



Pre-Load Bolt Assemblies BS EN 14399 - 3

HR Assemblies



BAPP

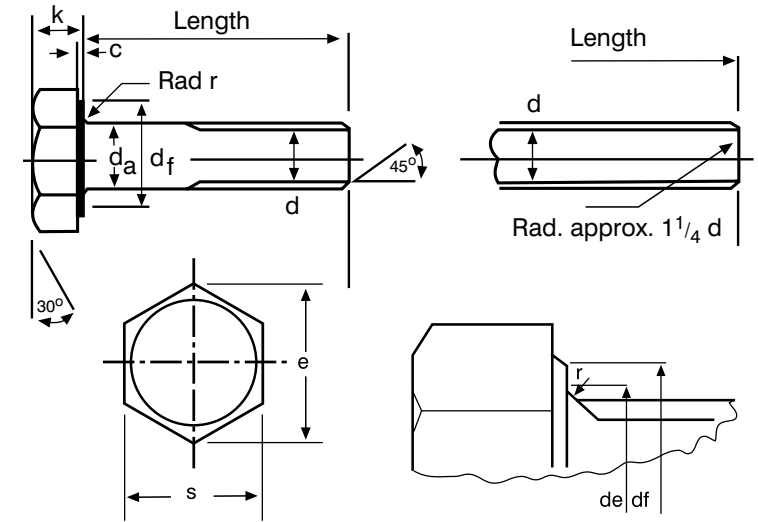
Group of Companies

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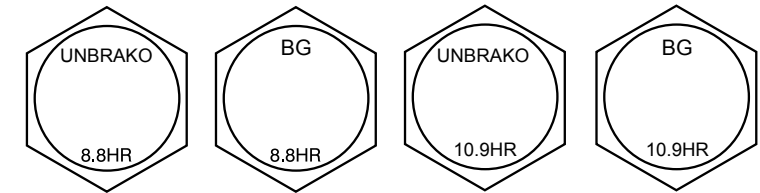
HR Assemblies

BS EN 14399 Bolt Dimensions

Nominal size and thread diameter d	Pitch of thread p (coarse pitch series)	Diameter of unthreaded shank d_a		Width across flats s		Width across corners e	Diameter of washer face d_f	Depth of washer face c		Radius under head r	Transition diameter d_e	Thickness of head k	
		max.	min.	max.	min.	min.	min.	max.	min.	min.	max.	max.	min.
M12	1.75	12.70	11.30	22.00	21.16	23.91	20.10	0.8	0.4	1.2	15.20	7.95	7.05
M16	2.00	16.70	15.30	27.00	26.16	29.56	24.90	0.8	0.4	1.2	19.20	10.75	9.25
M20	2.50	20.84	19.16	32.00	31.00	35.03	29.50	0.8	0.4	1.5	24.40	13.40	11.60
M22	2.50	22.84	21.16	36.00	35.00	39.55	33.30	0.8	0.4	1.5	26.40	14.90	13.10
M24	3.00	24.84	23.16	41.00	40.00	45.20	38.00	0.8	0.4	1.5	28.40	15.90	14.10
M27	3.00	27.84	26.16	46.00	45.00	50.85	42.80	0.8	0.4	2.0	32.40	17.90	16.10
M30	3.50	30.84	29.16	50.00	49.00	55.37	46.60	0.8	0.4	2.0	35.40	19.75	17.65
M36	4.00	37.00	35.0	60.00	58.80	66.44	55.90	0.8	0.4	2.0	42.40	23.55	21.45



BS EN 14399 Head Marking



Characteristic	Standard	
General Requirements	BS EN 14399-1	
Materials & Manufacture	BS EN ISO 898-1 Property Class 8.8 & 10.9	
Finish / Coatings	Self Colour / Black	BS EN 14399-3
	Zinc Electroplated	BS 7371-3 or BS EN ISO 4042
	Hot Dip Galvanized	BS EN ISO 10684
Mechanical Properties	BS EN 14399-3, BS EN ISO 898-1 8.8 & 10.9	
Dimensions & Tolerances	BS EN 14399-3	
Threads	ISO 261, ISO 965-2 tolerance class 6g	
Product Marking	BS EN 14399-3	

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 Mechanical properties of HR 8.8 Bolts

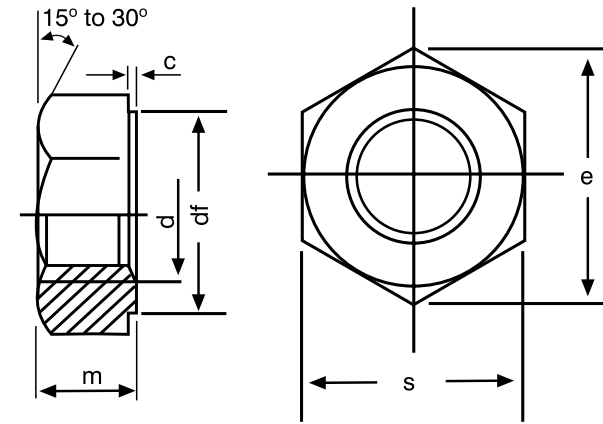
Bolt thread Dia	Stress Area mm ²	Proof Load min. kN	Ultimate Load min. kN	Hardness Rockwell HRC	
				min.	max.
M12	84.30	50.70	70.00	23.0	34.0
M16	157.0	94.50	130.0	23.0	34.0
M20	245.0	147.0	203.0	23.0	34.0
M22	303.0	182.0	252.0	23.0	34.0
M24	353.0	212.0	293.0	23.0	34.0
M27	459.0	275.0	381.0	23.0	34.0
M30	561.0	337.0	466.0	23.0	34.0
M36	817.0	490.0	678.0	23.0	34.0

