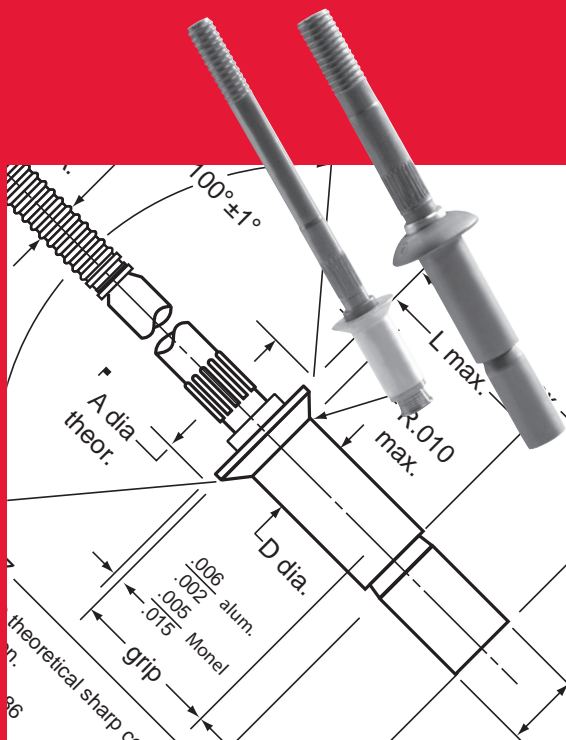


CHERRYLOCK® PROCESS MANUAL



CHERRY®
AEROSPACE



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ATTENTION: Blind fasteners are not always interchangeable with non-blind fasteners. Consult with the aircraft Original Equipment Manufacturer for proper application of this product.

CHERRYLOCK® RIVETS

BULBED CHERRYLOCK® RIVETS

The large blind head of this fastener introduced the word “bulb” to blind rivet terminology. Bulbed CherryLOCK® rivets are locked spindle and flush fracturing structural rivets. They conform to Procurement Specifications NAS1740 and Standards Pages NAS1738 and NAS1739. Bulbed CherryLOCK® rivets can be utilized in both thick and thin sheet applications.



Typical Maximum Grip Application

CHERRYLOCK® WIREDRAW RIVETS

Provides a wide range of sizes, materials and strength levels.

They conform to Procurement Specification NAS1400 and Standards Pages NAS1398 and NAS1399.

CherryLOCK® wiredraw rivets are also known as “CherryLOCK®” or “Standard CherryLOCK®”.



Typical Maximum Grip Application

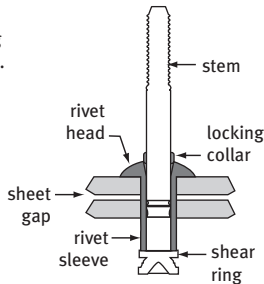
Both the standard and bulbed CherryLOCK® rivets offer important features desired in an aircraft blind rivet.

- Mechanically locked stem—assured reliability, no lost stems
- Wide grip range—a full 1/16"
- Self-inspecting—if it looks right, it is right
- Positive hole fill—increased joint strength
- High sheet clamp-up—increased fatigue strength
- Excellent head seating—fewer rejections
- Genuine flush fracturing spindle—no shaving, as with other “flushbreak rivets”, even in thin sheets
- Head marking—grip, materials and manufacturer’s symbol—provides identification for ready inspection
- All fasteners should be specified and used in accordance with manufacturer’s recommendations, using the grip range and hole size information provided in this manual.

HOW THEY WORK

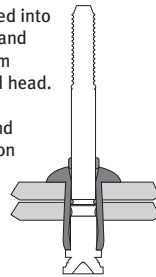
BULBED CHERRYLOCK® RIVETS

1. Before pulling begins.

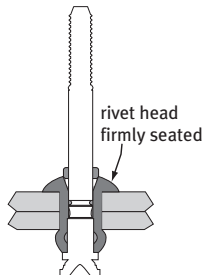


2. Stem is pulled into rivet sleeve and starts to form bulbed blind head.

Clamp-up and hole fill action begin.

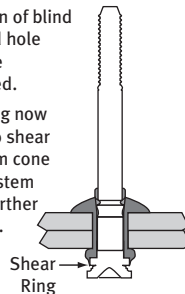


3. Clamp-up completed as stem continues to bulb out blind head.



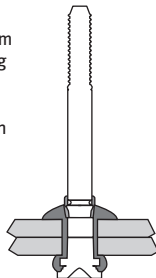
4. Formation of blind head and hole filling are completed.

Shear ring now begins to shear from stem cone to allow stem to pull further into rivet.



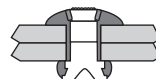
5. Shear ring has moved down stem cone until pulling head automatically stops stem break notch flush with top of rivet head.

Locking collar is now ready to be inserted.



6. Completely installed bulbed CherryLOCK® rivet

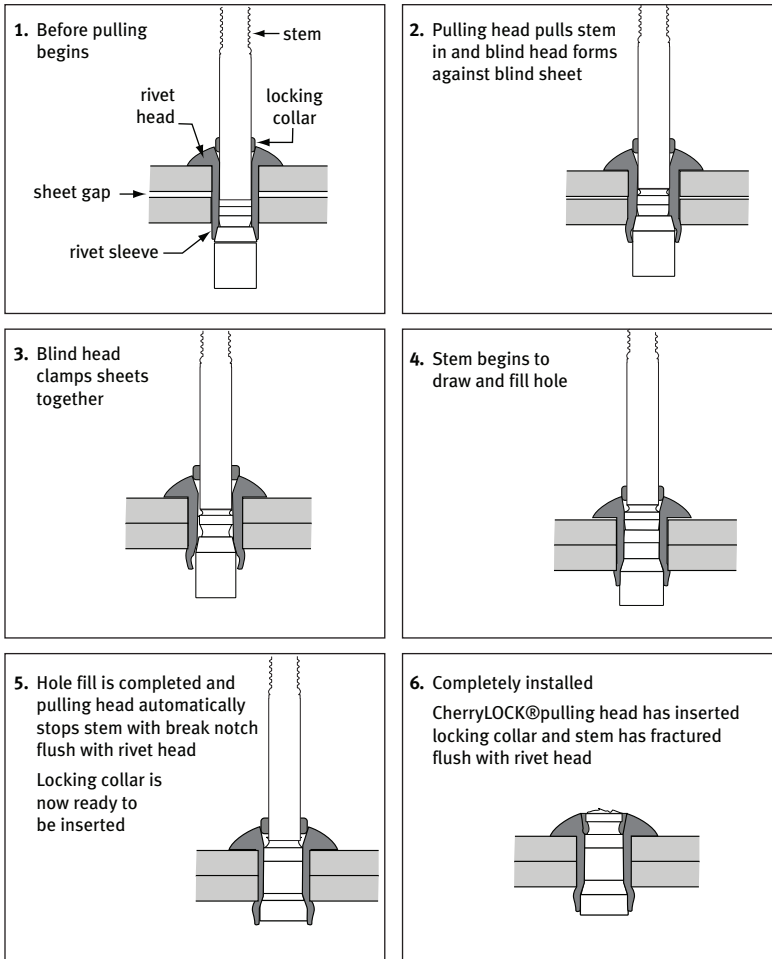
Pulling head has inserted locking collar and stem has fractured flush with rivet head. (maximum grip illustrated)



Note: In minimum grip, shear ring may not shear

HOW THEY WORK

WIREDRAW CHERRYLOCK® RIVETS



SELECTING THE RIVET

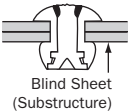
CHERRYLOCK® AND BULBED CHERRYLOCK®

Wiredraw CherryLOCK® and bulbed CherryLOCK® rivets should be used as a complete fastening system so that the best features of each can be utilized for optimum strength and performance.

