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FASTENERS

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Service News

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NUTS, BOLTS, AND SCREWS

Back in 1959 (*Service News* issue number 18) we ran a feature article on Common Bolts and Screws which was inspired by interest and requests resulting from an article we did back in 1958 (*Service News* issue number 9) on Screwdrivers. Even more interest and more requests resulted from the article on Common Bolts and Screws, and as a result we have in this issue another follow-up article on the subject of fasteners.

As a mate to the bolt and screw chart in issue number 18, we are including in this issue a large chart depicting and describing most of the nuts used on the C-130. And we have included a small chart showing which of the lighter, general usage NAS 1291 nuts replace which NAS 679 nuts (these essentially replaced the old nylon and fiber lock nuts a few years back).

In addition, in previous issues, we've also covered Helicoil Inserts and Paneloc Fasteners (issues 22 and 8, respectively).

This brings us up to our question: where do you want us to go from here? If you have a particularly troublesome problem associated with fasteners (or anything else for that matter), ask a Lockheed representative to pass the word along to us, or write to:

Editor, Service News Magazine
Customer Service Division
Lockheed-Georgia Company
Marietta, Georgia

contents

FASTENERS

One of the rewards of being a mechanic is being able to report new developments that prompt others to comment, "What will they think of next." For obvious reasons, in the aircraft and missiles field, a major emphasis today is being placed on making components lighter and smaller, without loss—and whenever possible with increase—in integrity.

The trends in this direction have been most impressively evident in electronics, where lighter, smaller, and more rugged transistors have replaced electron tubes in many applications. (Incidentally, you can now purchase a dummy cabinet for your compact transistor portable radio to make it look like the larger old-fashioned table models.)

Though it usually fails to be mentioned, these same trends have been taking place in the development of lighter and smaller fasteners which are stronger and more resistant to the new hazards created by high performance operations.

Let's take a look at one category of nuts that has gone through a period of design improvement. For years, fiber and nylon self- locking nuts were among the most commonly used fasteners in applications requiring vibration resistance and high prevailing torque. Then along came NAS 679 nuts which are lighter and smaller, yet able to meet or better all requirements applied to self-locking nuts. They raised the temperature applications from 250°F to 500°F, for example.

NAS 679 to NAS 1291

Now, the lighter and more efficient NAS 1291 nut is replacing the NAS 679 nut. The two are quite different in appearance, and they even require different size wrenches for the same thread size. You use a 1/4-inch wrench on NAS679A04W (which is a number 4 nut), for example, but you use a 5/32-inch wrench on NAS1291-04 (also a number 4 nut). Carrying this still further, the former is 4½ times heavier than the latter.

MOST COMMONLY USED NUTS

THESE ARE INTERCHANGEABLE IN MOST APPLICATIONS. BOTH ARE SELF-LOCKING ALL-METAL CONSTRUCTION.

STANDARD THREAD SIZE	LATEST AND LIGHTEST  NAS 1291	 NAS 679
4-40	NAS 1291-04 5/32 WRENCH	NAS 679A04W 1/4 WRENCH
6-32	NAS 1291-06 3/16 WRENCH	NAS 679A06W 5/16 WRENCH
8-32	NAS 1291-08 7/32 WRENCH	NAS 679A08W 11/32 WRENCH
10-32	NAS 1291-3 1/4 WRENCH	NAS 679A3W 3/8 WRENCH
1/4-28	NAS 1291-4 5/16 WRENCH	NAS 679A4W 7/16 WRENCH
5/16-24	NAS 1291-5 3/8 WRENCH	NAS 679A5W 1/2 WRENCH
3/8-24	NAS 1291-6 7/16 WRENCH	NAS 679A6 9/16 WRENCH
7/16-20	NOT AVAILABLE	NAS 679A7 11/16 WRENCH

THESE PART NUMBERS ARE FOR STEEL CADMIUM PLATED NUTS WITH DRY FILM LUBRICANT AND ARE USED AT MAX TEMPERATURES OF 500° FAHRENHEIT.

THESE NUTS REPLACE AN363 TYPE IN MOST APPLICATIONS.

SEE THE LARGE NUT IDENTIFICATION CHART FOR OTHER EXAMPLES.

We have included a chart on this page which tells you which NAS 1291 nut replaces which NAS 679. You will notice in the pictures of the two types of nuts, that there are even two entirely different looking NAS 1291 nuts. One has the conventional hex head while the other has a hex head with flutes between the points.

Here, at least, the situation is less complicated than appearances indicate. Both nuts require the same wrench. No special tool is required to mate with the flutes. The flutes are there merely because excess weight was trimmed off.

Limitations

Many different factors limit a nut's applications. A fiber or nylon locking device, for example, limits the temperature applications of a nut. There are many nuts which include these types of locking devices, but all NAS 679 and NAS 1291 nuts use an out-of-round or crimped top as a locking device.

In this connection, we should like to mention that when these nuts were first put into production, some were manufactured with too much crimp in the top. It is probable that very few, if any, of these are still lying around in stock, but if one should be used it can easily chew up a screw or stud. And this is one of those many cases where there is no substitute for experience in protecting against damage to equipment. If you should start to install a nut of this type and find that it feels too tight, back it off and discard it.

The mere fact that NAS 679 and NAS 1291 nuts do not have fiber or nylon locking devices does not release them for unlimited high-temperature applications. Their temperature limitations are based on the alloys of which they are made and the finishes they have applied.

Carbon or alloy steel nuts with finishes of molybedum disulfide or cadmium plate are limited to applications where temperatures never exceed 500° F. Nuts such as NAS 679C (which are made of corrosion resistant steel, a cousin to stainless steel) may be used for higher temperature applications up to 800° F. The usual silver plate finish on these nuts serves as a lubricant to prevent seizure.

