



Non Pre-Load Bolt Assemblies BS EN 15048 - 1 & 2

8.8 Assemblies



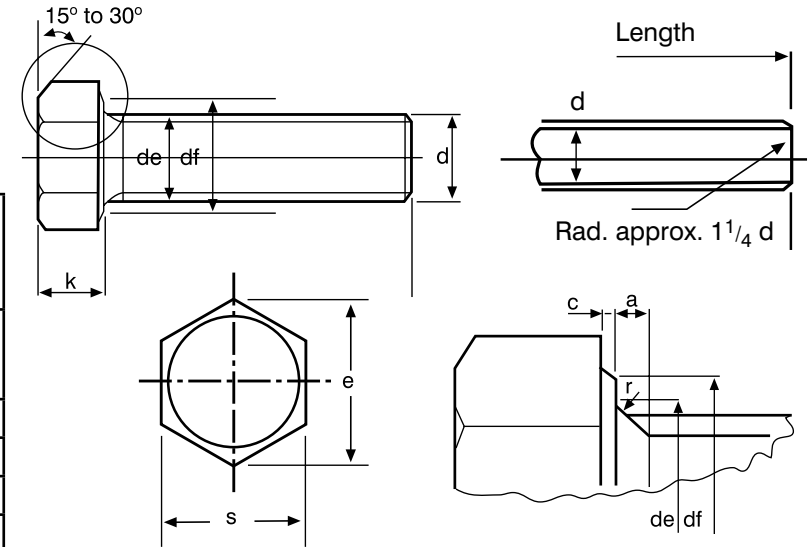
BAPP
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Non Pre-Load Bolt Assemblies BS EN 15048 - 1 & 2

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BS EN 15048 Fully Threaded Setscrew Dimensions

Nominal size and thread diameter d	Pitch of thread p	Plain Portion 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	
	(coarse pitch series)	max.	max.	min.	min.	min.	max.	min.	min.	max.	max.	min.
M12	1.75	5.25	19.00	18.67	21.10	17.40	0.60	0.15	0.60	13.70	7.68	7.32
M16	2.00	6.00	24.00	23.16	26.17	22.00	0.80	0.20	0.60	17.70	10.29	9.71
M20	2.50	7.50	30.00	29.16	32.95	27.70	0.80	0.20	0.80	22.40	12.85	12.15
M24	3.00	9.00	36.00	35.00	39.55	33.25	0.80	0.20	0.80	26.40	15.35	14.65
M30	3.50	10.50	46.00	45.00	50.85	42.75	0.80	0.20	1.00	33.40	19.12	18.28
M36	4.00	12.00	55.00	53.80	60.79	51.11	0.80	0.20	1.00	39.40	22.92	22.08



BS EN 15048 Head Marking



Characteristic	Standard	
Fully Threaded Setscrews		
General Requirements	ISO 4017	
Materials & Manufacture	BS EN ISO 898-1 Property Classes 8.8	
Finish / Coatings	Self Colour / Black	ISO 4017
	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 ISO 898-1 Property Classes 8.8	
Dimensions & Tolerances	ISO 4017	
Threads	ISO 965-2 Class 6G	
Product Marking	BS EN ISO 898-1	

Important Note

It is a requirement of BS EN 15048 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 15048 Mechanical properties of Grade 8.8 Setscrews

Bolt thread Dia	Tensile Strength	Proof Load	Elongation	Hardness Rockwell HRC	
	N/mm ² min.	N/mm ² min.	% min.	min.	max.
M12	800.00	660.00	12.00	23.00	34.00
M16	830.00	660.00	12.00	23.00	34.00
M20	830.00	660.00	12.00	23.00	34.00
M22	830.00	660.00	12.00	23.00	34.00
M24	830.00	660.00	12.00	23.00	34.00
M27	830.00	660.00	12.00	23.00	34.00
M30	830.00	660.00	12.00	23.00	34.00
M36	830.00	660.00	12.00	23.00	34.00

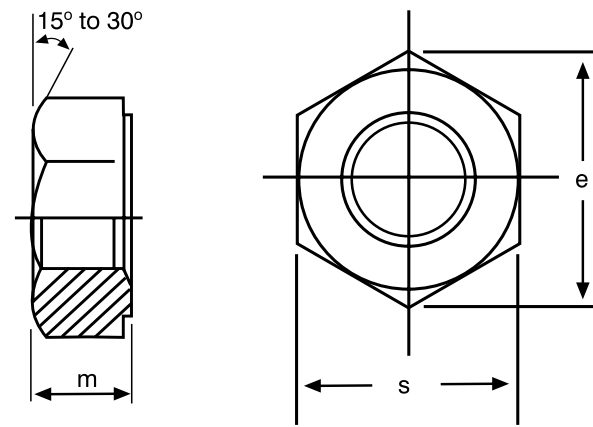
BS EN 15048 Assemblies also require a Charpy Impact Test to EN 10045-1

