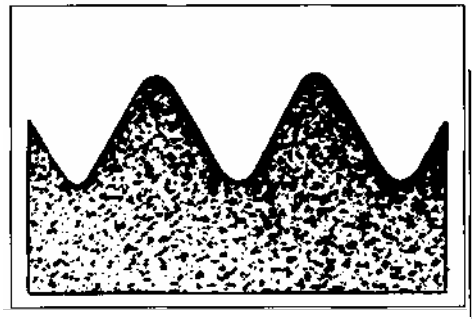
Special Features

When it comes to High Tensile Hexagon Head Bolts, Screws and Nuts, insist on "UNILOK". Here's why:

"UNILOK" High Tensile Hex Head Bolts and Nuts are used in a wide range of applications in industries ranging from automotive and farm equipment to structural, machine building and electrical industries. Their special design and properties offer several benefits especially to the economy minded user.

Forged Heads:
in contrast to conventional machined bolts. Machining cuts metal fibres, breaks fibre flow lines and creates planes of weakness at stress points. Controlled forging forms uniform grain flow with unbroken fibre flow lines; makes heads stronger; prevents fatigue failure in the vital fillet area.

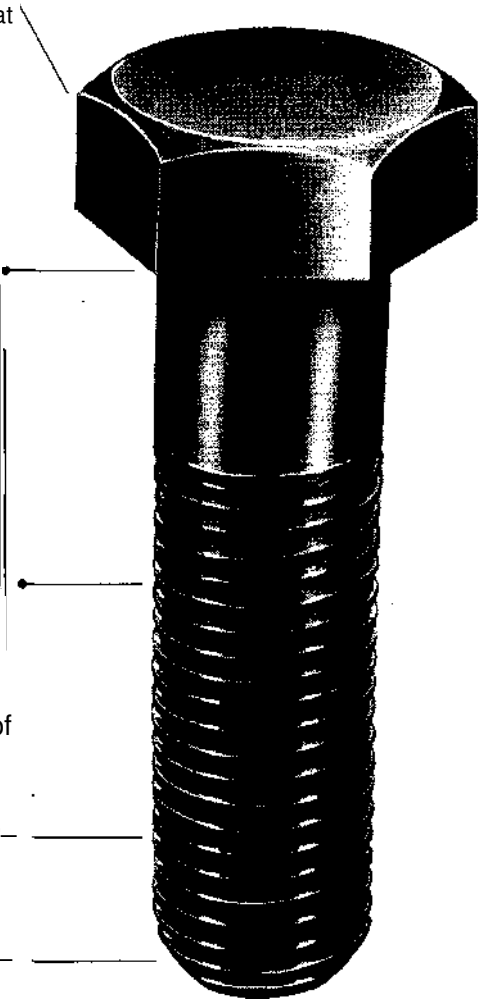
Controlled Under-Head Fillet:
Provides smooth transition in the area from head to shank; reduces stress concentrations; improves fatigue life.

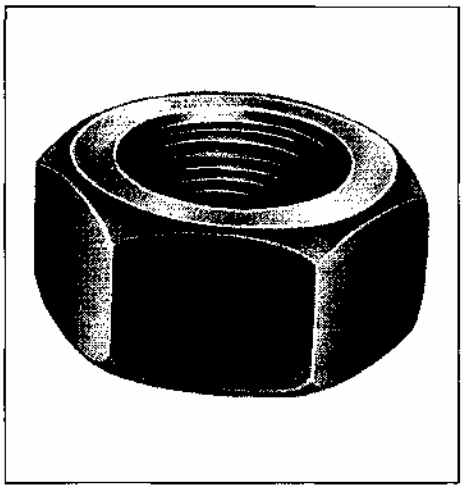


Rolled Threads:
Threads are rolled, not cut or ground. Rolled threads are more uniform and have closer tolerances. Contour following flow lines eliminate planes of weakness and improve fatigue strength

Dimensional Tolerances:
are held to precision grade to give maximum cross-section area and ensure smooth assembly.

Heat Treatment:
Heat treated in controlled atmosphere to achieve maximum strength and toughness.

