BOLTS, NUTS & GASKETS

Victory Bolt & Specialty Inc.

GRADE-2 HEX CAP SCREW

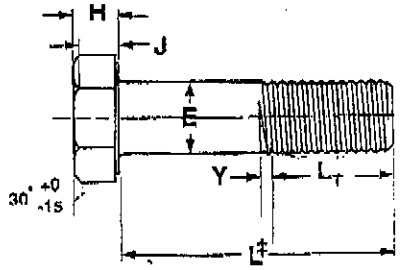
Description	A low or medium carbon steel, externally threaded mechanical device 1/4" diameter or larger, with a trimmed hex head and a washer face on the bearing surface.
Applications/ Advantages	Economical for use in non-critical applications where the fastener is not subject to extreme temperatures or stress beyond the limits listed herein.
Material	AISI 1006 - 1050 or equivalent steel
Hardness	1/4 through 3/4 in. diameter, 6 in. and shorter in length: Rockwell B80 - B100. 1/4 through 3/4 in. diameter, over 6 in. in length: Rockwell B70 - B100. 7/8 through 1-1/2 in. diameter, all lengths: Rockwell B70 - B100.
Proof Load	1/4 through 3/4 in. diameter, 6 in. and shorter in length: 55,000 psi. 1/4 through 3/4 in. diameter, over 6 in. in length: 33,000 psi. 7/8 through 1-1/2 in. diameter, all lengths: 33,000 psi.
Yield Strength*	1/4 through 3/4 in. diameter, 6 in. and shorter in length: 57,000 psi. minimum. 1/4 through 3/4 in. diameter, over 6 in. in length: 36,000 psi. minimum. 7/8 through 1-1/2 in. diameter, all lengths: 36,000 psi. minimum.
Tensile Strength	1/4 through 3/4 in. diameter, 6 in. and shorter in length: 74,000 psi. minimum. 1/4 through 3/4 in. diameter, over 6 in. in length: 60,000 psi. minimum. 7/8 through 1-1/2 in. diameter, all lengths: 60,000 psi. minimum.
Elongation*	18% minimum (all diameters)
Reduction of Area*	35% minimum (all sizes)
Plating	See Appendix-A for plating information

HEX CAP SCREW--STAINLESS STEEL, 18-8 & 316

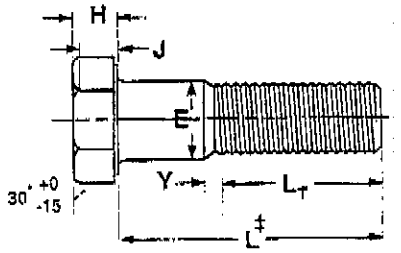
Description	18-8 and 316 stainless steel cap screws are both made from austenitic alloys as described below.
Applications/ Advantages	**18-8:** Used in products that require general atmospheric corrosion resistance, such as chemical and food-processing equipment. Some chemical environments may require special corrosion resistant materials and precautions. **316:** The molybdenum content gives this type of stainless even greater corrosion resistance than 18-8 as well as superior strength at high temperatures.
Material	**18-8:** A cap screw made from one of the following austenitic alloys: 303, 303Se, 304, XM7, all of which are characterized as having a chromium content of 17-19% and nickel content of 8-10%. Type 304 stainless is the most common variety used to make cap screws. **316:** A cap screw made from 316 stainless steel, an austenitic alloy which differs from 18-8 by its molybdenum content (2-3%) and a higher nickel content (10-14%).
Heat Treatment	The austenitic alloys develop their strength through work hardening during the fastener manufacturing process, as seen from the hardness properties below. The only heat treatment normally available on austenitic stainless alloys is annealing, which is done at approximately 1900°F to a dead soft condition and is not normally thermally reversible.
Hardness	1/4 through 5/8 in. diameter: Rockwell B95 - C32 3/4 through 1 in. diameter: Rockwell B80 - C32
Yield Strength*	1/4 through 5/8 in. diameter, 2.25D and longer: 65,000 psi. minimum 3/4" (2.25D & longer) & 7/8 through 1 in. diameter (3D & longer): 45,000 psi. minimum
Tensile Strength	1/4 through 5/8 in. diameter, 2.25D and longer: 100,000 - 150,000 psi. 3/4" (2.25D & longer) & 7/8 through 1 in. diameter (3D & longer): 85,000 - 140,000 psi.
Elongation in 4D*	1/4 through 5/8 in. diameter: 20% minimum; 3/4 through 1 in. diameter: 25% minimum.

