



بريشسون ميتال اندستريز ش.م.ع

**PRECISION**  
METAL INDUSTRIES FZC



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*New Technology In Metal*

## COMPANY PROFILE

### About Us:

**Precision Metal Industries FZC (PMI)** is a quality UAE brand founded in 2013 to manufacture fasteners of different grade & types such as carbon, alloy duplex & special customized fasteners. It was established to serve the requirements of oil & gas in UAE, GCC & internationally.

Through our skilled workforce & cutting-edge advanced manufacturing techniques, we deliver products at quality and efficiency that ensures customer success. Fasteners are manufactured & supplied in High Tensile, Corrosion Resistant Alloys, High Performance Alloys, Rare Exotic Alloys, widely used in sectors like Power, Oil, Gas, Energy, Processing unit, Marine and Construction industries.

We produce all the international standards like ASTM / ASME / DIN / BS EN / ISO & CUSTOMIZED Products. We have grown dramatically since the foundation offering our services nationwide and internationally. Our regular & customized products, creative packaging and merchandising initiatives have also earned us a reputation as industry innovators.

### **We are known for our ability to find those hard to find items!**

For further enquiries, quotes or to place an order you can contact us via email: [info@precisionmetal.me](mailto:info@precisionmetal.me)



## QUALITY MANAGEMENT SYSTEM

### Quality Control:

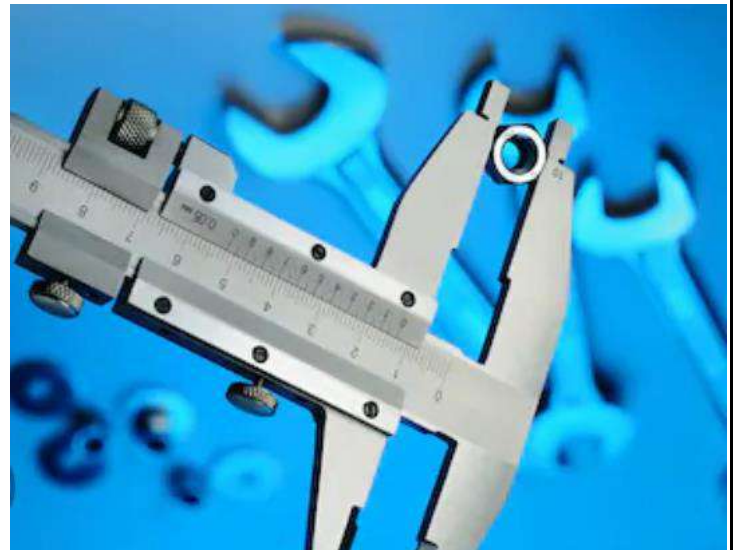


Precision Metal Industries FZC is dedicated to maintaining a high level of quality and reliability in serving our customers.

The company operates on quality management system based on the requirements of ISO: 9001:2015.

Material Test certificates are provided with every product to ensure compliance with required international standards.

Our state of art production unit ensures durable product with excellent finishing. Multiple tests and checks are done at every stage of production process to ensure the chemical, mechanical and dimensional accuracy of each and every fastener.





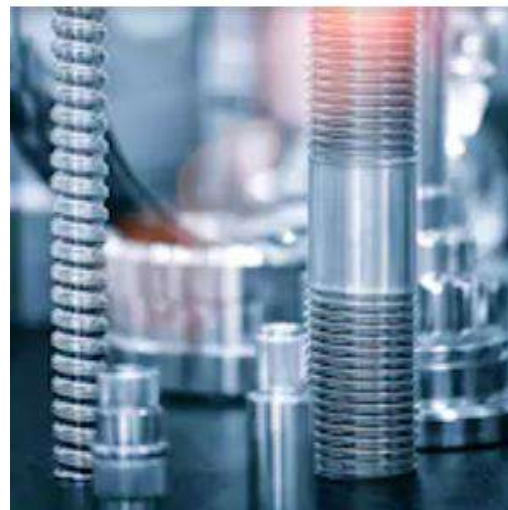


## PRODUCTS

The fasteners are produced as per various international standards such as ASME, ASTM, ANSI, BS, DIN, ISO, SAE, JIS and as per customers' specifications.

The manufacturing process of PMI is divided into two big categories:

Standard bolting according to international standards and special bolting according to customer drawings; in these two categories we can find the following types of products



### Products built to Perform

- Stud Bolts
- Hex Bolts
- Engineering Studs
- Eye bolts
- U Bolts
- Anchor Bolts
- Threaded Bars
- Collar Bolts
- Customized Request

### Materials

- ASTM A-193 Grades B-7, B-7M, B16
- ASTM A320 L-7, L-7M ▶ ASTM A-194
- Inconel™ (600/601/625/718/925)
- Stainless Steel (All ASTM Grades)
- Hastelloy™ B-2/C-22/C-276/G30,X
- Incoloy™ (800H/800HT/825)
- Titanium™ Monel™ (400/K500)
- ASTM A453 660 Grades A & B
- ASTM A354 Grades BC & BD
- Alloy 20™
- Nickel™ • Duplex™

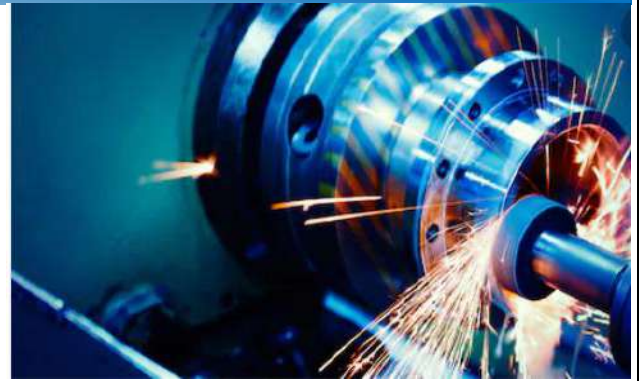
### Coatings

- Electro Zinc Galvanized
- Hot dip Galvanized
- PTFE Coating
- Xylan/Xylar
- Phosphate coating
- Nickel
- Zinc Nickel
- Ceramic Coating



## MANUFACTURING CAPACITY

Our extensive range of manufacturing processes gives us the ability to supply to many different industry sectors.



### CNC Machining

Our state-of-the-art manufacturing facility has extensive machining capacity in advanced CNC technology enabling the production of high quality, cost effective fasteners and precision components.



### High capacity thread rolling

On-site thread rolling capacity for Metric & Imperial thread forms in all materials up to 4".

### Hot Forging

We carry comprehensive stocks of blank bar to allow us to hot forge bespoke fasteners specific to our customers designs, specifications and industry standards.



## Standard specification for Alloy Steel / Stainless Steel bolting – A193 /A193M

ASTM A193 specification covers alloy and stainless steel bolting for pressure vessels, valves, flanges, and fittings for high temperature or high pressure service, or other special purpose applications. Several grades are covered, including ferritic steels and austenitic stainless steels

### CHEMICAL PROPERTIES

ASTM A193 / A193 M	ALLOY STEEL - FERRITIC				
	B5	B6	B7	B7M	B16
Carbon (C)	0.10 Min	0.08-0.15	0.37-0.49	0.37-0.49	0.36-0.47
Manganese (Mn)	1.00 Max	1.00 Max	0.65-1.10	0.65-1.10	0.45-0.70
Phosphorous (P) Max	0.04	0.04	0.035	0.035	0.035
Sulfur (S) Max	0.03	0.03	0.04	0.04	0.04
Silicon (Si)	1.00 Max	1.00 Max	0.15-0.35	0.15-0.35	0.15-0.35
Nickel (Ni)		11.5-13.5			
Chorium (Cr)	4.0-6.0		0.75-1.20	0.75-1.20	0.80-1.15
Molybdenum (Mo)	0.40-0.65		0.15-0.25	0.15-0.25	0.50-0.65
Vanadium (V)					0.25-0.25
Aluminium (Al) Max					0.015

ASTM A193 / A193 M	STAINLESS STEEL - AUSTENITIC											
	B8 CL1	B8A CL1A	B8 CL2	B8C CL1	B8CA CL1A	B8C CL2	B8M CL1	B8MA CL1A	B8M CL2	B8T CL1	B8T CL1A	B8T CL2
Carbon (C)	0.08 Max	0.08 Max	0.08 Max	0.08 Max	0.08 Max	0.08 Max	0.08 Max	0.08 Max	0.08 Max	0.08 Max	0.08 Max	0.08 Max
Manganese (Mn)	2.00 Max	2.00 Max	2.00 Max	2.00 Max	2.00 Max	2.00 Max	2.00 Max	2.00 Max	2.00 Max	2.00 Max	2.00 Max	2.00 Max
Phosphorous (P) Max	0.045	0.045	0.045	0.045	0.045	0.045	0.045	0.045	0.045	0.045	0.045	0.045
Sulfur (S) Max	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Silicon (Si)	1.00 Max	1.00 Max	1.00 Max	1.00 Max	1.00 Max	1.00 Max	1.00 Max	1.00 Max	1.00 Max	1.00 Max	1.00 Max	1.00 Max
Nickel (Ni)	8.0-11.0	8.0-11.0	8.0-11.0	9.0-12.0	9.0-12.0	9.0-12.0	10.0-14.0	10.0-14.0	10.0-14.0	9.0-12.0	9.0-12.0	9.0-12.0
Chorium (Cr)	18.0-20.0	18.0-20.0	18.0-20.0	17.0-19.0	17.0-19.0	17.0-19.0	16.0-18.0	16.0-18.0	16.0-18.0	17.0-19.0	17.0-19.0	17.0-19.0
Molybdenum (Mo)							2.00-3.00	2.00-3.00	2.00-3.00	5x(C+N) Min 0.70 Max	5x(C+N) Min 0.70 Max	5x(C+N) Min 0.70 Max
Columbium + Tantalum (Cb + Ta)				10 x c, Min 1.10 Max								
Nitrogen (N)										0.10 Max	0.10 Max	0.10 Max

## Standard specification for Alloy Steel / Stainless Steel bolting – A193 /A193M

### MECHANICAL PROPERTIES

Grade	Diameter, Inches/mm	Tensile Strength, Min		Yield Strength, Min		Elongation in 4D Min,%	Reduction of Area Min,%	Hardness, Max	Heat Treatment
		In Ksi	In Mpa	In Ksi	In Mpa				
B5	Up to,4Incl/Up to M100,incl	100	690	80	550	16	50	321 HBW or 35HRC	Quenched & Tempered/Min 1100° F or 593° C
B6	Up to,4Incl/Up to M100,incl	110	760	85	585	15	50		
B7	2-1/2 & Under/M64&under	125	860	105	720	16	50		
	Over2-1/2 to 4 / Over M64 to M100	115	795	95	655	16	50		
	Over 4 to 7 / Over M100 to M180	100	690	75	515	18	50		
B7M	4&Under/M100&under	100	690	80	550	18	50	235HBW or 99HRB	Quenched & Tempered/Min 1150° F or 620° C
	Over 4 to 7 / Over M100 to M180	100	690	75	515	18	50		
B16	2-1/2 & Under/M64&under	125	860	105	725	18	50	321HBW or 35HRC	Quenched & Tempered/Min 1200° F or 650° C
	Over2-1/2 to 4 / Over M64 to M100	110	760	95	655	17	45		
	Over 4 to 8 / Over M100 to M180	100	690	85	585	16	45		
B8 CL1, B8 M CL1 B8C CL1 B8T CL1	All Diameters	75	515	30	205	30	50	223HBW or 96HRB	carbide solution treated
B8A CL1A, B8MA CL1A B8CA CL1A B8TA CL1A	All Diameters	75	515	30	205	30	50	192HBW or 90 HRB	carbide solution treated in the finished condition
B8 CL2, B8C CL2 B8T CL2	3/4 & Under/M20 & Under	125	860	100	690	12	35	321 HBW or 35HRC	carbide solution treated and strain hardened
	Over3/4 to 1.incl/ Over M20 to M24 Incl	115	795	80	550	15	35		
	Over1 to1-1/4.incl/ Over M24 to M30 Incl	105	725	65	450	20	35		
	Over1-1/4 to 1-1/2.incl/ Over M30 to M36 Incl	100	960	50	345	28	45		
B8M CL2	3/4 & Under/M20 & Under	110	760	95	655	15	45	321HBW or 35HRC	carbide solution treated and strain hardened
	Over3/4 to 1.incl/ Over M20 to M24 Incl	100	690	80	550	20	45		
	Over 1 to 1-1/4.incl/ Over M24 to M30 Incl	95	655	65	450	25	45		
	Over 1-1/4 to 1-1/2.incl/ Over M30 to M36 incl	90	620	90	345	30	45		

\*Materials conform to ASTM & ASME SPECIFICATION

## Standard specification for Alloy Steel / Stainless Steel bolting – A320 /A320M

The ASTM A320 specification covers alloy steel and stainless steel bolting materials for low temperature service.

### CHEMICAL PROPERTIES

ASTM A320/A320M	ALLOY STEEL-FERRITIC				
	L7	L7M	L71	L73	L43
Carbon (C)	0.38-0.48	0.38-0.48	0.35-0.40	0.38-0.43	0.38-0.43
Manganese (Mn)	0.75-1.00	0.75-1.00	0.75-0.90	0.75-1.00	0.60-0.85
Phosphorus (P) Max	0.035	0.035	0.035	0.035	0.035
Sulfur (S) Max	0.04	0.04	0.04	0.04	0.04
Silicon (Si)	0.15-0.35	0.15-0.35	0.15-0.35	0.15-0.35	0.15-0.35
Nickel (Ni)				0.40-0.70	1.65-2.00
Chromium (Cr)	0.80-1.10	0.80-1.10		0.40-0.60	0.70-0.90
Molybdenum (Mo)	0.15-0.25	0.15-0.25	0.20-0.30	0.20-0.30	0.20-0.30

ASTM A320/A320M	STAINLESS STEEL-AUSTENITIC											
	B8 CL1	B8A CL1A	B8 CL2	B8C CL1	B8CA CL1A	B8C CL2	B8M CL1	B8MA CL1A	B8M CL2	B8T CL1	B8T CL1A	B8T CL2
Carbon (C)	0.08 Max	0.08 Max	0.08 Max	0.08 Max	0.08 Max	0.08 Max	0.08 Max	0.08 Max	0.08 Max	0.08 Max	0.08 Max	0.08 Max
Manganese (Mn)	2.00Max	2.00Max	2.00Max	2.00Max	2.00Max	2.00Max	2.00Max	2.00Max	2.00Max	2.00Max	2.00Max	2.00Max
Phosphorus (P) Max	0.045	0.045	0.045	0.045	0.045	0.045	0.045	0.045	0.045	0.045	0.045	0.045
Sulfur (S) Max	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Silicon (Si)	1.00 Max	1.00 Max	1.00 Max	1.00 Max	1.00 Max	1.00 Max	1.00 Max	1.00 Max	1.00 Max	1.00 Max	1.00 Max	1.00 Max
Nickel (Ni)	8.0-1.0	8.0-1.0	8.0-1.0	9.0-12.0	9.0-12.0	9.0-12.0	10.0-14.0	10.0-14.0	10.0-14.0	9.0-12.0	9.0-12.0	9.0-12.0
Chromium (Cr)	18.0-20.0	18.0-20.0	18.0-20.0	17.0-19.0	17.0-19.0	17.0-19.0	16.0-18.0	16.0-18.0	16.0-18.0	17.0-19.0	17.0-19.0	17.0-19.0
Molybdenum (Mo)							2.00-3.00	2.00-3.00	2.00-3.00	5x(C+N) Min; 0.70 Max	5x(C+N) Min; 0.70 Max	5x(C+N) Min; 0.70 Max
Columbium + Tantalum (Cb+Ta)				10xc,Min; 1.10Max								
Nitrogen (N)										0.10 Max	0.10 Max	0.10 Max



