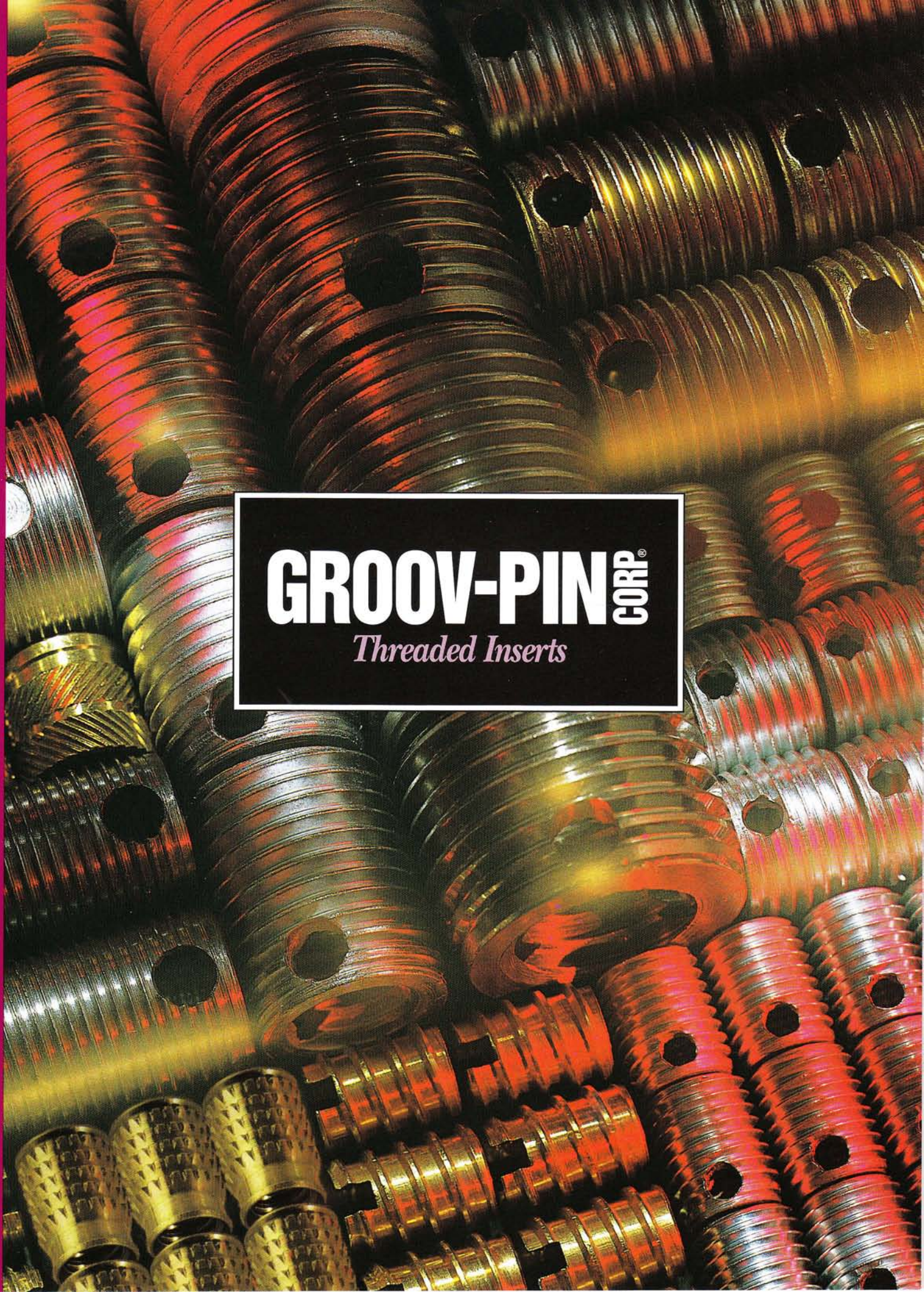

GROOV-PIN CORP®
Threaded Inserts

Groov-Pin® Corporation has been a leader in the design and manufacture of high-quality, engineered fasteners since the introduction of the "grooved" pin in 1926 and the patent of the self-tapping screw in 1942. The Corporation has continuously evolved and adapted to meet customer needs. Product lines have expanded to include a full range of solid pins and threaded inserts.

If you have a challenge for Groov-Pin Corporation, we would like to hear about it. Call us at (973)628-0002

GROOV-PIN COMMITMENT

Within our company, we strive to create an environment where each customer and every employee is important. We are committed to see that the needs of our customers are fully satisfied by solving fastening problems and reducing overall costs with our high-quality solid pins and threaded inserts.

Delivery performance and responsiveness to customer needs are top priorities. We stock the products most often requested by our customers and provide competitive lead times for a wide variety of products with special requirements. We are committed to continued improvement of our processes and products to support our customers' competitive efforts. We strive for good communication with our customers, particularly for special needs. Through technical and direct sales support, we attempt to establish a quality partnership with each customer to ensure smooth introductions of new components and cost reductions. We recognize the vital importance of listening and are committed to improve our ability to satisfy customer needs.

HOW TO USE THIS CATALOG

Threaded inserts will help you achieve strong, wear-resistant, reliable threads, even in soft metals, plastics or wood. This catalog will provide you with the key information you will need to select the proper insert for your application.

It has been carefully designed to serve as a *working document* making it easier for you to understand and specify the right fastener for your application.

This catalog leads you through a logical step-by-step process, from understanding what a threaded insert is, to designing with threaded inserts, to specifying.

Selection Guide: (page 4) This handy guide provides an easy-to-use, side-by-side comparison chart of the *types* of Groov-Pin threaded inserts, the materials they are commonly used with, and a description of their benefits.

Designing with Threaded Inserts: (pages 5 and 6) Open the Selection Guide, and you will find a desktop primer for tips on designing your assembly for maximum performance. Now, fold the overleaf (pages 6 and 7) to your left and you can view *it* while paging through each specific insert series spread (beginning on page 7). In each of *these* sections you will find further details, performance data and specifications.

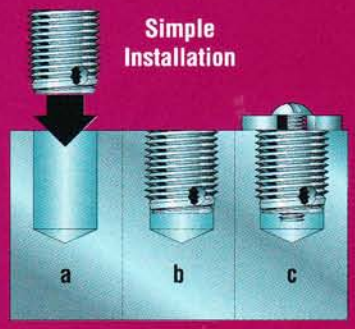
If you have any questions about inserts or need any assistance in selecting the right fastener, we invite you to call our Customer Service group at (201) 945–6780.

INDEX

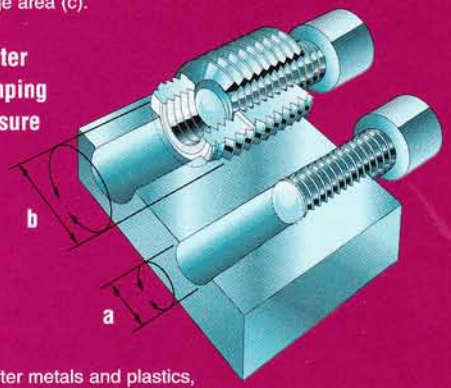
WHAT IS A THREADED INSERT?

Groov-Pin threaded inserts are cylindrical, metal bushings with features on the outside which lock them into a plastic or metal base material to anchor your fasteners. They provide high-quality, permanent, wear-resistant internal threads and are designed to be installed in molded or drilled holes in one simple step. While each style performs in a range of materials, they are generally classified by method of installation: Thread-Cutting, Thread-Forming, Push-In, or Ultrasound.

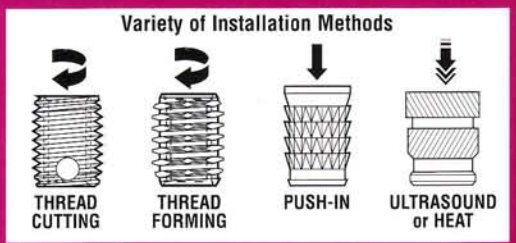
INSERT BASICS



Starting with a molded or drilled hole (a), the insert is installed in a single step using one of four methods shown below (b). Special features on the insert "lock" it into the base material and distributes forces from the fastener over a large area (c).



In softer metals and plastics, the shear force required to tear the fastener from the base material is much less than the tensile strength of the fastener (a). The threaded insert distributes forces from the fastener over a larger area to realize a much greater clamping force with the same fastener (b).



Depending on the type selected, threaded inserts are installed by one of four methods. Thread-Cutting and Thread-Forming inserts twist themselves into the base material. The Push-In method involves simply pressing the insert into a hole. Ultrasonic installation involves pressing the insert into a hole while softening the surrounding base material with ultrasonically generated heat.

Types of Threaded Inserts:

Tap-Lok®

SpeedSert®

Barb-Sert®

Vibra-Sert®

WHY DO I NEED A THREADED INSERT?

Threaded inserts are designed to improve the strength of assemblies by distributing forces from the fastener over a larger area in the base material, thus increasing their load-bearing capability. For metals such as aluminum, this means full utilization of high-tensile-strength fasteners. In plastics, threaded inserts avoid wear and cold-flow problems encountered with thread forming screws. Threaded inserts offer both engineering and cost economies.

IMPORTANT ADVANTAGES OF THREADED INSERTS

- ☐ Greater clamping pressure in softer materials – provides higher strength, better seals.
- ☐ Better use of high-tensile-strength fasteners.
- ☐ Resistance to vibration in assembly.
- ☐ High-quality standard threads without tapping.
- ☐ Permanent, wear-resistant threads.
- ☐ Protective of expensive castings and moldings.
- ☐ Reduced performance loss from cold flow of plastic.
- ☐ Reduce risks in molding cycle.
- ☐ Easy to install in a drilled or molded hole.
- ☐ Suitable for automatic installation.
- ☐ Wide variety of types to fit virtually any application.

PERFORMANCE ADVANTAGES

GREATER CLAMPING PRESSURE

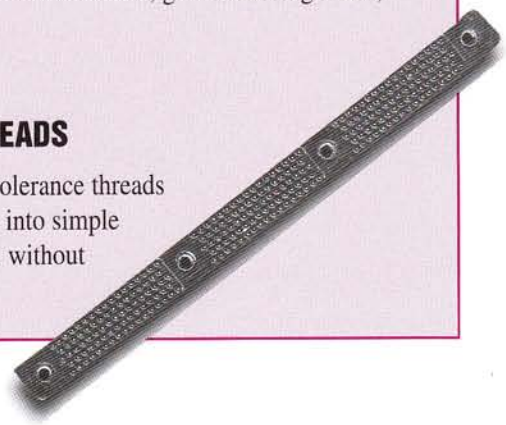
The use of threaded inserts from Groov-Pin in a drilled or molded hole provides up to 50% more clamping pressure than the same fastener used in a drilled or tapped hole without an insert. In plastic and softer metal, stronger assembly forces and better seals are achieved. In basic terms, the external diameter of the threaded insert is larger than the internal threaded diameter which accepts the fastener. The insert increases the effective load-bearing area, thereby increasing the shear force required to pull the fastener and insert from the base material.

