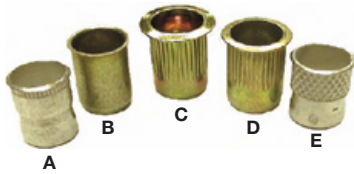


Product Information Report

Threaded Inserts



Overview

Threaded inserts provide threads in materials too thin for tapping, or in blind holes. They are ideal for use in areas where sheet metal screws can't achieve the clamp load and pull-out values required. They can be used in sheet metal, structural foam, fiberglass, wood, concrete and some plastics.

- A:** Threaded Inserts
- B:** TSN (Thinsheet) Threaded Inserts
- C:** Large Flange Diamond Grip II Threaded Inserts
- D:** Standard Flange Diamond Grip II Threaded Inserts
- E:** Threaded Inserts for Soft Materials

Applications



Appliances

- Refrigerator hinge to cabinet
- Refrigerator handle to door
- Leg leveler
- Components to cabinet
- Under-the-counter attachments

Architectural

- Vinyl window hardware to frame
- Aluminum door hardware to frame
- Threshold sweeps to frame
- Aluminum railing "T" joints

Vehicles

- Luggage racks to roof
- Spoilers to trunk lids
- Option controls to dash panel
- Under-hood option items
- Grab handles

Cabinetry

- Hardware to cabinet
- Hinges to cabinet
- Leg levelers
- Components to frame

Food Service

- Leg leveling
- Fixed leg attachment
- Coin box to unit
- Hardware to cabinet

Furniture

- Aluminum furniture assembly
- Leg leveling
- Brass headboards to frame

HVAC

- Compressors to base pans
- Access doors to cabinet
- Motors to blower housing
- Blower housing to unit
- Burner assembly to unit

Farm Equipment

- Mirrors/lights to cab
- Components to decking
- Guards to framing
- Seats to framing
- Access panels to frame

Hospital Equipment

- Wheelchair hand rims
- Wheelchair seats/back
- Handles/casters to carts
- Components to hospital beds
- Aluminum walker assembly

Military

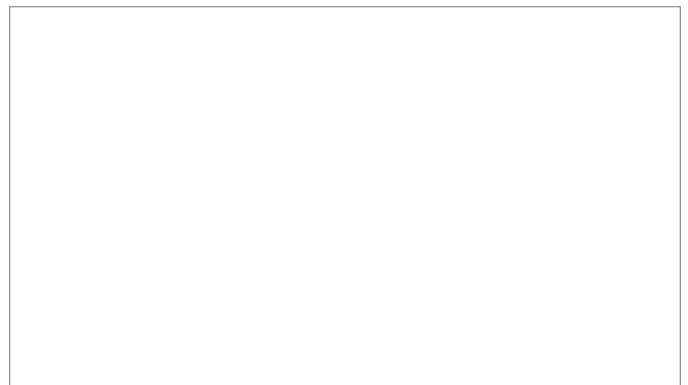
- Ducts/wireways to shelters
- Electronics to shelters
- Antenna assembly
- Hardware to shelters
- Side mirrors to body
- Armor to body
- Bulletproof glass to body
- Instruments to dash

Recreation

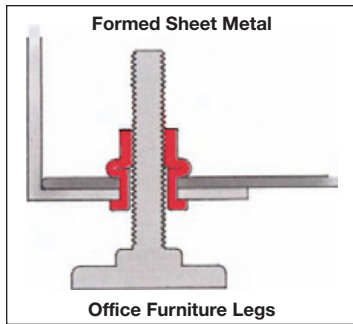
- Playground equipment assembly
- Bicycle frame attachments
- Basketball pole assembly
- Golf cart roof supports to body

RV Industry

- Instruments to boat dash
- Bow rails to deck
- Components to snowmobiles
- Components to motorcycles
- RV awning assembly



Problems/Solutions

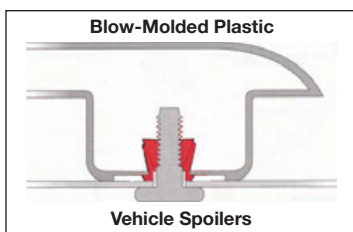


Problem

Light weight, thin gauge materials are being specified to reduce weight and freight costs. Traditional fasteners such as sheet metal screws cannot maintain torque and pull-out requirements in thinner materials.

