

**Cooper & Turner Ltd**

**STRUCTURAL**

**BS EN 15048**

**Non-preloaded Structural Bolting Assemblies**

**Property Class 10.9**

## Dimensions of Fully Threaded Bolts/Setscrews

Thread $d$		M16	M20	M24	M30	M36
$p$ (pitch)		2	2.5	3	3.5	4
$a$	max.	6	7.5	9	10.5	12
$c$	max.	0.8	0.8	0.8	0.8	0.8
	min.	0.2	0.2	0.2	0.2	0.2
$da$	max.	17.7	22.4	26.4	33.4	39.4
$dw$	min.	22.49	28.19	33.61	42.75	51.11
$e$	min.	26.75	33.53	39.98	50.85	60.79
$k$	nom.	10	12.5	15	18.7	22.5
	max.	10.18	12.715	15.215	19.12	22.92
	min.	9.82	12.285	14.785	18.28	22.08
$r$	min.	0.6	0.8	0.8	1	1
$s$	max.	24	30	36	46	55
	min.	23.67	29.67	35.38	45	53.8

Dimensions are in millimetres and apply prior to coating.

The table shows the popular dimensions, other diameters can be supplied provided the quantity required is sufficient to warrant manufacture.

In addition, standard thread bolts in accordance with BS EN ISO 4014 may be supplied (see pages 3 & 4).

## 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 10.9 Bolting Assemblies are not stock items and, therefore, Setscrews or Standard Thread Bolts may be supplied depending on availability

## CHARACTERISTIC STANDARD

Fully Threaded Bolts / Setscrews		
General Requirements		BS EN 15048 - 1 & 2
Threads		ISO 965 / BS3643 tolerance class 6g
Materials & Manufacture		BS EN ISO 898-1 Property Class 10.9
Mechanical Properties - Setscrews		BS EN ISO 898-1 Property Class 10.9
Mechanical Properties - Assemblies		BS EN 15048 - 2
Dimensions & Tolerances		BS EN ISO 4017
Finish/Coatings	Self Colour/Black	BS EN ISO 4017 - as processed
	Hot Dip Galvanized	BS EN ISO 10684
Product Marking		BS EN ISO 898-1 & BS EN 15048 - 1

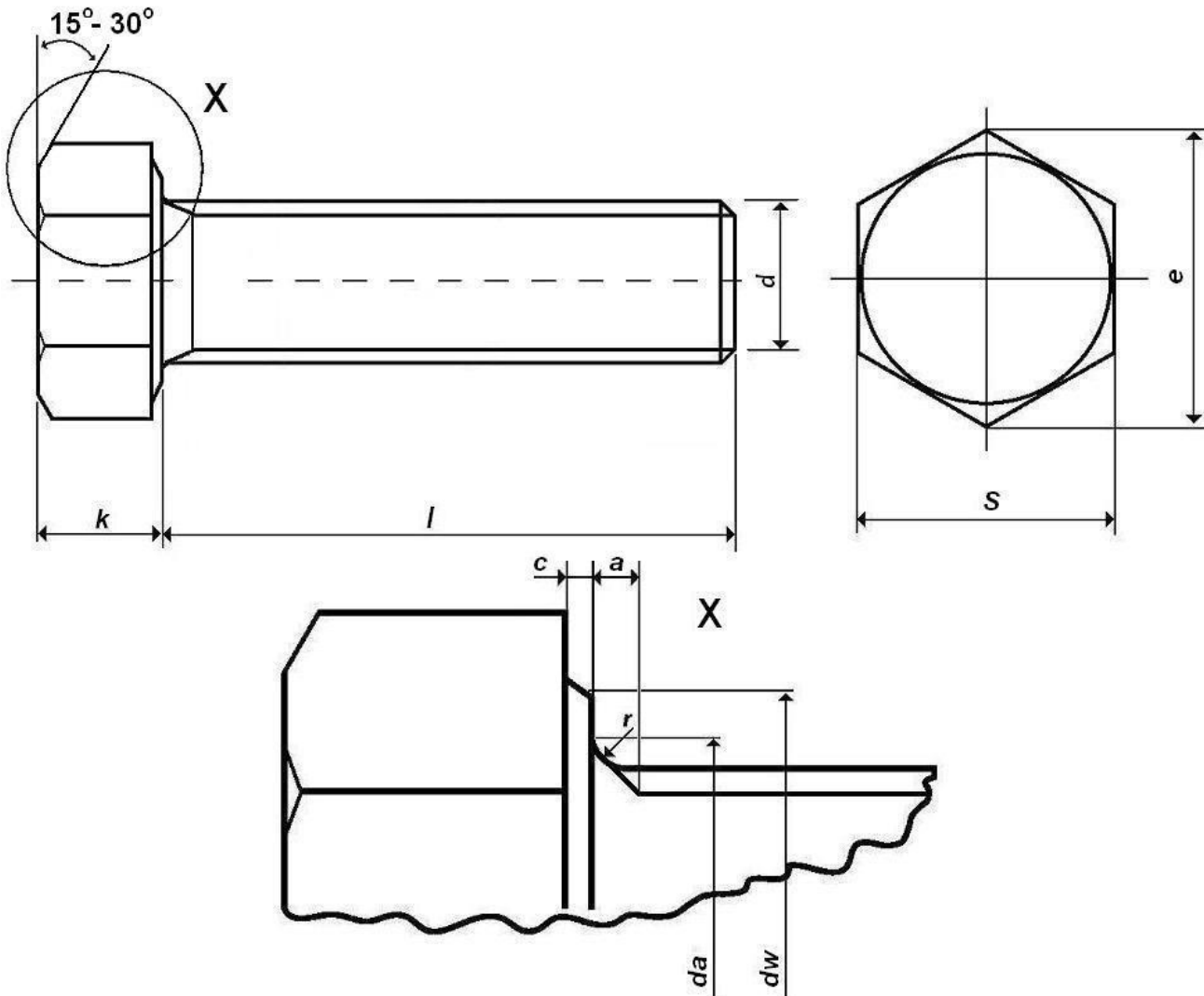
## Tolerance on nominal length for Fully Threaded