VIBRATION RESISTANCE

Threaded inserts, once installed, remain firmly locked into the base material and will withstand vibration without loosening. Proprietary features on the outside of the threaded insert capture the base material during the installation process in a way that resists axial and rotational forces. The vibration resistance of threaded inserts has been proven time and again in tests conducted by independent laboratories, government agencies, and commercial users.

HIGH-QUALITY THREADS

High-quality, standard-tolerance threads can be installed quickly into simple drilled or molded holes, without a tapping operation.



COLD FLOW RESISTANCE

When used in plastics, inserts reduce the loss of clamping pressure due to creep or cold flow of the base material. The inserts are designed to better distribute clamping forces to soft base materials. The insert will act as a metal bushing, providing a metal bearing surface for both fastener and mating component.

MOLDING ADVANTAGES

The use of post-molding inserts in plastic parts simplifies and reduces risks in the press cycle. Since inserts are quickly installed after the part leaves the mold, the press is not left idle while inserts are loaded into the mold and the potential for damage to the mold from dislodged or misplaced inserts is eliminated. Automatic installation of the inserts combined with better press up time can provide significant labor savings when compared to molded-in inserts.

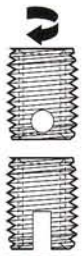
WEAR RESISTANCE

Groov-Pin inserts are designed to be permanent fasteners. The internal standard machine screw threads feature a lead-in chamfer or a counterbore to readily accept standard threaded fasteners during production or service. Threaded inserts can be used almost indefinitely, unlike thread forming screws which cannot maintain clamping pressure after repeated use. Also, the risk of crossed or stripped threads in expensive moldings or castings is dramatically reduced. Should the need arise, inserts can be replaced in the field or at a service site.

SIMPLE INSTALLATION

Groov-Pin inserts are designed for simple, economical installation and are compatible with automatic installation methods. *Just one step* provides permanent, reinforced threads in metal, plastic, cast or molded parts. Since they cover the spectrum of installation methods, Groov-Pin inserts are widely chosen by OEM's for medium- and high-volume production.

SELECTION GUIDE

INSTALLATION METHOD	BASE MATERIALS				PRODUCT	DESCRIPTION	PAGE
	Aluminum	Thermoset plastics	Thermo plastics	Wood	TAP-LOK®		
 THREAD CUTTING	▼	▼			Hole Series 	**Hole Series** threaded inserts are designed for use in tough-to-tap, high-strength materials as well as softer metals and plastics. Circular cutting elements self-tap and lock into the base material. They are able to resist extreme vibration with no loss in performance. **Available in steel and stainless steel.**	7
	▼	▼			Slotted Series 	**Slotted Series** threaded inserts are suitable for use in a wide range of machinable softer metals and plastics, particularly those with abrasive fillers. The cutting slots are designed to quickly tap into the base material and lock the insert in place. They are able to resist extreme vibration without loss of performance. **Available in steel, stainless steel or brass.**	9
		▼	▼	▼	Coarse Series 	**Coarse Series** threaded inserts are designed for use in thermoplastics and thermoset plastics. The cutting slots are designed to tap into the base material and lock the insert in place. They are able to resist extreme vibration. The coarse exterior threads anchor the insert firmly and distribute stress evenly in plastics and brittle base materials. This threaded insert is a high-quality, solid metal bushing. **Available in brass only.**	11
				▼	Wood Series 	**Wood Series** threaded inserts are designed for use in hard and soft woods as well as wood composites. Cutting slots and deep exterior threads are designed to tap into the wood and lock the insert in place. They are able to resist repeated shock and vibration. This threaded insert is a solid metal bushing that provides high-quality threads in most base materials. **Available in brass only.**	13
 THREAD FORMING	▼	▼	▼	▼	SPEEDSERT® 	**SpeedSert** self-threading inserts form strong threads in softer metals and plastics for a very high pull-out resistance. Their locking action makes them very resistant to vibration. **Available in stainless steel only.**	15
 PUSH-IN, ULTRASOUND or HEAT			▼		BARB-SERT® 	**Barb-Sert** threaded inserts provide superior pull-out and torque resistance in thermoplastics, making them a popular choice for molders. The unique exterior barb patterns make it possible to install them into straight or slightly tapered holes using a variety of methods such as push-in, ultrasound or heat. **Available in brass only.**	17
 ULTRASOUND or HEAT			▼		VIBRA-SERT®		
					Vibra-Sert I 	**Vibra-Sert** inserts are installed with ultrasound or with heat to produce high torque resistance and good pull-out resistance in thermoplastics. **Vibra-Sert I** inserts are to be used in straight or slightly tapered holes. **Vibra-Sert II** inserts are designed especially for use in tapered holes. **Available in brass only.**	19
			▼		Vibra-Sert II 		19

OPEN FOR DESIGN TIPS!

DESIGNING WITH THREADED INSERTS

The process of designing with threaded inserts can be separated into four steps:

1. Select the proper threaded insert for your base material and installation method from the selection guide on page 4.
2. Design the assembly.
3. Specify the proper hole configuration for the threaded insert.
4. Verify the required performance before entering production.

Note that performance and installation characteristics will vary depending upon the specific base material used, actual hole dimensions, and installation parameters. Preproduction prototype testing is strongly recommended to evaluate your specific application.

Threaded inserts are designed to create greater clamping pressure between a base material and a mating component using a standard machine screw. To better use the load-bearing capacity of high-tensile-strength machine screws, designing for threaded insert performance involves three considerations:

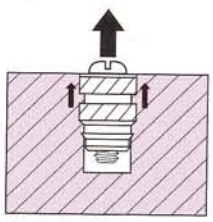
- Proper specification of mating components to avoid unnecessary forces between the threaded insert and the base material.
- Sufficient base material wall thickness to support the threaded insert.
- Proper hole dimensions.

The performance of threaded inserts is usually measured in terms of the axial or torsional forces required to shear the threaded insert from the base material. Pull-Out Resistance is the axial force required to pull the insert free of the base material, and Torque Resistance is the axial torque required to twist the threaded insert free of the base material. See fig. 5a and 5b.

Proper design for threaded inserts involves creating axial clamping forces on the threaded insert while minimizing excessive torques and jacking forces. See fig. 5c.

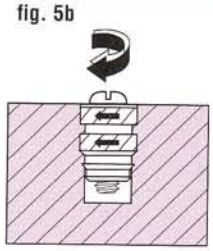
MEASURE OF PERFORMANCE

fig. 5a



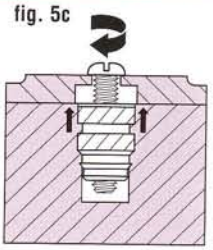
Pull-Out Resistance
Axial force applied to mating fastener which causes threaded insert to shear from base material.

fig. 5b



Torque Resistance
Excessive torque applied via mating fastener which causes threaded insert to twist in base material.

fig. 5c



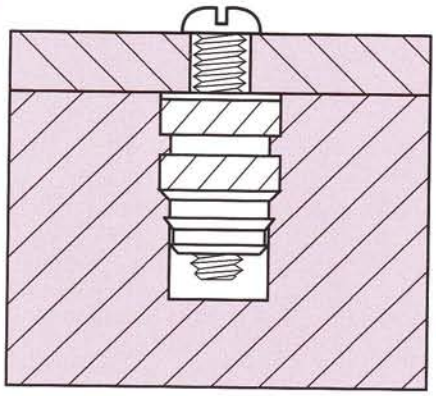
Jack-Out Resistance
Indirect measure of pull-out resistance. Torque applied via mating fastener through stepped washer which causes threaded insert to "jack" or shear from base material.

DESIGN OF MATING COMPONENTS

The threaded insert should be installed perpendicular to the surface of the base material so that the forces on the insert are axial. Mating components should be mounted flush to the surface of the base material to minimize the effects of uneven or rotational forces. To minimize jacking forces, holes in mating components for fasteners should be large enough for the fastener but smaller than the diameter of the threaded insert, and fasteners should not contact the base material when fully installed. See fig. 6.

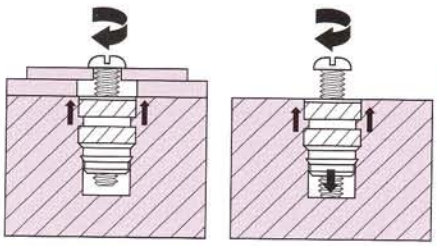
fig. 6

DO



- Mount threaded insert perpendicular to surface.
- Flush mount mating components.
- Specify access holes for fasteners smaller than insert diameter.
- Specify proper length fastener to avoid contact with loose material.

DON'T



- Create unnecessary forces between mating part and insert.
- Create jacking forces with access holes larger than insert diameter
- Create jacking forces with mating fasteners.

BOSS DIAMETER

To properly support the threaded insert, there must be sufficient material around the threaded insert. This is usually specified in terms of a minimum wall thickness or minimum boss diameter. When considering inserts installed near the edge of a part, minimum wall thickness is defined as the minimum thickness of base material around the drilled or molded hole for the threaded insert. In soft metal base materials, the minimum wall thickness should be 25% to 50% of the threaded insert diameter. In plastics, the minimum wall thickness should be increased to be 50% to 100% of the threaded insert diameter. When considering circular bosses, the minimum boss diameter should be the diameter of the threaded insert plus two times the minimum wall thickness (fig. 7).

HOLE CONFIGURATION

Hole configuration, hole diameter, and hole depth can have a significant impact on threaded insert performance and installation. Recommended hole configuration and dimensions are included with the insert specifications which follow. However, there are some useful general guidelines to follow. Groov-Pin recommends one of three hole configurations depending upon insert type:

- For softer metals and brittle plastics, a straight hole with up to 1° taper and counterbore or countersink (fig. 8a).
- For plastics, a straight hole with taper up to 3° and no counterbore or countersink (fig. 8b).
- For plastics, a hole with a taper of 8° and no counterbore or countersink (fig. 8c).

