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Two most common lock nut groups:

1. **PREVAILING TORQUE** – a design feature of the lock nut produces friction between threads of mated components thereby increasing the force needed to tighten as well as loosen the nut. The two main categories of prevailing torque type nuts include: **all metal** and **nylon insert** lock nuts.

2. **SURFACE-BEARING** - a free spinning nut that requires tightening against a bearing surface in order for the locking mechanism to function. Two common surface bearing type lock nuts include: **serrated flange** and **KEPS (K-Lock)**

1-Prevailing Torque Type Lock Nuts:

All metal prevailing torque type lock nuts achieve their prevailing torque by altering the shape of the nut in some way - most commonly by distorting the threads of the nut, which then bites into the mating part when tightened. The all-metal locking mechanism causes eventual damage to the protective coating of the threads on both bolt and nut. This increases the incidence of corrosion as well as galling. Replacing the nut will not restore the damage caused to the bolt threads. Thus there is limited re-use of all-metal lock nuts. Furthermore they are not recommended when the nut must travel down long spans of threaded shanks as the gradual wearing away of metal tends to loosen the grip of these lock nuts. All-metal lock nuts include:

1) 2-way Reversible Lock Nuts
2) Flex-Type Lock Nuts
3) Stover Lock Nuts.
4) Nylon Insert Lock Nuts

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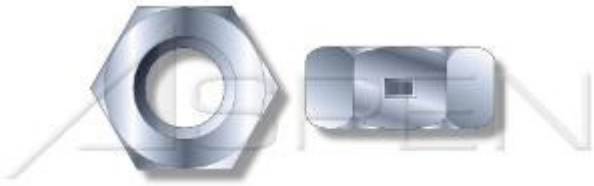
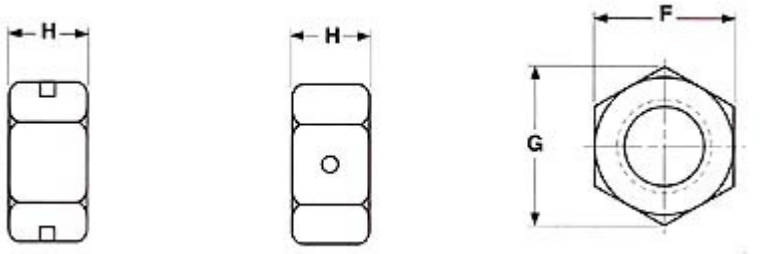
TWO WAY REVERSIBLE LOCK NUTS





Nominal or Basic Major Dia of Thread (inches)		F Width Across Flats			G Width Across Corners		H Thickness		
		Basic (inches)	Max	Min	Max	Min	Basic (inches)	Max	Min
#8	0.1640	11/32	0.344	0.332	0.397	0.378	3/16	0.193	0.178
#10	0.1900	3/8	0.375	0.362	0.433	0.413	13/64	0.203	0.187
1/4	0.2500	7/16	0.438	0.428	0.505	0.488	1/32	0.226	0.212
5/16	0.3125	1/2	0.500	0.489	0.577	0.557	17/64	0.273	0.258
3/8	0.3750	9/16	0.562	0.551	0.650	0.628	21/64	0.337	0.32
7/16	0.4375	11/16	0.688	0.675	0.794	0.768	3/8	0.385	0.365
1/2	0.5000	3/4	0.750	0.736	0.866	0.840	7/16	0.448	0.427
9/16	0.5625	7/8	0.875	0.861	1.010	0.982	31/64	0.496	0.473
5/8	0.6250	1-5/16	0.938	0.922	1.083	1.051	35/64	0.559	0.535
3/4	0.7500	1-1/8	1.125	1.088	1.299	1.240	41/64	0.665	0.617
7/8	0.8750	1-5/16	1.312	1.269	1.516	1.447	3/4	0.776	0.724
1	1.0000	1-1/2	1.500	1.450	1.732	1.653	55/64	0.887	0.831

Description: A one piece all metal prevailing torque type hex nut with two or three equally spaced round or rectangular indentations compressed onto the flat sides of the nut. These compressions create distort the internal threading and results in an increased resistance when tightened onto mating threads. Two-way reversible lock nuts are considered "two way" because they can be installed in either orientation (top up, top down). These nuts are also referred to as centerlock nuts, and are ideal for production and automated assembly. Since the locking of the mating part occurs in the center of the nut, screw length can be reduced, because threads need not protrude from the nut to lock securely. All-metal lock nuts are more resistant to higher temperatures and chemical exposure than non-metallic lock nuts (such as nylon insert lock nuts).