But it does not follow that you can always play it safe by using the higher temperature nut. There is the comparative cost of the nuts for one thing. Also important are other limitations on the nuts. In the steel varieties, for instance, only unlubricated cadmium plated nuts are to be used under sealant inside the fuel tanks. No other finish for steel nuts equals the ability of cadmium plate to adhere to sealant.

The same general usage restrictions apply to NAS 1291 nuts as were applied to its predecessors. Do not use ¼-inch or smaller NAS 1291 nuts (or other self-locking nuts for that matter) on drilled screws or studs.

Also, fifteen times on and off is the maximum for any one nut. The new locking method causes more wear on the opposing threads than was caused by nylon or fiber inserts, so the screw or stud also should receive some additional attention. In some instances, corrosion has resulted where the finish was rubbed off the screw by the locking device on the nut. Replacement of the screw usually will be in order whenever this is evident.

Bolt and Thread Lengths

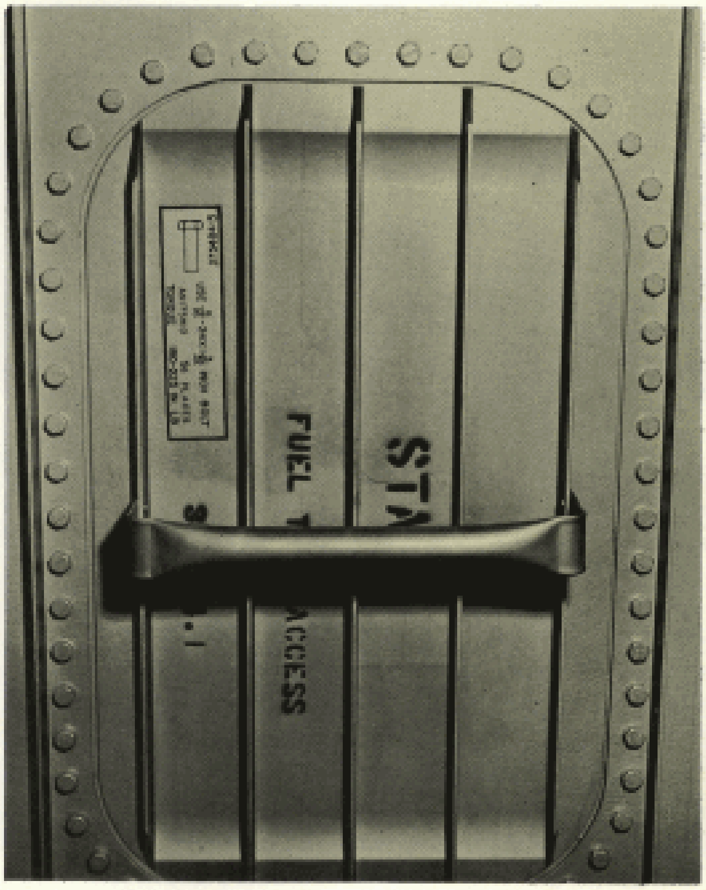
As a part of the overall weight savings program, more critical length bolts and screws and shorter thread-lengths are being used with these new nuts. The minimum thread protrusion through nuts to assure satisfactory self-locking is a full chamfer, if there is one, or 1/32 inch if the bolt or screw isn't chamfered.

There is no all inclusive rule covering the maximum length of the protrusion. As this is not consistent with the weight-savings program, new bolts in more critical lengths are being made to ensure against excessive protrusion. And to ensure that this end is not defeated by the use of longer bolts than are specified, shorter thread lengths are being provided. All of this is well and good if the nut is sitting out in plain view. If the bolt is too short, it will not protrude. If it is too long, the unthreaded shank will bottom into the nut before the bolt is secured.

Dome Nuts

There are, however, a large number of self-sealing anchor nuts on the C-130. With these, the dome enclosure rather severely limits the screw length, and you can't look inside to judge the protrusion.

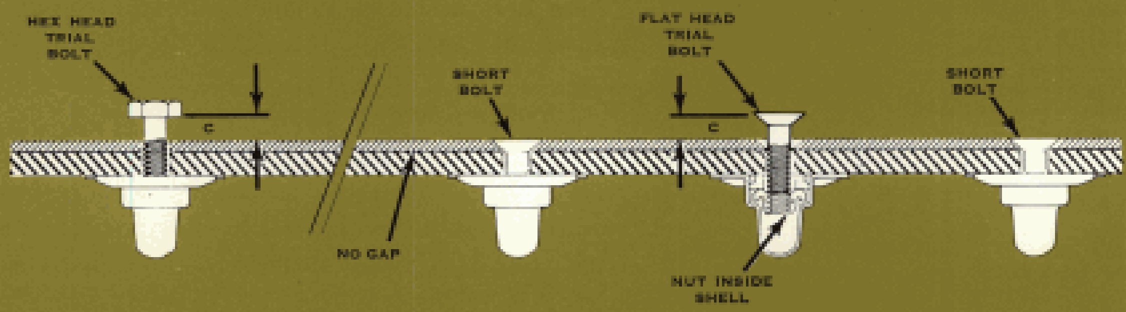
As a general rule there are decals or stencils in the vicinity of the dome nuts calling out the correct bolt or screw for each application. At those locations not



Decal on access panel shows bolt requirements. Here dome nuts are fastened to the removable panel.

marked in this manner, one solution is to reuse each screw in the same hole from which it was removed. This will take quite a bit of tagging and marking, but it will be worth it when you consider that due to varying material thicknesses (not apparent externally) several holes in a row may require different screw lengths.

There is an alternate solution, however. If there is some doubt about the proper length of bolt or screw



BE SURE TO USE THE CORRECT CHART

USE CHART A FOR SERIES NAS517 OR NAS 585 (LONG THREAD) SCREWS AS USED AROUND WING UPPER SURFACE (TANK) INSPECTION HOLES.