HOLE DIAMETER

Recommended hole diameters are included with the insert specifications which follow. Counterbore dimensions are included where appropriate. Note that actual hole dimensions are specified and not core-pin or drill sizes.

When evaluating insert performance, hole diameter may be adjusted to optimize threaded insert installation and performance. Although the inserts are designed to operate over a range of hole sizes, smaller hole sizes yield higher pull-out resistance in softer materials and larger hole sizes provide easier installation in more brittle or higher-tensile-strength materials.

When considering bosses in a plastic part, stepped holes may be specified to minimize undesirable sink marks (see fig. 7). Limit the maximum diameter of the stepped hole to 80% of the diameter of a straight hole (fig. 8a,b) or to the minor diameter of a tapered hole (fig. 8c).

HOLE DEPTH

Hole depth for blind holes should be at least the depth of the threaded insert plus two pitches of the internal thread (fig. 5c). This will allow full engagement of the mating fastener and avoid fouling of the internal thread by base material during installation. A hole depth of 1.2 times the insert length is recommended. For through holes, the material thickness should be greater than the length of the threaded insert.

fig. 7

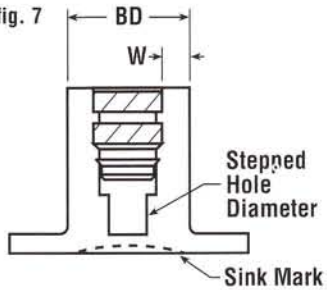
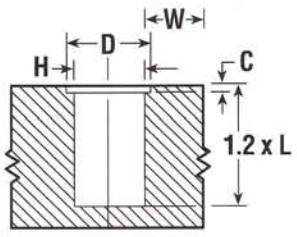


fig. 7
Minimum wall thickness (W) and minimum boss diameter (BD) are important parameters for performance of threaded inserts. They are also key factors in avoiding bulges or sink marks on the outside surface of the component. Minimum boss diameter is twice the minimum wall thickness plus the maximum diameter of the threaded insert.

THREE HOLE CONFIGURATIONS

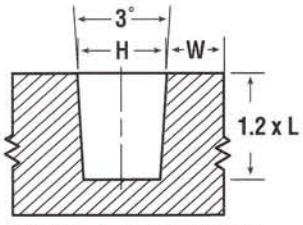
fig. 8a



STRAIGHT HOLE WITH COUNTERBORE

fig. 8a
Straight hole with taper up to 1° of diameter H and minimum depth 1.2 times insert length L. Counterbore of diameter equal to insert diameter D and depth C. Alternatively, a countersink of diameter D with 60° included angle may be specified for metals. Minimum wall thickness W.

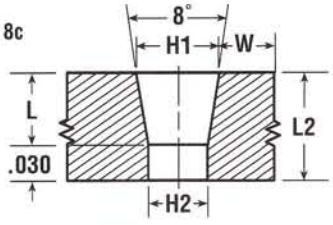
fig. 8b



STRAIGHT HOLE WITH NO COUNTERBORE

fig. 8b
Straight hole with taper up to 3° of diameter H and minimum depth 1.2 times insert length L. Minimum wall thickness W. No counterbore or countersink.

fig. 8c



TAPERED HOLE

fig. 8c
Tapered hole with 8° taper of major diameter H1 and minor diameter H2 with minimum depth L2 equal to insert length L plus .030 inch.

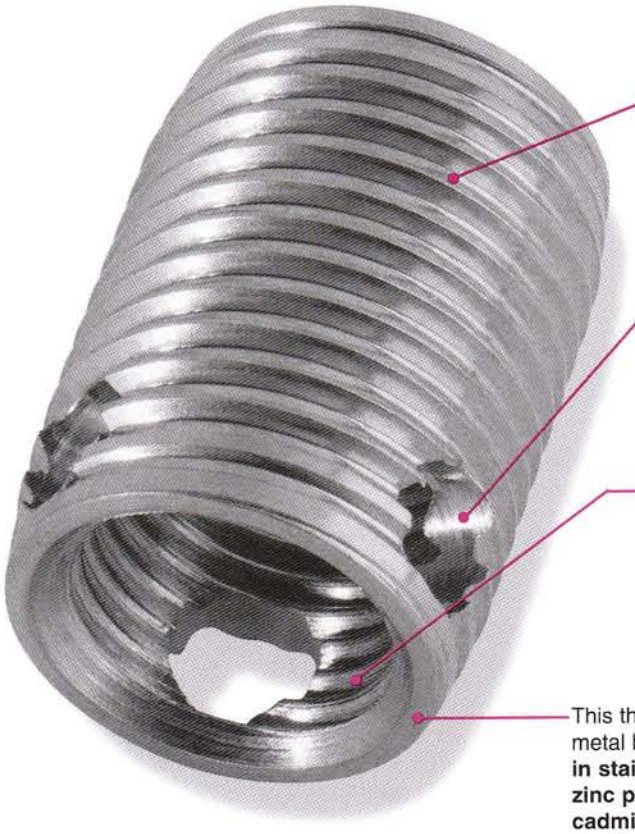
TAP-LOK HOLE SERIES

THREAD CUTTING

HOLE SERIES

- Highest pull-out resistance.
- Suitable for harder materials.
- Superior vibration resistance.
- One-step installation.
- Available certified to military standards.

Hole Series threaded inserts are designed for use in tough-to-tap, high-strength materials as well as softer metals and plastics.



Superior pull-out resistance in softer metals and plastics from the external v-form thread.

Circular cutting elements self-tap and lock into the base material. They are able to resist extreme vibration with no loss in performance.

High-quality internal threads are wear resistant, Unified and American Standard, class 2B, or ISO Metric standard, class 6H threads. Military versions conform to Unified and American Standard, class 3B.

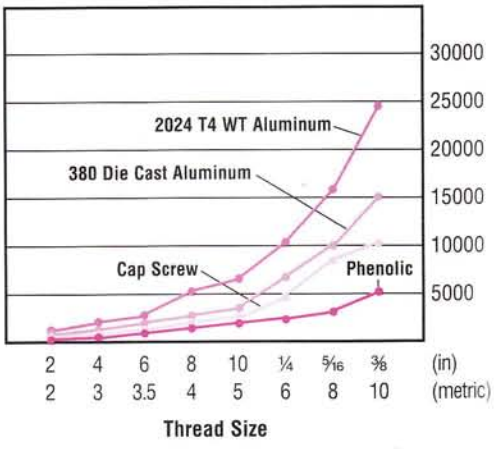
This threaded insert is a solid metal bushing that is **available in stainless steel, steel with zinc plating, or steel with cadmium plating in regular, medium or short length.**

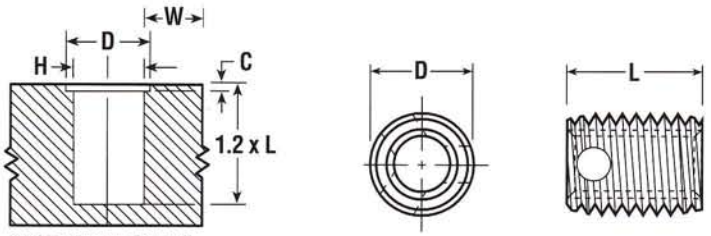
PERFORMANCE DATA*

Internal Thread Size (in)	Internal Thread Size (metric)	Effective Shear Area $(in)^2$	Pull-Out Resistance (lb) Phenolic (9,500 PSI Shear)	Pull-Out Resistance (lb) 380 Die Cast Aluminum (26,000 PSI Shear)	Pull-Out Resistance (lb) 2024 T4 Wrought Aluminum (40,000 PSI Shear)	Tensile Strength (lb) of 160,000 PSI Heat-Treated Cap Screw (in)	Tensile Strength (lb) of 160,000 PSI Heat-Treated Cap Screw (metric)
2	2	.040	380	1040	1600	–	510
4	3	.060	570	1560	2400	910	1250
6	3.5	.090	860	2340	3600	1370	1680
8	4	.130	1290	3380	5200	2120	2180
10	5	.170	1620	4420	6800	2825	3520
1/4	6	.270	2570	7020	10800	4800	4980
5/16	8	.410	3900	10660	16400	7900	9080
3/8	10	.610	5700	15860	24400	11700	14320
7/16	–	.780	7410	20280	31200	16050	–
1/2	12	1.040	9880	27040	41600	21550	20910
9/16	14	1.230	11590	31720	48800	27200	28520
5/8	16	1.610	15300	41860	64400	34200	38940
3/4	18	2.360	22420	61360	94400	50500	–

*Representative performance data for regular length. Preproduction prototype testing recommended for your application.

Pull-Out Resistance or Tensile Strength





STRAIGHT HOLE
WITH COUNTERBORE

SPECIFICATIONS

Inch Sizes		Metric Sizes		D	L Length			H	C
Internal Threads	Basic Part Number	Internal Threads	Basic Part Number	External Diameter	Regular (prefix H)	Medium (prefix HM)	Short (prefix HS)	Recommended Hole Diameter	Counterbore Diameter Depth
2-56	08656	M2 x 0.4	02040	.141	.188	.156	.125	.127	.030
4-40	11240	M3 x 0.5	03050	.172	.234	.187	.156	.159	.030
6-32	13832	M3.5 x 0.6	03560	.219	.281	.218	.187	.204	.030
8-32	16432	M4 x 0.7	04070	.250	.328	.250	.218	.235	.030
10-24 10-32	19024 19032	M5 x 0.8	05080	.297	.375	.296	.250	.278	.040
1/4-20 1/4-28	25020 25028	M6 x 1.0	06010	.375	.484	.375	.312	.352	.050
5/16-18 5/16-24	31218 31224	M8 x 1.25	08012	.469	.562	.469	.375	.443	.055
3/8-16 3/8-24	37516 37524	M10 x 1.5	10015	.563	.687	.562	.437	.533	.060
7/16-14 7/16-20	43714 43720	–	–	.640	.781	.656	.500	.608	.070
1/2-13 1/2-20	50013 50020	M12 x 1.75	12017	.734	.906	.750	.562	.697	.075
9/16-12 9/16-18	56212 56218	M14 x 2.0	14020	.813	1.000	.844	.625	.772	.080
5/8-11 5/8-18	62511 62518	M16 x 2.0	16020	.906	1.125	.937	.687	.862	.090
3/4-10 3/4-16	75010 75016	M18 x 2.0	18020	1.078	1.375	1.125	.812	1.029	.100

PART NUMBER SPECIFICATIONS = Length Prefix + Basic Part Number + Material Suffix

Example: 10-32 Medium-length, steel Hole Series threaded insert with zinc plating
HM-19032-14

M3 x 0.5 Short-length, stainless steel Hole Series threaded insert
HS-03050-50

Military Specifications: Military version conforms to MS35914.
Contact Customer Service for ordering information.