Material: Nuts are be made from a low-carbon steel which conforms to the following chemical composition requirements--Carbon: 0.47%max.; Phosphorus: 0.12% max.; Sulfur: 0.23% max..

Hardness: Rockwell C28 maximum

Proof Load: 90,000 psi.

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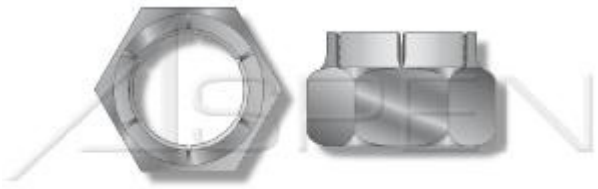
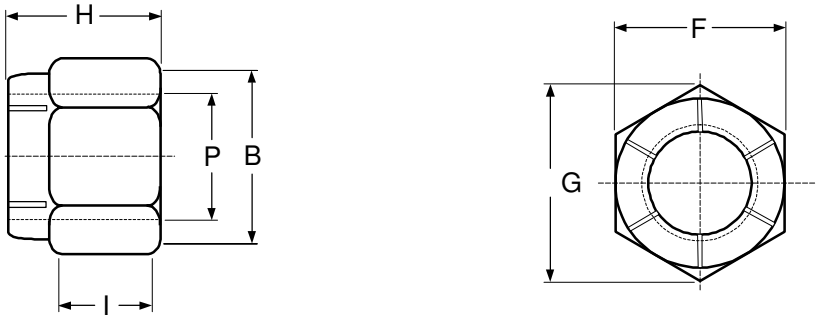
FLEX-TYPE LOCK NUTS (Flexloc)





Nominal Size or Basic Thread Diameter		F		B	G	H	P	I	Tensile Strength (psi.)	
		Width Across Flats		Bearing Surface Outside Dia.	Width Across Corners	Thickness	Bearing Surface Inside Dia.	Side Height	Coarse Thread	Fine Thread
		Max	Min	Min	Min	Max	Max	Min	Min	Min
4	0.1120	0.251	0.243	0.243	0.268	0.155	0.155	0.050	1,080	1,190
6	0.1380	0.313	0.305	0.305	0.339	0.180	0.181	0.075	1,620	1,890
8	0.1640	0.345	0.336	0.336	0.375	0.243	0.208	0.105	2,510	2,620
10	0.1900	0.376	0.367	0.367	0.410	0.243	0.230	0.085	3,120	3,590
1/4	0.2500	0.439	0.430	0.430	0.481	0.290	0.293	0.122	5,730	-
1/4	0.2500	0.439	0.430	0.430	0.481	0.320	0.293	0.135	-	6,550
5/16	0.3125	0.502	0.492	0.492	0.552	0.353	0.356	0.150	9,600	9,950
3/8	0.3750	0.564	0.553	0.553	0.623	0.462	0.418	0.210	13,800	14,500
7/16	0.4375	0.627	0.616	0.616	0.694	0.462	0.487	0.210	14,900	15,450
1/2	0.5000	0.752	0.741	0.741	0.836	0.602	0.551	0.285	22,000	23,800
5/8	0.6250	0.940	0.928	0.928	1.049	0.759	0.676	0.410	34,000	38,400
3/4	0.7500	1.064	1.052	1.052	1.192	0.884	0.807	0.505	50,000	52,300
7/8	0.8750	1.252	1.239	1.239	1.405	1.009	0.938	0.570	64,600	71,400
1	1.0000	1.440	1.427	1.427	1.619	1.134	1.064	0.635	85,000	90,500

