

PennEngineering®

BLIND THREADED INSERTS





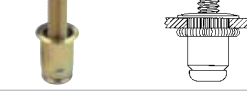




CATALOG

**ATLAS**®  
a **PEM**® Product

1009  
REV. 210

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# COMPANY

ATLAS® product manufacturing is housed within the PennEngineering 225,000 square foot facility located in Danboro, Pennsylvania. PennEngineering companies provide fastener and fastener installation design and product solutions worldwide for diverse industries, including electronics, computer, data/telecom, medical, automotive, marine, aircraft, and general manufacturing.



## CAPABILITIES

### Application Engineering Services

From our factories or in the field we can provide you with application analysis/review, 3D modeling, product samples, on-site training and total engineering support.

### Comprehensive website

Our PEMNET.com fastening resource center provides the tools to help you determine which type of ATLAS® blind threaded insert or installation tool is right for you. It includes a complete CAD library, fastener selector tool, conversion tables, tutorials/animations, literature, tech help, and environmental compliance references.

### Custom Designs

Our engineers can assist you in finding the most efficient solution to your application, and design the right fastener to meet your needs.

### Installation Tools

We can assess your application and recommend equipment that helps you achieve your lowest installed cost. Systems can be developed to handle multiple fastener types simultaneously to address challenging component handling and fastener installation.



### Prototype Development

We're equipped with the latest equipment to provide prototype samples and short run production quantities for your testing and analysis.

### Technical Lab

We have comprehensive testing facilities in each of our manufacturing locations. Our trained technicians worldwide can perform testing and provide complete analysis on pushout, pullout, spinout and assembly torque.





## QUALITY

**At PennEngineering, our goal is 100% defect-free product. To this end, we have adopted a manufacturing strategy of defect prevention rather than defect detection. We use statistical tools throughout our manufacturing processes to monitor the performance and assure effective quality control of each process step. If a non-conforming situation arises, it is resolved immediately with the use of appropriate quality assurance tools.**

Our fastener quality management system is ISO9001 registered and Department of Defense QSLM approved, and we can support DFARS clause 252.225-7014 requirements. This further underscores our commitment to excellence as we continue to provide quality products and services that meet or exceed our customers' expectations.

We are members of the Automotive Industry Action Group (AIAG) where we work together with other member companies to resolve issues critical to the automotive supply chain.

PennEngineering is also a registered member of the International Material Data System (IMDS).

### RoHS Compliance

The majority of Atlas part numbers are compliant with the European RoHS directive (2002/95/EU).

We are committed to helping our customers select RoHS compliant products and offer this general statement regarding compliance of our fasteners to the RoHS directive. To check status of specific product types go to the Product Compliance Lookup on our website. If compliance certification on specific part numbers is needed, we can supply such certification if a list of our part numbers is supplied. Submit your request to [RoHS@pemnet.com](mailto:RoHS@pemnet.com).



## ATLAS® BLIND THREADED INSERTS AND STUDS OVERVIEW

Atlas® Blind threaded inserts are designed to provide strong threads in thin panel sections. They are called “blind” because they can be installed from one side of the panel. Access to both sides is not required.

That’s why these fasteners are ideally suited for tubing, extrusion, and other similar types of applications.

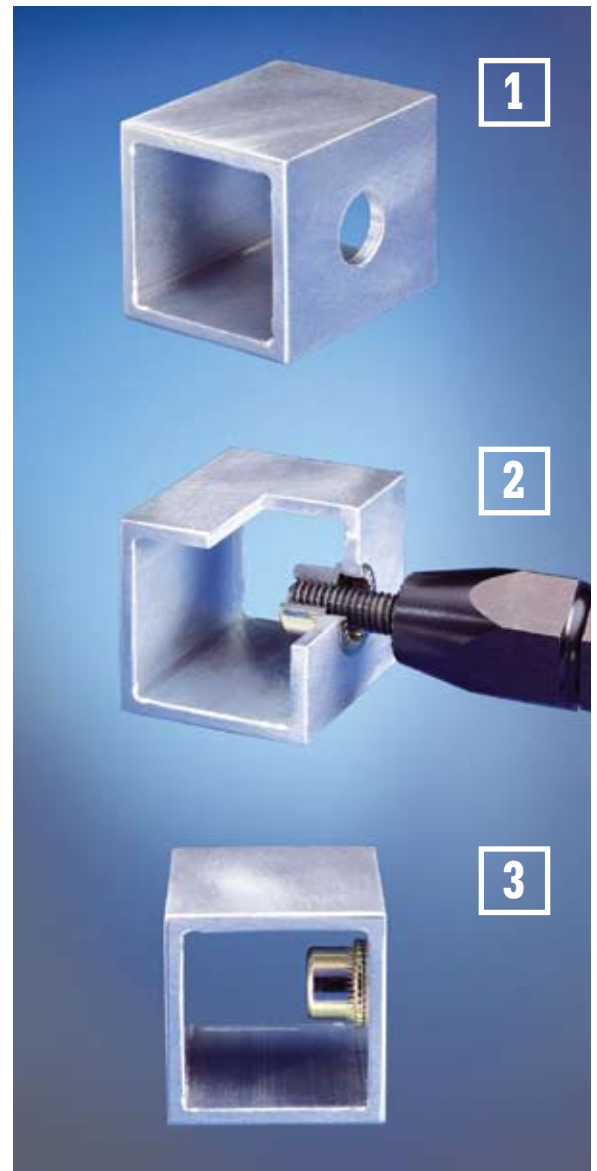
There are three types: SpinTite®, MaxTite®, and Plus+Tite® fasteners. The SpinTite types are used for most applications where strong threads are required for blind applications. They are installed from one side using a spin/spin technique. In addition to high thread strength and torque-out, these fasteners have minimal inventory requirements since each size can accommodate many grip ranges (material thickness).

The heavy duty MaxTite® types are designed for the most demanding applications. They are installed from one side using a “spin/pull” technique.

The blind Plus+Tite® inserts feature a slotted body that folds into four petals upon installation, gripping the backside of the parent material. These inserts can be installed into single, variable, or multiple thickness materials.

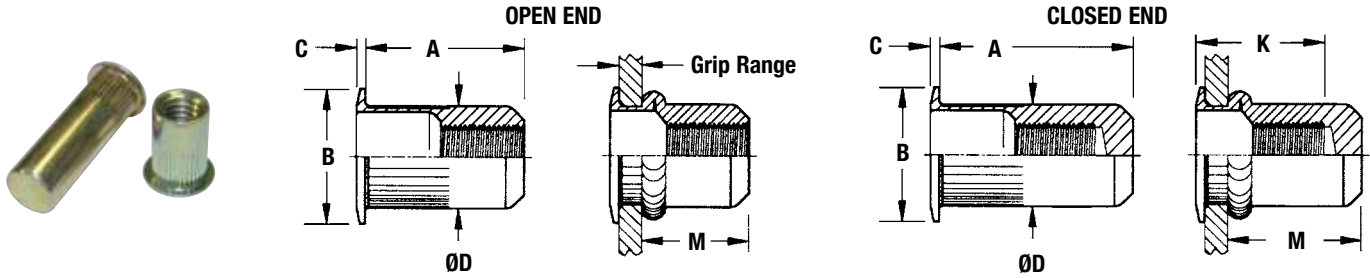
Typical industries that use blind threaded rivet technology:

- Appliances
- Automobiles and accessories
- Aviation and aerospace
- Electronics
- Food service equipment
- Furniture/fixtures/signs
- Industrial equipment
- Lawn and garden equipment
- Lighting
- Marine/boating
- Medical equipment
- Military equipment
- Recreational equipment
- Trucks and trailers





- Feature a large diameter, low-profile head and knurled shank.
- Offers highest all around strength.



All dimensions are in inches.

Thread Size (1)	Part Number (2)	Grip Range (1)	Open					Closed					Hole Size In Sheet +.006 -.000	
			A ±.015	B ±.015	C Nom.	ØD Max.	M Ref.	A ±.015	B ±.015	C Nom.	ØD Max.	K Min.		M Ref.
#6-32	AELS8-632-80	.020 - .080	.420	.390	.030	.265	.305	.740	.390	.030	.265	.43	.640	.266
#6-32	AELS8-632-130	.080 - .130	.470	.390	.030	.265	.305	.740	.390	.030	.265	.43	.580	.266
#8-32	AELS8-832-80	.020 - .080	.420	.390	.030	.265	.305	.740	.390	.030	.265	.43	.640	.266
#8-32	AELS8-832-130	.080 - .130	.470	.390	.030	.265	.305	.740	.390	.030	.265	.43	.580	.266
#10-32	AELS8-1032-130	.020 - .130	.475	.415	.030	.296	.315	.990	.415	.030	.296	.58	.845	.297
#10-32	AELS8-1032-225	.130 - .225	.585	.415	.030	.296	.315	.990	.415	.030	.296	.58	.735	.297
1/4-20	AELS8-420-165	.027 - .165	.580	.500	.030	.390	.380	1.190	.500	.030	.390	.70	1.005	.391
1/4-20	AELS8-420-260	.165 - .260	.680	.500	.030	.390	.380	1.190	.500	.030	.390	.70	.905	.391
5/16-18	AELS8-518-150	.027 - .150	.690	.685	.035	.530	.470	1.390	.685	.035	.530	.82	1.175	.531
5/16-18	AELS8-518-312	.150 - .312	.805	.685	.035	.530	.425	1.390	.685	.035	.530	.82	1.025	.531
3/8-16	AELS8-616-150	.027 - .150	.690	.685	.035	.530	.470	1.390	.685	.035	.530	.83	1.175	.531
3/8-16	AELS8-616-312	.150 - .312	.805	.685	.035	.530	.425	1.390	.685	.035	.530	.83	1.025	.531
1/2-13	AELS8-813-200	.063 - .200	1.150	.865	.047	.685	.850	—	—	—	—	—	—	.688
1/2-13	AELS8-813-350	.200 - .350	1.300	.865	.047	.685	.850	—	—	—	—	—	—	.688
1/2-13	AELS8-813-500	.350 - .500	1.450	.865	.047	.685	.850	—	—	—	—	—	—	.688

All dimensions are in millimeters.

Thread Size x Pitch (1)	Part Number (2)	Grip Range (1)	Open					Closed					Hole Size In Sheet +0.15	
			A ±0.38	B ±0.38	C Nom.	ØD Max.	M Ref.	A ±0.38	B ±0.38	C Nom.	ØD Max.	K Min.		M Ref.
M4 x 0.7	AELS8-470-2.0	0.5 - 2	10.67	9.91	0.76	6.73	7.75	18.8	9.91	0.76	6.73	11.6	16.26	6.75
M4 x 0.7	AELS8-470-3.3	2 - 3.3	11.94	9.91	0.76	6.73	7.75	18.8	9.91	0.76	6.73	11.6	14.73	6.75
M5 x 0.8	AELS8-580-3.3	0.5 - 3.3	12.07	10.54	0.76	7.52	8	25.15	10.54	0.76	7.52	15.6	21.46	7.6
M5 x 0.8	AELS8-580-5.7	3.3 - 5.7	14.86	10.54	0.76	7.52	8	25.15	10.54	0.76	7.52	15.6	18.67	7.6
M6 x 1	AELS8-610-4.2	0.7 - 4.2	14.73	12.7	0.76	9.91	9.65	30.23	12.7	0.76	9.91	17.5	25.53	10
M6 x 1	AELS8-610-6.6	4.2 - 6.6	17.27	12.7	0.76	9.91	9.65	30.23	12.7	0.76	9.91	17.5	22.99	10
M8 x 1.25	AELS8-8125-3.8	0.7 - 3.8	17.53	17.4	0.89	13.46	11.94	35.31	17.4	0.89	13.46	20.2	29.85	13.5
M8 x 1.25	AELS8-8125-7.9	3.8 - 7.9	20.45	17.4	0.89	13.46	10.8	35.31	17.4	0.89	13.46	20.2	26.04	13.5
M10 x 1.5	AELS8-1015-3.8	0.7 - 3.8	17.53	17.4	0.89	13.46	11.94	35.31	17.4	0.89	13.46	20.8	29.85	13.5
M10 x 1.5	AELS8-1015-7.9	3.8 - 7.9	20.45	17.4	0.89	13.46	10.8	35.31	17.4	0.89	13.46	20.8	26.04	13.5

(1) Additional thread sizes and grip ranges available.

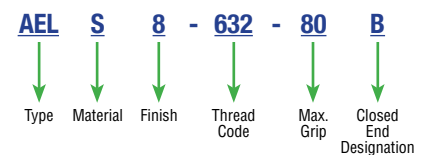
(2) For closed end, add a "B" to the end of the part number.

## MATERIAL & FINISH SPECIFICATIONS

Type	Threads	Standard Material <sup>(3)</sup>	Standard Finish
AEL / AEK	Unified, 2B per ASME B1.1 Metric, 6H per ASME B1.13M	Low Carbon Steel, C-1008 or, C-1010 or equivalent	RoHS Compliant Zinc Yellow Per ASTM B 633, Fe/Zn 8, Type II Plus Lubricant

(3) Other materials available. See page 34 for details.

### Part Number Designation



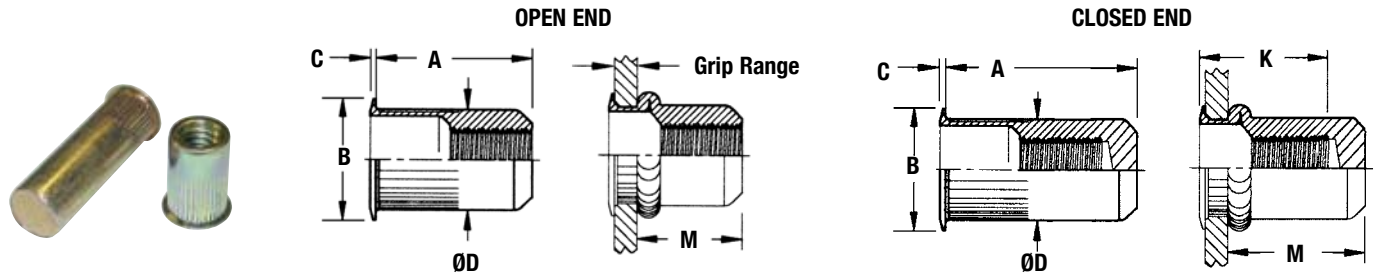
SEE PAGE 34 FOR MORE DETAIL



# SpinTite® — MINIMIZED-PROFILE HEAD TYPE AEK



- Feature a minimized-profile head and knurled shank.
- Allows near-flush installations with no need for special hole preparations such as countersinking or dimpling.



All dimensions are in inches.

Thread Size (1)	Part Number (2)	Grip Range (1)	Open					Closed					Hole Size In Sheet +.006 -.000	
			A ±.015	B ±.015	C Nom.	ØD Max.	M Ref.	A ±.015	B ±.015	C Nom.	ØD Max.	K Min.		M Ref.
#6-32	AEKS8-632-80	.020 - .080	.420	.310	.019	.265	.305	.740	.310	.019	.265	.43	.640	.266
#6-32	AEKS8-632-130	.080 - .130	.470	.310	.019	.265	.305	.740	.310	.019	.265	.43	.580	.266
#8-32	AEKS8-832-80	.020 - .080	.420	.310	.019	.265	.305	.740	.310	.019	.265	.43	.640	.266
#8-32	AEKS8-832-130	.080 - .130	.470	.310	.019	.265	.305	.740	.310	.019	.265	.43	.580	.266
#10-32	AEKS8-1032-130	.020 - .130	.475	.340	.019	.296	.315	.990	.340	.019	.296	.58	.845	.297
#10-32	AEKS8-1032-225	.130 - .225	.585	.340	.019	.296	.315	.990	.340	.019	.296	.58	.735	.297
1/4-20	AEKS8-420-165	.027 - .165	.580	.455	.022	.390	.380	1.190	.455	.022	.390	.70	1.005	.391
1/4-20	AEKS8-420-260	.165 - .260	.680	.455	.022	.390	.380	1.190	.455	.022	.390	.70	.905	.391
5/16-18	AEKS8-518-150	.027 - .150	.690	.595	.022	.530	.470	1.390	.595	.022	.530	.82	1.175	.531
5/16-18	AEKS8-518-312	.150 - .312	.805	.595	.022	.530	.425	1.390	.595	.022	.530	.82	1.025	.531
3/8-16	AEKS8-616-150	.027 - .150	.690	.595	.022	.530	.470	1.390	.595	.022	.530	.83	1.175	.531
3/8-16	AEKS8-616-312	.150 - .312	.805	.595	.022	.530	.425	1.390	.595	.022	.530	.83	1.025	.531

All dimensions are in millimeters.

Thread Size x Pitch (1)	Part Number (2)	Grip Range (1)	Open					Closed					Hole Size In Sheet +.015	
			A ±0.38	B ±0.38	C Nom.	ØD Max.	M Ref.	A ±0.38	B ±0.38	C Nom.	ØD Max.	K Min.		M Ref.
M4 x 0.7	AEKS8-470-2.0	0.5 - 2	10.67	7.87	0.48	6.73	7.75	18.8	7.78	0.48	6.73	11.6	16.26	6.75
M4 x 0.7	AEKS8-470-3.3	2 - 3.3	11.94	7.87	0.48	6.73	7.75	18.8	7.87	0.48	6.73	11.6	14.73	6.75
M5 x 0.8	AEKS8-580-3.3	0.5 - 3.3	12.07	8.64	0.48	7.52	8	25.15	8.64	0.48	7.52	15.6	21.46	7.6
M5 x 0.8	AEKS8-580-5.7	3.3 - 5.7	14.86	8.64	0.48	7.52	8	25.15	8.64	0.48	7.52	15.6	18.67	7.6
M6 x 1	AEKS8-610-4.2	0.7 - 4.2	14.73	11.56	0.55	9.91	9.65	30.23	11.56	0.55	9.91	17.5	25.53	10
M6 x 1	AEKS8-610-6.6	4.2 - 6.6	17.27	11.56	0.55	9.91	9.65	30.23	11.56	0.55	9.91	17.5	22.99	10
M8 x 1.25	AEKS8-8125-3.8	0.7 - 3.8	17.53	15.11	0.55	13.46	11.94	35.31	15.11	0.55	13.46	20.2	29.85	13.5
M8 x 1.25	AEKS8-8125-7.9	3.8 - 7.9	20.45	15.11	0.55	13.46	10.8	35.31	15.11	0.55	13.46	20.2	26.04	13.5
M10 x 1.5	AEKS8-1015-3.8	0.7 - 3.8	17.53	15.11	0.55	13.46	11.94	35.31	15.11	0.55	13.46	20.8	29.85	13.5
M10 x 1.5	AEKS8-1015-7.9	3.8 - 7.9	20.45	15.11	0.55	13.46	10.8	35.31	15.11	0.55	13.46	20.8	26.04	13.5

(1) Additional thread sizes and grip ranges available.

(2) For closed end, add a "B" to the end of the part number.

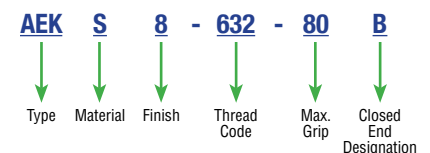
**ALSO AVAILABLE**

Type AEL and AEK nuts are available in aluminum, brass, and monel®. Type AEL is also available in wedge head, or sealed head styles.

Call for availability.