LENGTH PREFIX

H = Regular HM = Medium HS = Short

MATERIAL SUFFIX

12 = Case-hardened, cadmium-plated steel
14 = Case-hardened, zinc-plated steel
50 = Stainless steel

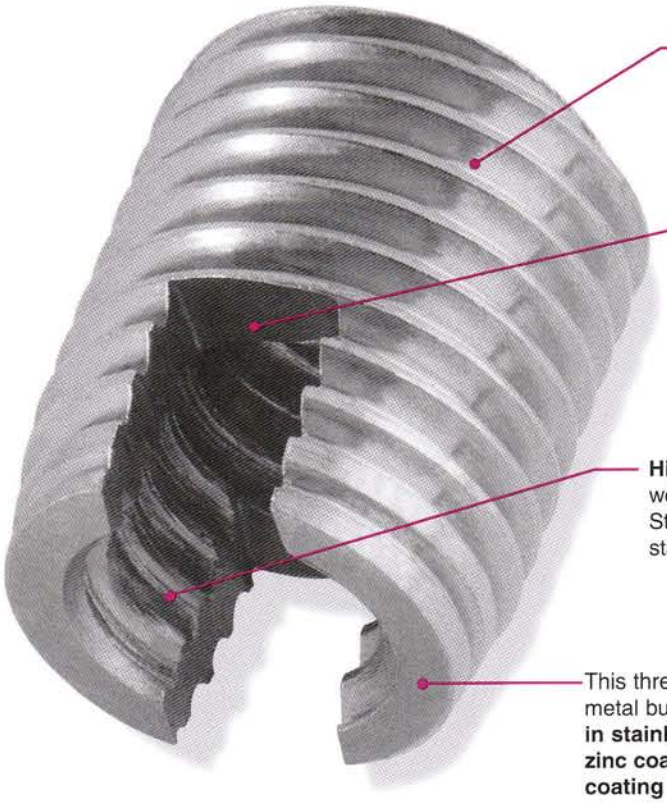
TAP-LOK SLOTTED SERIES

THREAD CUTTING

SLOTTED SERIES

- High pull-out resistance.
- Suitable for a wide range of metals and plastics.
- Superior vibration resistance.
- One-step installation.

Slotted Series threaded inserts are suitable for use in a wide range of machinable softer metals and plastics, particularly those that may contain abrasive fillers.



Superior pull-out resistance in softer metals and plastics from the external v-form thread.

Cutting slots are designed to quickly tap into the base material and lock the insert in place. They are able to resist extreme vibration without loss of performance.

High-quality internal threads are wear resistant, Unified and American Standard, class 2B, or ISO Metric standard, class 6H threads.

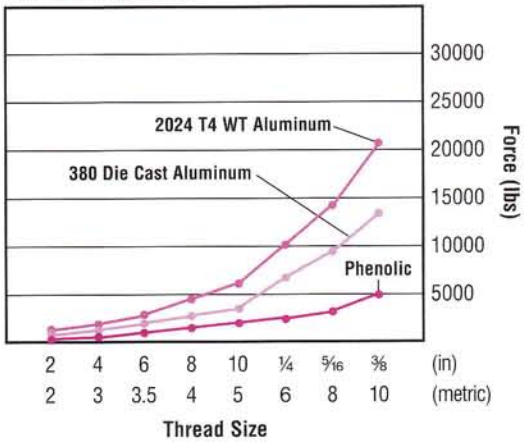
This threaded insert is a solid metal bushing that is **available in stainless steel, steel with zinc coating, steel with cadmium coating or brass in regular or short lengths.**

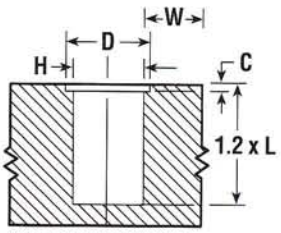
PERFORMANCE DATA*

Internal Thread Size (in)	Internal Thread Size (metric)	Effective Shear Area $(in)^2$	Pull-Out Resistance (lb) Phenolic (9,500 PSI Shear)	Pull-Out Resistance (lb) 380 Die Cast Aluminum (26,000 PSI Shear)	Pull-Out Resistance (lb) 2024 T4 Wrought Aluminum (40,000 PSI Shear)
2	2	.030	290	780	1200
4	3	.050	480	1300	2000
6	3.5	.080	760	2080	3200
8	4	.110	1050	2860	4400
10	5	.150	1430	3900	6000
1/4	6	.250	2380	6500	10000
5/16	8	.350	3330	9100	14000
3/8	10	.530	5040	13780	21200
7/16	–	.690	6560	17940	27600
1/2	12	.930	8840	24180	37200
9/16	14	1.140	10830	29640	45600
5/8	16	1.450	13780	37700	58000
3/4	18	2.150	20430	55900	86000

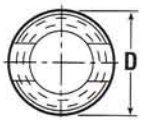
*Representative performance data for regular length. Preproduction prototype testing recommended for your application.

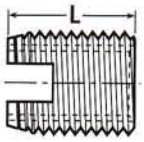
Pull-Out Resistance





STRAIGHT HOLE
WITH COUNTERBORE





SPECIFICATIONS

Inch Sizes		Metric Sizes		D	L		H			C
					Length		Recommended Hole Diameter			
Internal Threads	Basic Part Number	Internal Threads	Basic Part Number	External Diameter	Regular (no prefix)	Short (prefix S)	Aluminum	Thermoset Plastic	Thermo-Plastic	Counter-bore Depth
2-56	08656	M2 x 0.4	02040	.141	.187	–	.128	.128	.127	.030
4-40	11240	M3 x 0.5	03050	.172	.234	.156	.156	.153	.149	.030
6-32	13832	M3.5 x 0.6	03560	.219	.281	.187	.200	.195	.191	.030
8-32	16432	M4 x 0.7	04070	.250	.328	.218	.231	.227	.223	.030
10-24 10-32	19024 19032	M5 x 0.8	05080	.297	.375	.250	.272	.267	.261	.040
1/4-20 1/4-28	25020 25028	M6 x 1.0	06010	.375	.484	.312	.346	.339	.333	.050
5/16-18 5/16-24	31218 31224	M8 x 1.25	08012	.469	.562	.375	.436	.428	.421	.055
3/8-16 3/8-24	37516 37524	M10 x 1.5	10015	.563	.687	.437	.524	.517	.509	.060
7/16-14 7/16-20	43714 43720	–	–	.640	.781	.500	.597	.588	.579	.070
1/2-13 1/2-20	50013 50020	M12 x 1.75	12017	.734	.906	.562	.687	.677	.667	.075
9/16-12 9/16-18	56212 56218	M14 x 2.0	14020	.813	1.000	.625	.762	.751	.740	.080
5/8-11 5/8-18	62511 62518	M16 x 2.0	16020	.906	1.125	.687	.850	.838	.826	.090
3/4-10 3/4-16	75010 75016	M18 x 2.0	18020	1.078	1.375	.812	1.016	1.003	.990	.100

PART NUMBER SPECIFICATIONS = Length Prefix + Basic Part Number + Material Suffix

Example: 10-32 Short-length, steel Slotted Series threaded insert with zinc plating
S-19032-14

M3 x 0.5 Regular-length, stainless steel Slotted Series threaded insert
05080-50 (no length prefix for regular)

LENGTH PREFIX
None = Regular S = Short

MATERIAL SUFFIX
12 = Case-hardened, cadmium-plated steel
14 = Case-hardened, zinc-plated steel
50 = Stainless steel
30 = Brass

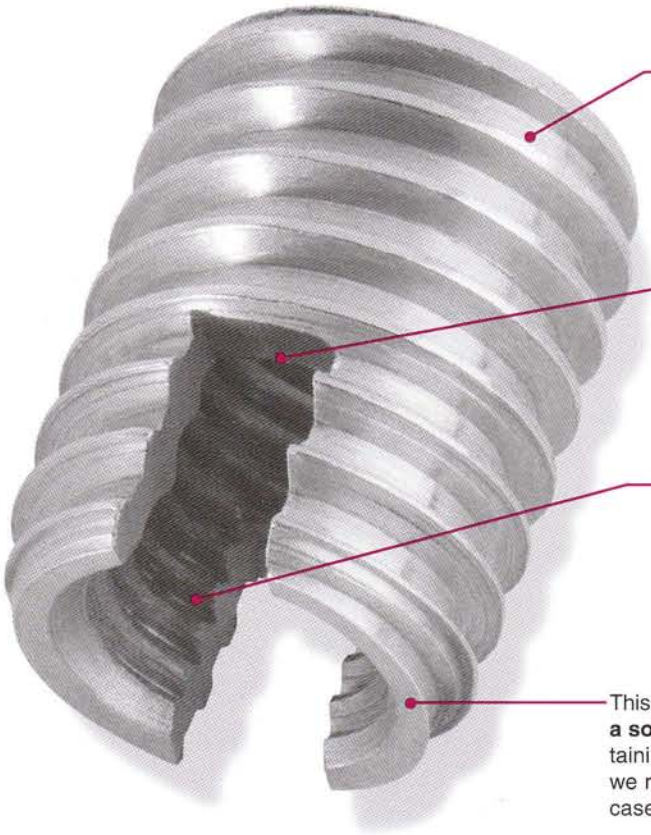
TAP-LOK COARSE SERIES

THREAD CUTTING

COARSE SERIES

- Highest pull-out resistance for plastics.
- Coarse external threads avoid stress cracking of base material.
- Self-tapping and self-locking.
- Suitable for thermosetplastics and thermoplastics.
- Superior vibration resistance.
- One-step installation.

Coarse external-thread series, brass inserts are designed specifically for use in plastics.



The **widely spaced threads** reduce installation torque and provide strong threads for superior pull-out resistance even in brittle plastics.

Cutting slots are self-tapping and self-locking for quick, easy installation and excellent resistance to vibration.

High-quality internal threads are wear resistant. Unified and American Standard, class 2B, or ISO Metric standard, class 6H threads.