Bulbed CherryLOCK® is a complete shear fastening system. Its features can be utilized for optimum strength and performance in both thick and thin sheet. It provides the highest possible design integrity, particularly in double dimple or high vibration areas.

The large blind head of the bulbed CherryLOCK® is of particular advantage in thin blind side sheets where sheet bearing failure under load is a problem, especially in applications where the blind sheet is equal to or less than the thickness shown in this table:

Rivet Diameter	Aluminum Blind Sheet Thickness	Titanium Blind Sheet Thickness
1/8"	.040	.020
5/32"	.040	.032
3/16"	.050	.032



The wiredraw CherryLOCK® system with its wider range of sizes and materials is especially suitable for applications unsuitable for bulbed CherryLOCK® rivets. Not recommended for double dimple.

MINIMUM BLIND SIDE MATERIAL DATA

The wiredrawing type rivet is designed to give the best hole filling of any blind rivet and as such must be limited to applications where the blind side substructure has sufficient bearing strength to withstand the wiredrawing installation loads. When blind side substructure is made up of thin or soft material, then the bulb type rivet would be the recommended rivet selection.

Wiredrawing type rivets are not recommended for double dimple applications.

Listed are the recommended rivet selection material types and minimum thicknesses for use with the wiredrawing type blind rivets.

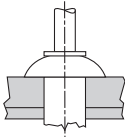
Rivet Material	Rivet Diameter	Blind Side Material Thickness (min)	Blind Side Material
Aluminum	-4	.030	2024 Aluminum or stronger
	-5	.040	
	-6	.050	
	-8	.060	
Monel & A-286 CRES	-4	.040	7075 Aluminum or stronger
	-5	.050	
	-6	.060	
	-8	.080	

SELECTING THE RIVET

HEAD STYLES

CherryLOCK® rivets are made in several standard head styles as listed below.

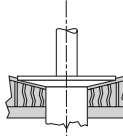
UNIVERSAL NASM20470



For protruding head applications. Available in both CherryLOCK® and bulbed CherryLOCK®.

Requires H681-()C series pulling head.

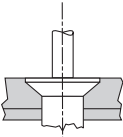
156° COUNTERSUNK



A large diameter, shallow countersunk head providing wide bearing area for honeycomb applications. Available in bulbed CherryLOCK® only.

Requires H681-()F series pulling head.

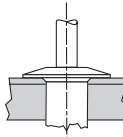
100° COUNTERSUNK NASM20426



For countersunk applications. Available in both CherryLOCK® and bulbed CherryLOCK®.

Requires H681-()C series pulling head.

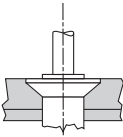
UNISINK



A combination countersunk and protruding head for use in very thin top sheets. Strength equal to double-dimpling without the high cost. Available in bulbed CherryLOCK® only.

Requires H681B166-() series pulling head.

100° COUNTERSUNK NAS1097



For thin top sheet machine-countersunk applications. Available in CherryLOCK® only.

Requires H681-()S series pulling head.

SELECTING THE RIVET

DIAMETERS

The shank diameter of CherryLOCK® rivets is measured in 32nds of an inch and is identified by the first dash number; 3/32 dia = (-3), 1/8 dia = (-4), etc.

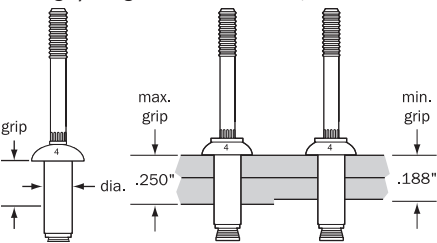
CherryLOCK®		Bulbed CherryLOCK®	
3/32"	(-3)*	—	—
1/8"	(-4)	1/8"	(-4)
5/32"	(-5)	5/32"	(-5)
3/16"	(-6)	3/16"	(-6)
1/4"	(-8)	—	—

*Available in A286 rivets only.
Wiredraw CherryLOCK® is nominal diameter only.

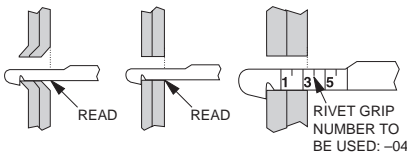
Note: Bulbed CherryLOCK® rivet sleeve is 1/64" oversize only.

GRIP LENGTH

Grip length refers to the maximum total sheet thickness to be riveted and is measured in 16ths of an inch. This is identified by the second dash number. All CherryLOCK® rivets, unless otherwise noted, have their grip length (max. grip) marked on the rivet head and have a total grip range of 1/16 of an inch (example: -04 grip rivet has a grip range of .188" to .250").



To determine the proper grip rivet to use, measure the material thickness with a 269C3 Cherry® selector gage as shown below. Always read to the next higher number.



To find the rivet grip number, determine the total thickness of the material to be fastened. Locate this amount between minimum and maximum columns on material thickness chart below.

Material Thickness Range		Rivet Grip No.
Min.	Max.	
See Stds. pages	1/16"	01
See Stds. pages	1/8"	02
1/8"	3/16"	03
3/16"	1/4"	04
1/4"	5/16"	05
5/16"	3/8"	06
3/8"	7/16"	07
7/16"	1/2"	08
1/2"	9/16"	09
9/16"	5/8"	10
5/8"	11/16"	11
11/16"	3/4"	12
3/4"	13/16"	13
13/16"	7/8"	14
7/8"	15/16"	15
15/16"	1"	16

Note: For double dimpled sheets, add countersunk rivet head height to material thickness.

CSK Bulbed CherryLOCK®	
Rivet Diameter	Head Height
1/8"	.035
5/32"	.047
3/16"	.063

CHERRYLOCK® TOOLS

CHERRYLOCK® HYDRO-SHIFT SYSTEM



The CherryLOCK® hydro-shift tooling system is an advanced design in which the sequence of operations necessary to install the rivet is accomplished hydraulically within the hydro-shift tool rather than by means of a mechanical pulling head.

See the tool selection chart on page 14 of this manual for the capacity of each of these hydro-shift tools.

*Capable of installing rivet group A only

**Capable of installing rivet group A, B and C

H681 PULLING HEADS

Attach directly to hydro-shift tools **G700, G784, G689 and G686B-S**.