## Standard specification for Alloy Steel / Stainless Steel bolting – A320 /A320M

### MECHANICAL PROPERTIES

Grade	Diameter, Inches / mm	Tensile Strength		Yield Strength, Min		Elongation in 2 in or 50mm Min,%	Reduction of Area Min,%	Hardness, Max	Heat Treatment	Charpy impact test requirement		
		In Ksi	In Mpa	In Ksi	In Mpa					Specimen size in mm	Test temp °F/°C	Min Energy req Joules
L7	2-1/2&under/65&under	125	860	105	725	16	50	321HBW or 35HRC	Quenched & Tempered/Min 1100° F or 593° C	x 10(7.5)	Minus150/Minus101	27(22)
L7M	2-1/2&under/65&under	100	690	80	550	18	50	235HBW or 99HRB	Quenched & Tempered/Min 1150° F for 602° C	x 10(7.5)	Minus100/Minus73	27(22)
L71	2-1/2&under/65&under	125	860	105	725	16	50	321HBW or 35HRC	Quenched & Tempered/Min 1100° F or 593° C	x 10(7.5)	Minus100/Minus73	27(22)
L73	2-1/2&under/65&under	125	860	105	725	16	50	321HBW or 35HRC	Quenched & Tempered/Min 1100° F or 593° C	x 10(7.5)	Minus100/Minus73	27(22)
L43	4& Under / 100 & Under	125	860	105	725	16	50	321HBW or 35HRC	Quenched & Tempered/Min 1100° F or 593° C	x 10(7.5)	Minus100/Minus73	27(22)
B8 CL1, B8M CL1, B8CCL1, B8T CL1	All Diameters	75	515	30	205	30	50	223HBW or 96HRB	Carbide solution treated	Not Applicable		
B8A CL1A, B8MA CL1A, B8CA CL1A, B8TA CL1A	All Diameters	75	515	30	205	30	50	192HBW or 90HRB	Carbide solution treated in the finished condition	Not Applicable		
B8 CL2	3/4& Under/M20 & Under	125	860	100	690	12	35	321HBW or 35HRC	Carbide solution treated and strain hardened	Not Applicable		
B8C CL2 B8T CL2	Over3/4 to 1.incl/ Over M20 to M30 Incl	115	795	80	550	15	35					
	Over1to 1-1/4.incl/ OverM24 to M30 Incl	105	725	65	450	20	35					
	Over1-1/4 to 1-1/2.incl/ Over M30 to M36 Incl	100	690	50	345	28	45					
B8M CL2	3/4 & Under/M20 & Under	110	760	95	655	15	45	321HBW or 35HRC	Carbide solution treated and strain hardened	Not Applicable		
	Over3/4 to 1.incl/ Over M20 to M24 Incl	100	690	80	550	20	45					
	Over 1 to 1-1/4.incl/ Over M24 to M30 Incl	95	655	65	450	25	45					
	Over 1-1/4 to 1-1/2.incl/ Over M30 to M36 Incl	90	620	90	345	30	45					

## Standard specification for Alloy Steel / Stainless Steel Nuts – A194/A194M

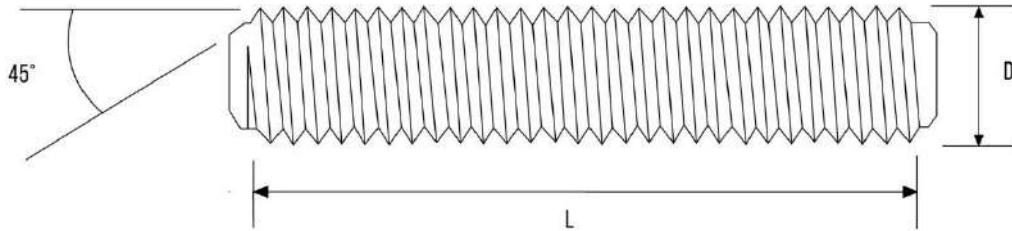
### CHEMICAL PROPERTIES

High Temperature or High Pressure Service or Both																	
ASTM A194/A194M	ALLOY STEEL-FERRITIC							STAINLESS STEEL-AUSTENITIC									
	2H	2HM	GR4	GR3	GR5	GR7	GR7M	GR8	GR8M	GR8C	GR8T	GR8S	GR8A	GR8MA	GR8CA	GR8TA	GR8SA
Carbon (C)	0.15 Min	0.15 Min	0.40-0.50	0.10 Min	0.15 Max	0.37-0.49	0.37-0.49	0.08 Max	0.08 Max	0.08 Max	0.08max	0.1 Max	0.08 Max	0.08 Max	0.08 Max	0.08 Max	0.1 Max
Manganese (Mn)	1.00 Max	1.00 Max	0.70-0.90	1.00 Max	1.00 Max	0.65-1.10	0.65-1.10	2.00 Max	2.00 Max	2.00 Max	2.00Max	0.70-0.9	2.00 Max	2.00 Max	2.00 Max	2.00 Max	0.7-0.9
Phosphorus (P) Max	0.04	0.04	0.035	0.04	0.04	0.035	0.035	0.045	0.045	0.045	0.045	0.06	0.045	0.045	0.045	0.045	0.06
Sulfur (S) Max	0.05	0.05	0.04	0.03	0.03	0.04	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Silicon (Si)	0.40 Max	0.40 Max	0.15-0.35	1.00 Max	1.00 Max	0.15-0.35	0.15-0.35	2.00 Max	1.00 Max	1.00 Max	1.00Max	3.5-4.5	1.00 Max	1.00 Max	1.00 Max	1.00 Max	3.5-4.5
Nickel (Ni)									10.0-14.0		9.0-12.0	8.0-9.0		10.0-14.0		9.0-12.0	8.0-9.0
Chorium (Cr)				1.0-5.0	11.5-13.5	0.75-1.20	0.75-1.20	18.0-20.0	16.0-18.0	17.0-19.0	17.0-19.0	15.0-18.0	18.0-20.0	16.0-18.0	17.0-19.0	17.0-19.0	16.0-18.0
Molybdenum (Mo)			0.20-0.30	0.40-0.65		0.15-0.25	0.15-0.25	8.0-11.0	2.00-3.00	9.0-12.0	5x(C-N) Min 0.70 Max	5x(C+N) Min 0.70 Max	8.0-11.0	2.00-3.00	9.0-12.0	5x(C+N) Min 0.70 Max	5x(C+N) Min; 0.70 Max
Vanadium (V)																	
Titanium (Ti)																	
Columbium + Tantalum (Cb+Ta)										5 x (c) Min					5x(C)Min		
Aluminium (Al) Max																	
Nitrogen (N)											0.10 Max	0.08-0.18				0.10 Max	0.08-0.18

### MECHANICAL PROPERTIES

Grade	Diameter, Inches/mm	Hardness, Max	Sample Nut after Heat Treatment	HEAT TREATMENT	Charpy Impact test requirement		
					Specimen size in mm	Test tempo °F/°C	Min Energy req Joules
2H	1-1/2.Incl/M36 Incl	248-327HBW or 24-35HRC	Min179HBW or 89HRB	Quenched & Tempered/Min 850°F or 455°C			Not Applicable
	Over1-1/2.Incl/M36 Incl	212-327HBW or Max35HRC	Min147HBW or 79HRB				
2HM	ALL	159-235HBW or 84-99HRB	Min159HBW or 84HRB	Quenched & Tempered/Min1150°F or 620°C			Not Applicable
GR4	ALL	248-327HBW or 24-35HRC	Min201HBW or 94HRB	Quenched & Tempered/Min1100°F or 595°C	10 x 10(7.5)	Minus150/Minus101	27(22)
GR3	ALL	248-327HBW or 24-35HRC	Min201HBW or 94HRB	Quenched & Tempered/Min1100°F or 595°C			Not Applicable
GR6	ALL	228-271HBW or 20-28HRC		Quenched & Tempered/Min1100°F or 595°C			27(22)
GR7	ALL	248-271HBW or 24-35HRC	Min201HBW or 94HRB	Quenched & Tempered/Min1100°F or 595°C	10 x 10(7.5)	Minus150/Minus101	27(22)
GR7 M	ALL	159-235HBW or 84-99HRB	Min201HBW or 94HRB	Quenched & Tempered/Min1150°F or 620°C	10 x 10(7.5)	Minus150/Minus73	
GR8	ALL	126-300HBW or Max32HRC					
GR8 M	ALL	126-300HBW or Max32HRC					
GR8 C	ALL	126-300HBW or Max32HRC					
GR8 T	ALL	126-300HBW or Max32HRC					
GR8 S	ALL	183-271HBW or Max25HRC					
GR8 A	ALL	126-192HBW or 60-90HRB		Carbide solution treated			Not Applicable
GR8 MA	ALL	126-192HBW or 60-90HRB		Carbide solution treated			
GR8 CA	ALL	126-192HBW or 60-90HRB		Carbide solution treated			
GR8 TA	ALL	126-192HBW or 60-90HRB		Carbide solution treated			
GR7 SA	ALL	126-192HBW or 60-90HR		Carbide solution treated			

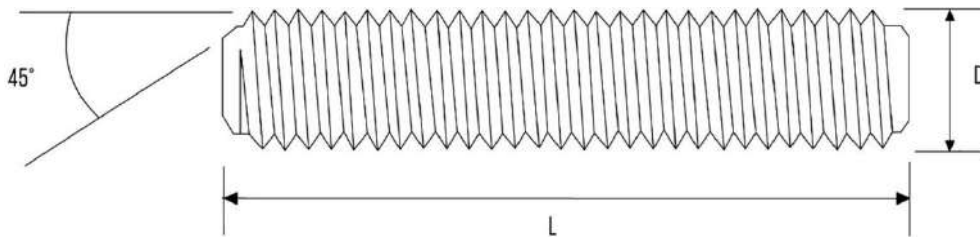
## STUDBOLTS (IMPERIAL) – ASME B16.5



DIA (D)		TPI (UNC)	TPI (UNS)	DIA (D)		TPI (UNC)	TPI (UNS)
1/4"	0.25	20	-	1.1/2"	1.50	6	8
5/16"	0.3125	18	-	1.5/8"	1.625	-	8
3/8"	0.375	16	-	1.3/4"	1.75	5	8
7/16"	0.4375	14	-	1.7/8"	1.875	-	8
1/2"	0.50	13	-	2"	2.00	4.5	8
9/16"	0.5625	12	-	2.1/4"	2.25	4.5	8
5/8"	0.625	11	-	2.1/2"	2.50	4	8
3/4"	0.75	10	-	2.3/4"	2.75	4	8
7/8"	0.875	9	-	3"	3.00	4	8
1"	1.00	8	8	3.1/4"	3.25	4	8
1.1/8"	1.125	7	8	3.1/2"	3.50	4	8
1.1/4"	1.25	7	8	3.3/4"	3.75	4	8
1.3/8"	1.375	6	8	4"	4.00	4	8

- The length (L), measured parallel to the axis, is the distance from first thread to first thread
- End points are flat and chamfered both ends
- Length of point on studbolts shall be not less than one nor more than two complete threads as measured from the extreme end parallel to the axis
- Threads are UNC for all studbolt diameters 1" and smaller
- Threads are UNS for all studbolt diameters 1.1/8" and above. These can be supplied as UNC but are non-standard.
- Threads are Class 2A for all studbolts in accordance with ASME B1.1

## STUDBOLTS (METRIC) – DIN976

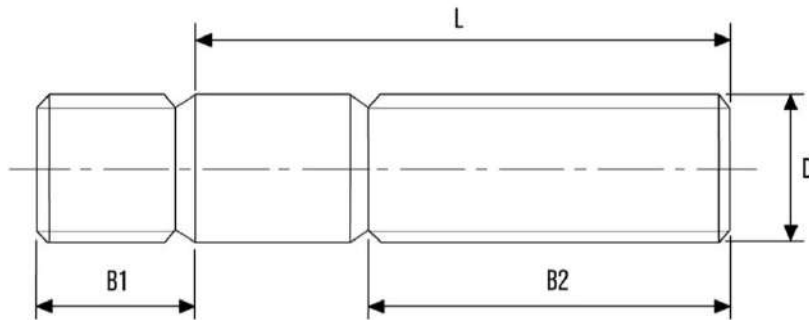


Diameter(D)	Pitch (Coarse)	Diameter(D)	Pitch (Coarse)
M6	1	M36	4
M8	1.25	M39	4
M10	1.5	M42	4.5
M12	1.75	M45	4.5
M14	2	M48	5
M16	2	M52	5
M18	2.5	M56	5.5
M20	2.5	M64	6
M22	2.5	M72	6
M24	3	M76	6
M27	3	M80	6
M30	3.5	M90	6
M33	3.5	M100	6

- The length (L), measured parallel to the axis, is the distance from end to end
- End points are flat and chamfered both ends
- Length of point on studbolts shall be not less than one nor more than two complete threads as measured from the extreme end parallel to the axis
- Threads are accordance with ISO 261

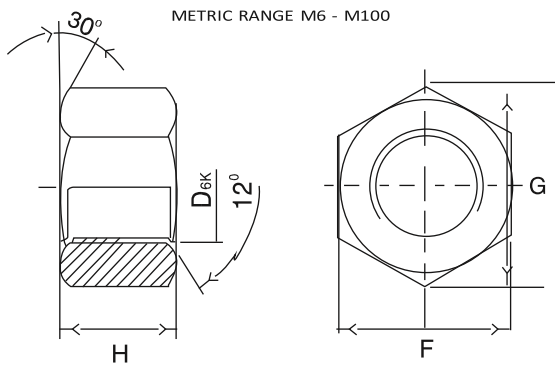


## ENGINEER STUDS – DIN939 (METAL END = 1.25xD)



Diameter (D)	Pitch	Metal End 1.25xD (B1)	Nut End (B2)		
			$L \leq 125$	$L = 125-200$	$L \geq 200$
M8	1.25	10	22	28	-
M10	1.50	12	26	32	45
M12	1.75	15	30	36	49
M14	2.00	18	34	40	53
M16	2.00	20	38	44	57
M18	2.50	22	42	48	61
M20	2.50	25	46	52	65
M22	2.50	28	50	56	69
M24	3.00	30	54	60	73
M27	3.00	35	60	66	79
M30	3.50	38	66	72	85
M33	3.50	42	72	78	91
M36	4.00	45	78	84	97
M39	4.00	50	84	90	103
M42	4.50	52	90	96	109
M45	4.50	58	98	102	115
M48	5.00	60	102	108	121
M52	5.00	65	110	116	129

## Dimensions of Heavy Hex Nuts



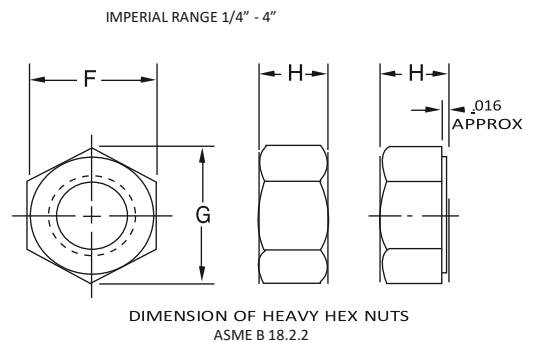
METRIC RANGE M6 - M100

ASME B 18.2.4 / UNI 5587

DIMENSION OF HEAVY HEX NUTS

DIA	F Width Across Flats		G Width Across Flats		H ISO 4033-UNI 5587	
	max	min	max	min	max	min
M 6	10,00	9,78	11,55	11,05	6,00	5,70
M 8	13,00	12,73	15,00	14,38	8,00	7,64
M 10	17,00	16,73	19,60	18,90	10,00	9,54
M 12	19,00	18,67	21,90	21,10	12,00	11,57
M 14	22,00	21,67	25,40	24,49	14,00	13,57
M 16	24,00	23,67	27,70	26,75	16,00	15,57
M 18	27,00	26,67	31,10	30,14	18,00	17,57
M 20	30,00	29,67	34,60	33,53	20,00	19,48
M 22	32,00	31,61	36,90	35,72	22,00	21,48
M 24	36,00	35,38	41,50	39,98	24,00	23,48
M 27	41,00	40,38	47,30	45,63	27,00	26,48
M 30	46,00	45,38	53,10	51,28	30,00	29,48
M 33	50,00	49,26	57,70	55,80	33,00	32,38
M 36	55,00	54,26	63,50	61,31	36,00	35,38
M 39	60,00	59,26	69,30	66,96	39,00	38,36
M 42	65,00	64,26	75,00	72,61	42,00	41,38
M 45	70,00	69,26	80,80	78,26	45,00	44,38
M 48	75,00	74,26	86,50	83,91	48,00	47,38
M 52	80,00	79,26	92,40	89,56	52,00	51,38
M 56	85,00	84,15	98,10	95,07	56,00	55,26
M 60	90,00	89,13	103,90	100,07	60,00	59,26
M 64	95,00	94,13	109,70	106,37	64,00	63,26
M 68	100,00	99,13	115,50	112,02	68,00	67,26
M 72	105,00	104,13	121,25	117,67	72,00	71,26
M 76	110,00	109,13	127,00	123,32	76,00	75,26
M 80	115,00	114,13	132,80	128,97	80,00	79,26
M 85	120,00	119,13	138,60	134,62	85,00	84,13
M 90	130,00	129,13	150,10	145,77	90,00	89,13
M 95	135,00	134,13	155,90	151,42	95,00	94,13
M 100	140,00	144,13	167,40	162,72	100,00	99,13

