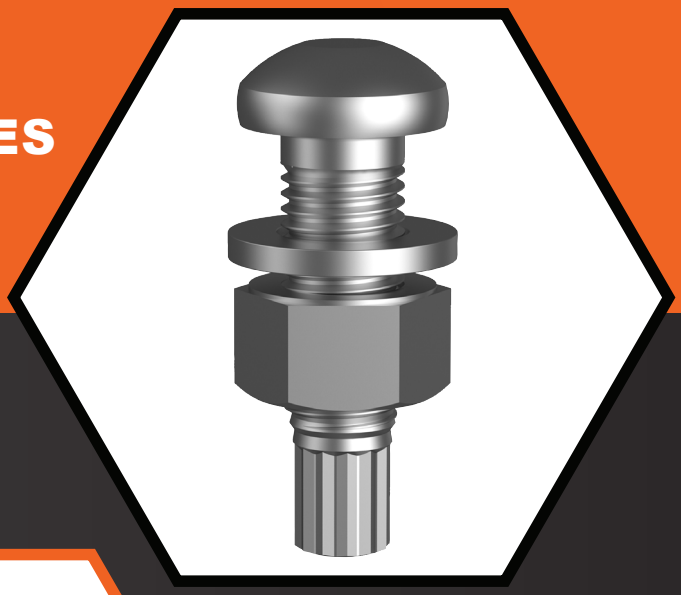
TCBOLTS STRUCTURAL K0 CLASS 10.9 HRC ASSEMBLIES

EN 14399-10



Bolting made safe, easy and accurate

Structural Connections | Class 10.9HRC | Shear Wrench Installation

PRODUCT **RELEASE**

HOBSON ENGINEERING

2409231PR

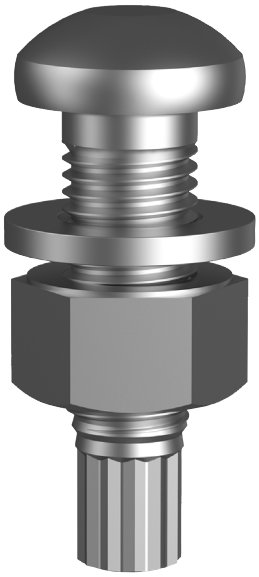
TCBOLTS Structural K0 HRC Assemblies

Tension controlled bolts and matching nuts are designed to eliminate operator error and installation issues in structural bolted connections.

Installation is completed using light weight ergonomic tools that provide reliable and safe operation.

The TCBOLT System Delivers

- Consistent tension
- One person - one sided Installation
- Reduced installation issues and installer fatigue/injury
- No torsional forces during installation
- Accurate visual inspection



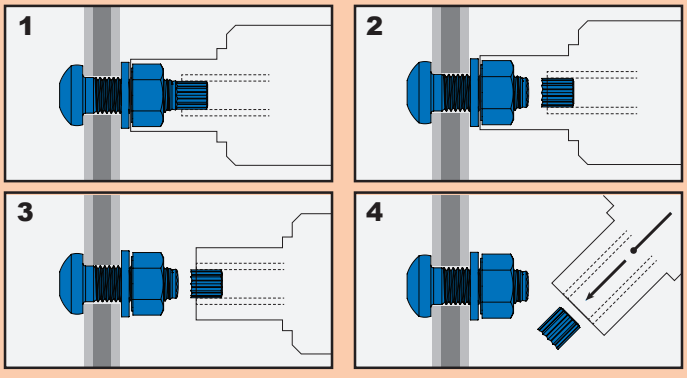
TCBOLTS STRUCTURAL K0 HRC ASSEMBLY
HOT DIP GALVANISED / EN14399-10:2018 / CLASS 10.9

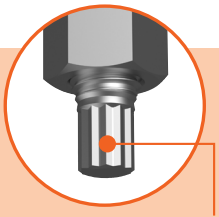
Part	*Size	Length L (mm)
KBCT9GCM16	M16	40-80
KBCT9GCM20	M20	45-100
KBCT9GCM22	M22	60-100
KBCT9GCM24	M24	60-150
KBCT9GCM30	M30	80-200
KBCT9GCM36	M36	90-240