Nominal length (mm)		Tolerance (mm)
Over	Up to and including	
30	50	±1.25
50	80	±1.5
80	120	±1.75
120	180	±2
180	250	±2.3

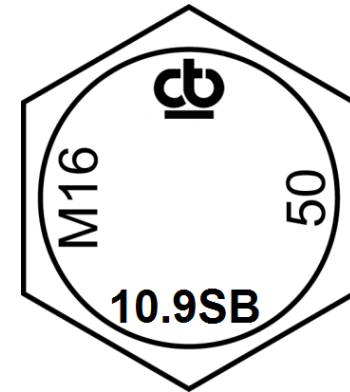
## CERTIFICATION

Property Class 10.9 Fully Threaded Bolts/Setscrews are supplied with a Test Certificate.

BS EN 15048 10.9 Bolting Assemblies are not stock items and, therefore, Setscrews or Standard Thread Bolts may be supplied depending on availability



## HEAD MARKING



**Setscrews & Standard Thread Bolts**  
 The actual arrangement and sizes of the markings may vary from that shown

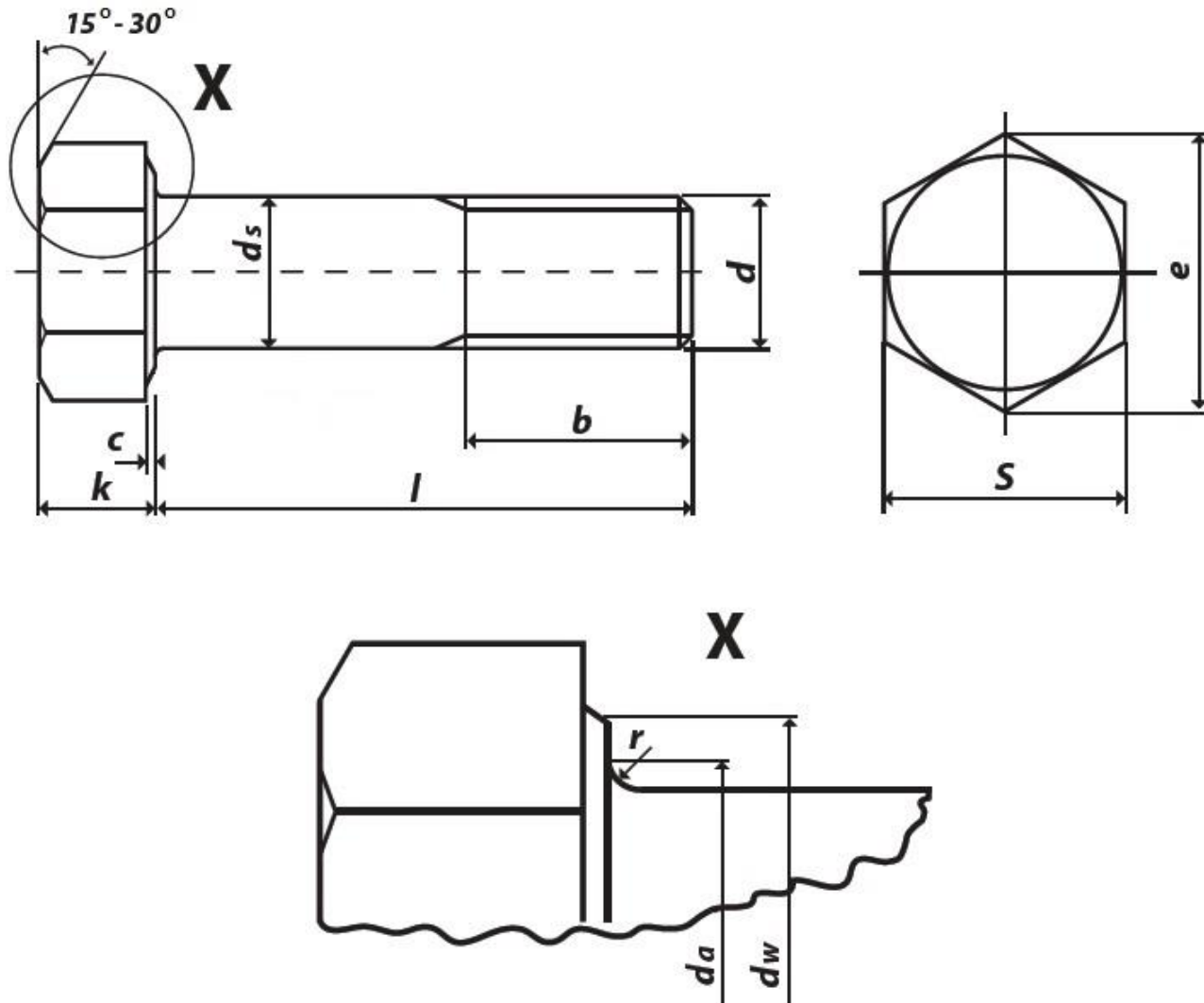
# BS EN 15048 Non-preloaded Structural Bolting Assemblies Property Class 10.9

BS EN 15048 10.9 Bolting Assemblies are not stock items and, therefore, Setscrews or Standard Thread Bolts may be supplied depending on availability

Dimensions of Standard Thread Bolts						
Thread $d$	M16	M20	M24	M30	M36	
$p$ (pitch)	2	2.5	3	3.5	4	
$b$	Bolt $\leq 125$	38	46	54	66	-
	Bolt $> 125$ $\leq 200$	44	52	60	72	84
	Bolt $> 200$	57	65	73	85	97
$c$	max.	0.8	0.8	0.8	0.8	0.8
	min.	0.2	0.2	0.2	0.2	0.2
$da$	max.	17.7	22.4	26.4	33.4	39.4
$ds$	max.	16.0	20.0	24.0	30.0	36.0
	min.	15.73	19.67	23.67	29.48	35.38
$dw$	min.	22.49	28.19	33.61	42.75	51.11
