



# SHZ

## Straight Hole Zerts

### FEATURES

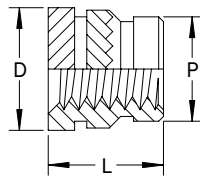
- Rapid self-aligning installation using heat or ultrasonic.
- Opposing helical knurls provide excellent pull-out and torque-out resistance.
- Thin boss walls permit compact design.
- Available in a wide variety of thread sizes, stud lengths and options.



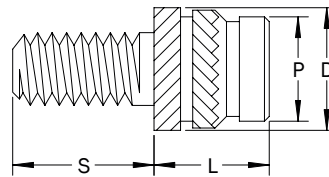
### PART DESCRIPTION EXAMPLE

SHZS	—	632	—	250 X 375	—	SS
T		T		T		T
Series Code		Insert or Stud Thread Code		Insert Length Code		Stud Length Code <sup>1</sup>
						Material Code <sup>2</sup>

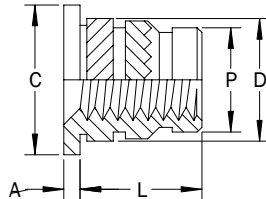
- (1) Omit stud length code for non-studded inserts.  
 (2) SS material code designates stainless steel. Standard insert material is brass. Omit SS material code for brass inserts. Custom materials and finishes available by request.



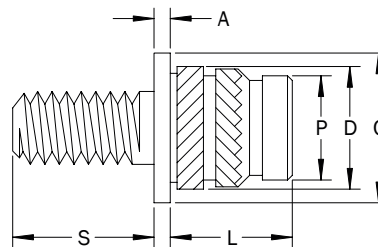
**Insert**  
Series Code SHZ



**Insert w/ Stud**  
Series Code SHZS



**Headed Insert**  
Series Code SHZH



**Headed Insert w/ Stud**  
Series Code SHZHS

SHZ Straight Hole Zerts

## GENERAL

	Insert Thread	Insert Thread Code	Boss		A Head Thickness	C Head Diameter	D Insert Diameter	P Pilot Diameter
			B Hole Dia. +.004 -.000	W Wall Thickness Min.				
INCH	0-80	080	.100	.051	—	—	.116	.095
	2-56	256	.126	.051	.021	.187	.141	.123
	4-40	440	.157	.063	.024	.218	.181	.154
	6-32	632	.189	.071	.030	.250	.214	.185
	8-32	832	.220	.083	.036	.281	.248	.218
	10-24	1024	.252	.102	.043	.312	.278	.249
	10-32	1032	.252	.102	.043	.312	.278	.249
	1/4-20	2520	.315	.130	.053	.375	.341	.312
	1/4-28	2528	.315	.130	.053	.375	.341	.312
	5/16-18	3118	.378	.177	.053	.437	.403	.374
	5/16-24	3124	.378	.177	.053	.437	.403	.374
	3/8-16	3716	.469	.236	.063	.551	.494	.465
	3/8-24	3724	.469	.236	.063	.551	.494	.465
	1/8-NPT	125NPT	.453	.236	—	—	.479	.450
	1/2-13	5013	.630	.315	.079	.748	.657	.622
	1/2-20	5020	.630	.315	.079	.748	.657	.622

(1) All dimensions are in inches and reference unless tolerated.

	Insert Thread	Insert Thread Code	Boss		A Head Thickness	C Head Diameter	D Insert Diameter	P Pilot Diameter
			B Hole Dia. +0.10 -0.00	W Wall Thickness Min.				
METRIC	M2 x 0.4	M2	3.20	1.30	0.53	4.80	3.60	3.10
	M2.5 x 0.45	M2.5	4.00	1.60	0.61	5.50	4.60	3.90
	M3 x 0.5	M3	4.00	1.60	0.61	5.50	4.60	3.90
	M3.5 x 0.6	M3.5	4.80	1.80	0.76	6.40	5.40	4.70
	M4 x 0.7	M4	5.60	2.10	0.91	7.10	6.30	5.50
	M5 x 0.8	M5	6.40	2.60	1.09	7.90	7.10	6.30
	M6 x 1.0	M6	8.00	3.30	1.35	9.50	8.70	7.90
	M8 x 1.25	M8	9.60	4.50	1.35	11.10	10.20	9.50
	M10 x 1.5	M10	11.90	6.00	1.60	14.00	12.60	11.80
	M12 x 1.75	M12	16.00	8.00	2.00	19.00	16.70	15.80

(1) All dimensions are in millimeters and reference unless tolerated.

