PRE-LOAD

BOLT ASSEMBLIES HR
BS EN 14399-3:2015

CE

EN14399-1

Cert No:
0038/CPR/4006773/B

BAPP

Group of Companies

Pre-Load Bolt Assemblies HR

BS EN 14399-3:2015

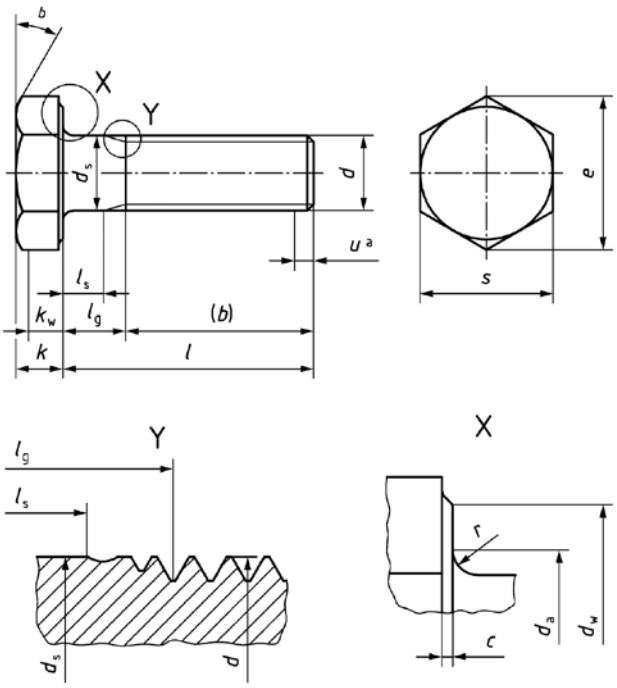
BS EN 14399-3 HR Bolt Dimensions. Classes 8.8 & 10.9

Thread *d*	*P*[a]	*b* (ref).			*c*		d_a	d_s		d_w		*e*	*k*			k_w	*r*	*s*	
		[b]	[c]	[d]	max.	min.	max.	max.	min.	max.	min.	min.	nom.	max.	min.	min.	min.	max.	min.
M12	1.75	30	-	-	0.8	0.4	15.2	12.70	11.30	[e]	20.1	23.91	7.5	7.95	7.05	4.90	1.2	22	21.16
M16	2.00	38	44	-	0.8	0.4	19.2	16.70	15.30		24.9	29.56	10	10.75	9.25	6.50	1.2	27	26.16
M20	2.50	46	52	65	0.8	0.4	24.4	20.84	19.16		29.5	35.03	12.5	13.40	11.60	8.10	1.5	32	31.00
M22	2.50	50	56	69	0.8	0.4	26.4	22.84	21.16		33.3	39.55	14	14.90	13.10	9.2	1.5	36	35.00
M24	3.00	54	60	73	0.8	0.4	28.4	24.84	23.16		38.0	45.20	15	15.90	14.10	9.9	1.5	41	40.00
M27	3.00	60	66	79	0.8	0.4	32.4	27.84	26.16		42.8	50.85	17	17.90	16.10	11.3	2.0	46	45.00
M30	3.50	66	72	85	0.8	0.4	35.4	30.84	29.16		46.6	55.37	18.7	19.75	17.65	12.4	2.0	50	49.00
M36	4.00	78	84	97	0.8	0.4	42.4	37.00	35.00		55.9	66.44	22.5	23.55	21.45	15.0	2.0	60	58.80

[a] *P* is the pitch of the thread
[b] For lengths $l_{nom} \leq 125$ mm
[c] For lengths 125 mm $< l_{nom} \leq 200$ mm
[d] For lengths $l_{nom} > 200$ mm
[e] $d_{w\ max} = s_{actual}$

Material		**Steel**
General Requirements		BS EN 14399-1 and BS EN 14399-2
Thread	Tolerance Class	6g[a]
	International Standards	ISO 261, ISO 965-2
Mechanical properties	Property Class	8.8 or 10.9
	European Standard	BS EN ISO 898-1
Tolerances	Product Grade	C except: dimensions *c* and *r*. Tolerance for lengths ≥ 160 mm ± 4.0mm
	European Standard	BS EN ISO 4759-1
Finish - Coating[b]	Uncoated	as processed[c]
	Hot Dip Galvanized	BS EN ISO 10684
	Others	to be agreed[d]
Surface Integrity		Limits for surface discontinuities as specified in EN 26157-1.
Acceptability		For acceptance procedure, see BS EN ISO 3269.

