

General

1. Eurocodes stipulate that high strength bolt, nut, and washer assemblies (hereafter called bolting assemblies) shall be supplied by a single manufacturer, who are responsible for the performance of the bolting assemblies.
2. Bolts and nuts shall bear at least the manufacturers mark, property class, and type (washers shall bear at least the marking 'H' to indicate the product is thru-hardened).
3. The coating (and consequently the performance) of the bolting assembly is under control of the manufacturer.
4. CE or UKCA marking is only applicable to bolting assemblies, not individual assembly components.
5. High strength preloaded bolting assemblies shall be supplied with Type 3.1 Material Test Certificates (MTCs) in accordance with EN 10204.

Specific

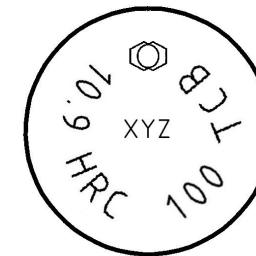
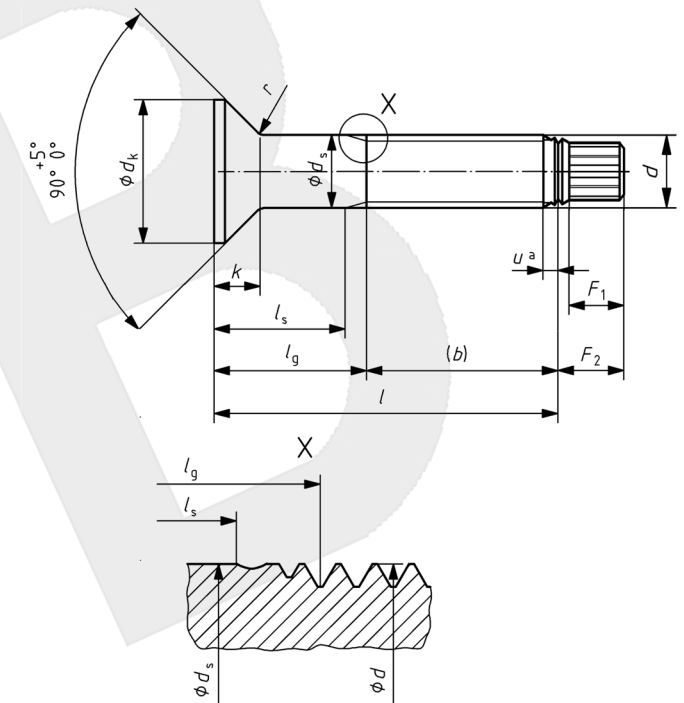
1. TCB bolting assemblies are supplied un-assembled, packed in steel kegs with the requisite nuts and washers packed in separate bags on top of the bolts.
2. Bolt heads and nuts are marked with a 3-character heat code that is specifically linked to the manufacturing lot number and is detailed on the Material Test Certificates. This provides full traceability of products back to the steel mill.
3. Bolt heads are stamped with the bolt length to aid correct identification on site.
4. TCB bolts and nuts are available as property class 10.9/10.
5. Nuts are supplied as the HRD type (nut height = 1D).
6. TCB bolting assemblies are supplied with the Greenkote[®] corrosion protection coating.

DIMENSIONS OF COUNTERSUNK HEAD BOLTS IN ACCORDANCE WITH BS EN 14399-10

Thread d		M12	M16	M20	M22	M24	M27	M30	M36
p		1.75	2.0	2.5	2.5	3.0	3.0	3.5	4.0
b	$\leq 125\text{mm}$	30	38	46	50	54	60	66	78
	$> 125 \leq 200\text{mm}$	-	44	52	56	60	66	72	84
	$> 200\text{mm}$	-	-	65	69	73	79	85	97
ds	max	12.70	16.70	20.84	22.84	24.84	27.84	30.84	37.00
	min	11.30	15.30	19.16	21.16	23.16	26.16	29.16	35.00
dk	max	24	32	40	44	48	54	60	72
	min	23.16	31.16	39.00	43.00	47.00	53.00	58.80	70.80
k	nom	8.0	10.1	13.0	14.0	16.0	17.5	19.5	23.0
	max	8.80	10.75	13.90	14.90	16.90	18.40	20.55	24.05
	min	7.25	9.25	12.10	13.10	15.10	16.10	18.45	21.95
r	max	1.6	1.6	2.0	2.0	2.0	2.5	2.5	2.5
	min	1.2	1.2	1.5	1.5	1.5	2.0	2.0	2.0
$F1$	min	11.0	13.0	15.0	15.5	16.0	19.0	21.0	25.0
$F2$	max	16.0	18.0	20.0	21.0	21.5	24.0	26.0	31.0
Spline a/f s_b	max	8	11.6	14.4	15.7	17.1	19.3	21.4	25.7
	min	7.4	11.0	13.8	15.1	16.5	18.7	20.8	25.1
Spline a/c e_b	min	8.36	12.43	15.60	17.06	18.65	21.13	23.50	28.50

