

## Basic Imperial Thread Chart

Basic Major Dia (mm)	Nom Dia.	Threads Per Inch		
		UNC	UNF	UNEF
1.85	#1	64	72	
2.18	#2	56	64	
2.51	#3	48	56	
2.84	#4	40	48	
3.18	#5	40	44	
3.50	#6	32	40	
4.17	#8	32	36	
4.83	#10	24	32	
5.49	#12	24	28	32
6.35	1/4	20	28	32
7.94	5/16	18	24	32
9.53	3/8	16	24	32
11.11	7/16	14	20	28
12.70	1/2	13	20	28
14.29	9/16	12	18	24
15.88	5/8	11	18	24
19.05	3/4	10	16	20
22.23	7/8	9	14	20
25.40	1	8	14	20
28.58	1 1/8	7	12	18
31.75	1 1/4	7	12	18
34.93	1 3/8	6	12	18
38.10	1 1/2	6	12	18

## Basic Metric Thread Chart (M1 - M100)

Diameter	Coarse Pitch	Fine Thread Pitches			Diameter	Coarse Pitch	Fine Thread Pitches		
M1	0.25	0.20			M14	2.00	1.50	1.25	1.00
M1.2	0.25	0.20			M16	2.00	1.50	1.00	
M1.4	0.30	0.20			M18	2.50	2.00	1.50	1.00
M1.6	0.35	0.20			M20	2.50	2.00	1.50	1.00
M1.7	0.35				M22	2.50	2.00	1.50	1.00
M1.8	0.35	0.20			M24	3.00	2.00	1.50	1.00
M2	0.40	0.25			M27	3.00	2.00	1.50	1.00
M2.2	0.45	0.25			M30	3.50	3.00	2.00	1.50
M2.3	0.40				M33	3.50	3.00	2.00	1.50
M2.5	0.45	0.35			M36	4.00	3.00	2.00	1.50
M2.6	0.45				M39	4.00	3.00	2.00	1.50
M3	0.50	0.35			M42	4.50	4.00	3.00	2.00
M3.5	0.60	0.35			M45	4.50	4.00	3.00	2.00
M4	0.70	0.50			M48	5.00	4.00	3.00	2.00
M5	0.80	0.50			M52	5.00	4.00	3.00	2.00
M6	1.00	0.75			M56	5.50	4.00	3.00	2.00
M7	1.00	0.75			M60	5.50	4.00	3.00	2.00
M8	1.25	1.00	0.75		M64	6.00	4.00	3.00	2.00
M9	1.25	1.00	0.75		M68	6.00	4.00	3.00	2.00
M10	1.50	1.25	1.00	0.75	M72	6.00	4.00	3.00	2.00
M11	1.50	1.00	0.75		M80	6.00	4.00	3.00	2.00
M12	1.75	1.50	1.25	1.00	M90	6.00	4.00	3.00	2.00
					M100	6.00	4.00	3.00	2.00

