

Design Considerations

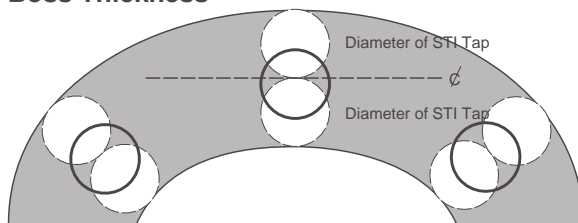


The following design considerations should be evaluated to maximise the security and safety of the fastening assembly using Recoil wire inserts.

Boss Dimensions

Boss thickness is a function of size and strength requirements and also design of components. For optimum strength, the minimum wall thickness should be twice the maximum diameter of the STI Recoil Tap. For minimum requirements, a wall thickness of twice the bolt diameter to centre line may be adequate.

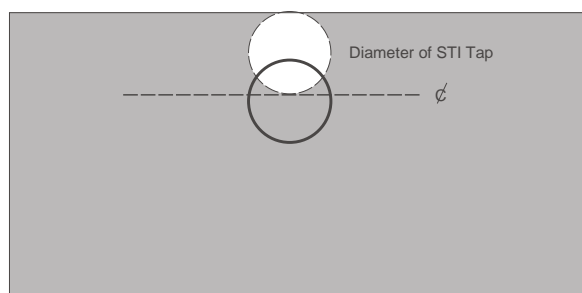
Boss Thickness



Edge Dimensions

The minimum edge distance recommended is the maximum diameter of the STI tap measured from the edge of the material to the centre line of the hole.

Edge Thickness



Minimum Material Thickness

The recommended minimum material thickness for through-hole applications is equal to the nominal length of the insert plus one pitch. This allows for proper countersinking and installation of the insert at 3/4 to 1 1/2 pitches below the surface of the component. In design critical applications, the minimum thickness may be reduced by eliminating the countersink and installing the insert to 1/4 to 1/2 pitch below the surface.

Class of Thread Fit

All Recoil inserts are produced to exacting tolerances where installation into the tapped hole will conform exactly to the parent material thread characteristics. It is therefore important that the tapped hole tolerances of either 2B or 3B (unified threads), or the applicable 4H5H and 5H (metric threads) combinations must be carefully controlled by precise tapping and gauging operations.

Gauging

Recoil inserts, when installed correctly in tapped and gauged holes, will conform with the tapped hole dimensions once the insert has been seated. Gauging of the tapped hole with the appropriate gauges prior to installing Recoil inserts is therefore highly recommended.

Bolt Engagement

Maximum strength of the bolted insert assembly will be achieved if the bolt or screw engages the full length of the insert. Ideally, the minimum bolt projection for safe engagement should be at least two pitches beyond the last coil of the insert.

Tang Removal

To achieve the optimum bolt engagement and hence maximum strength, the tang should be removed from the insert. Exceptions to this recommendation may be necessary in certain blind-hole applications involving light tensile bolt loading.

Design Method

The ultimate consideration is to design an assembly that balances the tensile strength of the bolt material against the shear strength of the parent material. With insert lengths available in 1, 1 1/2, 2, 2 1/2, and 3 times the nominal thread diameters, there are engagement lengths available to produce an assembly thread system where the bolt will fail without damage to the parent material or thread. The bolt must be fully engaged along the entire length of the insert to obtain this position.

Selection of the correct length insert can be determined from Table 1 referring to values for bolt ultimate strengths and parent material shear strengths. For intermediate strength value, use the next higher bolt tensile value or the next lower parent material shear strength.

Assembly strength is a function of shear area and the shear strength of the parent material, tensile strength and cross sectional area of the bolt. Table 1 provides a recommendation of the nominal length of insert which should be selected for a parent material of a certain shear strength, so that when a bolt is used with defined tensile properties, tensile failure of the bolt should occur before the insert is stripped away from the material in which it was inserted.

