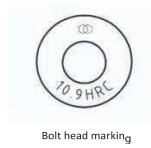
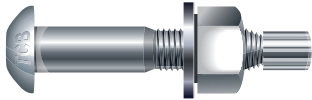


TC Bolts 10.9 HSFG



TCB Greenkote PM1 Grade 10.9 (H.S.F.G) Tension Control Bolts



Features and Benefit

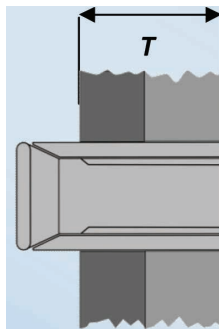
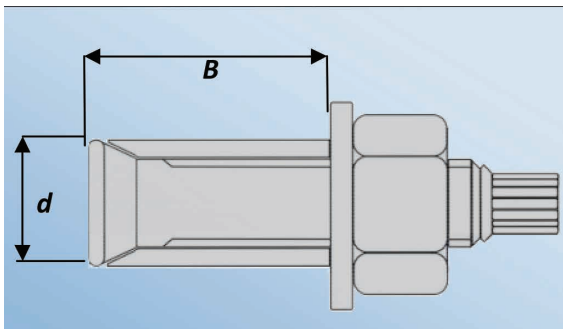
- Pre-loaded fixing for structural steelwork
- consistence tension
- Visual inspection
- Greenkote® coating treatment avoid hydrogen embrittlement
- fast, quiet and safety installation
- no HAVS, and low on-site noise
- no calibrated tools needed
- Greenkote® accepts any paint



EN14399-1

Diameter			M12	M16	M20	M22	M24	M27	M30	M36
p	Thread Pitch	[mm]	1.8	2.0	2.5	2.5	3.0	3.0	3.5	4.0
b	(L≤125)	[mm]	30.0	38.0	46.0	50.0	54.0	60.0	66.0	78.0
b	(125 < L ≤ 200)	[mm]	-	44.0	52.0	56.0	60.0	66.0	72.0	84.0
b	(L > 200)	[mm]	-	-	65.0	69.0	73.0	79.0	85.0	97.0
dk	min.	[mm]	21.0	27.0	34.0	38.5	43.0	48.0	52.0	66.0
dw	min.	[mm]	20.0	26.0	33.0	37.0	41.0	46.0	50.0	61.0
k	nom.	[mm]	8.0	10.0	13.0	14.0	15.0	17.0	19.0	23.0
k	max.	[mm]	8.8	10.8	13.9	14.9	15.9	17.9	2.0	24.0
k	min.	[mm]	7.2	9.2	12.1	13.1	14.1	16.1	18.0	22.0
ds	max.	[mm]	12.70	16.70	20.84	22.84	24.84	27.84	30.84	37.00
ds	min.	[mm]	11.30	15.30	19.16	21.16	23.16	26.16	29.16	35.00
R	nom.	[mm]	18.00	20.00	22.00	23.00	25.00	27.00	30.00	36.00
F1	min.	[mm]	11.00	13.00	15.00	15.50	16.00	19.00	21.00	25.00
F2	max.	[mm]	16.00	18.00	20.00	21.00	21.50	24.00	26.00	31.00

TCB Greenkote PM1 Grade 10.9 Tubolt



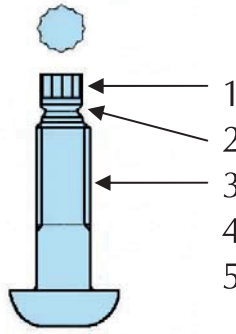
Features and Benefit

- Non-preloaded blind fixing for hollow section and associated steelwork
- standard 26mm clearance hole
- Grade 10.9 bolt offers greater shear resistance
- fast, quiet and safety installation
- Visual inspection, no calibrated tools needed