### INSERT LENGTH

INCH	Insert Thread	L Insert Length	Insert Length Code
	0-80	.125 <sup>2</sup>	125
	2-56	.100	100
		.115	115
		.125	125
		.138	138
		.157 <sup>2</sup>	157
	4-40	.096	096
		.140	140
		.170	170
.226 <sup>2</sup>		226	
.250		250	
.321		321	
6-32	.125	125	
	.150	150	
	.205	205	
	.226	226	
	.250	250	
	.281 <sup>2</sup>	281	
	.375	375	

- (1) All dimensions are in inches and reference unless toleranced.
- (2) Preferred insert length.
- (3) Custom insert lengths available by request.

INCH (CONTINUED)	Insert Thread	L Insert Length	Insert Length Code
	8-32	.115	115
		.150	150
		.185	185
		.250	250
		.281	281
		.321 <sup>2</sup>	321
	10-24 10-32	.185	185
		.226	226
		.250	250
		.310	310
		.375 <sup>2</sup>	375
		.400	400
	1/4-20 1/4-28	.250	250
		.312	312
		.348	348
	5/16-18 5/16-24	.500 <sup>2</sup>	500
3/8-16 3/8-24	.500 <sup>2</sup>	500	
1/8 NPT	.625 <sup>2</sup>	625	
1/2-13 1/2-20	.625 <sup>2</sup>	625	

- (1) All dimensions are in inches and reference unless toleranced.
- (2) Preferred insert length.
- (3) Custom insert lengths available by request.

METRIC	Insert Thread	L Insert Length	Insert Length Code
	M2 x 0.4	2.50	2.50
		3.18	3.18
		4.00 <sup>2</sup>	4.00
	M2.5 x 0.45	3.56	3.56
		5.74 <sup>2</sup>	5.74
	M3 x 0.5	4.00	4.00
		4.32	4.32
		5.00	5.00
		5.21	5.21
		5.74 <sup>2</sup>	5.74
	M3.5 x 0.6	3.80	3.80
		5.00	5.00
		7.14 <sup>2</sup>	7.14
	M4 x 0.7	4.00	4.00
		4.70	4.70
		5.51	5.51
		5.74	5.74
		6.35	6.35
		8.15 <sup>2</sup>	8.15
M5 x 0.8	5.80	5.80	
	6.35	6.35	
	9.50 <sup>2</sup>	9.50	
M6 x 1.0	6.35	6.35	
	6.80	6.80	
	7.90	7.90	
	12.70 <sup>2</sup>	12.70	
M8 x 1.25	12.70 <sup>2</sup>	12.70	
M10 x 1.5	12.70 <sup>2</sup>	12.70	
M12 x 1.75	15.90 <sup>2</sup>	15.90	

- (1) All dimensions are in millimeters and reference unless toleranced.
- (2) Preferred insert length.
- (3) Custom insert lengths available by request.

## STUD LENGTH

	Stud Thread	Stud Thread Code	D Insert Diameter	S - Stud Length									
				.187	.250	.312	.375	.437	.500	.625	.750	.875	1.000
				Stud Length Code									
INCH	0-80	080	.116	187	250	—	—	—	—	—	—	—	—
	2-56	256	.141	187	250	312	—	—	—	—	—	—	—
	4-40	440	.181	187	250	312	375	437	—	—	—	—	—
	6-32	632	.214	187	250	312	375	437	500	—	—	—	—
	8-32	832	.248	187	250	312	375	437	500	625	—	—	—
	10-24	1024	.278	187	250	312	375	437	500	625	750	—	—
	10-32	1032	.278	187	250	312	375	437	500	625	750	—	—
	1/4-20	2520	.341	—	250	312	375	437	500	625	750	875	1000
	1/4-28	2528	.341	—	250	312	375	437	500	625	750	875	1000
	5/16-18	3118	.403	—	—	312	375	437	500	625	750	875	1000
	5/16-24	3124	.403	—	—	—	375	437	500	625	750	875	1000
	3/8-16	3716	.494	—	—	—	375	437	500	625	750	875	1000
	3/8-24	3724	.494	—	—	—	375	437	500	625	750	875	1000
	1/8-NPT	125NPT	.479	—	—	—	375	437	500	625	750	875	1000
	1/2-13	5013	.657	—	—	—	—	—	500	625	750	875	1000
	1/2-20	5020	.657	—	—	—	—	—	500	625	750	875	1000

- (1) All dimensions are in inches and reference unless tolerated.  
 (2) Custom stud lengths available by request.