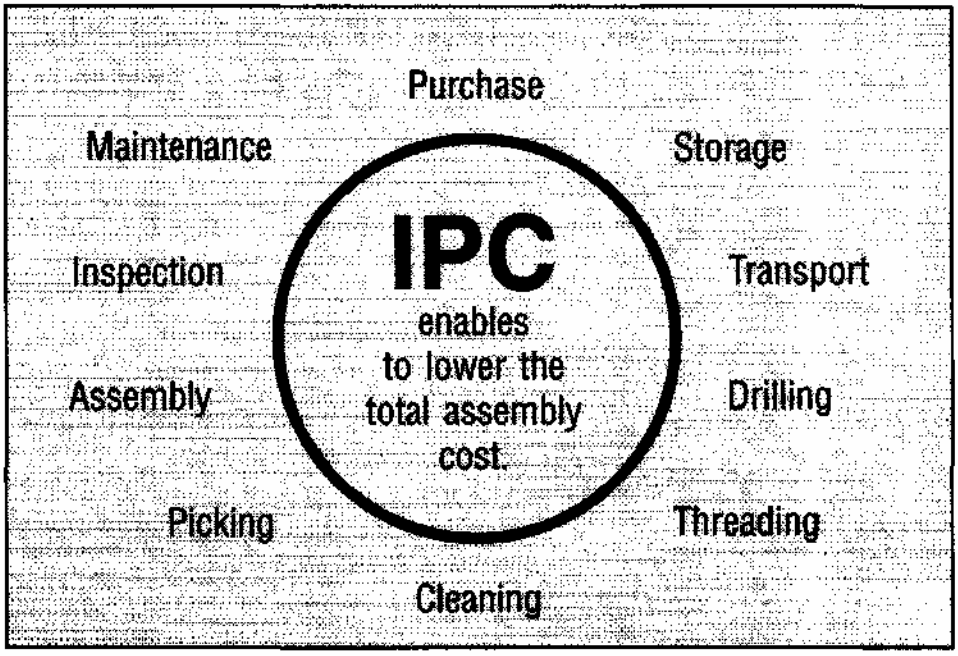




"UNILOK" High Tensile Hex Nuts are forged and dimensions are held to precision grade to ensure smooth assembly with **"UNILOK"** High Tensile Hex Head Bolts. In addition, heat treatment is tailored to suit the chemistry of every lot of steel. This imparts optimum mechanical properties to ensure that correct tightening torques can be applied to fulfil design requirements.

"UNILOK" Advantage

IPC : In-Place-Cost of fasteners.



When selecting a fastener for a particular application, it should be realized that the fastener cost is often secondary. More important is the cost of the assembled joint. These assembly costs include the cost of producing the holes, assembly time required and the cost of the fasteners. Fasteners itself represent less than 5% of the in-place or assembled cost.

The assembly function involves almost every department in a manufacturing industry, and the operations involved are as shown in the figure.

To reduce this in-place-cost, it is therefore, obvious that in a given joint, either the number of bolts used should be reduced, or diameters of the bolts used should be reduced.

This is possible by selecting smaller size fasteners with higher tensile strengths. The added advantage will be a lighter and smaller assembly.

Table alongside gives comparative strengths of High Tensile Bolts and Ordinary M.S. Bolts.

Strength Grade	Tensile Strength	Yield Strength	Yield Index (4.6=100)
4.6	400 MPa	240 MPa	100
8.8*	800 MPa	640 MPa	266
10.9*	1000 MPa	900 MPa	375

"High Tensile

It is obvious from the above table that the High Tensile Bolt of Property Class 10.9 is approx. 4 times stronger than an Ordinary M.S. Bolts of Property Class 4.6. This extra strength of High Tensile Bolts can be used to upgrade an assembled joint from a low tensile one to a high tensile one and gain all the advantages.

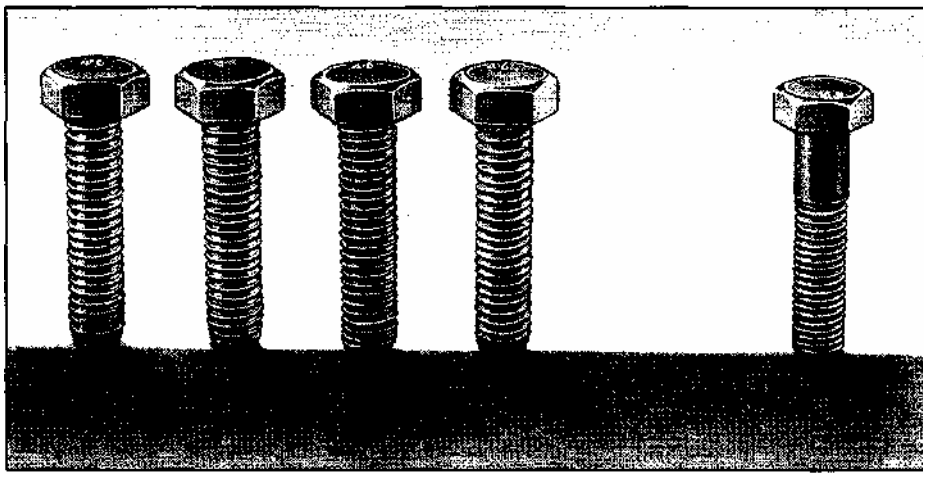
"UNILOK" High Tensile Hex Head Bolts and Nuts offer you substantial savings in the joint preparation and assembly costs, because of their dimensional accuracy and higher strength levels.