CHART A

THREAD SIZE		10-32	1/4-28	5/16-24
DIM C	MIN MAX	0.206 0.269	0.246 0.309	0.345 0.408

USE CHART B FOR SERIES NAS464, NAS623, NAS1103 THRU NAS1106, AND NAS1203 THRU NAS1206.

CHART B

THREAD SIZE		10-32	1/4-28	5/16-24
DIM C	MIN MAX	0.188 0.250	0.219 0.282	0.266 0.328

and the verifying must be done on the job, there is a reliable method which experienced mechanics have been using successfully for some years.

As shown in the illustration on this page, use screws on each side of the nut in question to draw out any misleading gap between the faying surfaces. Unless one or both of these screws are known to be the right length, use screws known to be a little short and tighten just enough to eliminate the gap, taking special care not to strip out the few threads engaged.

In the open hole between these screws, drop a trial screw and measure the distance "C" as shown in the illustration. Be sure the first thread of the screw contacts the first thread of the nut.

Compare your measurement of distance "C" to the table accompanying the illustration to determine if you have the proper screw length. A template measured and marked with dimension "C" would be a great timesaver as you will need to check this measurement numerous times as the work progresses.

The consequences of using the wrong length screw with a dome nut are quite severe. If a short threaded screw is too long, the threads will bottom out against the nut and you stand a good chance of twisting the nut free within the dome enclosure. A long threaded screw which is too long will bottom against the dome enclosure and possibly break the seal.

A screw that is too short will not lock properly, and will strip threads during installation or come loose and back out after the airplane is returned to service.

A couple of other reminders. Don't push down so hard on the screw that the seal is broken between the nut and the inside surface of the structure. And don't forget that all cross recess screws on the C-130 are Phillips type. If by chance you discover a Reed and Prince or Torq-Set, remove it and replace it with a Phillips head screw.

Dome nuts are used rather widely in the C-130. But there is one application in which they are used that requires some special attention. This is in the fuel tanks.

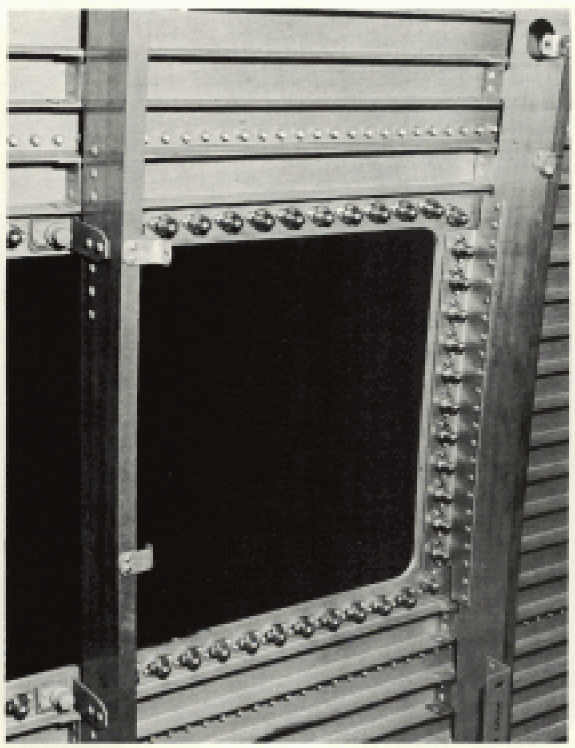
Should one of the dome nuts in the fuel tank need replacing, the procedure is about the same as for any nutplate, except for the sealing requirements. Some of these self sealing dome nuts require special rivets (Riv-O-Seal) with oversized heads and rubber O-rings used for installation. This is especially true on early airplanes; late serial C-130's use standard 3/32-inch diameter rivets.

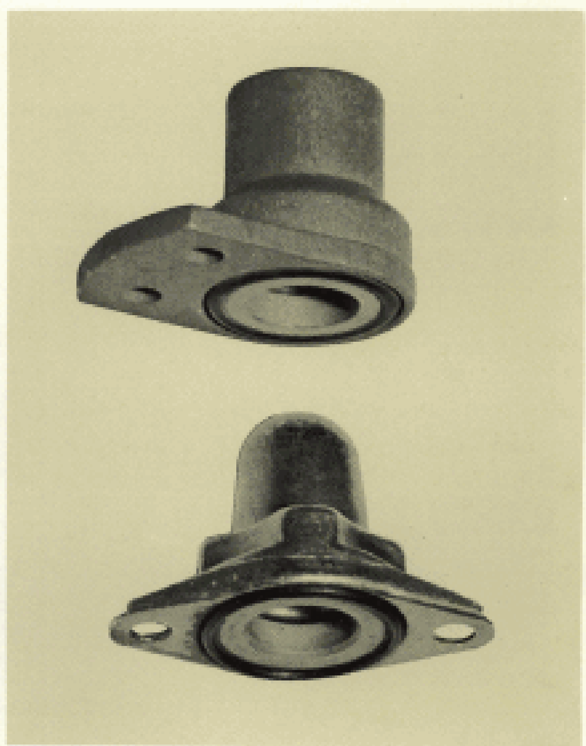
Either cadmium plated steel or anodized aluminum nuts, as specified, should be used in the tanks, because these are the only ones to which sealant will adhere satisfactorily. After the old dome nut has been removed, check the existing sealant around the immediate area. Remove any sealant that was in any way injured during removal of the nut. Using a wood or fiber scraper, carefully strip up the sealant for about ¼ inch around the area where the new nut plate will go. Then thoroughly clean the metal with TT-N-95 aliphatic naptha.

Use a clean, dry cellulose sponge, just barely dampened with naptha. And take care not to spread the naptha onto the remaining sealant. After the metal is thoroughly cleaned and dried, protect it from contamination of any sort until you are ready to replace the nut. Even a finger print could prevent the sealant from adhering to the metal and ultimately result in a leak.

