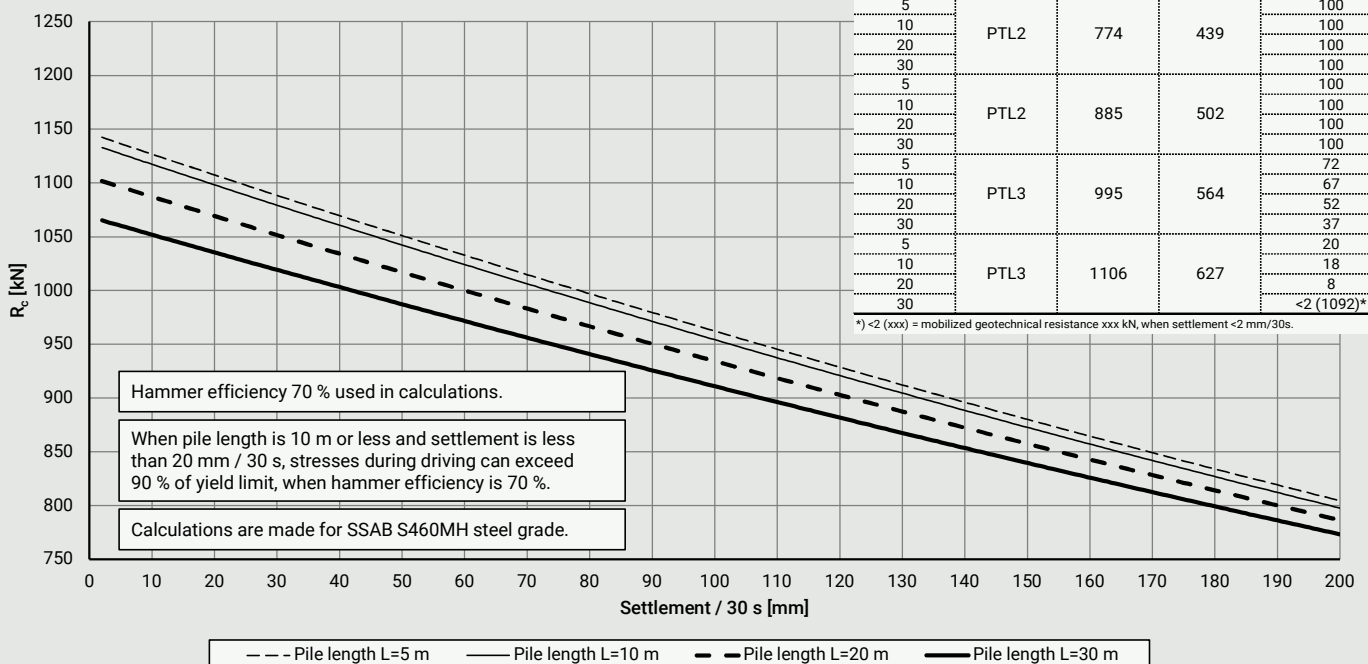
Diameter of the tool [mm]	D_t	140
Height of the tool [mm]	L_t	1050
Tool weight [kg]	m_t	120

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 - RR115/8

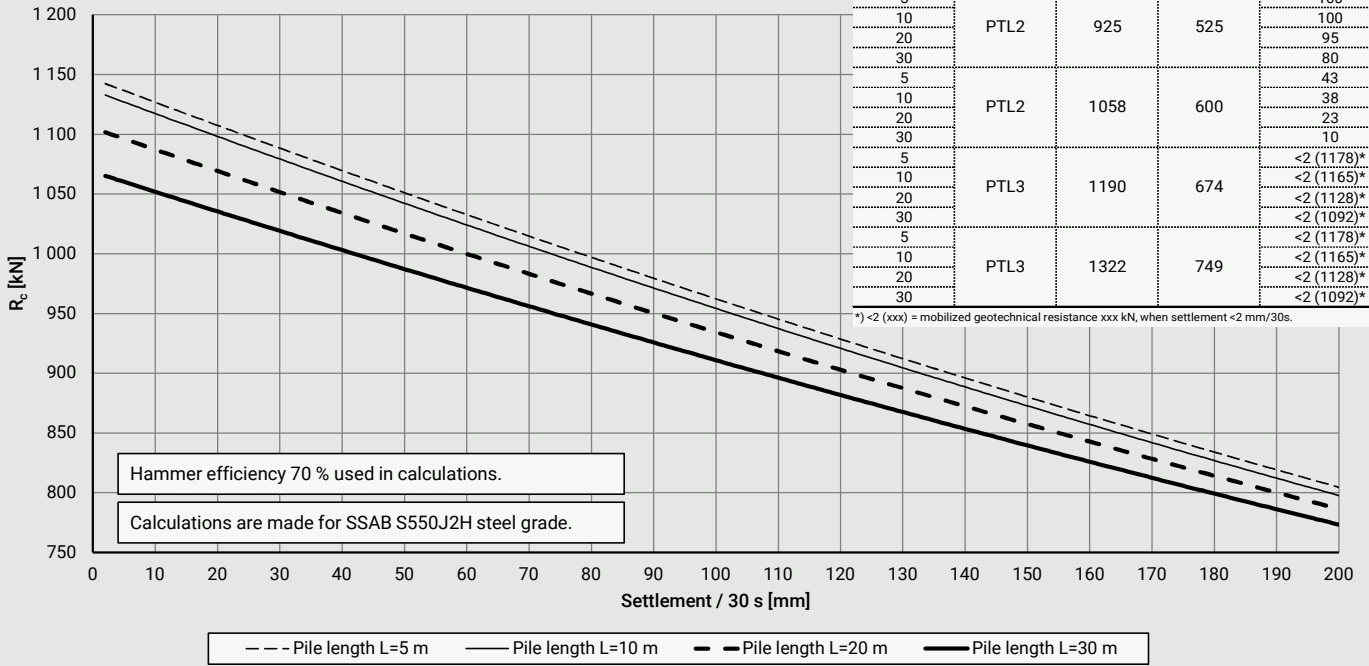


Hammer efficiency 70 %

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

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

Rammer M18 - RRs115/8

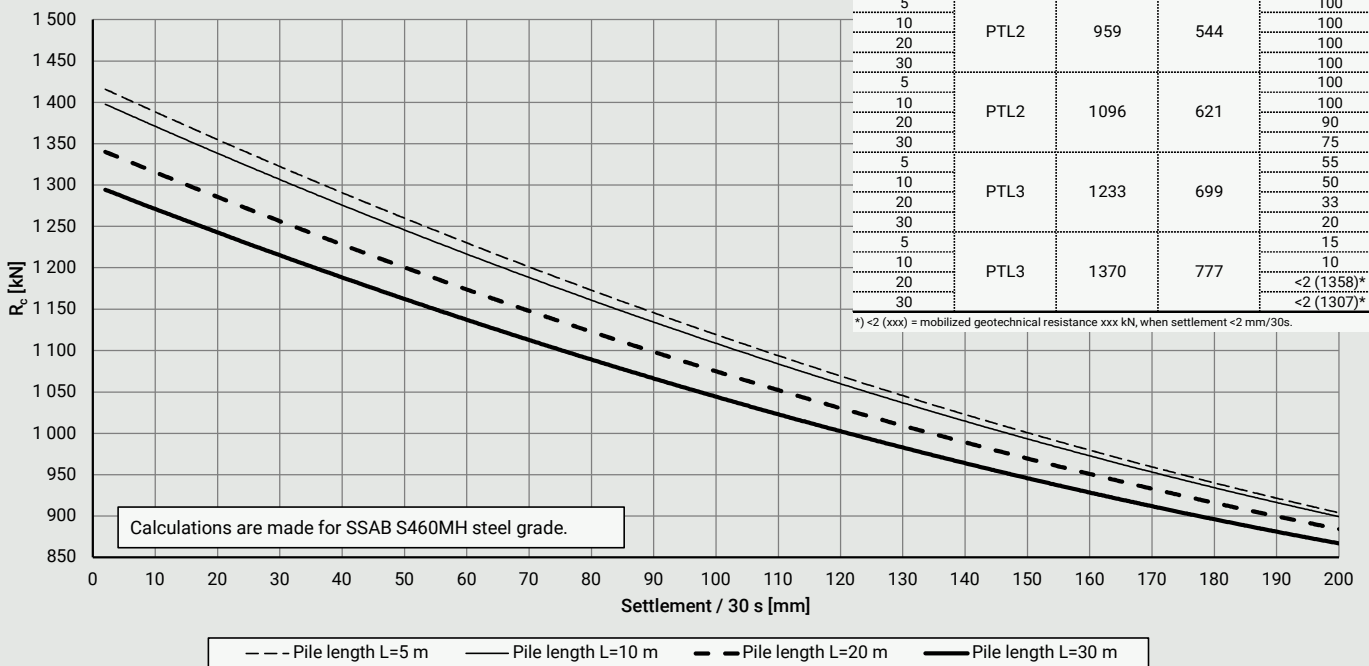


Hammer efficiency 80 %

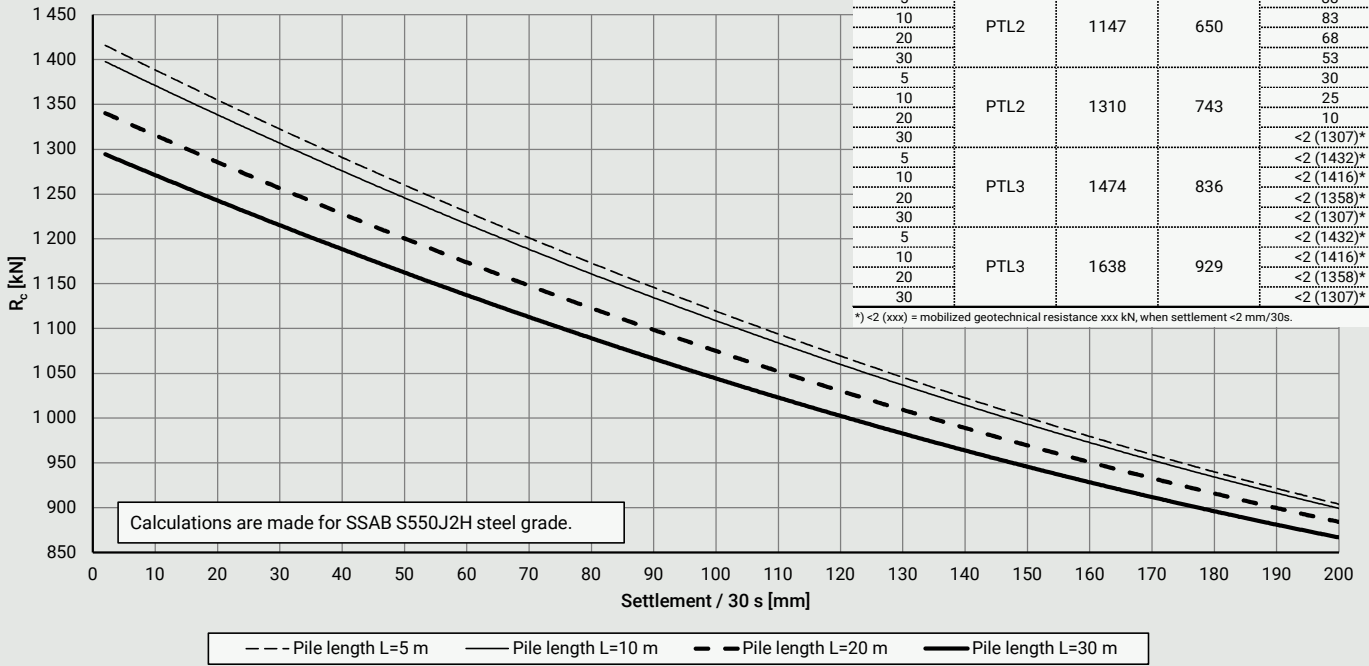
Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5				100
10				100
20	PTL1	822	466	100
30				100
5				100
10				100
20	PTL2	959	544	100
30				100
5				100
10				100
20	PTL2	1096	621	90
30				75
5				55
10				50
20	PTL3	1233	699	33
30				20
5				15
10				10
20	PTL3	1370	777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

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

Rammer M18 - RR140/8



Rammer M18 - RRs140/8

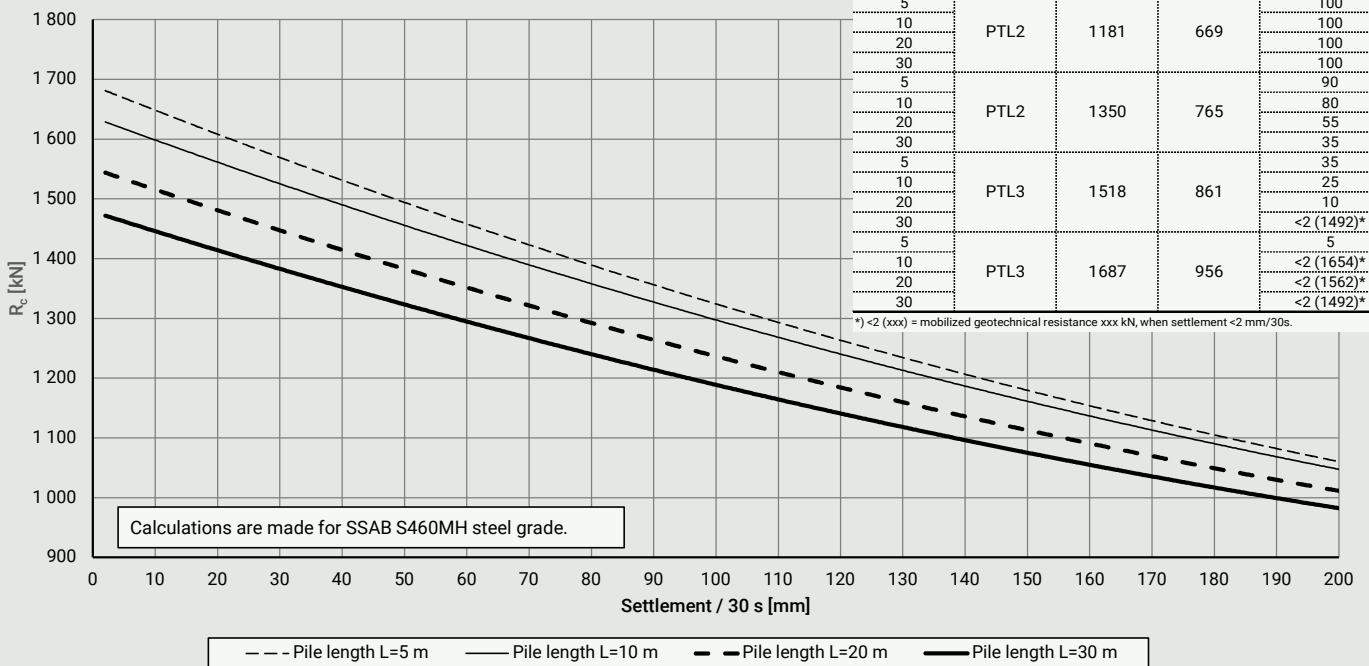


Hammer efficiency 80 %

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

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

Rammer M18 - 0



Hammer efficiency 80 %

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

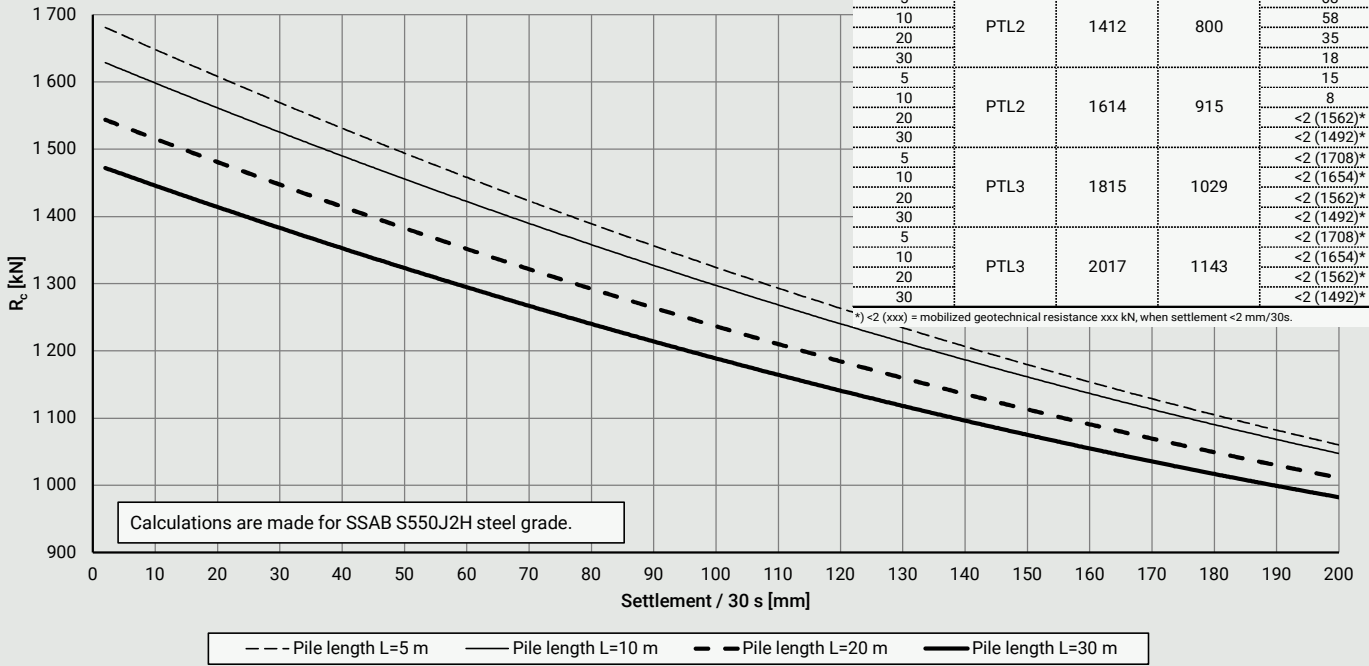
*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Hammer efficiency 80 %

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

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

Rammer M18 - RRs140/10

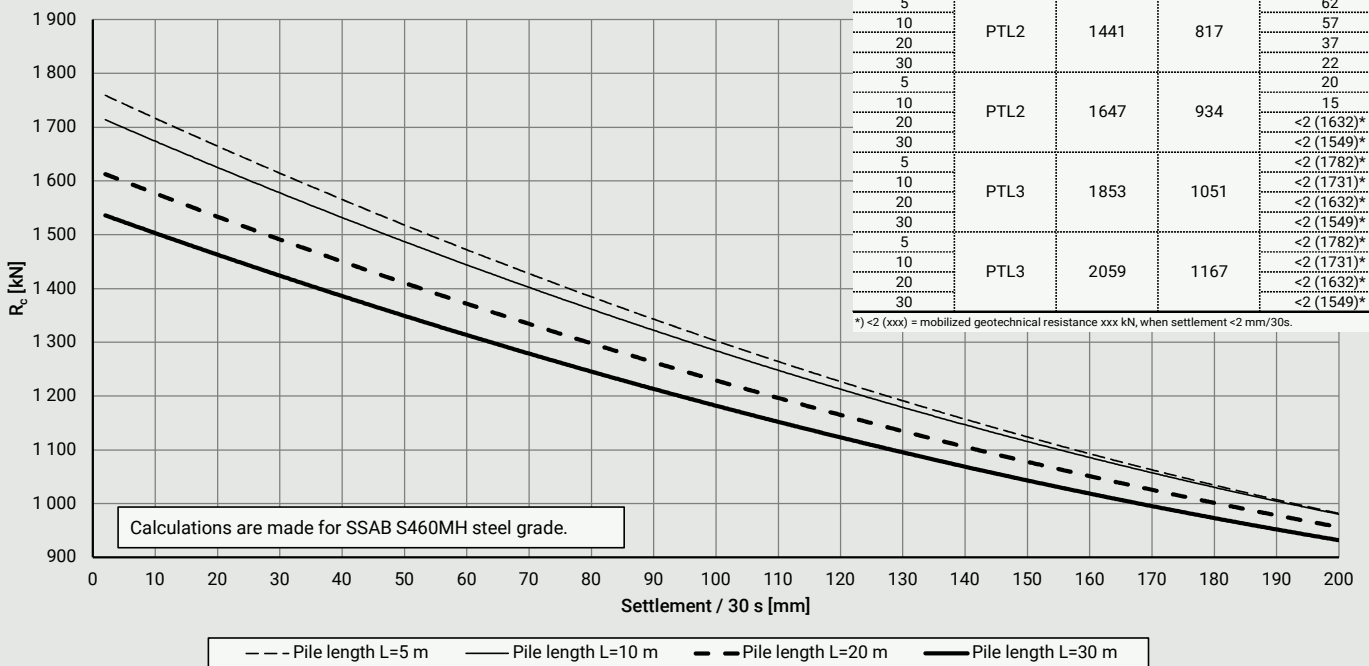


Hammer efficiency 80 %

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

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

Rammer M18 - RR170/10

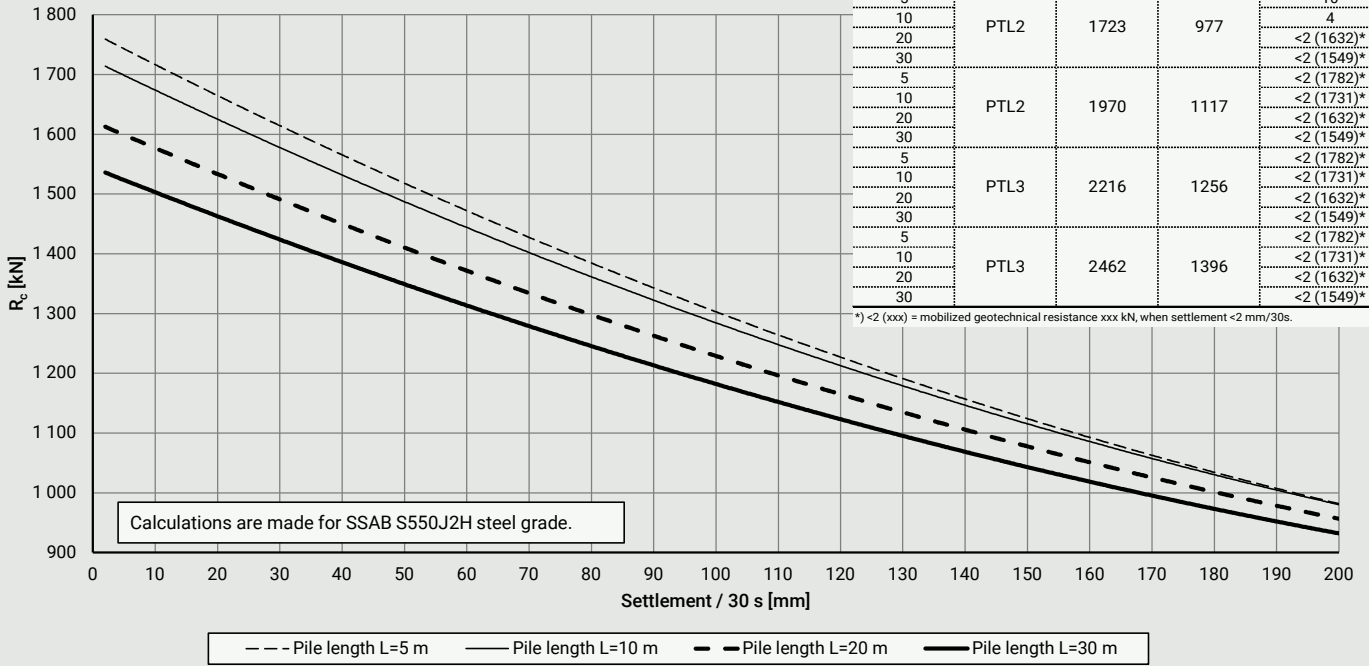


Hammer efficiency 80 %

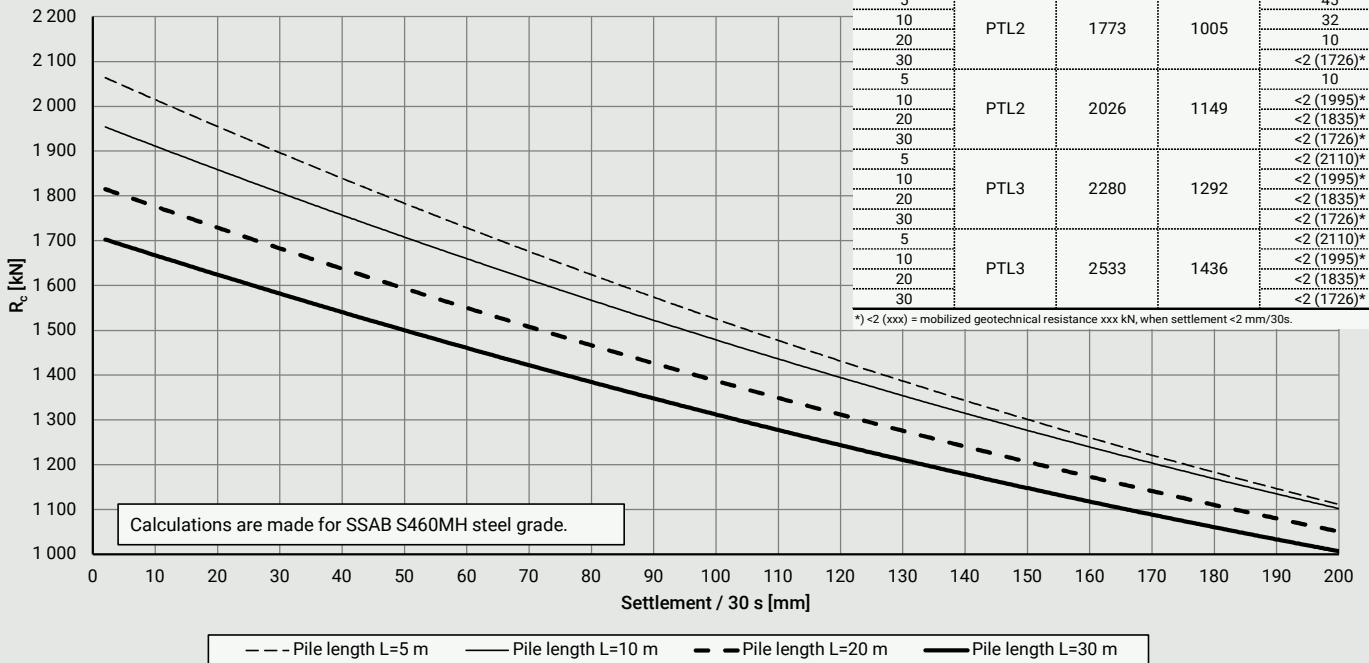
Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5				55
10				47
20	PTL1	1477	837	30
30				15
5				10
10				4
20	PTL2	1723	977	<2 (1632)*
30				<2 (1549)*
5				<2 (1782)*
10	PTL2	1970	1117	<2 (1731)*
20				<2 (1632)*
30				<2 (1549)*
5				<2 (1782)*
10	PTL3	2216	1256	<2 (1731)*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

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

Rammer M18 - RRs170/10



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				98
10				85
20	PTL1	1520	862	60
30				40
5				45
10				32
20	PTL2	1773	1005	10
30				<2 (1726)*
5				10
10				<2 (1995)*
20	PTL2	2026	1149	<2 (1835)*
30				<2 (1726)*
5				<2 (2110)*
10				<2 (1995)*
20	PTL3	2280	1292	<2 (1835)*
30				<2 (1726)*
5				<2 (2110)*
10				<2 (1995)*
20	PTL3	2533	1436	<2 (1835)*
30				<2 (1726)*

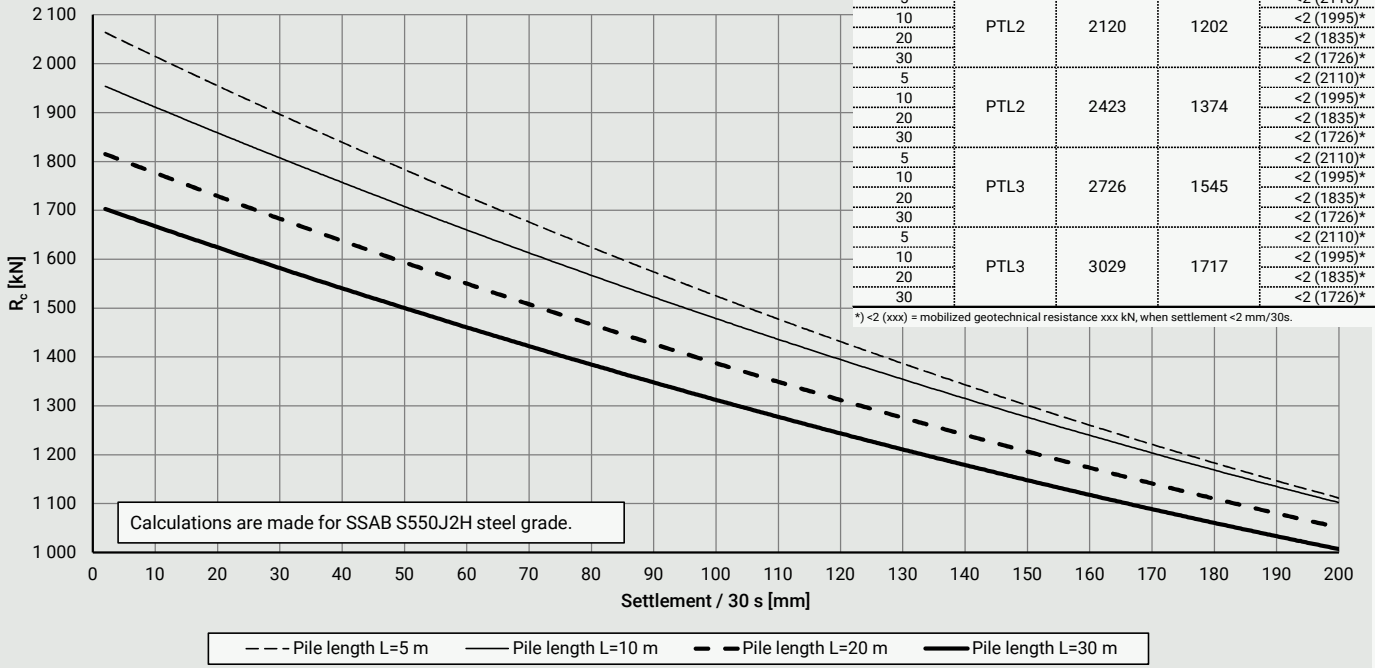
*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

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	PTL2	2120	1202	<2 (1726)*
5				<2 (2110)*
10				<2 (1995)*
20	PTL2	2423	1374	<2 (1835)*
30				<2 (1726)*
5				<2 (2110)*
10	PTL3	2726	1545	<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.

Rammer M18 - RRs170/12.5



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

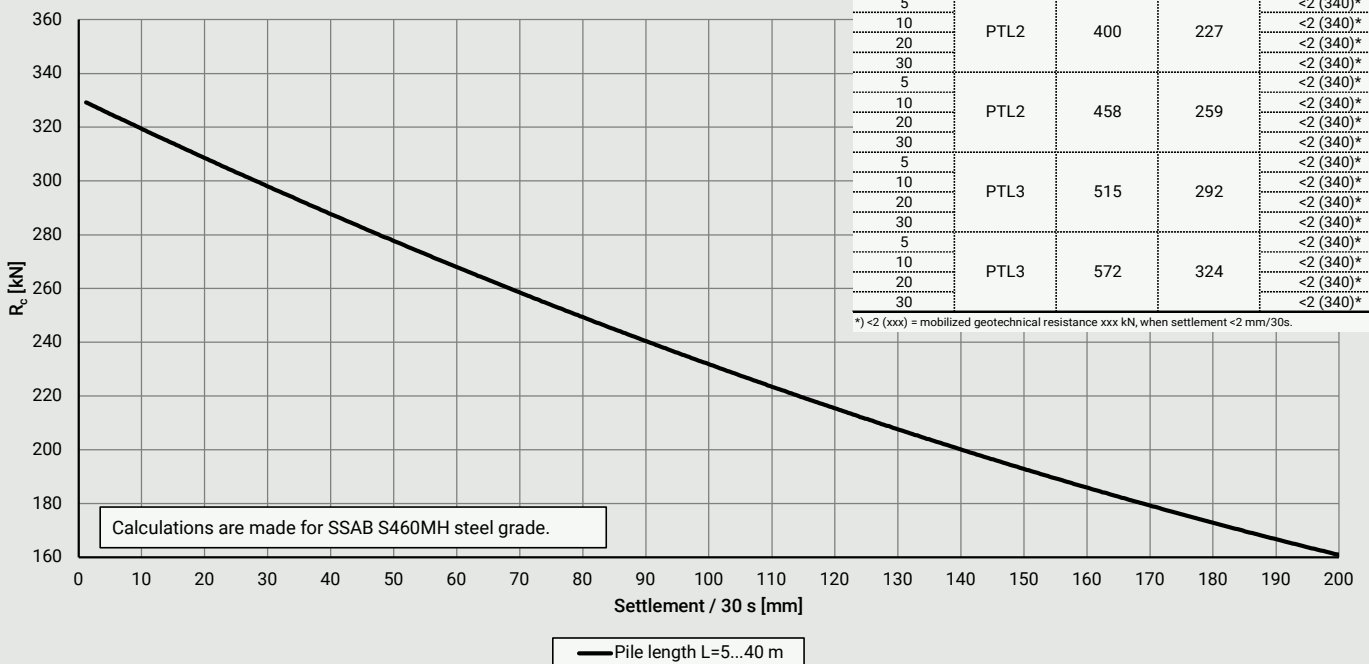
Diameter of the tool [mm]	D_t	250
Height of the tool [mm]	L_t	150
Tool weight [kg]	m_t	113

Hammer efficiency 80 %

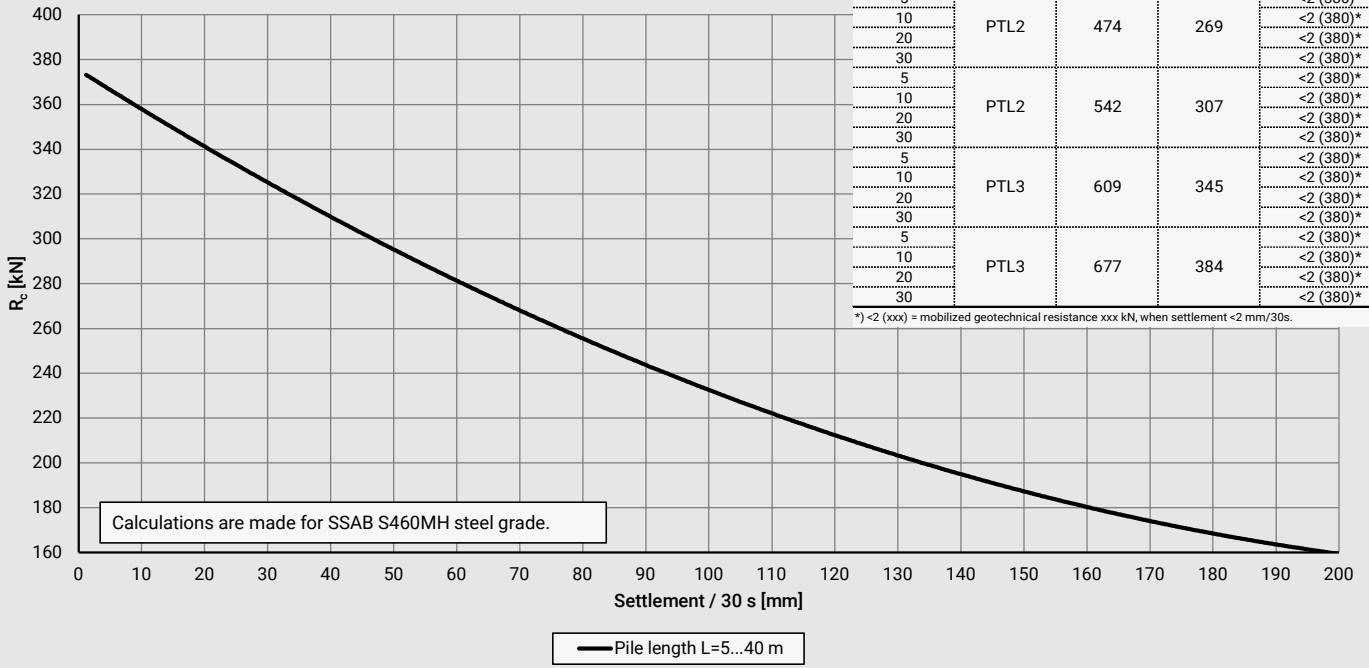
Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	343	195	<2 (340)*
10				<2 (340)*
20				<2 (340)*
30	PTL2	400	227	<2 (340)*
5				<2 (340)*
10				<2 (340)*
20	PTL2	458	259	<2 (340)*
30				<2 (340)*
5				<2 (340)*
10	PTL3	515	292	<2 (340)*
20				<2 (340)*
30				<2 (340)*
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 - RR75



BSP500 - RR90

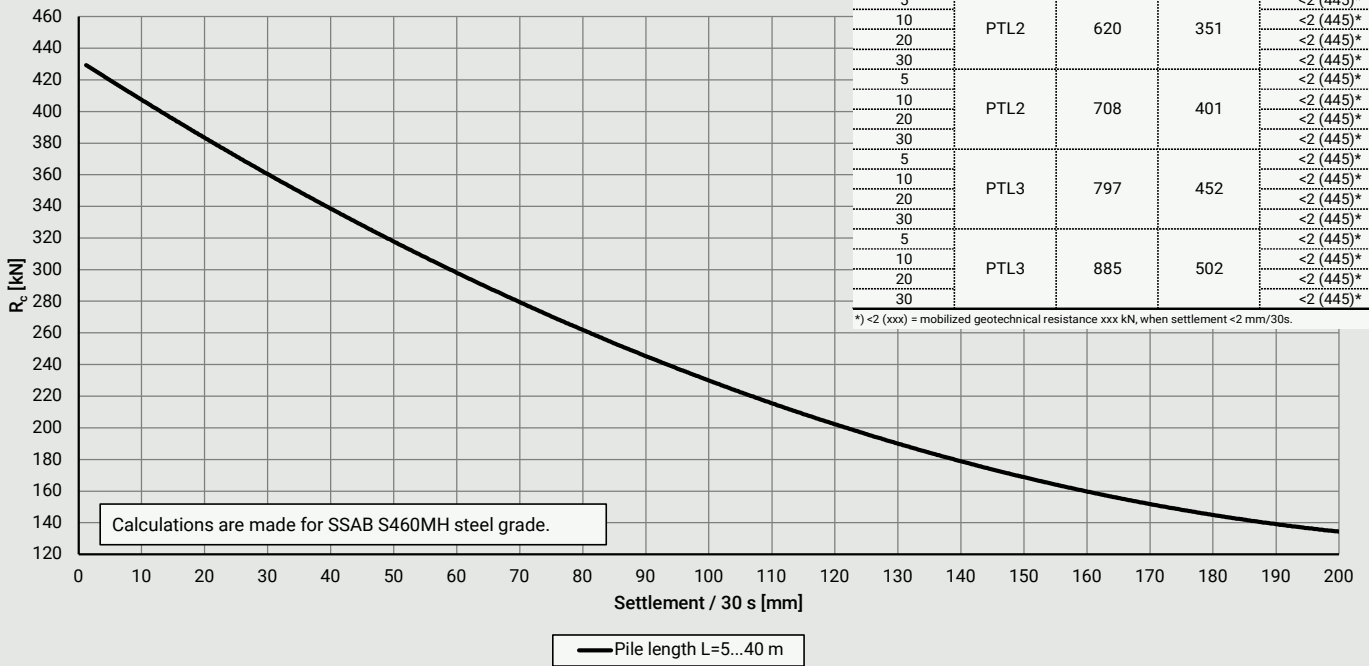


Hammer efficiency 80 %

Pile length [m]	Piling work class	R _c [kN]	R _d [kN]	Settlement / 30 s [mm]
5				<2 (380)*
10				<2 (380)*
20				<2 (380)*
30				<2 (380)*
5				<2 (380)*
10	PTL2	406	230	<2 (380)*
20				<2 (380)*
30				<2 (380)*
5				<2 (380)*
10	PTL2	474	269	<2 (380)*
20				<2 (380)*
30				<2 (380)*
5				<2 (380)*
10	PTL2	542	307	<2 (380)*
20				<2 (380)*
30				<2 (380)*
5				<2 (380)*
10	PTL3	609	345	<2 (380)*
20				<2 (380)*
30				<2 (380)*
5				<2 (380)*
10	PTL3	677	384	<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				<2 (445)*
10				<2 (445)*
20				<2 (445)*
30				<2 (445)*
5				<2 (445)*
10				<2 (445)*
20				<2 (445)*
30				<2 (445)*
5				<2 (445)*
10	PTL2	531	301	<2 (445)*
20				<2 (445)*
30				<2 (445)*
5				<2 (445)*
10	PTL2	620	351	<2 (445)*
20				<2 (445)*
30				<2 (445)*
5				<2 (445)*
10	PTL2	708	401	<2 (445)*
20				<2 (445)*
30				<2 (445)*
5				<2 (445)*
10	PTL3	797	452	<2 (445)*
20				<2 (445)*
30				<2 (445)*
5				<2 (445)*
10	PTL3	885	502	<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

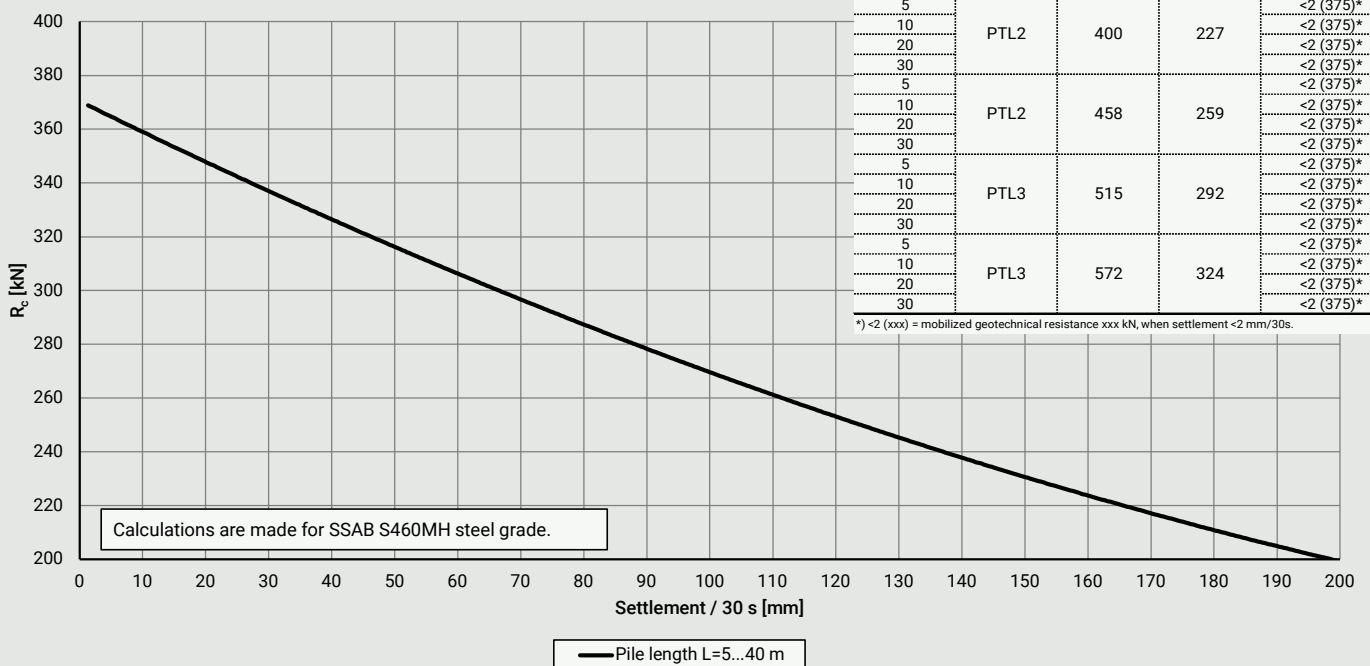
Diameter of the tool [mm]	D_t	250
Height of the tool [mm]	L_t	150
Tool weight [kg]	m_t	113

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 - RR75

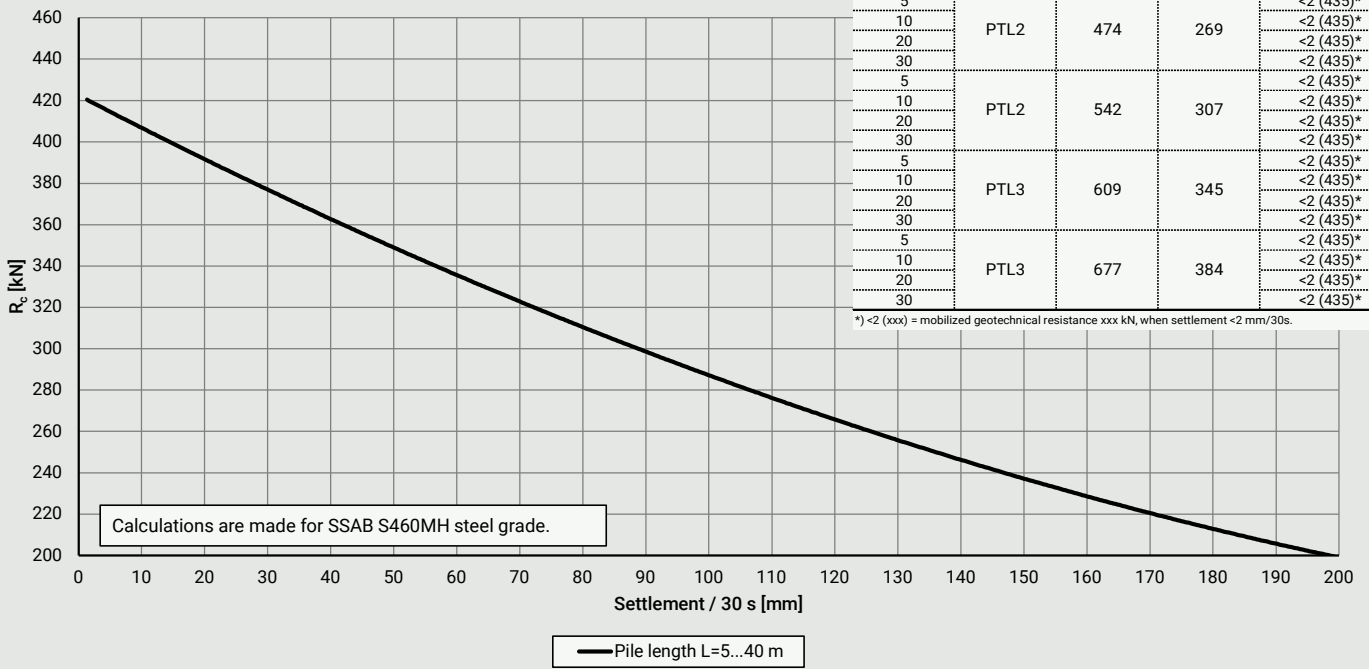


Hammer efficiency 80 %

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

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

BSP500N - RR90

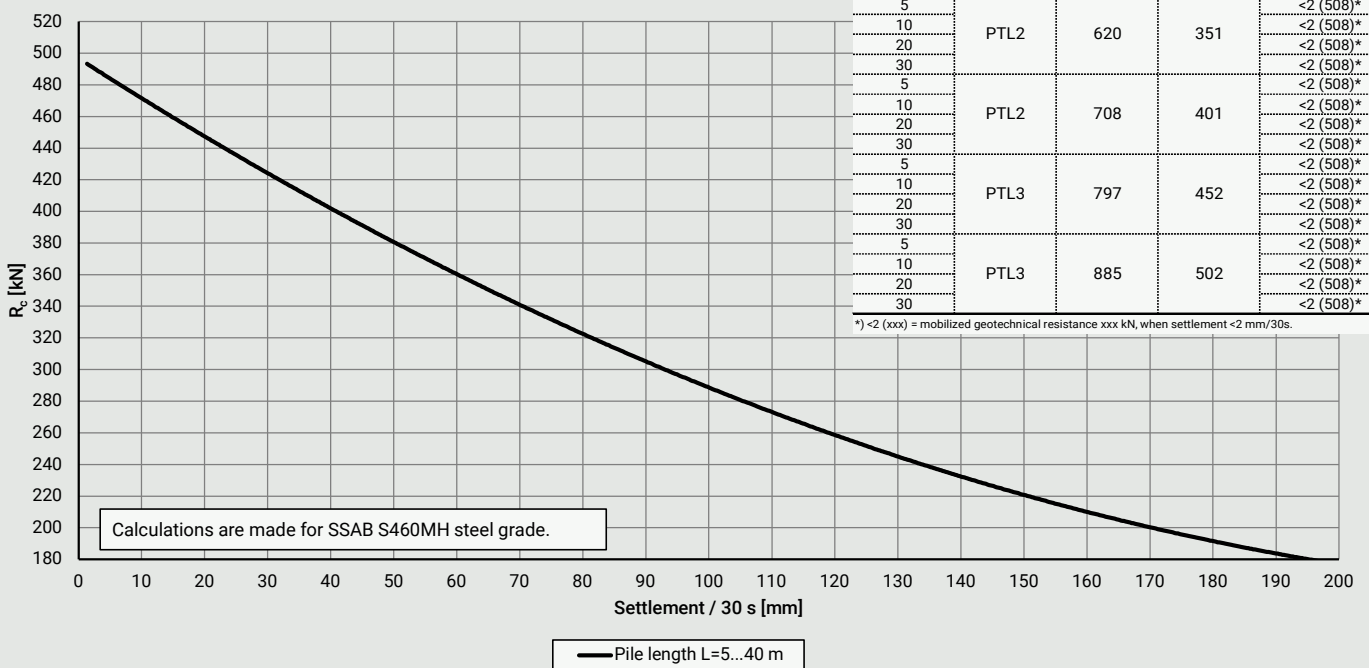


Hammer efficiency 80 %

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

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

BSP500N - RR115/6.3



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

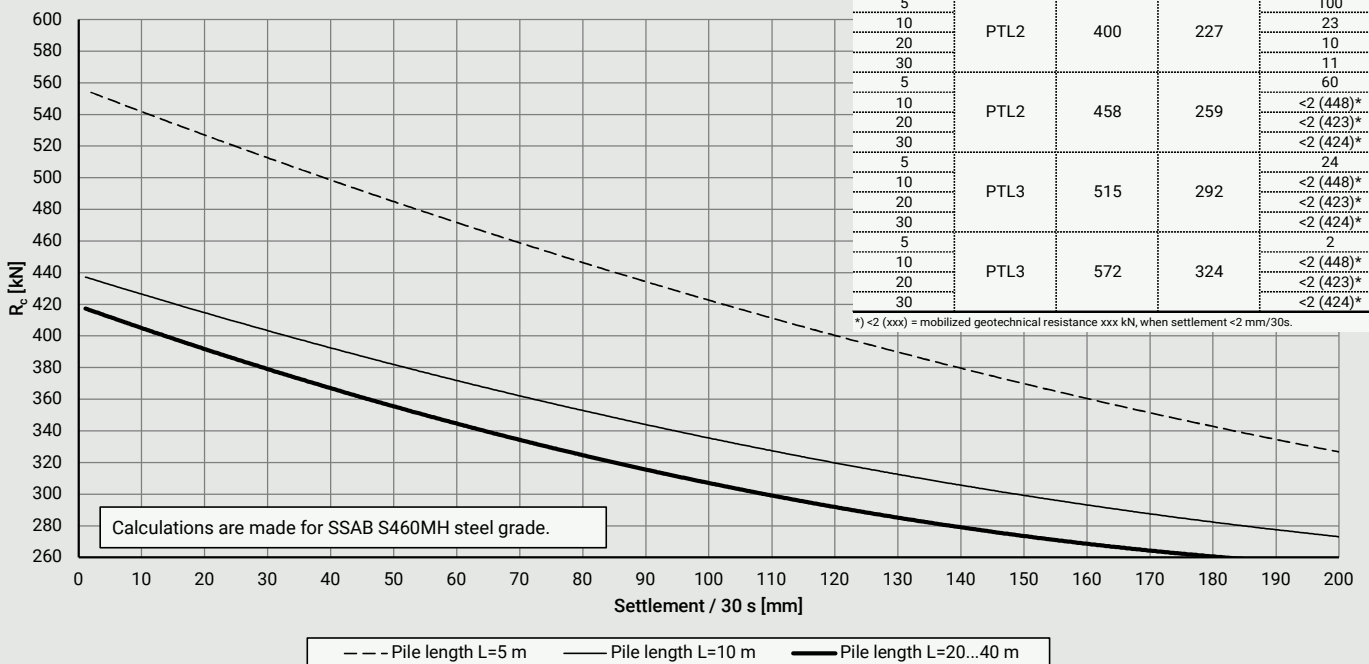
Diameter of the tool [mm]	D_t	300
Height of the tool [mm]	L_t	150
Tool weight [kg]	m_t	227

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

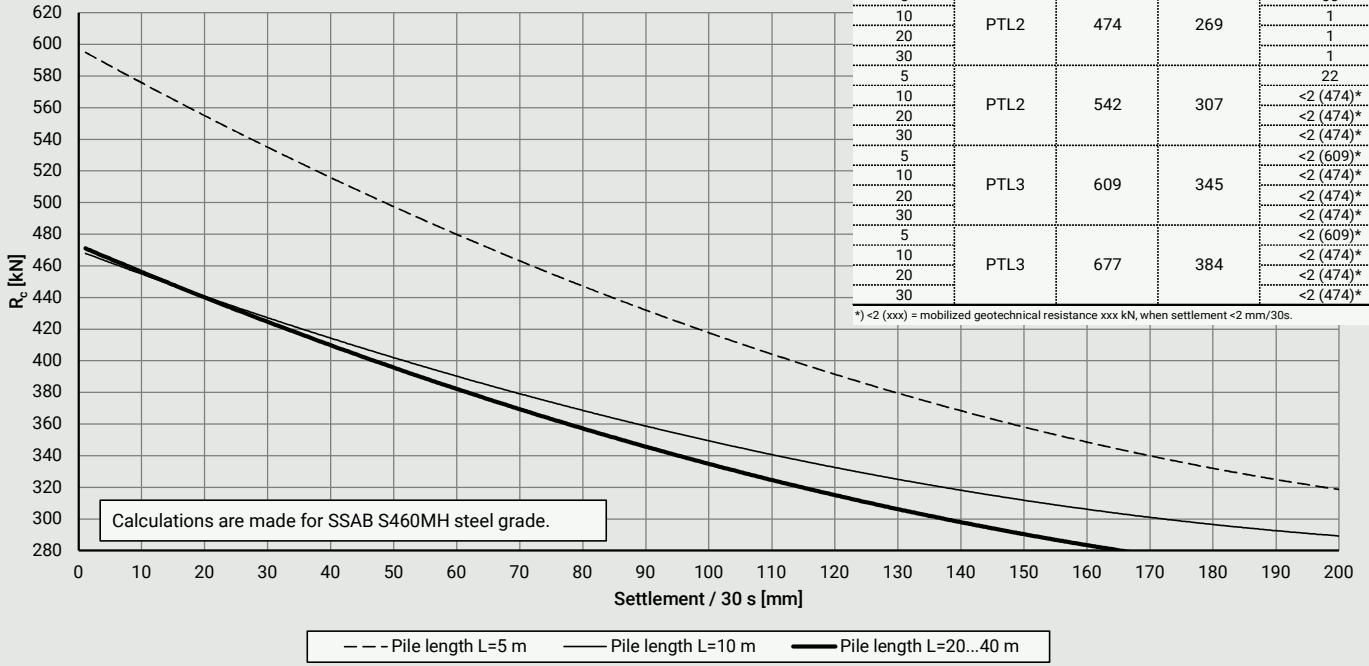


Hammer efficiency 80 %

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

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

BSP600 - RR90

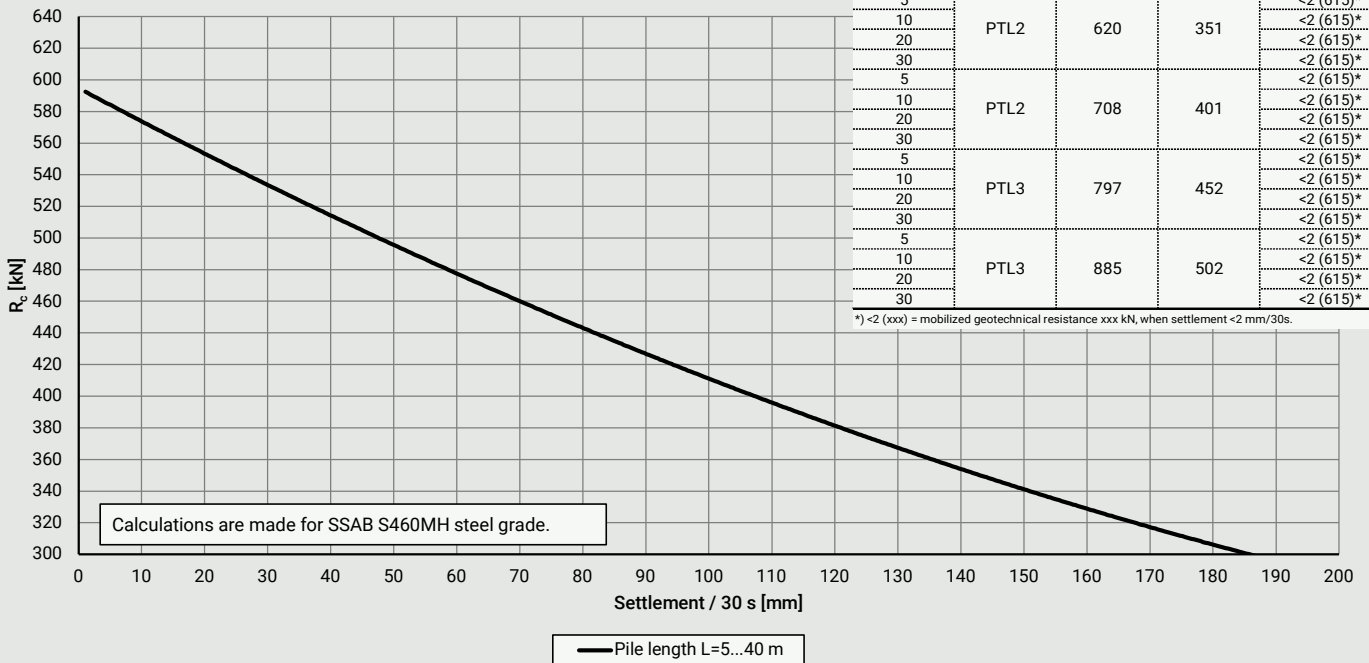


Hammer efficiency 80 %

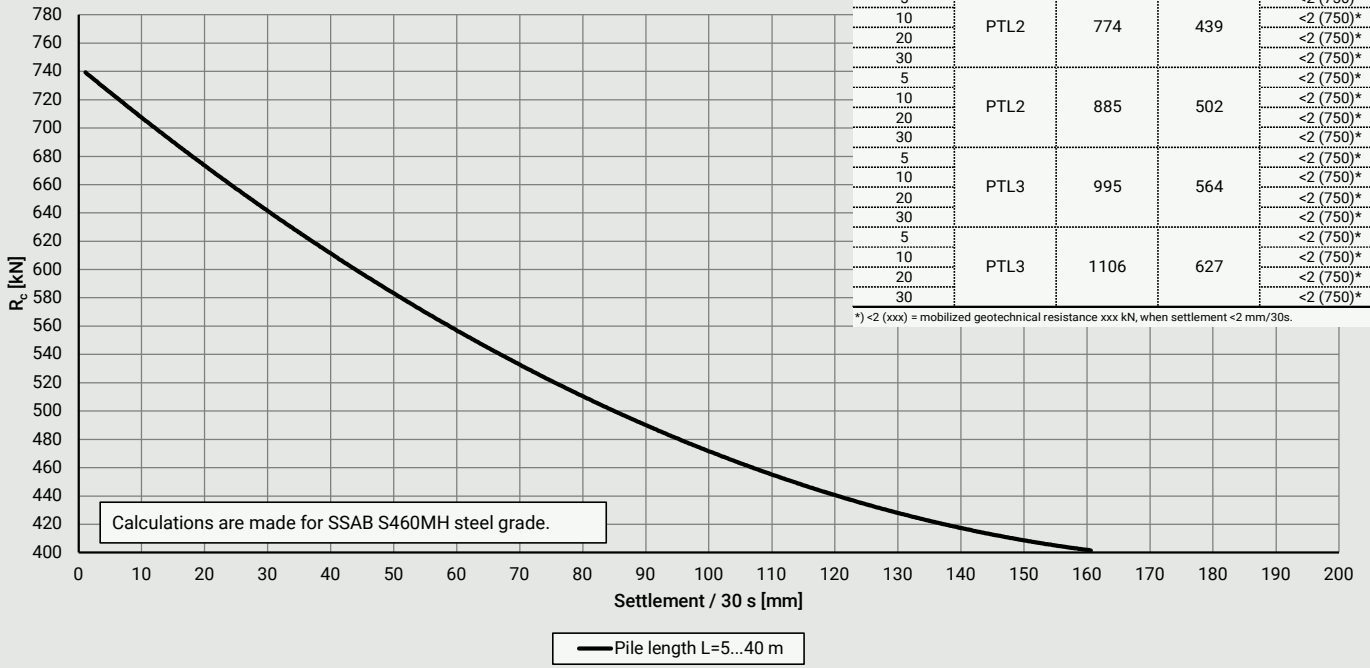
Pile length [m]	Piling work class	R _c [kN]	R _d [kN]	Settlement / 30 s [mm]
5				26
10	PTL1	531	301	26
20				26
30				26
5				<2 (615)*
10	PTL2	620	351	<2 (615)*
20				<2 (615)*
30				<2 (615)*
5				<2 (615)*
10	PTL2	708	401	<2 (615)*
20				<2 (615)*
30				<2 (615)*
5				<2 (615)*
10	PTL3	797	452	<2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

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

BSP600 - RR115/6.3



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	PTL2	774	439	21
5				<2 (750)*
10				<2 (750)*
20	PTL2	885	502	<2 (750)*
30				<2 (750)*
5				<2 (750)*
10	PTL3	995	564	<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

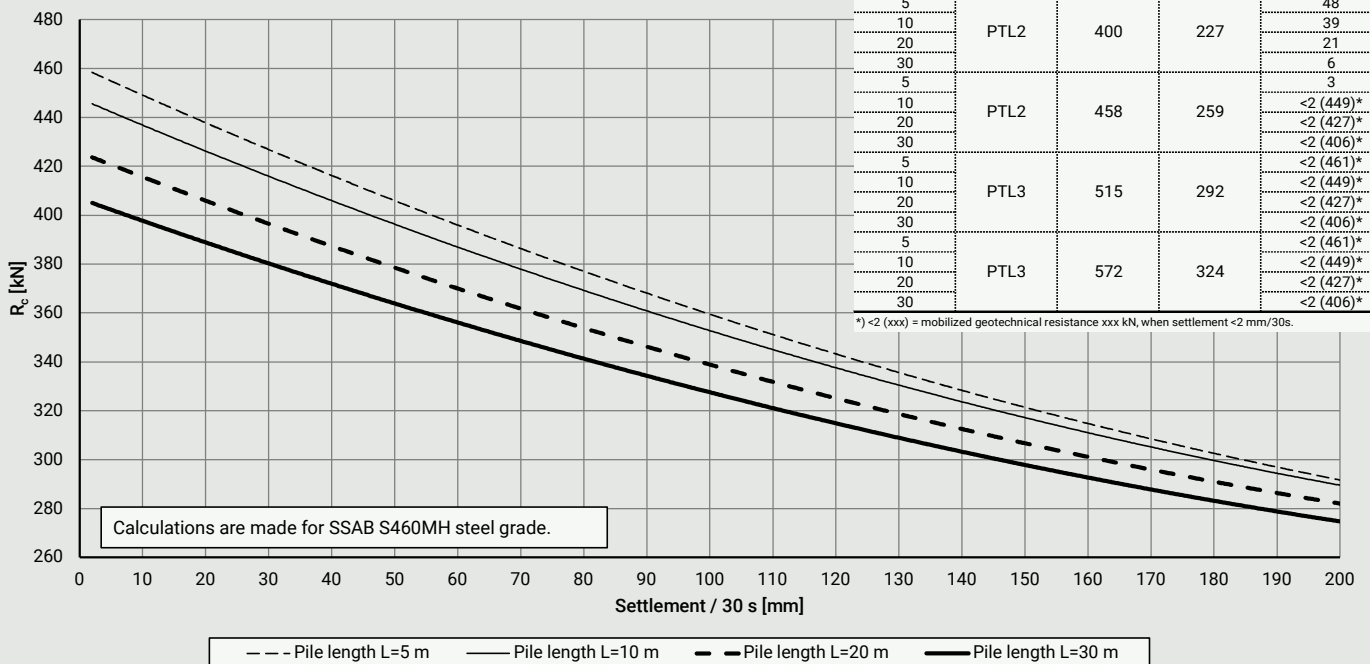
Diameter of the tool [mm]	D_t	90
Height of the tool [mm]	L_t	840
Tool weight [kg]	m_t	42

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 - RR75

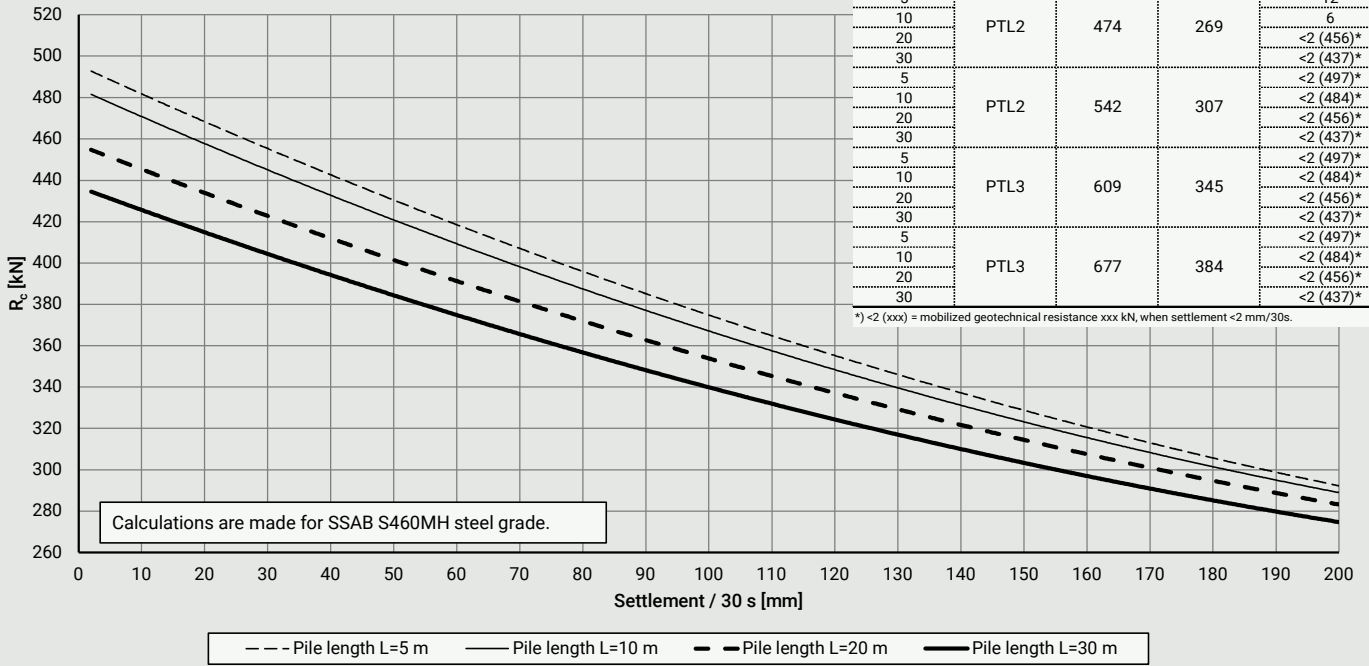


Hammer efficiency 80 %

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

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

Furukawa F9 - RR90

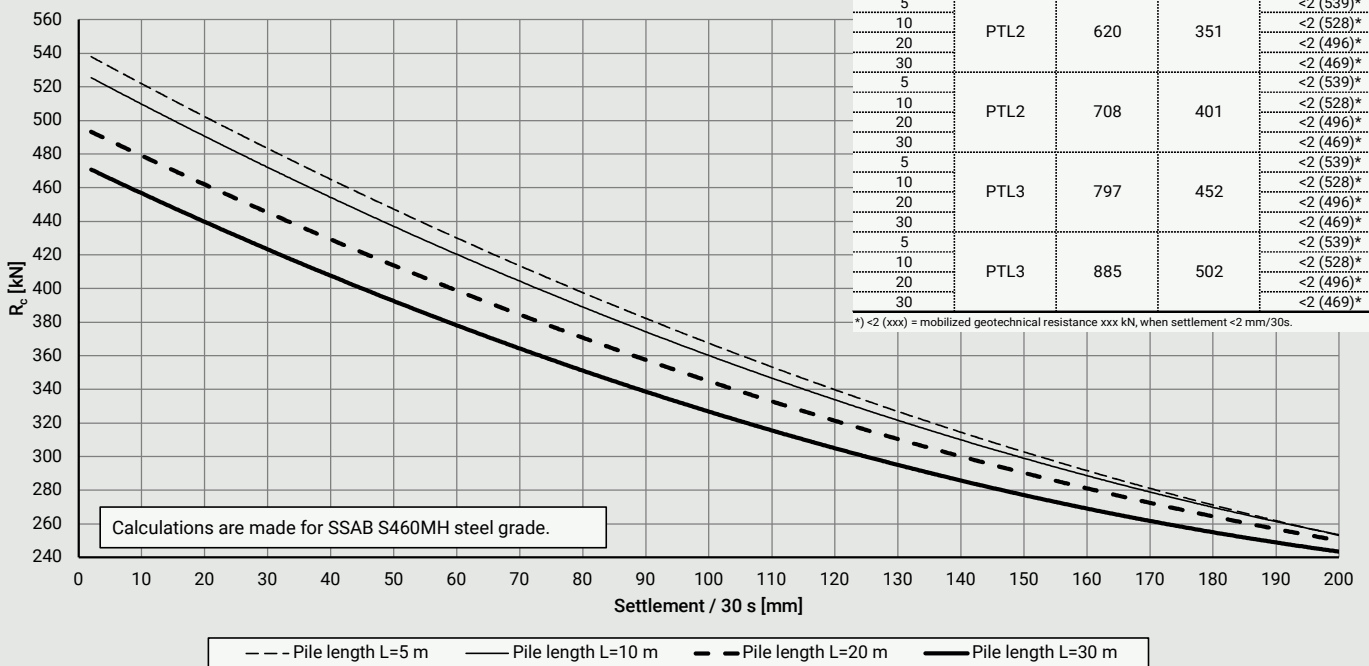


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5				6
10				<2 (528)*
20				<2 (496)*
30				<2 (469)*
5				<2 (539)*
10				<2 (528)*
20				<2 (496)*
30				<2 (469)*
5				<2 (539)*
10				<2 (528)*
20				<2 (496)*
30				<2 (469)*
5				<2 (539)*
10				<2 (528)*
20				<2 (496)*
30				<2 (469)*
5				<2 (539)*
10				<2 (528)*
20				<2 (496)*
30				<2 (469)*
5				<2 (539)*
10				<2 (528)*
20				<2 (496)*
30				<2 (469)*