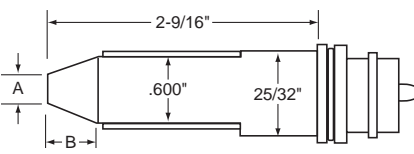


CHERRYLOCK® TOOLS

SELECTION OF PROPER HYDRO-SHIFT PULLING HEAD

H681 SERIES

A separate pulling head is required for each diameter CherryLOCK® rivet. It is acceptable that countersunk (C) pulling heads be used for installing both universal and countersunk head CherryLOCK® rivets. These heads fit directly on all Cherry® hydro-shift riveters.



Rivet Dia.	Pulling Head Number		Dim.	
			A	B
3/32"	H681-3C	Universal Head Countersunk Head (NASM20426)	.163	.332
1/8"	H681-4C	Universal Head Countersunk Head (NASM20426)	.208	.341
	H681-4F	Countersunk Head (156°)	.430	.358
	H681 -4S	Countersunk Head (NAS1097)	.174	.341
	H681B166-4	Unisink Head	.250	.359
5/32"	H681-5C	Universal Head Countersunk Head (NASM20426)	.269	.352
	H681-5F	Countersunk Head (156°)	.535	.338
	H681-5S	Countersunk Head (NAS1097)	.225	.352
	H681B166-5	Unisink Head	.313	.377
3/16"	H681-6C	Universal Head Countersunk Head (NASM20426)	.335	.386
	H681-6F	Countersunk Head (156°)	.625	.367
	H681-6S	Countersunk Head (NAS1097)	.281	.386
	H681B166-6	Unisink Head	.375	.419
1/4"	H681-8C	Universal Head Countersunk Head (NASM20426)	.458	.398
	H681-8S	Countersunk Head (NAS1097)	.274	.398

CHERRYLOCK® TOOLS

SELECTION OF PROPER HYDRO-SHIFT PULLING HEAD

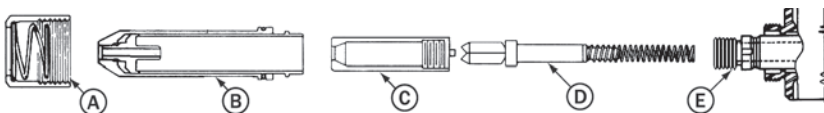
INSTALLING H681 PULLING HEAD ON RIVETER

Remove knurled cap **A** from front of riveter head.

Place jaw assembly **D** inside collet **C**.

Insert spring end of jaw assembly into hole in head piston **E**. Apply enough pressure to engage collet threads. Turn until collet bottoms on shoulder of piston and collet lock snaps into slot in piston. Hand tightening is sufficient. **Note:** To remove collet, push collet lock back into collet (using a blunt pointed tool) while turning the collet counterclockwise.

Place sleeve assembly **B** over collet and head piston. Slip knurled cap **A** over the sleeve assembly and hand tighten onto end of riveter head.

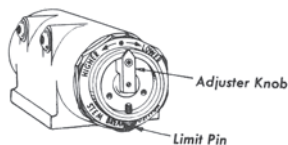


NOTE: Hydro-shift riveters are factory adjusted to break rivet stem flush and set collar properly. Fine adjustments to the shift point setting can be made by the operator. This adjustment determines the flushness of break of the rivet stem and may be accomplished as follows:

Make sure the riveter is connected to air supply.

With trigger released, turn adjuster knob clockwise to lower stem break and counter-clockwise to raise stem break. Always release tool trigger before turning knob.

A limit pin restricts adjustment to one-half turn of knob either direction from factory setting. Do not remove this limit pin. If more than one-half turn adjustment is required to achieve flush stem break, tool should be returned to your Tool Maintenance Department for checking with 680A159 gage. See page 12.



CHERRYLOCK® TOOLS

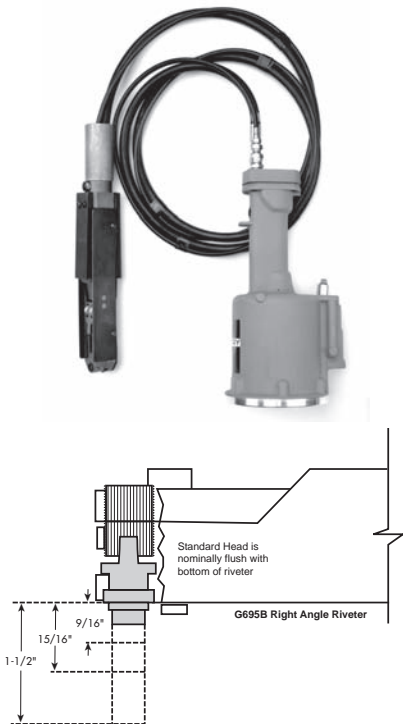
LIMITED ACCESS APPLICATIONS

G695B RIGHT ANGLE RIVETER

The Cherry® G695B right angle riveter is a tool designed specifically for installing CherryLOCK® rivets in limited access areas.

The power unit rests on the floor and is connected to the right angle unit with 8 feet of hose which further increases the flexibility of this tool. It will install most CherryLOCK® rivets up to a quarter-inch grip length and most bulbed CherryLOCK® rivets regardless of grip.

H690 series pulling heads fit directly on the above tools. A separate pulling head is required to install each diameter and head style CherryLOCK® rivet as shown in adjoining table.



Rivet Diameter	Standard Pulling Head Number
1/8"	H690-4U Universal Head H690-4C Countersunk Head
5/32"	H690-5U Universal Head H690-5C Countersunk Head
3/16"	H690-6U Universal Head H690-6C Countersunk Head
1/4"	H690-8U Universal Head H690-8C Countersunk Head

Note: These pulling heads are also available in 9/16", 15/16" and 1-1/2" extensions. To order, specify proper pulling head and add length of extension to part number (e.g. H690-4U-15/16").

This tool installs all bulbed CherryLOCK® rivets and installs up to -04 grip wiredraw CherryLOCK® rivets.

CHERRYLOCK® TOOLS

GAGES

269C3 GRIP GAGE

A simple, self-explanatory gage for determining material thickness and proper rivet grip length.



T172 RIVET HOLE SIZE GAGE

These are precision ground, go no-go gages used to check holes drilled for Cherry® blind rivets. They are made in all standard rivet diameters plus the oversize rivet diameters.



Rivet Diameter	Hole Gage Part Numbers	
	Standard	Bulbed
3/32"	T172-3	—
1/8"	T172-4	T172-400
5/32"	T172-5	T172-500
3/16"	T172-6	T172-600
1/4"	T172-8	—

628 SETTING GAGES

These gages are used to adjust the shift point and lock ring anvil settings on CherryLOCK® mechanical pulling heads H615B, H640B, H642 and H690. A separate gage is required for each rivet diameter and the correct gage is furnished with each new pulling head along with instructions for its use.



Rivet Dia.	Gage No.
1/8"	628-4 (green)
5/32"	628-5 (red)
3/16"	628-6 (blue)
1/4"	628-8 (aluminum)

680A159 SETTING GAGE

This gage is used to adjust the shift point setting on Cherry® hydro-shift riveters. One of these gages is furnished with each new hydro-shift riveter, along with instructions for its use.



ANVIL GAGES

These go no-go gages are used to check the hole diameters of lock ring anvils in all CherryLOCK® pulling heads H681 and H690. Their use will help eliminate installation problems caused by worn, oversized anvils. A separate gage is required for each rivet diameter.