Monel® is a registered trademark of Specialty Metals Corporation.

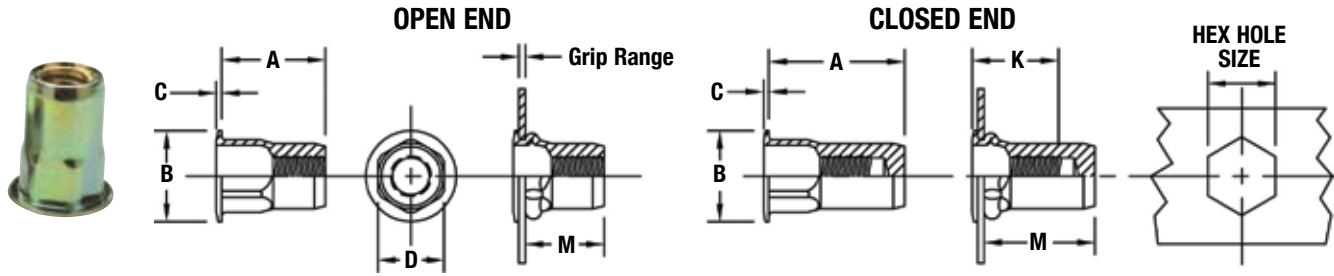
### Part Number Designation



SEE PAGE 34 FOR MORE DETAIL



- Feature a hex body design.
- Improved torque-out resistance.



All dimensions are in inches.

Thread Size (1)	Part Number	Grip Range (1)	Open					Closed					Hex Hole Size In Sheet +.006 -.000	
			A ±.015	B ±.015	C Nom.	D Max.	M Ref.	A ±.015	B ±.015	C Nom.	D Max.	K Min.		M Ref.
#6-32	AEHS8-632-80	.020 - .080	.385	.375	.027	.249	.295	.740	.375	.027	.249	.43	.640	.250
#6-32	AEHS8-632-130	.080 - .130	.435	.375	.027	.249	.295	.740	.375	.027	.249	.43	.580	.250
#8-32	AEHS8-832-80	.020 - .080	.385	.375	.027	.249	.295	.740	.375	.027	.249	.43	.640	.250
#8-32	AEHS8-832-130	.080 - .130	.435	.375	.027	.249	.295	.740	.375	.027	.249	.43	.580	.250
#10-32	AEHS8-1032-130	.020 - .130	.435	.390	.027	.280	.275	1.030	.390	.027	.280	.58	.845	.281
#10-32	AEHS8-1032-225	.130 - .225	.535	.390	.027	.280	.275	1.030	.390	.027	.280	.58	.735	.281
1/4-20	AEHS8-420-165	.027 - .165	.585	.510	.030	.374	.400	1.190	.510	.030	.374	.70	1.015	.375
1/4-20	AEHS8-420-260	.165 - .260	.685	.510	.030	.374	.400	1.190	.510	.030	.374	.70	.915	.375
5/16-18	AEHS8-518-150	.027 - .150	.685	.655	.035	.499	.530	1.445	.655	.035	.499	.82	1.235	.500
5/16-18	AEHS8-518-312	.150 - .312	.845	.655	.035	.499	.515	1.445	.655	.035	.499	.82	1.220	.500
3/8-16	AEHS8-616-150	.027 - .150	.685	.655	.035	.499	.530	1.445	.655	.035	.499	.83	1.235	.500
3/8-16	AEHS8-616-312	.150 - .312	.845	.655	.035	.499	.515	1.445	.655	.035	.499	.83	1.220	.500

All dimensions are in millimeters.

Thread Size x Pitch (1)	Part Number	Grip Range (1)	Open					Closed					Hex Hole Size In Sheet +0.15	
			A ±0.38	B ±0.38	C Nom.	D Max.	M Ref.	A ±0.38	B ±0.38	C Nom.	D Max.	K Min.		M Ref.
M4 x 0.7	AEHS8-470-2.0	0.5 - 2	9.78	9.53	0.68	6.35	7.49	18.8	9.53	0.68	6.35	11.6	16.26	6.35
M4 x 0.7	AEHS8-470-3.3	2 - 3.3	11.05	9.53	0.68	6.35	7.49	18.8	9.53	0.68	6.35	11.6	14.73	6.35
M5 x 0.8	AEHS8-580-3.3	0.5 - 3.3	11.05	9.91	0.68	7.1	6.99	26.16	9.91	0.68	7.1	15.6	21.46	7.14
M5 x 0.8	AEHS8-580-5.7	3.3 - 5.7	13.59	9.91	0.68	7.1	6.99	26.16	9.91	0.68	7.1	15.6	18.67	7.14
M6 x 1	AEHS8-610-4.2	0.7 - 4.2	14.86	12.96	0.76	9.5	10.16	30.23	12.96	0.76	9.5	17.5	25.78	9.53
M6 x 1	AEHS8-610-6.6	4.2 - 6.6	17.4	12.96	0.76	9.5	10.16	30.23	12.96	0.76	9.5	17.5	23.24	9.53
M8 x 1.25	AEHS8-8125-3.8	0.7 - 3.8	17.4	16.64	0.89	12.7	13.46	36.7	16.64	0.89	12.7	20.2	31.37	12.7
M8 x 1.25	AEHS8-8125-7.9	3.8 - 7.9	21.46	16.64	0.89	12.7	13.08	36.7	16.64	0.89	12.7	20.2	30.99	12.7
M10 x 1.5	AEHS8-1015-3.8	0.7 - 3.8	17.4	16.64	0.89	12.7	13.46	36.7	16.64	0.89	12.7	20.8	31.37	12.7
M10 x 1.5	AEHS8-1015-7.9	3.8 - 7.9	21.46	16.64	0.89	12.7	13.08	36.7	16.64	0.89	12.7	20.8	30.99	12.7

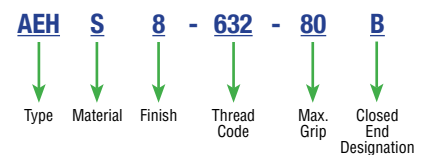
(1) Additional thread sizes and grip ranges available.  
 (2) For closed end, add a "B" to the end of the part number.

## MATERIAL & FINISH SPECIFICATIONS

Type	Threads	Standard Material <sup>(3)</sup>	Standard Finish
AEH	Unified, 2B per ASME B1.1 Metric, 6H per ASME B1.13M	Low Carbon Steel, C-1008 or, C-1010 or equivalent	RoHS Compliant Zinc Yellow Per ASTM B 633, Fe/Zn 8, Type II Plus Lubricant

(3) Other materials available. See page 34 for details.

### Part Number Designation

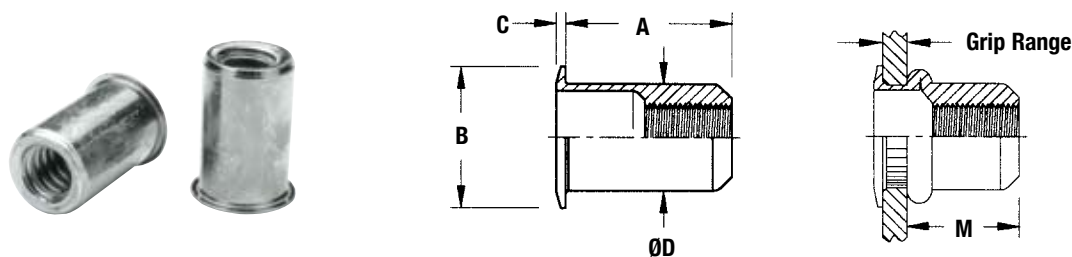


**ALSO AVAILABLE: Type AEH is available in aluminum and brass. Call for availability.**

SEE PAGE 34 FOR MORE DETAIL



- Features a low-profile head design.
- Allows near-flush installations with no need for special hole preparations such as countersinking or dimpling.



All dimensions are in inches.

Thread Size <sup>(1)</sup>	Part Number	Grip Range <sup>(1)</sup>	A ±.015	B ±.015	C Nom.	ØD max.	M Ref.	Hole Size In Sheet +.006 -.000
#6-32	AEOS10-632-80	.020 - .080	.385	.295	.018	.249	.315	.250
#8-32	AEOS10-832-80	.020 - .080	.385	.295	.018	.249	.315	.250
#10-24	AEOS10-1024-130	.020 - .130	.440	.320	.020	.280	.330	.281
#10-32	AEOS10-1032-130	.020 - .130	.440	.320	.020	.280	.330	.281
1/4-20	AEOS10-420-165	.030 - .165	.580	.425	.022	.374	.440	.375
1/4-28	AEOS10-428-165	.030 - .165	.580	.425	.022	.374	.440	.375
5/16-18	AEOS10-518-200	.040 - .200	.690	.560	.022	.499	.540	.500
5/16-24	AEOS10-524-200	.040 - .200	.690	.560	.022	.499	.540	.500
3/8-16	AEOS10-616-200	.040 - .200	.690	.560	.022	.499	.540	.500
3/8-24	AEOS10-624-200	.040 - .200	.690	.560	.022	.499	.540	.500

All dimensions are in millimeters.

Thread Size x Pitch <sup>(1)</sup>	Part Number	Grip Range <sup>(1)</sup>	A ±0.38	B ±0.25	C Nom.	ØD max.	M Ref.	Hole Size In Sheet +0.15
M4 x 0.7	AEOS10-470-2.0	0.5 - 2	9.78	7.49	0.46	6.32	8	6.4
M5 x 0.8	AEOS10-580-3.3	0.5 - 3.3	11.18	8.13	0.51	7.11	8.38	7.2
M6 x 1	AEOS10-610-4.2	0.76 - 4.2	14.73	10.8	0.56	9.5	11.18	9.6
M8 x 1.25	AEOS10-8125-5.1	1.02 - 5.1	17.53	14.22	0.56	12.67	13.72	12.7
M10 x 1.5	AEOS10-1015-5.1	1.02 - 5.1	17.53	14.22	0.56	12.67	13.72	12.7

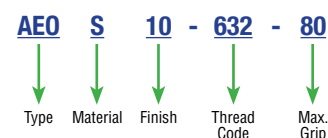
(1) Additional thread sizes and grip ranges available.

## MATERIAL & FINISH SPECIFICATIONS

Type	Threads	Standard Material <sup>(2)</sup>	Standard Finish
AEO	Unified, 2B per ASME B1.1 Metric, 6H per ASME B1.13M	Low Carbon Steel, C-1008, or C-1010 or equivalent	RoHS Compliant Zinc Clear per ASTM B 633, Fe/Zn 8, Type III Plus Lubricant

(2) Other materials available. See page 34 for details.

### Part Number Designation



SEE PAGE 34 FOR MORE DETAIL



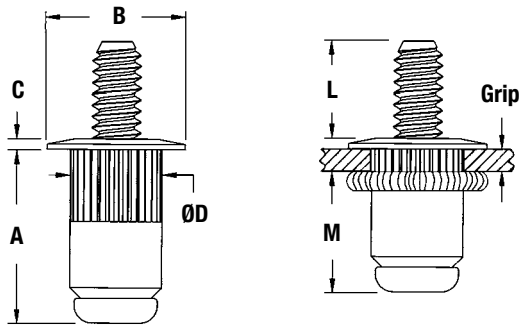
# SpinTite® — BLIND THREADED STUDS TYPE AES-UNIFIED



- Provides strong external threads in blind applications.
- Easy to install using spin/spin tooling.



**NOTE:** The “L” dimension is the height of the installed stud at max grip. The height of the stud will increase if it is installed into thinner material. To calculate “actual L” use this formula: max grip - actual grip + L = “actual L”



All dimensions are in inches.

Thread Size	Grip Code	Grip Range	Stud Length “L” Nom. (at Max. Grip)			A ±.020	B ±.015	C Nom.	ØD Max.	M Ref.	Hole Size In Sheet +.006 -.000	
			Part Number									
#6-32	80	.020 - .080	.500	.625	.750	.490	.390	.030	.265	.375	.266	
			AESS-632-80-500	AESS-632-80-625	AESS-632-80-750							
			.450	.575	.700							
#6-32	130	.080 - .130	.450	.575	.700	.540	.390	.030	.265	.375	.266	
			AESS-632-130-450	AESS-632-130-575	AESS-632-130-700							
			.500	.625	.750							
#8-32	80	.020 - .080	.500	.625	.750	.490	.390	.030	.265	.375	.266	
			AESS-832-80-500	AESS-832-80-625	AESS-832-80-750							
			.450	.575	.700							
#8-32	130	.080 - .130	.450	.575	.700	.540	.390	.030	.265	.375	.266	
			AESS-832-130-450	AESS-832-130-575	AESS-832-130-700							
			.500	.625	.750							
#10-24	130	.020 - .130	.500	.625	.750	.545	.415	.030	.296	.385	.297	
			AESS-1024-130-500	AESS-1024-130-625	AESS-1024-130-750							
			.405	.530	.655							
#10-24	225	.130 - .225	.405	.530	.655	.655	.415	.030	.296	.385	.297	
			AESS-1024-225-405	AESS-1024-225-530	AESS-1024-225-655							
			.500	.625	.750							
#10-32	130	.020 - .130	.500	.625	.750	.545	.415	.030	.296	.385	.297	
			AESS-1032-130-500	AESS-1032-130-625	AESS-1032-130-750							
			.405	.530	.655							
#10-32	225	.130 - .225	.405	.530	.655	.655	.415	.030	.296	.385	.297	
			AESS-1032-225-405	AESS-1032-225-530	AESS-1032-225-655							
			.625	.8125	1.000							
1/4-20	165	.027 - .165	.625	.8125	1.000	.670	.500	.030	.390	.470	.391	
			AESS-420-165-625	AESS-420-165-8125	AESS-420-165-1000							
			.530	.7175	.905							
1/4-20	260	.165 - .260	.530	.7175	.905	.770	.500	.030	.390	.470	.391	
			AESS-420-260-530	AESS-420-260-7175	AESS-420-260-905							
			.625	.875	1.125							
5/16-18	150	.027 - .150	.625	.875	1.125	.805	.685	.035	.530	.585	.531	
			AESS-518-150-625	AESS-518-150-875	AESS-518-150-1125							
			.508	.713	.963							
5/16-18	312	.150 - .312	.508	.713	.963	.920	.685	.035	.530	.540	.531	
			AESS-518-312-463	AESS-518-312-713	AESS-518-312-963							
			.750	1.000	1.250							
3/8-16	150	.027 - .150	.750	1.000	1.250	.805	.685	.035	.530	.585	.531	
			AESS-616-150-750	AESS-616-150-1000	AESS-616-150-1250							
			.508	.838	1.088							
3/8-16	312	.150 - .312	.508	.838	1.088	.920	.685	.035	.530	.540	.531	
			AESS-616-312-588	AESS-616-312-838	AESS-616-312-1088							

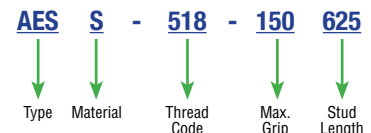
NOTE: The standard is assembled with an AEL insert but can also be assembled with an AEK or an AEH insert (see page 13).

## MATERIAL & FINISH SPECIFICATIONS

Type	Threads	Standard Material <sup>(1)</sup>	Standard Finish
AES	Unified, 2A per ASME B1.1 Metric, 6g per ASME B1.13M	Insert - Low Carbon Steel, C-1008 or equivalent Stud - Heat-treated medium carbon steel	RoHS Compliant Zinc Yellow per ASTM B 633, Fe/Zn 8, Type II

(1) Other materials available. See page 34 for details.

### Part Number Designation

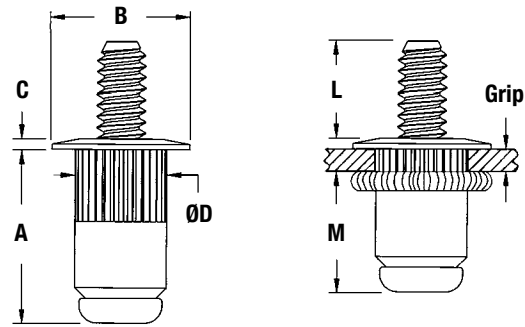


No finish code for standard finish zinc yellow.

**SEE PAGE 34 FOR MORE DETAIL**



**NOTE:** The “L” dimension is the height of the installed stud at max grip. The height of the stud will increase if it is installed into thinner material. To calculate “actual L” use this formula: max grip - actual grip + L = “actual L”



All dimensions are in millimeters.

Thread Size x Pitch	Grip Code	Grip Range	Stud Length “L” Nom. (at Max. Grip)			A ±0.51	B ±0.38	C Nom.	ØD Max.	M Ref.	Hole Size In Sheet +0.15
			Part Number								
M4 x 0.7	2.0	0.5 - 2.0	12	15	20	12.45	9.91	0.76	6.73	9.53	6.75
			AESS-470-2.0-12.0	AESS-470-2.0-15.0	AESS-470-2.0-20.0						
			10.7	13.7	18.7						
M4 x 0.7	3.3	2.0- 3.3	AESS-470-3.3-10.7	AESS-470-3.3-13.7	AESS-470-3.3-18.7	13.72	9.91	0.76	6.73	9.53	6.75
			12	15	20						
M5 x 0.8	3.3	0.5 - 3.3	AESS-580-3.3-12.0	AESS-580-3.3-15.0	AESS-580-3.3-20.0	13.85	10.54	0.76	7.52	9.78	7.6
			9.6	12.6	17.6						
M5 x 0.8	5.7	3.3 - 5.7	AESS-580-5.7-9.6	AESS-580-5.7-12.6	AESS-580-5.7-17.6	16.64	10.54	0.76	7.52	9.78	7.6
			15	20	25						
M6 x 1	4.2	0.7 - 4.2	AESS-610-4.2-15.0	AESS-610-4.2-20.0	AESS-610-4.2-25.0	17.02	12.7	0.76	9.91	11.94	10
			12.6	17.6	22.6						
M6 x 1	6.6	4.2 - 6.6	AESS-610-6.6-12.6	AESS-610-6.6-17.6	AESS-610-6.6-22.6	19.56	12.7	0.76	9.91	11.94	10
			16	22	28						
M8 x 1.25	3.8	0.7 - 3.8	AESS-8125-3.8-16.0	AESS-8125-3.8-22.0	AESS-8125-3.8-28.0	20.45	17.4	0.89	13.46	14.86	13.5
			13	17.9	23.9						
M8 x 1.25	7.9	3.8 - 7.9	AESS-8125-7.9-11.9	AESS-8125-7.9-17.9	AESS-8125-7.9-23.9	23.37	17.4	0.89	13.46	13.72	13.5
			20	25	30						
M10 x 1.5	3.8	0.7 - 3.8	AESS-1015-3.8-20.0	AESS-1015-3.8-25.0	AESS-1015-3.8-30.0	20.45	17.4	0.89	13.46	14.86	13.5
			17	20.9	25.9						
M10 x 1.5	7.9	3.8 - 7.9	AESS-1015-7.9-5.9	AESS-1015-7.9-20.9	AESS-1015-7.9-25.9	23.37	17.4	0.89	13.46	13.72	13.5

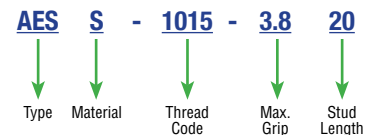
NOTE: The standard is assembled with an AEL insert but can also be assembled with an AEK or an AEH insert.