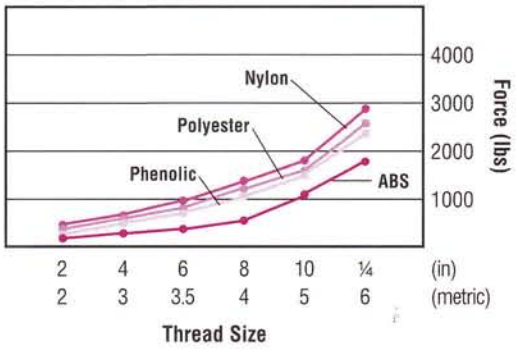
This threaded insert is **standard as a solid brass bushing**. For plastics containing highly abrasive fillers, we recommend regular slotted case-hardened steel inserts.

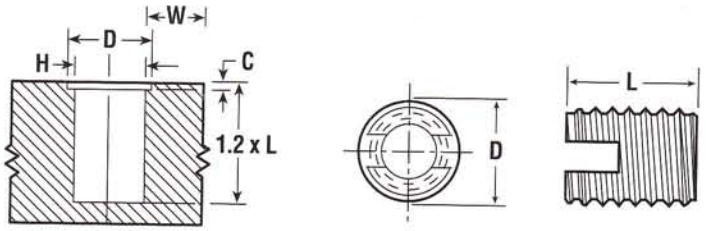
PERFORMANCE DATA*

Internal Thread Size (in)	Internal Thread Size (metric)	Effective Shear Area $(in)^2$	Pull-Out Resistance (lb) ABS (7,500 PSI Shear)	Nylon (12,000 PSI Shear)	Phenolic (9,500 PSI Shear)	Polyester (10,400 PSI Shear)
2	2	.030	140	360	290	310
4	3	.050	240	600	480	520
6	3.5	.080	380	960	760	830
8	4	.110	530	1320	1050	1140
10	5	.150	1130	1800	1430	1560
¼	6	.250	1880	3000	2380	2600

*Representative performance data for regular length. Preproduction prototype testing recommended for your application.

Pull-Out Resistance





STRAIGHT HOLE
WITH COUNTERBORE

SPECIFICATIONS

Inch Sizes		Metric Sizes		D	L	H	C
Internal Threads	Basic Part Number	Internal Threads	Part Number	Diameter	Length	Recommended Hole Diameter	Counterbore Depth
2-56	C08656-30	M2 x 0.4	C02040-30	.141	.187	.126	.030
4-40	C11240-30	M3 x 0.5	C03050-30	.171	.234	.150	.040
6-32	C13832-30	M3.5 x 0.6	C03560-30	.218	.281	.192	.050
8-32	C16432-30	M4 x 0.7	C04070-30	.250	.328	.224	.050
10-32	C19032-30	M5 x 0.8	C05080-30	.296	.375	.251	.055
¼-20	C25020-30	M6 x 1.0	C06010-30	.375	.484	.333	.060

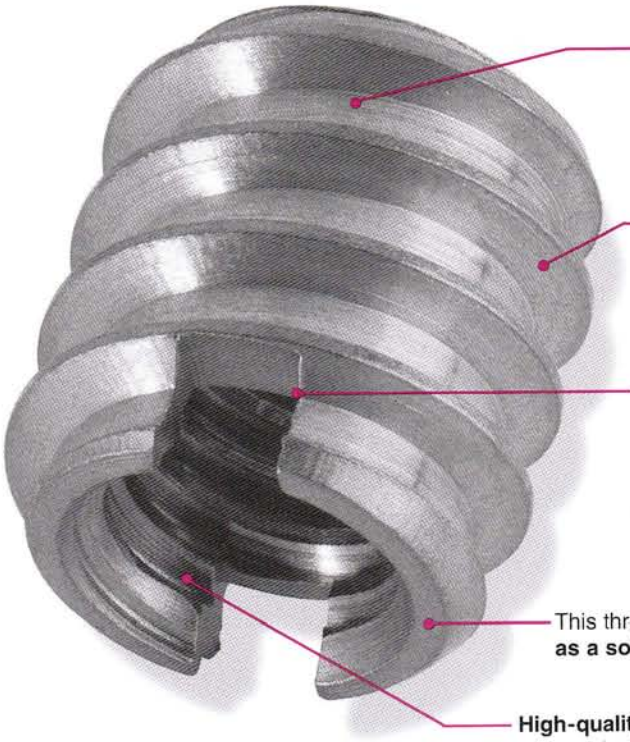
TAP-LOK WOOD SERIES

THREAD CUTTING

WOOD SERIES

- Suitable for use in hard or soft woods.
- Coarse pitch thread design reduces danger of splitting wood.
- Superior pull-out and vibration resistance.
- One-step, self-tapping installation.

Wood Series threaded inserts are designed specifically for use in wood for furniture, cabinets, plywood panels, and any components requiring quick on-site assembly or repeated assembly and disassembly.



Wide thread spacing provides stronger threads for greater pull-out resistance.

Coarse pitch external thread for **maximum strength and installation in small wood sections** with less danger of splitting.

Cutting slots are self-tapping and self-locking for quick, easy installation and excellent resistance to vibration.

This threaded insert is **standard as a solid brass bushing.**

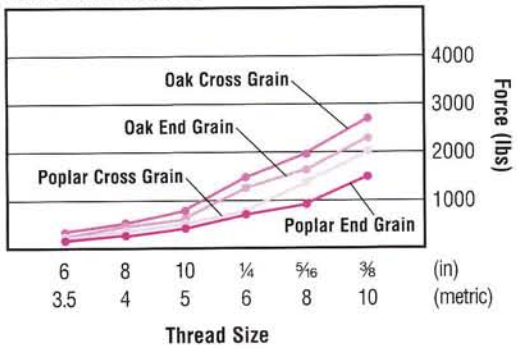
High-quality internal threads are wear resistant. Unified and American Standard, class 2B, or ISO Metric standard, class 6H threads.

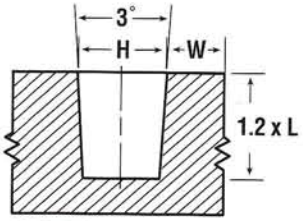
PERFORMANCE DATA*

Internal Thread Size (in)	Internal Thread Size (metric)	Pull-Out Resistance (lb) Poplar Cross Grain	Poplar End Grain	Oak Cross Grain	Oak End Grain
6	3.5	260	125	330	260
8	4	300	240	500	400
10	5	500	450	850	625
¼	6	850	725	1425	1250
5/16	8	1350	900	1950	1600
⅜	10	2000	1450	2700	2200

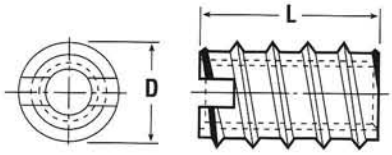
*Representative performance data for regular length. Preproduction prototype testing recommended for your application.

Pull-Out Resistance





STRAIGHT HOLE WITH
NO COUNTERBORE

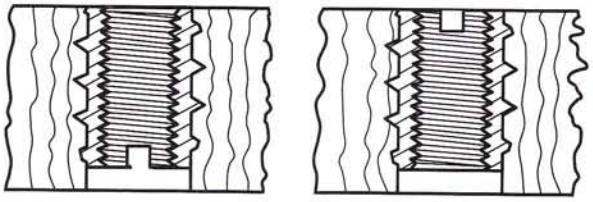


SPECIFICATIONS

Inch Sizes Internal Threads	Part Number	D External Diameter	L Length	H Recommended Hole Diameter
4-40	W-11240-30	.219	.344	.172
6-32	W-13832-30	.219	.344	.172
8-32	W-16432-30	.250	.406	.203
10-24	W-19024-30	.297	.469	.238
10-32	W-19032-30	.297	.469	.238
1/4-20	W-25020-30	.375	.500	.312
5/16-18	W-31218-30	.469	.500	.375
3/8-16	W-37516-30	.563	.938	.468

INSTALLATION RECOMMENDATIONS

For most wood applications including medium-hard and hardwood, the threaded insert should be installed slot down. The cutting action at the slotted section allows easier installation and avoids radial stresses which may otherwise tend to split the wood.



In soft wood, the threaded insert should be installed slot up. The threaded insert is then thread forming, similar to a wood screw. The absence of cutting provides a firm anchor in the relatively softwood.

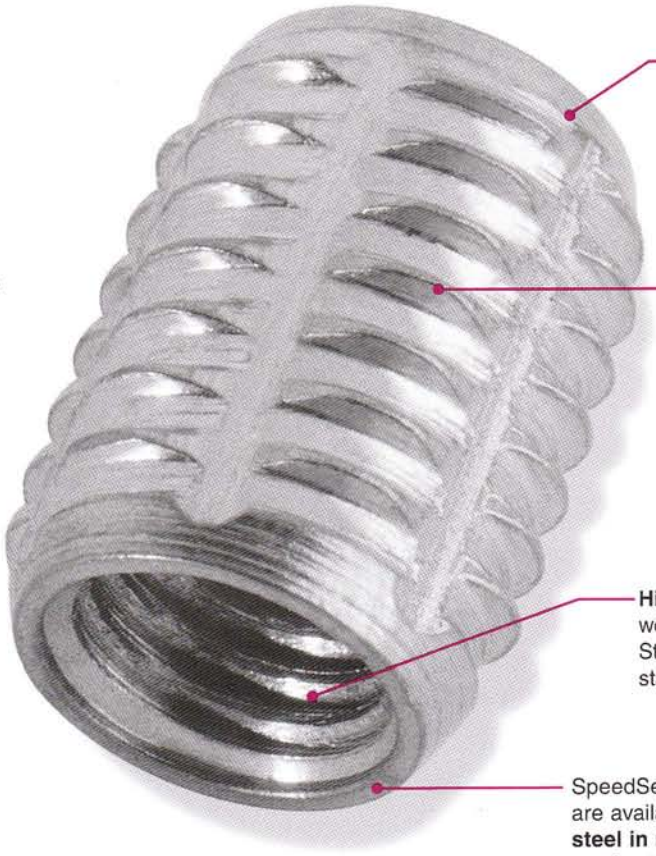
SPEEDSERT INSERTS

THREAD FORMING

SPEEDSERT

- Very high pull-out resistance.
- Suitable for a wide range of softer metals and plastics.
- Symmetric design for automatic feeding.
- One-step installation.
- No metal chips.

SpeedSert, self-threading inserts form strong threads in softer metals and plastics for a very high pull-out resistance. Their locking action makes them very resistant to vibration.



Ideal for automatic feed installations. Symmetrical design allows inserts to be installed using either end.