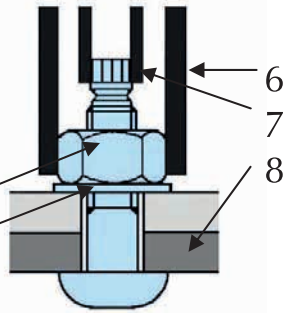
TCB Greenkote Tubolt

	Tensile Resistance F _t ,R _d (kN) 78	Shear Resistance F _v ,R _d (kN) 216	Clamping Load kN 56
	<i>d</i> (mm)	<i>B</i> (mm)	<i>T</i> _{grip} (mm)
TB16-A		35±0.3	20 to 30
TB16-B	25 ± 0.2	45±0.3	30 to 40
TB16-C	(to install in standard 26mm clearance hole)	55±0.3	40 to 50
TB16-D		65±0.3	50 to 60
TB16-E		75±0.3	60 to 70

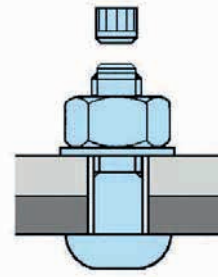
Before installation



During installation

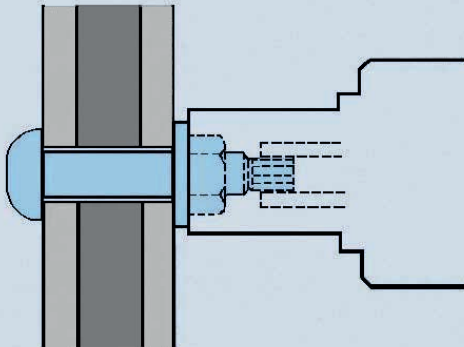


After installation



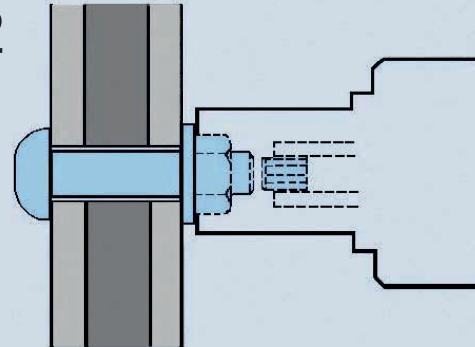
- 1 Spline
- 2 Break-neck
- 3 Thread
- 4 HRD Nut
- 5 Washer
- 6 Outer socket
- 7 Inner socket
- 8 Grip

1



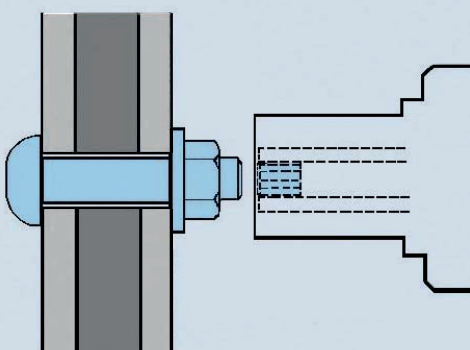
The inner socket of the shear wrench fits over the bolts spline while the outer socket fits over the nut.

2



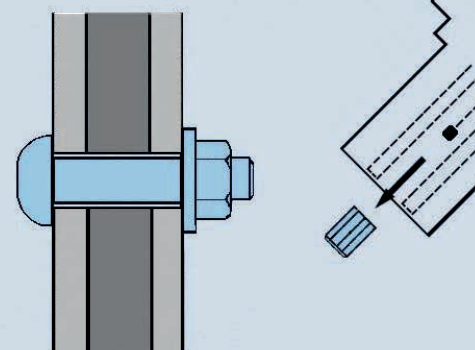
Press the trigger switch. The outer socket rotates clockwise and tightens the nut. When the correct preload is reached the outer socket stops rotating, the inner socket counter rotates and shears the spline off.

3



Stop the wrench and pull the outer socket off the nut. The spline is retained in the inner socket.

4



The wrench has a second trigger to eject the spline safely. The bolt is now properly installed with the correct tension.