## MATERIAL & FINISH SPECIFICATIONS

Type	Threads	Standard Material <sup>(1)</sup>	Standard Finish
AES	Unified, 2A per ASME B1.1 Metric, 6g per ASME B1.13M	Insert - Low Carbon Steel, C-1008 or equivalent Stud - Heat-treated medium carbon steel	RoHS Compliant Zinc Yellow per ASTM B 633, Fe/Zn 8, Type II

(1) Other materials available. See page 34 for details.

### Part Number Designation



No finish code for standard finish zinc yellow.

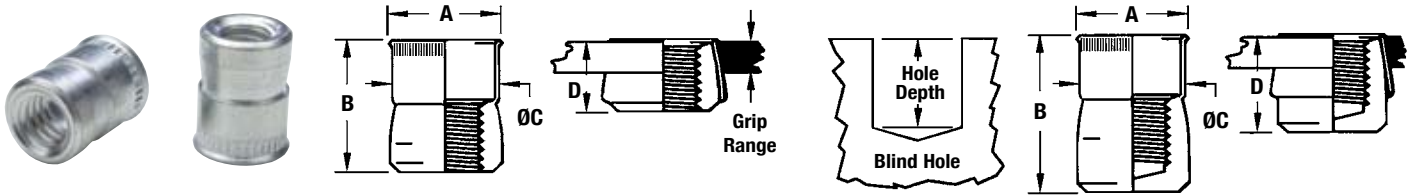
SEE PAGE 34 FOR MORE DETAIL



- Works in any thickness over .029"/0.76mm including blind applications.
- Minimal backside protrusion for restricted space applications.

### OPEN END

### CLOSED END



All dimensions are in inches.

Thread Size	Type			Thread Code	Installation Hole Size				Open				Closed				Blind Hole Depth Min.
	Steel	Stain-less	Alum-inum		Grip Range				A ±.005	B ±.015	ØC Max.	D Ref.	A ±.005	B ±.015	ØC Max.	D Ref.	
					.030 - .090	.091 - .124	.125 - .186	.187 - OVER									
#4-40	AETS	AETC	AETA	440	.188	.194	.194	.196	.211	.370	.1875	.205	.211	.660	.1875	.495	.400
#6-32	AETS	AETC	AETA	632	.219	.221	.228	.228	.240	.370	.2185	.205	.240	.675	.2185	.505	.400
#8-32	AETS	AETC	AETA	832	.250	.257	.266	.266	.269	.370	.2495	.205	.269	.675	.2495	.505	.400
#10-24	AETS	AETC	AETA	1024	.281	.290	.290	.297	.306	.370	.2805	.205	.306	.685	.2805	.520	.400
#10-32	AETS	AETC	AETA	1032	.281	.290	.290	.297	.306	.370	.2805	.205	.306	.685	.2805	.520	.400
1/4-20	AETS	AETC	AETA	420	.375	.375	.386	.391	.400	.515	.3745	.275	.400	1.005	.3745	.760	.540
5/16-18	AETS	AETC	AETA	518	.500	.500	.516	.516	.528	.615	.4995	.325	.528	1.065	.4995	.770	.640
3/8-16	AETS	AETC	AETA	616	.563	.563	.578	.578	.588	.745	.5615	.390	.588	1.450	.5615	1.095	.770
1/2-13	AETS	AETC	AETA	813	.750	.766	.781	.790	.800	.935	.7485	.485	.800	NA	.7485	NA	.960

All dimensions are in millimeters.

Thread Size x Pitch	Type			Thread Code	Installation Hole Size				Open				Closed				Blind Hole Depth Min.
	Steel	Stain-less	Alum-inum		Grip Range				A ±0.13	B ±0.38	ØC Max.	D Ref.	A ±0.13	B ±0.38	ØC Max.	D Ref.	
					1.52 - 2.3	2.31 - 3.15	3.16 - 4.75	4.76 - OVER									
M3x0.5	AETS	AETC	AETA	350	4.75	4.9	4.9	4.97	5.36	9.4	4.76	5.21	5.36	16.77	4.76	12.57	10.16
M4x0.7	AETS	AETC	AETA	470	6.35	6.5	6.74	6.74	6.83	9.4	6.34	5.21	6.83	17.15	6.34	12.83	10.16
M5x0.8	AETS	AETC	AETA	580	7.14	7.37	7.4	7.54	7.77	9.4	7.12	5.21	7.77	17.4	7.12	13.21	10.16
M6x1	AETS	AETC	AETA	610	9.52	9.52	9.8	9.92	10.16	13.08	9.51	6.99	10.16	25.53	9.51	19.3	13.72
M8x1.25	AETS	AETC	AETA	8125	12.7	12.7	13.09	13.09	13.41	15.62	12.69	8.26	13.41	27.05	12.69	19.56	16.26
M10x1.5	AETS	AETC	AETA	1015	14.28	14.28	14.68	14.68	14.94	18.92	14.26	9.91	14.94	36.83	14.26	27.81	19.56
M12x1.75	AETS	AETC	AETA	12175	19.05	19.44	19.84	20.05	20.32	23.75	19.01	12.32	20.32	NA	19.01	NA	24.38

Additional thread sizes and grip ranges available. Not a typical stock item.

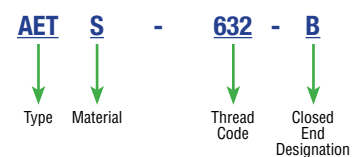
**NOTE:** The internal threads are manufactured oversized to compensate for resulting thread portion shrinkage during the installation process. They are not gaugeable prior to or after installation but will be compatible with Class 2A/3A or 6g screws after installation.

## MATERIAL & FINISH SPECIFICATIONS

Type	Threads	Standard Material <sup>(1)</sup>	Standard Finish
AETS	Unified, 2B per ASME B1.1 Metric, 6H per ASME B1.13M	Low Carbon Steel	Cadmium Plate per SAE AMS-QQ-P-416, Class III, Type I
AETC	Unified, 2B per ASME B1.1 Metric, 6H per ASME B1.13M	300 Series Stainless Steel	Cadmium Plate per SAE AMS-QQ-P-416, Class III, Type I
AETA	Unified, 2B per ASME B1.1 Metric, 6H per ASME B1.13M	5056 Aluminum or equivalent	Cadmium Plate per SAE AMS-QQ-P-416, Class III, Type I

(1) Other materials available. See page 34 for details.

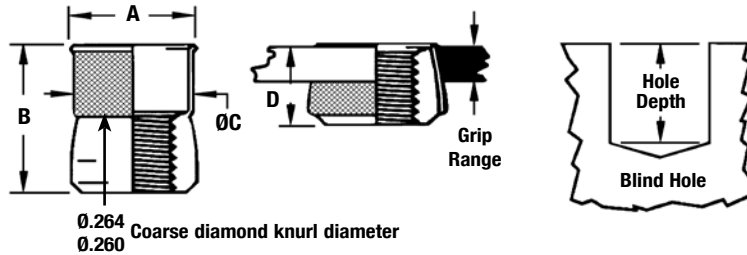
### Part Number Designation



SEE PAGE 34 FOR MORE DETAIL



- Knurls under the head of the insert increase spinout resistance.
- Works in any thickness over .029”/0.76mm including blind applications.
- Minimal backside protrusion for restricted space applications.



All dimensions are in inches.

Thread Size	Type		Thread Code	Installation Hole Size +.005 -.000	A ±.005	B ±.015	ØC Max.	D Ref.	Blind Hole Depth Min.
	Steel	Brass							
#6-32	AEWS	AEWB	632	.234	.255	.370	.233	.205	.400
#8-32	AEWS	AEWB	832	.266	.285	.370	.264	.205	.400
#10-24	AEWS	AEWB	1024	.297	.320	.370	.295	.205	.400
#10-32	AEWS	AEWB	1032	.297	.320	.370	.295	.205	.400
1/4-20	AEWS	AEWB	420	.391	.415	.515	.389	.275	.540
5/16-18	AEWS	AEWB	518	.531	.550	.615	.528	.325	.640
3/8-16	AEWS	AEWB	616	.594	.615	.740	.590	.390	.770

All dimensions are in millimeters.

Thread Size x Pitch	Type		Thread Code	Installation Hole Size +.013	A ±0.13	B ±0.38	ØC Max.	D Ref.	Blind Hole Depth Min.
	Steel	Brass							
M4 x 0.7	AEWS	AEWB	470	6.75	7.24	9.4	6.71	5.21	10.16
M5 x 0.8	AEWS	AEWB	580	7.54	8.13	9.4	7.5	5.21	10.16
M6 x 1	AEWS	AEWB	610	9.92	10.54	13.08	9.88	6.99	13.72
M8 x 1.25	AEWS	AEWB	8125	13.49	13.97	15.62	13.41	8.26	16.26
M10 x 1.5	AEWS	AEWB	1015	15	15.62	18.8	14.99	9.91	19.56

Additional thread sizes and grip ranges available. Not a typical stock item.

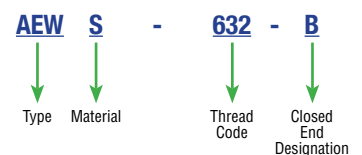
**NOTE:** The internal threads are manufactured oversized to compensate for resulting thread portion shrinkage during the installation process. They are not gaugeable prior to or after installation but will be compatible with Class 2A/3A or 6g screws after installation.

## MATERIAL & FINISH SPECIFICATIONS

Type	Threads	Standard Material <sup>(1)</sup>	Standard Finish
AEWS	Unified, 2B per ASME B1.1 Metric, 6H per ASME B1.13M	Low Carbon Steel	Cadmium Plate per SAE AMS-QQ-P-416, Class III, Type I
AEWB	Unified, 2B per ASME B1.1 Metric, 6H per ASME B1.13M	Free-machining Leaded brass	Cadmium Plate per SAE AMS-QQ-P-416, Class III, Type I

(1) Other materials available. See page 34 for details.

### Part Number Designation

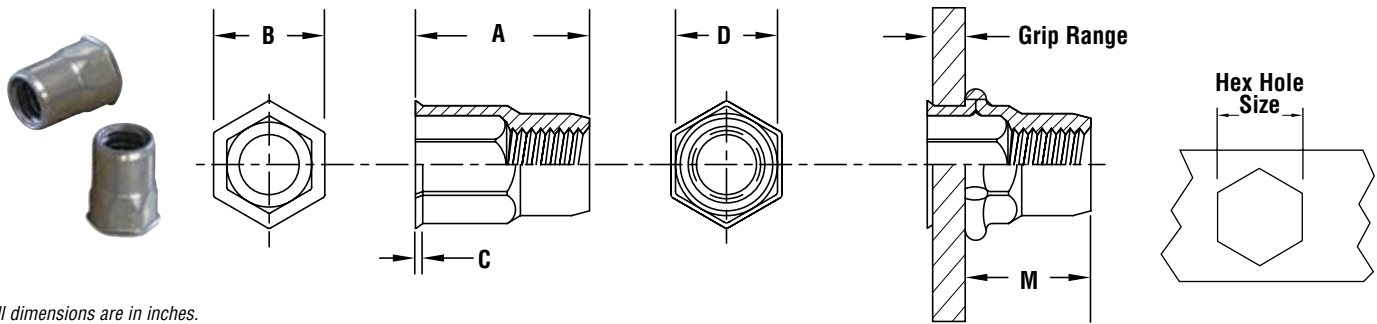


SEE PAGE 34 FOR MORE DETAIL



- Stainless Steel insert for superior corrosion resistance.
- Hexagonal hole for increased spinout resistance.

Installed With a Spin-Pull Tool



All dimensions are in inches.

Thread Size (1)	Part Number	Grip Range (1)	A ±.010	B ±.012	C ±.004	D Max.	M Ref.	Hex Hole Size In Sheet +.004 -.000
#8-32	AETHC-832-80	.020 - .080	.430	.260	.020	.235	.270	.236
#10-32	AETHC-1032-120	.020 - .120	.470	.300	.020	.275	.260	.276
1/4-20	AETHC-420-120	.020 - .120	.570	.380	.025	.353	.335	.354
1/4-20	AETHC-420-220	.120 - .220	.650	.380	.025	.353	.305	.354
5/16-18	AETHC-518-120	.020 - .120	.630	.470	.028	.432	.355	.433

All dimensions are in millimeters.

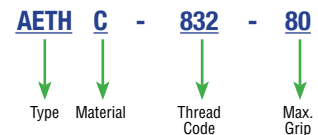
Thread Size (1)	Part Number	Grip Range (1)	A ±0.25	B ±0.31	C ±0.1	D Max.	M Ref.	Hex Hole Size In Sheet +0.1
M4	AETHC-M4-2.0	0.5 - 2	10.92	6.6	0.51	5.98	6.85	6
M5	AETHC-M5-3.0	0.5 - 3	11.94	7.62	0.51	6.98	6.6	7
M6	AETHC-M6-3.0	0.5 - 3	14.48	9.65	0.64	8.98	8.5	9
M6	AETHC-M6-5.5	3 - 5.5	16.51	9.65	0.64	8.98	7.75	9
M8	AETHC-M8-3.0	0.5 - 3	16	11.94	0.71	10.98	9	11

(1) Additional thread sizes and grip ranges available.

## MATERIAL & FINISH SPECIFICATIONS

Type	Threads	Standard Material <sup>(2)</sup>	Standard Finish
AETHC	Unified, 2B per ASME B1.1 Metric, 6H per ASME B1.13M	300 Series Stainless Steel	Passivated and/or tested per ASTM A380

### Part Number Designation



(2) Other materials available. See page 34 for details.

## PERFORMANCE DATA

Part Number	Test Sheet	Near Minimum Grip				Near Maximum Grip			
		Pullout (lbs.)	Pushout (lbs.)	Spinout (in. lbs.)	Upset Load (lbs.)	Pullout (lbs.)	Pushout (lbs.)	Spinout (in. lbs.)	Upset Load (lbs.)
AETHC-832-80	300 Series Stainless Steel	675	215	29	875	2400	450	55	1700
AETHC-1032-120	300 Series Stainless Steel	675	260	29	1150	2800	460	85	2000
AETHC-420-120	300 Series Stainless Steel	775	265	65	1700	4800	720	160	3100
AETHC-420-220	300 Series Stainless Steel	4100	570	165	1700	5100	650	205	3100
AETHC-518-120	300 Series Stainless Steel	825	260	90	2700	7000	1000	250	4600

Part Number	Test Sheet	Near Minimum Grip				Near Maximum Grip			
		Pullout (kN)	Pushout (kN)	Spinout (N•m)	Upset Load (kN)	Pullout (kN)	Pushout (kN)	Spinout (N•m)	Upset Load (kN)
AETHC-470-2.0	300 Series Stainless Steel	3.0	1.0	3.3	3.9	10.7	2.0	6.2	7.7
AETHC-580-3.0	300 Series Stainless Steel	3.0	1.2	3.3	5.1	12.5	2.0	9.6	8.9
AETHC-610-3.0	300 Series Stainless Steel	3.4	1.2	7.3	7.6	21.4	3.2	18.1	13.8
AETHC-610-5.5	300 Series Stainless Steel	18.2	2.5	18.6	7.6	22.7	2.9	23.2	13.8
AETHC-8125-3.0	300 Series Stainless Steel	3.7	1.2	10.2	12.0	31.1	4.4	28.2	20.5

## VALUE-ADDED OPTIONS

### AEH



Photo shown with AES insert assembled in AEH insert. Can also be assembled in an AEK insert.

### Half Hex Stud



This insert combines a variety of features; a half-hex, dog point stud with a PVC form seal bonded to the underside of the head.

### Wedge Head



Wedges under the head provide greater torque, especially in soft or thin materials.

*See page 34 for ordering information*

### Sealed Head



A PVC form seal is bonded to the underside of the head to provide a watertight seal. Spec # for sealed head meets GM1131M, type D.

*See page 34 for ordering information*

### Nylon Locking Patch



A nylon locking patch is available for applications requiring a locking element.

### Half Square Shank Insert



Half square shank for extremely high anti-rotation applications.

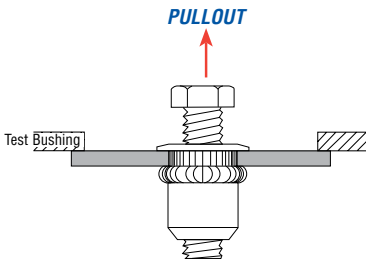
## ANTI CROSS-THREADING FEATURE



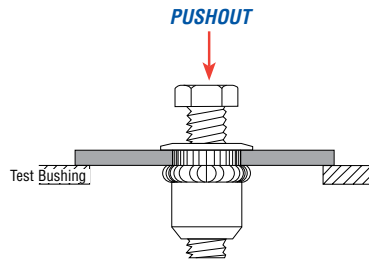
*MATHread is a trademark of MATHread, Inc.*

PennEngineering is a licensee for MATHread® anti cross-threading technology. Originally developed for the demands of the automotive industry, this patented design helps speed assembly and eliminates failures, repairs, scrap, downtime, and warranty service associated with thread damage.

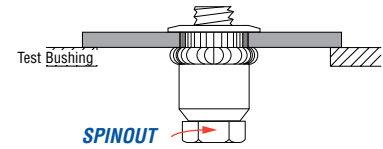
# SpinTite® TYPES AEL AND AEK PERFORMANCE DATA <sup>(5)</sup>



**Pullout** is the force required to pull the insert from the sheet. (1)



**Pushout** is the force required to push the insert through the sheet. (3)



**Spinout** is the measure of the torsional holding power of the fastener in the parent material after installation without inducing clamp load on the fastener.