Table 1 (Source BS 7752)

SHEAR STRENGTH PARENT MATERIAL	TENSILE STRENGTH OF BOLT SELECTED (Ultimate Tensile Strength)						
	400 (MPa) 58,000 (psi)	500 (MPa) 72,000 (psi)	600 (MPa) 87,000 (psi)	800 (MPa) 116,000 (psi)	1000 (MPa) 145,000 (psi)	1200 (MPa) 174,000 (psi)	1400 (MPa) 203,000 (psi)
70 to 99 MPa (10.0 to 14.4 Ksi)	2.0D	2.5D	2.5D	-	-	-	-
100 to 149 MPa (14.5 to 21.5 Ksi)	1.5D	1.5D	2.0D	3.0D	-	-	-
150 to 199 MPa (21.7 to 28.9 Ksi)	1.0D	1.5D	1.5D	2.0D	2.5D	3.0D	-
200 to 249 MPa (29.0 to 36.1 Ksi)	1.0D	1.0D	1.0D	1.5D	2.0D	2.0D	2.5D
250 to 299 MPa (36.2 to 43.3 Ksi)	1.0D	1.0D	1.0D	1.5D	1.5D	2.0D	2.0D
300 to 349 MPa (43.5 to 50.6 Ksi)	1.0D	1.0D	1.0D	1.0D	1.5D	1.5D	2.0D
> 350 MPa (50.7 Ksi)	1.0D	1.0D	1.0D	1.0D	1.0D	1.5D	1.5D

Note: Inserts are available in different lengths which are measured by the diameter of the thread. For example the length of a 3D insert would be three times the diameter.

Note: Table 1 is for guidance only. It remains the responsibility of the user to ensure that the insert nominal length chosen is suitable for the particular application concerned.

Design Method

The following Procedure can be used to verify a joint design incorporating a wire thread insert.

1. Select size and strength of bolt to be used. (refer to table 2)
2. Determine tensile failure load of the selected bolt.
3. Determine shear strength of parent material for the installation of the insert. (refer to table 3)
4. Determine length of insert based on the shear strength capability if parent material.

Note: Information in referring to joint strength is intended as a guide only. Engineering design configurations must be sought when exact calculations are required.

Design Example (Metric) Units

Step One:	Select Size and Strength of bolt to be used
Type	M16 x 2.0, SHE Grade 8
Nominal Diameter	16.0 mm
Pitch	2.0 mm
Shear Strength	1034 MPa (Refer Table 2)

Design Example (Inch) Units

Type	1/2"-13 UNC, Socket Head Cap Screw
Nominal Diameter	0.500"
TPI	13
Tensile Strength	181,000psi (Refer Table 2)

Table 2 Strength, Bolt (Metric)

BOLT GRADE	Tensile strength MPa (minimum)
SAE Grade 1 1/4" to 1"	413
SAE Grade 5 1/4" to 1 1/2"	827
SAE Grade 7 1/4" to 1 1/2"	917
SAE Grade 8 1/4" to 1 1/2"	1034
ASTM A354 BC 1/4" to 2 1/2"	862
BD 1/4" to 2 1/2"	862
Socket head screw products	1250
300 Series stainless steel (Cold Forged)	
304	700
316	700

Table 2 Strength, Bolt (Inch)

BOLT GRADE	Tensile strength psi (minimum)
SAE Grade 1 1/4" to 1"	60,000
SAE Grade 5 1/4" to 1 1/2"	120,000
SAE Grade 7 1/4" to 1 1/2"	133,000
SAE Grade 8 1/4" to 1 1/2"	150,000
ASTM A354 BC 1/4" to 2 1/2"	125,000
BD 1/4" to 2 1/2"	125,000
Socket head screw products	181,000
300 Series stainless steel (Cold Forged)	
304	101,000
316	101,000

Step Two: Determine tensile failure load of selected bolt

Min Thread Diameter	13.797mm (handbook)
Shear Area	149.5mm ² (calculated)*
Tensile Failure Load	154.589kN (calculated)#

*Area based on minor thread diameter.
#Parent material shear strength must exceed this.

Min Thread Diameter	0.407" (handbook)
Shear Area	0.130"² (calculated)*
Tensile Failure Load	23,450 psi (calculated)#

*Area based on minor thread diameter.
#Parent material shear strength must exceed this.

