DIN - German Institute For Standards

This is still the most used and popular standard for metric fasteners world wide. A lot of the DIN Standards are being revi to more closely mirror the ISO Standards, but that is an ongoing procedure.

ISO - International Standards Organization

For metric fasteners this is probably the 2nd most used or referenced standard today, but in comparison the number of IS Standards vs. DIN Standards is quite small.

JIS - Japanese Industrial Standards Institute

Many JIS Standards have been revised to comply with the DIN Standards, but that does not seem to follow the demand JIS metric fasteners, as most demand for JIS metric fasteners is to the old JIS Standard.

ANSI - American National Standards Institute

ANSI provides the coordination to ensure the various organizations developing standards avoid duplication and confusio ANSI's entry into the field of metric fasteners was well superseded by both DIN and ISO.

IFI - Industrial Fastener Institute

IFI is one of the various organizations developing standards. IFI Standards are not recognized worldwide, and are norm superseded by ANSI Standards.

Other Less Popular World Standards

AFNOR	BSI	DGN	NNI	SCC	SIS	SN (VSM)	UNI
France	Great Britain	Mexico	Netherlands	Canada	Sweden	Switzerland	Italy

With the exception of Socket Screws all threads from the Standards shown are interchangeable.

Thread Measurement - Metric Fasteners Pitch vs. Inch Fasteners Threads Per Inch (TPI)

Metric Product - Pitch is determined by the distance from the crest of one thread to the crest of the next thread. In metric, f pitch is always a smaller number than coarse pitch, because th crest of one thread to the crest of the next thread is a smaller number. Example M8 x 1.25 = coarse pitch and M8 x1.0 = fin pitch.

Inch Product - TPI is the actual number of threads per one inch, so for inch fasteners the fine thread fastener will have a higher number than the coarse thread fastener, because there will be more threads in that one inch. Example 5/16-18 (18TPI) = Coarse Thread and 5/16-24 (2 TPI) = fine thread.

Some Metric rules but they are not always adhered to in the United States.

For metric fasteners ,**coarse pitch** does not need to be called out because it is assumed, but for **fine pitch**, it must be called out as there are several fine pitches for some diameters.

Tensile Strength and **Yield Strength** - When referring to either tensile or yield strength you should not use commas. Example minimum tensile strength 176900 PSI, not 176,900 PSI. To convert **Megapascals (MPa)** to **PSI** use the conversion factor 145 - Example 1220 MPa x 145 = 176900 PSI.

Inch to Metric conversion - 1 inch = 25.4 mm - Example 4 inch length bolt converted to metric 4 x 25.4 = 101.6 mm, so yo use a 100mm bolt or screw**l meter** = 39.37 inches or just a little over 1 yard (36").

Common Lengths In Metric

M3 x 3	Increments of 1mm	M6 x 25	Increments of 5mm	M20 x 80	Increments of 10mm
M3 x 4		M6 x (28)		M20 x 90	
M3 x 5		M6 x 30		M20 x 100	
M3 x 6		M6 x 35		M20 x 110	
		M6 x 40		M20 x 120	
M6 x 6	Increments of 2mm	M6 x 45		M20 x 130	
M6 x 8		M6 x 50		M20 x 140	
M6 x 10		M6 x 55		M20 x 150	
M6 x 12		M6 x 60		M20 x 160	
M6 x (14)		M6 x 65		M20 x 180	Increments of 20mm
M6 x 16		M6 x 70		M20 x 200	
M6 x (18)		M6 x (75)		M20 x 220	
M6 x 20		M6 x 80		M20 x 240	
M6 x (22)				M20 x 260	
The lengths shown here do not apply to Dowel Pins				M20 x 280	
				M20 x 300	

Metric Gauging

Metric male thread plain	6g ring gage
Metric male thread plated	6h ring gage
Metric nut plain/plated	6H plug gage
Metric DIN 912 Socket	5g6g ring gage
Metric ISO 4762 Sockets	5g6g ring gage
Metric ANSI Sockets	4g6g ring gage

Tolerance For Fits and Threads

Tolerance for fits	h6, m6, H7, H9
Note that letters and numbers are reversed.	
Tolerance for threads	6h, 6g, 6H, 6G

