

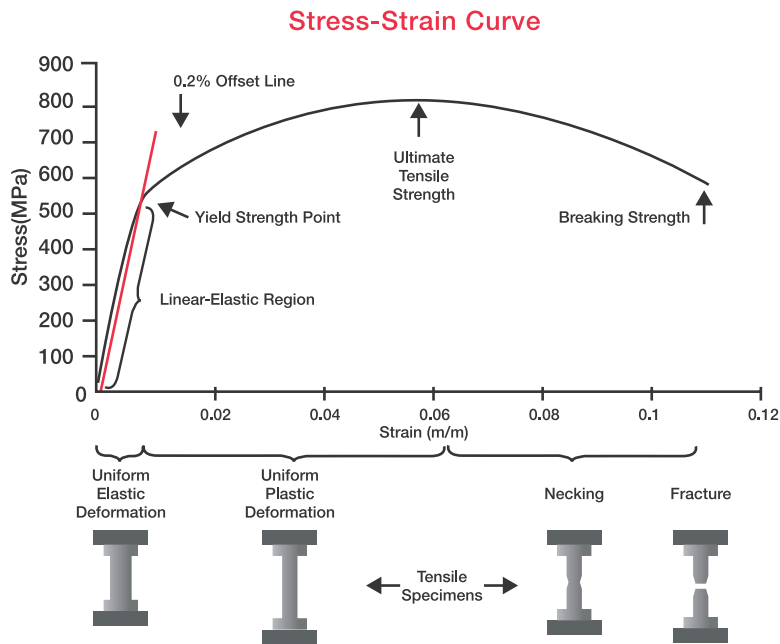


# STEEL

**General  
Information**

## TYPICAL STRESS-STRAIN CURVE

Below is a typical stress-strain curve. Each material has its own unique stress-strain curve.



### Tensile Properties

Tensile properties indicate how the material will react to forces being applied in tension.

A tensile test is a fundamental mechanical test measuring the applied load and the elongation of the specimen over some distance. Tensile tests are used to determine the elongation, reduction in area, tensile strength, yield strength and other tensile properties.

### Linear-Elastic Region and Elastic Constants

The stress and strain initially increase with a linear relationship.

This is the linear-elastic portion of the curve and it indicates that no plastic deformation has occurred.

In this region of the curve, when the stress is reduced, the material will return to its original shape.

### Yield Point

At some point, the stress-strain curve deviates from the straight-line relationship.

From this point on, some permanent deformation occurs in the specimen and the material is said to react plastically to any further increase in load or stress.

The material will not return to its original, unstressed condition when the load is removed.

### Yield Strength

The yield strength is the stress required to produce a small, amount of plastic deformation.

The offset yield strength is the stress corresponding to the intersection of the stress-strain curve and a line parallel to the elastic part of the curve offset by a specified strain.

### Ultimate Tensile Strength

The ultimate tensile strength is the maximum engineering stress level reached in a tension test.

The strength of a material is its ability to withstand external forces without breaking.

### Elongation and Reduction of Area

Elongation is the change in axial length divided by the original length of the specimen or portion of the specimen. It is expressed as a percentage. It is obtained by fitting the specimen back together after fracture and measuring the change in length and cross-sectional area.

## STRENGTH GRADE DESIGNATION SYSTEM

### For Steel Bolts, Screws and Studs

The property class symbol of bolts, screws and studs consists of two figures:

- the first figure indicates 1/100 of the nominal tensile strength in newtons per square millimetre
- the second figure indicates 10 times the ratio between lower yield stress  $R_{eL}$  (or stress at 0.2% non-proportional elongation  $R_{p0.2}$ ) and nominal tensile strength  $R_{m,nom}$  (yield stress ratio).

The multiplication of these two figures will give 1/10 of the yield stress in newtons per square millimetre.

**Example:**

Strength Grade Designation	4.6	4.8	8.8	10.9
Nominal Tensile Strength $R_{m,nom}$	400	400	800	1000
Nominal Lower Yield Stress $R_{eL}$ / (Stress at 0.2% non-proportional elongation $R_{p0.2}$ )	240	320	640	900

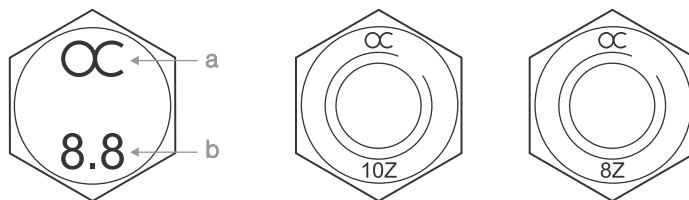
### For Steel Nuts

The strength grade designation system for steel nuts shall be a number, which is one-hundredth of the specified proof load stress in N/mm<sup>2</sup>.

**Example:**

Strength Grade Designation	6	8	10
Proof Load Stress N/mm <sup>2</sup>	600	800	1000

### Marking



a) Manufacturer's identification mark

b) Property class

Nuts tapped oversize shall be marked with the letter Z immediately after the property class mark in case of tolerance class 6AZ.

## RECOMMENDED BOLT AND NUT COMBINATIONS

According to BS 4190:2001, it is recommended that the grades of nut to be used with each grade of bolt or screw should be as shown in below table:

Grade of bolt	4.6	4.8	6.8	8.8 <sup>a</sup>	8.8 <sup>a</sup>
Recommended grade of nut	4	4	6	8	10

<sup>a</sup>When a thick protective coating is applied to a bolt of grade 8.8 or 10.9, which requires the nut thread to be overtapped, the next higher grade of nut should be used.

Note: Nuts of higher strength grade may be substituted for nuts of a lower strength grade.

## CORROSION RESISTANT FINISH: HOT DIP GALVANIZED

### What Is Hot Dip Galvanized?

Hot dip galvanizing is the formation of a coating of zinc and/or zinc/iron alloys on ferrous products by dipping them into molten zinc.

### Corrosion Resistance

The life of any zinc coating is directly proportional to its thickness. Hot dip galvanizing provides a tough metallurgically bonded coating suitable for long term environmental protection.

Galvanized coatings are protected under normal environmental weathering conditions by the formation of a naturally occurring surface zinc oxide patina. The testing of corrosion resistance shall not be carried out by the use of the salt spray test as the formation of the naturally occurring surface zinc oxide patina is prevented by the use of salt spray.

### Application

The coating shall be applied to the product by dipping it into molten zinc.

Hot dipped galvanized coatings shall not be applied to parts with a surface hardness of 390 HV or over.

Hot dipped galvanized coatings shall not be applied to fasteners of property classes 12,12.9 and over.

### Thread Gauging

Due to the thickness of coating applied during the galvanizing process it is not possible to gauge the threaded fasteners with standard thread gauges.

There are two different methods provided for, which give the necessary fundamental deviations (clearances) for the zinc layer applied to fasteners by hot dip galvanizing.

The first method consists of using nuts tapped oversize to tolerance class 6AZ or 6AX after coating, to mate with bolts or screws manufactured with screw threads to tolerance position g or h before coating.

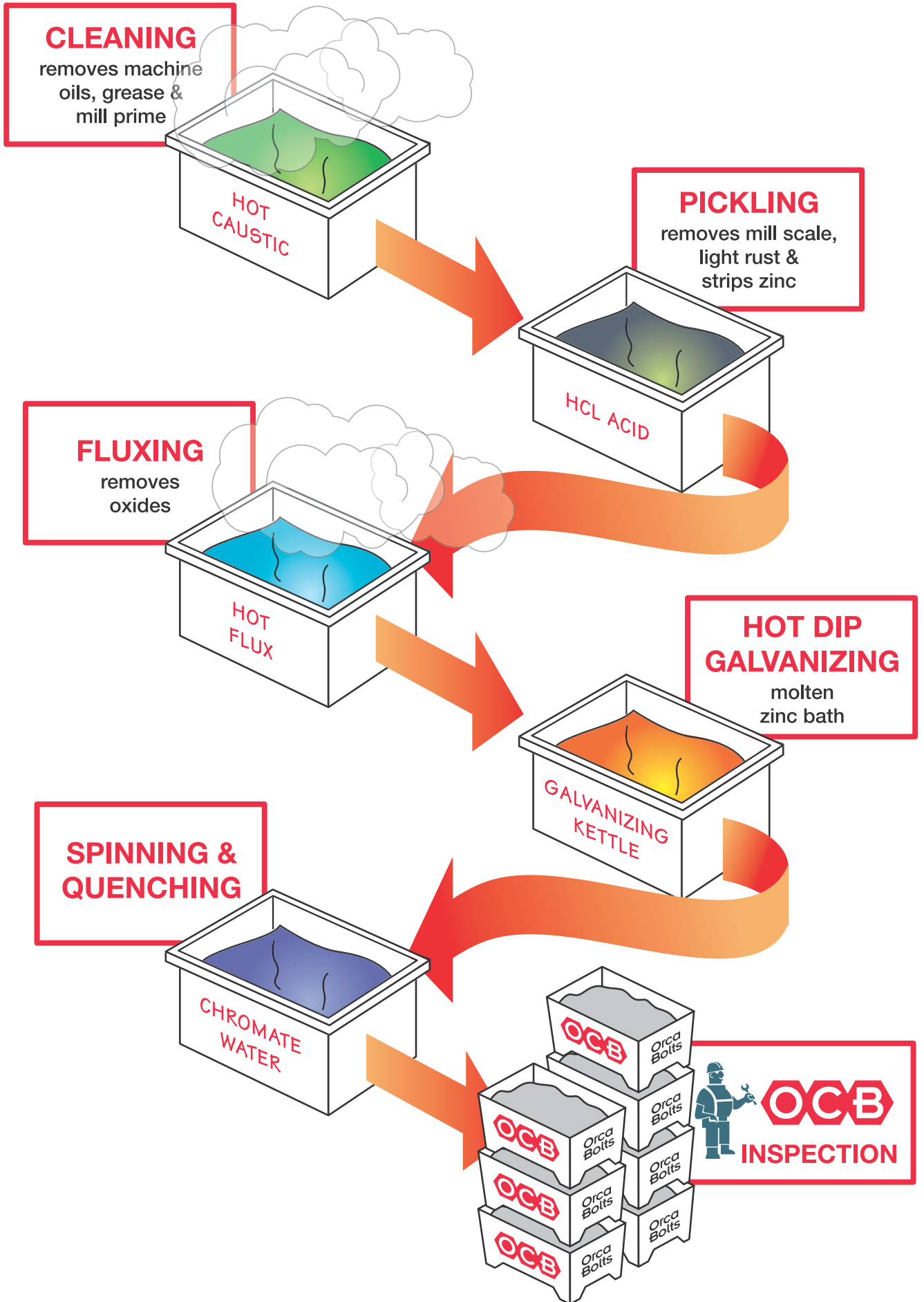
The second method consists of using bolts or screws manufactured with threads undersized to tolerance class 6az before coating, to mate with nuts tapped to tolerance position H or G after coating.