Description: A one piece all metal prevailing torque type hex lock nut with six equally spaced opposing slots aligned with the corners of the nut that are cut into a cylindrical collar of slightly smaller diameter at the top of the nut. It is this slotted section that locks the nut in place by increasing resistance to loosening forces when tightened onto a mated thread. It is a free spinning nut until the threads of the bolt reach the collar – then the slotted section expands and creates the prevailing torque locking action. The light hex version of this nut has a smaller across flats dimension that results in a lighter-weight nut with the same strength as the heavy hex variety. These are considered as one-way because they can only be installed one way - top up. Since they are all-metal, they are more resistant to higher temperatures and chemical exposure than non-metallic lock nuts (such as nylon insert lock nuts). They maintain their locking strength through approximately 15 removals and re-application. The temperature service limit for steel nuts is 550°F (450°F if zinc or cadmium plated). The temperature service limit for 18-8 stainless steel nuts with no additional finish is 850°F. They have far better resistance to vibration resistance compared to other lock nuts and do not gall threads.

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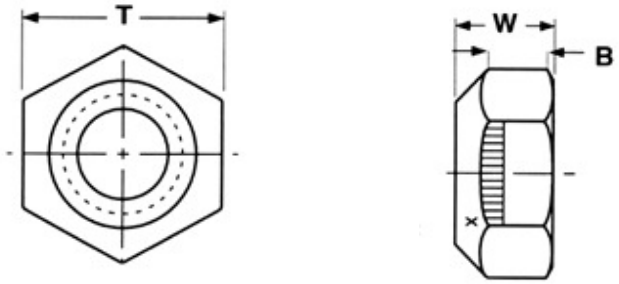
GRADE C STOVER EQUIVALENT LOCK NUTS (automation lock nut)



Nominal Size in Inches	T			W		B
	Width Across Flats			Overall Thickness		Hex Height
	Nom	Max	Min	Max	Min	Min
1/4	7/16	0.4385	0.428	0.226	0.212	0.145
5/16	1/2	0.5020	0.489	0.273	0.258	0.166
3/8	9/16	0.5645	0.551	0.337	0.32	0.198
7/16	11/16	0.6895	0.675	0.385	0.365	0.223
1/2	3/4	0.7520	0.736	0.448	0.427	0.262
9/16	7/8	0.8770	0.861	0.496	0.473	0.286
5/8	15/16	0.9395	0.922	0.559	0.535	0.329
3/4	1-1/8	1.1270	1.088	0.665	0.617	0.382
7/8	1-5/16	1.3145	1.269	0.776	0.724	0.45
1	1-1/2	1.5020	1.45	0.887	0.831	0.513

Description: A one piece all metal prevailing torque type hex lock nut with a conical top with chamfered corners. The resistance to loosening forces is created by a controlled distortion in the top threads from their normal helical form to a more elliptical shape. These are considered as one-way because they can only be installed one way - top up. Since they are all-metal, they are more resistant to higher temperatures and chemical exposure than non-metallic lock nuts (such as nylon insert lock nuts). Grade-GT Flange Style Automation Lock Nut: Similar to Grade-C but with a flange on the bottom side of the nut.

Grade-C: These nuts are reusable and can withstand temperatures of up to 450^0F. Can withstand severe vibration and shock loads. Grade-GT has a lower, more uniform bearing stress to clamp force ratio due to the flange. Furthermore lowers cost by eliminating the need for a washer. It is designed specifically for, but not exclusively with grade-8 frame bolts.

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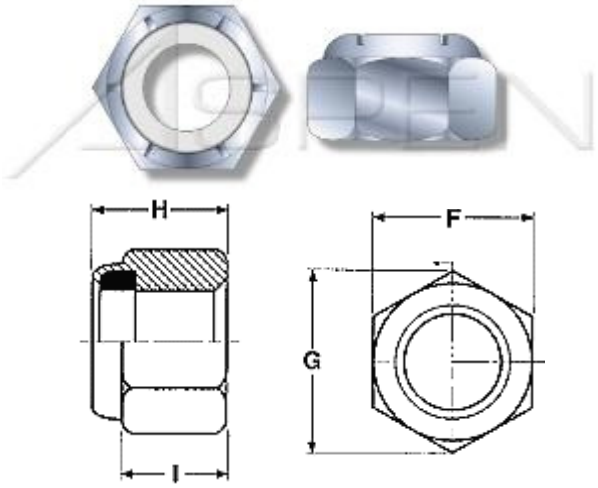
NYLON INSERT LOCK NUTS