Solution

Thinsheet threaded inserts can be installed in material as thin as 0.020" (0.70mm) and will provide strong load-bearing threads.

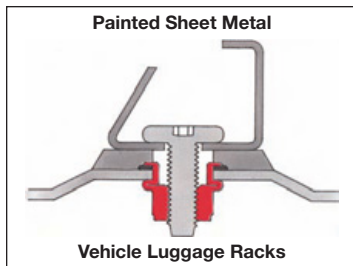


Problem

Plastics are being used everywhere for their color, corrosion resistance, weight and fabrication advantages. Fastening and insert molding in plastics are difficult.

Solution

Threaded inserts for soft materials are designed for use in plastics and offer numerous benefits. They can be installed post-molding to maximize molding machine time.

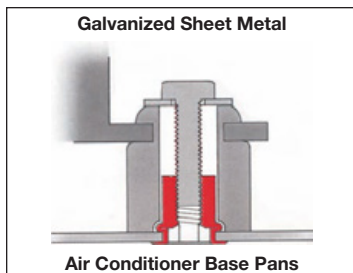


Problem

Pre-painted sheet metal can eliminate unsightly paint lines. Typical weld nuts and studs cannot be used without having to remove the paint.

Solution

Diamond Grip II Threaded Inserts are ideal for pre-painted materials. The insert and its installation tool will not mark or damage the finish of pre-painted sheet metal.

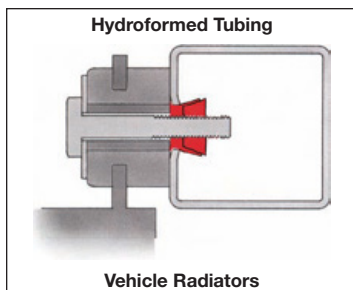


Problem

Galvanized sheet metal and metal stitching techniques have reduced the need for hazardous welding on zinc platings. Welding removes corrosion protection.

Solution

Diamond Grip II Threaded Inserts solve this problem. They do not damage the galvanized finish. No re-work is required and there are no hazardous fumes.



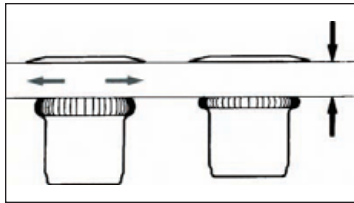
Problem

Hydroformed tubing is an emerging technology that uses internal water pressure to form steel tubes into complex shapes. Tapping or thread-forming screws do not work well in this ductile grade of steel.

Solution

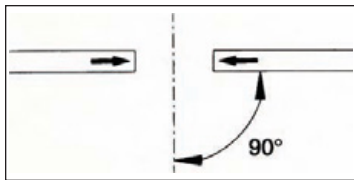
Threaded inserts install blind into hydroformed tubular shapes. These inserts provide excellent spin-out resistance and thread strength in hydroformed or any other type of tubular material.

Design Considerations



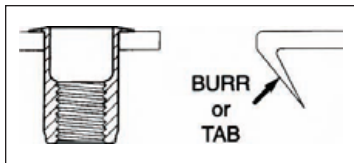
Parent Material

Material should be dense enough to support the hole fill and clamp load applied. Its thickness should be within the grip range of the selected insert.



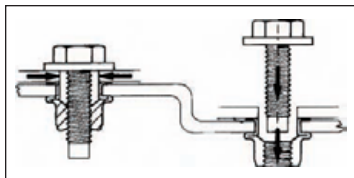
Hole Size

The hole produced in the parent material should be per the associated charts on the following pages. Tolerances for paint and other coatings should be considered to avoid an undersized hole.