## DIN / ISO / EN Crossover Chart

Title DIN Standard	DIN	DIN EN ISO	Comparable ISO Standard	Date of current standard/modified	Title of replacement standard	Comment
All-metal prevailing torque type hexagon nuts	980	7042	7042	Feb-98	Prevailing torque type (all-metal hexagon nuts), style 2 - Property classes 5, 8, 10 and 12	Height of nut changed; width across flat according to ISO 272 included
All-metal prevailing torque type hexagon nuts	980	10513	10513	Feb-98	Prevailing torque type all-metal hexagon nuts, style 2, with metric fine pitch thread - Property classes 8, 10 and 12	Height of nut changed; width across flat according to ISO 272 included
Clevis pins with head	1434		2341	Oct-92	Clevis pins with head	Only one head dimension. Some other nominal lengths defined
Clevis pins with head	1435		2341	Oct-92	Clevis pins with head	Only one head dimension. Some other nominal lengths defined
Clevis pins with head	1436		2341	Oct-92	Clevis pins with head	Only one head dimension. Some other nominal lengths defined
Clevis pins with head	1444		2341	Oct-92	Clevis pins with head	Some other nominal lengths defined
Clevis pins without head	1433		2340	Oct-92	Clevis pins without head	Some other nominal lengths defined
Clevis pins without head	1443		2340	Oct-92	Clevis pins without head	
Countersunk (flat) head tapping screws with cross recess	7982		7050	Aug-90	Cross recessed countersunk (flat) head tapping screws (common head style)	Head dimensions and countersunk angles changed
Cross recessed countersunk (flat) head screws (Countersunk heads according to ISO)	965	Jan-46	Jan-46	Oct-94	Countersunk flat head screws (common head style) with type H or type Z cross recess - Property class 4.8	Nominal size changed; head dimension changed; thread length changed; strength 8.8 included (see Part 2); penetration depth of cross slots changed
Cross recessed countersunk (oval) head screws (Countersunk heads according to ISO)	966	7047	7047	Oct-94	Countersunk raised head screws (common head style) with type H or type Z cross recess - Product grade A	Nominal size changed; head dimension changed; thread length changed; strength 8.8 omitted; penetration depth of cross slots changed
Cross recessed countersunk head drilling screws with tapping screw thread	7504	15482	15482	Feb-00	Cross recessed countersunk head drilling screws with tapping screw thread	Standard divided into five single standards (EN ISO 10666, 15480, 15481, 15482, 15483); thread ST 3.9 omitted; hexagon head with collar and slot (Form L) omitted
Cross recessed pan head drilling screws with tapping screw thread	7504	15481	15481	Feb-00	Cross recessed pan head drilling screws with tapping screw thread	Standard divided into five single standards (EN ISO 10666, 15480, 15481, 15482, 15483); thread ST 3.9 omitted; hexagon head with collar and slot (Form L) omitted
Cross recessed pan head tapping screws	7981		7049	Aug-90	Cross recessed pan head tapping screws	Marginal change of head dimensions. Caution with automatic feed and connection systems
Cross recessed raised countersunk head drilling screws with tapping screw thread	7504	15483	15483	Feb-00	Cross recessed raised countersunk head drilling screws with tapping screw thread	Standard divided into five single standards (EN ISO 10666, 15480, 15481, 15482, 15483); thread ST 3.9 omitted; hexagon head with collar and slot (Form L) omitted
Drilling screws with tapping screw thread - Mechanical and functional properties	7504	10666	10666	Feb-00	Drilling screws with tapping screw thread - Mechanical and functional properties	Standard divided into five single standards (EN ISO 10666, 15480, 15481, 15482, 15483); thread ST 3.9 omitted; hexagon head with collar and slot (Form L) omitted
Grooved pins - Full-length parallel grooved, with chamfer	1473	8740	8740	Mar-98	Grooved pins - Full-length parallel grooved, with chamfer	Nominal lengths redefined. Shear rate increased.
Grooved pins - Fulllength parallel grooved, with pilot	1470	8739	8739	Mar-98	Grooved pins - Full-length parallel grooved, with pilot	Nominal lengths redefined. Shear rate increased.
Grooved pins - Fulllength taper grooved	1471	8744	8744	Mar-98	Grooved pins - Full-length taper grooved	Nominal lengths redefined. Shear rate increased.