### Hydrogen Embrittlement

Hydrogen embrittlement may cause premature failure of parts which are heat treated or cold worked to a surface hardness of 320HV and above or property class 9.8 and above. Most electrolytic and acidic processes are liable to produce hydrogen embrittlement and, although baking after pickling and before coating will minimize the risk of failure, the process cannot be guaranteed to be completely effective.

If the risk of failure is unacceptable, cleaning and pre-treatment specifications such as abrasive blasting should be used.

### HOT DIP GALVANIZED PROCEDURES





## THICKNESS

The coating thickness can refer to following table for reference (BS EN ISO 1461:2009):

**Minimum Coating Thickness and Mass on Samples That Are Centrifuged  
(BS EN ISO 1461:2009)**

Article and its thickness	Local coating thickness (minimum) <sup>a</sup> µm	Local coating mass (minimum) <sup>b</sup> g/m <sup>2</sup>	Mean coating thickness (minimum) <sup>c</sup> µm	Mean coating mass (minimum) <sup>b</sup> g/m <sup>2</sup>
Articles with threads:				
> 6 mm diameter	40	285	50	360
A 6 mm diameter	20	145	25	180
Other articles (including castings):				
B 3 mm	45	325	55	395
< 3 mm	35	250	45	325

NOTE: This table is for general use: fastener coating standards and individual product standards may have different requirements: see also A.2.h). Local coating mass and mean coating mass requirements are set out in this table for reference in such cases of dispute.

**Minimum Coating Thickness and Mass on Samples That Are Not Centrifuged  
(BS EN ISO 1461:2009)**

Article and its thickness	Local coating thickness (minimum) <sup>a</sup> µm	Local coating mass (minimum) <sup>b</sup> g/m <sup>2</sup>	Mean coating thickness (minimum) <sup>c</sup> µm	Mean coating mass (minimum) <sup>b</sup> g/m <sup>2</sup>
Steel > 6 mm	70	505	85	610
Steel > 3 mm to A 6 mm	55	395	70	505
Steel B 1,5 mm to A 3 mm	45	325	55	395
Steel < 1,5 mm	35	250	45	325
Castings B 6 mm	70	505	80	575
Castings < 6 mm	60	430	70	505

NOTE: This table is for general use: individual product standards may include different requirements including different categories of thickness. Local coating mass and mean coating mass requirements are set out in this table for reference in such cases of dispute.



# STEEL

Ordering  
Code

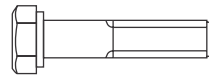
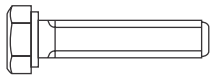
**ORDERING CODE:**

Ordering code consists of 11 digits

EXAMPLE	product code	diameter	length
<b>CODE</b>	<b>1 0 0 5</b>	<b>0 1 2</b>	<b>0 0 5 0</b>
<b>PRODUCT</b>	<b>BS 4190 Hex. Head Screw</b> Grade 8.8 Hot Dip Galvanized	<b>M12</b>	<b>50mm long</b>

EXAMPLE	product code	diameter	length
<b>CODE</b>	<b>1 1 0 5</b>	<b>0 2 0</b>	<b>0 1 0 0</b>
<b>PRODUCT</b>	<b>BS 4190 Hex. Head Bolt</b> Grade 8.8 Hot Dip Galvanized	<b>M20</b>	<b>100mm long</b>

**STEEL HEX. HEAD SCREW / HEX. HEAD BOLT**



- |   |   |
|---|---|
| <b>1000</b> <small>Product Code</small> BS 4190:2001 Hex. Head Screw Grade 4.6<br>Hot Dip Galvanized to BS EN ISO 1461:2009 | <b>1100</b> BS 4190:2001 Hex. Head Bolt Grade 4.6<br>Hot Dip Galvanized to BS EN ISO 1461:2009  |
| <b>1001</b> BS 4190:2001 Hex. Head Screw Grade 4.8<br>Hot Dip Galvanized to BS EN ISO 1461:2009                             | <b>1101</b> BS 4190:2001 Hex. Head Bolt Grade 4.8<br>Hot Dip Galvanized to BS EN ISO 1461:2009  |
| <b>1005</b> BS 4190:2001 Hex. Head Screw Grade 8.8<br>Hot Dip Galvanized to BS EN ISO 1461:2009                             | <b>1105</b> BS 4190:2001 Hex. Head Bolt Grade 8.8<br>Hot Dip Galvanized to BS EN ISO 1461:2009  |
| <b>1007</b> BS 4190:2001 Hex. Head Screw Grade 10.9<br>Hot Dip Galvanized to BS EN ISO 1461:2009                            | <b>1107</b> BS 4190:2001 Hex. Head Bolt Grade 10.9<br>Hot Dip Galvanized to BS EN ISO 1461:2009 |
| <b>1200</b> BS 4190:2001 Hex. Head Screw Grade 4.6<br>Zinc Plated to BS 7371-3:2009   | <b>1300</b> BS 4190:2001 Hex. Head Bolt Grade 4.6<br>Zinc Plated to BS 7371-3:2009              |
| <b>1201</b> BS 4190:2001 Hex. Head Screw Grade 4.8<br>Zinc Plated to BS 7371-3:2009   | <b>1301</b> BS 4190:2001 Hex. Head Bolt Grade 4.8<br>Zinc Plated to BS 7371-3:2009              |
| <b>1205</b> BS 4190:2001 Hex. Head Screw Grade 8.8<br>Zinc Plated to BS 7371-3:2009   | <b>1305</b> BS 4190:2001 Hex. Head Bolt Grade 8.8<br>Zinc Plated to BS 7371-3:2009              |
| <b>1207</b> BS 4190:2001 Hex. Head Screw Grade 10.9<br>Zinc Plated to BS 7371-3:2009  | <b>1307</b> BS 4190:2001 Hex. Head Bolt Grade 10.9<br>Zinc Plated to BS 7371-3:2009             |
| <b>1400</b> BS 4190:2001 Hex. Head Screw Grade 4.6<br>Black   | <b>1500</b> BS 4190:2001 Hex. Head Bolt Grade 4.6<br>Black                                      |
| <b>1401</b> BS 4190:2001 Hex. Head Screw Grade 4.8<br>Black   | <b>1501</b> BS 4190:2001 Hex. Head Bolt Grade 4.8<br>Black                                      |
| <b>1405</b> BS 4190:2001 Hex. Head Screw Grade 8.8<br>Black   | <b>1505</b> BS 4190:2001 Hex. Head Bolt Grade 8.8<br>Black                                      |
| <b>1407</b> BS 4190:2001 Hex. Head Screw Grade 10.9<br>Black  | <b>1507</b> BS 4190:2001 Hex. Head Bolt Grade 10.9<br>Black                                     |

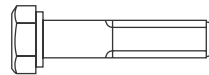
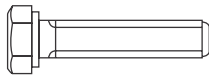


