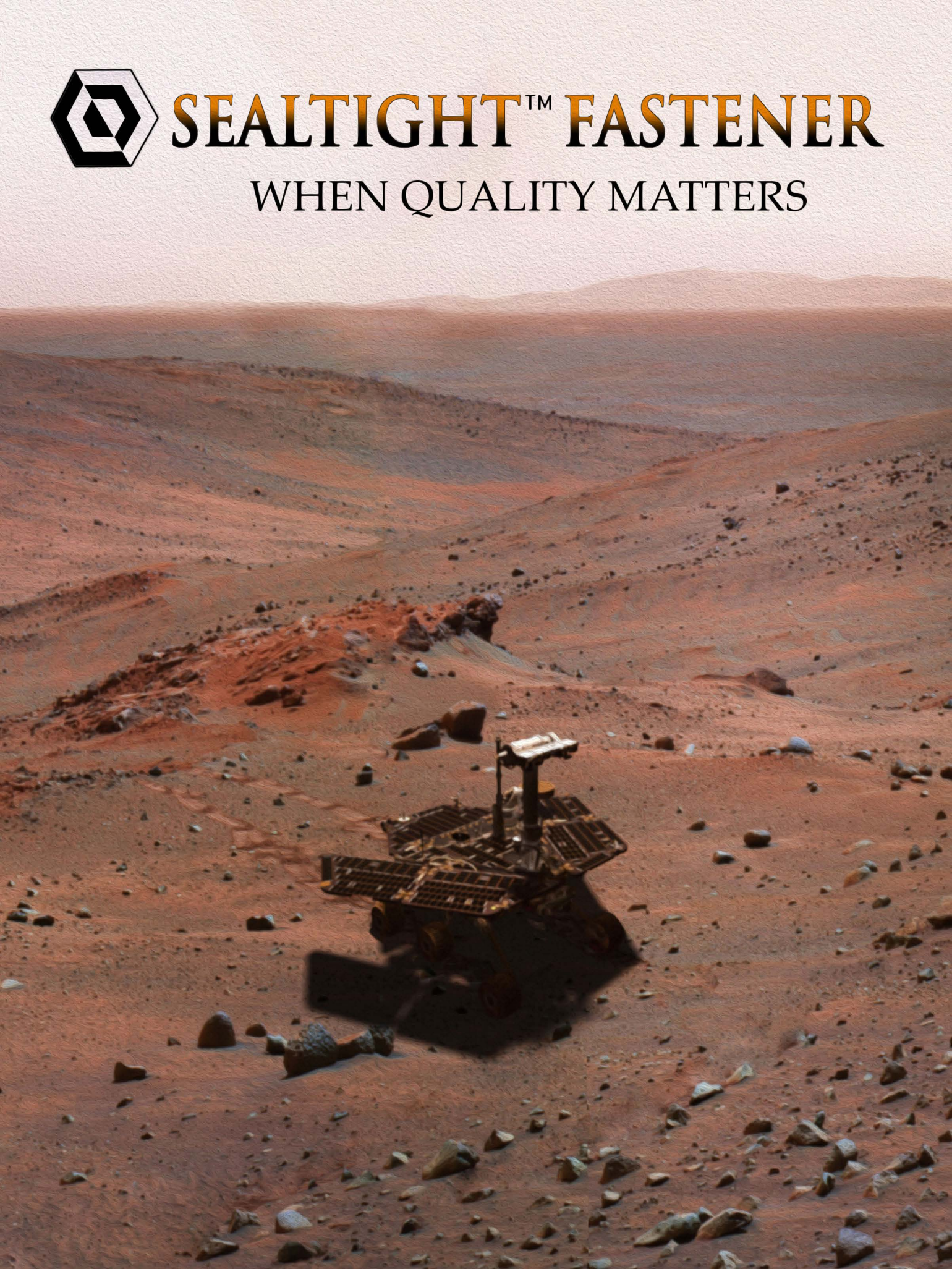
SEALTIGHT™ FASTENER

WHEN QUALITY MATTERS



SEALTIGHT™ FASTENER PART NUMBER CODES

BBM1P021A10A

Designates B&B Hardware Sealtight™ Fastener Part #

OTHER DESIGNATIONS
C = Captive Grip
F = Ferrous Collector
G = Grip Length
M = Metric
N = Nut
S = Special
T = Teflon Series
* Optional, Combinations Allowed.

DRIVE SYSTEMS
0 = None
1 = Phillips
2 = Slotted
3 = Internal Hex (Socket)
4 = Internal 6 Lobe (Torx)
5 = Square
6 = Pozi Drive
7 = Tamper Proof
8 = Spline
N/A for Nuts

HEAD STYLES
B = Button Head
F = Flat Head
H = Hex Head
I = Fillister
J = Flat Fillister
L = 6 Lobe (Torx)
P = Pan Head
Q = Round Head Rivet
R = Flat Head Rivet
S = Socket Head
T = Truss Head
U = Round Head
N/A for Nuts

SIZE & THREAD STYLES

Standard	Metric
01 =	M 2X0.4
02 = 2-56	M 2.5X.045
03 = 2-64	M 3X0.5
04 = 4-40	M 3.5X0.6
05 = 4-48	M 4X0.7
06 = 6-32	M 5X0.8
07 = 6-40	M 6X1
08 = 8-32	M 8X1.25
09 = 8-36	M 8X1
10 = 10-24	M 10X1.5
11 = 10-32	M 10X1.25
12 = 12-24	M 12X1.75
13 = 12-28	M 12X1.5
14 = 1/4-20	M 14X2
15 = 1/4-28	M 14X1.5
16 = 5/16-18	M 16X2
17 = 5/16-24	M 16X1.5
18 = 3/8-16	M 18X1.5
19 = 3/8-24	M 20X1.5
20 = 7/16-14	M 20X2.5
21 = 7/16-20	M 22X1.5
22 = 1/2-13	M 22X2.5
23 = 1/2-20	M 24X2
24 = 9/16-12	M 24X3
25 = 9/16-18	M 25X1.5
26 = 5/8-11	M 27X2
27 = 5/8-18	M 27X3
28 = 3/4-10	M 30X1.5
29 = 3/4-16	M 30X2
30 = 7/8-9	M 30X3.5
31 = 7/8-14	
32 = 1-8	
33 = 1-12	
34 = 1 1/8-7	
35 = 1 1/8-12	
36 = 1 1/4-7	
37 = 1 1/4-12	

RIVET SIZES
02 = 3/32
06 = 1/8
08 = 5/32
10 = 3/16
14 = 1/4
16 = 5/16
18 = 3/8
*Q or R must be specified under head style for rivets.

MATERIALS
1 = Austenitic 300 SS
2 = Martensitic 400 SS
3 = Molybdenum Alloy
4 = Nickel Alloy
5 = Chromium Alloy
6 = Carbon Steel
7 = Aluminum
8 = Copper

OPTIONS:
LOCKING ELEMENTS
A = Patch
E = Epoxy Patch 360
P = Pellet
S = Strip
T = 360 Patch
V = Vibra-tite Patch

COATINGS
B = Black Oxide
C = Cadmium Plate
I = Silver Plate
L = Black Chromate
M = Chromium Plate
N = Dull Nickel
O = Copper Plate
R = Bright Nickel
U = Rust Prevention
Z = Zinc Plate

DRILL STYLES
D = Drilled Shank
H = Drilled Head

TAPPING THREADS
1 = Type A
2 = Type AB
3 = Type BP
4 = Type C
5 = Type 1
6 = Type F
7 = Type G
8 = Type 23
9 = Type F2
*Optional, Combinations Allowed.

LENGTHS
In 1/16 inch or 1mm increments.
N/A for Nuts — See Lengths.

O'RING COMPOUNDS
A = General Purpose Buna N
B = Buna N Mil-P-5315
C = Buna N Mil-R-7362
D = Buna N Mil-P-25732
E = Ethylene Propylene
F = Fluorosilicone
G = Silicone AMS 3302
H = Silicone AMS 3304
I = Flurocarbon (Viton)
J = Butyl
K = Kalrez
L = Epichlorohydrin
M = Ethylene Acrylic
N = Neopreme
O = Polysulfide
P = Polyurethane
Q = Aflas
R = Teflon
S = Vamac
T = FDA App. Buna N
U = FDA App. Ethylene Prop.
V = FDA App. Fluorosilicone
W = FDA App. Silicone
X = FDA App. Viton
Y = FDA App. Butyl
Z = FDA App. Neopreme

Sealtight® O'ring Part # Codes

BBO-XXXA

B&B O'ring Part #
Sizes
O'ring Compounds

See O'rings.

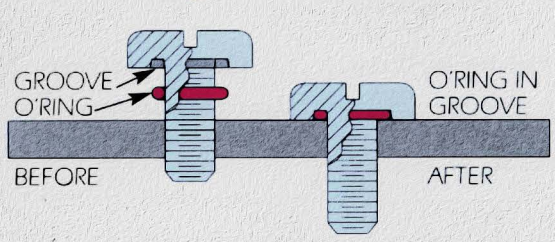
SEALTIGHT™ FASTENER... The Perfect Sealing Solution!

1 • 800 • 969 • 4634

TOPIC

How Sealtight™ Fasteners Work & About Sealtight™ Fastener

How Sealtight™ Fasteners Work



A Sealtight fastener is a fastener sealing assembly primarily consisting of an o'ring sealing member and a fastener with a groove formed in the undersurface of the fastener head.

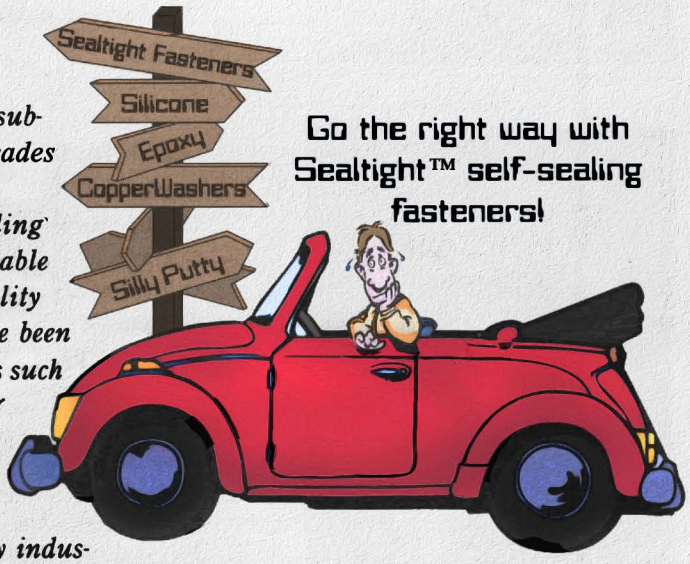
The fastener is comprised of an enlarged fastener head with a groove formed in the undersurface of the head and a shank that extends from the fastener head. As the Sealtight fastener mates with the work piece the outer rim on the undersurface of the fastener head enters into metal to metal contact with the work piece and the full volume of the o'ring is completely enclosed within the groove.

The groove is precisely calculated to compress its mating o'ring enough to provide a positive, stable seal line between the end wall surface of the groove and the relatively flat surface of the mating part. Too much compression on the o'ring causes compression set, o'ring failure, and/or non-reusability of the o'ring. When an o'ring goes compression set (forced beyond its elastic limits) the seal line between the o'ring and its mating product becomes unstable and is disrupted. In this environment o'ring failure is eminent.

Sealtight fasteners are manufactured under strict quality control standards, assuring that tight tolerances are held in order to continually provide reliable sealing products. All Sealtight™ Fastener products meet the ISO 9001:2008 and AS9100C quality standards.

Sealtight fasteners have proven to be a reliable method of fastener sealing for decades. Sealtight fasteners are sold as a complete self-sealing assembly and are designed to seal any standard or oversized clearance hole. Even under the most adverse conditions Sealtight fasteners with the proper o'ring / fastener combination will withstand internal or external working pressures of greater than 20,000 psi. If you are unsure of the proper combination required for your application contact your local Sealtight Fastener Distributor or contact Sealtight Fastener direct at 1-800-969-4634.

About Sealtight™ Fastener



Sealtight™ Fastener is a wholly owned subsidiary of B&B Hardware, Inc. With decades of specializing in self-sealing products, Sealtight™ Fastener can meet all your sealing fastener needs. Our complete line of reusable self-sealing fasteners meet the highest quality standards on the market. Our fasteners have been used in many critical high-tech applications such as the space shuttle, missiles, aircraft, laser and radiation applications, hydraulic-equipment, underwater equipment, engines, computers, electronics, gauges, gas cylinders and much more. Every industry has used these fasteners to provide a leakproof seal for liquids and gases and to protect their products from environmental contaminant's. Solve your leakage problems with the perfect sealing solution – Sealtight™ Fasteners.

The perfect sealing solution... for every industry!

Listed below are just a few of the places you will find Sealtight™ Fasteners.

AEROSPACE
- Space Shuttles
- Missile Cases
- Radar Systems
- Ultrasonic Inspection Equipment
- Aircraft Targeting & Tracking Systems
- Aircraft Ejection Seats
- Pilot Gas Masks

MEASUREMENT
- Gas Meters
- Ultrasonic Flow Meters & Detectors
- Leak Detection & Flow Restriction Testing Equipment
- Waste Water Treatment Equipment
- Dimensional Gauging Equipment
- Measuring/Inspection Systems
- Metering Pumps

MEDICAL
- X-ray Equipment
- Medical Lasers
- Environmental Control Systems
- Life Support Systems
- Ultraviolet Curing Equipment
- Dental Cameras
- Automatic Insulin Injectors

MARINE
- Engine Gauges & Instrumentation
- Sonar Equipment
- Underwater Tracking Devices
- Mini-Submarines
- Underwater Robotic Equipment
- Marine Communications & Navigation Equipment
- Underwater Mapping Devices
- Underwater Construction Equipment

AUTOMOTIVE
- Race Car Electronic Equipment
- Diesel Fuel Injection Systems
- Air Actuated Brake Systems
- Automotive Computers
- Vacuum Chambers & Pressurized Systems
- Automotive Security Alarms
- Oil Pans

ENVIRONMENTAL
- Environmental Monitoring Systems
- Explosion Proof Enclosures
- Medical Monitoring Systems
- Hazardous Materials Containment
- Combustion & Emission Control Systems
- Instrument Housings
- Environmental Test Chambers

COMMERCIAL
- Fire Extinguishers
- Water Sports Equipment
- Supermarket Scanners
- Car Washers
- Water Related Automation
- Nitrogen Gas Generators
- Precision Balanced Golf Clubs
- Pneumatic Power Tools
- Outdoor Speaker Systems

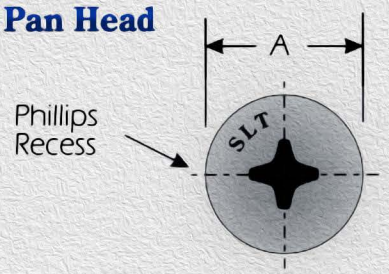
FLUID POWER
- Oil Field Support Products
- Hydraulic Telescoping Rams
- Centrifugal Pumps
- Electrohydraulic Control System Devices
- Linear Drive Cylinders
- Hydraulic Actuators
- Pneumatic Valve Bodies

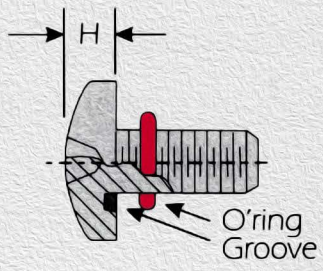
ELECTRONICS
- Electronic Amplifier Systems
- Digital/Vision Readout Systems
- Walk Through Detection Equipment
- Optical Sensors
- Field Satellite Communications Equipment
- Electronic Enclosures
- Military Field Radios

HIGH TECHNOLOGY
- Robotics
- Global Positioning Equipment
- Inferred Night Vision Products
- Artificial Intelligence Systems
- Nuclear Powered Systems
- Motion Control Products
- Laser Targeting Products

PHILLIPS & SLOTTED PAN HEADS

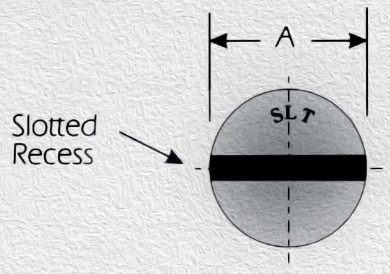
Phillips Pan Head

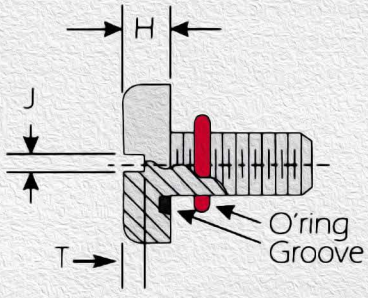




STANDARD (Part # BB1P-)			METRIC (Part # BBM1P-)		
SIZE	A	H	SIZE	A	H
2	.172-.182	.057-.062	M2	4.30-4.57	1.39-1.52
4	.228-.238	.075-.080	M2.5	5.23-5.48	1.60-1.85
6	.282-.294	.092-.097	M3	6.22-6.47	1.77-2.03
8	.335-.347	.109-.115	M3.5	7.16-7.46	2.33-2.46
10	.391-.403	.126-.133	M4	8.43-8.76	2.69-2.87
12	.446-.458	.142-.150	M5	10.03-10.33	3.30-3.47
1/4	.497-.517	.170-.175	M6	12.47-12.97	4.19-4.31
5/16	.619-.640	.192-.209	M8	15.77-16.30	4.90-5.33
3/8	.741-.765	.225-.243	M10	19.07-19.68	5.89-6.35
7/16	.862-.888	.258-.277	M12	24.63-25.37	7.11-7.69
1/2	.983-1.012	.290-.313	M14	25.90-26.94	8.12-8.68
9/16	1.025-1.066	.323-.345	M16	29.31-30.50	9.06-9.70
5/8	1.150-1.197	.355-.380	M18	35.05-36.57	10.41-11.15
3/4	1.400-1.460	.420-.449	M20	36.06-37.59	11.17-11.43

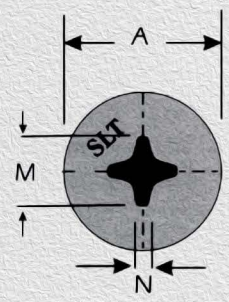
Slotted Pan Head

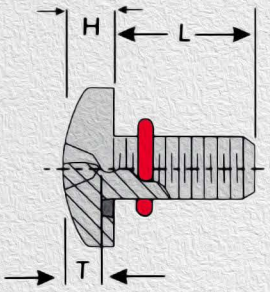




STANDARD (Part # BB2P-)					METRIC (Part # BBM2P-)				
SIZE	A	H	J	T	SIZE	A	H	J	T
2	.155-.167	.045-.055	.016-.023	.014-.022	M2	4.14-5.83	1.09-1.34	.40-.58	.35-.56
4	.205-.219	.060-.070	.023-.031	.023-.031	M2.5	4.92-5.23	1.34-1.60	.40-.58	.35-.56
6	.256-.270	.074-.084	.031-.039	.030-.040	M3	5.84-6.14	1.62-1.87	.68-.88	.66-.91
8	.306-.322	.088-.098	.039-.048	.037-.050	M3.5	6.60-7.00	1.87-2.10	.78-.99	.76-1.01
10	.357-.373	.099-.112	.045-.054	.043-.058	M4	7.60-8.00	2.20-2.40	.96-1.21	.91-1.27
12	.407-.425	.112-.127	.050-.060	.050-.068	M5	9.10-9.50	2.56-2.89	1.14-1.37	1.09-1.47
1/4	.473-.492	.133-.148	.050-.060	.050-.068	M6	11.50-12.00	3.22-3.60	1.27-1.52	1.27-1.72
5/16	.594-.615	.162-.180	.060-.075	.068-.087	M8	15.08-16.00	4.11-4.80	1.52-1.90	1.72-2.20
3/8	.716-.740	.195-.214	.070-.084	.083-.106	M10	18.18-20.00	4.95-6.00	1.77-2.13	2.10-2.69
7/16	.837-.863	.228-.250	.080-.094	.098-.124	M12	24.00-25.01	6.40-7.11	2.03-2.38	2.48-3.14
1/2	.958-.987	.260-.285	.080-.094	.114-.142	M14	25.29-26.39	7.39-8.10	2.28-2.69	3.25-4.08
9/16	1.000-1.041	.293-.319	.090-.106	.128-.161	M16	28.65-29.84	8.28-9.01	2.54-2.99	3.65-4.54
5/8	1.125-1.172	.325-.354	.100-.118	.144-.179	M18	34.41-35.94	9.65-10.51	2.54-2.99	3.65-4.54
3/4	1.375-1.435	.390-.424	.114-.133	.160-.197	M20	35.38-36.90	10.13-10.99	2.89-3.37	4.06-5.00

MS 3212 and MS 3213





B&B Hardware, Inc. Sealtight™ Fastener is a QPL, QSL & QML approved government vendor.