Thread Size	Max. Grip	Test Sheet	Near Minimum Grip				Near Maximum Grip				
			Thickness (in.)	Sheet Hardness	Pullout (lbs.) (1)	Spinout (in. lbs.) (2)	Thickness (in.)	Sheet Hardness	Pullout (lbs.) (1)	Pushout (lbs.) (3) (4)	
										AEL	AEK
6-32 & 8-32	.080	Aluminum	.032	HRB 48	339	—	.060	HRB 67	897	—	—
		Cold-rolled Steel	.030	HRB 37	339	19	.071	HRB 43	969	689	390
	.130	Aluminum	.090	HRB 66	1515	—	.123	HRB 63	1684	—	—
		Cold-rolled Steel	.087	HRB 75	1514	18	.115	HRB 52	1869	689	390
10-32 & 10-24	.130	Aluminum	.030	HRB 28	342	—	.125	HRB 57	2284	—	—
		Cold-rolled Steel	.029	HRB 47	469	24	.128	HRB 49	2429	940	408
	.225	Aluminum	.136	HRB 20	2464	—	.185	HRB 57	2220	—	—
		Cold-rolled Steel	.165	HRB 56	2530	24	.187	HRB 77	2442	940	408
1/4-20 & 1/4-28	.165	Aluminum	.032	HRB 48	561	—	.125	HRB 57	2441	—	—
		Cold-rolled Steel	.030	HRB 43	581	80	.165	HRB 56	3448	744	615
	.260	Aluminum	.185	HRB 58	2798	—	.250	HRB 60	3796	—	—
		Cold-rolled Steel	.165	HRB 56	3028	64	.247	HRB 96	3370	744	615
5/16-18, 5/16-24, & 3/8-16	.150	Aluminum	.032	HRB 48	668	—	.125	HRB 57	3602	—	—
		Cold-rolled Steel	.030	HRB 43	687	100	.115	HRB 52	3478	1505	901
	.312	Aluminum	.185	HRB 60	5152	—	.312	HRB 52	6451	—	—
		Cold-rolled Steel	.165	HRB 60	4934	59	.312	HRB 90	5975	1505	901

Thread Size	Max. Grip	Test Sheet	Near Minimum Grip				Near Maximum Grip				
			Thickness (mm)	Sheet Hardness	Pullout (kN) (1)	Spinout (N•m) (2)	Thickness (mm)	Sheet Hardness	Pullout (kN) (1)	Pushout (kN) (3) (4)	
										AEL	AEK
M4	2.0	Aluminum	0.8	HRB 48	1.5	—	1.5	HRB 67	4	—	—
		Cold-rolled Steel	0.8	HRB 37	1.5	2.1	1.8	HRB 43	4.3	3.1	1.7
	3.3	Aluminum	2.3	HRB 66	6.7	—	3.1	HRB 63	7.5	—	—
		Cold-rolled Steel	2.2	HRB 75	6.7	2	2.9	HRB 52	8.3	3.1	1.7
M5	3.3	Aluminum	0.8	HRB 28	1.5	—	3.1	HRB 57	10.2	—	—
		Cold-rolled Steel	0.7	HRB 47	2.1	2.7	3.3	HRB 49	10.8	4.2	1.8
	5.7	Aluminum	3.5	HRB 20	11	—	4.7	HRB 57	9.9	—	—
		Cold-rolled Steel	4.2	HRB 56	11.3	4.1	4.7	HRB 77	10.9	4.2	1.8
M6	4.2	Aluminum	0.8	HRB 48	2.5	—	3.2	HRB 57	10.9	—	—
		Cold-rolled Steel	0.8	HRB 43	2.6	9	4.2	HRB 56	15.3	3.3	2.7
	6.6	Aluminum	4.7	HRB 58	12.4	—	6.4	HRB 60	16.9	—	—
		Cold-rolled Steel	4.2	HRB 56	13.5	7.2	6.3	HRB 96	15	3.3	2.7
M8 & M10	3.8	Aluminum	0.8	HRB 48	3	—	3.2	HRB 57	16	—	—
		Cold-rolled Steel	0.8	HRB 43	3.1	11.3	2.9	HRB 52	15.5	6.7	4
	7.9	Aluminum	4.7	HRB 60	22.9	—	7.9	HRB 52	28.7	—	—
		Cold-rolled Steel	4.2	HRB 60	21.9	6.7	7.9	HRB 90	26.6	6.7	4

(1) For pullout, test sheet is supported with a bushing diameter of three times the ØD Max.

(2) Spinout testing conducted by inserting a screw into shank end of insert and tightening until insert spins in sheet.

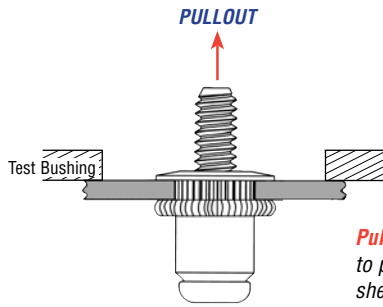
(3) For pushout, test sheet is supported with a bushing diameter of three times the ØD Max.

(4) Pushout testing conducted only for near max grip steel sheet. For this condition type AEK has lower pushout than type AEL due to thinner head height.

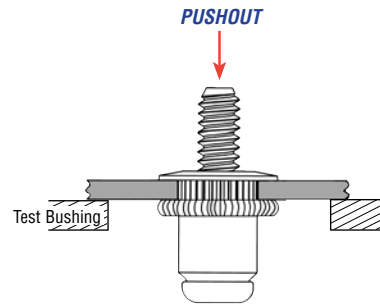
Pullout and spinout performance is the same for type AEL and AEK.

(5) Values reported are averages when all installation specifications and procedures are followed. Variations in mounting hole size and installation procedure will affect this data.

Performance testing of this product in your application is recommended. We will be happy to provide samples for this purpose.



**Pullout** is the force required to pull the insert from the sheet. (1)



**Pushout** is the force required to push the insert through the sheet. (2)

Thread Size	Max. Grip	Test Sheet	Near Minimum Grip			Near Maximum Grip			
			Thickness (in.)	Sheet Hardness	Pullout (lbs.) (1)	Thickness (in.)	Sheet Hardness	Pullout (lbs.) (1)	Pushout (lbs.) (2) (3)
6-32 & 8-32	.080	Aluminum	.032	HRB 48	339	.060	HRB 67	897	—
		Cold-rolled Steel	.030	HRB 37	339	.071	HRB 43	969	689
	.130	Aluminum	.090	HRB 66	1515	.123	HRB 63	1684	—
		Cold-rolled Steel	.087	HRB 75	1514	.115	HRB 52	1869	689
10-32 & 10-24	.130	Aluminum	.030	HRB 28	342	.125	HRB 57	2284	—
		Cold-rolled Steel	.029	HRB 47	469	.128	HRB 49	2429	940
	.225	Aluminum	.136	HRB 20	2464	.185	HRB 57	2220	—
		Cold-rolled Steel	.165	HRB 56	2530	.187	HRB 77	2442	940
1/4-20 & 1/4-28	.165	Aluminum	.032	HRB 48	561	.125	HRB 57	2441	—
		Cold-rolled Steel	.030	HRB 43	581	.165	HRB 56	3448	744
	.260	Aluminum	.185	HRB 58	2798	.250	HRB 60	3796	—
		Cold-rolled Steel	.165	HRB 56	3028	.247	HRB 96	3370	744
5/16-18, 5/16-24, & 3/8-16	.150	Aluminum	.032	HRB 48	668	.125	HRB 57	3602	—
		Cold-rolled Steel	.030	HRB 43	687	.115	HRB 52	3478	1505
	.312	Aluminum	.185	HRB 60	5152	.312	HRB 52	6451	—
		Cold-rolled Steel	.165	HRB 60	4934	.312	HRB 90	5975	1505

Thread Size	Max. Grip	Test Sheet	Near Minimum Grip			Near Maximum Grip			
			Thickness (mm)	Sheet Hardness	Pullout (kN) (1)	Thickness (mm)	Sheet Hardness	Pullout (kN) (1)	Pushout (kN) (2) (3)
M4	2.0	Aluminum	0.8	HRB 48	1.5	1.5	HRB 67	4	—
		Cold-rolled Steel	0.8	HRB 37	1.5	1.8	HRB 43	4.3	3.1
	3.3	Aluminum	2.3	HRB 66	6.7	3.1	HRB 63	7.5	—
		Cold-rolled Steel	2.2	HRB 75	6.7	2.9	HRB 52	8.3	3.1
M5	3.3	Aluminum	0.8	HRB 28	1.5	3.1	HRB 57	10.2	—
		Cold-rolled Steel	0.7	HRB 47	2.1	3.3	HRB 49	10.8	4.2
	5.7	Aluminum	3.5	HRB 20	11	4.7	HRB 57	9.9	—
		Cold-rolled Steel	4.2	HRB 56	11.3	4.7	HRB 77	10.9	4.2
M6	4.2	Aluminum	0.8	HRB 48	2.5	3.2	HRB 57	10.9	—
		Cold-rolled Steel	0.8	HRB 43	2.6	4.2	HRB 56	15.3	3.3
	6.6	Aluminum	4.7	HRB 58	12.4	6.4	HRB 60	16.9	—
		Cold-rolled Steel	4.2	HRB 56	13.5	6.3	HRB 96	15	3.3
M8 & M10	3.8	Aluminum	0.8	HRB 48	3	3.2	HRB 57	16	—
		Cold-rolled Steel	0.8	HRB 43	3.1	2.9	HRB 52	15.5	6.7
	7.9	Aluminum	4.7	HRB 60	22.9	7.9	HRB 52	28.7	—
		Cold-rolled Steel	4.2	HRB 60	21.9	7.9	HRB 90	26.6	6.7

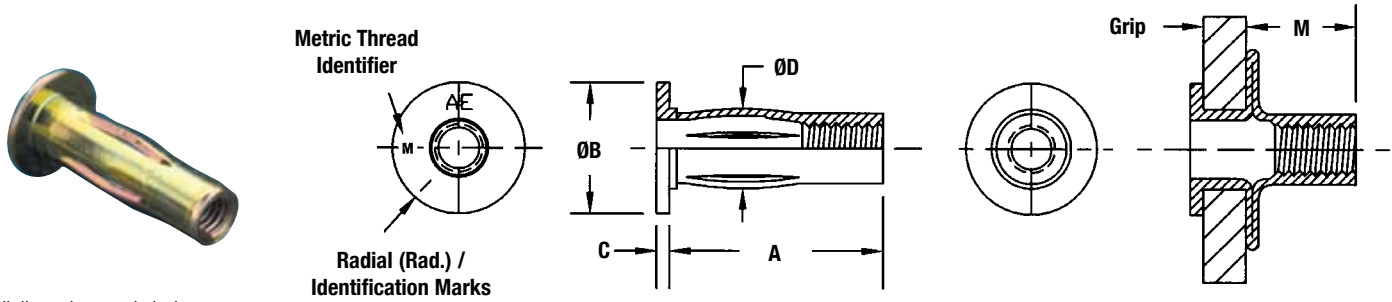
(1) For pullout, test sheet is supported with a bushing diameter three times ØD Max.

(2) For pushout, test sheet is supported with a bushing diameter three times ØD Max.

(3) Values reported are averages when all installation specifications and procedures are followed. Variations in mounting hole size and installation procedure will affect this data. Performance testing of this product in your application is recommended. We will be happy to provide samples for this purpose.

# Plus+Tite® — PRE-BULBED INSERT\*

- Designed for superior pullout resistance in plastics and thin sheet metal.
- Pre-bulbed design requires less installation load.



All dimensions are in inches.

Thread Size	Part Number	Grip Range	Identification Mark	A ±.015	ØB Nom.	C Nom.	ØD Max.	M Ref.	Hole Size In Sheet +.006 -.000
#10-32	AES10P175PBZYR	.020 - .175	None	.781	.500	.038	.329	.425	.336
#10-32	AES10P320PBZYR	.175 - .320	1 Rad.	.921	.500	.038	.329	.425	.336
1/4-20	AES25P280PBZYR	.020 - .280	None	1.000	.625	.057	.382	.520	.390
1/4-20	AES25P500PBZYR	.280 - .500	1 Rad.	1.235	.625	.057	.382	.520	.390
5/16-18	AES31P280PBZYR	.020 - .280	None	1.141	.750	.062	.495	.775	.500
5/16-18	AES31P500PBZYR	.280 - .500	1 Rad.	1.375	.750	.062	.495	.775	.500
3/8-16	AES37P280PBZYR	.020 - .280	None	1.218	.875	.088	.587	.775	.594

All dimensions are in millimeters.

Thread Size x Pitch	Part Number	Grip Range	Identification Mark	A ±0.38	ØB Nom.	C Nom.	ØD Max.	M Ref.	Hole Size In Sheet +0.15
M6 x 1	AESM6P7.1PBZYR	0.50 - 7.1	None	25.4	15.88	1.45	9.8	13.2	10
M6 x 1	AESM6P12.7PBZYR	7.1 - 12.7	1 Rad.	31.34	15.88	1.45	9.8	13.2	10
M8 x 1.25	AESM8P7.1PBZYR	0.50 - 7.1	None	29.25	19.05	1.57	12.57	19.69	12.7
M8 x 1.25	AESM8P12.7PBZYR	7.1 - 12.7	1 Rad.	34.93	19.05	1.57	12.57	19.69	12.7
M10 x 1.5	AESM10P7.1PBZYR	0.50 - 7.1	None	30.94	22.2	2.24	14.91	19.69	15.09

NOTE: The Atlas® spin-spin or spin-pull tool can be used to install pre-bulbed inserts. Material hardness will affect the published grip ranges. Trial installations of this product in your application are recommended. We will be happy to provide samples for this purpose.

\*Pre-bulbed inserts require less installation load than straight shank and require slightly larger mounting hole size.



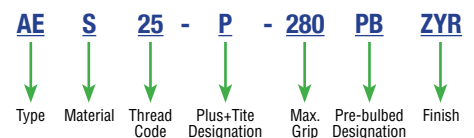
Installs into single, variable, or multiple thickness materials.

## MATERIAL & FINISH SPECIFICATIONS

Type	Threads	Standard Material <sup>(1)</sup>	Standard Finish
AE	Unified, 2B per ASME B1.1 Metric, 6H per ASME B1.13M	Low Carbon Steel, C-1008 or, C-1010 or equivalent	RoHS Compliant Zinc Yellow Per ASTM B 633, Fe/Zn 8, Type II

(1) Other materials available. See page 35 for details.

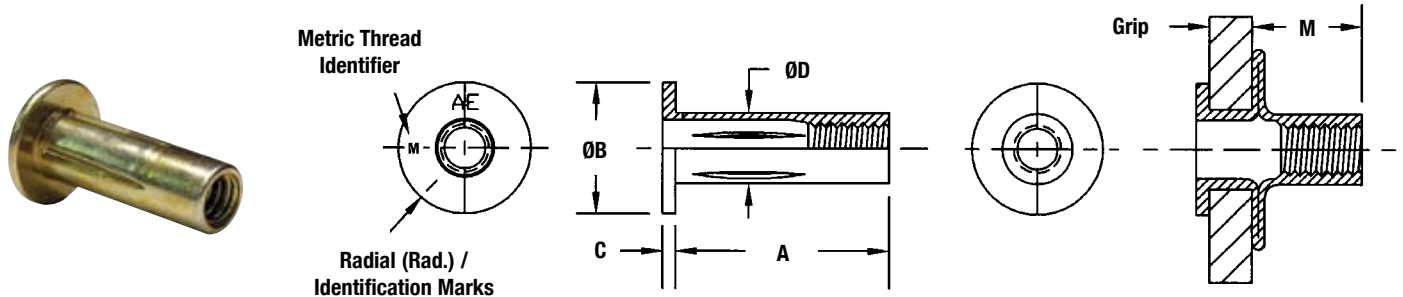
### Part Number Designation



SEE PAGE 35 FOR MORE DETAIL

# Plus+Tite® — STRAIGHT SHANK INSERT

- Designed for superior pullout resistance in plastics and thin sheet metal.
- Straight shank design uses smaller mounting hole.



All dimensions are in inches.

Thread Size	Part Number	Grip Range	Identification Mark	A ±.015	ØB Nom.	C Nom.	ØD Max.	M Ref.	Hole Size In Sheet +.006 -.000
#10-32	AES10P175ZYR	.020 - .175	None	.781	.500	.038	.272	.425	.273
#10-32	AES10P320ZYR	.175 - .320	1 Rad.	.921	.500	.038	.272	.425	.273
1/4-20	AES25P280ZYR	.020 - .280	None	1.000	.625	.058	.346	.505	.347
1/4-20	AES25P500ZYR	.280 - .500	1 Rad.	1.234	.625	.058	.346	.505	.347
5/16-18	AES31P280ZYR	.020 - .280	None	1.141	.750	.062	.437	.570	.438
5/16-18	AES31P500ZYR	.280 - .500	1 Rad.	1.375	.750	.062	.437	.570	.438
3/8-16	AES37P280ZYR	.020 - .280	None	1.218	.875	.088	.514	.605	.515
3/8-16	AES37P500ZYR	.280 - .500	1 Rad.	1.437	.875	.088	.514	.605	.515

All dimensions are in millimeters.

Thread Size x Pitch	Part Number	Grip Range	Identification Mark	A ±0.38	ØB Nom.	C Nom.	ØD Max.	M Ref.	Hole Size In Sheet +0.15
M6 x 1	AESM6P7.1ZYR	0.50 - 7.1	None	25.40	15.87	1.5	8.79	12.8	8.8
M6 x 1	AESM6P12.7ZYR	7.1 - 12.7	1 Rad.	31.32	15.87	1.5	8.79	12.8	8.8
M8 x 1.25	AESM8P7.1ZYR	0.50 - 7.1	None	28.95	19.04	1.57	11.1	14.47	11.11
M8 x 1.25	AESM8P12.7ZYR	7.1 - 12.7	1 Rad.	34.90	19.04	1.57	11.1	14.47	11.11
M10 x 1.5	AESM10P7.1ZYR	0.50 - 7.1	None	30.94	22.23	2.24	13.06	15.75	13.07
M10 x 1.5	AES10P12.7ZYR	7.1 - 12.7	1 Rad.	36.50	22.23	2.24	13.06	15.75	13.07

NOTE: The Atlas® spin-pull tool is recommended to install straight shank inserts. Material hardness will affect the published grip ranges. Trial installations of this product in your application are recommended. We will be happy to provide samples for this purpose.



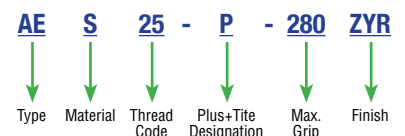
Installs into single, variable, or multiple thickness materials.

## MATERIAL & FINISH SPECIFICATIONS

Type	Threads	Standard Material <sup>(1)</sup>	Standard Finish
AE	Unified, 2B per ASME B1.1 Metric, 6H per ASME B1.13M	Low Carbon Steel, C-1008 or, C-1010 or equivalent	RoHS Compliant Zinc Yellow Per ASTM B 633, Fe/Zn 8, Type II

(1) Other materials available. See page 35 for details.

### Part Number Designation



SEE PAGE 35 FOR MORE DETAIL



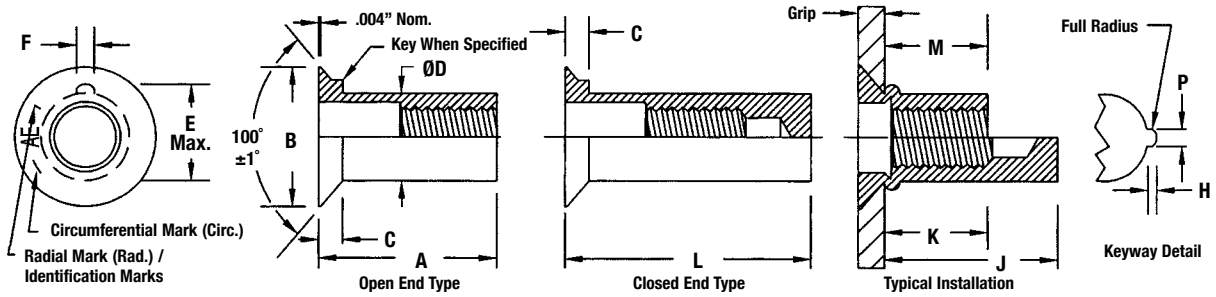
# MaxTite® COUNTERSUNK HEAD — UNIFIED



- Designed for high load applications. Countersunk feature allow fastener to be installed flush with sheet surface.



Keyed Closed End Shown



All dimensions are in inches.

See page AE-35 for part number key.