DIA	F Width Across Flats		G Width Across Flats		H Thickness Heavy Hex Nuts	
	max	min	max	min	max	min
1/4	12,70	12,40	14,65	14,12	6,35	5,54
5/16	14,27	13,87	16,51	15,80	7,98	7,11
3/8	17,48	16,99	20,17	19,38	9,58	8,66
7/16	19,05	18,49	22,00	21,08	11,20	10,24
1/2	22,23	21,59	25,65	24,61	12,80	11,79
9/16	23,83	23,09	27,51	26,34	14,43	13,36
5/8	26,97	26,19	31,17	29,85	16,03	14,91
3/4	31,75	30,78	36,65	35,10	19,25	18,03
7/8	36,53	35,41	42,16	40,36	22,48	21,16
1	41,28	40,01	47,65	45,62	25,70	24,26
1-1/8	46,02	44,60	53,16	50,88	28,93	27,41
1-1/4	50,80	49,23	58,65	56,11	31,78	30,15
1-3/8	55,58	53,82	64,16	61,37	35,00	33,27
1-1/2	60,33	58,42	69,65	66,60	38,23	36,40
1-5/8	65,07	63,02	75,16	71,83	41,45	39,52
1-3/4	69,85	67,61	80,65	77,09	44,68	42,65
1-7/8	74,63	72,24	86,15	82,35	47,90	45,77
2	79,38	76,84	91,64	87,60	51,13	48,91
2-1/4	88,90	86,06	102,64	98,09	57,18	54,74
2-1/2	98,43	95,25	113,64	108,59	63,63	60,99
2-3/4	107,95	104,44	124,64	119,06	70,03	67,23
3	117,48	113,67	135,64	129,59	76,53	73,48
3-1/4	127,00	122,89	146,55	140,08	82,60	79,35
3-1/2	136,53	132,06	157,66	150,57	89,05	85,60
3-3/4	146,05	141,27	168,66	161,06	95,50	91,85
4	155,58	150,50	179,65	171,58	101,96	98,09



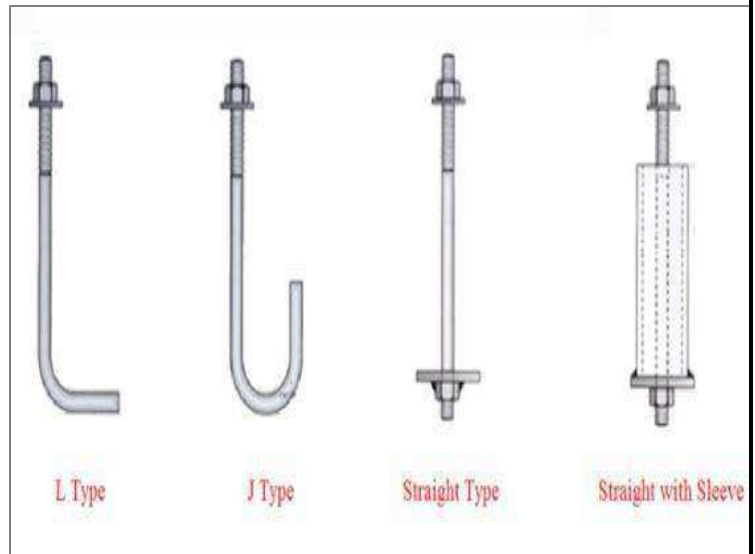
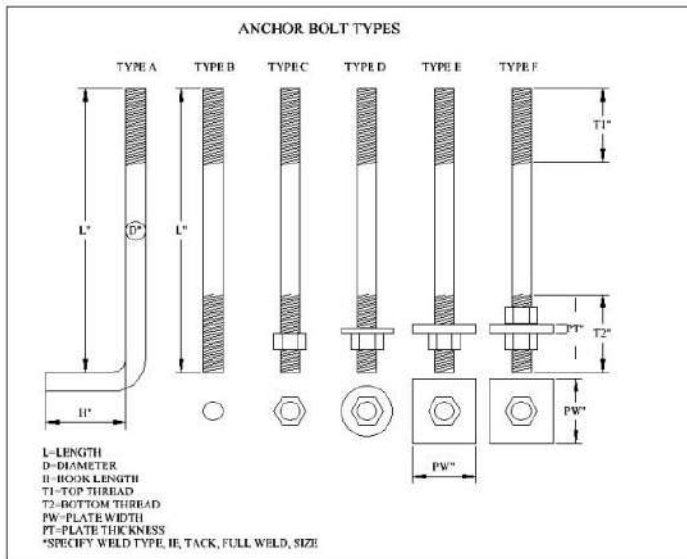
DIMENSION OF HEAVY HEX NUTS  
ASME B 18.2.2

## ANCHOR BOLTS

Standard Specification : As per ASTM F1554 Gr 36/55/105, ASTM A307, ASTM A193/193M Gr B7, ISO Gr 4.6/8.8/10.9, BS 7419 etc.

Range : M3 to M160 (Metric Series)  
1/4" to 8" ( Inch Series)

Surface Finish : Black, Zinc plated, Hot Dip Galvanized etc.

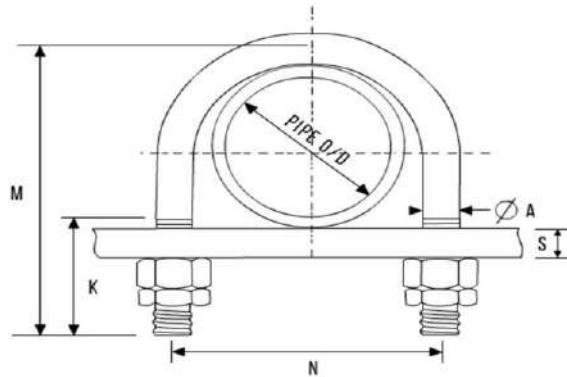


Note: Can be manufactured as per customers requirements/ drawings as well.

### Properties of Various grades of Anchor Bolts

Desc	ISO 898 - 1			ASTM F 1554			ASTM A307 Gr C	ASTM A 193M Gr B7	
	Gr 4.6	Gr 8.8	Gr 10.9	36	55	105			
<b>CHEMICAL PROPERTIES</b>									
CARBON	0.26	0.25-0.55	0.15-0.35	-0.29			-0.33	0.37-0.49	
MANAGENESE	0.75	-0.25	0.7-	0.54-0.98			0.75	0.65-1.10	
SULPHUR	-0.05	-0.035	-0.035	-0.06	-0.058	-0.058	-0.05	-0.040	
PHOSPHOROUS	-0.04	-0.035	-0.035	-0.05	-0.048	-0.048	-0.04	-0.035	
SILICON								0.15-0.35	
CHROMIUM								0.75-1.20	
MOLYDENUM								0.15-0.25	
NICKLE									
VANADIUM									
BORON		-0.003	-0.003		-				
ALLOY ELEMENTS		YES	YES		YES	YES		YES	
<b>MECHANICAL PROPERTIES</b>									
		d<16	d>16						
TENSILE(N/mm <sup>2</sup> )	400	800	830	1040	400-558	517-655	862-1034	400-552	860
YIELD(N/mm <sup>2</sup> )	240	640	660	940	248	380	724	248	720
ELONGATION(%)	22%	12%	12%	9%	20% *	18% *	12% *	23% **	16% ***
REDUCTION(%)	-	52%		48%	40%	30%	45%	40%	50%
HARDNESS	67 HRB	22-32 HRC	23-34 HRC	32-39 HRC	-	-	-	-	24-35 HRC
*	Elongation in 200mm			**	Elongation in 50mm		***	Elongation in 4D	

U BOLTS (GRIP PIPE)- BS3974



GRIP TYPE U-BOLT

NOM SIZE	PIPE O/D	A (DIA)	N	M	K	S (MAX)
1/2" - 015 MM	21.3	8	30	50	25	7
3/4" - 020 MM	26.9	8	35	60	25	10
1" - 025 MM	33.7	8	45	65	25	10
1-1/4" - 032 MM	42.4	8	55	75	25	10
1-1/2" - 040 MM	48.3	10	60	90	35	16
2" - 050 MM	60.3	10	75	100	35	16
2-1/2" - 065 MM	76.1	12	90	130	45	19
3-1/4" - 080 MM	88.9	16	105	150	50	19
4" - 100 MM	114.3	16	135	175	50	19
5" - 125 MM	139.7	16	160	200	50	19
6" - 150 MM	168.3	20	190	235	55	19
7" - 175 MM	193.7	20	215	260	55	19
8" - 200 MM	219.1	20	245	295	55	19
9" - 225 MM	244.5	20	270	310	55	19
10" - 250 MM	273.0	20	300	350	60	22
12" - 300 MM	323.9	20	350	400	60	22
14" - 350 MM	355.6	24	385	440	65	22
16" - 400 MM	406.4	24	435	500	65	22
18" - 450 MM	457.0	24	485	540	70	22
20" - 500 MM	508.0	24	540	600	70	22
22" - 550 MM	559.0	24	590	650	70	22
24" - 600 MM	610.0	24	640	700	70	22

Standard Specification : BS 3974

Material : ISO GR 4.6, 8.8, A36 ASTM A 307, Gr B7, SS 304, SS 316

Surface Finish : BLACK, ZINC PLATED, HDG, PTFE coated

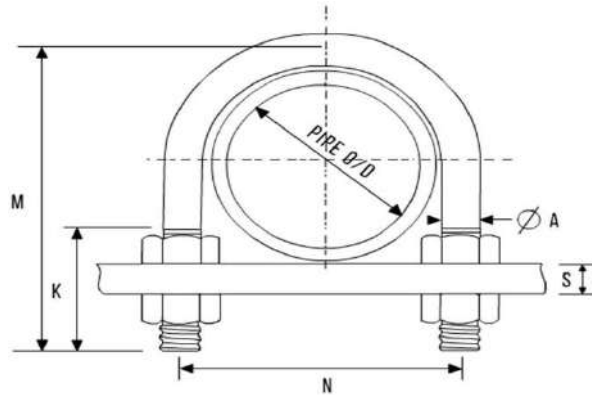
U Bolt Covered with : PTFE / Neoprene / PVC / Nylon / Silicon / Poly Urethane / Heat Shrink Sleeve

Base plate : PTFE / Neoprene / PVC / Nylon / Silicon / Poly Urethane / SS / CS / Aluminum





U BOLTS (NON GRIP PIPE) BS3974



NON GRIP TYPE U-BOLT

NOM SIZE	PIPE O/D	A (DIA)	N	M	K	S (MAX)
1/2" - 015 MM	21.3	8	40	45	25	10
3/4" - 020 MM	26.9	8	45	55	30	10
1" - 025 MM	33.7	8	50	60	30	10
1-1/4" - 032 MM	42.4	8	60	70	30	10
1-1/2" - 040 MM	48.3	10	65	85	40	16
2" - 050 MM	60.3	10	80	100	40	16
2-1/2" - 065 MM	76.1	12	95	120	50	19
3-1/4" - 080 MM	88.9	16	110	140	55	19
4" - 100 MM	114.3	16	140	165	55	19
5" - 125 MM	139.7	16	165	190	55	19
6" - 150 MM	168.3	20	195	225	65	19
7" - 175 MM	193.7	20	220	250	65	19
8" - 200 MM	219.1	20	250	275	65	19
9" - 225 MM	244.5	20	275	300	65	19
10" - 250 MM	273	20	305	335	75	22
12" - 300 MM	323.9	20	355	385	75	22
14" - 350 MM	355.6	24	390	425	80	22
16" - 400 MM	406.4	24	440	475	80	22
18" - 450 MM	457	24	495	525	80	22
20" - 500 MM	508	24	545	575	80	22
22" - 550 MM	559	24	595	625	80	22
24" - 600 MM	610	24	645	675	80	22

Standard Specification : BS 3974

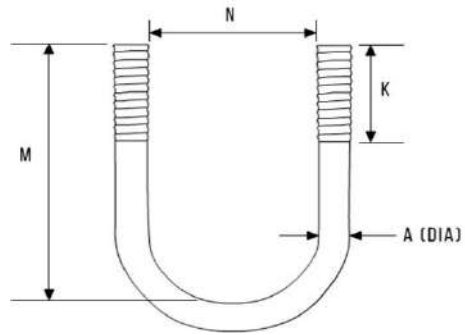
Material : ISO GR 4.6, 8.8, A36 ASTM A 307, Gr B7, SS 304, SS 316

Surface Finish : BLACK, ZINC PLATED, HDG, PTFE coated

U Bolt Covered with : PTFE / Neoprene / PVC / Nylon / Silicon / Poly Urethane / Heat Shrink Sleeve

Base plate : PTFE / Neoprene / PVC / Nylon / Silicon / Poly Urethane / SS / CS / Aluminum

## U BOLTS STANDARD TYPE



NOM SIZE	A (DIA)	M	N	K
1/2" - 015 MM	6	48	21	30
3/4" - 020 MM	6	53	27	30
1" - 025 MM	6	60	34	30
1-1/4" - 032 MM	10	70	45	40
1-1/2" - 040 MM	10	75	51	40
2" - 050 MM	10	85	60	40
2-1/2" - 065 MM	10	100	76	40
3-1/4" - 080 MM	12	115	90	40
4" - 100 MM	12	140	114	40
5" - 125 MM	12	165	140	40
6" - 150 MM	12	200	170	50
8" - 200 MM	16	260	225	50
10" - 250 MM	16	315	277	50
12" - 300 MM	16	360	324	50
14" - 350 MM	16	395	365	75
16" - 400 MM	16	495	415	85
18" - 450 MM	16	535	465	85
20" - 500 MM	16	595	520	85
22" - 550 MM	20	645	570	90
24" - 600 MM	20	695	620	90

- All dimensions in millimetres

U BOLTS / CLAMPS CONFIGURATIONS



U-BOLTS RUBBER LINED WITH PTFE PAD



RUBBER MOULDED SLEEVED U-BOLT



U-BOLT WITH PTFE SLEEVE & PAD



U-BOLTS PU COATING WITH RUBBER PAD LINED



U-BOLTS SILICON RUBBER LINED



U-BOLT PVC COATED



SQUARE TYPE U-BOLT

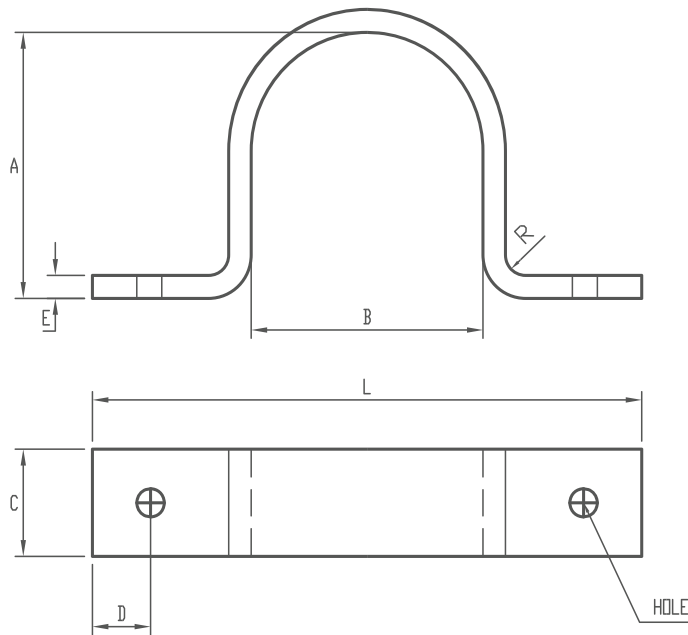


SADDLE CLAMP



TWO PIECE CLAMP

## SADDLE CLAMP



Standard Specification : NS 5551

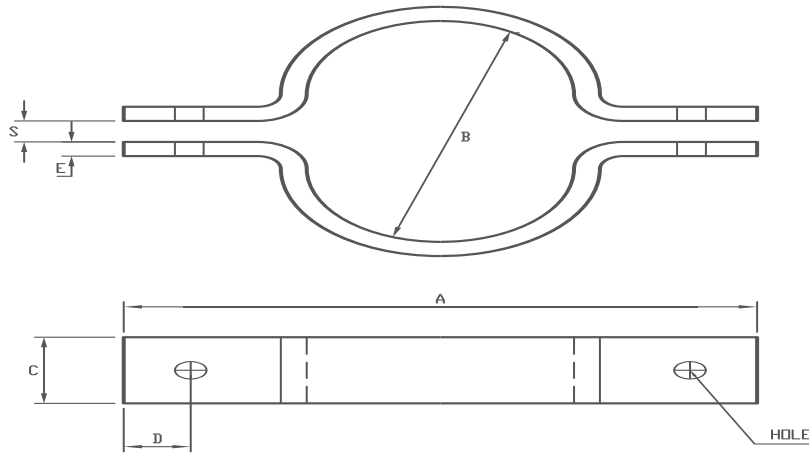
Material : MILD STEEL, SS 304, SS 316

Surface Finish : BLACK, ZINC PLATED, HDG, PTFE COATED etc.