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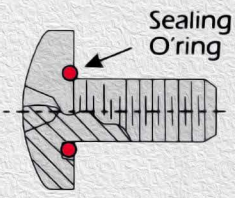


Typical Sealing Arrangement

NOMINAL SIZE			#4 .1120	#6 .1380	#8 .1640	#10 .1900	#10 .1900	1/4 .2500
THREADS PER INCH			40UNC-2A	32UNC-2A	32UNC-2A	32UNF-2A	24UNF-2A	20UNC-2A
A HEAD DIAMETER		MAX MIN	.238 .205	.294 .256	.347 .306	.403 .357	.403 .357	.517 .473
H HEAD HEIGHT		MAX MIN	.080 .070	.097 .087	.115 .105	.133 .122	.133 .122	.175 .162
M DIAMETER OF RECESS		MAX MIN	.122 .109	.166 .153	.182 .169	.199 .186	.199 .186	.281 .268
T DEPTH OF RECESS		MAX MIN	.078 .060	.091 .066	.108 .082	.124 .100	.124 .100	.161 .135
N WIDTH OF RECESS		MIN	.019	.028	.030	.031	.031	.036
DRIVER SIZE			1	2	2	2	2	3
L	LENGTH	TOLERANCE	DASH NO.	DASH NO.	DASH NO.	DASH NO.	DASH NO.	DASH NO.
Threads shall extend to within 2 threads of the bearing surface of the head, or closer if practicable	1/4		1	11	21	-	-	-
	5/16		2	12	22	-	-	-
	3/8		3	13	23	31	39	47
	7/16		4	14	24	32	40	48
	1/2	+0	5	15	25	33	41	49
	9/16	-1/32	6	16	26	34	42	50
	5/8		7	17	27	35	43	51
	3/4		8	18	28	36	44	52
	7/8		9	19	29	37	45	53
	1		10	20	30	38	46	54
	1-1/8	+0	-	-	-	-	-	55
	1-1/4	-1/16	-	-	-	-	-	56

MS3212 NOTES:

Material: (a) Screw, steel corrosion-resisting, as per QQ-S-763 Class 302, 303, 304, 305 or equal to or interchangeable with 16-18 or 18-8 chromium nickel alloy steel (developed for cold heading) with minimum tensile strength of 75,000 psi.
(b) Sealing o-ring, silicone rubber in accordance with ZZ-R-765, Class IIA or IIb, Grade 70.

Threads: Thread dimensions and designations shall be interpreted in accordance with NBS handbook H-28, Class 2A UNC or UNF series.

Treatment: Passivation is in accordance with QQ-P-35.

Recess: Recess conforms to Type I cross recess pan head machine screws as per ANSI B18.6.3-1972.

Dimensions: All dimensions are in inches.

Part Number: MS part number consists of MS number, plus dash number. Example: MS3213-1.

MS3213 NOTES:

Material: (a) Screw, steel corrosion-resisting, as per QQ-S-763 Class 302, 303, 304, 305 or equal to or interchangeable with 16-18 or 18-8 chromium nickel alloy steel (developed for cold heading) with minimum tensile strength of 75,000 psi.
(b) Sealing o-ring, fluorosilicone rubber in accordance with Type I, Class I of M1L-R-25988, Grade 70.

Threads: Thread dimensions and designations shall be interpreted in accordance with NBS handbook H-28, Class 2A UNC or UNF series.

Treatment: Passivation is in accordance with QQ-P-35.

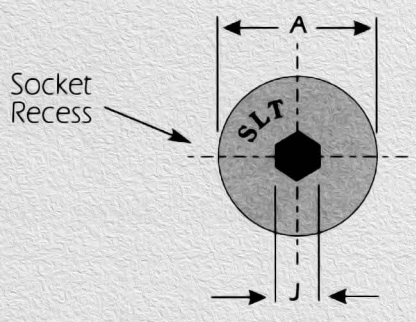
Recess: Recess conforms to Type I cross recess pan head machine screws as per ANSI B18.6.3-1972.

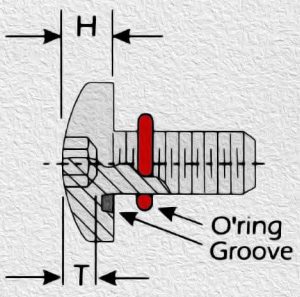
Dimensions: All dimensions are in inches.

Part Number: MS part number consists of MS number, plus dash number. Example: MS3213-1.

Socket Pan Heads & Six Lobe Pan Heads

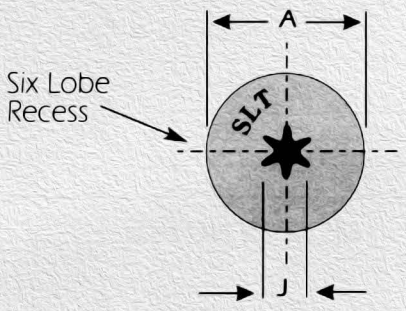
Socket Pan Heads

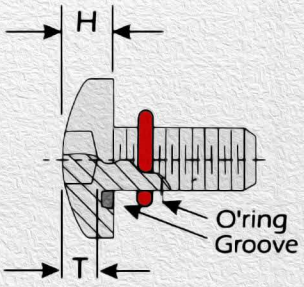




Standard (Part # BB3P-)					Metric (Part # BBM3P-)				
Size	A	H	J (NOM)	T (MIN)	Size	A	H	J (NOM)	T (MIN)
2	.172 - .182	.057 - .062	(.050)	.025	M2.5	5.23 - 5.48	1.60 - 1.85	M1.5	.80
4	.228 - .238	.075 - .080	1/16 (.062)	.031	M3	6.22 - 6.47	1.77 - 2.03	M2.0	1.04
6	.282 - .294	.092 - .097	5/64 (.078)	.031	M3.5	7.16 - 7.46	2.33 - 2.46	M2.0	1.04
8	.335 - .347	.109 - .115	3/32 (.094)	.038	M4	8.43 - 8.76	2.69 - 2.87	M2.5	1.30
10	.391 - .403	.126 - .133	1/8 (.125)	.051	M5	10.03 -10.33	3.30 - 3.47	M3.0	1.56
1/4	.497 - .517	.170 - .175	5/32 (.156)	.058	M6	12.47 -12.97	4.19 - 4.31	M4.0	2.08

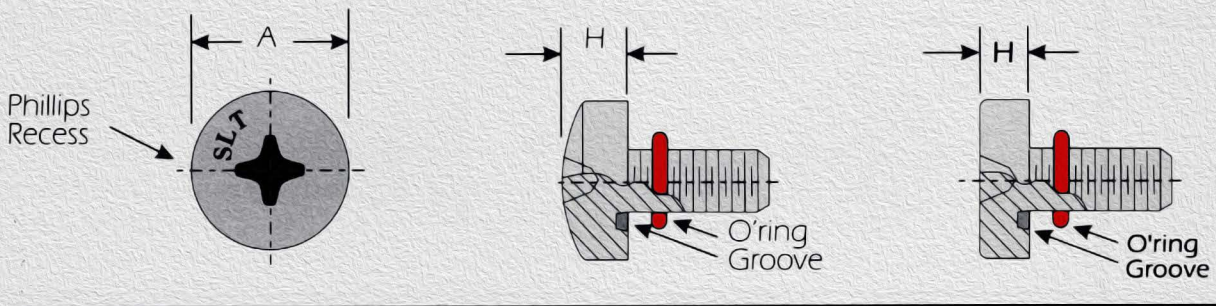
Six Lobe Pan Heads





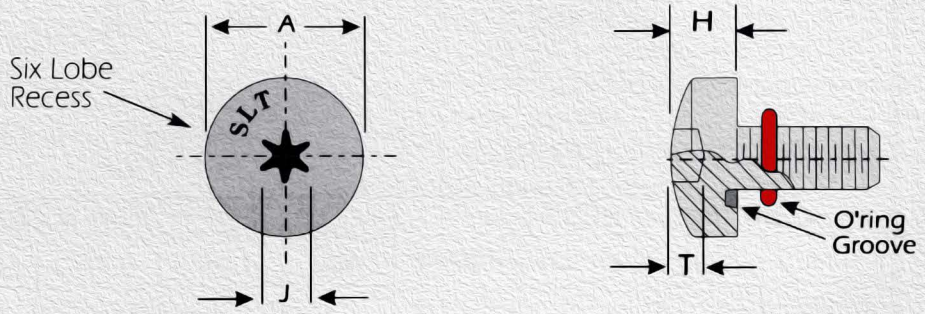
Standard (Part # BB4P-)					Metric (Part # BBM4P-)				
Size	A	H	J (NOM)	T (MIN)	Size	A	H	J (NOM)	T (MIN)
2	.172 - .182	.057 - .062	T6 (.069)	.017	M2.5	5.23 - 5.48	1.60 - 1.85	T8 (2.44)	.609
4	.228 - .238	.075 - .080	T8 (.096)	.024	M3	6.22 - 6.47	1.77 - 2.03	T8 (2.44)	.686
6	.282 - .294	.092 - .097	T8 (.096)	.027	M3.5	7.16 - 7.46	2.33 - 2.46	T9 (2.57)	.864
8	.335 - .347	.109 - .115	T9 (.101)	.038	M4	8.43 - 8.76	2.69 - 2.87	T10 (2.81)	1.016
10	.391 - .403	.126 - .133	T15 (.132)	.052	M5	10.03 -10.33	3.30 - 3.47	T15 (3.35)	1.270
1/4	.497 - .517	.170 - .175	T20 (.155)	.061	M6	12.47 -12.97	4.19 - 4.31	T20 (3.94)	1.520

Phillips Fillister Head (I) & Phillips Flat Fillister Head (J)



Standard (Part # BB1I- or BB1J-)					Metric (Part # BBM1I- or BBM1J-)				
SIZE	A	H	A(FLAT)	H(FLAT)	SIZE	A	H	A(FLAT)	H(FLAT)
2	.172-.182	.066-.083	.156-.164	.058-.066	M2	4.30-4.57	1.66-2.11	3.80-4.10	1.30-1.60
4	.228-.238	.088-.107	.205-.213	.080-.090	M2.5	5.23-5.48	2.23-2.72	4.62-4.77	1.93-2.08
6	.282-.294	.111-.132	.254-.262	.096-.106	M3	6.22-6.47	2.81-3.35	5.54-5.70	2.28-2.49
8	.335-.347	.133-.156	.304-.313	.115-.125	M3.5	7.16-7.46	3.37-3.96	6.45-6.65	2.43-2.64
10	.391-.403	.156-.180	.353-.362	.132-.142	M4	8.43-8.76	3.96-4.57	7.36-7.60	2.92-3.12
12	.446-.458	.178-.205	.378-.403	.173-.183	M5	10.03-10.33	4.52-5.20	9.27-9.50	3.58-3.81
1/4	.497-.517	.207-.237	.429-.438	.173-.183	M6	12.47-12.97	5.25-6.02	10.27-10.50	4.29-4.52
5/16	.619-.640	.262-.295	.537-.547	.216-.226	M8	15.77-16.30	6.65-7.49	13.74-14.00	5.84-6.09
3/8	.741-.765	.315-.355	.646-.656	.258-.268	M10	19.07-19.68	8.00-9.02	17.24-17.50	7.39-7.64
7/16	.862-.888	.321-.368	.787-.798	.265-.275	M12	24.63-25.37	8.15-9.35	20.74-21.00	8.94-9.19
1/2	.983-1.012	.362-.412	.866-.875	.297-.307	M14	25.90-26.94	9.19-10.46	23.67-23.92	9.72-9.98
9/16	1.025-1.066	.410-.466	.936-.945	.336-.346	M16	29.31-30.50	10.41-11.84	27.74-28.00	12.19-12.44
5/8	1.150-1.197	.461-.521	.990-1.000	.375-.385	M18	35.05-36.57	11.70-13.23	33.35-33.61	13.86-14.12
3/4	1.400-1.460	.542-.612	1.240-1.250	.441-.451	M20	36.06-37.59	13.76-15.54	35.61-36.39	15.54-15.79

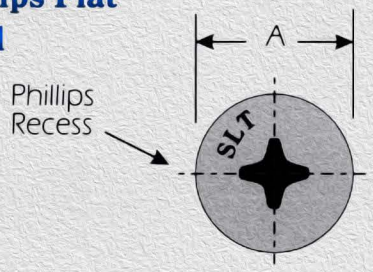
Special Six Lobe Fillister

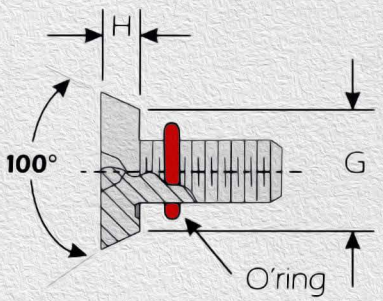


Standard (Part # BBS4I-)					Metric (Part # BBMS4I-)				
SIZE	A	H	J (NOM)	T (MIN)	SIZE	A	H	J (NOM)	T (MIN)
2	.172-.182	.088-.107	T8 (.096)	.024	M2.5	5.23-5.48	2.23-2.72	T8 (2.44)	.609
4	.228-.238	.111-.132	T10 (.111)	.040	M3	6.22-6.47	2.87-3.40	T10 (2.81)	1.016
6	.282-.294	.133-.156	T15 (.132)	.052	M3.5	7.16-7.46	3.37-3.96	T15 (3.35)	1.320
8	.335-.347	.156-.180	T20 (.155)	.065	M4	8.43-8.76	3.96-4.57	T20 (3.94)	1.651
10	.391-.403	.207-.237	T25 (.178)	.080	M5	10.03-10.33	5.25-6.02	T25 (4.52)	2.032
1/4	.497-.517	.262-.295	T30 (.221)	.111	M6	12.47-12.97	6.65-7.49	T30 (5.61)	2.819

PHILLIPS FLAT HEADS & SOCKET FLAT HEADS

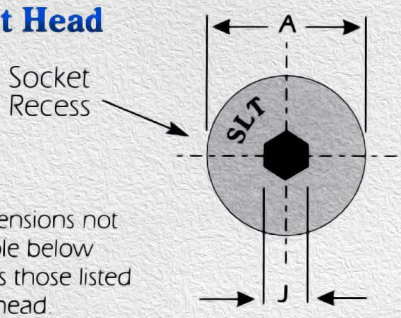
Phillips Flat Head



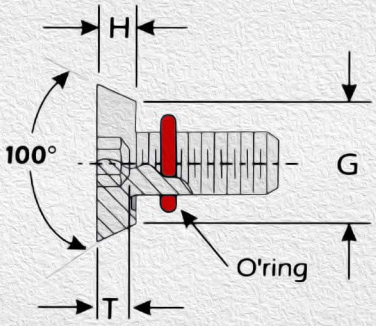


Standard (Part # BB1F- or BBS1F-)					Metric (Part # BBM1F- or BBMS1F-)				
Size	A (MIN)	A (REF)	H (REF)	G	Size	A (MIN)	A (REF)	H (REF)	G
2	.200	.213-.225	.034	.133-.138					
4	.231	.267-.279	.035	.190-.195	M2	5.08	5.41-5.72	.86	3.38-3.51
6	.287	.323-.334	.036	.249-.254	M2.5	5.46	6.09-6.40	.87	4.03-4.32
8	.362	.400-.410	.041	.306-.311	M3	6.04	7.03-7.34	.89	4.92-5.05
10	.452	.496-.510	.065	.352-.360	M3.5	7.28	8.20-8.48	.91	6.33-6.45
12	.510	.551-.565	.068	.400-.410	M4	9.19	10.16-10.41	1.041	7.77-7.90
1/4	.600	.647-.665	.076	.478-.486	M5	11.48	12.60-12.95	1.651	8.94-9.14
5/16	.724	.775-.793	.103	.533-.543	M6	15.24	16.43-16.89	1.930	12.14-12.34
3/8	.850	.903-.921	.130	.597-.607	M8	18.38	19.68-20.14	2.620	13.53-13.79
7/16	.963	1.031-1.049	.160	.653-.663	M10	21.59	22.93-23.39	3.300	15.16-15.42
1/2	1.114	1.159-1.177	.192	.705-.715	M12	28.29	29.43-29.89	4.870	17.90-18.16
9/16	1.237	1.287-1.305	.224	.757-.767	M14	31.41	32.68-33.14	5.690	19.23-19.48
5/8	1.360	1.415-1.433	.258	.804-.814	M16	34.54	35.94-36.40	6.550	20.42-20.68
3/4	1.483	1.543-1.561	.294	.846-.856	M18	37.66	39.19-39.65	7.470	21.49-21.74

Socket Flat Head

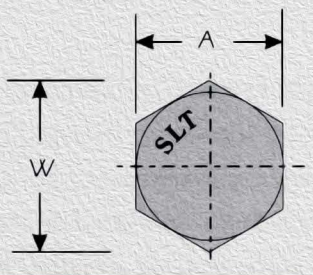


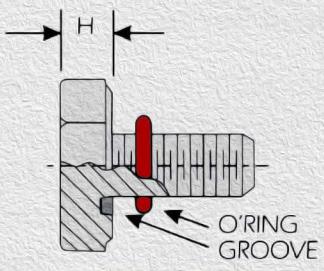
NOTE: All dimensions not listed in the table below are the same as those listed for phillips flat head.