Step Three: Determine shear strength of parent material for the installation of the insert (refer Table 3)

Type	2024 Wrought Aluminum, T64 temper
Shear Strength	283 MPa (Refer Table 3)

Type	5083 Wrought Aluminum, annealed Condition
Shear Strength	25,000 psi (Refer Table 3)

Table 3 Shear Strength, Parent Material (Metric)

ALLOY	TEMPER	SHEAR STRENGTH MPa (typical)
SHEET & PLATE		
1200	0	62
2024	T62	283
5005	H34	97
5251	H34	138
5083	0	172
5083	H321	109
7075	T6	331
EXTRUSIONS (including machine rod)		
1350	H112	55
2011	T3	221
2011	T6	234
2014	T6	290
6060	T5	117
6061	T6	207
CASTINGS (Properties refer to test bars only)		
CA401	F1-Sand	96*
LM6	F1-Sand	96*
A13	F1-Sand	96*
AC601	T5-Sand	123*
LM25	T5-Sand	123*
A356	T5-Sand	123*

Table 3 Shear Strength, Parent Material (Inch)

ALLOY	TEMPER	SHEAR STRENGTH psi (typical)
SHEET & PLATE		
1200	0	9,000
2024	T62	41,000
5005	H34	14,000
5251	H34	20,000
5083	0	25,000
5083	H321	16,000
7075	T6	48,000
EXTRUSIONS (including machine rod)		
1350	H112	8,000
2011	T3	32,000
2011	T6	34,000
2014	T6	42,000
6060	T5	17,000
6061	T6	30,000
CASTINGS (Properties refer to test bars only)		
CA401	F1-Sand	14,000*
LM6	F1-Sand	14,000*
A13	F1-Sand	14,000*
AC601	T5-Sand	18,000*
LM25	T5-Sand	18,000*
A356	T5-Sand	18,000*

Shear strength of standard parent materials, (indication only refer supplier for specific properties)

*Shear strength based on 60% of ultimate tensile strength.

Step Four, Determine the length of insert based on shear strength of parent material

Nominal Diameter 16.0 mm (Selected bolt)
 Pitch 2.0 mm
 Pitch Diameter (min) 17.299mm
 (Refer Taped Hole Data)

$$L = \frac{\text{Tensile Strength of Bolt}}{\text{Shear Circumference Strength of Hole} \times \text{Arbitrary Constant}}$$

L = Length of fitted insert
Arbitrary Constant = 0.5
 (Based on shearing of the parent material occurring along the pitch diameter of the tapped hole)

$$L = \frac{1034 \times (13.797^2 \pi/4)}{283 \times 17.299 \pi \times 0.5}$$

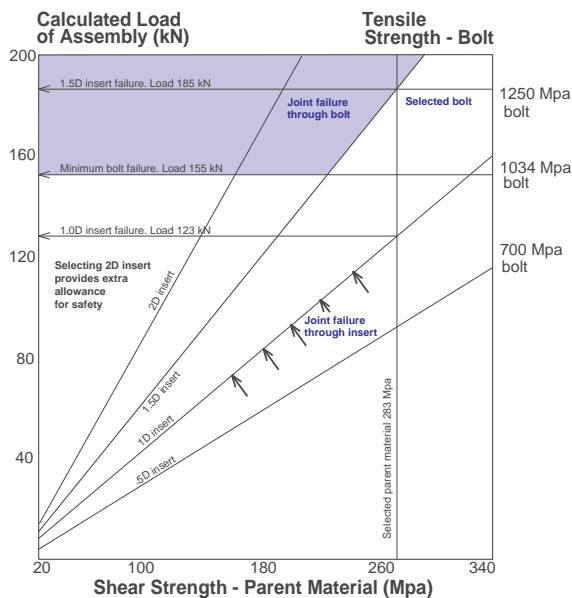
L = 20.2mm

Conclusion:

For this application a 16mm diameter bolt has been selected. Insert engagement of 20.2mm was calculated. The suitable diameter of the insert can be determined by dividing the length of the insert by the diameter of the bolt.