S.No	Pipe Size (Inches)	Pipe OD	A	B	C	D	E	S	Threads	Hole Dia
1	1/2"	21.3	80	21	25	10	6	3	M10	11
2	3/4"	26.9	85	26	25	10	6	3	M10	11
3	1"	33.7	95	34	25	10	6	3	M10	11
4	1-1/4"	42.4	110	43	30	10	6	5	M10	11
5	1-1/2"	48.3	120	49	30	10	6	5	M10	11
6	2"	60.3	145	59	40	15	8	5	M12	14
7	2-1/2"	76.1	165	77	40	15	8	5	M12	14
8	3-1/4"	88.9	180	89	40	15	8	5	M12	14
9	4"	114.3	215	115	50	15	10	6	M16	18
10	5"	139.7	245	140	50	15	10	6	M16	18
11	6"	168.3	288	170	50	20	12	6	M16	18
12	7"	193.7	314	194	50	20	12	6	M16	18
13	8"	219.1	340	220	50	20	12	8	M16	18
14	10"	273	400	273	50	20	16	8	M16	18
15	12"	323.9	454	324	60	22	16	8	M20	22
16	14"	355.6	486	356	60	22	16	8	M20	22
17	16"	406.4	536	470	60	22	20	8	M20	22



**TWO PIECE CLAMP**



Nom. Size d x n in.	B			C		H	
	Basic	Min.	Max.	Min.	Basic	Max.	Min.
1/2 x 13	22.22	21.59	25.65	24.61	12.3	12.8	11.78
5/8 x 11	26.98	26.19	31.16	29.84	15.47	16.02	14.91
3/4 x 10	31.75	30.78	36.65	35.10	18.65	19.25	18.03
7/8 x 9	36.51	35.41	42.16	40.36	21.82	22.47	21.16
1 x 8	41.27	40.0	47.65	45.62	25.00	25.70	24.28
1-1/8 x 8	46.03	44.60	53.16	50.85	28.17	28.93	27.41
1-1/4 x 8	50.8	49.22	58.65	56.11	30.95	31.77	30.15
1-1/2 x 8	59.4	58.70	67.90	67.40	37.00	37.50	36.50

**Standard Specification : NS 5553**

**Diameter : Metric M3 - M52 MM**  
**( 1/4" - 2" ) , PIPE SIZE FROM 1/4" - 84" ANY THICKNESS**

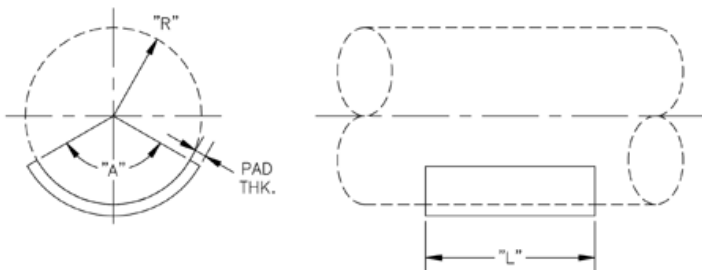
**Material : SS / CS / Aluminium / MS**

**Surface Finish : BLACK, ZINC PLATED, HDG, PTFE COATED etc.**

## FRP (Fiber-Reinforced-Polymer) Wear Pads

**FRP pads** Also known as non-metallic wear pads, these products are used as corrosion protection for uninsulated piping systems and extend the life of the pipe. They also eliminate metal to metal contact and electrically isolate the piping from the pipe rack and other metal structural elements.

FRP (Fiber-Reinforced-Polymer) Wear Pads are a cost-effective, durable, and easy-to-install solution for the prevention of pipe friction damage and corrosion due to contact with other metals.



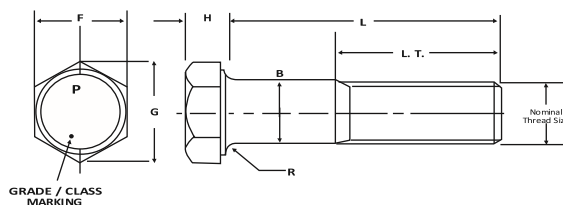
PIPE SIZE	THICKNESS	LENGTH L	ANGLE A	RADIUS R
1/2"	1/4"	12	90	7/16"
3/4"	1/4"	12	90	9/16"
1	1/4"	12	90	5/8"
1 1/4	1/4"	12	90	7/8"
1 1/2	1/4"	12	90	1
2	1/4"	12	90	1 3/16
2 1/2	1/4"	12	90	1 7/16
3	1/4"	12	90	1 13/16
3 1/2	1/4"	12	90	1 3/4
4	1/4"	12	90	2 1/4
5	1/4"	12	90	2 13/16
6	1/4"	12	60	3 5/16
8	1/4"	12	60	4 5/16
10	1/4"	12	60	5 3/8
12	1/4"	12	30	6 3/8
14	1/4"	12	30	7
16	1/4"	12	30	8
18	1/4"	12	30	9
20	1/4"	12	30	10
24	3/8"	12	30	12
26-48	3/8"	12	30	1/2 of Pipe O.D.



## HEAVY HEX STRUCTURAL BOLTS - ASTM A325

### Notes:

1. The Bolt will generally conform to ANSI/ASME B 18.2.6 Hex Heavy Hex Structural Bolts.
2. Threads will conform to class 2A of ANSI B1.1 Coarse Series
3. Material: MEDIUM CARBON / ALLOY STEEL. Heat Treatment Type 1 as per ASTM A325
4. All dimensions are in inches.



Nominal Thread Size-D	TPI	F Max.	G Max.	B Max.	H Nom.	R Min.	Length of Thread LT	Length Range
	UNC						LT	
1/2"	13	0.875"	1.010"	0.515"	5/16"	0.009"	1.00"	1-1/2"-4"
5/8"	11	1.062"	1.227"	0.642"	25/64"	0.021"	1.25"	1-1/2"-8"
3/4"	10	1.250"	1.443"	0.768"	15/32"	0.021"	1.38"	1/2"-8"
7/8"	9	1.438"	1.660"	0.895"	35/64"	0.031"	1.50"	1-1/2"-8"
1"	8	1.625"	1.876"	1.022"	39/64"	0.062"	1.75"	1-1/2"-8"
1-1/8"	8UN	1.812"	2.093"	1.149"	11/16"	0.062"	2.00"	2"-8"
1-1/4"	8UN	2.000"	2.309"	1.276"	25/32"	0.062"	2.00"	2"-8"
1-3/8"	8UN	2.188"	2.526"	1.404"	27/32"	0.062"	2.25"	2-1/2"-8"
1-1/2"	8UN	2.375"	2.742"	1.522"	15/16"	0.062"	2.25"	2-1/2"-8"

### PHYSICAL PROPERTIES

Bolt Diameter, in	Tensile Strength, min, psi (MPa)	Proof Load Stress, min, psi (MPa)	Yield Strength, min, psi (MPa)	Elongation, in 4D, min, %	Reduction of Area, min, %
1/2 to 1, incl.	120 000 (825)	85 000 (586)	92 000 (635)	14	35
Over 1 to 1 1/2	105 000 (725)	74 000 (510)	81 000 (560)	14	35

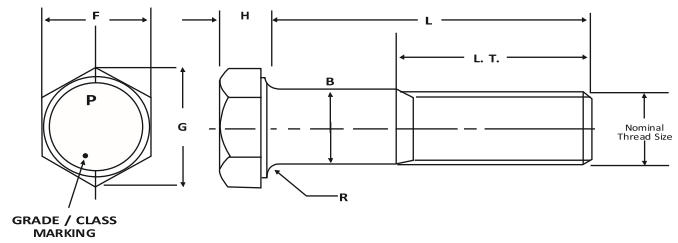
Rotational Capacity Test for Zinc-Coated Bolts	
Nominal Length in.	Nominal Nut Rotation, degrees (turn)
L ≤ 4 X Bolt Dia	240 (2/3)
> 4 ≤ 8 X Bolt Dia	360 (1)
> 8 X < 12 X Bolt Dia	420 (11/6)
Over 12D	Test not applicable

Hardness Requirements for Bolts					
Bolt Size	Bolt Length	Brinell		Rockwell C	
		Min	Max	Min	Max
in.	in.				
1/2 to 1, incl	Less than 2D	253	319	25	34
	2D and over		319		34
1 1/8 to 1 1/2, incl	Less than 3D	223	286	19	30
	3D and over		286		30

## HEAVY HEX STRUCTURAL BOLTS - ASTM A325 -ASTM A325 M

### Metric Series - Dimensions

1. The Bolts will generally conform to ASME B18.2.6M (ANSI/ASME B 18.2.3.7M). Metric Heavy Hex Structural Bolts
2. Threads will conform to Class 6g of ANSI B1.13M Coarse Series
3. Material: High Grade Carbon/Alloy Steel
4. Heat Treatment as per ASTM A 325M or ASTM F 568M Class 8.8
5. Thread length LT
  - LT1 for L<100
  - LT2 for L > 100



Nominal Thread Size	Pitch	F Max	G Max.	B Max.	H Nom.	R Nom.	Length of Thread		Length Range
							LT1	LT2	
M12	1.75	22.00	25.40	12.70	8.0	0.6	25		30-200
M16	2.00	27.00	31.18	16.70	10.0	0.6	31	38	50-200
M20	2.50	24.00	39.26	20.84	12.5	0.8	36	43	50-200
M22	2.50	36.00	41.57	22.84	14.0	0.8	38	45	70-200
M24	3.00	41.00	47.34	24.84	15.0	1.0	41	48	70-200
M27	3.00	46.00	52.12	27.84	17.0	1.2	44	51	80-200
M30	3.50	50.00	57.74	30.84	18.7	1.2	49	56	100-200
M36	4.00	60.00	69.28	37.00	22.5	1.5	56	63	100-200
M39*	4.00	64.00	72.00	39.84	24.5	1.7	84	90	100-200
M42*	4.50	68.95	79.12	42.84	26.0	1.7	90	96	100-200
M48*	5.00	78.80	90.42	48.84	29.8	1.7	102	108	100-200
M56*	5.50	88.60	101.66	56.84	34.7	1.9	118	124	100-200
M64*	6.00	98.40	112.91	64.84	39.6	1.8	134	140	100-200

\* Non Standard Sizes

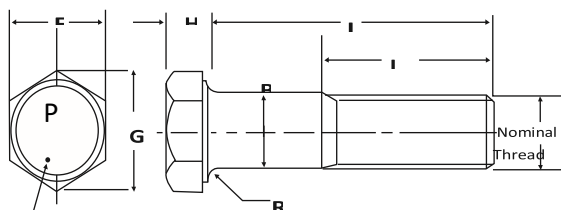
### PHYSICAL PROPERTIES

Bolt Diameter, in	Tensile Strength, min, MPa	Yield Strength, min, MPa	Proof Load Stress, Min, MPa	Elongation, in 4D, min, %	Reduction of Area, min, %
M12 to M36 incl	830	660	600	14	35

ROTATIONAL CAPACITY TEST FOR ZINC COATED BOLTS	
Bolt length in	Nominal Nut rotation degree (Turn)
2D AND SHORTER	180 (1/2)
OVER 2D TO 3D Incl.	240 (2/3)
OVER 3D TO 4D Incl.	300 (7/8)
OVER 4D TO 8D Incl.	360 (1)
OVER 8D	420 (1-1/8)

Hardness Requirements for Bolts					
Bolt Size	Bolt Length	Brinell		Rockwell C	
		Min	Max	Min	Max
M12 to M24, incl	Less than 2D A	253	319	25	34
	2D and over		319		34
M25 to M36, incl	Less than 3D A	223	286	19	30
	3D and over		286		30

## HEX BOLTS / SCREWS - ASTM A307. GR.A / GR.B



**GRADE MARKING**

### INCHES : Notes:

1. The bolt will generally conform to ANSI / ASME B 18.2.1 Heavy hex Bolts
2. Threads will conform to class 2A of ANSI B1.1 coarse series.
3. Material: Low Carbon Steel
4. Bolt lengths equal to or shorter than those listed in column / L.F.T will be fully threaded.
5. All Dimensions are in inches.

Nominal Thread Size-D	TPI UNC	F Max.	G Max.	B Max.	H Nom.	R Min.	Length of Thread LT		L.F.T.	Length Range
							L<6"	L>6"		
3/8"	16	0.562	0.650	0.388	1/4"	0.01	1.00	1.25	1.250	1/2"-4"
1/2"	13	0.750	0.866	0.515	11/34"	0.01	1.25	1.50	1.500	3/4"-8"
5/8"	11	0.938	1.083	0.642	27/64"	0.02	1.50	1.75	1.750	1"-8"
3/4"	10	1.125	1.299	0.768	1/2"	0.02	1.75	2.00	2.000	1-1/2"-8"
7/8"	9	1.312	1.516	0.895	37/64"	0.02	2.00	2.25	2.250	1-1/2"-8"
1"	8	1.500	1.732	1.022	43/64"	0.03	2.25	2.50	2.500	1-1/2"-8"
1-1/8"	8UN	1.688	1.949	1.149	3/4"	0.03	2.50	2.75	2.750	2"-8"
1-1/4"	8UN	1.875	2.165	1.277	27/32"	0.03	2.75	3.00	3.000	2"-8"
1-3/8"	8UN	2.062	2.382	1.404	29/32"	0.03	3.00	3.25	3.250	2-1/2"-8"
1-1/2"	8UN	2.250	2.598	1.531	1"	0.02	3.25	3.50	3.500	2-1/2"-8"

### METRICS : Notes:

1. The Bolt will generally conform to ASME 18.2.6M (ANSI / ASME B 18.2.3.7M) Heavy Hex Bolts
2. Threads will conform to class 6G ANSI B1.13M Coarse Series
3. Material: Low carbon Steel
4. Bolt lengths equal to or shorter than those listed in column L.F.T will be fully threaded.
5. All Dimensions are in metrics.

Nominal Thread Size	Pitch	F Max.	G Max.	B Max.	H Nom.	R Min.	Length of Thread LT		Length Range
							LT1	LT2	
M12	1.75	22.00	25.40	12.70	8.0	0.6	25	—	30-200
M16	2.00	27.00	31.18	16.70	10.0	0.6	31	38	50-200
M20	2.50	34.00	39.26	20.84	12.5	0.8	36	43	50-200
M22	2.50	36.00	41.57	22.84	14.0	0.8	38	45	70-200
M24	3.00	41.00	47.34	24.84	15.0	0.8	41	48	70-200
M27	3.00	46.00	52.12	27.84	17.0	1.0	44	51	80-200
M30	3.50	50.00	57.74	30.84	18.7	1.2	49	56	100-200
M36	4.00	60.00	69.28	37.00	22.5	1.2	56	63	100-200
M39*	4.00	64.00	72.00	39.84	24.5	1.5	84	90	100-200
M42*	4.50	68.95	79.12	42.84	26.0	1.7	90	96	100-200
M48*	5.00	78.80	90.42	48.84	29.8	1.7	102	108	100-200
M56*	5.50	88.60	101.66	56.84	34.7	1.7	118	124	100-200
M64*	6.00	98.40	112.91	64.84	39.6	1.9	134	140	100-200

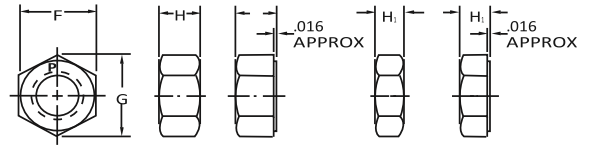
\*Non Standard sizes

## HEAVY HEXAGONAL NUTS A563 OR A,B,C,D,DH,DH3 / ASTM A563 M

### ASTM A563

D/A	F		G		H		Hs	
	Width Across flats max	Flats min	Width Across flats min	Corners max	Thickness Heavy Nuts max	Heavy Hex Jam Nuts max	min	min
1/4	12,70	12,40	14,66	14,12	6,35	5,54	4,78 5,59	3,96
5/16	14,27	13,87	16,51	15,80	7,98	7,11	6,40	4,72
3/8	17,48	16,99	20,17	19,38	9,58	8,66	7,24	5,49
7/16	19,05	18,49	22,00	21,08	11,20	10,24	8,05	6,27
1/2	22,23	21,59	25,65	24,61	12,80	11,79		7,04
9/16	23,83	23,09	27,51	26,34	14,43	13,36	8,86 9,68	7,80
5/8	26,97	26,19	31,17	29,85	16,03	14,91	11,33	8,56
3/4	31,75	30,78	36,65	35,10	19,25	18,03	12,95	10,11
7/8	38,53	35,41	42,16	40,38	22,48	21,16	14,61	11,63
1	41,28	40,01	47,65	45,62	25,70	24,28		13,18
1-1/8	46,02	44,60	53,16	50,88	28,93	27,41	16,23	14,71
1-1/4	50,80	49,23	58,65	56,11	31,78	30,15	19,08	17,45
1-3/8	55,58	53,82	64,16	61,37	35,00	33,27	20,70	18,97
1-1/2	60,33	58,42	69,65	66,60	38,23	36,40	22,35	20,52
1-5/8	65,07	63,02	75,18	71,83	41,45	39,52	23,98	22,05
1-3/4	69,85	67,61	80,65	77,09	44,68	42,65	25,63	23,60
1-7/8	74,63	72,24	86,16	82,35	47,90	45,77	27,25	25,12
2	79,38	76,84	91,64	87,60	51,13	48,91	28,91	25,67
2-1/4 2-1/2	88,90	86,06	102,64	98,09	57,18	54,74	31,78	29,32
	98,43	95,25	113,64	108,59	63,63	60,99	38,23	35,59
2-3/4	107,95	104,44	124,64	119,08	70,03	67,23	41,50	38,66
3	117,48	113,67	135,64	129,59	76,53	73,48	44,78	41,73
3-1/4 3-1/2	127,00	122,89	146,66	140,08	82,60	79,35	47,65	44,40
1/2	136,53	132,08	157,66	150,57	89,05	84,60	50,95	47,50
3-3/4 4	146,05	141,27	168,66	161,06	95,50	91,85	54,20	50,55
	155,58	150,50	179,66	171,58	101,96	98,09	57,51	53,64

### ASTM A563 IMPERIAL RANGE 1/4 - 4



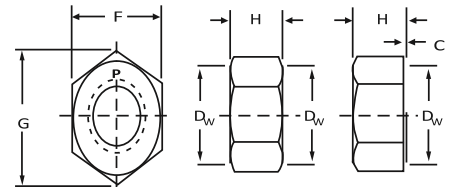
- Note :
- The Nuts generally conform to ANSI B18.2.2 inch Heavy Hex Nuts.
  - Thread will uniform to 2A of ANSI B 1.1.
  - In Bolt nuts assembly, tightening should be done by rotation.
  - All Dimensions are in Inches Size.