*Hole size in steel work as per AS4100

» For use with **TONE®** **TCBOLT** Shear Wrench

Installation





TONE®

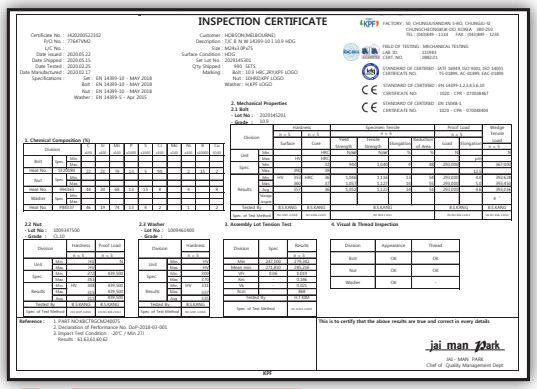
The Spline:

TCBOLTS are installed with **TONE® TCBOLT** Shear Wrenches. When the correct pre-load is reached the outer socket stops rotating. The inner socket counter rotates and shears the spline off. The wrench then ejects the spline safely. The bolt is now properly installed with the correct tension.

K0 Quality Assurance Documentation Online

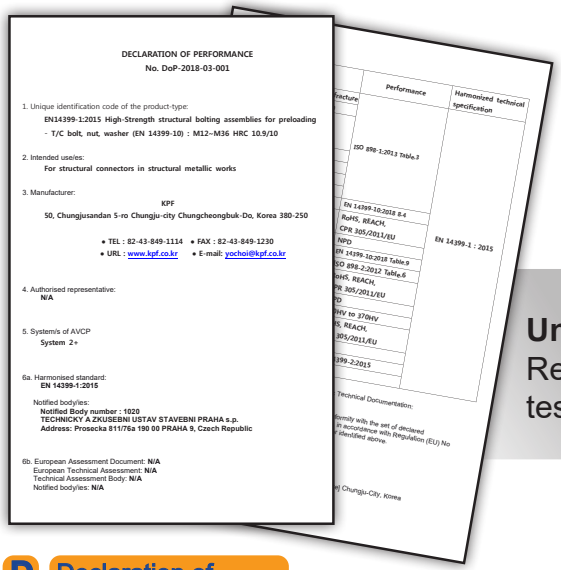
Test & ILAC/NATA Certificates

Trace Number	Description	Category	Part Number	Certificates
2029145301-2RY	TCB/N/W 10.9 K0 HDG:M24 X 75	Structural	KBCT9GCM240075	CE F D
2029145500-2RY	TCB/N/W 10.9 K0 HDG:M24 X 80	Structural	KBCT9GCM240080	CE F D



F Factory Production Control (FPC)

CE The European Union's Certificate of conformity



D Declaration of Performance (DoP)

Unique 3-Letter Code
Reference for online test certification

TCBOLTS Structural K0 HRC Assemblies

EN 14399-10 Tension controlled assemblies are designed to eliminate operator error and installation issues in structural bolted connections. By using the specified material thickness and correct hole size, installation is fast and guaranteed.

Technical

- Class 10.9 for higher loads facilitates the use of smaller diameter bolts
- TCBOLTS can be used in both shear and tension connections
- No bolt relaxation as no torsional twisting is induced during tightening
- Does not loosen with vibration - no locknut required
- Dome head- no rotation of head when installing
- No lubrication required if stored correctly

OH&S

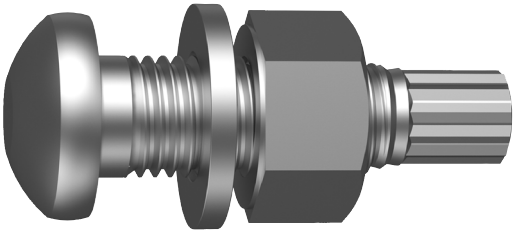
- Non-impacting electric shear wrenches
- Reduced operator fatigue
- No air compressors and dangerous hoses

Applications

Connections in structural steel including:

- Bridges
- Stadiums
- High rise
- Airports
- Road and rail gantries
- Wind farms
- LNG plants
- Refineries