### ORDERING CODE:

Ordering code consists of 11 digits

<b>EXAMPLE</b>	product code	diameter	length
<b>CODE</b>	<b>1 0 1 5</b>	<b>0 1 2</b>	<b>0 0 5 0</b>
<b>PRODUCT</b>	<b>BS 3692 Hex. Head Screw</b> Grade 8.8 Hot Dip Galvanized	<b>M12</b>	<b>50mm long</b>
<b>EXAMPLE</b>	product code	diameter	length
<b>CODE</b>	<b>1 3 1 5</b>	<b>0 2 0</b>	<b>0 1 0 0</b>
<b>PRODUCT</b>	<b>BS 3692 Hex. Head Bolt</b> Grade 8.8 Hot Dip Galvanized	<b>M20</b>	<b>100mm long</b>

### STEEL HEX. HEAD SCREW / HEX. HEAD BOLT



- |   |   |
|---|---|
| <b>1010</b> <small>Product Code</small> BS 3692:2001 Hex. Head Screw Grade 4.6<br>Hot Dip Galvanized to BS EN ISO 1461:2009 | <b>1110</b> BS 3692:2001 Hex. Head Bolt Grade 4.6<br>Hot Dip Galvanized to BS EN ISO 1461:2009  |
| <b>1011</b> BS 3692:2001 Hex. Head Screw Grade 4.8<br>Hot Dip Galvanized to BS EN ISO 1461:2009                             | <b>1111</b> BS 3692:2001 Hex. Head Bolt Grade 4.8<br>Hot Dip Galvanized to BS EN ISO 1461:2009  |
| <b>1015</b> BS 3692:2001 Hex. Head Screw Grade 8.8<br>Hot Dip Galvanized to BS EN ISO 1461:2009                             | <b>1115</b> BS 3692:2001 Hex. Head Bolt Grade 8.8<br>Hot Dip Galvanized to BS EN ISO 1461:2009  |
| <b>1017</b> BS 3692:2001 Hex. Head Screw Grade 10.9<br>Hot Dip Galvanized to BS EN ISO 1461:2009                            | <b>1117</b> BS 3692:2001 Hex. Head Bolt Grade 10.9<br>Hot Dip Galvanized to BS EN ISO 1461:2009 |
| <b>1210</b> BS 3692:2001 Hex. Head Screw Grade 4.6<br>Zinc Plated to BS 7371-3:2009   | <b>1310</b> BS 3692:2001 Hex. Head Bolt Grade 4.6<br>Zinc Plated to BS 7371-3:2009              |
| <b>1211</b> BS 3692:2001 Hex. Head Screw Grade 4.8<br>Zinc Plated to BS 7371-3:2009   | <b>1311</b> BS 3692:2001 Hex. Head Bolt Grade 4.8<br>Zinc Plated to BS 7371-3:2009              |
| <b>1215</b> BS 3692:2001 Hex. Head Screw Grade 8.8<br>Zinc Plated to BS 7371-3:2009   | <b>1315</b> BS 3692:2001 Hex. Head Bolt Grade 8.8<br>Zinc Plated to BS 7371-3:2009              |
| <b>1217</b> BS 3692:2001 Hex. Head Screw Grade 10.9<br>Zinc Plated to BS 7371-3:2009  | <b>1317</b> BS 3692:2001 Hex. Head Bolt Grade 10.9<br>Zinc Plated to BS 7371-3:2009             |
| <b>1410</b> BS 3692:2001 Hex. Head Screw Grade 4.6<br>Black   | <b>1510</b> BS 3692:2001 Hex. Head Bolt Grade 4.6<br>Black                                      |
| <b>1411</b> BS 3692:2001 Hex. Head Screw Grade 4.8<br>Black   | <b>1511</b> BS 3692:2001 Hex. Head Bolt Grade 4.8<br>Black                                      |
| <b>1415</b> BS 3692:2001 Hex. Head Screw Grade 8.8<br>Black   | <b>1515</b> BS 3692:2001 Hex. Head Bolt Grade 8.8<br>Black                                      |
| <b>1417</b> BS 3692:2001 Hex. Head Screw Grade 10.9<br>Black  | <b>1517</b> BS 3692:2001 Hex. Head Bolt Grade 10.9<br>Black                                     |

**ORDERING CODE:**

Ordering code consists of 11 digits

EXAMPLE	product code	diameter	
<b>CODE</b>	<b>3 0 0 5</b>	<b>0 2 4</b>	<b>3 0 0 0</b>
<b>PRODUCT</b>	<b>Fully Threaded Rod</b> Grade 8.8 Hot Dip Galvanized	<b>M24</b>	<b>3000mm long</b>

EXAMPLE	product code	diameter	
<b>CODE</b>	<b>3 0 0 5</b>	<b>0 2 4</b>	<b>1 1 0 0</b>
<b>PRODUCT</b>	<b>Fully Threaded Rod</b> Grade 8.8 Hot Dip Galvanized	<b>M24</b>	<b>1100mm long</b>

**STEEL FULLY THREADED ROD**



- |   |  |
|---|--|
| <b>3000</b> Fully Threaded Rod Grade 4.6<br><small>Product Code</small> Hot Dip Galvanized to BS EN ISO 1461:2009 | <b>3010</b> Fully Threaded Rod Grade 4.6<br>Zinc Plated to BS 7371-3:2009  |
| <b>3001</b> Fully Threaded Rod Grade 4.8<br>Hot Dip Galvanized to BS EN ISO 1461:2009                             | <b>3011</b> Fully Threaded Rod Grade 4.8<br>Zinc Plated to BS 7371-3:2009  |
| <b>3005</b> Fully Threaded Rod Grade 8.8<br>Hot Dip Galvanized to BS EN ISO 1461:2009                             | <b>3015</b> Fully Threaded Rod Grade 8.8<br>Zinc Plated to BS 7371-3:2009  |
| <b>3007</b> Fully Threaded Rod Grade 10.9<br>Hot Dip Galvanized to BS EN ISO 1461:2009                            | <b>3017</b> Fully Threaded Rod Grade 10.9<br>Zinc Plated to BS 7371-3:2009 |
| <b>3020</b> Fully Threaded Rod Grade 4.6<br>Black   |  |
| <b>3021</b> Fully Threaded Rod Grade 4.8<br>Black   |  |
| <b>3025</b> Fully Threaded Rod Grade 8.8<br>Black   |  |
| <b>3027</b> Fully Threaded Rod Grade 10.9<br>Black  |  |

### ORDERING CODE:

Ordering code consists of 11 digits

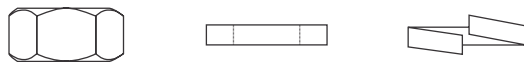
EXAMPLE	product code	diameter	
<b>CODE</b>	<b>4 0 0 6</b>	<b>0 3 0</b>	<b>0 0 0 0</b>

**PRODUCT**    **BS 4190 Hex. Nut**  
Class 10 Hot Dip Galvanized    **M30**

EXAMPLE	product code	diameter	
<b>CODE</b>	<b>5 0 0 0</b>	<b>0 3 0</b>	<b>0 0 0 0</b>

**PRODUCT**    **BS 4320 Form A Flat Washer**  
Hot Dip Galvanized    **M30**

### STEEL HEX NUT & WASHER



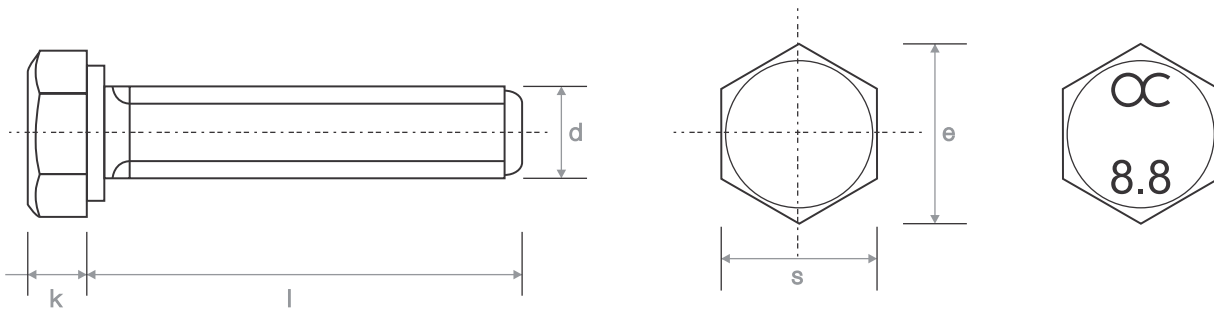
- |  |  |
|--|--|
| <b>4004</b> BS 4190:2001 Hex. Nut Class 8<br><small>Product Code</small> Hot Dip Galvanized to BS EN ISO 1461:2009 | <b>4014</b> BS 3692:2001 Hex. Nut Class 8<br>Hot Dip Galvanized to BS EN ISO 1461:2009   |
| <b>4006</b> BS 4190:2001 Hex. Nut Class 10<br>Hot Dip Galvanized to BS EN ISO 1461:2009                            | <b>4016</b> BS 3692:2001 Hex. Nut Class 10<br>Hot Dip Galvanized to BS EN ISO 1461:2009  |
| <b>4104</b> BS 4190:2001 Hex. Nut Class 8<br>Zinc Plated to BS 7371-3:2009   | <b>4114</b> BS 3692:2001 Hex. Nut Class 8<br>Zinc Plated to BS 7371-3:2009               |
| <b>4106</b> BS 4190:2001 Hex. Nut Class 10<br>Zinc Plated to BS 7371-3:2009  | <b>4116</b> BS 3692:2001 Hex. Nut Class 10<br>Zinc Plated to BS 7371-3:2009              |
| <b>4204</b> BS 4190:2001 Hex. Nut Class 8<br>Black   | <b>4214</b> BS 3692:2001 Hex Nut Class 8<br>Black  |
| <b>4206</b> BS 4190:2001 Hex. Nut Class 10<br>Black  | <b>4216</b> BS 3692:2001 Hex Nut Class 10<br>Black                                       |
| <b>5000</b> BS 4230:1968 Form A Flat Washer<br>Hot Dip Galvanized to BS EN ISO 1461:2009                           | <b>5002</b> BS EN ISO 7089:2000 Flat Washer<br>Hot Dip Galvanized to BS EN ISO 1461:2009 |
| <b>5100</b> BS 4230:1968 Form A Flat Washer<br>Zinc Plated to BS 7371-3:2009                                       | <b>5103</b> BS EN ISO 7089:2000 Flat Washer<br>Zinc Plated to BS 7371-3:2009             |
| <b>5200</b> BS 4230:1968 Form A Flat Washer<br>Black   | <b>5203</b> BS EN ISO 7089 :2000 Flat Washer<br>Black                                    |
| <b>5950</b> Spring Washer<br>Hot Dip Galvanized to BS EN ISO 1461:2009   | <b>5960</b> Spring Washer<br>Zinc Plated to BS 7371-3:2009                               |
| <b>5970</b> Spring Washer<br>Black   |  |