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

Furukawa F9 - RR115/6.3



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

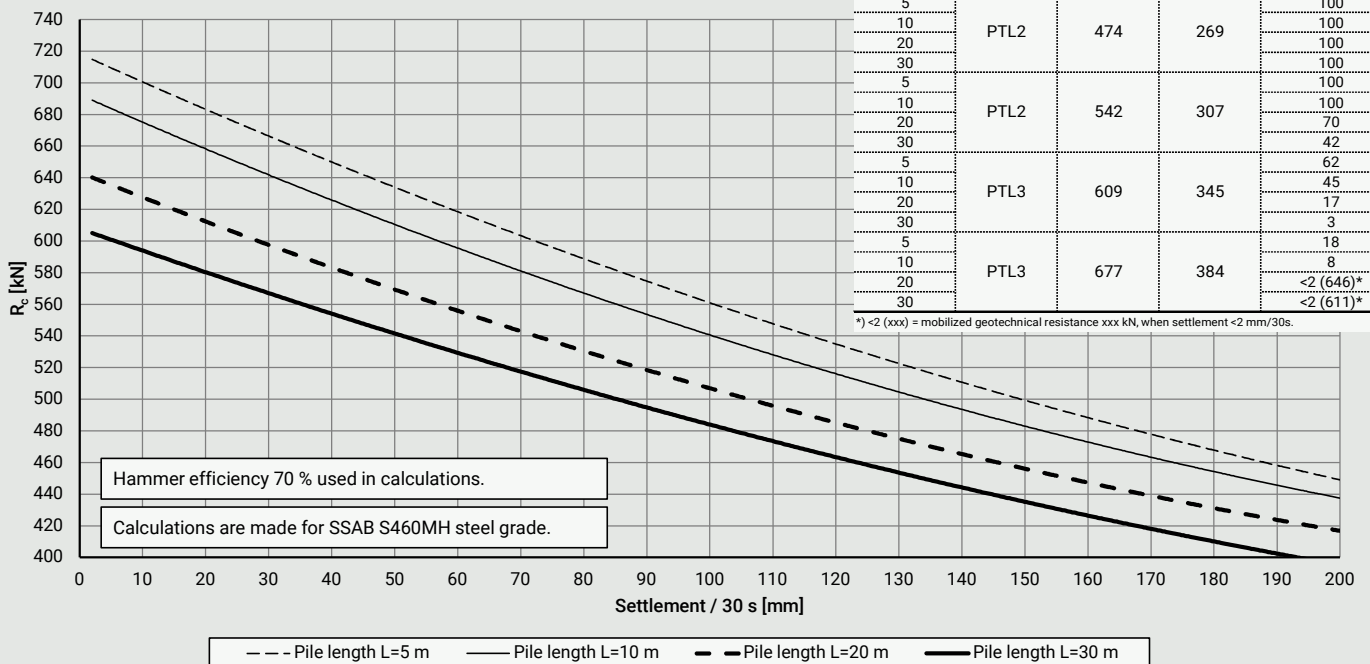
Diameter of the tool [mm]	D_t	105
Height of the tool [mm]	L_t	600
Tool weight [kg]	m_t	41

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

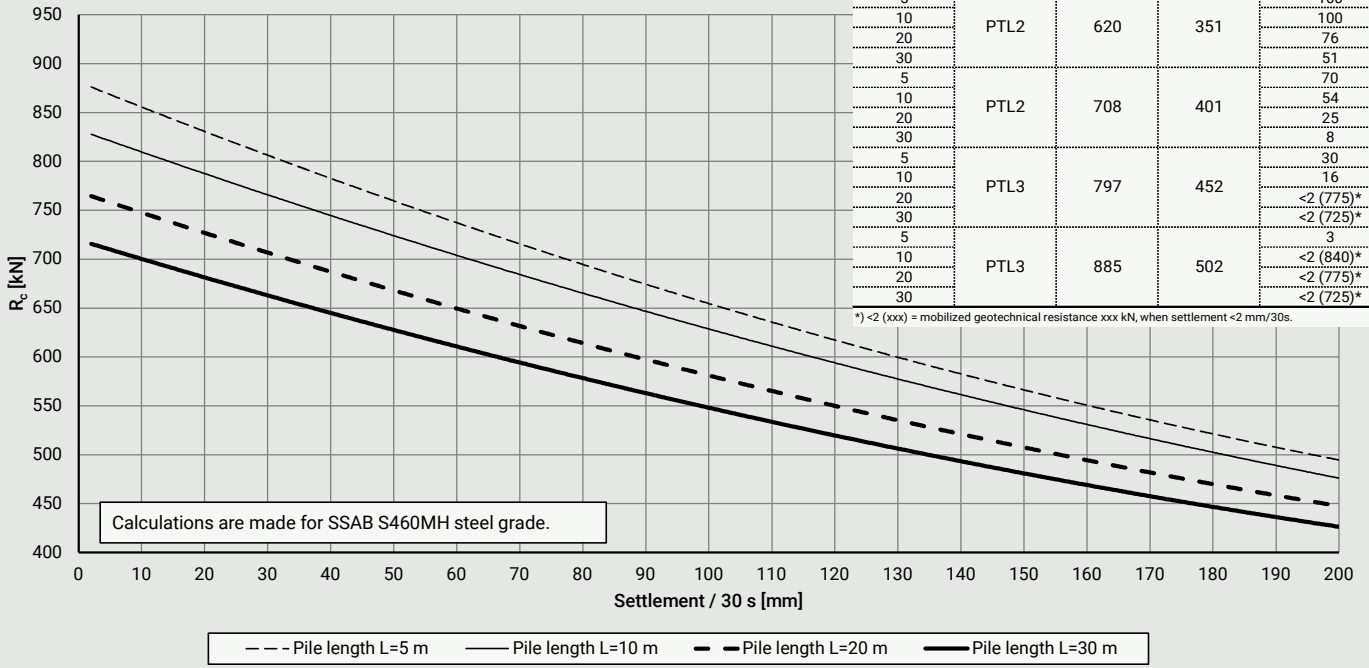


Hammer efficiency 80 %

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

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

Furukawa F12 - RR115/6.3

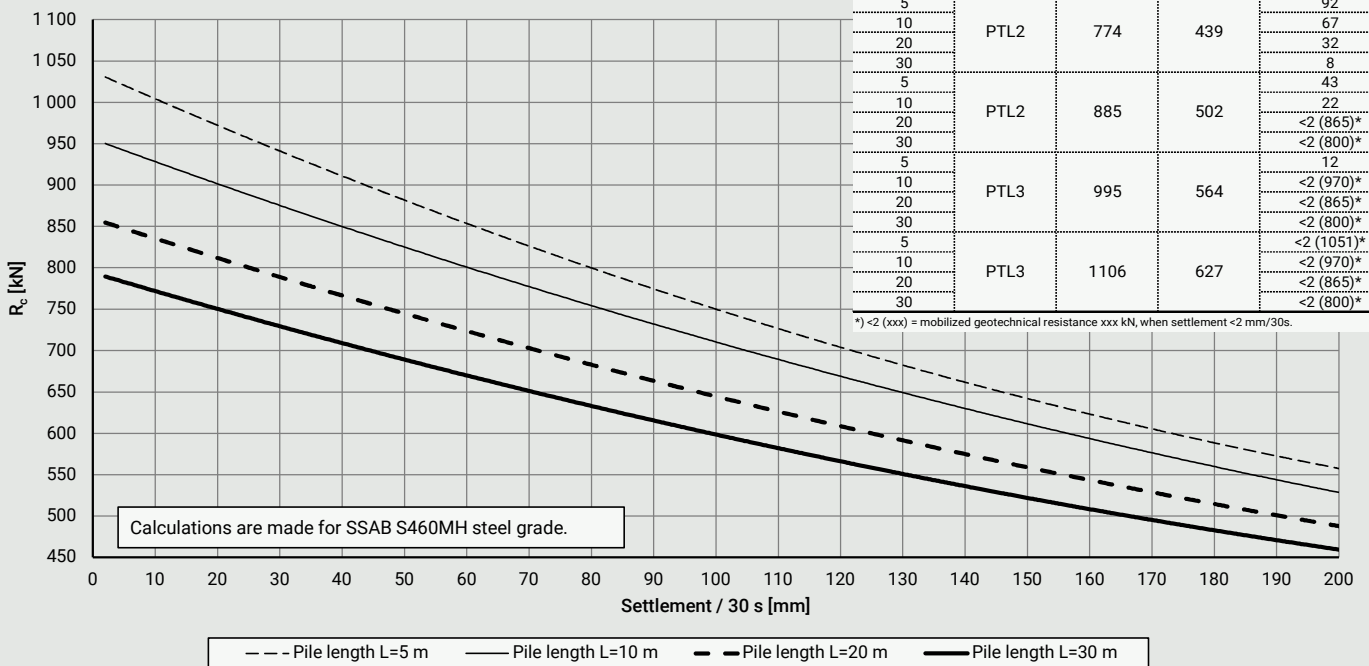


Hammer efficiency 80 %

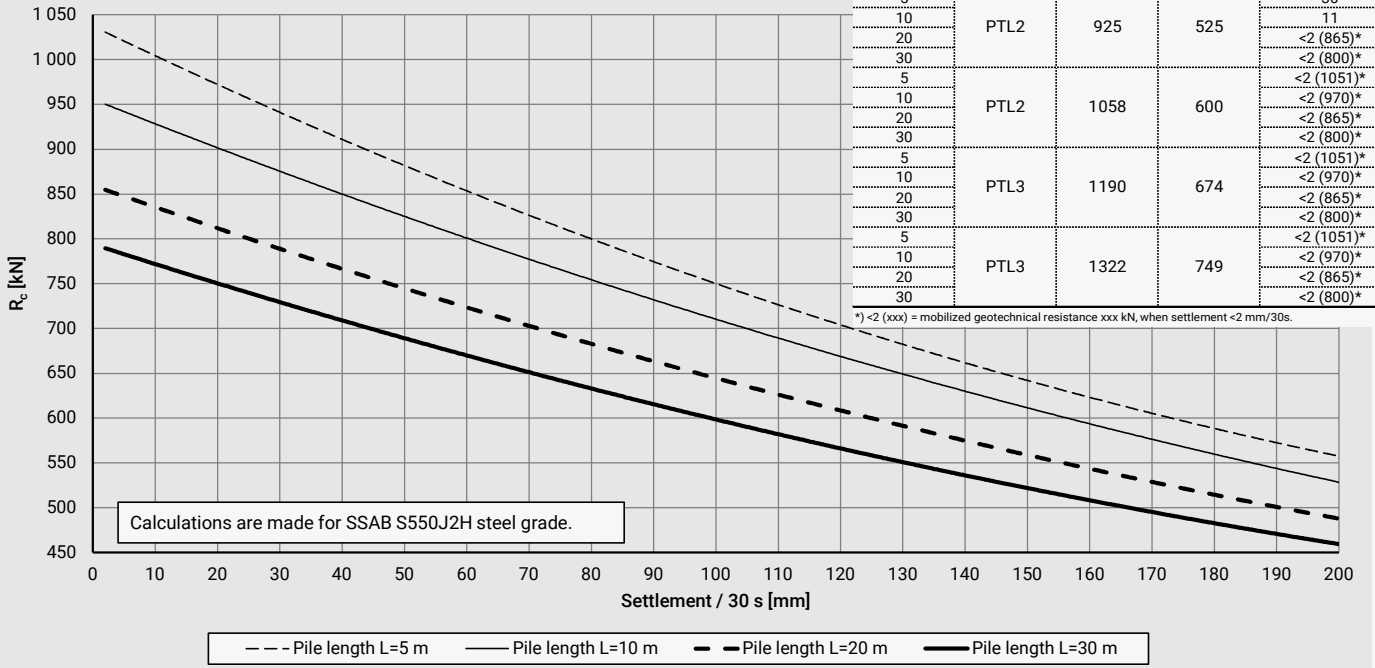
Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5				100
10				100
20	PTL1	664	376	90
30				61
5				92
10				67
20	PTL2	774	439	32
30				8
5				43
10				22
20	PTL2	885	502	<2 (865)*
30				<2 (800)*
5				12
10				<2 (970)*
20	PTL3	995	564	<2 (865)*
30				<2 (800)*
5				<2 (1051)*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

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

Furukawa F12 - RR115/8



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	PTL2	925	525	4
5				30
10				11
20	PTL2	1058	600	<2 (865)*
30				<2 (800)*
5				<2 (1051)*
10	PTL3	1190	674	<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

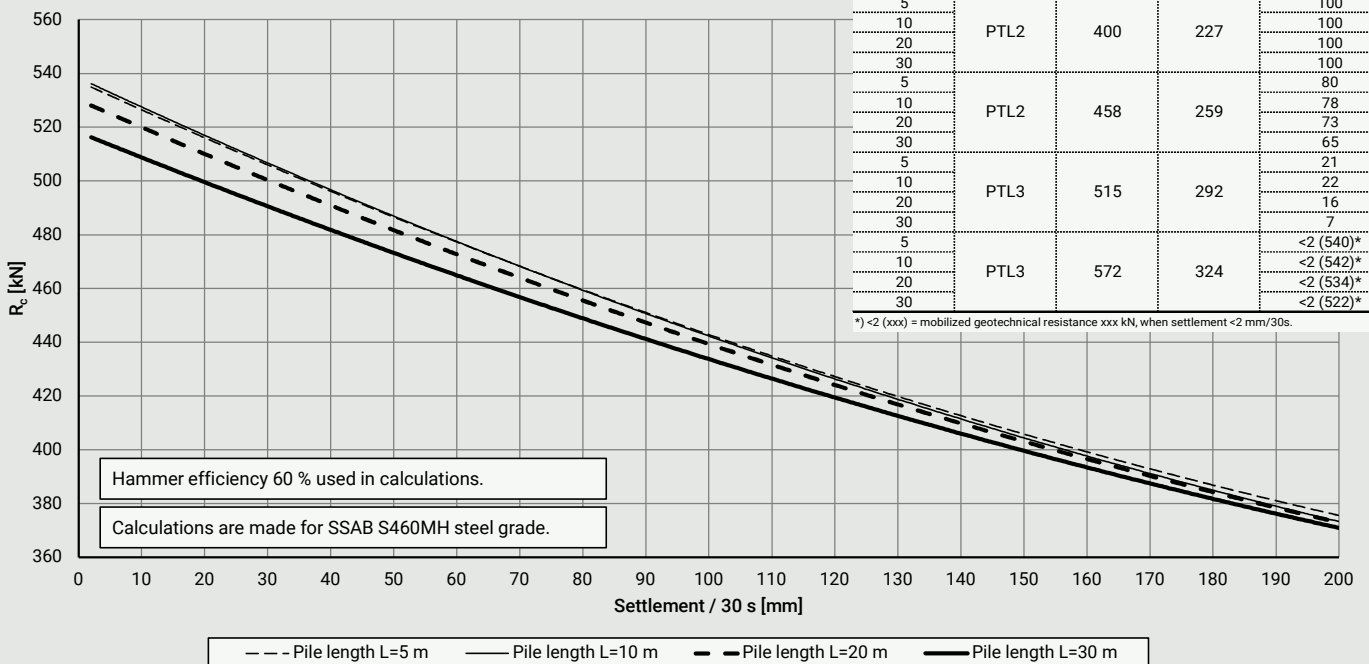
Diameter of the tool [mm]	D_t	120
Height of the tool [mm]	L_t	1000
Tool weight [kg]	m_t	90

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

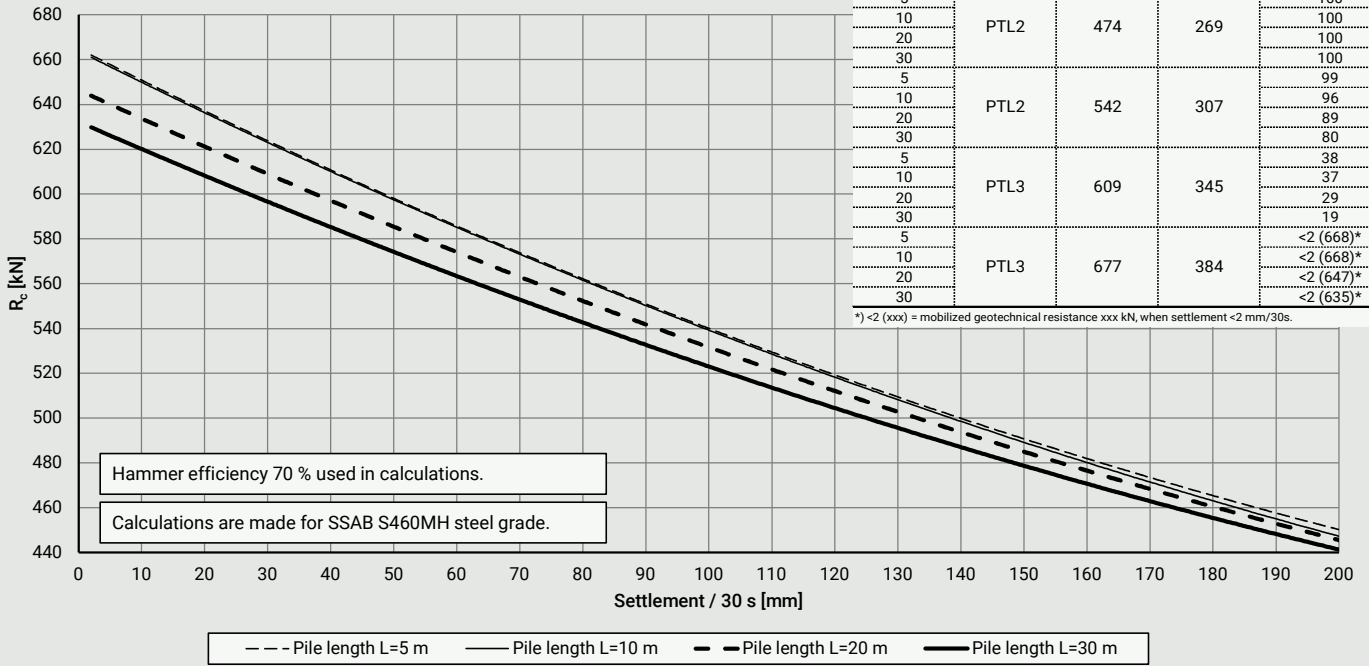


Hammer efficiency 70 %

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

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

Furukawa F19 - RR90

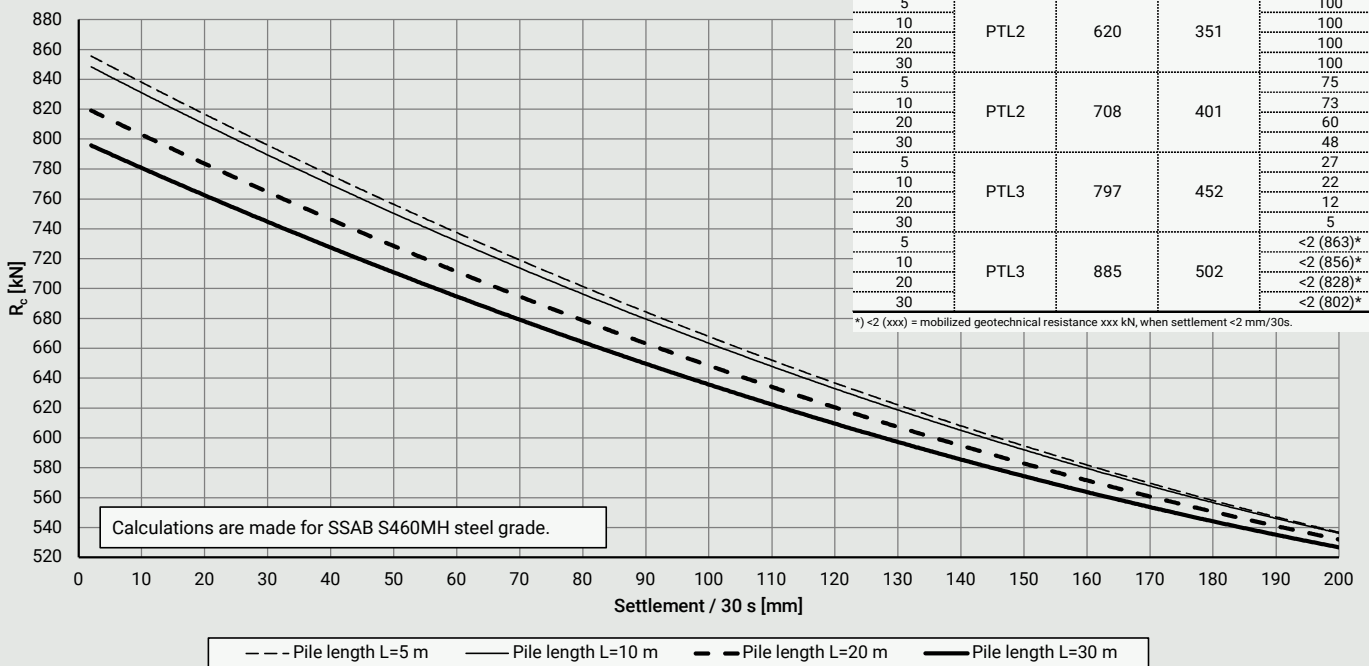


Hammer efficiency 80 %

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

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

Furukawa F19 - RR115/6.3

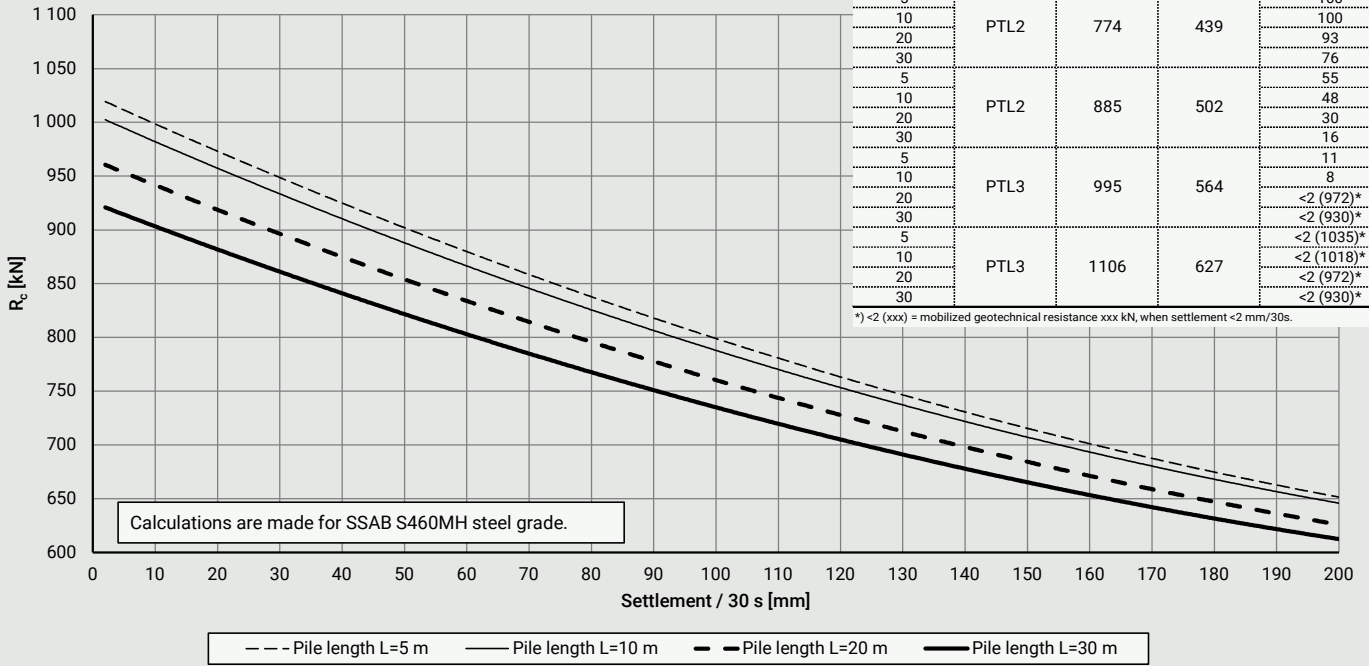


Hammer efficiency 80 %

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

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

Furukawa F19 - RR115/8

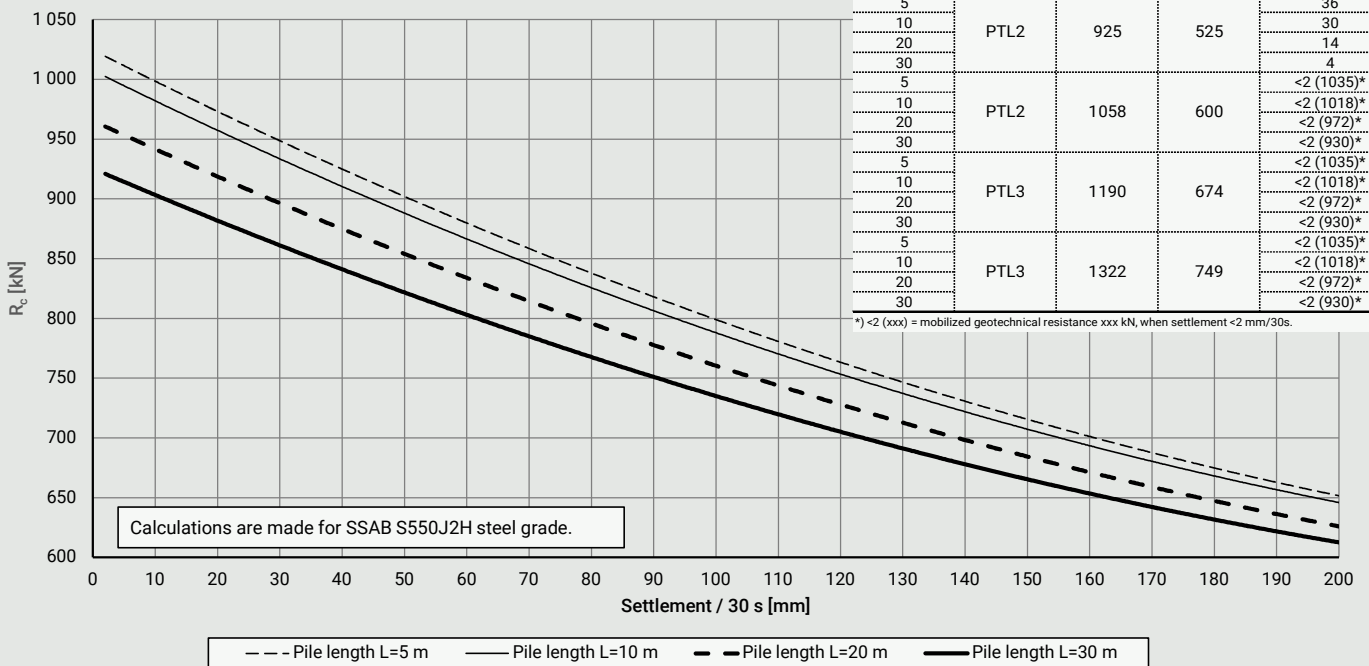


Hammer efficiency 80 %

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

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

Furukawa F19 - RRs115/8

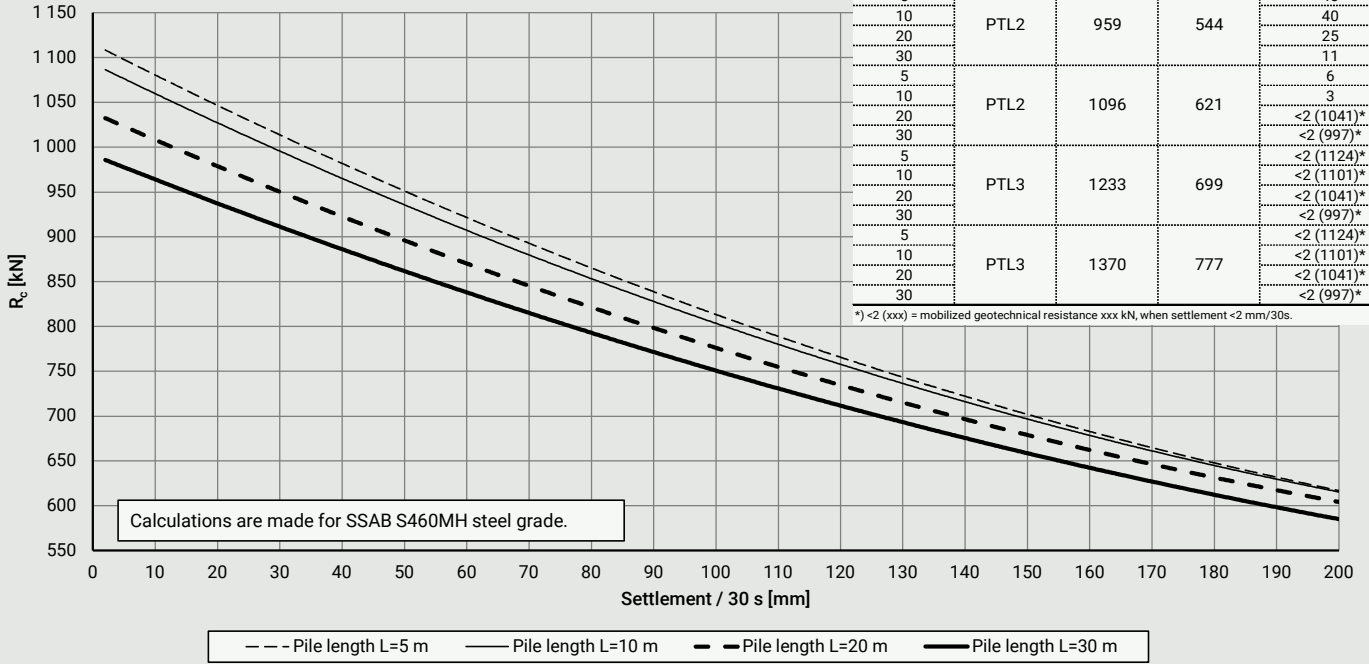


Hammer efficiency 80 %

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

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

Furukawa F19 - RR140/8

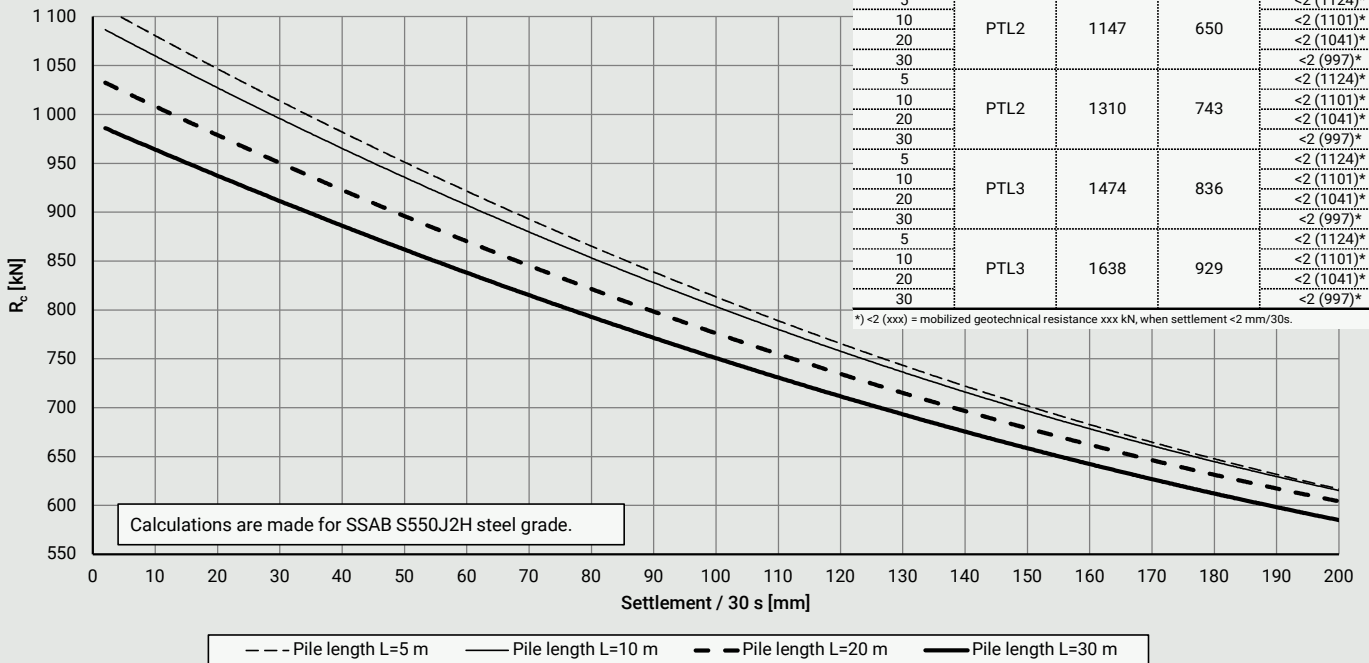


Hammer efficiency 80 %

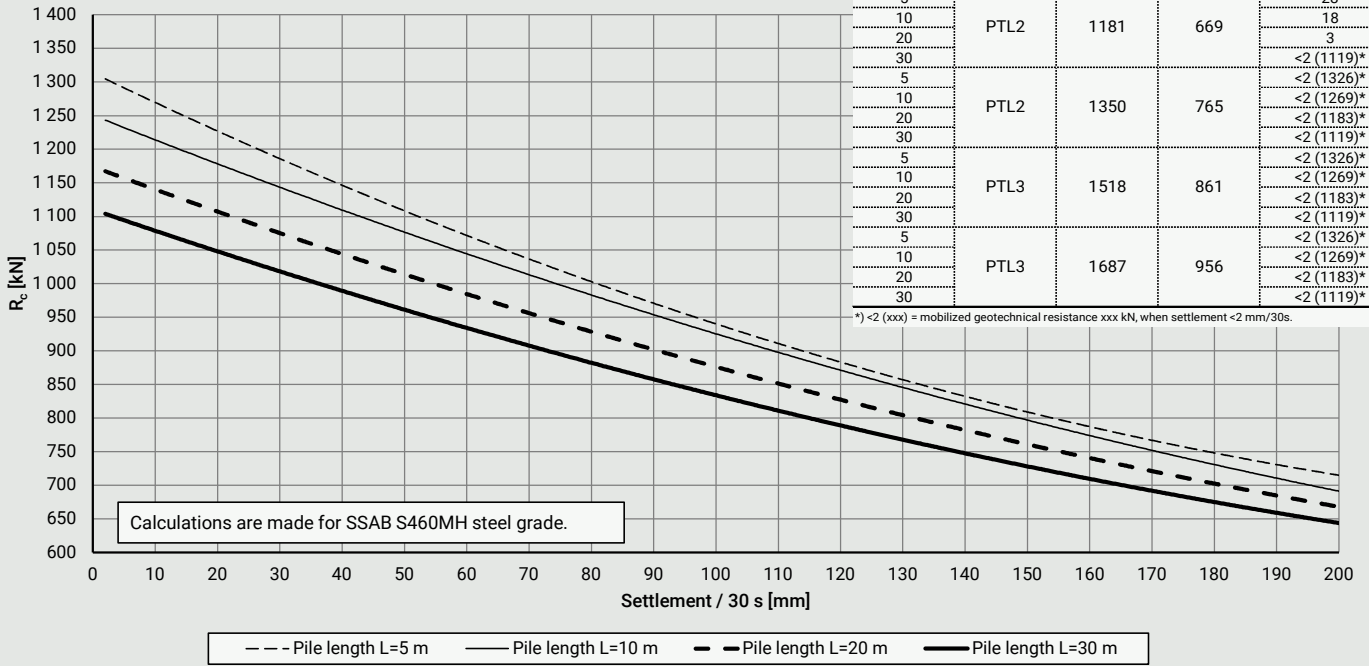
Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5				36
10				31
20	PTL1	983	557	18
30				6
5				<2 (1124)*
10				<2 (1101)*
20	PTL2	1147	650	<2 (1041)*
30				<2 (997)*
5				<2 (1124)*
10				<2 (1101)*
20	PTL2	1310	743	<2 (1041)*
30				<2 (997)*
5				<2 (1124)*
10				<2 (1101)*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

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

Furukawa F19 - RRs140/8



Furukawa F19 - 0

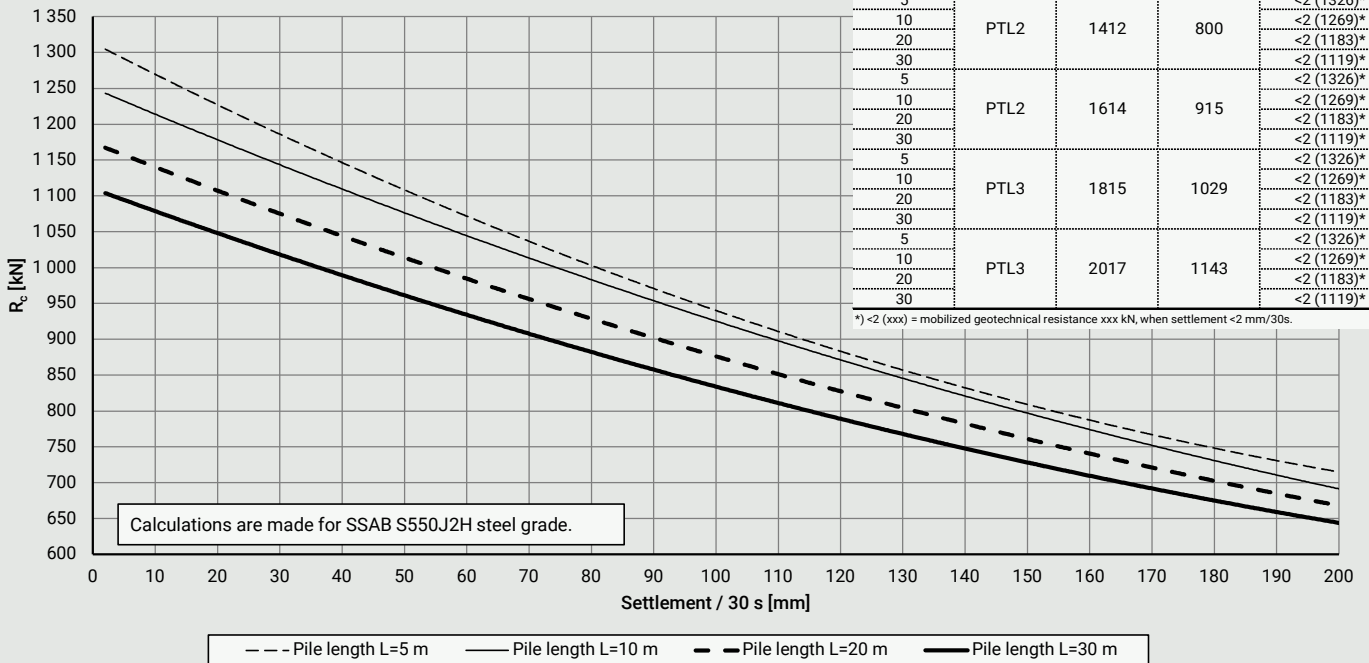


Hammer efficiency 80 %

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

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

Furukawa F19 - RRs140/10

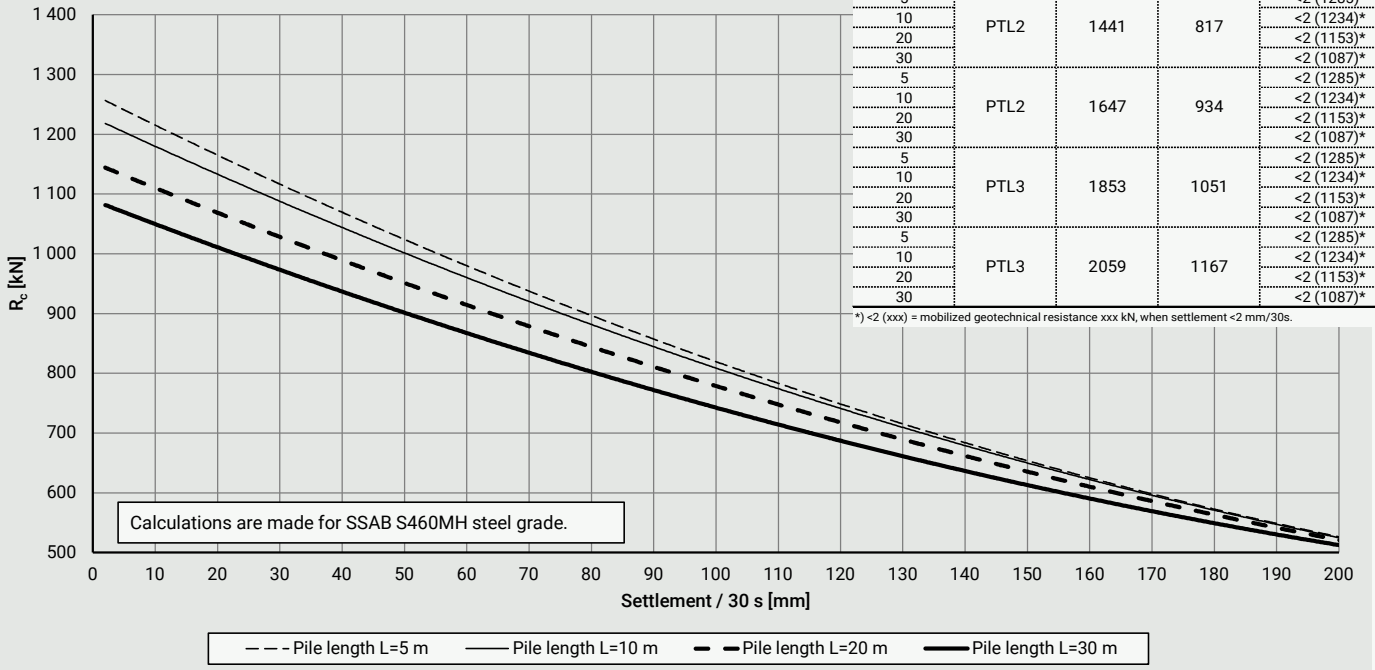


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5				20
10				11
20				<2 (1183)*
30				<2 (1119)*
5				<2 (1326)*
10	PTL1	1210	686	<2 (1269)*
20				<2 (1183)*
30				<2 (1119)*
5				<2 (1326)*
10	PTL2	1412	800	<2 (1269)*
20				<2 (1183)*
30				<2 (1119)*
5				<2 (1326)*
10	PTL2	1614	915	<2 (1269)*
20				<2 (1183)*
30				<2 (1119)*
5				<2 (1326)*
10	PTL3	1815	1029	<2 (1269)*
20				<2 (1183)*
30				<2 (1119)*
5				<2 (1326)*
10	PTL3	2017	1143	<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	PTL2	1441	817	<2 (1087)*
5				<2 (1285)*
10				<2 (1234)*
20	PTL2	1647	934	<2 (1153)*
30				<2 (1087)*
5				<2 (1285)*
10	PTL3	1853	1051	<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

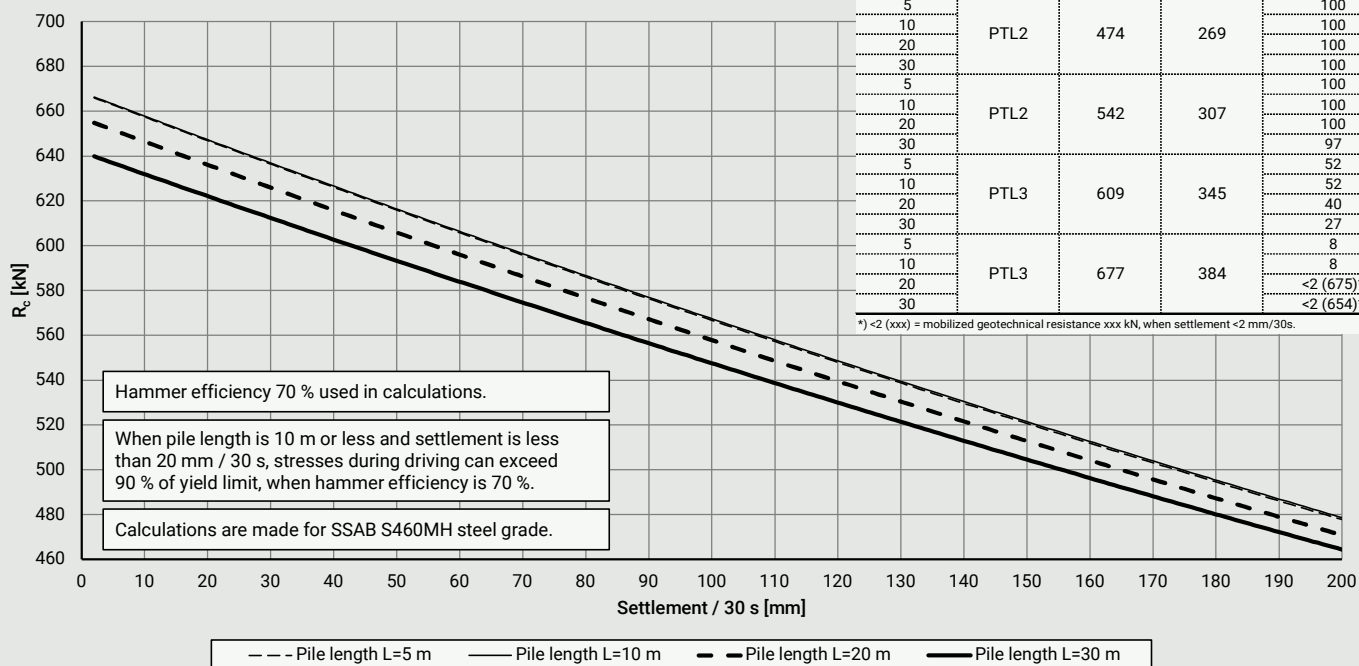
Diameter of the tool [mm]	D_t	120
Height of the tool [mm]	L_t	800
Tool weight [kg]	m_t	71

Hammer efficiency 70 %

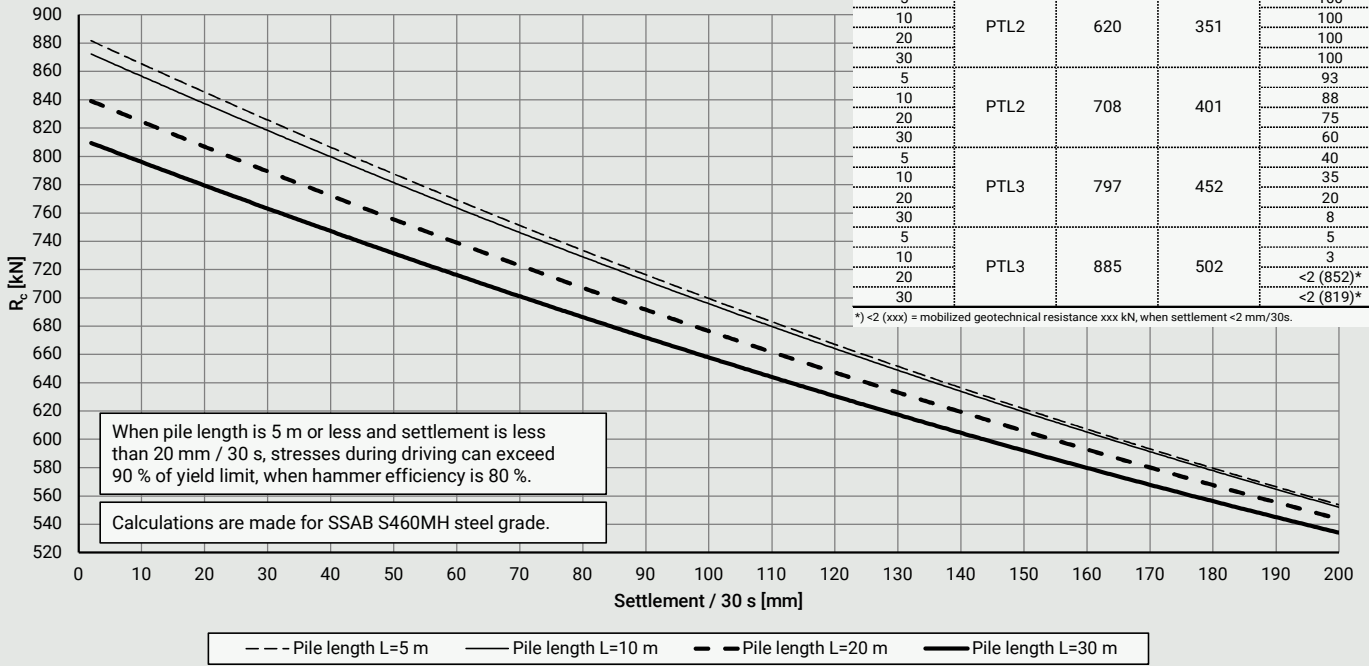
Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	406	230	100
10				100
20				100
30				100
5	PTL2	474	269	100
10				100
20				100
30				100
5	PTL2	542	307	97
10				100
20				100
30				97
5	PTL3	609	345	52
10				52
20				40
30				27
5	PTL3	677	384	8
10				8
20				<2 (675)*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

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

Furukawa FXJ175 - RR90



Furukawa FXJ175 - RR115/6.3

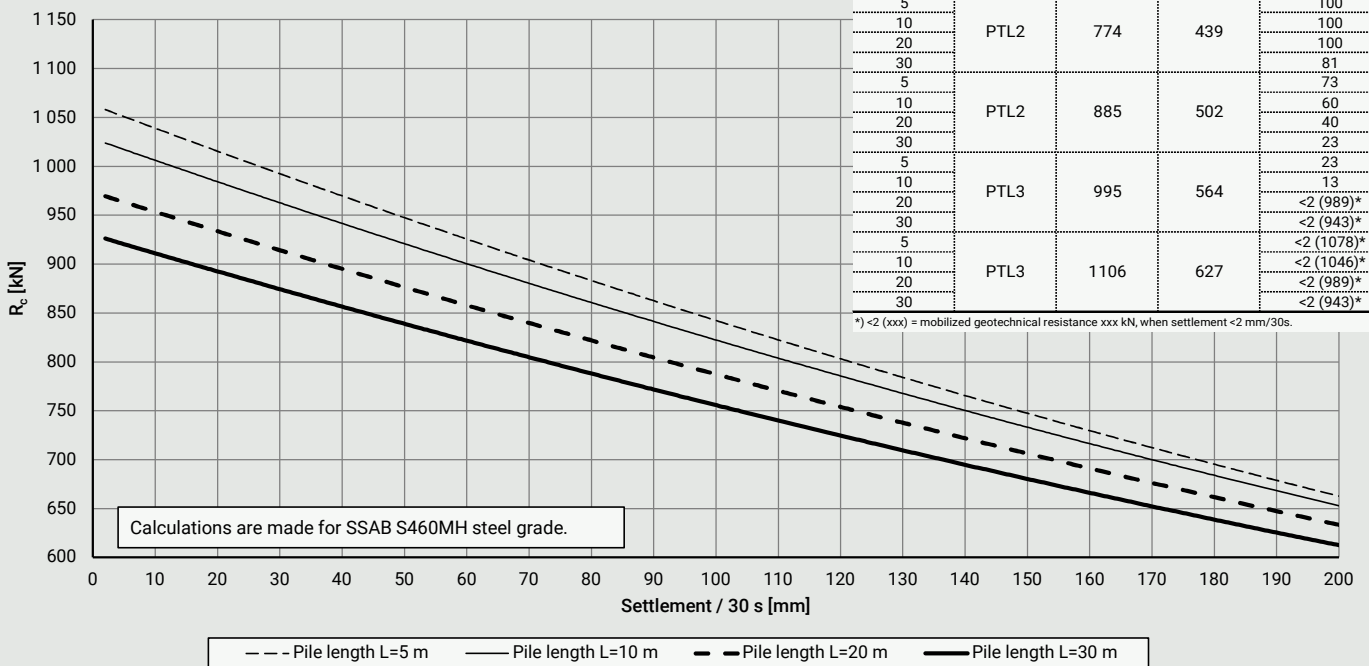


Hammer efficiency 80 %

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

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

Furukawa FXJ175 - RR115/8

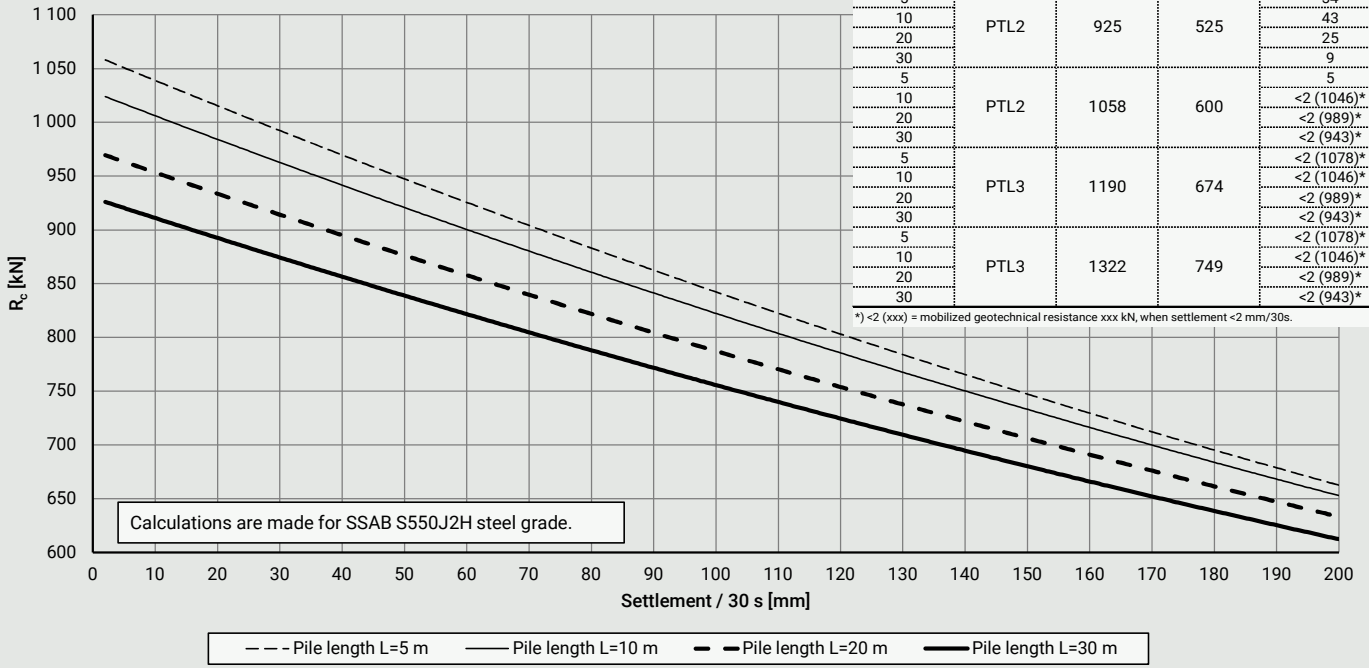


Hammer efficiency 80 %

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

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

Furukawa FXJ175 - RR115/8

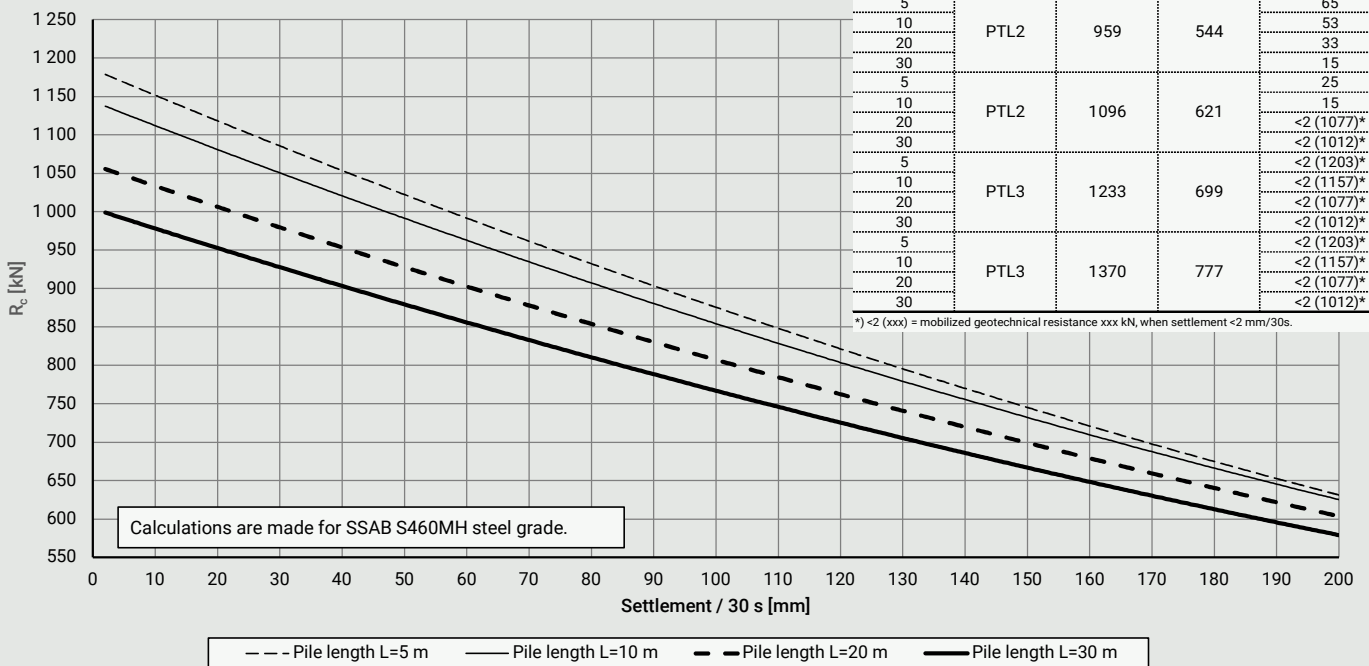


Hammer efficiency 80 %

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

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

Furukawa FXJ175 - RR140/8

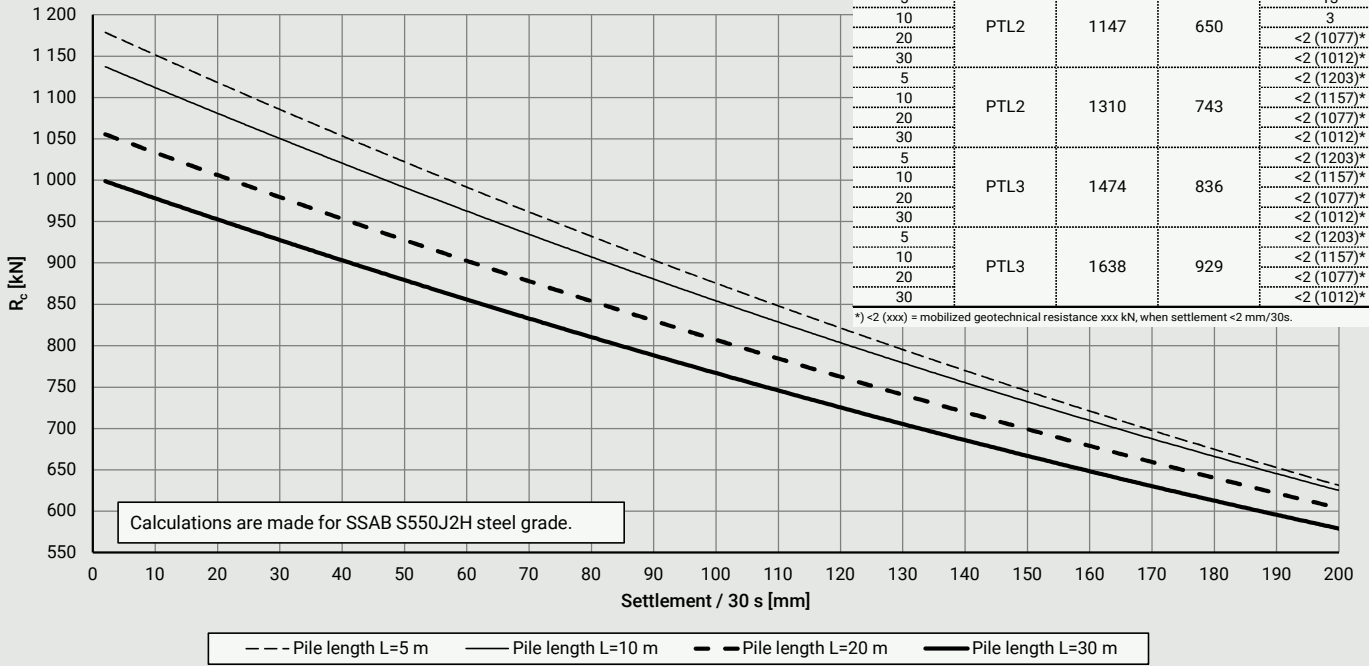


Hammer efficiency 80 %

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

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

Furukawa FXJ175 - RRs140/8

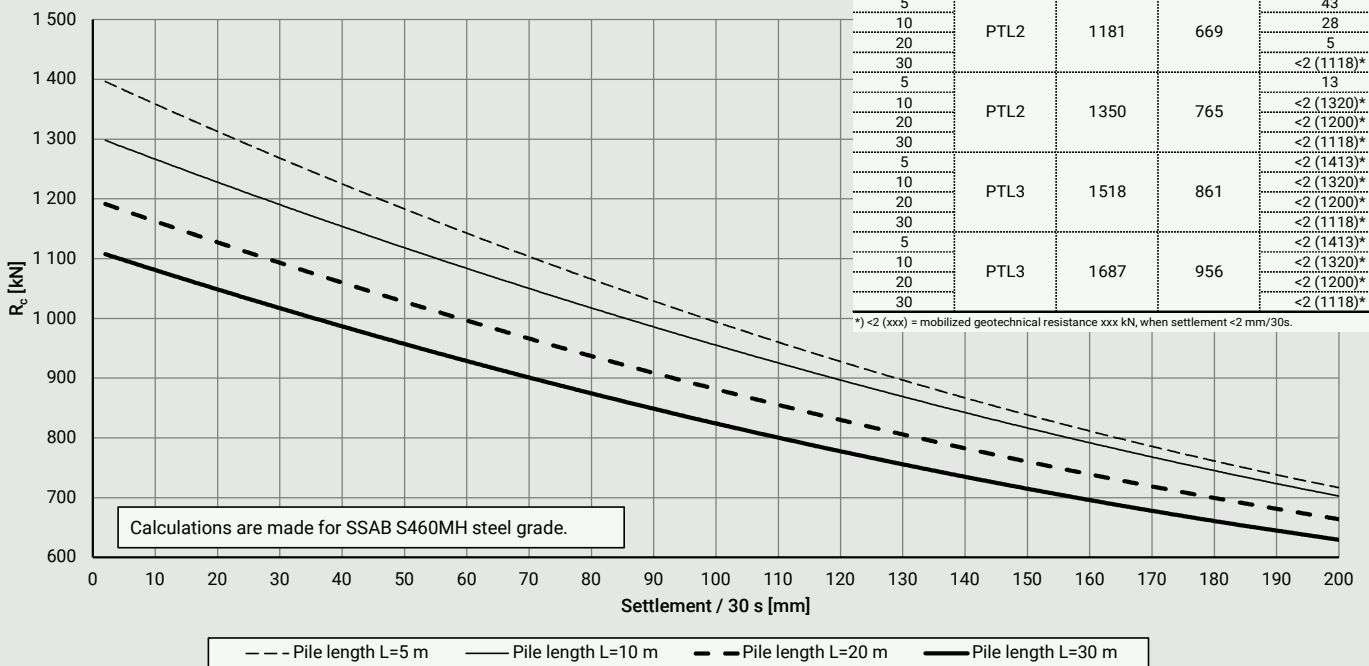


Hammer efficiency 80 %

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	PTL2	1147	650	8
5				13
10				3
20	PTL2	1310	743	<2 (1077)*
30				<2 (1012)*
5				<2 (1203)*
10	PTL3	1474	836	<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 - 0

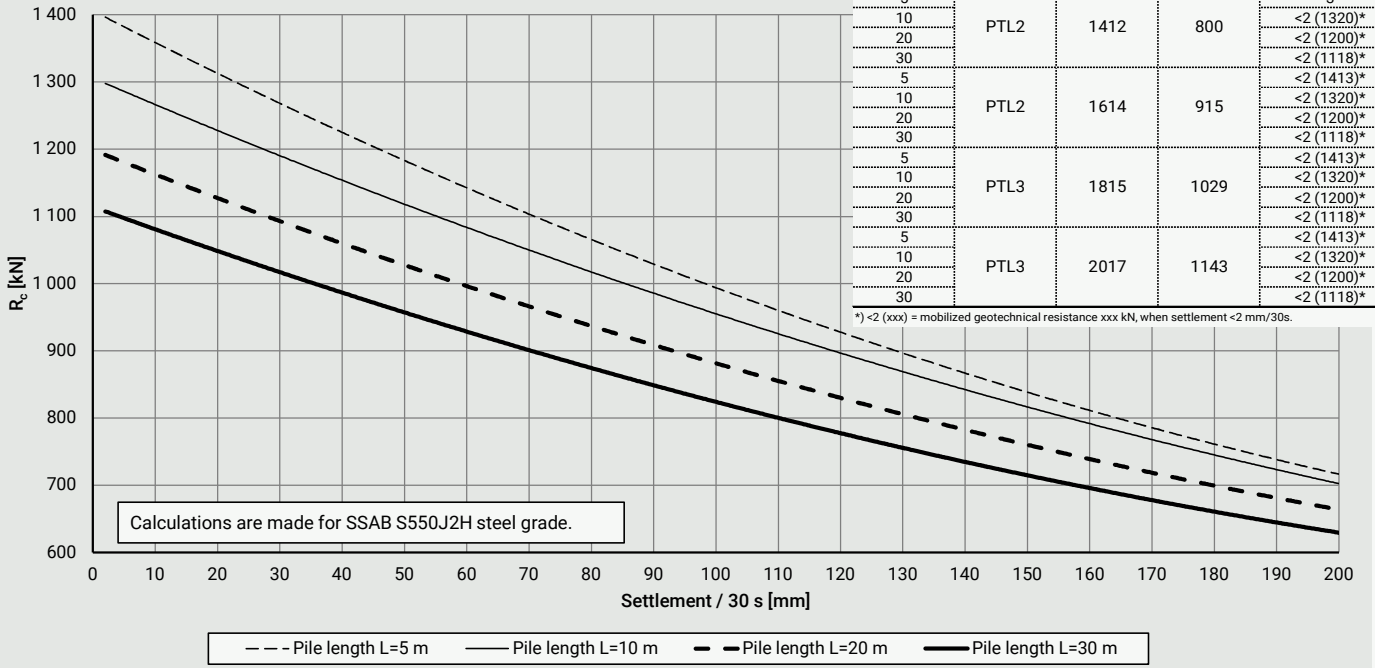


Hammer efficiency 80 %

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	PTL2	1181	669	27
5				43
10				28
20	PTL2	1350	765	5
30				<2 (1118)*
5				13
10	PTL3	1518	861	<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

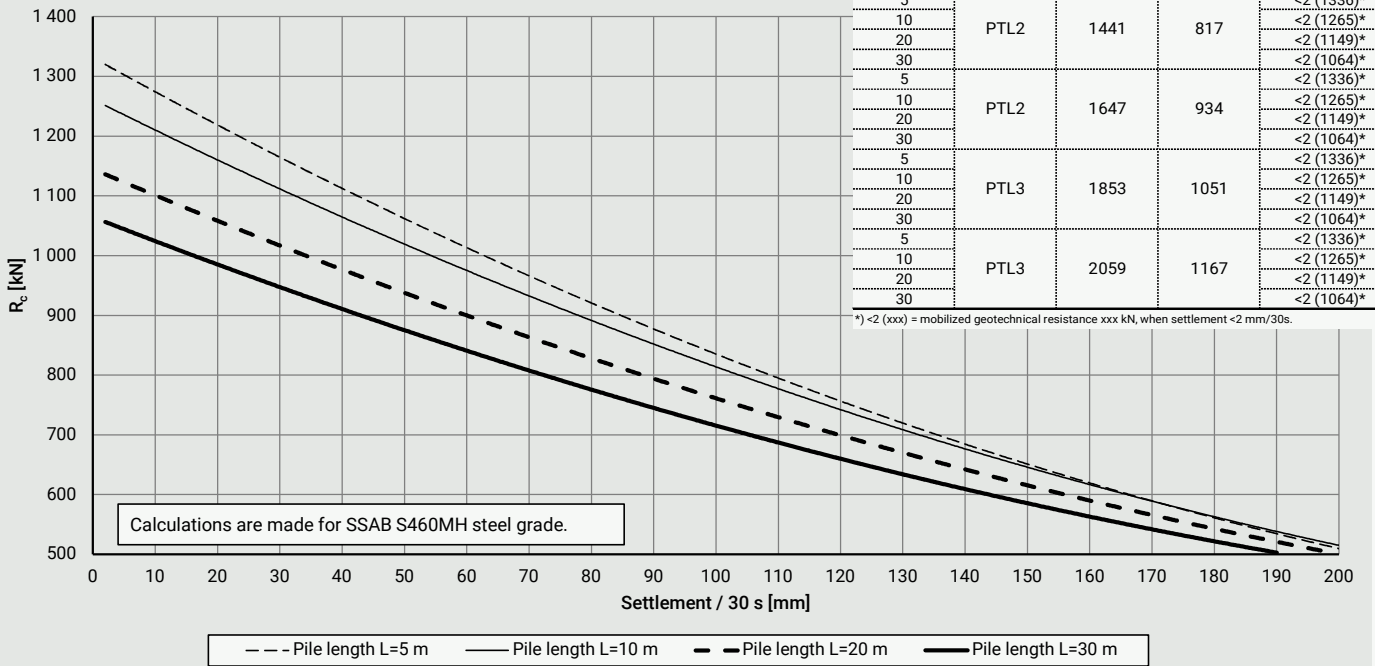


Hammer efficiency 80 %

Pile length [m]	Piling work class	R _c [kN]	R _d [kN]	Settlement / 30 s [mm]
5				37
10				22
20	PTL1	1210	686	<2 (1200)*
30				<2 (1118)*
5				3
10	PTL2	1412	800	<2 (1320)*
20				<2 (1200)*
30				<2 (1118)*
5	PTL2	1614	915	<2 (1413)*
10				<2 (1320)*
20				<2 (1200)*
30	PTL3	1815	1029	<2 (1118)*
5				<2 (1413)*
10				<2 (1320)*
20	PTL3	2017	1143	<2 (1200)*
5				<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				16
10				5
20	PTL1	1235	700	<2 (1149)*
30				<2 (1064)*
5				<2 (1336)*
10	PTL2	1441	817	<2 (1265)*
20				<2 (1149)*
30				<2 (1064)*
5	PTL2	1647	934	<2 (1336)*
10				<2 (1265)*
20				<2 (1149)*
30	PTL3	1853	1051	<2 (1064)*
5				<2 (1336)*
10				<2 (1265)*
20	PTL3	2059	1167	<2 (1149)*
30				<2 (1064)*
5				<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