Thread Size*	B Ref.	C Max.	ØD +.000 -.004	E Max.	F +.005 -.000	Install Drill Size (Ref.)	Install Hole Size		Keyway Dimensions		Pull Up Factor
							Min.	Max.	P +.003 -.000	H	
#6-32	.323	.063	.189	.240	.054	#12	.189	.193	.062	.056 - .058	.065
#8-32	.355	.063	.221	.271	.054	#2	.221	.226	.062	.056 - .058	.065
#10-32	.391	.065	.250	.302	.054	1/4	.250	.256	.062	.056 - .058	.080
1/4-20	.529	.089	.332	.382	.054	Q	.332	.338	.062	.056 - .058	.095
5/16-18	.656	.104	.413	.505	.120	Z	.413	.423	.128	.097 - .102	.120
3/8-16	.770	.124	.490	.597	.120	12.5mm	.490	.500	.128	.110 - .115	.155
1/2-13	.906	.124	.625	.733	.120	5/8	.625	.635	.128	.110 - .115	.185

Thread-Grip Number	Grip Range	Indent. Mark	Open End Keyed and Keyless				Closed End Keyless				Closed End Keyed					
			A ±.015	M Ref.	Wt. (lbs./1000)		L ±.015	J Ref.	K Ref.	Wt. (lbs./1000)		L ±.015	J Ref.	K Ref.	Wt. (lbs./1000)	
					Alum.	Steel				Alum.	Steel				Alum.	Steel
6-106	.065 - .106	Blank	.500	.325	.8	2.5	.687	.510	.325	1.2	3.6	.812	.635	.425	1.4	4.2
6-161	.106 - .161	2 Rad.	.500	.280	.8	2.4	.687	.465	.280	1.2	3.5	.812	.590	.380	1.3	4.1
6-201	.161 - .201	4 Rad.	.562	.295	.9	2.6	.687	.420	.260	1.1	3.4	.812	.545	.335	1.3	4.0
6-241	.201 - .241	1 Circ.	.625	.315	.9	2.9	.812	.505	.295	1.3	4.0	.812	.505	.295	1.3	4.0
6-281	.241 - .281	2 Circ.	.625	.270	.9	2.8	.812	.465	.265	1.3	3.9	.812	.465	.265	1.3	3.9
6-321	.281 - .321	3 Circ.	.687	.290	1.0	3.0	.844	.455	.265	1.3	4.0	.844	.455	.265	1.3	4.0
8-106	.065 - .106	Blank	.500	.325	1.0	3.1	.687	.510	.325	1.5	4.6	.812	.635	.425	1.8	5.4
8-161	.106 - .161	2 Rad.	.500	.280	1.0	3.0	.687	.465	.280	1.5	4.5	.812	.590	.380	1.7	5.3
8-201	.161 - .201	4 Rad.	.562	.290	1.1	3.3	.687	.415	.255	1.4	4.4	.812	.540	.330	1.7	5.2
8-241	.201 - .241	1 Circ.	.625	.310	1.2	3.6	.875	.560	.290	1.8	5.5	.875	.560	.290	1.8	5.5
8-281	.241 - .281	2 Circ.	.687	.325	1.1	3.2	.875	.515	.290	1.8	5.4	.875	.515	.290	1.8	5.4
8-321	.281 - .321	3 Circ.	.687	.295	1.2	3.8	.875	.485	.300	1.7	5.2	.875	.485	.300	1.7	5.2
10-116	.065 - .116	Blank	.578	.395	1.4	4.3	.828	.645	.395	2.2	6.7	.828	.645	.395	2.2	6.7
10-166	.116 - .166	1 Rad.	.625	.385	1.5	4.6	.875	.635	.385	2.3	6.9	.875	.635	.385	2.3	6.9
10-216	.166 - .216	2 Rad.	.687	.400	1.6	4.9	.938	.650	.400	2.4	7.2	.938	.650	.400	2.4	7.2
10-266	.216 - .266	3 Rad.	.734	.390	1.7	5.1	.984	.640	.390	2.5	7.5	.984	.640	.390	2.5	7.5
10-316	.266 - .316	4 Rad.	.781	.385	1.8	5.4	1.031	.635	.385	2.5	7.7	1.031	.635	.385	2.5	7.7
10-366	.316 - .366	5 Rad.	.844	.400	1.9	5.7	1.094	.650	.400	2.6	8.0	1.094	.650	.400	2.6	8.0
25-151	.089 - .151	Blank	.687	.440	3.2	9.8	1.000	.750	.435	5.0	15.1	1.000	.750	.435	5.0	15.1
25-211	.151 - .211	1 Rad.	.750	.440	3.4	10.3	1.062	.750	.435	5.2	15.7	1.062	.750	.435	5.2	15.7
25-271	.211 - .271	2 Rad.	.812	.440	3.6	10.9	1.125	.750	.435	5.4	16.3	1.125	.750	.435	5.4	16.3
25-331	.271 - .331	3 Rad.	.875	.435	3.8	11.5	1.187	.750	.435	5.5	16.9	1.187	.750	.435	5.5	16.9
25-391	.331 - .391	4 Rad.	.937	.435	4.0	12.1	1.250	.750	.435	5.7	17.5	1.250	.750	.435	5.7	17.5
25-451	.391 - .451	5 Rad.	1.000	.445	4.2	12.7	1.312	.760	.445	5.9	18.1	1.312	.760	.445	5.9	18.1
31-181	.106 - .181	Blank	.844	.540	5.9	17.8	1.218	.915	.540	9.0	27.5	1.218	.915	.540	9.0	27.5
31-256	.181 - .256	1 Rad.	.937	.560	6.3	19.3	1.312	.935	.560	9.5	28.9	1.312	.935	.560	9.5	29.0
31-331	.256 - .331	2 Rad.	1.000	.550	6.6	20.1	1.406	.955	.550	10.0	30.4	1.406	.955	.550	10.0	30.5
31-406	.331 - .406	3 Rad.	1.093	.565	7.1	21.5	1.468	.940	.565	10.2	31.1	1.468	.940	.565	10.2	31.2
31-481	.406 - .481	4 Rad.	1.156	.555	7.3	22.3	1.562	.960	.555	10.7	32.6	1.562	.960	.555	10.8	32.7
31-556	.481 - .556	5 Rad.	1.250	.575	7.8	23.7	1.625	.950	.575	10.9	33.3	1.625	.950	.575	11.0	33.4
37-211	.125 - .211	Blank	.938	.580	8.9	27.0	1.375	1.020	.655	13.9	42.3	1.375	1.020	.655	13.9	42.4
37-296	.211 - .296	1 Rad.	1.031	.590	9.4	28.7	1.468	1.030	.655	14.5	44.1	1.468	1.030	.655	14.5	44.1
37-381	.296 - .381	2 Rad.	1.125	.600	10.0	30.5	1.562	1.040	.675	15.0	45.8	1.562	1.040	.675	15.1	45.9
37-466	.381 - .466	3 Rad.	1.219	.615	10.6	32.3	1.656	1.050	.690	15.6	47.6	1.656	1.050	.690	15.7	47.7
37-551	.466 - .551	4 Rad.	1.312	.625	11.2	34.0	1.750	1.065	.705	16.2	49.4	1.750	1.065	.705	16.2	49.5
37-636	.551 - .636	5 Rad.	1.422	.650	11.9	36.2	1.859	1.090	.715	16.9	51.6	1.859	1.090	.715	17.0	51.7
50-226	.125 - .226	Blank	.984	.610	14.0	43.2	1.406	1.030	.610	21.9	66.6	1.406	1.030	.610	21.9	66.6
50-326	.226 - .326	1 Rad.	1.094	.620	15.0	45.7	1.515	1.040	.620	22.9	69.7	1.515	1.040	.620	22.9	69.7
50-426	.326 - .426	2 Rad.	1.218	.640	16.2	49.2	1.625	1.050	.640	23.8	72.6	1.625	1.050	.640	23.8	72.6
50-526	.426 - .526	3 Rad.	1.312	.635	16.9	51.6	1.750	1.075	.635	25.0	76.3	1.750	1.075	.635	25.0	76.3

\* Both UNC and UNF threads available in No. 10 and larger thread sizes. Check for availability of other grip ranges and designs.

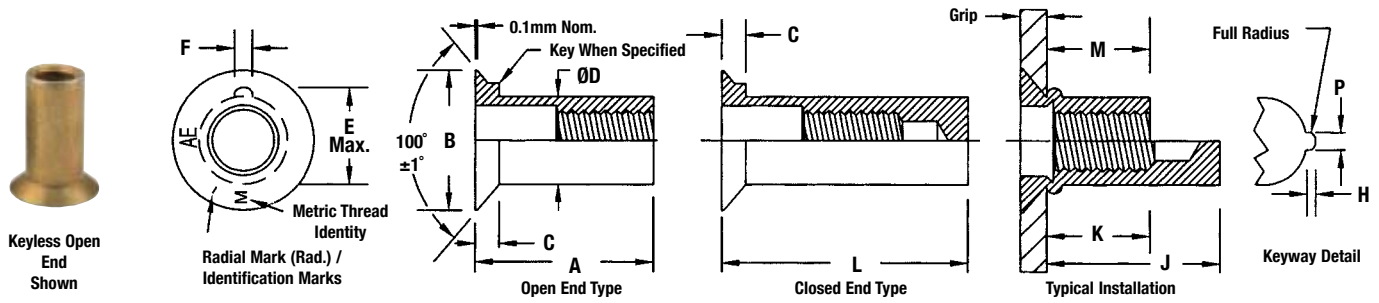
Weights: For brass fasteners, multiply weight of aluminum equivalent by 3.13. Weights for CH (4037 alloy steel) and SS (Type 430 stainless steel) same as steel.



# MaxTite® COUNTERSUNK HEAD — METRIC



- Designed for high load applications. Countersunk feature allow fastener to be installed flush with sheet surface.



All dimensions are in millimeters.

See page AE-35 for part number key.

Thread Size x Pitch	B Ref.	C Max.	ØD -0.1	E Max.	F +0.13	Install Drill Size (Ref.)	Install Hole Size		Keyway Dimensions		Pull Up Factor
							Min.	Max.	P +0.08	H	
M4 x 0.7	9.01	1.6	5.61	6.88	1.37	5.6	5.6	5.74	1.57	1.42 - 1.47	1.9
M5 x 0.8	11.17	1.83	7.13	8.73	1.85	7.2	7.2	7.3	2.06	1.7 - 1.75	2.4
M6 x 1	13.43	2.26	8.43	10.33	2.23	8.5	8.5	8.6	2.44	2.06 - 2.13	2.92
M8 x 1.25	16.65	2.64	10.48	12.82	3.05	10.5	10.5	10.75	3.25	2.46 - 2.59	3.18
M10 x 1.5	19.50	3.15	12.44	15.15	3.05	12.5	12.5	12.7	3.25	2.79 - 2.92	3.94
M12 x 1.75	22.79	3.15	15.88	18.6	3.05	15.9	15.9	16.13	3.25	2.79 - 2.92	4.7

Thread-Grip Number	Grip Range	Indent. Mark	Open End Keyed and Keyless				Closed End Keyed and Keyless				
			A ±0.38	M Ref.	Wt. (lbs./1000)		L ±0.38	J Ref.	K Ref.	Wt. (lbs./1000)	
					Alum.	Steel				Alum.	Steel
M4 - 3.1	1.6 - 3.1	Blank	12	6.98	1	3	16.5	11.5	6.98	1.5	4.6
M4 - 4.1	3.1 - 4.1	1 Rad.	13	6.98	1	3.2	17.5	11.5	6.98	1.6	4.7
M4 - 5.1	4.1 - 5.1	2 Rad.	14	6.98	1.1	3.4	18.5	11.5	6.98	1.6	4.8
M4 - 6.1	5.1 - 6.1	3 Rad.	15	6.98	1.1	3.5	19.5	11.5	6.98	1.6	5
M4 - 7.1	6.1 - 7.1	4 Rad.	16	6.98	1.2	3.7	20.5	11.5	6.98	1.7	5.2
M4 - 8.1	7.1 - 8.1	5 Rad.	17	6.98	1.2	3.8	21.5	11.5	6.98	1.8	5.3
M5 - 3.6	1.8 - 3.6	Blank	16	9.98	2.1	6.3	22	15.97	9.98	3.1	9.5
M5 - 5.1	3.6 - 5.1	1 Rad.	17.5	9.98	2.2	6.6	23.5	15.97	9.98	3.2	9.8
M5 - 6.6	5.1 - 6.6	2 Rad.	19	9.98	2.3	7	25	15.97	9.98	3.3	10.1
M5 - 8.1	6.6 - 8.1	3 Rad.	20.5	9.98	2.4	7.3	26.5	15.97	9.98	3.4	10.5
M5 - 9.6	8.1 - 9.6	4 Rad.	22	9.98	2.5	7.6	28	15.97	9.98	3.5	10.8
M5 - 11.1	9.6 - 11.1	5 Rad.	23.5	9.98	2.6	8	29.5	15.97	9.98	3.7	11.2
M6 - 4.1	2.25 - 4.1	Blank	18	10.96	3.3	10.1	25	17.97	10.96	5	15.1
M6 - 5.6	4.1 - 5.6	1 Rad.	19.5	10.96	3.5	10.6	26.5	17.97	10.96	5.1	15.6
M6 - 7.1	5.6 - 7.1	2 Rad.	21	10.96	3.6	11.1	28	17.97	10.96	5.3	16
M6 - 8.6	7.1 - 8.6	3 Rad.	22.5	10.96	3.8	11.6	29.5	17.97	10.96	5.4	16.5
M6 - 10.1	8.6 - 10.1	4 Rad.	24	10.96	4	12.2	31	17.97	10.96	5.6	17.1
M6 - 11.6	10.1 - 11.6	5 Rad.	25.5	10.96	4.2	12.7	32.5	17.97	10.96	5.8	17.7
M8 - 5.1	2.69 - 5.1	Blank	20.5	12.23	5.2	15.9	28.5	20.23	12.23	7.9	24.2
M8 - 7.1	5.1 - 7.1	1 Rad.	22.5	12.23	5.5	16.7	30.5	20.23	12.23	8.3	25.2
M8 - 9.1	7.1 - 9.1	2 Rad.	24.5	12.23	5.8	17.7	32.5	20.23	12.23	8.5	26
M8 - 11.1	9.1 - 11.1	3 Rad.	26.5	12.23	6.1	18.6	34.5	20.23	12.23	8.9	27
M8 - 13.1	11.1 - 13.1	4 Rad.	28.5	12.23	6.4	19.6	36.5	20.23	12.23	9.1	27.8
M8 - 15.1	13.1 - 15.1	5 Rad.	30.5	12.23	6.7	20.4	38.5	20.23	12.23	9.5	28.9
M10 - 6.1	3.17 - 6.1	Blank	23	12.72	7.6	23.1	31.5	21.47	12.72	11.4	34.7
M10 - 8.6	6.1 - 8.6	1 Rad.	25.5	12.72	8	24.4	34	21.47	12.72	11.8	36
M10 - 11.1	8.6 - 11.1	2 Rad.	28	12.72	8.4	25.7	36.5	21.47	12.72	12.2	37.2
M10 - 13.6	11.1 - 13.6	3 Rad.	30.5	12.72	8.9	27	39	21.47	12.72	12.7	38.6
M10 - 16.1	13.6 - 16.1	4 Rad.	33	12.72	9.3	28.4	41.5	21.47	12.72	13.1	39.8
M12 - 6.1	3.17 - 6.1	Blank	27	16.35	14.2	43.2	35	24.34	16.35	20.3	61.7
M12 - 8.6	6.1 - 8.6	1 Rad.	29.5	16.35	15.1	46	37.5	24.34	16.35	21.1	64.4
M12 - 11.1	8.6 - 11.1	2 Rad.	32	16.35	15.9	48.3	40	24.34	16.35	21.9	66.8
M12 - 13.6	11.1 - 13.6	3 Rad.	34.5	16.35	16.9	51.4	42.5	24.34	16.35	22.9	69.8
M12 - 16.1	13.6 - 16.1	4 Rad.	37	16.35	17.7	53.9	45	24.34	16.35	23.8	72.6

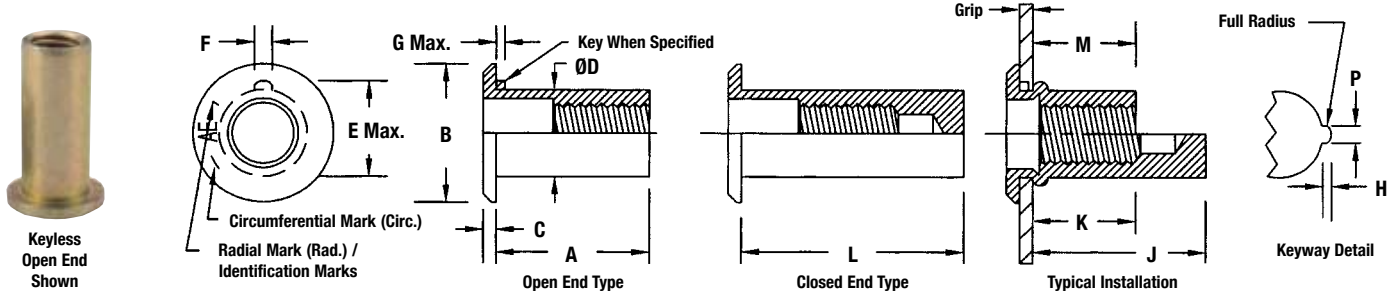
Weights: For brass fasteners, multiply weight of aluminum equivalent by 3.13. Weights for CH (4037 alloy steel) and SS (Type 430 stainless steel) same as steel.



# MaxTite® FLATHEAD — UNIFIED



- Designed for high load applications. Available with rib, key or full hex features for high torque applications.



All dimensions are in inches.

See page AE-35 for part number key.