**STEEL**

**BS 4190**

**BS 4190 STEEL HEXAGON HEAD SCREWS (FULL THREAD)**



EXAMPLE

product code	1 0 0 5	diameter	0 1 2	length	0 0 5 0
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CODE

PRODUCT

**BS 4190 Hex. Head Screw**  
Grade 8.8 Hot Dip Galvanized

**M12**

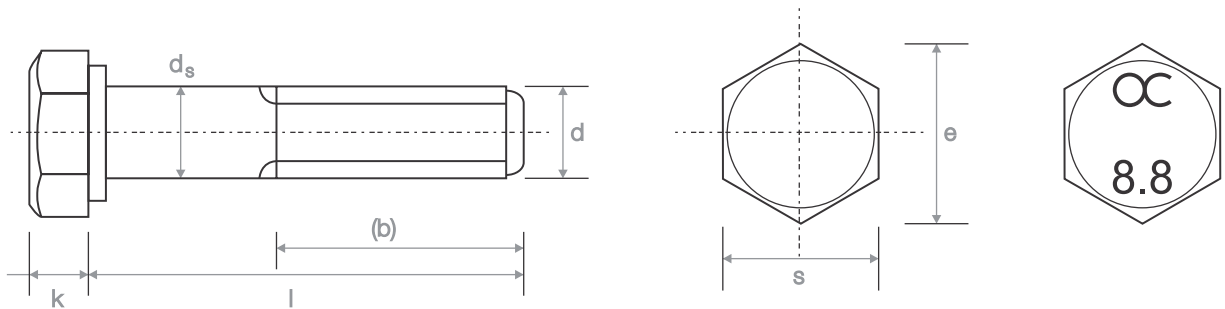
**50mm long**

Available product codes: 1000, 1001, 1005, 1007, 1200, 1201, 1205, 1207  
1400, 1401, 1405, 1407

nominal size and thread diameter	pitch of thread	width across flats		width across corners		height of head	
		min	max	min	max	min	max
<b>d</b>		<b>s</b>		<b>e</b>		<b>k</b>	
M5	0.8	7.64	8.00	8.63	9.2	3.125	3.875
M6	1	9.64	10.00	10.89	11.5	3.625	4.375
M8	1.25	12.57	13.00	14.20	15.0	5.125	5.875
M10	1.5	16.57	17.00	18.72	19.6	6.55	7.45
M12	1.75	18.48	19.00	20.88	21.9	7.55	8.45
M16	2	23.16	24.00	26.17	27.7	9.55	10.45
M20	2.5	29.16	30.00	32.95	34.6	12.10	13.90
(M22)	2.5	31.00	32.00	35.03	36.9	13.10	14.90
M24	3	35.00	36.00	39.55	41.6	14.10	15.90
(M27)	3	40.00	41.00	45.20	47.3	16.10	17.90
M30	3.5	45.00	46.00	50.85	53.1	17.95	20.05
(M33)	3.5	49.00	50.00	55.37	57.7	19.95	22.05
M36	4	53.80	55.00	60.79	63.5	21.95	24.05
(M39)	4	58.80	60.00	66.44	69.3	23.95	26.05
M42	4.5	63.80	65.00	72.09	75.1	24.95	27.05
(M45)	4.5	68.80	70.00	77.74	80.8	26.95	29.05
M48	5	73.80	75.00	83.39	86.6	28.95	31.05
(M52)	5	78.80	80.00	89.04	92.4	31.75	34.25
M56	5.5	83.60	85.00	94.47	98.1	33.75	36.25
(M60)	5.5	88.60	90.00	100.12	103.9	36.75	39.25
M64	6	93.60	95.00	105.77	109.7	38.75	41.25
(M68)	6	98.60	100.00	111.42	115.5	41.75	44.25



**BS 4190 STEEL HEXAGON HEAD BOLTS (PARTIAL THREAD)**



**EXAMPLE**

product code

diameter

length

**CODE**

**1 1 0 5**

**0 2 0**

**0 1 0 0**

**PRODUCT**

**BS 4190 Hex. Head Bolt**  
Grade 8.8 Hot Dip Galvanized

**M20**

**100mm long**

Available product codes: 1100, 1101, 1105, 1107, 1300, 1301, 1305, 1307  
1500, 1501, 1505, 1507

nominal size and thread diameter	pitch of thread	width across flats		width across corners		height of head		diameter of unthreaded shank		Thread of Length		
		s		e		k		d <sub>s</sub>		(1)	(2)	(3)
d		min	max	min	max	min	max	min	max			
M5	0.8	7.64	8.00	8.63	9.2	3.125	3.875	4.52	5.48	16	-	-
M6	1	9.64	10.00	10.89	11.5	3.625	4.375	5.52	6.48	18	24	-
M8	1.25	12.57	13.00	14.20	15.0	5.125	5.875	7.42	8.58	22	28	-
M10	1.5	16.57	17.00	18.72	19.6	6.55	7.45	9.42	10.58	26	32	-
M12	1.75	18.48	19.00	20.88	21.9	7.55	8.45	11.30	12.70	30	36	49
M16	2	23.16	24.00	26.17	27.7	9.55	10.45	15.30	16.70	38	44	57
M20	2.5	29.16	30.00	32.95	34.6	12.10	13.90	19.16	20.84	46	52	65
(M22)	2.5	31.00	32.00	35.03	36.9	13.10	14.90	21.16	22.84	50	56	69
M24	3	35.00	36.00	39.55	41.6	14.10	15.90	23.16	24.84	54	60	73
(M27)	3	40.00	41.00	45.20	47.3	16.10	17.90	26.16	27.84	60	66	79
M30	3.5	45.00	46.00	50.85	53.1	17.95	20.05	29.16	30.84	66	72	85
(M33)	3.5	49.00	50.00	55.37	57.7	19.95	22.05	32.00	34.00	72	78	91
M36	4	53.80	55.00	60.79	63.5	21.95	24.05	35.00	37.00	78	84	97
(M39)	4	58.80	60.00	66.44	69.3	23.95	26.05	38.00	40.00	84	90	103
M42	4.5	63.80	65.00	72.09	75.1	24.95	27.05	41.00	43.00	90	96	109
(M45)	4.5	68.80	70.00	77.74	80.8	26.95	29.05	44.00	46.00	96	102	115
M48	5	73.80	75.00	83.39	86.6	28.95	31.05	47.00	49.00	-	108	121
(M52)	5	78.80	80.00	89.04	92.4	31.75	34.25	50.80	53.20	-	116	129
M56	5.5	83.60	85.00	94.47	98.1	33.75	36.25	54.80	57.20	-	124	137
(M60)	5.5	88.60	90.00	100.12	103.9	36.75	39.25	58.80	61.20	-	132	145
M64	6	93.60	95.00	105.77	109.7	38.75	41.25	62.80	65.20	-	140	153
(M68)	6	98.60	100.00	111.42	115.5	41.75	44.25	62.80*	69.20	-	148	161

(1) l A 125mm; (2) 125mm < l A 200mm; (3) l > 200mm (l: nominal length of bolt)

Sizes in brackets are non-preferred

\* May due to typing error in BS 4190.