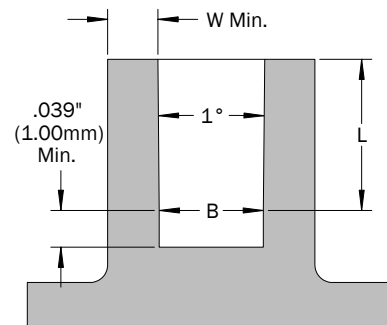
### STUD LENGTH (CONTINUED)

METRIC	Stud Thread	Stud Thread Code	D Insert Diameter	S - Stud Length									
				5.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	25.00
				Stud Length Code									
	M2 x 0.4	M2	3.60	5.00	6.00	8.00	—	—	—	—	—	—	—
	M2.5 x 0.45	M2.5	4.60	5.00	6.00	8.00	10.00	—	—	—	—	—	—
	M3 x 0.5	M3	4.60	5.00	6.00	8.00	10.00	12.00	—	—	—	—	—
	M3.5 x 0.6	M3.5	5.40	5.00	6.00	8.00	10.00	12.00	14.00	—	—	—	—
	M4 x 0.7	M4	6.30	5.00	6.00	8.00	10.00	12.00	14.00	16.00	—	—	—
	M5 x 0.8	M5	7.10	5.00	6.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	—
	M6 x 1.00	M6	8.70	—	6.00	8.00	10.00	12.00	14.00	16.00	18.00	20.00	25.00
	M8 x 1.25	M8	10.20	—	—	8.00	10.00	12.00	14.00	16.00	18.00	20.00	25.00
	M10 x 1.5	M10	12.60	—	—	—	10.00	12.00	14.00	16.00	18.00	20.00	25.00
	M12 x 1.75	M12	16.70	—	—	—	—	12.00	14.00	16.00	18.00	20.00	25.00

- (1) All dimensions are in millimeters and reference unless toleranced.
- (2) Custom stud lengths available by request.

### BOSS DESIGN RECOMMENDATION

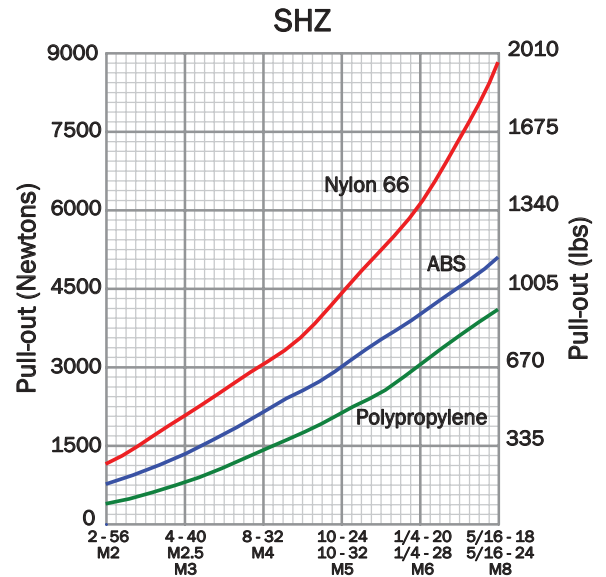
The SHZ Straight Hole Zert is designed to be installed into a straight molded hole with a 1° inclusive taper. The top of the hole should not be countersunk or counterbored as this will decrease the insert's performance. The recommended hole size applies at the point reached by the bottom of the insert. Molded holes should be used wherever possible as drilled holes may result in diminished performance. Minimum boss wall thicknesses shown are for reference and may vary depending on the type of plastic.



## INSTALLATION

The insert may be installed by pre-heating or ultrasonic vibration methods. When using heat, the insert should be hot enough to soften the plastic without melting it to avoid flash around the top. Ultrasonic vibration should be applied using low amplitude and the minimum amount of power necessary to satisfactorily soften the plastic. In both methods, avoid excessive pressure that would force an insert into a hole without allowing the plastic to properly soften and flow around the insert features.

## PERFORMANCE



(1) Performance data shown is for preferred insert lengths and reference only. Variations in application, boss material type and size, and installation method will affect the loads. PENCOM strongly encourages testing in the application.