Nominal Size or Basic Thread Diameter		ESNA Part Numbers				F			H		I	G
		Steel, Zinc-plate		Stainless		Width Across Flats			Thickness		Side Height	Width Across Corners (Ref)
		Coarse	Fine	Coarse	Fine	Basic	Max	Min	Max	Min	Ref	
2	0.0860	21NM-26		79NM-26		1/4	0.251	0.243	0.153	0.133	0.081	0.268
3	0.0990	21NM-38		79NM-38		1/4	0.251	0.243	0.153	0.133	0.081	0.268
4	0.1120	21NM-40	--	79NM-40	--	1/4	0.251	0.243	0.153	0.133	0.081	0.268
5	0.1250	21NM-50	--	--	--	1/4	0.251	0.243	0.153	0.133	0.081	0.268
6	0.1380	21NM-62	--	79NM-62	--	5/16	0.313	0.305	1.880	0.168	0.103	0.339
8	0.1640	21NM-82	--	79NM-82	--	11/32	0.345	0.336	0.239	0.219	0.140	0.374
10	0.1900	21NM-04	21NM-02	79NM-04	79NM-02	3/8	0.376	0.367	0.249	0.229	0.140	0.410
12	0.2160	21NM-124	21NM-128	79NM-124		7/16	0.439	0.430	0.328	0.298	0.225	0.482
1/4	0.2500	21NE-040	21NE-048	79NE-040	--	7/16	0.439	0.430	0.328	0.298	0.225	0.482
5/16	0.3125	21NE058	21NE-054	79NE-058	--	1/2	0.502	0.492	0.359	0.290	0.250	0.552
3/8	0.3750	21NE-066	21NE-064	79NE-066	--	9/16	0.564	0.553	0.468	0.438	0.335	0.622
7/16	0.4375	21NE-074	21NE-070	--	--	11/16	0.627	0.616	0.468	0.438	0.324	0.698
1/2	0.5000	21NM-083	21NE-080	79NE-083	--	3/4	0.752	0.741	0.609	0.579	0.464	0.837
9/16	0.5625	21NM-092	21NE-098	--	--	7/8	0.877	0.865	0.656	0.626	0.469	0.978
5/8	0.6250	21NE-101	21NE-108	79NE-108	--	15/16	0.940	0.928	0.765	0.735	0.593	1.051
3/4	0.7500	41NE-120	41NE-126	79NE-120	--	1-1/8	1.064	1.052	0.890	0.860	0.742	1.191
7/8	0.8750	41NE-149	41NE-144	--	--	1-5/16	1.252	1.239	0.999	0.969	0.790	1.403
1	1.0000	41NE-168	41NE-164	--	--	1-1/2	1.440	1.427	1.078	1.016	0.825	1.615
1 1/8	1.1250	41NE177	--	--	--	1-11/16	1.627	1.614	1.203	1.141	0.930	1.826
1 1/4	1.2500	41NE-197	41NE-202	--	--	1-7/8	1.815	1.801	1.422	1.360	1.125	2.038
1 1/2	1.5000	41NE-242	--	--	--	2-1/4	2.197	2.159	1.640	1.578	1.313	2.444

Description: Nylon insert torque prevailing type lock nuts contain a captive (permanent) undersized nylon (or other polymer) insert that grips the mating threads when tightened and generates the prevailing torque. The nylon insert also dampens vibration between the bolt and nut further securing the mated components and provides a gas and moisture seal. Because the threads of the mating bolt deform but do not cut into the nylon so nylon insert lock nuts may be re-used a limited number of times. These nuts are considered one-way lock nuts because they can only be installed one-way—top up. Unlike all-metal nuts, the nylon insert limits the use at elevated temperatures or when exposed to certain chemicals.