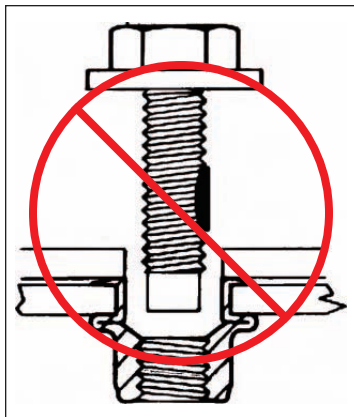
Backside Surface

All surfaces should be free of punch slugs or excessive burrs. Such obstructions prohibit proper insert installation.



Mating Part – Hole Size and Alignment

The mating part should be non-rotational and be in contact with the insert. The hole size should be 0.040" (1.0mm) smaller than the head diameter of the insert. The alignment of the mating part must provide perpendicular entry of the fastener to the insert.

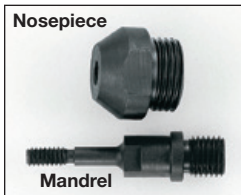


Mating Fastener

For threaded inserts, the mating fastener should have a “free-spinning” design and be the specified grade/class. They are not designed to be used with mechanical, chemical-locking or prevailing torque elements. Using dog point screws can minimize cross-threading in the assembly process. Mating screws should be hand-started and then can be power driven. Do not use an impact wrench to install fasteners.

Installation Tools

NutDrill™ Installation Tool (Item No. 28613)



The NutDrill™ Installation Tool can install most threaded insert styles (sizes 6–32 to 5/16–18) that we offer.*

1. Select the correct conversion kit for the threaded insert to be placed.
2. Insert the mandrel into the tool (left hand thread).
3. Insert the nosepiece onto the tool (left hand thread).
4. Thread the insert onto the protruding mandrel until it is flush against the nosepiece.
5. Place the insert tool onto drill.**
6. Make sure the drill is set to the proper torque and lowest speed setting.
7. Depress trigger and install insert. Insert is fully set when drill makes a “clicking” sound.
8. Set drill to reverse setting and remove tool from insert.

*Do not use with 5/16–18 Diamond Grip II Threaded Inserts.
 **Drill must be a 12V or more cordless drill with reversible turn and torque settings.

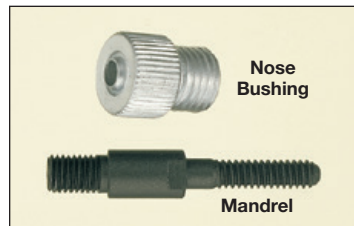
Thread Size	Approximate Torque Setting
6–32	Less Than 7
8–32	7 to 9
10–24	10 to 12
10–32	10 to 12
1/4–20	15 to 16
5/16–18	16 to 18

Diamond Grip II and TSN Installation Tool (Item No. 84211)



The Diamond Grip II and TSN Installation Tool can only be used on Diamond Grip II Threaded Inserts and TSN (Thinsheet) threaded inserts.

1. Select the correct conversion kit for the threaded insert to be placed.
2. With the tool in the full open position, insert the mandrel (left hand thread).
3. Thread the bushing into the tool nose (left hand thread).
4. Thread the insert onto the protruding mandrel until it is flush against the nose bushing.
5. Place the insert into the prepared hole and squeeze the handles.
6. The insert is fully placed when the tool handles can no longer be depressed under normal hand pressure. Release the handles immediately. Do not force the tool handles into the fully-closed position.
7. Release the handles and disengage the mandrel by rotating the mandrel puller knob in a counter-clockwise direction.



Installation Tools (cont.)

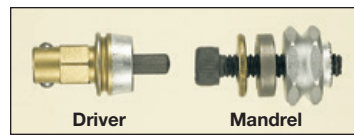
Standard and Soft Material Threaded Inserts Installation Tool (Item No. 84220)



Standard threaded inserts and threaded inserts for soft materials can be installed using the Threaded Insert Installation Tool.