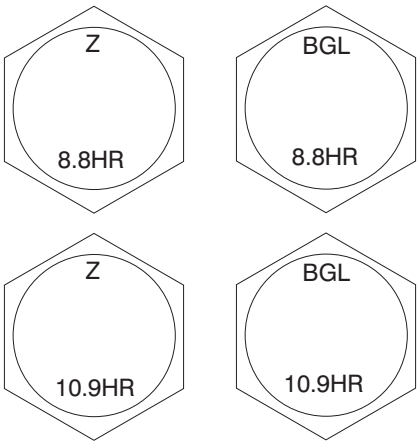
[a] The tolerance class specified applies to bolts without or before any coating. Hot-dip galvanized bolts are intended for assembly with nuts tapped oversize to 6AZ.
[b] Attention is drawn to the need to consider the risk of hydrogen embrittlement in the case of bolts of property class 10.9, when selecting an appropriate surface treatment process (e.g. cleaning and coating), see the relevant coating standards.
[c] "As processed" means the normal finish resulting from manufacture with a light coating of oil.
[d] Other coatings may be negotiated between the purchaser and the manufacturer provided they do not impair the mechanical properties or the functional characteristics. Coatings of cadmium or cadmium alloy are not permitted.



Bolt/Nut/Washer Assembly System HR		
General Requirements	BS EN 14399-1	
Materials & Manufacture	BS EN 14399-3	
Marking	HR	
Property Classes	8.8/8	10.9/10
Washer(s)	BS EN 14399-5 or BS EN 14399-6	
Marking	H	
Suitable Test for Preloading	BS EN 14399-2	
"K" Class Designation	"K0 & K2" Class	

Key
a incomplete thread u ≤ 2P
b 15° to 30°

BS EN 14399-3 HR Head Marking



CE
EN14399-1
Cert No:
0038/CPR/4006773/B

IMPORTANT NOTE

It is a requirement of BS EN 14399 that the bolt, nut and washer assembly is supplied by one manufacturer who is responsible for the function of the assembly. All the components are identified with the manufacturer's mark. The coating of the assembly is under the control of the manufacturer.

BS EN 14399-3 HR Nut Dimensions. Classes 8 & 10														
Thread *d*	*P*[a]	d_a		d_w		*e*	*m*		m_w	*c*		*s*		*t*
		max.	min.	max.	min.	min.	max.	min.	min.	max.	min.	max.	min.	
M12	1.75	13.0	12	[b]	20.1	23.91	10.80	10.37	8.3	0.8	0.4	22	21.16	0.38
M16	2.00	17.3	16		24.9	29.56	14.80	14.10	11.3	0.8	0.4	27	26.16	0.47
M20	2.50	21.6	20		29.5	35.03	18.00	16.90	13.5	0.8	0.4	32	31.00	0.58
M22	2.50	23.7	22		33.3	39.55	19.40	18.10	14.5	0.8	0.4	36	35.00	0.63
M24	3.00	25.9	24		38.0	45.20	21.50	20.20	16.2	0.8	0.4	41	40.00	0.72
M27	3.00	29.1	27		42.8	50.85	23.80	22.50	18.1	0.8	0.4	46	45.00	0.80
M30	3.50	32.4	30		46.6	55.37	25.60	24.30	19.5	0.8	0.4	50	49.00	0.87
M36	4.00	38.9	36		55.9	66.44	31.00	29.40	22.4	0.8	0.4	60	58.80	1.05

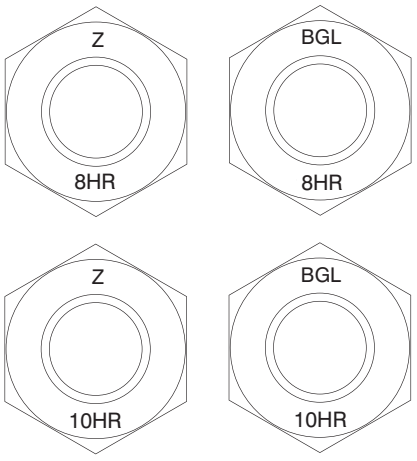
[a] *P* is the pitch of the thread
[b] d_w max = *s* actual