Rivet Dia.	Gage No.
3/32"	P913
1/8"	P856
5/32"	P857
3/16"	P858
1/4"	P859

CHERRYLOCK® TOOLS

MAINTENANCE ITEMS

700A77 AIR BLEEDER

To keep Cherry® rivet hydraulic tools operating at peak efficiency, it is absolutely essential that the hydraulic systems be kept full of fluid and free of air.

Based on the same principle used in bleeding the hydraulic brake system of an automobile, the 700A77 Cherry® air bleeder will quickly and easily remove all air and assure the complete filling of the tool with Dexron III automatic transmission fluid. It may be used in the tool crib or right on the production line, since it requires but a few minutes to perform this vital function. The air bleeder is a small item, but it does a really big job: it prevents downtime.



SERVICE KITS

An assortment of O-rings, seals, screws, washers and gaskets is available in kit form for each Cherry® power tool. To avoid unnecessary downtime, it is advisable to have these kits on hand for the tools being serviced.

Cherry® Tool	Service Kit No.
G685B-S & G686B-S	G685-S/686-SKS
G689	G689KS
G695B	G695KS
G700	G700KS
G715A	G715KS
G740A	G740KS
G784	G784KS

SELECTING CHERRYLOCK® TOOLS

The numbers shown in the rivet columns below are the maximum grip length that can be installed with these tools.

Tool Model	Pulling Head	Rivet Dia.	Bulbed CherryLOCK® NAS1738 & NAS1739				Standard CherryLOCK® NAS1398 & NAS1399					
			Aluminum		Monel & Inconel		Aluminum		Monel		CRES Inconel	
			2235		2539	2538		2162			2643	2642
			2239		2545	2540		2164			2653	2652
			2245	2238	2839	2838	2163	2262			2663	2662
			2249	2248	2845	2840	2263	2264	2563	2564	²	²
			Univ.	Ctsk.	Univ.	Ctsk.	Univ.	Ctsk.	Univ.	Ctsk.	Univ.	Ctsk.
G700	H681	-3	NA	NA	NA	NA	NA	NA	NA	NA	ALL	ALL
		-4	ALL	ALL	ALL	ALL	8	9	8	9	8	9
		-5	—	—	—	—	—	—	—	—	—	—
		-6	—	—	—	—	—	—	—	—	—	—
		-8	NA	NA	NA	NA	—	—	—	—	—	—
G784	H681	-3	NA	NA	NA	NA	NA	NA	NA	NA	ALL	ALL
		-4	ALL	ALL	ALL	ALL	ALL	ALL	ALL	ALL	ALL	ALL
		-5	ALL	ALL	ALL	ALL	8	9	8	9	8	9
		-6	ALL	ALL	ALL ¹	ALL ¹	8	9	8	9	8 ¹	9 ¹
		-8	NA	NA	NA	NA	—	—	—	—	—	—
G686B-S	H681	-4	ALL	ALL	ALL	ALL	ALL	ALL	ALL	ALL	ALL	ALL
		-5	ALL	ALL	ALL	ALL	ALL	ALL	ALL	ALL	ALL	ALL
		-6	ALL	ALL	ALL	ALL	ALL	ALL	ALL	ALL	ALL	ALL
		-8	NA	NA	NA	NA	ALL	ALL	ALL	ALL	—	—
G689	H681	-4	ALL	ALL	ALL	ALL	ALL	ALL	ALL	ALL	ALL	ALL
		-5	ALL	ALL	ALL	ALL	ALL	ALL	ALL	ALL	ALL	ALL
		-6	ALL	ALL	ALL	ALL	ALL	ALL	ALL	ALL	ALL	ALL
		-8	NA	NA	NA	NA	ALL	ALL	ALL	ALL	ALL	ALL
G695B	H690	-4	ALL	ALL	ALL	ALL	4	4	4	4	4	4
		-5	ALL	ALL	ALL	ALL	4	4	4	4	4	4
		-6	—	—	—	—	4	4	4	4	—	—
		-8	NA	NA	NA	NA	4	4	—	—	—	—

1 May require 95 PSI air pressure at tool

2 3/32" A-286 (CR2662 & CR2663) rivets may be installed with any Cherry® hydro-shift riveter

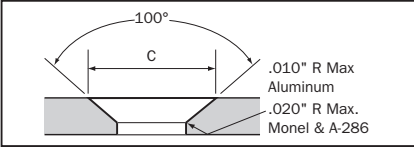
— indicates rivet sizes which cannot be installed in any grip length

HOLE PREPARATION

Proper hole preparation is very important in obtaining a strong, rigid, and reliable blind riveted joint.

HOLE SIZE

CherryLOCK® rivets are designed to function within a specified hole range. The hole size limits, along with suggested drill sizes, are listed below.



Recommended Drill Sizes, Hole Size and Countersunk Diameter Limits

Rivet Dia.	CherryLOCK®			Bulbed CherryLOCK®			100° NASM20426 Head		100° NAS1097 Head		100° Unisink Head	
	Drill Size	Min.	Max.	Drill Size	Min.	Max.	C Max.	C Min.	C Max.	C Min.	C Max.	C Min.
3/32"	#40	.097	.100	—	—	—	.182	.176	—	—	—	—
1/8"	#30	.129	.132	#27	.143	.146	.228	.222	.195	.189	.173	.167
5/32"	#20	.160	.164	#16	.176	.180	.289	.283	.246	.240	.216	.210
3/16"	#10	.192	.196	#5	.205	.209	.356	.350	.302	.296	.258	.252
1/4"	F	.256	.261	—	—	—	.479	.473	.395	.389	—	—

The above drill sizes are those which normally produce holes within the specified limits. Holes should be checked with a Cherry® go no-go gage to assure drilling accuracy.

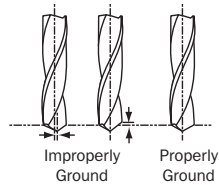


Rivet Diameter	Hole Gage Part Numbers	
	Standard	Bulbed
3/32"	T172-3	—
1/8"	T172-4	T172-400
5/32"	T172-5	T172-500
3/16"	T172-6	T172-600
1/4"	T172-8	—

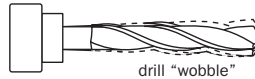
HOLE PREPARATION

DRILLING PROCEDURE

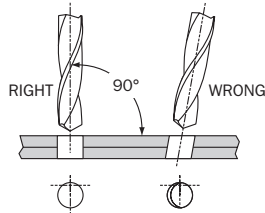
Use a clean, sharp, properly ground drill. Improperly ground drills will create oval or oversize holes.



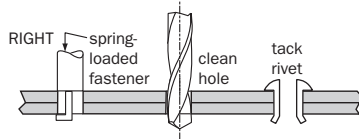
Center the drill in the chuck so that the drill will run true. A “wobble” in the drill will create an oversize hole.



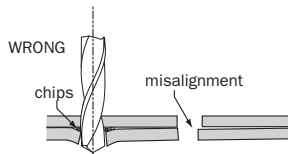
Hold the drill perpendicular to the surface being drilled. Do not force the drill through the material.