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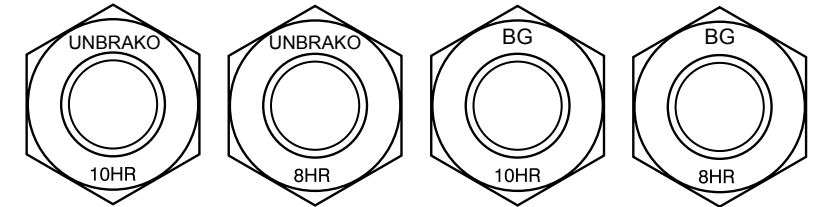
HR Assemblies

Dimensions of BS EN 14399 Nuts

Nominal size and thread diameter <i>d</i>	Pitch of thread <i>p</i> (Coarse pitch series)	Width across flats <i>s</i>		Width across corners <i>e</i>	Diameter of washer face <i>df</i>	Depth of washer face <i>c</i>		Thickness of nut <i>m</i>	
		max.	min.	min.	min.	max.	min.	max.	min.
M12	1.75	22.00	21.16	23.91	20.10	0.8	0.4	10.80	10.37
M16	2.00	27.00	26.16	29.56	24.90	0.8	0.4	14.80	14.10
M20	2.50	32.00	31.00	35.03	29.50	0.8	0.4	18.00	16.90
M22	2.50	36.00	35.00	39.55	33.30	0.8	0.4	19.40	18.10
M24	3.00	41.00	40.00	45.20	38.00	0.8	0.4	21.50	20.20
M27	3.00	46.00	45.00	50.85	42.80	0.8	0.4	23.80	22.50
M30	3.50	50.00	49.00	55.37	46.60	0.8	0.4	25.60	24.30
M36	4.00	60.00	58.80	66.44	55.90	0.8	0.4	31.00	29.40



BS EN 14399 Nut Marking



BS EN 14399 Proof load values of property classes 8 & 10 nuts

Nut thread Dia	Stress Area Test Mandrel	Property Class	
		8	10
		Tolerance class 1) 6H or 2) 6AZ	Tolerance class 1) 6H or 2) 6AZ
	mm ²	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

1) 6H is the tolerance class for self colour & Zinc Plated nuts
2) 6AZ is the tolerance class for hot dip galvanized nuts.

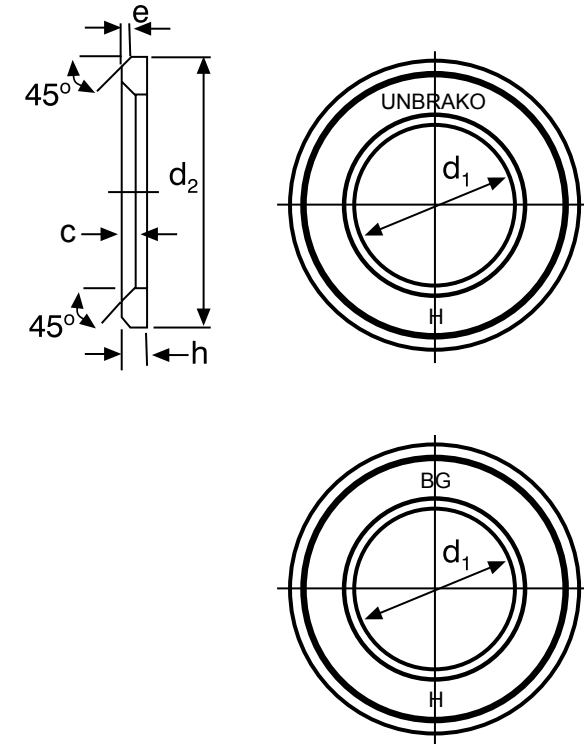
Characteristic	Standard	
General Requirements	BS EN 14399-1	
Materials & Manufacture	BS EN 20898-2 Property Classes 8 & 10	
Finish / Coatings	Self Colour / Black	BS EN 14399-3
	Zinc Electroplated	BS 7371-3 or BS EN ISO 4042
	Hot Dip Galvanized	BS 7371-6 or BS EN ISO 10684
Mechanical Properties	BS EN 14399-3 BS EN 20898-2 Classes 8 & 10	
Dimensions & Tolerances	BS EN 14399-3	
Threads	ISO 261 ISO 965-2 tolerance Class 6H or 6AZ	
Product Marking	BS EN 14399-3	

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HR Assemblies

BS EN 14399 Chamfered Washer Dimensions

Nominal size of bolt or screw	BS EN 14399 Parts 5 & 6									
	Inside Diameter d1		Outside Diameter d2		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



BS EN 14399 Mechanical properties of chamfered washer

Characteristic	Standard	
General Requirements	BS EN 14399-1	
Finish / Coatings	Self Colour / Black	BS EN 14399-5 & 6
	Zinc Electroplated	BS 7371-3 or BS EN ISO 4042
	Hot Dip Galvanized	BS 7371-6 or BS EN ISO 10684
Mechanical Properties	BS EN 14399-5 & 6	
Dimensions & Tolerances	BS EN 14399-5 & 6	
Product Marking	BS EN 14399-5 & 6	

Nominal Size	Vickers Hardness (HV)	
	min	max
M16 to M36 inclusive	300	370