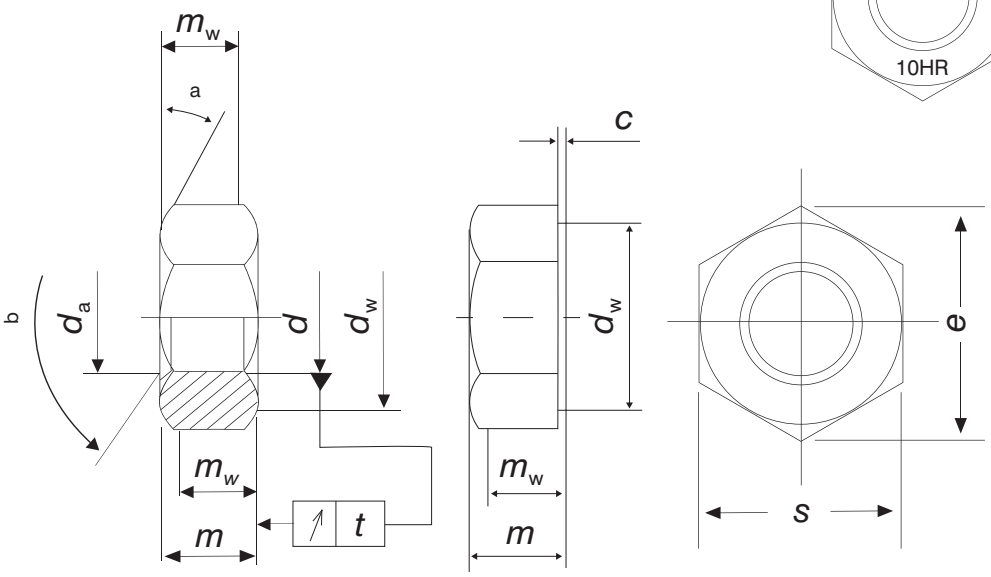
Material		**Steel**		
General Requirements		BS EN 14399-1 and BS EN 14399-2		
Thread	Coating of the Bolt	Uncoated	Hot dip galvanized	Others
	Tolerance Class of the Nut	6H	6AZ	6H[a]
	International Standards	ISO 261, ISO 965-2	ISO 261, ISO 965-5	ISO 261, ISO 965-2, ISO 965-5
Mechanical properties	Property Class	8[b] or 10[b]		
	European Standard	BS EN ISO 898-2		
Tolerances	Product Grade	B except for dimensions *m* and *c*		
	European Standard	BS EN ISO 4759-1[c]		
Finish - Coating[b]	Uncoated	as processed[d]		
	Hot Dip Galvanized	BS EN ISO 10684		
	Others	to be agreed[e]		
Surface Integrity		Limits for surface discontinuities as specified in BS EN ISO 6157-2		
Acceptability		For acceptance procedure, see BS EN ISO 3269.		

[a] For other coatings that need an increased fundamental deviation and according to the relevant standard, oversize tapped nuts with a thread tolerance class up to 6AZ may be used.
[b] For mechanical properties, proof load values and hardness values other than those specified see BS EN ISO 898-2.
[c] Except tolerance on perpendicularity of bearing face, see BS EN 14399-3.
[d] "As processed" means the normal finish resulting from manufacture with a light coating of oil.
[e] Other coatings may be negotiated between the purchaser and the manufacturer provided they do not impair the mechanical properties or the functional characteristics. Coatings of cadmium or cadmium alloys are not permitted.

BS EN 14399-3 HR Nut Proof Loads. Classes 8 & 10			
Nut Thread Dia.	Stress Area Test Mandrel mm²	Property Class	
		8	10
		Proof Load kN	Proof Load kN
M12	84.30	84.30	97.80
M16	157.0	157.0	182.1
M20	245.0	245.0	284.2
M22	303.0	303.0	351.2
M24	353.0	353.0	409.5
M27	459.0	459.0	532.4
M30	561.0	561.0	650.8
M36	817.0	817.0	947.7

BS EN 14399-3 HR Nut Marking





Pre-Load Bolt Washers

BS EN 14399-5:2015 / BS EN 14399-6:2015

BS EN 14399-5 Washer Dimensions (Hardened)						
Nominal Size of Bolt or Screw	Inside Diameter d_1		Outside Diameter d_2		Thickness h	
	max.	min.	max.	min.	max.	min.
M12	13.27	13.00	24.00	23.48	3.3	2.7
M16	17.27	17.00	30.00	29.48	4.3	3.7
M20	21.33	21.00	37.00	36.38	4.3	3.7
M22	23.33	23.00	39.00	38.38	4.3	3.7
M24	25.33	25.00	44.00	43.38	4.3	3.7
M27	28.52	28.00	50.00	49.00	5.6	4.4
M30	31.62	31.00	56.00	54.80	5.6	4.4
M36	37.62	37.00	66.00	64.80	6.6	5.4

BS EN 14399-6 Chamfered Washer Dimensions (Hardened)										
Nominal Size of Bolt or Screw	Inside Diameter d_1		Outside Diameter d_2		Thickness h		External Chamfer e		Internal Chamfer c	
	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.
M12	13.27	13.00	24.00	23.48	3.3	2.7	1.00	0.50	1.9	1.6
M16	17.27	17.00	30.00	29.48	4.3	3.7	1.50	0.75	1.9	1.6
M20	21.33	21.00	37.00	36.38	4.3	3.7	1.50	0.75	2.5	2.0
M22	23.33	23.00	39.00	38.38	4.3	3.7	1.50	0.75	2.5	2.0
M24	25.33	25.00	44.00	43.38	4.3	3.7	1.50	0.75	2.5	2.0
M27	28.52	28.00	50.00	49.00	5.6	4.4	2.00	1.00	3.0	2.5
M30	31.62	31.00	56.00	54.80	5.6	4.4	2.00	1.00	3.0	2.5
M36	37.62	37.00	66.00	64.80	6.6	5.4	2.50	1.25	3.0	2.5