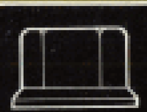
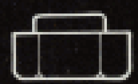
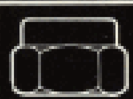
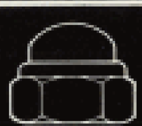
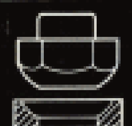
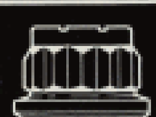
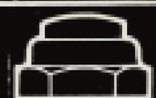
The nut plate also should be clean—that is to say, in new condition. Do not clean nut plate with naptha as this will damage the rubber gasket. One word of caution here, be sure the nut plate you use is not lubricated. Many nuts come from the factory with a dry film lubricant applied. These nuts are absolutely prohibited in the fuel tanks.

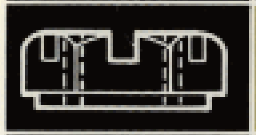
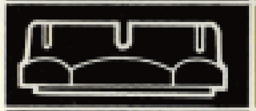
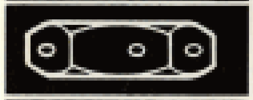
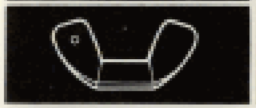
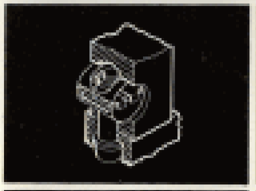
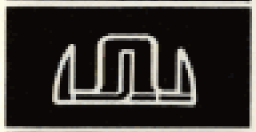
As mentioned previously, you can use either anodized aluminum or cadmium plated steel nuts depending on structural requirements. There has been a general rule in maintenance circles for years that you should not place dissimilar metals in contact with each other or galvanic corrosion might result. This rule does not apply in this case. There are several reasons, but the most important is that galvanic corrosion requires the presence of an electrolyte. And as these nuts are installed clean and dry, then sealed, there will be no electrolyte present to create an electrical flow.
(Continued on page 12)

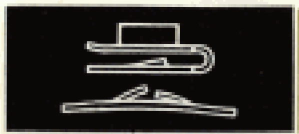
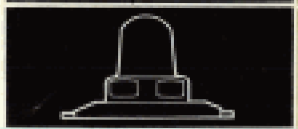
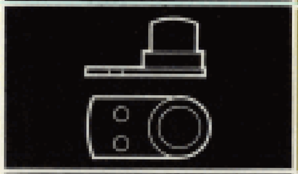
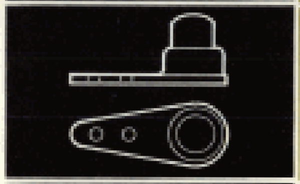
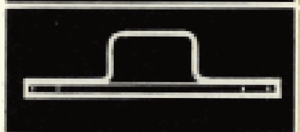
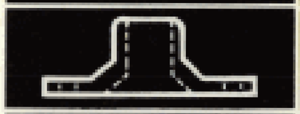
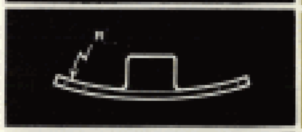
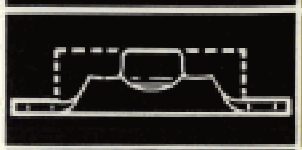
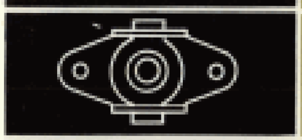
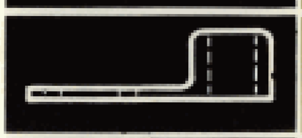


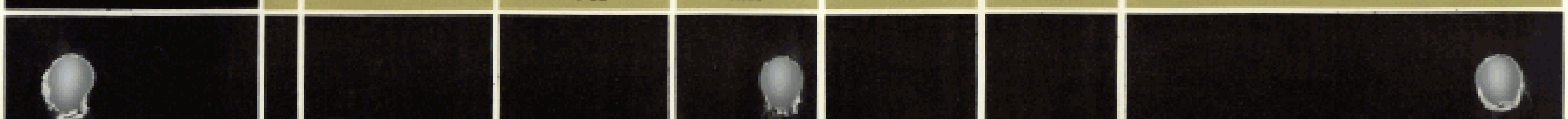


NUT IDENTIFICATION CHART

		PART NUMBER	SIZE & THREAD	MATERIAL	MAX TEMP °F	MAX TENSION 1000 PSI	REMARKS
	◆	NAS1291-04 NAS1291-6 NAS1291C4 NAS1291C4M NAS1291X4	4-40 3/8-24 1/4-28 1/4-28 1/4-28	SCP SCP CRES CRES SCP	500 500 800 500 500	125 125 125 125 125	GENERAL APPLICATIONS OF TENSION AND SHEAR—LIGHT WEIGHT ◆ "X" WHERE ADHESIVES ARE USED
	◆	NAS679A04W NAS679A7 NAS679C4W NAS679C4MW NAS679X4	4-40 7/16-20 1/4-28 1/4-28 1/4-28	SCP SCP CRES CRES SCP	500 500 500 500 500	125 125 125 125 125	GENERAL APPLICATIONS OF TENSION AND SHEAR ◆ "X" WHERE ADHESIVES ARE USED
		NAS1021B04 NAS1021B6 NAS1021A8 NAS1021C12 NAS1022A20	4-40 3/8-24 1/2-20 3/4-16 1-1/4-12	SCP SCP SCP CRES SCP	250 250 500 800 500	NA NA 125 125 NA	SCP NONSTRUCTURAL & NONMAGNETIC—NYLON LOCK GENERAL APPLICATIONS OF TENSION AND SHEAR IN SIZES NOT AVAILABLE IN NAS1291 NAS1022 SHEAR ONLY—AN23 TYPE BOLTS
		MS20500-1032 MS20500-820	10-32 1/2-20	CRES CRES	1200 1200	NA NA	CRES TYPE 347 USE ONLY WITH CRES BOLTS OR SCREWS
		22K1-62 22K1-054	6-32 5/16-24	SCP SCP	250 250	125 125	CAP NUTS
	 ★ ◆	52LH2935-02 52LH2935-054 12NE2935-064 2935-0 (-06)	10-32 5/16-24 3/8-24 ALL	SCP SCP SCP SCP	500 500 250 500	145 145 145 145	FOR MISALIGNMENT UP TO 8° ★12NE = NYLON LOCK ◆BASE FOR ABOVE
		57555-428 57555-2412	1/4-28 1-1/2-12	SCP SCP	500 500	220 220	HIGH TENSION APPLICATIONS WITH BOLTS MS20004 THRU MS20020
		52NKTE-054	5/16-24	NA	NA	NA	NYLON CAP—ELECTRICAL
		AN310-3 AN310-20	10-32 1-1/4-12	SCP SCP	500 500	125 125	USE WITH AN3 TYPE BOLTS—NOT WITH SHEAR BOLTS OF AN23 TYPE