## DIN / ISO / EN Crossover Chart

Title DIN Standard	DIN	DIN EN ISO	Comparable ISO Standard	Date of current standard/modified	Title of replacement standard	Comment
Hexagon socket set screws with flat point	913	4026	4026	May-04	Hexagon socket set screws with flat point	Nominal sizes M1.4, M1.8, M14, M18 and M22 omitted
Hexagon thin nuts with M 1,6 to M 10 threads	439-1	4036	4036	Feb-01	Hexagon thin nuts (un chamfered) - Product grade B	Correlation of dimensions with DIN 439-1, except for the width across flat of the nut M10
Hexagon thin nuts with M 1,6 to M 52 and M 8x1 to M 52x3 threads	439-2	4035	4035	Mar-01	Hexagon thin nuts (un chamfered) - Product grades A and B	In tables 1 and 2 abbreviations changed and some specifications (thread dimensions) changed
Hexagon thin nuts with M 1,6 to M 52 and M 8x1 to M 52x3 threads	439-2	4035	4035	Mar-01	Hexagon thin nuts (un chamfered) - Product grades A and B	Standard divided by regular type screw threads and fine threads; width across flats according to ISO 272 changed; nominal size range changed; fine thread see ISO 8675
Hexagon thin nuts with M 1,6 to M 52 and M 8x1 to M 52x3 threads	439-2	8675	8675	Mar-01	Hexagon thin nuts (un chamfered) with metric fine pitch thread - Product grades A and B	Standard divided by regular type screw threads and fine threads; width across flats according to ISO 272 changed; nominal size range changed; regular type screw thread see ISO 4035
Hexagon washers head drilling screws with tapping screw thread	7504	15480	15480	Feb-00	Hexagon washers head drilling screws with tapping screw thread	Standard divided into five single standards (EN ISO 10666, 15480, 15481, 15482, 15483); thread ST 3,9 omitted; hexagon head with collar and slot (Form L) omitted
High-strength hexagon head bolts with large widths across flats for structural steel bolting	6914		7412	Jun-06	High-strength structural bolting assemblies for preloading - Part 4: System HV - Hexagon bolt and nut assemblies	
High-strength hexagon nuts with large widths across flats for structural steel bolting	6915			Jun-06	High-strength structural bolting assemblies for preloading - Part 4: System HV - Hexagon bolt and nut assemblies	
M 8x1 to M 100x4 hexagon head bolts with fine pitch thread	961	8676	8676	Mar-01	Hexagon head screws with metric fine pitch thread - Product grades A and B	Nominal size extended; width across flats according to DIN ISO 272 included
Mushroom head square neck bolts	603		8677	Oct-81		
Parallel pins of unhardened steel and austenitic stainless steel	7	2338	2338	Feb-98	Parallel pins of unhardened steel and austenitic stainless steel	Nominal length redefined (with round end) form A+C deleted
Parallel pins with internal thread	7979	8735	8735	Mar-98	Parallel pins with internal thread, of hardened and martensitic stainless steel	Dimensions partially changed
Parallel pins with internal thread, of unhardened and austenitic stainless steel	7979	8733	8733	Mar-98	Parallel pins with internal thread, of unhardened and austenitic stainless steel	Dimensions partially changed
Parallel pins, Hardened; Tolerance Zone m6	6325	8734	8734	Mar-98	Parallel pins of hardened and martensitic stainless steel (Dowel pins)	Some other nominal lengths defined
Plain washers - Extra large series, product grade C	440	7094	7094	Dec-00	Plain washers - Extra large series, product grade C	Nominal sizes changed, nominal size 24 size "a" redefined to the maximum, square-end hole Form R omitted; (standard DIN 440 still valid)
Plain washers for clevis pins; product grade A	1440		8738	Oct-92	Plain washers for clevis pins; product grade A	Nominal sizes changed
Prevailing torque type - All-metal hexagon nuts with flange	6927		7044	Feb-98	Prevailing torque type - All-metal hexagon nuts with flange	Width across flat M10 changed
Prevailing torque type all-metal hexagon nuts	6925	7042	7042	Feb-98	Prevailing torque type (all-metal hexagon nuts), style 2 - Property classes 5, 8, 10 and 12	Height of nut changed; width across flat according to ISO 272 included
Prevailing torque type all-metal hexagon nuts	6925	10513	10513	Feb-98	Prevailing torque type all-metal hexagon nuts, style 2, with metric fine pitch thread - Property classes 8, 10 and 12	Height of nut changed; width across flat according to ISO 272 included
Prevailing torque type hexagon nuts with hexagon (with non-metallic insert), with metric fine pitch thread	6926		12125	Feb-98	Prevailing torque type hexagon nuts with flange (with non-metallic insert), with metric fine pitch thread	Width across flat M10 changed