THREADED BRASS FASTENERS ARE FUNCTIONAL PRODUCTS ONLY
AS BRASS IS VERY SOFT, SUPPLIERS OF THIS MATERIAL TO LINDSTROM WILL NOT GUARANTEE THREAD TOLERANCE TO EITHER 6G, 6H, OR 6H

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METRIC COARSE & FINE THREAD PITCHES					
Diameter	Coarse Pitch C	Fine Pitch F	Extra Fine Pitch X	Super Fine Pitch S	Very Fine Pitch V
M1	0.25	0.2			
M1.2	0.25	0.2			
M1.4	0.3	0.2			
M1.6	0.35	0.2			
M1.7	0.35				
M1.8	0.35	0.2			
M2	0.4	0.25			
M2.2	0.45	0.25			
M2.3	0.4				
M2.5	0.45	0.35			
M2.6	0.45				
M3	0.5	0.35			
M3.5	0.6	0.35			
M4	0.7	0.5			
M5	0.8	0.5			
M6	1	0.75			
M7	1	0.75			
M8	1.25	1	0.75		
M9	1.25	1	0.75		
M10	1.5	1.25	1	0.75	
M11	1.5	1	0.75		
M12	1.75	1.5	1.25	1	
M14	2	1.5	1.25	1	
M16	2	1.5	1		
M18	2.5	2	1.5	1	
M20	2.5	2	1.5	1	
M22	2.5	2	1.5	1	
M24	3	2	1.5	1	
M27	3	2	1.5	1	
M30	3.5	3	2	1.5	1
M33	3.5	3	2	1.5	
M36	4	3	2	1.5	
M39	4	3	2	1.5	
M42	4.5	4	3	2	1.5
M45	4.5	4	3	2	1.5
M48	5	4	3	2	1.5
M52	5	4	3	2	1.5
M56	5.5	4	3	2	1.5
M60	5.5	4	3	2	1.5
M64	6	4	3	2	1.5
M68	6	4	3	2	1.5
M72	6	4	3	2	1.5
M80	6	4	3	2	1.5
M90	6	4	3	2	1.5
M100	6	4	3	2	1.5

METRIC THREAD PREFERENCE CLASSES APPLY TO COARSE PITCH ONLY					FINE PITCH SHOULD NOT BE USED IN NEW DESIGN
Diameter	Class 1	Class 2	Class 3	Just Don't Use	
M1	X				X
M1.2	X				X
M1.4		X			X
M1.6	X				X
M1.7				X	X
M1.8				X	X
M2	X				X
M2.2		X			X
M2.3				X	X
M2.5	X				X
M2.6			X		X
M3	X				X
M3.5		X			X
M4	X				X
M5	X				X
M6	X				X
M7			X		X
M8	X				X
M9				X	X
M10	X				X
M11				X	X
M12	X				X
M14	X	X			X
M16	X				X
M18		X			X
M20	X				X
M22		X			X
M24	X				X
M27		X			X
M30	X				X
M33		X			X
M36	X				X
M39			X		X
M42	X				X
M45				X	X
M48	X				X
M52			X		X
M56	X				X
M60			X		X
M64	X				X
M68			X		X
M72	X				X
M80	X				X
M90	X				X
M100	X				X

It Is The Practice In The Metric System To Not Show The Pitch When Dealing In Coarse Threads. EXAMPLE : If You Wanted To Indicate M12 With A Coarse Pitch (1.75) You Would Write or Say Just M12.

