

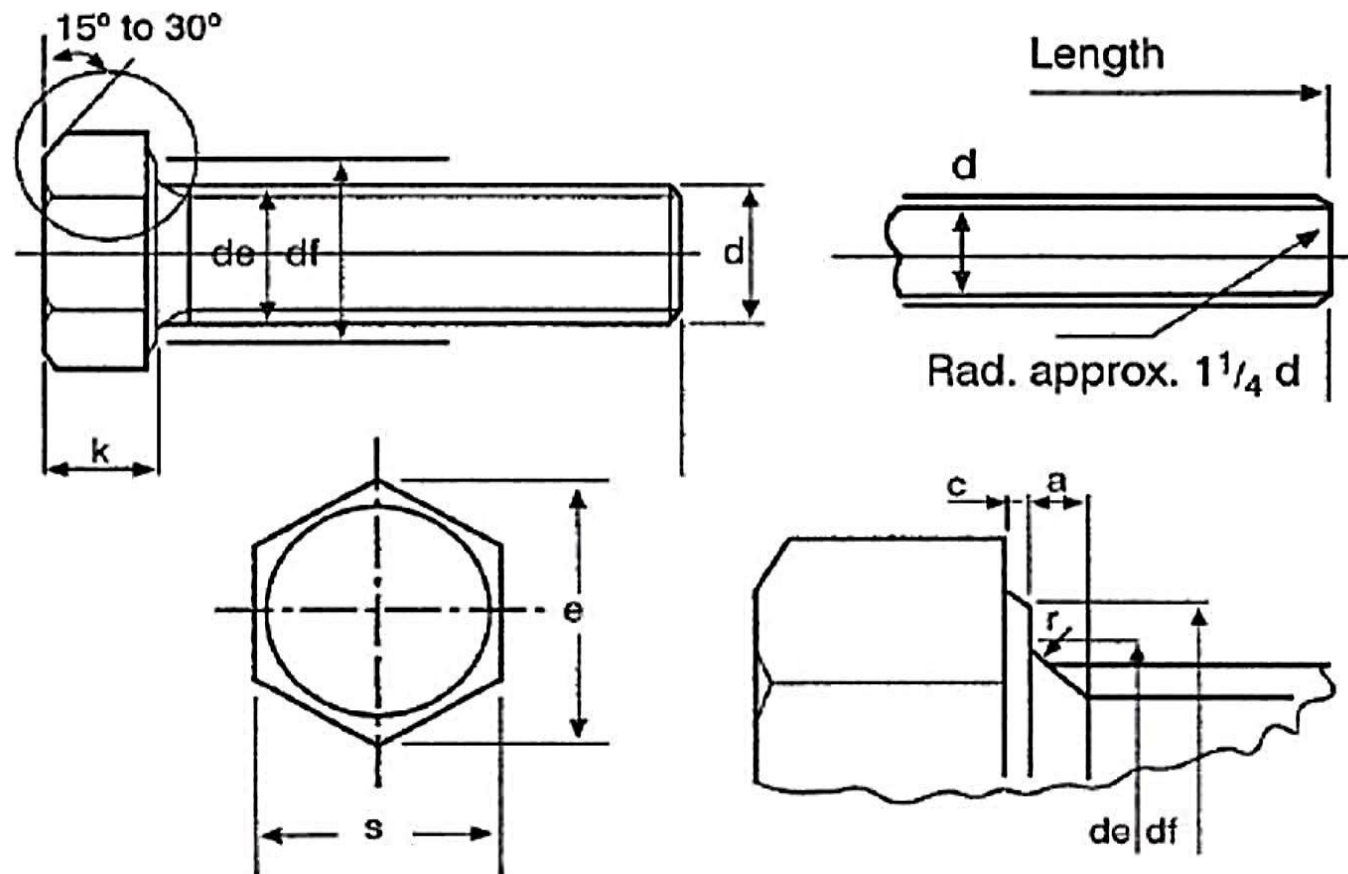
NON-PRE LOAD ASSEMBLIES GRADE 8.8 BS EN 15084-1 & 2