To insure proper hole alignment and to prevent burrs and chips from lodging between the sheets, the materials to be riveted should be clamped tightly together.



Tack rivets or clamps should be used to prevent material creep and hole misalignment during the drilling operation.



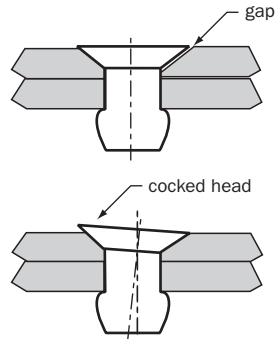
HOLE PREPARATION

COUNTERSINKING

Accurate countersinking is of primary importance to the structural integrity of a flush riveted joint. Standard countersinking procedures as used with solid rivets are also applicable to CherryLOCK® rivets. The following points, however, should be carefully noted:

The countersink pilot should be no more than .001" smaller than the hole diameter. A greatly undersized pilot will produce a countersink which is not concentric with the hole, creating head gap problems.

An countersink pilot which is too small also creates a countersink whose axis is not in line with the axis of the drilled hole. This will result in a "cocked" rivet head.

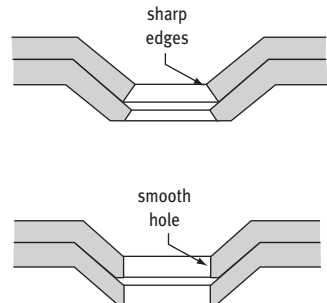


DIMPLING

Normal dimpling procedures stretch and enlarge the pilot holes in thin sheet applications. The sheets (as dimpled) provide only sharp edges within the hole.

To overcome the problems inherent in this type of application, the dimple should first be prepared with a hole size which will allow for subsequent reaming.

The hole should then be reamed to the dimensions specified for the size rivet being installed. The bulbed CherryLOCK® is especially recommended for this application.



CHERRYLOCK® INSTALLATION

DE-BURRING

All drilling operations cause burrs to form on each end of the hole being drilled, as well as between the sheets. Whenever possible, all burrs should be removed.

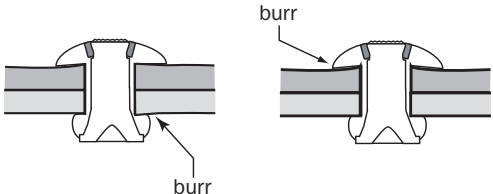
When using a drill or center reamer to remove burrs, care must be taken to remove **ONLY** the burr. Do not chamfer the sheets, as this may materially affect the strength of the riveted joint, particularly with respect to the blind sheet.



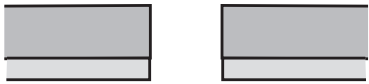
remove chips



remove burrs

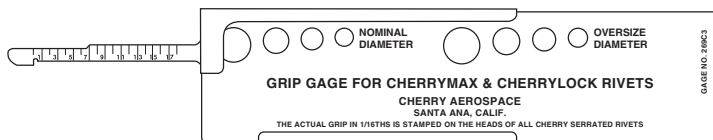


Poor



Good

CHERRYLOCK® INSTALLATION

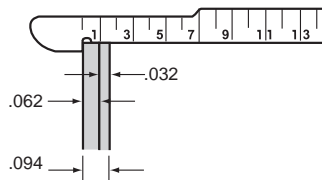


269C3 GRIP GAGE

RIVET GRIP SELECTION

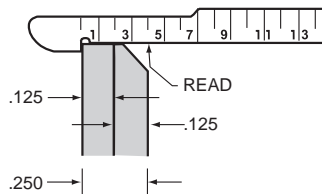
To determine the proper grip rivet to use, measure the material thickness with a 269C3 grip gage as shown below.

Insert the grip gage into the prepared hole, draw gage back until lip contacts backside of structure and read where front side of structure coincides with numbers and lines on gage. Always read to the next higher number (if reading is directly on a line you may use either that grip or the next higher one).



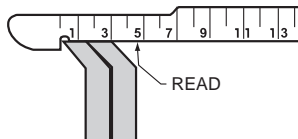
PROTRUDING HEAD

Correct rivet grip is a -.02, since grip range of a -.02 rivet is .062 to .125.



MACHINE COUNTERSUNK

Read correct rivet grip to top of sheet. Since this example is on the line use either -.04 or -.05 grip.



DOUBLE DIMPLE

Read correct rivet grip to top of sheet. Grip is sheet thickness plus rivet head height. This example would require a -.05 grip.

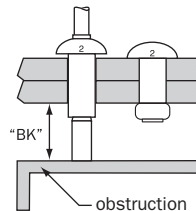
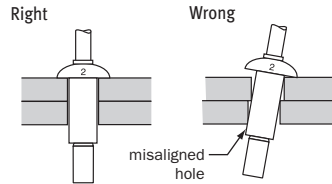
CHERRYLOCK® INSTALLATION

PLACING RIVET IN HOLE

Select the proper pulling head to conform to the diameter and head style of CherryLOCK® rivet being installed. The rivet is now ready to be placed in the hole.

The holes in the sheets to be fastened must be of correct size and aligned properly. Do not force the rivet into the hole.

In limited blind clearance applications, the manufactured head of the standard CherryLOCK® rivet can protrude above the top sheet and will pull down to the sheet as the stem is pulled in. The minimum blind clearance is the “BK” dimension; this is listed on our Standards Pages.



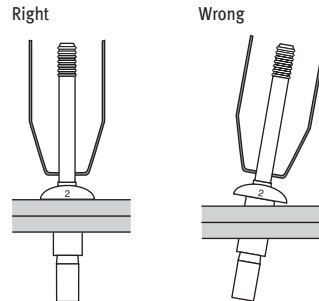
PLACING PULLING HEAD ON RIVET STEM

Hold the riveter and pulling head in line with the axis of the rivet, while holding the riveter in a light and flexible manner.

NOTE: CherryLOCK® wiredraw rivets require longer stroke installation tools than the CherryLOCK® bulbed rivet.

Stroke requirements increase with the increase in grip length.

There are three groups (or stroke settings) for CherryLOCK® wiredraw rivets. These are identified in the CherryLOCK® catalog under each wiredraw part number. See “Rivet Group” in the CherryLOCK® wiredraw portion of the catalog for stroke limits.



CHERRYLOCK® INSTALLATION

When installing CherryLOCK® rivets, hold the riveter in line with the rivet as accurately as possible, and, applying a steady but light pressure, pull the trigger and **let the rivet do the work.**

ACTUATING RIVETER

The pulling head will pull down and seat against the rivet head.

The rivet clamping action will pull the sheets together and seat the rivet head.

The action of the rivet will automatically help to bring the riveter and pulling head into proper alignment with the rivet axis.

Pressing down with force will not allow the rivet and the riveter to align themselves with the hole, and this may limit the head seating action of the rivet.