Exterior lobes are designed to roll through the base material and lock the insert in place without leaving chips behind. The wave gently rolls through the base material pushing it back and then allowing it to return behind the wave crest to securely lock the insert in place.

High-quality internal threads are wear resistant. Unified and American Standard, class 2B, or ISO Metric standard, class 6H threads.

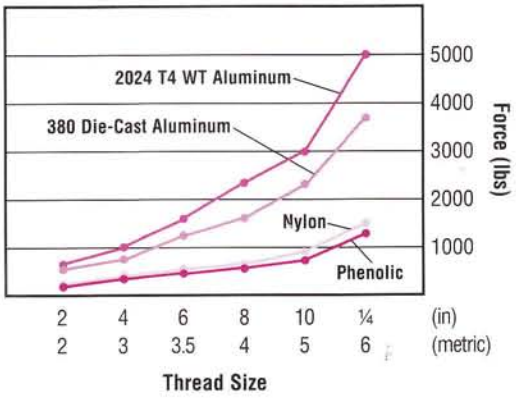
SpeedSert threaded insert are available in **stainless steel in regular, medium, or short lengths.**

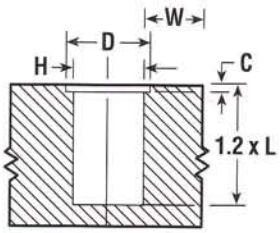
PERFORMANCE DATA*

Internal Thread Size (in)	Internal Thread Size (metric)	Effective Shear Area $(in)^2$	Pull-Out Resistance (lb) Phenolic (9,500 PSI Shear)	Nylon (12,000 PSI Shear)	380 Die Cast Aluminum (30,000 PSI Shear)	2024 T4 Wrought Aluminum (40,000 PSI Shear)
2	2	.015	140	180	450	600
4	3	.025	240	300	750	1000
6	3.5	.040	380	480	1200	1600
8	4	.055	520	660	1650	2200
10	5	.075	710	900	2250	3000
¼	6	.125	1190	1500	3750	5000

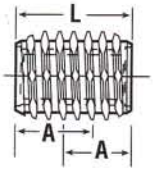
*Representative performance data for regular length. Preproduction prototype testing recommended for your application.

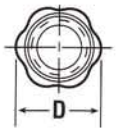
Pull-Out Resistance





STRAIGHT HOLE
WITH COUNTERBORE





SPECIFICATIONS

Inch Sizes		Metric Sizes		D	L	A	H Recommended Hole Diameter		C
Internal Threads	Basic Part Number	Internal Threads	Basic Part Number	Diameter	Length*	Internal Lock Location+	Plastics	Aluminum	Counterbore Depth
2-56	SP0256	M2 x 0.4	SPM2 x 0.4	.138	.190	.120	.125	.128	.020
	SPA0256		SPAM2 x 0.4	.138	.160	NA	.125	.128	.020
	SPB0256		SPBM2 x 0.4	.138	.120	NA	.125	.128	.020
4-40	SP0440	M3 x 0.5	SPM3 x 0.5	.172	.230	.150	.155	.161	.040
	SPA0440		SPAM3 x 0.5	.172	.190	.130	.155	.161	.040
	SPB0440		SPBM3 x 0.5	.172	.160	NA	.155	.161	.040
6-32	SP0632	M3.5 x 0.6	SPM3.5 x 0.6	.216	.280	.190	.197	.204	.040
	SPA0632		SPAM3.5 x 0.6	.216	.220	.160	.197	.204	.040
	SPB0632		SPBM3.5 x 0.6	.216	.190	NA	.197	.204	.040
8-32	SP0832	M4 x 0.7	SPM4 x 0.7	.253	.330	.210	.234	.237	.040
	SPA0832		SPAM4 x 0.7	.253	.250	.170	.234	.237	.040
	SPB0832		SPBM4 x 0.7	.253	.220	NA	.234	.237	.040
10-24	SP1024	M5 x 0.8	SPM5 x 0.8	.280	.370	.240	.253	.263	.050
	SPA1024		SPAM5 x 0.8	.280	.300	.210	.253	.263	.050
	SPB1024		SPBM5 x 0.8	.280	.250	NA	.253	.263	.050
10-32	SP1032			.280	.370	.230	.253	.263	.050
	SPA1032			.280	.300	.200	.253	.263	.050
	SPB1032			.280	.250	NA	.253	.263	.050
¼-20	SP420	M6 x 1.0	SPM6 x 1.0	.370	.490	.320	.340	.348	.050
	SPA420		SPAM6 x 1.0	.370	.370	.260	.340	.348	.050
	SPB420		SPBM6 x 1.0	.370	.312	NA	.340	.348	.050
¼-28	SP428			.370	.490	.290	.340	.348	.050
	SPA428			.370	.370	.230	.340	.348	.050
	SPB428			.370	.312	NA	.340	.348	.050

PART NUMBER SPECIFICATION = Length prefix + Metric prefix + Lock prefix + Internal threaded size

Example: 10-32 Medium-length, threaded insert
SPA1032

3 x 0.5 Regular-length, metric threaded insert with internal lock
SPML3 x 0.5

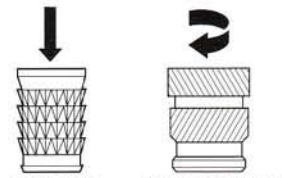
NA = Not Available

***LENGTH PREFIX**
SP = Regular SPA = Medium SPB = Short

METRIC PREFIX
(None) = Inch size
M = Metric

+LOCK PREFIX
(None) = Non-locking threaded insert with passivation
L = Locking threaded insert with dry-lubricant finish

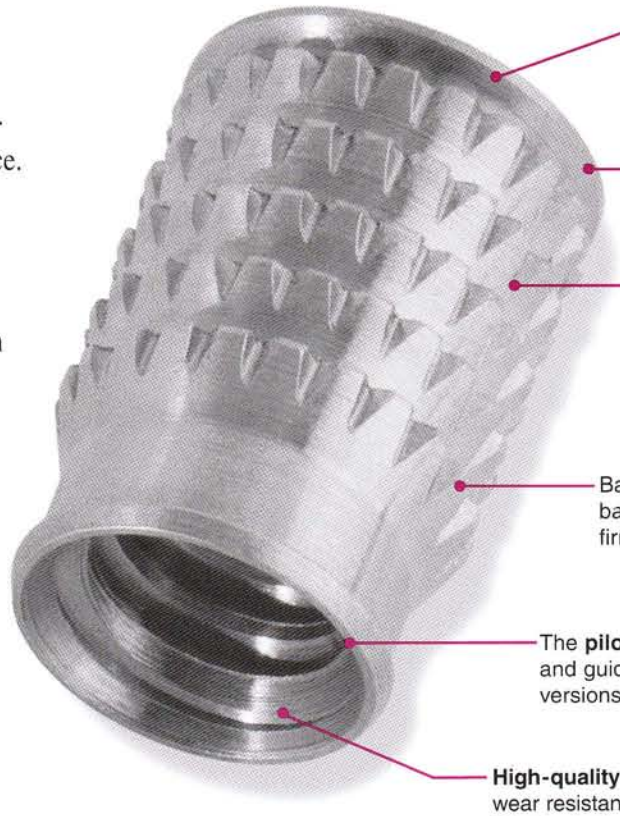
BARB-SERT INSERTS



BARB–SERT

- Designed for use with thermoplastics.
- Superior pull-out and torque resistance.
- Suitable for push-in, ultrasonic or heated installations.

Barb-Sert threaded inserts provide superior pull-out and torque resistance in thermoplastics, making them a popular choice for molders.



Barb-Serts are made of **solid brass in regular or short length.**

The **top ring** directs molten plastic downward leaving a mar-free surface.

Unique exterior barb pattern makes it possible to install Barb-Serts into straight or slightly tapered holes using a variety of methods such as push-in, ultrasound or heat.

Barbs displace and capture plastic base material during installation to firmly lock the insert in place.

The **pilot ring** eases orientation and guides installation. Headed versions are also available.

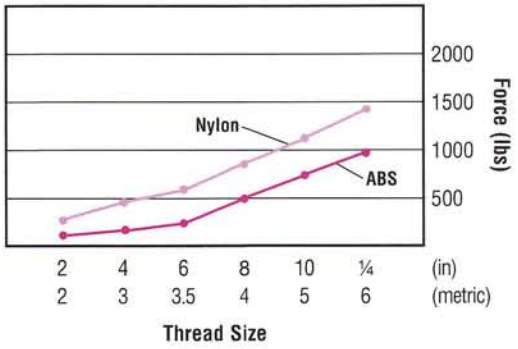
High-quality internal threads are wear resistant, Unified and American Standard, class 2B, or ISO Metric standard, class 6H threads.

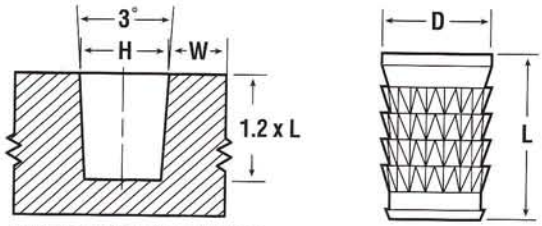
PERFORMANCE DATA*

Internal Thread Size (in)	Internal Thread Size (metric)	Pull-Out Resistance (lb) ABS	Pull-Out Resistance (lb) Nylon
2	2	140	240
4	3	270	420
6	3.5	330	590
8	4	500	800
10	5	710	1100
¼	6	990	1410

*Representative performance data for regular length. Preproduction prototype testing recommended for your application.