1. Select the correct conversion kit for the threaded insert to be placed.
2. Attach driver portion of conversion kit to tool.
3. Thread insert onto mandrel.
4. Place the insert into the prepared hole.
5. Set tool into mandrel, lower the grip bar and twist the T-handle clockwise until the insert is set.
6. To remove the mandrel, keep the grip bar lowered and twist the T-handle in a counter-clockwise motion until the mandrel is out of the insert.

See the chart at the right for replacement socket head cap screw sizes for the mandrel.

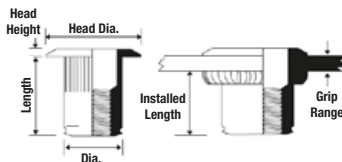


Size	Length
4-40	1/4"
6-32	3/4"
8-32	3/4"
10-24	1"
10-32	1"
12-24	1"
1/4-20	1-1/4"
1/4-28	1-1/4"
5/16-18	1-1/4"
5/16-24	1-1/4"
3/8-16	1-1/4"
3/8-24	1-1/4"
M3 x 0.5	20mm
M4 x 0.7	20mm
M4 x 0.8	30mm
M6 x 1.0	30mm
M8 x 1.25	30mm
M10 x 1.5	35mm

Specifications – Diamond Grip II Threaded Inserts

Material: 1010/1008 Steel
Finish: Zinc/Yellow Dichromate (ASTM-B633 Type II)
Threads: Unified – 2B/21 per ASME B1.1
Metric – 6H/21 per ASME B1.13M

Small Flange

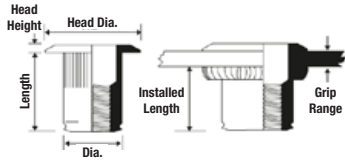


Item No.	Thread Size	Grip Range (Inches)	Hole/Drill Size (Inches)	Head Dia. ±0.010 (Inches)	Head Height ±0.002 (Inches)	Length ±0.015 (Inches)	Max. Dia. (Inches)	Max. Installed Length (Inches)
94730	6-32	0.020 – 0.080	17/64	0.310	0.019	0.420	0.265	0.305
94731	8-32							
94732	10-24	0.020 – 0.130	19/64	0.340	0.019	0.475	0.296	0.315
94733	10-32							
94734	1/4-20	0.027 – 0.165	25/64	0.455	0.022	0.580	0.390	0.380
94735	1/4-28							
94736	5/16-18	0.027 – 0.150	17/32	0.595	0.022	0.690	0.530	0.470
94737	5/16-24							
94738	3/8-16	0.027 – 0.150	17/32	0.595	0.022	0.690	0.530	0.470
94739	3/8-24							

Item No.	Thread Size	Grip Range (mm)	Hole/Drill Size (Inches)	Head Dia. ±0.25 (mm)	Head Height ±0.05 (mm)	Length ±0.38 (mm)	Max. Dia. (mm)	Max. Installed Length (mm)
94740	M4 x 0.7	0.5 – 2.0	17/64	7.87	0.48	10.67	6.73	7.75
94741	M5 x 0.8	0.5 – 3.3	19/64	8.64	0.48	12.07	7.52	8.00
94742	M6 x 1.0	0.7 – 4.2	25/64	11.56	0.55	14.73	9.91	9.65
94743	M8 x 1.25	0.7 – 3.8	17/32	15.11	0.55	17.53	13.46	11.94
94744	M10 x 1.5	0.7 – 3.8	17/32	15.11	0.55	20.45	13.46	10.90