D = Nominal diameter of the screw in inches
*These properties are tested only on machined specimens when the testing machine cannot provide for full testing of the parts.
**Product standards require the manufacturer's head marking to appear on the top of all cap screws 1/4" diameter and larger. "X" represents one location such a marking may appear.

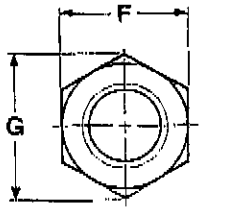
Cap Screws & Bolts — Head and Thread Dimensions — Hex Cap Screws



Cut Thread



Rolled Thread



UNDERSIDE OF HEAD

‡Length of a cap screw is measured from the underhead bearing surface to the extreme end of the screw.

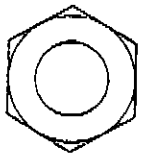
Hex Cap Screws

ASME B18.2.1-1996

Nominal or Basic Product Diameter		E		F			G		H			J	L_T		Y
		Body Diameter		Width Across Flats			Width Across Corners		Head Height			Wrenching Height	Thread Length		Transition Thread Length
													For Screw Lengths ≤6 in.	For Screw Lengths > 6 in.	
		Max	Min	Basic	Max	Min	Max	Min	Basic	Max	Min	Min	Ref	Ref	Max
1/4	0.2500	0.2500	0.2450	7/16	0.438	0.428	0.505	0.488	5/32	0.163	0.150	0.106	0.750	1.000	0.250
5/16	0.3125	0.3125	0.3065	1/2	0.500	0.489	0.577	0.557	13/64	0.211	.0195	0.140	0.875	1.125	0.278
3/8	0.3750	0.3750	0.3690	9/16	0.562	0.551	0.650	0.628	15/64	0.243	0.226	0.160	1.000	1.250	0.312
7/16	0.4375	0.4375	0.4305	5/8	0.625	0.612	0.722	0.698	9/32	0.291	0.272	0.195	1.125	1.375	0.357
1/2	0.5000	0.5000	0.4930	3/4	0.750	0.736	0.866	0.840	5/16	0.323	0.302	0.215	1.250	1.500	0.385
9/16	0.5625	0.5625	0.5545	13/16	0.812	0.798	0.938	0.910	23/64	0.371	0.348	0.250	1.375	1.625	0.417
5/8	0.6250	0.6250	0.6170	15/16	0.938	0.922	1.083	1.051	25/64	0.403	0.378	0.269	1.500	1.750	0.455
3/4	0.7500	0.7500	0.7410	1-1/8	1.125	1.100	1.299	1.254	15/32	0.483	0.455	0.324	1.750	2.000	0.500
7/8	0.8750	0.8750	0.8660	1-5/16	1.312	1.285	1.516	1.465	35/64	0.563	0.531	0.378	2.000	2.250	0.556
1	1.0000	1.0000	0.9900	1-1/2	1.500	1.469	1.732	1.675	39/64	0.627	0.591	0.416	2.250	2.500	0.625
1-1/8	1.1250	1.1250	1.1140	1-11/16	1.688	1.631	1.949	1.859	11/16	0.718	0.658	0.461	2.500	2.750	0.714
1-1/4	1.2500	1.2500	1.2390	1-7/8	1.875	1.812	2.165	2.066	25/32	0.813	0.749	0.530	2.750	3.000	0.714
1-1/2	1.5000	1.5000	1.4880	2-1/4	2.250	2.175	2.598	2.480	1-5/16	0.974	0.902	0.640	3.250	3.500	0.833