Standard (Part # BB3F-)					Metric (Part # BBM3F-)				
Size	A (MIN)	A (REF)	J (NOM)	T (MIN)	Size	A (MIN)	A (REF)	J (NOM)	T (MIN)
2	.200	.213-.225	.062	.133-.138					
4	.231	.267-.279	.062	.190-.195	M2	5.08	5.41-5.72	.7	.43
6	.287	.323-.334	.078	.249-.254	M2.5	5.46	6.09-6.40	.9	.58
8	.362	.400-.410	.094	.306-.311	M3	6.04	7.03-7.34	1.3	.63
10	.452	.496-.510	.125	.352-.360	M3.5	7.28	8.20-8.48	1.5	.80
12	.510	.551-.565	.125	.400-.410	M4	9.19	10.16-10.41	2.0	1.1
1/4	.600	.647-.665	.156	.478-.486	M5	11.48	12.60-12.95	2.5	1.5
5/16	.724	.775-.793	.188	.533-.543	M6	15.24	16.43-16.89	3.0	1.9
3/8	.850	.903-.921	.219	.597-.607	M8	18.38	19.68-20.14	4.0	2.2
7/16	.963	1.031-1.049	.250	.653-.663	M10	21.59	22.93-23.39	5.0	3.0
1/2	1.114	1.159-1.177	.312	.705-.715	M12	28.29	29.43-29.89	6.0	3.6
9/16	1.237	1.287-1.305	.375	.757-.767	M14	31.41	32.68-33.14	8.0	4.3
5/8	1.360	1.415-1.433	.375	.804-.814	M16	34.54	35.94-36.40	10.0	4.7
3/4	1.483	1.543-1.561	.500	.846-.856	M18	37.66	39.19-39.65	10.0	4.8

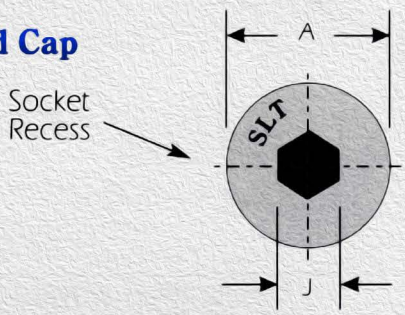
Hex Head

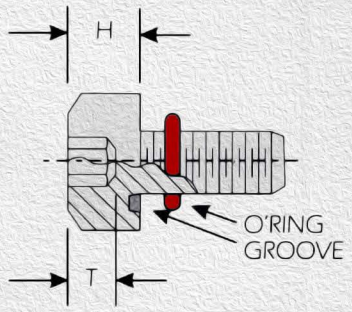




Standard (Part # BB0H-)					Metric (Part # BBM0H-)				
SIZE	Width Across Flats BASIC	ACTUAL (A)	W(REF)	H	SIZE	Width Across Flats BASIC	ACTUAL (A)	W(REF)	H
4	1/4	.244-.250	.275	.092-.104	M3.5	8mm	7.78-8.00	8.78	2.66-3.05
6	5/16	.305-.314	.346	.105-.120	M4	10mm	8.78-9.00	9.80	3.30-3.80
8	3/8	.364-.376	.424	.122-.154	M5	13mm	12.78-13.00	13.80	3.85-4.38
10	7/16	.428-.440	.510	.140-.172	M6	13mm	12.78-13.00	13.80	3.85-4.38
12	1/2	.490-.502	.580	.172-.204	M8	16mm	15.57-16.00	18.03	6.17-6.85
1/4	1/2	.490-.502	.580	.172-.204	M10	16mm	15.57-16.00	18.03	6.17-6.85
5/16	9/16	.553-.565	.650	.203-.235	M12	18mm	17.57-18.00	20.31	7.24-7.95
3/8	5/8	.615-.627	.720	.234-.266	M14	21mm	20.16-21.00	23.51	8.51-9.25
7/16	11/16	.675-.688	.790	.265-.300	M16	24mm	23.16-24.00	26.94	9.68-10.75
1/2	3/4	.736-.750	.870	.302-.323	M20	30mm	29.16-30.00	33.79	12.12-13.40
9/16	7/8	.860-.875	.950	.325-.378	M22	36mm	35.00-36.00	40.56	13.10-14.90
5/8	15/16	.918-.938	1.080	.378-.444	M24	41mm	40.00-41.00	46.27	14.10-15.90
3/4	1 1/8	1.100-1.125	1.295	.455-.524	M27	46mm	45.00-46.00	51.98	16.10-17.90
7/8	1 5/16	1.275-1.312	1.510	.531-.604	M30	50mm	49.00-50.00	56.55	17.65-19.75
1	1 1/2	1.460-1.500	1.730	.591-.700					

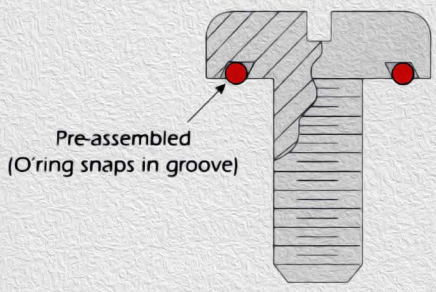
Socket Head Cap





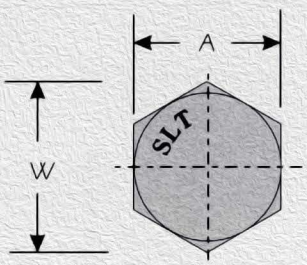
Standard (Part # BB3S-)					Metric (Part # BBM3S-)				
SIZE	A	H	J(NOM)	T(MIN)	SIZE	A	H	J(NOM)	T(MIN)
2	.176-.183	.108-.112	3/32 .094	.038	M2	4.33-4.50	2.40-2.50	2.0	1.00
4	.218-.226	.134-.138	7/64 .109	.051	M2.5	5.32-5.50	2.89-3.00	2.5	1.25
6	.262-.270	.159-.164	9/64 .141	.064	M3	6.80-7.00	3.88-4.00	3.0	1.50
8	.303-.312	.185-.190	5/32 .156	.077	M4	8.27-8.50	4.86-5.00	4.0	2.00
10	.365-.375	.244-.250	3/16 .188	.090	M5	9.74-10.00	5.85-6.00	5.0	2.50
1/4	.457-.469	.306-.312	1/4 .250	.120	M6	12.70-13.00	7.83-8.00	6.0	3.00
5/16	.550-.562	.368-.375	5/16 .312	.151	M8	15.67-16.00	9.81-10.00	8.0	4.00
3/8	.642-.656	.430-.438	3/8 .375	.182	M10	17.63-18.00	11.79-12.00	10.0	5.00
7/16	.735-.750	.492-.500	3/8 .375	.213	M12	20.60-21.00	13.77-14.00	12.0	6.00
1/2	1.107-1.125	.616-.625	1/2 .500	.245	M14	23.58-24.00	15.76-16.00	14.0	7.00
5/8	1.107-1.125	.740-.750	5/8 .625	.307	M16	29.53-30.00	19.73-20.00	17.0	8.00
3/4	1.293-1.312	.864-.875	3/4 .750	.370	M20	35.48-36.00	23.70-24.00	19.0	10.00
7/8	1.479-1.500	.988-1.000	3/4 .750	.432	M24	44.42-45.00	29.67-30.00	22.0	12.00
1	1.665-1.688	1.111-1.125	7/8 .875	.495	M30	53.37-54.00	36.00-54.64	27.0	15.00

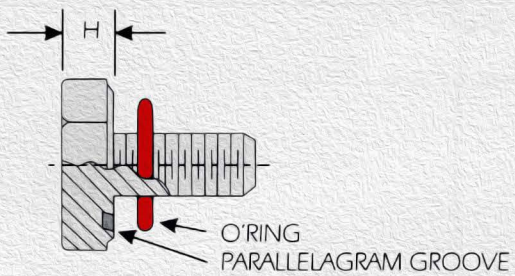
Oversized Head Series



Sealtights oversized head fasteners are specifically designed for those applications that require an enlarged clearance hole. (See clearance holes for dimensions.) For instance, if the area directly adjacent to the hole must be chamfered for ease of component assembly, then Sealtights oversized head fastener would be an ideal choice to seal the outer bearing surface area. Leakproof protection for oversized holes can easily be achieved with an oversized head configuration. By enlarging the fastener head and using a unique patented parallelogram shaped groove, we can place the location of the sealing surface outside the standard clearance hole area. The o'ring snaps into place and is held captive within the groove. This oversized head configuration can be incorporated with any head style or drive type to create a unique oversized head fastener designed specifically for your application, or you can choose one of the 3 most common oversized head configurations as listed in this design catalog. Sealtights oversized head fasteners are shipped to you as a pre-assembled hassle free unit to minimize your installation time and costs.

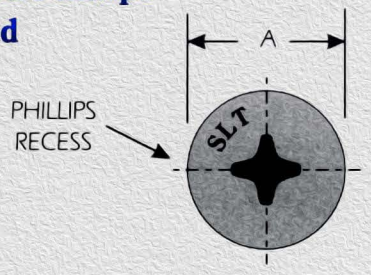
Oversized Hex Head

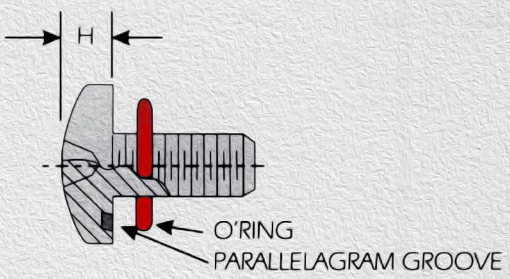




Standard (Part # BB0H-)						Metric (Part # BBM0H-)					
CODE	SIZE	Width Across Flats BASIC	Width Across Flats ACTUAL (A)	W(REF)	H	CODE	SIZE	Width Across Flats BASIC	Width Across Flats ACTUAL (A)	W(REF)	H
0604	4	1/4	.244-.250	.275	.092-.104						
0806	6	5/16	.305-.314	.346	.105-.120	0504	M3.5	8mm	7.78-8.00	8.78	2.66-3.05
1008	8	3/8	.364-.376	.424	.122-.154	0605	M4	10mm	8.78-9.00	9.80	3.30-3.80
1410	10	7/16	.428-.440	.510	.140-.172	0706	M5	13mm	12.78-13.00	13.80	3.85-4.38
1412	12	1/2	.490-.502	.580	.172-.204	0806	M6	13mm	12.78-13.00	13.80	3.85-4.38
1614	1/4	1/2	.490-.502	.580	.172-.204	1008	M8	16mm	15.57-16.00	18.03	6.17-6.85
1816	5/16	9/16	.553-.565	.650	.203-.235	1210	M10	16mm	15.57-16.00	18.03	6.17-6.85
2018	3/8	5/8	.615-.627	.720	.234-.266	1412	M12	18mm	17.57-18.00	20.31	7.24-7.95
2220	7/16	11/16	.675-.688	.790	.265-.300	1614	M14	21mm	20.16-21.00	23.51	8.51-9.25
2422	1/2	3/4	.736-.750	.870	.302-.323	1816	M16	24mm	23.16-24.00	26.94	9.68-10.75
2624	9/16	7/8	.860-.875	.950	.325-.378	2220	M20	30mm	29.16-30.00	33.79	12.12-13.40
2826	5/8	15/16	.918-.938	1.080	.378-.444	2422	M22	36mm	35.00-36.00	40.56	13.10-14.90
3028	3/4	1 1/8	1.100-1.125	1.295	.455-.524	2524	M24	41mm	40.00-41.00	46.27	14.10-15.90
3230	7/8	1 5/16	1.275-1.312	1.510	.531-.604	2827	M27	46mm	45.00-46.00	51.98	16.10-17.90
3432	1	1 1/2	1.460-1.500	1.730	.591-.700	3230	M30	50mm	49.00-50.00	56.55	17.65-19.75

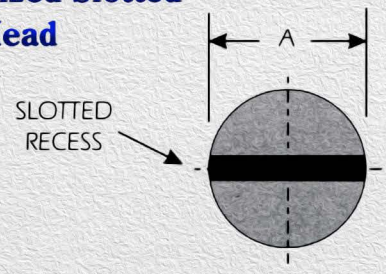
Oversized Phillips Pan Head

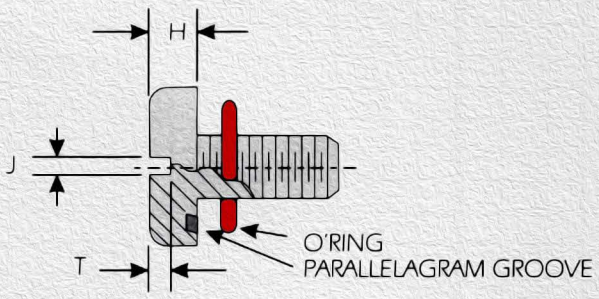




Standard (Part # BB1P-)				Metric (Part # BBM1P-)			
CODE	SIZE	A	H	CODE	SIZE	A	H
0402	2	.228-.238	.075-.080	0301	M2	5.23-5.48	1.60-1.85
0604	4	.282-.294	.092-.097	0402	M2.5	6.22-6.47	1.77-2.03
0806	6	.335-.347	.109-.115	0503	M3	7.16-7.46	2.33-2.46
1008	8	.391-.403	.126-.133	0504	M3.5	8.43-8.76	2.69-2.87
1410	10	.446-.458	.142-.150	0605	M4	10.03-10.33	3.30-3.47
1412	12	.497-.517	.170-.175	0706	M5	12.47-12.97	4.19-4.31
1614	1/4	.619-.640	.192-.209	0806	M6	15.77-16.30	4.90-5.33
1816	5/16	.741-.765	.225-.243	1008	M8	19.07-19.68	5.89-6.35
2018	3/8	.862-.888	.258-.277	1210	M10	24.63-25.37	7.11-7.69
2220	7/16	.983-1.012	.290-.313	1412	M12	25.90-26.94	8.12-8.68
2422	1/2	1.025-1.066	.323-.345	1614	M14	29.31-30.50	9.06-9.70
2624	9/16	1.150-1.197	.355-.380	1816	M16	35.05-36.57	10.41-11.15
2826	5/8	1.400-1.460	.420-.449	2018	M18	36.06-37.59	11.17-11.43

Oversized Slotted Pan Head

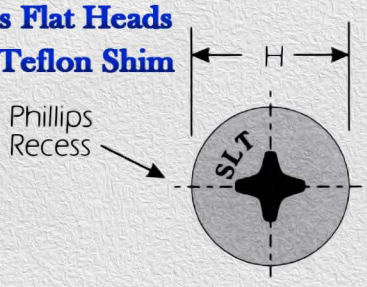


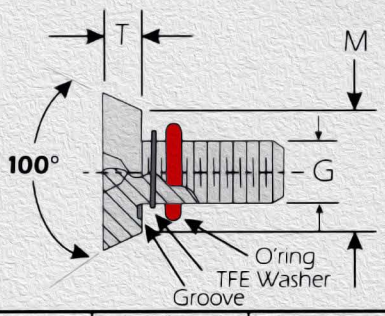


Standard (Part # BB2P-)						Metric (Part # BBM2P-)					
CODE	SIZE	A	H	J	T	CODE	SIZE	A	H	J	T
0402	2	.205-.219	.060-.070	.023-.031	.023-.031	0301	M2	4.92-5.23	1.34-1.60	.40-.58	.35-.56
0604	4	.256-.270	.074-.084	.031-.039	.030-.040	0402	M2.5	5.84-6.14	1.62-1.87	.68-.88	.66-.91
0806	6	.306-.322	.088-.098	.039-.048	.037-.050	0503	M3	6.60-7.00	1.87-2.10	.78-.99	.76-1.01
1008	8	.357-.373	.099-.112	.045-.054	.043-.058	0504	M3.5	7.60-8.00	2.20-2.40	.96-1.21	.91-1.27
1410	10	.407-.425	.112-.127	.050-.060	.050-.068	0605	M4	9.10-9.50	2.56-2.89	1.14-1.37	1.09-1.47
1412	12	.473-.492	.133-.148	.050-.060	.050-.068	0706	M5	11.50-12.00	3.22-3.60	1.27-1.52	1.27-1.72
1614	1/4	.594-.615	.162-.180	.060-.075	.068-.087	0806	M6	15.08-16.00	4.11-4.80	1.52-1.90	1.72-2.20
1816	5/16	.716-.740	.195-.214	.070-.084	.083-.106	1008	M8	18.18-20.00	4.95-6.00	1.77-2.13	2.10-2.69
2018	3/8	.837-.863	.228-.250	.080-.094	.098-.124	1210	M10	24.00-25.01	6.40-7.11	2.03-2.38	2.48-3.14
2220	7/16	.958-.987	.260-.285	.080-.094	.114-.142	1412	M12	25.29-26.39	7.39-8.10	2.28-2.69	3.25-4.08
2422	1/2	1.000-1.041	.293-.319	.090-.106	.128-.161	1614	M14	28.65-29.84	8.28-9.01	2.54-2.99	3.65-4.54
2624	9/16	1.125-1.172	.325-.354	.100-.118	.144-.179	1816	M16	34.41-35.94	9.65-10.51	2.54-2.99	3.65-4.54
2826	5/8	1.375-1.435	.390-.424	.114-.133	.160-.197	2018	M18	35.38-36.90	10.13-10.99	2.89-3.37	4.06-5.00

PHILLIPS FLAT HEADS WITH TEFLON SHIM

Philips Flat Heads With Teflon Shim



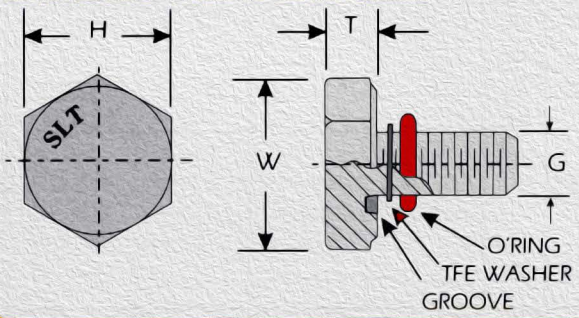


Part#	BBT1F04-	BBT1F06-	BBT1F08-	BBT1F10-	BBT1F11-	BBT1F14-	BBT1F15-
Size	4-40 UNC-3A	6-32 UNC-3A	8-32 UNC-3A	10-24 UNC-3A	10-32 UNF-3A	1/4-20 UNC-3A	1/4-28 UNC-3A
H/Min.	.279-.267/.231	.334-.323/.287	.410-.400/.362	.510-.496/.452	.510-.496/.452	.666-.648/.600	.666-.648/.600
T	.041	.042	.045	.073	.073	.097	.097
G	.112 Max	.138-.136	.164-.162	.189-.186	.189-.186	.249-.246	.249-.246
M	.164-.162	.226-.222	.274-.268	.286-.278	.286-.278	.388-.380	.388-.380

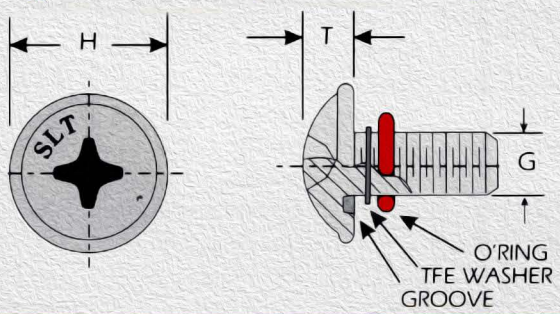
Length Code	Grip Length	Screw Length	Grip Length	Screw Length	Grip Length	Screw Length	Grip Length	Screw Length	Grip Length	Screw Length	Grip Length	Screw Length	Grip Length	Screw Length
01				.343		.343		.343		.343				
03				.469		.469		.469		.469		.531		.531
04			.125	.531	.125	.531	.125	.531	.125	.531	.125	.594	.125	.594
05			.188	.594	.188	.594	.188	.594	.188	.594	.188	.656	.188	.656
06	—	.250	.250	.656	.250	.656	.250	.656	.250	.656	.250	.719	.250	.719
07	—	.312	.312	.719	.312	.719	.312	.719	.312	.719	.312	.781	.312	.781
08	—	.375	.375	.781	.375	.781	.375	.781	.375	.781	.375	.844	.375	.844
09	—	.438	.438	.844	.438	.844	.438	.844	.438	.844	.438	.906	.438	.906
10	—	.500	.500	.906	.500	.906	.500	.906	.500	.906	.500	.969	.500	.969
11	—	.562	.562	.969	.562	.969	.562	.969	.562	.969	.562	1.031	.562	1.031
12	—	.625	.625	1.031	.625	1.031	.625	1.031	.625	1.031	.625	1.093	.625	1.093
13	—	.688	.688	1.093	.688	1.093	.688	1.093	.688	1.093	.688	1.156	.688	1.156
14	—	.750	.750	1.156	.750	1.156	.750	1.156	.750	1.156	.750	1.219	.750	1.219
15	—	.812	.812	1.219	.812	1.219	.812	1.219	.812	1.219	.812	1.281	.812	1.281
16	—	.875	.875	1.281	.875	1.281	.875	1.281	.875	1.281	.875	1.343	.875	1.343
18	—	1.000	1.000	1.406	1.000	1.406	1.000	1.406	1.000	1.406	1.000	1.468	1.000	1.468
20					1.125	1.531	1.125	1.531	1.125	1.531	1.125	1.594	1.125	1.594
22					1.250	1.656	1.250	1.656	1.250	1.656	1.250	1.719	1.250	1.719
26					1.500	1.906	1.500	1.906	1.500	1.906	1.500	1.969	1.500	1.969
30					1.750	2.156	1.750	2.156	1.750	2.156	1.750	2.219	1.750	2.219
34					2.000	2.406	2.000	2.406	2.000	2.406	2.000	2.468	2.000	2.468

NOTES: TFE = Polytetrafluorethylene, Grip Length Tolerances +/- .015; Length Tolerance + .030/-.015
Replace dash in part # with o'ring code followed by the length # code as shown in these tables.