		AN320-3 AN320-20	10-32 1-1/4-12	SCP SCP	500 500	NA NA	USE WITH SHEAR BOLTS OF AN23 TYPE
		MS21025-16 MS21025-39	1"-16 2.4375" —16	SCP SCP	500 500	NA NA	FOR BEARING RETAINING
		NAS509-4 NAS509-24	1/4-28 1-1/2-12	SCP SCP	500 500	NA NA	USE WITH NAS513 KEYED WASHER AS WITH ROD END TERMINALS HYD CYL
	◆ ◆ ★* ★	AN340-4 AN345-10 AN316-4R AN316-16R AN345C10 AN345B10	4-40 10-32 1/4-28 1"-14 10-32 10-32	SCP SCP SCP SCP CRES BRASS	500 500 500 500 800 800	NA NA NA NA NA NA	PLAIN NUTS—NOT SELF LOCKING ◆ AN340 & AN345 NONSTRUCTURAL * AN316 FOR SHEAR OR JAMB ONLY AN315 (NOT SHOWN) INCREASED HEIGHT ★ "R" = RH THREAD; "L" = LH THREAD
		MS25082-7 MS25082-8 MS25082-10	3/8-32 15/32-32 5/8-18	SCP SCP SCP	500 500 500	NA NA NA	FOR MOUNTING ELECTRICAL EQUIPMENT NOT SELF LOCKING
		52-1650-02 52-1650-048	8-32 1/4-28	SCP SCP	250 250	125 125	USE WHERE DOUBLE FLUSH IS REQ AS WITH WINDSHIELDS
		AN350-832 AN350-8 AN350-B5	8-32 1/2-20 1/2-20	SCP SCP BRASS	500 500 500	50 50 NA	WING NUT—NOT SELF LOCKING
	 ◆ * ★ ■	2752-048 2752-108 2752-126 2752-202 LS4893-4(-20) 12-4237-108 2452-126 2452-126RET	1/4-28 5/8-18 3/4-16 1/4-12 ALL 5/8-18 3/4-16 NA	SCP SCP SCP SCP SCP NA NA NA	250 250 250 250 500 NA NA NA	160 160 160 160 NA NA 100 NA	BARREL NUTS—SELF LOCKING HEAVY STRUCTURAL APPLICATIONS ◆RETAINERS—AS REQUIRED * NOT SELF LOCKING—FLOATING ★NONFLOATING ■ RETAINER
		56-56310	10-32	SCP	500	NA	NONSTRUCTURAL—USE WITH WOOD
		NAS407-13 NAS407-21 A6939-1032-24A	6-32 6-32 10-3	SCP SCP SCP	500 500 500	NA NA NA	FOR FRONT MOUNTING OF INSTRUMENTS "T" = 0.062 "T" = OVER 0.375 "T" = 0.125

		A1953-6Z-1 A1161-6Z-1 A1779-10Z-1	6Z 6Z 10Z	SP ST SP ST SP ST	400 400 400	NA NA NA	LIMITED APPLICATIONS—SCREWS MUST BE SELF-TAPPING PARKER-KALON TYPE Z
		A2502-02 A2502-045 F1960-5 FSN-5310-920-5696	10-32 1/4-28 5/16-24	SCP SCP SCP	225 225 225	NA NA NA	SELF SEALING - FLOATING NUT - SELF LOCKING. USE IN FUEL OR CABIN PRESSURE SEAL APPLICATIONS.—SCP SHELL
		A2507-02 A2507-045 A2507-054	10-32 1/4-28 5/16-24	SCP SCP SCP	225 225 225	NA NA NA	SELF SEALING—FLOATING NUT—SELF LOCKING SEE APPLICATION ABOVE ANODIZED ALUM SHELL
	 ◆	22NA17K3-02 T125032K MT125032K1	10-32 8-32 8-32	SCP SCP SCP	250 NA NA	NA NA NA	CAPPED NONFLOATING NUT ◆ MT = REDUCED RIVET SPACING
	 ★ ★	NAS680A04 NAS680A06K NAS680A6 NAS680C04 NAS680C6K	4-40 6-32 3/8-24 4-40 3/8-24	SCP SCP SCP CRES CRES	500 500 500 800 800	125 125 125 125 125	SELF LOCKING—TWO LUG PLATE ★ "K" = CSK RIVET HOLES
	 ★ ★	NAS681A08 NAS681A4K NAS681C3K	8-32 1/4-28 10-32	SCP SCP CRES	500 500 800	125 125 125	SELF LOCKING—TWO LUG PLATES 100° CSK: USED UNDER DIMPLES ★ "K" = CSK RIVET HOLES
		LS4993F06-2 LS4993G3-3 LS4993J3-4 LS4993K3-10	6-32 10-32 1/4-28 10-32	SCP SCP SCP SCP	500 500 500 500	125 125 125 125	LUGS UP AS ILLUSTRATED . . . . R = 1 LUGS UP 100° CKS . . . . R = 1,500 LUGS DOWN . . . . R = 2 LUGS DOWN 100° CSK . . . . . . R = 5 FOR MATERIAL SEE NAS680 & NAS681
	 ★ ◆ ◆	NAS686A06 NAS686A6 NAS686C06K NAS686C6 NAS1068A08 NAS1068C4	6-32 3/8-24 6-32 3/8-24 8-32 1/4-28	SCP SCP CRES CRES SCP CRES	500 500 800 800 800 800	125 125 125 125 125 125	USE FOR SHEAR & TENSION WHERE A FLOATING NUT IS REQUIRED ★ "K" = CSK RIVET HOLES ◆ REDUCED RIVET SPACING
		12LHA2932-22-02	10-32	SCP	NA	NA	LARGE BOLT HOLE TO RECEIVE DIMPLE
	 ★ ◆ ◆	NAS682A06 NAS682A7 NAS682C5K NAS696A04 NAS696C06	6-32 7/16-20 5/16-24 4-40 6-32	SCP SCP CRES SCP CRES	500 500 800 500 800	125 125 125 125 125	ONE LUG—SELF LOCKING ◆ REDUCED RIVET SPACING ★ "K" = CSK RIVET HOLES