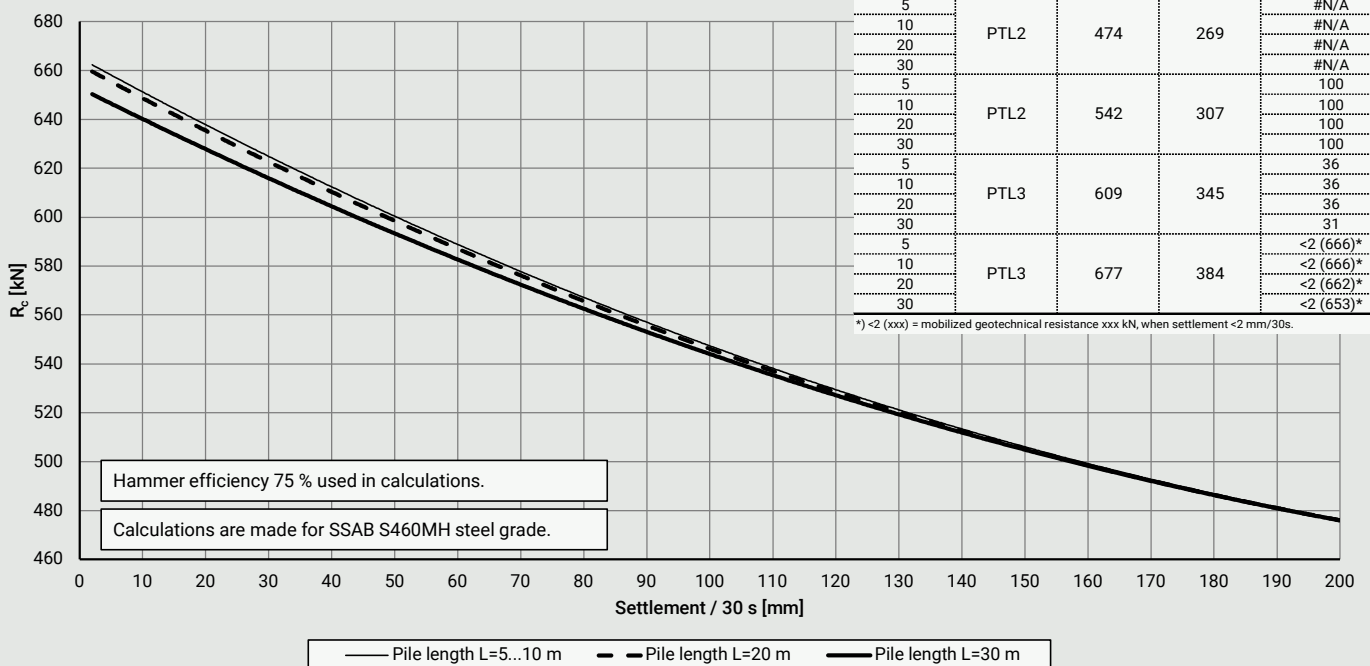
Diameter of the tool [mm]	D_t	135
Height of the tool [mm]	L_t	1200
Tool weight [kg]	m_t	135

Hammer efficiency 75 %

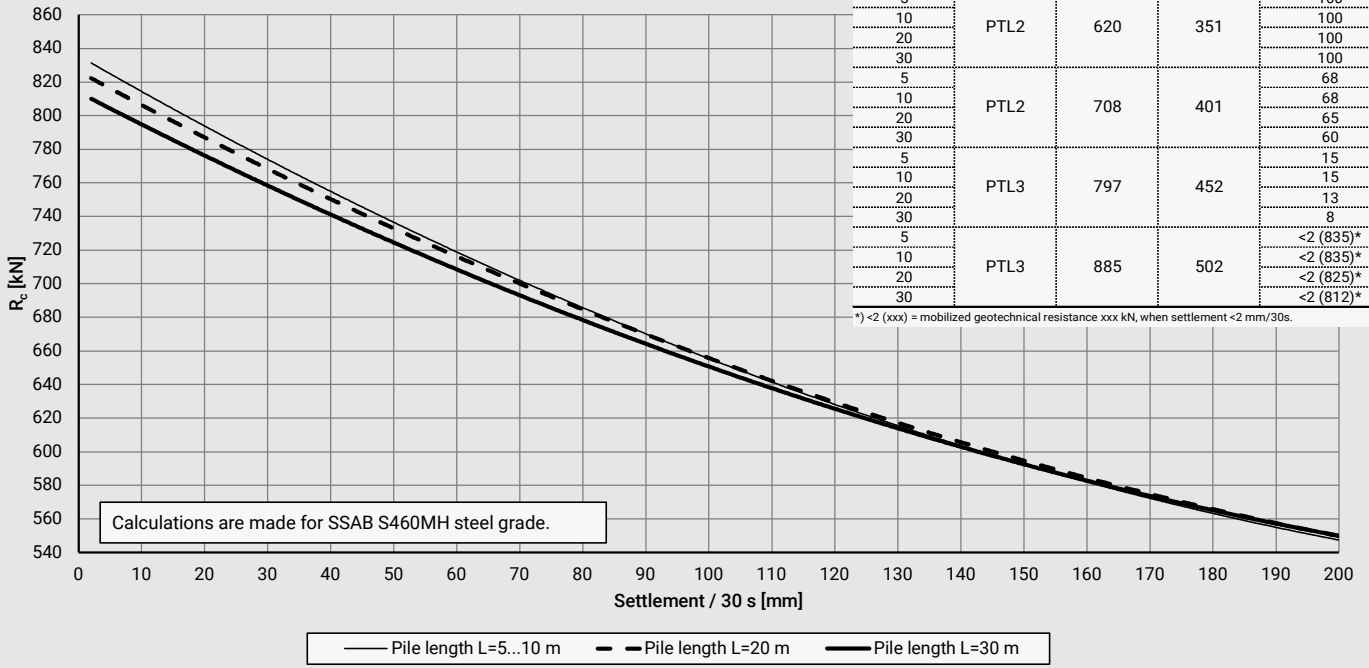
Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	406	230	100
10				100
20				100
30				100
5	PTL2	474	269	#N/A
10				#N/A
20				#N/A
30				#N/A
5	PTL2	542	307	100
10				100
20				100
30				100
5	PTL3	609	345	36
10				36
20				36
30				31
5	PTL3	677	384	<2 (666)*
10		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

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

Furukawa HB20G - RR90



Furukawa HB20G - RR115/6.3

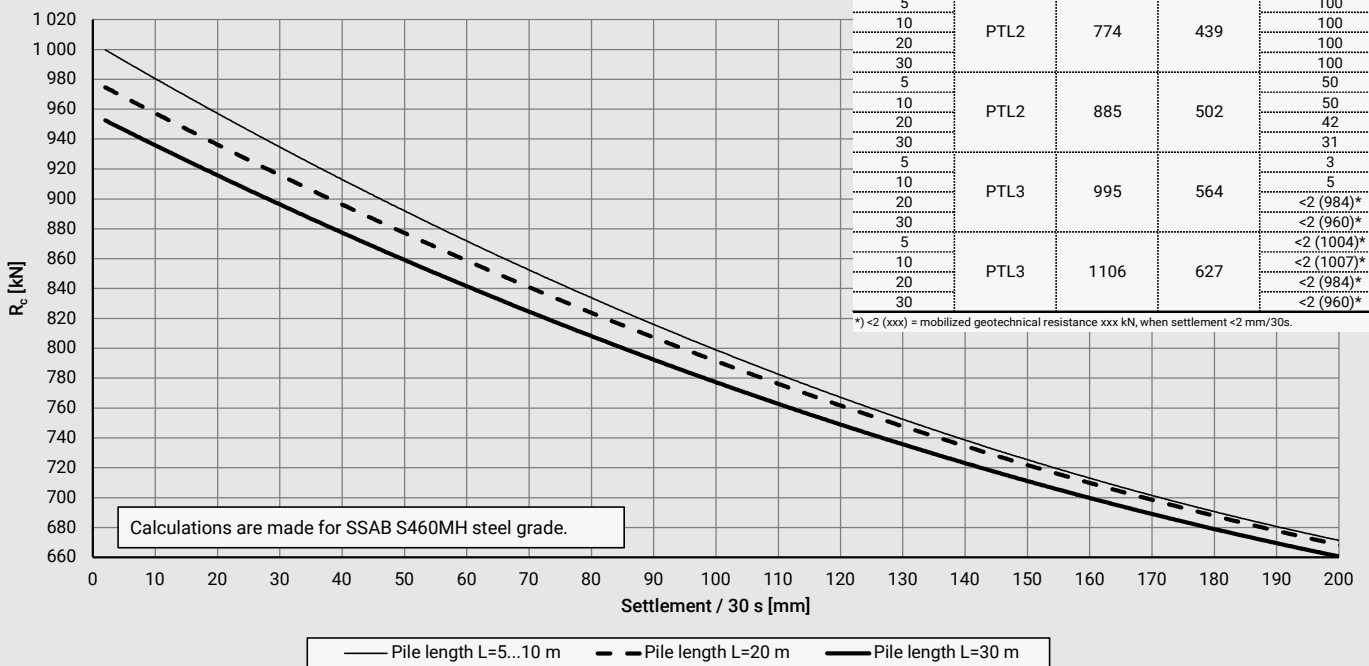


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5				100
10				100
20				100
30				100
5				100
10	PTL1	531	301	100
20				100
30				100
5				100
10	PTL2	620	351	100
20				100
30				100
5				68
10	PTL2	708	401	68
20				65
30				60
5				15
10	PTL3	797	452	15
20				13
30				8
5				<2 (835)*
10	PTL3	885	502	<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				100
10				100
20				100
30				100
5				100
10	PTL1	664	376	100
20				100
30				100
5				100
10	PTL2	774	439	100
20				100
30				100
5				50
10	PTL2	885	502	50
20				42
30				31
5				3
10	PTL3	995	564	5
20				<2 (984)*
30				<2 (960)*
5				<2 (1004)*
10	PTL3	1106	627	<2 (1007)*
20				<2 (984)*
30				<2 (960)*

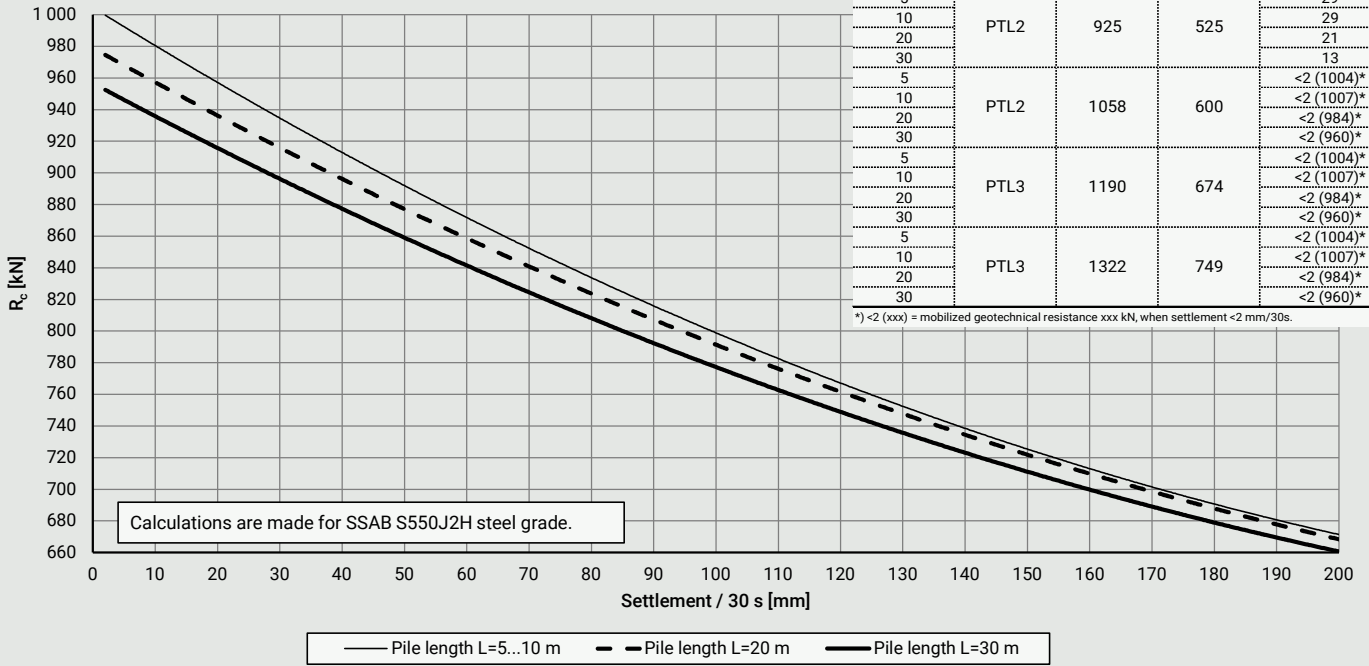
*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Hammer efficiency 80 %

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

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

Furukawa HB20G - RRs115/8

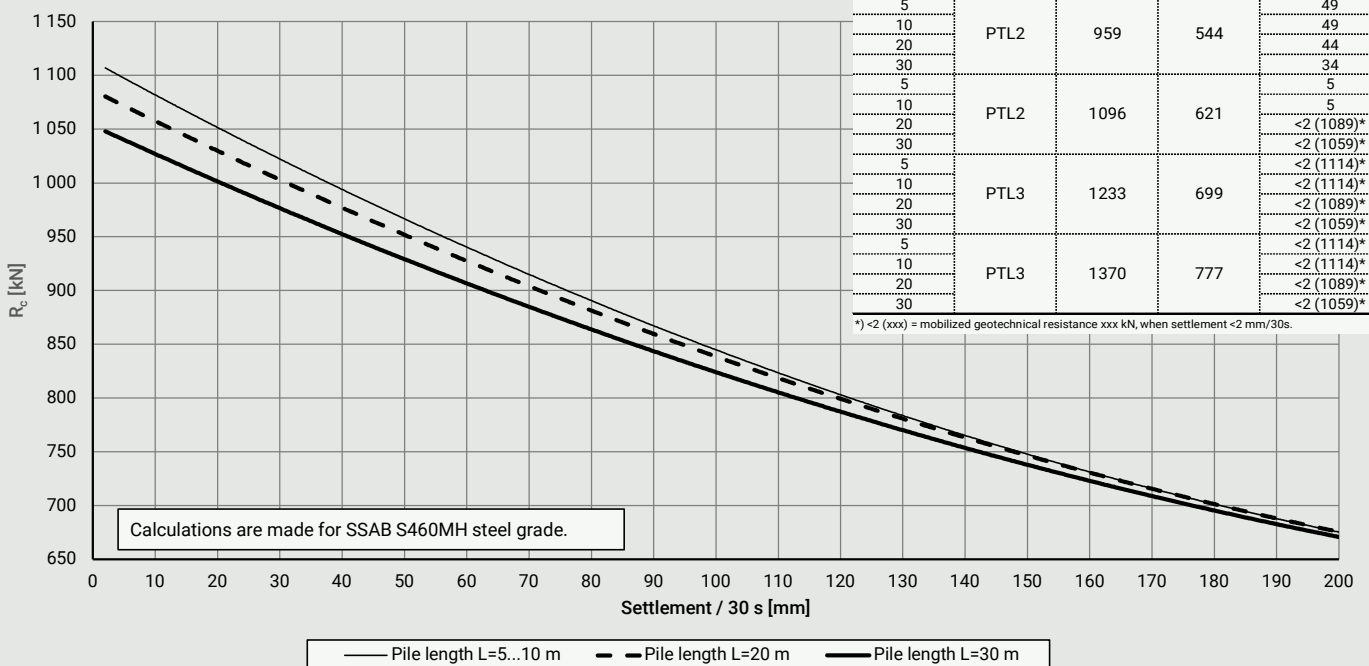


Hammer efficiency 80 %

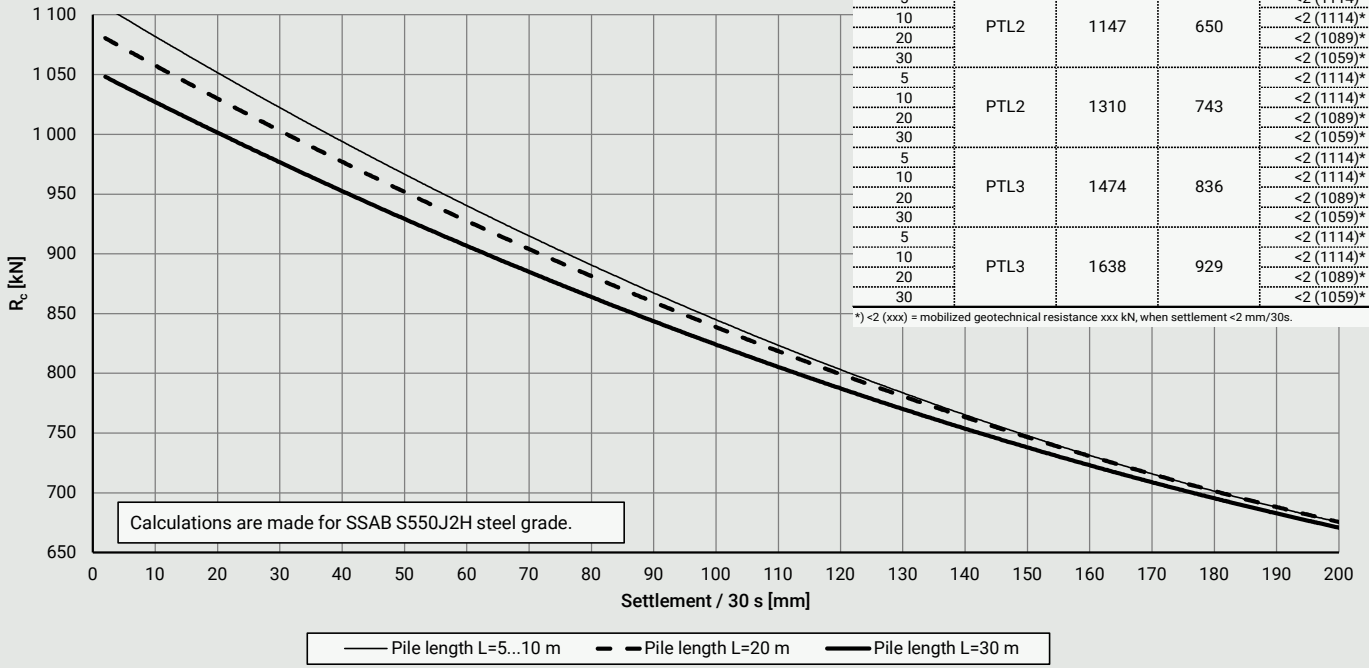
Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5				100
10				100
20	PTL1	822	466	100
30				100
5				49
10				49
20	PTL2	959	544	44
30				34
5				5
10				5
20	PTL2	1096	621	<2 (1089)*
30				<2 (1059)*
5				<2 (1114)*
10				<2 (1114)*
20	PTL3	1233	699	<2 (1089)*
30				<2 (1059)*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

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

Furukawa HB20G - RR140/8



Furukawa HB20G - RRs140/8

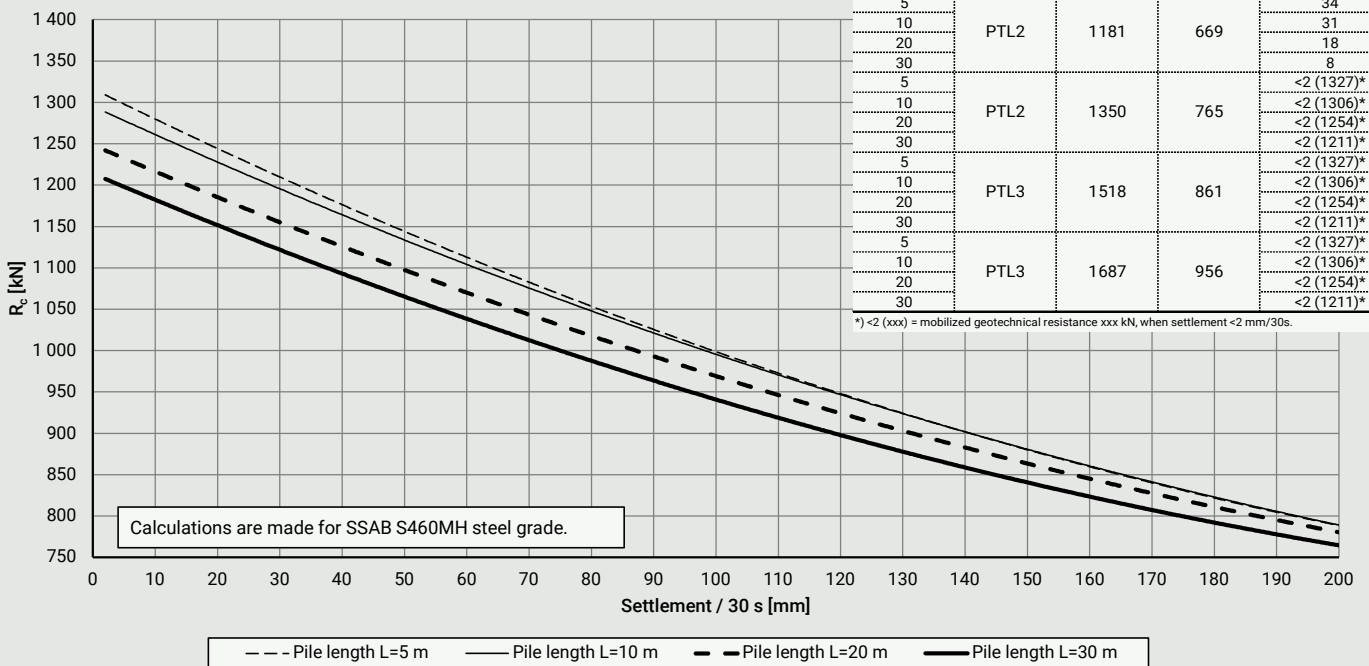


Hammer efficiency 80 %

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

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

Furukawa HB20G - 0



Hammer efficiency 80 %

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

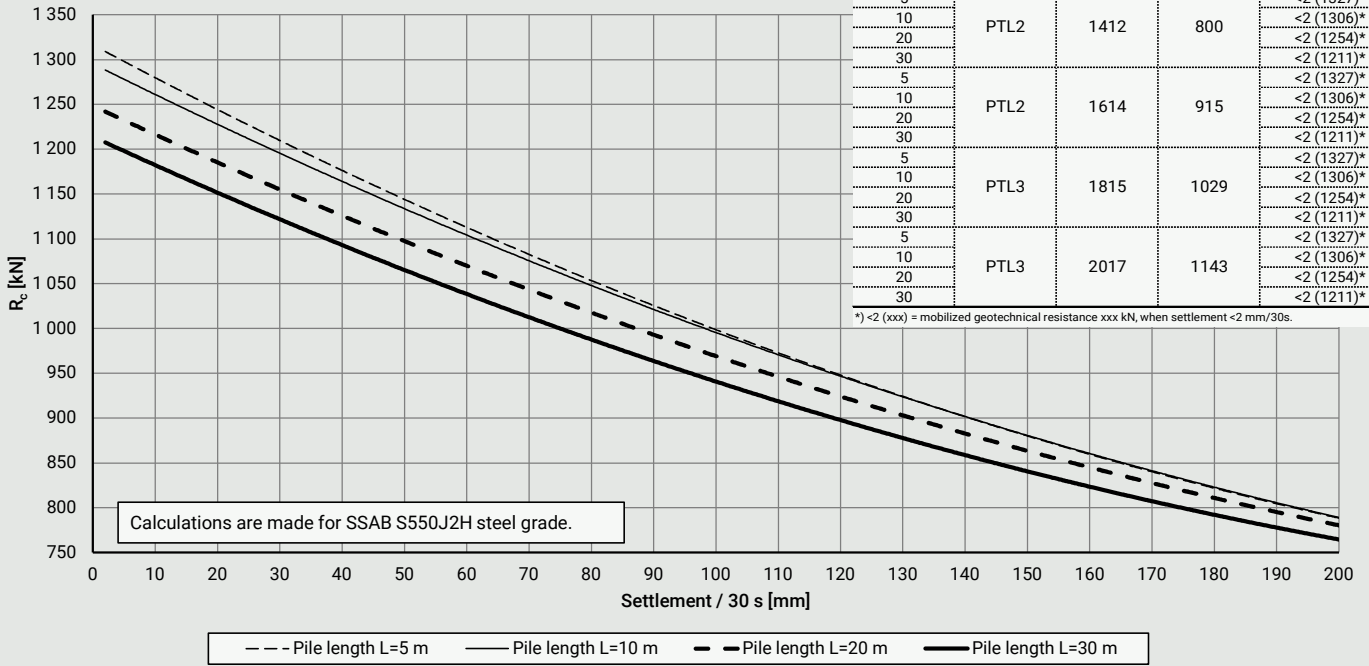
*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Hammer efficiency 80 %

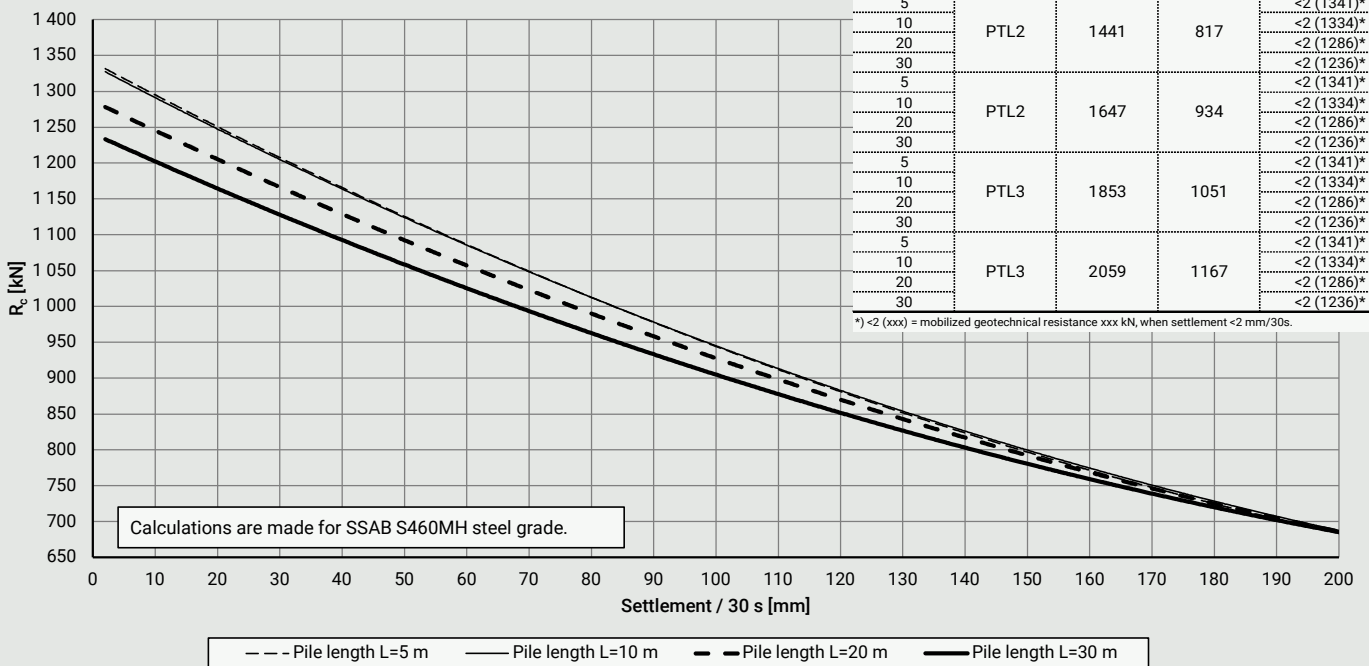
Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5				26
10				21
20				10
30				3
5	PTL1	1210	686	<2 (1327)*
10				<2 (1306)*
20				<2 (1254)*
30				<2 (1211)*
5	PTL2	1412	800	<2 (1327)*
10				<2 (1306)*
20				<2 (1254)*
30				<2 (1211)*
5	PTL2	1614	915	<2 (1327)*
10				<2 (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 - RRs140/10



Furukawa HB20G - RR170/10

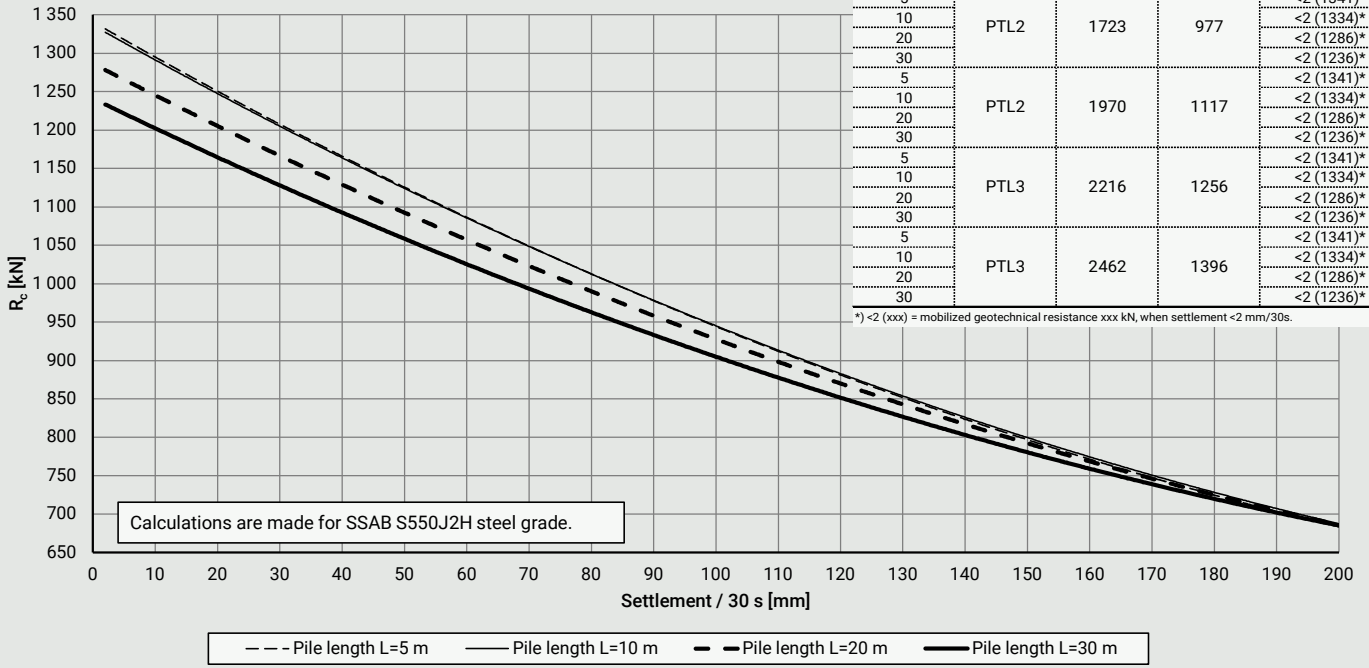


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5				21
10				21
20				10
30				3
5	PTL1	1235	700	<2 (1341)*
10				<2 (1334)*
20				<2 (1286)*
30				<2 (1236)*
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

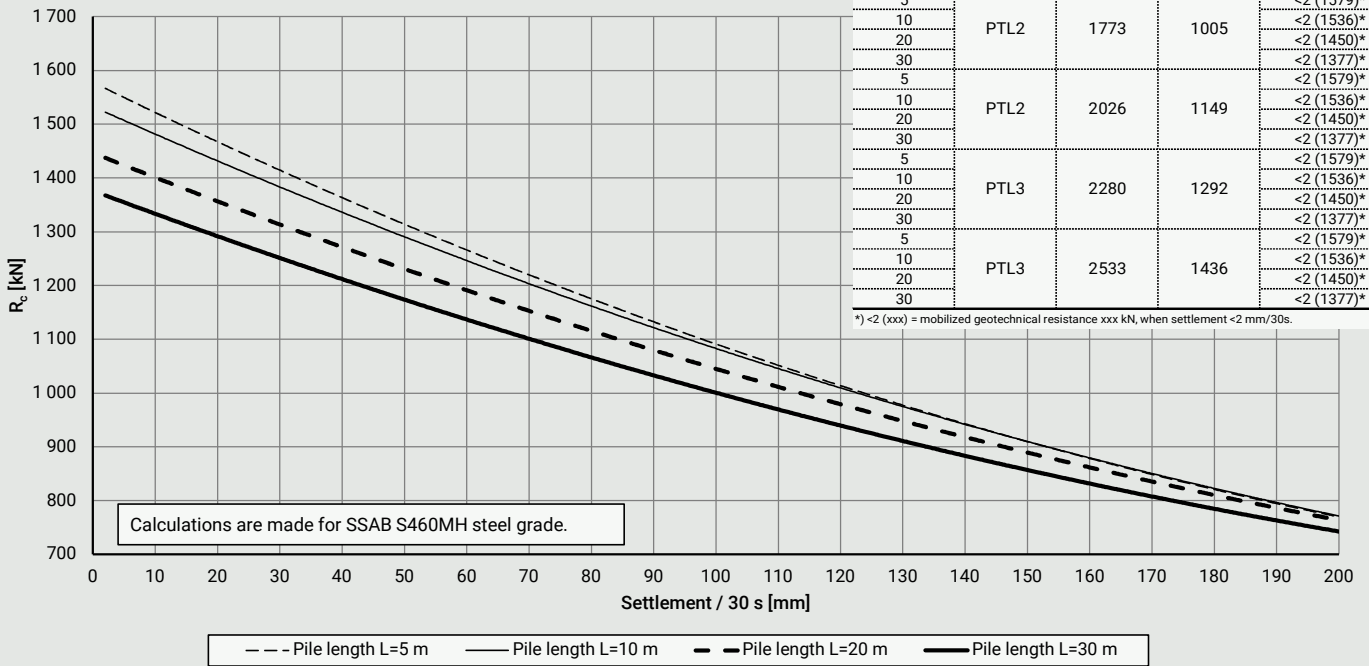


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5				<2 (1341)*
10				<2 (1334)*
20	PTL1	1477	837	<2 (1286)*
30				<2 (1236)*
5				<2 (1341)*
10	PTL2	1723	977	<2 (1334)*
20				<2 (1286)*
30				<2 (1236)*
5				<2 (1341)*
10	PTL2	1970	1117	<2 (1334)*
20				<2 (1286)*
30				<2 (1236)*
5				<2 (1341)*
10	PTL3	2216	1256	<2 (1334)*
20				<2 (1286)*
30				<2 (1236)*
5				<2 (1341)*
10	PTL3	2462	1396	<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				10
10				3
20	PTL1	1520	862	<2 (1450)*
30				<2 (1377)*
5				<2 (1579)*
10	PTL2	1773	1005	<2 (1536)*
20				<2 (1450)*
30				<2 (1377)*
5				<2 (1579)*
10	PTL2	2026	1149	<2 (1536)*
20				<2 (1450)*
30				<2 (1377)*
5				<2 (1579)*
10	PTL3	2280	1292	<2 (1536)*
20				<2 (1450)*
30				<2 (1377)*
5				<2 (1579)*
10	PTL3	2533	1436	<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

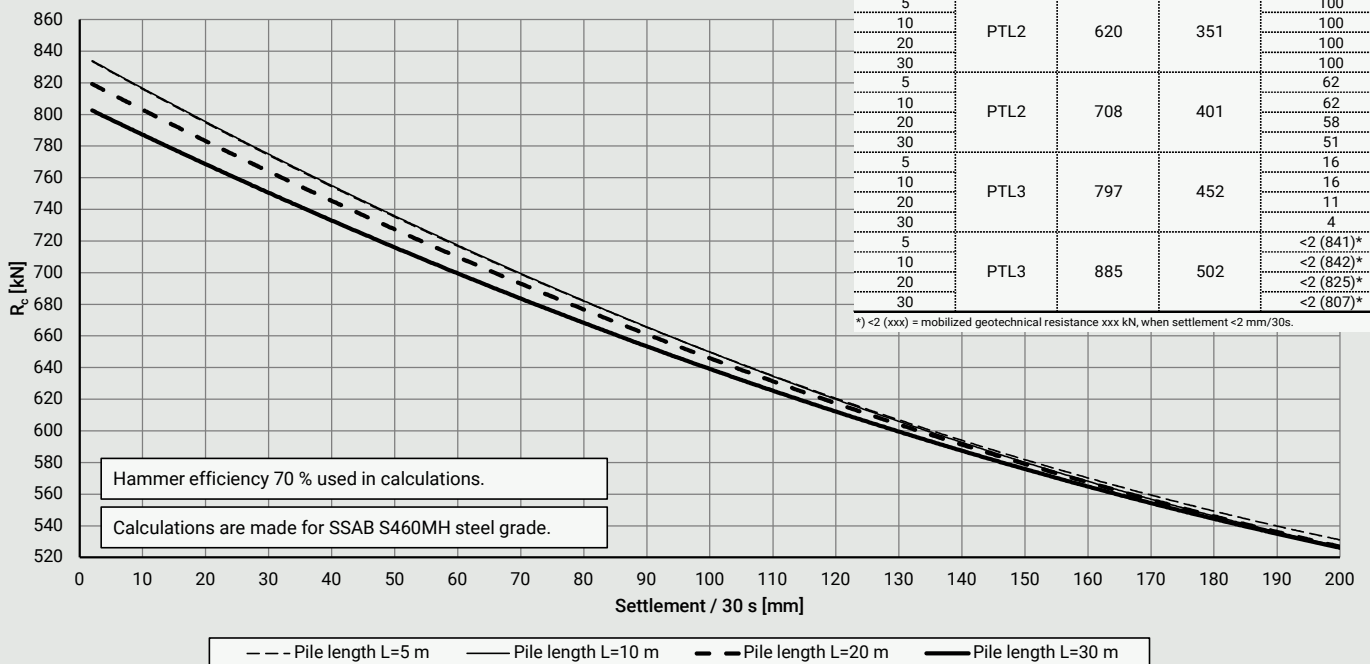
Diameter of the tool [mm]	D_t	135
Height of the tool [mm]	L_t	1100
Tool weight [kg]	m_t	120

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 - RR115/6.3

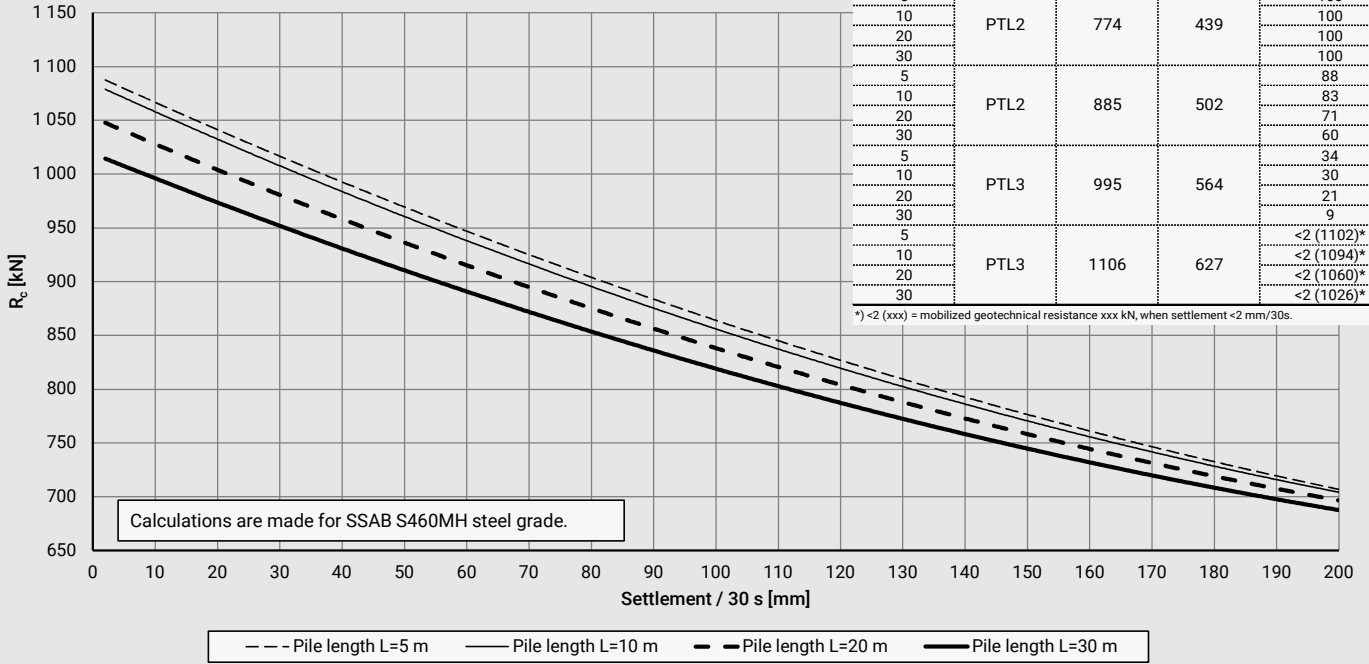


Hammer efficiency 80 %

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

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

Furukawa F22 - RR115/8

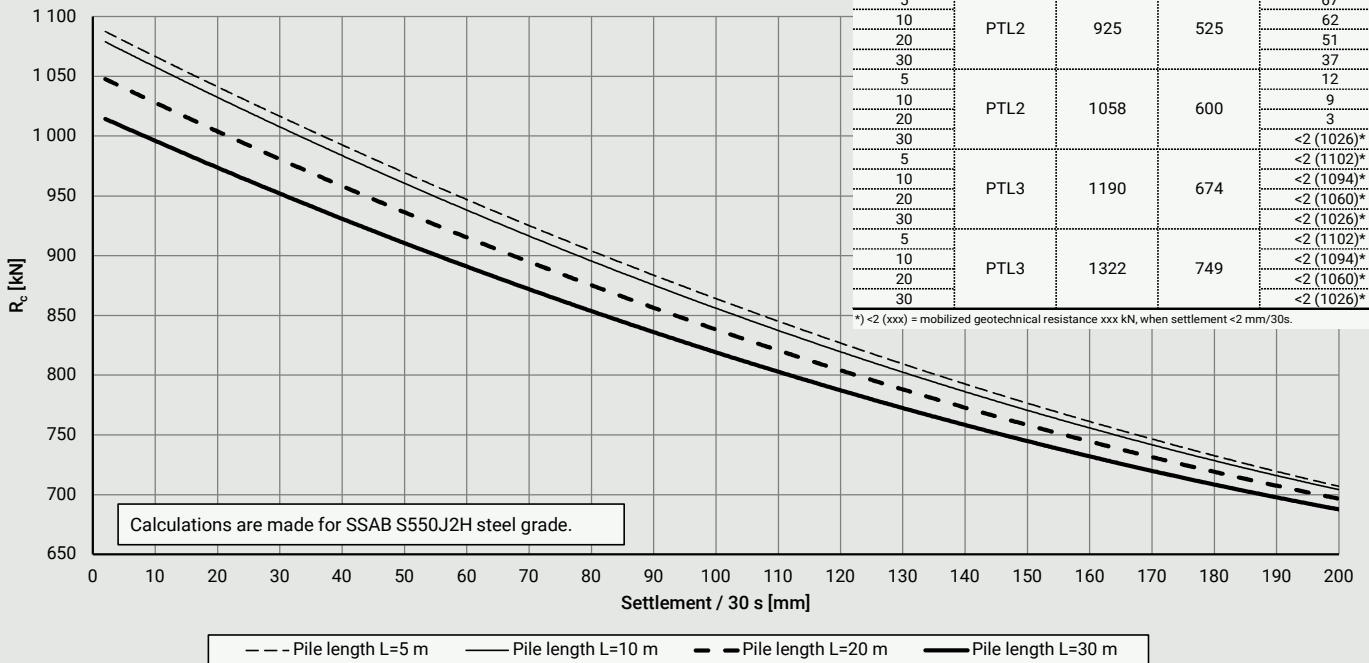


Hammer efficiency 80 %

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

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

Furukawa F22 - RRs115/8

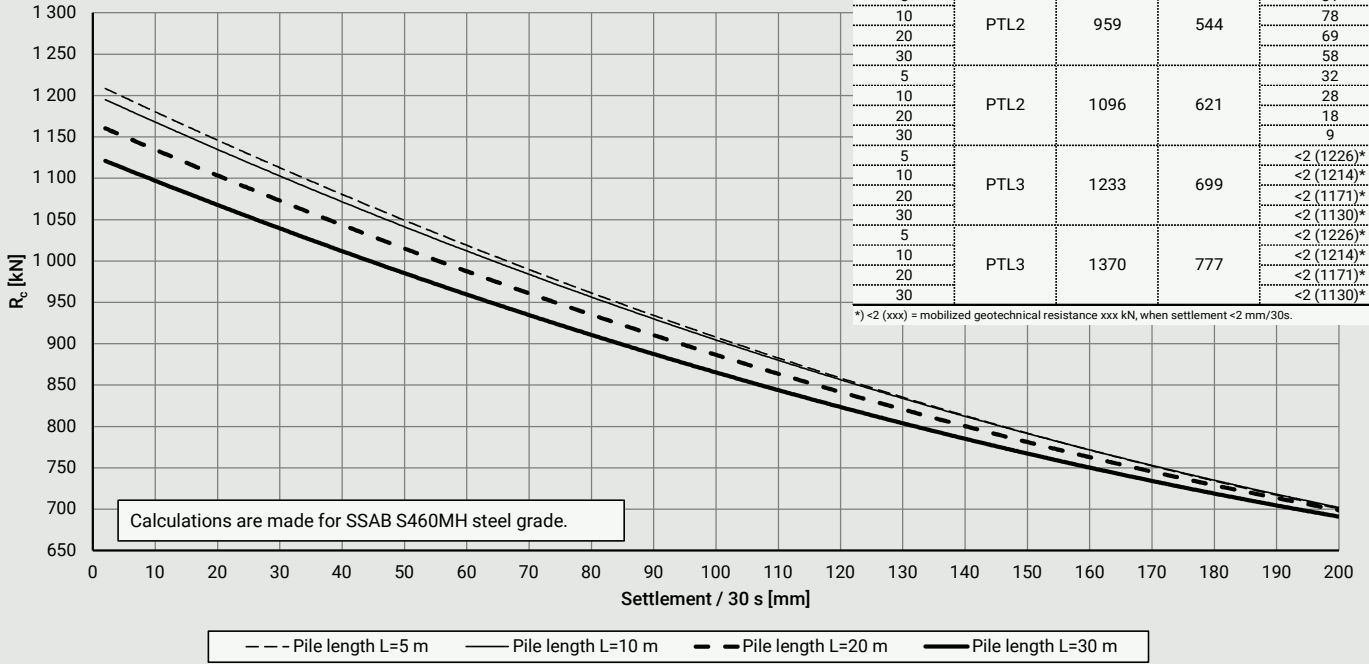


Hammer efficiency 80 %

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

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

Furukawa F22 - RR140/8

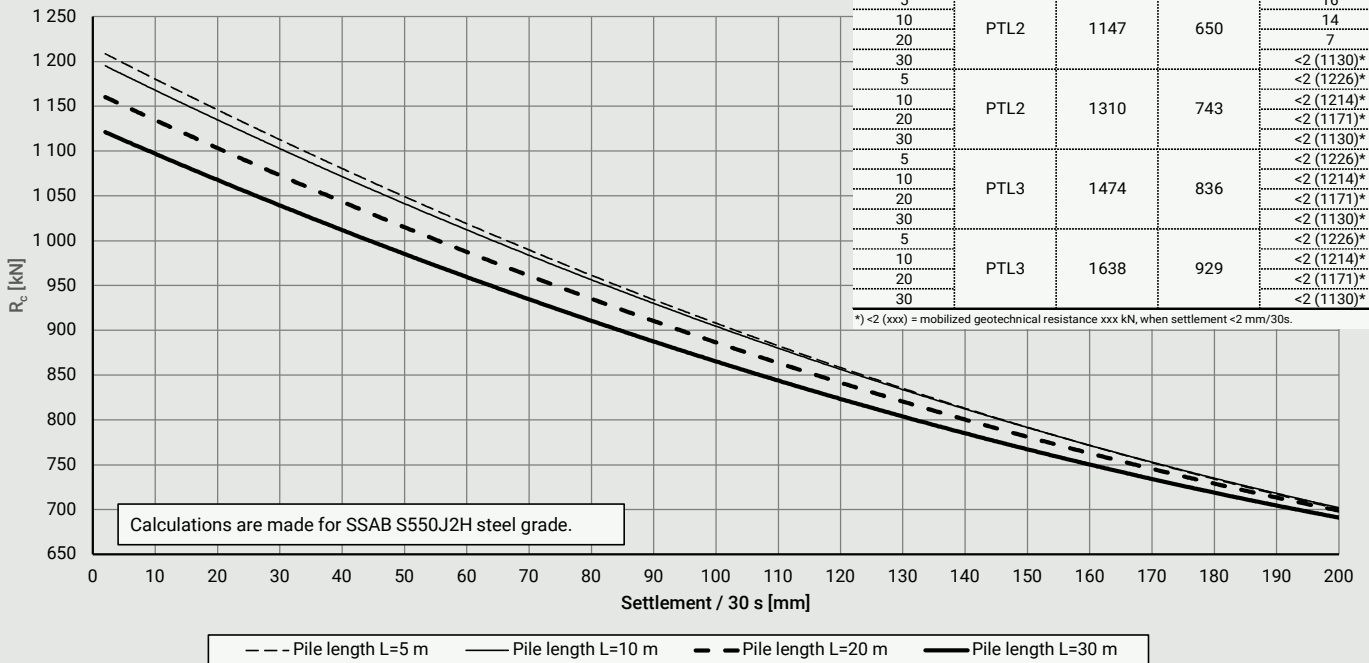


Hammer efficiency 80 %

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

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

Furukawa F22 - RRs140/8

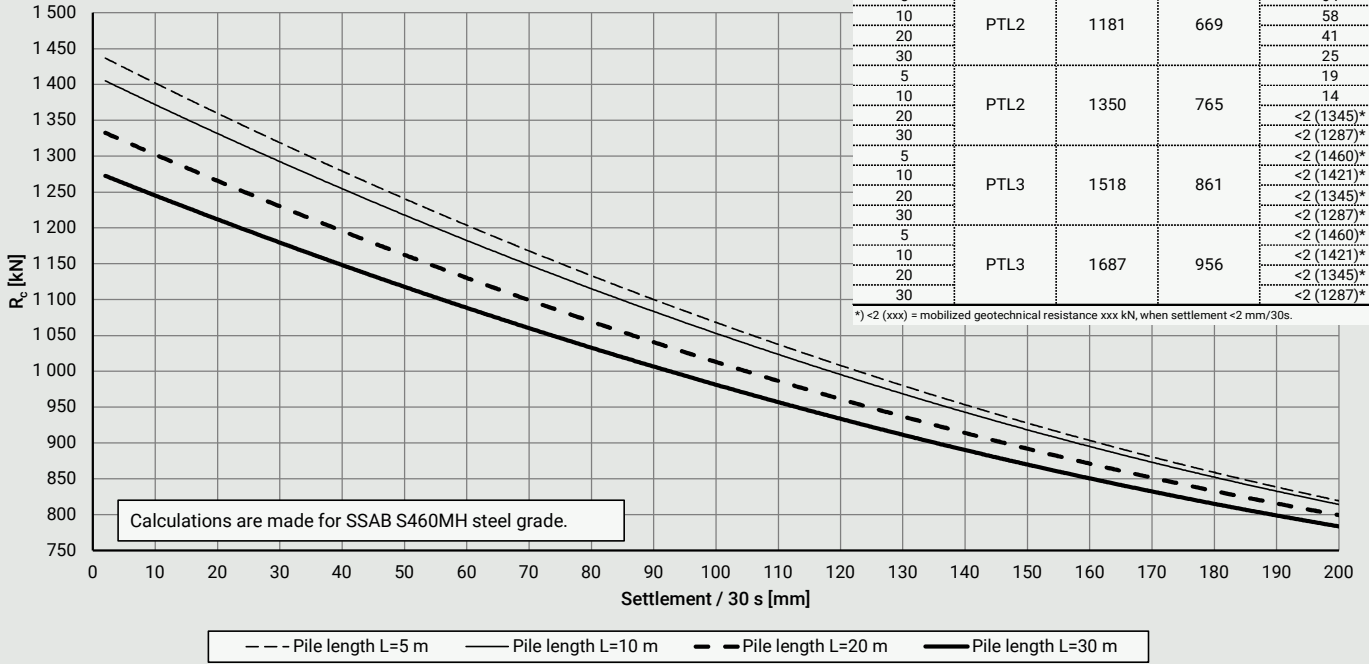


Hammer efficiency 80 %

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

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

Furukawa F22 - 0

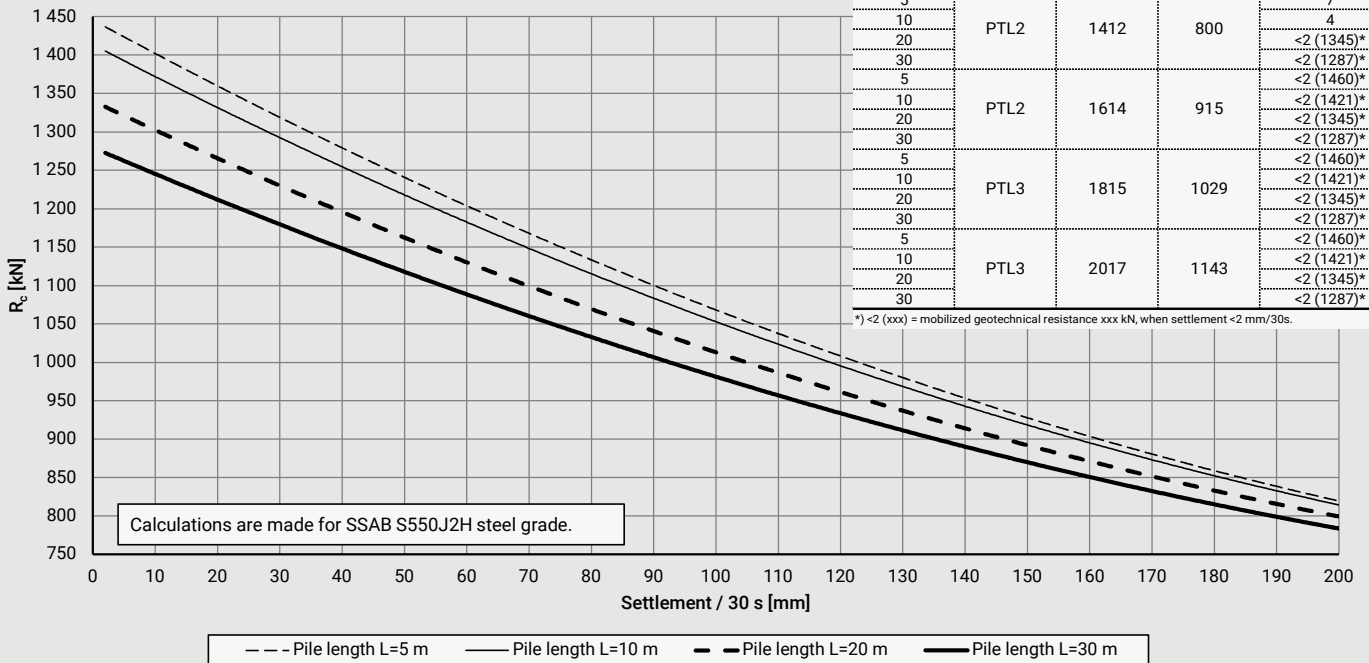


Hammer efficiency 80 %

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

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

Furukawa F22 - RRs140/10

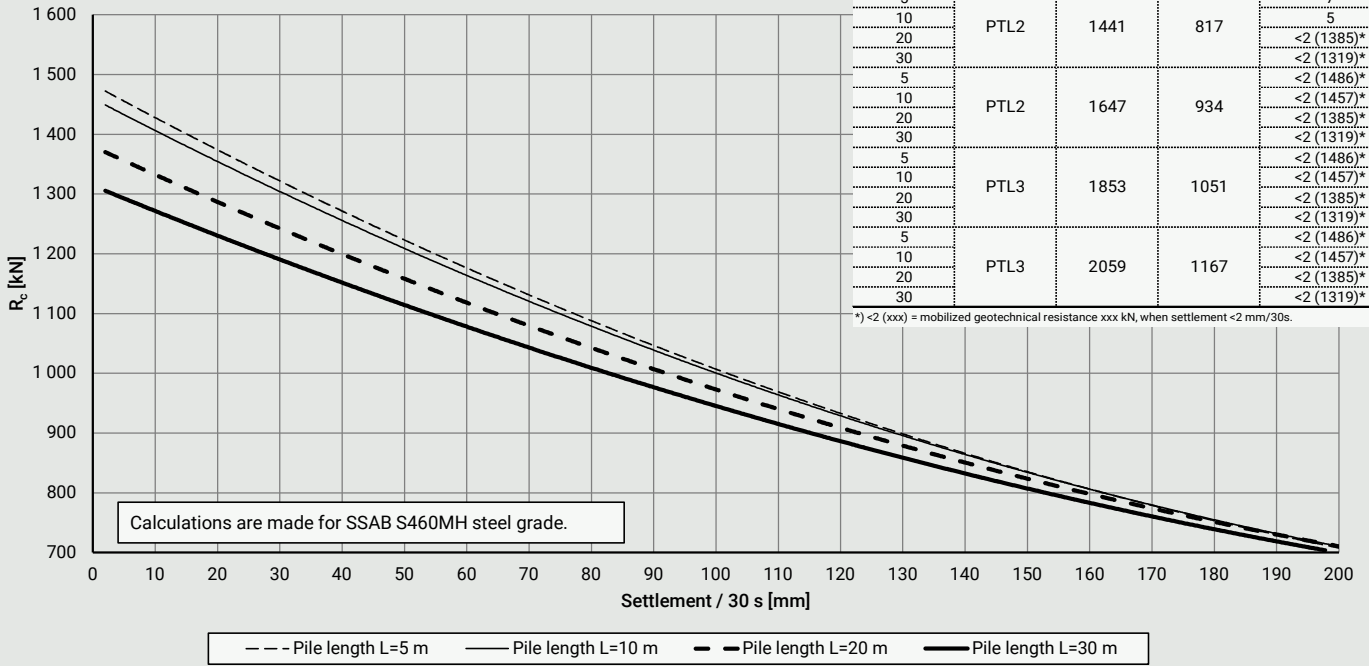


Hammer efficiency 80 %

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

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

Furukawa F22 - RR170/10

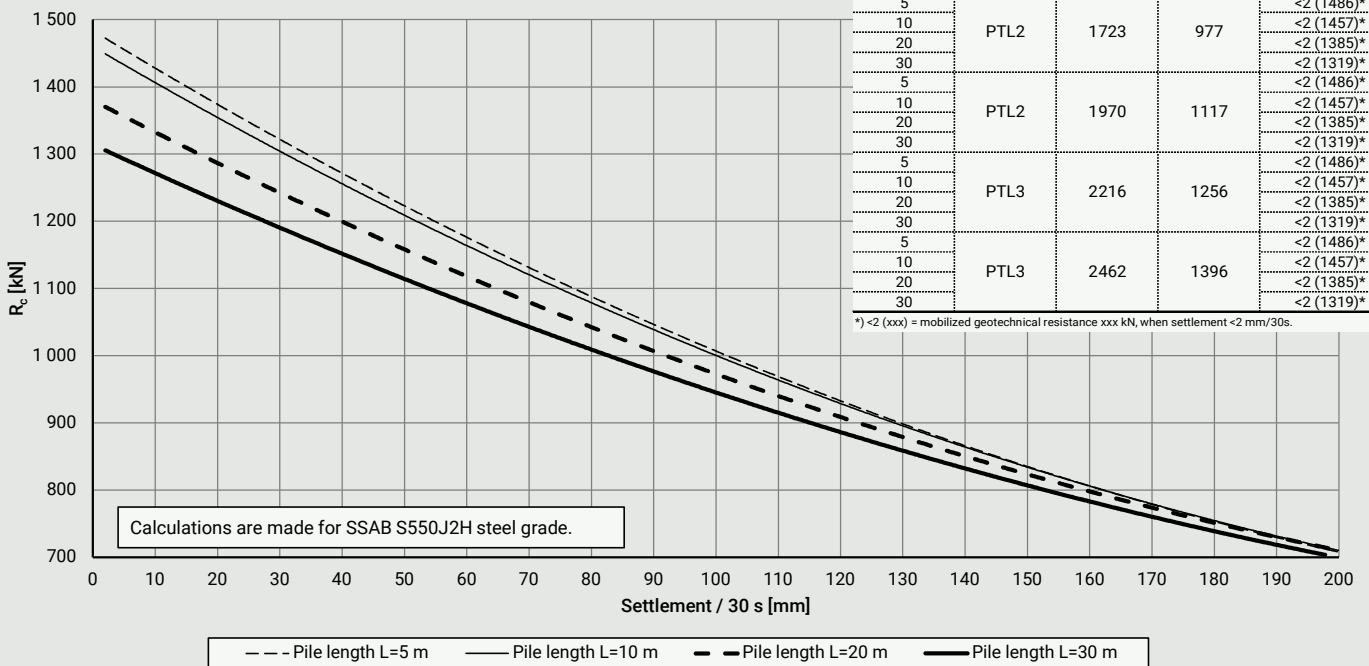


Hammer efficiency 80 %

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

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

Furukawa F22 - RRs170/10

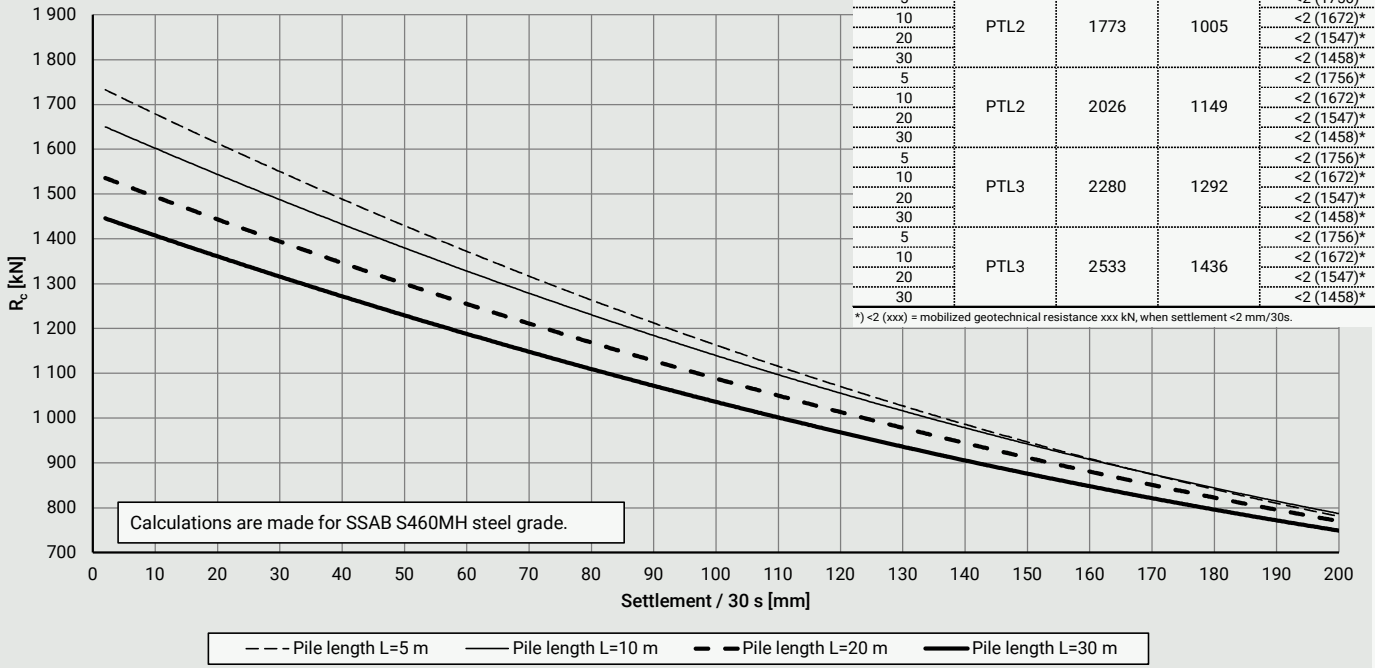


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	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 F22 - RR170/12.5



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

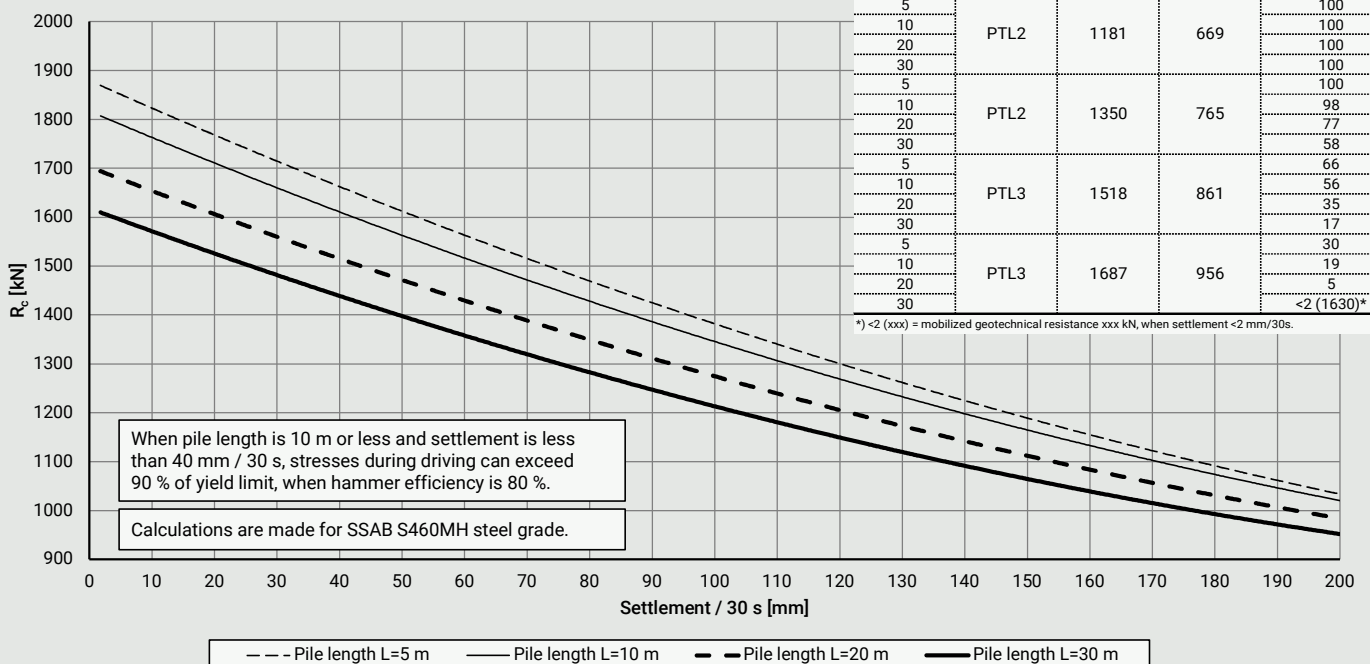
Diameter of the tool [mm]	D_t	140
Height of the tool [mm]	L_t	900
Tool weight [kg]	m_t	110

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 - RR140/10

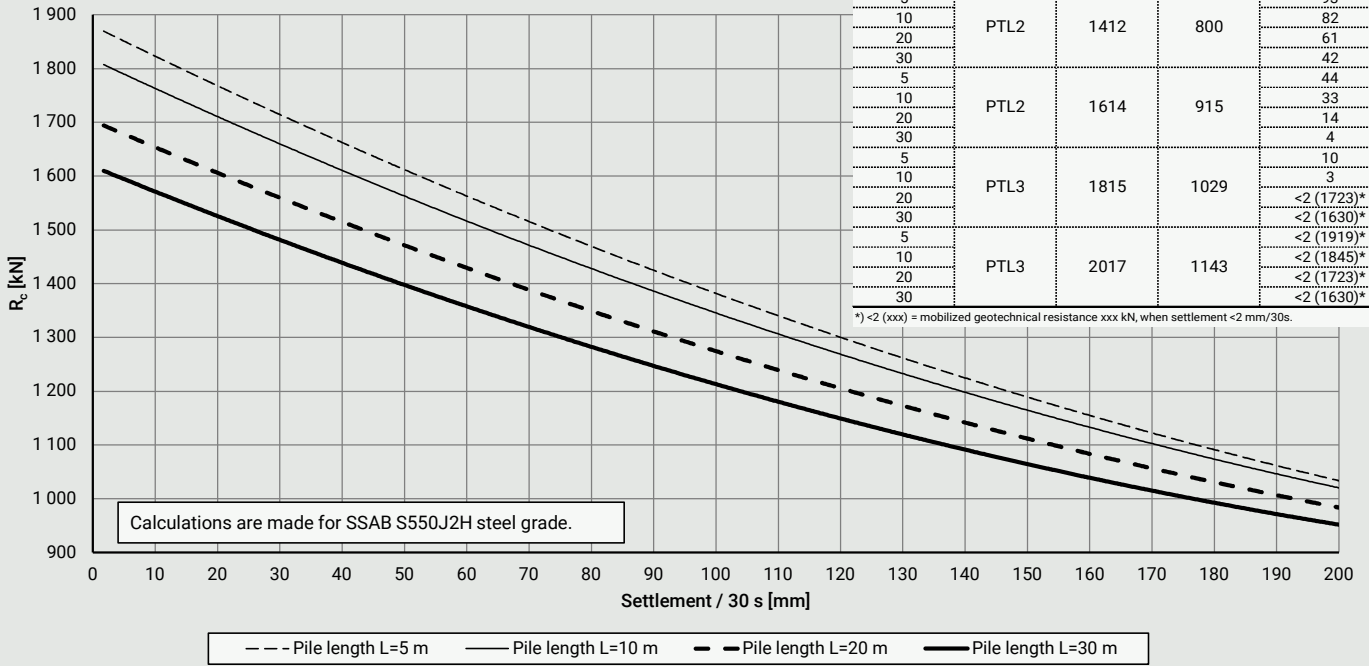


Hammer efficiency 80 %

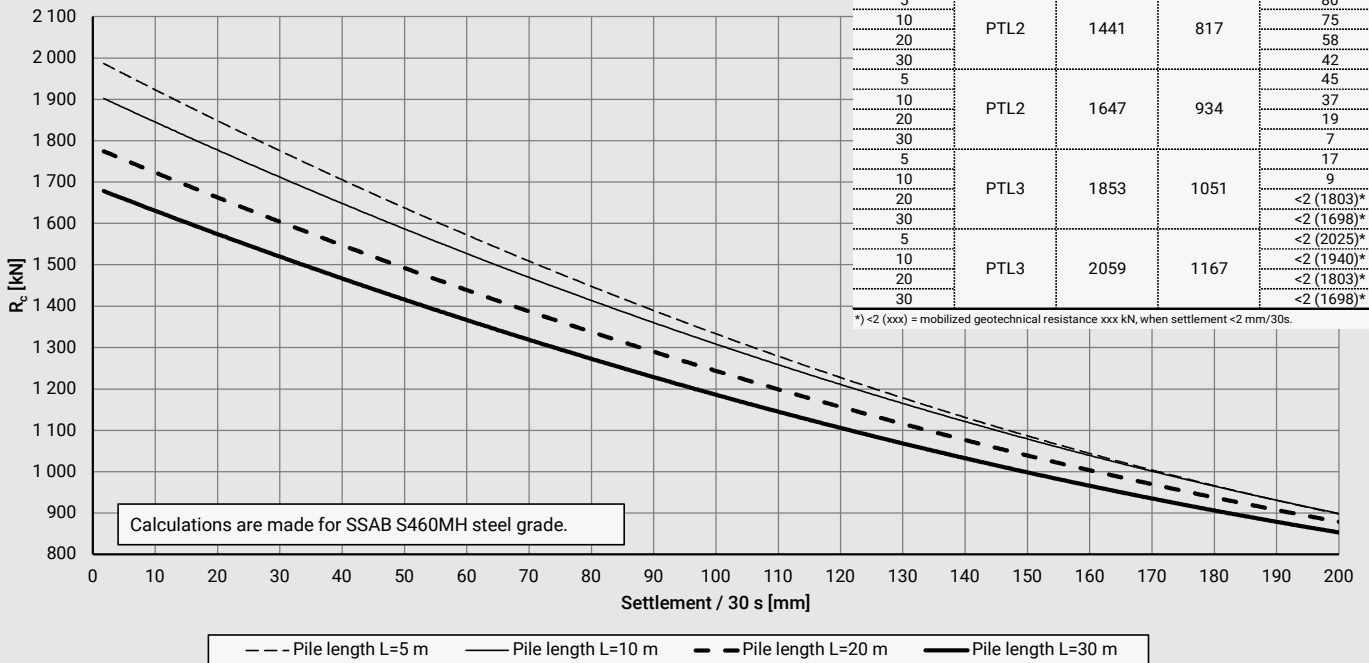
Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5				100
10				100
20	PTL1	1210	686	100
30				100
5				93
10	PTL2	1412	800	82
20				61
30				42
5				44
10	PTL2	1614	915	33
20				14
30				4
5				10
10	PTL3	1815	1029	3
20				<2 (1723)*
30				<2 (1630)*
5				<2 (1919)*
10	PTL3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