For example:

$$\begin{aligned} L/\text{dia} &= 20.1/16 \\ &= 1.26 \text{ select next highest size} \\ &\text{Therefore use a 1.5D insert} \end{aligned}$$



The shaded area in the graph indicates the region in which bolt failure will occur.

Note: Inserts are available in standard lengths which are multiples of the diameter. For example an insert with a length of 1.5D will measure one and a half times as long as the diameter when installed.

Note: The example above is an indication only. Engineering design configuration must be sought when exact calculations are required.

Nominal Diameter 0.500" (Selected bolt)
 TPI 13
 Pitch Diameter (min) 0.550"
 (Refer Taped Hole Data)

$$L = \frac{\text{Tensile Strength of Bolt}}{\text{Shear Circumference Strength of Hole} \times \text{Arbitrary Constant}}$$

L = Length of fitted insert
Arbitrary Constant = 1.085"
 (Based on shearing of the parent material occurring along the pitch diameter of the tapped hole)

$$L = \frac{181,000 \times (0.407^2 \pi/4)}{25,000 \times 0.550 \pi \times 0.5}$$

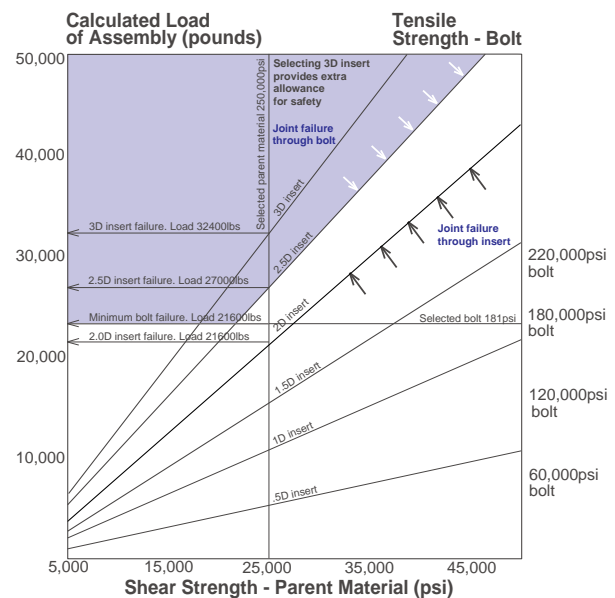
L = 1.085"

Conclusion:

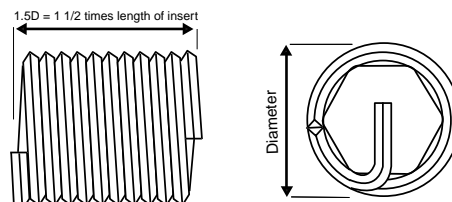
For this application a 1/2" diameter bolt has been selected. Insert engagement of 1.085" was calculated. The suitable diameter of the insert can be determined by dividing the length of the insert by the diameter of the bolt.

For example:

$$\begin{aligned} L/\text{dia} &= 1.085/.5" \\ &= 2.1 \text{ select next highest size} \\ &\text{Therefore use a 2.5D insert} \end{aligned}$$



The shaded area in the graph indicates the region in which bolt failure will occur.



