

## Bolt lengths and tolerances for standard TCBs to EN 14399-10

Length (l)			M12		M16		M20		M22		M24		M27		M30		M36	
			<i>l<sub>s</sub></i>	<i>l<sub>g</sub></i>	<i>l<sub>s</sub></i>	<i>l<sub>g</sub></i>	<i>l<sub>s</sub></i>	<i>l<sub>g</sub></i>	<i>l<sub>s</sub></i>	<i>l<sub>g</sub></i>	<i>l<sub>s</sub></i>	<i>l<sub>g</sub></i>	<i>l<sub>s</sub></i>	<i>l<sub>g</sub></i>	<i>l<sub>s</sub></i>	<i>l<sub>g</sub></i>	<i>l<sub>s</sub></i>	<i>l<sub>g</sub></i>
<i>nom</i>	<i>min</i>	<i>max</i>	<i>min</i>	<i>max</i>	<i>min</i>	<i>max</i>	<i>min</i>	<i>max</i>	<i>min</i>	<i>max</i>	<i>min</i>	<i>max</i>	<i>min</i>	<i>max</i>	<i>min</i>	<i>max</i>	<i>min</i>	<i>Max</i>
<b>30</b>	28.75	31.25	6	11.25														
<b>35</b>	33.75	36.25	6	11.25														
<b>40</b>	38.75	41.25	6	11.25	8	14												
<b>45</b>	43.75	46.25	6.25	15	8	14												
<b>50</b>	48.75	51.25	11.25	20	8	14	10	17.5	11	18.5								
<b>55</b>	53.50	56.5	16.25	25	8	14	10	17.5	11	18.5								
<b>60</b>	58.50	61.5	21.25	30	12	22	10	17.5	11	18.5	12	21						
<b>65</b>	63.50	66.5	26.25	35	17	27	10	17.5	11	18.5	12	21						
<b>70</b>	68.50	71.5	31.25	40	22	32	11.5	24	11	18.5	12	21						
<b>75</b>	73.50	76.5	36.25	45	27	37	16.5	29	12.5	25	12	21						
<b>80</b>	78.50	81.5	41.25	50	32	42	21.5	34	17.5	30	12	21	13.5	22.5	15	25.5		
<b>85</b>	83.25	86.75	46.25	55	37	47	26.5	39	22.5	35	16	31	13.5	22.5	15	25.5		
<b>90</b>	88.25	91.75	51.25	60	42	52	31.5	44	27.5	40	21	36	15	30	15	25.5		
<b>95</b>	93.25	96.75	56.25	65	47	57	36.5	49	32.5	45	26	41	20	35	15	25.5		
<b>100</b>	98.25	101.75	61.25	70	52	62	41.5	54	37.5	50	31	46	25	40	16.5	34	18	30
<b>105</b>	103.25	106.75			57	67	46.5	59	42.5	55	36	51	30	45	21.5	39	18	30
<b>110</b>	108.25	111.75			62	72	51.5	64	47.5	60	41	56	35	50	26.5	44	18	30
<b>115</b>	113.25	116.75			67	77	56.5	69	52.5	65	46	61	40	55	31.5	49	23	35
<b>120</b>	118.25	121.75			72	82	61.5	74	57.5	70	51	66	45	60	36.5	54	22	42
<b>125</b>	123.0	127.0			77	87	66.5	79	62.5	75	56	71	50	65	41.5	59	27	47
<b>130</b>	128.0	132.0			76	86	65.5	78	61.5	80	55	70	49	64	40.5	58	26	46
<b>135</b>	133.0	137.0			81	91	70.5	83	66.5	85	60	75	54	69	45.5	63	31	51

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Length (l)			M12		M16		M20		M22		M24		M27		M30		M36	
			$l_s$	$l_g$	$l_s$	$l_g$	$l_s$	$l_g$	$l_s$	$l_g$	$l_s$	$l_g$	$l_s$	$l_g$	$l_s$	$l_g$	$l_s$	$l_g$
nom	min	max	min	max	min	max	min	max	Min	max	min	max	min	max	Min	max	min	Max
140	138.0	142.0			86	96	75.5	88	71.5	90	65	80	59	74	50.5	68	36	56
145	143.0	147.0			91	101	80.5	93	76.5	95	70	85	64	79	55.5	73	41	61
150	148.0	152.0			96	106	85.5	98	81.5	100	75	90	69	84	60.5	78	46	66
155	153.0	157.0			101	111	90.5	103	86.5	105	80	95	74	89	65.5	83	51	71
160	156.0	164.0			106	116	95.5	108	91.5	110	85	100	79	94	70.5	88	56	76
165	161.0	169.0			111	121	100.5	113	96.5	115	90	105	84	99	75.5	93	61	81
170	166.0	174.0			116	126	105.5	118	101.5	120	95	110	89	104	80.5	98	66	86
175	171.0	179.0			121	131	110.5	123	106.5	125	100	115	94	109	85.5	103	71	91
180	176.0	184.0			126	136	115.5	128	111.5	130	105	120	99	114	90.5	108	76	96
185	181.0	189.0			131	141	120.5	133	116.5	135	110	125	104	119	95.5	113	81	101
190	186.0	194.0			136	146	125.5	138	121.5	140	115	130	109	124	100.5	118	86	106
195	191.0	199.0			141	151	130.5	143	126.5	145	120	135	114	129	105.5	123	91	111
200	196.0	204.0			146	156	135.5	148	131.5	150	125	140	119	134	110.5	128	96	116
210	206.0	214.0					132.5	145	128.5	141	122	137	116	131	107.5	125	93	113
220	216.0	224.0					142.5	155	138.5	151	132	147	126	141	117.5	135	103	123
230	226.0	234.0									142	157	136	151	127.5	145	113	133
240	236.0	244.0									152	167	146	161	137.5	155	123	143
250	246.0	254.0									162	177	156	171	147.5	165	133	153
260	256.0	264.0									172	187	166	181	157.5	175	143	163
270	266.0	274.0									182	197	176	191	167.5	185	153	173
280	276.0	284.0									192	207	186	201	177.5	195	163	183
290	286.0	294.0									202	217	196	211	187.5	200	173	193

$\alpha$   $l_{g \max} = l_{\text{nom}} - b$ ,  $l_{s \min} = l_{g \max} - 5p$

When  $l_{s \min}$  as calculated by the formula in  $\alpha$  is less than  $0.5d$  then it's value shall be  $0.5d$  and  $l_{g \max} = l_{s \min} + 3p$ . They are shown above the stepped line