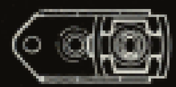
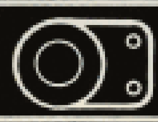
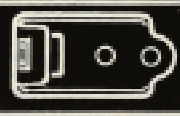
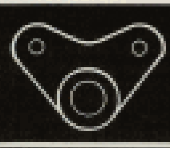
		PART NUMBER	SIZE & THREAD	MATERIAL	MAX TEMP °F	MAX TENSION 1000 PSI	REMARKS
	 ★ ★	NAS683A08 NAS683A5K NAS683C5K	8-32 5/16-24 5/16-24	SCP SCP CRES	500 500 800	125 125 125	100° CSK: USED UNDER DIMPLES ★ "K" = CSK RIVET HOLES
	 ★ ★	NAS687A06 NAS687A5K NAS687C5K	6-32 5/16-24 5/16-24	CSK CSK CRES	500 500 800	125 125 125	USE FOR SHEAR & TENSION WHERE A FLOATING NUT IS REQUIRED ★ "K" = CSK RIVET HOLES
	 ★ ★	NAS1067A08 NAS1067A6K NAS1067C6K	8-32 3/8-24 3/8-24	SCP SCP CRES	500 500 800	125 125 125	REDUCED RIVET SPACING SELF LOCKING ★ "K" = CSK RIVET HOLES
		136R-62 136R-02 22A27-22-048 22A27-22-054	6-32 10-32 1/4-28 5/16-24	BCP BCP SCP SCP	500 500 250 250	NA NA NA NA	SELF LOCKING—USED WITH AN255 SCREWS FOR ATTACHING ELECTRICAL JUNCTION BOX COVERS
	 ★ * ★ *	NAS684A06 NAS684A7 NAS684C06K NAS684C7 NAS698A06 NAS698C5K	6-32 7/16-20 6-32 7/16-20 6-32 5/16-24	SCP SCP CRES CRES SCP CRES	500 500 800 800 500 800	125 125 125 125 125 125	SELF LOCKING—CORNER NUT PLATE ★ "K" = CSK RIVET HOLES * NAS698 = REDUCED RIVET SPACING
	 ★	NAS685A08 NAS685C5K	8-32 5/16-24	SCP CRES	500 800	125 125	SELF LOCKING CORNER NUT PLATE 100° CSK: USE UNDER DIMPLES ★ "K" = CSK RIVET HOLES
	 * *	NAS688P8-(◆) NAS688P16-(◆) NAS689P8-(◆) NAS689P20-(◆) NAS690P8-(◆) NAS690P20-(◆) NAS691P8-(◆) NAS691P20-(◆) 2201-064-J8-(◆) 2201-064-J10-(◆) G11-1032-8-(◆) G11-1032-20-(◆)	8-32 10-32 1/4-28 5/16-24 3/8-24 10-32 	SCP SCP SCP SCP SCP SCP 	200 200 200 200 200 200 200 200 200 200 200 200	125 125 125 125 125 125 125 125 125 125 125 125	USE AN426AD3 RIVETS TO ATTACH CHANNEL ALUM ALLOY CHANNEL ANODIZED CLAD OR BARE NUMBER BEFORE DASH IS NUT SPACING IN 1/8 INCH ◆ NUMBER AFTER DASH IS AMOUNT OF NUTS IN CHANNEL * 100° CSK: USE UNDER DIMPLE

CHART ABBREVIATIONS

SCP	STEEL CADMIUM PLATE	CRES	CORROSION RESISTANT STEEL (USUALLY SILVER PLATED)	CSK	COUNTER SUNK	ELECT.	ELECTRICAL
BCP	BRASS CADMIUM PLATE			NA	NOT APPLICABLE	SP ST	SPRING STEEL

FASTENERS........ (*Continued from page 7*)

Sealing

Wait until after the nut has been installed before preparing the sealant. The sealing compound used in the tanks is a polysulfide type sealant conforming to Specification MIL-S-8802. There is a Class A for brush application and a Class B for sealing gun or spatula application.

Three brush applications of Class A sealant eliminate the need for using Class B sealant.

We would like to refer you to *Service News* issue number 6 and to T.O. 1C-130A-2-5 before you start any sealing. As emphasized in these publications, extreme care must be exercised in the maintenance of a clean sealing surface and in mixing the sealant,

Sealant kits (a base and an accelerator) should be mixed just prior to use. Mixing should be accomplished when the temperature is between 65°F and 90°F, and you should be absolutely sure to get a perfect blend without a trace of discoloration.