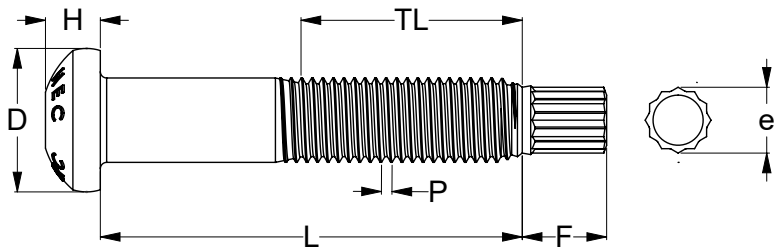
Material	10.9 **Class 10.9**
Finish	HDG **Hot Dip Galvanised**



Bolt dimensions

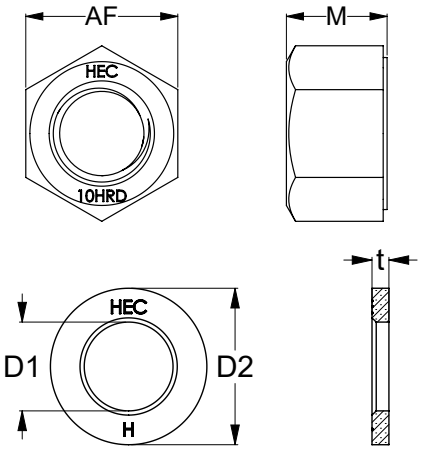
Part	Nominal Size	Hole In Steel Work	Thread Pitch	Head Ø	Head Height	Thread Length			Spine Ø	Spline Break-off Length
			P_{Nom}	D_{Min}	H_{Nom}	TL_{Ref}			e_{Min}	F_{Max}
						L ≤ 125	125 ≤ L ≤ 200	L ≥ 200		
KBCT9GCM12	M12	14	1.75	21.0	8	30	-	-	8.36	16.0
KBCT9GCM16	M16	18	2.0	27.0	10	38	44	-	12.43	18.0
KBCT9GCM20	M20	22	2.5	34.0	13	46	52	65	15.60	20.0
KBCT9GCM22	M22	24	2.5	38.5	14	50	56	59	17.06	21.0
KBCT9GCM24	M24	27	3.0	43.0	15	54	60	73	18.65	21.5
KBCT9GCM27	M27	30	3.0	48.0	17	60	66	79	21.13	24.0
KBCT9GCM30	M30	33	3.5	52.0	19	66	72	85	23.50	26.0
KBCT9GCM36	M36	39	4.0	66.0	23	78	84	97	28.50	31.0

[a] dimensions apply before coating
[b] all dimensions in mm



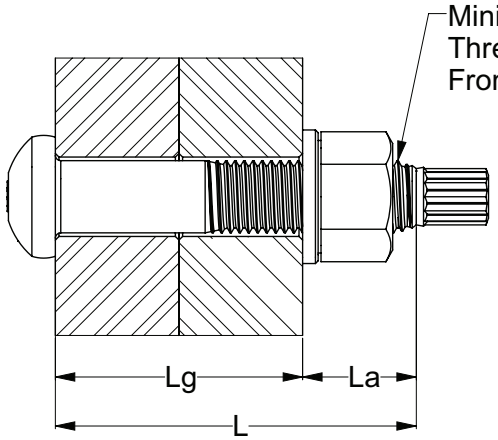
TCBOLTS Structural K0 HRC Assemblies

Nut Dimensions (HRD)			Washer Dimensions (EN14399-5)		
Nominal Size	Across Flats	Nut Height	Inside Ø	Outside Ø	Thickness
	AF_{Max}	M_{Max}	$D1_{Min}$	$D2_{Max}$	t_{Nom}
M12	22	12.35	13	24	3
M16	27	16.35	17	30	4
M20	32	20.65	21	37	4
M22	36	22.65	23	39	4
M24	41	24.65	25	44	4
M27	46	27.65	28	50	5
M30	50	30.65	31	56	5
M36	60	36.80	37	66	6