Thread Size*	B ±.015	C Nom.	ØD +.000 - .004	E Max.	F +.005 - .000	G Max.	Install Drill Size (Ref.)	Install Hole Size		Keyway Dimensions		Pull Up Factor
								Min.	Max.	P +.003 - .000	H	
#6-32	.325	.032	.189	.240	.054	.023	#12	.189	.193	.062	.056 - .058	.065
#8-32	.357	.032	.221	.271	.054	.023	#2	.221	.226	.062	.056 - .058	.065
#10-32	.406	.038	.250	.302	.054	.023	1/4	.250	.256	.062	.056 - .058	.080
1/4-20	.475	.058	.332	.382	.054	.035	Q	.332	.338	.062	.056 - .058	.095
5/16-18	.665	.062	.413	.505	.120	.040	Z	.413	.423	.128	.097 - .102	.120
3/8-16	.781	.088	.490	.597	.120	.040	12.5mm	.490	.500	.128	.110 - .115	.155
1/2-13	.906	.085	.625	.733	.120	.040	5/8	.625	.635	.128	.110 - .115	.185

Thread-Grip Number	Grip Range	Indent. Mark	Open End Keyed and Keyless				Closed End Keyless				Closed End Keyed					
			A ±.015	M Ref.	Wt. (lbs./1000)		L ±.015	J Ref.	K Ref.	Wt. (lbs./1000)		L ±.015	J Ref.	K Ref.	Wt. (lbs./1000)	
					Alum.	Steel				Alum.	Steel				Alum.	Steel
6-75	.010 - .075	1 Rad.	.438	.300	.8	2.4	.625	.490	.305	1.2	3.5	.750	.615	.405	1.4	4.1
6-120	.075 - .120	3 Rad.	.500	.315	.9	2.6	.625	.440	.255	1.1	3.4	.750	.565	.355	1.3	4.0
6-160	.120 - .160	5 Rad.	.500	.270	.9	2.6	.750	.520	.260	1.3	4.0	.750	.520	.310	1.3	4.0
6-200	.160 - .200	1 Circ.	.562	.290	.9	2.8	.750	.480	.260	1.3	3.9	.750	.480	.260	1.3	3.9
6-240	.200 - .240	2 Circ.	.625	.310	1.0	3.0	.750	.435	.260	1.3	3.8	.750	.435	.260	1.3	3.8
6-280	.240 - .280	3 Circ.	.687	.330	1.1	3.3	.812	.455	.265	1.3	4.1	.812	.455	.265	1.3	4.1
8-75	.010 - .075	1 Rad.	.438	.300	1.0	3.0	.625	.490	.305	1.5	4.5	.750	.615	.405	1.7	5.3
8-120	.075 - .120	3 Rad.	.500	.315	1.1	3.3	.625	.440	.255	1.4	4.4	.750	.565	.355	1.7	5.2
8-160	.120 - .160	5 Rad.	.500	.270	1.1	3.2	.750	.520	.260	1.7	5.1	.750	.520	.310	1.7	5.1
8-200	.160 - .200	1 Circ.	.625	.350	1.3	3.9	.750	.475	.265	1.6	5.0	.750	.475	.265	1.6	5.0
8-240	.200 - .240	2 Circ.	.625	.305	1.2	3.8	.875	.555	.310	1.9	5.6	.875	.555	.310	1.9	5.6
8-280	.240 - .280	3 Circ.	.687	.340	1.3	4.1	.875	.530	.290	1.8	5.6	.875	.530	.290	1.8	5.6
10-80	.010 - .080	Blank	.531	.380	1.5	4.5	.781	.630	.380	2.3	6.8	.781	.630	.380	2.3	6.8
10-130	.080 - .130	1 Rad.	.594	.390	1.6	4.9	.843	.640	.390	2.4	7.2	.843	.640	.390	2.4	7.2
10-180	.130 - .180	2 Rad.	.641	.390	1.7	5.1	.891	.640	.390	2.4	7.4	.891	.640	.390	2.4	7.4
10-230	.180 - .230	3 Rad.	.703	.395	1.8	5.4	.953	.645	.395	2.6	7.8	.953	.645	.395	2.6	7.8
10-280	.230 - .280	4 Rad.	.750	.395	1.9	5.7	1.000	.645	.395	2.6	8.0	1.000	.645	.395	2.6	8.0
10-330	.280 - .330	5 Rad.	.797	.385	1.9	5.9	1.047	.630	.385	2.7	8.2	1.047	.630	.385	2.7	8.2
25-80	.020 - .080	Blank	.625	.450	3.2	9.7	.937	.760	.440	4.9	15.1	.937	.760	.440	5.0	15.1
25-140	.080 - .140	1 Rad.	.687	.450	3.4	10.3	1.000	.760	.440	5.1	15.7	1.000	.760	.440	5.1	15.7
25-200	.140 - .200	2 Rad.	.750	.450	3.6	10.9	1.062	.760	.440	5.3	16.2	1.062	.760	.440	5.3	16.3
25-260	.200 - .260	3 Rad.	.812	.445	3.8	11.5	1.125	.755	.445	5.5	16.8	1.125	.755	.445	5.5	16.8
25-320	.260 - .320	4 Rad.	.875	.445	4.0	12.0	1.187	.755	.445	5.7	17.4	1.187	.755	.445	5.7	17.4
25-380	.320 - .380	5 Rad.	.937	.445	4.1	12.6	1.250	.755	.445	5.9	18.0	1.250	.755	.445	5.9	18.0
31-125	.030 - .125	Blank	.750	.505	6.0	18.2	1.187	.940	.550	9.6	29.1	1.187	.940	.550	9.6	29.2
31-200	.125 - .200	1 Rad.	.875	.555	6.7	20.3	1.281	.960	.555	10.1	30.6	1.281	.960	.555	10.1	30.7
31-275	.200 - .275	2 Rad.	.937	.540	6.9	21.1	1.343	.950	.560	10.3	31.4	1.343	.950	.560	10.3	31.5
31-350	.275 - .350	3 Rad.	1.032	.560	7.4	22.6	1.437	.965	.570	10.8	32.9	1.437	.965	.570	10.8	32.9
31-425	.350 - .425	4 Rad.	1.125	.580	7.9	24.0	1.531	.985	.575	11.3	34.3	1.531	.985	.575	11.3	34.4
31-500	.425 - .500	5 Rad.	1.187	.565	8.2	24.9	1.593	.975	.580	11.5	35.1	1.593	.975	.580	11.6	35.2
37-115	.030 - .115	Blank	.844	.585	9.7	29.7	1.281	1.020	.660	14.8	45.0	1.281	1.020	.660	14.8	45.1
37-200	.115 - .200	1 Rad.	.938	.595	10.3	31.4	1.375	1.030	.670	15.4	46.8	1.375	1.030	.670	15.4	46.9
37-285	.200 - .285	2 Rad.	1.031	.605	10.9	33.2	1.468	1.040	.680	15.9	48.5	1.468	1.040	.680	16.0	48.6
37-370	.285 - .370	3 Rad.	1.125	.615	11.5	34.9	1.562	1.050	.690	16.5	50.3	1.562	1.050	.690	16.5	50.4
37-455	.370 - .455	4 Rad.	1.218	.630	12.0	36.7	1.656	1.065	.710	17.1	52.1	1.656	1.065	.710	17.1	52.2
37-540	.455 - .540	5 Rad.	1.312	.635	12.6	38.5	1.750	1.075	.715	17.7	53.8	1.750	1.075	.715	17.7	53.9
50-150	.050 - .150	Blank	.906	.605	14.0	42.6	1.328	1.030	.605	21.9	66.6	1.328	1.030	.605	21.9	66.6
50-250	.150 - .250	1 Rad.	1.031	.630	15.2	46.3	1.453	1.055	.630	23.1	70.3	1.453	1.055	.630	23.1	70.3
50-350	.250 - .350	2 Rad.	1.141	.640	16.2	49.2	1.562	1.060	.640	24.0	73.2	1.562	1.060	.640	24.0	73.2
50-450	.350 - .450	3 Rad.	1.250	.650	17.1	52.2	1.671	1.070	.650	25.0	76.1	1.671	1.070	.650	25.0	76.1

\* Both UNC and UNF threads available in No. 10 and larger thread sizes. Check for availability of other grip ranges and designs.

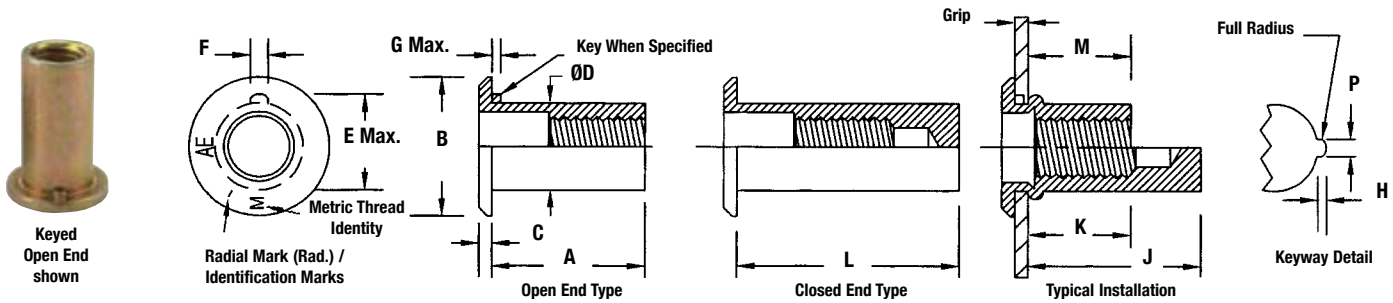
Weights: For brass fasteners, multiply weight of aluminum equivalent by 3.13. Weights for CH (4037 alloy steel) and SS (Type 430 stainless steel) same as steel.



# MaxTite® FLATHEAD — METRIC



- Designed for high load applications. Available with rib, key or full hex features for high torque applications.



All dimensions are in millimeters.

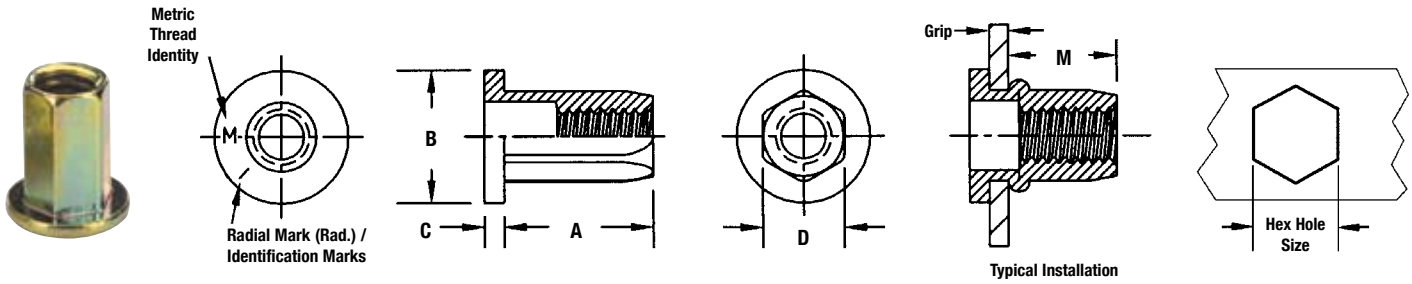
See page AE-35 for part number key.

Thread Size x Pitch	B ±0.38	C Nom.	ØD -0.1	E Max.	F +0.13	G Max.	Install Drill Size (Ref.)	Install Hole Size		Keyway Dimensions		Pull Up Factor
								Min.	Max.	P +0.08	H	
M4 x 0.7	9.01	0.81	5.61	6.88	1.37	0.58	5.6	5.6	5.74	1.57	1.42 - 1.47	1.9
M5 x 0.8	11.17	1.22	7.13	8.73	1.85	0.58	7.2	7.2	7.3	2.06	1.7 - 1.75	2.4
M6 x 1	13.43	1.47	8.43	10.33	2.23	0.89	8.5	8.5	8.6	2.44	2.06 - 2.13	2.9
M8 x 1.25	16.65	1.57	10.48	12.82	3.05	1.02	10.5	10.5	10.75	3.25	2.46 - 2.59	3.18
M10 x 1.5	19.5	2.23	12.44	15.15	3.05	1.02	12.5	12.5	12.7	3.25	2.79 - 2.92	3.94
M12 x 1.75	22.79	2.23	15.88	18.6	3.05	1.02	15.9	15.9	16.13	3.25	2.79 - 2.92	4.7

Thread-Grip Number	Grip Range	Indent. Mark	Open End Keyed and Keyless				Closed End Keyed and Keyless					
			A ±0.38	M Ref.	Wt. (lbs./1000)		L ±0.38	J Ref.	K Ref.	Wt. (lbs./1000)		
					Alum.	Steel				Alum.	Steel	
M4 - 2.0	0.25 - 2	Blank	11	7.08	1	3.1	16	12.08	7.08	1.6	5	
M4 - 3.0	2 - 3	1 Rad.	12	7.08	1.1	3.3	17	12.08	7.08	1.7	5.2	
M4 - 4.0	3 - 4	2 Rad.	13	7.08	1.1	3.4	18	12.08	7.08	1.8	5.3	
M4 - 5.0	4 - 5	3 Rad.	14	7.08	1.2	3.5	19	12.08	7.08	1.8	5.5	
M4 - 6.0	5 - 6	4 Rad.	15	7.08	1.2	3.7	20	12.08	7.08	1.9	5.7	
M4 - 7.0	6 - 7	5 Rad.	16	7.08	1.3	3.8	21	12.08	7.08	1.9	5.8	
M5 - 2.0	0.25 - 2	Blank	14.5	10.09	2.2	6.6	20	15.6	10.09	3	9.3	
M5 - 3.5	2 - 3.5	1 Rad.	16	10.09	2.3	6.9	21.5	15.6	10.09	3.2	9.6	
M5 - 5.0	3.5 - 5	2 Rad.	17.5	10.09	2.4	7.2	23	15.6	10.09	3.2	9.9	
M5 - 6.5	5 - 6.5	3 Rad.	19	10.09	2.5	7.5	24.5	15.6	10.09	3.4	10.3	
M5 - 8.0	6.5 - 8	4 Rad.	20.5	10.09	2.6	7.9	26	15.6	10.09	3.5	10.6	
M5 - 9.5	8 - 9.5	5 Rad.	22	10.09	2.7	8.2	27.5	15.6	10.09	3.6	11.1	
M6 - 2.0	0.75 - 2	Blank	15.5	10.58	3.4	10.3	23	18.07	10.58	5.1	15.5	
M6 - 3.5	2 - 3.5	1 Rad.	17	10.58	3.5	10.7	24.5	18.07	10.58	5.3	16	
M6 - 5.0	3.5 - 5	2 Rad.	18.5	10.58	3.7	11.2	26	18.07	10.58	5.4	16.5	
M6 - 6.5	5 - 6.5	3 Rad.	20	10.58	3.8	11.7	27.5	18.07	10.58	5.6	17	
M6 - 8.0	6.5 - 8	4 Rad.	21.5	10.58	4	12.2	29	18.07	10.58	5.7	17.5	
M6 - 9.5	8 - 9.5	5 Rad.	23	10.58	4.2	12.7	30.5	18.07	10.58	5.9	18	
M8 - 3.0	0.75 - 3	Blank	18	11.83	5.2	15.9	26	19.82	11.83	7.9	24	
M8 - 5.0	3 - 5	1 Rad.	20	11.83	5.7	16.9	28	19.82	11.83	8.2	25	
M8 - 7.0	5 - 7	2 Rad.	22	11.83	5.9	17.9	30	19.82	11.83	8.6	26	
M8 - 9.0	7 - 9	3 Rad.	24	11.83	6.2	19	32	19.82	11.83	8.9	27.2	
M8 - 11.0	9 - 11	4 Rad.	26	11.83	6.5	19.7	34	19.82	11.83	9.1	27.8	
M8 - 13.0	11 - 13	5 Rad.	28	11.83	6.8	20.8	36	19.82	11.83	9.5	28.8	
M10 - 3.0	1 - 3	Blank	20	13.2	8	24.5	29	22.18	13.2	12.2	37.3	
M10 - 5.5	3 - 5.5	1 Rad.	22.5	13.2	8.5	25.9	31.5	22.18	13.2	12.6	38.4	
M10 - 8.0	5.5 - 8	2 Rad.	25	13.2	8.9	27	34	22.18	13.2	13.1	39.5	
M10 - 10.5	8 - 10.5	3 Rad.	27.5	13.2	9.3	28.4	36.5	22.18	13.2	13.4	41	
M10 - 13.0	10.5 - 13	4 Rad.	30	13.2	9.7	29.6	39	22.18	13.2	13.8	42.1	
M12 - 3.0	1 - 3	Blank	24	16.45	14.9	45.5	32	24.44	16.45	21.1	64.1	
M12 - 5.5	3 - 5.5	1 Rad.	26.5	16.45	15.9	48.3	34.5	24.44	16.45	21.9	66.7	
M12 - 8.0	5.5 - 8	2 Rad.	29	16.45	16.6	50.7	37	24.44	16.45	22.7	69.3	
M12 - 10.5	8 - 10.5	3 Rad.	31.5	16.45	17.6	53.5	39.5	24.44	16.45	23.6	71.9	
M12 - 13.0	10.5 - 13	4 Rad.	34	16.45	18.5	56.3	42	24.44	16.45	24.5	74.7	

Weights: For brass fasteners, multiply weight of aluminum equivalent by 3.13. Weights for CH (4037 alloy steel) and SS (Type 430 stainless steel) same as steel.

- Designed for high load applications. Full hex feature for high torque applications.



All dimensions are in inches. See page AE-35 for part number key.

Thread Size (1)	Part Number (2)	Grip Range (1)	Identification Mark	A ±.015	B ±.015	C Nom.	D Max.	M Ref.	Hex Hole Size In Sheet +.005 -.000
#10-32	AES10H85ZYR	.010 - .085	Blank	.344	.344	.043	.223	.200	.224
#10-32	AES10H135ZYR	.085 - .135	1 Rad.	.406	.344	.043	.223	.210	.224
#10-32	AES10H185ZYR	.135 - .185	2 Rad.	.453	.344	.043	.223	.210	.224
1/4-20	AES25H85ZYR	.020 - .085	Blank	.406	.437	.043	.296	.245	.297
1/4-20	AES25H145ZYR	.085 - .145	1 Rad.	.469	.437	.043	.296	.250	.297
1/4-20	AES25H205ZYR	.145 - .205	2 Rad.	.531	.437	.043	.296	.250	.297
5/16-18	AES31H105ZYR	.030 - .105	Blank	.562	.562	.048	.368	.375	.369
5/16-18	AES31H175ZYR	.105 - .175	1 Rad.	.640	.562	.048	.368	.380	.369
5/16-18	AES31H245ZYR	.175 - .245	2 rad.	.703	.562	.048	.368	.375	.369
3/8-16	AES37H115ZYR	.030 - .115	Blank	.625	.656	.058	.437	.400	.438
3/8-16	AES37H205ZYR	.115 - .205	1 Rad.	.718	.656	.058	.437	.405	.438
3/8-16	AES37H295ZYR	.205 - .295	2 Rad.	.812	.656	.058	.437	.410	.438

All dimensions are in millimeters.

Thread Size (1)	Part Number (2)	Grip Range (1)	Identification Mark	A ±0.38	B ±0.38	C Nom.	D Max.	M Ref.	Hex Hole Size In Sheet +0.13
M5 x 0.8	AESM5H215ZYR	0.5 - 2.15	Blank	10.3	9.52	1.09	6.35	6.72	6.36
M5 x 0.8	AESM5H355ZYR	2.15 - 3.55	1 Rad.	11.9	9.52	1.09	6.35	6.72	6.36
M5 x 0.8	AESM5H505ZYR	3.55 - 5.05	2 Rad.	13.48	9.52	1.09	6.35	6.72	6.36
M6 x 1	AESM6H215ZYR	0.5 - 2.15	Blank	10.3	11.09	1.09	7.52	6.22	7.54
M6 x 1	AESM6H365ZYR	2.15 - 3.65	1 Rad.	11.9	11.09	1.09	7.52	6.22	7.54
M6 x 1	AESM6H520ZYR	3.65 - 5.2	2 Rad.	13.48	11.09	1.09	7.52	6.22	7.54
M8 x 1.25	AESM8H255ZYR	0.5 - 2.55	Blank	15.86	15.07	1.57	10.08	10.35	10.11
M8 x 1.25	AESM8H455ZYR	2.5 - 4.55	1 Rad.	17.84	15.07	1.57	10.08	10.35	10.11
M8 x 1.25	AESM8H660ZYR	4.55 - 6.6	2 Rad.	19.82	15.07	1.57	10.08	10.35	10.11
M10 x 1.5	AESM10H295ZYR	0.75 - 2.95	Blank	15.88	17.48	1.57	11.89	13.08	11.91
M10 x 1.5	AESM10H520ZYR	2.95 - 5.2	1 Rad.	18.24	17.48	1.57	11.89	13.08	11.91
M10 x 1.5	AESM10H750ZYR	5.2 - 7.5	2 Rad.	20.62	17.48	1.57	11.89	13.08	11.91

(1) Additional thread sizes and grip ranges are available.  
 (2) Other materials available. See page 35 for details. Cadmium finish available upon request.