STANDARDS	BS EN 15048-1 & 2 (British & EN Standard)															
Nominal Diameter	M12		M16		M20		M22		M24		M27		M30		M36	
Coarse Pitch	1.75		2.00		2.50		2.50		3.00		3.00		3.50		4.00	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Unthreaded Shank a	5.00	5.30	5.90	6.05	7.40	7.55	8.20	8.35	8.90	9.00	10.05	10.50	10.40	10.55	11.95	12.05
Threaded Length ≤100 & ≥100	34	38	36	44	46	54	50	58	50	60	62	72	67	77	78	88
Across Flat s	17.60	18.10	23.20	24.10	29.20	30.10	32.20	33.10	35.20	36.10	39.70	40.60	45.10	46.10	53.10	55.20
Across Corner e	19.90	20.00	26.20	26.30	32.95	33.05	36.35	36.45	39.60	39.80	44.65	44.75	50.90	51.00	60.70	60.85
Head Thickness k	7.35	7.75	9.72	10.30	12.20	12.90	13.45	13.80	14.70	15.40	16.60	16.80	18.30	19.15	22.10	23.00
Washer Face df	16.50	16.55	22.05	22.10	27.75	27.80	29.40	29.60	33.30	33.45	36.80	36.90	42.80	43.00	51.20	51.25
Washer face Depth c	0.15	0.60	0.20	0.80	0.20	0.80	0.20	0.80	0.20	0.80	0.20	0.80	0.80	0.80	0.20	0.80
Radios r	0.60 Min.		0.60 Min.		0.80 Min.		0.80 Min.		0.80 Min.		1.00 Min.		1.00 Min.		1.00 Min.	
Transition Diameter de	13.65	13.75	17.60	17.75	22.30	22.45	24.75	24.90	26.30	26.40	31.55	31.60	33.30	33.45	39.30	39.45

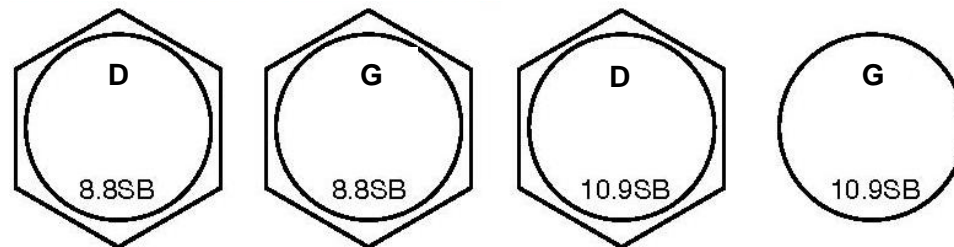
All dimensions in mm

		BS EN 15048 Mechanical properties of grade 8.8 setscrews								
Characteristic		Standard	Size	Tensile Strength	Stress Area	Proof Load	Elongation	Reduction	Hardness HRC	
				N/mm ²	mm ²	N/mm ²	%	%	Min.	Max.
Fully Threaded Setscrews										
General Requirements		BS EN ISO 15048-1 & 2/ISO 4017	M12	800	84.30	660	12	35	23	34
Material & Manufacture		BS EN ISO 898-1 Class 8.8 & 10.9	M16	830	157	660	12	35	23	34
Mechanical Properties		BS EN ISO 898-1 Class 8.8 & 10.9	M20	830	245	660	12	35	23	34
Thread Tolerance		ISO 965-2 or BS3643 6G	M22	830	303	660	12	35	23	34
Dimension		ISO 898-1/ISO 4017	M24	830	353	660	12	35	23	34
Finish/ Coating	Self Colour	ISO 898-1 as standard	M27	830	459	660	12	35	23	34
	Hop Dip Galv	BS EN ISO 10684/BS7371-6	M30	830	561	660	12	35	23	34
	Electro Zinc	BS EN ISO 4042/BS7371-3	M36	830	817	660	12	35	23	34
Product Marking		BS EN ISO 898-1/15048-1	BS EN 15048 Assemblies also require a charpy impact test to EN 10045-1							

Under the BS EN 15048-1 standard it is required that the bolt nut & washer should be assembled by the manufacturer who should be responsible for the function of the assembly. A set (bolt, nut & washer) should be identified by manufacturer identity mark/head marking and the coating of the assembly should be controlled by manufacturer.