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

Furukawa F27 - RRs140/10



Furukawa F27 - RR170/10



Hammer efficiency 80 %

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

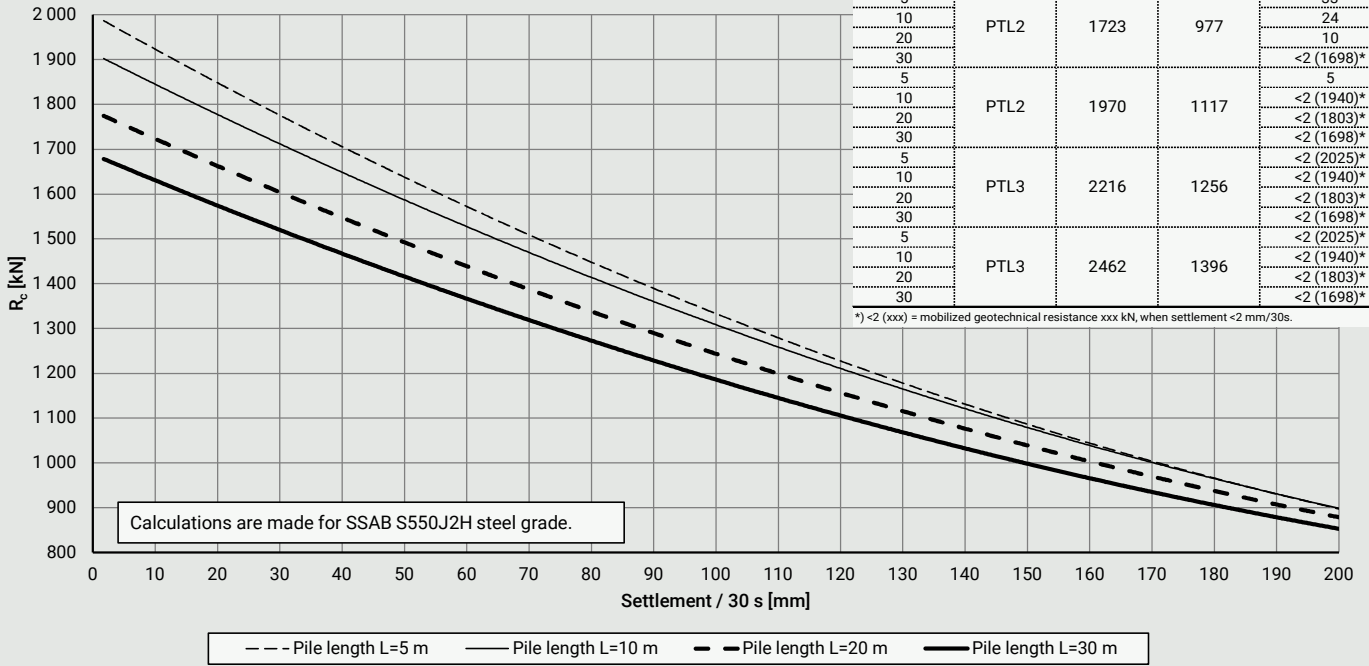
*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Hammer efficiency 80 %

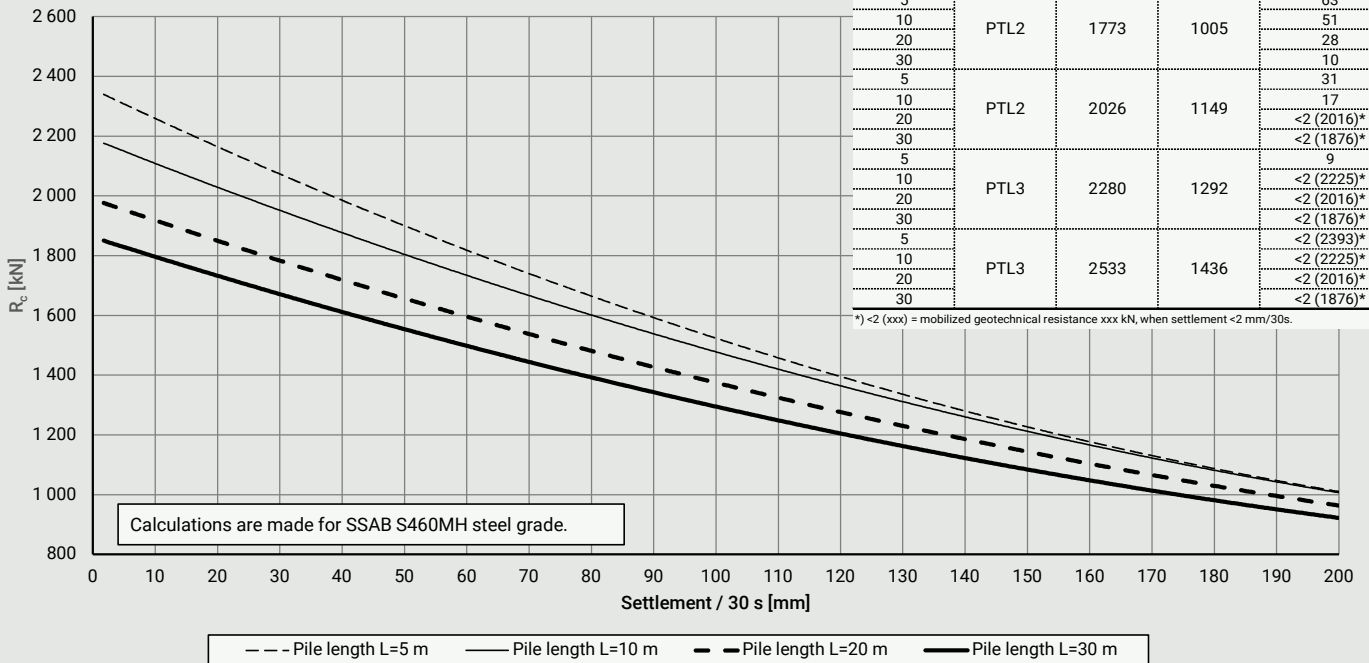
Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5				73
10				66
20				49
30				35
5				33
10	PTL1	1477	837	24
20				10
30				<2 (1698)*
5				5
10	PTL2	1723	977	<2 (1940)*
20				<2 (1803)*
30				<2 (1698)*
5				<2 (2025)*
10	PTL3	2216	1256	<2 (1940)*
20				<2 (1803)*
30			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

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

Furukawa F27 - RRs170/10



Furukawa F27 - RR170/12.5

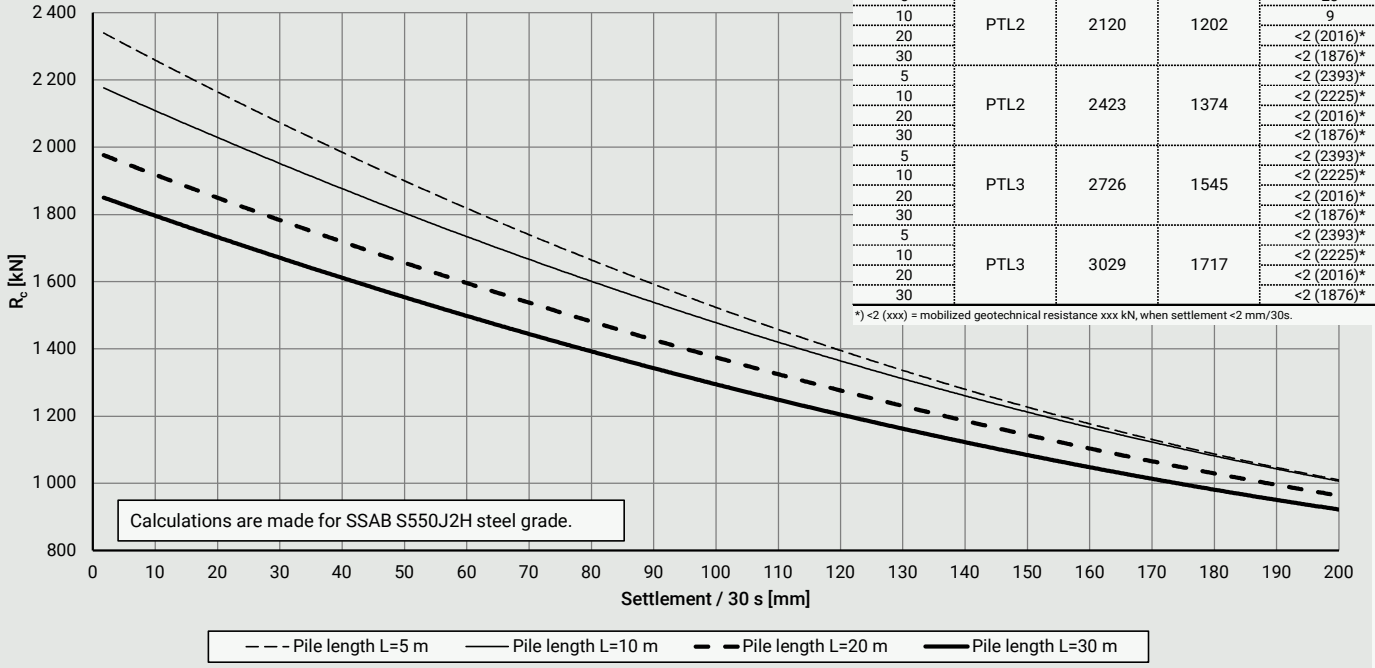


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5				100
10				95
20				72
30				53
5				63
10	PTL1	1520	862	51
20				28
30				10
5				31
10	PTL2	1773	1005	17
20				<2 (2016)*
30				<2 (1876)*
5				9
10	PTL2	2026	1149	<2 (2225)*
20				<2 (2016)*
30				<2 (1876)*
5				<2 (2393)*
10	PTL3	2280	1292	<2 (2225)*
20				<2 (2016)*
30				<2 (1876)*
5				<2 (2393)*
10	PTL3	2533	1436	<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	PTL2	2120	1202	7
5				23
10				9
20	PTL2	2423	1374	<2 (2016)*
30				<2 (1876)*
5				<2 (2393)*
10	PTL3	2726	1545	<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

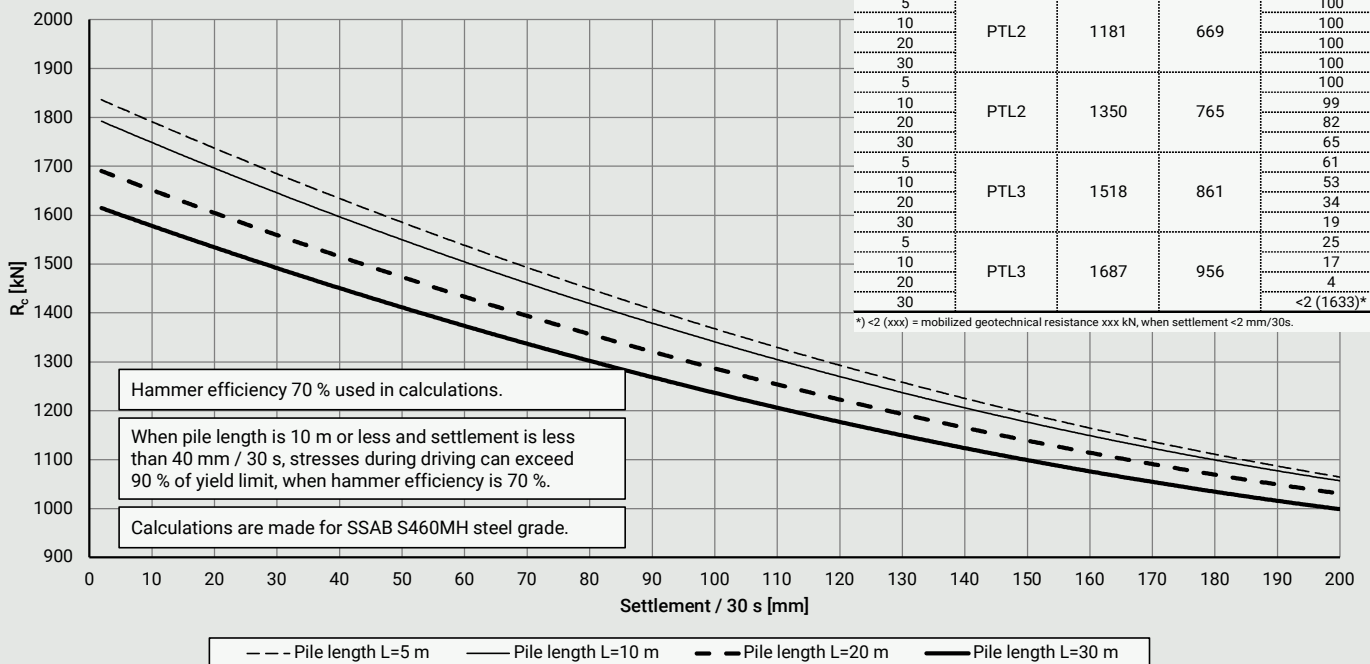
Diameter of the tool [mm]	D_t	155
Height of the tool [mm]	L_t	800
Tool weight [kg]	m_t	119

Hammer efficiency 70 %

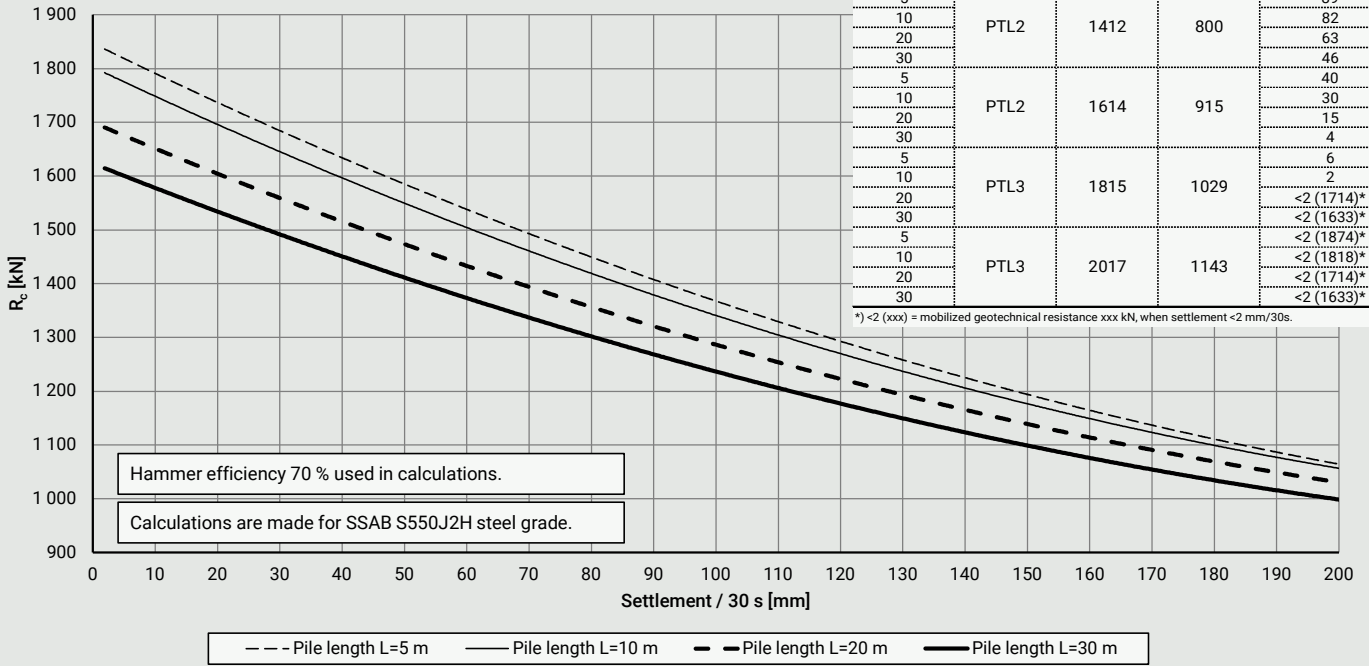
Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	1012	574	100
10				100
20				100
30				100
5	PTL2	1181	669	100
10				100
20				100
30				100
5	PTL2	1350	765	99
10				82
20				65
30				61
5	PTL3	1518	861	53
10				34
20				19
30				25
5	PTL3	1687	956	17
10				4
20				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

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

Furukawa FXJ375 - RR140/10



Furukawa FXJ375 - RRs140/10

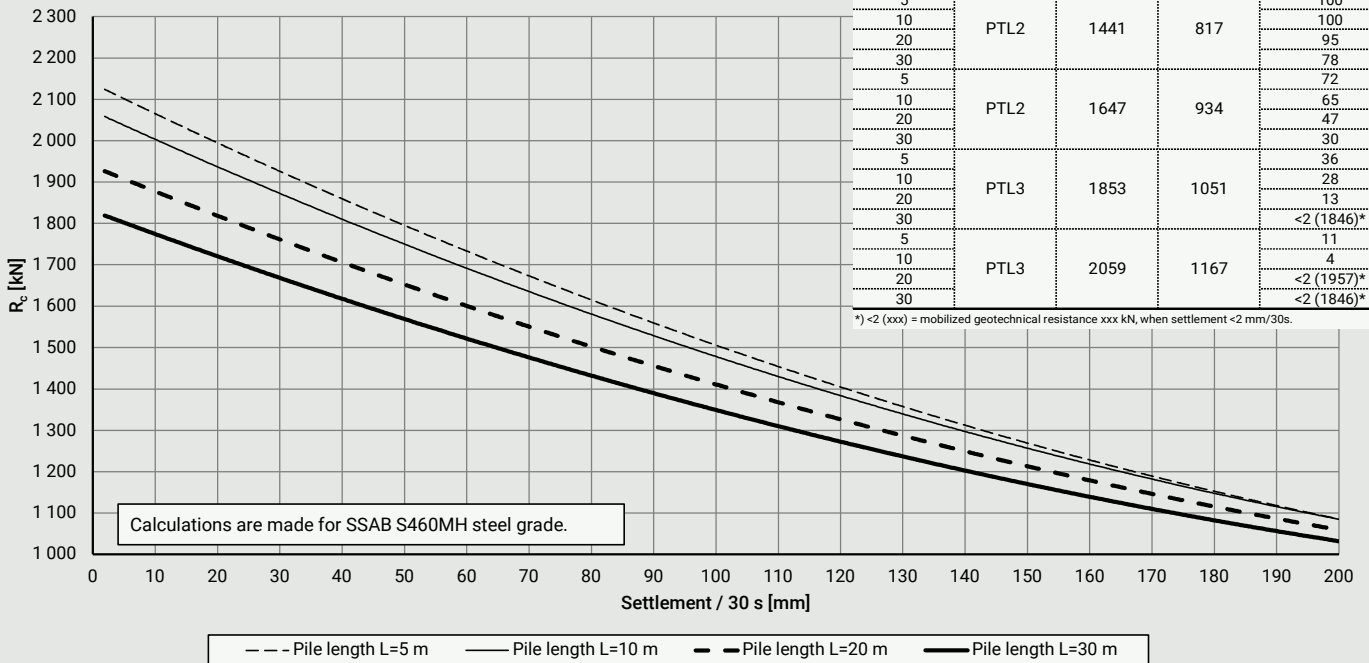


Hammer efficiency 70 %

Pile length [m]	Piling work class	R _c [kN]	R _d [kN]	Settlement / 30 s [mm]
5				100
10				100
20				100
30				100
5				89
10	PTL1	1210	686	82
20				63
30				46
5				40
10	PTL2	1412	800	30
20				15
30				4
5				6
10	PTL2	1614	915	2
20				<2 (1714)*
30				<2 (1633)*
5				<2 (1874)*
10	PTL3	1815	1029	<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				100
10				100
20				100
30				100
5				100
10	PTL1	1235	700	100
20				100
30				100
5				78
10	PTL2	1441	817	72
20				65
30				47
5				30
10	PTL2	1647	934	36
20				28
30				13
5				<2 (1846)*
10	PTL3	1853	1051	11
20				4
30				<2 (1957)*
5				<2 (1846)*
10	PTL3	2059	1167	<2 (1846)*
20				<2 (1846)*
30				<2 (1846)*

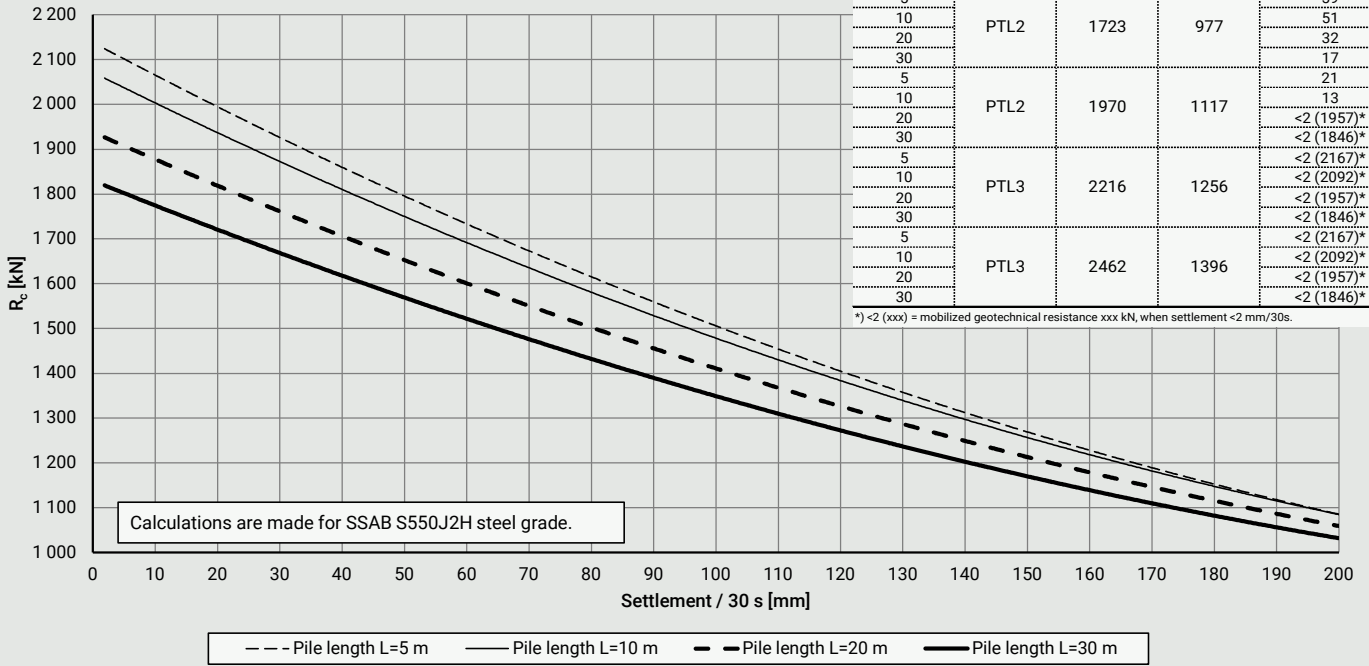
*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Hammer efficiency 80 %

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

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

Furukawa FXJ375 - RRs170/10

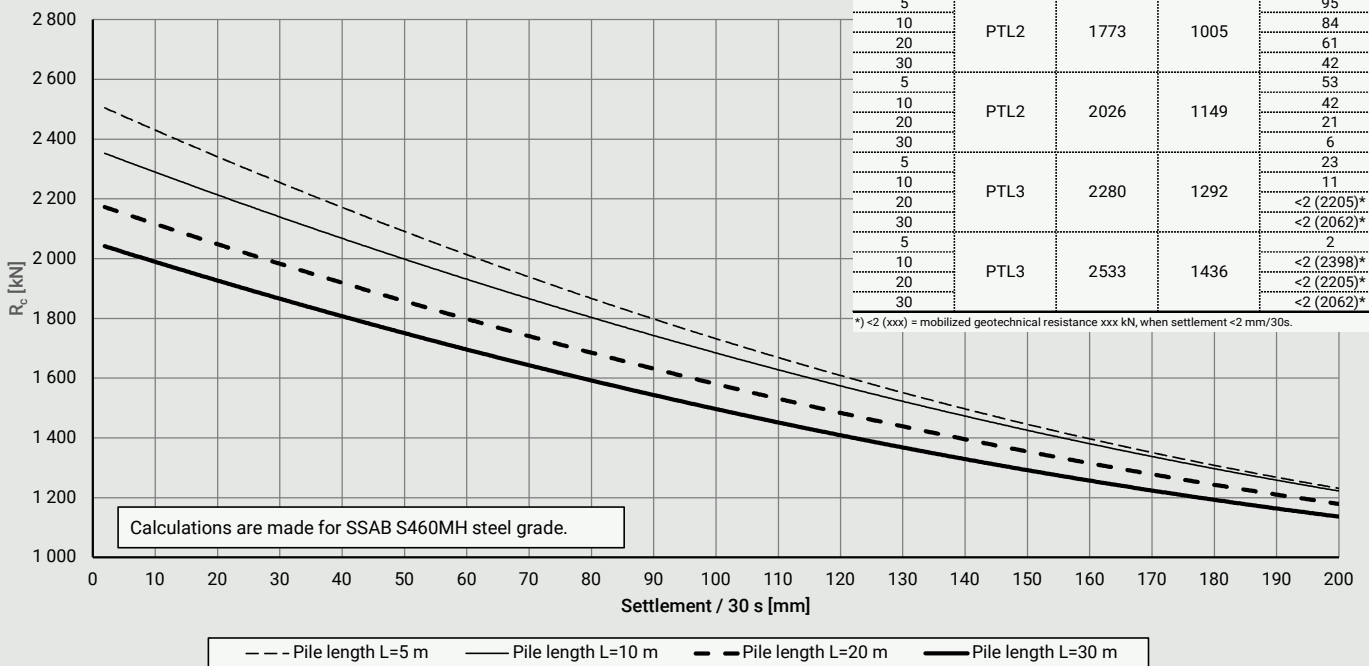


Hammer efficiency 80 %

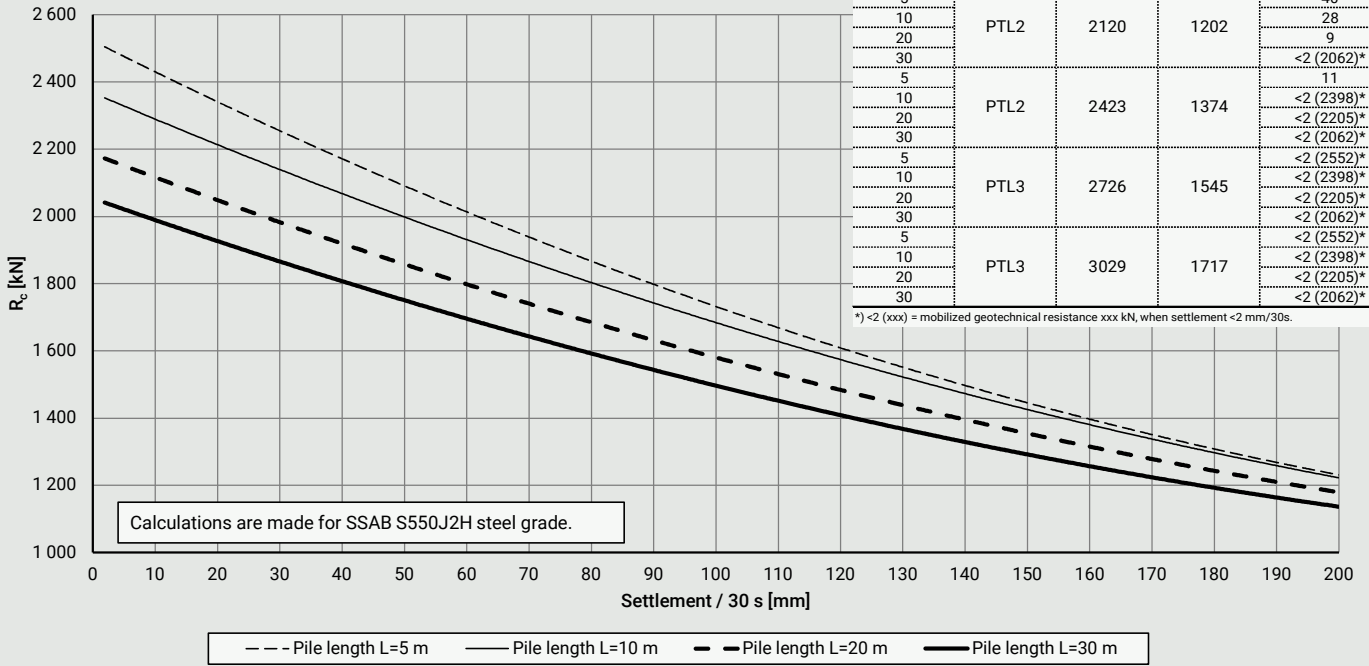
Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5				100
10				100
20				100
30				95
5				95
10	PTL1	1520	862	84
20				61
30				42
5				53
10	PTL2	1773	1005	42
20				21
30				6
5				23
10	PTL2	2026	1149	11
20				<2 (2205)*
30				<2 (2062)*
5				2
10	PTL3	2280	1292	<2 (2398)*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

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

Furukawa FXJ375 - RR170/12.5



Furukawa FXJ375 - RRs170/12.5

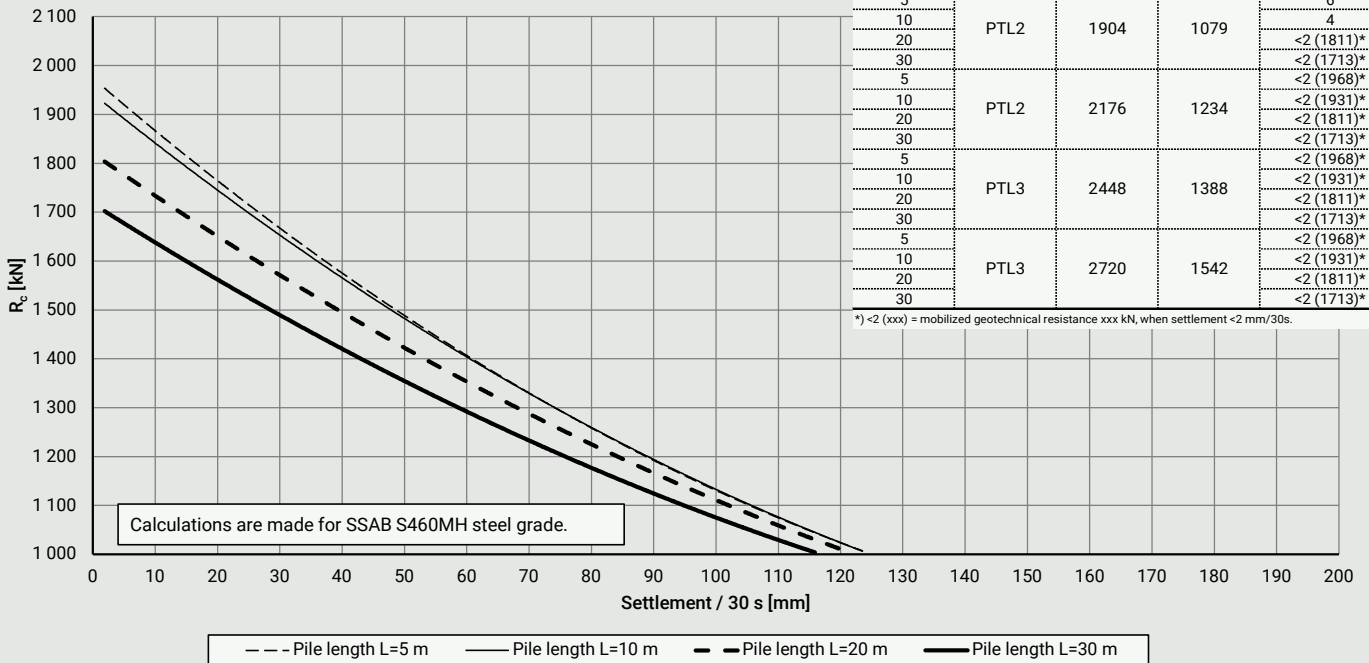


Hammer efficiency 80 %

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

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

Furukawa FXJ375 - RR220/10

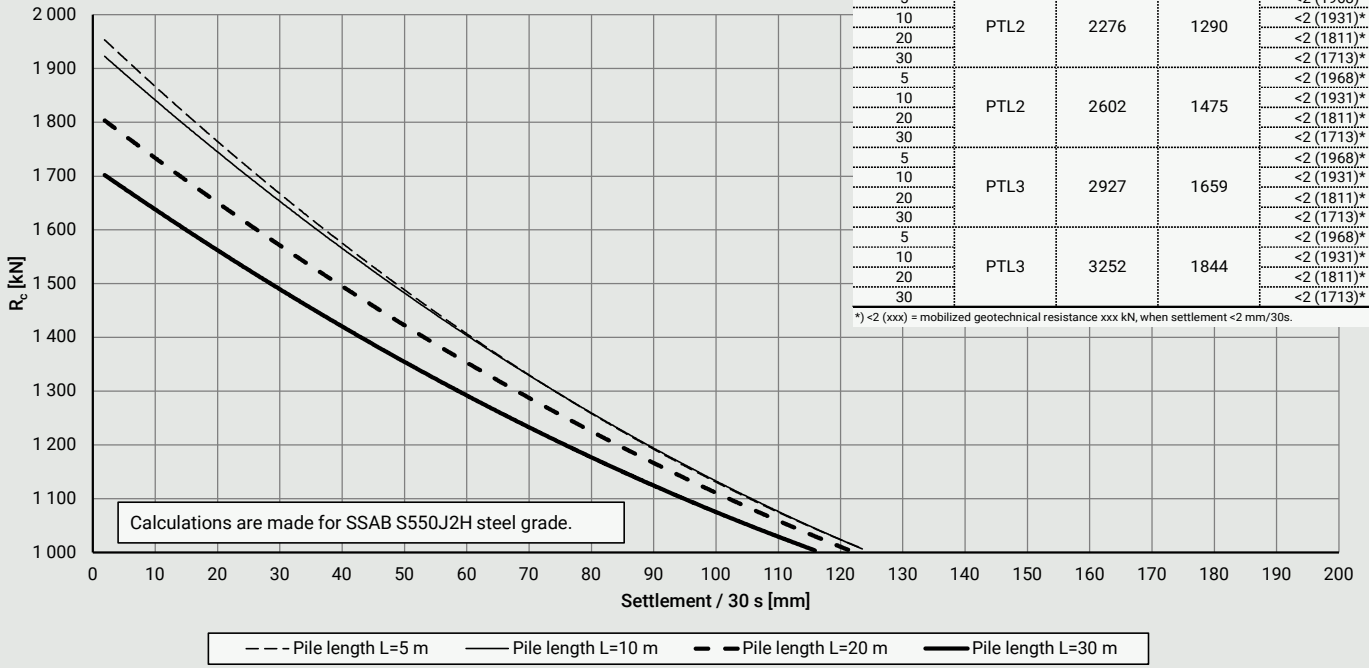


Hammer efficiency 80 %

Pile length [m]	Piling work class	R _c [kN]	R _d [kN]	Settlement / 30 s [mm]
5				32
10				30
20				21
30				10
5				6
10	PTL1	1632	925	4
20				<2 (1811)*
30				<2 (1713)*
5				<2 (1968)*
10	PTL2	1904	1079	<2 (1931)*
20				<2 (1811)*
30				<2 (1713)*
5				<2 (1968)*
10	PTL2	2176	1234	<2 (1931)*
20				<2 (1811)*
30				<2 (1713)*
5				<2 (1968)*
10	PTL3	2448	1388	<2 (1931)*
20				<2 (1811)*
30				<2 (1713)*
5				<2 (1968)*
10	PTL3	2720	1542	<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				3
10	PTL1	1951	1106	<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

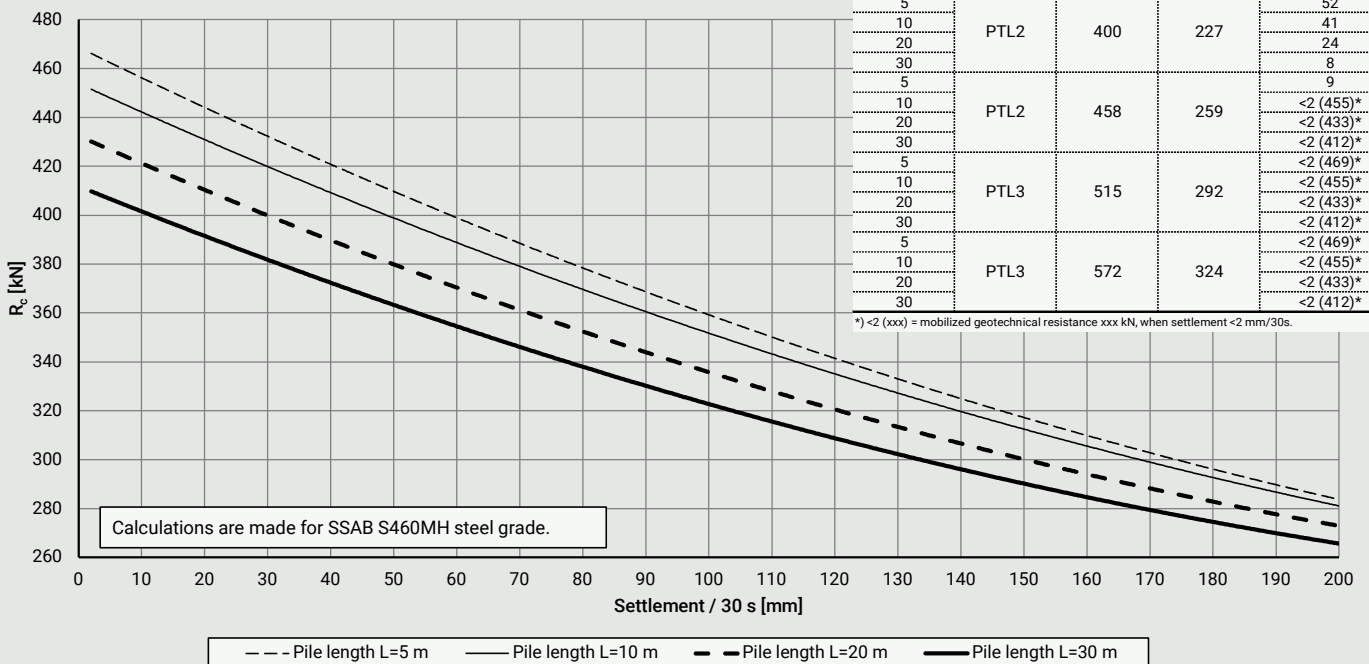
Diameter of the tool [mm]	D_t	90
Height of the tool [mm]	L_t	800
Tool weight [kg]	m_t	40

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	<2 (455)*
10				<2 (433)*
20				<2 (412)*
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 - RR75

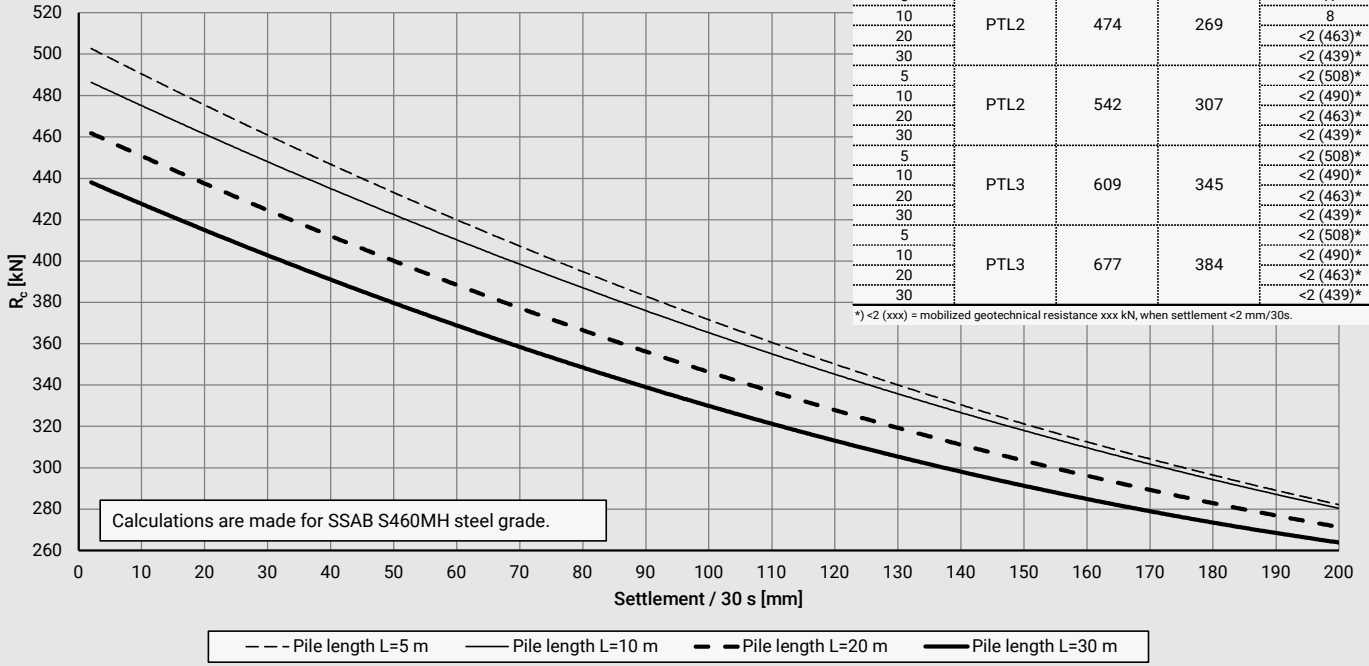


Hammer efficiency 80 %

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

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

Hydraram SG600S - RR90

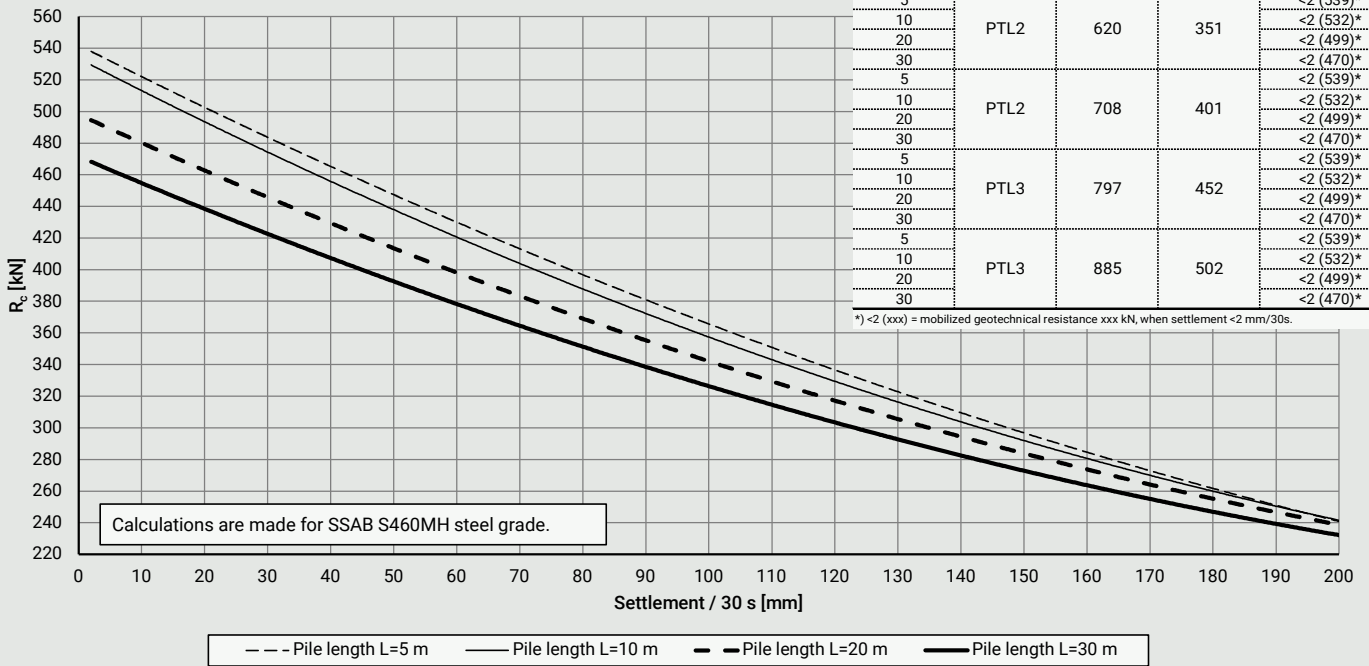


Hammer efficiency 80 %

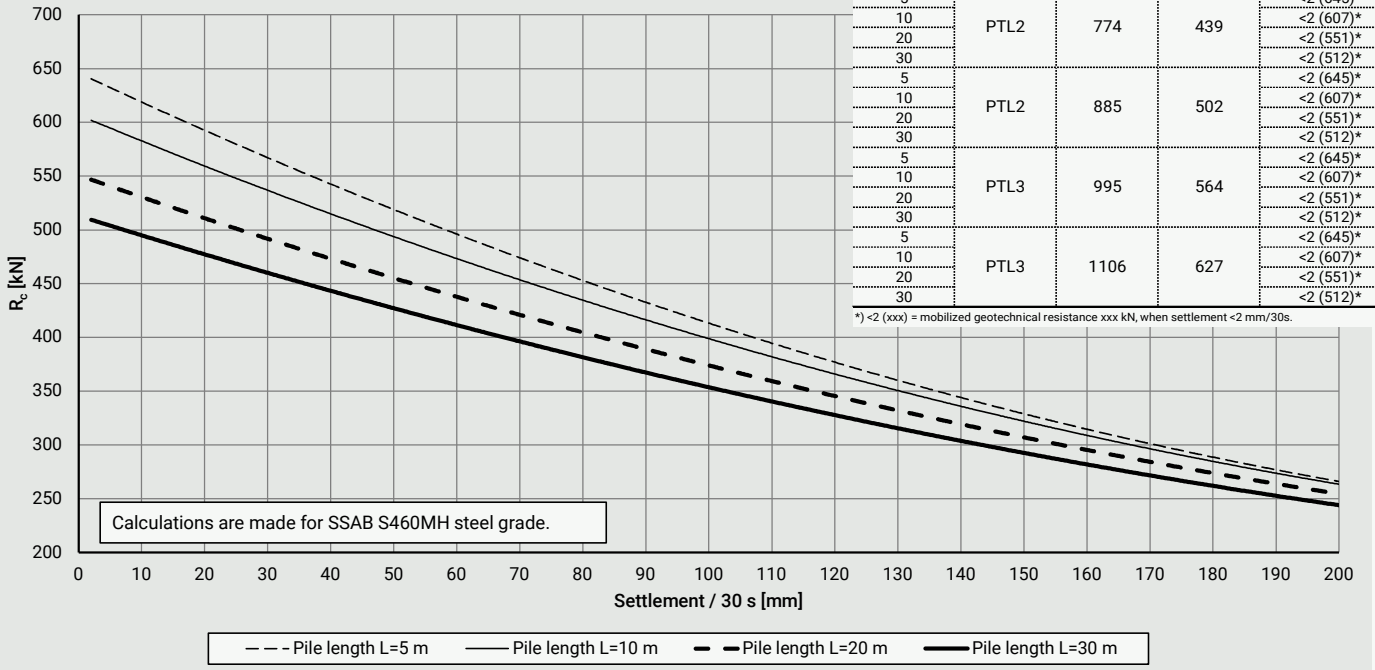
Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5				6
10				3
20	PTL1	531	301	<2 (499)*
30				<2 (470)*
5				<2 (539)*
10				<2 (532)*
20	PTL2	620	351	<2 (499)*
30				<2 (470)*
5				<2 (539)*
10				<2 (532)*
20	PTL2	708	401	<2 (499)*
30				<2 (470)*
5				<2 (539)*
10				<2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

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

Hydraram SG600S - RR115/6.3



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	PTL2	774	439	<2 (512)*
5				<2 (645)*
10				<2 (607)*
20	PTL2	885	502	<2 (551)*
30				<2 (512)*
5				<2 (645)*
10	PTL3	995	564	<2 (607)*
20				<2 (551)*
30				<2 (512)*
5	PTL3	1106	627	<2 (645)*
10				<2 (607)*
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

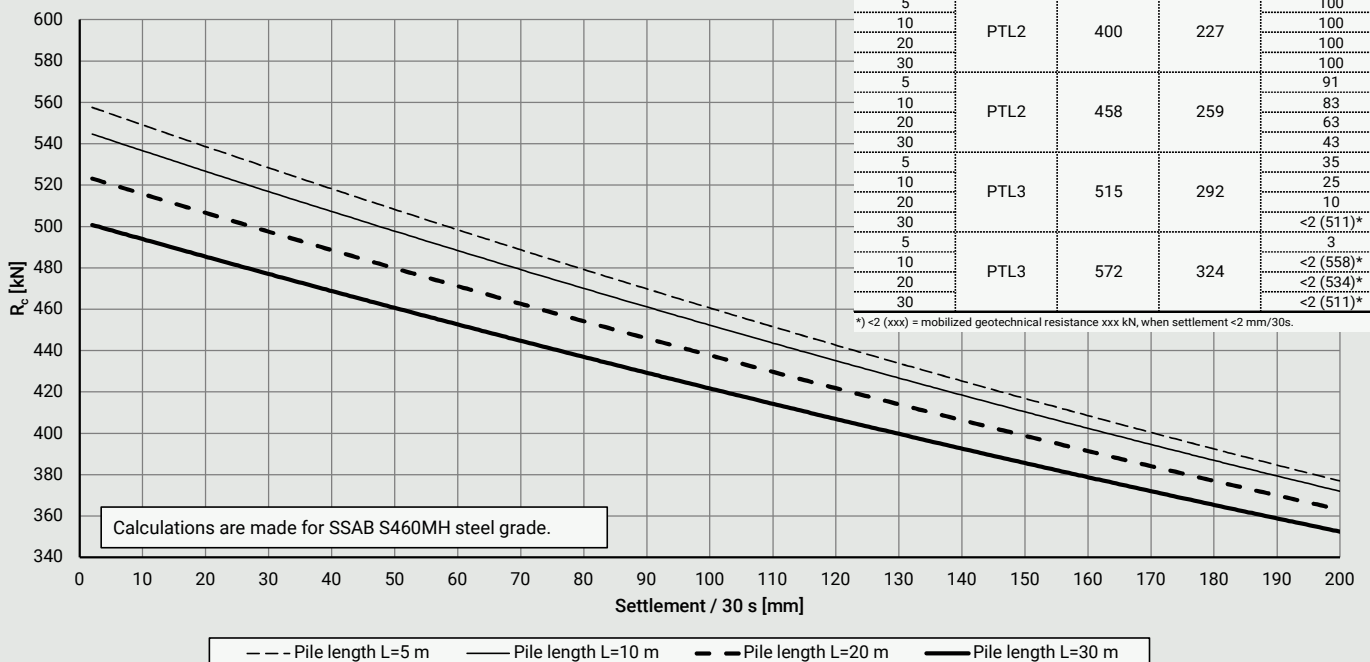
Diameter of the tool [mm]	D_t	100
Height of the tool [mm]	L_t	800
Tool weight [kg]	m_t	50

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 - RR75

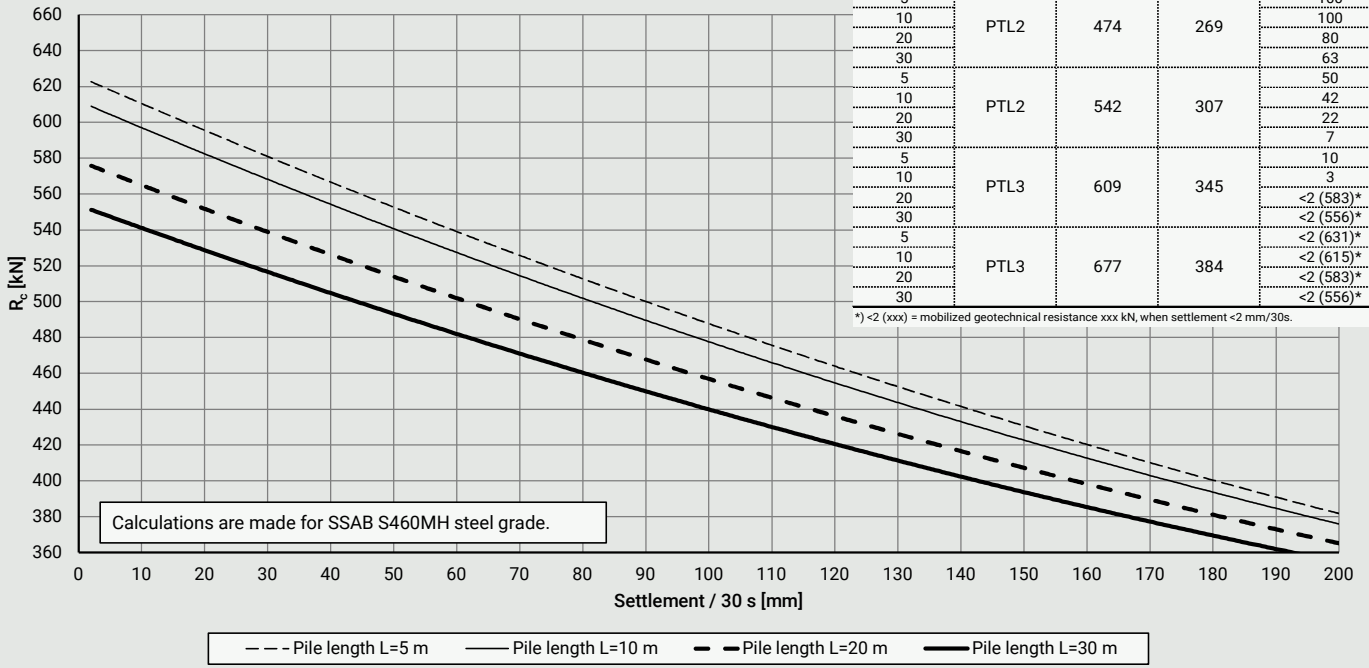


Hammer efficiency 80 %

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

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

Hydraram SG800S - RR90

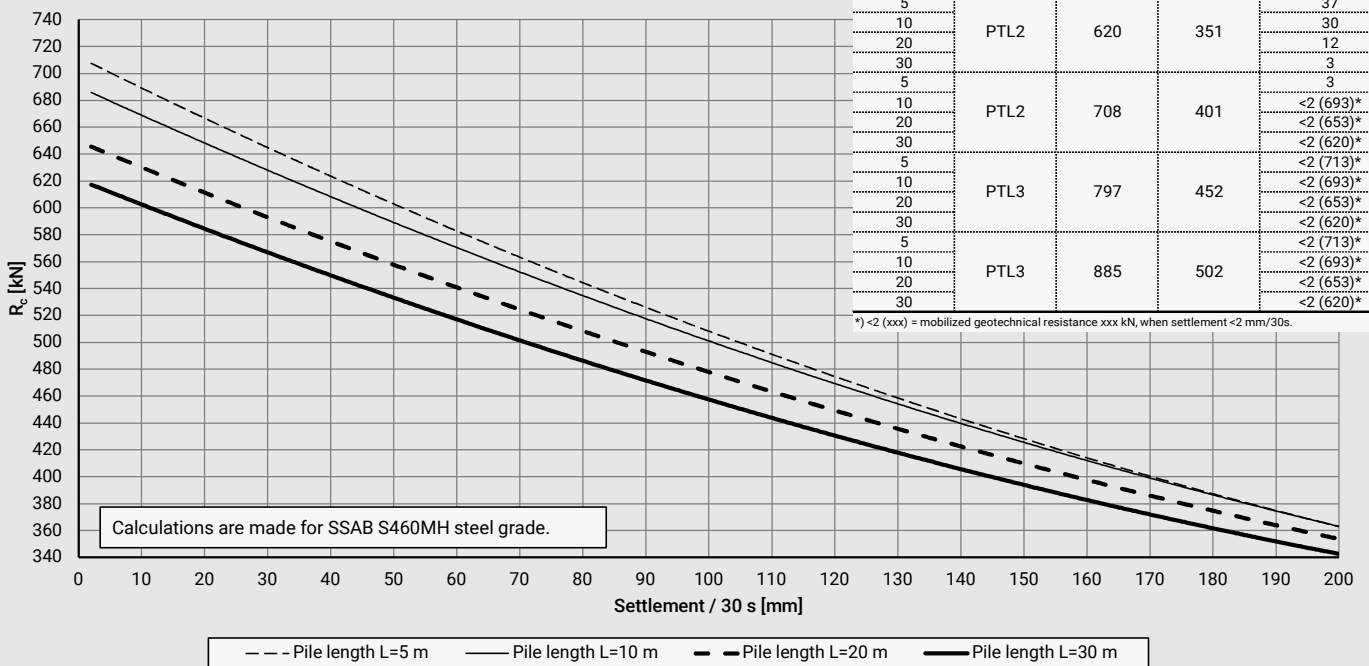


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5				85
10				80
20				63
30				45
5	PTL1	531	301	37
10				30
20				12
30				3
5	PTL2	620	351	3
10				<2 (693)*
20				<2 (653)*
30				<2 (620)*
5	PTL2	708	401	<2 (713)*
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 - RR115/6.3

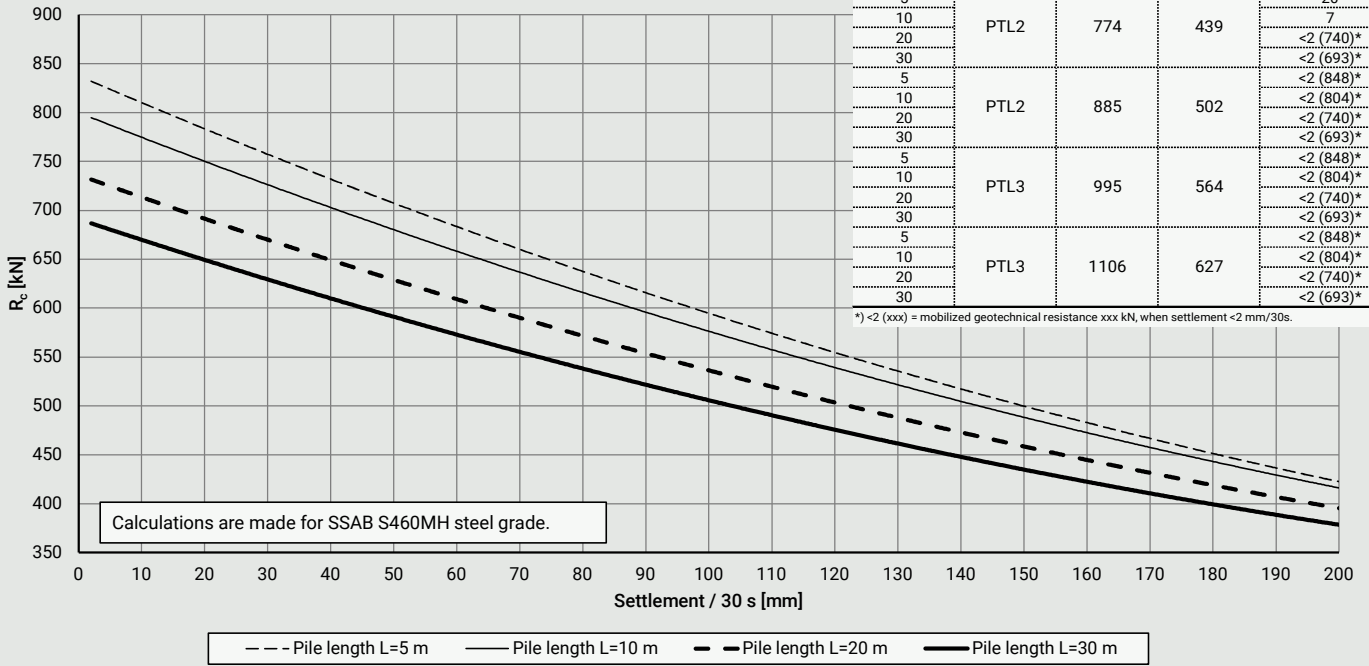


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5				63
10				50
20				28
30				10
5	PTL1	664	376	20
10				7
20				<2 (740)*
30				<2 (693)*
5	PTL2	774	439	<2 (848)*
10				<2 (804)*
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 - RR115/8

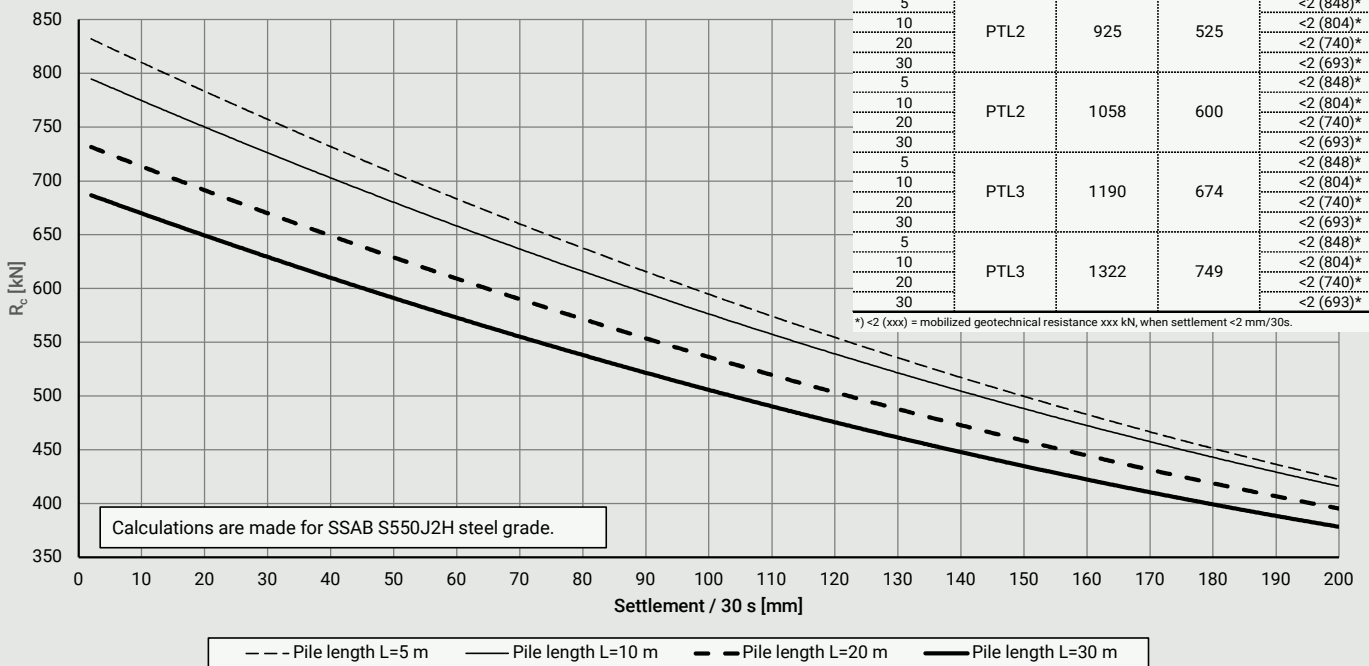


Hammer efficiency 80 %

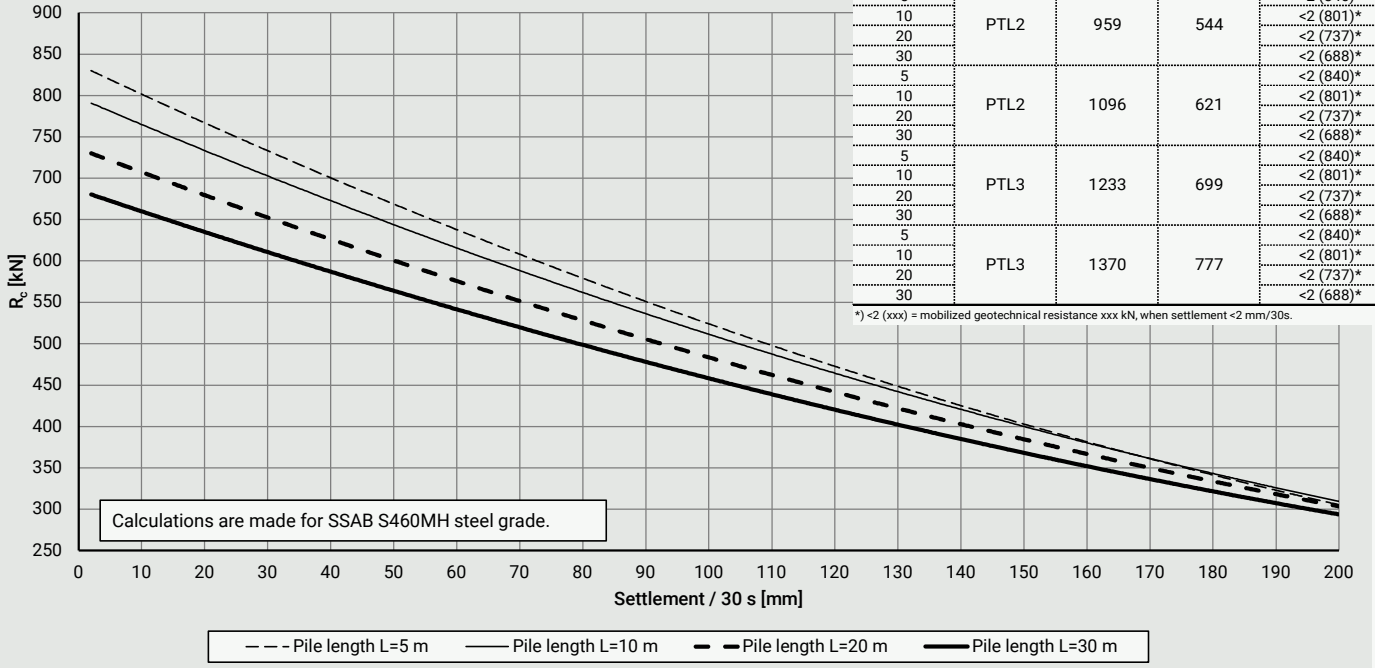
Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5				15
10				5
20				<2 (740)*
30				<2 (693)*
5	PTL1	793	450	<2 (848)*
10				<2 (804)*
20				<2 (740)*
30				<2 (693)*
5	PTL2	925	525	<2 (848)*
10				<2 (804)*
20				<2 (740)*
30				<2 (693)*
5	PTL2	1058	600	<2 (848)*
10				<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 - RRs115/8



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	PTL2	959	544	<2 (688)*
5				<2 (840)*
10				<2 (801)*
20	PTL2	1096	621	<2 (737)*
30				<2 (688)*
5				<2 (840)*
10	PTL3	1233	699	<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

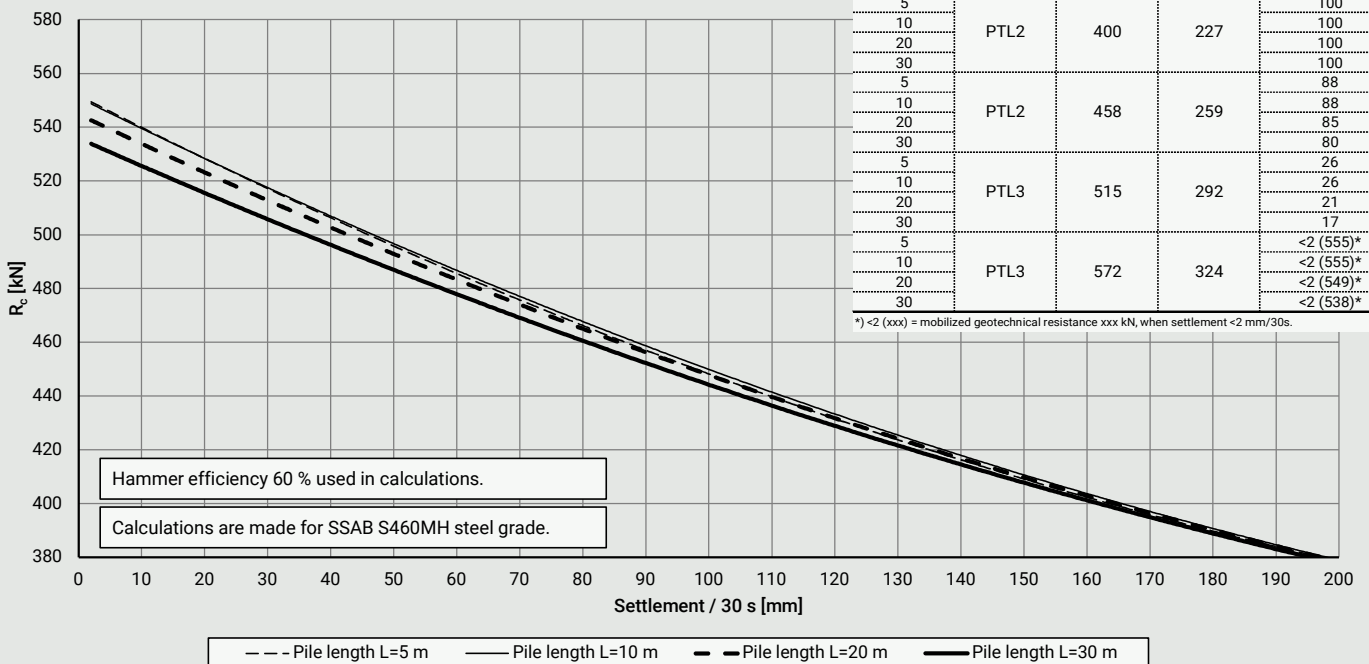
Diameter of the tool [mm]	D_t	130
Height of the tool [mm]	L_t	920
Tool weight [kg]	m_t	96