## DIN / ISO / EN Crossover Chart

Title DIN Standard	DIN	DIN EN ISO	Comparable ISO Standard	Date of current standard/modified	Title of replacement standard	Comment
Prevailing torque type hexagon nuts with non-metallic insert	982	7040	7040	Feb-98	Prevailing torque type hexagon nuts (with non-metallic insert), style 1 - Property classes 5, 8 and 10	Height of nut changed; width across flat according to ISO 272 included
Prevailing torque type hexagon nuts with non-metallic insert	982	10512	10512	Feb-98	Prevailing torque type hexagon nuts (with non-metallic insert), style 1, with metric fine pitch thread - Property classes 6, 8 and 10	Height of nut changed; width across flat according to ISO 272 included
Prevailing torque type hexagon nuts with non-metallic insert	6924	7040	7040	Feb-98	Prevailing torque type hexagon nuts (with non-metallic insert), style 1 - Property classes 5, 8 and 10	Height of nut changed; width across flat according to ISO 272 included
Prevailing torque type hexagon nuts with non-metallic insert	6924	10512	10512	Feb-98	Prevailing torque type hexagon nuts (with non-metallic insert), style 1, with metric fine pitch thread - Property classes 6, 8 and 10	Height of nut changed; width across flat according to ISO 272 included
Prevailing torque type hexagon thin nuts with non-metallic insert	985	10511	10511	Feb-98	Prevailing torque type hexagon, thin nuts (with non-metallic insert)	Height of nut changed; width across flat according to ISO 272 included
Product grade A washers with a hardness from 300 HV, designed for use with hexagon head bolts and nuts	125-2	7089	7089	Nov-00	Plain washers - Normal series, Product grade A	Without chamfer, up to nominal diameter 64
Product grade A washers with a hardness from 300 HV, designed for use with hexagon head bolts and nuts	125-2	7090	7090	Mar-90	Plain washers, chamfered - Normal series, Product grade A	Without chamfer, up to nominal diameter 64
Product grade A washers with a hardness up to 250 HV, designed for use with cheese head screws	433-1	7092	7092	Nov-00	Plain washers - Small series, Product grade A	Pyramid diamond hardness 140 HV cancelled; rating changed
Product grade A washers with a hardness up to 250 HV, designed for use with hexagon head bolts and nuts	125-1	7089	7089	Nov-00	Plain washers - Normal series, Product grade A	Without chamfer, up to nominal diameter 64
Product grade A washers with a hardness up to 250 HV, designed for use with hexagon head bolts and nuts	125-1	7090	7090	Mar-90	Plain washers, chamfered - Normal series, Product grade A	Without chamfer, up to nominal diameter 64
Product grade A washers with a hardness up to 300 HV, designed for use with cheese head screws	433-2	7092	7092	Nov-00	Plain washers - Small series, Product grade A	Nominal sizes changed
Product grade C washers, designed for use with hexagon head bolts and nuts	126	7091	7091	Nov-00	Plain washers - Normal series, Product grade C	Nominal sizes changed
Raised countersunk (oval) head; tapping screws with cross recess	7983		7051	Aug-90	Cross recessed raised countersunk (oval) head tapping screws	Head dimensions and countersunk angles changed
Recessed raised cheese (fillister) head screws	7985	7045	7045	Oct-94	Pan head screws with type H or type Z cross recess - product grade A	Nominal size changed; head dimension changed; thread length changed; penetration depth of cross slots changed
Slotted cheese head screws - Product grade A	84	1207	1207	Oct-94	Slotted cheese head screws - Product grade A	Modifications of dimensions < 2,5; dimension of slots changed; partly nominal lengths deleted; strength 8.8 deleted
Slotted countersunk (flat) head screws (Countersunk heads according to ISO)	963	2009	2009	Oct-94	Slotted countersunk flat head screws (common head style) - Product grade A	Nominal size changed; head dimension changed; thread length changed; strength 8.8 cancelled
Slotted headless screws with shank	427	2342	2342	May-04	Slotted headless screws with shank	
Slotted pan head screws - Product grade A	85	1580	1580	Oct-94	Slotted pan head screws - Product grade A	Thread included; dimensions of head and slot changed; strength 8.8 deleted
Slotted raised countersunk (oval) head screws (Countersunk heads according to ISO)	964	2010	2010	Oct-94	Slotted raised countersunk head screws (common head style) - Product grade A	Nominal size changed; head dimension changed; thread length changed; strength 8.8 cancelled
Slotted set screws with cone point	553		7434	Oct-92	Slotted set screws with cone point	No modifications of dimensions