### ASTM A563 M

Nominal Nut Dia and Thread Pitch	F		G		H		Dw	C		Total Runout of Bearing Surface FIM
	Width Across Flats		Width Across Corners		Thickness		Bearing Face Dia	Washer Face Thickness		
	Max	Min	Max	Min	Max	Min	Min	Max	Min	
M12 x 1.75	21.00	20.16	24.25	22.78	12.3	11.9	19.2	0.8	0.4	0.38
M14 x 2	24.00	23.16	27.71	26.17	14.3	13.6	22.0	0.8	0.4	0.42
M16 x 2	27.00	26.16	31.18	29.56	17.1	16.4	24.9	0.8	0.4	0.47
M20 x 2.5	34.00	33.00	39.26	37.29	20.7	19.4	31.4	0.8	0.4	0.58
M22 x 2.5	36.00	35.00	41.57	39.55	23.6	22.3	33.3	0.8	0.4	0.63
M24x3	41.00	40.00	47.34	45.20	24.2	22.9	38.0	0.8	0.4	0.72
M27x3	46.00	45.00	53.12	50.85	27.6	26.3	42.8	0.8	0.4	0.80
M30 x 3.5	50.00	49.00	57.74	55.3	30.7	29.1	46.6	0.8	0.4	0.87
M36 x 4	60.00	58.80	69.28	66.44	36.6	35.0	55.9	0.8	0.4	1.05
*M42 x 4.5	70.00	61.90	80.83	77.41	42.0	40.4	64.5	1.0	0.5	1.22
*M48 x 5	80.00	77.60	92.38	88.46	48.0	46.4	79.7	1.0	0.5	1.40
*M56 x 5.5	90.00	87.20	103.92	99.41	56.0	54.1	82.8	1.0	0.5	1.57
*M64 x 6	100.00	96.80	115.47	110.35	64.0	62.1	92.0	1.0	0.5	1.75
*M72 x 6	110.00	106.40	127.02	121.30	72.0	70.1	101.1	1.2	0.6	1.92
*M80 x 6	120.00	116.40	138.56	132.24	80.0	78.1	110.2	1.2	0.6	2.09
*M90 x 6	135.00	130.50	155.56	148.77	90.0	87.8	124.0	1.2	0.6	2.36
*M100 x 6	150.00	145.00	173.21	165.30	100.0	97.8	137.8	1.2	0.6	2.62

\* Non standard sizes

### ASTM A563 M METRIC RANGE M12 - M100



- Note :
- The nuts will generally conform to ASME B18.2.6M (ANSI B18 2.4.6 M) Metric Heavy Hexagonal Nuts.
  - Threads will conform to Class 6H of ANSI B1.13M for Coarse Series.
  - In Bolt/Nut assembly, tightening should be done by rotation of nut.
  - All Dimensions are in millimeters.

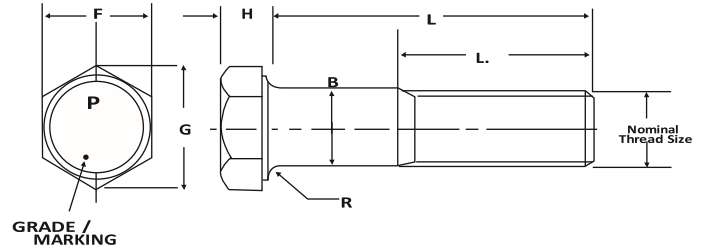
### PHYSICAL PROPERTIES :

Property Class	For use with Bolts of type and finish	Proof Load Stress N/mm <sup>2</sup>	Rockwell Hardness HR
8S	ASTM A 325M Type 1 and 2 (non-coated)	1,075	B89-C38
10S	ASTM A 325M Type 1 and 2 (zinc-coated)	1,245 (Normal Tapping) 1,165 (Oversize Tapping)	026-C38

## HEXAGONAL HEX BOLTS / SCREWS DIN 931 / 933

**Note:**

- The Bolts/Screws will generally conform to DIN 931/933, ISO 4014
- Mechanical Properties : BS 3692 / ISO 898 - 1
- Threads will conform to class 6g of DIN 13- Coarse Series/ ISO 965 / 2
- Thread Length LT
  - LT1 for  $L < 125$
  - LT2 for  $L > 125$  to 200
  - LT3 for  $L > 200$
- Bolt lengths equal to or shorter than those listed in column/LFT will be fully threaded
- All dimensions are in millimeters
- Full threaded bolts also available as per client requirement. For DIN 933 all dimensions will be the same except LT1, LT2 & LT3.



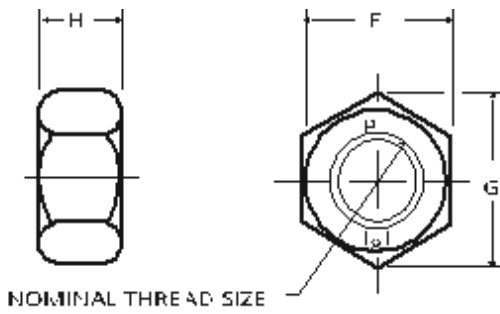
Nominal Thread Size-D	Pitch	F Max.		G Max.		B Max.	H Nom.	R Min.	Length of Thread				Length Range
									LT1	LT2	LT3	L.F.T.	
M6	1.00	10.0		11.05		6.0	4.0	0.25	18			25	15-100
M8	1.25	13.0		14.38		8.0	5.3	0.40	22	28		30	15-100
M10	1.50	17.0	16.0	18.90	17.80	10.0	6.4	0.60	26	32	45	35	15-100
M12	1.75	19.0	18.0	21.10	20.03	12.0	7.5	0.60	30	36	49	40	20-150
M14	2.00	22.0	21.0	24.49	23.35	14.0	8.8	0.60	34	40	53	45	25-150
M16	2.00	24.0		26.75		16.0	10.0	0.60	38	44	57	50	25-200
M18	2.50	27.0		30.14		18.0	11.5	0.60	42	48	61	60	35-200
M20	2.50	30.0		33.53		20.0	12.5	0.80	46	52	65	60	35-200
M22	2.50	32.0	34.0	35.72	37.72	22.0	14.0	0.80	50	56	69	65	40-200
M24	3.00	36.0		39.98		24.0	15.0	1.00	54	60	73	75	40-200
M27	3.00	41.0		45.20		27.0	17.0	1.00	60	66	79	85	70-200
M30	3.50	46.0		50.85		30.0	18.7	1.00	66	72	85	85	70-300
M33	3.50	50.0		55.37		33.0	21.0	1.00	72	78	91	95	75-300
M36	4.00	55.0		60.79		36.0	22.5	1.00	78	84	97	100	80-300
M39	4.00	60.0		66.44		39.0	25.0	1.00	84	90	103	110	90-300
M42	4.50	65.0		71.30		42.0	26.0	1.20	90	96	109	120	90-300
M45	4.50	70.0		76.95		45.0	28.0	1.20	96	102	115		100-300
M48	5.00	75.0		82.6		48.0	30.0	1.60	107	108	116		100-300
M52	5.00	80.0		88.25		52.0	33.0	1.60		116	129		150-350

### Metric Series - Physical Properties as per ISO 898-1

PROPERTY CLASS	5.8	6.8	8.8		10.9	12.9
Diameter	All Diameter	All Diameter	<M16	>M16	All Diameter	All Diameter
Unit	N/mm <sup>2</sup>	N/mm <sup>2</sup>	N/mm <sup>2</sup>	N/mm <sup>2</sup>	N/mm <sup>2</sup>	
Tensile Strength(Min.)	520	600	800	830	1040	1220
Yield Strength 0.2% OFFSET (Min)	420	480	640	660	940	1100
Proof Load Stress	380	440	580	600	830	970
Impact Strength in Joules(Min)	N/A	N/A	30	30	20	20
Hardness Rockwell (HR)	B82-B95	B89-B100	C22-C32	C23-C34	C32-C39	C38
Elongation (Min) %	N/A	N/A	12	12	9	8
Reduction of Area(Min.) [%]	N/A	N/A	52	52	48	35



## HEXAGON NUTS DIN 934 CL 8 / CL 10



### HEXAGON NUTS DIN 934

**Note:**

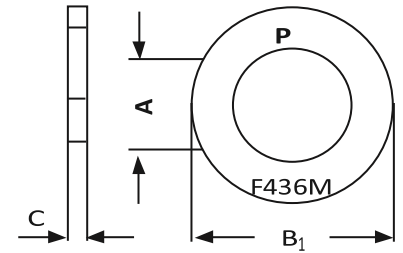
1. The nuts will generally conform to ISO 4032, DIN 934, also DIN 555
2. Threads will conform to Class 6H of ISO 965/2 for Coarse Series.
3. Material & Heat Treatment: To achieve mechanical properties of Property Class 8 or 10
4. Nuts of Property Class 10 are used with bolts of Property Class 10.9. ( In general, nuts of a higher property class can be replaced with nuts of lower property class in a joint.
5. In Bolt / Nuts assembly, tightening should be done by rotation of unit.
6. Size in brackets are non-preferred standards.
7. All dimensions are in millimeters.
8. Material available in Gr.5,6,8,10,A4-70/80 (SS316), A4L-70/80 (SS316L), A2-70/80 (SS304L)

Nominal Thread Size	Pitch	F Max.		G Min		H Max.
M6	1.0	10.0		11.05		5.00
M8	1.25	13.0		14.38		6.50
M10	1.5	17.0	16.0	18.90	17.77	8.00
M12	1.75	19.0	18.0	21.10	20.03	10.00
(M14)	2.0	22.0	21.0	24.49	23.33	11.00
M16	2.0	24.0		26.75		13.00
(M16)	2.5	27.0		29.56		15.00
M20	2.5	30.0		32.95		16.00
(M22)	2.5	32.0	34.0	35.03	37.29	18.00
M24	3.0	36.0		32.95		19.00
(M27)	3.0	41.0		45.20		22.00
M30	3.5	46.0		50.85		24.00
(M33)	3.5	50.0		55.37		26.00
M36	4.0	55.0		60.79		29.00
(M39)	4.0	60.0		66.44		31.00
M42	4.5	65.0		71.30		34.00
M45	4.5	70.0		76.95		36.00
M48	5.0	75.0		82.6		38.00
M52	5.0	80.0		88.25		42.00
M56	5.5	85.0		93.56		45.00
M60	5.5	90.0		99.21		48.00
M64	6.0	95.0		104.86		51.00
M68	6.0	100		110.51		54.00
M72		105		116.16		58.00
M76		110		121.81		61.00
M80		115		127.44		64.00
M84		120		133.11		68.00
M92		130		144.8		72.00
M100		145		161.04		80

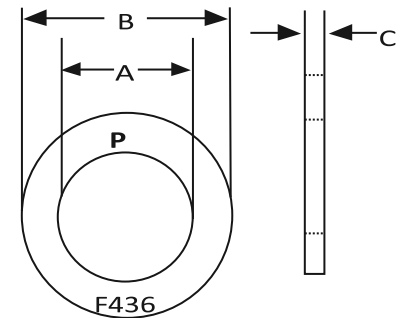
## HARDENED STEEL WASHER - ASTM F436 / F436 M TYPE 01 & TYPE 03

F436 WASHER DIMENSIONS						
Bolt Dia	Inner Diameter (A)		Outer Diameter (B)		Thickness (c)	
	Max.	Min.	Max.	Min.	Max.	Min.
12	14.4	14	27	25.7	4.6	3.1
14	16.4	16	30	28.7	4.6	3.1
16	18.4	18	34	32.4	4.6	3.1
20	22.5	22	42	40.4	4.6	3.1
22	24.5	24	44	42.4	4.6	3.4
24	26.5	26	50	48.4	4.6	3.4
27	30.5	30	56	54.1	4.6	3.4
30	33.6	33	60	58.1	4.6	3.4
36	39.6	39	72	70.1	4.6	3.4
42	45.6	45	84	81.8	7.2	4.6
48	52.7	52	95	92.8	7.2	4.6
56	62.7	62	107	104.5	8.7	6.1
64	70.7	70	118	115.8	8.7	6.1
72	78.7	76	130	127.5	8.7	6.1
80	86.9	86	142	139.5	8.7	6.1
90	96.6	96	159	156.5	8.7	6.1
100	107.9	107	176	173.5	8.7	6.1

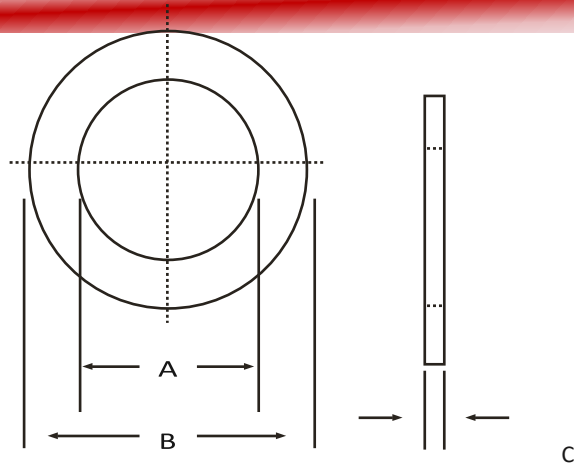
ASTM F436M



Bolt Size	B Outside Diameter	A Inside Diameter	C Thickness Min	Max
1/2	1-1/16	17/32	0.097	0.177
5/8	1-5/16	11/16	0.122	0.177
3/4	1-15/32	13/16	0.122	0.177
7/8	1-3/4	15/16	0.136	0.177
1	2	1-1/8	0.136	0.177
1-1/8	2-1/4	1-1/4	0.136	0.177
1-1/4	2-1/2	1-3/8	0.136	0.177
1-3/8	2-3/4	1-1/2	0.136	0.177
1-1/2	3	1-5/8	0.136	0.177
1-5/8	3-1/4	1-3/4	0.178	0.28
1-3/4	3-3/8	1-7/8	0.178	0.28
1-7/8	3-1/2	2	0.178	0.28
2	3-3/4	2-1/8	0.178	0.28
2-1/4	4	2-3/8	0.24	0.34
2-1/2	4-1/2	2-5/8	0.24	0.34
2-3/4	5	2-7/8	0.24	0.34
3	5-1/2	3-1/8	0.24	0.34
3-1/4	6	3-3/8	0.24	0.34
3-1/2	6-1/2	3-5/8	0.24	0.34
3-3/4	7	3-7/8	0.24	0.34
4	7-1/2	4-1/8	0.24	0.34



## PLAIN WASHER DIN 125

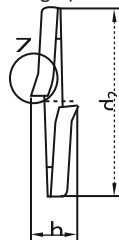


USED FOR	A	B	C
M5	5.5	10	1
M6	6.6	12	1.6
M7	7.6	14	1.6
M8	9	16	1.6
M10	11	20	2
M12	13.5	24	2.5
M14	15.5	28	2.5
M16	17.5	30	3
M20	22	37	3
M22	24	39	3
M24	26	44	4
M27	30	50	4
M30	33	56	4
M33	36	60	5
M36	39	66	5
M39	42	72	6
M42	45	78	7
M45	48	85	7
M48	52	92	8
M52	56	98	8
M56	62	105	9
M60	66	110	9
M64	70	115	9
M72	78	125	10
M80	86	140	12
M90	96	160	12
M95	98	165	12
M100	104	175	14