Hammer efficiency 60 %

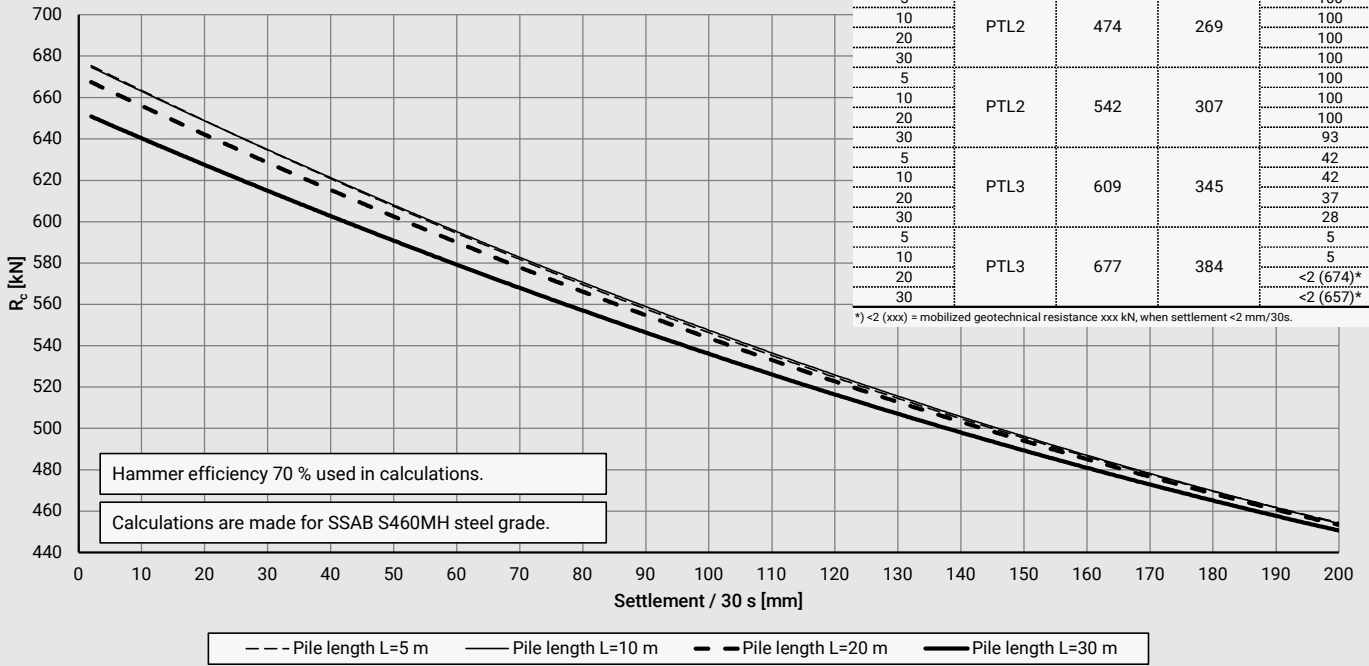
Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	343	195	100
10				100
20				100
30				100
5	PTL2	400	227	100
10				100
20				100
30				100
5	PTL2	458	259	88
10				88
20				85
30				80
5	PTL3	515	292	26
10				26
20				21
30				17
5	PTL3	572	324	<2 (555)*
10				<2 (555)*
20				<2 (549)*
30				<2 (539)*

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

MSB MS600H - RR75



MSB MS600H - RR90

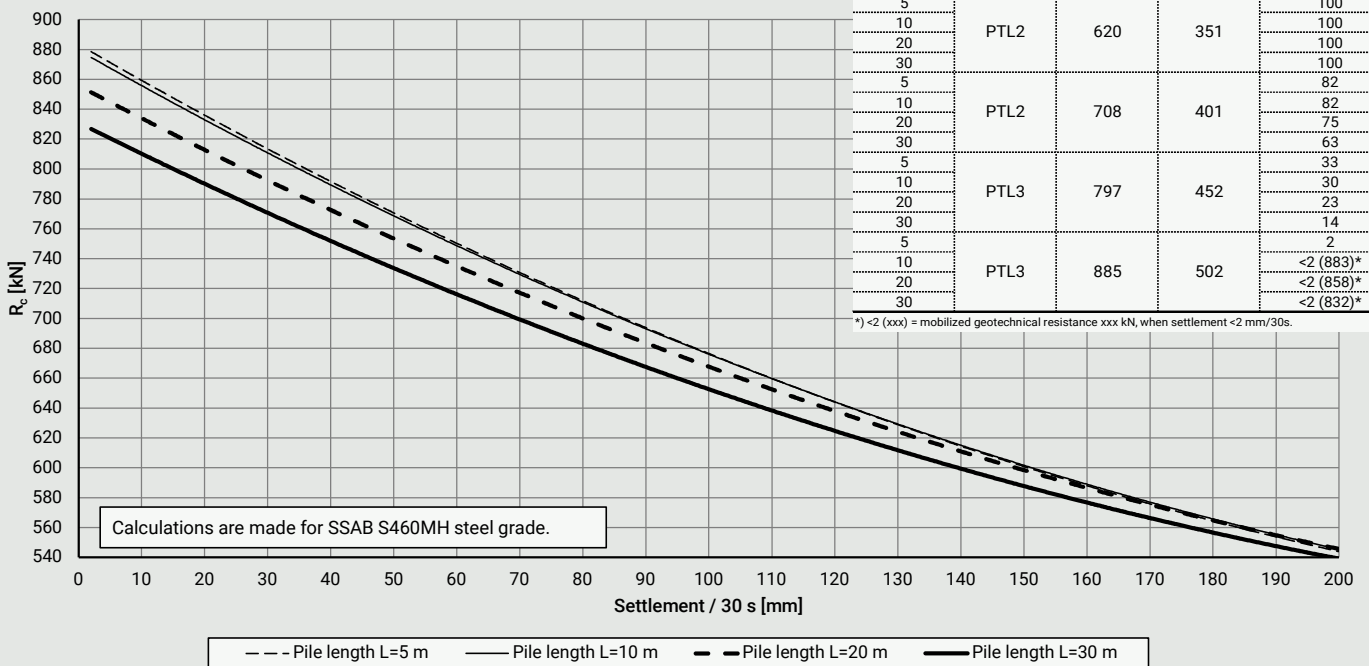


Hammer efficiency 70 %

Pile length [m]	Piling work class	R _c [kN]	R _d [kN]	Settlement / 30 s [mm]
5				100
10				100
20	PTL1	406	230	100
30				100
5				100
10				100
20	PTL2	474	269	100
30				100
5				100
10				100
20	PTL2	542	307	100
30				93
5				42
10				42
20	PTL3	609	345	37
30				28
5				5
10				5
20	PTL3	677	384	<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				100
10				100
20	PTL1	531	301	100
30				100
5				100
10				100
20	PTL2	620	351	100
30				100
5				82
10				82
20	PTL2	708	401	75
30				63
5				33
10				30
20	PTL3	797	452	23
30				14
5				2
10				<2 (883)*
20	PTL3	885	502	<2 (858)*
30				<2 (832)*

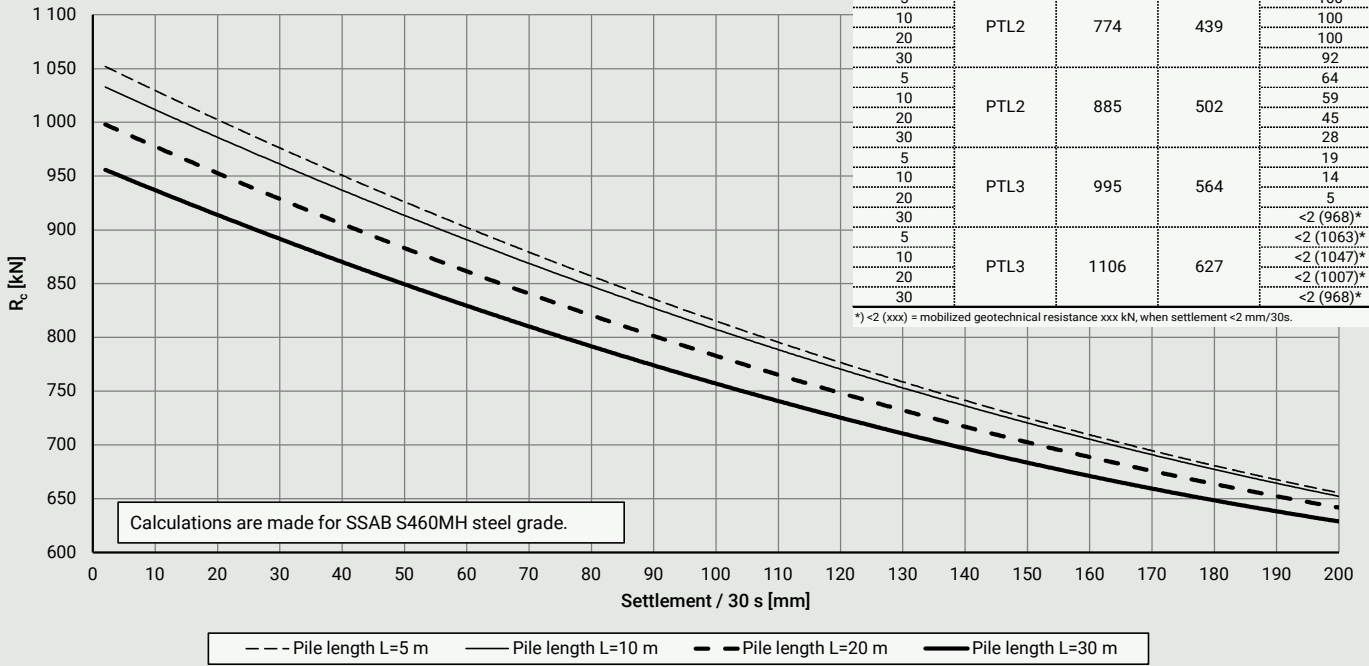
*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Hammer efficiency 80 %

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

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

MSB MS600H - RR115/8

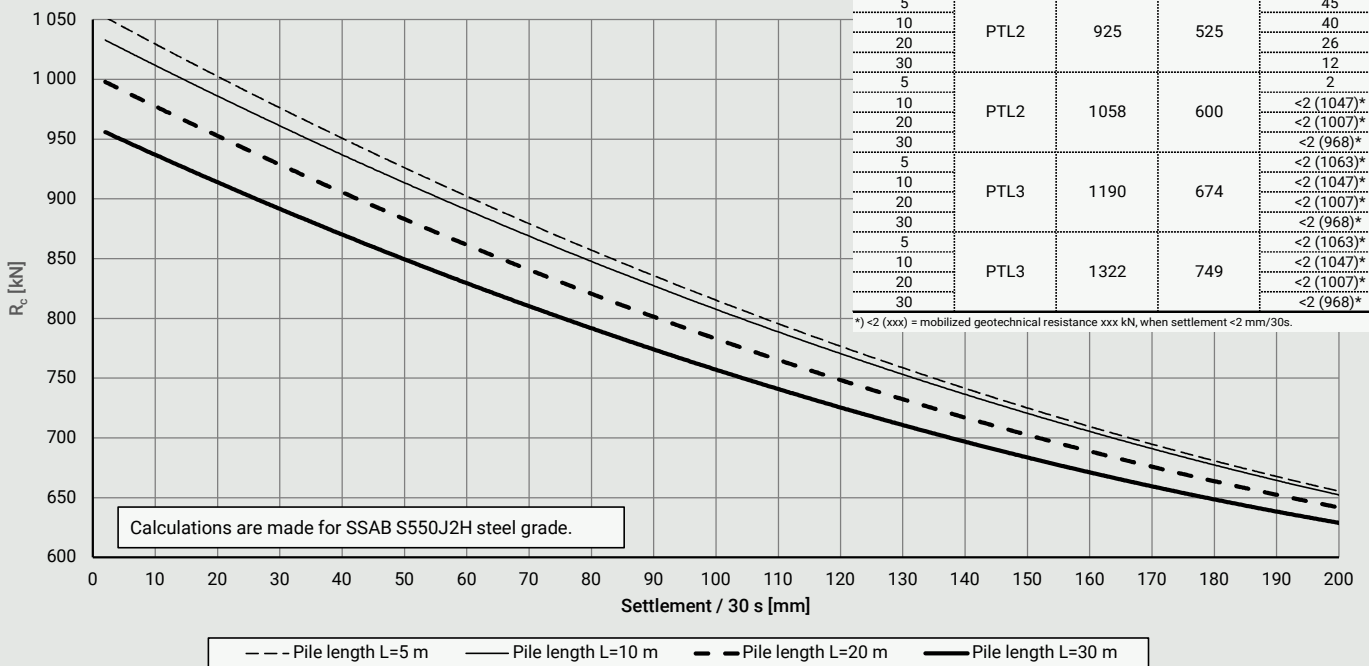


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5				100
10				100
20				96
30				80
5	PTL1	793	450	45
10				40
20				26
30				12
5	PTL2	925	525	2
10				<2 (1047)*
20				<2 (1007)*
30				<2 (968)*
5	PTL2	1058	600	<2 (1063)*
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 - RRs115/8

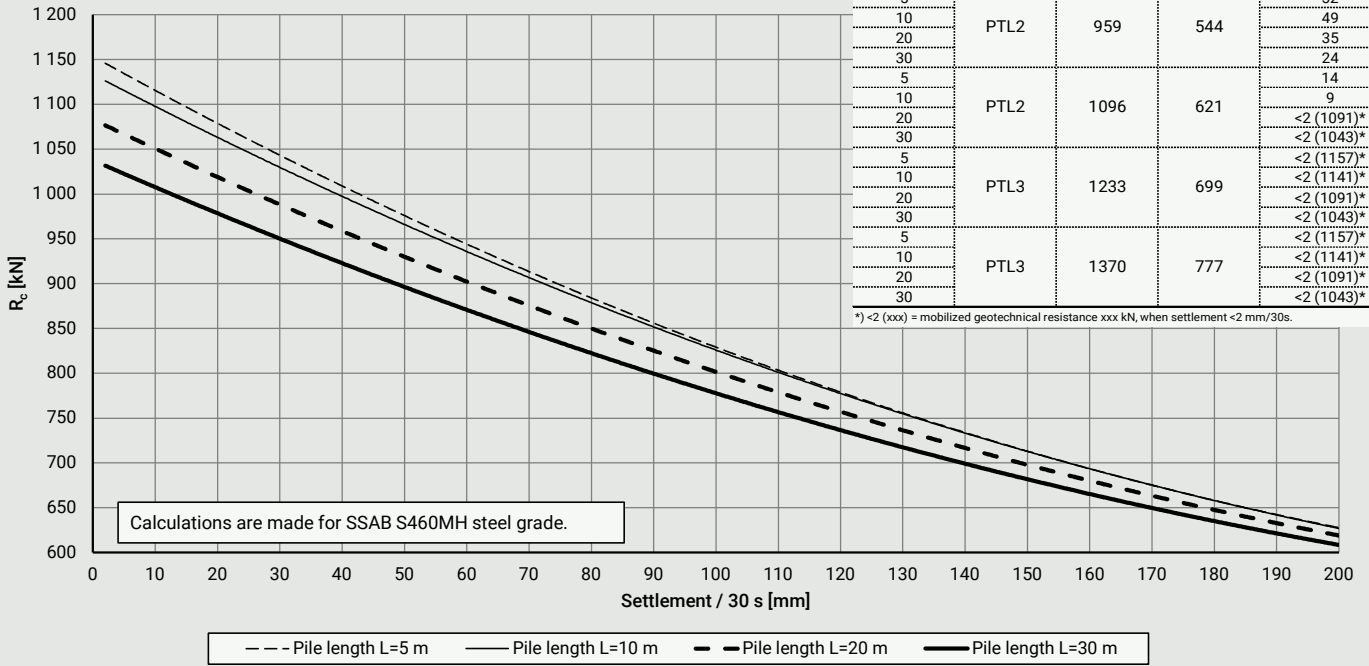


Hammer efficiency 80 %

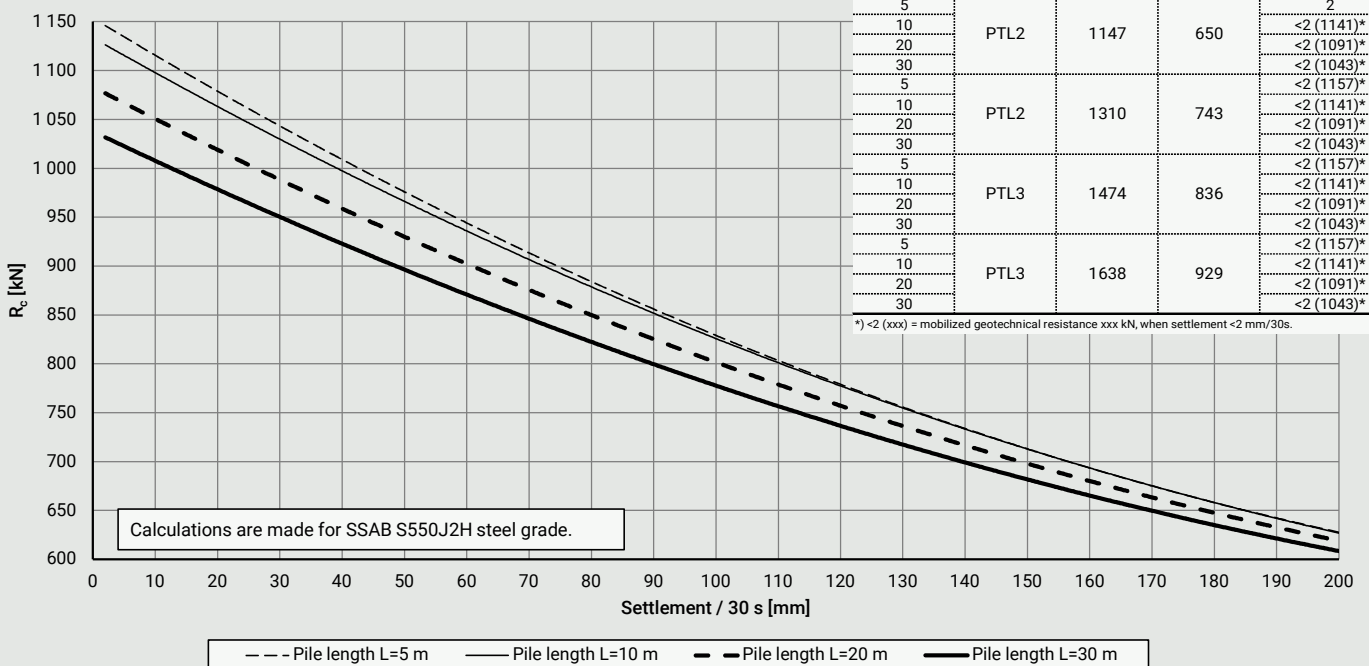
Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5				100
10				100
20	PTL1	822	466	94
30				80
5				52
10				49
20	PTL2	959	544	35
30				24
5				14
10				9
20	PTL2	1096	621	<2 (1091)*
30				<2 (1043)*
5				<2 (1157)*
10				<2 (1141)*
20	PTL3	1233	699	<2 (1091)*
30				<2 (1043)*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

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

MSB MS600H - RR140/8



MSB MS600H - RRs140/8



Hammer efficiency 80 %

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

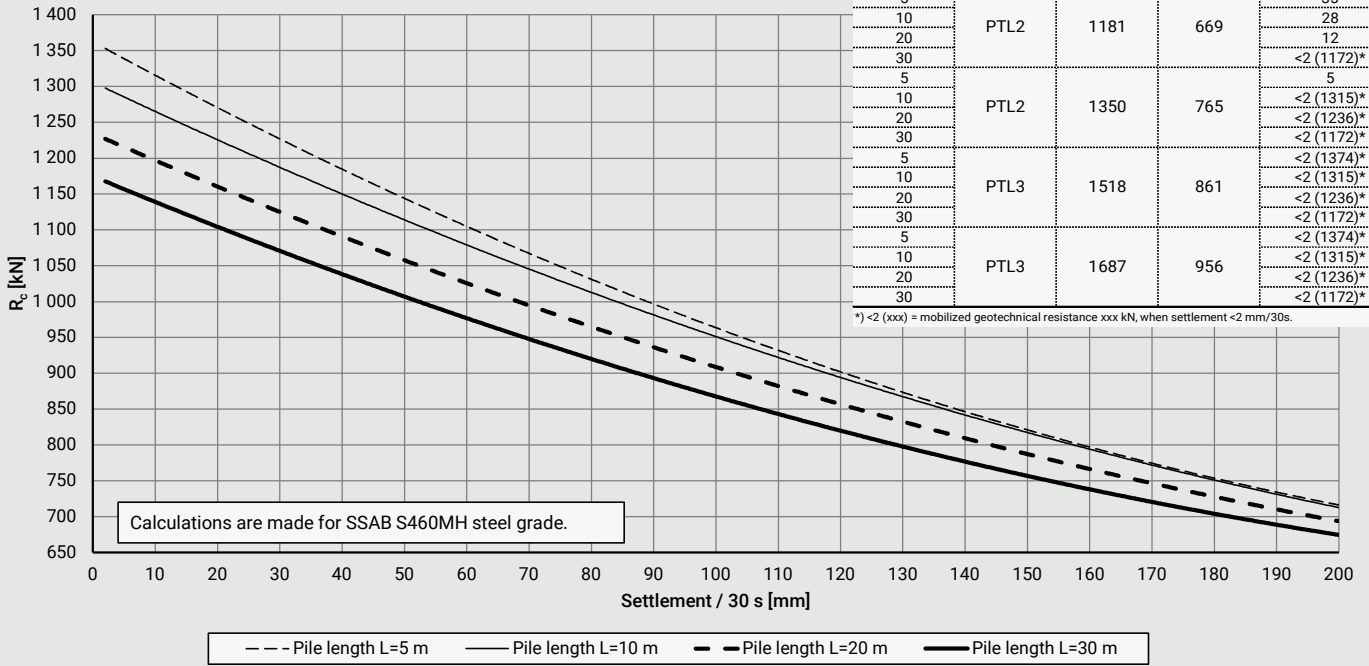
*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Hammer efficiency 80 %

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

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

MSB MS600H - RR140/10

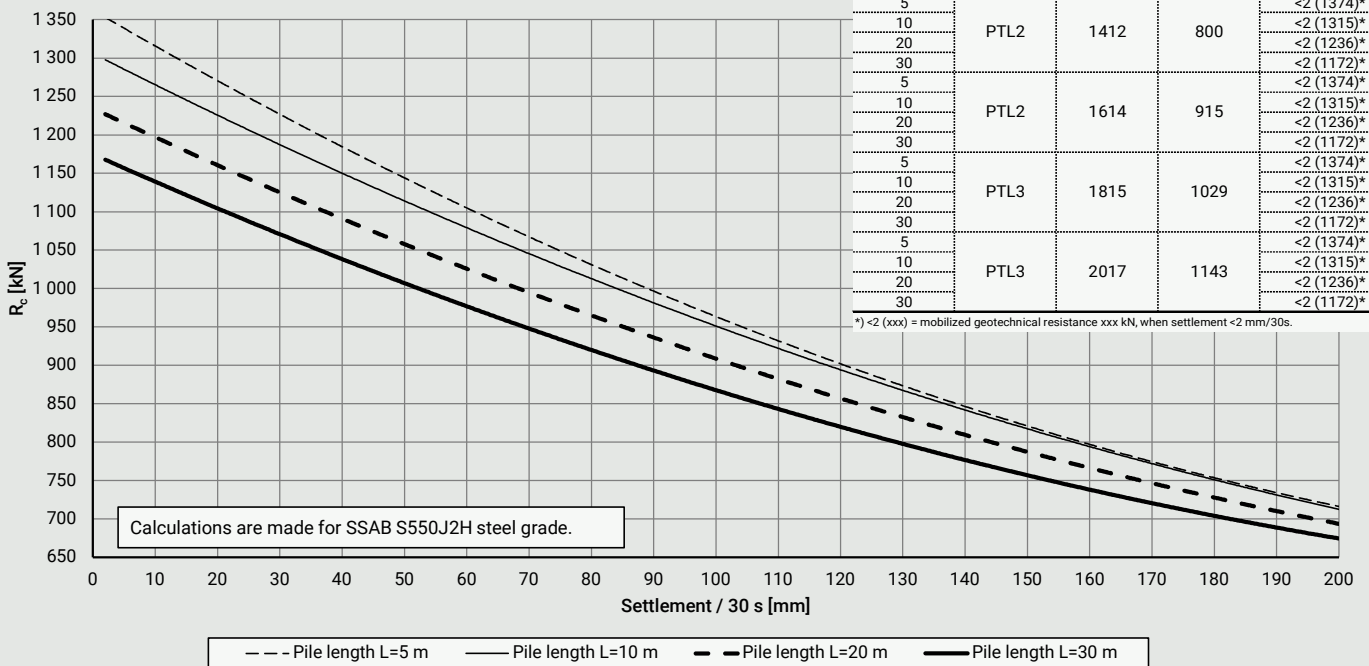


Hammer efficiency 80 %

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

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

MSB MS600H - RRs140/10

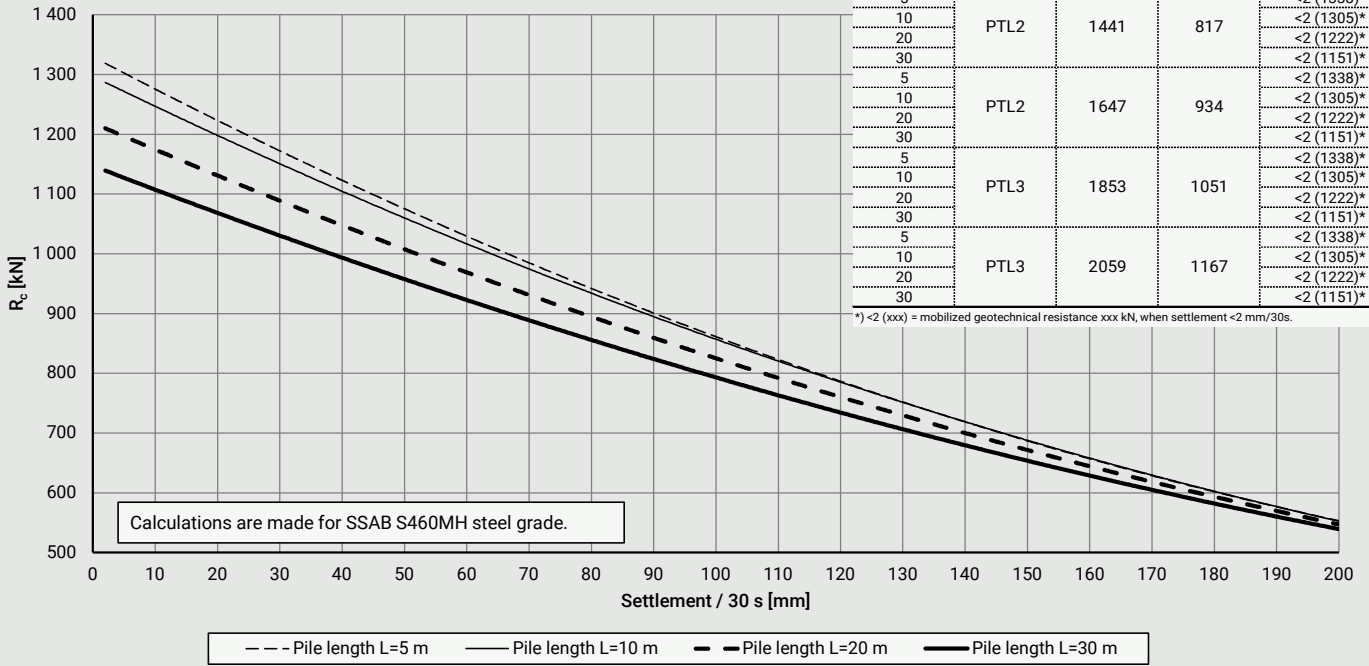


Hammer efficiency 80 %

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

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

MSB MS600H - RR170/10

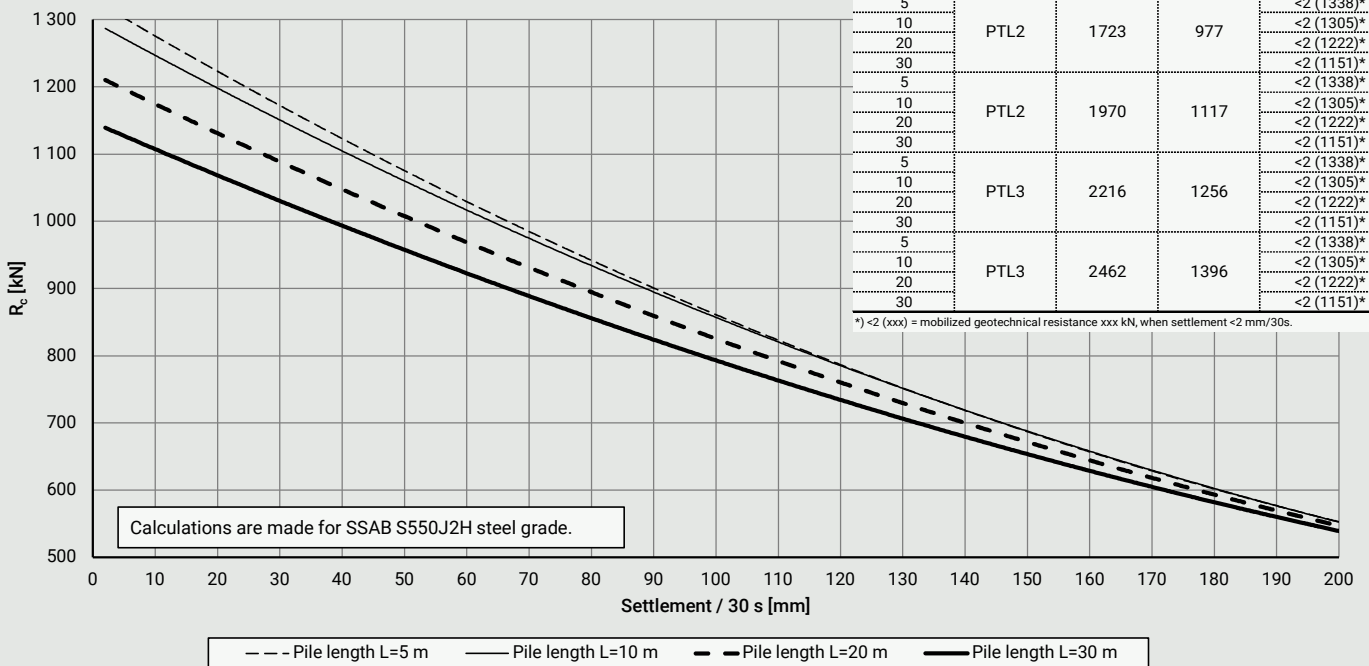


Hammer efficiency 80 %

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

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

MSB MS600H - RRs170/10



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

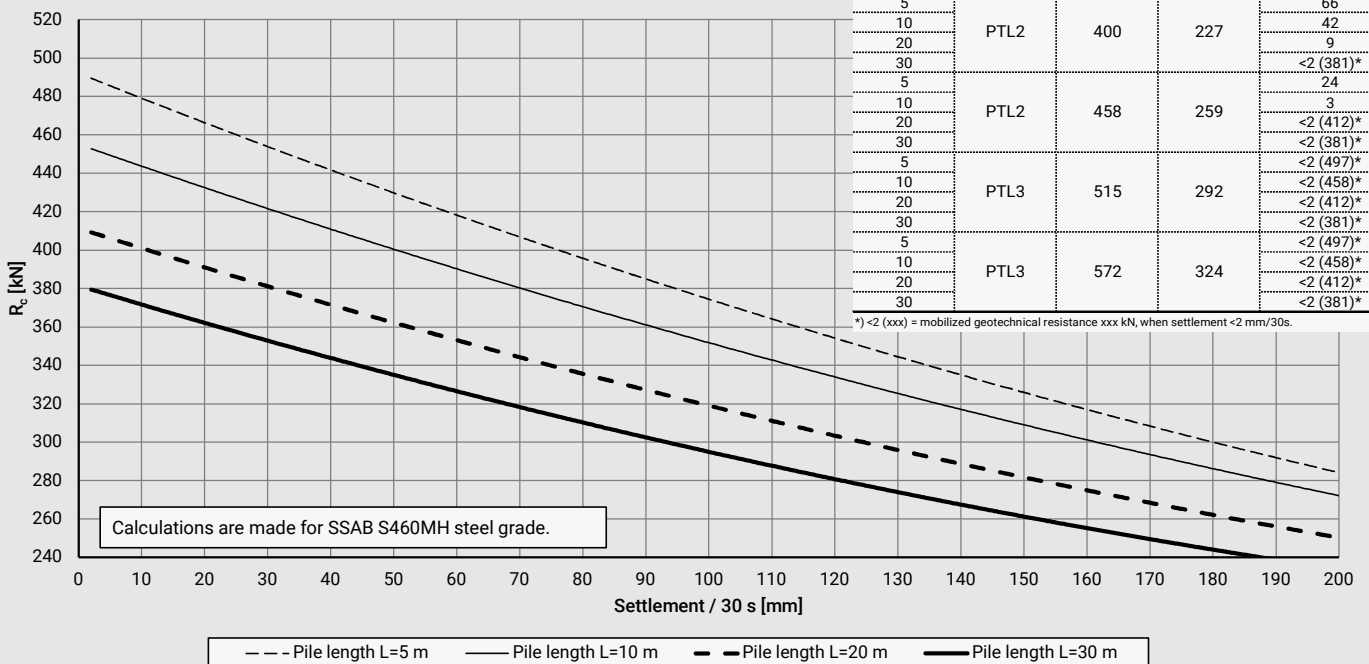
Diameter of the tool [mm]	D_t	75
Height of the tool [mm]	L_t	640
Tool weight [kg]	m_t	22

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 - RR75

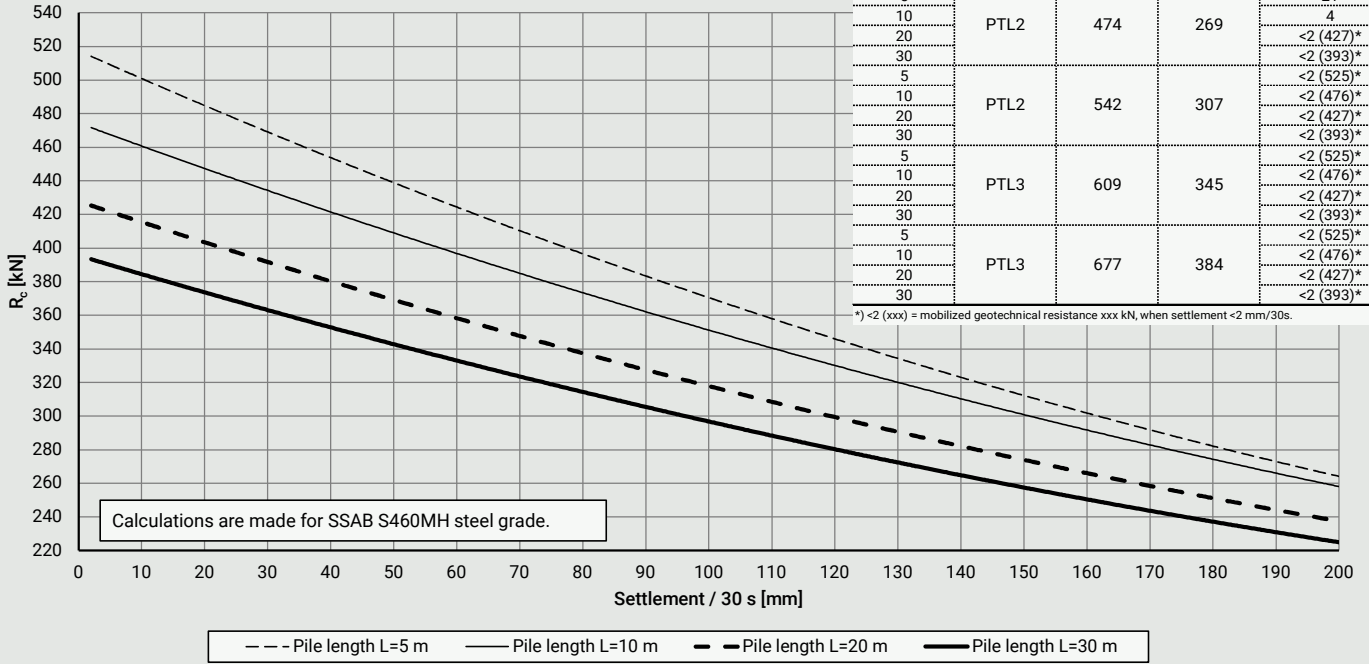


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5				66
10				45
20				15
30				<2 (393)*
5				21
10				4
20				<2 (427)*
30				<2 (393)*
5				<2 (525)*
10				<2 (476)*
20				<2 (427)*
30				<2 (393)*
5				<2 (525)*
10				<2 (476)*
20				<2 (427)*
30				<2 (393)*
5				<2 (525)*
10				<2 (476)*
20				<2 (427)*
30				<2 (393)*
5				<2 (525)*
10				<2 (476)*
20				<2 (427)*
30				<2 (393)*

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

OKB350 - RR90

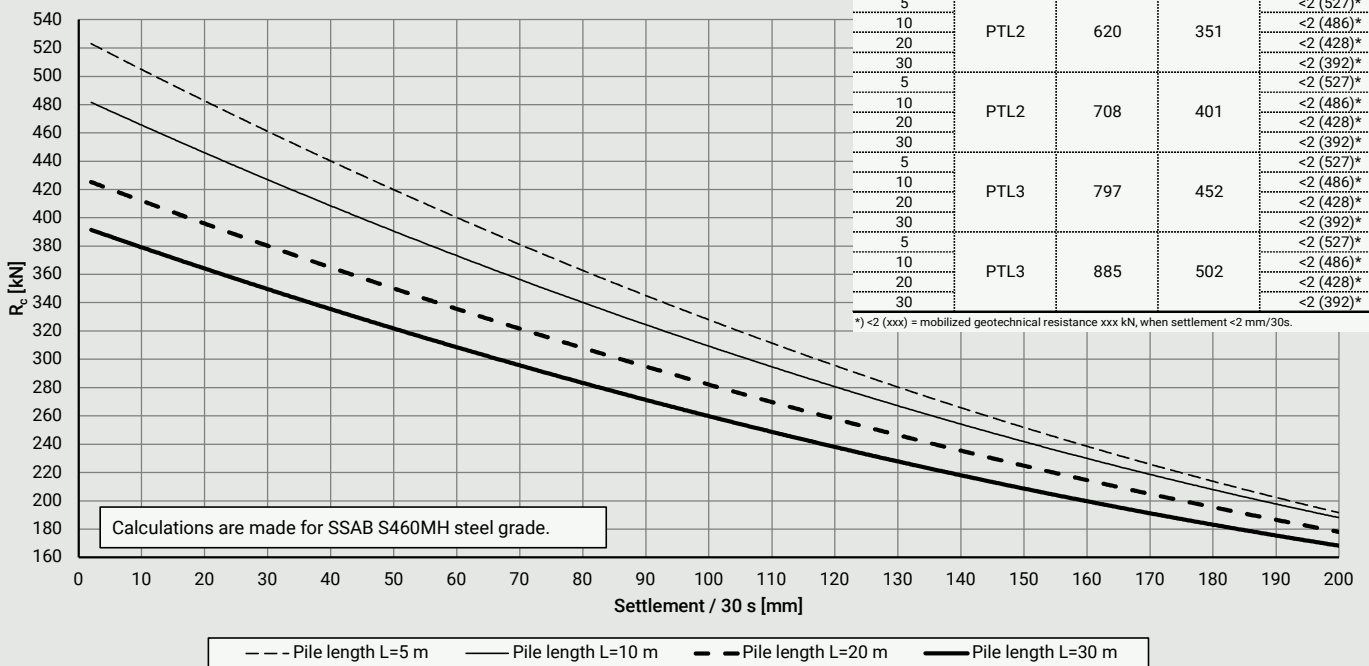


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5				<2 (527)*
10				<2 (486)*
20				<2 (428)*
30				<2 (392)*
5				<2 (527)*
10				<2 (486)*
20				<2 (428)*
30				<2 (392)*
5				<2 (527)*
10				<2 (486)*
20				<2 (428)*
30				<2 (392)*
5				<2 (527)*
10				<2 (486)*
20				<2 (428)*
30				<2 (392)*
5				<2 (527)*
10				<2 (486)*
20				<2 (428)*
30				<2 (392)*

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

OKB350 - RR115/6.3



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!

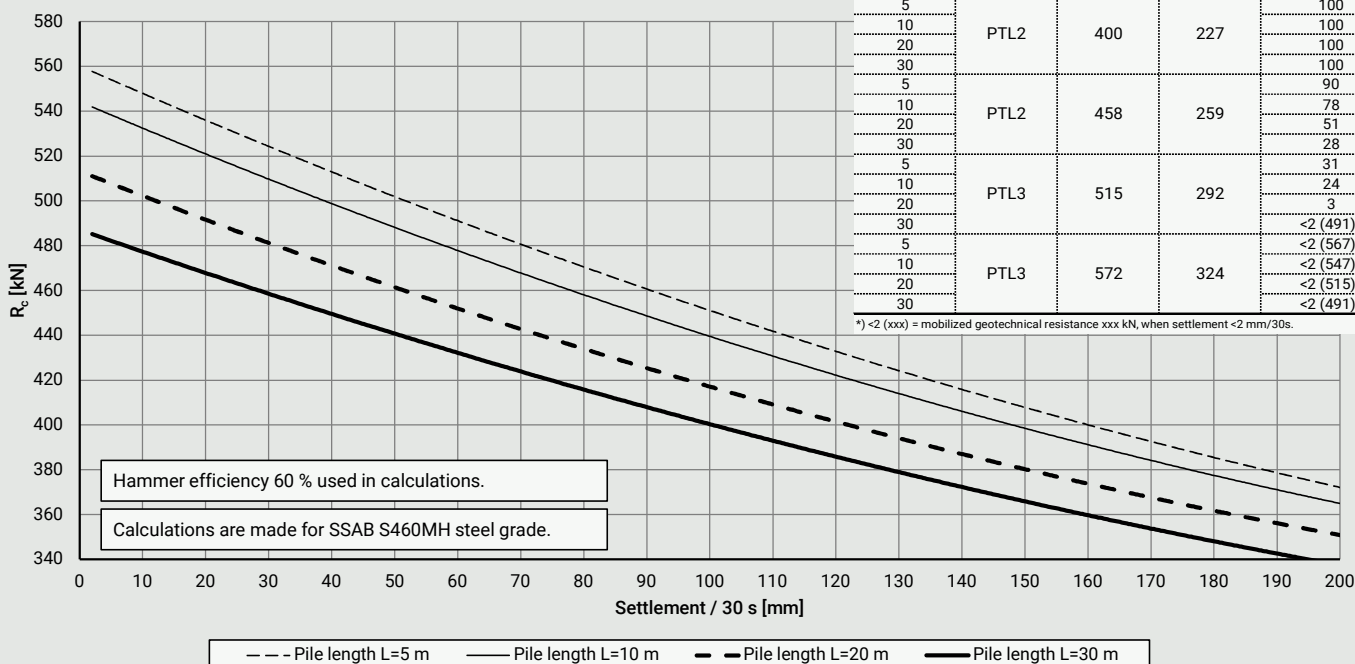
SPD uses technology of several different ram manufacturers. With SPD rams you need to consider also original manufacturer and type of the ram. These graphs and tables have been made for SPD1000 ram which is originally OKB1000 ram. For SPD rams where original ram is something else, you need to choose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

Hammer efficiency 60 %

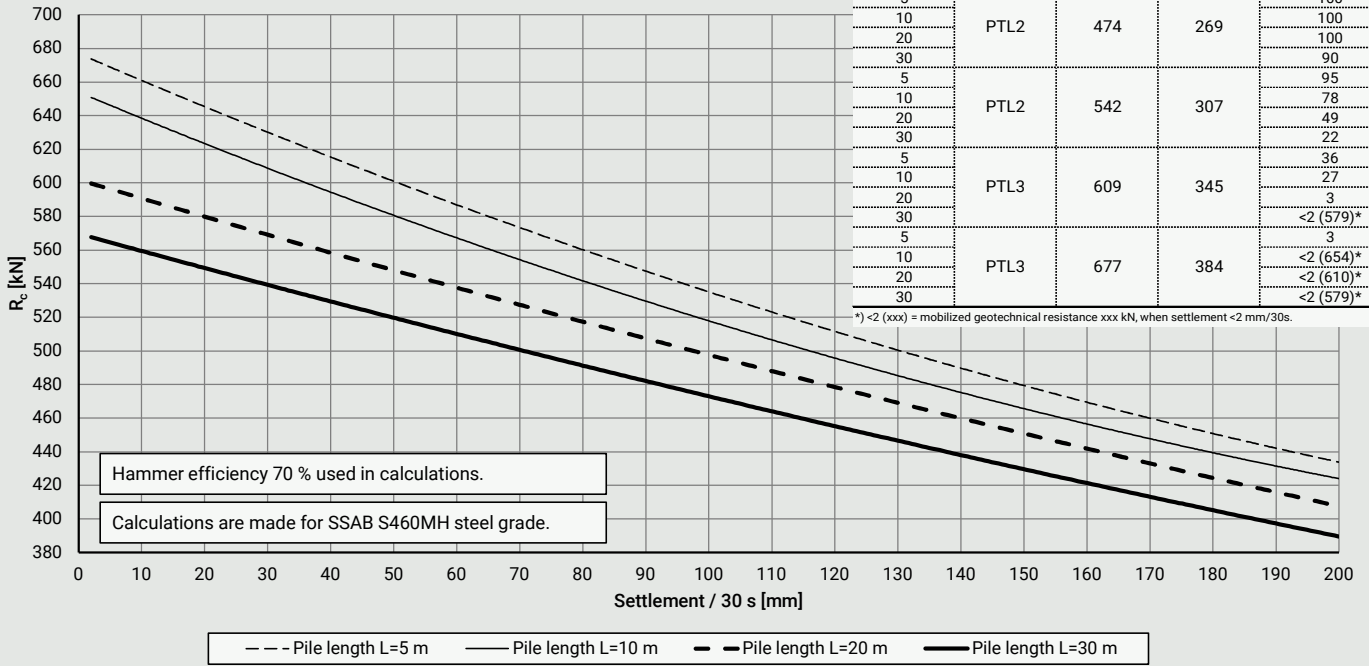
Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	343	195	100
10				100
20				100
30				100
5	PTL2	400	227	100
10				100
20				100
30				100
5	PTL2	458	259	90
10				78
20				51
30				28
5	PTL3	515	292	31
10				24
20				3
30				<2 (491)*
5	PTL3	572	324	<2 (567)*
10				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

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

OKB1000 / SPD1000 - RR75



OKB1000 / SPD1000 - RR90

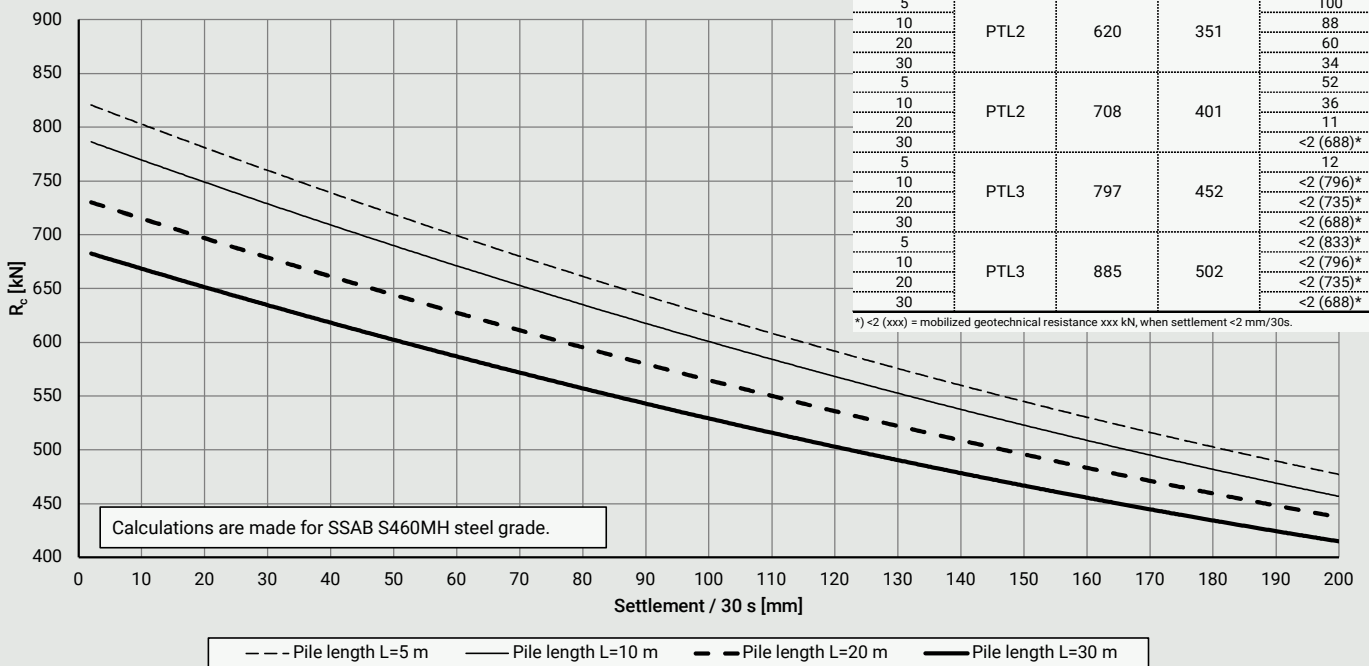


Hammer efficiency 70 %

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

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

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				100
10				100
20	PTL1	531	301	100
30				99
5				100
10				88
20	PTL2	620	351	60
30				34
5				52
10				36
20	PTL2	708	401	11
30				<2 (688)*
5				12
10				<2 (796)*
20	PTL3	797	452	<2 (735)*
30				<2 (688)*
5				<2 (833)*
10				<2 (796)*
20	PTL3	885	502	<2 (735)*
30				<2 (688)*

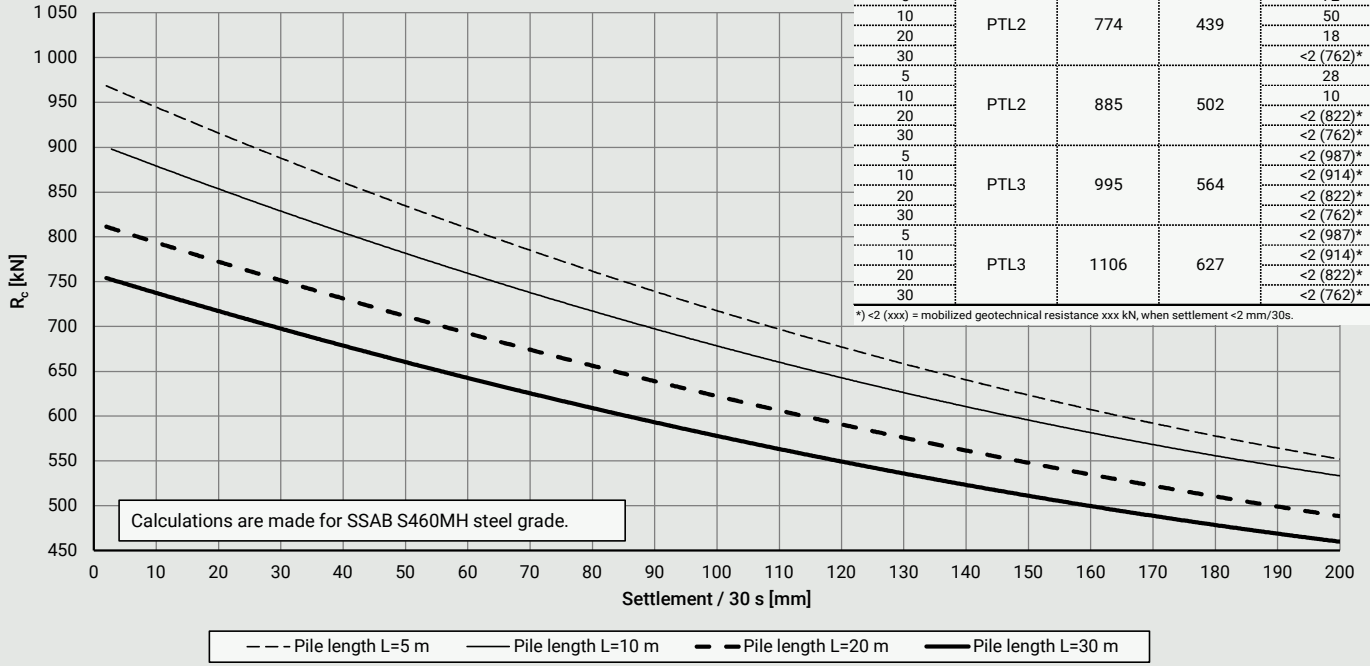
*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Hammer efficiency 80 %

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

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

OKB1000 / SPD1000 - RR115/8

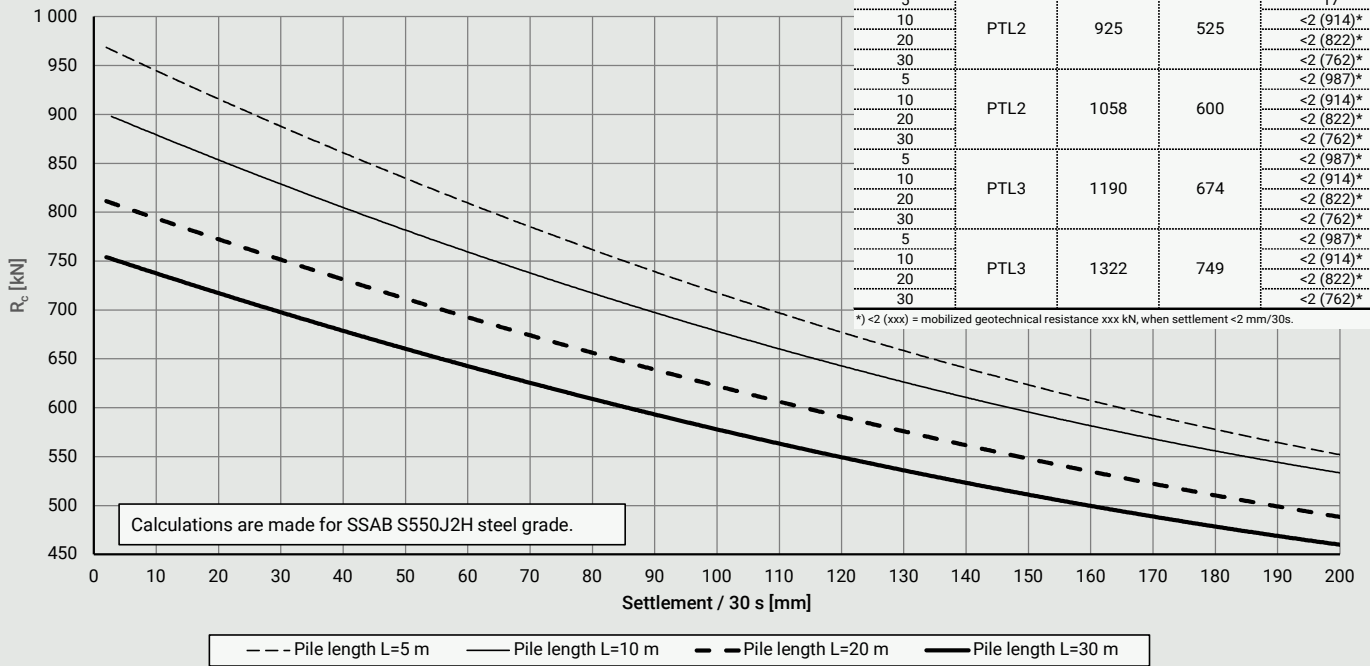


Hammer efficiency 80 %

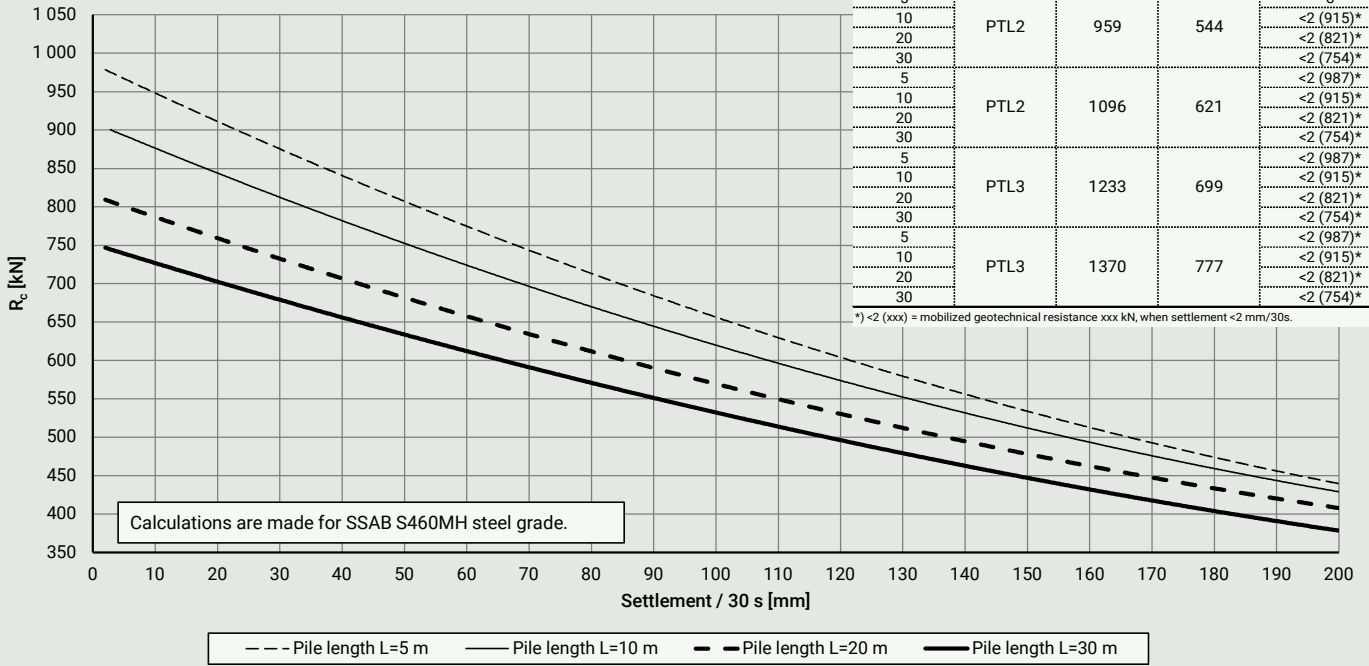
Pile length [m]	Piling work class	R _c [kN]	R _d [kN]	Settlement / 30 s [mm]
5				62
10				41
20	PTL1	793	450	10
30				<2 (762)*
5				17
10				<2 (914)*
20	PTL2	925	525	<2 (822)*
30				<2 (762)*
5				<2 (987)*
10				<2 (914)*
20	PTL2	1058	600	<2 (822)*
30				<2 (762)*
5				<2 (987)*
10				<2 (914)*
20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

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

OKB1000 / SPD1000 - RRs115/8



OKB1000 / SPD1000 - RR140/8

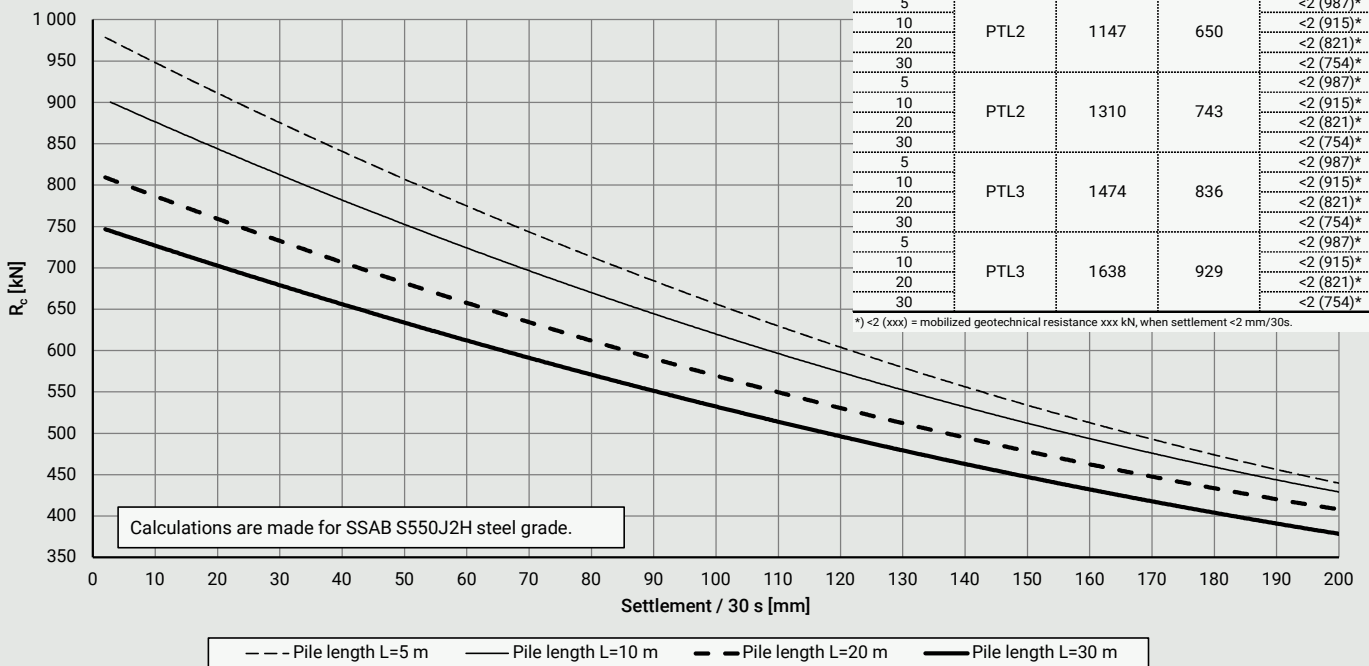


Hammer efficiency 80 %

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

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

OKB1000 / SPD1000 - RRs140/8

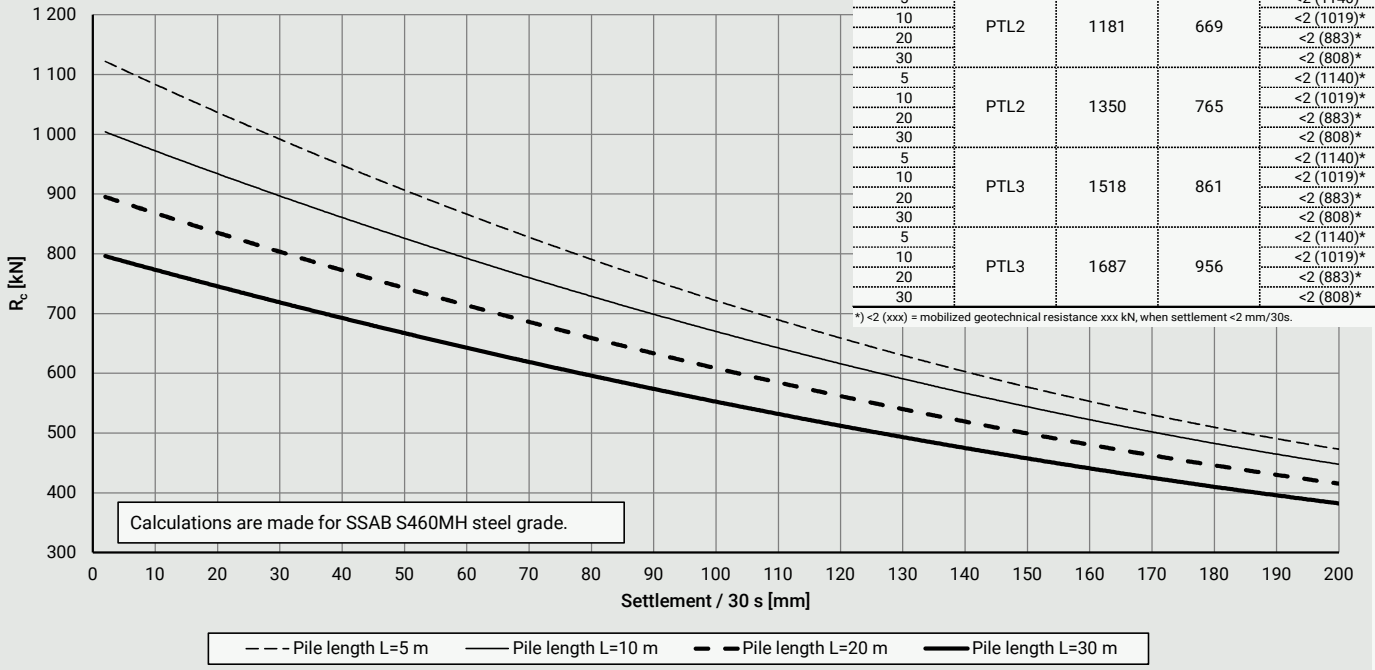


Hammer efficiency 80 %

Pile length [m]	Piling work class	R _c [kN]	R _d [kN]	Settlement / 30 s [mm]
5				3
10				<2 (915)*
20	PTL1	983	557	<2 (821)*
30				<2 (754)*
5				<2 (987)*
10	PTL2	1147	650	<2 (915)*
20				<2 (821)*
30				<2 (754)*
5				<2 (987)*
10	PTL2	1310	743	<2 (915)*
20				<2 (821)*
30				<2 (754)*
5				<2 (987)*
10	PTL3	1474	836	<2 (915)*
20				<2 (821)*
30				<2 (754)*
5				<2 (987)*
10	PTL3	1638	929	<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				25
10	PTL1	1012	574	4
20				<2 (883)*
30				<2 (808)*
5				<2 (1140)*
10	PTL2	1181	669	<2 (1019)*
20				<2 (883)*
30				<2 (808)*
5				<2 (1140)*
10	PTL2	1350	765	<2 (1019)*
20				<2 (883)*
30				<2 (808)*
5				<2 (1140)*
10	PTL3	1518	861	<2 (1019)*
20				<2 (883)*
30				<2 (808)*
5				<2 (1140)*
10	PTL3	1687	956	<2 (1019)*
20				<2 (883)*
30				<2 (808)*

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

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

Notice!

