BOLT AND WELD CAPACITIES - To BS5950 - Pt1: 2000

Grade 4.6 Bolt Capacities (for bolts in standard clearance holes)						
Bolt Size	Tensile Stress Area (mm^2)	Tension Capacity (kN)		Single Shear Capacity (kN)	Thickness of ply to achieve single shear bolt capacity (min. end distance = 2 x dia)	
	A_t	P_{nom}	P_t	P_s	t_p (S275)	t_p (S355)
M10	58.0	11.1	13.9	9.3	2.02	2.02
M12	84.3	16.2	20.2	13.5	2.44	2.44
M16	157	30.1	37.7	25.1	3.41	3.41
M20	245	47.0	58.8	39.2	4.26	4.26
M24	353	67.8	84.7	56.5	5.12	5.12
M30	561	108	135	89.8	6.50	6.50
M36	817	157	196	131	7.89	7.89
Note that t_p for countersunk heads = (t_p + bolt diameter / 4)						

Grade 8.8 Bolt Capacities (for bolts in standard clearance holes)						
Bolt Size	Tensile Stress Area (mm^2)	Tension Capacity (kN)		Single Shear Capacity (kN)	Thickness of ply to achieve single shear bolt capacity (min. end distance = 2 x dia)	
	A_t	P_{nom}	P_t	P_s	t_p (S275)	t_p (S355)
M10	58.0	26.0	32.5	21.8	4.73	3.95
M12	84.3	37.8	47.2	31.6	5.73	4.79
M16	157	70.3	87.9	58.9	8.00	6.69
M20	245	110	137	91.9	10.0	8.35
M24	353	158	198	132	12.0	10.0
M30	561	251	314	210	15.2	12.8
M36	817	366	458	306	18.5	15.5
Note that t_p for countersunk heads = (t_p + bolt diameter / 4)						

General Grade Pretensioned HSFG Bolts Non-Slip under Factored Load for bolts in standard clearance holes			
Bolt Size	Min. Shank Tension (kN)	Tension Capacity (kN)	Slip Resistance μ = 0.4
	P_O	$0.9P_o$	P_{sL}
M12	49.4	44.5	17.8
M16	92.1	82.9	33.2
M20	144	130	51.8
M24	207	186	74.5
M30	286	257	103
M36	418	376	151

Higher Grade Pretensioned HSFG Bolts Non-Slip under Factored Load for bolts in standard clearance holes			
Bolt Size	Min. Shank Tension (kN)	Tension Capacity (kN)	Slip Resistance μ = 0.4
	P_O	$0.9P_o$	P_{sL}
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M16	103.9	93.5	37.4
M20	161.8	146	58.2
M24	233.4	210	84.0
M30	370.0	333	133
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Fillet Weld Capacities For elements joined at 90deg to each other					
Weld Leg Size (mm)	Weld Throat Size (0.7 x Leg) (mm)	E35 Electrode with S275		E42 Electrode with S355	
		Longitudinal Capacity (kN/mm)	Transverse Capacity (kN/mm)	Longitudinal Capacity (kN/mm)	Transverse Capacity (kN/mm)
s	a	P_L	P_T	P_L	P_T
3	2.1	0.462	0.578	0.525	0.656
4	2.8	0.616	0.770	0.700	0.875
5	3.5	0.770	0.963	0.875	1.09
6	4.2	0.924	1.16	1.05	1.31
8	5.6	1.23	1.54	1.40	1.75
10	7.0	1.54	1.93	1.75	2.19
12	8.4	1.85	2.31	2.10	2.63
15	10.5	2.31	2.89	2.63	3.28
18	12.6	2.77	3.47	3.15	3.94
20	14.0	3.08	3.85	3.50	4.38
22	15.4	3.39	4.24	3.85	4.81
25	17.5	3.85	4.81	4.38	5.47