

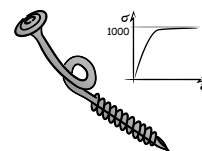
TBS

Large head screw
Galvanized carbon steel

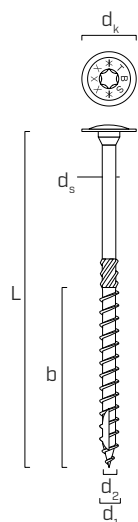


SPECIAL STEEL

Highly ductile (moves with the wood) and resistant steel
($f_{yk} = 1000 \text{ N/mm}^2$).



GEOMETRY AND MECHANICAL CHARACTERISTICS



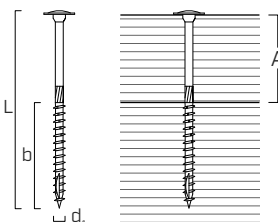
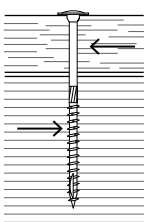
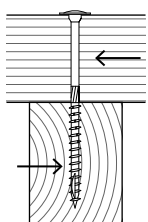
TBS SCREW						
Nominal diameter	d_1	[mm] [inch]	6 1/4 "	8 5/16 "	8 MAX 5/16 "	10 3/8 "
Head diameter	d_k	[mm]	15.50	19.00	24.50	25.00
		[inch]	0.610	0.748	0.965	0.984
Tip diameter	d_2	[mm]	3.95	5.40	5.40	6.40
		[inch]	0.156	0.213	0.213	0.252
Shank diameter	d_s	[mm]	4.30	5.80	5.80	7.00
		[inch]	0.169	0.228	0.228	0.276
Pre-drilling diameter	d_v	[mm]	4.00	5.00	5.00	6.00
		[inch]	0.157	0.197	0.197	0.236
Bending strength	F_{yb}	[N/mm ²]	1000	1000	1000	1000
		[psi]	145038	145038	145038	145038
Characteristic tensile strength	$f_{tens,k}$	[kN]	11.3	20.1	20.1	31.4
		[lbf]	2.540	4.519	4.519	7.059

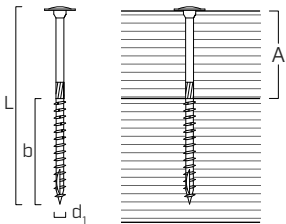
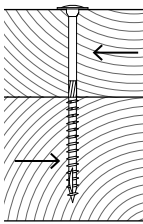
PRODUCT CODES AND PIECES PER PACKAGE

d ₁	Length L	CODE	pcs	d ₁	Length L	CODE	pcs
[mm] [inch]	[mm]			[mm] [inch]	[mm]		
6 1/4 "	60	TBS660	100	8 5/16 "	40	TBS840	100
	70	TBS670	100		60	TBS860	100
	80	TBS680	100		80	TBS880	50
	90	TBS690	100		100	TBS8100	50
	100	TBS6100	100		120	TBS8120	50
	120	TBS6120	100		140	TBS8140	50
	140	TBS6140	100		160	TBS8160	50
	160	TBS6160	100		180	TBS8180	50
	180	TBS6180	100		200	TBS8200	50
	200	TBS6200	100		220	TBS8220	50
	220	TBS6220	100		240	TBS8240	50
	240	TBS6240	100		260	TBS8260	50
	260	TBS6260	100		280	TBS8280	50
	280	TBS6280	100		300	TBS8300	50
	300	TBS6300	100		320	TBS8320	50
10 3/8 "	8 MAX 5/16 " MAX				340	TBS8340	50
					360	TBS8360	50
					380	TBS8380	50
					400	TBS8400	50
					440	TBS8440	50
					480	TBS8480	50
					520	TBS8520	50
					200	TBSMAX8200	50
					220	TBSMAX8220	50
					240	TBSMAX8240	50
					100	TBS10100	50
					120	TBS10120	50
					140	TBS10140	50
					160	TBS10160	50
					180	TBS10180	50
					200	TBS10200	50
					220	TBS10220	50
					240	TBS10240	50
					260	TBS10260	50
					280	TBS10280	50
					300	TBS10300	50
					320	TBS10320	50
					340	TBS10340	50
					360	TBS10360	50
					380	TBS10380	50
					400	TBS10400	50
					440	TBS10440	50
					480	TBS10480	50
					520	TBS10520	50