SCREWS WITH ANY FINE PITCH SHOULD NOT BE USED IN NEW DESIGN - ALSO SEE REFERENCE AT TOP OF PAGE

DIN BOOK 45 - PITCHES & METRIC THREAD PREFERENCES - LFG 10/01/2016 REVISED

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MECHANICAL PROPERTIES FOR BOLTS AND SCREWS

Steel Property Class 3.6 Through 12.9	Tensile Strength min. (psi)	Yield Strength min. (psi)		Vickers Hardness (HV)	Brinell Hardness (HB)	Rockwell Hardness (HRB)	Rockwell Hardness (HRC)	Similar To
3.6	47850	28710	min.	95	90	52	NA	
			max.	250	238	99.5	NA	
4.6	58000	34800	min.	120	114	67	NA	
			max.	250	238	99.5	NA	
4.8	60900	49300	min.	130	124	71	NA	
			max.	250	238	99.5	NA	
5.6	72500	58000	min.	155	147	79	NA	
			max.	250	238	99.5	NA	
5.8	75400	60900	min.	160	152	82	NA	Grade 2
			max.	250	238	99.5	NA	
6.8	87000	69600	min.	190	181	89	NA	
			max.	250	238	99.5	NA	
8.8 ≤16mm	116000	92800	min.	250	238	NA	22	Grade 5
			max.	320	304	NA	32	
8.8 >16mm	120350	95700	min.	255	242	NA	23	
			max.	335	318	NA	34	
9.8	130500	104400	min.	290	276	NA	28	Above Grade 5
			max.	360	342	NA	37	
10.9	150800	136300	min.	320	304	NA	32	Grade 8
			max.	380	361	NA	39	
12.9	176900	159500	min.	385	366	NA	39	ASTM A574
			max.	435	414	NA	44	
	Tensile Strength (psi)							
	min.	max.						
90	130500	159500	min.	280	268	NA	27	Above Grade 5
			max.	340	323	NA	34	
100	145000	174000	min.	320	304	NA	32	Grade 8
			max.	370	352	NA	38	

Stainless Steel Grades A1 - A2 - A4	Tensile Strength min. (psi)	Yield Strength min. (psi)	Hardness	Similar To
Property Class 50	72500	30450	Vickers, Brinell or Rockwell Hardness Are Not Measurable Factors For Stainless Steel	A1 Stnl Steel ~ Free Cutting Stnl Steel
Property Class 70	101500	65250		A2 Stnl Steel ~ 18-8 Stnl Steel
Property Class 80	116000	87000		A4 Stnl Steel ~ 316 Stnl Steel

Brass	Tensile Strength min. (psi)	Yield Strength min. (psi)	Hardness	
Ms 63	53000		Vickers, Brinell or Rockwell Hardness Are Not Measurable Factors For Brass	
Ms 58	55000			

HYDROGEN EMBRITTLEMENT WITH HARDENED FASTENERS

LINDSTROM METRIC, LLC AND MEGA METRIC, DIVISION OF LINDSTROM METRIC, LLC REQUIRES OUR PLATERS AND SUPPLIERS OF PLATED FASTENERSTO BAKE QUALIFIED HARDENED PRODUCTS. HOWEVER, THERE IS NO PLATING PROCESS WHICH WILL GUARANTEE COMPLETE FREEDOM FROM HYDROGEN EMBRITTLEMENT. THEREFORE, LINDSTROM METRIC AND MEGA METRIC CANNOT BE HELD LIABLE FOR ANY LOSS OR DAMAGE WHICH OCCURS AS A RESULT OF HYDROGEN EMBRITTLEMENT. IF A REDUCED PROBABILITY OF ENCOUNTERING HYDROGEN EMBRITTLEMENT IS DESIRED, AN ALTERNATE PROCESS AND / OR FINISH SHOULD BE CONSIDERED

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Property Class	M3	M4	M5	M6	M8	M10	M12	M14	M16	M18	M20	M22
8.8	0.80	1.8	3.6	7	17	33	60	97	150	201	282	390
10.9	1.1	2.6	5.1	10	25	48	85	137	208	287	398	552
12.9	1.3	3.1	6.2	12	29	58	102	165	250	342	479	664

Property Class	M24	M27	M30	M33	M36	M39	M42	M45	M48	M52	M56	M60
8.8	499	746	982	1331	1717	2220	2737	3390	4095	5250	6547	8175
10.9	750	1051	1383	1875	2407	3120	3840	4762	5775	7387	9225	11475
12.9	843	1266	1657	2250	2895	3750	4638	5722	6825	9000	11280	13800

Property Class	M64	M68	M72	M76	M80	M85	M90	M95	M100	Torque Factors To be Considered
8.8	9900	12000	14250	16800	19725	24000	28350	33450	39000	Material - Property Class
10.9	13950	16950	20100	23625	27600	33225	38925	46875	54750	Are Screws Plain, Zinc Plated, Cadmium Plated, or Lubricated
12.9	17175	20100	24000	28350	33375	40125	47700	56250	66000	

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THE ONLY WAY TO DETERMINE A TRUE TORQUE VALUE IS BY ACTUAL APPLICATION

TORQUE VALUES LFG 10/01/10 REVISED

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