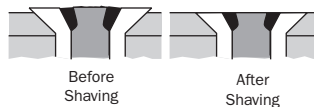
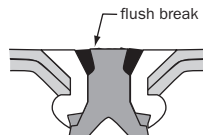
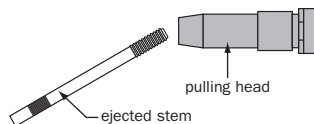
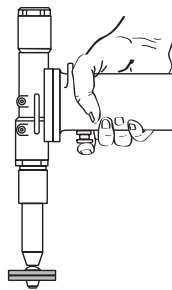
When the rivet is completely installed, release the trigger and the pulling head will automatically eject the pulling portion of the stem through the front end. Controlled stem release into receptacle will control F.O.D. problems.

RIVET SHAVING

Normal shop practice will result in countersunk rivets which are essentially flush with the aircraft skin. Further secondary operations are not normally necessary.

When perfect aerodynamic flushness is required, the sheet should be countersunk so that the rivet heads protrude and subsequent shaving will produce complete aerodynamic flushness. The table on the right shows the recommended countersink diameter to be used for shaving.

When rivets are to be shaved for aerodynamic flushness, care should be taken to assure the pulling head is properly adjusted so that a flush stem fracture will occur within the limits shown on page 23, to insure that any reduction in spindle retention due to shaving will be held to a minimum and within safety limits.



NASM20426 head only.

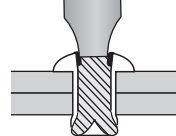
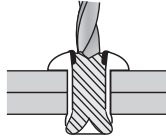
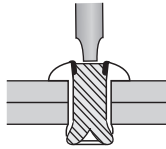
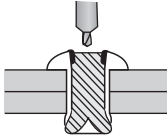
Rivet Dia.	Recommended Countersink Dia. +.005 -.000	Approx. Protrusion of Rivet Head Above Sheet
1/8"	.214"	.005"
5/32"	.274"	.005"
3/16"	.339"	.005"
1/4"	.461"	.005"

Values are for 100°

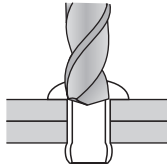
RIVET REMOVAL

Should it be necessary to remove an installed CherryLOCK® rivet, the following procedures are recommended:

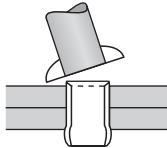
1. In thick material remove the lock by driving out the rivet stem, using a pin punch.
2. If the rivets have been installed in thin sheets, driving out the locked stem may damage the sheets. It is recommended that the stem be center punched first and a small center drill be used to provide a guide for a larger drill on top of the rivet stem. The larger drill can then be used to drill away the lock. Finally, use a pin punch to drive out the stem.



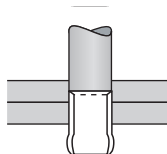
3. Drill nearly through the head of the rivet, using a drill the same size as the rivet shank. **Do not drill completely through rivet head.**



4. Break off rivet head, using a pin punch as a pry.



5. Drive out the remaining rivet shank with a pin punch having a diameter equal to the rivet shank.



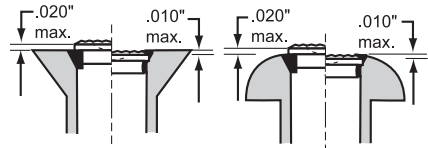
CAUTION: Never drill completely through the rivet sleeve to remove a rivet as this will tend to enlarge the hole.

CHERRYLOCK® INSPECTION

Inspection for the proper installation of CherryLOCK® rivets can be made from the visible side of the work.

STEM AND COLLAR FLUSHNESS

If the rivet stem and collar are flush within the limits described it can be safely concluded that a satisfactory blind head and lock has been formed.



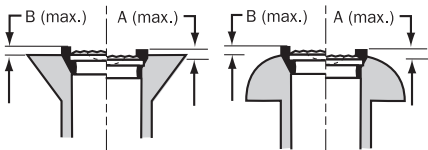
STEM PROTRUSION LIMITS

Rivet Size	-3 Dia.	-4 Dia.	-5 Dia.	-6 Dia.	-8 Dia.
A max.	.015	.015	.020	.025	.030
B max.	.010	.010	.010	.015	.020

Inspect installed rivet flushness to break-off limits of NAS1400 and NAS1740

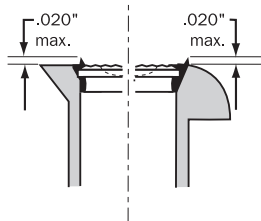
A = Collar above breaknotch of stem

B = Collar above top of rivet head



COLLAR PROTRUSION LIMITS

A slight collar “flash” caused by the pressures necessary to drive the collar is acceptable within the limit shown.

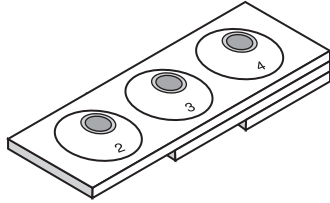


COLLAR FLASH

CHERRYLOCK® INSPECTION

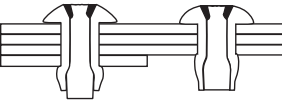
GRIP LENGTH

CherryLOCK® rivets have the grip length marked on the rivet head (except 3/32" and 1/8" diameter and 5/32" in NAS1097 head style) to provide positive inspection from the visible side to show that the rivets have been installed with the correct grip.

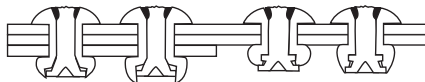


TYPICAL BLIND HEAD

If the grip marking indicates the rivet has been installed in the proper grip and the stem and collar are flush within prescribed limits, blind heads typical of those illustrated will be obtained.

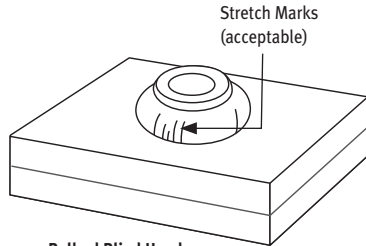


Max. Grip Min. Grip
CherryLOCK® Rivets



Aluminum Monel Aluminum Monel
Max. Grip Min. Grip
Bulbed CherryLOCK® Rivets

Superficial stretch marks which may appear in the rivet sleeve are not detrimental to rivet strength and are acceptable.



Bulbed Blind Head

TROUBLESHOOTING

The correct installation of CherryLOCK® rivets requires that the instructions contained in this manual regarding hole preparation, tools and installation technique be carefully followed.

It is imperative that the pulling heads be clean, free from chips, burrs and dry sealant and are in proper adjustment and mechanical repair.

The following trouble shooting guide will consider several sources for each problem and a solution for each.

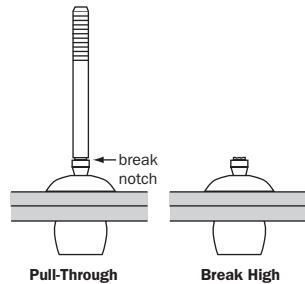
The following problems and solutions apply to both bulbed and CherryLOCK® rivets.

RIVET STEM PULLS THROUGH OR BREAKS HIGH

Rivet stem break notch pulls to .030" or higher above rivet head. Stem **may** or **may not** break.

SOURCE OF PROBLEM

- A. Pulling head shifts too late—readjust pulling head to shift sooner.
- B. Rivet installed in oversize hole—drill smaller holes or use larger diameter rivet.
- C. Rivet installed in under minimum grip—use shorter grip rivet.