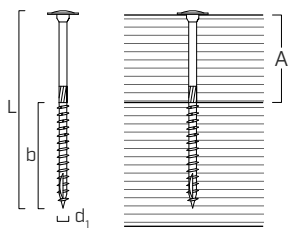
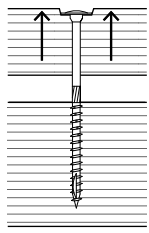


STATIC VALUES: SHEAR WOOD-WOOD

GEOMETRY							WOOD-WOOD Z//				WOOD-WOOD Z _{mL}			
														
							REFERENCE LATERAL DESIGN VALUE (Z) FOR:				REFERENCE LATERAL DESIGN VALUE (Z) FOR:			
d ₁	Length L		Thread length b		Side member A		G=0.35 Z//	G=0.42 Z//	G=0.50 Z//	G=0.55 Z//	G=0.35 Z _{mL}	G=0.42 Z _{mL}	G=0.50 Z _{mL}	G=0.55 Z _{mL}
	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[lbf]	[lbf]	[lbf]	[lbf]	[lbf]	[lbf]	[lbf]	[lbf]
6 1/4"	60	2 3/8"	40	1 5/8"	20	0.787	99	124	152	171	99	124	152	171
	70	2 3/4"	40	1 5/8"	30	1.181	107	143	182	210	107	143	182	210
	80	3 1/8"	50	2"	30	1.181	113	143	182	210	113	143	182	210
	90	3 4/8"	50	2"	40	1.575	128	166	195	213	128	166	195	213
	100	4"	60	2 3/8"	40	1.575	128	166	195	213	128	166	195	213
	120	4 3/4"	75	2 3/4"	45	1.772	138	166	195	213	138	166	195	213
	140	5 1/2"	75	2 3/4"	65	2.559	140	166	195	213	140	166	195	213
	160	6 1/4"	75	2 3/4"	85	3.346	140	166	195	213	140	166	195	213
	180	7 1/8"	75	2 3/4"	105	4.134	140	166	195	213	140	166	195	213
	200	7 7/8"	75	2 3/4"	125	4.921	140	166	195	213	140	166	195	213
	220	8 5/8"	100	4"	120	4.724	140	166	195	213	140	166	195	213
	240	9 1/2"	100	4"	140	5.512	140	166	195	213	140	166	195	213
	260	10 1/4"	100	4"	160	6.299	140	166	195	213	140	166	195	213
	280	11"	100	4"	180	7.087	140	166	195	213	140	166	195	213
	300	11 7/8"	100	4"	200	7.874	140	166	195	213	140	166	195	213
8 5/16"	40	1 5/8"	32	1 1/8"	8	0.315	101	122	145	159	49	64	82	94
	60	2 3/8"	52	2"	8	0.315	101	122	145	159	49	64	82	94
	80	3 1/8"	52	2"	28	1.102	198	224	252	270	129	148	171	186
	100	4"	52	2"	48	1.890	254	283	308	323	150	181	218	239
	120	4 3/4"	80	3 1/8"	40	1.575	229	264	303	323	140	166	197	217
	140	5 1/2"	80	3 1/8"	60	2.362	258	283	308	323	169	201	225	239
	160	6 1/4"	100	4"	60	2.362	258	283	308	323	169	201	225	239
	180	7 1/8"	100	4"	80	3.150	258	283	308	323	179	201	225	239
	200	7 7/8"	100	4"	100	3.937	258	283	308	323	179	201	225	239
	220	8 5/8"	100	4"	120	4.724	258	283	308	323	179	201	225	239
	240	9 1/2"	100	4"	140	5.512	258	283	308	323	179	201	225	239