## Plating and Finishes

Finish	Color	Anti-Corrosion Properties	Used With	Characteristics And Uses
Black Oxide	Black	Good-Interior Only	Most metals	Decorative finish. Used on interior applications.
Phosphating	Dull, gray, black, or blue	Excellent	Ferrous metals	A chemical process of rust-proofing steel.
Electrogalvanized	Bright Blue-white	Very good	All metals	A commonly used finish with good rust resistance, appearance and low cost.
Black Zinc	Black	Excellent	All metals	Rich and lustrous. With or without lacquering.
Chrome	Bright Blue-white	Excellent	All metals	Used wherever a beautiful finish is desired. Bright blue-white lustrous appearance. Electroplated.
Nickel	Silver	Very good	All metals	A hard stable, dull white or bright burnished finish. Used for appliances and hardware.
Passivating	-	Excellent	Stainless steels	For stainless steels. A nitric acid dip to remove foreign material and brighten finish.

## Thread Tolerance for Imperial Fasteners

Limits for UNC Threads According to ASME B1.2

Thread Size in mm	UNC	Major Diameter(d)		Pitch Diameter(d2)	
		Max. (mm)	Min. (mm)	Max. (mm)	Min. (mm)
5#	40	3.15	3.03	2.74	2.68
6#	32	3.48	3.33	2.97	2.9
8#	32	4.14	3.99	3.63	3.55
10#	24	4.8	4.62	4.11	4.03
12#	24	5.46	5.28	4.77	4.69
1/4	20	6.32	6.12	5.5	5.4
5/16	18	7.91	7.69	6.99	6.89
3/8	16	9.49	9.25	8.46	8.35
7/16	14	11.08	10.82	9.9	9.78
1/2	13	12.66	12.39	11.39	11.26
9/16	12	14.25	13.96	12.87	12.74
5/8	11	15.83	15.52	14.33	14.19
3/4	10	17.41	17.08	15.83	15.68
7/8	9	22.18	21.82	20.34	20.18
1	8	25.35	24.97	23.29	23.12
1-1/8	7	28.52	28.1	26.16	25.98
1-1/4	7	31.69	31.28	29.34	29.15
1-3/8	6	34.86	34.4	32.11	31.91
1-1/2	6	38.04	37.58	35.29	35.08
1-3/4	5	44.38	43.86	41.08	40.86
2	4.5	50.73	50.17	47.06	46.82
2-1/4	4.5	57.08	56.52	53.41	53.16
2-1/2	4	63.42	62.82	59.3	59.03
2-3/4	4	69.77	69.16	65.64	65.38
3	4	76.12	75.51	71.99	71.72
3-1/4	4	82.47	81.86	78.34	78.06
3-1/2	4	88.82	88.21	84.69	84.41
3-3/4	4	95.16	94.56	91.04	90.75
4	4	101.51	100.91	97.39	97.1