Incomplete thread $u \leq 2p$

All dimensions in mm



Bolt Head Marking

BOLT LENGTH AND SHANK DIMENSIONS OF COUNTERSUNK HEAD BOLTS IN ACCORDANCE WITH BS EN 14399-10

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
45	43.75	46.25	-	15														
50	48.75	51.25	-	15	-	18												
55	53.50	56.5	16.25	25	-	18												
60	58.50	61.5	21.25	30	-	18												
65	63.50	66.5	26.25	35	-	18	-	23	-	24								
70	68.50	71.5	31.25	40	22	32	-	23	-	24								
75	73.50	76.5	36.25	45	27	37	-	23	-	24	-	28						
80	78.50	81.5	41.25	50	32	42	-	23	-	24	-	28	-	29.5				
85	83.25	86.75	46.25	55	37	47	26.5	39	-	24	-	28	-	29.5				
90	88.25	91.75	51.25	60	42	52	31.5	44	27.5	40	-	28	-	29.5	-	33.5		
95	93.25	96.75	56.25	65	47	57	36.5	49	32.5	45	-	28	-	29.5	-	33.5		
100	98.25	101.75	61.25	70	52	62	41.5	54	37.5	50	31	46	-	29.5	-	33.5		
110	108.25	111.75			62	72	51.5	64	47.5	60	41	56	35	50	-	33.5	-	39
115	113.25	116.75			67	77	56.5	69	52.5	65	46	61	40	55	31.5	49	-	39
120	118.25	121.75			72	82	61.5	74	57.5	70	51	66	45	60	36.5	54	-	39
130	128.0	132.0			76	86	65.5	78	61.5	80	55	70	49	64	40.5	58	-	39
140	138.0	142.0			86	96	75.5	88	71.5	90	65	80	59	74	50.5	68	-	39

a $l_{g \max} = l_{nom} - b$; $l_{s \min} = l_{g \max} - 5p$

When $l_{s \min}$ as calculated by the formula in a is less than $knom. + 0,5d$ then the bolts shall be fully threaded, and in the case $l_{g \max}$ is equal to a a_{max} as specified in ISO 3508 for product grade C. Fully threaded bolts are shown above the bold stepped line.

Ex stock sizes are indicated by the coloured cell and red figures

12 34

BOLT LENGTH AND SHANK DIMENSIONS OF COUNTERSUNK HEAD BOLTS IN ACCORDANCE WITH BS EN 14399-10

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
150	148.0	152.0			96	106	85.5	98	81.5	94	75	90	69	84	60.5	78	46	66
160	156.0	164.0			106	116	95.5	108	91.5	110	85	100	79	94	70.5	88	56	76
170	166.0	174.0			116	126	105.5	118	101.5	120	95	110	89	104	80.5	98	66	86
180	176.0	184.0			126	136	115.5	128	111.5	130	105	120	99	114	90.5	108	76	96
190	186.0	194.0			136	146	125.5	138	121.5	140	115	130	109	124	100.5	118	86	106
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

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

When $l_{s \min}$ as calculated by the formula in a is less than $k \text{ nom.} + 0,5d$ then the bolts shall be fully threaded, and in the case $l_{g \max}$ is equal to a l_{max} as specified in ISO

Ex stock sizes are indicated by the coloured cell and red figures

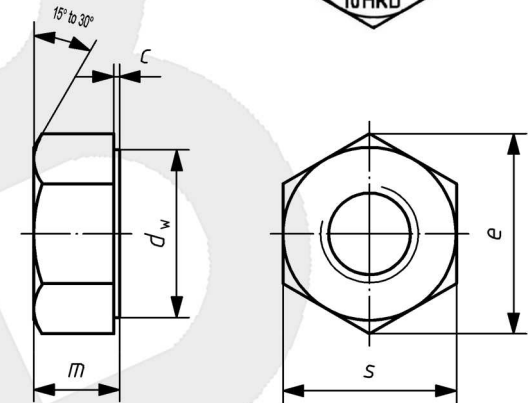
12 34

DIMENSIONS OF HRD NUTS IN ACCORDANCE WITH BS EN 14399-10

Nominal diameter		M12	M16	M20	M22	M24	M27	M30	M36
<i>p</i>		1.75	2	2.5	2.5	3	3	3.5	4
<i>d_w</i>	max	's' actual							
	min	20.1	24.9	29.5	33.3	38	42.8	46.6	55.9
<i>e</i>	min	23.91	29.56	35.03	39.55	45.2	50.85	55.37	66.44
<i>m</i>	max	12.35	16.35	20.65	22.65	24.65	27.65	30.65	36.65
	min	11.65	15.65	19.35	21.35	23.35	26.35	29.35	35.35
<i>c</i>	max	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
	min	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
<i>s</i>	max	22	27	32	36	41	46	50	60
	min	21.16	26.16	31	35	40	45	49	58.8