	260	10 1/4"	100	4"	160	6.299	258	283	308	323	179	201	225	239
	280	11"	100	4"	180	7.087	258	283	308	323	179	201	225	239
	300	11 7/8"	100	4"	200	7.874	258	283	308	323	179	201	225	239
	320	12 5/8"	100	4"	220	8.661	258	283	308	323	179	201	225	239
	340	13 3/8"	100	4"	240	9.449	258	283	308	323	179	201	225	239
	360	14 1/4"	100	4"	260	10.236	258	283	308	323	179	201	225	239
	380	15"	100	4"	280	11.024	258	283	308	323	179	201	225	239
	400	15 3/4"	100	4"	300	11.811	258	283	308	323	179	201	225	239
	440	17 1/4"	100	4"	340	13.386	258	283	308	323	179	201	225	239
	480	19"	100	4"	380	14.961	258	283	308	323	179	201	225	239
	520	20 1/2"	100	4"	420	16.535	258	283	308	323	179	201	225	239
8 MAX 5/16" MAX	200	7 7/8"	120	4 3/4"	80	3.150	258	239	308	323	179	201	224	239
	220	8 5/8"	120	4 3/4"	100	3.937	258	239	308	323	179	201	224	239
	240	9 1/2"	120	4 3/4"	120	4.724	258	239	308	323	179	201	224	239
10 3/8"	100	4"	52	2"	48	1.890	245	294	350	385	152	188	231	256
	120	4 3/4"	60	2 3/8"	60	2.362	294	352	391	410	179	218	262	291
	140	5 1/2"	60	2 3/8"	80	3.150	327	358	391	410	197	246	275	293
	160	6 1/4"	80	3 1/8"	80	3.150	327	358	391	410	210	246	275	293
	180	7 1/8"	80	3 1/8"	100	3.937	327	358	391	410	219	246	275	293
	200	7 7/8"	100	4"	100	3.937	327	358	391	410	219	246	275	293
	220	8 5/8"	100	4"	120	4.724	327	358	391	410	219	246	275	293
	240	9 1/2"	100	4"	140	5.512	327	358	391	410	219	246	275	293
	260	10 1/4"	100	4"	160	6.299	327	358	391	410	219	246	275	293
	280	11"	100	4"	180	7.087	327	358	391	410	219	246	275	293
	300	11 7/8"	100	4"	200	7.874	327	358	391	410	219	246	275	293
	320	12 5/8"	120	4 3/4"	200	7.874	327	358	391	410	219	246	275	293
	340	13 3/8"	120	4 3/4"	220	8.661	327	358	391	410	219	246	275	293
	360	14 1/4"	120	4 3/4"	240	9.449	327	358	391	410	219	246	275	293
	380	15"	120	4 3/4"	260	10.236	327	358	391	410	219	246	275	293
	400	15 3/4"	120	4 3/4"	280	11.024	327	358	391	410	219	246	275	293
	440	17 1/4"	120	4 3/4"	320	12.598	327	358	391	410	219	246	275	293
	480	19"	120	4 3/4"	360	14.173	327	358	391	410	219	246	275	293
	520	20 1/2"	120	4 3/4"	400	15.748	327	358	391	410	219	246	275	293