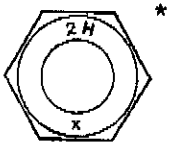
Tolerance on Length	Nominal Screw Size	Nominal Screw Length				
		Up to 1 In., incl.	Over 1 in. to 2-1/2 in., incl.	Over 2-1/2 in. to 4 in., incl.	Over 4 in. to 6 in., incl.	Longer than 6 in.
	1/4 to 3/8	-0.03	-0.04	-0.06	-0.08	-0.18
	7/16 and 1/2	-0.03	-0.06	-0.08	-0.10	-0.18
	9/16 to 3/4	-0.08	-0.08	-0.10	-0.10	-0.18
	7/8 and 1	....	-0.10	-0.14	-0.16	-0.20
	1-1/8 to 1-1/2	....	-0.12	-0.18	-0.18	-0.22

Steel & Stainless Heavy Hex Nuts

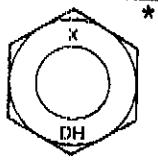

Grade-A

Grade-C *

STEEL



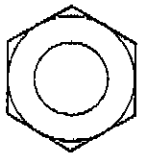
Grade-2H *



Grade-DH *

Drade-DH3 *

Description	A six-sided internally threaded fastener which is both thicker and wider across the flats than a same-sized finished hex nut. Nuts in sizes 7/16 & smaller shall be double chamfered. Larger sizes are either double chamfered or chamfered on top with a washer faced bearing surface.
Applications/ Advantages	This is the strongest of all comparably-graded nuts because of its greater length of thread engagement and greater resistance to dilation (widening or stretching). Grade-A nuts are used with low-carbon heavy hex bolts. Grade-C nuts are recommended for use with A-325 structural bolts. Grade-2H nuts are recommended for use with bolts in high-pressure and high-temperature service. Grade-DH nuts are recommended for use with A-490, Type-1 structural bolts and Grade-DH3 nuts for use with A-490, Type-3 structural bolts.
Material	Nuts shall be made from a steel which conforms to the following chemical composition requirements (heat analysis)-- **Grades-A & C--** *Carbon:* 0.55% maximum; *Phosphorus:* 0.12% maximum; *Sulfur:* 0.023% maximum. **Grade-2H--** *Carbon:* 0.40% minimum, *Manganese:* 1.00% maximum; *Phosphorus:* 0.04% maximum; *Sulfur:* 0.05% maximum; *Silicon:* 0.40% maximum. **Grade-DH--** *Carbon:* 0.20-0.55%; *Manganese:* 0.60% minimum; *Phosphorus:* 0.04% maximum; *Sulfur:* 0.05% maximum. **Grade-DH3--** *Carbon:* 0.20-0.53%; *Manganese:* 0.40% minimum; *Phosphorus:* 0.046% maximum; *Sulfur:* 0.050% maximum; *Copper:* 0.20% minimum; *Chromium:* 0.45% minimum; (Either *Nickel:* 0.20% minimum or *Molybdenum:* 0.15% minimum, may be used).
Heat Treatment	**Grade-2H:** These nuts shall be heat treated by quenching in a liquid medium from a temperature above the transformation temperature and tempering at a temperature of at least 850°F. **Grades-C, DH & DH3:** These nuts shall be heat treated by quenching in a liquid medium from a temperature above the transformation temperature and tempering at a temperature of at least 800°F.
Core Hardness	**Grade-A:** Rockwell B68 - C32 **Grade-C:** Rockwell B78 - C38 **Grades-2H, DH & DH3:** Rockwell C24 - C38
Proof Load	**Grade-A:** Coarse- 100,000 psi.; Fine- 90,000 psi. **Grade-C:** 144,000 psi. **Grade-2H:** 150,000 psi. **Grades-DH & DH3:** 175,000 psi.
Plating	See Appendix-A for plating information.