Pull-Out Resistance





STRAIGHT HOLE WITH NO COUNTERBORE

SPECIFICATIONS

Inch Sizes		Metric Sizes		D	L Length		H	W
Internal Thread Size	Part Number	Internal Thread Size	Part Number	Diameter	Regular	Short	Recommended Hole Diameter	Recommended Minimum Wall Thickness
2-56	B08656-30	M2 x 0.4	B02545-30	.173	.205		.159	.067
2-56	BS08656-30	M2 x 0.4	BS02545-30	.173		.160	.159	.067
4-40	B11240-30	M3 x 0.5	B03050-30	.173	.205		.159	.067
4-40	BS11240-30	M3 x 0.5	BS03050-30	.173		.160	.159	.067
6-32	B13832-30	M3.5 x 0.6	B03560-30	.217	.276		.196	.089
6-32	BS13832-30	M3.5 x 0.6	BS03560-30	.217		.160	.196	.089
8-32	B16432-30	M4 x 0.7	B04070-30	.250	.335		.229	.098
8-32	BS16432-30	M4 x 0.7	BS04070-30	.250		.217	.229	.098
10-24	B19024-30	M5 x 0.8	B05080-30	.280	.395		.255	.114
10-24	BS19024-30	M5 x 0.8	BS05080-30	.280		.257	.255	.114
10-32	B19032-30			.280	.395		.255	.114
10-32	BS19032-30			.280		.257	.255	.114
¼-20	B25020-30	M6 x 1	B06010-30	.335	.500		.320	.130
¼-20	BS25020-30	M6 x 1	BS06010-30	.335		.296	.320	.130

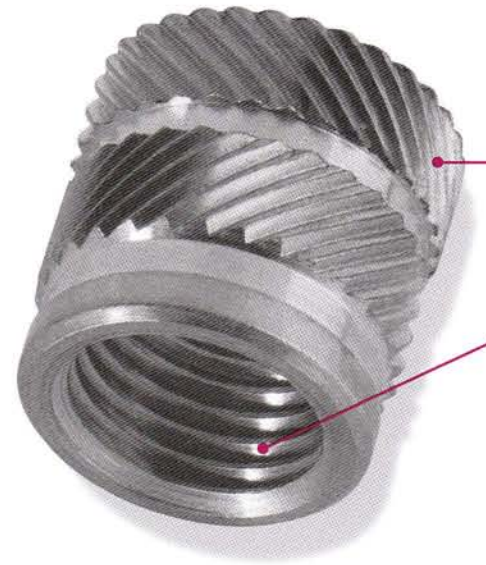
VIBRA-SERT INSERTS

ULTRASOUND
OR HEAT

VIBRA-SERT

- Superior torque resistance.
- Designed for use in thermoplastics.
- Provides a clean surface finish.

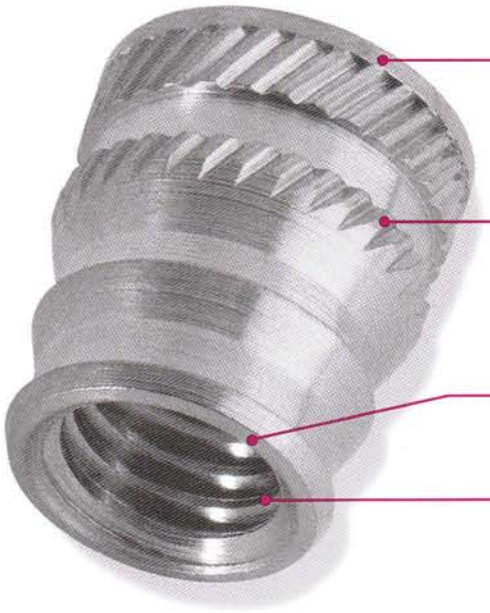
Vibra-Sert inserts are installed with ultrasound to produce high torque resistance and good pull-out resistance in thermoplastics. Vibra-Sert I inserts are to be used in straight or slightly tapered holes. Vibra-Sert II inserts are designed specifically for use in tapered holes.



VIBRA-SERT I

Exterior knurls combined with knurl channel design capture plastic base material during installation and lock the insert in place.

High-quality internal threads are wear resistant, Unified and American Standard, class 2B, or ISO Metric standard, class 6H threads.



VIBRA-SERT II

The top flange directs molten plastic downward leaving a mar-free surface.

Exterior knurls combined with knurl channel design capture plastic base material during installation and lock the insert in place.

The pilot ring eases orientation and guides installation.

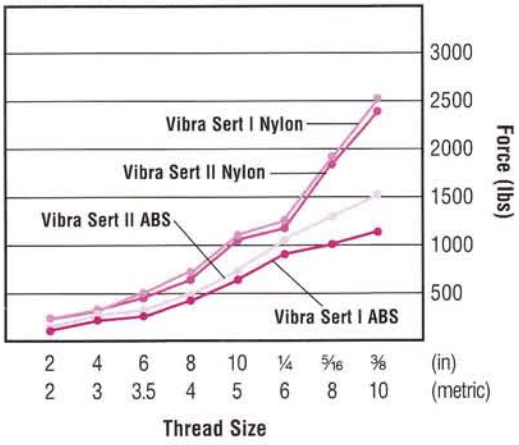
Vibra-Serts are **made of solid brass in regular or short lengths.** Headed versions are also available.

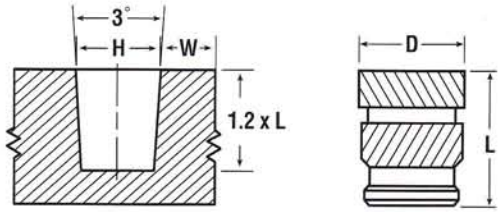
PERFORMANCE DATA*

Internal Thread Size (in)	Internal Thread Size (metric)	Pull-Out Resistance (lb)			
		Vibra Sert I		Vibra Sert II	
		ABS	Nylon	ABS	Nylon
2	2	120	210	140	200
4	3	240	370	280	350
6	3.5	290	505	330	480
8	4	440	700	500	650
10	5	620	1100	710	1050
1/4	6	870	1260	1030	1200
5/16	8	1030	1890	1340	1800
3/8	10	1170	2520	1520	2400

*Representative performance data for regular length. Preproduction prototype testing recommended for your application.

Pull-Out Resistance

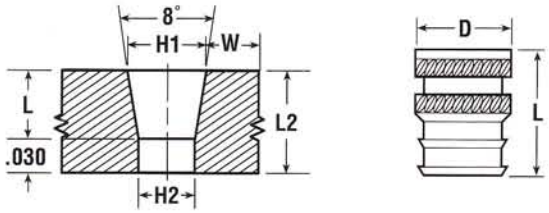




STRAIGHT HOLE WITH NO COUNTERBORE

VIBRA-SERT® I SPECIFICATIONS

Inch Sizes		Metric Sizes		D	L	H	W
Internal Thread Size	Part Number	Internal Thread Size	Part Number	Diameter	Length	Recommended Hole Diameter	Recommended Minimum Wall Thickness
2-56	V108656-30	M2 x 0.4	V102040-30	.143	.157	.126	.051
4-40	V111240-30	M3 x 0.5	V103050-30	.183	.226	.157	.063
6-32	V113832-30	M3.5 x 0.6	V103560-30	.216	.281	.188	.071
8-32	V116432-30	M4 x 0.7	V104070-30	.250	.321	.221	.083
10-32	V119032-30	M5 x 0.8	V105080-30	.280	.375	.252	.102
1/4-20	V125020-30	M6 x 1	V106010-30	.343	.500	.315	.130
5/16-18	V131218-30	M8 x 1.25	V108012-30	.405	.500	.377	.177
3/8-16	V137516-30	M10 x 1.5	V110015-30	.462	.500	.440	.236



TAPERED HOLE

VIBRA-SERT® II SPECIFICATIONS

Inch Sizes		Metric Sizes		D	L Length		H Recommended Hole Diameter		W
Internal Thread Size	Part Number	Internal Thread Size	Part Number	Diameter	Regular	Short	H1	H2	Recommended Minimum Wall Thickness
2-56	V208656-30	M2 x 0.4	V202245-30	.141	.188		.123	.107	.080
2-56	V2S08656-30	M2 x 0.4	V2S02245-30	.141		.115	.123	.118	.080
4-40	V211240-30	M3 x 0.5	V203050-30	.172	.219		.159	.141	.093
4-40	V2S11240-30	M3 x 0.5	V2S03050-30	.172		.135	.159	.153	.093
6-32	V213832-30	M3.5 x 0.6	V203560-30	.219	.250		.206	.185	.116
6-32	V2S13832-30	M3.5 x 0.6	V2S03560-30	.219		.150	.206	.199	.116
8-32	V216432-30	M4 x 0.7	V204070-30	.250	.312		.234	.208	.133
8-32	V2S16432-30	M4 x 0.7	V2S04070-30	.250		.185	.234	.226	.133
10-24	V219024-30			.297	.375		.277	.246	.159
10-24	V2S19024-30			.297		.225	.277	.267	.159
10-32	V219032-30			.297	.375		.277	.246	.159
10-32	V2S19032-30			.297		.225	.277	.267	.159
		M5 x 0.8	V205080-30	.328	.438		.315	.278	.171
		M5 x 0.8	V2S05080-30	.328		.265	.315	.303	.171
1/4-20	V225020-30	M6 x 1	V206010-30	.375	.500		.363	.321	.194
1/4-20	V2S25020-30	M6 x 1	V2S06010-30	.375		.300	.363	.349	.194
5/16-18	V231218-30	M8 x 1.25	V208012-30	.469	.562		.448	.401	.245
5/16-18	V2S31218-30	M8 x 1.25	V2S08012-30	.469		.335	.448	.431	.245
3/8-16	V237516-30	M10 x 1.5	V210015-30	.563	.625		.540	.488	.293
3/8-16	V2S37516-30	M10 x 1.5	V2S10015-30	.563		.375	.540	.523	.293

INSTALLATION

Installation tools for Tap-lok thread-cutting and SpeedSert thread-forming inserts feature hardened studs for twisting the threaded insert into the base material and a release mechanism for easy removal of the tool once the insert is locked into the base material.

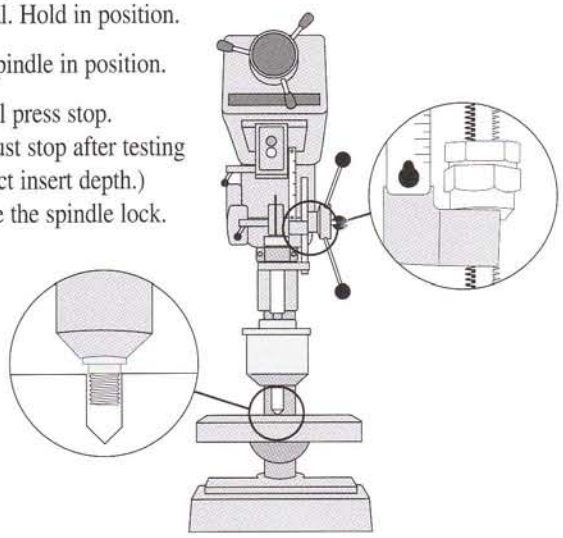
For installation, the insert is twisted onto the tool stud and into contact with the tool nose piece. The tool is then used to twist the threaded insert into the base material.