After the nut plate is installed, brush a fillet around the faying surface. Allow this to cure. Then apply an overcoating of the same sealant. Again allow sufficient time for curing, and apply another coat. Three coats are necessary for complete protection against leaks and corrosion.

After the last coat of sealant has cured so that there is no stickiness, apply a coat of Buna-N (Specification MIL-S-4383) over the area. Overlap the old sealant for a distance up to several inches.

At normal temperatures, Buna-N sets up in about 30 minutes, but you can speed up the setting with a heat lamp. It is vital that the Buna-N be set before fuel is added to the tanks. Otherwise, the Buna-N will wash off, and the sealant will be left unprotected.

Nut Identification Chart

The large chart included in this issue is intended as a reference for the identification of those nuts most commonly used on the C-130. It was designed as a follow-on to the chart, in *Service News* issue number 18, listing bolts and screws most commonly used on the C-130. Actually we have gone somewhat beyond the *most commonly used* concept and have included almost all acceptable nuts except those special nuts specified for limited applications.

This chart is organized on the assumption that you ordinarily will know what the nut you want looks like and will be seeking a part number along with application and usage information. Thus we elected not to use an alphabetical-numerical arrangement, but in anticipation of saving the most time most of the time, we have grouped the nuts according to similarity and usage. There are some unavoidable exceptions which you will no doubt discover.

Within a particular series, the general approach we followed was to include: first, the part number of the smallest nut available in the series; second, the part number of the largest size available; and in addition, examples representative of the different materials and finishes available.

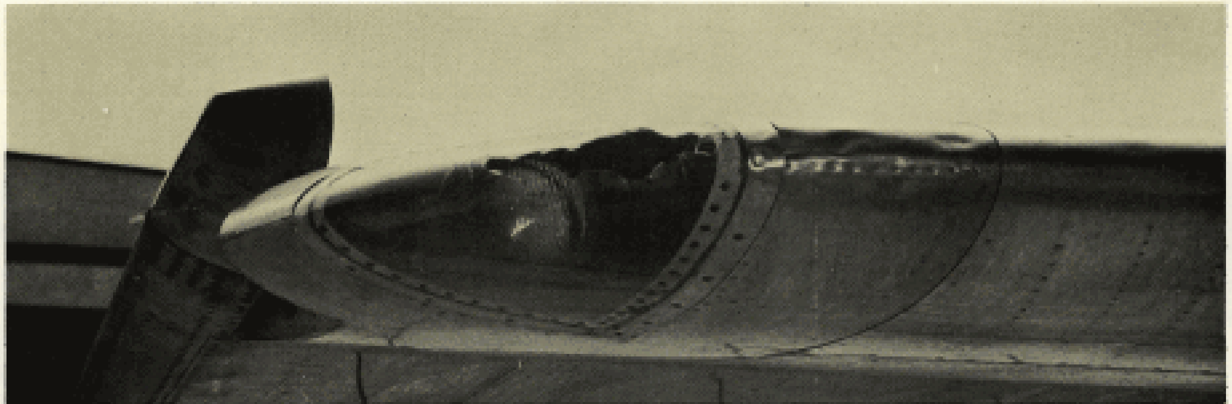
GENERAL:

Nuts of corrosion resistant steel are used only with bolts and screws of similar materials. This material is relatively nonmagnetic.

Nuts used in flight safety structural applications require individual magnetic particle inspection and are marked with green dye.

All nuts including fiber or nylon in their construction are limited to applications with a maximum temperature of 250°F.

Damaged projection weld plate nuts (not shown) may be replaced by corresponding plate nuts with holes. Drill out the welds to the proper size for standard rivets or screws required to attach the new nut plate.



HAIL DAMAGE

With the exceptions provided by several types of weather missions, you usually don't deliberately plan flights through hailstorms. Sometimes airplanes do get hit and damaged by hail, though.

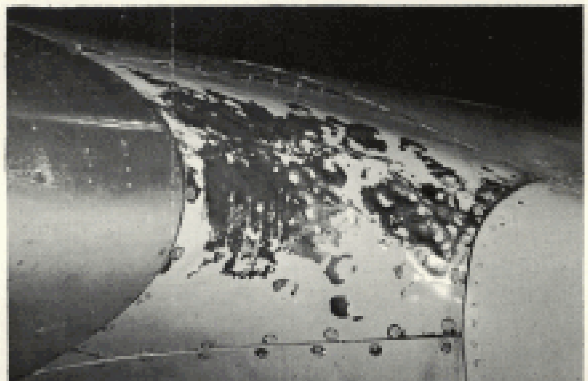
Recent relatively severe hailstone damage to a GV-1 Marine tanker resulted in the development of criteria for determining acceptable damage to empennage and wing leading edges.

These criteria are suggested as a guide to repair and replacement decisions.

Lockheed Engineering has determined that smooth, approximately round, local depressions are permissible without repair or replacement under the following provisions:

> Each depression can be no larger than one half the distance between the chordwise rows of leading edge rivets.
>
> The depressions can show no evidence of sharp bends or cracks.
>
> The depressions can be no closer, one to another, than one inch, edge to edge.
>
> The depressions can be no deeper than 0.080 inch as measured from the surface of a spline laid along the chordwise contour.

The spline should be made of plastic measuring 0.090 by 0.50 by 18 inches in thickness, width, and length, respectively. The thickness 0.090 inch, is the most critical dimension since this will give the right amount of flexibility.



GV-1 PHOTOGRAPHS COURTESY OF U. S. MARINE CORPS PHOTOGRAPHIC LABORATORY, M C A S, EL TORO, CALIFORNIA

The spline should be laid chordwise along the leading edge contour and bent to fit the contour. Measurement should be made from the inside edge of the spline to the deepest point in the hole. A carefully bent piece of .080 wire can be used for this measurement.