**Specifications –
Diamond Grip II
Threaded Inserts (cont.)**

Large Flange



Item No.	Thread Size	Grip Range (Inches)	Hole/Drill Size (Inches)	Head Dia. ±0.010 (Inches)	Head Height ±0.002 (Inches)	Length ±0.015 (Inches)	Max. Dia. (Inches)	Max. Installed Length (Inches)
51669	6-32	0.020 – 0.080	17/64	0.390	0.030	0.420	0.265	0.305
51670	8-32							
51671	10-24	0.020 – 0.130	19/64	0.415	0.030	0.475	0.296	0.315
51672	10-32							
51673	1/4-20	0.027 – 0.165	25/64	0.500	0.030	0.590	0.390	0.380
51674	1/4-28							
51675	5/16-18	0.027 – 0.150	17/32	0.685*	0.035	0.690	0.530	0.470
51676	5/16-24							
51677	3/8-16	0.027 – 0.150	17/32	0.685*	0.035	0.690	0.530	0.470
51678	3/8-24							

*±0.025

Item No.	Thread Size	Grip Range (mm)	Hole/Drill Size (Inches)	Head Dia. ±0.25 (mm)	Head Height ±0.05 (mm)	Length ±0.38 (mm)	Max. Dia. (mm)	Max. Installed Length (mm)
51679	M4 x 0.7	0.5 – 2.0	17/64	9.91	0.76	10.67	6.73	7.75
51680	M5 x 0.8	0.5 – 3.3	19/64	10.54	0.76	12.07	7.52	9.00
51681	M6 x 1.0	0.7 – 4.2	25/64	12.70	0.76	14.73	9.91	9.65
51682	M8 x 1.25	0.7 – 3.8	17/32	17.40*	0.89	17.53	13.46	11.94
51683	M10 x 1.5	0.7 – 3.8	17/32	17.40*	0.89	20.45	13.46	10.90

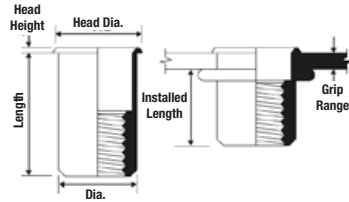
*±0.64

Pull-Out Values

Thread Size	In Steel Sheet*				In Aluminum Sheet*			
	0.03" (0.76mm)	0.062" (1.57mm)	0.09" (2.28mm)	0.125" (3.17mm)	0.03" (0.76mm)	0.062" (1.57mm)	0.09" (2.28mm)	0.125" (3.17mm)
6-32	316	817	1,347	1,952	276	898	1,464	1,604
8-32		773	1,428	2,000	275	828	1,341	1,571
10-24	473	971	1,694	2,127	325	964	1,626	1,967
10-32								
1/4-20	570	1,196	2,244	2,983	411	1,157	2,269	2,892
1/4-28								
5/16-18	703	2,034	3,066	4,501	463	1,435	2,591	3,896
5/16-24								
3/8-16	703	1,509	2,551	4,501	601	1,554	2,709	3,850
3/8-24								
M4 x 0.7	1.4	3.4	6.3	8.8	1.2	3.6	5.9	6.9
M5 x 0.8	2.1	4.3	7.5	9.4	1.4	4.2	7.2	8.7
M6 x 1.0	2.5	5.3	9.9	13.2	1.8	5.1	10.0	12.8
M8 x 1.25	3.1	9.0	13.6	20.0	2.0	6.3	11.5	17.3
M10 x 1.5	3.1	6.7	11.3	20.0	2.6	6.9	12.0	17.1

*Fractional sizes have pull-out values listed in pounds (lbs.) and metric sizes have pull-out values listed in Kilo-Newtons (kN).

Specifications – TSN (Thinsheet) Threaded Inserts



Material: 1010/1008 Steel
Finish: Zinc Plate (ASTM-B633 Type III)
Threads: Unified – 2B/21 per ASME B1.1