unit in mm

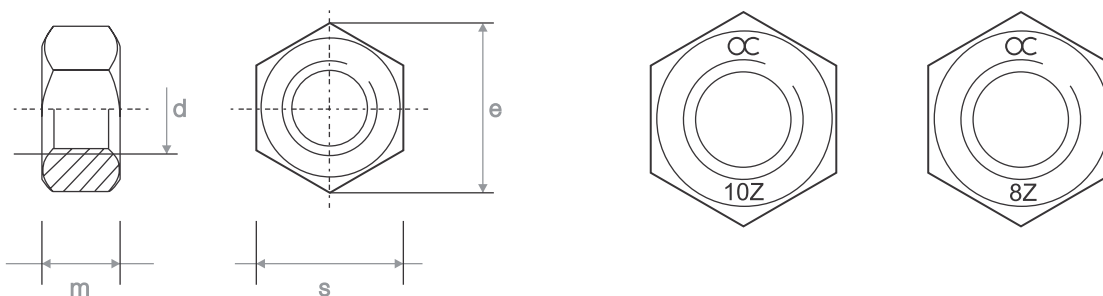
**BS 4190 STANDARD LENGTH TABLE (M5-M30)**

nominal length	M5	M6	M8	M10	M12	M16	M20	(M22)	M24	(M27)	M30
12	X	X	X	X							
14	X	X	X	X							
16	X	X	X	X	X					Screws only	
20	X	X	X	X	X						
25	X	X	X	X	X	X	X				
30	X	X	X	X	X	X	X	X	X		
35	X	X	X	X	X	X	X	X	X	X	X
40	X	X	X	X	X	X	X	X	X	X	X
45	X	X	X	X	X	X	X	X	X	X	X
50		X	X	X	X	X	X	X	X	X	X
55		X	X	X	X	X	X	X	X	X	X
60		X	X	X	X	X	X	X	X	X	X
65		X	X	X	X	X	X	X	X	X	X
70		X	X	X	X	X	X	X	X	X	X
75		X	X	X	X	X	X	X	X	X	X
80		X	X	X	X	X	X	X	X	X	X
85		X	X	X	X	X	X	X	X	X	X
90		X	X	X	X	X	X	X	X	X	X
100		X	X	X	X	X	X	X	X	X	X
110		X	X	X	X	X	X	X	X	X	X
120		X	X	X	X	X	X	X	X	X	X
130		X	X	X	X	X	X	X	X	X	X
140		X	X	X	X	X	X	X	X	X	X
150				X	X	X	X	X	X	X	X
160				X	X	X	X	X	X	X	X
170				X	X	X	X	X	X	X	X
180				X	X	X	X	X	X	X	X
190				X	X	X	X	X	X	X	X
200					X	X	X	X	X	X	X
220					X	X	X	X	X	X	X
240					X	X	X	X	X	X	X
260					X	X	X	X	X	X	X
280					X	X	X	X	X	X	X
300										X	X
325										X	X
350										X	X
375										X	X
400										X	X
425										X	X
450										X	X
475										X	X
500										X	X

**BS 4190 STANDARD LENGTH TABLE (M33-M68)**

nominal length	(M33)	M36	(M39)	M42	(M45)	M48	(M52)	M56	(M60)	M64	(M68)
35	X										
40	X										
45	X	X	X						Screws only		
50	X	X	X	X							
55	X	X	X	X	X	X					
60	X	X	X	X	X	X					
65	X	X	X	X	X	X	X	X			
70	X	X	X	X	X	X	X	X			
75	X	X	X	X	X	X	X	X	X		
80	X	X	X	X	X	X	X	X	X		
85	X	X	X	X	X	X	X	X	X	X	X
90	X	X	X	X	X	X	X	X	X	X	X
100	X	X	X	X	X	X	X	X	X	X	X
110	X	X	X	X	X	X	X	X	X	X	X
120	X	X	X	X	X	X	X	X	X	X	X
130	X	X	X	X	X	X	X	X	X	X	X
140	X	X	X	X	X	X	X	X	X	X	X
150	X	X	X	X	X	X	X	X	X	X	X
160	X	X	X	X	X	X	X	X	X	X	X
170	X	X	X	X	X	X	X	X	X	X	X
180	X	X	X	X	X	X	X	X	X	X	X
190	X	X	X	X	X	X	X	X	X	X	X
200	X	X	X	X	X	X	X	X	X	X	X
220	X	X	X	X	X	X	X	X	X	X	X
240	X	X	X	X	X	X	X	X	X	X	X
260	X	X	X	X	X	X	X	X	X	X	X
280	X	X	X	X	X	X	X	X	X	X	X
300	X	X	X	X	X	X	X	X	X	X	X
325	X	X	X	X	X	X	X	X	X	X	X
350	X	X	X	X	X	X	X	X	X	X	X
375	X	X	X	X	X	X	X	X	X	X	X
400	X	X	X	X	X	X	X	X	X	X	X
425	X	X	X	X	X	X	X	X	X	X	X
450	X	X	X	X	X	X	X	X	X	X	X
475	X	X	X	X	X	X	X	X	X	X	X
500	X	X	X	X	X	X	X	X	X	X	X

**BS 4190 STEEL HEXAGON NUTS**



EXAMPLE

product code

diameter

CODE

**4 0 0 6**

**0 3 0**

**0 0 0 0**

PRODUCT

**BS 4190 Hex. Nut**  
Class 10 Hot Dip Galvanized

**M30**

Available product codes: 4004, 4006, 4104, 4106, 4204, 4206

nominal size and thread diameter	pitch of thread	width across flats		width across corners		Thickness	
		s		e		m	
d		min	max	min	max	min	max
M5	0.8	7.64	8.00	8.63	9.20	3.625	4.375
M6	1	9.64	10.00	10.89	11.50	4.625	5.375
M8	1.25	12.57	13.00	14.20	15.00	6.125	6.875
M10	1.5	16.57	17.00	18.72	19.60	7.55	8.45
M12	1.75	18.48	19.00	20.88	21.90	9.55	10.45
M16	2	23.16	24.00	26.17	27.70	12.45	13.55
M20	2.5	29.16	30.00	32.95	34.60	15.45	16.55
(M22)	2.5	31.00	32.00	35.03	36.90	17.45	18.55
M24	3	35.00	36.00	39.55	41.60	18.35	19.65
(M27)	3	40.00	41.00	45.20	47.30	21.35	22.65
M30	3.5	45.00	46.00	50.85	53.10	23.35	24.65
(M33)	3.5	49.00	50.00	55.37	57.70	25.35	26.65
M36	4	53.80	55.00	60.79	63.50	28.35	29.65
(M39)	4	58.80	60.00	66.44	69.30	30.20	31.80
M42	4.5	63.80	65.00	72.09	75.10	33.20	34.80
(M45)	4.5	68.80	70.00	77.74	80.80	35.20	36.80
M48	5	73.80	75.00	83.39	86.60	37.20	38.80
(M52)	5	78.80	80.00	89.04	92.40	41.20	42.80
M56	5.5	83.60	85.00	94.47	98.10	44.20	45.80
(M60)	5.5	88.60	90.00	100.12	103.90	47.20	48.80
M64	6	93.60	95.00	105.77	109.70	50.05	51.95
(M68)	6	98.60	100.00	111.42	115.50	53.05	54.95

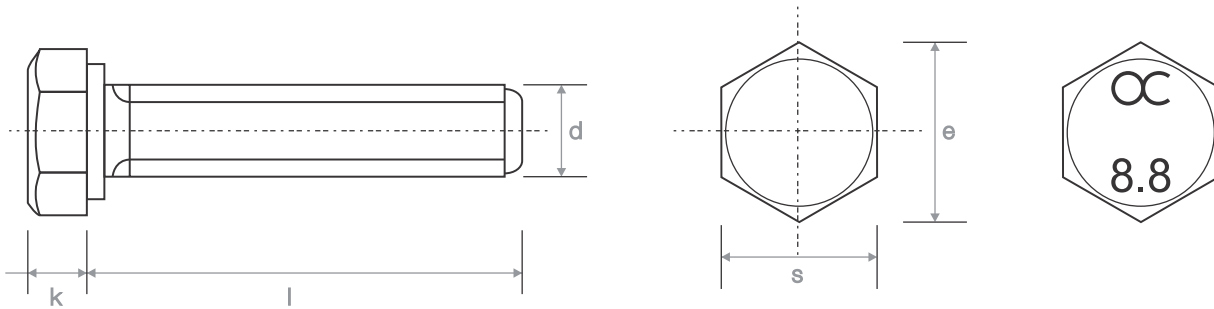


# STEEL

## BS 3692



**BS 3692 STEEL HEXAGON HEAD SCREWS (FULL THREAD)**



EXAMPLE

product code

diameter

length

CODE

**1 0 1 5**

**0 1 2**

**0 0 5 0**

PRODUCT

**BS 3692 Hex. Head Screw**  
Grade 8.8 Hot Dip Galvanized

**M12**

**50mm long**

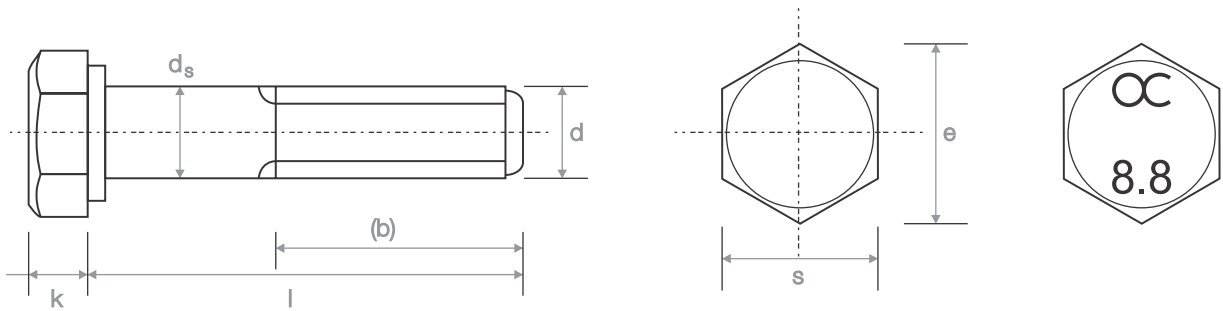
Available product codes: 1010, 1011, 1015, 1017, 1210, 1211, 1215, 1217  
1410, 1411, 1415, 1417