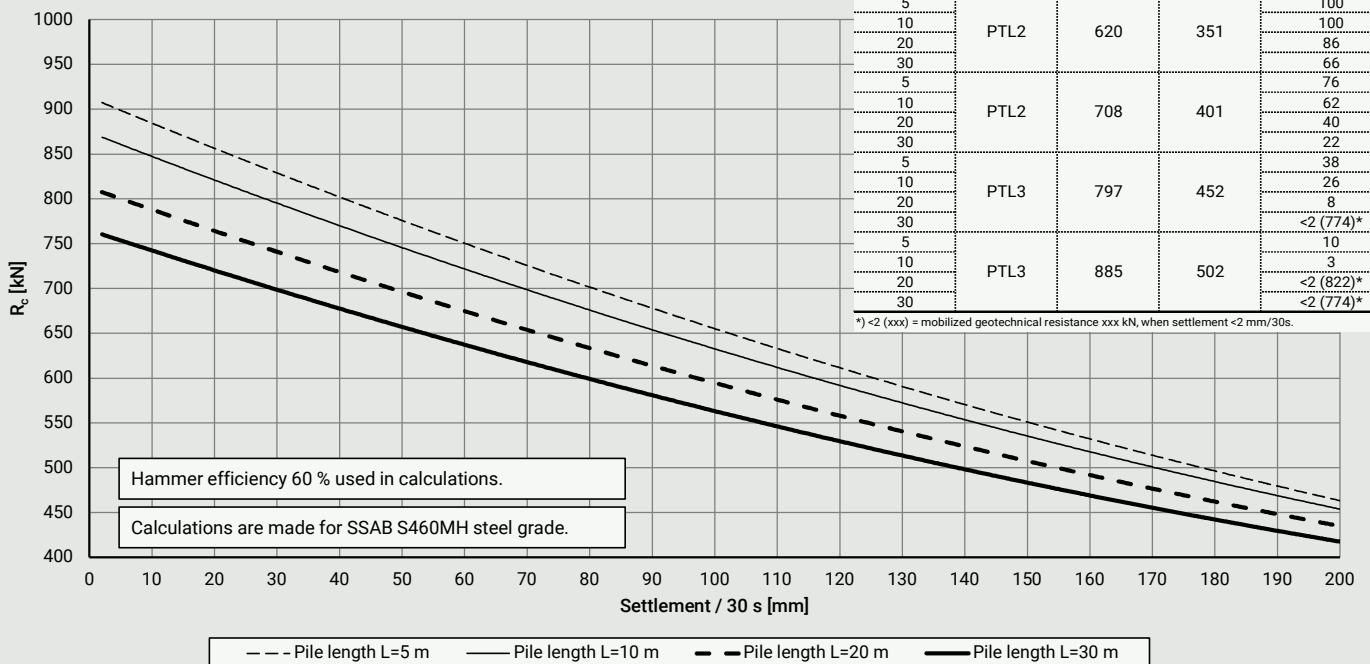
SPD uses technology of several different ram manufacturers. With SPD rams you need to consider also original manufacturer and type of the ram. These graphs and tables have been made for SPD1500 ram which is originally OKB1500 ram. For SPD rams where original ram is something else, you need to choose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

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 - RR115/6.3

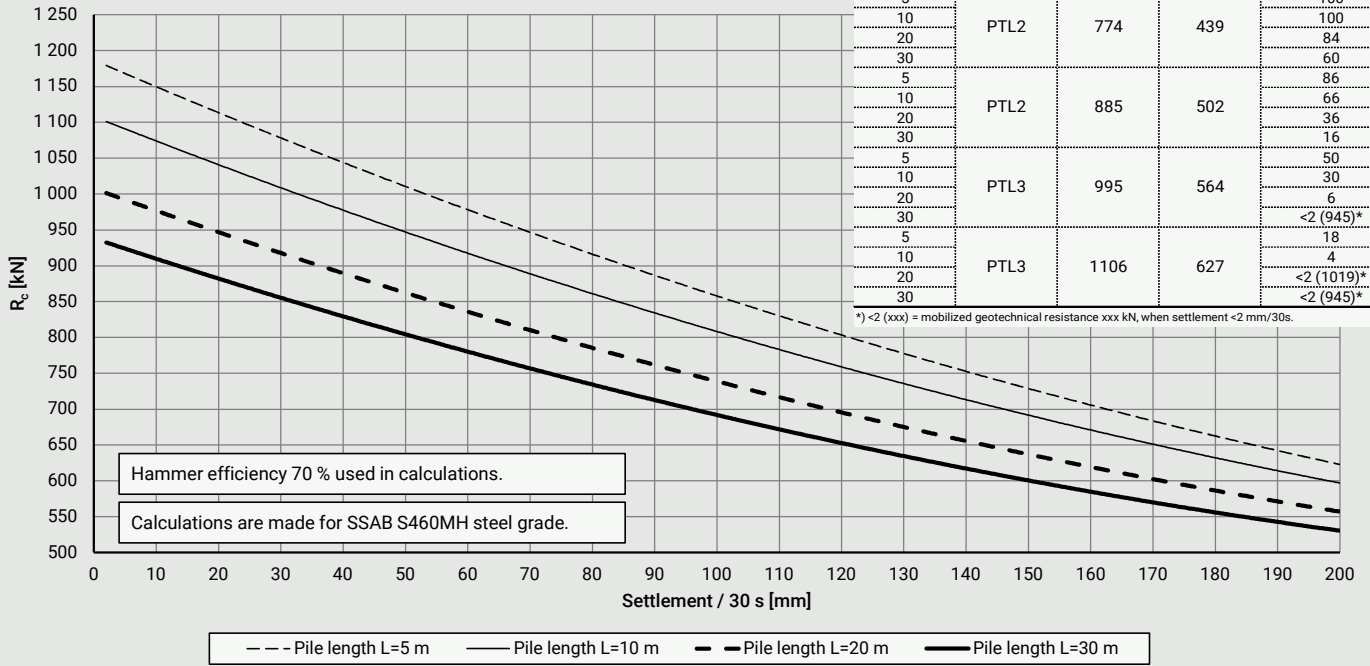


Hammer efficiency 70 %

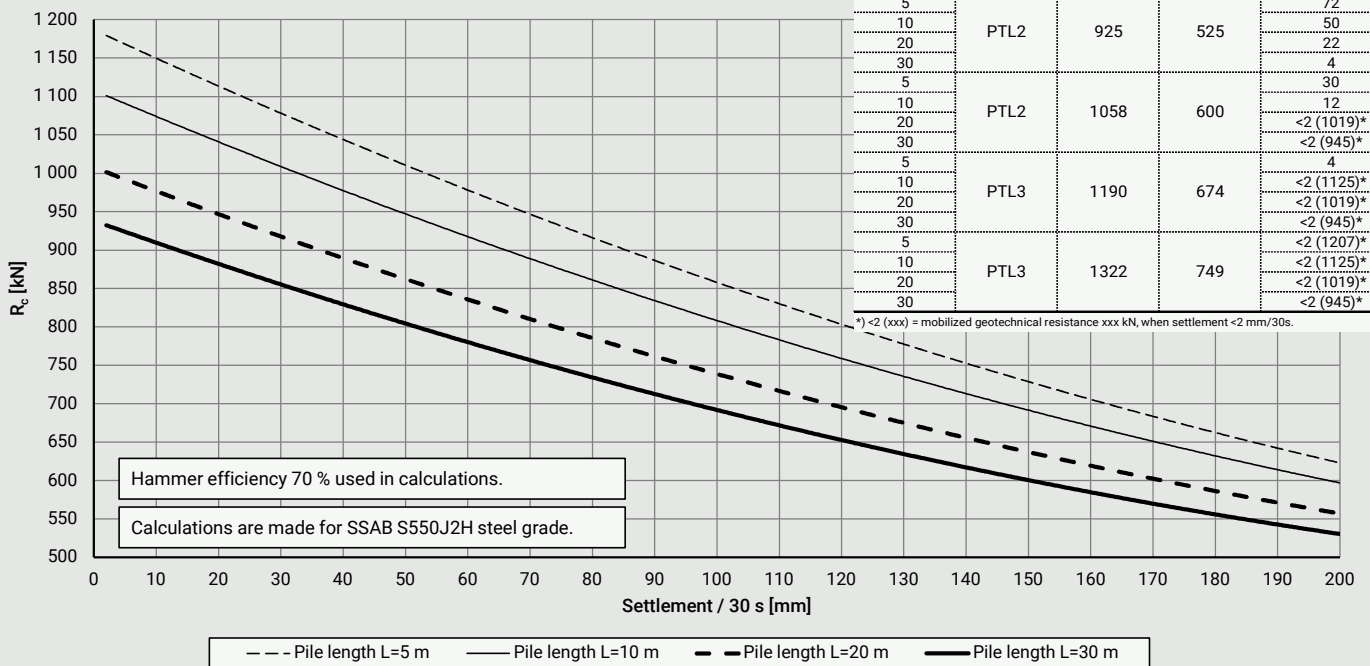
Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5				100
10				100
20	PTL1	664	376	100
30				100
5				100
10	PTL2	774	439	100
20				84
30				60
5				86
10	PTL2	885	502	66
20				36
30				16
5				50
10	PTL3	995	564	30
20				6
30				<2 (945)*
5				18
10	PTL3	1106	627	4
20				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

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

OKB1500 / SPD1500 - RR115/8



OKB1500 / SPD1500 - RRs115/8



Hammer efficiency 70 %

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

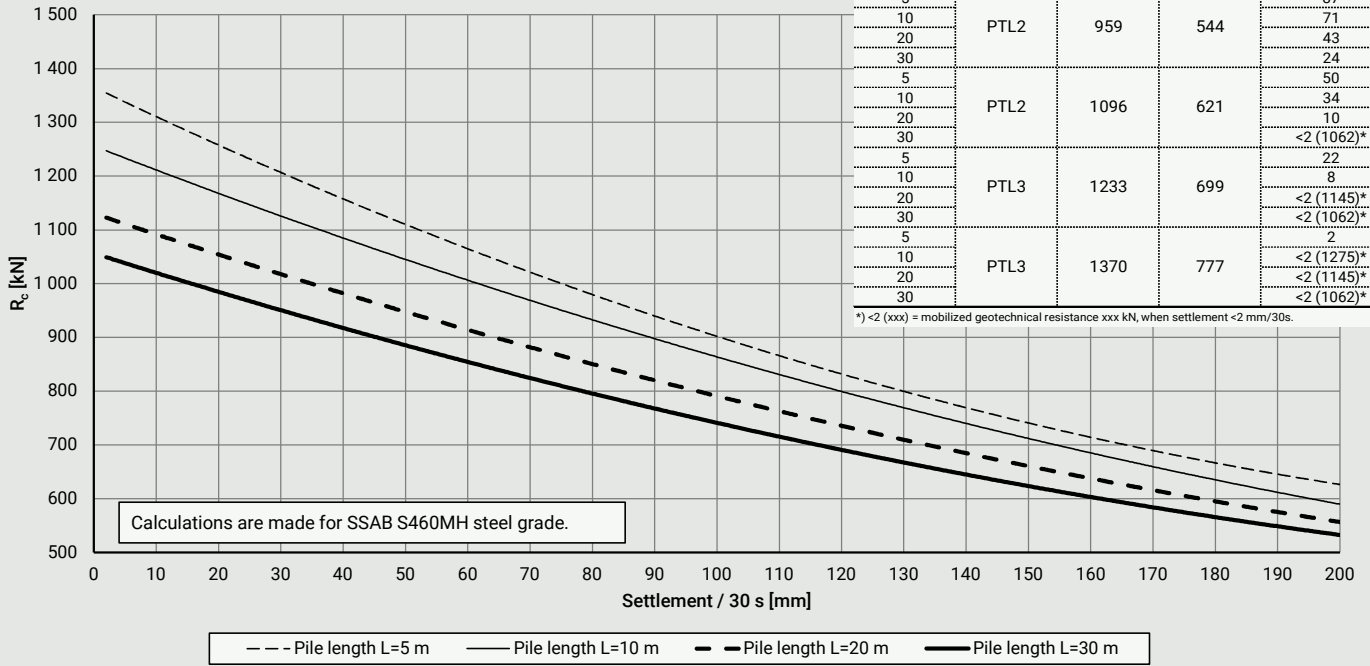
*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Hammer efficiency 80 %

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

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

OKB1500 / SPD1500 - RR140/8

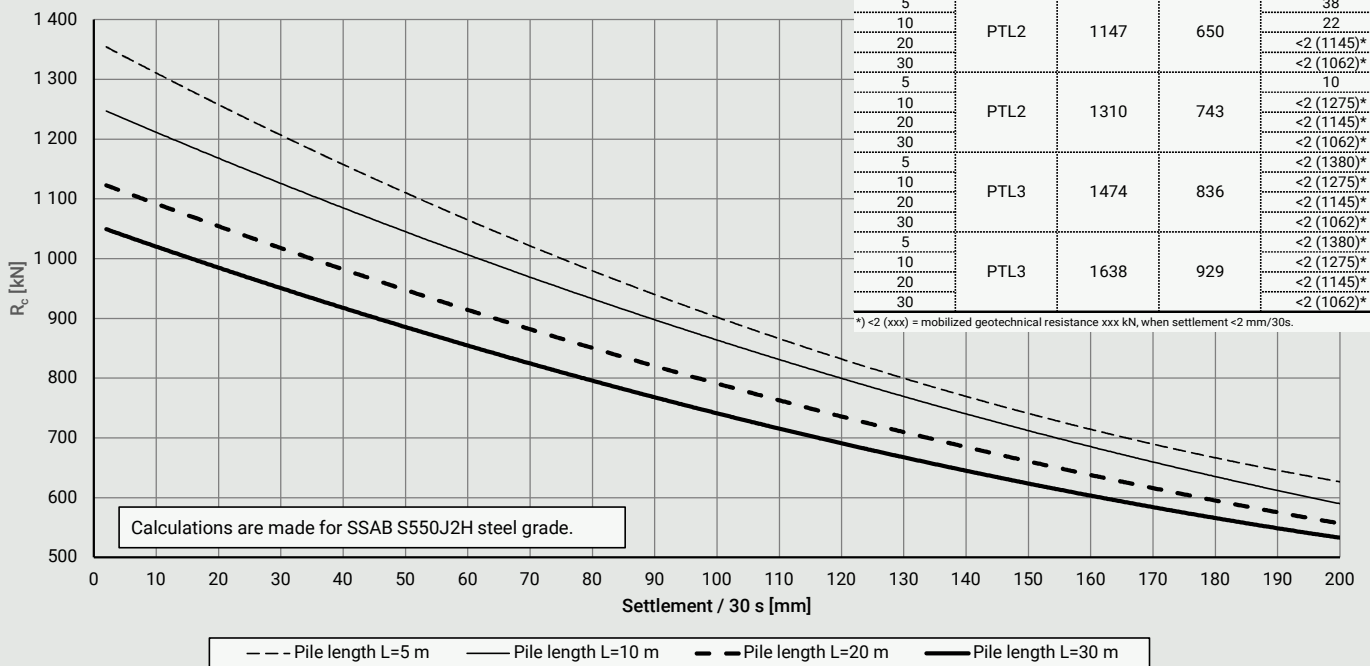


Hammer efficiency 80 %

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

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

OKB1500 / SPD1500 - RRs140/8

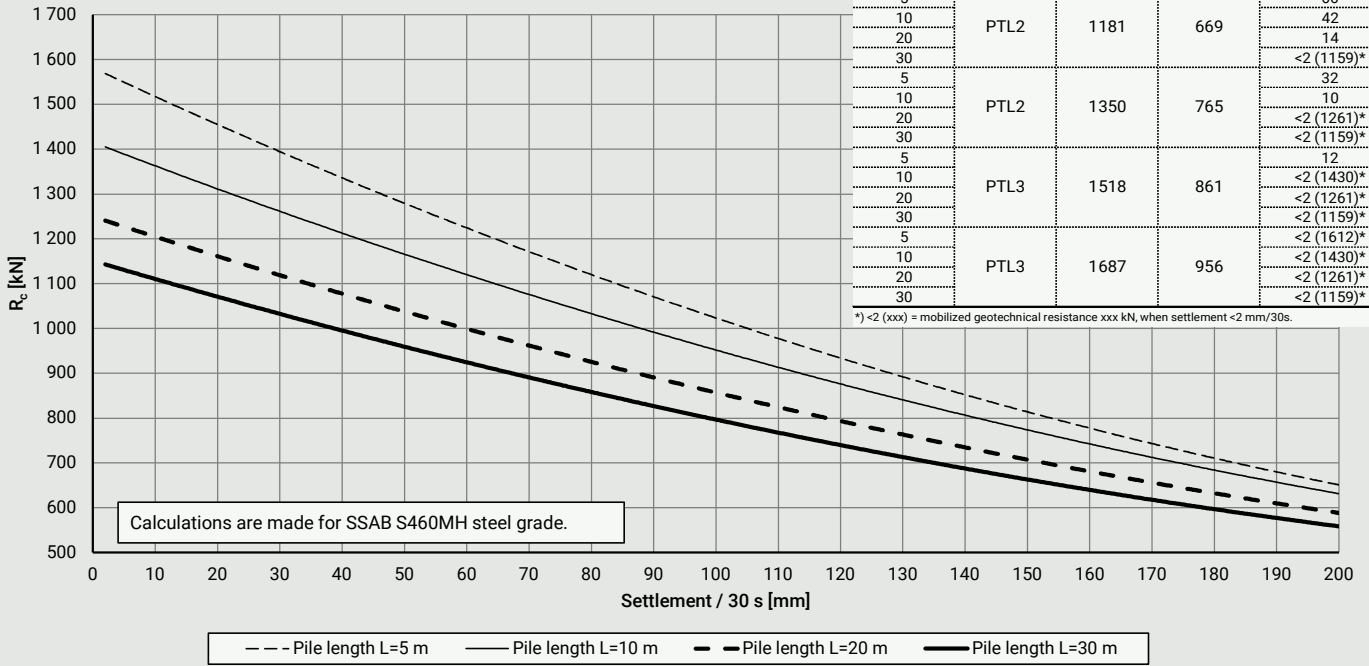


Hammer efficiency 80 %

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

OKB1500 / SPD1500 - RR140/10

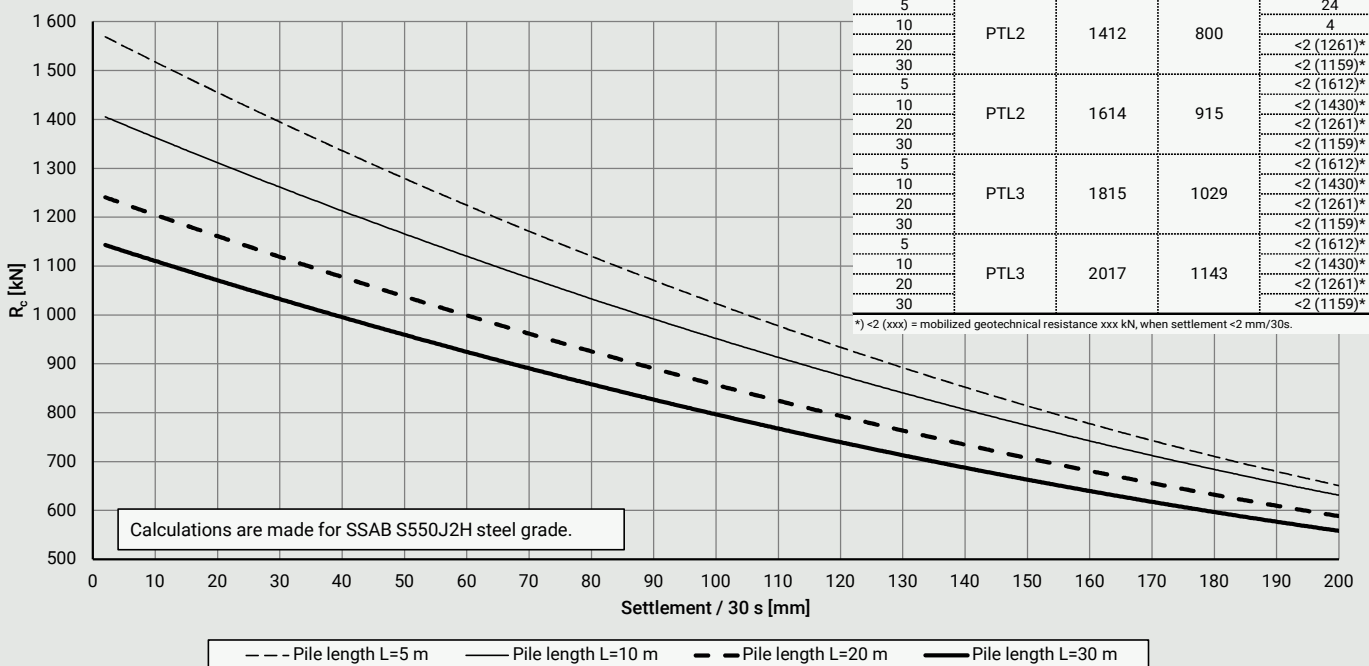


Hammer efficiency 80 %

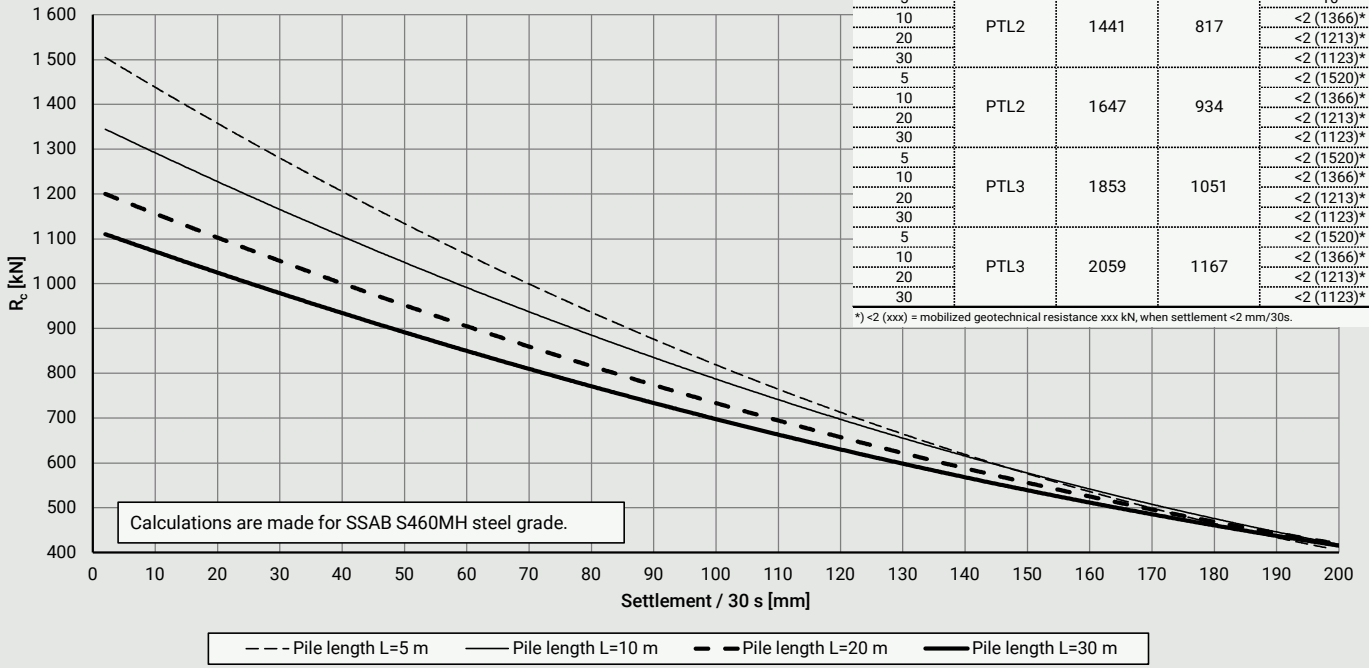
Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5				58
10				36
20				8
30				<2 (1159)*
5	PTL1	1210	686	24
10				4
20				<2 (1261)*
30				<2 (1159)*
5	PTL2	1412	800	<2 (1612)*
10				<2 (1430)*
20				<2 (1261)*
30				<2 (1159)*
5	PTL2	1614	915	<2 (1612)*
10				<2 (1430)*
20				<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 - RRs140/10



OKB1500 / SPD1500 - RR170/10

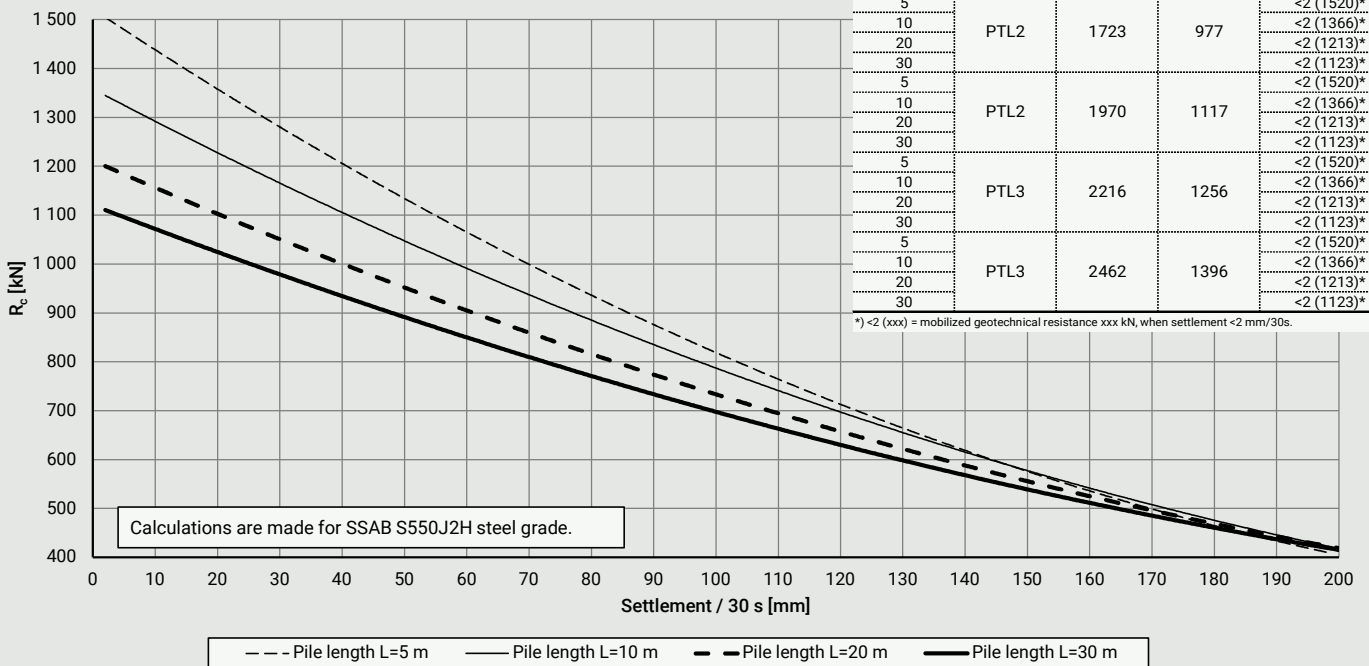


Hammer efficiency 80 %

Pile length [m]	Piling work class	R _c [kN]	R _d [kN]	Settlement / 30 s [mm]
5				32
10				16
20	PTL1	1235	700	<2 (1213)*
30				<2 (1123)*
5				<2 (1366)*
10	PTL2	1441	817	<2 (1366)*
20				<2 (1213)*
30				<2 (1123)*
5	PTL2	1647	934	<2 (1520)*
10				<2 (1366)*
20				<2 (1213)*
30	PTL3	1853	1051	<2 (1123)*
5				<2 (1520)*
10				<2 (1366)*
20	PTL3	2059	1167	<2 (1213)*
30				<2 (1123)*
5				<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 - RRs170/10

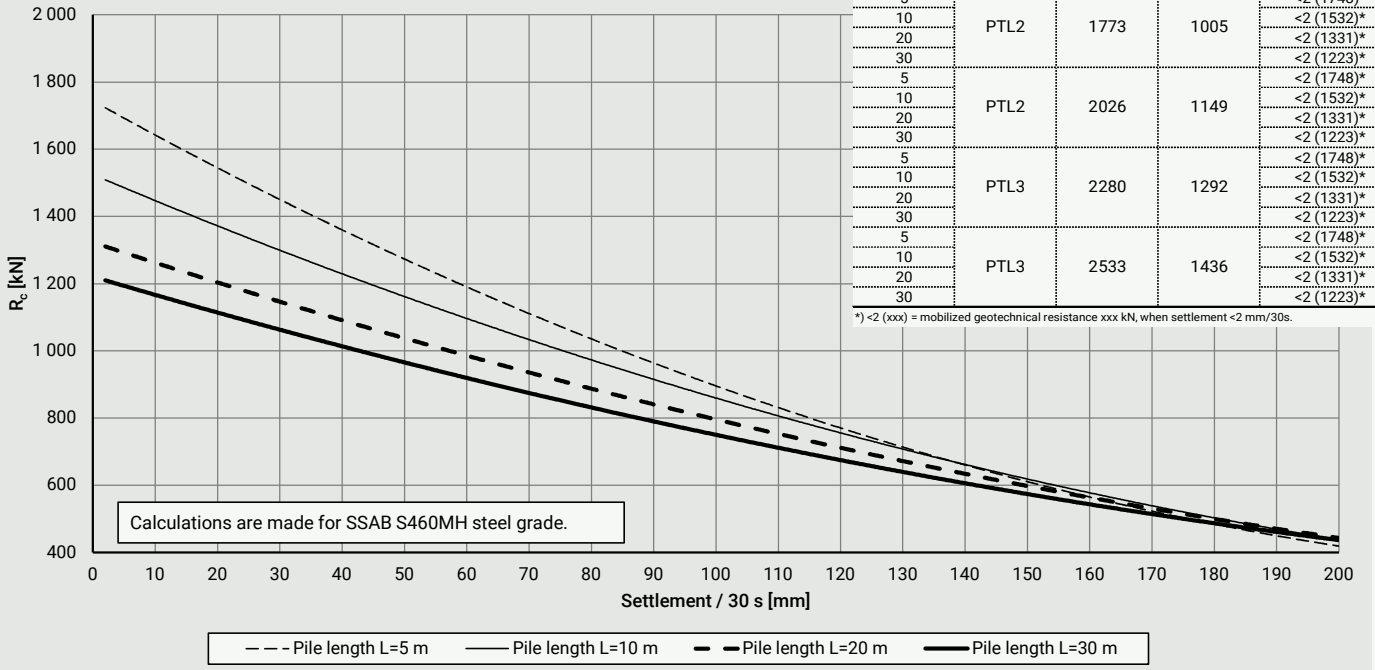


Hammer efficiency 80 %

Pile length [m]	Piling work class	R _c [kN]	R _d [kN]	Settlement / 30 s [mm]
5				6
10				<2 (1366)*
20	PTL1	1477	837	<2 (1213)*
30				<2 (1123)*
5				<2 (1520)*
10	PTL2	1723	977	<2 (1366)*
20				<2 (1213)*
30				<2 (1123)*
5	PTL2	1970	1117	<2 (1520)*
10				<2 (1366)*
20				<2 (1213)*
30	PTL3	2216	1256	<2 (1123)*
5				<2 (1520)*
10				<2 (1366)*
20	PTL3	2462	1396	<2 (1213)*
30				<2 (1123)*
5				<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				22
10	PTL1	1520	862	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)*
30				<2 (1223)*

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

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!

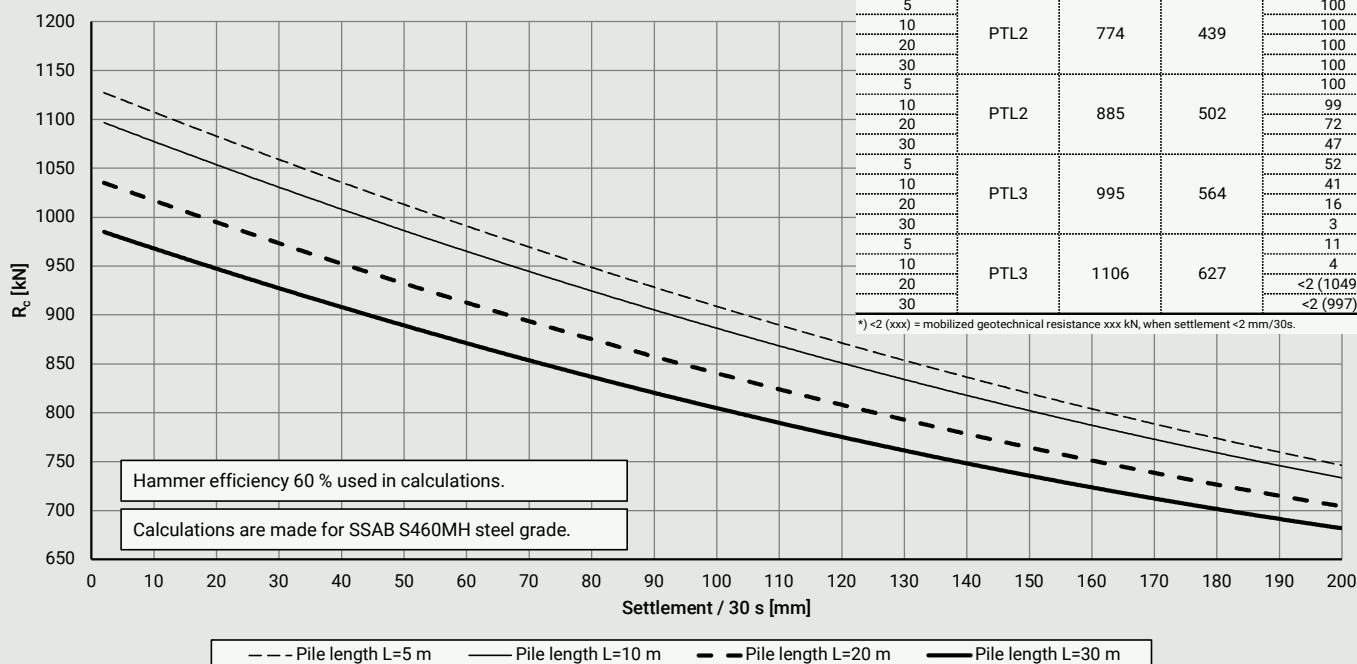
SPD uses technology of several different ram manufacturers. With SPD rams you need to consider also original manufacturer and type of the ram. These graphs and tables have been made for SPD2000 ram which is originally OKB2000 ram. For SPD rams where original ram is something else, you need to choose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

Hammer efficiency 60 %

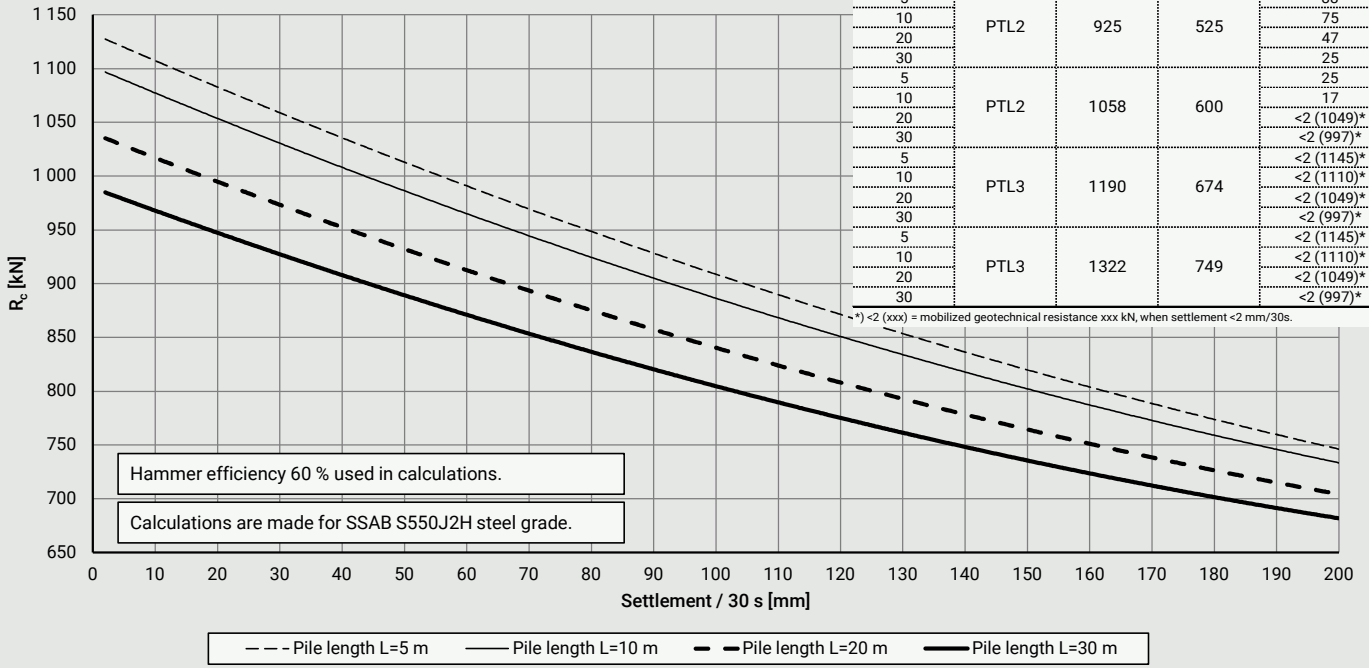
Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	664	376	100
10				100
20				100
30				100
5	PTL2	774	439	100
10				100
20				100
30				100
5	PTL2	885	502	99
10				72
20				47
30				52
5	PTL3	995	564	41
10				16
20				3
30				11
5	PTL3	1106	627	4
10				<2 (1049)*
20	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

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

OKB2000 / SPD2000 - RR115/8



OKB2000 / SPD2000 - RR_s115/8

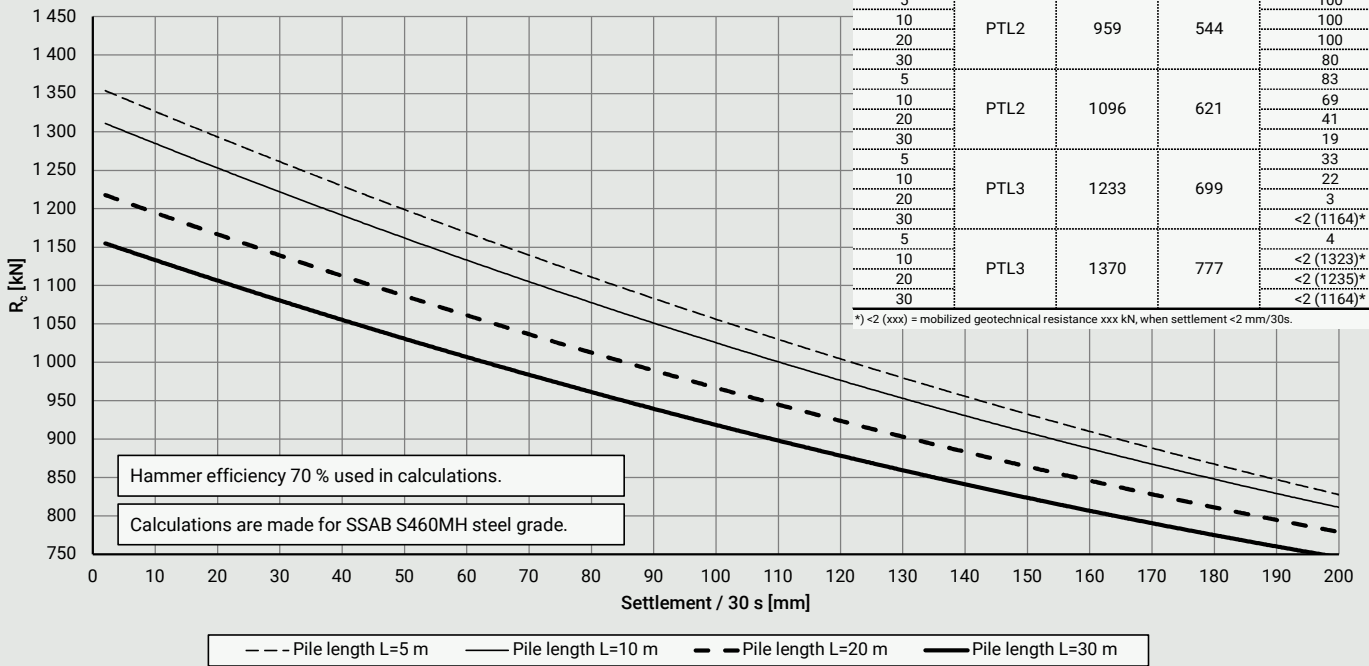


Hammer efficiency 60 %

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

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

OKB2000 / SPD2000 - RR_s140/8

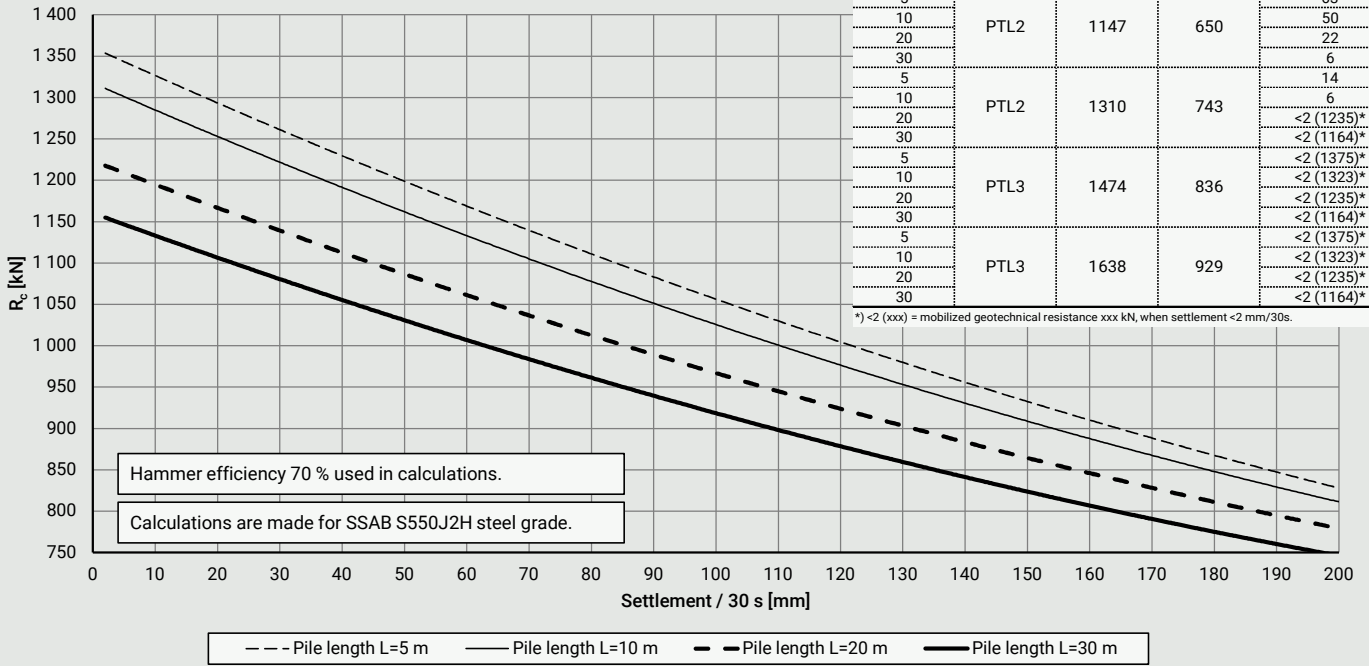


Hammer efficiency 70 %

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

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

OKB2000 / SPD2000 - RR_s140/8

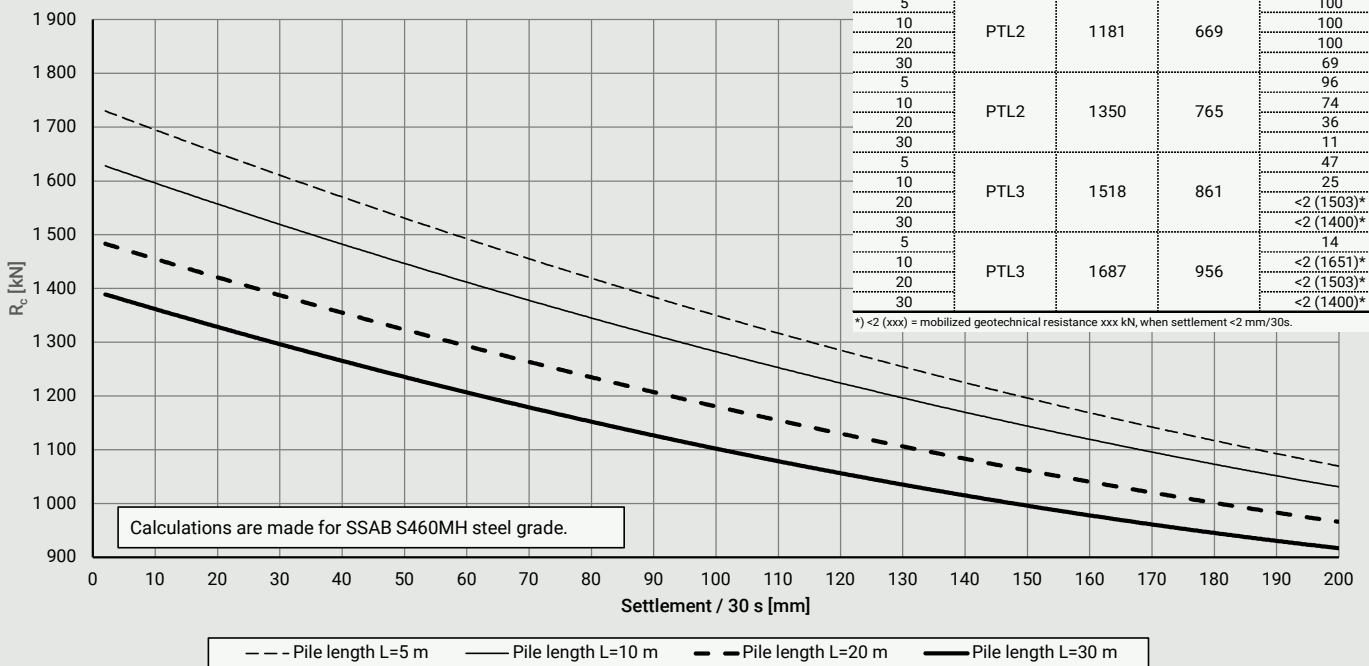


Hammer efficiency 70 %

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

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

OKB2000 / SPD2000 - RR_s140/10



Hammer efficiency 80 %

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

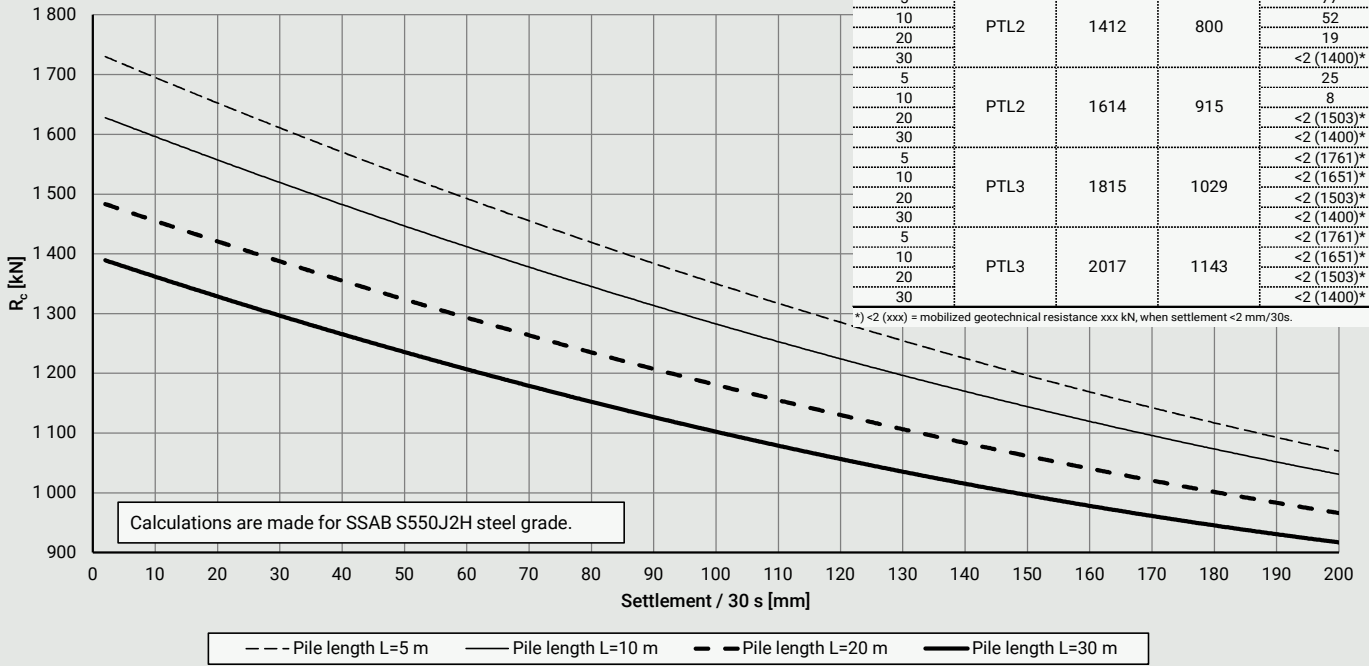
*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Hammer efficiency 80 %

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

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

OKB2000 / SPD2000 - RR_s140/10

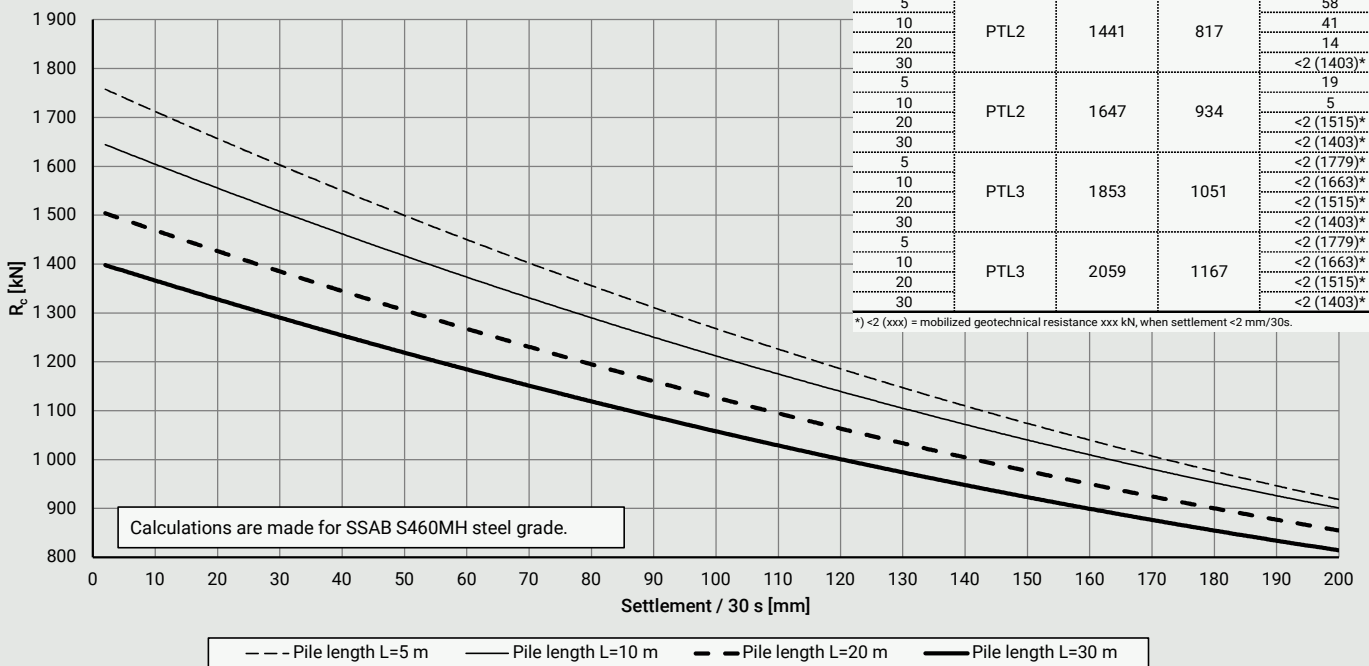


Hammer efficiency 80 %

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

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

OKB2000 / SPD2000 - RR_s170/10

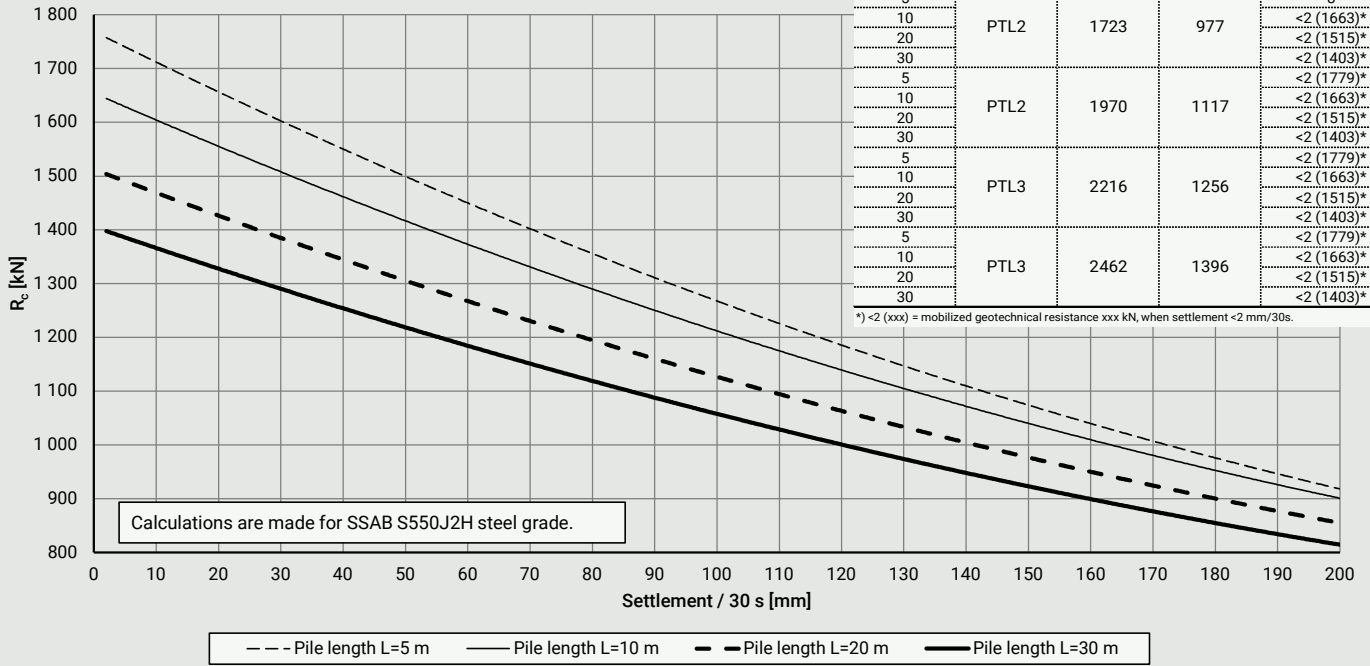


Hammer efficiency 80 %

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

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

OKB2000 / SPD2000 - RR_s170/10

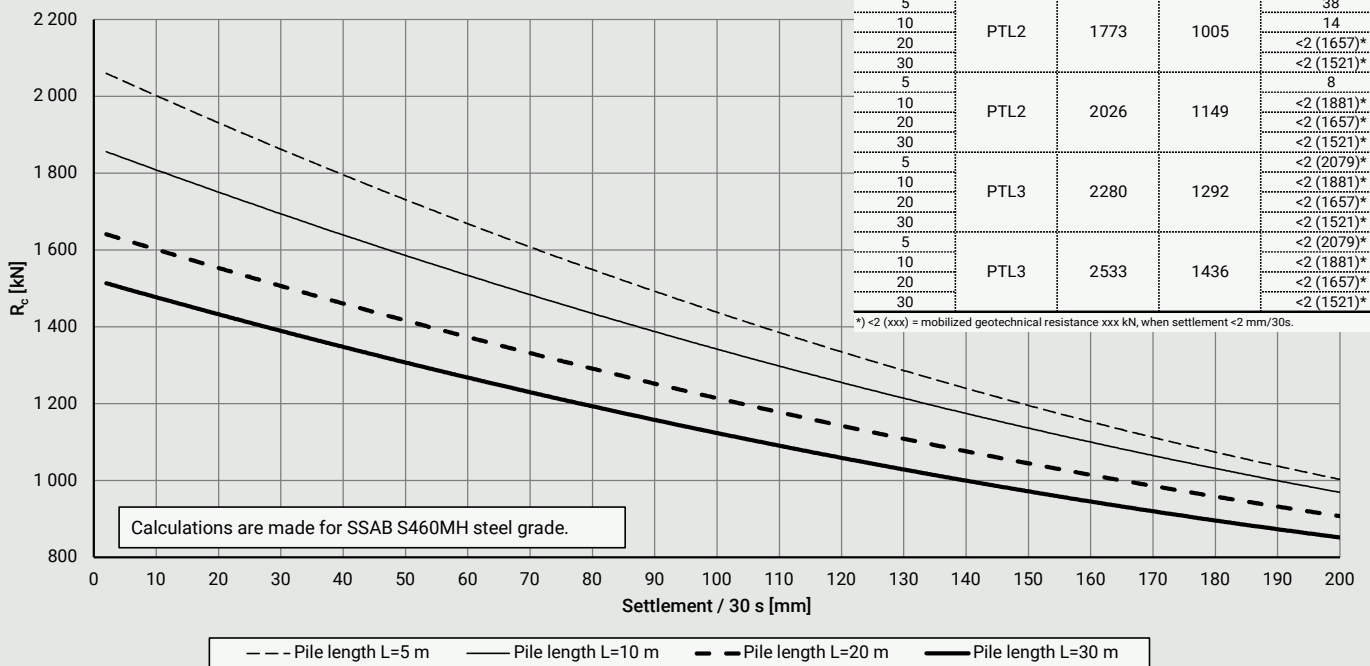


Hammer efficiency 80 %

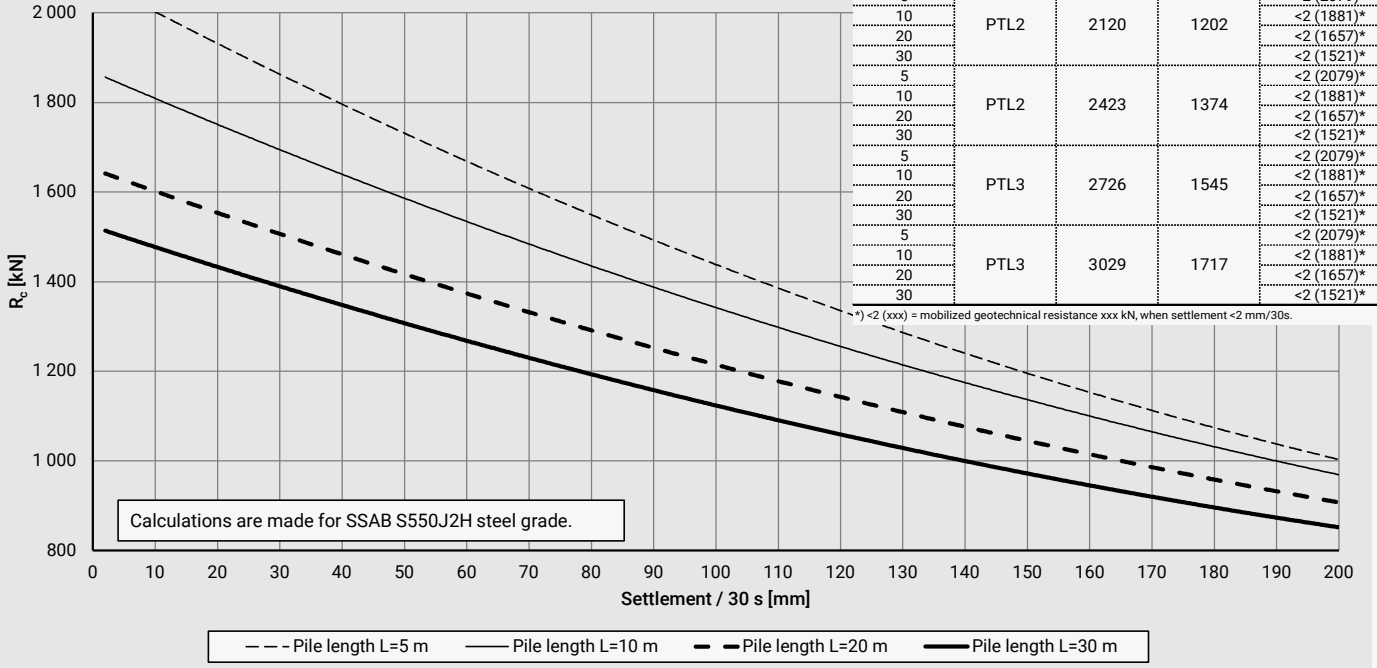
Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5				80
10				58
20				25
30				3
5				38
10				14
20				<2 (1657)*
30				<2 (1521)*
5				8
10	PTL1	1520	862	<2 (1881)*
20				<2 (1657)*
30				<2 (1521)*
5				<2 (2079)*
10	PTL2	1773	1005	<2 (1881)*
20				<2 (1657)*
30				<2 (1521)*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

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

OKB2000 / SPD2000 - RR₁₇₀/12.5



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				33
10				9
20	PTL1	1817	1030	<2 (1657)*
30				<2 (1521)*
5				<2 (2079)*
10	PTL2	2120	1202	<2 (1881)*
20				<2 (1657)*
30				<2 (1521)*
5	PTL2	2423	1374	<2 (2079)*
10				<2 (1881)*
20				<2 (1657)*
30	PTL3	2726	1545	<2 (1521)*
5				<2 (2079)*
10				<2 (1881)*
20	PTL3	3029	1717	<2 (1657)*
5				<2 (2079)*
10				<2 (1881)*
30				<2 (1521)*

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

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

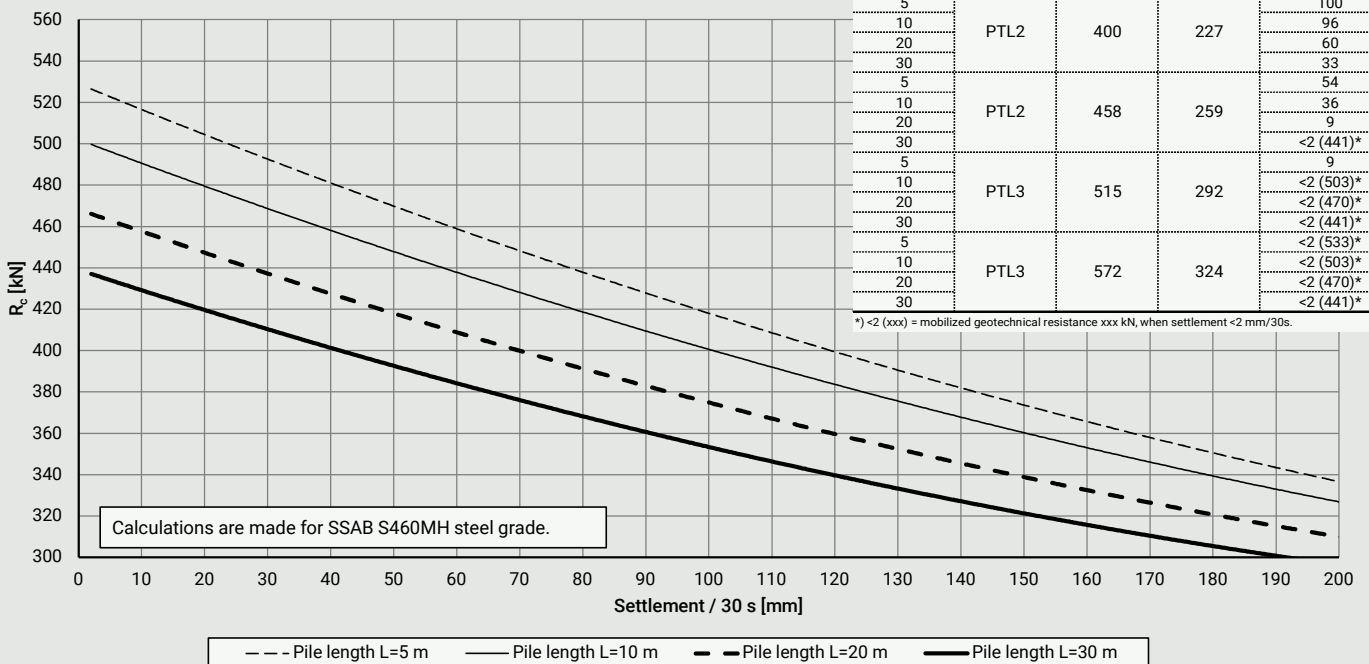
Diameter of the tool [mm]	D_t	95
Height of the tool [mm]	L_t	600
Tool weight [kg]	m_t	33

Hammer 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 - RR75

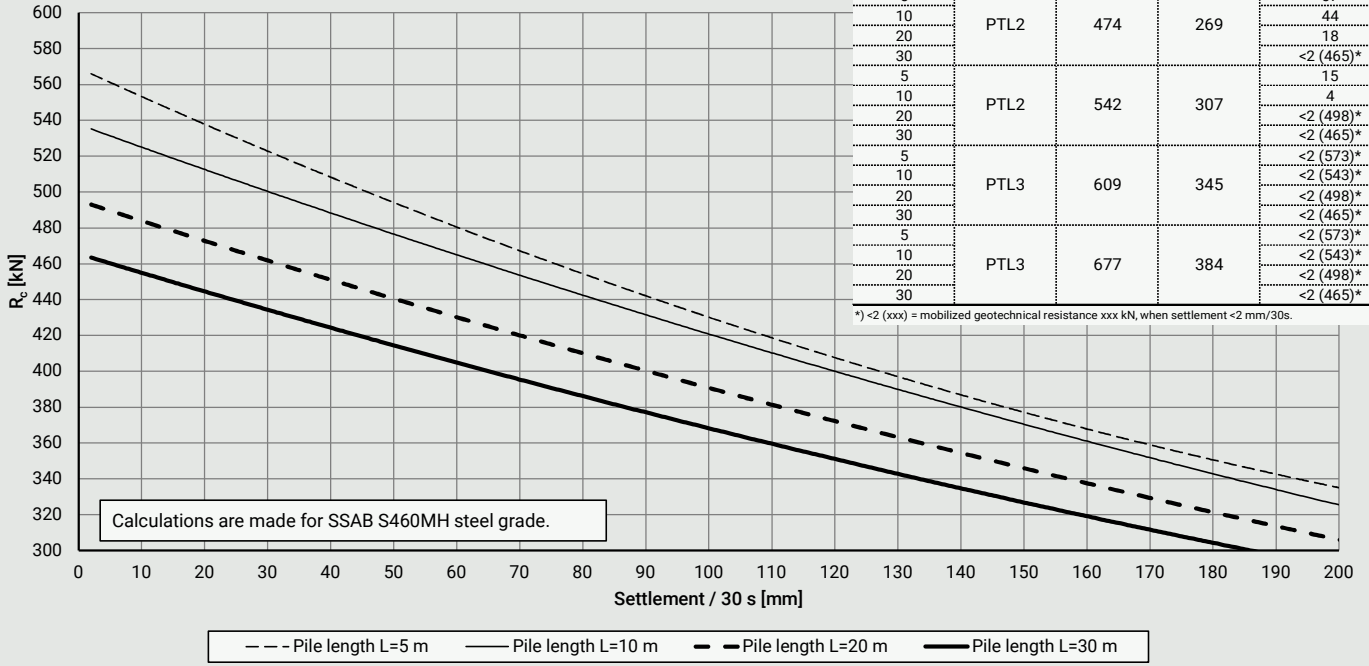


Hammer efficiency 80 %

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

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

Hammer HS450 - RR90

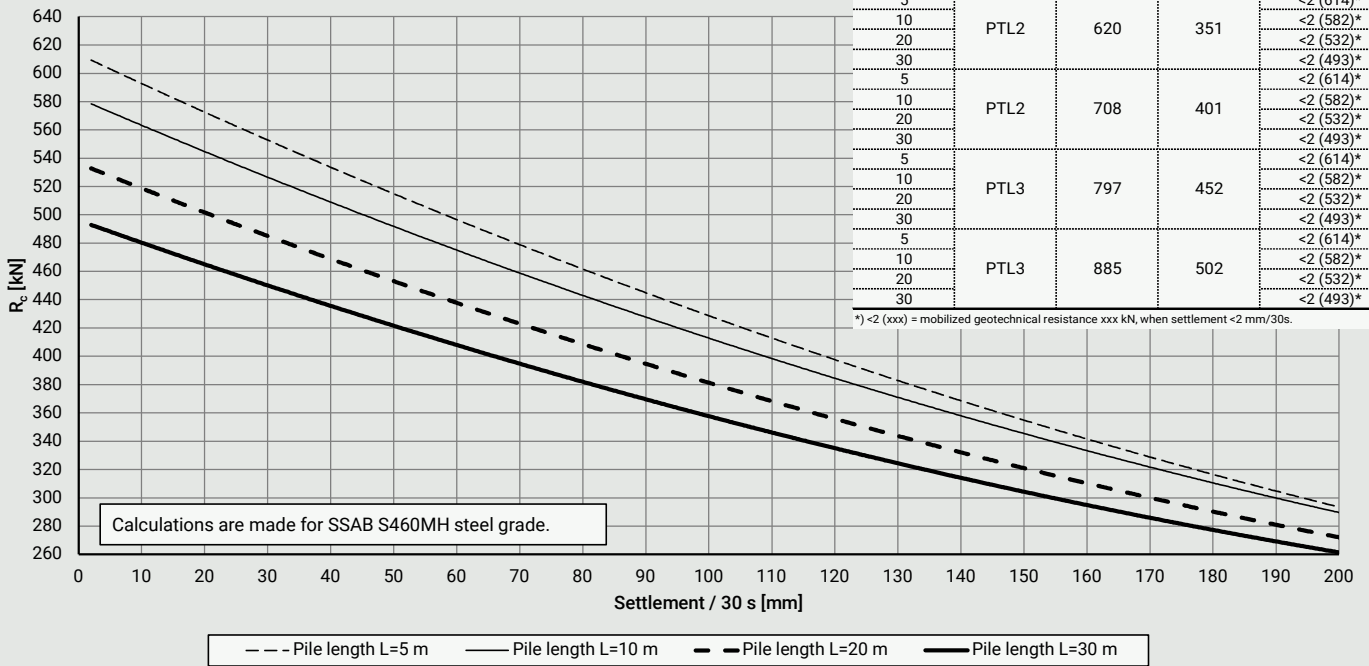


Hammer efficiency 80 %

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

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

Hammer HS450 - RR115/6.3



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

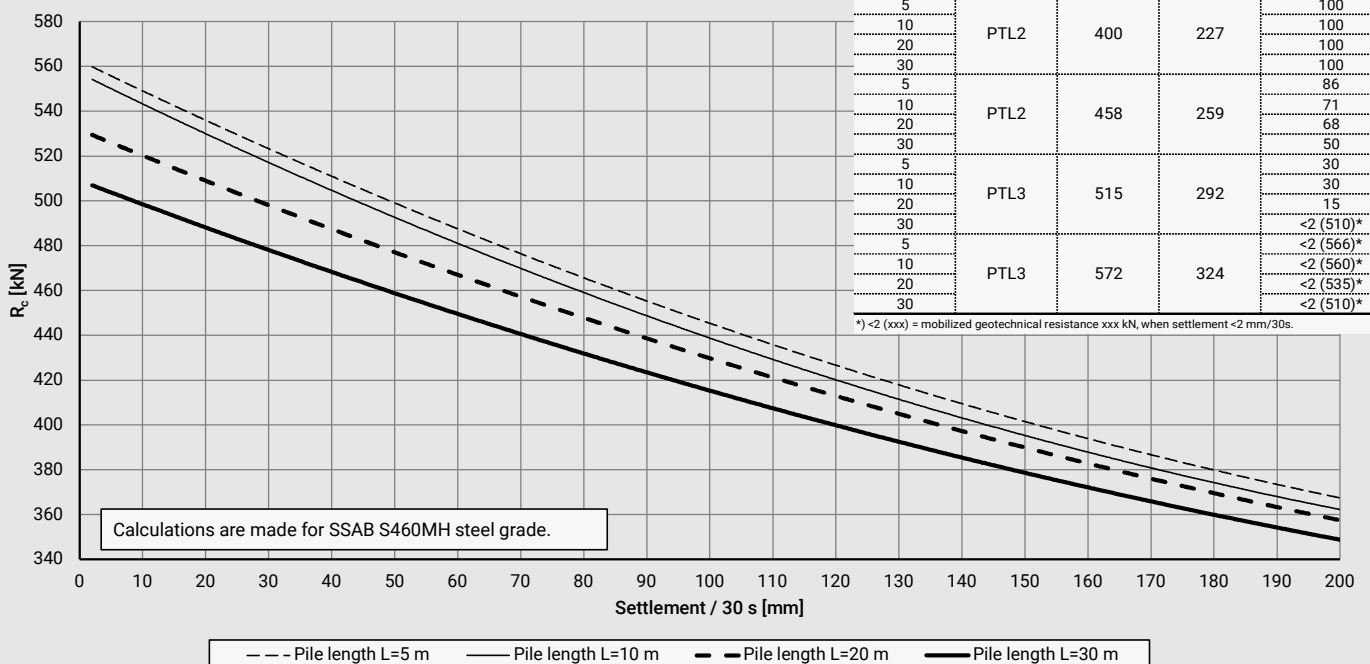
Diameter of the tool [mm]	D_t	100
Height of the tool [mm]	L_t	800
Tool weight [kg]	m_t	50

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

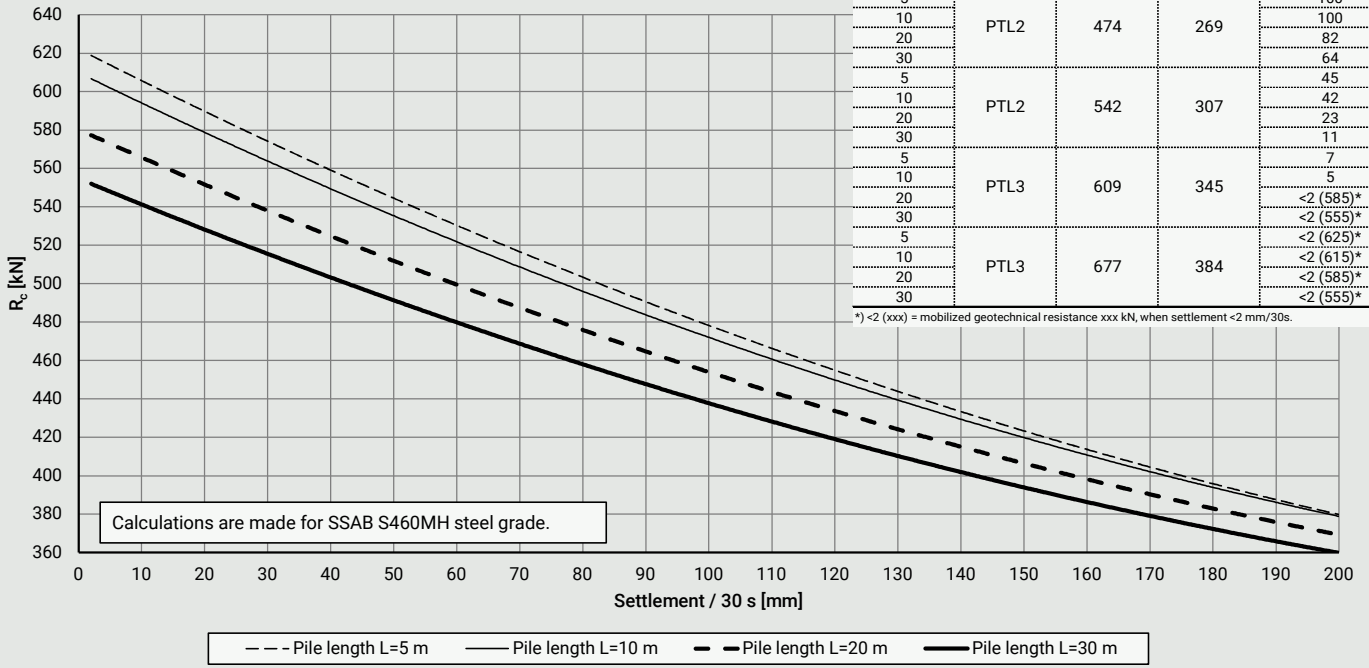


Hammer efficiency 80 %

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

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

Hammer HS700 - RR90

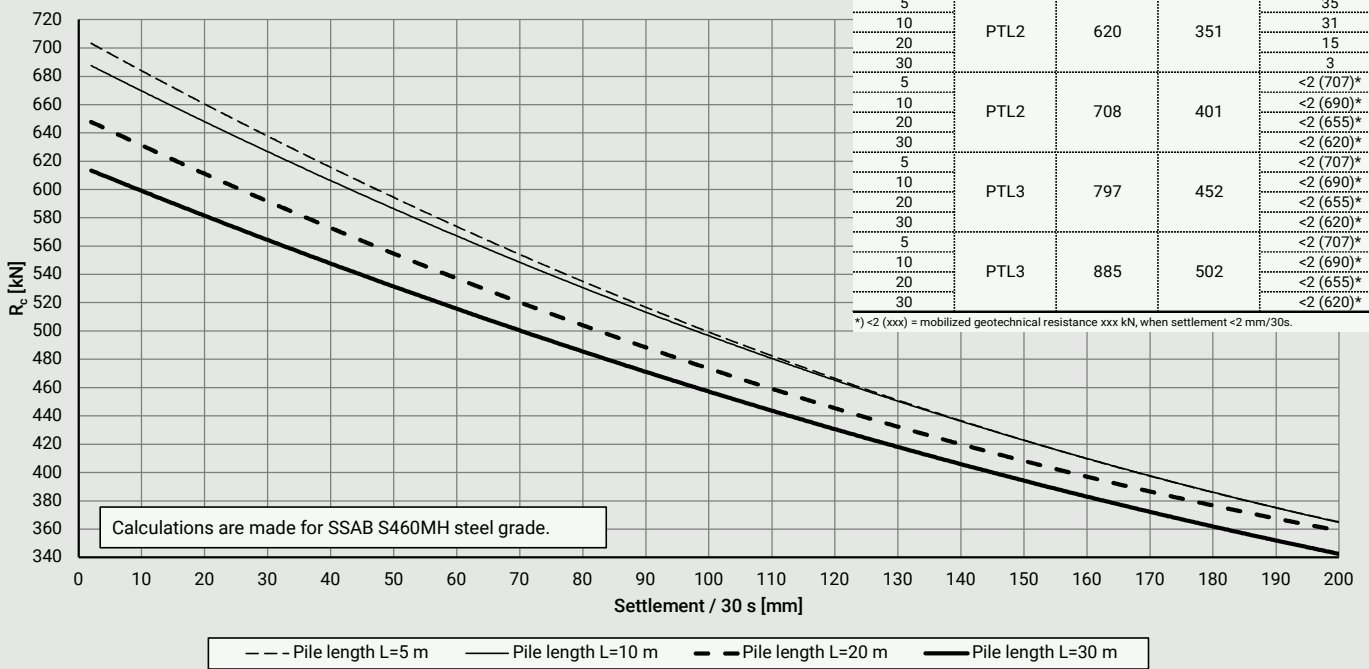


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5				83
10				80
20				62
30				47
5	PTL1	531	301	35
10				31
20				15
30				3
5	PTL2	620	351	<2 (707)*
10				<2 (690)*
20				<2 (655)*
30				<2 (620)*
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 - RR115/6.3