Hex Head With Teflon Shim



Phillips Button Head With Teflon Shim



Hex Head With Teflon Shim

Part#	BBT0H10-	BBT0H11-	BBT0H14-	BBT0H15-	BBT0H16-	BBT0H17-	BBT0H18-	BBT0H19-
Size	10-24 UNF-3A	10-32 UNC-3A	1/4-20 UNC-3A	1/4-28 UNF-3A	5/16-18 UNC-3A	5/16-24 UNF-3A	3/8-16 UNC-3A	3/8-24 UNF-3A
G	.189-.186	.189-.186	.249-.246	.249-.246	.312-.309	.312-.309	.374-.371	.374-.371
H	.440-.428	.440-.428	.502-.490	.502-.490	.565-.553	.565-.553	.627-.615	.627-.615
W	.510	.510	.580	.580	.650	.650	.720	.720
T	.155	.155	.180	.180	.212	.212	.248	.248

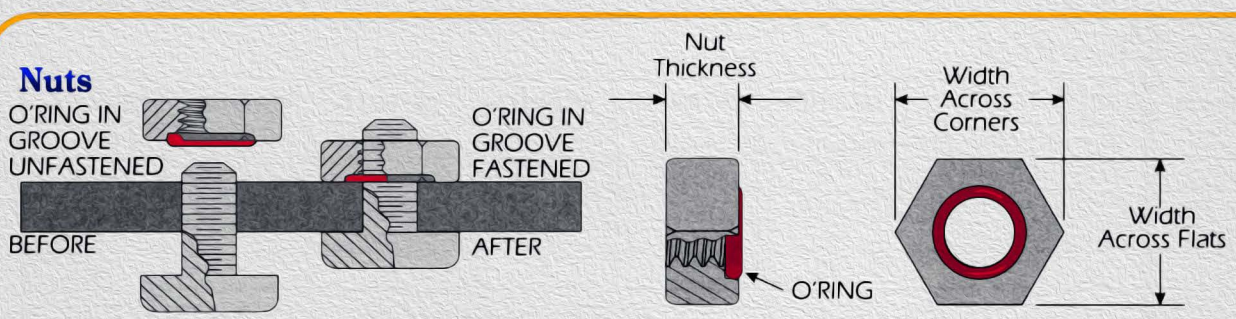
Length Code	Grip Length	Screw Length	Grip Length	Screw Length	Grip Length	Screw Length	Grip Length	Screw Length	Grip Length	Screw Length	Grip Length	Screw Length	Grip Length	Screw Length	Grip Length	Screw Length
03	.062	.468	.062	.468	.062	.468	.062	.468								
04	.125	.531	.125	.531	.062	.531	.062	.531	.062	.593	.062	.593				
05	.250	.656	.250	.656	.187	.656	.187	.656	.187	.718	.187	.718	.062	.703	.062	.703
06	.375	.781	.375	.781	.312	.781	.312	.781	.312	.843	.312	.843	.187	.828	.187	.828
07	.500	.906	.500	.906	.437	.906	.437	.906	.437	.968	.437	.968	.312	.953	.312	.953
10	.625	1.032	.625	1.032	.562	1.032	.562	1.032	.562	1.093	.562	1.093	.437	1.078	.437	1.078
11	.750	1.156	.750	1.156	.687	1.156	.687	1.156	.687	1.218	.687	1.218	.562	1.203	.562	1.203
12	.875	1.281	.875	1.281	.812	1.281	.812	1.281	.812	1.343	.812	1.343	.687	1.328	.687	1.328
13	1.000	1.406	1.000	1.406	.937	1.406	.937	1.406	.937	1.468	.937	1.468	.812	1.453	.812	1.453
14	1.125	1.531	1.125	1.531	1.062	1.531	1.062	1.531	1.062	1.593	1.062	1.593	.937	1.578	.937	1.578
15	1.250	1.656	1.250	1.656	1.187	1.656	1.187	1.656	1.187	1.718	1.187	1.718	1.062	1.703	1.062	1.703
16	1.375	1.781	1.375	1.781	1.312	1.781	1.312	1.781	1.312	1.843	1.312	1.843	1.187	1.828	1.187	1.828
17	1.500	1.906	1.500	1.906	1.437	1.906	1.437	1.906	1.437	1.968	1.437	1.968	1.312	1.953	1.312	1.953
20	1.625	2.032	1.625	2.032	1.562	2.032	1.562	2.032	1.562	2.093	1.562	2.093	1.437	2.078	1.437	2.078

Phillips Button Head With Teflon Shim

Part#	BBT1B04-	BBT1B06-	BBT1B08-	BBT1B10-	BBT1B11-	BBT1B14-	BBT1B15-
Size	4-40 UNC-3A	6-32 UNC-3A	8-32 UNC-3A	10-24 UNC-3A	10-32 UNF-3A	1/4-20 UNC-3A	1/4-28 UNF-3A
H	.285-.270	.370-.350	.385-.365	.440-.420	.440-.420	.580-.555	.580-.555
T	.080-.070	.100-.090	.115-.105	.135-.125	.135-.125	.160-.145	.160-.145
G	.112 Max	.138 Max	.164 Max	.189-.186	.189-.186	.249-.246	.249-.246

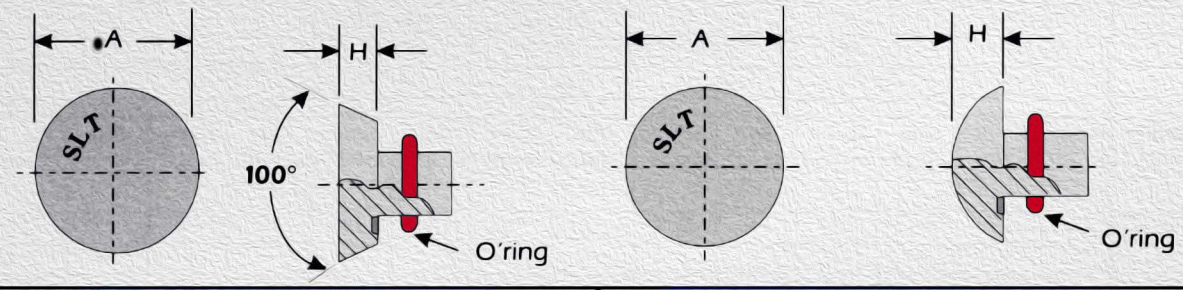
Length Code	Grip Length	Screw Length	Grip Length	Screw Length	Grip Length	Screw Length	Grip Length	Screw Length	Grip Length	Screw Length	Grip Length	Screw Length	Grip Length	Screw Length
03	—	.187	—	.187	—	.187								
04	—	.250	—	.250	—	.250	—	.250	—	.250	—	.250	—	.250
05	—	.312	—	.312	—	.312	—	.312	—	.312	—	.312	—	.312
06	—	.375	—	.375	—	.375	—	.375	—	.375	—	.375	—	.375
07	—	.438	—	.438	—	.438	—	.438	—	.438	—	.438	—	.438
08	—	.500	—	.500	—	.500	.125	.500	.125	.500	.125	.500	.125	.500
09	—	.562	—	.562	—	.562	.156	.562	.156	.562	.156	.562	.156	.562
10	—	.625	—	.625	—	.625	.218	.625	.218	.625	.218	.625	.218	.625
11	—	.687	—	.687	—	.687	.281	.687	.281	.687	.281	.687	.281	.687
12	—	.750	—	.750	—	.750	.343	.750	.343	.750	.343	.750	.343	.750
14	—	.875	—	.875	—	.875	.468	.875	.468	.875	.468	.875	.468	.875
16	—	1.000	—	1.000	—	1.000	.593	1.000	.593	1.000	.593	1.000	.593	1.000
18	—	1.125	—	1.125	—	1.125	.718	1.125	.718	1.125	.718	1.125	.718	1.125
20	—	1.250	—	1.250	—	1.250	.843	1.250	.843	1.250	.843	1.250	.843	1.250
22			—	1.375	—	1.375	.968	1.375	.968	1.375	.968	1.375	.968	1.375
24			—	1.500	—	1.500	1.093	1.500	1.093	1.500	1.093	1.500	1.093	1.500
26					—	1.625	1.218	1.625	1.218	1.625	1.218	1.625	1.218	1.625
28					—	1.750	1.343	1.750	1.343	1.750	1.343	1.750	1.343	1.750
30					—	1.875	1.468	1.875	1.468	1.875	1.468	1.875	1.468	1.875
32					—	2.000	1.593	2.000	1.593	2.000	1.593	2.000	1.593	2.000

Nuts



Standard (Part # BBN-)				Metric (Part # BBNM-)			
SIZE	WIDTH ACROSS FLATS	WIDTH ACROSS CORNERS	NUT THICKNESS	SIZE	WIDTH ACROSS FLATS	WIDTH ACROSS CORNERS	NUT THICKNESS
2	.180-.188	.205-.217	.085-.094	M2	3.82-4.00	4.32-4.62	1.80-2.00
4	.241-.250	.275-.289	.116-.125	M2.5	4.82-5.00	5.45-5.77	2.30-2.50
6	.302-.312	.344-.361	.144-.156	M3	5.32-5.50	6.01-6.35	2.55-2.75
8	.332-.344	.378-.397	.158-.172	M3.5	5.82-6.00	6.58-6.93	2.80-3.00
10	.362-.375	.413-.433	.174-.188	M4	6.78-7.00	7.66-8.08	3.30-3.50
1/4	.488-.500	.556-.577	.218-.250	M5	7.78-8.00	8.79-9.24	4.40-4.70
5/16	.546-.562	.622-.650	.280-.314	M6	9.78-10.00	11.05-11.55	4.90-5.20
3/8	.669-.688	.763-.794	.341-.377	M8	12.73-13.00	14.38-15.01	6.44-6.80
7/16	.728-.750	.830-.866	.403-.441	M10	15.73-16.00	17.77-18.48	8.04-8.40
1/2	.850-.875	.969-1.010	.464-.504	M12	17.73-18.00	20.03-20.78	10.37-10.80
9/16	.909-.938	1.037-1.083	.526-.568	M14	20.67-21.00	23.35-24.25	12.10-12.80
5/8	1.031-1.062	1.175-1.227	.587-.631	M16	23.67-24.00	26.75-27.71	14.10-14.80
3/4	1.212-1.250	1.382-1.443	.710-.758	M20	29.16-30.00	32.95-34.64	16.90-18.00
7/8	1.394-1.438	1.589-1.660	.833-.885	M24	35.00-36.00	39.55-41.57	20.20-21.50
1	1.575-1.625	1.796-1.876	.956-1.012	M30	45.00-46.00	50.85-53.12	24.30-25.60

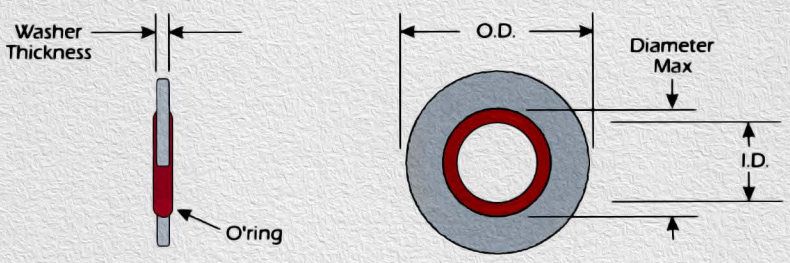
Standard and Round Head Rivet



Standard or Flat Head Rivet Part # BB0R-				Universal or Round Head Rivet Part # BB0Q-			
SIZE	ACTUAL SIZE	A	H	SIZE	ACTUAL SIZE	A	H
3/32	.093-.097	.198-.216	.023-.029	3/32	.093-.097	.178-.196	.040-.049
1/8	.124-.128	.260-.278	.030-.036	1/8	.124-.128	.238-.262	.054-.063
5/32	.155-.159	.326-.344	.045-.051	5/32	.155-.159	.296-.328	.067-.076
3/16	.187-.191	.388-.406	.058-.064	3/16	.186-.190	.360-.390	.080-.090
1/4	.249-.253	.472-.490	.082-.088	1/4	.249-.253	.485-.515	.107-.117
5/16	.311-.315	.603-.621	.096-.102	5/16	.311-.315	.610-.640	.133-.143
3/8	.374-.378	.731-.749	.125-.131	3/8	.374-.378	.735-.765	.161-.171

NOTE: Sealtight structural self-sealing blind rivets are currently in the design phase. If you are interested, check for availability.

O'ring Sealing Washer



Part # (BBWO-XXA)							
SIZE CODE (XX in Part#)	THREAD MAJOR DIAM. (REF.)	I.D. +/- .010	E DIAM. MAX.	O.D. +/- .010	WASHER THICKNESS	MAX. SAFE OPERATING PRESSURE P.S.I.	DIAMETRAL CLEARANCE (REF.)
06	.138	.130	.229	.385	.040 +/- .004	10,100	1/64 Max.
08	.164	.156	.255	.385	.040 +/- .004	8,100	1/64 Max.
10	.190	.180	.317	.443	.050 +/- .005	6,800	1/64 Max.
11	.190	.186	.365	.468	.050 +/- .005	4,800	1/64 to 1/32
14	.250	.240	.381	.505	.050 +/- .005	5,600	1/64 Max.
15	.250	.245	.422	.531	.050 +/- .005	4,500	1/64 to 1/32
16	.312	.301	.488	.603	.050 +/- .005	4,000	1/64 to 1/32
18	.375	.364	.546	.666	.050 +/- .005	3,800	1/64 to 1/32
20	.438	.427	.618	.760	.050 +/- .005	4,100	1/64 to 1/32
22	.500	.490	.696	.880	.050 +/- .005	5,000	1/64 to 1/32
24	.562	.552	.759	1.067	.050 +/- .005	7,200	1/64 to 1/32
26	.625	.615	.818	1.193	.050 +/- .005	8,000	1/64 to 1/32
28	.750	.740	.982	1.322	.064 +/- .005	6,700	1/64 to 1/32
30	.875	.864	1.105	1.510	.064 +/- .005	7,000	1/64 to 1/32
32	1.000	.988	1.234	1.760	.064 +/- .005	8,000	1/64 to 1/32

Sealtight™ Fastener O'rings

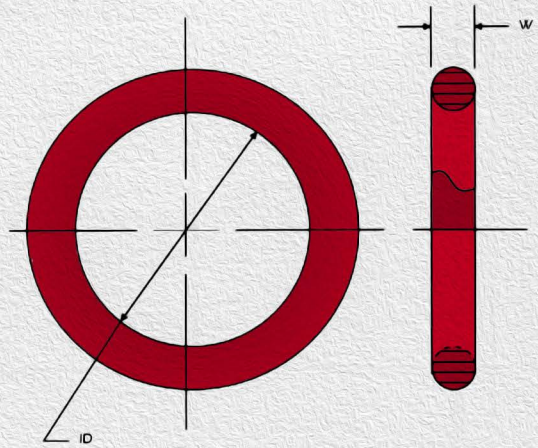
BBO - 000A

- **BBO** — Designates B&B Hardware Sealtight O'ring Part # (Standard = BBO, Metric = BBOM)
- **000A** — 2 or 3 Digit Code for O'ring Size; last letter = O'RING COMPOUNDS

O'RING COMPOUNDS	
A = General Purpose Buna N	N = Neopreme
B = Buna N Mil-P-5315	O = Polysulfide
C = Buna N Mil-R-7362	P = Polyurethane
D = Buna N Mil-P-25732	Q = Aflas
E = Ethylene Propylene	R = Teflon
F = Fluorosilicone	S = Vamac
G = Silicone AMS 3302	T = FDA App. Buna N
H = Silicone AMS 3304	U = FDA App. Ethylene Prop.
I = Flurocarbon (Viton)	V = FDA App. Fluorosilicone
J = Butyl	W = FDA App. Silicone
K = Kalrez	X = FDA App. Viton
L = Epichlorohydrin	Y = FDA App. Butyl
M = Ethylene Acrylic	Z = FDA App. Neopreme

SEALTIGHT™ FASTENER O'RINGS

Standard		Metric	
Size Code	Screw Size	Size Code	Screw Size
02	2	02	M2/2.5
04	4	04	M3/3.5
06	6	05	M4
08	8	06	M5
10	10	07	M6
14	1/4	08	M8
16	5/16	10	M10
18	3/8	12	M12
20	7/16	14	M14
22	1/2	16	M16
24	9/16	18	M18
26	5/8	20	M20
28	3/4	22	M22
30	7/8	24	M24
32	1	25	M25