## Thread Tolerance for Imperial Fasteners

Limits for UN Threads According to ASME B1.1

Thread Size in mm	UN	Major Diameter(d)		Pitch Diameter(d2)	
		Max. (mm)	Min. (mm)	Max. (mm)	Min. (mm)
1-1/8	8	28.52	28.14	26.46	26.28
1-1/4	8	31.7	31.32	29.63	29.46
1-3/8	8	34.87	34.49	32.81	32.62
1-1/2	8	38.04	37.66	35.98	35.8
1-5/8	6	41.21	40.75	38.46	38.25
1-5/8	8	41.22	40.84	38.46	38.25
1-3/4	8	44.39	44.01	42.33	42.14
1-7/8	6	47.56	47.1	44.81	44.6
1-7/8	8	47.57	47.19	45.5	45.31
2	8	50.74	50.36	48.68	48.48
2-1/4	8	57.09	56.71	55.03	54.82
2-1/2	8	63.44	63.06	61.38	61.17
2-3/4	8	69.79	69.41	67.72	67.51
3	8	76.13	75.75	74.07	73.86
3-1/4	8	82.47	81.86	78.34	78.06
3-1/2	8	88.83	88.45	86.77	86.55
3-3/4	8	95.18	94.8	93.12	92.89
4	8	101.53	101.15	99.47	99.24



## Thread Tolerance for Metrics

Limits for Metric (standard) Coarse Threads According To ISO 965

Thread Size in mm	Engagement Length		Major Diameter(d)		Pitch Diameter(d2)	
	from	to	Max. (mm)	Min. (mm)	Max. (mm)	Min. (mm)
M1	0,6	1,7	1000	0,933	0,838	0,785
M1.2	0,6	1,7	1100	1033	0,938	0,885
M1.4	0,7	2	1400	1325	1205	1149
M1.6	0,8	2,6	1581	1496	1354	1291
M1.8	0,8	2,6	1781	1696	1554	1491
M2	1	3	1981	1886	1721	1654
M2.5	1,3	3,8	2180	2080	1888	1817
M3	1,5	4,5	2980	2874	2655	2580
M3.5	1,7	5	3479	3354	3089	3,004
M4	2	6	3978	3838	3523	3433
M5	2,5	7,5	4976	4826	4456	4361
M6	3	9	5974	5794	5324	5212
M7	3	3	6974	6794	6324	6212
M8	4	12	7972	7760	7160	7042
M10	5	15	9968	9732	8994	8862
M12	6	18	11966	11701	10829	10679
M14	8	24	13962	13682	12663	12503
M16	8	24	15962	15682	14663	14503
M18	10	30	17958	17623	16334	16164
M20	10	30	19958	19623	18334	18164
M22	10	30	21958	21623	20334	20164
M24	12	36	23952	23577	22003	21803
M27	12	36	26952	26577	25003	24803
M30	15	45	29947	29522	27674	27462
M33	15	45	32947	32522	30674	30462
M36	18	53	35940	35465	33342	33118
M39	18	53	38940	38465	36342	36118

## Thread Tolerance for Metrics

Limits For Metric Fine Threads According To ISO 965

Thread Size in mm	Engagement Length		Major Diameter(d)		Pitch Diameter(d2)	
	from	to	Max. (mm)	Min. (mm)	Max. (mm)	Min. (mm)
M8x1	3.00	9	7974	7794	7324	7212
M10x1.25	4.00	12	9972	9760	9160	9042
M12x1.25	4, 5	13	11972	11760	11160	11028
M14x1.5	5, 6	16	13968	13732	12994	12854
M16x1.5	5, 6	16	15968	15732	14994	14854
M18x1.5	5, 6	16	17968	17732	16994	16854
M20x1.5	5, 6	16	19968	19732	18994	18854
M22x1.5	5, 6	16	21968	21732	20994	20854
M24x2	8, 5	25	23962	23682	22663	22,493
M27x2	8, 5	25	26962	26682	25663	25493
M30x2	8, 5	25	29962	29682	28663	28493
M33x2	8, 5	25	32962	32682	31663	31493
M36x3	12	36	35952	35577	34003	33803
M39x3	12	36	38952	38577	37003	36803