$e$	min.	26.75	33.53	39.98	50.85	60.79
$k$	nom.	10	12.5	15	18.7	22.5
	max.	10.18	12.715	15.215	19.12	22.92
	min.	9.82	12.285	14.785	18.28	22.08
$r$	min.	0.6	0.8	0.8	1	1
$s$	max.	24	30	36	46	55
	min.	23.67	29.67	35.38	45	53.8
Dimensions are in millimetres and apply prior to coating.						
The table shows the popular dimensions, other diameters can be supplied provided the quantity required is sufficient to warrant manufacture.						
Fully Threaded Bolts / Setscrews in accordance with BS EN ISO 4017 may be supplied (see pages 1 & 2).						

CHARACTERISTIC	STANDARD	
<b>Standard Thread Bolts</b>		
General Requirements	BS EN 15048 - 1 & 2	
Threads	ISO 965 / BS3643 tolerance class 6g	
Materials & Manufacture	BS EN ISO 898-1 Property Class 10.9	
Mechanical Properties - Setscrews	BS EN ISO 898-1 Property Class 10.9	
Mechanical Properties - Assemblies	BS EN 15048 - 2	
Dimensions & Tolerances	BS EN ISO 4014	
Finish/Coatings	Self Colour/Black	BS EN ISO 4014 - as processed
	Hot Dip Galvanized	BS EN ISO 10684
Product Marking	BS EN ISO 898-1 & BS EN 15048 - 1	

BS EN 15048 10.9 Bolting Assemblies are not stock items and, therefore, Setscrews or Standard Thread Bolts may be supplied depending on availability