All dimensions in millimeters

Nut Marking

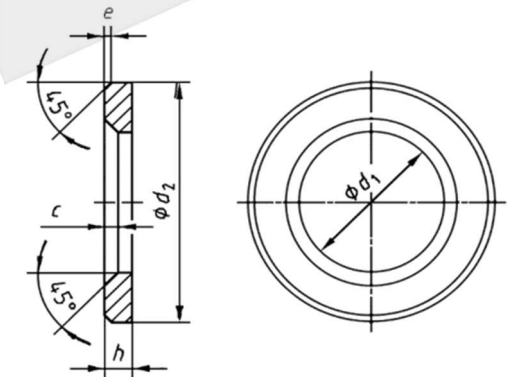


DIMENSIONS OF WASHERS IN ACCORDANCE WITH BS EN 14399-6 (HD & H)

Nominal diameter		M12	M16	M20	M22	M24	M27	M30	M36
<i>d₁</i>	min	13	17	21	23	25	28	31	37
	max	13.27	17.27	21.33	23.33	25.33	28.52	31.62	37.62
<i>d₂</i>	min	25.48	31.38	39.38	43.38	47.38	49.00	54.80	64.80
	max	26	32	40	44	48	50	56	66
<i>h</i>	min	2.7	3.7	3.7	3.7	3.7	4.4	4.4	5.4
	max	3.3	4.3	4.3	4.3	4.3	5.6	5.6	6.6
Marking		HD	HD	HD	HD	HD	H	H	H

M12 to M24 washers have a larger *d₂* dimensions and are marked 'HD'

All dimensions in millimeters



MECHANICAL PROPERTIES OF CLASS 10.9 BOLTS IN ACCORDANCE WITH BS EN 14399-10

		M12	M16	M20	M22	M24	M27	M30	M36
Stress Area	mm ²	84.3	157	245	303	353	459	561	817
Minimum Ultimate Tensile Strength	kN	87.7	163	255	315	367	477	583	850
Proof Load	kN	70	130	203	252	293	381	466	678
Hardness (Min/Max)	HRC	32 / 39							

MECHANICAL PROPERTIES OF CLASS 10 HRD NUTS IN ACCORDANCE WITH BS EN 14399-10

		M12	M16	M20	M22	M24	M27	M30	M36
Stress Area of mandrel	mm ²	84.3	157	245	303	353	459	561	817
Proof Load	kN	104.9	195.5	305	377.2	439.5	571.5	698.4	1017.1
Hardness (Min/Max)	HV	272 / 353							

SPECIFICATIONS FOR BOLTS AND REFERENCE STANDARDS

General requirements		BS EN 14399-1 and BS EN 14399-2
Thread	Tolerance class	6g
	Standard	ISO 261, ISO 965-2
Mechanical properties	Property class	10.9
	Standards	ISO 898-1
Tolerances	Product grade	C except : dimension r. Tolerance on length ≥ 160 mm: ± 4.0 mm
	Standard	ISO 4759-1
Finish - Coating	Greenkote	To specification
	Additional protection against corrosion	After tightening, the non-coated area appearing at the end of the bolt resulting from the fracture of the spline-end may be protected against corrosion by applying an efficient protective treatment (e.g. by a complementary zinc rich paint).
Surface integrity		Limits of surface discontinuities as specified in EN 26157-1
Acceptability		For acceptance procedure, see ISO 3269



SPECIFICATIONS FOR NUTS AND REFERENCE STANDARDS

General requirements		BS EN 14399-1 and BS EN 14399-2
Thread	Coating of the bolt	Greenkote
	Tolerance class	Up to 6AZ
	Standard	ISO 261, ISO 965-2, ISO 965-5
Mechanical properties	Property class	10
	Standards	ISO 898-2
Tolerances	Product grade	B
	Standard	ISO 4759-1
Finish - Coating	Greenkote	To specification
Surface integrity		Limits of surface discontinuities as specified in ISO 6157-1
Acceptability		For acceptance procedure, see ISO 3269



SPECIFICATIONS FOR WASHERS AND REFERENCE STANDARDS

General requirements		BS EN 14399-1 and BS EN 14399-2
Mechanical properties	Hardness range	300 HV to 370 HV
Tolerances	Product grade	A
	Standard	ISO 4759-3
Finish - Coating	Greenkote	To specification
Workmanship		Parts shall be uniform and free of irregularities or detrimental defects. No protruding burrs shall appear on the washers
Acceptability		For acceptance procedure, see ISO 3269