Sealtight™ Standard O'rings

Sealtight Part # (Corresponds to AS568A)	Standard AS568A Size (Units are in Inches) I.D.	+/-	W	+/-	Sealtight Part # (Corresponds to AS568A)	Standard AS568A Size (Units are in Inches) I.D.	+/-	W	+/-	Sealtight Part # (Corresponds to AS568A)	Standard AS568A Size (Units are in Inches) I.D.	+/-	W	+/-
BBO-001	.029	.004	.040	.003	BBO-111	.424	.005	.103	.003	BBO-170	7.737	.045	.103	.003
BBO-002	.042	.004	.050	.003	BBO-112	.487	.005	.103	.003	BBO-171	7.987	.045	.103	.003
BBO-003	.056	.004	.060	.003	BBO-113	.549	.007	.103	.003	BBO-172	8.237	.050	.103	.003
BBO-004	.070	.005	.070	.003	BBO-114	.612	.009	.103	.003	BBO-173	8.487	.050	.103	.003
BBO-005	.101	.005	.070	.003	BBO-115	.674	.009	.103	.003	BBO-174	8.737	.050	.103	.003
BBO-006	.114	.005	.070	.003	BBO-116	.737	.009	.103	.003	BBO-175	8.987	.050	.103	.003
BBO-007	.145	.005	.070	.003	BBO-117	.799	.010	.103	.003	BBO-176	9.237	.055	.103	.003
BBO-008	.176	.005	.070	.003	BBO-118	.862	.010	.103	.003	BBO-177	9.487	.055	.103	.003
BBO-009	.208	.005	.070	.003	BBO-119	.924	.010	.103	.003	BBO-178	9.737	.055	.103	.003
BBO-010	.239	.005	.070	.003	BBO-120	.987	.010	.103	.003	BBO-201	.171	.005	.139	.004
BBO-011	.301	.005	.070	.003	BBO-121	1.049	.010	.103	.003	BBO-202	.234	.005	.139	.004
BBO-012	.364	.005	.070	.003	BBO-122	1.112	.010	.103	.003	BBO-203	.296	.005	.139	.004
BBO-013	.426	.005	.070	.003	BBO-123	1.174	.012	.103	.003	BBO-204	.359	.005	.139	.004
BBO-014	.489	.005	.070	.003	BBO-124	1.237	.012	.103	.003	BBO-205	.421	.005	.139	.004
BBO-015	.551	.007	.070	.003	BBO-125	1.299	.012	.103	.003	BBO-206	.484	.005	.139	.004
BBO-016	.614	.009	.070	.003	BBO-126	1.362	.012	.103	.003	BBO-207	.546	.007	.139	.004
BBO-017	.676	.009	.070	.003	BBO-127	1.424	.012	.103	.003	BBO-208	.609	.009	.139	.004
BBO-018	.739	.009	.070	.003	BBO-128	1.487	.012	.103	.003	BBO-209	.671	.010	.139	.004
BBO-019	.801	.009	.070	.003	BBO-129	1.549	.015	.103	.003	BBO-210	.734	.010	.139	.004
BBO-020	.864	.009	.070	.003	BBO-130	1.612	.015	.103	.003	BBO-211	.796	.010	.139	.004
BBO-021	.926	.009	.070	.003	BBO-131	1.674	.015	.103	.003	BBO-212	.859	.010	.139	.004
BBO-022	.989	.010	.070	.003	BBO-132	1.737	.015	.103	.003	BBO-213	.921	.010	.139	.004
BBO-023	1.051	.010	.070	.003	BBO-133	1.799	.015	.103	.003	BBO-214	.984	.010	.139	.004
BBO-024	1.114	.010	.070	.003	BBO-134	1.862	.015	.103	.003	BBO-215	1.046	.010	.139	.004
BBO-025	1.176	.011	.070	.003	BBO-135	1.925	.017	.103	.003	BBO-216	1.109	.012	.139	.004
BBO-026	1.239	.011	.070	.003	BBO-136	1.987	.017	.103	.003	BBO-217	1.171	.012	.139	.004
BBO-027	1.301	.011	.070	.003	BBO-137	2.050	.017	.103	.003	BBO-218	1.234	.012	.139	.004
BBO-028	1.364	.013	.070	.003	BBO-138	2.112	.017	.103	.003	BBO-219	1.296	.012	.139	.004
BBO-029	1.489	.013	.070	.003	BBO-139	2.175	.017	.103	.003	BBO-220	1.359	.012	.139	.004
BBO-030	1.614	.013	.070	.003	BBO-140	2.237	.017	.103	.003	BBO-221	1.421	.012	.139	.004
BBO-031	1.739	.015	.070	.003	BBO-141	2.300	.020	.103	.003	BBO-222	1.484	.015	.139	.004
BBO-032	1.864	.015	.070	.003	BBO-142	2.362	.020	.103	.003	BBO-223	1.609	.015	.139	.004
BBO-033	1.989	.018	.070	.003	BBO-143	2.425	.020	.103	.003	BBO-224	1.734	.015	.139	.004
BBO-034	2.114	.018	.070	.003	BBO-144	2.487	.020	.103	.003	BBO-225	1.859	.018	.139	.004
BBO-035	2.239	.018	.070	.003	BBO-145	2.550	.020	.103	.003	BBO-226	1.984	.018	.139	.004
BBO-036	2.364	.018	.070	.003	BBO-146	2.612	.020	.103	.003	BBO-227	2.109	.018	.139	.004
BBO-037	2.489	.018	.070	.003	BBO-147	2.675	.020	.103	.003	BBO-228	2.234	.020	.139	.004
BBO-038	2.614	.020	.070	.003	BBO-148	2.737	.022	.103	.003	BBO-229	2.359	.020	.139	.004
BBO-039	2.739	.020	.070	.003	BBO-149	2.800	.022	.103	.003	BBO-230	2.484	.020	.139	.004
BBO-040	2.864	.020	.070	.003	BBO-150	2.862	.022	.103	.003	BBO-231	2.609	.020	.139	.004
BBO-041	2.989	.024	.070	.003	BBO-151	2.987	.022	.103	.003	BBO-232	2.734	.024	.139	.004
BBO-042	3.239	.024	.070	.003	BBO-152	3.237	.024	.103	.003	BBO-233	2.859	.024	.139	.004
BBO-043	3.489	.024	.070	.003	BBO-153	3.487	.024	.103	.003	BBO-234	2.984	.024	.139	.004
BBO-044	3.739	.027	.070	.003	BBO-154	3.737	.028	.103	.003	BBO-235	3.109	.024	.139	.004
BBO-045	3.989	.027	.070	.003	BBO-155	3.987	.028	.103	.003	BBO-236	3.234	.024	.139	.004
BBO-046	4.239	.030	.070	.003	BBO-156	4.237	.030	.103	.003	BBO-237	3.359	.024	.139	.004
BBO-047	4.489	.030	.070	.003	BBO-157	4.487	.030	.103	.003	BBO-238	3.484	.024	.139	.004
BBO-048	4.739	.030	.070	.003	BBO-158	4.737	.030	.103	.003	BBO-239	3.609	.028	.139	.004
BBO-049	4.989	.037	.070	.003	BBO-159	4.987	.035	.103	.003	BBO-240	3.734	.028	.139	.004
BBO-050	5.239	.037	.070	.003	BBO-160	5.237	.035	.103	.003	BBO-241	3.859	.028	.139	.004
BBO-102	.049	.005	.103	.003	BBO-161	5.487	.035	.103	.003	BBO-242	3.984	.028	.139	.004
BBO-103	.081	.005	.103	.003	BBO-162	5.737	.035	.103	.003	BBO-243	4.109	.028	.139	.004
BBO-104	.112	.005	.103	.003	BBO-163	5.987	.035	.103	.003	BBO-244	4.234	.030	.139	.004
BBO-105	.143	.005	.103	.003	BBO-164	6.237	.040	.103	.003	BBO-245	4.359	.030	.139	.004
BBO-106	.174	.005	.103	.003	BBO-165	6.487	.040	.103	.003	BBO-246	4.484	.030	.139	.004
BBO-107	.206	.005	.103	.003	BBO-166	6.737	.040	.103	.003	BBO-247	4.609	.030	.139	.004
BBO-108	.237	.005	.103	.003	BBO-167	6.987	.040	.103	.003	BBO-248	4.734	.030	.139	.004
BBO-109	.299	.005	.103	.003	BBO-168	7.237	.045	.103	.003	BBO-249	4.859	.035	.139	.004
BBO-110	.362	.005	.103	.003	BBO-169	7.487	.045	.103	.003	BBO-250	4.984	.035	.139	.004

Sealtight™ Standard O'rings

Sealtight Part # (Corresponds to AS568A)	Standard AS568A Size (Units are in Inches) I.D.	+/-	W	+/-
BBO-251	5.109	.035	.139	.004
BBO-252	5.234	.035	.139	.004
BBO-253	5.359	.035	.139	.004
BBO-254	5.484	.035	.139	.004
BBO-255	5.609	.035	.139	.004
BBO-256	5.734	.035	.139	.004
BBO-257	5.859	.035	.139	.004
BBO-258	5.984	.035	.139	.004
BBO-259	6.234	.040	.139	.004
BBO-260	6.484	.040	.139	.004
BBO-261	6.734	.040	.139	.004
BBO-262	6.984	.040	.139	.004
BBO-263	7.234	.045	.139	.004
BBO-264	7.484	.045	.139	.004
BBO-265	7.734	.045	.139	.004
BBO-266	7.984	.045	.139	.004
BBO-267	8.234	.050	.139	.004
BBO-268	8.484	.050	.139	.004
BBO-269	8.734	.050	.139	.004
BBO-270	8.984	.050	.139	.004
BBO-271	9.234	.055	.139	.004
BBO-272	9.484	.055	.139	.004
BBO-273	9.734	.055	.139	.004
BBO-274	9.984	.055	.139	.004
BBO-275	10.484	.055	.139	.004
BBO-276	10.984	.065	.139	.004
BBO-277	11.484	.065	.139	.004
BBO-278	11.984	.065	.139	.004
BBO-279	12.984	.065	.139	.004
BBO-280	13.984	.065	.139	.004
BBO-281	14.984	.065	.139	.004
BBO-282	15.955	.075	.139	.004
BBO-283	16.955	.080	.139	.004
BBO-284	17.955	.085	.139	.004
BBO-309	.412	.005	.210	.005
BBO-310	.475	.005	.210	.005
BBO-311	.537	.007	.210	.005
BBO-312	.600	.009	.210	.005
BBO-313	.662	.009	.210	.005
BBO-314	.725	.010	.210	.005
BBO-315	.787	.010	.210	.005
BBO-316	.850	.010	.210	.005
BBO-317	.912	.010	.210	.005
BBO-318	.975	.010	.210	.005
BBO-319	1.037	.010	.210	.005
BBO-320	1.100	.012	.210	.005
BBO-321	1.162	.012	.210	.005
BBO-322	1.225	.012	.210	.005
BBO-323	1.287	.012	.210	.005
BBO-324	1.350	.012	.210	.005
BBO-325	1.475	.015	.210	.005
BBO-326	1.600	.015	.210	.005
BBO-327	1.725	.015	.210	.005
BBO-328	1.850	.015	.210	.005
BBO-329	1.975	.018	.210	.005
BBO-330	2.100	.018	.210	.005
BBO-331	2.225	.018	.210	.005
BBO-332	2.350	.018	.210	.005
BBO-333	2.475	.020	.210	.005
BBO-334	2.600	.020	.210	.005
BBO-335	2.725	.020	.210	.005
BBO-336	2.850	.020	.210	.005
BBO-337	2.975	.024	.210	.005
BBO-338	3.100	.024	.210	.005
BBO-339	3.225	.024	.210	.005
BBO-340	3.350	.024	.210	.005
BBO-341	3.475	.024	.210	.005
BBO-342	3.600	.028	.210	.005
BBO-343	3.725	.028	.210	.005
BBO-344	3.850	.028	.210	.005
BBO-345	3.975	.028	.210	.005
BBO-346	4.100	.028	.210	.005
BBO-347	4.225	.030	.210	.005
BBO-348	4.350	.030	.210	.005
BBO-349	4.475	.030	.210	.005
BBO-350	4.600	.030	.210	.005
BBO-351	4.725	.030	.210	.005
BBO-352	4.850	.030	.210	.005
BBO-353	4.975	.037	.210	.005
BBO-354	5.100	.037	.210	.005
BBO-355	5.225	.037	.210	.005
BBO-356	5.350	.037	.210	.005
BBO-357	5.475	.037	.210	.005
BBO-358	5.600	.037	.210	.005
BBO-359	5.725	.037	.210	.005
BBO-360	5.850	.037	.210	.005
BBO-361	5.975	.037	.210	.005
BBO-362	6.225	.040	.210	.005
BBO-363	6.475	.040	.210	.005
BBO-364	6.725	.040	.210	.005
BBO-365	6.975	.040	.210	.005
BBO-366	7.225	.045	.210	.005
BBO-367	7.475	.045	.210	.005
BBO-368	7.725	.045	.210	.005
BBO-369	7.975	.045	.210	.005
BBO-370	8.225	.050	.210	.005
BBO-371	8.475	.050	.210	.005
BBO-372	8.725	.050	.210	.005
BBO-373	8.975	.050	.210	.005
BBO-374	9.225	.055	.210	.005
BBO-375	9.475	.055	.210	.005
BBO-376	9.725	.055	.210	.005
BBO-377	9.975	.055	.210	.005
BBO-378	10.475	.060	.210	.005
BBO-379	10.975	.060	.210	.005
BBO-380	11.475	.065	.210	.005
BBO-381	11.975	.065	.210	.005
BBO-382	12.975	.065	.210	.005
BBO-383	13.975	.070	.210	.005
BBO-384	14.975	.070	.210	.005
BBO-385	15.955	.075	.210	.005
BBO-386	16.955	.080	.210	.005
BBO-387	17.955	.085	.210	.005
BBO-388	18.955	.090	.210	.005
BBO-389	19.955	.095	.210	.005
BBO-390	20.955	.095	.210	.005
BBO-391	21.955	.100	.210	.005
BBO-392	22.940	.105	.210	.005
BBO-393	23.940	.110	.210	.005
BBO-394	24.940	.115	.210	.005
BBO-395	25.940	.120	.210	.005
BBO-425	4.475	.033	.275	.006
BBO-426	4.600	.033	.275	.006
BBO-427	4.725	.033	.275	.006
BBO-428	4.850	.033	.275	.006
BBO-429	4.975	.037	.275	.006
BBO-430	5.100	.037	.275	.006
BBO-431	5.225	.037	.275	.006
BBO-432	5.350	.037	.275	.006
BBO-433	5.475	.037	.275	.006
BBO-434	5.600	.037	.275	.006
BBO-435	5.725	.037	.275	.006
BBO-436	5.850	.037	.275	.006
BBO-437	5.975	.037	.275	.006
BBO-438	6.225	.040	.275	.006
BBO-439	6.475	.040	.275	.006
BBO-440	6.725	.040	.275	.006
BBO-441	6.975	.040	.275	.006
BBO-442	7.225	.045	.275	.006
BBO-443	7.475	.045	.275	.006
BBO-444	7.725	.045	.275	.006
BBO-445	7.975	.045	.275	.006
BBO-446	8.475	.055	.275	.006
BBO-447	8.975	.055	.275	.006
BBO-448	9.475	.055	.275	.006
BBO-449	9.975	.055	.275	.006
BBO-450	10.475	.060	.275	.006
BBO-451	10.975	.060	.275	.006
BBO-452	11.475	.060	.275	.006
BBO-453	11.975	.060	.275	.006
BBO-454	12.475	.060	.275	.006
BBO-455	12.975	.060	.275	.006
BBO-456	13.475	.070	.275	.006
BBO-457	13.975	.070	.275	.006
BBO-458	14.475	.070	.275	.006
BBO-459	14.975	.070	.275	.006
BBO-460	15.475	.070	.275	.006
BBO-461	15.955	.075	.275	.006
BBO-462	16.455	.075	.275	.006
BBO-463	16.955	.080	.275	.006
BBO-464	17.455	.085	.275	.006
BBO-465	17.955	.085	.275	.006
BBO-466	18.455	.085	.275	.006
BBO-467	18.955	.090	.275	.006
BBO-468	19.455	.090	.275	.006
BBO-469	19.955	.095	.275	.006
BBO-470	20.955	.095	.275	.006
BBO-471	21.955	.100	.275	.006
BBO-472	22.940	.105	.275	.006
BBO-473	23.940	.110	.275	.006
BBO-474	24.940	.115	.275	.006
BBO-475	25.940	.120	.275	.006

O'RING COMPOUNDS

The most common O'ring compounds are Buna N (Nitrile) and Silicone to AMS3304.

O'ring Compound	Sealtight O'ring Code	Astm D1418	Astm D2000	Temperature Limits Low / High (Deg F)	Shore A Hardness Range	Weather Resistance	Oxygen Resistance	Ozone Resistance	Acid Resistance	Radiation	Water Swell Resistance	Steam Resistance	Oil, Gas, Kerosene	Alcohols	Alkali Resistance	Gas Impermeability	Lubricating Oils, Petroleum Based	Animal/Vegetable Oils	Synthetic Di Ester Lubricants	Silicate Hydraulic Fluids	Phospate Ester (Skydrol)	Helosepated Hydrocarbons	Aromatic Hydrocarbons	Aliphatic Hydrocarbons	Polar (Ketones) Solvents	Salt Water	Vacuum	Ethylene Glycol
Buna N (Nitrile)	A	NBR, XNBR	BF,BG,BK,CH	-40/250	40-90	F-G	G	P-F	G	G	G	F	E	G-E	G	G-E	E	G	G-E	NR	P	F	P	G-E	P	E	G	E
Buna to Mil-P5315	B	NBR, XNBR	BF,BG,BK,CH	-70/225	70	G	G	P-F	G	G	G	F	E	G	G	G-E	E	G	G-E	G	P	F	P	G-E	P	E	G	E
Buna to Mil-R7362	C	NBR, XNBR	BF,BG,BK,CH	-55/225	70	G	G	P-F	G	G	G	F	E	G	G	G-E	E	G	G-E	G	P	F	P	G-E	P	E	G	E
Buna to Mil-P-25732	D	NBR, XNBR	BF,BG,BK,CH	-65/250	75	G	G	P-F	G	G	G	F	E	G	G	G-E	E	G	G-E	G	P	F	P	G-E	P	E	G	E
Ethylene Propylene	E	EPM, EDPM	AA,BA,CA,DA	-70/400	40-90	E	E	E	G	G	E	E	NR	E	E	F	P	G	NR	E	E	P	P	P	E	E	G-E	E
Fluorosilicone	F	FSI, FVMQ	FK	-100/400	50-80	E	E	E	G	G	E	P	E	G	G	P	E	E	E	G	P	F	F	G	P	G	F	G
Silicone to AMS3302	G	MQ,PMQ,SI,VMQ,PVMQ	FC,FE,GE	-75/450	45-55	E	E	E	G	F	E	P	F	G	E	P	P	E	NR	P	P	P	P	P	P	G	F	G
Silicone to AMS3304	H	MQ,PMQ,SI,VMQ,PVMQ	FC,FE,GE	-75/450	65-75	E	E	E	G	G	E	F	F	E	E	P	P	E	NR	P	P	P	P	P	P	G	F	G
Flurocarbon (Viton)	I	FKM	HK	-20/500	50-95	E	E	E	E	G	G	P	E	G	G	G-E	E	E	E	F	P	E	E	E	E	P	E	E
Butyl	J	IIR	AA,BA	-75/250	40-80	G-E	E	E	E	G	E	G	G-E	E	G	E	P	E	P-G	G	G	P	P	P	G	E	G	E
Kalrez	K	FFKM		-35/500	65-95	E	G-E	G	E	G	E	E	E	E	E	-	E	G	E	E	E	G	E	E	E	-	E	E
Epichlorohydrin	L	CO,ECO	CH	-65/275	50-90	E	G	E	F-G	P	G	F-G	G	G-E	F	G-E	E	E	G	G	P	E	G	E	P	-	G	G
Ethelyne Acrylic	M			-30/350	45-90	E	E	G	G	G-E	G-E	P	F	G-E	G	E	P	G	-	G	P	P-G	P-F	G	P	-	F	E
Neopreme	N	CR	BC,BE	-65/300	40-90	G-E	E	E	G	G	F	P	F	E	E	G	G	G	P	G	P	F	P	F	P	E	G	E
Polysulfide	O	T	AK,BK	-65/225	50-80	G-E	NR	E	F	NR	P	P	F	E	P	G-E	F	NR	P-G	F-G	P	F	G	E	G	F	-	F
Polyurethane	P	AU, EU	BG	-65/225	70-90	G	E	G	P	G	P	P	G	P	F	E	G	G	P	G	P	P	F	F	P	G	P	G
Aflas	Q	FKM	HK	23/400	60-95	E	G-E	E	G	G-E	G	G-E	G	G	E	G	G	-	G-E	-	G	P-F	F-G	F	F	-	E	F
Teflon	R			-300/450	98	E	G-E	E	E	G-E	E	E	E	E	E	E	E	G	E	E	G	G	E	E	E	E	E	E
Vamac	S		EE,EF,EG	-40/300	50-90	E	G-E	E	P	G-E	G	G	F	F	P-G	G	G	G	-	G	P	P	P	P	P	-	G	E
FDA Buna N	T	NBR, XNBR	BF,BG,BK,CH	-40/250	40-90	F-G	G	P-F	G	G	G	F	E	G-E	G	G-E	E	G	G-E	G	P	F	P	G-E	P	E	G	E
FDA Ethylene Prop.	U	EPM, EDPR	AA,BA,CA,DA	-70/400	40-90	E	E	E	G	G	E	E	NR	E	E	F	P	G	NR	E	E	P	P	P	E	E	G-E	E
FDA Fluorosilicone	V	FSI, FVMQ	FK	-100/400	50-80	E	E	E	G	G	E	P	E	G	G	P	E	E	E	G	P	F	F	G	P	G	F	G
FDA Silicone	W	MQ,PMQ,SI,VMQ,PVMQ	FC,FE,GE	-75/450	25-80	E	E	E	G	G	E	F	F	E	E	P	P	E	E	P	P	P	P	P	P	G	F	G
FDA Viton	X	FKM	HK	-20/500	50-95	E	E	E	E	G	G	P	E	G	G	G-E	E	E	E	F	P	E	E	E	P	E	E	E
FDA Butyl	Y	IIR	AA,BA	-75/250	40-80	G-E	E	E	E	G	E	G	G-E	E	G	E	P	E	P-G	G	G	P	P	P	G	E	G	E
FDA Neopreme	Z	CR	BC,BE	-65/300	40-90	G-E	E	E	G	G	F	P	F	E	E	G	G	G	P	G	P	P	P	F	P	E	G	E

E = Excellent G = Good F = Fair P = Poor NR = Not Rated - = Not Tested

Choosing Your Fastener Material

Selection of the right material for your specific application can be difficult, but the following guidelines will help you make the right choice. If the fastener's main function is to deliver strength, think steel. If the environment is corrosive, consider steel with a protective coating. For a severe corrosive environment think stainless steel or a non-ferrous alloy. If non-magnetic permeability is important, bypass conventional steel and martensitic (magnetic) stainless steel and choose austenitic (non-magnetic) stainless steel, aluminum or copper. Where high electrical conductivity is a major requirement, turn to aluminum or copper. For a weight saving task select aluminum. And for high and low temperature service investigate stainless steel or a super alloy. If it is still unclear as to which material you should use, our engineering staff at Sealtight™ Fastener would be happy to assist you.