nominal size and thread diameter	pitch of thread	width across flats		width across corners		height of head	
d		s		e		k	
		min	max	min	max	min	max
M1.6	0.35	3.08	3.2	3.48	3.7	0.975	1.225
M2	0.4	3.88	4.0	4.38	4.6	1.275	1.525
M2.5	0.45	4.88	5.0	5.51	5.8	1.575	1.825
M3	0.5	5.38	5.5	6.08	6.4	1.875	2.125
M4	0.7	6.85	7.0	7.74	8.1	2.675	2.925
M5	0.8	7.85	8.0	8.87	9.2	3.35	3.650
M6	1	9.78	10.0	11.05	11.5	3.85	4.15
M8	1.25	12.73	13.0	14.38	15.0	5.35	5.65
M10	1.5	16.73	17.0	18.9	19.6	6.82	7.18
M12	1.75	18.67	19.0	21.10	21.9	7.82	8.18
(M14)	2	21.67	22.0	24.49	25.4	8.82	9.18
M16	2	23.67	24.0	26.75	27.7	9.82	10.18
(M18)	2.5	26.67	27.0	30.14	31.2	11.785	12.215
M20	2.5	29.67	30.0	33.53	34.6	12.785	13.215
(M22)	2.5	31.61	32.0	35.72	36.9	13.785	14.215
M24	3	35.38	36.0	39.98	41.6	14.785	15.215
(M27)	3	40.38	41.0	45.63	47.3	16.785	17.215
M30	3.5	45.38	46.0	51.28	53.1	18.74	19.26
(M33)	3.5	49.38	50.0	55.80	57.7	20.74	21.26
M36	4	54.26	55.0	61.31	63.5	22.74	23.26
(M39)	4	59.26	60.0	66.96	69.3	24.74	25.26
M42	4.5	64.26	65.0	72.61	75.1	25.74	26.26
(M45)	4.5	69.26	70.0	78.26	80.8	27.74	28.26
M48	5	74.26	75.0	83.91	86.6	29.74	30.26
(M52)	5	79.26	80.0	89.56	92.4	32.69	33.21
M56	5.5	84.13	85.0	95.07	98.1	34.69	35.31
(M60)	5.5	89.13	90.0	100.72	103.9	37.69	38.31
M64	6	94.13	95.0	106.37	109.7	39.69	40.31
(M68)	6	99.13	100.0	112.02	115.5	42.69	43.31

Sizes in brackets are non-preferred

unit in mm

**BS 3692 STEEL HEXAGON HEAD BOLTS (PARTIAL THREAD)**



EXAMPLE

CODE

product code

**1 1 1 5**

diameter

**0 2 0**

length

**0 1 0 0**

PRODUCT

**BS 3692 Hex. Head Bolt**  
Grade 8.8 Hot Dip Galvanized

**M20**

**100mm long**

Available product codes: 1110, 1111, 1115, 1117, 1310, 1311, 1315, 1317  
1510, 1511, 1515, 1517

nominal size and thread diameter	pitch of thread	width across flats		width across corners		height of head		diameter of unthreaded shank		Thread of Length		
		s		e		k		$d_s$		(1)	(2)	(3)
d		min	max	min	max	min	max	min	max			
M1.6	0.35	3.08	3.2	3.48	3.7	0.975	1.225	1.46	1.6	9	-	-
M2	0.4	3.88	4.0	4.38	4.6	1.275	1.525	1.86	2.0	10	-	-
M2.5	0.45	4.88	5.0	5.51	5.8	1.575	1.825	2.23	2.5	11	-	-
M3	0.5	5.38	5.5	6.08	6.4	1.875	2.125	2.86	3.0	12	-	-
M4	0.7	6.85	7.0	7.74	8.1	2.675	2.925	3.82	4.0	14	-	-
M5	0.8	7.85	8.0	8.87	9.2	3.35	3.650	4.82	5.0	16	-	-
M6	1	9.78	10.0	11.05	11.5	3.85	4.15	5.82	6.0	18	-	-
M8	1.25	12.73	13.0	14.38	15.0	5.35	5.65	7.78	8.0	22	-	-
M10	1.5	16.73	17.0	18.9	19.6	6.82	7.18	9.78	10.0	26	32	-
M12	1.75	18.67	19.0	21.10	21.9	7.82	8.18	11.73	12.0	30	36	-
(M14)	2	21.67	22.0	24.49	25.4	8.82	9.18	13.73	14.0	34	40	-
M16	2	23.67	24.0	26.75	27.7	9.82	10.18	15.73	16.0	38	44	57
(M18)	2.5	26.67	27.0	30.14	31.2	11.785	12.215	17.73	18.0	42	48	61
M20	2.5	29.67	30.0	33.53	34.6	12.785	13.215	19.67	20.0	46	52	65
(M22)	2.5	31.61	32.0	35.72	36.9	13.785	14.215	21.67	22.0	50	56	69
M24	3	35.38	36.0	39.98	41.6	14.785	15.215	23.67	24.0	54	60	73
(M27)	3	40.38	41.0	45.63	47.3	16.785	17.215	26.67	27.0	60	66	79
M30	3.5	45.38	46.0	51.28	53.1	18.74	19.26	29.67	30.0	66	72	85
(M33)	3.5	49.38	50.0	55.80	57.7	20.74	21.26	32.61	33.0	72	78	91
M36	4	54.26	55.0	61.31	63.5	22.74	23.26	35.61	36.0	78	84	97
(M39)	4	59.26	60.0	66.96	69.3	24.74	25.26	38.61	39.0	84	90	103
M42	4.5	64.26	65.0	72.61	75.1	25.74	26.26	41.61	42.0	90	96	109
(M45)	4.5	69.26	70.0	78.26	80.8	27.74	28.26	44.61	45.0	96	102	115
M48	5	74.26	75.0	83.91	86.6	29.74	30.26	47.61	48.0	102	108	121
(M52)	5	79.26	80.0	89.56	92.4	32.69	33.21	51.54	52.0	-	116	129
M56	5.5	84.13	85.0	95.07	98.1	34.69	35.31	55.54	56.0	-	124	137
(M60)	5.5	89.13	90.0	100.72	103.9	37.69	38.31	59.54	60.0	-	132	145
M64	6	94.13	95.0	106.37	109.7	39.69	40.31	63.54	64.0	-	140	153
(M68)	6	99.13	100.0	112.02	115.5	42.69	43.31	67.54	68.0	-	148	161

(1)  $l \geq 125$ mm; (2)  $125$ mm  $< l \leq 200$ mm; (3)  $l > 200$ mm ( $l$ : nominal length of bolt)  
Sizes in brackets are non-preferred