UNILOK" Advantage

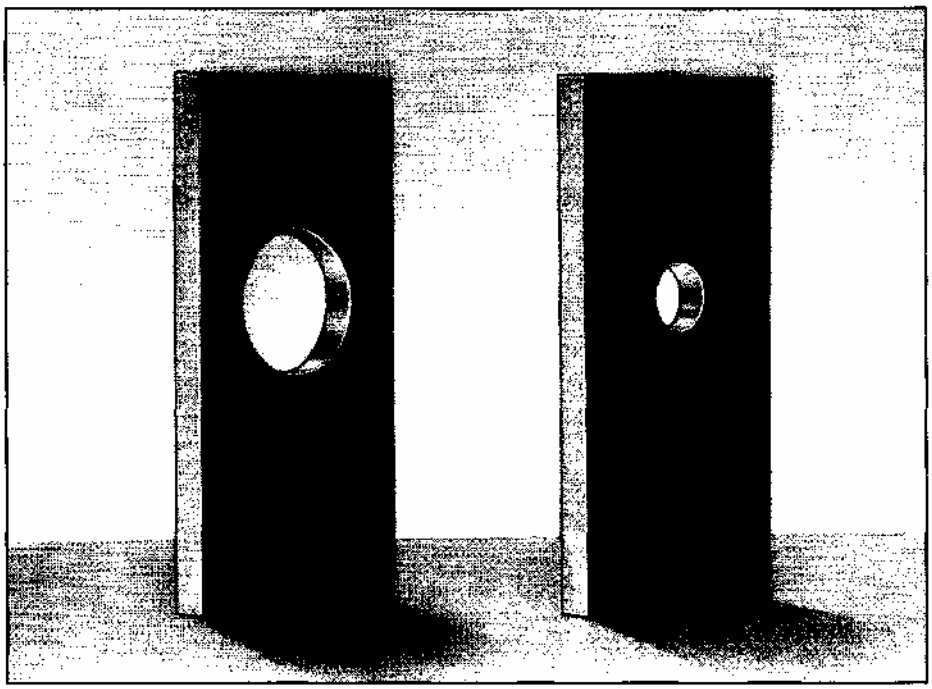
Advantages of "UNILOK" High Tensile Fasteners. Maximum Strength with Minimum of Fasteners.

Where you need 4 Mild Steel Bolts to do a specific job,

Just 1 "UNILOK" High Tensile Bolt is enough



Where a given size of Mild Steel Bolt is needed for a particular job, smaller size of "UNILOK" High Tensile Bolt will do. And in lesser numbers.

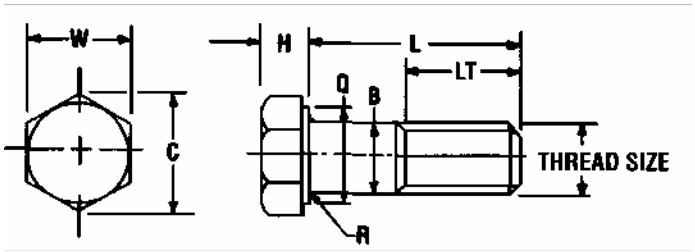


Hexagon Head Bolts/Screws

Metric Series-Dimensions

Note :

1. The bolts and screws will generally conform to IS : 1364, ISO 4014, ISO 4017 and DIN 931/933.
2. Threads will conform to class 6g of IS : 4218, ISO 261/965, Coarse Series.
3. Material : "UNILOK" High grade carbon/alloy steel.
4. Heat Treatment : Property Class 10.9 or 8.8 of IS : 1367, ISO 898-1.
5. Thread Length LT:
   LT1 for L^ 125
   LT2 for L> 125 to 200 LT3
   for L > 200
6. Screw lengths equal to or shorter than those listed in row 'LFT[1] will be threaded to head.
7. Sizes in brackets are non-preferred standards.
8. All dimensions are in millimeters.