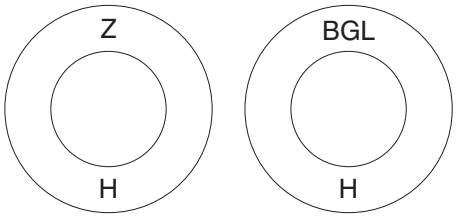
Material		**Steel**
General requirements		BS EN 14399-1 and BS EN 14399-2
Mechanical properties	Hardness range	300 HV to 370 HV
Tolerances	Product grade	A
	European Standard	BS EN ISO 4759-3
Finish - Coating[a]	Uncoated	as processed[b]
	Hot dip galvanized	BS EN ISO 10684
	Others	to be agreed[c]
Workmanship		Parts shall be uniform and free of irregularities or detrimental defects. No protruding burrs shall appear on the washer.
Acceptability		For acceptance procedure, see BS EN ISO 3269.

[a] Attention is drawn to the need to consider the risk of hydrogen embrittlement when selecting an appropriate surface treatment process (e.g. cleaning and coating), see relevant coating standards.

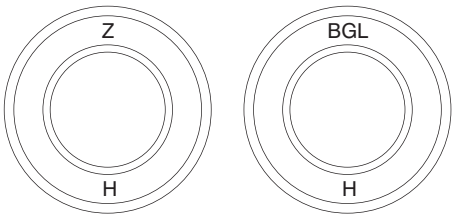
[b] "As processed" means the normal finish resulting from heat treatment with a light coating of oil.

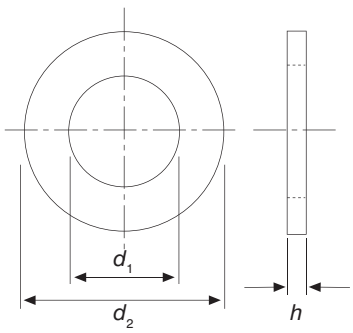
[c] Other coatings may be negotiated between the purchaser and the manufacturer provided they do not impair the mechanical properties or the functional characteristics. Coatings of cadmium or cadmium alloys are not permitted.

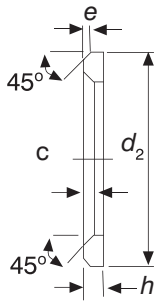
BS EN 14399-5 Washer Marking

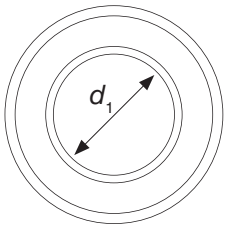


BS EN 14399-6 Washer Marking









EN14399-1
Cert No:
0038/CPR/4006773/B

MANUFACTURERS OF HIGH INTEGRITY BOLTING ASSEMBLIES FOR WORLDWIDE STRUCTURAL ENGINEERING PROJECTS

BARNSLEY
01226 388444
sales@bappbarnsley.co.uk

BRIGHOUSE
01484 710531
sales@bappbrighouse.co.uk

DONCASTER
01302 364444
sales@bappdon.co.uk

HULL
01482 329797
sales@bapphull.co.uk

LEEDS
01132 439600
sales@bappleeds.co.uk

LEICESTERSHIRE
01162 841888
sales@bappleicester.co.uk

MANSFIELD
01623 751558
sales@bappmansfield.co.uk

PRESTON
01772 704700
sales@bapppreston.co.uk

ROCHDALE
01706 359500
sales@bapproch.co.uk

SCUNTHORPE
01724 282112
sales@bappscunthorpe.co.uk

WEST MIDLANDS
01215 259232
sales@bappwestmidlands.co.uk

UK
01226 380902
sales@bappuk.co.uk

EXPORT
+44 (0)1226 394017
export@bappgroup.co.uk

HEAD OFFICE
+44 (0)1226 383824
enquiries@bappgroup.co.uk

TECHNICAL
+44 (0)7894 000204
technical@bappgroup.co.uk

CERTIFIED ISO 9001:2015 · BCSA · BIAFD · Achilles TransQ Global MEMBER · Achilles UVDB QUALIFIED · RISQS RAILWAY INDUSTRY SUPPLIER QUALIFICATION SCHEME VERIFIED

www.bapp.co.uk