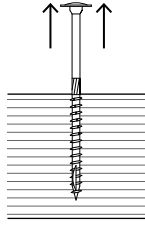
GEOMETRY							WOOD-WOOD $Z_{\perp}$			
										
							REFERENCE LATERAL DESIGN VALUE (Z) FOR:			
d_1	Length L		Thread length b		Side member A		$G=0.35$ $Z_{\perp}$	$G=0.42$ $Z_{\perp}$	$G=0.50$ $Z_{\perp}$	$G=0.55$ $Z_{\perp}$
$\begin{matrix} \text{[mm]} \\ \text{[inch]} \end{matrix}$	$\begin{matrix} \text{[mm]} \\ \text{[inch]} \end{matrix}$	$\begin{matrix} \text{[inch]} \end{matrix}$	$\begin{matrix} \text{[mm]} \\ \text{[inch]} \end{matrix}$	$\begin{matrix} \text{[inch]} \end{matrix}$	$\begin{matrix} \text{[mm]} \\ \text{[inch]} \end{matrix}$	$\begin{matrix} \text{[mm]} \\ \text{[inch]} \end{matrix}$	$\begin{matrix} \text{[lbf]} \end{matrix}$	$\begin{matrix} \text{[lbf]} \end{matrix}$	$\begin{matrix} \text{[lbf]} \end{matrix}$	$\begin{matrix} \text{[lbf]} \end{matrix}$
6 1/4"	60	2 3/8"	40	1 5/8"	20	0.787	99	124	152	171
	70	2 3/4"	40	1 5/8"	30	1.181	107	143	182	210
	80	3 1/8"	50	2"	30	1.181	113	143	182	210
	90	3 4/8"	50	2"	40	1.575	128	166	195	213
	100	4"	60	2 3/8"	40	1.575	128	166	195	213
	120	4 3/4"	75	2 3/4"	45	1.772	138	166	195	213
	140	5 1/2"	75	2 3/4"	65	2.559	140	166	195	213
	160	6 1/4"	75	2 3/4"	85	3.346	140	166	195	213
	180	7 1/8"	75	2 3/4"	105	4.134	140	166	195	213
	200	7 7/8"	75	2 3/4"	125	4.921	140	166	195	213
	220	8 5/8"	100	4"	120	4.724	140	166	195	213
	240	9 1/2"	100	4"	140	5.512	140	166	195	213
	260	10 1/4"	100	4"	160	6.299	140	166	195	213
	280	11"	100	4"	180	7.087	140	166	195	213
	300	11 7/8"	100	4"	200	7.874	140	166	195	213
8 5/16"	40	1 5/8"	32	1 1/8"	8	0.315	49	64	82	94
	60	2 3/8"	52	2"	8	0.315	49	64	82	94
	80	3 1/8"	52	2"	28	1.102	109	137	160	176
	100	4"	52	2"	48	1.890	127	166	206	223
	120	4 3/4"	80	3 1/8"	40	1.575	128	154	185	206
	140	5 1/2"	80	3 1/8"	60	2.362	155	183	208	223
	160	6 1/4"	100	4"	60	2.362	155	183	208	223
	180	7 1/8"	100	4"	80	3.150	160	183	208	223
	200	7 7/8"	100	4"	100	3.937	160	183	208	223
	220	8 5/8"	100	4"	120	4.724	160	183	208	223
	240	9 1/2"	100	4"	140	5.512	160	183	208	223
	260	10 1/4"	100	4"	160	6.299	160	183	208	223
	280	11"	100	4"	180	7.087	160	183	208	223
	300	11 7/8"	100	4"	200	7.874	160	183	208	223
	320	12 5/8"	100	4"	220	8.661	160	183	208	223
	340	13 3/8"	100	4"	240	9.449	160	183	208	223
	360	14 1/4"	100	4"	260	10.236	160	183	208	223
	380	15"	100	4"	280	11.024	160	183	208	223
	400	15 3/4"	100	4"	300	11.811	160	183	208	223
	440	17 1/4"	100	4"	340	13.386	160	183	208	223
	480	19"	100	4"	380	14.961	160	183	208	223
	520	20 1/2"	100	4"	420	16.535	160	183	208	223
8 MAX 5/16" MAX	200	7 7/8"	120	4 3/4"	80	3.150	160	183	208	223
	220	8 5/8"	120	4 3/4"	100	3.937	160	183	208	223
	240	9 1/2"	120	4 3/4"	120	4.724	160	183	208	223
10 3/8"	100	4"	52	2"	48	1.890	106	138	178	204
	120	4 3/4"	60	2 3/8"	60	2.362	127	166	213	245
	140	5 1/2"	60	2 3/8"	80	3.150	151	197	243	267
	160	6 1/4"	80	3 1/8"	80	3.150	170	219	249	267
	180	7 1/8"	80	3 1/8"	100	3.937	191	219	249	267
	200	7 7/8"	100	4"	100	3.937	192	219	249	267
	220	8 5/8"	100	4"	120	4.724	192	219	249	267
	240	9 1/2"	100	4"	140	5.512	192	219	249	267
	260	10 1/4"	100	4"	160	6.299	192	219	249	267
	280	11"	100	4"	180	7.087	192	219	249	267
	300	11 7/8"	100	4"	200	7.874	192	219	249	267
	320	12 5/8"	120	4 3/4"	200	7.874	192	219	249	267
	340	13 3/8"	120	4 3/4"	220	8.661	192	219	249	267
	360	14 1/4"	120	4 3/4"	240	9.449	192	219	249	267
	380	15"	120	4 3/4"	260	10.236	192	219	249	267
	400	15 3/4"	120	4 3/4"	280	11.024	192	219	249	267
	440	17 1/4"	120	4 3/4"	320	12.598	192	219	249	267
	480	19"	120	4 3/4"	360	14.173	192	219	249	267
	520	20 1/2"	120	4 3/4"	400	15.748	192	219	249	267