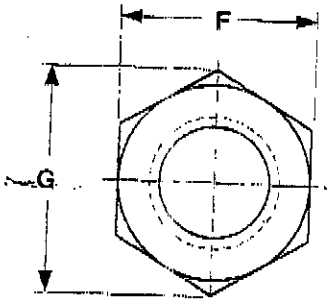


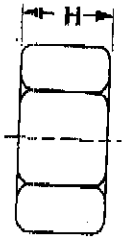
18-8 STAINLESS STEEL

Description	A six-sided internally threaded fastener which is both thicker and wider across the flats than a same-sized finished hex nut, made of 18-8 stainless steel. Nuts in sizes 7/16 & smaller shall be double chamfered. Larger sizes are either double chamfered or chamfered on top with a washer faced bearing surface.
Applications/ Advantages	This is the strongest of all 18-8 stainless hex nuts because of its greater length of thread engagement and greater resistance to dilation (widening or stretching).
Material	Nuts shall be made from one of the following austenitic stainless alloys: 303, 303Se, 304, XM7, all of which are characterized as having a chromium content of 18% and a nickel content of 8%.
Heat Treatment	The austenitic alloys develop their strength through work hardening during the fastener manufacturing process, as seen from the hardness properties below. The only heat treatment normally available on austenitic stainless alloys is annealing, which is done at approximately 1900°F to a dead soft condition and is not normally thermally reversible.
Hardness	1/4 through 5/8": Rockwell B95 - C32 3/4 through 1": Rockwell B80 - C32
Proof Load	1/4 through 5/8": 100,000 psi 3/4 through 1": 85,000 psi.

*Product standards require all grade-marked nuts 1/4" diameter and larger to have a raised or depressed grade-marking and insignia identifying its manufacturer. "X" represents one location a manufacturer's insignia may appear.

Nuts — Heavy Hex — Dimensional Information





Heavy Hex Nuts

ANSI/ASME B18.2.2

Nominal Size or Basic Major Diameter of Thread		F Width Across Flats			G Width Across Corners		H Thickness		
		Basic	Max	Min	Max	Min	Basic	Max	Min
1/4	0.2500	1/2	0.500	0.488	0.577	0.556	15/64	0.250	0.218
5/16	0.3125	9/16	0.562	0.546	0.650	0.622	19/64	0.314	0.280
3/8	0.3750	11/16	0.688	0.669	0.794	0.763	23/64	0.377	0.341
7/16	0.4375	3/4	0.750	0.728	0.866	0.830	27/64	0.441	0.403
1/2	0.5000	7/8	0.875	0.850	1.010	0.969	31/64	0.504	0.464
9/16	0.5625	15/16	0.938	0.909	1.083	1.037	35/64	0.568	0.526
5/8	0.6250	1-1/16	1.062	1.031	1.227	1.175	39/64	0.631	0.587
3/4	0.7500	1-1/4	1.250	1.212	1.443	1.382	47/64	0.758	0.710
7/8	0.8750	1-7/16	1.438	1.394	1.660	1.589	55/64	0.885	0.833
1	1.0000	1-5/8	1.625	1.575	1.876	1.796	63/64	1.012	0.956
1-1/8	1.1250	1-13/16	1.812	1.756	2.093	2.002	1-7/64	1.139	1.079
1-1/4	1.2500	2	2.000	1.938	2.309	2.209	1-7/32	1.251	1.187
1-3/8	1.3750	2-3/16	2.188	2.119	2.526	2.416	1-11/32	1.378	1.310
1-1/2	1.5000	2-3/8	2.375	2.300	2.742	2.622	1-15/32	1.505	1.433
1-5/8	1.6250	2-9/16	2.562	2.481	2.959	2.828	1-19/32	1.632	1.556
1-3/4	1.7500	2-3/4	2.750	2.662	3.175	3.035	1-23/32	1.759	1.679
2	2.0000	3-1/8	3.125	3.025	3.608	3.449	1-31/32	2.013	1.925
2-1/4	2.2500	3-1/2	3.500	3.388	4.041	3.862	2-13/64	2.251	2.155
2-1/2	2.5000	3-7/8	3.875	3.750	4.474	4.275	2-29/64	2.505	2.401
2-3/4	2.7500	4-1/4	4.250	4.112	4.907	4.688	2-45/64	2.759	2.647
3	3.0000	4-5/8	4.625	4.475	5.340	5.102	3-1/64	3.013	2.898
3-1/4	3.2500	5	5.000	4.838	5.774	5.515	3-3/16	3.252	3.124
3-1/2	3.5000	5-3/8	5.375	5.200	6.207	5.928	3-7/16	3.506	3.370
3-3/4	3.7500	5-3/4	5.750	5.562	6.640	6.341	3-11/16	3.760	3.616
4	4.0000	6-1/8	6.125	5.925	7.073	6.755	3-15/16	4.014	3.862

Anchor Industrial Sales, Inc.