Thread Identification

Thread Identification And Drill Chart Metric

DIAMETER IN INCHES	THREAD SIZE MM	ISO COARSE			OTHER	ISO FINE			BA			
		DRILL SIZE				SIZE	DIAMETER			DRILL		
		PITCH	INCH	MM			PITCH	INCH	MM		MM	INCH
.079	2	.4		2.1				0	6.0	.236	1	6.2
.087	2.2	.45	No. 42	2.3				2	4.7	.185	.8	4.9
.098	2.5	.45	No. 37	2.6				4	3.6	.142	.66	3.8
.118	3	.5	1/8	3.2				6	2.8	.110	.53	2.9
.138	3.5	.6	No. 27	3.7				8	2.2	.860	.43	2.3
.157	4	.7	11/64	4.2				10	1.7	.670	.35	1.7
.197	5	.8	13/64	5.2								
236	6	1	1/4	6.3								
276	7	1	9/32	7.3								
315	8	1.25	21/64	8.3		1	21/64	8.3				
354	9	1.25		9.4		1		9.3				
394	10	1.5	13/32	10.4	1*	1.25	13/32	10.25				
433	11	1.5		11.5	1	1.25		11.25				
472	12	1.75	31/64	12.5	1.25	1.5	31/64	12.25				
512	13			13.5		1.5		13.25				
551	14	2	37/64	14.5	1.25*	1.5	9/16	14.25				
630	16	2	21/32	16.5		1.5	21/32	16.5				
709	18	2.5	47/64	18.75	1.5*	2	23/32	18.5				
787	20	2.5	13/16	20.75	1.5	2	13/16	20.5				
866	22	2.5		22.75	1.5	2		22.5				
945	24	3		24.75	1.5	2		24.5				

*M10 X 1, M12 X 1.25, M14 X 1.25, M18 X 1.5 - popular spark plug sizes sizes above M24 available on request.

Inch

DIAMETER		THREAD SIZE	THREADS PER INCH						DRILL SIZE					
INCHES	MM		UNC	BSW	UNF	BSF	BSF*	NPT*	UNC	BSW	UNF, SAE, BSF	BSP	NPT	
					(SAE)				INCH	MM	INCH	MM	INCH	MM
.86	2.18	#2	56		64				3/32	2.3	No. 37	2.3		
.990	2.51	#3	48		56				No.36	2.7		2.7		
.112	2.84	#4	40		48				No.31	3.0	No.31	3.0		
.125	3.17	#5 (1/8)	40	40	44		28	27	N0.29	3.4		3.3	3/8	9.9
.138	3.50	#6	32		40				N0.25	3.7	N0.26	3.7		
.164	4.16	#8	32		36				11/64	4.4	11/64	4.4		
.190	4.82	#10 (3/16)	24		32				13/64	5.1	13/64	5.1		
.187	4.76	3/16		24	32				13/64	5.0	13/64	5.0		
.216	5.49	#12 (7/32)	24	24					15/64	5.6				
.250	6.35	1/4	20	20	28	26	19	18	17/64	6.7	17/64	6.6	33/64	13.5
.312	7.93	5/16	18	18	24	22			21/64	8.3	21/64	8.2		
.375	9.52	3/8	16	16	24	20	19	18	25/64	9.9	25/64	9.8	21/32	17.0
.437	11.11	7/16	14	14	20	18			29/64	11.5	29/64	11.5		
.500	12.70	1/2	13	12	20	16	14	14	17/32	13.0	33/64	13.0	13/16	21.5
.562	14.28	9/16	12	12	18	16			19/32	14.5	37/64	14.5		
.625	15.87	5/8	11	11	18	14			21/32	16.5	41/64	16.25		
.750	19.05	3/4	10	10	16	12	14	14	25/32	19.75	49/64	19.5	1 1/64	27.0
.875	22.22	7/8	9	9	14	11			29/32	23.0	57/64	22.5		
1.000	25.40	1"	8	8	12 (14)	10	11	11 1/2	1 1/32	26.0	1 1/64	26.0	1 9/32	33.5
1.125	28.57	1 1/8"	7	7	12	9	11		1 5/32	29.5	1 5/32	29.5		
1.250	31.75	1 1/4"	7	7	12	9	11		1 9/32	33.0	1 9/32	32.5		
1.375	34.92	1 3/8"	6	6	12	8	11		1 13/32	36.0	1 13/32	36.0		
1.500	38.10	1 1/2"	6	6	12	8	11		1 17/32	39.0	1 17/32	39.0		

*Nominal diameters for BSP and NPT are not thread diameters but relate to the inside diameter of the pipe.