STATIC VALUES: TRACTION HEAD PENETRATION

GEOMETRY							HEAD-PULL THROUGH W_H			
										
d_1	Length L		Head Diameter (d_k)		Side Member Thickness A		G=0.35 W_H	G=0.42 W_H	G=0.50 W_H	G=0.55 W_H
[mm] [inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[lbs]	[lbs]	[lbs]	[lbs]
6 1/4"	60	2 3/8"	16	0.610	20	0.787	128	184	260	315
	70	2 3/4"	16	0.610	30	1.181	191	275	390	472
	80	3 1/8"	16	0.610	30	1.181	191	275	390	472
	90	3 4/8"	16	0.610	40	1.575	247	356	504	610
	100	4"	16	0.610	40	1.575	247	356	504	610
	120	4 3/4"	16	0.610	45	1.772	247	356	504	610
	140	5 1/2"	16	0.610	65	2.559	247	356	504	610
	160	6 1/4"	16	0.610	85	3.346	247	356	504	610
	180	7 1/8"	16	0.610	105	4.134	247	356	504	610
	200	7 7/8"	16	0.610	125	4.921	247	356	504	610
	220	8 5/8"	16	0.610	120	4.724	247	356	504	610
	240	9 1/2"	16	0.610	140	5.512	247	356	504	610
	260	10 1/4"	16	0.610	160	6.299	247	356	504	610
	280	11"	16	0.610	180	7.087	247	356	504	610
8 5/16"	300	11 7/8"	16	0.610	200	7.874	247	356	504	610
	40	1 5/8"	19	0.748	8	0.315	63	90	128	154
	60	2 3/8"	19	0.748	8	0.315	63	90	128	154
	80	3 1/8"	19	0.748	28	1.102	219	315	447	540
	100	4"	19	0.748	48	1.890	371	535	758	917
	120	4 3/4"	19	0.748	40	1.575	313	450	638	772
	140	5 1/2"	19	0.748	60	2.362	371	535	758	917
	160	6 1/4"	19	0.748	60	2.362	371	535	758	917
	180	7 1/8"	19	0.748	80	3.150	371	535	758	917
	200	7 7/8"	19	0.748	100	3.937	371	535	758	917
	220	8 5/8"	19	0.748	120	4.724	371	535	758	917
	240	9 1/2"	19	0.748	140	5.512	371	535	758	917
	260	10 1/4"	19	0.748	160	6.299	371	535	758	917
	280	11"	19	0.748	180	7.087	371	535	758	917
	300	11 7/8"	19	0.748	200	7.874	371	535	758	917
	320	12 5/8"	19	0.748	220	8.661	371	535	758	917
	340	13 3/8"	19	0.748	240	9.449	371	535	758	917
	360	14 1/4"	19	0.748	260	10.236	371	535	758	917
8 MAX 5/16" MAX	380	15"	19	0.748	280	11.024	371	535	758	917
	400	15 3/4"	19	0.748	300	11.811	371	535	758	917
	440	17 1/4"	19	0.748	340	13.386	371	535	758	917
10 3/8"	480	19"	19	0.748	380	14.961	371	535	758	917
	520	20 1/2"	19	0.748	420	16.535	371	535	758	917
	200	7 7/8"	25	0.965	80	3.150	617	889	1260	1524
	220	8 5/8"	25	0.965	100	3.937	617	889	1260	1524
	240	9 1/2"	25	0.965	120	4.724	617	889	1260	1524
	100	4"	25	0.984	48	1.890	494	711	1007	1219
	120	4 3/4"	25	0.984	60	2.362	617	889	1259	1524
	140	5 1/2"	25	0.984	80	3.150	643	926	1312	1587
	160	6 1/4"	25	0.984	80	3.150	643	926	1312	1587
	180	7 1/8"	25	0.984	100	3.937	643	926	1312	1587
	200	7 7/8"	25	0.984	100	3.937	643	926	1312	1587
	220	8 5/8"	25	0.984	120	4.724	643	926	1312	1587
	240	9 1/2"	25	0.984	140	5.512	643	926	1312	1587
	260	10 1/4"	25	0.984	160	6.299	643	926	1312	1587
	280	11"	25	0.984	180	7.087	643	926	1312	1587
	300	11 7/8"	25	0.984	200	7.874	643	926	1312	1587
	320	12 5/8"	25	0.984	200	7.874	643	926	1312	1587
	340	13 3/8"	25	0.984	220	8.661	643	926	1312	1587
	360	14 1/4"	25	0.984	240	9.449	643	926	1312	1587
10 3/8"	380	15"	25	0.984	260	10.236	643	926	1312	1587
	400	15 3/4"	25	0.984	280	11.024	643	926	1312	1587
	440	17 1/4"	25	0.984	320	12.598	643	926	1312	1587
	480	19"	25	0.984	360	14.173	643	926	1312	1587
	520	20 1/2"	25	0.984	400	15.748	643	926	1312	1587