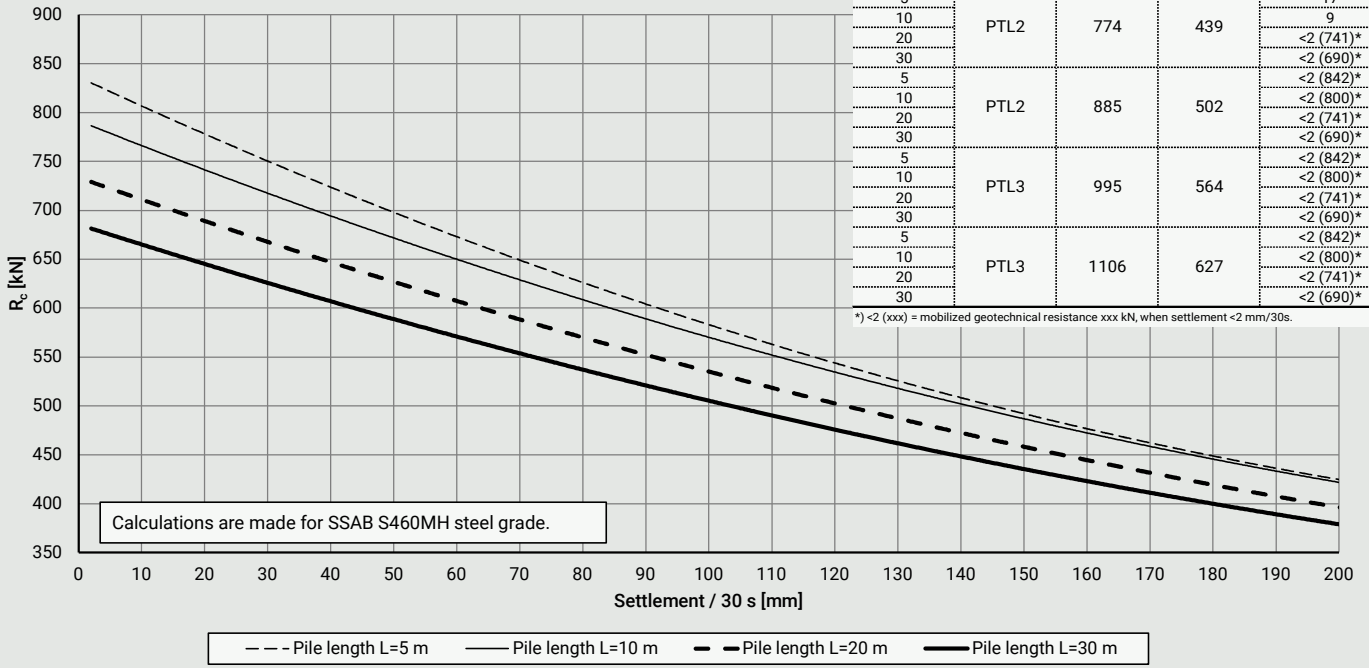


Hammer efficiency 80 %

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

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

Hammer HS700 - RR115/8

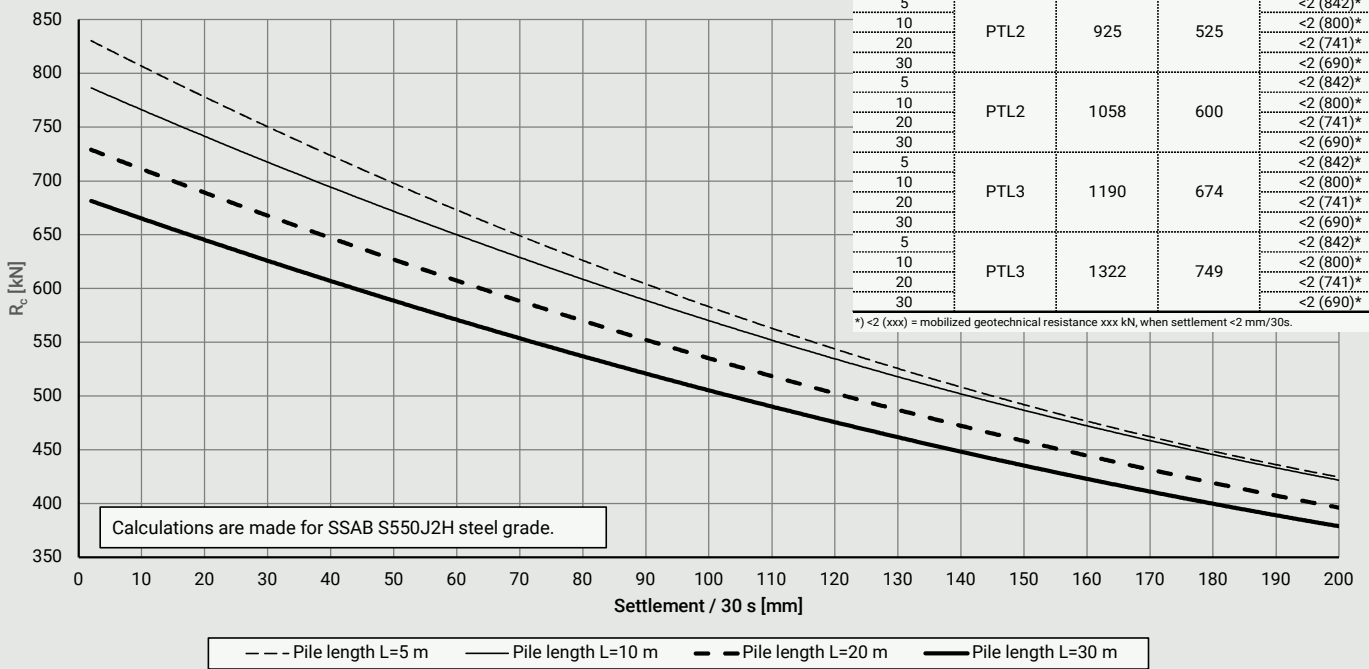


Hammer efficiency 80 %

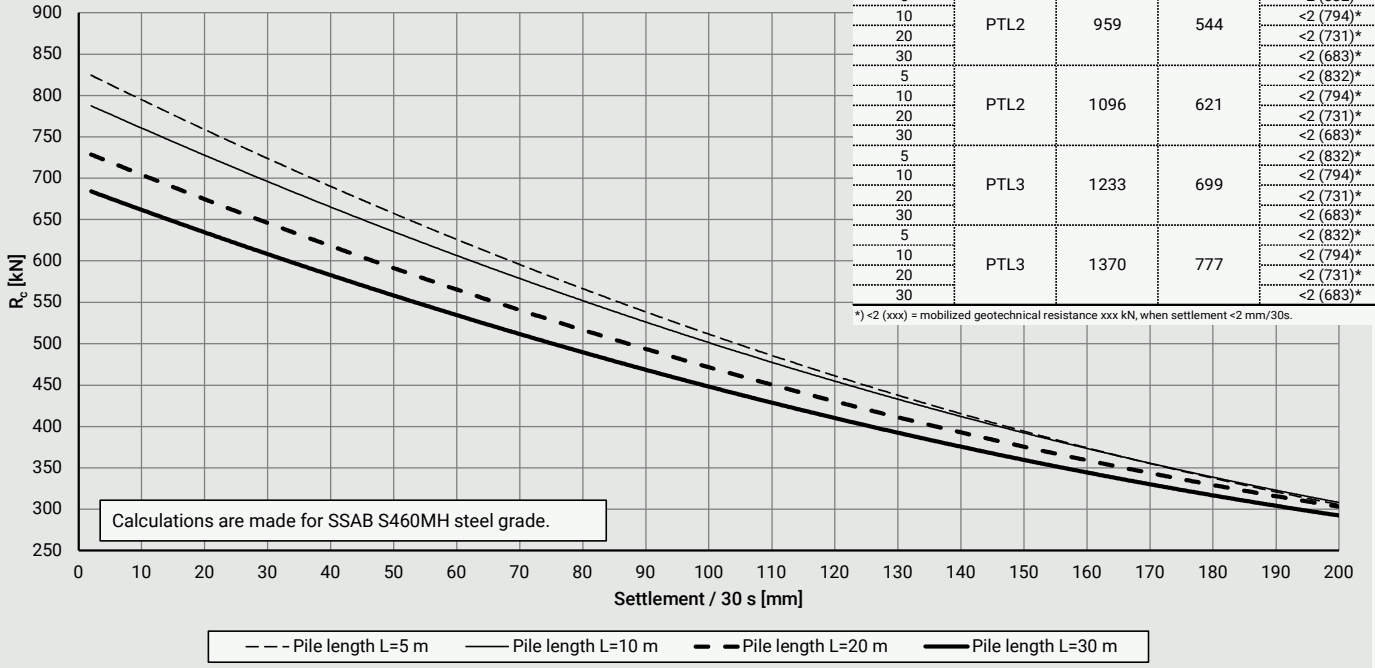
Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5				13
10				4
20				<2 (741)*
30				<2 (690)*
5				<2 (842)*
10				<2 (800)*
20	PTL1	793	450	<2 (741)*
30	PTL1	793	450	<2 (690)*
5				<2 (842)*
10				<2 (800)*
20	PTL2	925	525	<2 (741)*
30	PTL2	925	525	<2 (690)*
5				<2 (842)*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

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

Hammer HS700 - RRs115/8



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	PTL2	959	544	<2 (683)*
5				<2 (832)*
10				<2 (794)*
20	PTL2	1096	621	<2 (731)*
5				<2 (832)*
10				<2 (794)*
30	PTL3	1233	699	<2 (731)*
5				<2 (832)*
10				<2 (794)*
20	PTL3	1370	777	<2 (731)*
5				<2 (832)*
10				<2 (794)*
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

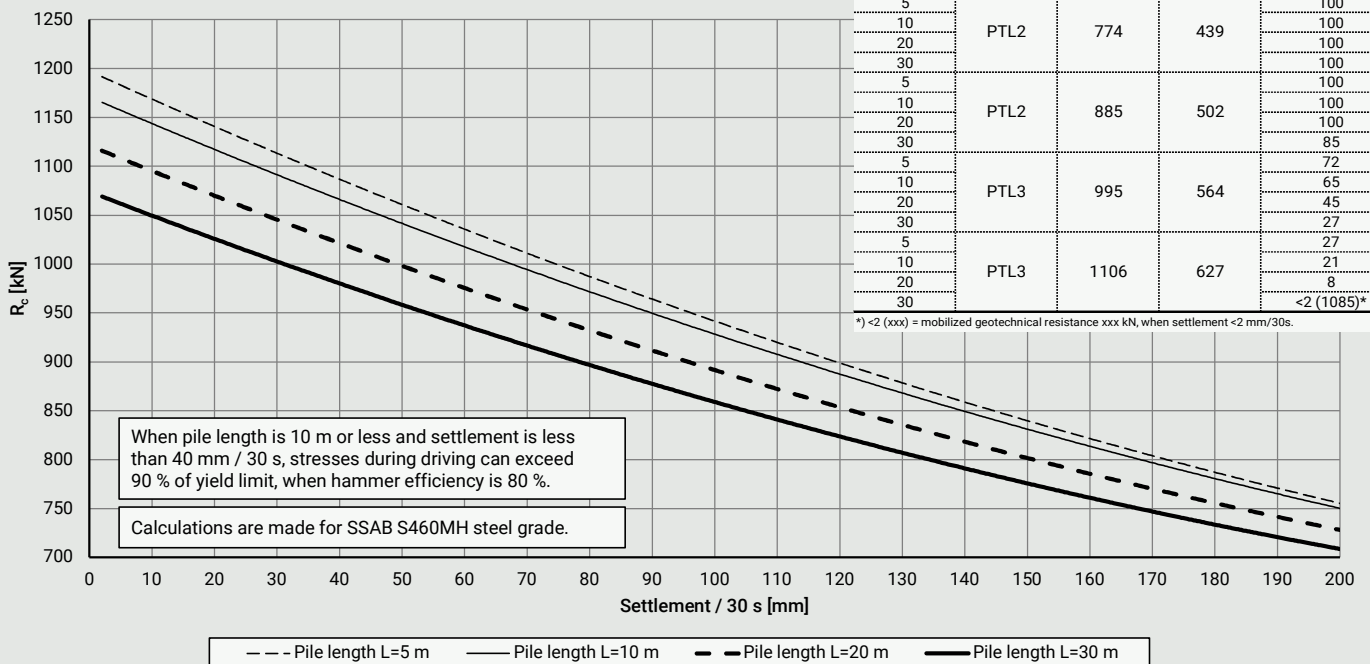
Diameter of the tool [mm]	D_t	135
Height of the tool [mm]	L_t	800
Tool weight [kg]	m_t	90

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) - RR115/8

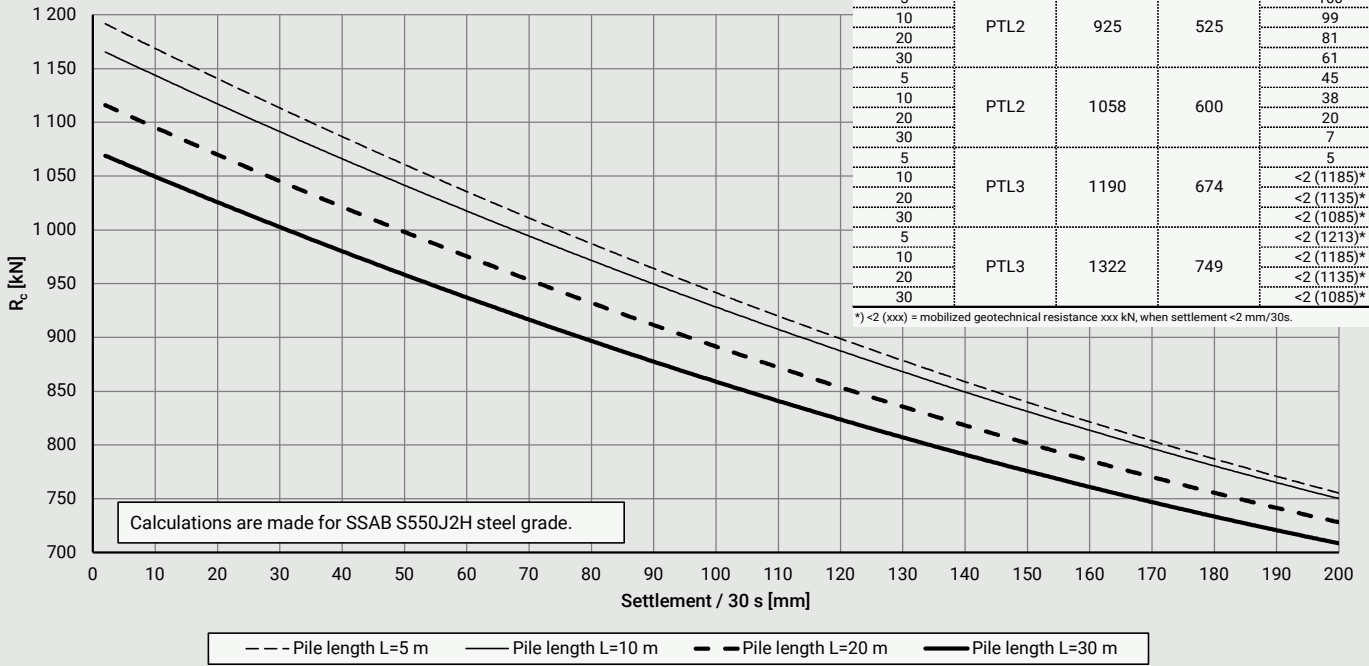


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5				100
10				100
20	PTL1	793	450	100
30				100
5				100
10	PTL2	925	525	99
20				81
30				61
5				45
10	PTL2	1058	600	38
20				20
30				7
5				5
10	PTL3	1190	674	<2 (1185)*
20				<2 (1135)*
30				<2 (1085)*
5				<2 (1213)*
10	PTL3	1322	749	<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) - RR115/8

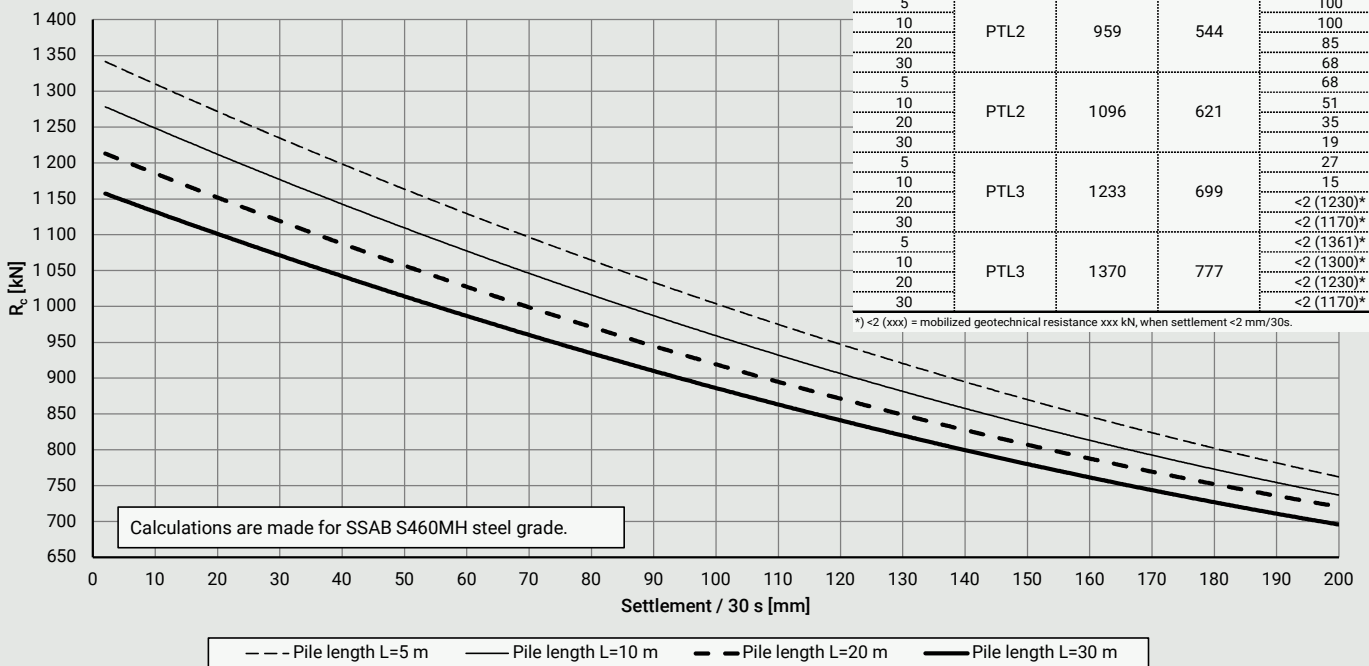


Hammer efficiency 80 %

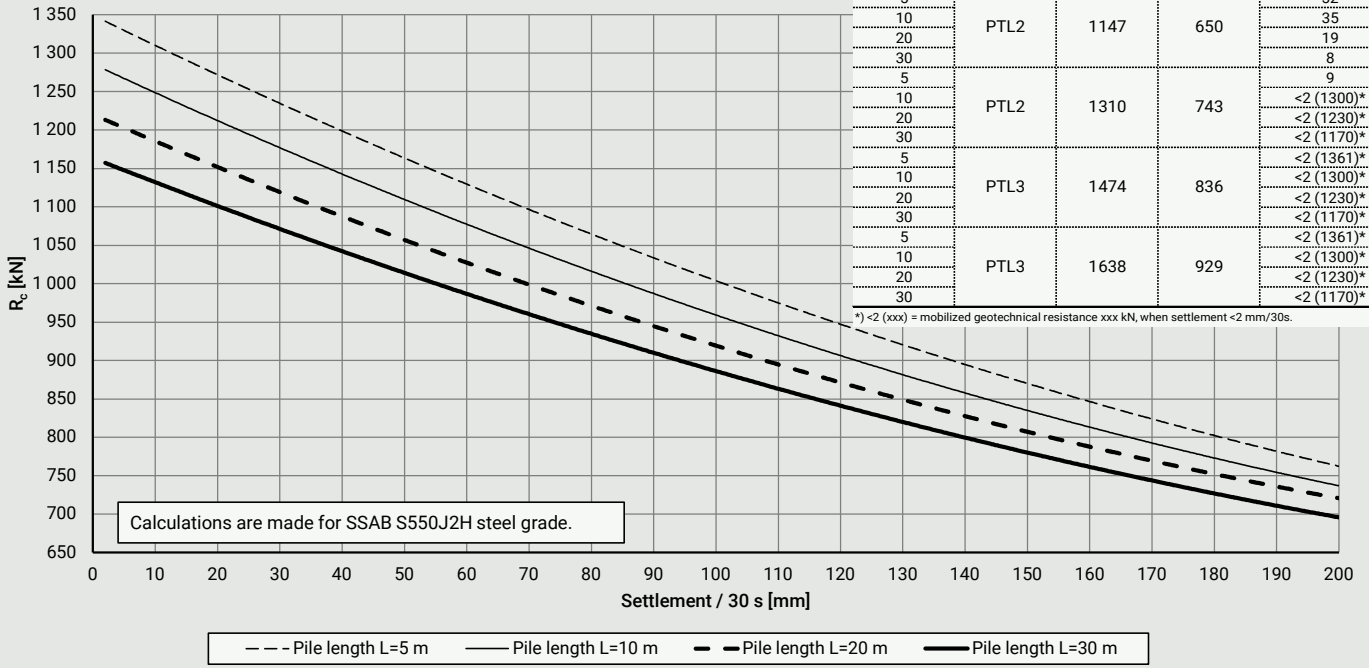
Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5				100
10				100
20	PTL1	822	466	100
30				100
5				100
10	PTL2	959	544	100
20				85
30				68
5				68
10	PTL2	1096	621	51
20				35
30				19
5				27
10	PTL3	1233	699	15
20				<2 (1230)*
30				<2 (1170)*
5				<2 (1361)*
10	PTL3	1370	777	<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) - RR140/8



General Breaker GB8 (AT/AF) - RR_s140/8

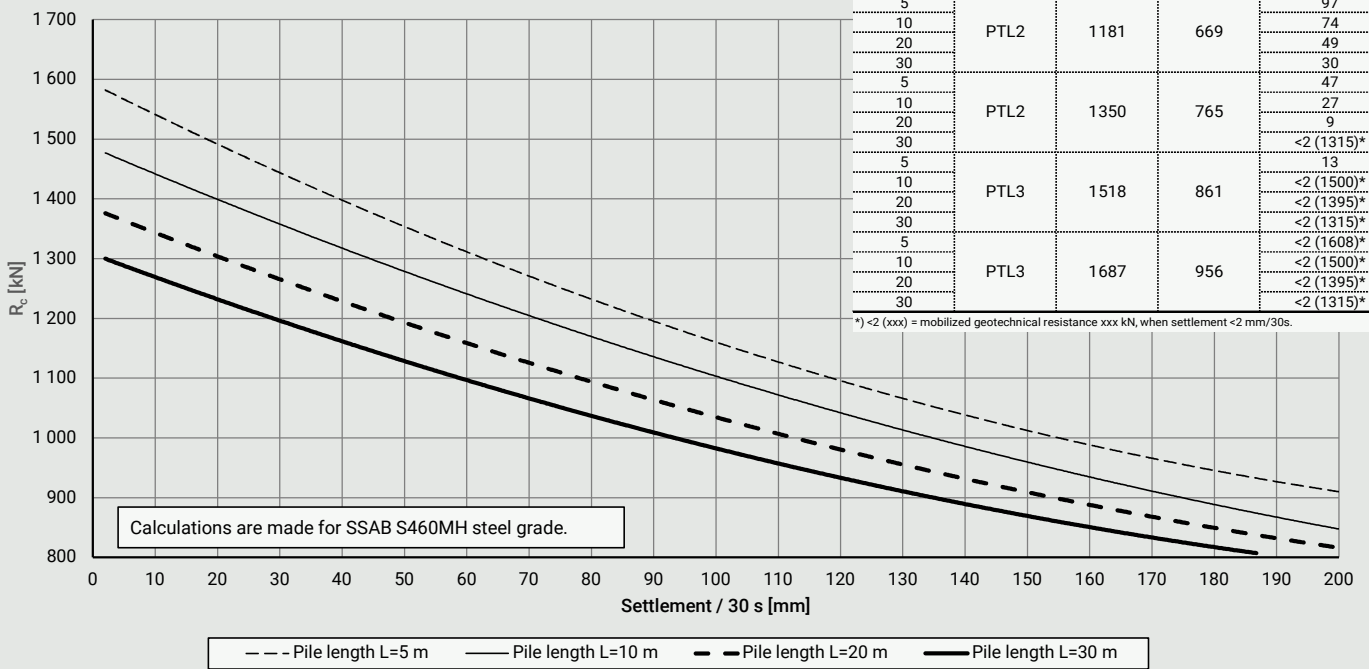


Hammer efficiency 80 %

Pile length [m]	Piling work class	R _c [kN]	R _d [kN]	Settlement / 30 s [mm]
5				100
10				92
20				76
30				59
5				52
10	PTL1	983	557	35
20				19
30				8
5				9
10	PTL2	1147	650	<2 (1300)*
20				<2 (1230)*
30				<2 (1170)*
5				<2 (1361)*
10	PTL3	1474	836	<2 (1300)*
20				<2 (1230)*
30				<2 (1170)*
5				<2 (1361)*
10	PTL3	1638	929	<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) - RR_s140/10

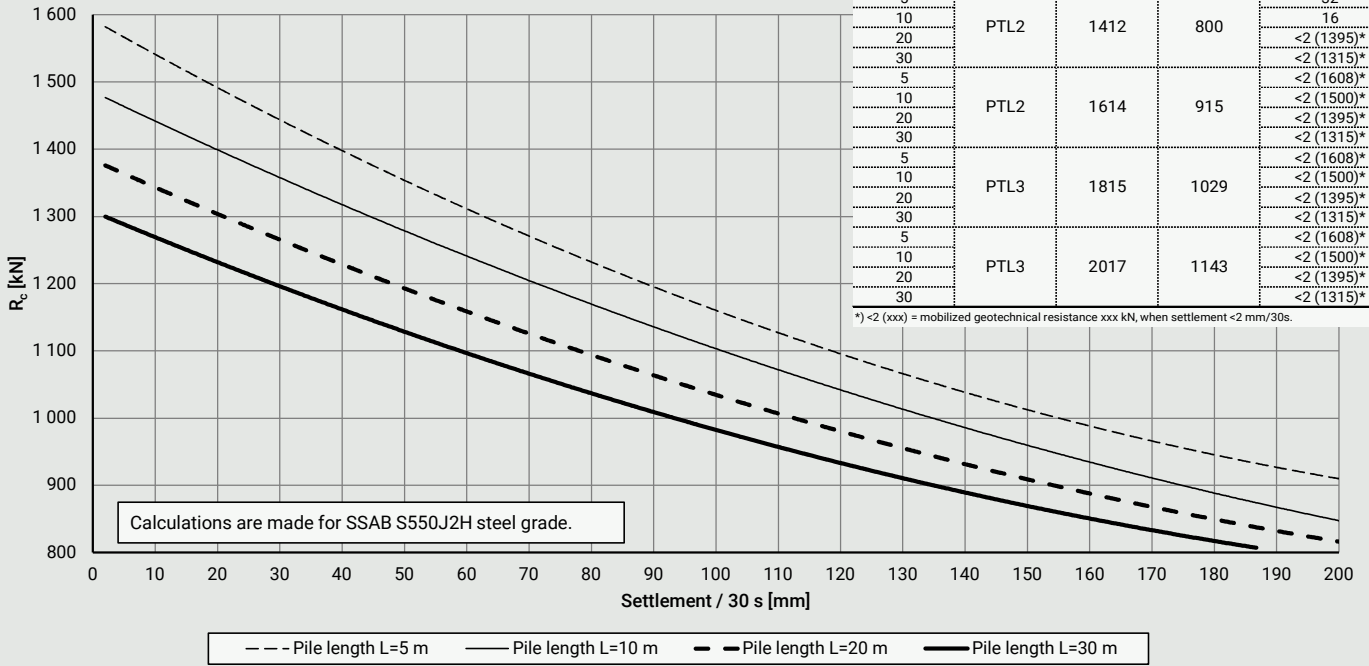


Hammer efficiency 80 %

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

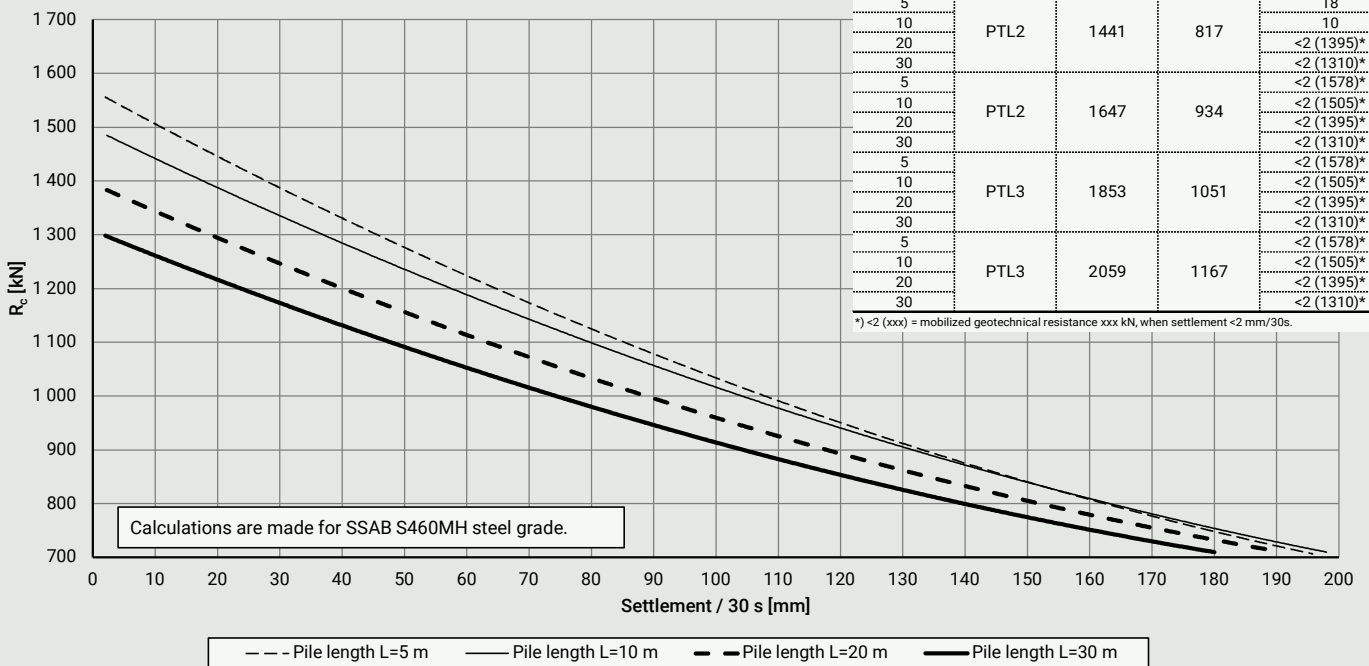


Hammer efficiency 80 %

Pile length [m]	Piling work class	R _c [kN]	R _d [kN]	Settlement / 30 s [mm]
5				88
10				65
20				40
30				22
5				32
10				16
20	PTL1	1210	686	<2 (1395)*
30				<2 (1315)*
5				<2 (1608)*
10				<2 (1500)*
20	PTL2	1412	800	<2 (1395)*
30				<2 (1315)*
5				<2 (1608)*
10				<2 (1500)*
20	PTL2	1614	915	<2 (1395)*
30				<2 (1315)*
5				<2 (1608)*
10				<2 (1500)*
20	PTL3	1815	1029	<2 (1395)*
30				<2 (1315)*
5				<2 (1608)*
10				<2 (1500)*
20	PTL3	2017	1143	<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				56
10				48
20				30
30				15
5				18
10				10
20				<2 (1395)*
30				<2 (1310)*
5				<2 (1578)*
10				<2 (1505)*
20				<2 (1395)*
30				<2 (1310)*
5				<2 (1578)*
10				<2 (1505)*
20				<2 (1395)*
30				<2 (1310)*
5				<2 (1578)*
10				<2 (1505)*
20				<2 (1395)*
30				<2 (1310)*
5				<2 (1578)*
10				<2 (1505)*
20				<2 (1395)*
30				<2 (1310)*

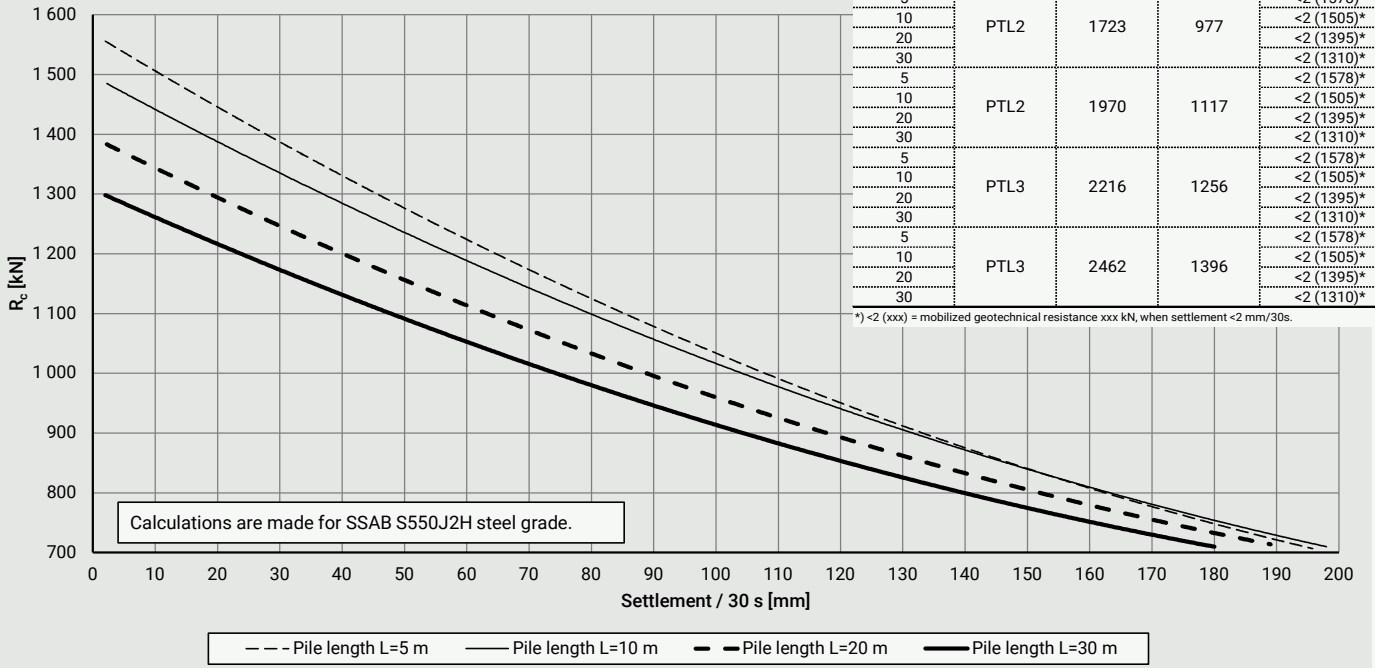
*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

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.

General Breaker GB8 (AT/AF) - RR_s170/10



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

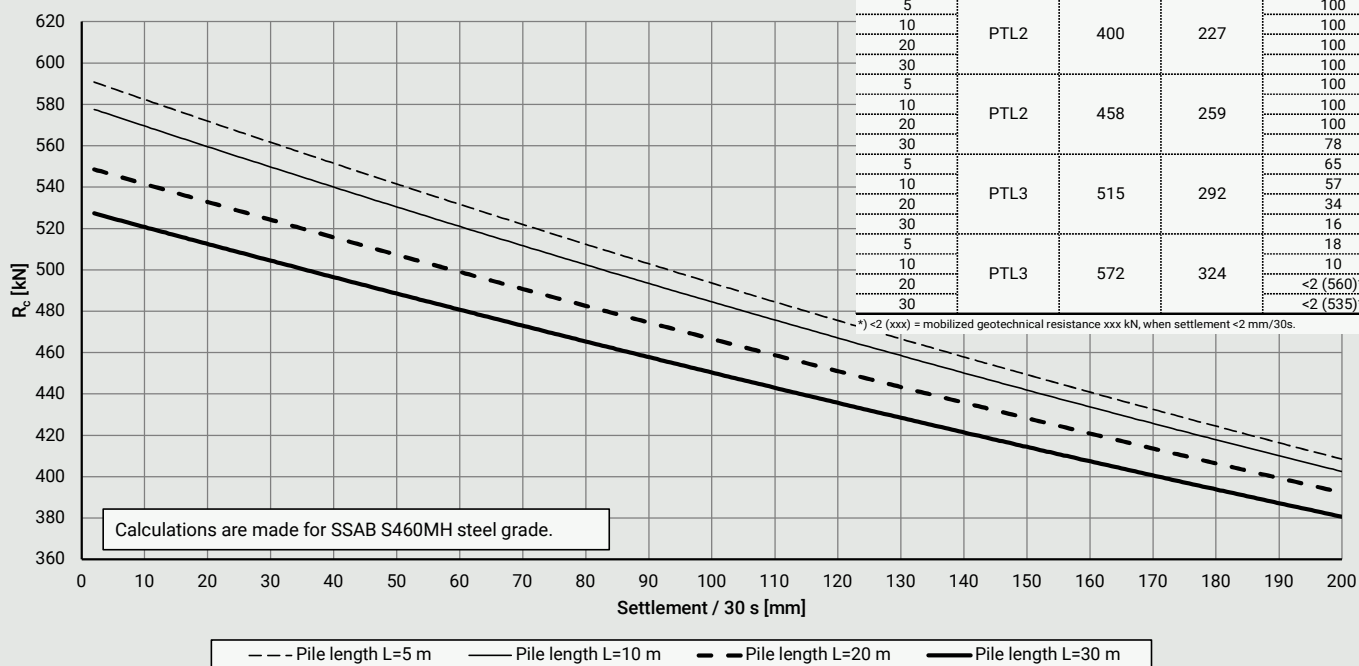
Diameter of the tool [mm]	D_t	105
Height of the tool [mm]	L_t	800
Tool weight [kg]	m_t	50

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	16
10				65
20				57
30				34
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 - RR75

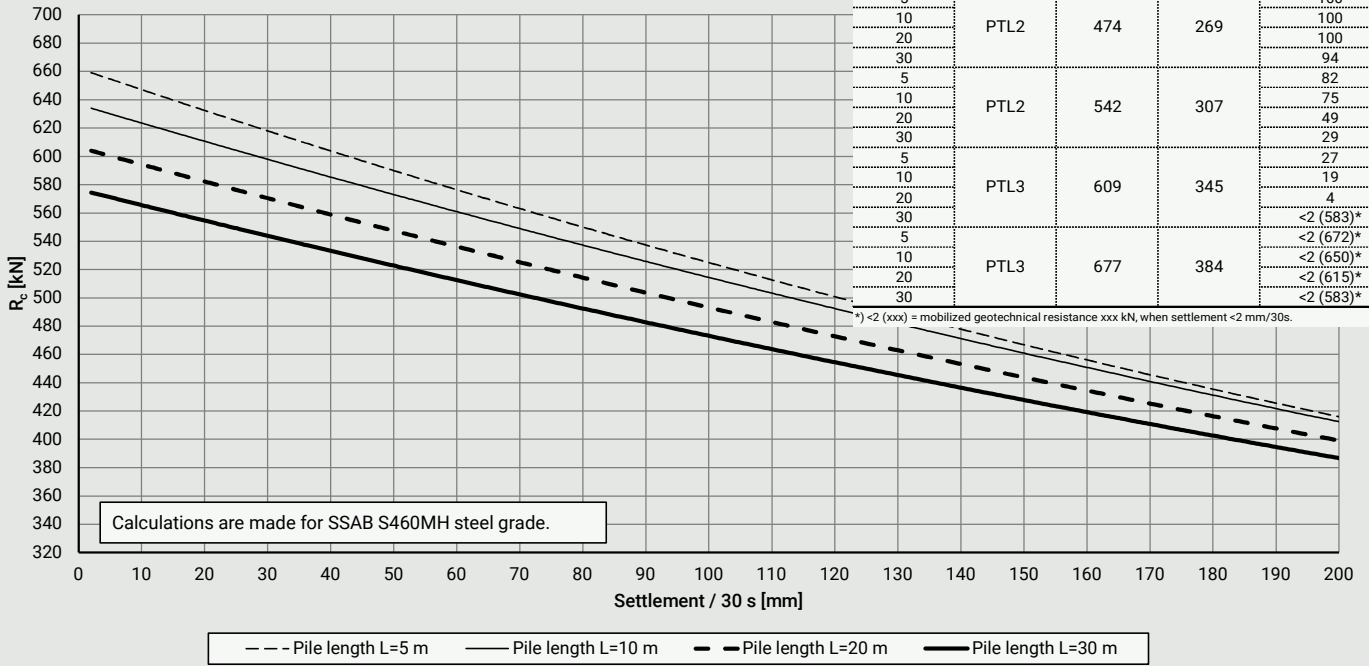


Hammer efficiency 80 %

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

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

D&A 130V - RR90

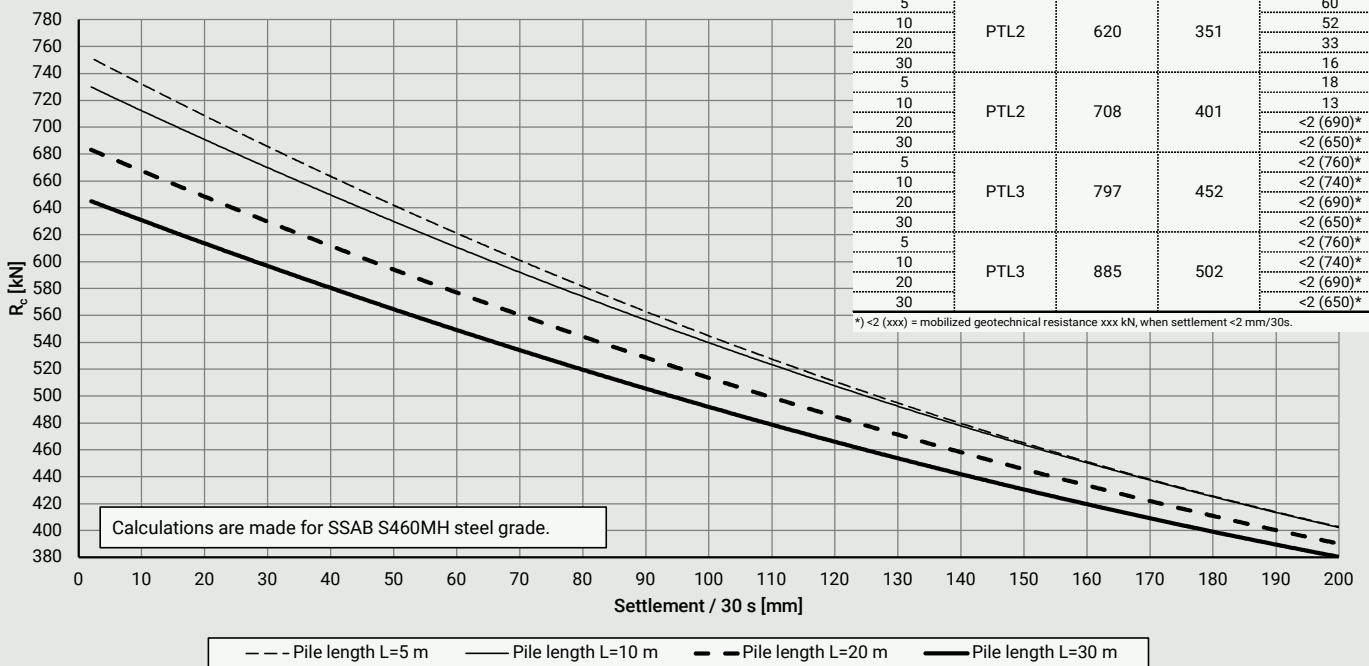


Hammer efficiency 80 %

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

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

D&A 130V - RR115/6.3

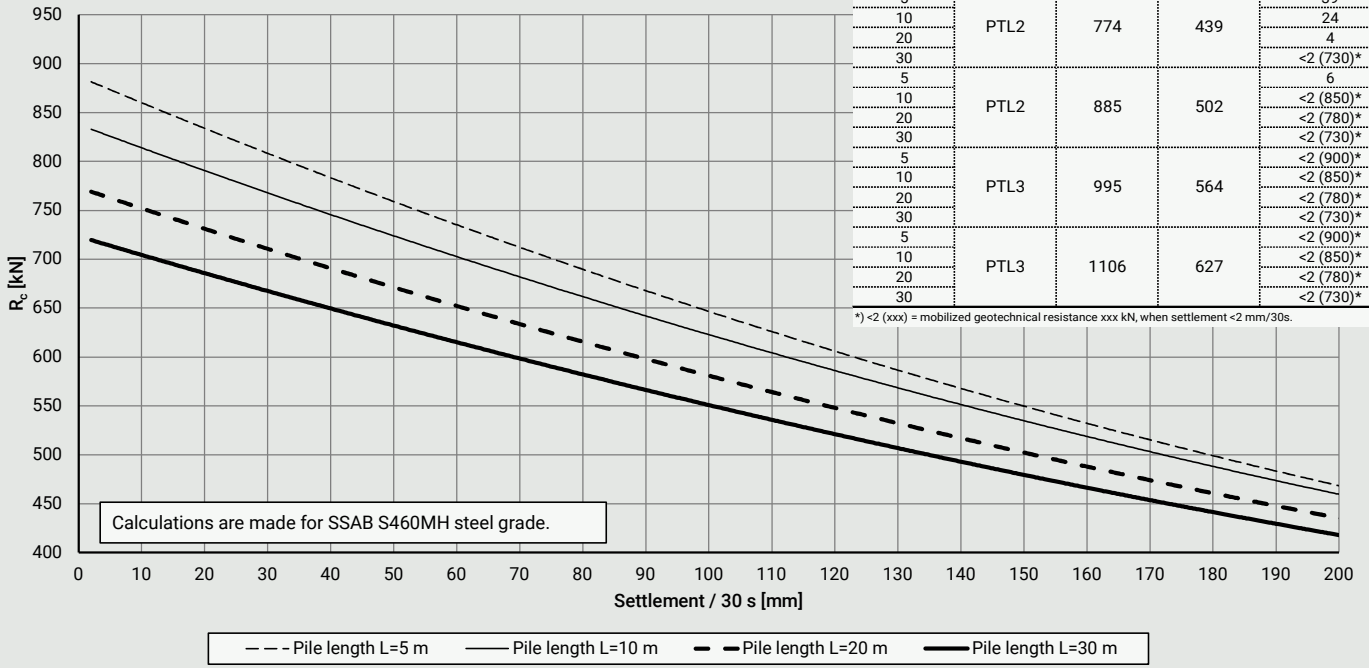


Hammer efficiency 80 %

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

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

D&A 130V - RR115/8

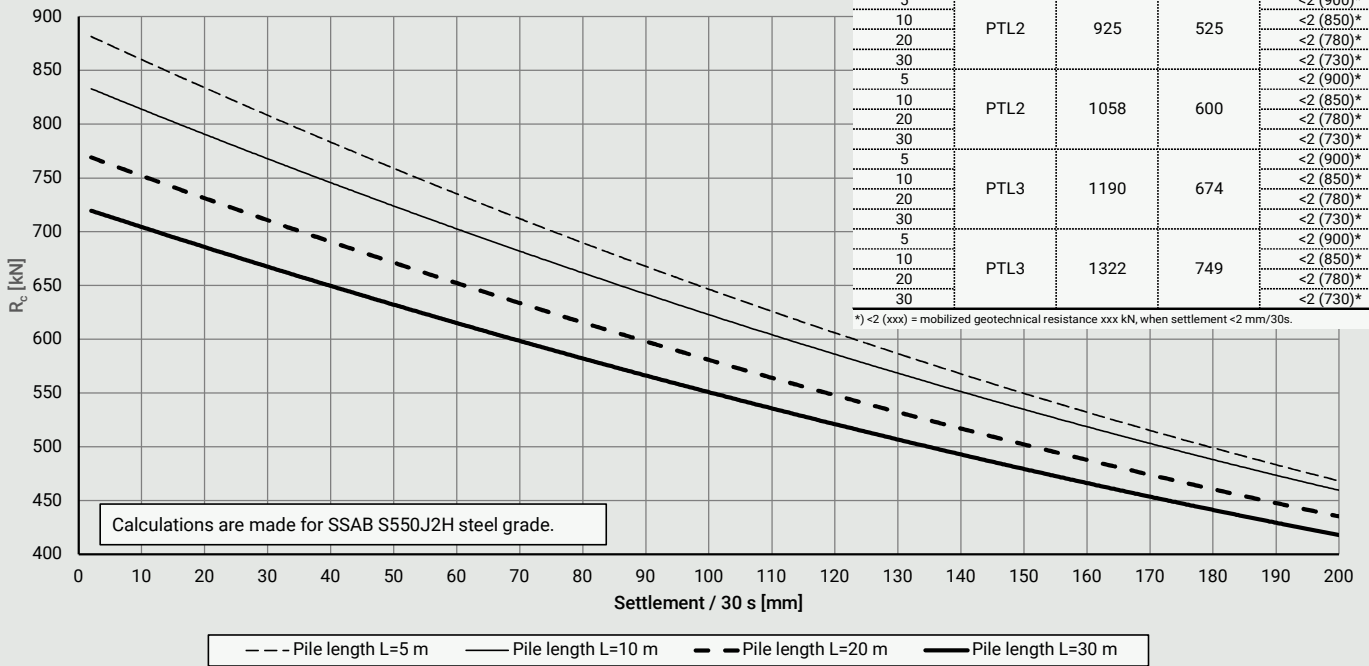


Hammer efficiency 80 %

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

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

D&A 130V - RRs115/8

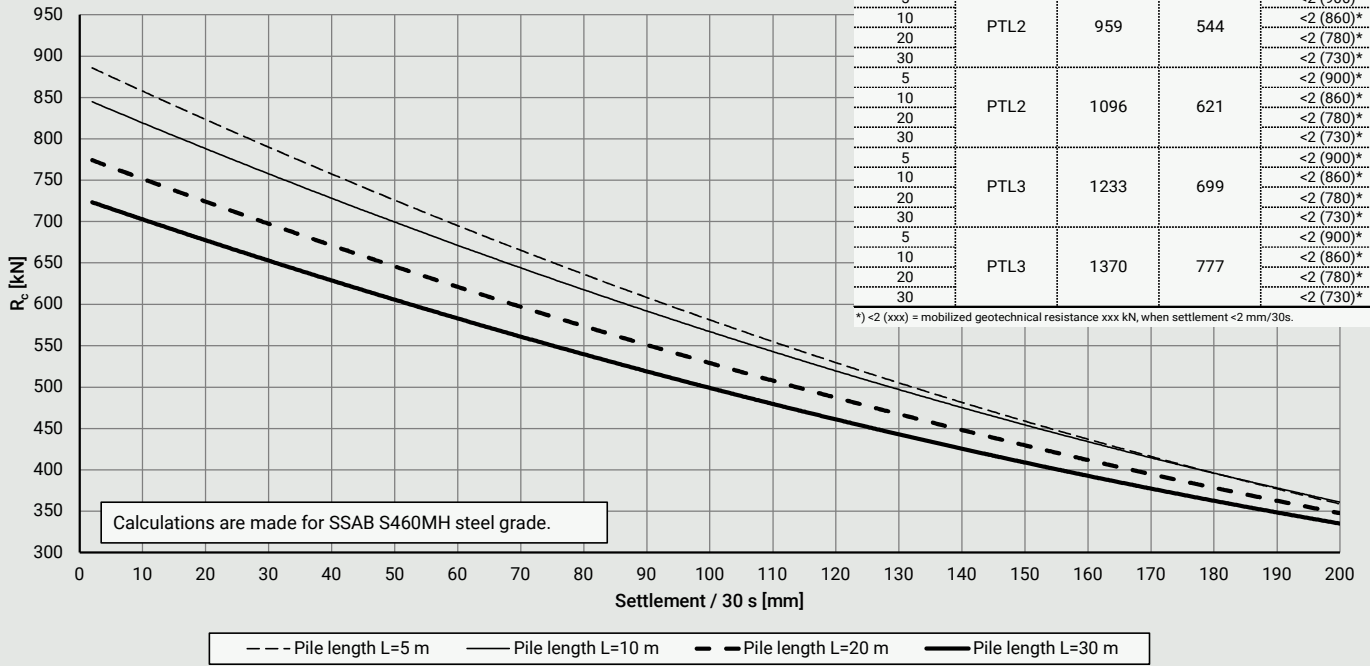


Hammer efficiency 80 %

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

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

D&A 130V - RR140/8

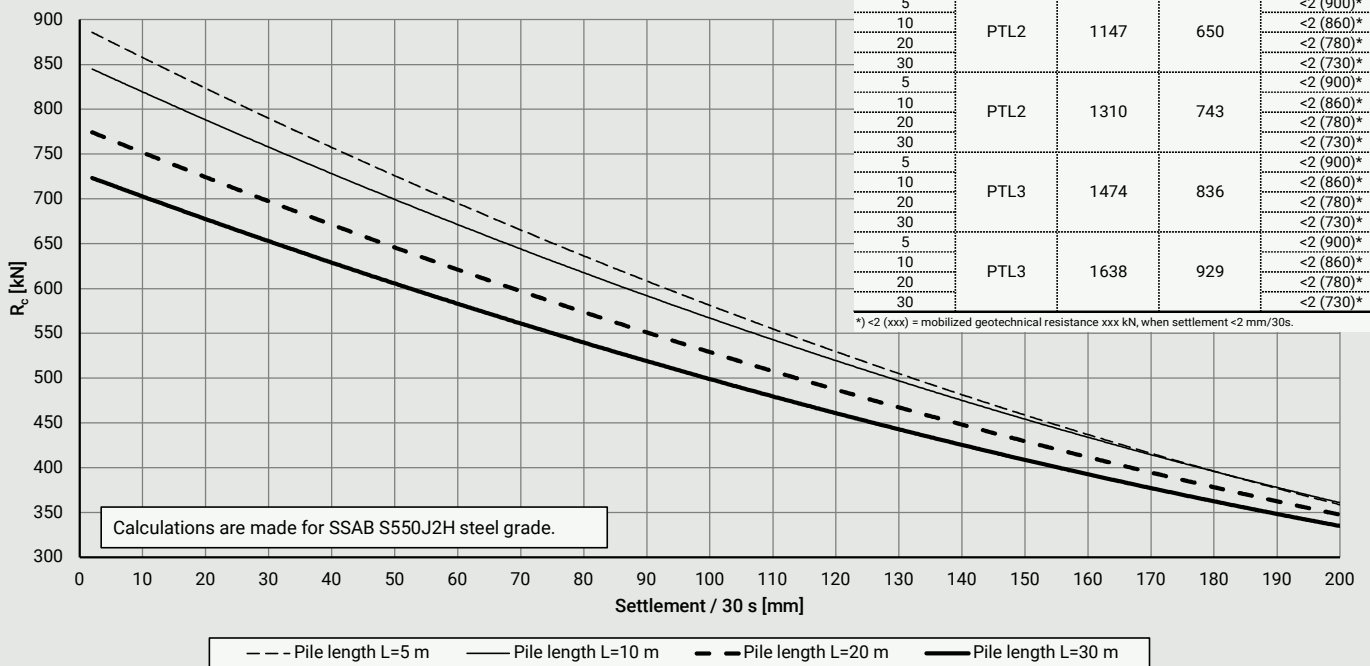


Hammer efficiency 80 %

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

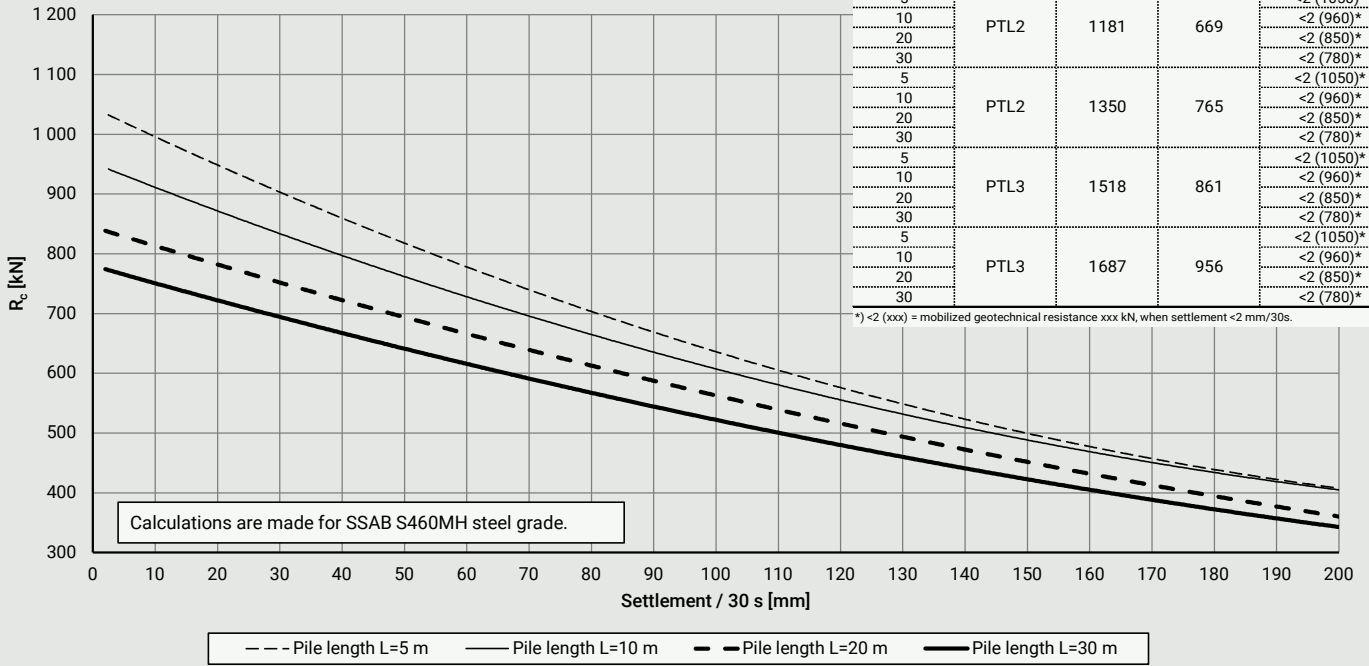


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5				8
10	PTL1	1012	574	<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 - RR140/10

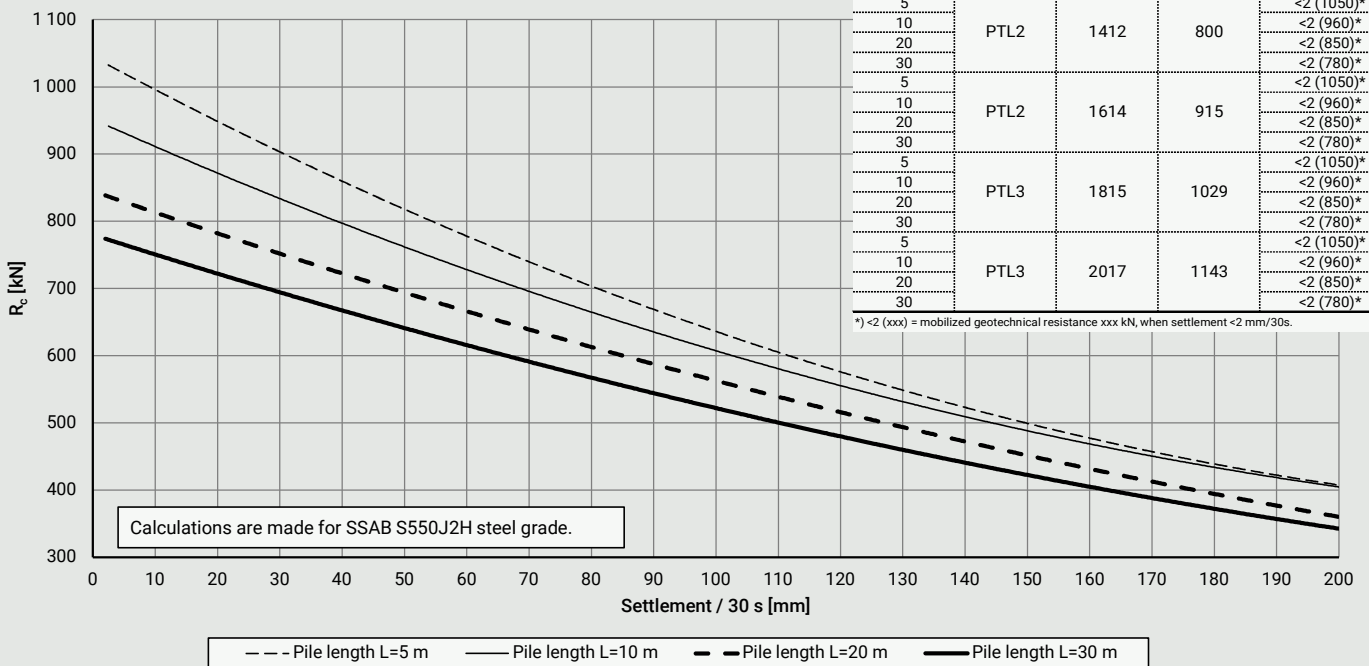


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5				<2 (1050)*
10	PTL1	1210	686	<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 130V - RRs140/10



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

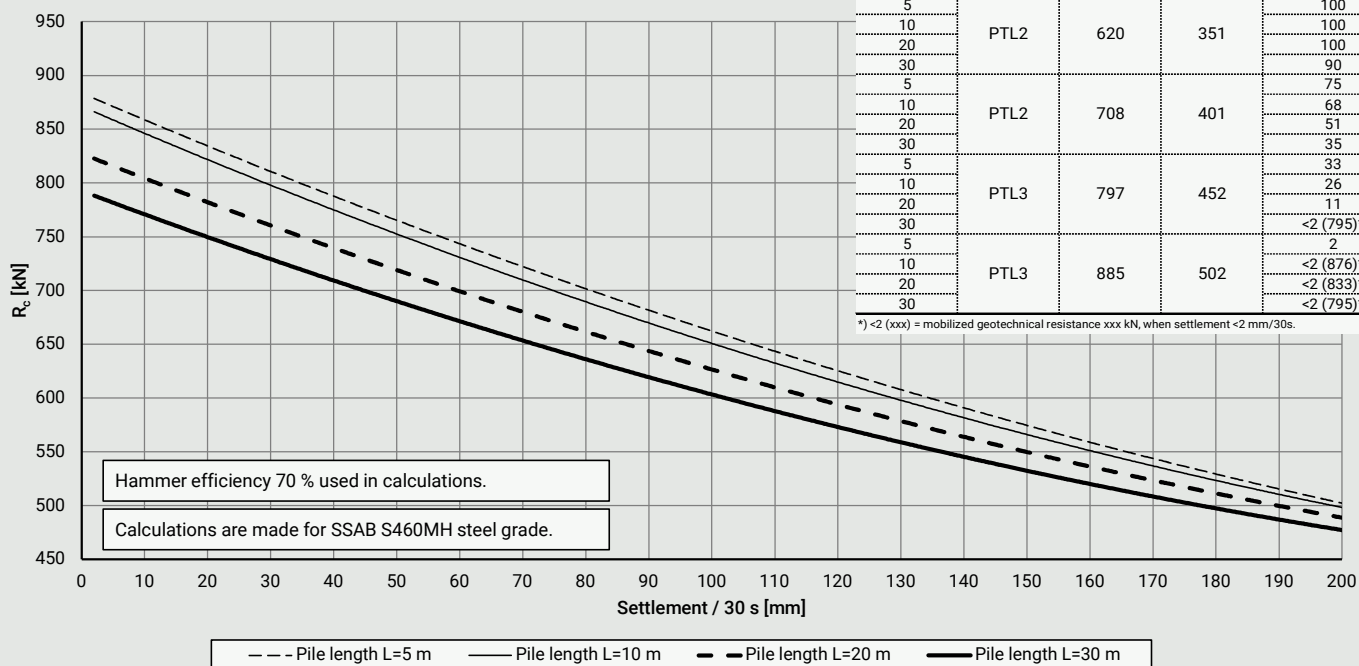
Diameter of the tool [mm]	D_t	115
Height of the tool [mm]	L_t	800
Tool weight [kg]	m_t	65

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 - RR115/6.3

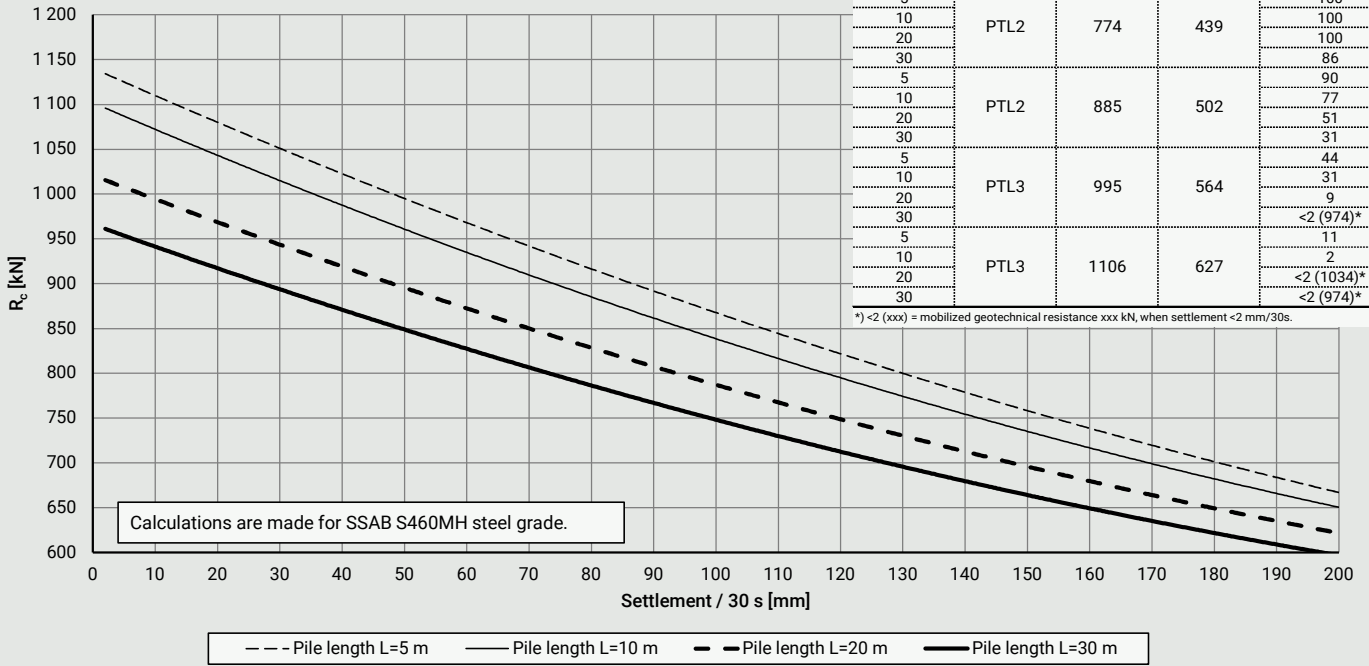


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5				100
10				100
20				100
30				100
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 - RR115/8

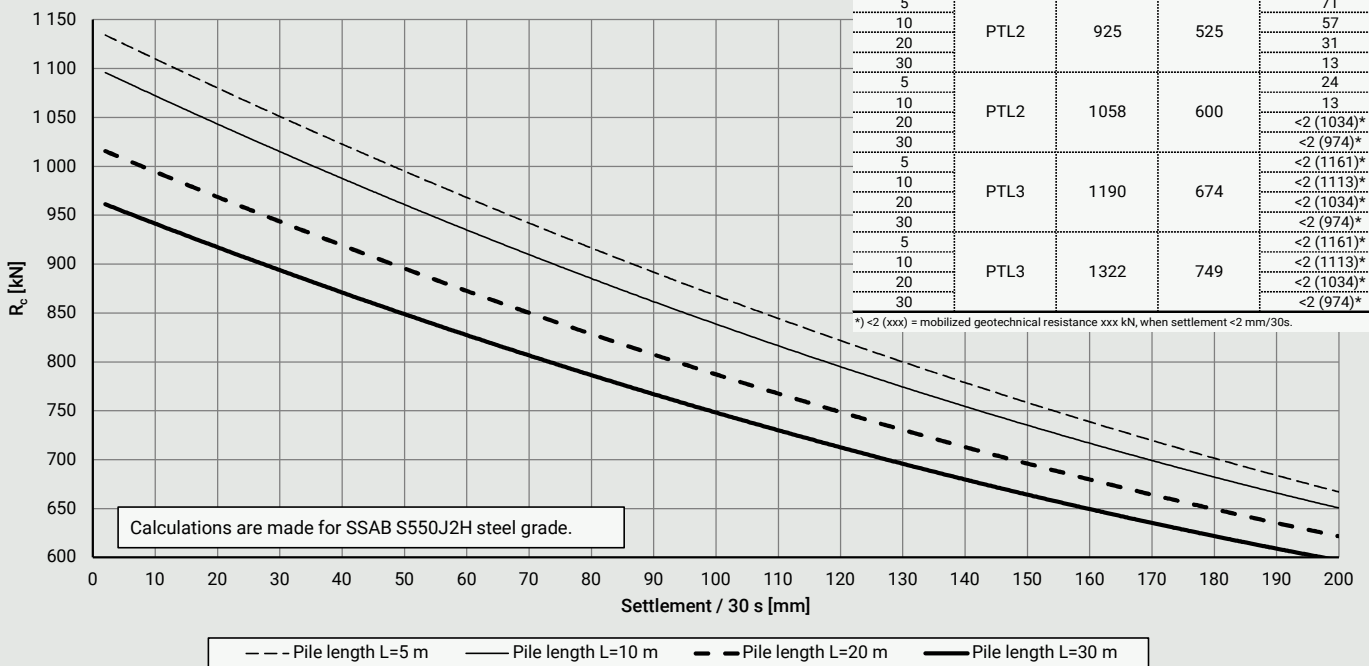


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5				100
10				100
20				97
30				75
5	PTL1	793	450	71
10				57
20				31
30				13
5	PTL2	925	525	24
10				13
20				<2 (1034)*
30				<2 (974)*
5	PTL2	1058	600	<2 (1161)*
10				<2 (1113)*
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 - RRs115/8