HIGH STRENGTH TENSION CONTROL BOLTS (TCB) (BS EN 14399-10)



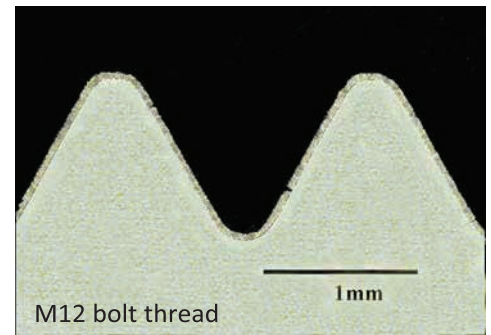
Greenkote® is an innovative diffusion coating incorporating the very latest technology. The patented process is a Thermo-Chemical Surface Modification (TCSM) which can be applied to various metals, alloys, sintered ferrous base materials, grey iron and cast iron. Unlike conventional coatings, Greenkote® is totally environmentally friendly and does not produce any solid, liquid or gaseous toxic wastes. The process is also free of chrome, cadmium, acids, cyanides and chlorides.



Standard of coating: PM-1 (average 25µm)
Coating Composition: Zn-Al polymetallic composition

Advantages of Greenkote®

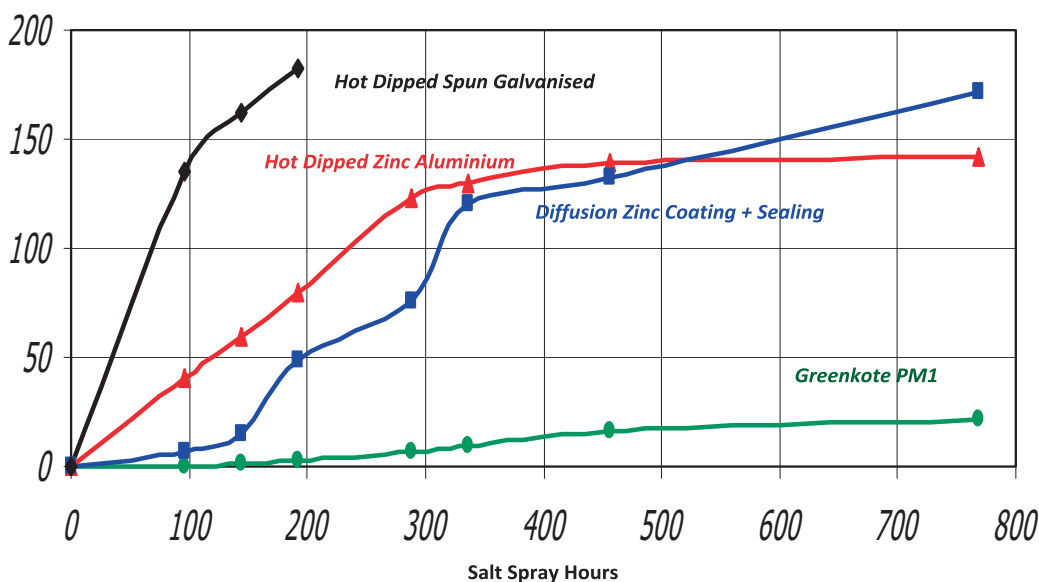
- Diffusion sacrificial corrosion resistance coating
- High degree of wear and abrasion resistance
- Salt spray resistance up to 1200 hours
- Long term corrosion protection up to 350°C (752°F)
- No hydrogen embrittlement
- Thickness uniformity ±10% maximum
- Relatively low processing temperature
- Excellent preparation for painting, duplex coatings, adhesives and rubber mouldings



***Excellent paint pull-off test results achieved with the following international paint manufacturers**

International Paint Ltd Leigh's Paints	Ameron International Sigma Coatings	E. Wood Ltd Carboline Co
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ASTM B117 Salt Spray Test 1 - Coating Loss



Failure is reached when the area of substrate corrosion exceeds 5% of the total sample area.