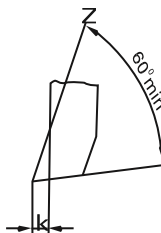
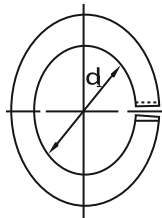
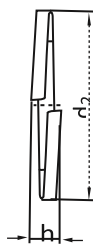
## Spring lock washer DIN 127

### 2 Dimensions

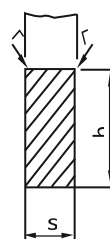
Type A with tang ends  
(size 3 and larger)



Type B,



with square ends



#### Legend

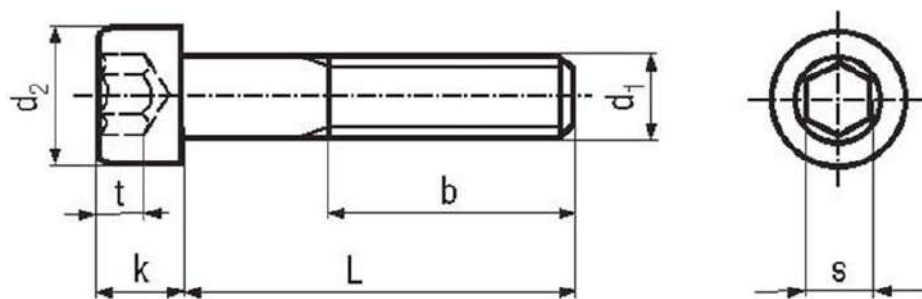
d1 - Inner diameter  
 d2 - Outer diameter  
 S - Washer width  
 h - unloaded washer height  
 r - radius  
 b - side length  
 k - tooth height

Tang ends for type

Washer cross section (enlarged)

Nominal Size	d1		d2	b	s	Type A		Type B		k	T	Mass (7.85 kg/dm <sup>3</sup> ) per 1000 units in kg	For Thread Size		
	min	max	max			Unit Deviations	Limit Deviations	min	max					min	max
2 <sup>1)</sup>	2.1	2.4	4.4	0.9	+0.1	0.5	+0.1	—	—	1	1.2	—	0.1	0.033	2
2.2 <sup>1)2)</sup>	2.3	2.6	4.8	1	+0.1	0.6	+0.1	—	—	1.2	1.4	—	0.1	0.050	2.2
2.5 <sup>1)</sup>	2.6	2.9	5.1	1	+0.1	0.6	+0.1	—	—	1.2	1.4	—	0.1	0.053	2.5
3 <sup>1)</sup>	3.1	3.4	6.2	1.3	+0.1	0.8	+0.1	1.9	1.9	1.6	1.9	0.15	0.2	0.11	3
3.5 <sup>1)</sup>	3.6	3.9	6.7	1.3	+0.1	0.8	+0.1	1.9	1.9	1.6	1.9	0.15	0.2	0.12	3.5
4	4.1	4.4	7.6	1.5	+0.1	0.9	+0.1	2.1	2.1	1.8	2.1	0.15	0.2	0.18	4
5	5.1	5.4	9.2	1.8	+0.1	1.2	+0.1	2.7	2.7	2.4	2.8	0.15	0.2	0.36	5
6	6.1	6.5	11.8	2.5	+0.15	1.6	+0.1	3.6	3.6	3.2	3.8	0.2	0.3	0.83	6
7 <sup>1)</sup>	7.1	7.5	12.8	2.5	+0.15	1.6	+0.1	3.6	3.6	3.2	3.8	0.2	0.3	0.93	7
8	8.1	8.5	14.8	3	+0.15	2	+0.1	4.6	4.6	4	4.7	0.3	0.5	1.6	8
10	10.2	10.7	18.1	3.5	+0.2	2.2	+0.15	5	5	4.4	5.2	0.3	0.5	2.53	10
12	12.2	12.7	21.1	4	+0.2	2.5	+0.15	5.8	5.8	5	5.9	0.4	1	3.82	12
14	14.2	14.7	24.1	4.5	+0.2	3	+0.15	6.8	6.8	6	7.1	0.4	1	6.01	14
16	16.2	17	27.1	5	+0.2	3.5	+0.2	7.8	7.8	7	8.3	0.4	1	8.91	16
18	18.2	19	29.4	5	+0.2	3.5	+0.2	7.8	7.8	7	8.3	0.4	1	9.73	18
20	20.2	21.2	33.6	6	+0.2	4	+0.2	8.8	8.8	8	9.4	0.4	1	15.2	20
22	22.5	23.5	35.9	6	+0.2	4	+0.2	11	11	8	9.4	0.4	1	16.5	22
24	24.5	25.5	40	7	+0.25	5	+0.2	11	11	10	11.4	0.5	1.6	26.2	24
27	27.5	28.5	43	7	+0.25	5	+0.2	11	11	10	11.8	0.5	1.6	28.7	27
30	30.5	31.7	48.2	8	+0.25	6	+0.2	13.6	13.6	12	14.2	0.8	1.6	44.3	30
36	36.5	37.7	58.2	10	+0.25	6	+0.2	13.6	13.6	12	14.2	0.8	1.6	67.3	36
39 <sup>1)2)</sup>	39.5	40.7	61.2	10	+0.25	6	+0.2	13.6	13.6	12	14.2	0.8	1.6	71.7	39
42 <sup>1)2)</sup>	42.5	43.7	68.2	12	+0.25	7	+0.25	15.6	15.6	14	16.5	0.8	2	111	42
45 <sup>1)2)</sup>	45.5	46.7	71.2	12	+0.25	7	+0.25	15.6	15.6	14	16.5	0.8	2	117	45 48
48 <sup>1)2)</sup>	53	50.5	75	12	+0.25	7	+0.25	15.6	15.6	14	16.5	0.8	2	123	52
52 <sup>1)2)</sup>		54.5	83	14	+0.25	8	+0.25	18	18	16	18.9	1	2	182	
56 <sup>1)2)</sup>	57	58.5	87	14	+0.25	8	+0.25	18	18	16	18.9	1	2	193	56
60 <sup>1)2)</sup>	61	62.5	91	14	+0.25	8	+0.25	18	18	16	18.9	1	2	203	60
64 <sup>1)2)</sup>	65	66.5	95	14	+0.25	8	+0.25	18	18	16	18.9	1	2	213	64
68 <sup>1)2)</sup>	69	70.5	99	14	+0.25	8	+0.25	18	18	16	18.9	1	2	228	68
72 <sup>1)2)</sup>	73	74.5	103	14	+0.25	8	+0.25	18	18	16	18.9	1	2	240	72
80 <sup>1)2)</sup>	81	82.5	111	14	+0.25	8	+0.25	18	18	16	18.9	1	2	262	80
90 <sup>1)2)</sup>	91	92.5	121	14	+0.25	8	+0.25	18	18	16	18.9	1	2	299	90
100 <sup>1)2)</sup>	101	102.5	131	14	+0.25	8	+0.25	18	18	16	18.9	1	2	318	100

## HEXAGON SOCKET HEAD CAP SCREWS



Size (d1)	Thread Pitch	Head Diameter (d2)		Head Height (k)		Key Size (s)		Key Engagement (t)
		Min	Max	Min	Max	Min	Max	Nominal
M1.4	0.3	2.46	2.74	1.26	1.4	1.32	1.36	0.6
M1.6	0.35	2.86	3.14	1.46	1.6	1.52	1.56	0.7
M2	0.4	3.62	3.98	1.86	2	1.52	1.56	1
M2.5	0.45	4.32	4.68	2.36	2.5	2.02	2.06	1.1
M3	0.5	5.32	5.68	2.86	3	2.52	2.58	1.3
M4	0.7	6.78	7.22	3.82	4	3.02	3.08	2
M5	0.8	8.28	8.72	4.82	5	4.02	4.095	2.5
M6	1	9.78	10.22	5.7	6	5.02	5.14	3
M8	1.25	12.73	13.27	7.64	8	6.02	6.14	4
M10	1.5	15.73	16.27	9.64	10	8.025	8.175	5
M12	1.75	17.73	18.27	11.57	12	10.025	10.175	6
M14	2	20.67	21.33	13.57	14	12.032	12.212	7
M16	2	23.67	24.33	15.57	16	14.032	14.212	8
M18	2.5	26.67	27.33	17.57	18	14.032	14.212	9
M20	2.5	29.67	30.33	19.48	20	17.05	17.23	10
M22	2.5	32.61	33.39	21.48	22	17.05	17.23	11
M24	3	35.61	36.39	23.48	24	19.05	19.275	12
M27	3	39.61	40.39	26.48	27	19.065	19.275	13.5
M30	3.5	44.61	45.39	29.48	30	22.065	22.275	15.5
M33	3.5	49.61	50.39	32.38	33	24.065	24.275	18
M36	4	53.54	54.56	35.38	36	27.065	27.275	19
M39	4	57.54	58.46	38.38	39	27.065	27.275	22
M42	4.5	62.54	63.46	41.38	42	32.08	32.33	24
M45	4.5	66.54	67.46	44.38	45	32.08	32.33	24
M48	5	71.54	72.46	47.38	48	36.08	36.33	28
M56	5.5	93.46	94.54	55.26	56	41.08	41.33	34
M64	6	95.46	96.54	63.26	64	46.08	46.33	38
M72	6	107.46	108.54	71.26	72	55.1	55.4	43
M80	6	119.46	120.54	79.26	80	65.1	65.4	48
M90	6	134.37	135.63	89.13	90	75.1	75.4	54
M100	6	149.37	150.63	99.13	100	85.12	85.47	60

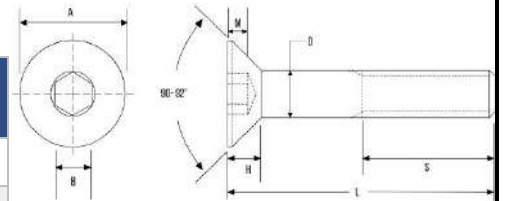
Note:

1. All dimensions are in MM
2. Available in full thread as well
3. Equivalent Standards: ISO 4762, CSN 21143, PN 82302, UNI 5931.

## SOCKET COUNTERSUNK SCREWS (DIN 7991 / ISO 10642)

### SOCKET COUNTERSUNKS SCREWS (METRIC) - DIN 7991 / ISO 10642

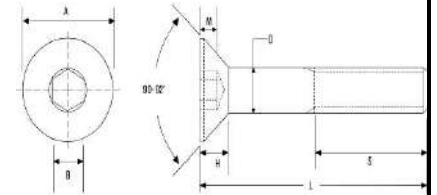
DIA	A	B	M (MIN)	S (MIN)	H (MIN)
M3	5.54 - 6.72	2.020 - 2.080	1.1	18	1.86
M4	7.53 - 8.96	2.520 - 2.580	1.5	20	2.48
M5	9.43 - 11.20	3.020 - 3.080	1.9	22	3.10
M6	11.34 - 13.44	4.020 - 4.095	2.2	24	3.72
M8	15.24 - 17.92	5.020 - 5.140	3.0	28	4.96
M10	19.22 - 22.40	6.020 - 6.140	3.6	32	6.20
M12	23.12 - 26.88	8.025 - 8.175	4.3	36	7.44
M14	26.52 - 30.80	10.025 - 10.175	4.5	40	8.40
M16	29.01 - 33.60	10.025 - 10.175	4.8	44	8.80
M20	36.05 - 40.32	12.032 - 12.212	5.6	52	10.16



Dimensions in millimetres

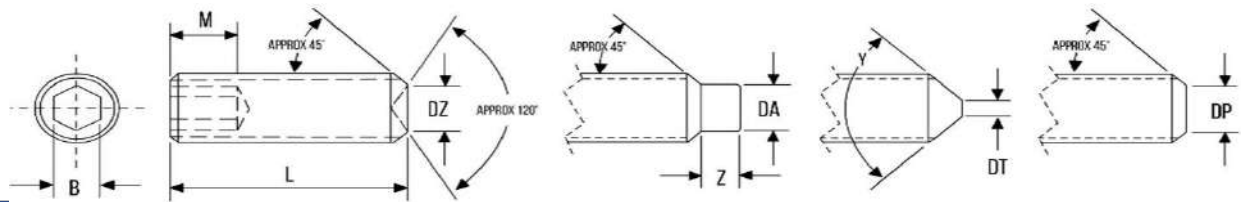
### SOCKET COUNTERSUNKS SCREWS (IMPERIAL) – ASME 18.3

DIA	A	B	M (MIN)	S (MIN)
1/4	0.480 - 0.531	5/32 (0.156)	0.111	1.00
5/16	0.600 - 0.656	3/16 (0.188)	0.135	1.12
3/8	0.720 - 0.781	7/32 (0.219)	0.159	1.25
7/16	0.781 - 0.844	1/4 (0.250)	0.159	1.38
1/2	0.872 - 0.938	5/16 (0.312)	0.172	1.50
5/8	1.112 - 1.188	3/8 (0.375)	0.220	1.75
3/4	1.355 - 1.438	1/2 (0.500)	0.220	2.00
7/8	1.604 - 1.688	9/16 (0.562)	0.248	2.25
1	1.841 - 1.938	5/8 (0.625)	0.297	2.50
1-1/8	2.079 - 2.188	3/4 (0.750)	0.325	2.81
1-1/4	2.316 - 2.438	7/8 (0.875)	0.358	3.12
1-3/8	2.553 - 2.688	7/8 (0.875)	0.402	3.44
1-1/2	2.791 - 2.938	1 (1.000)	0.435	3.75



• Dimensions in inches

## SOCKET SETSCREWS (METRIC) - ISO 4026 / 4027 / 4028 / 4029



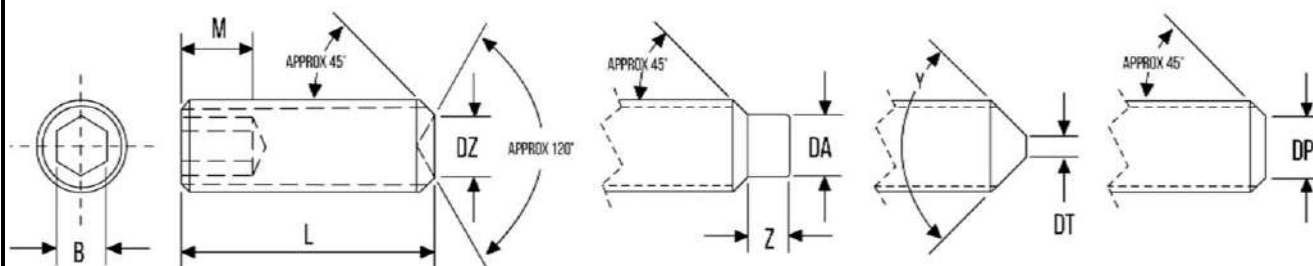
DIA	CUP POINT (M)		DOG POINT (M)			CONE POINT (M)		FLAT POINT (M)	
	LENGTH	MIN	LENGTH	MIN	Z	LENGTH	MIN	LENGTH	MIN
M3	L ≤ 4	1.20	L ≤ 5	1.20	0.75 - 1.00	L ≤ 4	1.20	L ≤ 3	1.20
	L > 4	2.00	L > 5	2.00	1.50 - 1.75	L > 4	2.00	L > 3	2.00
M4	L ≤ 5	1.50	L ≤ 6	1.50	1.00 - 1.25	L ≤ 5	1.50	L ≤ 4	1.50
	L > 5	2.50	L > 6	2.50	2.00 - 2.25	L > 5	2.50	L > 4	2.50
M5	L ≤ 5	2.00	L ≤ 6	2.00	1.25 - 1.50	L ≤ 6	2.00	L ≤ 5	2.00
	L > 5	3.00	L > 6	3.00	2.50 - 2.75	L > 6	3.00	L > 5	3.00
M6	L ≤ 6	2.00	L ≤ 8	2.00	1.50 - 1.75	L ≤ 6	2.00	L ≤ 6	2.00
	L > 6	3.50	L > 8	3.50	3.00 - 3.25	L > 6	3.50	L > 6	3.50
M8	L ≤ 8	3.00	L ≤ 10	3.00	2.00 - 2.25	L ≤ 8	3.00	L ≤ 8	3.00
	L > 8	5.00	L > 10	5.00	4.00 - 4.30	L > 8	5.00	L > 8	5.00
M10	L ≤ 10	4.00	L ≤ 12	4.00	2.50 - 2.75	L ≤ 10	4.00	L ≤ 10	4.00
	L > 10	6.00	L > 12	6.00	5.00 - 5.30	L > 10	6.00	L > 10	6.00
M12	L ≤ 12	4.80	L ≤ 16	4.80	3.00 - 3.25	L ≤ 12	4.80	L ≤ 12	4.80
	L > 12	8.00	L > 16	8.00	6.00 - 6.30	L > 12	8.00	L > 12	8.00
M14	L ≤ 14	5.60	L ≤ 20	5.60	3.50 - 3.80	L ≤ 14	5.60	L ≤ 14	5.60
	L > 14	9.00	L > 20	9.00	7.00 - 7.36	L > 14	9.00	L > 14	9.00
M16	L ≤ 16	6.40	L ≤ 20	6.40	4.00 - 4.30	L ≤ 16	6.40	L ≤ 16	6.40
	L > 16	10.00	L > 20	10.00	8.00 - 8.36	L > 16	10.00	L > 16	10.00
M18	L ≤ 18	7.20	L ≤ 25	7.20	4.50 - 4.80	L ≤ 18	7.20	L ≤ 18	7.20
	L > 18	11.00	L > 25	11.00	9.00 - 9.86	L > 18	11.00	L > 18	11.00
M20	L ≤ 20	8.00	L ≤ 25	8.00	5.00 - 5.30	L ≤ 20	8.00	L ≤ 20	8.00
	L > 20	12.00	L > 25	12.00	10.00 - 10.36	L > 20	12.00	L > 20	12.00