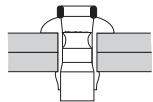


RIVET STEM BREAKS LOW

Collar does not set: Rivet stem breaks well below rivet head and collar does not set.

SOURCE OF PROBLEM

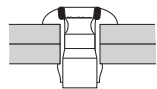
- A. Rivet installed in undersize hole—drill out holes to proper size.
- B. Rivet installed in over maximum grip—use longer grip rivet.
- C. Holes slanted or misaligned—use more care to obtain holes which are properly aligned and normal to the sheets.
- D. Installer “cocks” pulling head—use more care to align tool and keep arm flexible to allow rivet to align itself.



Collar does set: Rivet stem breaks below rivet head but collar is set.

SOURCE OF PROBLEM

- A. Pulling head shifts too soon—use 680A159 to verify stroke setting.
- B. Wrong type head—only Cherry® tools will install CherryLOCK® rivets. Do not use other manufacturer's tooling.



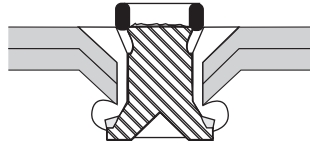
TROUBLESHOOTING

LOCKING COLLAR DOES NOT SET

Rivet stem breaks near flush but collar does not set.

SOURCE OF PROBLEM

- A. Rivet installed in over maximum grip—use longer grip rivet.
- B. Chips prevent anvil from setting collar—chips, burrs, and dry sealant will build up on head anvil and restrict forward thrust necessary to set collar. Clean thoroughly and readjust.
- C. Rivet installed in undersize hole—drill out hole to proper size.
- D. Pulling head shifts too soon—use 680A159 to verify stroke setting.

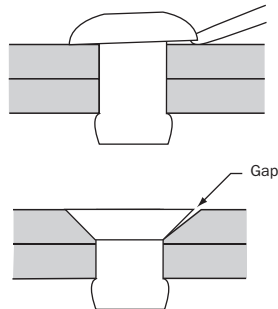


POOR HEAD SEATING

Rivet head does not seat properly against top sheet or in countersink.

SOURCE OF PROBLEM

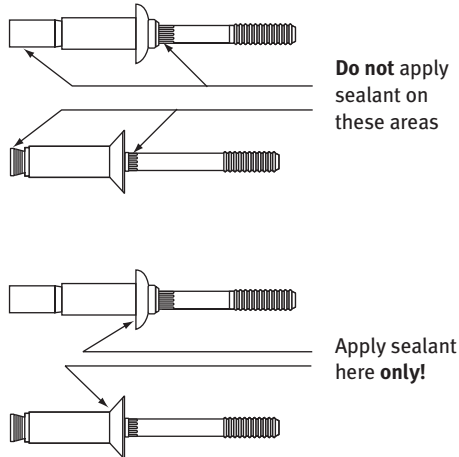
- A. Holes slanted or misaligned—use more care to obtain holes which are properly aligned and normal to the sheets.
- B. Countersink not concentric with hole—use countersink pilot which is close to hole size.
- C. Installer “cocks” pulling head and rivet head during installation. Installer should hold tool and pulling head in a flexible manner, so rivet can clamp head down properly.



PROPER SEALANT APPLICATION

Blind rivets depend on a balance of lubricity to friction, compression and radial expansion during installation. In the manufacturing process, lubricants are typically used to ensure the blind rivet installs correctly.

Sealant should be applied **ONLY** around the rivet sleeve (see illustration). It is critical that the sealant does not touch either the lock collar or the plug section of the fastener.






When sealant is applied to the fastener incorrectly, two conditions may occur. Either the stem of the fastener will pull high or all the way through the rivet sleeve, or the stem will break prematurely and will be too deep in the rivet sleeve to be properly locked by the lock collar. In either case, the rivet must be removed and replaced. Initial care in the application of sealant will eliminate this replacement process.

CONVERSION TABLE

NAS NUMBERS TO CHERRY® RIVET NUMBERS

A complete conversion table of Cherry® rivet numbers is available upon request.

CHERRYLOCK® RIVETS

Head Style	NAS No.	Cherry® No.	Rivet Material	Stem Material
Universal Head (NASM20470) 	NAS 1398B None None NAS 1398C NAS 1398CW NAS 1398D NAS 1398M NAS 1398MS NAS 1398MW	CR2263 CR2643* CR2653 CR2663 CR2663CW CR2163 CR2563M CR2563S CR2563	5056 Aluminum A286 CRES A286 CRES A286 CRES A286 CRES, Cad. Plt'd. 2017 Aluminum Monel Monel, Silver Plt'd. Monel, Cad. Plt'd.	7075 Aluminum A286 CRES, STA A286 CRES A286 CRES A286 CRES A286 CRES 7075 Aluminum Monel Monel Monel
Countersunk Head (NASM20426) 	NAS 1399B None None NAS 1399C NAS 1399CW NAS 1399D NAS 1399M NAS 1399MS NAS 1399MW	CR2262 CR2642* CR2652 CR2662 CR2662CW CR2162 CR2562M CR2562S CR2562	5056 Aluminum A286 CRES A286 CRES A286 CRES A286 CRES, Cad. Plt'd. 2017 Aluminum Monel Monel, Silver Plt'd. Monel, Cad. Plt'd.	7075 Aluminum A286 CRES, STA A286 CRES A286 CRES A286 CRES A286 CRES 7075 Aluminum Monel Monel Monel
Countersunk Head (NAS1097) 	None None None None None	CR2164 CR2564 CR2564M CR2664 CR2664CW	2017 Aluminum Monel, Cad. Plt'd. Monel A286 CRES A286 CRES, Cad. Plt'd.	7075 Aluminum Monel Monel A286 CRES A286 CRES




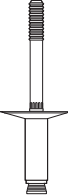
*95KSI fastener for use in high bearing strength material, steel, CRES, Ti, etc.

CONVERSION TABLE

NAS NUMBERS TO CHERRY RIVET NUMBERS

A complete conversion table of Cherry® rivet numbers is available upon request.