Determining required bolt length

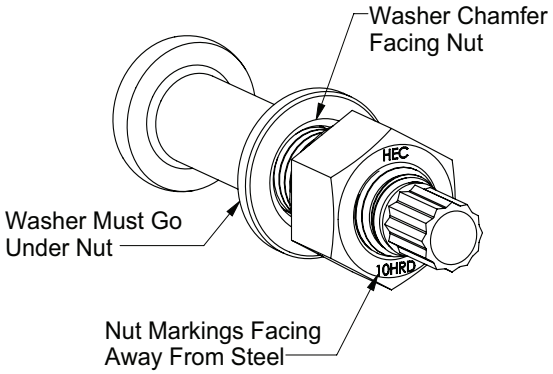
Nominal Size	Additional Length for Nut and Washer
	L_{nw} (mm)
M12	18
M16	23
M20	27
M22	29
M24	32
M27	35
M30	38
M36	46



Bolt length (L) = Grip Length (Lg) + Added Length (La)

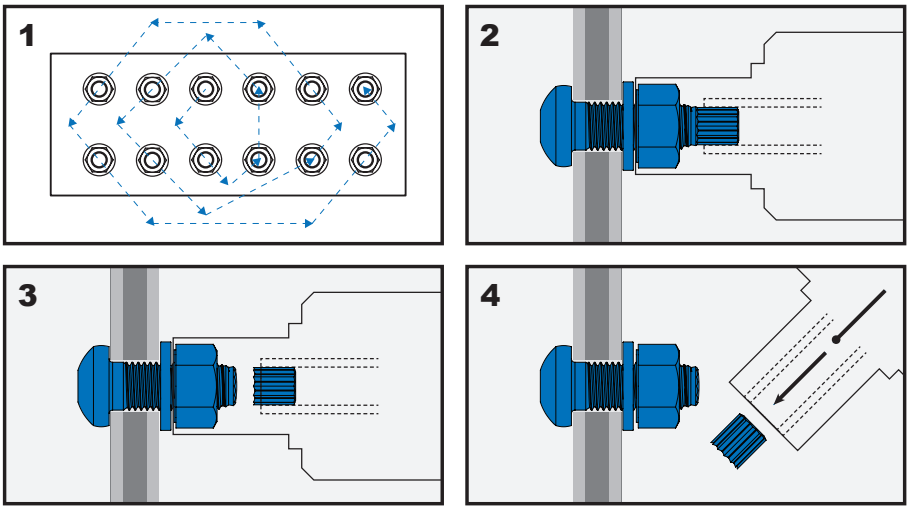
Bolt length (L) is determined by adding the nut, washer and 2 thread pitch lengths (L_{nw}) to the required grip length (L_g).

Correct assembly configuration



- Washer must be placed under the nut with the chamfered side facing away from the steel-work.
- The washer chamfer does not affect the final tension of the assembly but allows for the nut to be removed easily in temporary fixings.
- Nut markings should face away from the steel work to allow for easy identification.

Installation guide



Snugging of the nut can be achieved by using:

A. Podger spanner
B. Electric snug master [Tone® Model: SGS-5LE]
C. A few Impacts of an impact wrench

The selected option depends on the number and size of bolts in each connection.

Installation as per EN1090-2

1. Check that nut runs freely along bolt length prior to installation. Assemblies where the nut does not run freely after initial loosening should be discarded.
2. Before commencement of tensioning all components in the joint shall be fitted together and all bolt assemblies shall be brought to snug tight.
   Snug Tight: Prior to final tensioning of the bolts the steel plates in the connection must be brought into full contact i.e. No Gap. Correct tension of the bolts and so load transmission **WILL NOT** be achieved if a gap between the steel plates remains. Installers must be aware of any deformation in the steel particularly from welding
3. Insert spline end into inner-socket and nut into outer-socket. Ensure there is good engagement of the nut before proceeding.
4. Squeeze the power trigger to begin nut rotation, as the tightening proceeds the rotation speed gradually slows. Once the assembly is bedded there will be a distinct change in sound coming from the shear wrench. Release the power trigger and the gearing will backtrack to allow for disengagement.
5. Once all components are bedded the final tightening can occur. Reattached shear wrench and continue tightening.
6. When the designated torque has been reached rotation of the nut will stop and the inner-socket will shear off the spline end at the break neck.
7. Separate wrench from the nut. The spline end will remain in the inner-socket until ejected by squeezing the eject lever.