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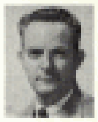

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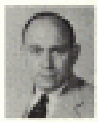

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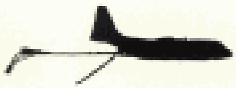
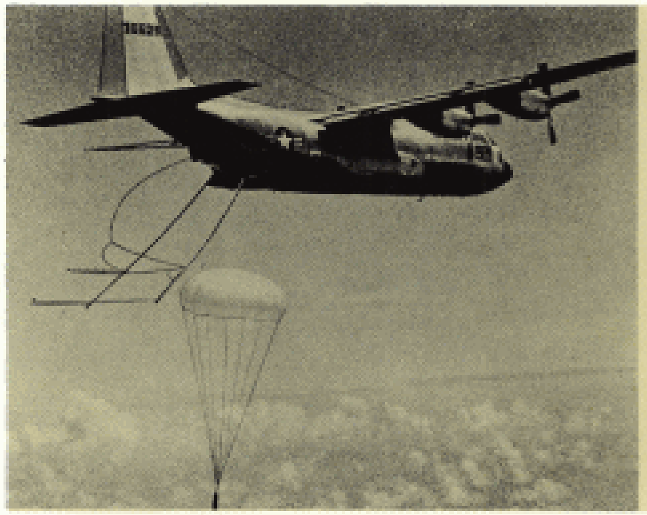


JC-130

The airplane on this issue's cover is the JC-130B, equipped with an Aerial Retrieval and Transport System. The C-130 equipped with this system is capable of catching a space capsule as it descends by parachute. Or the system can be employed in direct pickup of men or equipment from heavy seas or rough terrain.

During the flight to and from the pickup zone, the system is stowed in the cargo compartment. Upon approach to the object to be retrieved, the ramp is opened, and the system is extended to the catch



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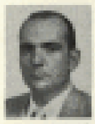

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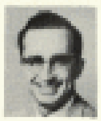

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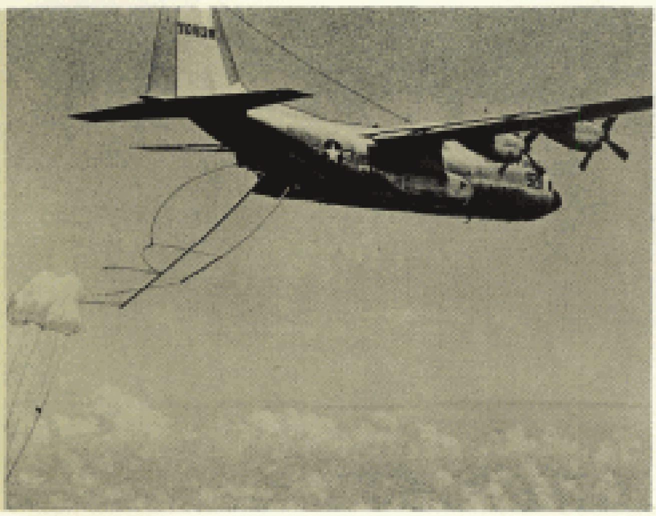

position. Airspeed is reduced to approximately 150 miles per hour for the catch.

In preparation for a ground or sea pickup, a nylon line attached to the catch is carried aloft by a balloon cluster. The snare loop of the retrieval system snatches the nylon line, and the catch is hauled aloft in a high parabolic arc—the almost vertical takeoff of the catch permits pickup from rough terrain or very tight places.

The pickup jolt to a man is less than that ordinarily experienced during the opening of a parachute.

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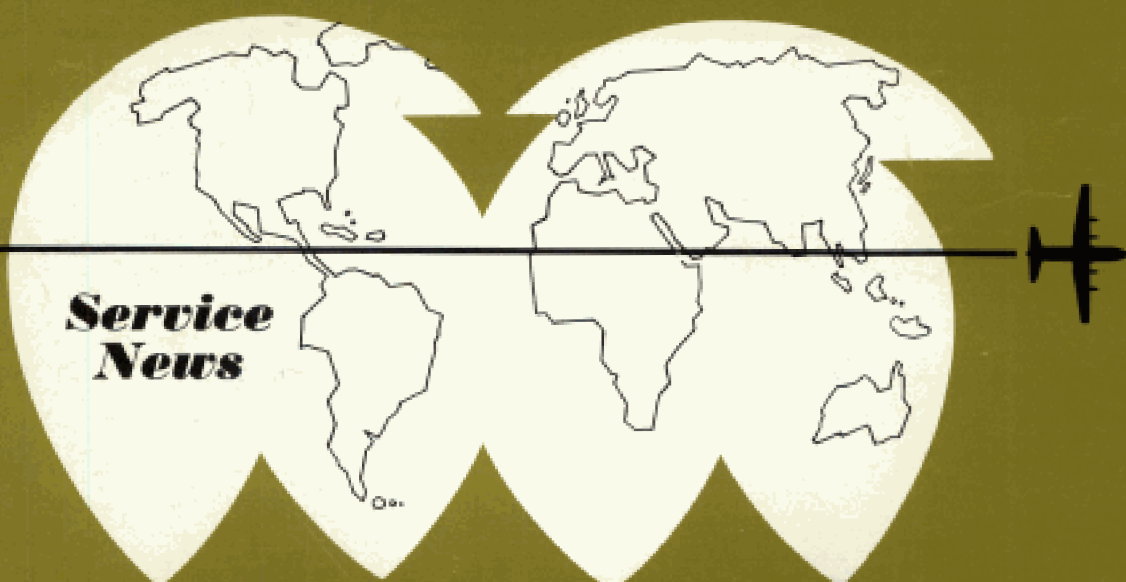

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