Item No.	Thread Size	Grip Range (Inches)	Hole/Drill Size (Inches)	Head Dia. ±0.010 (Inches)	Head Height ±0.002 (Inches)	Length ±0.015 (Inches)	Max. Dia. (Inches)	Max. Installed Length (Inches)
84203	6-32	0.020 – 0.080	1/4	0.295	0.018	0.385	0.249	0.315
84204	8-32							
84205	10-24	0.020 – 0.130	9/32	0.320	0.020	0.440	0.280	0.330
84206	10-32							
84207	1/4-20	0.030 – 0.165	3/8	0.425	0.022	0.580	0.374	0.440
84208	1/4-28							
84209	5/16-18	0.040 – 0.200	1/2	0.560	0.022	0.690	0.499	0.540
84210	5/16-24							
85685	3/8-16	0.040 – 0.200	1/2	0.560	0.022	0.690	0.499	0.540

Pull-Out Values

Thread Size	In Steel Sheet*				In Aluminum Sheet*			
	0.0359" (0.91mm)	0.0598" (1.52mm)	0.1046" (2.66mm)	0.1196" (3.05mm)	0.032" (0.81mm)	0.063" (1.60mm)	0.100" (2.54mm)	0.125" (3.17mm)
4-40	139	359	383	406	196	357	423	454
6-32	158	421	466	483	246	443	489	531
8-32	181	456	676	721	321	648	713	723
10-24	301	619	849	1,113	313	713	955	998
10-32								
1/4-20	329	738	1,003	1,762	349	798	1,530	1,791
1/4-28								
5/16-18	368	823	1,108	1,999	382	1,148	2,051	2,181
5/16-24								
3/8-16	381	902	1,251	2,363	391	1,893	2,844	2,922
3/8-24								
M3 x 0.5	0.6	1.6	1.7	1.8	0.9	1.6	1.9	2.0
M4 x 0.7	0.8	2.0	3.0	3.2	1.4	2.9	3.2	3.2
M5 x 0.8	1.3	2.8	3.8	5.0	1.4	3.2	4.2	4.4
M6 x 1.0	1.5	3.3	4.5	7.8	1.6	3.5	6.8	8.0
M8 x 1.25	1.6	3.7	4.9	8.9	1.7	5.1	9.1	9.7
M10 x 1.5	1.7	4.0	5.6	10.5	1.7	8.4	12.7	13.0

*Fractional sizes have pull-out values listed in pounds (lbs.) and metric sizes have pull-out values listed in Kilo-Newtons (kN).

Specifications – Threaded Inserts for Soft Materials

Material: C1110 Steel
Finish: Cadmium per QQ-P-416 Type I Class 3
Threads: Compatible with 2A/3A or 6g after installation
These can be used in material with a thickness greater than 0.062" (1.57mm).

Item No.	Thread Size	Hole/Drill Size (Inches)	Head Dia. ±0.010 (Inches)	Head Height ±0.002 (Inches)	Length ±0.015 (Inches)	Max. Dia. (Inches)	Max. Installed Length (Inches)
95970	6-32	15/64	0.255	0.370	0.233	0.205	0.400
95971	8-32	17/64	0.285	0.370	0.264	0.205	0.400
95972	10-24	19/64	0.320	0.370	0.295	0.205	0.400
95973	10-32						
95974	1/4-20	25/64	0.415	0.515	0.389	0.275	0.540
95975	1/4-28						
95976	5/16-18	17/32	0.550	0.615	0.528	0.325	0.640
95977	5/16-24						
95978	3/8-16	19/32	0.615	0.740	0.590	0.390	0.770
95979	3/8-24						

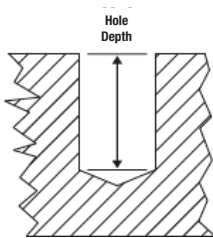
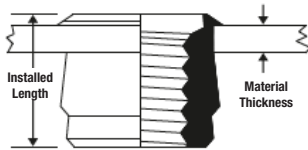
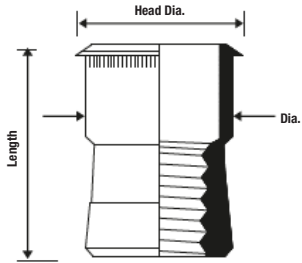
Specifications – Threaded Inserts

Material: C1010 or C1110 Steel

Finish: Cadmium per QQ-P-416 Type I Class 3

Threads: Compatible with 2A/3A or 6g after installation

These can be used in material with a thickness greater than 0.030" (0.76mm).