The following chart should only be used as a rough guide to the resistant abilities of materials. Specific details covering corrosion-resistant properties of material under special conditions can be found in various engineering handbooks or by contacting a Sealtight Fastener representative.

CODE	Alloy Name	Federal or Astm Spec No.	Tensile Stength (in 1,000 PSI)	Corrosion Resistance	High Temp Resistance	Low Temp Resistance	Chemical Resistance
1	SS-302HQ (18-8)	QQ-S-763CL302	90	GOOD	GOOD	GOOD	GOOD
	SS-304	QQ-S-763CL304	90	GOOD	GOOD	GOOD	GOOD
	SS-305	QQ-S-763CL305	90	GOOD	GOOD	GOOD	GOOD
	SS-316	QQ-S-763CL316	90-150	VERY GOOD	VERY GOOD	VERY GOOD	VERY GOOD
	SS-321	QQ-S-763CL321	90	VERY GOOD	VERY GOOD	VERY GOOD	VERY GOOD
	SS-16-18	QQ-S-763CL347	85-95	GOOD	GOOD	GOOD	GOOD
	SS-A286	———	125-250	EXCELLENT	EXCELLENT	EXCELLENT	EXCELLENT
2	SS-410	QQ-S-763CL410	125-180	FAIR	GOOD	POOR	GOOD
	SS-431	QQ-S-763CL431	125-195	FAIR	GOOD	FAIR	GOOD
3	Moly -4037	QQ-S-624FS4037	80-150	EXCELLENT	GOOD	GOOD	EXCELLENT
	Moly -4130	QQ-S-624FS4130	80-200	EXCELLENT	GOOD	GOOD	EXCELLENT
	Moly -4140	QQ-S-624FS4140	80-200	EXCELLENT	GOOD	GOOD	EXCELLENT
	Moly -8740	QQ-S-624FS8740	140-250	EXCELLENT	GOOD	GOOD	EXCELLENT
4	MONEL-400	QQ-N-281CL"A"	70-160	EXCELLENT	EXCELLENT	EXCELLENT	EXCELLENT
	MONEL-K500	QQ-N-286CL"A"	80-200	EXCELLENT	EXCELLENT	EXCELLENT	EXCELLENT
	INCONEL-X750	———	185	EXCELLENT	EXCELLENT	EXCELLENT	EXCELLENT
	HASTELLOY "C"	———	116	EXCELLENT	EXCELLENT	EXCELLENT	EXCELLENT
5	Chromium 5115	———	120-200	EXCELLENT	GOOD	GOOD	EXCELLENT
	Chromium 5120	———	120-200	EXCELLENT	GOOD	GOOD	EXCELLENT
	Chromium 5140	———	120-250	EXCELLENT	GOOD	GOOD	EXCELLENT
6	Carbon 1018	QQ-S-635C1018	60	FAIR	GOOD	POOR	POOR
	Carbon 1035	QQ-S-635C1035	60-120	FAIR	GOOD	FAIR	POOR
	Carbon 1038	QQ-S-635C1038	60-120	FAIR	GOOD	FAIR	POOR
7	Aluminum 2024	QQ-A-200/3C	26-70	FAIR	FAIR	GOOD	GOOD
	Aluminum 6061	QQ-A-270	18-68	GOOD	FAIR	FAIR	GOOD
	Aluminum 7075	QQ-A-282	33-83	FAIR	FAIR	FAIR	GOOD
8	NAVAL BRASS 462	QQ-B-637	52	FAIR	FAIR	FAIR	FAIR
	ALUM BRONSE 613	———	75	GOOD	FAIR	FAIR	FAIR
	SILIC BRONSE 651	QQ-C-591	75-85	GOOD	FAIR	FAIR	GOOD

The most common Sealtight Fastener material is Stainless Steel-302HQ (18-8).

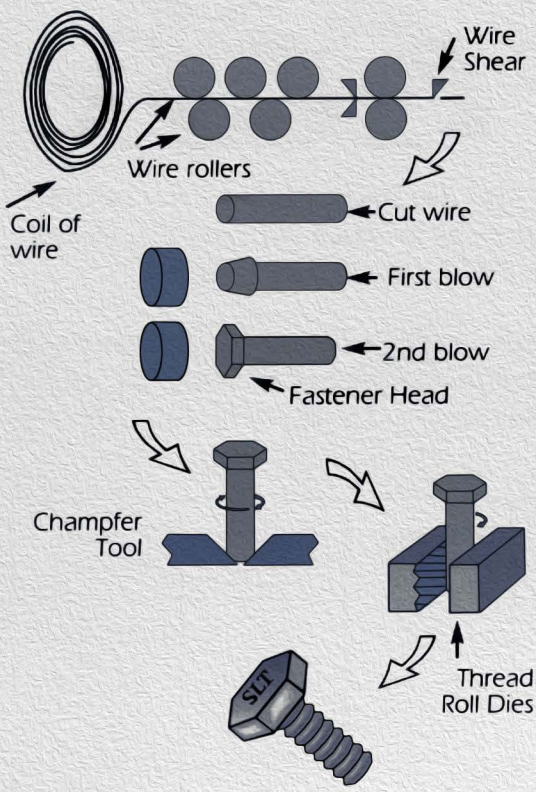
COLD FORMING VS. MACHINING

What method is used to manufacture Sealtight Fasteners and why?

Although the primary and preferred method used to manufacture Sealtight fasteners is cold forming, there are instances where cold forming is not feasible. Screw machines are a more economical and reliable means of manufacturing for small volume production, such as proto-type runs where stock is not available or for special products that are too complicated for cold forming equipment. The following describes the primary differences between cold forming and machining methods of production.

Cold Forming:

Similar to pressing clay into a mold, cold forming is a process that forces metal wire into dies causing the metal to take the shape of the die. Cold forming employs high pressure at room temperature to force the metal to move beyond its elastic limit. It is predominately a closed die, cold forging operation used to form high quality parts and assure greater parts uniformity at a high rate of production. A cold forming machine can take 4-16 hours or more to setup, depending on the complexity of the product to be produced. Cold forming provides remarkable flexibility making it possible to manufacture just about any geometrical shape. As shown in the picture, material is fed from a coil of wire into and through the wire rollers of the cold forming machine, where the wire is precisely cut by the wire shear and transferred to the first of several die cavities where it is struck with a punch or hammer (this is called 'a blow'). The first blow begins to form the shape of the fastener head while the second blow finishes the form/shape desired. The complexity of the shape or design desired determines the number of blows required to achieve that shape or design. Sealtight self-sealing fasteners add another level of complexity by forming a precisely calculated groove in the undersurface of the fastener head at the same time that the fastener head is formed. The fastener is transferred to as many dies as necessary to achieve the desired shape with little or no scrap. After the head is formed, the end of the fastener shank opposite the fastener head is spun in a chamfer tool. This removes a small amount of metal from the end of the fastener shank creating a 30-45 degree chamfer angle on the end of the fastener shank. This chamfer acts as a thread relief when mating with internally threaded products. The fastener is then moved to a thread roller where the threads are formed into the fastener shank, ending the cold forming process.



Machining:

Similar to wood carving (although far more precise), machining starts with a metal rod or shaped stock. Shearing off or removing the unwanted material produces the desired end product. Unlike cold forming, machining discourages nonsymmetrical configurations. Machining is primarily a low volume process (5,000 pieces or less). Screw machines are relatively easy to set up and run. The quick set up time makes screw machines ideal for small runs (less than 1,000 pieces). The labor and tooling required to set up and run a product is a large factor in determining the cost of the end product; therefore, in low volume applications, machining is an extremely accurate and cost effective means of manufacturing. However, it is difficult to maintain product uniformity in high volume machining operations because high volume runs are harder on screw machine tooling. Screw machines require continual monitoring, modification and tool changes throughout the production period making screw machines cost prohibitive in most high production applications.

Cold Forming vs. Machining:

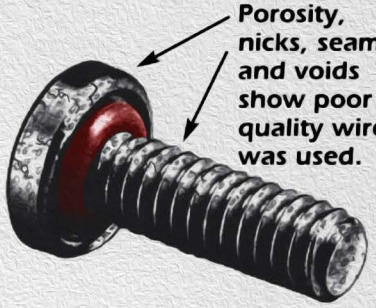
Strength and cost are two main considerations when choosing between cold forming and machining. When a part is cold formed the grain flow lines are neither cut nor broken but follow the contour of the upset. This process increases the tensile strength of the part. Cold formed parts as compared to machined parts are stronger and tougher both statically and in fatigue, therefore producing a higher quality end product. However, cold forming machine setup costs vary depending on the complexity of the product to be produced and can be exorbitant. With higher volumes (5,000 pieces or more), it is easier to absorb these set up costs, but with lower volumes (1,000 pieces or less), machining may be a more cost effective method. However, if stock is available in a part previously manufactured at a longer length, we can often cut-off a portion of the screw thread length and re-chamfer the end to form the desired part at a lower cost and shorter lead time than machining from scratch.

How can you tell what quality of raw material was used in the cold forming process:

The most important factor in creating a quality product is the selection of raw material (cold forming wire). As an example you might need a product cold formed in 302HQ (18-8) stainless wire to the federal specification QQ-S-763. Although this is a very extensive specification, there are still min./max. tolerances and no preference as to how wire must be drawn to form the raw material. In critical applications, this can be a very real problem because there is a wide range of quality with raw materials. The goal in drawing wire is to create a wire with as little impurities/imperfections as possible. The lower the impurities the higher the tensile strength. The old adage "you get what you pay for" applies here. The closer the manufacturer gets to a 100% pure wire product the more it costs in time and money to produce that wire. Therefore, the cost of the wire depends on the purity of the wire drawn, and the purity of the wire depends on the process used to draw or create that wire. The most common problem caused by impurities is in the form of bubbles in the wire when it is drawn. These bubbles or impurities many times remain undetected in the cold drawn wire. When the material is upset in the cold forming process most of the bubbles or impurities are brought to the wire surface and are visible in the cold formed product as voids, pits, or porosity. Wire impurities are also seen in the form of nicks, gouges or seams in the finished product. These defects are particularly important when dealing with self-sealing fasteners, since a difference of .003 in the depth of the groove (about the thickness of one sheet of paper) is enough to cause o'ring failure. If defects are visible in cold formed fasteners, then the strength, reliability, and overall quality of the fastener is in question. Two primary questions must be considered: 'The application in which the fastener is being used?' and 'Who would be effected if the said product were to fail?' It may be that the legal exposure vs. product failure ratio is acceptable to your company given the nature of your application. However, if you are unsure of the product application, or you know it is a critical application, you should choose a higher quality product.

See the Difference!

Sealtight Fasteners use high quality wire!



A competitor's fastener.

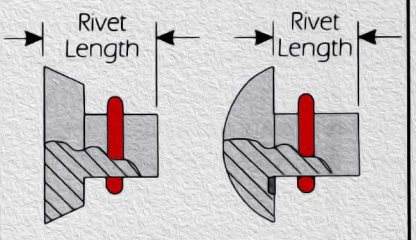
At Sealtight Fastener, we assure the quality of our fasteners starting with the raw material. We select and use only the highest quality raw materials. This is proven in the manufacturing of our fasteners, since cold forming self inspects the quality of the material used. The absence of surface defects on the cold formed product is strong evidence that the material used was a highly pure/high quality wire. Take any competitive product and hold it next to a Sealtight Fastener. Look at the side of the fastener head and the undersurface groove area, you will visibly see the difference.

STANDARD & METRIC LENGTHS

Length Code	Standard Length	
01	1/16	.062
02	1/8	.125
03	3/16	.187
04	1/4	.250
05	5/16	.312
06	3/8	.375
07	7/16	.438
08	1/2	.500
09	9/16	.562
10	5/8	.625
11	11/16	.687
12	3/4	.750
13	13/16	.812
14	7/8	.875
15	15/16	.937
16	1	1.000
17	1-1/16	1.062
18	1-1/8	1.125
19	1-3/16	1.187
20	1-1/4	1.250
21	1-5/16	1.312
22	1-3/8	1.375
23	1-7/16	1.438
24	1-1/2	1.500
25	1-9/16	1.562
26	1-5/8	1.625
27	1-11/16	1.687
28	1-3/4	1.750
29	1-13/16	1.812
30	1-7/8	1.875
31	1-15/16	1.937
32	2	2.000
33	2-1/16	2.062
34	2-1/8	2.125
35	2-3/16	2.187
36	2-1/4	2.250
37	2-5/16	2.312
38	2-3/8	2.375
39	2-7/16	2.438
40	2-1/2	2.500
41	2-9/16	2.562
42	2-5/8	2.625
43	2-11/16	2.687
44	2-3/4	2.750
45	2-13/16	2.812
46	2-7/8	2.875
47	2-15/16	2.937
48	3	3.000
49	3-1/16	3.062
50	3-1/8	3.125
51	3-3/16	3.187
52	3-1/4	3.250
53	3-5/16	3.312
54	3-3/8	3.375
55	3-7/16	3.438
56	3-1/2	3.500
57	3-9/16	3.562
58	3-5/8	3.625
59	3-11/16	3.687
60	3-3/4	3.750
61	3-13/16	3.812
62	3-7/8	3.875
63	3-15/16	3.937
64	4	4.000

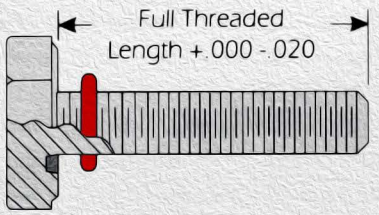
Length Code	Metric Length	
01	1mm	.039
02	2mm	.078
03	3mm	.118
04	4mm	.157
05	5mm	.196
06	6mm	.236
07	7mm	.275
08	8mm	.314
09	9mm	.354
10	10mm	.393
11	11mm	.433
12	12mm	.472
13	13mm	.511
14	14mm	.551
15	15mm	.590
16	16mm	.629
17	17mm	.669
18	18mm	.708
19	19mm	.748
20	20mm	.787
25	25mm	.984
30	30mm	1.181
35	35mm	1.377
40	40mm	1.574
45	45mm	1.771
50	50mm	1.968
55	55mm	2.165
60	60mm	2.362
65	65mm	2.559
70	70mm	2.755
75	75mm	2.952
80	80mm	3.149
85	85mm	3.346
90	90mm	3.543
95	95mm	3.740

RIVETS



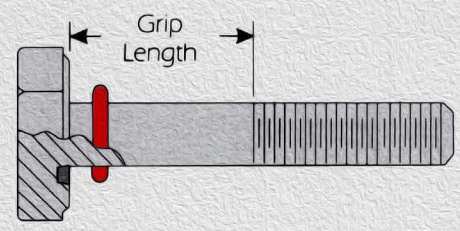
To designate a standard flat head rivet use R; to designate a universal round head rivet use Q, under head style in the part number, see part number code chart for details. The most commonly asked for rivet lengths are tabulated below:

Length Code	Rivet Length	
04	1/4	.250
06	3/8	.375
08	1/2	.500
10	5/8	.625
12	3/4	.750
14	7/8	.875
16	1	1.000
20	1 1/4	1.250
22	1 3/8	1.375
24	1 1/2	1.500



Length is measured from the bottom of the fastener head to the end of the fastener, except for flat head fasteners which are measured from the top of the head. All Sealtight fasteners come full threaded, unless a grip, captive grip, or teflon series is specified under the special designations in the part number. Refer to the part number code chart, grip length chart, captive grip length, and teflon series for details.

NOTE: Length Code is not used for nuts.



Sealtight Fastener grip lengths follow the ANSI / ASME standard. The tabulated grip lengths represent the maximum grip. The total length minus the tabulated grip length equal the minimum thread length.