STATIC VALUES: TRACTION THREAD WITHDRAWAL

WITHDRAWAL



d_i [mm] [inch]	G=0.33 W [lbs/in]	G=0.42 W [lbs/in]	G=0.50 W [lbs/in]	G=0.55 W [lbs/in]
6 1/4"	126	166	216	249
8 5/16"	157	206	268	309
8 MAX 5/16" MAX	157	206	268	309
10 3/8"	185	244	316	365

NOTES

- Values based on the "Technical Design Guide USA", download from www.rothoblaas.com
- Values were calculated considering the threaded part as being completely inserted into the wood
- Reference lateral design values (Z) are based on NDS 2018. Characteristic values of mechanical properties and geometries are in accordance with ETA-11/0030
- Reference lateral design values (W) are based on NDS 2018. Characteristic values of mechanical properties and geometries are in accordance with ETA-11/0030
- The axial thread-extraction resistance was calculated considering a 90° angle between the grain and the connector and for a fixing length of b
- Reference lateral design values (W_{tr}) are based on NDS 2018. Characteristic values of mechanical properties and geometries are in accordance with ETA-11/0030
- The axial resistance to head penetration was calculated using wood elements. In the case of steel-wood connections, generally the steel tensile strength is binding with
- Download the latest version of this document from www.rothoblaas.com respect to head separation or penetration

GENERAL PRINCIPLES

- The reference resistance values for connections shall be multiplied by all applicable adjustment factors (ref. NDS Table 11.3.1)
- Sizing and verification of the wooden elements, panels and steel plates must be done separately
- For different calculation methods, the My Project software is available free of charge (www.rothoblaas.com)
- The characteristic resistances were calculated using solid wood or glulam. In the case of joints with CLT elements, the resistance values may be different and should be calculated taking into account the characteristics of the panel and the connection configuration
- ASTM A36 steel side plates. Bearing strength $F_e=87.000$ [psi]