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## Proof Load, Ultimate Tensile Load & Hardness of Bolts

Nominal Diameter & Thread Pitch	Stress Area mm <sup>2</sup>	Property Class 10.9			
		Proof Load min kN	Tensile Load min kN	Hardness Rockwell HRC	
				min	max
<b>M16 x 2</b>	157	130	163	32	39
<b>M20 x 2.5</b>	245	203	255	32	39
<b>M24 x 3</b>	353	293	367	32	39
<b>M30 x 3.5</b>	561	466	583	32	39
<b>M36 x 4</b>	817	678	850	32	39

## Bolt and Nut combinations supplied

Bolt Property Class & Finish	supplied with	Nut Property Class & Finish
10.9 - Self Colour		BS EN ISO 4032 PC 10 Self Colour
10.9 - Hot Dip Galvanized		BS EN ISO 4033 PC 12 Hot Dip Galvanized

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## DIMENSIONS OF BS EN ISO 4032 PC 10 NUTS

Thread <i>d</i>		M16	M20	M24	M30	M36
<i>P</i> (pitch)		2	2.5	3	3.5	4
<i>dw</i>	min.	22.5	27.7	33.3	42.8	51.1
	<i>e</i>	min.	26.75	32.95	39.55	50.85
<i>m</i>	max.	14.8	18.0	21.5	25.6	31
	min.	14.1	16.9	20.2	24.3	29.4
<i>s</i>	max.=nom	24	30	36	46	55
	min.	23.67	29.16	35	45	53.8

Dimensions are in millimetres and apply prior to coating

## DIMENSIONS OF BS EN ISO 4033 PC 12 NUTS

Thread <i>d</i>		M16	M20	M24	M30	M36
<i>P</i> (pitch)		2	2.5	3	3.5	4
<i>dw</i>	min.	22.5	27.7	33.3	42.8	51.1
	<i>e</i>	min.	26.75	32.95	39.55	50.85
<i>m</i>	max.	16.4	20.3	23.9	28.6	34.7
	min.	15.7	19.0	22.6	27.8	33.1
<i>s</i>	max.=nom	24	30	36	46	55
	min.	23.67	29.16	35	45	53.8