Thread Identification

Screw Pitch Gauge

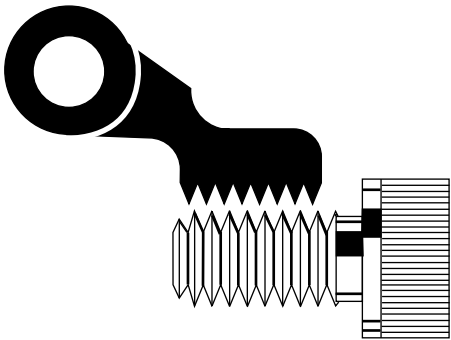
It is critical that inserts match the tapped hole exactly as some inch and metric are very close but only one is exactly right. A screw pitch gauge is the perfect tool to identify exact TPI or pitch. The bolt diameter should be measured and matched to the closest size over, relating to the TPI or pitch of the thread.

In general, major diameter of bolt or male thread will always be slightly less than the exact diameter listed in the thread identification and drill chart.

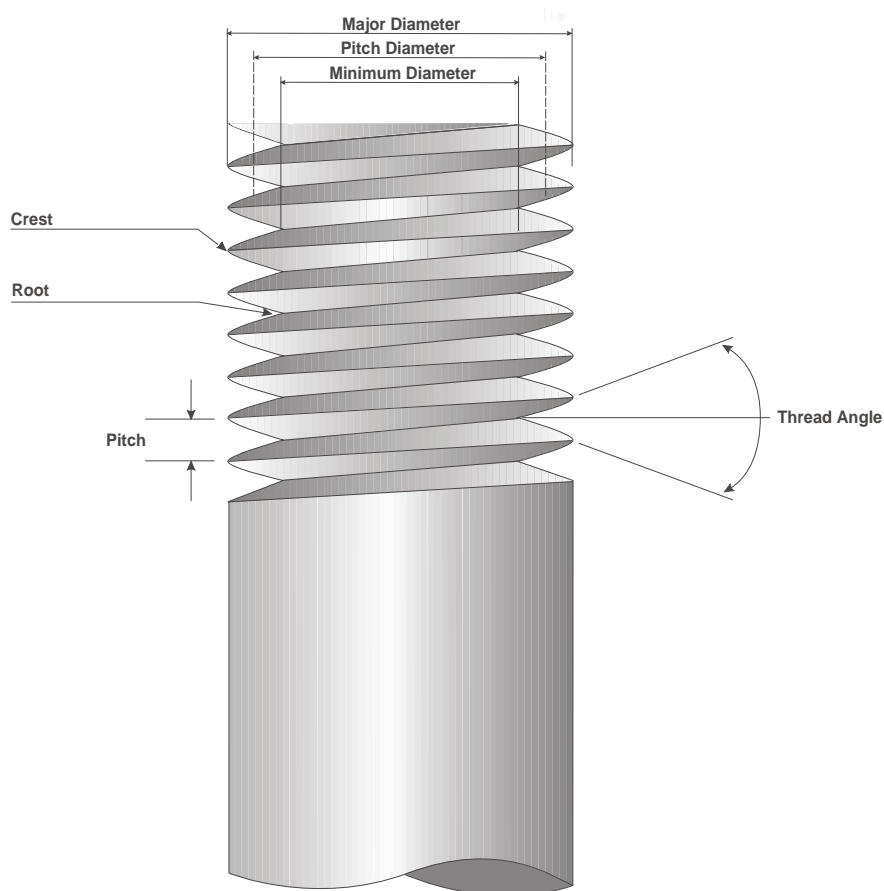
Drill Sizes

Drill sizes are recommended only. The nearest standard size drill above or below is generally quite suitable for repairs and in many instances, drilling is not necessary for stripped holes. For precision tolerances, the thread identification and drill chart is an accurate guide, but final size depends on material and machining conditions.

In practice BSW interchanges with UNC except at 3/16" and 1/2", SAE interchanges with UNF, except 1" UNF - 12 TPI, SAE - 14 TPI.