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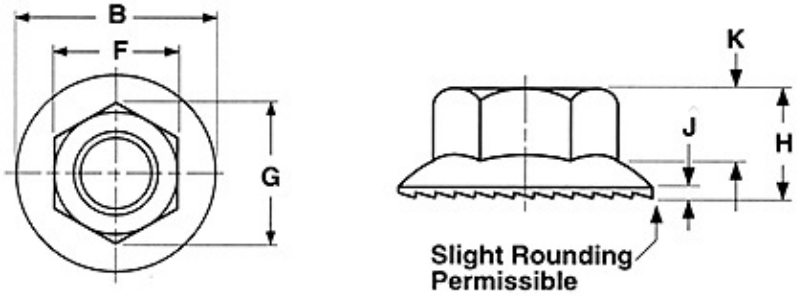
2- Surface-Bearing Lock Nuts:

SERRATED FLANGE LOCK NUTS



Nominal Size or Basic Major Dia or Thread		F		G		B		H		K	J
		Width Across Flats		Width Across Corners		Flange Diameter		Nut Thickness		Wrench	Flange
		Max	Min	Max	Min	Max	Min	Max	Min	Length(Min)	Thick(Min)
4	0.1120	0.2500	0.2410	0.2890	0.2750	0.3860	0.3700	0.1600	0.1470	0.10	0.02
6	0.1380	0.3120	0.3020	0.3610	0.3420	0.4220	0.4060	0.1710	0.1560	0.10	0.02
8	0.1640	0.3440	0.3340	0.3970	0.3810	0.4690	0.4520	0.2030	0.1870	0.13	0.02
10	0.1900	0.3750	0.3650	0.4330	0.4160	0.5000	0.4800	0.2190	0.2030	0.13	0.03
12	0.2160	0.4380	0.4280	0.5050	0.4880	0.5940	0.5740	0.2360	0.2220	0.14	0.04
1/4	0.2500	0.4380	0.4280	0.5050	0.4880	0.5940	0.5740	0.2360	0.2220	0.14	0.04
5/16	0.3125	0.5000	0.4890	0.5770	0.5570	0.6800	0.6600	0.2830	0.2680	0.17	0.04
3/8	0.3750	0.5620	0.5510	0.6500	0.6280	0.7500	0.7280	0.3470	0.3300	0.23	0.04
7/16	0.4375	0.6880	0.6750	0.7940	0.7680	0.9370	0.9100	0.3950	0.3750	0.26	0.04
1/2	0.5000	0.7500	0.7360	0.8660	0.8400	1.0310	1.0000	0.4580	0.4370	0.31	0.05
9/16	0.5625	0.8750	0.8610	1.0100	0.9820	1.1880	1.1550	0.5060	0.4830	0.35	0.05
5/8	0.6250	0.9380	0.9220	1.0830	1.0510	1.2810	1.2480	0.5690	0.5450	0.40	0.05
3/4	0.7500	1.1250	0.1088	1.2990	1.2400	1.5000	1.4600	0.6750	0.6270	0.46	0.06
3/4	0.7500	1.1250	0.1088	1.2990	1.2400	1.5000	1.4600	0.6750	0.6270	0.46	0.06

Description: A one piece all-metal lock nut with a flanged bearing surface that increases the surface area substantially and has circular serrations radiating outwards. Unlike prevailing torque types, this bearing lock nut does not lock onto mating threads. It is a free spinning nut until the serrations contact and displace material on the mating surface upon tightening. Depending on surface finish, localized surface corrosion may occur. The serrations are designed not to interfere with the tightening of the nut, but once tightened against a bearing surface, the teeth produce a ratchet-type locking mechanism resistant to vibrational and other loosening forces. The serrated flange eliminates any need for a washer or lock washer. The increased flange size relative to the rest of the nut distributes the load over a greater area. Furthermore it is ideal for irregular or over-sized holes. Since they are all-metal, they are more resistant to higher temperatures and chemical exposure than non-metallic lock nuts (such as nylon insert lock nuts).
Material: Steel nuts are made from carbon steel conforming to the following chemical composition requirements--
Carbon: 0.47% max.; **Phosphorus**: 0.12% max.; **Sulfur**: 0.23% max; Stainless steel nuts are 18-8 Stainless steel.
Steel nuts are case hardened to the proper hardness to ensure the serrations will have sufficient gripping strength - Rockwell HR15N 78 - 90