**BS 3692 STANDARD LENGTH TABLE (M1.6-M20)**

nominal length	M1.6	M2	M2.5	M3	M4	M5	M6	M8	M10	M12	(M14)	M16	(M18)	M20
5	X	X	X	X	X									
6	X	X	X	X	X	X	X							
(7)	0	0	0	0	0	0	0				Screws only			
8	X	X	X	X	X	X	X	X	X					
(9)	0	0	0	0	0	0	0	0	0					
10	X	X	X	X	X	X	X	X	X	X	X			
(11)	0	0	0	0	0	0	0	0	0	0	0			
12	X	X	X	X	X	X	X	X	X	X	X	X		
14		X	X	X	X	X	X	X	X	X	X	X		
16		X	X	X	X	X	X	X	X	X	X	X	X	X
(18)			0	0	0	0	0	0	0	0	0	0	0	0
20			X	X	X	X	X	X	X	X	X	X	X	X
(22)			0	0	0	0	0	0	0	0	0	0	0	0
25			X	X	X	X	X	X	X	X	X	X	X	X
(28)				0	0	0	0	0	0	0	0	0	0	0
30				X	X	X	X	X	X	X	X	X	X	X
(32)				0	0	0	0	0	0	0	0	0	0	0
35				X	X	X	X	X	X	X	X	X	X	X
(38)				0	0	0	0	0	0	0	0	0	0	0
40				X	X	X	X	X	X	X	X	X	X	X
45				X	X	X	X	X	X	X	X	X	X	X
50				X	X	X	X	X	X	X	X	X	X	X
55					X	X	X	X	X	X	X	X	X	X
60					X	X	X	X	X	X	X	X	X	X
65					X	X	X	X	X	X	X	X	X	X
70					X	X	X	X	X	X	X	X	X	X
75						X	X	X	X	X	X	X	X	X
80						X	X	X	X	X	X	X	X	X
85							X	X	X	X	X	X	X	X
90							X	X	X	X	X	X	X	X
(95)								0	0	0	0	0	0	0
100								X	X	X	X	X	X	X
(105)								0	0	0	0	0	0	0
110								X	X	X	X	X	X	X
(115)									0	0	0	0	0	0
120									X	X	X	X	X	X
(125)									0	0	0	0	0	0
130									X	X	X	X	X	X
140									X	X	X	X	X	X
150									X	X	X	X	X	X
160									X	X	X	X	X	X
170										X	X	X	X	X
180										X	X	X	X	X
190		Screws and bolts									X	X	X	X
200											X	X	X	X
220												X	X	X

Sizes and lengths shown in brackets are non-preferred  
 "X" indicates first choice length; "0" indicates second choice length.

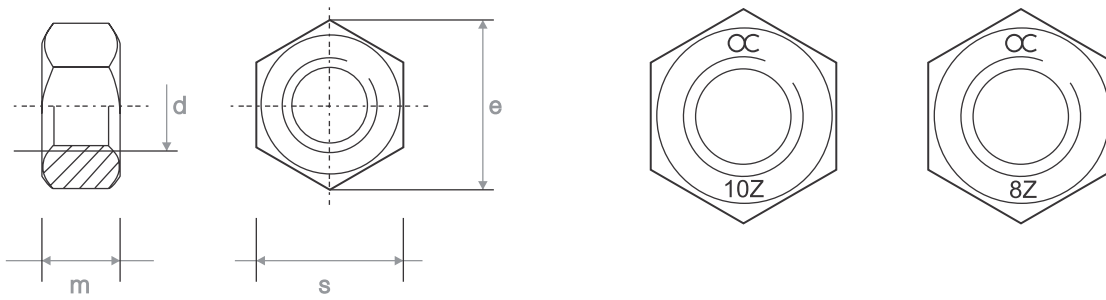
unit in mm

**BS 3692 STANDARD LENGTH TABLE (M22-M68)**

nominal length	(M22)	M24	(M27)	M30	(M33)	M36	(M39)	M42	(M45)	M48	(M52)	M56	(M60)	M64	(M68)
16	X	X	X												
(18)	0	0	0												
20	X	X	X									Screws only			
(22)	0	0	0												
25	X	X	X												
(28)	0	0	0												
30	X	X	X												
(32)	0	0	0												
35	X	X	X	X	X	X	X								
(38)	0	0	0	0	0	0	0								
40	X	X	X	X	X	X	X	X	X	X					
45	X	X	X	X	X	X	X	X	X	X					
50	X	X	X	X	X	X	X	X	X	X	X				
55	X	X	X	X	X	X	X	X	X	X	X				
60	X	X	X	X	X	X	X	X	X	X	X				
65	X	X	X	X	X	X	X	X	X	X	X				
70	X	X	X	X	X	X	X	X	X	X	X				
75	X	X	X	X	X	X	X	X	X	X	X				
80	X	X	X	X	X	X	X	X	X	X	X				
85	X	X	X	X	X	X	X	X	X	X	X				
90	X	X	X	X	X	X	X	X	X	X	X				
(95)	0	0	0	0	0	0	0	0	0	0	0				
100	X	X	X	X	X	X	X	X	X	X	X				
(105)	0	0	0	0	0	0	0	0	0	0	0				
110	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
(115)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
120	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
(125)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
130	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
140	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
150	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
160	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
170	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
180	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
190	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
200	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
220	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
240			X	X	X	X	X	X	X	X	X	X	X	X	X
260			X	X	X	X	X	X	X	X	X	X	X	X	X
280			X	X	X	X	X	X	X	X	X	X	X	X	X
300			X	X	X	X	X	X	X	X	X	X	X	X	X
325	Screws and bolts		X	X	X	X	X	X	X	X	X	X	X	X	X
350			X	X	X	X	X	X	X	X	X	X	X	X	X
375			X	X	X	X	X	X	X	X	X	X	X	X	X
400			X	X	X	X	X	X	X	X	X	X	X	X	X

Sizes and lengths shown in brackets are non-preferred  
 "X" indicates first choice length; "0" indicates second choice length.

**BS 3692 STEEL HEXAGON NUTS**



**EXAMPLE**

product code

diameter

**CODE**

**4 0 1 6**

**0 3 0**

**0 0 0 0**

**PRODUCT**

**BS 3692 Hex. Nut**  
Class 10 Hot Dip Galvanized

**M30**

Available product codes: 4014, 4016, 4114, 4116, 4214, 4216

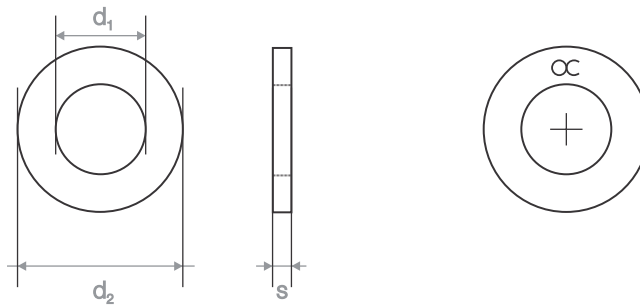
nominal size and thread diameter	pitch of thread	width across flats		width across corners		Thickness	
		min	max	min	max	min	max
d		s		e		m	
M1.6	0.35	3.08	3.20	3.48	3.70	1.05	1.30
M2	0.4	3.88	4.00	4.38	4.60	1.35	1.60
M2.5	0.45	4.88	5.00	5.51	5.80	1.75	2.00
M3	0.5	5.38	5.50	6.08	6.40	2.15	2.40
M4	0.7	6.85	7.00	7.74	8.10	2.90	3.20
M5	0.8	7.85	8.00	8.87	9.20	3.70	4.00
M6	1	9.78	10.00	11.05	11.50	4.70	5.00
M8	1.25	12.73	13.00	14.38	15.00	6.14	6.50
M10	1.5	16.73	17.00	18.90	19.60	7.64	8.00
M12	1.75	18.67	19.00	21.10	21.90	9.64	10.00
(M14)	2	21.67	22.00	24.49	25.40	10.57	11.00
M16	2	23.67	24.00	26.75	27.70	12.57	13.00
(M18)	2.5	26.67	27.00	30.14	31.20	14.57	15.00
M20	2.5	29.67	30.00	33.53	34.60	15.57	16.00
(M22)	2.5	31.61	32.00	35.72	36.90	17.57	18.00
M24	3	35.38	36.00	39.98	41.60	18.48	19.00
(M27)	3	40.38	41.00	45.63	47.30	21.48	22.00
M30	3.5	45.38	46.00	51.28	53.10	23.48	24.00
(M33)	3.5	49.38	50.00	55.80	57.70	25.48	26.00
M36	4	54.26	55.00	61.31	63.50	28.48	29.00
(M39)	4	59.26	60.00	66.96	69.30	30.38	31.00
M42	4.5	64.26	65.00	72.61	75.10	33.38	34.00
(M45)	4.5	69.26	70.00	78.26	80.80	35.38	36.00
M48	5	74.26	75.00	83.91	86.60	37.38	38.00
(M52)	5	79.26	80.00	89.56	92.40	41.38	42.00
M56	5.5	84.13	85.00	95.07	98.10	44.38	45.00
(M60)	5.5	89.13	90.00	100.72	103.90	47.38	48.00
M64	6	94.13	95.00	106.37	109.70	50.26	51.00