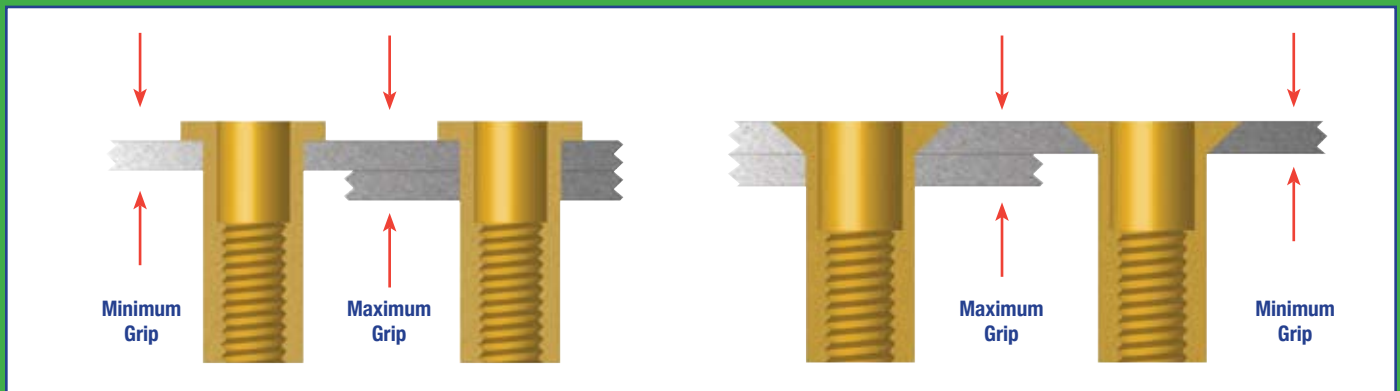
## MaxTite® MATERIAL & FINISH SPECIFICATIONS

Round Body				
Code	Material	Threads	Standard Finish	Min. Tensile Strength (PSI Ult.)
A	6053 Aluminum or 6061 Aluminum	Unified, 3B per ASME B1.1 Metric, 6H per ASME B1.13M	Anodized in accordance with MIL-A-8625, Type II, Class 1 plus lubricant	25,000
S	Low Carbon Steel	Unified, 3B per ASME B1.1 Metric, 6H per ASME B1.13M	Cadmium Plate - .0003" minimum thickness per SAE AMS-QQ-P-416 Class 2, Type II	42,000
CH	4037 Alloy Steel	Unified, 3B per ASME B1.1 Metric, 6H per ASME B1.13M	Cadmium Plate - .0003" minimum thickness per SAE AMS-QQ-P-416 Class 2, Type II	55,000 (No. 4 & No. 6 Thread Size) 85,000 (No. 8 to 1/2" Thread Sizes)
SS	430 Stainless Steel	Unified, 3B per ASME B1.1 Metric, 6H per ASME B1.13M	Passivated and/or tested per ASTM A380 plus lubricant	67,000
NM	300 Series Stainless Steel	Unified, 3B per ASME B1.1 Metric, 6H per ASME B1.13M	Passivated and/or tested per ASTM A380 plus lubricant	80,000
BR	Alloy No. 260 Brass	Unified, 3B per ASME B1.1 Metric, 6H per ASME B1.13M	None - bright as machined	50,000
Hex Body				
Code	Material	Threads	Standard Finish	Min. Tensile Strength (PSI Ult.)
S	Low Carbon Steel	Unified, 3B per ASME B1.1 Metric, 6H per ASME B1.13M	Zinc Yellow Plate per ASTM B 633, Fe/Zn 8, Type II	45,000

NOTE: Types AESS and AENM parts ordered per specifications NAS452, NAS453, NAS1329, or NAS1330 will be pickled and passivated per AMS2700 Type II.

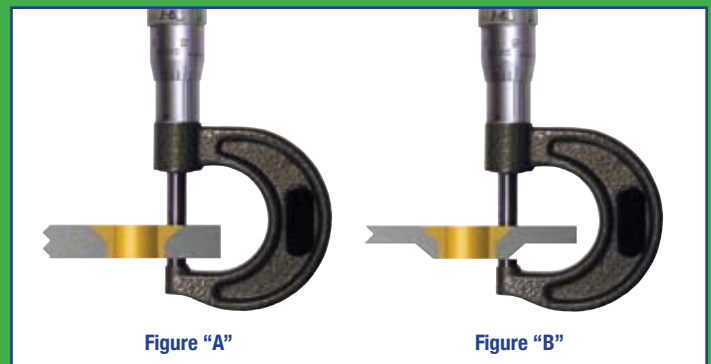
## MaxTite® GRIP RANGE

All fasteners are designed for installation into a range of material thickness. Maximum Grip represents the greatest material thickness into which a specific fastener should be properly installed. Minimum Grip represents the least thickness of material into which a specific fastener should be properly installed. The zone of material thickness between the minimum and maximum grip is the grip range.



In surface installations or machine countersunk installations, the grip is the same as the material thickness (see figure "A"). For dimple or press countersunk holes, the grip is the measurement from the top metal surface to the underside of the dimple hole (see figure "B").

**IMPORTANT:** Measurements must include air gaps, paint and any burrs that cannot be removed.

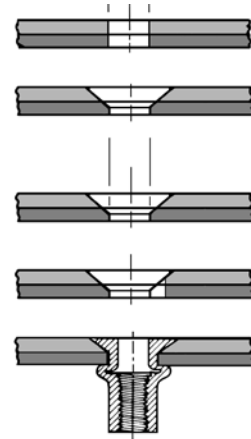


## MaxTite® COUNTERSUNK HOLE PREPARATION

### MACHINING METHOD

To obtain a precision hole and countersink, follow these steps:

- STEP 1** Drill an undersized hole in the sheet.
- STEP 2** Countersink the hole.
- STEP 3** Drill correct diameter hole with finish drill.
- STEP 4** If keyed fastener is to be used, cut a keyway to the correct dimensions.
- STEP 5** Install fastener.

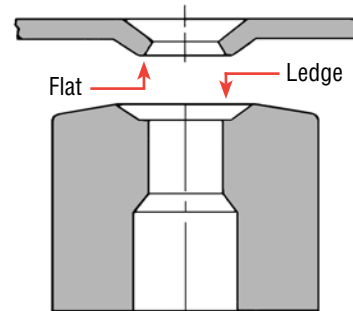


### DIMPLING METHOD

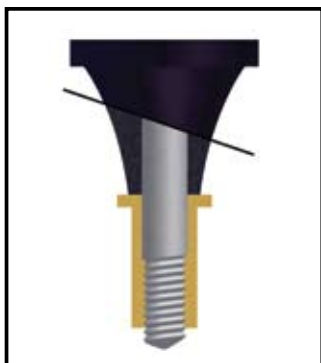
Sheets thinner than a fastener head thickness require a dimple countersink installation.

The ideal bulge on any fastener installation will always be formed against a flat under-surface. The bell-mouth that results from ordinary dimpling will not permit the fastener to form a proper bulge and these fasteners will form a weak bulge, a spread shank, and may possibly shear.

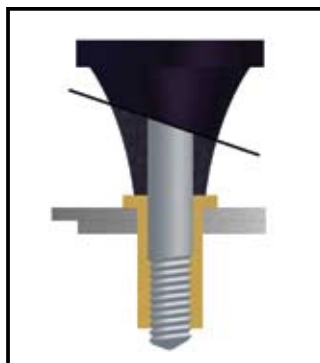
A ledge at the bottom of the dimpling die must be used to provide a flat surface in the dimpling operation. The "flat" on the dimple will save costly deburring before dimpling and enables the fastener to form normally, providing maximum strength.



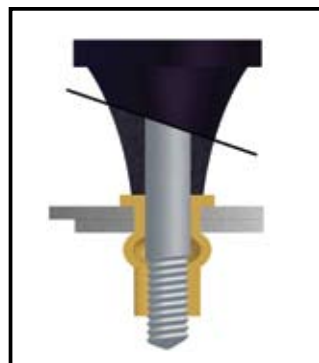
## MaxTite® INSTALLATION



**STEP 1** The fastener is threaded onto the pull-up stud of an installation tool.



**STEP 2** The fastener, on the pull-up stud, is inserted into the drilled or punched hole.



**STEP 3** The pull-up stud retracts and bulges the unthreaded portion of the fastener shank against the flat undersurface.



**STEP 4** The installation tool stud is removed, leaving the fastener secure and ready for the attachment screw.

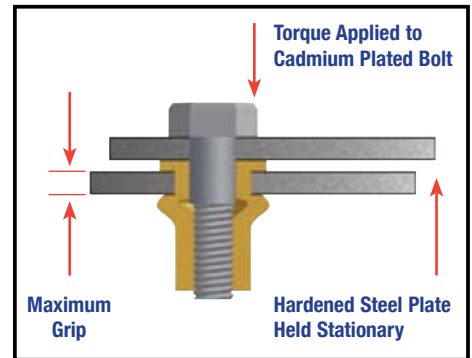
**NOTE:** For open end fasteners, the pull-up stud tip protrudes beyond the end of the MaxTite fastener. On closed end fasteners, screw the pull-up stud into the fastener minimum of seven turns. Be sure the anvil rests on the fastener head.

### TORQUE STRENGTH DATA - TORQUE-AXIAL LOAD RELATIONSHIP

When used with a non-rotating mating part, these fasteners may be safely loaded to a torque equivalent of their maximum upset loads. Surpassing these loads will cause the screw to break, or the fastener will continue to upset until ultimate strip load is attained.

Because of the many variables such as type of lubrication, plating, type and grade of screw or bolt, it is recommended that a pilot test be conducted to determine the optimum assembly torque.

Thread Size	Torque Equiv. of Max. Upset Load (in. lbs.) <sup>(1)</sup>			
	Aluminum	Brass	Steel	Stainless Steel
#6-32	12	24	24	30
#8-32	16	40	38	45
#10-32	25	45	45	60
1/4-20	60	130	130	160
5/16-18	100	156	156	260
3/8-16	190	345	344	400
1/2-13	350	NA	660	NA



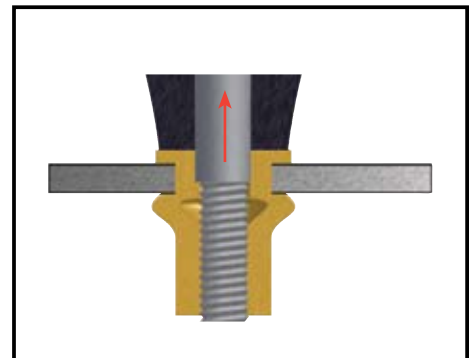
**Torque Strength**

Thread Size	Torque Equiv. of Max. Upset Load (N•m) <sup>(1)</sup>			
	Aluminum	Brass	Steel	Stainless Steel
M3	0.9	1.7	1.7	1.7
M4	1.8	4.5	4.3	5.1
M5	2.8	5.1	5.1	6.8
M6	6.8	14.7	14.7	18.1
M8	11.3	17.6	17.6	29.4
M10	21.5	39	38.9	45.2
M12	39.6	—	74.6	—

(1) These values are averages only.

### UPSET LOAD (lbs.) / (kN)

Thread Size	Aluminum		Brass		Steel		Stainless Steel	
	Min. Grip	Max. Grip	Min. Grip	Max. Grip	Min. Grip	Max. Grip	Min. Grip	Max. Grip
#6-32	500	600	800	950	850	1000	1000	1300
#8-32	600	700	1300	1500	1000	1250	1400	1650
#10-32	750	800	1600	1800	1300	1500	1900	2000
1/4-20	1300	1450	2570	2880	2300	2610	3300	3400
5/16-18	1900	2150	3870	4210	3300	3650	4800	5600
3/8-16	2570	2700	4620	4940	4965	5325	6100	6660
1/2-13	4000	4400	NA	NA	6700	7200	NA	NA



Thread Size	Aluminum		Brass		Steel		Stainless Steel	
	Min. Grip	Max. Grip	Min. Grip	Max. Grip	Min. Grip	Max. Grip	Min. Grip	Max. Grip
M3	1.8	2	3.1	3.6	3.1	3.6	3.6	4
M4	2.7	3.1	5.8	6.7	4.4	5.6	6.2	7.3
M5	3.3	3.6	7.1	8	5.8	6.7	8.4	8.9
M6	5.8	6.4	11.4	12.8	10.2	11.6	14.7	15.1
M8	8.4	9.6	17.2	18.7	14.7	16.2	21.3	24.9
M10	11.4	12	20.5	22	22.1	23.7	27.1	29.6
M12	17.8	19.6	—	—	29.8	32	—	—

Aluminum fasteners tested in aluminum plates. Steel and brass fasteners tested in steel plates. Stainless steel fasteners tested in stainless steel plates. These values are averages only and based on controlled tests - certain variations must be expected in actual practice. Performance testing of this product in your application is recommended. We will be happy to provide samples for this purpose.

NA - Test data not available.

## ATLAS® SERIES 800 SPIN-SPIN TOOLS

- Totally pneumatic.
- Installs Atlas SpinTite® and pre-bulbed Plus+Tite® fasteners into various material thickness.
- Lightweight, easy to handle.



### Series 800

Also available Series 806 tool with adjustable clutch to install #4-40 to 1/4-20 thread sizes.



### Series 900 In-line tool

Also available with 90° nose piece.



## Installs Types AEL, AEK, AEH, AEO, AET, AEW and Pre-Bulbed Plus+Tite®

	Thread Size	Complete Tool Part No. Series 800	Complete Tool Part No. Series 900	Tool RPM	Air Settings			Nose Assembly Components For Internally Threaded Nuts			Stud Series Part No. For Nose Assembly
					Fastener Material			Part No. For Complete Nose Assembly	Mandrel Socket Head Cap Screw	Bearing Set (P/N)	
					Steel & Brass	Aluminum	Monel				
					Dynamic Air Pressure Settings	Dynamic Air Pressure Settings	Dynamic Air Pressure Settings				
PSI	#4-40	AE801-440	AE901-440	3000	35 - 45	30 - 40	35 - 45	AENP-440	440 x 1.50"	AEPB-4	AESNP-440
	#6-32	AE801-632	AE901-632	3000	70 - 80	60 - 80	70 - 80	AENP-632	632 x 1.50"	AEPB-6	AESNP-632
	#8-32	AE801-832	AE901-832	3000	70 - 90	50 - 70	70 - 90	AENP-832	832 x 1.50"	AEPB-8	AESNP-832
	#10-24	AE802-1024	AE902-1024	1500	60 - 90	40 - 70	60 - 90	AENP-1024	1024 x 1.75"	AEPB-10	AESNP-1024
	#10-32	AE802-1032	AE902-1032	1500	60 - 90	40 - 70	60 - 90	AENP-1032	1032 x 1.75"	AEPB-10	AESNP-1032
	1/4-20	AE803-2520	AE903-2520	600	70 - 90	60 - 80	70 - 95	AENP-2520	420 x 1.50"	AEPB-25	AESNP-2520
	1/4-28	AE803-2528	AE903-2528	600	70 - 90	60 - 80	70 - 95	AENP-2528	428 x 1.50"	AEPB-25	AESNP-2528
	5/16-18	AE804-3118	AE904-3118	400	70 - 110	60 - 90	70 - 110	AENP-3118	518 x 2.00"	AEPB-31	AESNP-3118
	5/16-24	AE804-3124	AE904-3124	400	70 - 110	60 - 90	70 - 110	AENP-3124	524 x 2.00"	AEPB-31	AESNP-3124
	3/8-16	AE804-3716	AE904-3716	400	70 - 110	60 - 90	70 - 110	AENP-3716	616 x 2.00"	AEPB-37	AESNP-3716
	3/8-24	AE804-3724	AE904-3724	400	70 - 110	60 - 90	70 - 110	AENP-3724	624 x 2.00"	AEPB-37	AESNP-3724
	1/2-13	AE808-5013	—	275	75 - 120	60 - 90	75 - 110	AENP-5013	813 x 2.50"	AEPB-50	AESNP-5013
1/2-20	AE808-5020	—	275	75 - 120	60 - 90	75 - 110	AENP-5020	820 x 2.50"	AEPB-50	AESNP-5020	
BARS	M3	AE801-M3	AE901-M3	3000	2.4 - 3.1	2.1 - 2.7	2.4 - 3.1	AENP-M3	M3 x 40mm	AEPB-M3	AESNP-M3
	M4	AE801-M4	AE901-M4	3000	2.4 - 3.1	3.4 - 4.8	4.8 - 6.2	AENP-M4	M4 x 40mm	AEPB-M4	AESNP-M4
	M5	AE802-M5	AE902-M5	1500	4.8 - 5.5	2.7 - 4.8	4.1 - 6.2	AENP-M5	M5 x 45mm	AEPB-M5	AESNP-M5
	M6	AE803-M6	AE903-M6	600	4.1 - 5.5	4.1 - 5.5	4.8 - 6.5	AENP-M6	M6 x 40mm	AEPB-M6	AESNP-M6
	M8	AE804-M8	AE904-M8	400	4.8 - 6.2	4.1 - 6.2	4.8 - 7.5	AENP-M8	M8 x 50mm	AEPB-M8	AESNP-M8
	M10	AE804-M10	AE904-M10	400	4.1 - 7.5	4.1 - 6.2	4.8 - 7.5	AENP-M10	M10 x 50mm	AEPB-M10	AESNP-M10
	M12	AE808-M12	—	275	4.1 - 7.5	4.1 - 6.2	5.1 - 7.5	AENP-M12	M12 x 60mm	AEPB-M12	AESNP-M12

NOTE: The air supplied to the 800 and 900 series tools should be dry and free of contamination to prevent premature wear and tear of the internal components. We suggest use of a filter, pressure regulator, and oiler system, which are available through Atlas, to be located in close proximity to the tool. All available thread sizes may not be listed. Contact us for availability. Optional mandrel lengths are also available for all product families.

## ATLAS® AE45 SPIN-PULL TOOL

The ATLAS® AE45 spin-pull tool provides powerful spin/pull action to easily install Atlas MaxTite® and straight shank Plus+Tite® fasteners. The tool is designed for long life and trouble free service.

The **unified kit**, AE45-UN, includes a gun and tooling to install thread sizes #6-32 through 1/2-13. The **metric kit**, AE45-MT, includes a gun and tooling to install thread sizes M4 through M10.



### AE 45 Series Tool Specifications

Model No.	Thread Sizes	Weight <sup>(1)</sup>	Air <sup>(2)</sup>	Air Use	Minimum Hose Size I.D.	Max. Axial Pulling Load
AE45-UN	#6 to 1/2"	6.5 lbs.	80-100 PSI	530 cu. in.	3/8"	6300 lbs. @ 90 PSI
AE45-MT	M4 to M10	2.9 kg.	6.1 to 6.8 Bars	8.7 liters	9.5 mm	28 kN @ 6.45 BAR

(1) With nose piece.

(2) Dynamic air pressure for unified tool is 60 to 90 PSI and 4.1 to 6.2 Bars for the metric tool.

### AE45-UN NOSE ASSEMBLY PART NUMBERS

Thread Size	Part No. For Complete Nose Assembly
#6-32	AE45NP-632
#8-32	AE45NP-832
#10-24	AE45NP-1024
#10-32	AE45NP-1032
1/4-20	AE45NP-2520
1/4-28	AE45NP-2528
5/16-18	AE45NP-3118
3/8-16	AE45NP-3716
1/2-13	AE45NP-5013

### AE45-MT NOSE ASSEMBLY PART NUMBERS

Thread Size	Part No. For Complete Nose Assembly
M4	AE45NP-M4
M5	AE45NP-M5
M6	AE45NP-M6
M8	AE45NP-M8
M10	AE45NP-M10
M12	AE45NP-M12

## L6000 INSTALLATION TOOL

- Ideal for light production requirements.
- Installs most SpinTite® fastener types and sizes.