BS EN 15048 HEAD MARKING

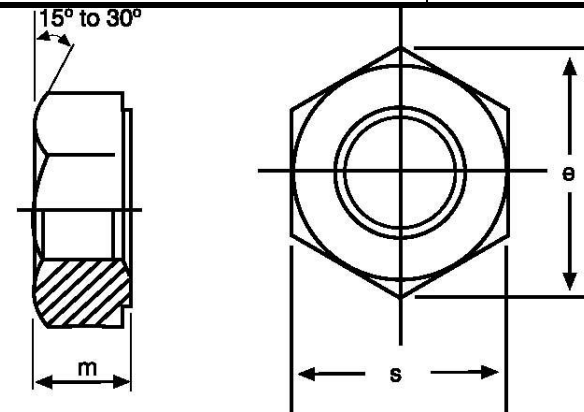


BS EN 15048 NUT DIMENSIONS						
Nominal Size & Thread Dia. d	Pitch Of Thread p	Width across Flats s		Width Across Corners e	Thickness of nut m	
		Max.	Min.		Max.	Min.
M12	1.75	18.00	17.57	21.10	10.80	10.37
M16	2.00	24.00	23.67	26.75	14.80	14.10
M20	2.50	30.00	29.16	32.95	18.00	16.90
M24	3.00	36.00	35.00	39.55	21.50	20.20
M30	3.50	46.00	45.00	50.85	25.60	24.30
M36	4.00	55.00	53.80	60.79	31.00	29.40

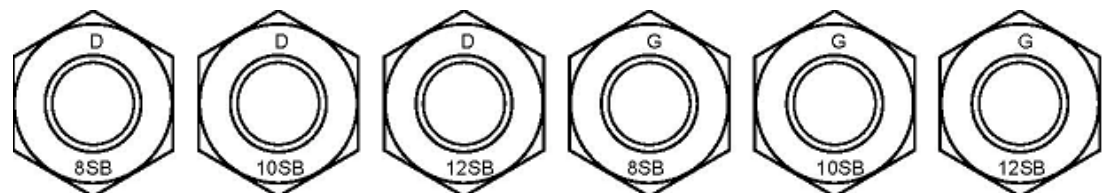
Nuts		
Characteristic	Standard	
General Requirements	ISO 4032 & 4034	
Material & Manufacture	ISO 4032 & 4034 CLASS 8, 10 & 12	
Finish/ Coatings	Self Colour	ISO 4032 & 4034
	Hot Dip Galv	BS7371-6/ BS EN ISO 10684
	Electro Zinc	BS7371-3/ BS EN ISO 4042
Mechanical Properties	Self Colour/Electro Zinc	ISO 4032 & 4034 CLASS 8
	Hot Dip Galv	ISO 4032 & 4034 CLASS 10 & 12
Dimensions & Tolerances	ISO 4032 & 4034	
Threads	Self colour/Electro Zinc	ISO965-2 CLASS 6H
	Hot Dip Galv	ISO965-2 CLASS 6AZ
Product Marking	BS EN ISO 898-2	

Nut Thread Dia.	Stress Area Test Mandrel	Property Class	
		Tolerance Class 6h(1)	Tolerance Class 6AZ (2)
	mm ²	Proof Load kN	Proof Load kN
M12	84.30	67.00	78.10
M16	157.00	125.00	150.00
M20	245.00	196.00	236.00
M24	353.00	282.00	342.00
M30	561.00	448.00	551.00
M36	817.00	653.00	808.00

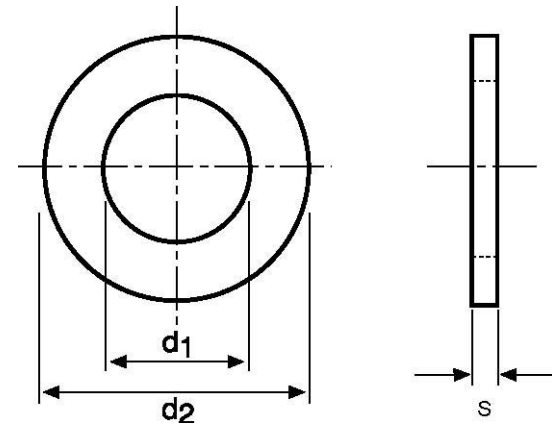
6H(1) is the tolerance class for self-colour & electro zinc nuts
6az(2) is the tolerance class for hot dip galvanized nuts



BS EN 15048 Nut Markings



BS EN ISO 15048 WASHER DIMENSIONS						
Nominal Size of Bolt or Screw	EN ISO 7089 - 2000					
	<i>d1</i>		<i>d2</i>		<i>s</i>	
	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	34.40	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



WASHERS		
Characteristic		Standard
General Requirements		EN ISO 7089 – 2000
Material & Manufacture		EN ISO 7089 – 2000
Finish & Coatings	Self Colour	EN ISO 7089 – 2000
	Electro Zinc	BS EN ISO 4042 or BS 7371-3
	Hot Dip Galvanized	BE EN ISO 10684 or BS7371-6
Dimensions & Tolerances		EN ISO 7089-2000