Sizes in brackets are non-preferred

unit in mm



**BS 4320 FORM A STEEL FLAT WASHERS**



EXAMPLE

product code

diameter

CODE

**5 0 0 0**

**0 3 0**

**0 0 0 0**

PRODUCT

**BS 4320 Form A Flat Washer**  
Hot Dip Galvanized

**M30**

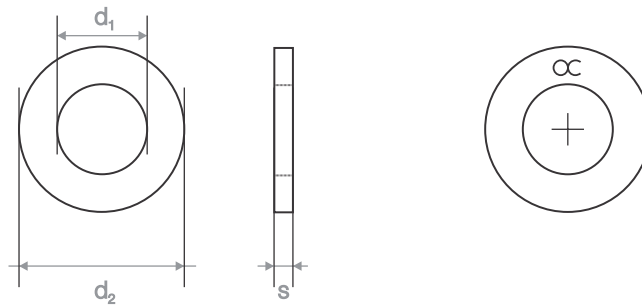
Available product codes: 5000, 5100, 5200

nominal size of bolt or screw	inside diameter		outside diameter		thickness	
	d <sub>1</sub>		d <sub>2</sub>		s	
	min	max	min	max	min	max
M1.0	1.1	1.25	2.3	2.5	0.2	0.4
M1.2	1.3	1.45	2.8	3.0	0.2	0.4
(M1.4)	1.5	1.65	2.8	3.0	0.2	0.4
M1.6	1.7	1.85	3.7	4.0	0.2	0.4
M2.0	2.2	2.35	4.7	5.0	0.2	0.4
(M2.2)	2.4	2.55	4.7	5.0	0.4	0.6
M2.5	2.7	2.85	6.2	6.5	0.4	0.6
M3	3.2	3.4	6.7	7	0.4	0.6
(M3.5)	3.7	3.9	6.7	7	0.4	0.6
M4	4.3	4.5	8.7	9	0.7	0.9
(M4.5)	4.8	5.0	8.7	9	0.7	0.9
M5	5.3	5.5	9.7	10	0.9	1.1
M6	6.4	6.7	12.1	12.5	1.4	1.8
(M7)	7.4	7.7	13.6	14	1.4	1.8
M8	8.4	8.7	16.6	17	1.4	1.8
M10	10.5	10.9	20.5	21	1.8	2.2
M12	13.0	13.4	23.5	24	2.3	2.7
(M14)	15.0	15.4	27.5	28	2.3	2.7
M16	17.0	17.4	29.5	30	2.7	3.3
(M18)	19.0	19.5	33.2	34	2.7	3.3
M20	21	21.5	36.2	37	2.7	3.3
(M22)	23	23.5	38.2	39	2.7	3.3
M24	25	25.5	43.2	44	3.7	4.3
(M27)	28	28.5	49.2	50	3.7	4.3
M30	31	31.6	55.0	56	3.7	4.3
(M33)	34	34.6	59.0	60	4.4	5.6
M36	37	37.6	65.0	66	4.4	5.6
(M39)	40	40.6	71.0	72	5.4	6.6

Sizes in brackets are non-preferred

unit in mm

**BS EN ISO 7089 STEEL FLAT WASHERS**



EXAMPLE

product code

diameter

CODE

**5 0 0 2**

**0 3 0**

**0 0 0 0**

PRODUCT

**BS EN ISO 7089 Flat Washer**  
Hot Dip Galvanized

**M30**

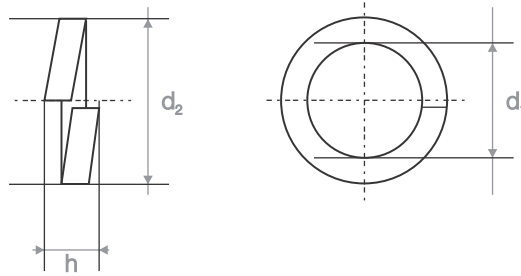
Available product codes: 5002, 5103, 5203

nominal size	inside diameter		outside diameter		thickness	
	d <sub>1</sub>		d <sub>2</sub>		s	
	min	max	min	max	min	max
M1.6	1.70	1.84	3.7	4.0	0.25	0.35
M2	2.20	2.34	4.7	5.0	0.25	0.35
M2.5	2.70	2.84	5.7	6.0	0.45	0.55
M3	3.20	3.38	6.64	7.00	0.45	0.55
(M3.5)	3.70	3.88	7.64	8.00	0.45	0.55
M4	4.30	4.48	8.64	9.00	0.7	0.9
M5	5.30	5.48	9.64	10.00	0.9	1.1
M6	6.40	6.62	11.57	12.00	1.4	1.8
M8	8.40	8.62	15.57	16.00	1.4	1.8
M10	10.50	10.77	19.48	20.00	1.8	2.2
M12	13.00	13.27	23.48	24.00	2.3	2.7
(M14)	15.00	15.27	27.48	28.00	2.3	2.7
M16	17.00	17.27	29.48	30.00	2.7	3.3
(M18)	19.00	19.33	33.38	34.00	2.7	3.3
M20	21.00	21.33	36.38	37.00	2.7	3.3
(M22)	23.00	23.33	38.38	39.00	2.7	3.3
M24	25.00	25.33	43.38	44.00	3.7	4.3
(M27)	28.00	28.33	49.38	50.00	3.7	4.3
M30	31.00	31.39	55.26	56.00	3.7	4.3
(M33)	34.00	34.62	58.8	60.0	4.4	5.6
M36	37.00	37.62	64.8	66.0	4.4	5.6
(M39)	42.00	42.62	70.8	72.0	5.4	6.6
M42	45.00	45.62	76.8	78.0	7	9
(M45)	48.00	48.62	83.6	85.0	7	9
M48	52.00	52.74	90.6	92.0	7	9
(M52)	56.00	56.74	96.6	98.0	7	9
M56	62.00	62.74	103.6	105.0	9	11
(M60)	66.00	66.74	108.6	110.0	9	11
M64	70.00	70.74	113.6	115.0	9	11

Sizes in brackets are non-preferred

unit in mm

STEEL SPRING WASHERS



EXAMPLE

product code

diameter

CODE

5 9 5 0

0 3 0

0 0 0 0

PRODUCT

Spring Washer  
Hot Dip Galvanized

M30

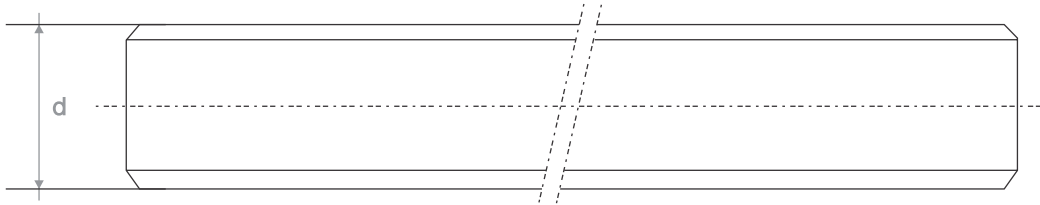
Available product codes: 5950, 5960, 5970

nominal size of bolt or screw	inside diameter		outside diameter	height	
	$d_1$		$d_2$	$h$	
	min	max	max	min	max
M2	2.1	2.4	4.4	1	1.2
M2.2	2.3	2.6	4.8	1.2	1.4
M2.5	2.6	2.9	5.1	1.2	1.4
M3	3.1	3.4	6.2	1.6	1.9
M3.5	3.6	3.9	6.7	1.6	1.9
M4	4.1	4.4	7.6	1.8	2.1
M5	5.1	5.4	9.2	2.4	2.8
M6	6.1	6.5	11.8	3.2	3.8
M7	7.1	7.5	12.8	3.2	3.8
M8	8.1	8.5	14.8	4	4.7
M10	10.2	10.7	18.1	4.4	5.2
M12	12.2	12.7	21.1	5	5.9
M14	14.2	14.7	24.1	6	7.1
M16	16.2	17	27.4	7	8.3
M18	18.2	19	29.4	7	8.3
M20	20.2	21.2	33.6	8	9.4
M22	22.5	23.5	35.9	8	9.4
M24	24.5	25.5	40	10	11.8
M27	27.5	28.5	43	10	11.8
M30	30.5	31.7	48.2	12	14.2
M33*	33.5	34.7	53.2	12	14.2
M36	36.5	37.7	58.2	12	14.2
M39	39.5	40.7	61.2	12	14.2
M42	42.5	43.7	68.2	14	16.5
M45	45.5	46.7	71.2	14	16.5
M48	49	50.5	75	14	16.5
M52	53	54.5	83	16	18.9
M56	57	58.5	87	16	18.9
M60	61	62.5	91	16	18.9
M64	65	66.5	95	16	18.9
M68	69	70.5	99	16	18.9
M72	73	74.5	103	16	18.9
M80	81	82.5	111	16	18.9
M90	91	92.5	121	16	18.9
M100	101	102.5	131	16	18.9

\* size not included in standard

unit in mm

**STEEL FULLY THREADED RODS**



EXAMPLE

product code

diameter

length

**CODE**

**3 0 0 5**

**0 2 4**

**3 0 0 0**

**PRODUCT**

**Fully Threaded Rod**  
Grade 8.8 Hot Dip Galvanized

**M24**

Available product codes: 3000, 3001, 3005, 3007, 3010, 3011, 3015, 3017  
3020, 3021, 3025, 3027

nominal size and thread diameter	pitch of thread	nominal size and thread diameter	pitch of thread
d		d	
M2	0.4	M20	2.5
M2.5	0.45	(M22)	2.5
M3	0.5	M24	3
(M3.5)	0.6	(M27)	3
M4	0.7	M30	3.5
M5	0.8	(M33)	3.5
M6	1	M36	4
M8	1.25	(M39)	4
M10	1.5	M42	4.5
M12	1.75	(M45)	4.5
(M14)	2	M48	5
M16	2	(M52)	5
(M18)	2.5		