Thread Size	Complete Tool Part Number
#4-40	L-6000-440
#6-32	L-6000-632
#8-32	L-6000-832
#10-24	L-6000-1024
#10-32	L-6000-1032
1/4-20	L-6000-2520
1/4-28	L-6000-2528
M5	L-6000-M5
M6	L-6000-M6

## L-845/722 HEX WRENCH INSTALLATION TOOL

- Designed for installing SpinTite® and MaxTite® fasteners.
- Great for field installations or repair work.
- Ideal for prototype applications.
- Comes with hex key.



**Model L-845** - Installs nuts #4-40 to 1/4" and M4 to M6  
**Model L-722** - Installs nuts 5/16" to 1/2" and M8 to M12

Thread Size	Complete Tool Part Number
#4-40	L-845-440
#6-32	L-845-632
#8-32	L-845-832
#10-24	L-845-1024
#10-32	L-845-1032
1/4-20	L-845-2520
1/4-28	L-845-2528
5/16-18	L-722-3118
5/16-24	L-722-3124
3/8-16	L-722-3716
3/8-24	L-722-3724
1/2-13	L-722-5013
1/2-20	L-722-5020
M4	L-845-M4
M5	L-845-M5
M6	L-845-M6
M8	L-722-M8
M10	L-722-M10
M12	L-722-M12

## AE10 HAND TOOL

- Ideal for light production requirements.
- Installs most SpinTite® fastener types and sizes.
- Ideal for prototype applications.



**Model AE10-U** - Installs nuts #6-32 to 3/8-16  
**Model AE10-M** - Installs nuts M3 to M8

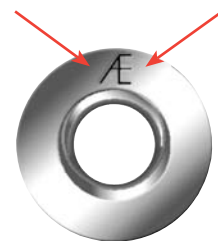
For more information on our installation tools and any troubleshooting questions, check our web site.



### AE® Prototype Kits

The AE® prototype kit contains a wide variety of ATLAS® blind threaded rivets for repair or prototype needs. The kit contains over 1,200 pieces of Type AELS SpinTite® unified and metric fasteners, proper sized drill bits, and a hand installation tool. To order specify item number PKAE-100. Check with your local distributor for pricing.

Look for the "AE" on ATLAS® Plus+Tite® and MaxTite® inserts.



# THREAD CODE COMPARISON CHART

	Common Industry Standard	Alternate Industry Standard	Atlas® SpinTite® Thread Code	Atlas® MaxTite®/Plus+Tite® Thread Code
<b>UNIFIED</b>	#0-80	.060 - 80	—	—
	#1-64	.073 - 64	—	—
	#1-72	.073 - 72	—	—
	#2-56	.086 - 56	—	—
	#2-64	.086 - 64	—	—
	#3-48	.099 - 48	—	—
	#3-56	.099 - 56	—	—
	#4-40	.112 - 40	440	4
	#4-48	.112 - 48	448	448
	#5-40	.125 - 40	540	5
	#5-44	.125 - 44	544	544
	#6-32	.138 - 32	632	6
	#6-40	.138 - 40	640	640
	#8-32	.164 - 32	832	8
	#8-36	.164 - 36	836	836
	#10-24	.190 - 24	1024	1024
	#10-32	.190 - 32	1032	10
	#12-24	.216 - 24	1224	12
	#12-28	.216 - 28	1228	1228
	1/4-20	.2500 - 20	420	25
	1/4-28	.2500 - 28	428	2528
	5/16-18	.3125 - 18	518	31
	5/16-24	.3125 - 24	524	3124
	3/8-16	.3750 - 16	616	37
	3/8-24	.3750 - 24	624	3724
	7/16-14	.4375 - 14	714	43
	7/16-20	.4375 - 20	720	4320
	1/2-13	.5000 - 13	813	50
1/2-20	.5000 - 20	820	5020	
5/8-11	.6250 - 11	1011	—	
5/8-18	.6250 - 18	1018	—	
3/4-10	.7500 - 10	1210	—	
3/4-16	.7500 - 16	1216	—	
<b>METRIC</b>	M1.6 x 0.35	—	—	—
	M2 x 0.4	—	—	—
	M2.5 x 0.45	—	—	—
	M3 x 0.5	—	350	M3
	M3.5 x 0.6	—	3560	M3.5
	M4 x 0.7	—	470	M4
	M5 x 0.8	—	580	M5
	M6 x 1	—	610	M6
	M8 x 1.25	—	8125	M8
	M8 x 1	—	810	Special
	M10 x 1.5	—	1015	M10
	M10 x 1.25	—	10125	Special
	M10 x 1	—	1010	Special
	M12 x 1.75	—	12175	M12
	M14 x 2	—	1420	M14
M16 x 2	—	1620	M16	

# GENERAL CONVERSION CHARTS

Drill Size	Inch	mm	Drill Size	Inch	mm	Drill Size	Inch	mm	Drill Size	Inch	mm	Drill Size	Inch	mm
80	.0135	.343	50	.0700	1.778	22	.1570	3.988	G	.2610	6.630	31/64	.4844	12.304
79	.0145	.368	49	.0730	1.854	21	.1590	4.039	17/64	.2556	6.746	1/2	.5000	12.700
1/64	.0156	.396	48	.0760	1.930	20	.1610	4.089	H	.2660	6.756	33/64	.5156	13.096
78	.0160	.406	5/64	.0781	1.984	19	.1660	4.216	I	.2720	6.909	17/32	.5312	13.492
77	.0180	.457	47	.0785	1.994	18	.1695	4.305	J	.2770	7.036	35/64	.5469	13.891
76	.0200	.508	46	.0810	2.057	11/64	.1719	4.366	K	.2810	7.137	9/16	.5625	14.288
75	.0210	.533	45	.0820	2.083	17	.1730	4.394	9/32	.2812	7.142	37/64	.5781	14.684
74	.0225	.572	44	.0860	2.184	16	.1770	4.496	L	.2900	7.366	19/32	.5938	15.083
73	.0240	.609	43	.0890	2.261	15	.1800	4.572	M	.2950	7.493	39/64	.6094	15.479
72	.0250	.635	42	.0935	2.375	14	.1820	4.623	19/64	.2969	7.541	5/8	.6250	15.875
71	.0260	.660	3/32	.0938	2.383	13	.1850	4.700	N	.3020	7.671	41/64	.6406	16.271
70	.0280	.711	41	.0960	2.438	3/16	.1875	4.763	5/16	.3125	7.938	21/32	.6562	16.667
69	.0292	.742	40	.0980	2.489	12	.1890	4.801	O	.3160	8.026	43/64	.6719	17.066
68	.0310	.787	39	.0995	2.527	11	.1910	4.851	P	.3230	8.204	11/16	.6875	17.463
1/32	.0312	.792	38	.1015	2.578	10	.1935	4.915	21/64	.3281	8.334	45/64	.7031	17.859
67	.0320	.813	38	.1040	2.642	9	.1960	4.978	Q	.3320	8.433	23/32	.7188	18.258
66	.0330	.838	36	.1065	2.705	8	.1990	5.055	R	.3390	8.611	47/64	.7344	18.654
65	.0350	.889	7/64	.1094	2.779	7	.2010	5.105	11/32	.3438	8.733	3/4	.7500	19.050
64	.0360	.914	35	.1100	2.794	13/64	.2031	5.159	S	.3480	8.839	419/64	.7656	19.446
63	.0370	.940	34	.1110	2.819	6	.2040	5.182	T	.3580	9.093	25/32	.7812	19.842
62	.0380	.965	33	.1130	2.870	5	.2055	5.220	23/64	.3594	9.129	51/64	.7969	20.241
61	.0390	.991	32	.1160	2.946	4	.2090	5.309	U	.3680	9.347	13/16	.8125	20.638
60	.0400	1.016	31	.1200	3.048	3	.2130	5.410	3/8	.3750	9.525	53/64	.8281	21.034
59	.0410	1.041	1/8	.1250	3.175	7/32	.2188	5.558	V	.3770	9.576	27/32	.8438	21.433
58	.0420	1.067	30	.1285	3.264	2	.2210	5.613	W	.3860	9.804	55/64	.8594	23.829
57	.0430	1.092	29	.1360	3.454	1	.2280	5.791	25/64	.3906	9.921	7/8	.8750	22.225
56	.0465	1.181	28	.1405	3.569	A	.2340	5.944	X	.3970	10.084	57/64	.8906	22.621
3/64	.0469	1.191	9/63	.1406	3.571	15/64	.2344	5.954	Y	.4040	10.262	29/32	.9062	23.017
55	.0520	1.321	27	.1440	3.658	B	.2380	6.045	13/32	.4062	10.317	59/64	.9219	23.416
54	.0550	1.397	26	.1470	3.734	C	.2420	6.147	Z	.4130	10.490	15/16	.9375	23.813
53	.0595	1.511	25	.1495	3.797	D	.2460	6.248	27/64	.4219	10.716	61/64	.9531	24.209
1/16	.0625	1.588	24	.1520	3.861	1/4	.2500	6.350	7/16	.4375	11.113	31/32	.9688	24.608
52	.0635	1.613	23	.1540	3.912	E	.2500	6.350	29/64	.4531	11.509	63/64	.9844	25.004
51	.0670	1.702	5/32	.1562	3.967	F	.2570	6.528	15/32	.4688	11.908	1	1.000	25.400

## DECIMAL EQUIVALENTS OF STANDARD GAUGE SHEET ALUMINUM AND SHEET METAL

No. of Gauge	Gauge		No. of Gauge	Gauge		No. of Gauge	Gauge	
	Alum. (B & S)	Steel (US Std.)		Alum. (B & S)	Steel (US Std.)		Alum. (B & S)	Steel (US Std.)
10	.1019	.1345	17	.0453	.0538	24	.0201	.0239
11	.0907	.1196	18	.0403	.0478	25	.0179	.0209
12	.0808	.1046	19	.0359	.0418	26	.0159	.0179
13	.0720	.0897	20	.0320	.0359	27	.0142	.0164
14	.0641	.0747	21	.0285	.0329	28	.0126	.0149
15	.0571	.0673	22	.0253	.0299	29	.0113	.0135
16	.0508	.0598	23	.0226	.0269	30	.0100	.0120

# GENERAL CONVERSION CHARTS

## SUGGESTED ASSEMBLY TORQUE VALUES TO PRODUCE CORRESPONDING BOLT LOADS

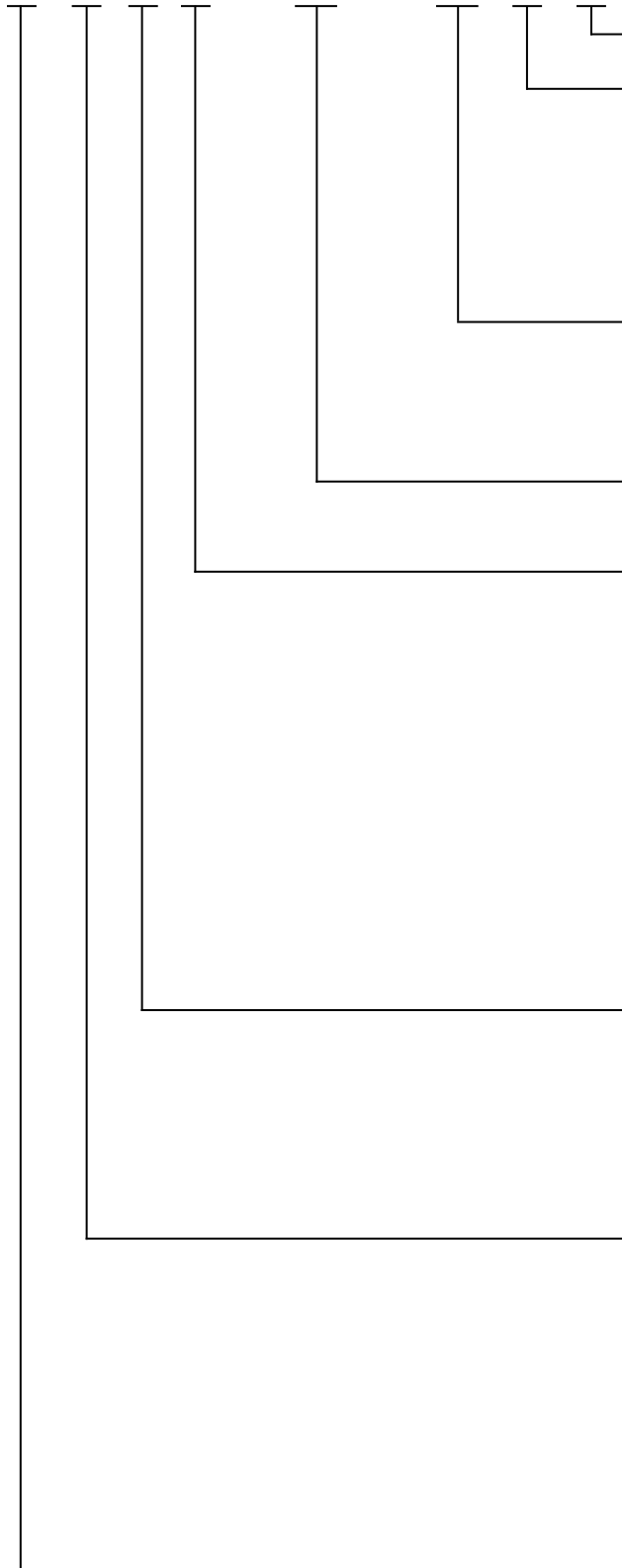
Thread Size	SAE Grade 5 Bolts		
	Clamp Load (lbs.)	Assembly Torque (in lbs.)	
		Dry	Plated
#4-40	380	8	6
#6-32	580	16	12
#8-32	900	30	22
#10-24	1120	43	32
#10-32	1285	49	36
1/4-20	2000	96	75
1/4-28	2300	120	86
5/16-18	3350	204	156
5/16-24	3700	228	168
3/8-16	4950	360	276
3/8-24	5600	420	300

## METRIC CONVERSIONS

<b>LINEAR</b>	Multiply INCHES	by 25.4	to get MILLIMETERS (mm)	Multiply MILLIMETERS (mm)	by .03937	to get INCHES
	Multiply INCHES	by 2.54	to get CENTIMETERS (cm)	Multiply CENTIMETERS (cm)	by .3937	to get INCHES
<b>TORQUE</b>	Multiply INCH-POUNDS	by 0.11298	to get NEWTON-METERS (Nm)	Multiply NEWTON-METERS (Nm)	by 8.851	to get INCH-POUNDS
	Multiply FOOT-POUNDS	by 1.3558	to get NEWTON-METERS (Nm)	Multiply NEWTON-METERS (Nm)	by 0.7376	to get FOOT-POUNDS
<b>FORCE</b>	Multiply POUNDS	by .00445	to get KILONEWTONS (kN)	Multiply KILONEWTONS (kN)	by 224.72	to get POUNDS
<b>PRESSURE</b>	Multiply PSI	by .069	to get BARS	Multiply BARS	by 14.5	to get PSI

# ATLAS® SpinTite® PART NUMBER KEY

**AE L S 8 - 420 - 165 B W**



**W** is for wedge head.

**B** here indicates closed end thread, **S** indicates sealant under the head, **BS** is closed end w/sealant under head, **blank** is open end. **Numbers preceded by a dash** in this position is the nominal stud length when installed in max grip. For parts with Unified threads, the number shown is the max grip in thousands of an inch. For parts with Metric threads, the number shown is the max grip in millimeters.

**Grip Range Code:**

For parts with Unified threads, the number shown is the max grip in thousands of an inch. For parts with Metric threads, the number shown is the max grip in millimeters.

**Thread Code:** See Thread Code Comparison Chart on page 36. Can also be used to determine if part is SpinTite® or MaxTite®/Plus+Tite®.

**Finish Code Number:**

- 1 = Clear protective coating
- 2 = Cadmium and clear chromate (standard on type T, but not shown)
- 3 = Zinc and clear chromate
- 4 = Zinc and yellow chromate
- 5 = Zinc and black chromate
- 6 = Tin plate
- 7 = Cadmium and yellow chromate
- 8 = RoHS compliant zinc and yellow chromate (standard on all but AET and AEO). For AES leave blank.
- 9 = Tin/zinc plate
- 10 = RoHS compliant zinc and clear chromate (standard on AEO)

**Material Code:**

- S = Steel
- A = Aluminum
- B = Brass
- M = Monel® alloy 400 (AEL and AEK only)
- C = Stainless Steel (AETHC and AEK only)

**Head and Shank Type Code**

- K = Round ribbed shank, minimum-profile head
- L = Round ribbed shank, low-profile head
- H = Half hex shank, low-profile head
- O = Thin wall, smooth round shank, low-profile head
- T = 360° swaging, low-profile head
- S = Externally threaded stud installed into type AEL insert
- TH = Full metric mounting hole
- W = Diamond knurl

**All ATLAS® part numbers** begin with AE for Atlas Engineering.

# ATLAS® MaxTite® and Plus+Tite® PART NUMBER KEY

**AE S 25 P 280 PB ZYR**

## Standard Finishes:

MaxTite: Steel - Cadmium and clear chromate (no suffix)  
 Aluminum - Anodized (no suffix)  
 Stainless Steel - Passivated and/or tested per ASTM A380 (no suffix)  
 Brass - No additional finish (no suffix)  
 Alloy Steel - Cadmium and clear chromate (no suffix)  
 Plus+Tite and standard full hex: Zinc and yellow chromate (ZYR suffix)

## Non Standard Finish Designation:

CSI = Cadmium and yellow hexavalent chromate  
 ZN = Zinc and clear hexavalent chromate (inactive for new designs)  
 ZY = Zinc and hexavalent yellow chromate (inactive for new designs)  
 ZNR = Zinc and clear trivalent chromate (RoHS compliant)  
 ZYR = Zinc and trivalent yellow chromate (RoHS compliant)

**PB** here indicates **Pre-Bulbed**, only used with Plus+Tite®

## Grip Range and MaxTite® Head Style Code:

For parts with Unified threads, the number shown is the max grip in thousands of an inch. For parts with Metric threads, the number shown is the max grip in millimeters. Grip range codes ending with a 0 or 5 indicate a flathead product. Grip range codes ending with a 1 or 6 indicate a countersunk head product. All Plus+Tite inserts have a flat head, regardless of last character of grip range code.

## Key/No Key, Thread End Type and Shank Type Code per table below:

Code	Key	Thread End	Shank Type
-	No	Open	Smooth round
K	Yes	Open	Smooth round
B	No	Closed	Smooth round
KB	Yes	Closed	Smooth round
R	No	Open	Ribbed round
H	No	Open	Full-hex body
P	No	Open	Slotted (Plus+Tite®)

**Thread Code:** See Thread Code Comparison Chart on page 31. Can also be used to determine if part is SpinTite® or MaxTite®/Plus+Tite®.

## Material Code:

S = Steel  
 A = Aluminum  
 NM = 300 Series stainless steel (**N**on **M**agnetic)  
 SS = Type 430 stainless steel  
 BR = Brass  
 CH = 4037 Alloy Steel

**All ATLAS® part numbers** begin with AE for **A**tlas **E**ngineering.

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