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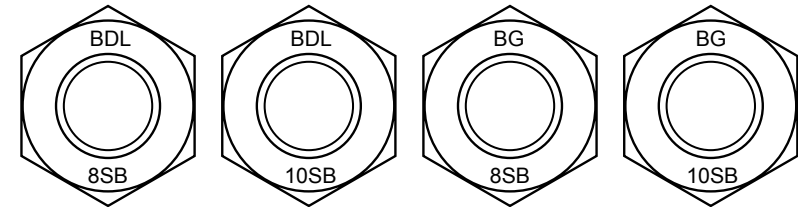
8.8 Assemblies

BS EN 15048 Nut Dimensions

Nominal size and thread diameter <i>d</i>	Pitch of thread <i>p</i>	Width across flats <i>s</i>		Width across corners <i>e</i>	Thickness of nut <i>m</i>	
		max.	min.	min.	max.	min.
M12	1.75	18.00	17.57	20.03	12.20	10.40
M16	2.00	24.00	23.67	26.75	15.90	14.10
M20	2.50	30.00	29.16	32.95	19.00	16.90
M24	3.00	36.00	35.00	39.55	22.30	20.20
M30	3.50	46.00	45.00	50.85	26.40	24.30
M36	4.00	55.00	53.80	60.79	31.90	29.40



BS EN 15048 Nut Markings



BS EN 15048 Proof load values of property classes 8 & 10 nuts

Characteristic		Standard
Nuts		
General Requirements		ISO 4032 & 4034
Materials & Manufacture		ISO 4032 & 4034 Class 8 & 10
Finish / Coatings	Self Colour / Black	ISO 4032 & 4034
	Zinc Electroplated	BS 7371-3 or BS EN ISO 4042
	Hot Dip Galvanized	BS 7371-6 or BS EN ISO 10684
Mechanical Properties	Self Colour / Zinc Electroplated	ISO 4032 & 4034 Class 8
	Hot Dip Galvanized	ISO 4032 & 4034 Class 10
Dimensions & Tolerances		ISO 4032 & 4034
Threads	Self Colour / Zinc Electroplated	ISO 965-2 Class 6H
	Hot Dip Galvanized	ISO 965-2 Class 6AZ
Product Marking		BS EN ISO 898-2

Nut thread Dia	Stress Area Test Mandrel	Property Class	
		8	10
		Tolerance class 6H (1)	Tolerance class 6AZ (2)
	mm ²	Proof Load kN	Proof Load kN
M12	84.30	67.00	78.10
M16	157.0	125.0	150.0
M20	245.0	196.0	236.0
M24	353.0	282.0	342.0
M30	561.0	448.0	551.0
M36	817.0	653.0	808.0

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

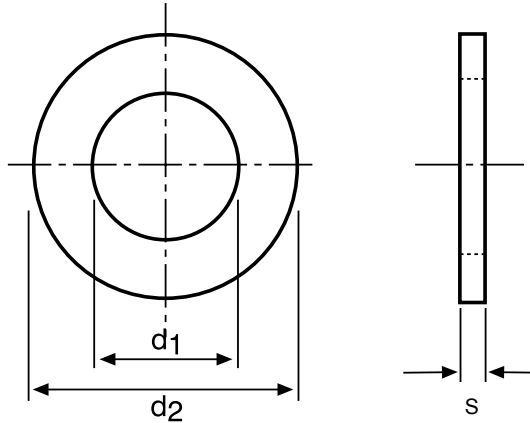
Non Pre-Load Bolt Assemblies

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8.8 Assemblies

BS EN 15048 Washer Dimensions

Nominal size of bolt or screw	EN ISO 7091 - 2000					
	Inside Diameter d1		Outside Diameter d2		Thickness s	
	max	min	max	min	max	min
M12	13.93	13.50	24.00	22.70	2.80	2.20
M16	17.93	17.50	30.00	28.70	3.60	2.40
M20	22.52	22.00	37.00	35.40	3.60	2.40
M24	26.52	26.00	44.00	42.40	4.60	3.40
M30	33.62	33.00	56.00	54.10	4.60	3.40
M36	40.00	39.00	66.00	64.10	6.00	4.00



Characteristic		Standard
Washers		
General Requirements		EN ISO 7091 - 2000
Materials & Manufacture		EN ISO 7091 - 2000
Finish / Coatings	Self Colour / Black	EN ISO 7091 - 2000
	Zinc Electroplated	BS 7371-3 or BS EN ISO 4042
	Hot Dip Galvanized	BS 7371-6 or BS EN ISO 10684
Dimensions & Tolerances		EN ISO 7091 - 2000