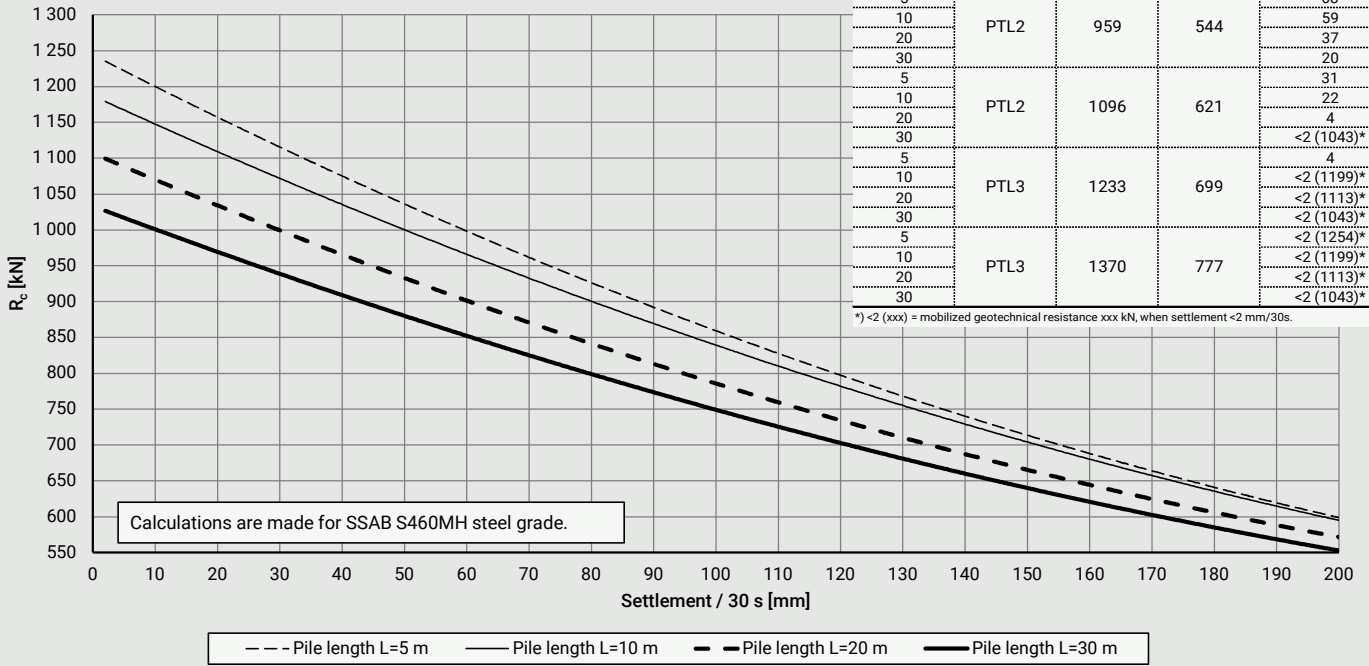


Hammer efficiency 80 %

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

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

D&A 150V - RR140/8

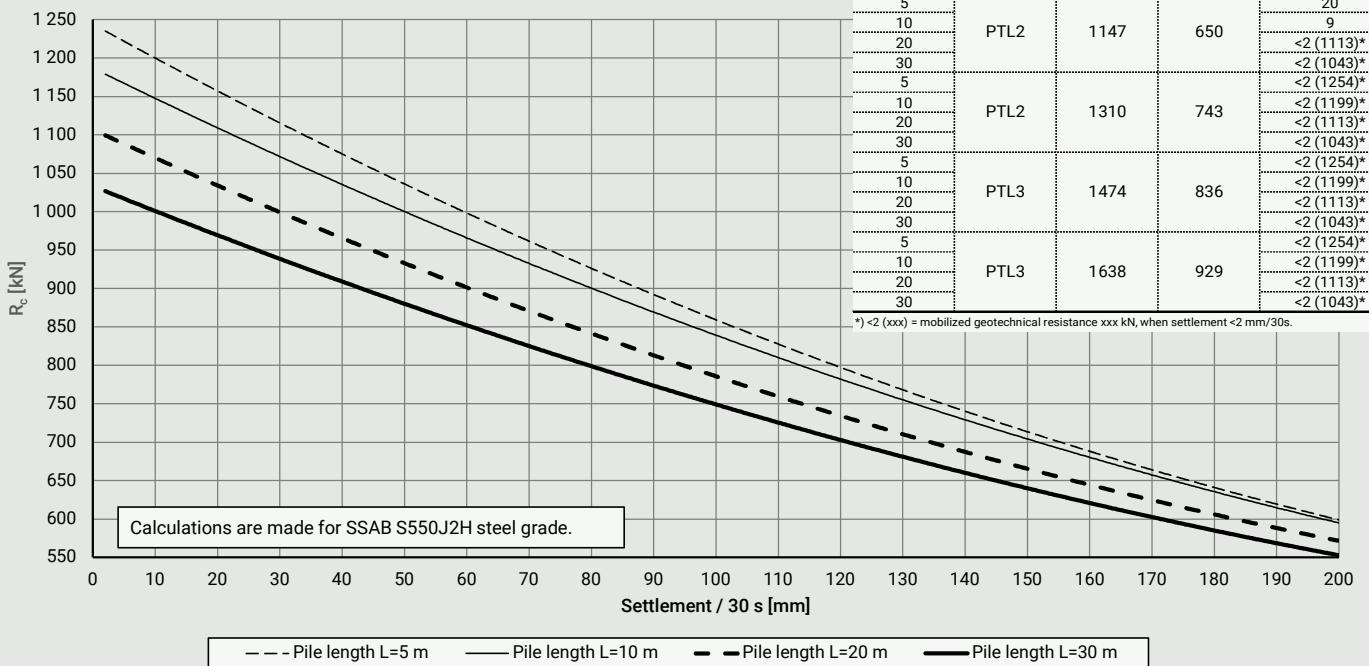


Hammer efficiency 80 %

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

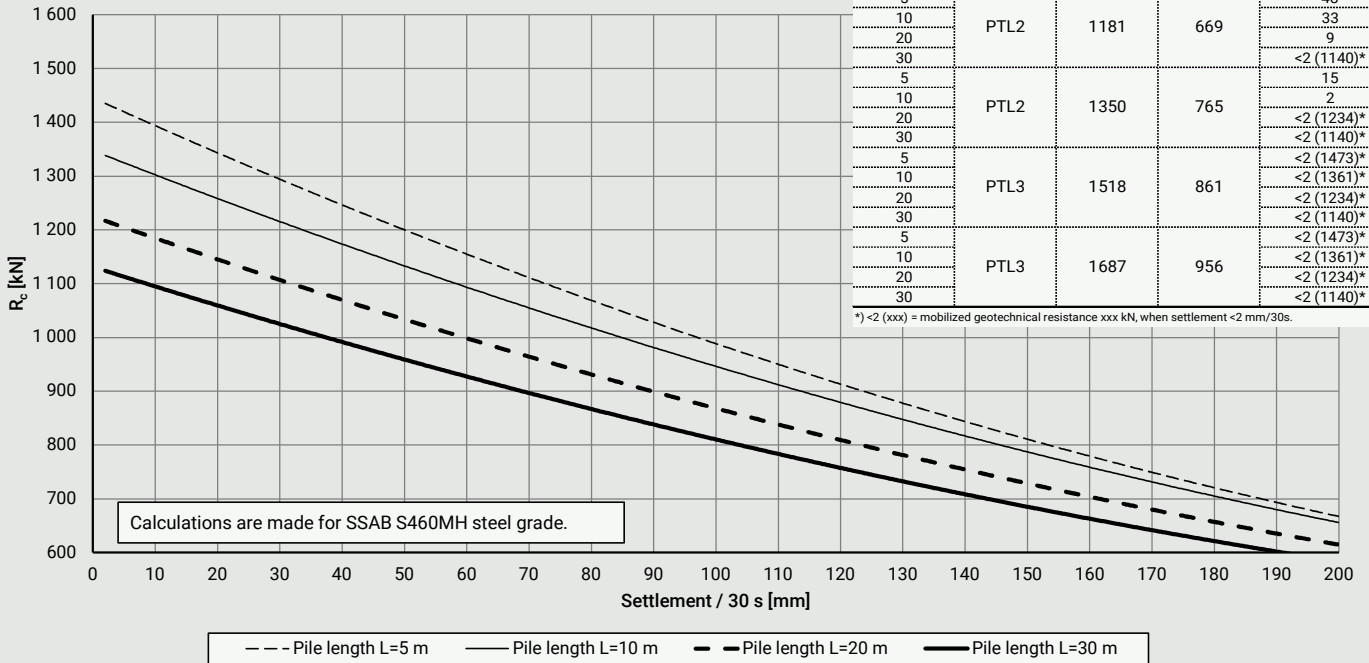


Hammer efficiency 80 %

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

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

D&A 150V - RR140/10

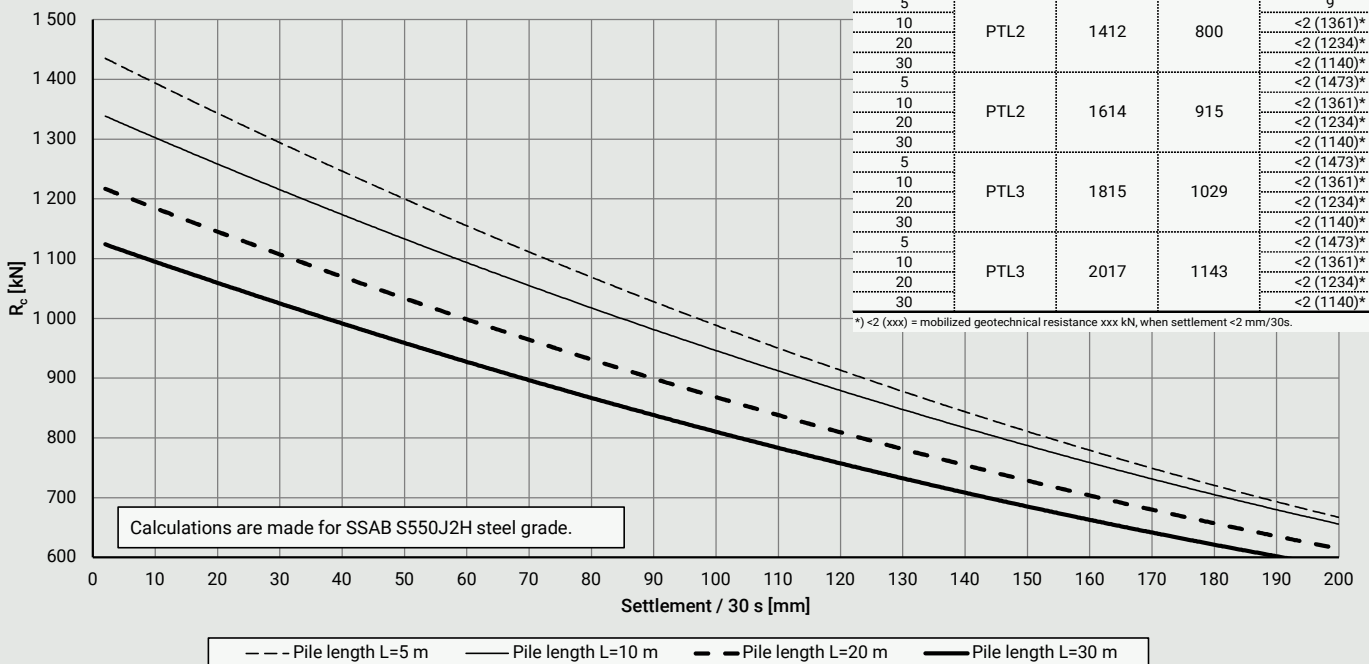


Hammer efficiency 80 %

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



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

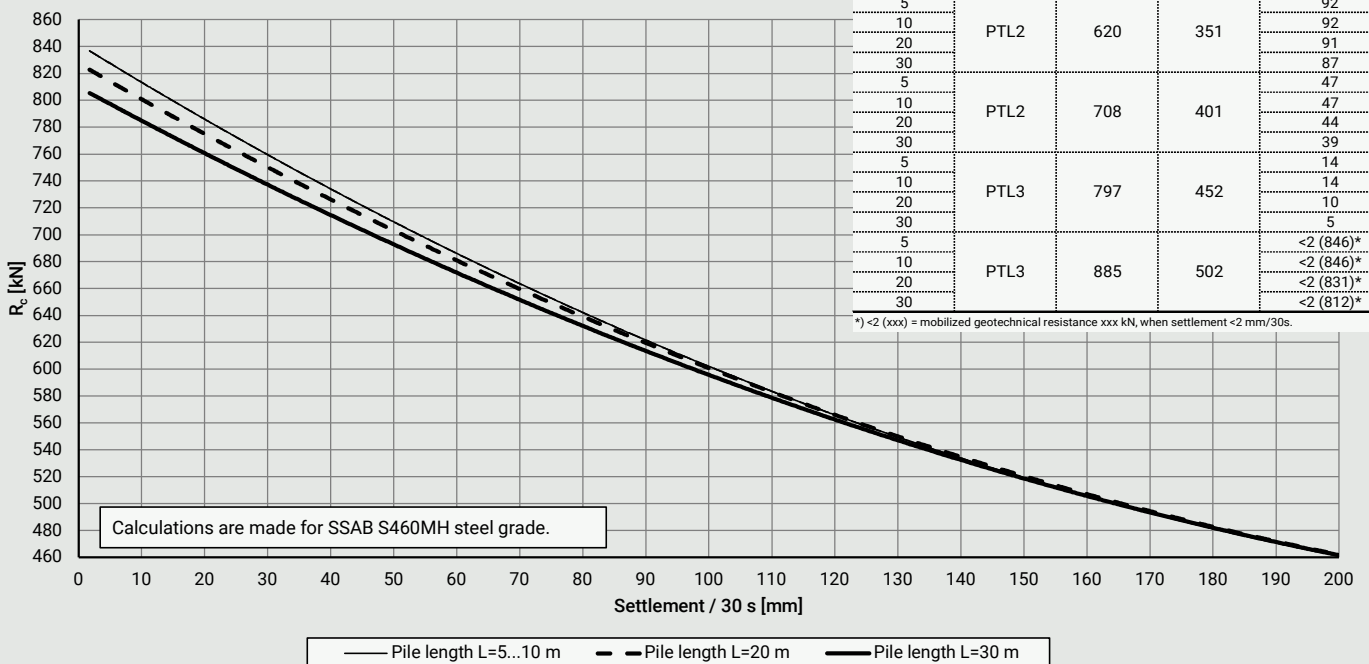
Diameter of the tool [mm]	D_t	140
Height of the tool [mm]	L_t	900
Tool weight [kg]	m_t	110

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

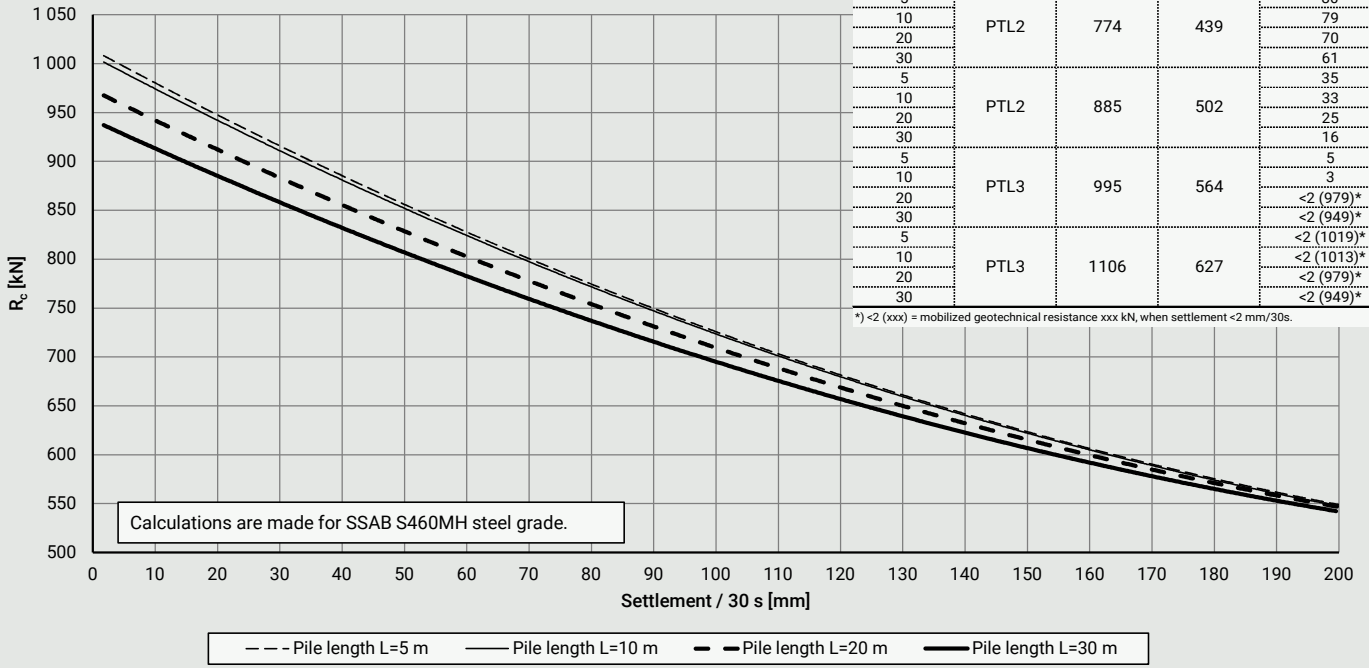


Hammer efficiency 80 %

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

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

D&A 180V - RR115/8

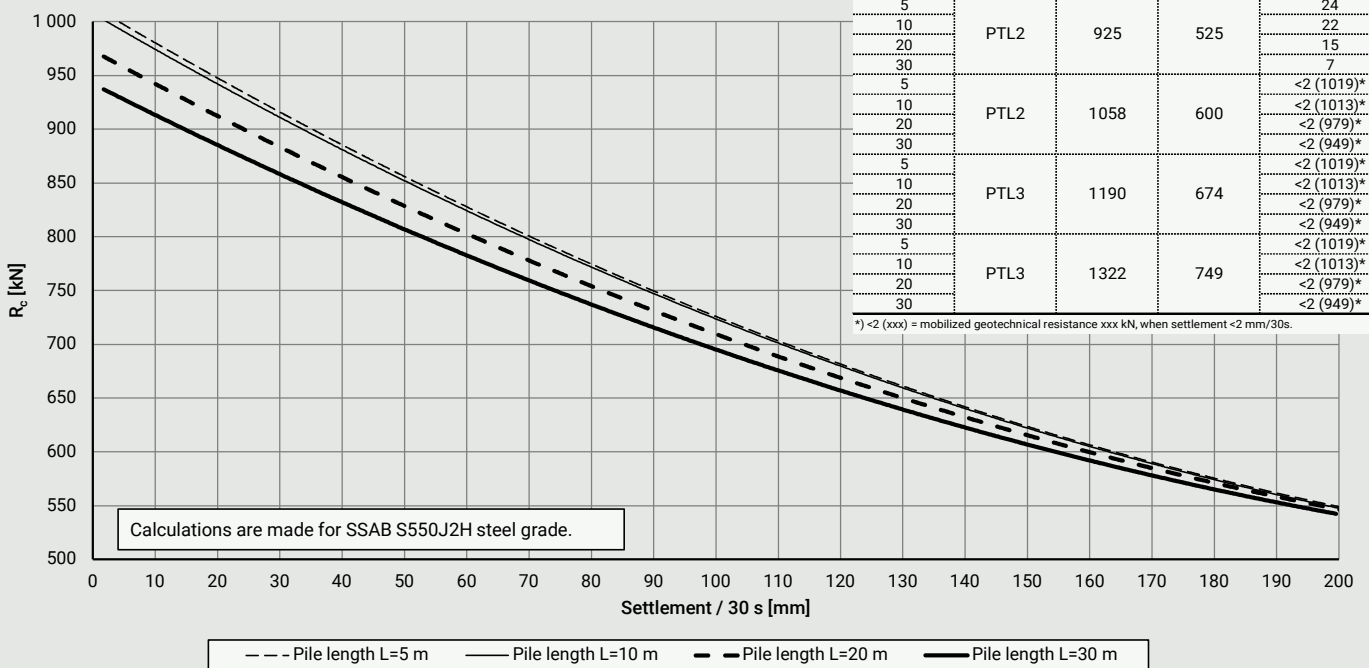


Hammer efficiency 80 %

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

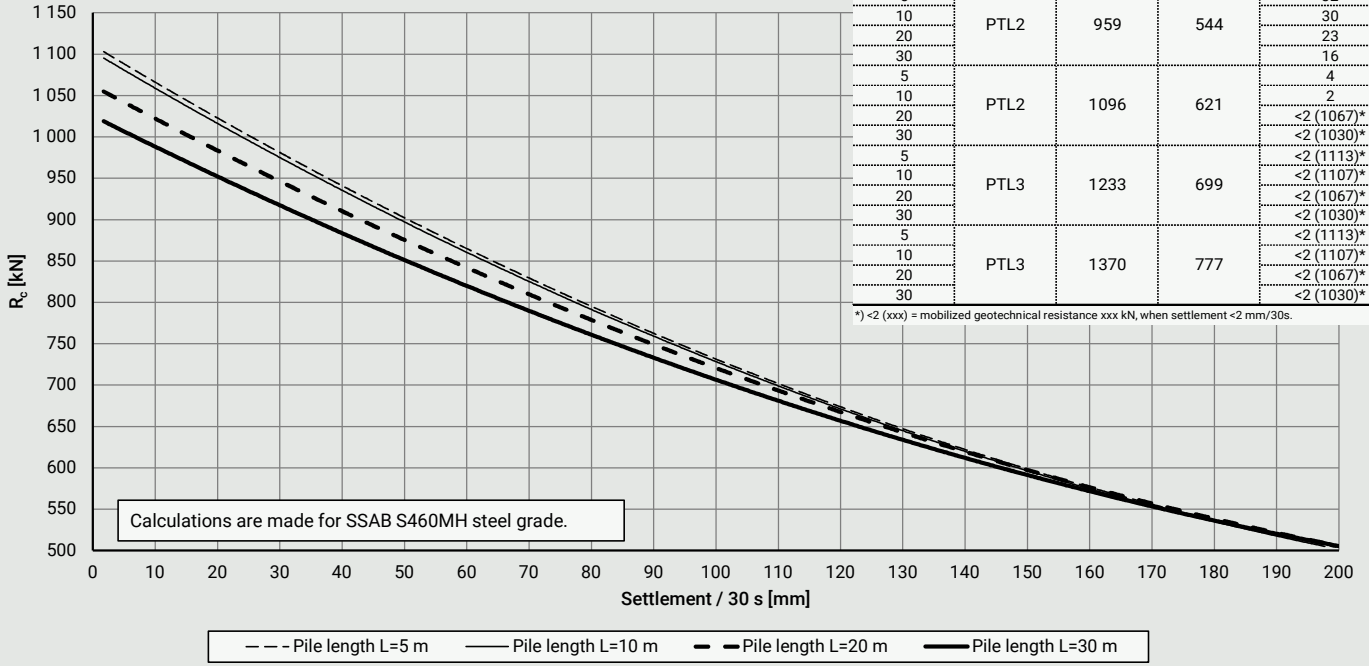


Hammer efficiency 80 %

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

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

D&A 180V - RR140/8

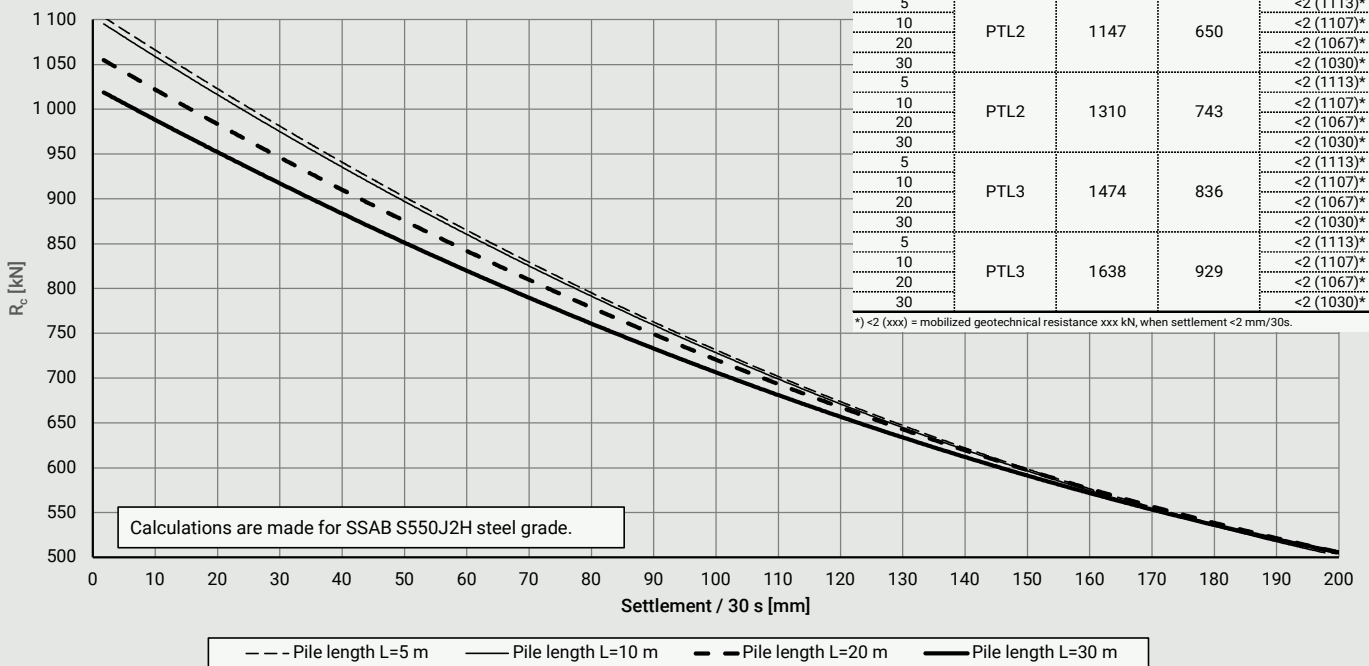


Hammer efficiency 80 %

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

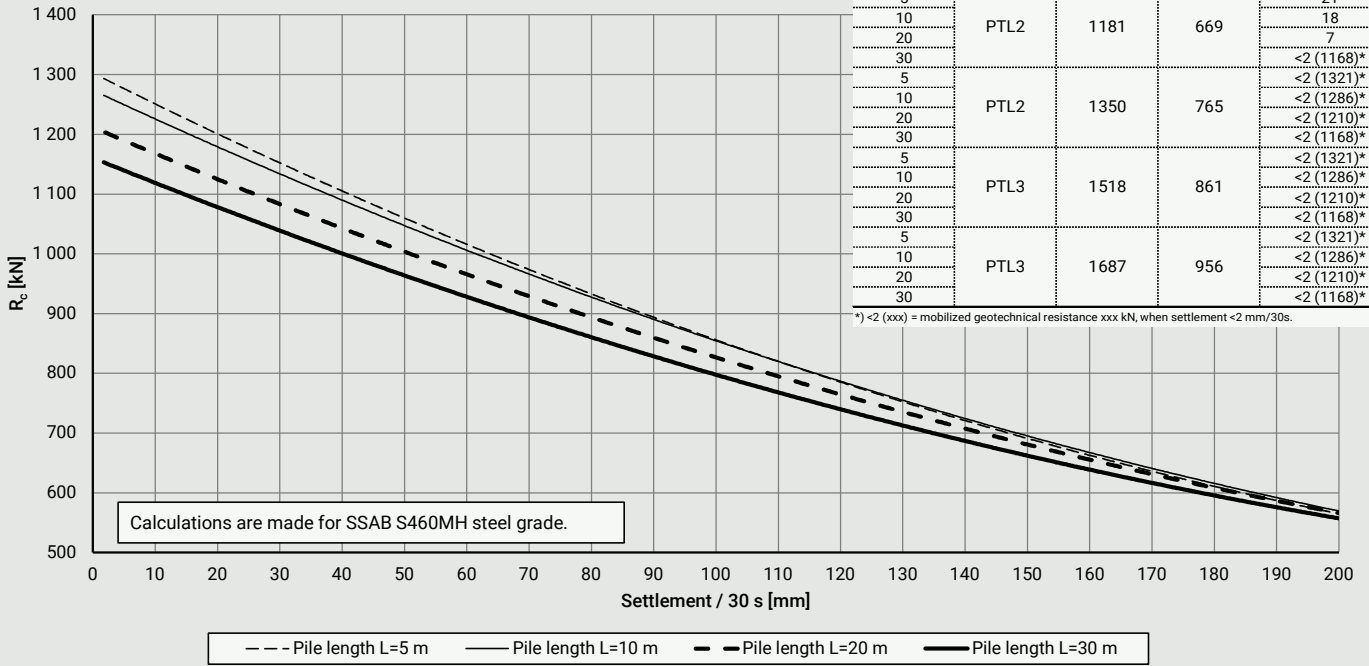


Hammer efficiency 80 %

Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5				58
10				54
20				42
30				31
5				21
10				18
20				7
30				<2 (1168)*
5				<2 (1321)*
10				<2 (1286)*
20				<2 (1210)*
30				<2 (1168)*
5				<2 (1321)*
10				<2 (1286)*
20				<2 (1210)*
30				<2 (1168)*
5				<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 - RR140/10

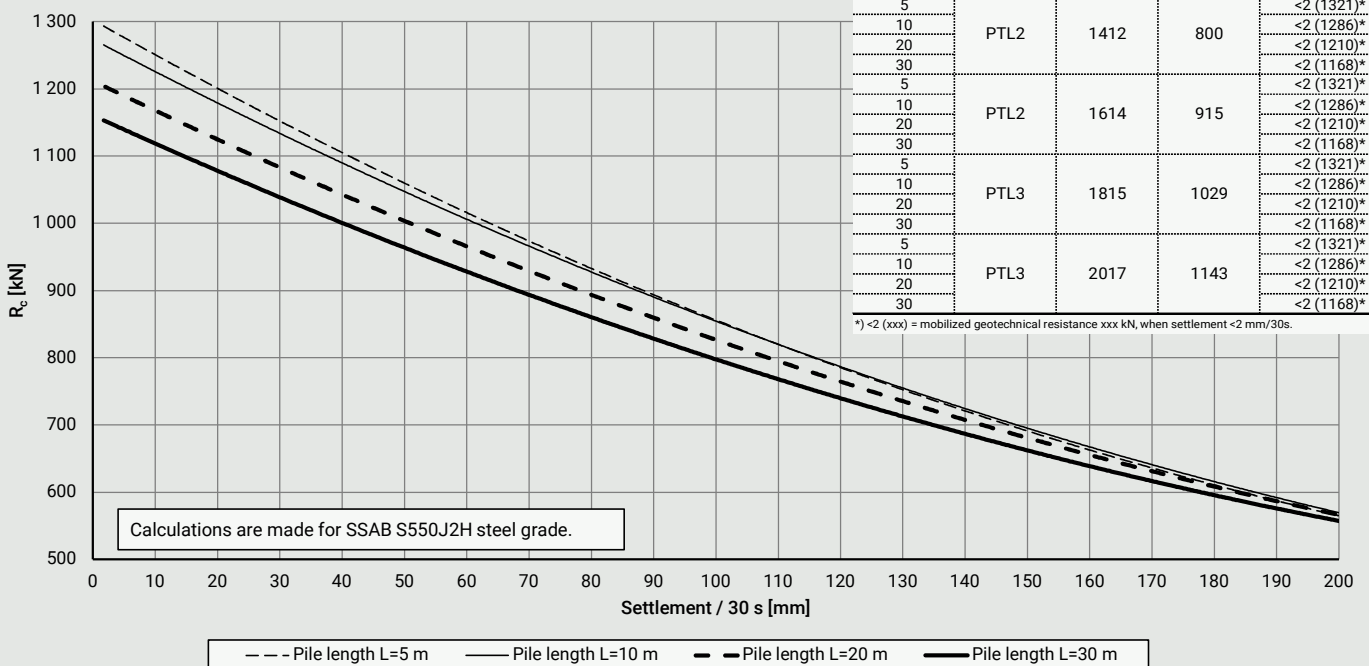


Hammer efficiency 80 %

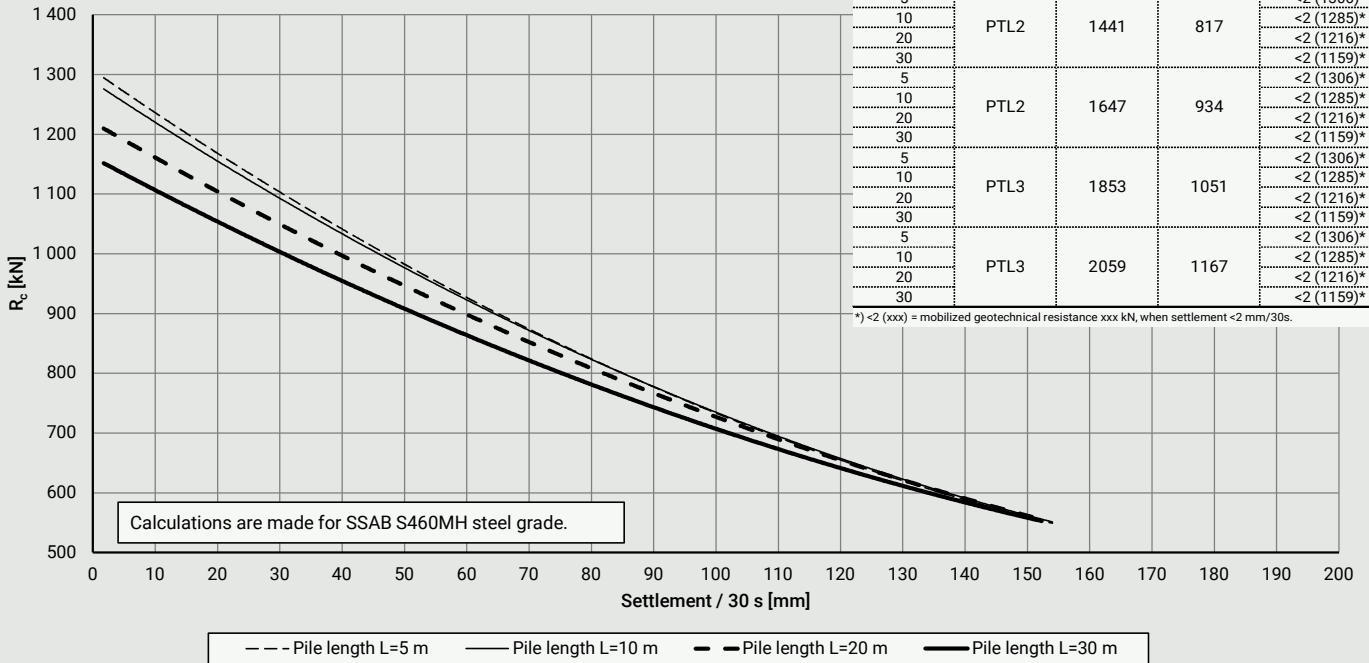
Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5				16
10				12
20				<2 (1210)*
30				<2 (1168)*
5				<2 (1321)*
10				<2 (1286)*
20				<2 (1210)*
30				<2 (1168)*
5				<2 (1321)*
10				<2 (1286)*
20				<2 (1210)*
30				<2 (1168)*
5				<2 (1321)*
10				<2 (1286)*
20				<2 (1210)*
30				<2 (1168)*
5				<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



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

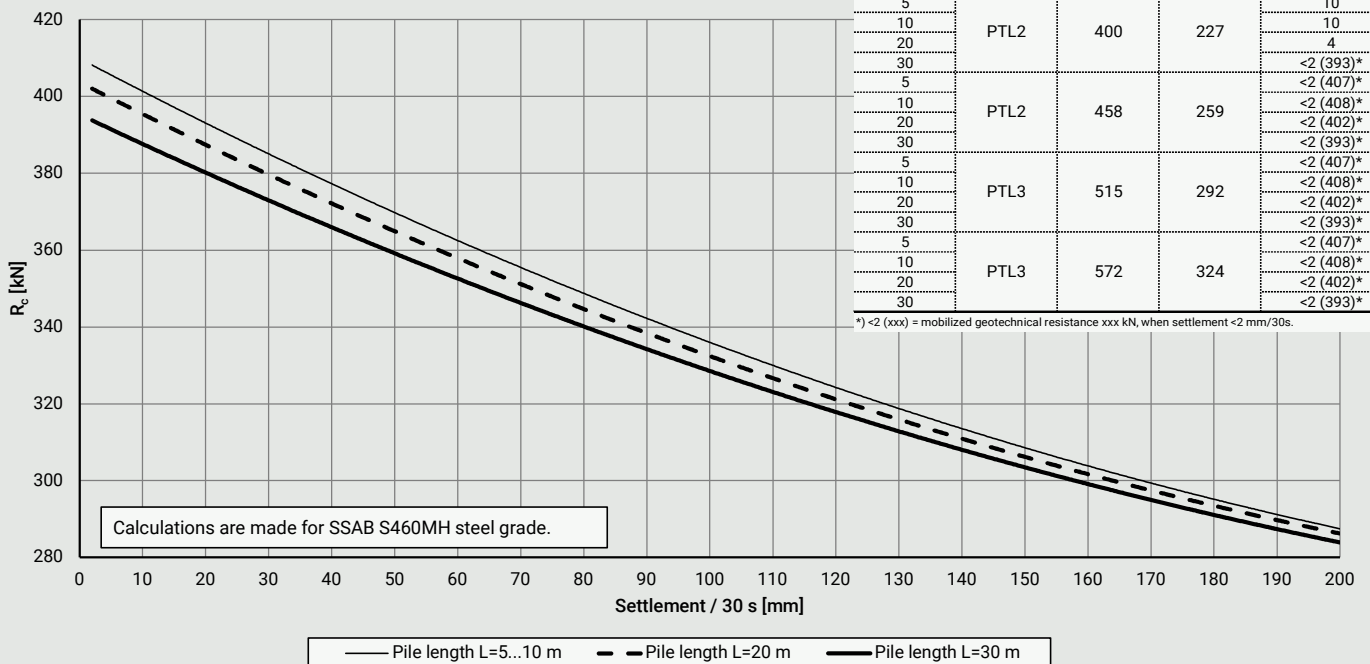
Diameter of the tool [mm]	D_t	105
Height of the tool [mm]	L_t	1000
Tool weight [kg]	m_t	68

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 - RR75

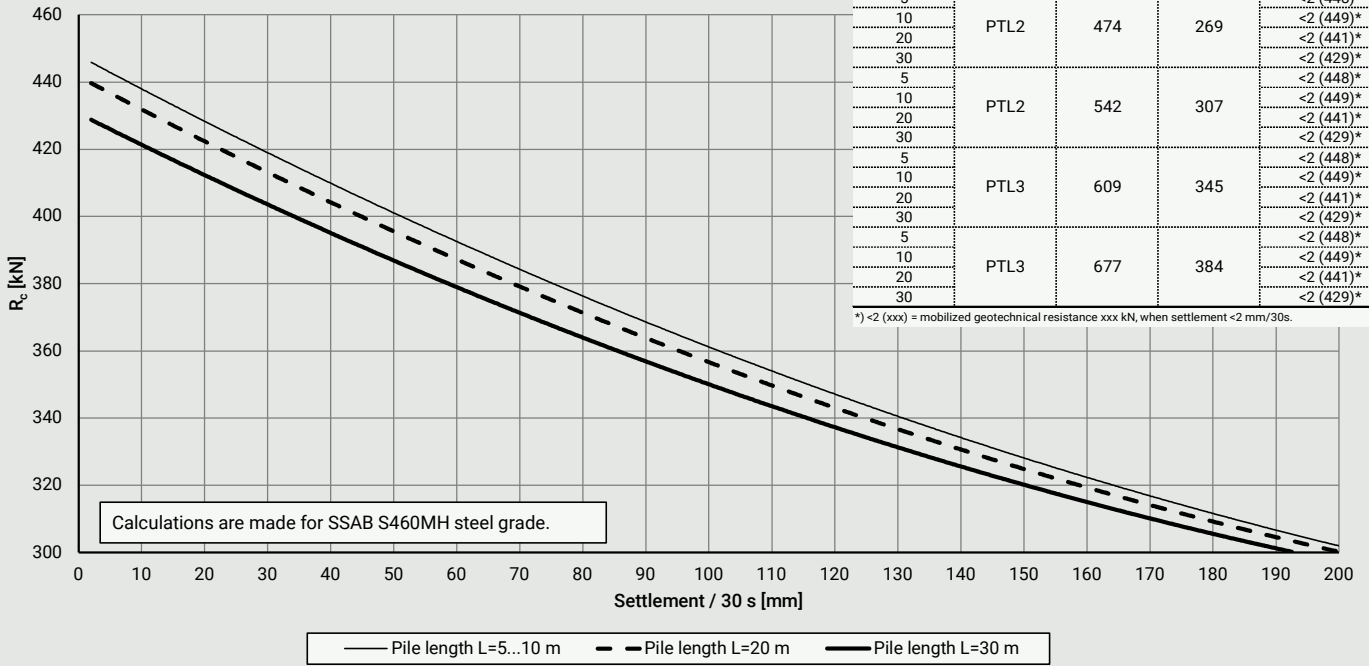


Hammer efficiency 80 %

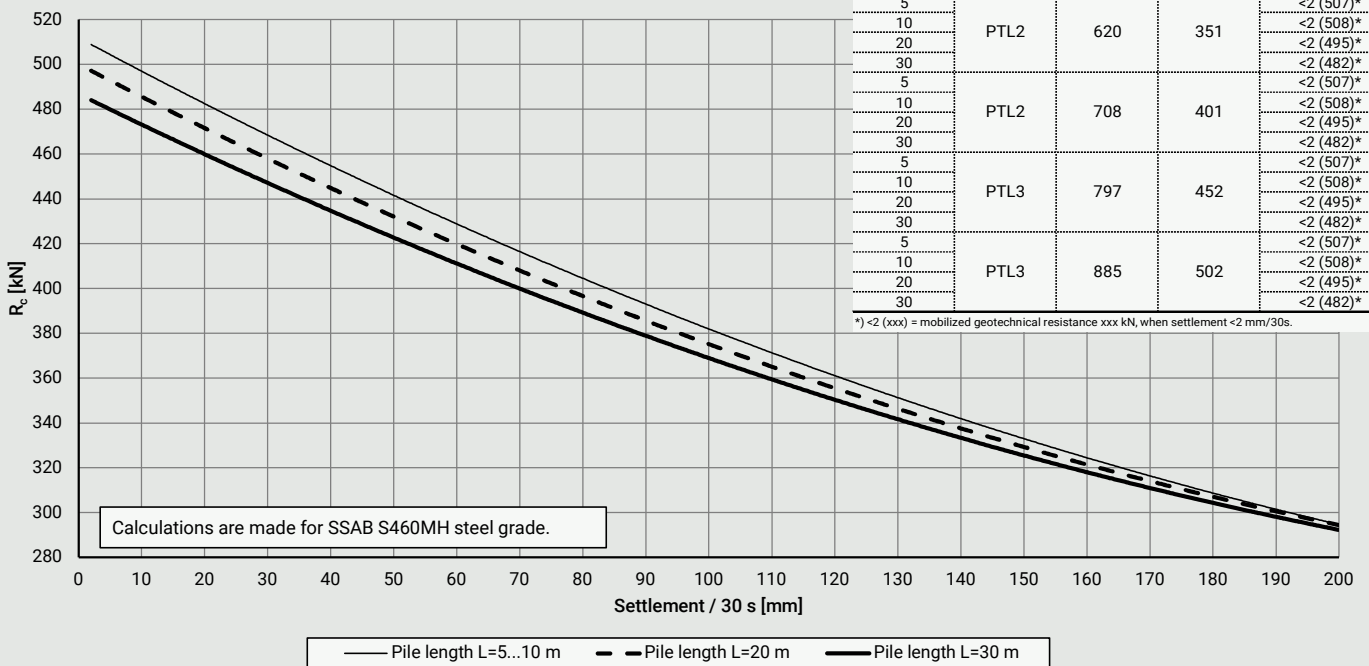
Pile length [m]	Piling work class	R _c [kN]	R _d [kN]	Settlement / 30 s [mm]
5				42
10				42
20	PTL1	406	230	35
30				24
5				<2 (448)*
10	PTL2	474	269	<2 (441)*
20				<2 (429)*
30				<2 (429)*
5				<2 (448)*
10	PTL2	542	307	<2 (449)*
20				<2 (441)*
30				<2 (429)*
5				<2 (448)*
10	PTL3	609	345	<2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

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

Brokk BHB 705 - RR90



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				<2 (507)*
10	PTL1	531	301	<2 (508)*
20				<2 (495)*
30				<2 (482)*
5				<2 (507)*
10	PTL2	620	351	<2 (508)*
20				<2 (495)*
30				<2 (482)*
5				<2 (507)*
10	PTL2	708	401	<2 (508)*
20				<2 (495)*
30				<2 (482)*
5				<2 (507)*
10	PTL3	797	452	<2 (508)*
20				<2 (495)*
30				<2 (482)*
5				<2 (507)*
10	PTL3	885	502	<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

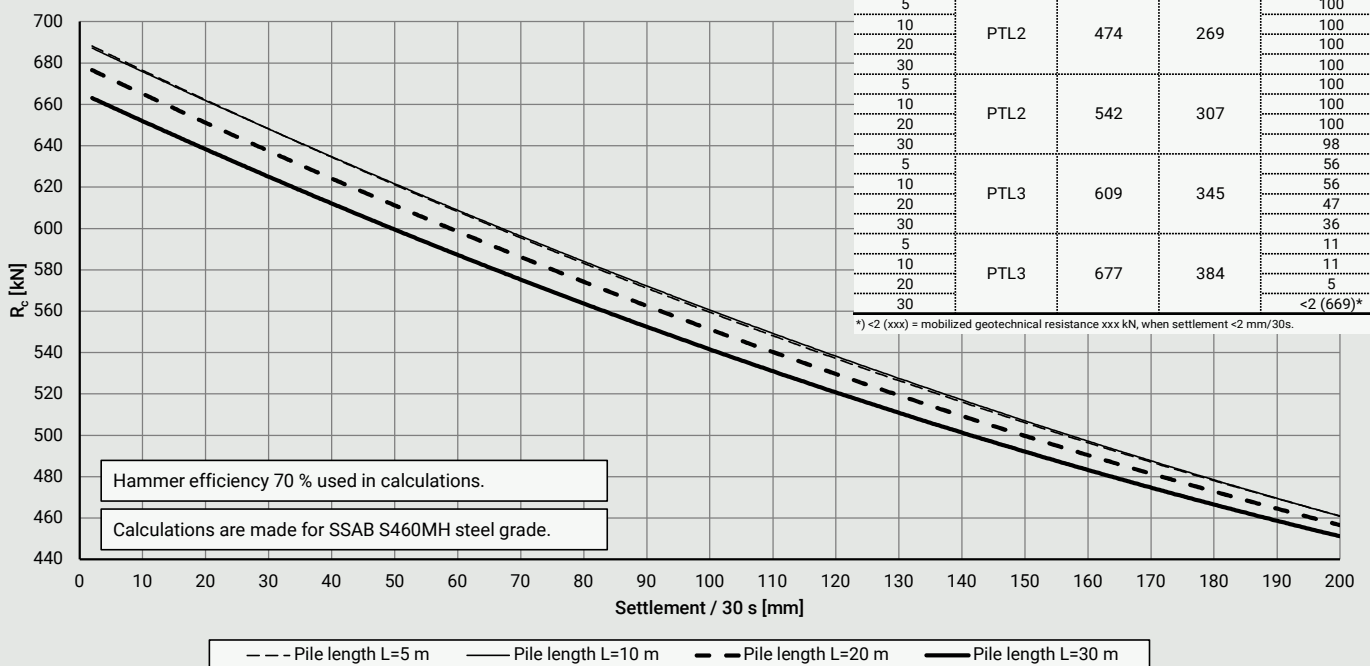
Diameter of the tool [mm]	D_t	140
Height of the tool [mm]	L_t	700
Tool weight [kg]	m_t	85

Hammer efficiency 70 %

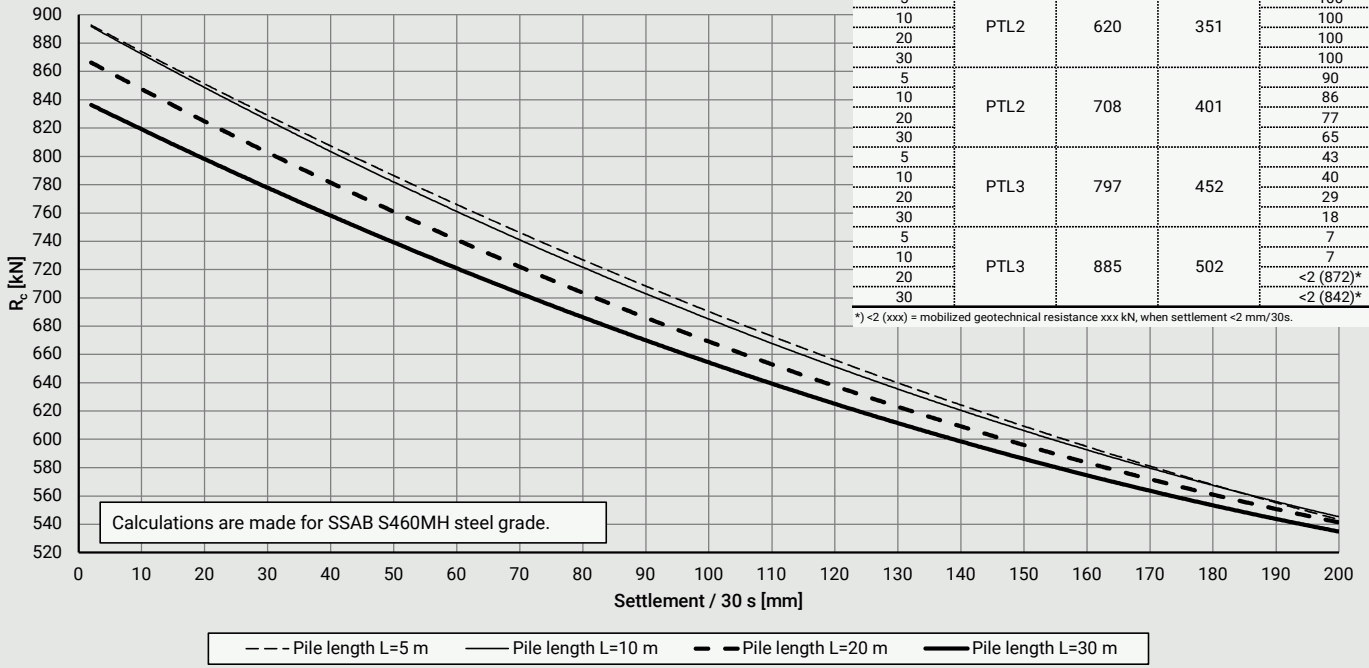
Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5	PTL1	406	230	100
10				100
20				100
30				100
5	PTL2	474	269	100
10				100
20				100
30				100
5	PTL2	542	307	100
10				100
20				100
30				98
5	PTL3	609	345	56
10				56
20				47
30				36
5	PTL3	677	384	11
10				11
20				5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

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

Epiroc MB1700 - RR90



Epiroc MB1700 - RR115/6.3

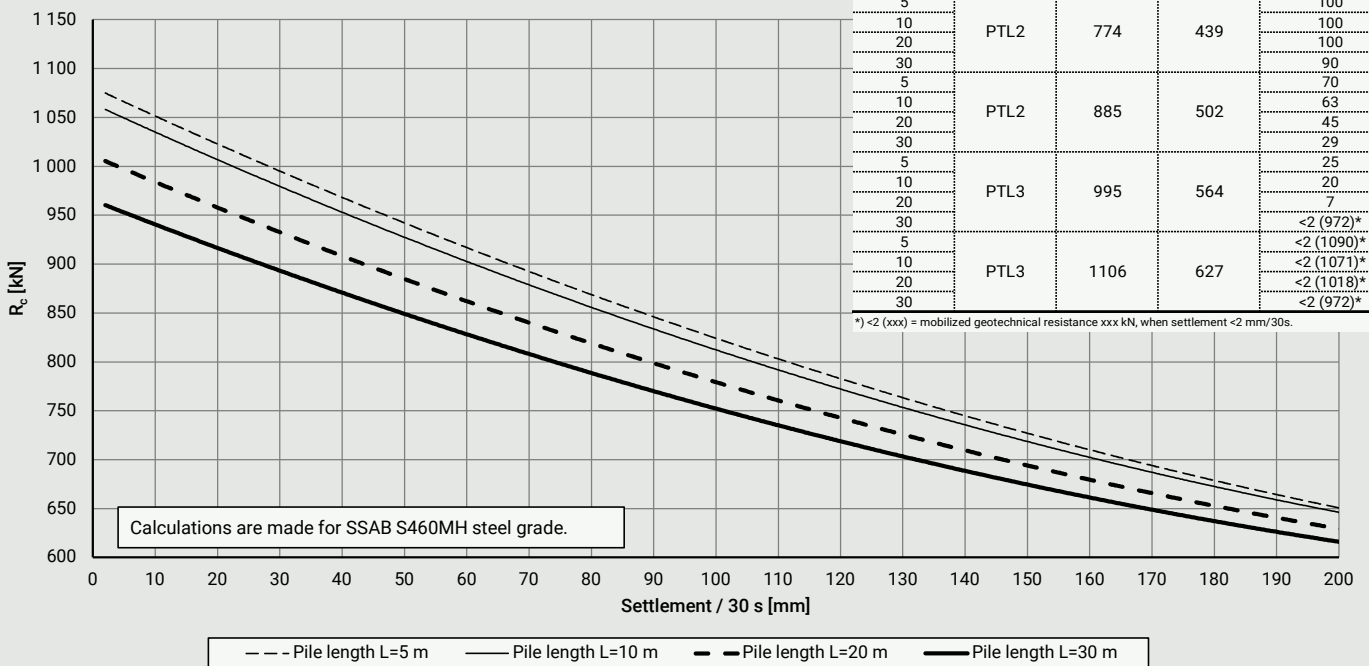


Hammer efficiency 80 %

Pile length [m]	Piling work class	R _c [kN]	R _d [kN]	Settlement / 30 s [mm]
5				100
10				100
20	PTL1	531	301	100
30				100
5				100
10	PTL2	620	351	100
20				100
30				100
5				90
10	PTL2	708	401	86
20				77
30				65
5				43
10	PTL3	797	452	40
20				29
30				18
5				7
10	PTL3	885	502	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				100
10				100
20	PTL1	664	376	100
30				100
5				100
10	PTL2	774	439	100
20				100
30				90
5				70
10	PTL2	885	502	63
20				45
30				29
5				25
10	PTL3	995	564	20
20				7
30				<2 (972)*
5				<2 (1090)*
10	PTL3	1106	627	<2 (1071)*
20				<2 (1018)*
30				<2 (972)*

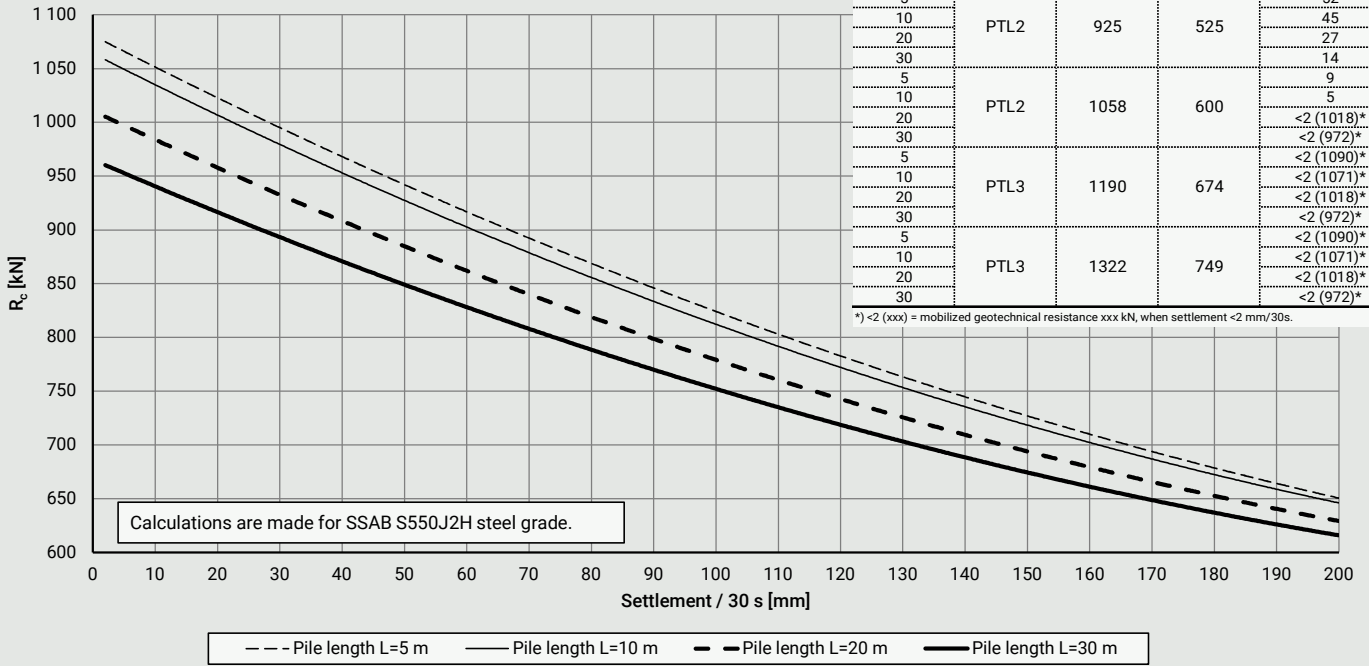
*) <2 (xxx) = mobilized geotechnical resistance xxx kN, when settlement <2 mm/30s.

Hammer efficiency 80 %

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

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

Epiroc MB1700 - RR115/8

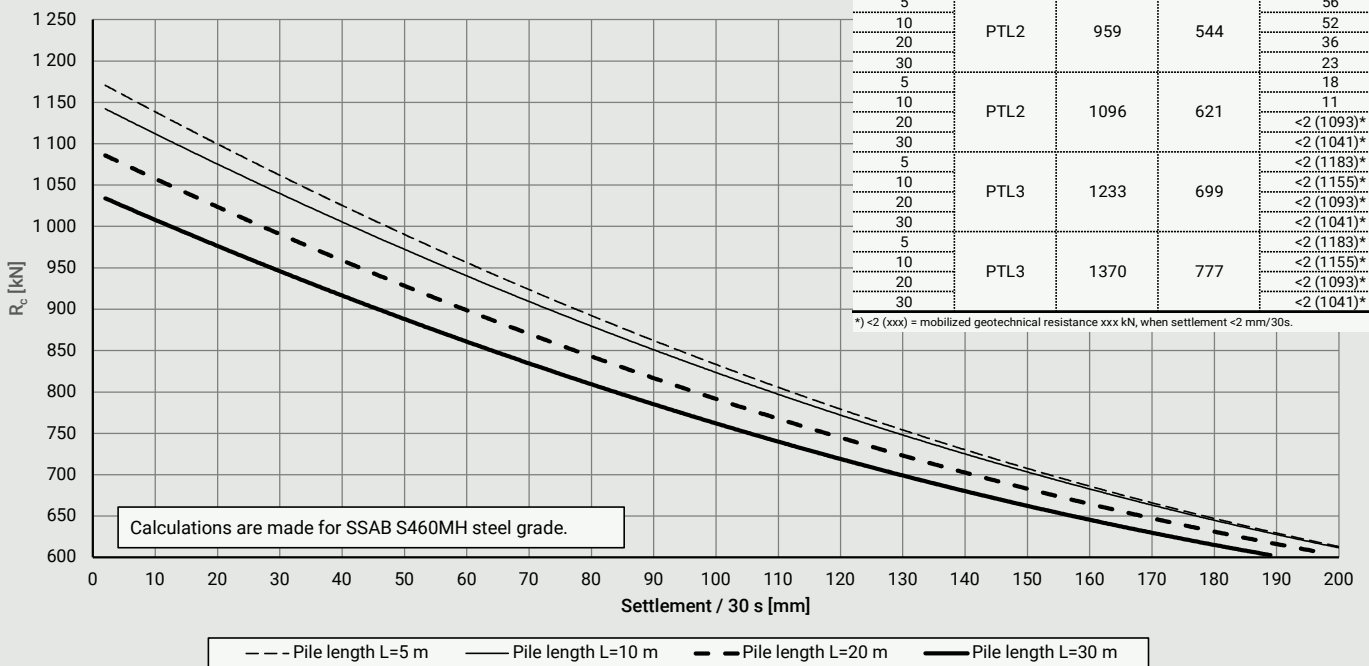


Hammer efficiency 80 %

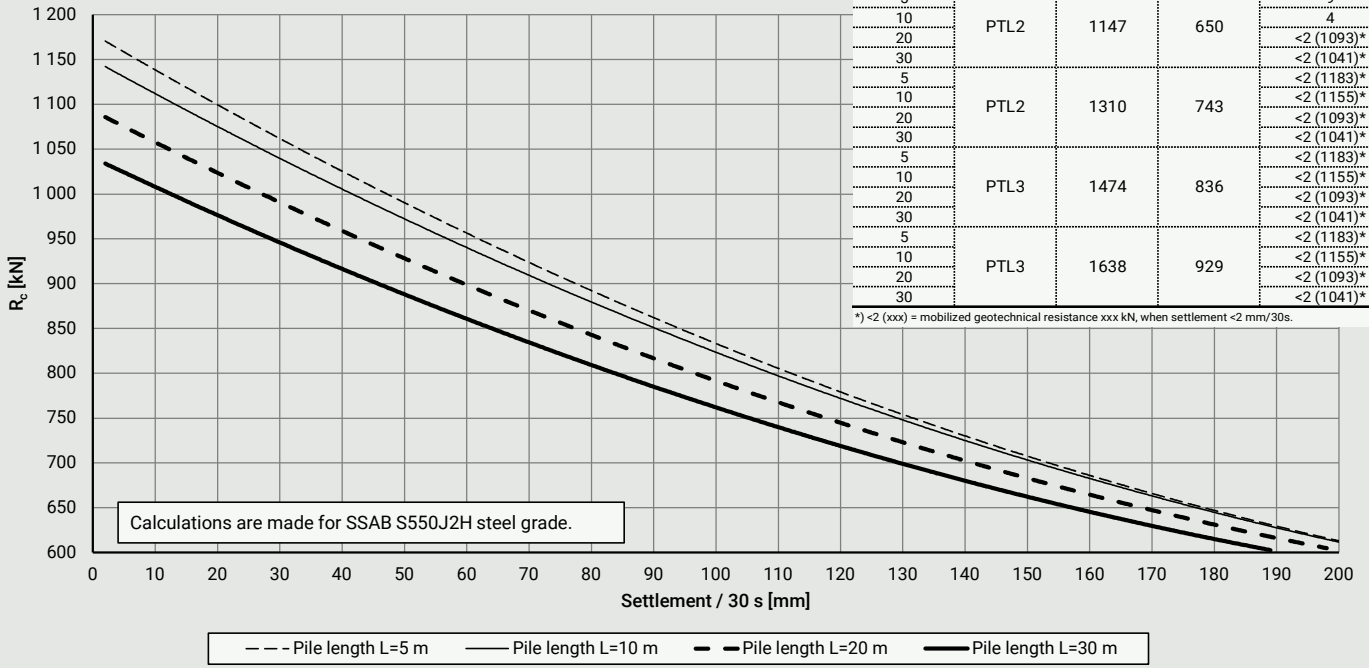
Pile length [m]	Piling work class	R_c [kN]	R_d [kN]	Settlement / 30 s [mm]
5				100
10				100
20	PTL1	822	466	88
30				74
5				56
10				52
20	PTL2	959	544	36
30				23
5				18
10				11
20	PTL2	1096	621	<2 (1093)*
30				<2 (1041)*
5				<2 (1183)*
10				<2 (1155)*
20	PTL3	1233	699	<2 (1093)*
30				<2 (1041)*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

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

Epiroc MB1700 - RR140/8



Epiroc MB1700 - RR140/8

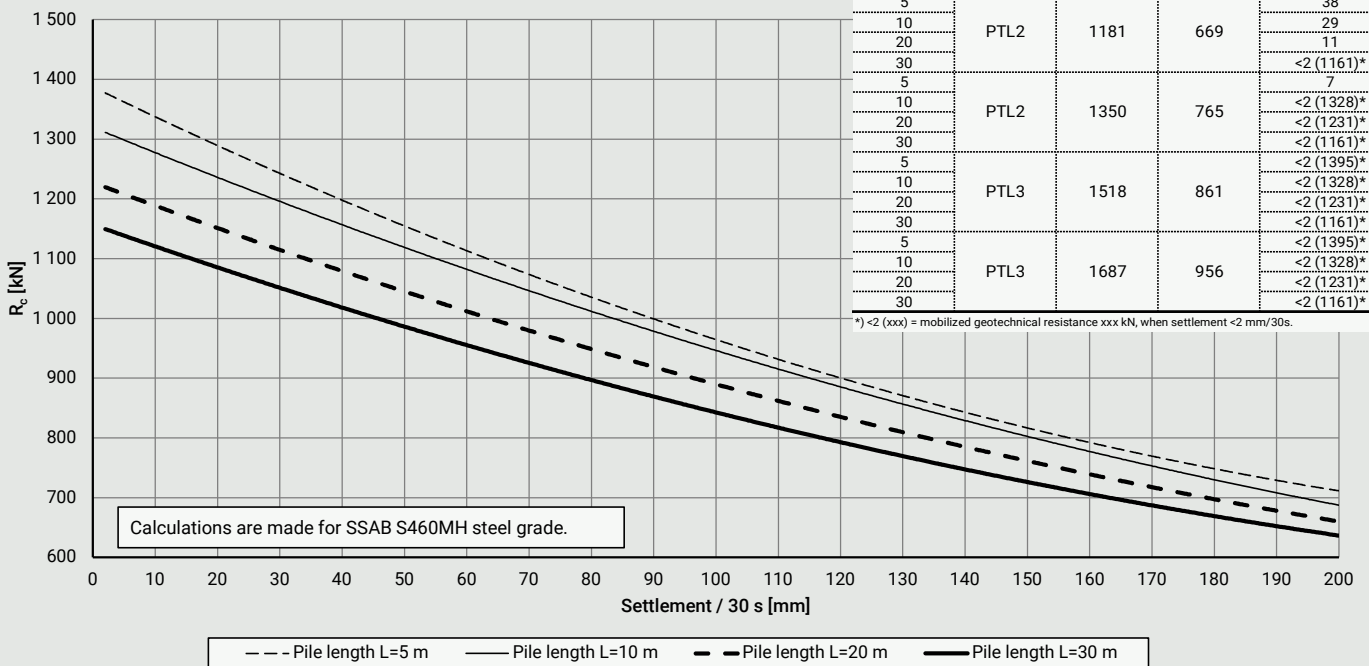


Hammer efficiency 80 %

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

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

Epiroc MB1700 - RR140/10

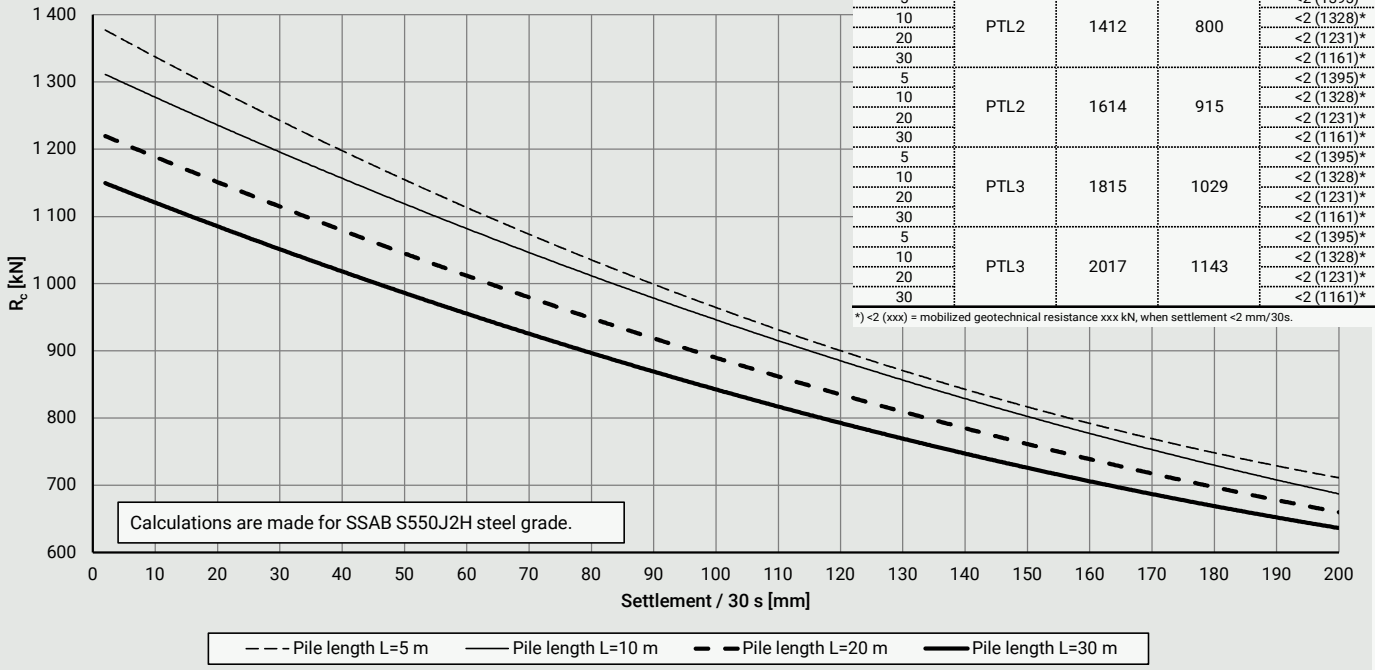


Hammer efficiency 80 %

Pile length [m]	Piling work class	R _c [kN]	R _d [kN]	Settlement / 30 s [mm]
5				85
10				76
20	PTL1	1012	574	54
30				36
5				38
10				29
20	PTL2	1181	669	11
30				<2 (1161)*
5				7
10				<2 (1328)*
20	PTL2	1350	765	<2 (1231)*
30				<2 (1161)*
5				<2 (1395)*
10				<2 (1328)*
20	PTL3	1518	861	<2 (1231)*
30				<2 (1161)*
5				<2 (1395)*
10				<2 (1328)*
20	PTL3	1687	956	<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	PTL2	1412	800	<2 (1161)*
5				<2 (1395)*
10				<2 (1328)*
20	PTL2	1614	915	<2 (1231)*
30				<2 (1161)*
5				<2 (1395)*
10	PTL3	1815	1029	<2 (1328)*
20				<2 (1231)*
30				<2 (1161)*
5	PTL3	2017	1143	<2 (1395)*
10				<2 (1328)*
30				<2 (1161)*

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

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The SSAB logo consists of the letters 'SSAB' in a bold, dark blue, sans-serif font. The letter 'A' is stylized with a white triangle pointing to the right, integrated into its structure.