Thread Features



General Information

SI Units & Conversions for Characteristics of Mechanical Fasteners

PROPERTY	UNIT	SYMBOL	CONVERSION			APPROXIMATE EQUIVALENT
			FROM	TO	MULTIPLY BY	
Length	metre	m	inch	mm	25.4	25mm =1 in
	centimetre	cm	inch	cm	2.54	300mm=1 ft
	millimetre	mm	foot	mm	304.8	1m=39.37
Mass	kilogram	kg	ounce	g	28.35	28g=1oz
	gram	g	pound	kg	.4536	1kg=2.2lb=35oz
	tonne (megagram)	t	ton (224lb)	kg	984.2	1t=2206lbs
Density	kilogram per cub. metre	kg/m ³	pounds per cu. ft	kg/m ³	16.02	16kg/m ³ =1lb/ft ³
Temperature	deg. Celsius	°C	deg. Fahr	°C	(°F-32)x5/9	0°C=32 °F
Area	square metre	m ²	sq. inch	mm ²	645.2	645mm ² =1 in ²
	squaremillimetre	mm ²	sq. ft	m ²	.0929	1m ² =11 ft ²
Volume	cubic metre	m ³	cu. in	mm ³	16387	16400mm ³ =1 in ³
	cubic centimetre	cm ³	cu. ft	m ³	.02832	1m ³ =35ft ³
	cubic millimetre	mm ³	cu. yd	m ³	.7645	1m ³ =1.3yd
Force	newton	N	ounce(Force)	N	.278	1N=3.6 oz ^f
	kilonewton	kN	pound(Force)	kN	.00445	4.4kN=1 lbf
	meganewton	MN	kip	MN	.00445	1kN=225 lbf
Pressure	bar	bar	MPa	bar	.1	1MPa=1bar
	megapascal	MPa	pound/in ² (psi)	MPa	.0069	1MPa=145 psi
	newton/sqmm	N/m ²	Kip/in ² (ksi)	MPa	6.895	7MPa=1ksi
Torque	newton-meters	N-m	inch-ounce	N-m	.00706	1N-m=140 in.oz
			inch-pound	N-m	.113	1N-m=9 in. lb
			foot-pound	N-m	1.356	1N-m.75 ft lb 1.4N-m=1 ft.lb

Hardness Comparison Table

Brinell 10m/m Ball 3000kg load.	Firth or Vickers 120kg	Rockwell		Brinell 10m/m Ball 3000kg load.	Firth or Vickers 120kg	Rockwell	
		C. Scale 120° Cone 150kg load.	B. Scale 1/16" Ball 100kg load			C. Scale 120° Cone 150kg load.	B. Scale 1/16" 100kg load.
800	-	72	-	276	278	30	105
780	1220	71	-	269	272	29	104
760	1170	70	-	261	261	28	103
745	1114	68	-	258	258	27	102
725	1060	67	-	255	255	26	102
712	1021	66	-	249	250	25	101
682	940	65	-	245	246	24	100
688	905	64	-	240	240	23	99
652	867	63	-	237	235	22	99
262	803	62	-	229	226	21	98
614	775	61	-	224	221	20	97
601	746	60	-	217	127	19	96
590	727	59	-	211	213	18	95
576	694	57	-	206	209	17	94
552	649	56	-	203	201	16	94
545	639	55	-	200	199	15	93
529	606	54	-	196	197	14	92
514	587	53	120	191	190	13	92
502	565	52	119	187	186	12	91
495	551	51	119	185	184	11	91
477	534	49	118	183	183	10	90
461	489	47	117	175	174	7	88
444	474	46	116	170	171	6	87
427	460	45	115	167	168	5	87
415	435	44	115	165	165	4	86
401	413	43	114	163	162	3	85
388	401	42	114	160	159	2	84
374	390	41	113	156	154	1	83
370	385	40	112	154	152	-	82
362	280	39	111	152	150	-	82
351	361	38	111	147	147	-	80
346	352	37	110	147	147	-	79
331	335	36	109	143	144	-	79
323	320	35	109	141	142	-	77
311	312	34	108	140	135	-	75
301	305	33	107	135	135	-	75
293	291	32	106	130	130	-	72
285	285	31	105	-	-	-	-

Relevant Insert Standards

Military Specifications

MS122076 thru MS122275
MS124651 thru MS12444850
MS21209
MS33537
MIL-I-8846
MIL-STD-1312
MIL-L-8937
MIL-L-46010
MIL-T-21309