BULBED CHERRYLOCK® RIVETS

Head Style	NAS No.	Cherry® No.	Rivet Material	Stem Material
Universal Head (NASM20470) 	NAS 1738B NAS 1738E NAS 1738M NAS 1738MW NAS 1738C NAS 1738CW	CR2249 CR2239 CR2539 CR2539P CR2839 CR2839CW	5056 Aluminum 5056 Aluminum Monel Monel, Cad. Plt'd. Inconel 600 Inconel 600, Cad. Plt'd.	Alloy Steel, Cad. Plt'd. Inconel 600 Inconel 600 Inconel 600 A286 CRES A286 CRES
Countersunk Head (NASM20426) 	NAS 1739B NAS 1739E NAS 1739M NAS 1739MW NAS 1739C NAS 1739CW	CR2248 CR2238 CR2538 CR2538P CR2838 CR2838CW	5056 Aluminum 5056 Aluminum Monel Monel, Cad. Plt'd. Inconel 600 Inconel 600, Cad. Plt'd.	Alloy Steel, Cad. Plt'd. Inconel 600 Inconel 600 Inconel 600 A286 CRES A286 CRES
Unisink Head 	— — — —	CR2235 CR2245 CR2545 CR2845	5056 Aluminum 5056 Aluminum Monel Inconel 600	Inconel 600 Alloy Steel, Cad. Plt'd. Inconel 600 A286 CRES
Countersunk Head (156°) 	— —	CR2540 CR2840	Monel Inconel 600	Inconel 600 A286 CRES

DECIMAL EQUIVALENT CHART

Nom.	M/M	Dec.	Nom.	M/M	Dec.	Nom.	M/M	Dec.	Nom.	M/M	Dec.	Nom.	M/M	Dec.
—	.1	.0039	1/16	—	.0625	21	—	.1590	K	—	.2810	9/16	—	.5625
—	.2	.0079	52	—	.0635	20	—	.1610	9/32	—	.2812	37/64	—	.5781
—	.3	.0118	51	—	.0670	19	—	.1660	L	—	.2900	—	15.0	.5906
80	—	.0135	50	—	.0700	18	—	.1695	M	—	.2950	19/32	—	.5937
79	—	.0145	49	—	.0730	11/64	—	.1719	19/64	—	.2969	39/64	—	.6094
1/64	—	.0156	48	—	.0760	17	—	.1730	N	—	.3020	5/8	—	.6250
—	.4	.0157	5/64	—	.0781	16	—	.1770	5/16	—	.3125	—	16.0	.6299
78	—	.0160	47	—	.0785	15	—	.1800	—	8.0	.3150	41/64	—	.6406
77	—	.0180	—	2	.0787	14	—	.1820	O	—	.3160	21/32	—	.6562
—	.5	.0197	46	—	.0810	13	—	.1850	P	—	.3230	—	17.0	.6693
76	—	.0200	45	—	.0820	3/16	—	.1875	21/64	—	.3281	43/64	—	.6719
75	—	.0210	44	—	.0860	12	—	.1890	Q	—	.3320	11/16	—	.6875
74	—	.0225	43	—	.0890	11	—	.1910	R	—	.3390	14/84	—	.7031
—	.6	.0236	42	—	.0935	10	—	.1935	11/32	—	.3437	—	18.0	.7087
73	—	.0240	3/32	—	.0937	9	—	.1960	S	—	.3480	23/32	—	.7187
72	—	.0250	41	—	.0960	—	5.0	.1968	—	9.0	.3543	47/64	—	.7344
71	—	.0260	40	—	.0980	8	—	.1990	T	—	.3580	—	19.0	.7480
—	.7	.0276	39	—	.0995	7	—	.2010	23/64	—	.3594	3/4	—	.7500
70	—	.0280	38	—	.1015	13/64	—	.2031	U	—	.3680	49/54	—	.7656
69	—	.0292	37	—	.1040	6	—	.2040	3/8	—	.3750	25/32	—	.7812
68	—	.0310	36	—	.1065	5	—	.2055	V	—	.3770	—	20.0	.7874
1/32	—	.0312	7/64	—	.1094	4	—	.2090	W	—	.3860	51/64	—	.7969
—	.8	.0315	35	—	.1100	3	—	.2130	25/64	—	.3906	13/16	—	.8125
67	—	.0320	34	—	.1110	7/32	—	.2187	—	10.0	.3937	—	21.0	.8268
66	—	.0330	33	—	.1130	2	—	.2210	X	—	.3970	53/64	—	.8281
65	—	.0350	32	—	.1160	1	—	.2280	Y	—	.4040	27/32	—	.8437
—	.9	.0354	—	3.0	.1181	A	—	.2340	13/32	—	.4062	55/64	—	.8594
64	—	.0360	31	—	.1200	15/64	—	.2344	Z	—	.4130	—	22.0	.8661
63	—	.0370	1/8	—	.1250	—	6.0	.2362	27/64	—	.4219	7/8	—	.8750
62	—	.0380	30	—	.1285	B	—	.2380	—	11.0	.4331	57/64	—	.8906
61	—	.0390	29	—	.1360	C	—	.2420	7/16	—	.4375	—	23.0	.9055
—	1	.0394	28	—	.1405	D	—	.2460	29/64	—	.4531	29/32	—	.9062
60	—	.0400	9/64	—	.1406	1/4	—	.2500	15/32	—	.4687	59/64	—	.9219
59	—	.0410	27	—	.1440	E	—	.2500	—	12.0	.4724	15/16	—	.9375
58	—	.0420	26	—	.1470	F	—	.2570	31/64	—	.4844	—	24.0	.9449
57	—	.0430	25	—	.1495	G	—	.2610	1/2	—	.5000	61/64	—	.9531
56	—	.0465	24	—	.1520	17/64	—	.2656	—	13.0	.5118	31/32	—	.9687
3/64	—	.0469	23	—	.1540	H	—	.2660	33/64	—	.5156	—	25.0	.9842
55	—	.0520	5/32	—	.1562	I	—	.2720	17/32	—	.5312	63/64	—	.9844
54	—	.0550	22	—	.1570	—	7.0	.2756	35/64	—	.5469	1	25.4	1.000
53	—	.0595	—	4.0	.1575	J	—	.2770	—	14.0	.5512	—	—	—

LIMITED WARRANTY

Seller warrants the goods conform to applicable specifications and drawings and will be manufactured and inspected according to generally accepted practices of companies manufacturing industrial or aerospace fasteners. In the event of any breach of the foregoing warranty, Buyer's sole remedy shall be to return defective goods (after receiving authorization from Seller) for replacement or refund of the purchase price, at the Seller's option. Seller agrees to any freight costs in connection with the return of any defective goods, but any costs relating to removal of the defective or nonconforming goods or installation of replacement goods shall be Buyer's responsibility. SELLER'S WARRANTY DOES NOT APPLY WHEN ANY PHYSICAL OR CHEMICAL CHANGE IN THE FORM OF THE PRODUCT IS MADE BY BUYER. THE FOREGOING EXPRESS WARRANTY AND REMEDY ARE EXCLUSIVE AND ARE IN LIEU OF ALL OTHER WARRANTIES AND REMEDIES; ANY IMPLIED WARRANTY AS TO QUALITY, FITNESS FOR PURPOSE, OR MERCHANTABILITY IS HEREBY SPECIFICALLY DISCLAIMED AND EXCLUDED BY SELLER. This warranty is void if seller is not notified in writing of any rejection of the goods within one (1) Year after initial use by buyer of any power Riveter or ninety (90) days after initial use of any other product.

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Attention

Blind fasteners are not always a suitable substitute for solid shank fasteners. Maintenance personnel are reminded that AC 43.13-1A chapter 2, section 3, stipulates: "Do not substitute hollow rivets for solid rivets in load carrying members without specific approval of the application by a representative of the Federal Aviation Administration. Blind rivets may be used in blind locations in accordance with the conditions listed in Chapter 5, provided the edge distances and spacings are not less than the minimum listed in paragraph 99d."



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1224 East Warner Avenue, Santa Ana, CA 92705
voice: 714-545-5511 • fax: 714-850-6093
www.cherryaerospace.com



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