Thread Size	Pitch	W Max.	C Min.	B Max.	H Nom.	R Min.	Q Min	Length of Thread				Length Range L
								LT1	LT2	LT3	LFT	
M4	0.7	7.0	7.66	4.0	2.8	0.2	5.9	14	-	-	20	10-40
M5	0.8	8.0	8.79	5.0	3.5	0.2	6.9	16	-	-	20	10-50
M6	1.0	10.0	11.05	6.0	4.0	0.25	8.9	18	-	-	25	10-50
MB	1.25	13.0	14.38	8.0	5.3	0.4	11.6	22	28	-	30	12-90
M10	1.5	16.0	17.80	10.0	6.4	0.4	15.6	26	32	45	35	16-90
M12	1.75	18.0	20.30	12.0	7.5	0.6	17.4	30	36	49	40	20-280
(M14)	2.0	21.0	23.45	14.0	8.8	0.6	20.5	34	40	53	45	25-200
M16	2.0	24.0	26.75	16.0	10.0	0.6	22.5	38	44	57	50	25-280
(M18)	2.5	27.0	30.14	18.0	11.5	0.6	25.3	42	48	61	60	40-200
M20	2.5	30.0	33.53	20.0	12.5	0.8	28.2	46	52	65	60	40-280
(M22)	2.5	34.0	37.72	22.0	14.0	0.8	30.0	50	56	69	65	50-280
M24	3.0	36.0	39.98	24.0	15.0	0.8	33.6	54	60	73	75	50-280
(M27)	3.0	41.0	45.20	27.0	17.0	1.0	38.0	60	66	79	85	70-300
M30	3.5	46.0	50.85	30.0	18.7	1.0	42.7	66	72	85	85	75-300
(M33)	3.5	50.0	55.55	33.0	21.0	1.0	46.6	72	78	91	95	75-300
M36	4.0	55.0	60.79	36.0	22.5	1.0	51.1	78	84	97	100	80-300
(M39)	4.0	60.0	66.44	39.0	25.0	1.0	55.9	84	90	103	110	90-300
M42	4.5	65.0	72.02	42.0	26.0	1.2	61.6	90	96	109	120	90-300

Hexagon Head Bolts/Screws

Metric Series-Physical Properties-Tightening Torques

Physical Properties :

Property Class			8.8				10.9	
Diameter			≤M16		>M16		all diameters	
Unit			N/mm^2	Kgf/mm^2	N/mm^2	Kgf/mm^2	N/mm^2	Kgf/mm^2
Tensile Strength, Min.			800	81.5	830	84.6	1040	106.0
Yield Strength, 0.2% offset Min.			640	65.2	660	67.2	940	95.8
Proof Lead Stress			580	59.1	600	61.2	830	84.6
Shear Strength, Min.			480	48.9	498	50.8	624	63.6
Hardness	Brinell	HB	219-285		242-319		295-362	
	Rockwell	HRC	20-30		23-34		31-39	
Elongation % on GL = √ 5.65A. A= Cross Sectional Area.			12% Min.				9% Min	

Recommended Tightening Torques and Induced Loads :

Thread Size	Stress Area mm^2	Property Class 8.8				Property Class 10.9			
		Torque		Induced Load		Torque		Induced Load	
		Nm	Kgm.	N	Kgs.	NM	Kgm.	N	Kgs.
M4	8.78	3.0	0.30	3877	395	4.3	0.44	5695	580
M5	14.2	6.0	0.62	6361	648	8.9	0.91	9344	952
M6	20.1	10.3	1.05	9005	918	15.1	1.54	13230	1348
M8	36.6	25.0	2.54	16400	1671	37.0	3.73	24080	2455
M10	58.0	50.0	5.11	26360	2686	74.0	7.50	38700	3946
M12	84.3	87.0	8.90	38300	3905	128.0	13.08	56300	5735
(M14)	115.0	139.0	14.17	52300	5327	205.0	20.82	76800	7824
M16	157.0	214.0	21.82	72300	7375	315.0	32.06	106300	10832
(M18)	192.0	304.0	30.97	91200	9300	435.0	44.10	129900	13246
M20	245.0	431.0	43.91	116400	11868	615.0	62.54	165800	16903
(M22)	303.0	586.0	59.74	144000	14677	835.0	85.08	205100	20904
M24	353.0	745.0	75.94	167700	17100	1060.0	108.00	238700	24333
(M27)	459.0	1090.0	111.00	218100	22234	1550.0	158.00	310400	31640
M30	561.0	1480.0	150.00	266600	27175	2105.0	214.60	379400	38671
(M33)	694.0	2013.0	205.20	329800	33618	2865.0	292.00	469300	47839
M36	817.0	2586.0	263.60	388200	39576	3680.0	375.00	552500	56318
(M39)	976.0	3346.0	341.10	463800	47278	4760.0	485.40	660000	67278
M42	1120.0	4135.0	421 .50	532200	54253	5880.0	599.80	757400	77205

Note :

The tightening torques calculated to induce approximate stresses as under in screw threads:

448 N/mm^2 for Property Class 8.8, dia ≤ M16
462 N/mm^2 for Property Class 8.8, dia > M16
658 N/mm^2 for Property Class 10.9.