Standard Grip Length

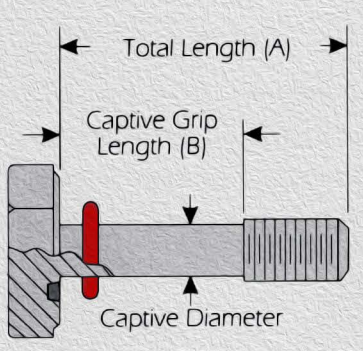
Length Code	Nom. Size / Length	2	4	6	8	10	1/4	5/16	3/8	7/16	1/2	5/8	3/4	7/8	1
14	0.88	0.25													
16	1.00	0.25	0.25												
20	1.25	0.62	0.25	0.50	0.38	0.38									
24	1.50	0.88	0.75	0.50	0.38	0.38	0.50					Full Thread			
28	1.75	1.12	0.75	1.00	0.88	0.88	0.50	0.62	0.50						
32	2.00	—	1.25	1.00	0.88	0.88	1.00	0.62	0.50	0.62					
36	2.25	—	1.25	1.50	1.38	1.38	1.00	1.12	1.00	0.62	0.75				
40	2.50	—	—	1.50	1.38	1.38	1.50	1.12	1.00	1.12	0.75	0.75			
44	2.75	—	—	2.00	1.88	1.88	1.50	1.62	1.50	1.12	0.75	0.75			
48	3.00	—	—	—	1.88	1.88	2.00	1.62	1.50	1.62	1.50	0.75	1.00		
52	3.25	—	—	—	2.38	2.38	2.00	2.12	2.00	1.62	1.50	1.50	1.00	1.00	
56	3.50	—	—	—	—	2.38	2.50	2.12	2.00	2.12	1.50	1.50	1.00	1.00	1.00
60	3.75	—	—	—	—	2.88	2.50	2.62	2.50	2.12	2.25	1.50	1.00	1.00	1.00
64	4.00	—	—	—	—	2.88	3.00	2.62	2.50	2.62	2.25	2.25	2.00	1.00	1.00

Metric Grip Length

Length Code	Nom. Size / Length	M5x0.8	M8x1.25	M6x1	M10x1.5	M12x1.75	M14x2	M16x2	M20x2.5	M24x3
25	25 mm	9.0								
30	30 mm	14.0	12.0							
35	35 mm	19.0	17.0	13.0				Full Thread		
40	40 mm	24.0	22.0	18.0	14.0					
45	45 mm	29.0	27.0	23.0	19.0	15.0				
50	50 mm	34.0	32.0	28.0	24.0	20.0	16.0			
55	55 mm	—	37.0	33.0	29.0	25.0	21.0	17.0		
60	60 mm	—	42.0	38.0	34.0	30.0	26.0	22.0		
65	65 mm	—	—	43.0	39.0	35.0	31.0	27.0	19.0	
70	70 mm	—	—	48.0	44.0	40.0	36.0	32.0	24.0	
75	75 mm	—	—	53.0	49.0	45.0	41.0	37.0	29.0	
80	80 mm	—	—	58.0	54.0	50.0	46.0	42.0	34.0	26.0
85	85 mm	—	—	—	59.0	55.0	51.0	47.0	39.0	31.0
90	90 mm	—	—	—	64.0	60.0	56.0	52.0	44.0	36.0

To specify a grip, choose G under the special designations in the part number. See part number code chart for details.

CAPTIVE GRIP LENGTHS



Sealtight Fastener captive grip lengths are shown in the following tables. The tabulated captive grip lengths represent the maximum grip. The total length minus the tabulated captive grip length equals the minimum thread length. Also tabulated is the nominal captive diameter. Note: unless otherwise specified captive grip length tolerances are +/-.003 for standard and +/-.0702 for metric

Standard			Metric		
Length Code	Total Length (A)	Captive Grip Length (B)	Length Code	Total Length (A)	Captive Grip Length (B)
08	.500	.125	12	12mm	2mm
10	.625	.250	13	13mm	3mm
12	.750	.375	14	14mm	4mm
14	.875	.500	15	15mm	5mm
16	1.000	.625	16	16mm	6mm
18	1.125	.750	17	17mm	7mm
20	1.250	.875	18	18mm	8mm
22	1.375	1.000	19	19mm	9mm
24	1.500	1.125	20	20mm	10mm
26	1.625	1.250	25	25mm	15mm
28	1.750	1.375	30	30mm	20mm
30	1.875	1.500	35	35mm	25mm
32	2.000	1.625	40	40mm	30mm
34	2.125	1.750	45	45mm	35mm
36	2.250	1.875	50	50mm	40mm
38	2.375	2.000	55	55mm	45mm
40	2.500	2.125	60	60mm	50mm
42	2.625	2.250	65	65mm	55mm
44	2.750	2.375	70	70mm	60mm
46	2.875	2.500	75	75mm	65mm
48	3.000	2.625	80	80mm	70mm
50	3.125	2.750	85	85mm	75mm
52	3.250	2.875	90	90mm	80mm
54	3.375	3.000	95	95mm	85mm
56	3.500	3.125			
58	3.625	3.250			
60	3.750	3.375			
62	3.875	3.500			
64	4.000	3.625			

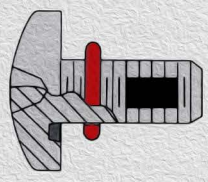
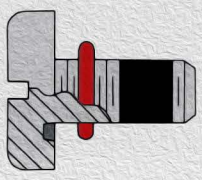
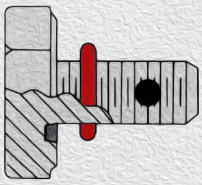
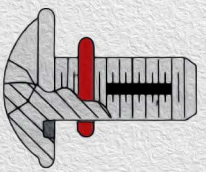
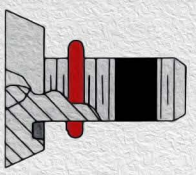
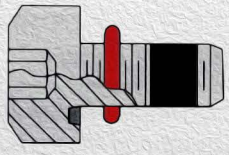
Standard and Metric Captive Diameters														
Standard Nom Size	2	4	6	8	10	1/4	5/16	3/8	7/16	1/2	5/8	3/4	7/8	1
Standard Captive Diameter	.059	.073	.097	.119	.139	.189	.246	.301	.352	.402	.517	.634	.744	.854
Metric Nom Size	M3		M4		M5		M6		M8		M10		M12	M14	M16
Metric Captive Diameter	2.332		3.115		4.007		4.790		6.443		8.172		10.122	11.581	13.581

Note: Unless otherwise specified, captive diameter tolerances are +/-.001 for standard and +/-.0254 for metric fasteners.

For a captive grip, specify the letter C under the special designations in the part number. See part number code chart for details.

Locking Elements

The most common locking element is the patch. Locking elements are used to "lock" the fastener in place. Locking elements lessen the potential of the fastener vibrating loose. In applications where vibration is present, consider using a locking element.

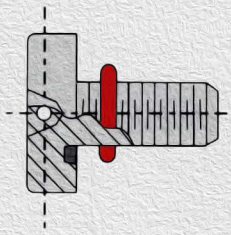
TYPE (CODE)	LOCKING ELEMENT
 PATCH (A)	*The Patch is composed of powdered nylon which is sprayed on the fastener fusing to the material, making the fastener self-locking, while leaving it fully adjustable. The Patch is completely dry requiring no curing time after installation. Its internal strength and resiliency remain high, even after continual re-use.*
 EPOXY (E)	*Epoxy is a powerful locking adhesive that outperforms most nylon locking elements in first-off torque evaluations. Epoxy is dry to the touch; yet, the forces of engagement crush the surface skin mixing the separate epoxy components and initiating a chemical reaction. Within minutes of assembly the fastener can not be removed without a wrench. Curing continues for 72 hours.*
 PELLET (P)	*Pellet is a special, tough nylon, Vespel, or Kel-F plug, inserted into a drilled hole, which makes the threaded fastener self-locking while leaving it fully adjustable. Its high internal strength and resiliency help resist deformation even after repeated use.*
 STRIP (S)	*Strip is a tough bar of nylon, Kel-F, or Vespel, inserted into a milled slot in the fastener threads, which makes it self-locking. Ideal for military and commercial fasteners, the strip performs well in both high and low temperature extremes. Its compressibility, resiliency and strength allow repeated removals or adjustments.*
 360 PATCH (T)	*The 360 degree Patch is the same as the Patch except it is a 360 degree ring.*
 ACRYLIC (V)	*Acrylic, also known as Vibra-tite, makes any threaded fastener self-locking even under extreme vibration conditions. Coated parts can easily be adjusted, removed and reused many times. Under the surface is a thick, resilient, taffy-like resin but the surface is dry to touch. It can be stored indefinitely before use.*

Coatings

The most common coating is black oxide. Black oxide will cause the appearance of the fastener to be black. This coating is used in stealth applications where eliminating reflection is critical. Many military applications require this coating.

COATING, PLATING OR FINISH	CODE	MATERIALS USED ON	CORROSION RESISTANCE	Characteristics
Anodizing	–	Aluminum	Excellent	*Acid electrolytic treatment. Frosty-etched appearance. Produces a hard oxide surface. Automatically done.*
Passivating	–	Stainless Steel	Excellent	*Chemical treatment. Removes iron particles and produces a passive surface. Automatically done.*
Black-Oxide	B	Most Metals	Indoor, very good Outdoor, fair to good	*A chemical reaction caused by combining a material with oxygen to form a black protective coating used mainly for decorative purposes.*
Cadmium Plate	C	Most Metals	Excellent	*Bright silver gray, dull gray, or black. Electroplated finish, extremely effective corrosion protection in marine environments. Also used for decorative purposes.*
Silver Plate	I	All Metals	Excellent	*Excellent electrical conductor. Expensive. Used mainly for decorative purposes.*
Black Chromate	L	Zinc & Cadmium Plated Fasteners	Very good to excellent	*A chemical conversion coating applied to plated parts to enhance corrosion protection. Colors available are black, olive drab, blue, gold, and bronze.*
Chromium Plate	M	Most Metals	Good (improves w/ copper or nickle undercoats)	*Bright blue-white, lustrous electroplated finish. Has fairly hard surface. Used for decorative purposes or to add wear resistance.*
Dull Nickel	N	Most Metals	Indoor, very good Outdoor, fair to good	*Whitish cast. Can be obtained by mechanical surface finishing or by using a special plating bath.*
Copper Plate	O	Most Metals	Fair	*Copper electroplated finish. Used as nickel and chromium plate undercoat. Can be blackened and relieved to obtain antique, statuary and venetian finishes.*
Bright Nickel	R	Most Metals	Same as dull nickel	*Electroplated silver colored finish. Used mainly for decorative purposes.*
Rust Preventatives	U	All Metals	Varies with oil function	*Varied in color and film thickness. Usually applied to phosphate and black oxide finishes. Used to protect parts in transit or storage.*
Zinc Plate	Z	All Metals	Very Good	*Electroplated blue-white gray color used mainly for corrosion protection of carbon steel parts.*

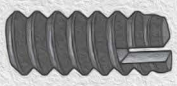
Drill Styles



H=Drilled Head
FLAT FILLISTER HEAD
Perfect for applications requiring safety wire.

Standard		Metric		Standard		Metric	
Basic Diam.	Hole Reference	Basic Diam.	Hole Reference	Basic Diam.	Hole Reference	Basic Diam.	Hole Reference
4	.035	M3	.87	4	.035	M3	.87
6	.067	M4	1.70	6	.035, .0465	M4	1.27
8	.067	M5	1.70	8	.0465	M5	1.27
10	.067	M6	1.70	10	.0465	M6	1.27
1/4	.076, .086	M8	1.93, 2.18	1/4	.0465, .0625	M8	1.27
5/16	.076, .086	M10	1.93, 2.18	5/16	.0465, .0625	M10	1.57
3/8	.076, .086, .106, .116	M12	1.93, 2.18, 2.69, 2.94	3/8	.0625, .0635	M12	1.57
7/16	.106, .116	M16	2.94	7/16	.0625, .0635	M16	1.57
1/2	.106, .116, .141, .151	M20	3.58, 3.83	1/2	.0635, .0940	M20	2.07
5/8	.141, .151	M24	3.58, 3.83	5/8	.0635, .0940	M24	2.07
3/4	.141, .151	M30	3.58, 3.83	3/4	.0935, .0940	M30	2.07
7/8	.141, .151	M36	3.83	7/8	.0935, .125	M36	2.07
1	.141, .151			1	.0935, .125		

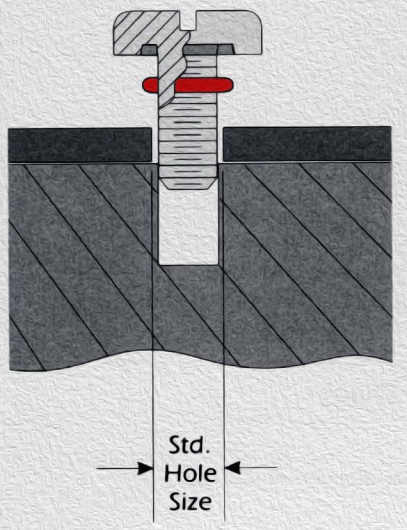
Tapping Threads

Picture	Code	Tapping Screw Thread Styles
	1	Type A: A thread forming screw primarily for use with thin metal .015 to .050 inch thick.
	2	Type AB: A thread forming screw for use with thin to thick metal .015 to .200 inch thick.
	3	Type BP: A thread forming screw for use with plastics, non ferrous castings, and thin to thick metals .050 to .200 inch thick with a cone point for applications where holes are slightly misaligned.
	4	Type C: A thread forming screw with either course or fine machine screw threads and blunt tapered point. Eliminates chips and permits replacement with standard screw in the field.
	5	Type 1: A thread cutting screw with single flute for general use. Produces fine standard machine screw threads for field replacement.
	6	Type F: A thread cutting screw with machine screw thread and blunt tapered point for use with heavy gauge sheet metal, aluminum, zinc, die castings, cast iron, brass, and plastic.
	7	Type G: A thread cutting screw with machine screw threads and blunt die point similar to #4 but requires less driving torque and is commonly used with low strength metals and plastics.
	8	Type 23: A thread cutting screw with fine thread offering maximum thread cutting area and excellent chip clearing, with minimum tightening torques.
	9	Type F2: A thread cutting screw with a tapping screw thread and blunt tapered point. Multi-cutting edges and chip cavities for easier installation.

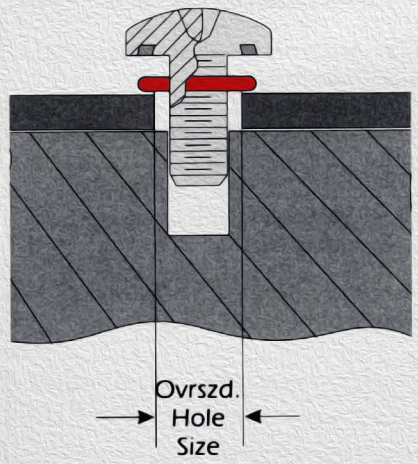
Hole Size

The following table shows standard and oversized recommended hole sizes. If your application requires a larger hole, use an oversized head.

Standard Hole Size



Oversized Hole Size



Standard Hole Dim.		Std. Oversized Hole Dim.		Metric Hole Dim.		Metric Ovrszd. Hole Dim.	
Nom. Size	Max. Min.	Nom. Size	Max. Min.	Nom. Size	Max. Min.	Nom. Size	Max. Min.
2	.095 .091	2	.128 .122	M2	2.438 2.311	M2	2.946 2.819
4	.128 .122	4	.150 .146	M2.5	2.946 2.819	M2.5	3.454 3.327
6	.150 .146	6	.178 .172	M3	3.454 3.327	M3	3.657 3.556
8	.178 .172	8	.201 .198	M3.5	3.657 3.556	M3.5	4.547 4.420
10	.201 .198	10	.228 .223	M4	4.547 4.420	M4	5.563 5.436
12	.228 .223	12	.266 .260	M5	5.563 5.436	M5	6.655 6.528
1/4	.266 .260	1/4	.332 .326	M6	6.655 6.528	M6	9.042 8.915
5/16	.332 .326	5/16	.397 .390	M8	9.042 8.915	M8	11.049 10.922
3/8	.397 .390	3/8	.468 .460	M10	11.049 10.922	M10	14.046 13.919
7/16	.468 .460	7/16	.531 .524	M12	14.046 13.919	M12	16.053 15.926
1/2	.531 .524	1/2	.578 .574	M14	16.053 15.926	M14	18.059 17.932
9/16	.578 .574	9/16	.654 .645	M16	18.059 17.932	M16	22.047 21.920
5/8	.654 .645	5/8	.778 .768	M20	22.047 21.920	M20	24.054 23.927
3/4	.778 .768	3/4	.904 .894	M22	24.054 23.927	M22	26.060 25.933
7/8	.904 .894	7/8	1.028 1.018	M24	26.060 25.933	M24	33.071 32.944
1	1.028 1.018			M30	33.071 32.944		

Do not chamfer clearance holes.
Break all sharp edges .0062 inch maximum.

Suggested Tightening Torque Values *(All torque values in inch pounds.)*

This table represents the suggested torquing values for dry, or near dry Sealtight self-sealing fastener products. Mating products were wiped clean and contained no thread sealant, locking element or foreign matter.

Note: A lubricated fastener requires less torque to attain the same clamping force as a non-lubricated fastener!

Fastener Thread Size	Material (Code) 316SS (1)	300 (1) 400 (2) Stainless Series	Molybdemum Alloy (3)	1038 Medium Carbon Steel (6)
2-56	2.6	2.5	2.5	2.3
2-64	3.2	3.0	3.1	2.8
4-40	5.5	5.2	5.3	4.8
4-48	6.9	6.6	6.7	6.1
6-32	10.1	9.6	9.8	8.9
6-40	12.7	12.1	12.3	11.2
8-32	19.8	19.8	20.2	18.4
8-36	22.0	22.0	22.4	20.4
10-24	23.8	22.8	25.9	21.2
10-32	33.1	31.7	34.9	29.3
1/4-20	78.8	75.2	85.3	68.8
1/4-28	99.0	94.0	106.0	87.0
5/16-18	138	132	149	123
5/16-24	147	142	160	131
3/8-16	247	236	266	219
3/8-24	271	259	294	240
7/16-20	393	376	427	349
7/16-24	418	400	451	371
1/2-13	542	517	584	480
1/2-20	565	541	613	502
9/16-12	713	682	774	632
9/16-18	787	752	855	697
5/8-11	1160	1110	1330	1030
5/8-18	1301	1244	1482	1154
3/4-10	1558	1490	1790	1382
3/4-16	1582	1530	1832	1416
7/8-9	2420	2318	2755	2130
7/8-14	2430	2328	2775	2140
1-8	3250	3110	3730	2885
1-14	3595	3440	4130	3185

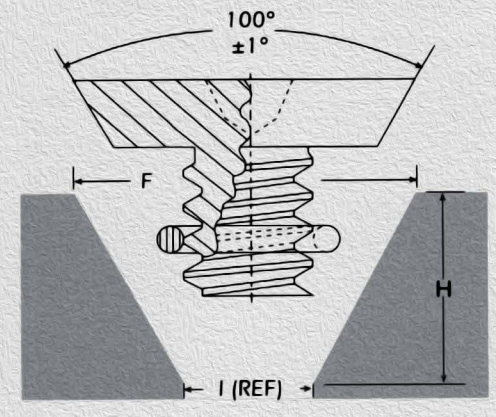
Weights of Fasteners

(Approximate weights for Phillips Pan Head self-sealing fasteners in 302HQ SS in lbs. per 100 fasteners.)

