Weathering Grade TCBs

European Specifications

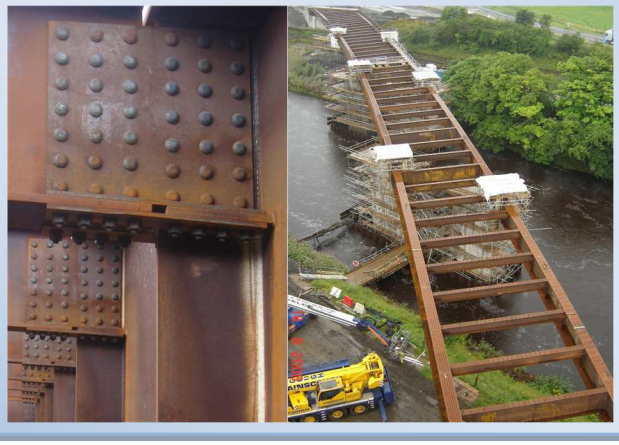
The European standard for preloaded bolting is EN 14399-1 however no specific information on weathering grade steel is detailed within this standard. The only reference to weathering grade steel in relationship to structural bolting assemblies is detailed in EN 1090-2 section 5.6.6 which contains the following information;

- *Weather resistant assemblies shall be made of improved atmospheric corrosion resistance material the chemical composition of which shall be specified.*
- *NOTE Type 3 Grade A fasteners to ASTM standard A325 would be suitable*
- *Their mechanical characteristics, performance and delivery conditions shall conform to the requirements in EN 14399-1 or EN 15048-1 as relevant.*

TCB Assembly Specifications

Weathering grade TCBs are available as class 10.9/10 in M24 & M30 diameter only. Bolt and nut dimensions, markings, specifications and reference standards are in accordance with EN 14399-10 and assembly preloads meet the minimum as specified in EN 1090-2 table 19.

Bolts are manufactured with a cup head with nuts in the HRD style along with an additional mark 'W' stamped on the bolt head, nut and washer to denote they are of a weathering grade. A sample 3.1 Certificate of Inspection is detailed on page 2.



Haydon Bridge, England

Chemical composition

WS TCB bolting assemblies are manufactured from Posten30W grade steel of which the chemical composition is detailed below. TCB Ltd have been supplying Weathering grade TCB assemblies for 20 years.

	Chemical Component (%)								
	C	Si	Mn	P	S	S-Al	Cu	Ni	Cr
POSTEN30W	0.30 to 0.38	0.20 to 0.30	0.70 to 0.90	0.025 max	0.025 max	0.02 to 0.05	0.25 to 0.45	0.30 to 0.40	0.60 to 0.90

CERTIFICATE OF INSPECTION

Tension Control Bolts Ltd
TCB House
Clywedog Road South
Wrexham Industrial Estate
Wrexham LL13 9XS
United Kingdom
T: + 44 (0) 1978 661122
F: +44 (0) 1978 661177
E: info@tcbolts.com

Certificate number: J420170327136
Customer: SAMPLE
PO Number: 123456
Date issued: 2017.03.17
Date tested: 2017.01.16
Specifications:
Set: EN 14399-1
Bolt: EN 14399-10
Nut: EN 14399-10
Washer: JSS II 09 - 1996

Description: HIGH STRENGTH STRUCTURAL BOLTING ASSEMBLIES, WEATHERING GRADE HRC
Size: M24 X 90
Finish: UNCOATED
Set Lot No: 2016291700
Marking: 10.9W/10W/W

1. Chemical composition (%)

			C x100	Si x100	Mn x100	P x1000	S x1000	Cr x100	Mo x100	Ni x100	B x10000	Cu x100
Bolt	Spec.	min										
		max										
Heat no.	SF71003		36	26	77	14	5	66	1	34	2	33
Nut	Spec.	min										
		max										
Heat no.	SF71005		36	26	77	10	7	69		34	1	33
Washer	Spec.	min										
		max										
Heat no.	L34875		19	21	90	12	6	37		33		22

2. Mechanical properties

2.1 Bolt

Lot No: 2016291600
Class: 10

		hardness				specimen tensile				proof load		wedge tensile load	impact test -20°C
		n = 5		n = 5		n = 5				n = 5			
		surface		core		yield strength	tensile strength	elongation	reduction of area	load	elongation	n = 5	n = 5
Unit	Min			HRC		N/mm²	N/mm²	%	%	kN		kN	J
	Max	HV		HRC							µm		
Spec.	Min			32		940	1040	9	48	293		367	27
	Max		390		39						12.5		
Result	Min	HV	344		35	1027	1095	14	53	293	4.0	394	48
	Max		354		36	1043	1114	15	54	293	5.0	397	54
	Avg		349		36	1035	1105	14	53	293	4.6	396	51
Wedge angle °												6	

2.2. Nut

Lot No: 1006763200
Class: 10

		hardness		proof load
		n = 5		n = 5
Unit	Min	HV		kN
	Max	HV		
Spec.	Min	272		439
	Max	353		
Result	Min	HV	302	PASS
	Max	HV	321	PASS
	Avg	HV	311	PASS

2.3 Washer

Lot No: 1006310800
Class: F35

		hardness		
		n = 5		
Unit	Min	HRC		
	Max	HRC		
Spec.	Min	35		
	Max	45		
Result	Min	HRC	41	
	Max	HRC	42	
	Avg	HRC	42	

3. Assembly tension test

3.1. Individual tension

		$F_{r\,min}$
		n = 5
Unit	Min	kN
	Max	
Spec.	Min	247
	Max	
Result	Min	280
	Max	295
	Avg	

3.2 Mean tension

		$F_{r\,mean\,min}$
		n = 5
Unit	Min	kN
	Max	
Spec.	Min	272
	Max	
Result	Min	
	Max	
	Avg	288

3.3 Co-efficient of variation

	V_{Fr}
	n = 5
Unit	
Spec.	≤ 0,06
Result	0.04

Certificate of Inspection Type 3.1 in accordance wth EN 10204:2004

Ben Hatley, Quality Dept