DIA	DP	DZ	DT (MAX)	DA	B
M3	1.75 - 2.00	1.15 - 1.40	0.75	1.75 - 2.00	1.152 - 1.580
M4	2.25 - 2.50	1.75 - 2.00	1.00	2.25 - 2.50	2.020 - 2.080
M5	3.20 - 3.50	2.25 - 2.50	1.25	3.20 - 3.50	2.520 - 2.580
M6	3.70 - 4.00	2.75 - 3.00	1.50	3.70 - 4.00	3.020 - 3.080
M8	5.20 - 5.50	4.70 - 5.00	2.00	5.20 - 5.50	4.020 - 4.095
M10	6.64 - 7.00	5.70 - 6.00	2.50	6.64 - 7.00	5.020 - 5.140
M12	8.14 - 8.50	7.64 - 8.00	3.00	8.14 - 8.50	6.020 - 6.140
M14	9.64 - 10.00	8.64 - 9.00	4.00	9.64 - 10.00	6.020 - 6.140
M16	11.57 - 12.00	9.64 - 10.00	4.00	11.57 - 12.00	8.025 - 8.175
M18	12.57 - 13.00	11.57 - 12.00	5.00	12.57 - 13.00	10.025 - 10.175
M20	14.57 - 15.00	13.57 - 14.00	5.00	14.57 - 15.00	10.025 - 10.175

Dimensions in millimetres



## SOCKET SETSCREWS (IMPERIAL) -- ASME B18.3



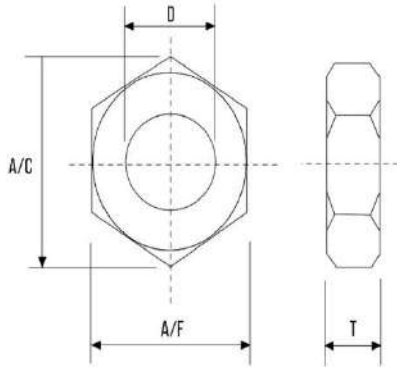
DIA	CUP POINT (M)		DOG POINT (M)			CONE POINT (M)		FLAT POINT (M)	
	LENGTH	MIN	LENGTH	MIN	Z	LENGTH	MIN	LENGTH	MIN
1/4	L ≥ 0.25	0.125	L ≥ 0.31	0.125	0.059 - 0.067	L ≥ 0.31	0.125	L ≥ 0.25	0.125
5/16	L ≥ 0.31	0.156	L ≥ 0.38	0.156	0.074 - 0.082	L ≥ 0.44	0.156	L ≥ 0.31	0.156
3/8	L ≥ 0.38	0.188	L ≥ 0.44	0.188	0.089 - 0.099	L ≥ 0.44	0.188	L ≥ 0.38	0.188
7/16	L ≥ 0.44	0.219	L ≥ 0.50	0.219	0.104 - 0.114	L ≥ 0.63	0.219	L ≥ 0.44	0.219
1/2	L ≥ 0.50	0.250	L ≥ 0.63	0.250	0.120 - 0.130	L ≥ 0.63	0.250	L ≥ 0.50	0.250
5/8	L ≥ 0.63	0.312	L ≥ 0.88	0.312	0.148 - 0.164	L ≥ 0.88	0.312	L ≥ 0.63	0.312
3/4	L ≥ 0.75	0.375	L ≥ 1.00	0.375	0.480 - 0.196	L ≥ 1.00	0.375	L ≥ 0.75	0.375
7/8	L ≥ 0.88	0.500	L ≥ 1.00	0.500	0.211 - 0.227	L ≥ 1.00	0.500	L ≥ 0.88	0.500
1	L ≥ 1.00	0.562	L ≥ 1.25	0.562	0.240 - 0.260	L ≥ 1.25	0.562	L ≥ 1.00	0.562

DIA	DP	DZ	DF (MAX)	DA	B
1/4	0.118 - 0.132	0.118 - 0.132	0.0250	0.149 - 0.156	1/8 (0.125)
5/16	0.156 - 0.132	0.156 - 0.132	0.0312	0.195 - 0.203	5/32 (0.156)
3/8	0.194 - 0.212	0.194 - 0.212	0.0375	0.241 - 0.250	3/16 (0.188)
7/16	0.232 - 0.252	0.232 - 0.252	0.4370	0.287 - 0.297	7/32 (0.219)
1/2	0.270 - 0.291	0.270 - 0.291	0.0500	0.334 - 0.344	1/4 (0.250)
5/8	0.347 - 0.371	0.347 - 0.371	0.0625	0.456 - 0.469	5/16 (0.312)
3/4	0.425 - 0.450	0.425 - 0.450	0.7500	0.549 - 0.562	3/8 (0.375)
7/8	0.502 - 0.530	0.502 - 0.530	0.8750	0.642 - 0.656	1/2 (0.500)
1	0.579 - 0.609	0.579 - 0.609	0.1000	0.734 - 0.750	9/16 (0.562)

• Dimensions in inches

**HEX LOCK NUT (METRIC) - DIN 439-2 / ISO 4035 AND NYLON INSERT NUT (METRIC) - DIN 985 THIN TYPE (T)**

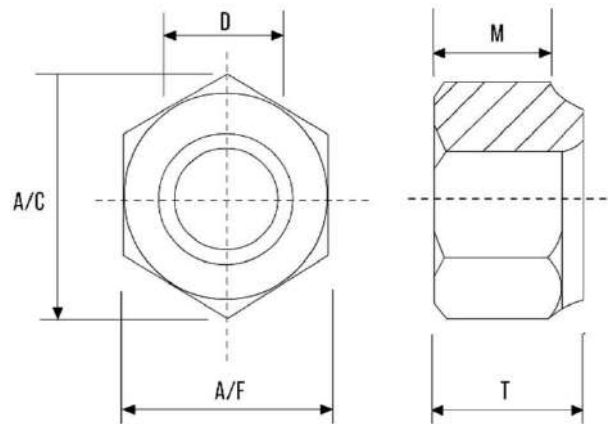
**HEX LOCK NUT (METRIC) - DIN 439-2 / ISO 4035**



DIA	TPI	A/C	THICKNESS (T)		A/F	
	(COARSE)	MIN	MIN	MAX	MIN	MAX
M6	1.00	10.89	2.90	3.20	9.78	10.00
M8	1.25	14.20	3.70	4.00	12.73	13.00
M10	1.50	18.90	4.70	5.00	16.73	17.00
M12	1.75	21.10	5.70	6.00	18.67	19.00
M14	2.00	24.49	6.42	7.00	20.67	21.0
M16	2.00	26.75	7.42	8.00	23.67	24.00
M18	2.50	29.56	8.42	9.00	26.16	27.00
M20	2.50	32.95	9.10	10.00	29.16	30.00
M22	2.50	35.03	9.90	11.00	31.00	32.00
M24	3.00	39.55	10.90	12.00	35.00	36.00
M27	3.00	45.20	12.40	13.50	40.00	41.00
M30	3.50	50.85	13.90	15.00	45.00	46.00
M33	3.50	55.37	15.40	16.50	49.00	50.00
M36	4.00	60.79	16.90	18.00	53.80	55.00
M39	4.00	66.44	18.20	19.50	58.80	60.00
M42	4.50	71.30	19.70	21.00	63.10	65.00
M45	4.50	76.95	21.20	22.50	68.10	70.00
M48	5.00	82.60	22.70	24.00	73.10	75.00
M52	5.00	88.25	24.70	26.00	78.10	80.00
M56	5.50	18.90	4.70	5.00	16.73	17.00

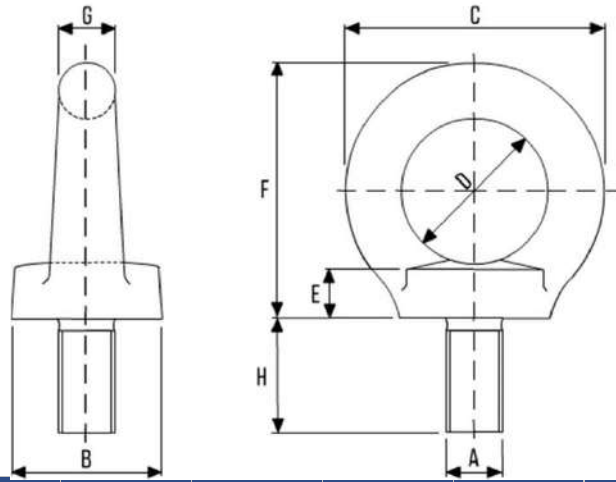
**NYLON INSERT NUT (METRIC) - DIN 985 THIN TYPE (T)**

DIA	TPI	A/C	r		M	A/F	
	COARSE	MIN	MIN	NOM	MIN	MIN	MAX
M10	1.50	18.90	9.64	10.00	6.50	15.73	16.00
M12	1.75	21.10	11.57	12.00	8.00	17.73	18.00
M14	2.00	24.49	13.30	14.00	9.50	20.67	21.00
M16	2.00	26.75	15.30	16.00	10.50	23.67	24.00
M18	2.50	29.56	17.66	18.50	13.00	26.16	27.00
M20	2.50	32.95	18.70	20.00	14.00	29.16	30.00
M22	2.50	35.03	20.70	22.00	15.00	33.00	34.00
M24	3.00	39.55	22.70	24.00	15.00	35.00	36.00
M27	3.00	45.20	25.70	27.00	17.00	40.00	41.00
M30	3.50	50.85	28.70	30.00	19.00	45.00	46.00
M33	3.50	55.37	31.40	33.00	22.00	49.00	50.00
M36	4.00	60.79	34.40	36.00	25.00	53.80	55.00
M39	4.00	66.44	37.40	39.00	27.00	58.80	60.00
M42	4.50	72.09	40.40	42.00	29.00	63.10	65.00
M45	4.50	76.95	43.40	45.00	32.00	68.10	70.00
M48	5.00	82.60	46.40	48.00	36.00	73.10	75.00



Dimensions in millimetres

## DIN580 EYEBOLT



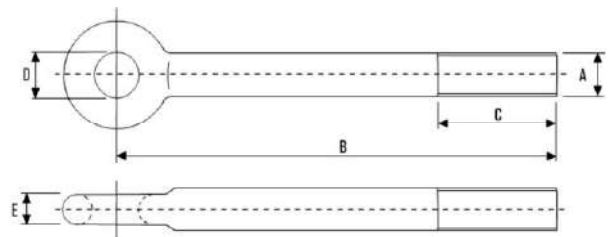
A	B	C	D	E	F	G	H	SWL
M6	17	28	16	6	31	6	13	70 KG
M8	20	36	20	6	36	8	15	140 KG
M10	25	45	25	8	45	10	18	230 KG
M12	30	54	30	10	53	12	22	340 KG
M14	35	63	35	12	62	14	28	490 KG
M16	35	63	35	12	62	16	28	700 KG
M20	40	72	40	14	71	18	30	1200 KG
M22	45	81	45	16	80	20	35	1500 KG
M24	50	90	50	16	90	20	38	1800 KG
M27	50	90	50	18	90	24	38	2500 KG
M30	65	108	60	18	109	24	45	3200 KG
M33	65	108	60	22	109	28	45	4300 KG
M36	75	126	70	22	128	28	55	4600 KG
M39	75	126	70	26	128	32	55	6100 KG
M42	85	144	80	30	147	32	65	7000 KG
M45	85	144	90	30	147	36	65	8000 KG
M48	100	166	90	35	168	36	70	8600 KG
M52	100	166	90	35	168	36	70	9900 KG
M56	110	184	100	38	187	42	80	11500 KG
M64	120	206	110	42	208	48	90	16000 KG

- Dimensions in millimetres
- SWL shown for vertical lift
- Available in Carbon, Alloy & Stainless Steels
- Full range of different finishes available

**EYE BOLTS : SLING ROD EYEBOLT , INTEGRAL FORGED EYE BS3974, DIN 444**

**INTEGRAL FORGED EYE BS3974**

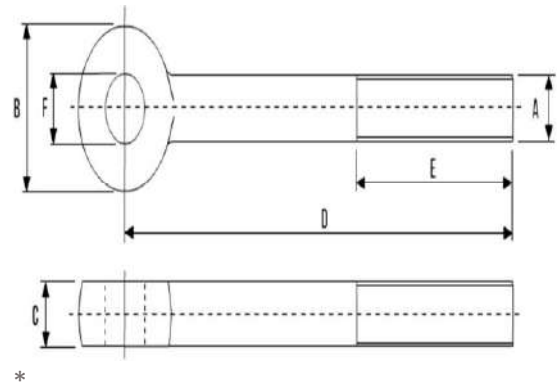
	B*	C*	D	E	SWL
M8	300	200	14	6	230 KG
M10	300	200	16	7	360 KG
M12	300	200	18	9	530 KG
M16	300	200	22	12	1010 KG
M20	300	200	26	14	1580 KG
M24	300	200	30	17	2280 KG
M30	300	200	36	21	3650 KG
M36	300	200	42	26	5340 KG
M42	300	200	48	30	7400 KG



\*Denotes standard sizes. Shorter lengths available. Longer shanks up to 3000mm also available.

**PALM EYEBOLT – STRAIGHT SIDES**

A (MM)	A (INCH)	B	C	D (MIN)	D (MAX)	E (MIN)	E (MAX)	F
M8	5/16"	16	8	30	3000	15	1500	8
M10	3/8"	25	10	35	3000	15	1500	10
M12	1/2"	26	13	38	3000	18	1500	13
M12	---	34	12	45	3000	18	1500	12
M16	5/8"	32	16	45	5500	20	2000	16
M16	5/8"	38	16	45	5500	20	2000	16
M20	3/4"	42	20	55	5500	25	2000	20
M20	3/4"	50	20	60	5500	25	2000	20
M24	1"	51	26	65	5500	30	2000	26
M24	---	51	24	65	5500	30	2000	24
M30	1.1/8"	60	30	70	5500	35	2000	30
M33	1.1/4"	70	33	90	5500	40	2000	33
M39	1.1/2"	80	39	95	5500	45	2000	39
M56	2.1/4"	115	56	120	1000	50	800	56
M64	2.1/2"	130	64	140	1000	60	800	64
M72	2.3/4"	150	72	165	1000	75	800	72
M76	3"	150	76	170	1000	85	800	76

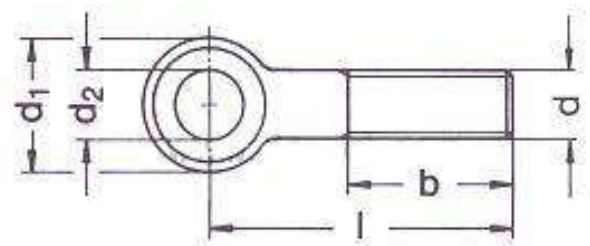


Denotes standard sizes. Shorter lengths available. Longer shanks up to 3000mm also available.