Item No.	Thread Size	Head Dia. ±0.005 (Inches)	Length ±0.015 (Inches)	Maximum Dia. (Inches)	Maximum Installed Length (Inches)	Minimum Hole Depth (Inches)
81083	4-40	0.211	0.370	0.1875	0.205	0.400
81084	6-32	0.240	0.370	0.2185	0.205	0.400
81085	8-32	0.269	0.370	0.2495	0.205	0.400
81086	10-24	0.306	0.370	0.2805	0.205	0.400
81087	10-32					
81088	1/4-20	0.400	0.515	0.3745	0.275	0.540
81240	1/4-28					
81089	5/16-18	0.528	0.615	0.4995	0.325	0.640
81090	5/16-24					
81207	3/8-16	0.588	0.745	0.5615	0.390	0.770
81208	3/8-24					

Item No.	Thread Size	Head Dia. ±0.013 (mm)	Length ±0.38 (mm)	Maximum Dia. (mm)	Maximum Installed Length (mm)	Minimum Hole Depth (mm)
85894	M3 x 0.5	5.36	9.40	4.76	5.21	10.16
85895	M4 x 0.7	6.83	9.40	6.34	5.21	10.16
85896	M5 x 0.8	7.77	9.40	7.12	5.21	10.16
85897	M6 x 1.0	10.16	13.08	9.51	6.99	13.72
85898	M8 x 1.25	13.41	15.62	12.69	8.26	16.26
85899	M10 x 1.5	14.94	18.92	14.26	9.91	19.56

Thread Size	0.030" – 0.090" Mat. Thickness		0.091" – 0.124" Mat. Thickness		0.125" – 0.186" Mat. Thickness		0.187"+ Mat. Thickness	
	Drill Size (Inches)	Decimal (Inches)	Drill Size (Inches)	Decimal (Inches)	Drill Size (Inches)	Decimal (Inches)	Drill Size (Inches)	Decimal (Inches)
4-40	3/16	0.1875	#10	0.1935	#10	0.1935	#9	0.1960
6-32	7/32	0.2188	#2	0.2210	#1	0.2280	#1	0.2280
8-32	1/4	0.2500	F	0.2570	17/64	0.2656	17/64	0.2656
10-24	9/32	0.2813	L	0.2900	L	0.2900	19/64	0.2969
10-32								
1/4-20	3/8	0.3750	3/8	0.3750	W	0.3860	25/64	0.3906
1/4-28								
5/16-18	1/2	0.5000	1/2	0.5000	33/64	0.5156	33/64	0.5156
5/16-24								
3/8-16	9/16	0.5625	9/16	0.5625	37/64	0.5781	37/64	0.5781
3/8-24								

Thread Size	0.76" – 2.29" Mat. Thickness		0.091" – 0.124" Mat. Thickness		0.125" – 0.186" Mat. Thickness		0.187"+ Mat. Thickness	
	Drill Size (Inches)	Decimal (Inches)	Drill Size (Inches)	Decimal (Inches)	Drill Size (Inches)	Decimal (Inches)	Drill Size (Inches)	Decimal (Inches)
M3 x 0.5	3/16	0.1875	#10	0.1935	#10	0.1935	#9	0.1960
M4 x 0.7	1/4	0.2500	F	0.2570	17/64	0.2656	17/64	0.2656
M5 x 0.8	9/32	0.2813	L	0.2900	L	0.2900	19/64	0.2969
M6 x 1.0	3/8	0.3750	3/8	0.3750	W	0.3860	25/64	0.3906
M8 x 1.25	1/2	0.5000	1/2	0.5000	33/64	0.5156	33/64	0.5156
M10 x 1.5	9/16	0.5625	9/16	0.5625	37/64	0.5781	37/64	0.5781