Grip Tolerances for TCBs (using 1 x HRC Nut and 1 x Harden Washer)

Dia. / Length	M12		M16		M20		M22		M24		M27		M30		M36	
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
30	13	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
35	13	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	13	21	15	16	-	-	-	-	-	-	-	-	-	-	-	-
45	13	26	15	21	-	-	-	-	-	-	-	-	-	-	-	-
50	18	31	15	26	21	21	-	-	-	-	-	-	-	-	-	-
55	23	36	15	31	21	26	23	22	-	-	-	-	-	-	-	-
60	-	-	15	36	21	31	23	27	25	25	-	-	-	-	-	-
65	33	46	25	41	21	36	21	32	25	30	-	-	-	-	-	-
70	-	-	30	46	24	41	21	37	25	35	30	31	-	-	-	-
75	43	56	35	51	27	46	27	42	26	40	-	-	-	-	-	-
80	-	-	40	56	34	51	30	47	26	45	29	41	22	38	-	-
85	-	-	-	-	39	56	35	52	31	50	-	-	-	-	-	-
90	-	-	46	66	42	61	40	57	35	55	32	51	32	48	-	-
95	-	-	-	-	49	66	45	62	41	60	-	-	-	-	-	-
100	-	-	57	76	54	71	50	67	45	65	42	61	42	58	24	47
105	-	-	62	81	59	76	55	72	51	70	-	-	-	-	-	-
110	-	-	67	86	64	81	60	77	55	75	52	71	52	68	-	-
115	-	-	-	-	69	86	-	-	61	80	-	-	-	-	-	-
120	-	-	77	96	74	91	70	87	64	85	61	81	62	78	44	67
125	-	-	-	-	79	96	-	-	71	90	-	-	-	-	-	-
130	-	-	87	106	81	101	80	97	71	95	71	91	72	88	-	-
135	-	-	-	-	86	106	-	-	-	-	-	-	-	-	-	-
140	-	-	97	116	91	111	90	107	81	105	81	101	82	98	64	87
145	-	-	-	-	96	116	-	-	-	-	-	-	-	-	-	-
150	-	-	107	126	101	121	100	117	91	115	91	111	92	108	-	-
155	-	-	-	-	106	126	-	-	-	-	-	-	-	-	-	-
160	-	-	117	136	111	131	110	127	101	125	101	121	102	118	84	107
165	-	-	-	-	116	136	-	-	-	-	-	-	-	-	-	-
170	-	-	127	146	-	-	120	137	111	135	111	131	112	128	94	117
175	-	-	-	-	126	146	-	-	-	-	-	-	-	-	-	-
180	-	-	-	-	-	-	-	-	121	145	121	141	122	138	104	127
185	-	-	-	-	136	156	-	-	-	-	-	-	-	-	-	-
190	-	-	-	-	-	-	-	-	131	155	131	151	132	148	114	137
200	-	-	-	-	151	171	150	167	141	165	141	161	142	158	124	147
210	-	-	-	-	-	-	160	177	151	175	-	-	152	168	134	157
220	-	-	-	-	171	191	-	-	161	185	161	181	162	178	144	167
230	-	-	-	-	-	-	-	-	171	195	-	-	-	-	-	-
240	-	-	-	-	-	-	-	-	181	205	181	201	182	198	164	187
260	-	-	-	-	-	-	-	-	201	225	-	-	202	218	184	207
280	-	-	-	-	-	-	-	-	221	245	-	-	222	238	204	227

* This grip tolerance chart has been compiled to meet the technical requirements of EN 1092-2 section 8.2.2 (stated below):

Note from BS EN 1092-2:2008 section 8.2.2

Reference Min. Grip: For preloaded bolts, at least four full threads (in addition to the thread run out) shall remain clear between the bearing surface of the nut and the unthreaded part of the shank.

Reference Max. Grip: The length of protrusion shall be at least the length of one thread pitch measured from the outer face of the nut to the end of the bolt.