Dimensions in millimetres, Available in Carbon, Alloy & Stainless Steels with range of different finishes available

**DIN 444 eye bolts dimensions**

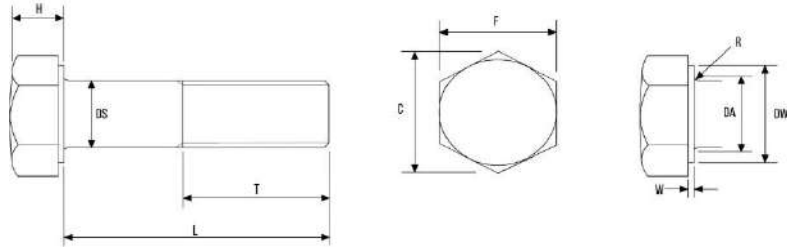
d	d1	d2	b to 125	b to 200
M5	12	5	16	
M6	14	6	18	
M8	18	8	22	28
M10	20	10	26	32
M12	25	12	30	36
M16	32	16	38	44
M20	40	18	46	52



## HIGH-STRENGTH STRUCTURAL BOLTING ASSEMBLIES FOR PRELOADING

	Bolt/Nut/Washer Assembly System HR		Bolt/Nut/Washer Assembly System HV	
General Requirements	EN 14399-1			
Bolt/Nut Assembly	EN 14399-3		EN 14399-4	
Marking	HR		HV	
Property Class	8.8/8	10.9/10	10.9/10	
Washer(s)	EN 14399-5 or EN 14399-6		EN 14399-5 or EN 14399-6	
Marking	H		H	
Suitability Test for Preloading	EN 14399-2			

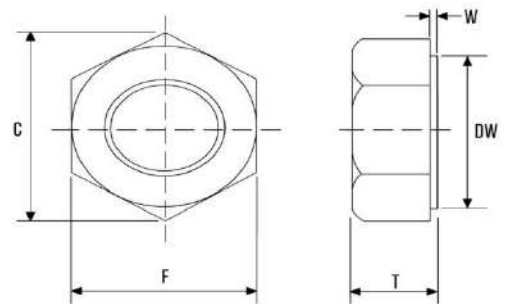
### EN14399-3 DIMENSIONS OF BOLTS



Diameter	Pitch	Thread Length (T)			Depth of Washer Face (W)		Transition Diameter (DA)	Diameter of Washer Face (DW)	Dia. of Unthreaded Shank (DS)		Width Across Corners (C)	Thickness of Head (H)		Radius (R)	Width Across Flats (F)	
		Bolt ≤ 125	Bolt 125-200	Bolt >200	Min.	Max.			Min.	Max.		Min.	Max.		Min.	Max.
M12	1.75	30	-	-	0.4	0.8	15.2	20.1	11.3	12.7	23.91	7.05	7.95	1.2	21.2	22
M16	2	38	44	-	0.4	0.8	19.2	24.9	15.3	16.7	29.56	9.25	10.8	1.2	26.2	27
M20	2.5	46	52	65	0.4	0.8	24.4	29.5	19.2	20.8	35.03	11.6	13.4	1.5	31	32
M22	2.5	50	56	69	0.4	0.8	26.4	33.3	21.2	22.8	39.55	13.1	14.9	1.5	35	36
M24	3	54	60	73	0.4	0.8	28.4	38	23.2	24.8	45.2	14.1	15.9	1.5	40	41
M27	3	60	66	79	0.4	0.8	32.4	42.8	26.2	27.8	50.85	16.1	17.9	2	45	46
M30	3.5	66	72	85	0.4	0.8	35.4	46.6	29.2	30.8	55.37	17.7	19.8	2	49	50
M36	4	78	84	97	0.4	0.8	42.4	55.9	35	37	66.44	21.5	23.6	2	58.8	60

### EN14399-3 DIMENSIONS OF NUTS

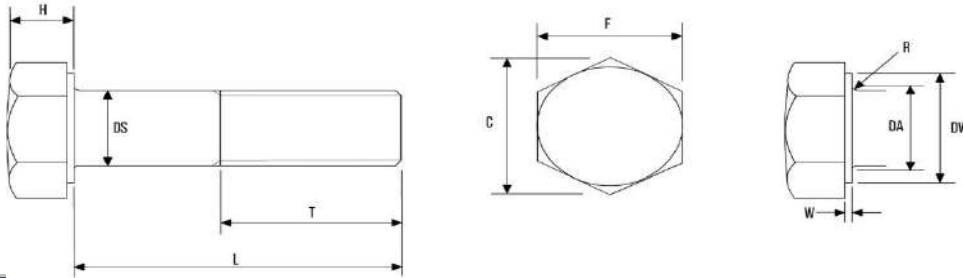
Diameter	Pitch	DW	C	T		W		F	
		Min.	Min.	Min.	Min.	Min.	Max.	Min.	Max.
M12	1.75	20.1	23.9	10.4	10.8	0.4	0.8	21.2	22
M16	2	24.9	29.6	14.1	14.8	0.4	0.8	26.2	27
M20	2.5	29.5	35	16.9	18	0.4	0.8	31	32
M22	2.5	33.3	39.6	18.1	19.4	0.4	0.8	35	36
M24	3	38	45.2	20.2	21.5	0.4	0.8	40	41
M27	3	42.8	50.9	22.5	23.8	0.4	0.8	45	46
M30	3.5	46.6	55.4	24.3	25.6	0.4	0.8	49	50
M36	4	55.9	66.4	29.4	31	0.4	0.8	58.8	60



For hot-dip galvanized nuts, the dimensions apply before galvanizing.

## HIGH-STRENGTH STRUCTURAL BOLTING ASSEMBLIES FOR PRELOADING

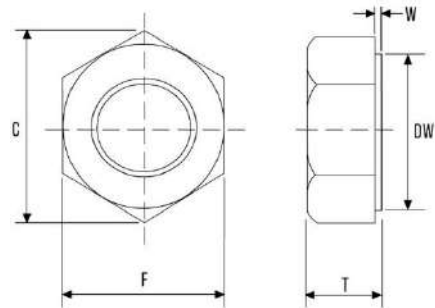
### EN14399-4 DIMENSIONS OF BOLTS



Diameter	Pitch	Bolt ≤ 125	Depth of Washer Face (W)		Transition Diameter (DA)	Diameter of Washer Face (DW)	Width Across Corners (C)	Dia. of Unthreaded Shank (DS)		Thickness of Head (H)		Radius (R)	Width Across Flats (F)	
			Min.	Max.				Min.	Max.	Min.	Max.		Min.	Max.
M12	1.75	23	0.4	0.8	15.2	20.1	23.91	11.3	12.7	7.55	8.45	1.2	21.2	22
M16	2	28	0.4	0.8	19.2	24.9	29.56	15.3	16.7	9.25	10.8	1.2	26.2	27
M20	2.5	33	0.4	0.8	24	29.5	35.03	19.2	20.8	12.1	13.9	1.5	31	32
M22	2.5	34	0.4	0.8	26	33.3	39.55	21.2	22.8	13.1	14.9	1.5	35	36
M24	3	39	0.4	0.8	28	38	45.2	23.2	24.8	14.1	15.9	1.5	40	41
M27	3	41	0.4	0.8	32	42.8	50.85	26.2	27.8	16.1	17.9	2	45	46
M30	3.5	44	0.4	0.8	35	46.6	55.37	29.2	30.8	18	20.1	2	49	50
M36	4	52	0.4	0.8	41	55.9	66.44	35	37	22	24.1	2	58.8	60

### EN14399-4 DIMENSIONS OF NUTS

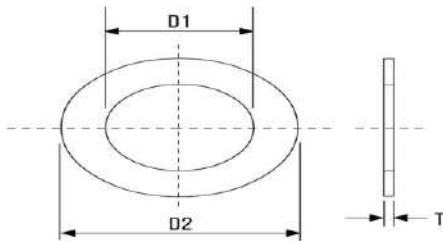
Diameter	Pitch	DW	C	T		F	
		Min.	Min.	Min.	Max.	Min.	Max.
M12	1.75	20.1	23.91	9.64	10	21.16	22
M16	2	24.9	29.56	12.3	13	26.16	27
M20	2.5	29.5	35.03	14.9	16	31	32
M22	2.5	33.3	39.55	16.9	18	35	36
M24	3	38	45.2	18.7	20	40	41
M27	3	42.8	50.85	20.7	22	45	46
M30	3.5	46.6	55.37	22.7	24	49	50
M36	4	55.9	66.44	27.7	29	58.8	60



For hot-dip galvanized nuts, the dimensions apply before galvanizing

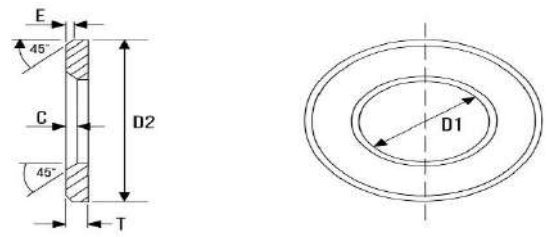
## WASHERS FOR EN 14399 STRUCTURAL BOLTS

### EN14399-5 DIMENSIONS OF PLAIN WASHERS



DIA	Inside Diameter (D1)		Outside Diameter (D2)		Thickness (T)		
	Max.	Min.	Max.	Min.	Nom.	Max.	Min.
M12	13.27	13	24	23.48	3	3.3	2.7
M16	17.27	17	30	29.48	4	4.3	3.7
M20	21.33	21	37	36.38	4	4.3	3.7
M22	23.33	23	39	38.38	4	4.3	3.7
M24	25.33	25	44	43.38	4	4.3	3.7
M27	28.52	28	50	49	5	5.6	4.4
M30	31.62	31	56	54.8	5	5.6	4.4
M36	37.62	37	66	64.8	6	6.6	5.4

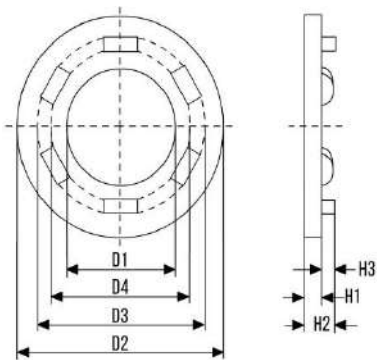
### EN14399-6 DIMENSIONS OF PLAIN CHAMFERED WASHERS



DIA	Inside Diameter (D1)		Outside Diameter (D2)		Thickness (T)		External Chamfer (E)		Internal Chamfer (C)	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
M12	13.3	13	24	23.5	3.3	2.7	1	0.5	1.9	1.6
M16	17.3	17	30	29.5	4.3	3.7	1.5	0.75	1.9	1.6
M20	21.3	21	37	36.4	4.3	3.7	1.5	0.75	2.5	2
M22	23.3	23	39	38.4	4.3	3.7	1.5	0.75	2.5	2
M24	25.3	25	44	43.4	4.3	3.7	1.5	0.75	2.5	2
M27	28.5	28	50	49	5.6	4.4	2	1	3	2.5
M30	31.6	31	56	54.8	5.6	4.4	2	1	3	2.5
M36	37.6	37	66	64.8	6.6	5.4	2.5	1.25	3	2.5

Characteristic	Material	General Requirements	Hardness Range	Tolerances (Intl. STD)
Standard	Steel	EN 14399-1	300 HV to 370 HV	EN ISO 4759-3

### EN14399-9 DIMENSIONS OF COMPRESSIBLE WASHER TYPE DTI



Diameter	Internal Diameter D1		External Diameter D2		Material Thickness H1	Height over Protrusions	Height of Protrusions	Protrusion tangential diameter	Protrusion internal diameter
	Min.	Max.	Min.	Max.		H2	H3	D3	D4
M12	12.8	12.9	26	32.5	2.5	5.5	0.8	20	13.85
M16	16.8	16.9	35	36.8	3	6	0.8	25	17.85
M20	21	21.1	41	46	3.5	6.5	0.8	29	22.05
M22	23.1	23.2	46.5	50.6	4	7	0.8	33	24.15
M24	25.2	25.3	50	55.2	4	7	0.8	38	26.25
M27	28.3	28.4	54	62.1	4	7	0.8	43	29.4
M30	31.5	31.6	59	69	4	7	0.8	46.5	32.55
M36	37.8	37.9	78	83	4	7.5	0.8	56	38.85

Characteristic	Material	General Requirements	Heat Treatment	Maximum Hardness	Associated bolts & nuts	Tolerances (International Standard)
Standard	Steel	EN 14399-1	Hardened & tempered or controlled rolled & tempered	380 HV	EN14399-3, EN14399-4, EN14399-7 or EN14399-8	EN ISO 4759-3



**SPECIAL FASTENERS**



**HEX HEAD BOLT**  
DIN 931 / ISO 4014



**SLOTTED CHEESE HEAD SCREWS** DIN84



**HEX HEAD BOLT**  
DIN 933 / ISO 4017



**SLOTTED PAN HEAD SCREWS** DIN 85



**SOCKET CAP SCREWS**  
LOW HEAD DIN 6912



**CSK HEAD SCREWS TX**  
DIN 7991



**SOCKET CAP SCREWS**  
DIN 912



**EYE BOLTS**  
DIN 444



**T - BOLTS**  
DIN 186



**HAMMER HEAD SCRES**  
ART NR. 9097



**SLOTTED PH SCREWS**  
WITH SHOULDER DIN 923



**T - BOLTS**  
DIN 188



**WING NUTS, AMERICAN**  
TYPE SIMILAR DIN 315



**HEX SOCKET PIPE PLUGS**  
DIN 906



**HEX SOCKET PIPE PLUGS**  
DIN 908



**HEX HEAD PIPE PLUG**  
DIN 910



**SLOTTED SET SCREW** DIN  
913 FLAT POINT



**ENGINEER STUDS**  
DIN 938



**ENGINEER STUDS**  
DIN 939



**POINT** DIN 438



**SQUARE NUTS** DIN 557



**SQUARE THIN NUTS**  
DIN 562



**SQUARE WELD NUTS**  
DIN 928



**HEX THIN NUT**  
DIN 439/ 936

**SPECIAL FASTENERS**



**LONG NUTS**  
DIN 6334



**HEX NUTS**  
DIN 934



**LOCK NUT - LOW TYPE**  
DIN 985 / DIN 982



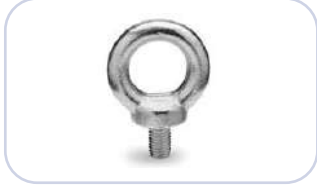
**HEX CASTLE NUTS  
SLOTTED** DIN 935



**NYLOC DOMED CAP NUTS**  
DIN 986



**HEX DOMED CAP NUTS  
HIGH TYPE** DIN 1587



**LIFTING EYE BOLTS**  
DIN 580



**HEX FLANGE NUTS**  
DIN 6923



**LIFTING EYE NUTS**  
DIN 582



**SQUARE WASHER**  
DIN 436



**BOW NUTS**  
DIN 80704



**WASHER FOR CLEVIS  
PINS** DIN 1440



**SPRING LOCK WASHERS**  
DIN 127 B



**TABWASHER WITH 2 TABS**  
DIN 463



**TOOTHED LOCK**  
DIN 6797



**TOOTHED LOCK**  
DIN 6797



**SQUARE TAPER WASHER**  
DIN 434



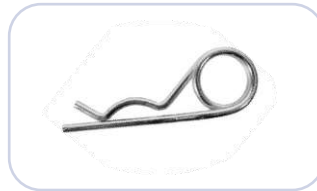
**TAPPER PINS**



**COTTER PIN**  
DIN 94



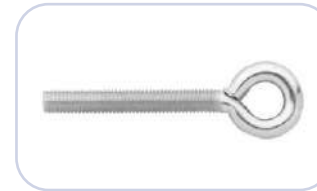
DIN 7967



**SPLIT PIN TYPE "BETA"**  
DIN 11024



**HEX WOOD SCREWS**  
DIN 571



**SCREW EYES**  
Art NR 9078



**THROUGH BOLT**

## EXOTIC FASTENERS

In addition to carbon steel fasteners, we specialize in providing customers with specialty fasteners from the materials listed below.

### Hastelloy

C276  
C22  
C4  
C-2000  
G,X,B

### Exotics

904L  
A-286  
Carpenter 20/CB3  
Alloy 20, 60  
Nitronic Alloy 50, 60  
Inconel  
Titanium

### Copper

Aluminum Bronze  
Aluminum Nickel  
Bronze  
Brass  
Phosphorous Bronze  
Silicon Bronze

### Nickel Alloys

Nickel Alloy C276,  
Nickel Alloy B2, B3,  
Nickel Alloy G-30  
Inconel 625, 718,  
Inconel 825, 925  
Monel 400



## INDUSTRIES / CUSTOMER CARE:

### Our Markets:

- Oil & Gas
- Petrochemical
- Power Generation
- Renewable Energy
- Offshore
- Engineering
- Construction
- Nuclear
- Electrical



### Customer Service:

Our customer base has grown significantly over the years and we now have daily shipments throughout the United Arab Emirates and across the globe.

### Services provided:

- Assembling
- Special customized packing/documentation
- Service at your facility/ site
- Dedicated stock
- 24X7 Customer Service / Delivery

For further enquiries, quotes or to place an order you can contact us via email: [info@precisionmetal.me](mailto:info@precisionmetal.me) / Tel: + 065679699 / 971505276821.