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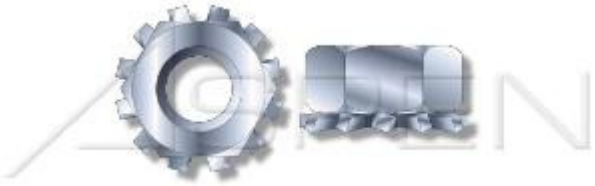
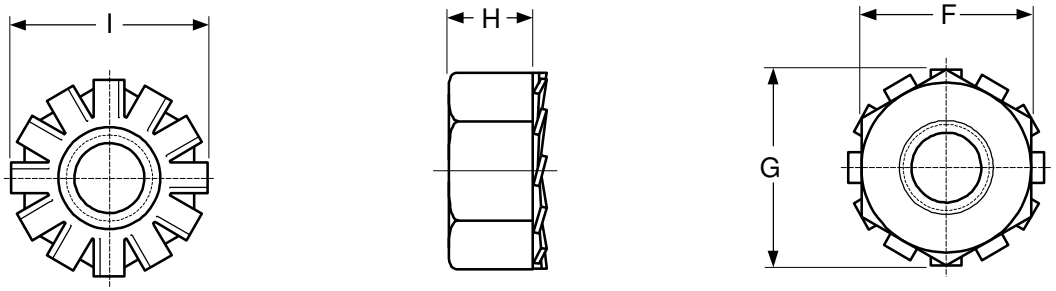
K-LOCK (KEPS) LOCK NUTS





Nominal Size or Basic Thread Dia.		F			G		H		I	
		Width Across Flats			Width Across Corners		Thickness		Washer Dia.	
		Basic	Max	Min	Max	Min	Max	Min	Max	Min
4	0.112	1/4	0.2500	0.2410	0.2890	0.2750	0.0980	0.0870	0.2860	0.2770
5	0.125	5/16	0.3120	0.3020	0.3610	0.3440	0.1140	0.1020	0.3480	0.3380
6	0.138	5/16	0.3120	0.3020	0.3610	0.3440	0.1140	0.1020	0.3480	0.3380
6 SP	0.138	1/4	0.2500	0.2410	0.2890	0.0275	0.0980	0.0870	0.2870	0.2770
8	0.164	11/32	0.3440	0.3320	0.3970	0.3780	0.1300	0.1170	0.3810	0.3700
8 SP	0.164	5/16	0.3120	0.3020	0.3610	0.3440	0.1140	0.1020	0.3480	0.3380
10	0.190	3/8	0.3750	0.3620	0.4330	0.4130	0.1300	0.1170	0.4060	0.3950
12	0.216	7/16	0.4380	0.4230	0.5050	0.4820	0.1610	0.1480	0.5060	0.4940
1/4	0.250	7/16	0.4380	0.4230	0.5050	0.4820	0.1930	0.1780	0.5060	0.4940
5/16	0.313	1/2	0.5000	0.4890	0.5770	0.5570	0.2730	0.2580	0.5920	0.5790
3/8	0.375	9/16	0.5620	0.5510	0.6500	0.6280	0.3850	0.3650	0.6650	0.6510
1/2	0.500	3/4	0.7500	0.7360	0.8660	0.8400	0.4370	0.4250	0.8980	0.8780

An all-metal hex nut pre-assembled with a free spinning lock washer, often external tooth. Unlike prevailing torque types, this bearing lock nut does not lock onto mating threads. Rather it is a free spinning nut that must be firmly tightened against a bearing surface so the teeth of the lock washer can bite into the surface onto which it is being tightened. It is the washer that resists vibrational loosening forces. Depending on surface finish, localized surface corrosion may occur as the lock washer bites into and removes the surface treatment. Since they are all-metal, they are more resistant to higher temperatures and chemical exposure.

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Key Considerations When Choosing Specific Styles of Lock Nuts:

- Select the correct lock nut for the specific task at hand
- Good design ensures savings in the long run
- Re-use (need to disassemble/reassemble components)
- Localized corrosion - (Surface finish onto which the nut is tightened)
- Length of thread exposure (top-lock vs center-lock)
- Exposure to chemicals
- Exposure to extreme temperatures
- Size and shape of hole

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If you don't see what you are looking for, please contact us and we'll be happy to help you find what you need.

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