To remove the tool from the insert, the insert must be released. Production tools automatically release the insert when torque on the tool is reversed. Hand tools must be released manually.

DRILL PRESS INSTALLATION-PRODUCTION TOOL

3 Easy Steps:

1. Bring end of nose piece tightly against surface of material. Hold in position.
2. Lock spindle in position.
3. Set drill press stop. (Readjust stop after testing for exact insert depth.) Release the spindle lock.



After set-up is complete, hold the insert so that the rotating tool drive stud will thread into it. Hold the insert by the outer thread until it is snug against the nose piece.

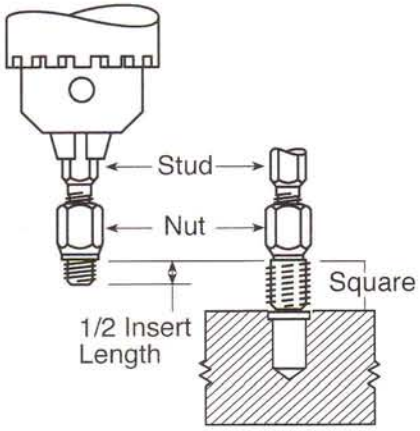
Maintain the speed of the installation stud to between 100 and 500 RPM.

HAND TOOL INSTALLATION

To Install:

1. Install hand tool in a holding device such as a drill press chuck or hand-tapping fixture to assure perpendicular alignment with work.

   Caution: *Do not use power. Chucking the hand tool on a drill press is for alignment purposes only.*
2. Screw inserts on stud until it contacts nut.
3. Install to correct depth in the drilled hole.
4. Hold stud against rotation and loosen the nut with a wrench.
5. Unscrew stud from the insert.



It is important that the installation tool be squarely aligned with the work surface.

Field repairs can be made by using the hand tool in conjunction with either a carpenter's brace or a speed wrench.

INSTALLATION TOOLS FOR THREAD-CUTTING AND THREAD-FORMING INSERTS

Inch Sizes			Metric Sizes		
Internal Threads	Production Tool Number	Hand Tool Number	Internal Threads	Production Tool Number	Hand Tool Number
2-56	PT0256	HT0256	M2 x 0.4	PTM0204	HTM0204
4-40	PT0440	HT0440	M3 x 0.5	PTM0305	HTM0305
6-32	PT0632	HT0632	M3.5 x 0.6	PTM0306	HTM0306
8-32	PT0832	HT0832	M4 x 0.7	PTM0407	HTM0407
10-24	PT1024	HT1024	M5 x 0.8	PTM0508	HTM0508
10-32	PT1032	HT1032	–	–	–
1/4-20	PT2520	HT2520	M6 x 1.0	PTM0610	HTM0610
1/4-28	PT2528	HT2528	–	–	–
5/16-18	PT3118	HT3118	M8 x 1.25	PTM0812	HTM0812
5/16-24	PT3124	HT3124	–	–	–
3/8-16	PT3716	HT3716	M10 x 1.5	PTM1015	HTM1015
3/8-24	PT3724	HT3724	–	–	–
7/16-14	PT4314	HT4314	–	–	–
7/16-20	PT4320	HT4320	–	–	–
1/2-13	PT5013	HT5013	M12 x 1.75	PTM1217	HTM1217
1/2-20	PT5020	HT5020	–	–	–
9/16-12	PT5612	HT5612	M14 x 2.0	PTM1420	HTM1420
9/16-18	PT5618	HT5618	–	–	–
5/8-11	PT6211	HT6211	M16 x 2.0	PTM1620	HTM1620
5/8-18	PT6218	HT6218	–	–	–
3/4-10	PT7510	HT7510	M18 x 2.0	PTM1820	HTM1820
3/4-16	PT7516	HT7516	–	–	–

IMPORTANT NOTES

1. High-volume users are advised to order replacement studs when placing insert order.
2. Special tools are available for installing threaded inserts into deep recesses and close to obstructions.

For further information, contact Customer Service.

To Order Production or Hand Tools:

Specify the tool number for the internal thread size of the thread-cutting or thread-forming insert desired.

To Order Replacement Parts:

Replacement studs and nose pieces can be ordered for production tools. Specify the production tool number with a suffix:

Stud = ST
Nose Piece = NP

Example: Replacement nose piece for production tool for 8-32 insert would be specified by PT0832-NP.

MORE PRECISION PRODUCTS FROM GROOV-PIN

GROOVED PINS...FOR SUPERIOR HOLDING POWER

Choose from a wide range of grooved pins when your application needs to withstand severe shock and vibration. These solid pins feature three grooves which are pressed into the cylindrical body to expand its diameter to a size greater than its nominal diameter. When a grooved pin is pressed into a hole the constraining action compresses the expanded material producing a powerful holding force.

Grooved pins are made for fast, easy installation. All that is required is a straight drilled hole. Pins may be driven by hammer, air cylinder or hydraulic press, or may be hopper-fed for automatic installation.

KNURL PINS

Knurled pins are similar to grooved pins but feature a series of ridges or teeth around the nominal diameter rather than three grooves. The teeth may form a straight knurl, helical knurl or diamond knurl pattern. Since a wide variety of configurations is possible, most knurl pins are manufactured to customer specification.

Knurl pins are best suited for use in softer materials such as aluminum castings, plastics and applications where holding in a thin cross section is required.

SPRING PINS

For fast assembly and solid locking action, try tubular slotted spring pins. Available in plain or plated carbon spring steel, or in corrosion-resistant stainless.

DRIVE STUDS

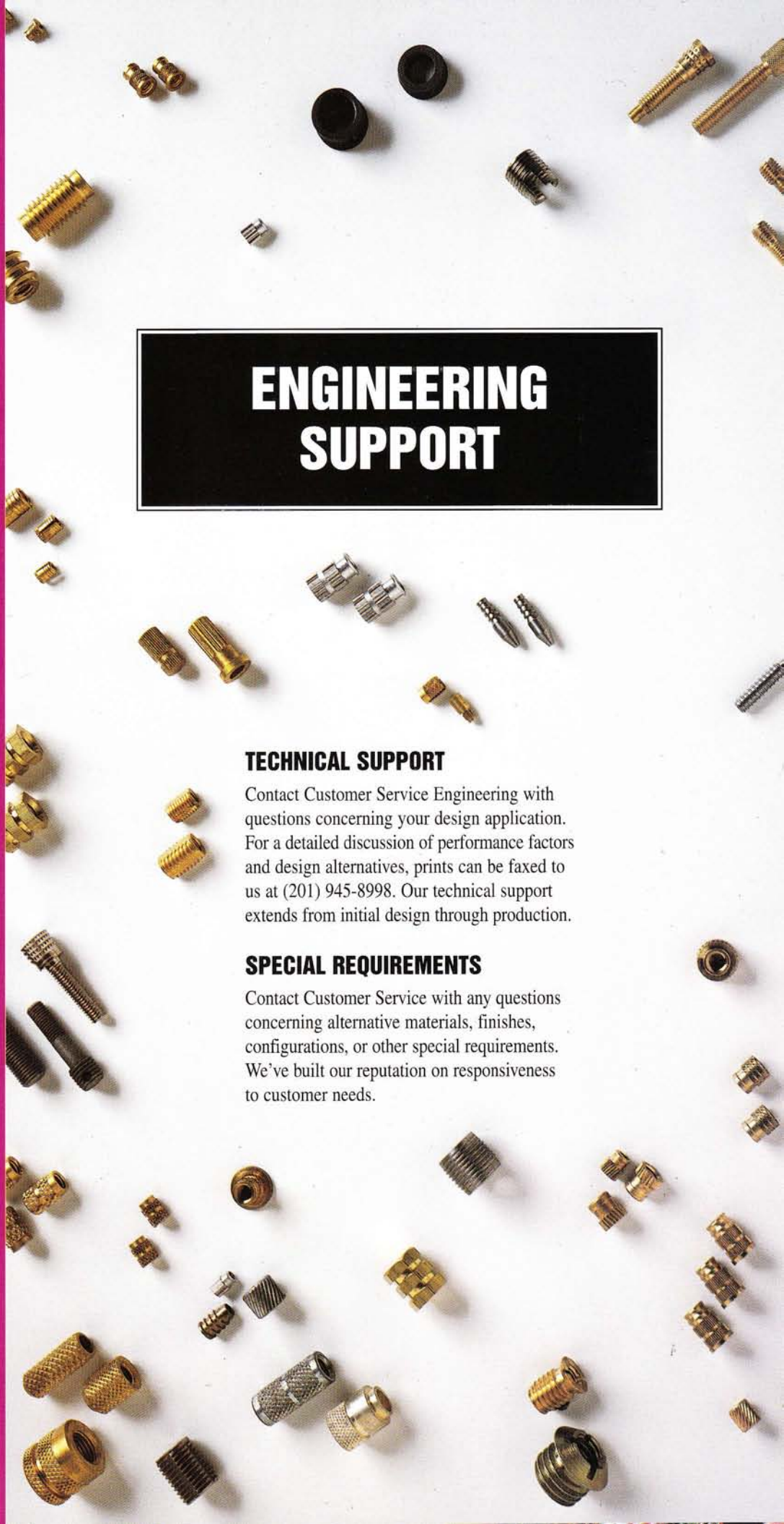
Grooved Drive Studs incorporate the same principles as grooved pins and are used to replace bolts, screws and rivets wherever a headed fastener is required. They can be applied quicker than threaded fasteners and require only a drilled hole for insertion. Offset Ribbed Drive Studs are designed for application in any material subject to plastic deformation, such as cold- and hot-rolled steel, zinc die castings, aluminum or magnesium sand, or die castings. They are particularly recommended for secure fastening where extreme vibration is encountered.

Quality Commitment

Groov-Pin Corporation is committed to being a world-class supplier of specialty fasteners and machined parts by fully satisfying the needs of its customers.

To do this in an increasingly demanding market, we strive to meet or exceed our customers' expectations of product quality, service and value.

We further recognize that our success depends on employing only the highest standards of innovative engineering, stringent manufacturing process control, and exacting quality inspection.



ENGINEERING SUPPORT

TECHNICAL SUPPORT

Contact Customer Service Engineering with questions concerning your design application. For a detailed discussion of performance factors and design alternatives, prints can be faxed to us at (201) 945-8998. Our technical support extends from initial design through production.

SPECIAL REQUIREMENTS

Contact Customer Service with any questions concerning alternative materials, finishes, configurations, or other special requirements. We've built our reputation on responsiveness to customer needs.