Federal Specifications

FED-STD-H28
QQ-A-250
QQ-P-35
QQ-P-416
QQ-Z-325
TT-M-261
PP-H-1581

SAE Specification

MA1565
MA1567
MA3279 / MA3280 / MA3281
MA3329 / MA3330 / MA3331
AS 1370
AMS 2400
AMS 2402
AMS 2410
AMS 2411
AMS 2427
AMS 2460
AMS 2645

AECMA Specifications (European Aerospace Standards)

EN 2942
EN 2943
EN 2944
EN 2945
EN 3044
EN 3542

SBAC Specifications

AGS 3600

AGS 3700

AS 6733
AS 8455

LN Specifications

LN 9039
LN 9499

General Electric Specifications

GE C9F1
GE N926

DIN Specifications

DIN 8140

British Standard Whitworth Specifications

BS 4377
BS 7751.1

BS 7751.2
BS 7752
BS 7753

Recoil manufacture to many standards and are available upon request.

Title

Insert, Corrosion Resistant, Helical Coil, Coarse Thread
Insert, Corrosion Resistant, Helical Coil, Fine Thread
Insert Screw Thread - Screw Locking
Insert - Standard Dimensions, Assembly
Inserts, Screw Thread, Helical Coil
Fastener, Test Methods
Lubricant, Solid Film, Heat Cured, Corrosion Inhibiting NATO Code No. S-1738
Lubricant, Solid Film, Heat Cures, Corrosion Inhibiting
Tools For Inserting and Extracting Helical Coil Inserts

Title

Screw Thread Standards for Federal Service
General Specifications for Aluminium and Aluminium Alloy, Plate and Sheet
Passivation Treatments for Corrosion Resisting Steel
Plating, Cadmium (Electrodeposited)
Plating, Zinc (Electrodeposited) - (Superseded by ASTM B633-85)
Methyl-Ethyl-Ketone (for use in organic coatings)
Shipment and storage of Packing for Hardware (fastener and related items) Packaging.

Title

Inserts, Metric Screw Thread, Procurement Specification
Inserts, metric, Standard Dimensions, Assembly
Inserts, Screw thread, Metric, Free-Running
Inserts, Screw Thread, Metric, Screw Locking
Aerospace Standard - Metric Screw Threads MJ Profile
Aerospace Material Standard for Cadmium Plating
Aerospace Material Standard for Zinc Plating
Electroplating Standard, Silver, Nickel Strike
Electroplating Standard - Silver, High Temperature Applications
Aluminium Plating, Ion Vapour Deposition
Magnetic Particle Inspection
Fluorescent Dye Penetrant Inspection

Title

Insert, Screw Thread, Self Locking, (Inco x 750) SilverPlated
Wire Thread Inserts, (self-locking), Technical Specification
Insert, Screw Thread, Self-Locking, Cres (Z10-CN18-09), Unplated
Assembly with Self-Locking inserts
Installation of Self-Locking Thread inserts - Design Dimensions
Insert, Screw Thread, Self-Locking, (Inco x 750) Dry Film Lubricated.

Title

Insert, Screw thread, metric, screw locking, helical coil corrosion resistant steel
DTD 734 cadmium plated
Insert-screw thread, unified screw locking, helical coil, h.r. alloy BS HR 503 Source control drawing
UNF Unplated
UNF Cadmium plated

Title

Aerospace, wire thread inserts, assembly and special tools
Aerospace, wire thread inserts, screw locking, assembly and special tools

Title

Wire Insert
Stainless steel Wire Locking Inserts for temperatures up to 700 deg F

Title

Wire thread inserts for ISO metric screw threads - tapped holes for thread inserts thread tolerances.

Title

Tapping of holes to receive wire thread inserts (ISO metric threads)
Prevailing torque type wire thread inserts - Specifications for ISO metric course pitch threads
Prevailing torque type wire thread inserts - Specifications for ISO metric fine pitch threads
Free running type wire thread inserts - Specifications for ISO metric course pitch threads
Performance of prevailing torque wire thread inserts