Diam. Nom. / Length (Inches)	2	4	6	8	10	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1
1/8	.05	.09	.15	.25	.38	—	—	—	—	—	—	—	—	—	—
3/16	.06	.10	.16	.26	.39	—	—	—	—	—	—	—	—	—	—
1/4	.07	.11	.18	.29	.42	.86	—	—	—	—	—	—	—	—	—
5/16	.07	.13	.20	.32	.45	.92	1.68	—	—	—	—	—	—	—	—
3/8	.08	.14	.22	.35	.49	.99	1.78	2.93	—	—	—	—	—	—	—
7/16	.09	.16	.23	.37	.52	1.05	1.89	3.08	4.44	—	—	—	—	—	—
1/2	.09	.17	.25	.40	.55	1.12	1.99	3.23	4.66	7.27	—	—	—	—	—
9/16	.10	.18	.27	.43	.59	1.18	2.10	3.37	4.86	7.58	9.49	—	—	—	—
5/8	.11	.19	.29	.46	.63	1.25	2.20	3.52	5.08	7.92	9.92	12.36	—	—	—
3/4	.12	.22	.33	.51	.70	1.37	2.41	3.81	5.50	8.58	10.74	13.38	21.60	—	—
7/8	.14	.23	.35	.57	.77	1.50	2.62	4.11	5.90	9.20	11.22	13.98	22.57	33.94	—
1	.15	.26	.40	.63	.84	1.62	2.82	4.41	6.33	9.87	12.04	15.00	24.22	36.42	50.91
1-1/4	—	.31	.42	.47	.74	1.88	3.23	4.99	6.70	10.24	12.60	16.76	26.79	39.95	55.54
1-1/2	—	.36	.48	.54	.84	2.13	3.66	5.59	7.75	11.50	14.05	18.51	29.37	43.48	60.18
1-3/4	—	—	.62	.95	1.26	2.38	4.08	6.18	8.82	12.89	15.80	20.46	31.94	47.02	64.81
2	—	—	.69	1.07	1.39	2.63	4.49	6.77	9.84	14.20	17.47	22.59	34.77	50.55	69.45
2-1/4	—	—	.77	1.19	1.53	2.89	4.91	7.36	10.89	15.57	19.20	24.72	37.85	54.42	74.08
2-1/2	—	—	.84	1.30	1.67	3.14	5.33	7.96	11.94	16.94	20.93	26.86	40.93	58.60	79.13
2-3/4	—	—	.92	1.40	1.81	3.40	5.74	8.54	12.99	18.30	22.67	28.99	44.00	62.79	84.59
3	—	—	.99	1.51	1.95	3.65	6.16	9.14	14.04	19.67	24.40	31.13	47.09	66.98	90.06
3-1/2	—	—	—	1.75	2.23	4.16	7.01	10.31	16.14	22.40	27.87	35.40	53.25	75.36	100.99
4	—	—	—	—	2.51	4.67	7.83	11.51	18.23	25.14	31.34	39.66	59.40	83.73	111.92
4-1/2	—	—	—	—	2.78	5.17	8.66	12.71	20.33	27.87	34.80	43.93	65.56	92.10	122.85
5	—	—	—	—	3.06	5.68	9.52	13.92	22.43	30.60	38.27	48.20	71.72	100.49	133.78
5-1/2	—	—	—	—	3.34	6.19	10.34	15.11	24.52	33.34	41.74	52.47	77.88	108.86	144.71
6	—	—	—	—	3.61	6.71	11.18	16.31	26.62	36.07	45.20	56.73	84.04	117.24	155.64

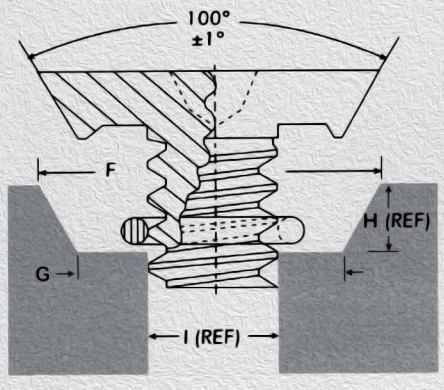
Flat Head Counterbore Dimensions & Tool

Flat Head Counterbore



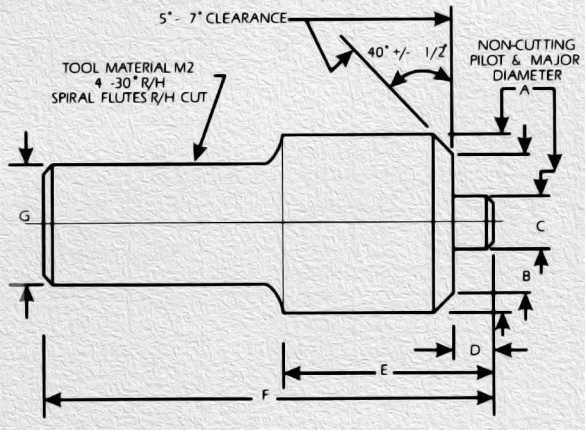
Part # BB1F- Counterbore Dimensions					
Size	F (REF)	F	H (MAX)	H (REF)	I (REF)
4	.273	.267 .279	.079	.075	.0950
6	.329	.323 .334	.093	.089	.1169
8	.405	.400 .410	.114	.110	.1428
10	.503	.496 .510	.149	.143	.1619
1/4	.656	.647 .665	.196	.184	.2164
5/16	.784	.775 .793	.221	.213	.2752

Special Flat Head Counterbore



Part # BBS1F- Counterbore Dimensions				
Screw Size	F	G	H (REF(	I (REF)
4	.279 .267	.164 .162	.035	.0950
6	.334 .323	.226 .222	.036	.1169
8	.410 .400	.274 .268	.041	.1428
10	.510 .496	.274 .268	.065	.1619
1/4	.665 .647	.388 .380	.076	.2164
5/16	.793 .775	.498 .490	.103	.2752

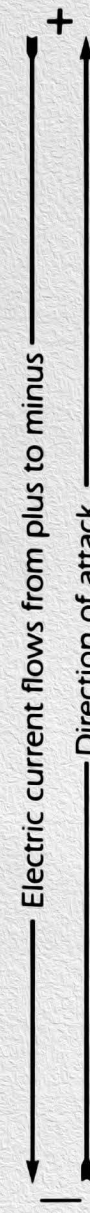
Special Flat Head Counterbore Tool



Size	A +.000 -.001	B	C +.000 -.001	D ±.03	E ±.06	F ±.06	G +.000 -.001
4	.0950	.162-.164	.312	.0950	1.00	3.00	.312
6	.1169	.222-.226	.375	.1169	1.00	3.00	.375
8	.1428	.268-.274	.437	.1428	1.25	3.25	.375
10	.1619	.278-.286	.562	.1619	1.25	3.25	.375
1/4	.2164	.380-.388	.700	.2164	1.50	3.50	.375
5/16	.2752	.490-.498	.825	.2752	1.50	3.50	.375

Galvanic Series for Metals

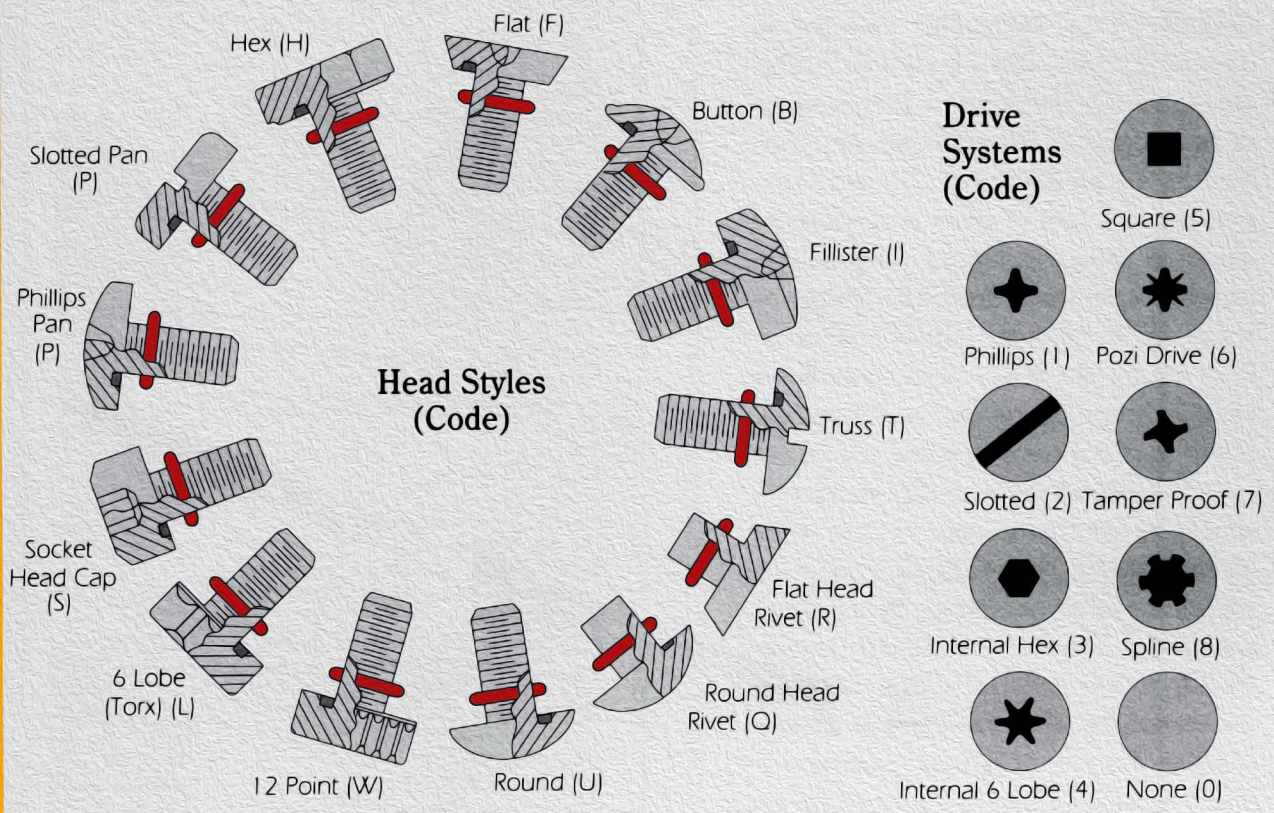
GALVANIC CORROSION: *This type of corrosion occurs when dissimilar (different) metals or alloys are in the presence of an electrolyte (Moisture can be classified as an electrolyte). All carbons, graphites, metals, & alloys have different electrical voltage potential. Galvanic corrosion occurs when dissimilar metals or alloys are in intimate contact near to or in an electrolyte. When similar metals are used galvanic corrosion is eliminated. When it is necessary to use dissimilar metals within a system the materials should be selected as near to each other on the galvanic series list as possible to reduce the potential voltage between the materials. The current density corresponds to the level of voltage between the materials. When the current density is lower, the rate of galvanic corrosion is less. The galvanic series is a list of metals in descending order of electrical potential. The list starts at the top with the least noble materials (lowest resistance to galvanic corrosion), and ends with the most noble materials. In product design the portion of the product with the largest exposed surface area should be comprised of the least noble material.*



Magnesium
Magnesium Alloys
Zinc
Beryllium
Aluminum 1100, 3003, 3004, 5052, 6053
Cadmium
Aluminum 2017, 2024, 2117
Steel 1018,1038, or Wrought Iron
HSLA Steel, Cast Iron
Chrome Iron (active)
430 Stainless (active)
302, 303, 321, 347, 410, 416 Stainless Steel (active)
Ni-Resist Cast Iron
316, 317 Stainless (active)
Carpenter 20Cb-3 Stainless (active)
Aluminum Bronze (CA 687)
Hastelloy C, Inconcel 625, Titanium (active)
Lead
Tin
Inconel 600 (active)
Nickel (active)
Inconel Nickel-Chromium Alloy (active)
Hastelloy B (active)
Naval Brass (CA 464), Yellow Brass (CA 268)
Red Brass (CA 230), Admiralty Brass (CA 443)
Copper (CA 102)
Manganese Bronze (CA 675), Tin Bronze (CA 903 & CA 905)
410, 416 Stainless (passive) Phosphor Bronze (CA 521 & CA 524)
Silicon Bronze (CA 651 & CA 655)
Nickel Silver (CA 732, 735, 745, 752, 754, 757, 765, 770, 794)
Copper Nickel 90-10
Copper Nickel 80-20
430 Stainless (passive)
Copper Nickel 70-30
Nickel Aluminum Bronze (CA 630 & CA 632)
Monel 400, K500
Nickel (passive)
60% Ni 15% Cr (passive)
Inconcel 600 (passive)
80% Ni 20% Cr (passive)
Chrome Iron (passive)
302, 303, 304, 321, 347 Stainless (passive)
316, 317 Stainless (passive)
Carpenter 20Cb-3 Stainless, Incoloy 825 (passive)
Silver
Titanium, Hastelloy C & C276, Inconel 625 (passive)
Graphite
Zirconium
Gold
Platinum

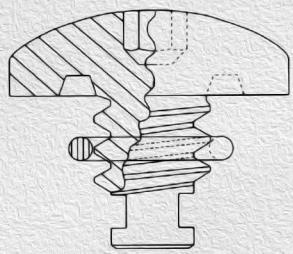
Patent and Copyright Restrictions:

UNLIMITED COMBINATIONS TO MEET ALL YOUR SELF-SEALING FASTENER NEEDS!

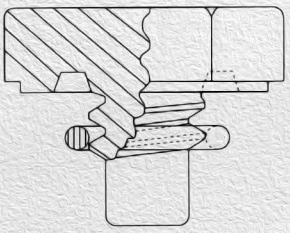


Specials

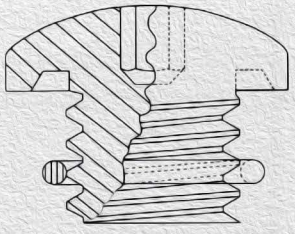
A special Sealtight Fastener can be specifically designed for those applications that have unique requirements.



CAPTIVATED SOCKET PAN



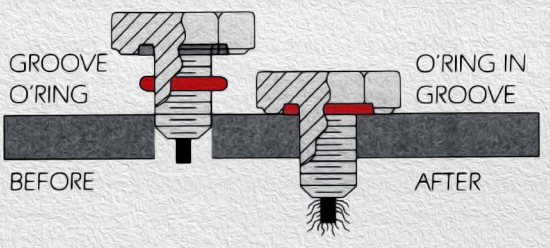
FULL DOG POINT HEX



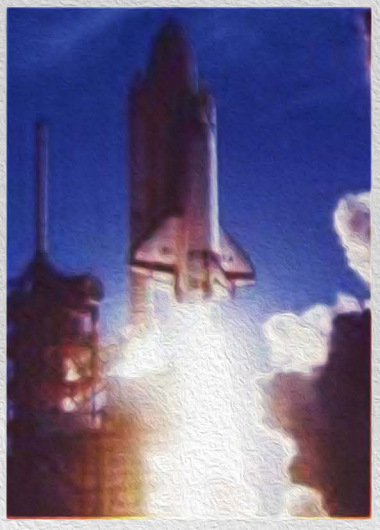
SOCKET PAN HEAD PLUG

A special ending - Ferrous Particle Collector

We'll attach a special magnet to the base of our fasteners upon request. This draws ferrous particles out of thick engine/gear lubricant. By clearing the fluid of damage causing contaminants– machine life is extended and end product performance is increased.



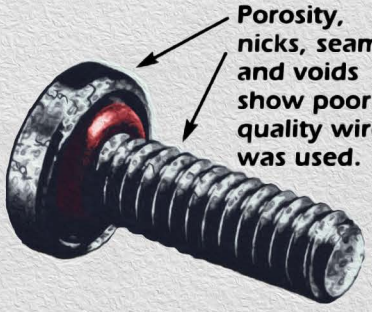
Sealtight Fasteners...
The Perfect Sealing Solution
...When Quality Matters



...When Failure Is Not An Option

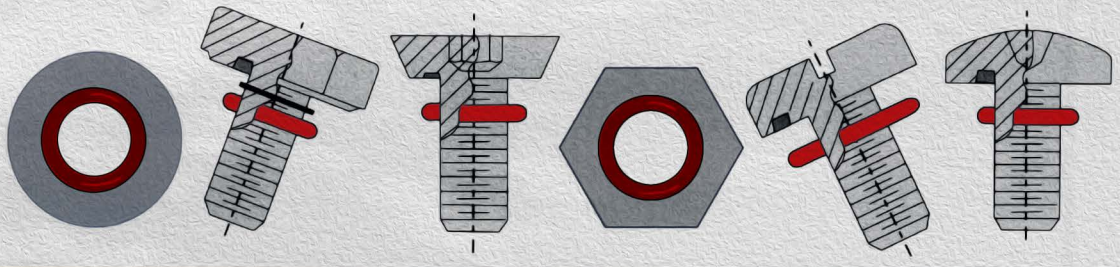
See the Difference!

Sealtight Fasteners
use high quality wire!

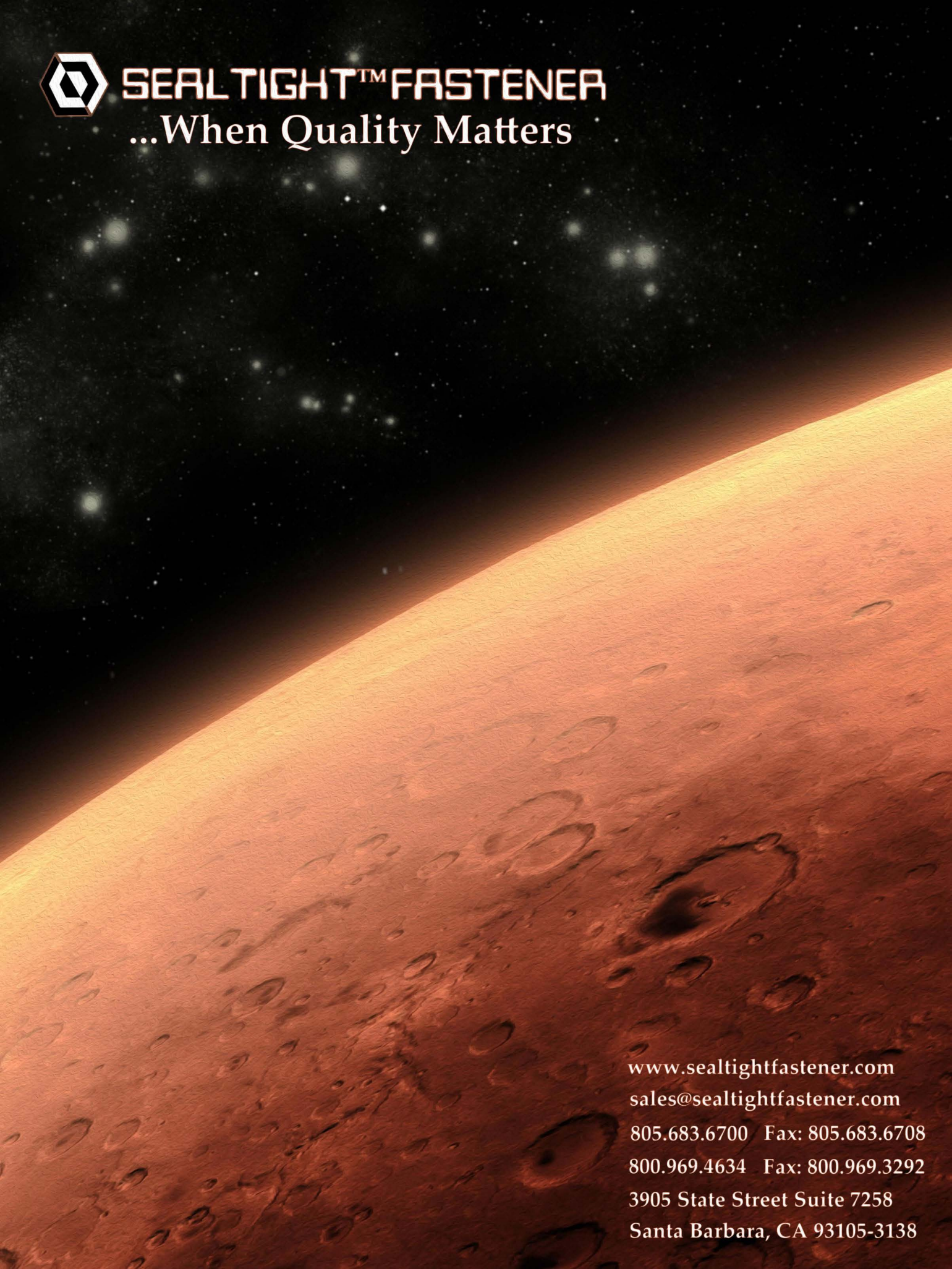


A competitor's fastener.

...The Choice Of Industry Leaders For Decades



SEALTIGHT™ FASTENER... Serious Solutions For Serious Designs.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