- Compression Packings
- Gasketing Products
- Mechanical Seals
- Expansion Joints
- Hydraulic Components
- Oil Seals

Style 440GS & 540GS

Cost effective general service non-asbestos gasketing

A quality compressed gasketing material available with two different rubber binders to cover your full range of gasketing needs.

Both styles are black in color with a distinctive Anchor brand – the brand you can trust for reliability.

STYLE 440GS NITRILE binder – recommended for water, general service steam, hydrocarbons, oils, gasoline, mild acids and mild alkalies.

STYLE 540GS NEOPRENE binder – recommended for water, general service steam, refrigerants (ammonia / freon), oils, fuels, mild acids and mild alkalies.

SHEET SIZES AVAILABLE
60"x60", 60"x120", 60"x180", 150"x150"

THICKNESSES AVAILABLE
1/64", 1/32", 3/64", 1/16", 3/32", 1/8"

[redacted]

Anchor Industrial Sales, Inc

TECHNICAL DATA	440GS†	540GS
MAX. OPERATING CONDITIONS Temperature Pressure	 750°F (400°C) 1450 psi	 750°F (400°C) 1000 psi
COMPRESSIBILITY ASTM F36A RECOVERY ASTM F36A	7-17% Min. 50%	7-17% Min. 50%
HOT COMPRESSION TEST * Thickness Decrease 23°C (73°F) Thickness Decrease 300°C (572°F)	 6% 10%	 6% 10%
TENSILE STRENGTH ASTM F152 Across Grain	 2200 psi	 2000 psi
CHANGE IN TENSILE STRENGTH ASTM F152 after immersion in ASTM-Oil 3, 5h/150°C (300°F)	 – 30%	 – 55%
WEIGHT INCREASE ASTM F146 after immersion in Fuel B 5h/23°C (73°F)	 Max. 15%	 Max. 20%
THICKNESS INCREASE ASTM F146 after immersion in ASTM Oil 1, 5h/150°C (300°F) ASTM Oil 3, 5h/150°C (300°F) ASTM Fuel A, 5h/23°C (73°F) ASTM Fuel B, 5h/23°C (73°F)	 0-5% 0-15% 0-5% 0-10%	 0-5% 10-25% 0-10% 5-20%
LEACHABLE CHLORIDE CONTENT	< 100 ppm	< 500 ppm
DENSITY	1.6 g/cc	1.68 g/cc
NOTE: Typical values based on 1/16" gasket thickness unless otherwise noted. Test results in accordance with ASTM F104.		
* 1/16" thick material, 3575 psi., gasket load		
† meets physical properties of P-1141-A		

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NOTES:

Warranty

[redacted]

0502/440/540

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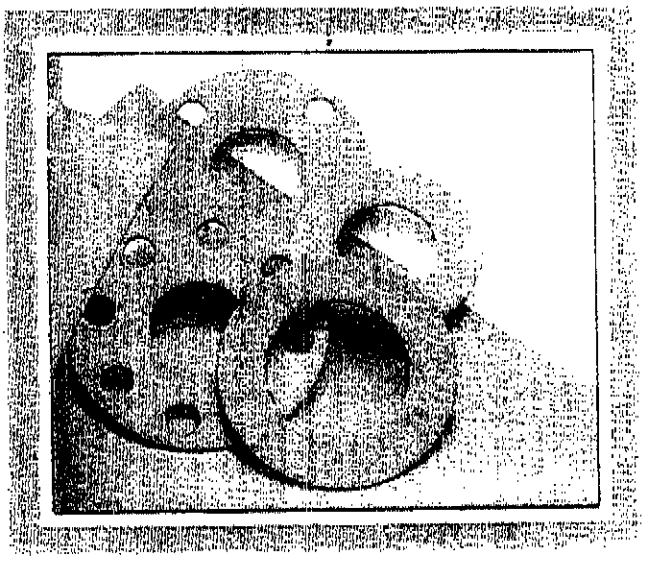

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STYLE 540GS NEOPRENE binder – recommended for water, general service steam, refrigerants (ammonia / freon), oils, fuels, mild acids and mild alkalies.

SHEET SIZES AVAILABLE
60"x60", 60"x120", 60"x180", 150"x150"

THICKNESSES AVAILABLE
1/64", 1/32", 3/64", 1/16", 3/32", 1/8"