Dimensions are in millimetres and apply prior to coating

## CHARACTERISTIC

## STANDARD

### General Requirements

BS EN ISO 4032 or 4033

### Threads

Self Colour

ISO 965 / BS 3643 tolerance class 6H

Hot Dip Galvanized

ISO 965-5 tolerance class 6AZ

### Materials & Manufacture

BS EN 20898-2 Property Classes 10 & 12

### Mechanical Properties

Self Colour

BS EN 20898-2 Property Class 10

Hot Dip Galvanized

BS EN 20898-2 Property Class 12

### Dimensions & Tolerances

BS EN ISO 4032 – Self Colour  
BS EN ISO 4033 – Hot Dip Galvanized

### Finish / Coating

Self Colour / Black

BS EN ISO 4032 - as processed

Hot Dip Galvanized

BS EN ISO 10684

### Product Marking

BS EN 20898-2 & BS EN 15048 - 1

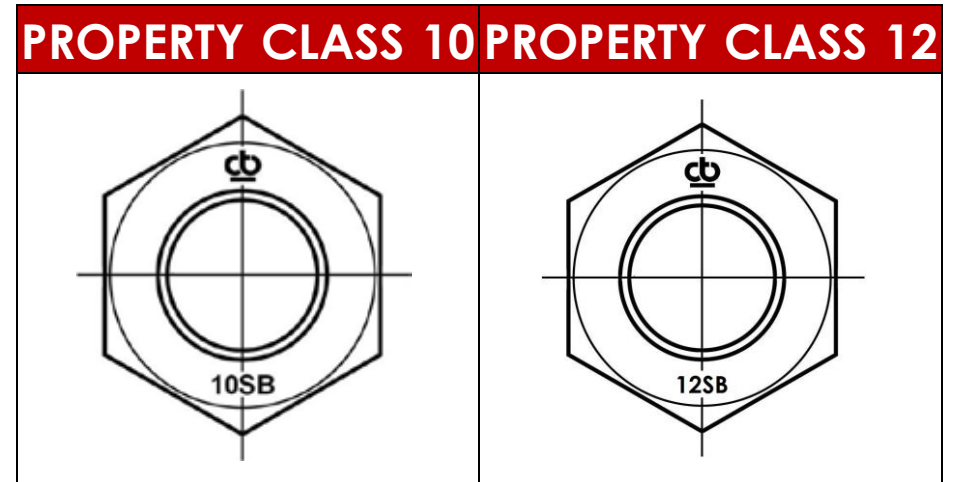
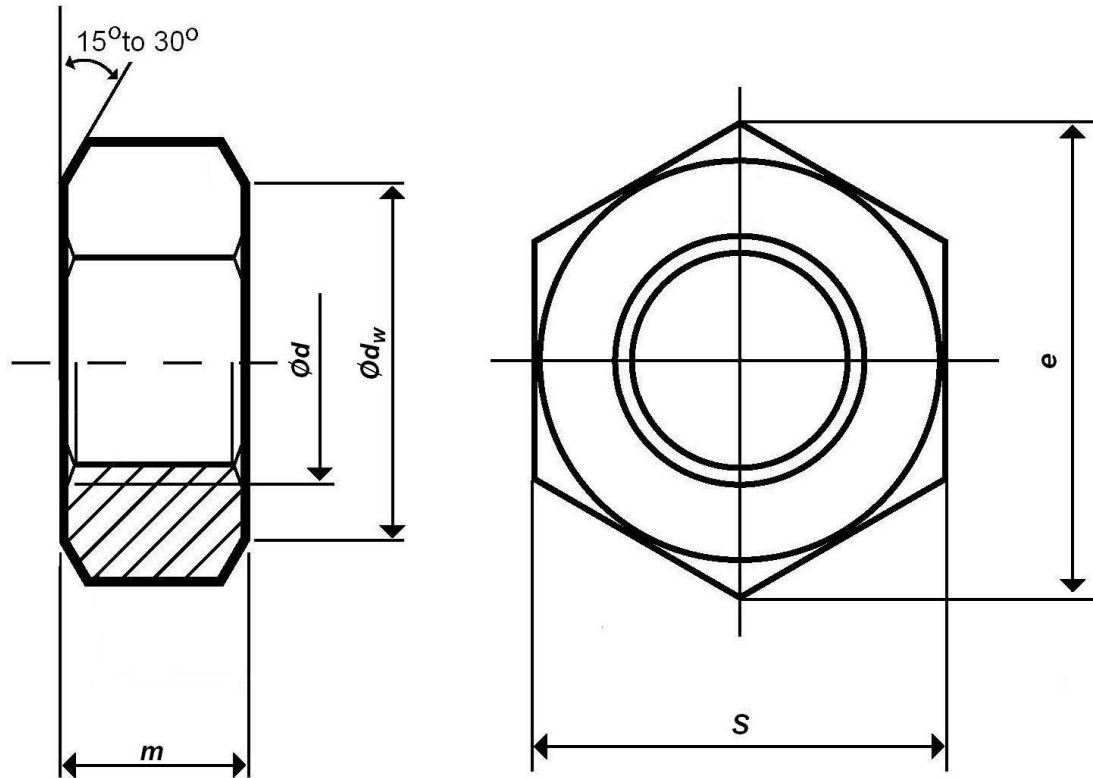
## PROOF LOAD OF NUTS

Nominal Diameter & Thread Pitch	Stress Area	Proof Load min	
		BS EN ISO 4032 PC 10 Standard 6H fit <sup>1</sup>	BS EN ISO 4033 PC 12 over tapped 6AZ fit <sup>2</sup>
	mm <sup>2</sup>	kN	kN
M16 x 2	157	164.9	186.8
M20 x 2.5	245	259.7	294
M24 x 3	353	374.2	423.6
M30 x 3.5	561	594.7	673.2
M36 x 4	817	866	980.4

<sup>1</sup> Nut finish self colour

<sup>2</sup> Nut finish hot dip galvanized

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## DIMENSIONS OF BS EN 7091 WASHERS

Nominal size of bolt or screw	Inside diameter d1		Outside diameter d2		Thickness s	
	max	min	max	min	max	min
<b>M16</b>	17.93	17.50	30	28.7	3.6	2.4
<b>M20</b>	22.52	22	37	35.4	3.6	2.4
<b>M24</b>	26.52	26	44	42.4	4.6	3.4
<b>M30</b>	33.62	33	56	54.1	4.6	3.4
<b>M36</b>	40	39	66	64.1	6	4

Dimensions are in millimetres and apply prior to coating

## CHARACTERISTIC STANDARD

General Requirements		BS EN ISO 7091
Materials & Manufacture		BS EN ISO 7091
Dimensions & Tolerances		BS EN ISO 7091
Finish / Coatings	Self Colour / Black	BS EN ISO 7091 – as processed
	Hot Dip Galvanized	BS EN ISO 10684