TCBOLTS Structural K0 HRC Assemblies

Mechanical properties

General requirements

	Bolt	Nut	Washer
General Requirements	EN 14399-1 and EN 14399-2		
Type of bolting assembly	HRC (EN14399-10: Bolt and Nut assemblies with calibrated preload)		
Dimensions and Tolerances	EN 14399-10	EN 14399-10	EN 14399-5
Property Class	10.9	10	Hardness Range: 300HV-370HV
Mechanical Properties	EN ISO 898-1	EN ISO 898-2	EN 14399-5
Finish - Coating	HDG to EN ISO 10684		

Mechanical properties

Mechanical Properties of Bolts AS4291.1					
Nominal Size	Stress Area	Proof Load	Min. UTS	Rockwell Hardness (HRC)	
	mm^2	kN	kN	min	max
12	84.3	70	87.7	32	39
16	157.0	130	163.0		
20	245.0	203	255.0		
22	303.0	252	315.0		
24	353.0	293	367.0		
27	459.0	381	477.0		
30	561.0	466	583.0		
36	817.0	678	850.0		

Minimum bolt tension

Minimum bolt tension at fracture of spline-end (EN14399-10)		
Nominal Size	Minimum Individual Value	Minimum Mean Value
	$F_{r\,min}$	$F_{r\,mean\,min}$
	$0.7 \times F_{ub} \times A_s$ [a]	$0.77 \times F_{ub} \times A_s$ [a]
	kN	kN
12	59	64
16	109	120
20	171	188
22	212	233
24	247	271
27	321	353
30	392	431
36	571	629

[a] F_{ub} is the nominal tensile strength of the bolt ($R_{m,\,nom}$).

Storage and Handling

Correct storage and handling of TCBOLTs is critical to maintain the friction factor.

- All assemblies must be protected from dirt and moisture.
- Only the assemblies to be used should be removed from the carton.
- Additional lubrication should never be applied to TCBOLTs.
- Dirty / Oily / Rusted assemblies should not be used.
- Changes to the coating or foreign matter will affect the tension achieved.

TONE® TCBOLTS Shear Wrench

To be used with TCBOLTs:

- For use with **TCBOLTs EN 14399-10 Class 10.9 HRC**
- Light weight
- Low noise
- Trigger for spline ejection
- Ergonomic

Features	Model		
	XT-GH-242EZ	XT-GV-302EZ	XT-GX-362EZ
Adaptable Bolts Diameter Range	M16, M20, M22, M24	M27, M30	M36
Rated Voltage (Single Phase)	240V	240V	240V
Rated Max. Torque (Nm)	950	1900	4000
No-Load Speed (RPM)	10	5	2.8
Weight (Main Body) (Kg)	6.2	6.7	10.1

Nominal Size	Socket Type	Tone® Shear Wrench Socket Attachments
		XT-GH-242EZ
M16	Inner	XT-GH-SI-416T
	Outer	XT-GH-SO-M416
M20	Inner	XT-GH-SI-420T
	Outer	XT-GH-SO-M420
M22	Inner	XT-GH-SI-422T
	Outer	XT-GH-SO-M422
M24	Inner	XT-GH-SI-424T
	Outer	XT-GH-SO-M424

PART: XT-GH-242EZ
M16, M20, M22, M24

Tool Supplied with
M24 Inner + Outer Sockets

Nominal Size	Socket Type	Tone® Shear Wrench Socket Attachments	
		XT-GV-302EZ	XT-GX-362EZ
M27	Inner	XT-GV-SI-V327T	-
	Outer	XT-GV-SO-VM327	-
M30	Inner	XT-GV-SI-V330T	-
	Outer	XT-GV-SO-VM330	-
M36	Inner	-	XT-GX-SI-X336T
	Outer	-	XT-GX-SO-XM336

PART: XT-GV-302EZ
M27, M30

Tool Supplied with
M30 Inner + Outer Sockets

PART: XT-GX-362EZ
M36

Tool Supplied with
M36 Inner + Outer Sockets