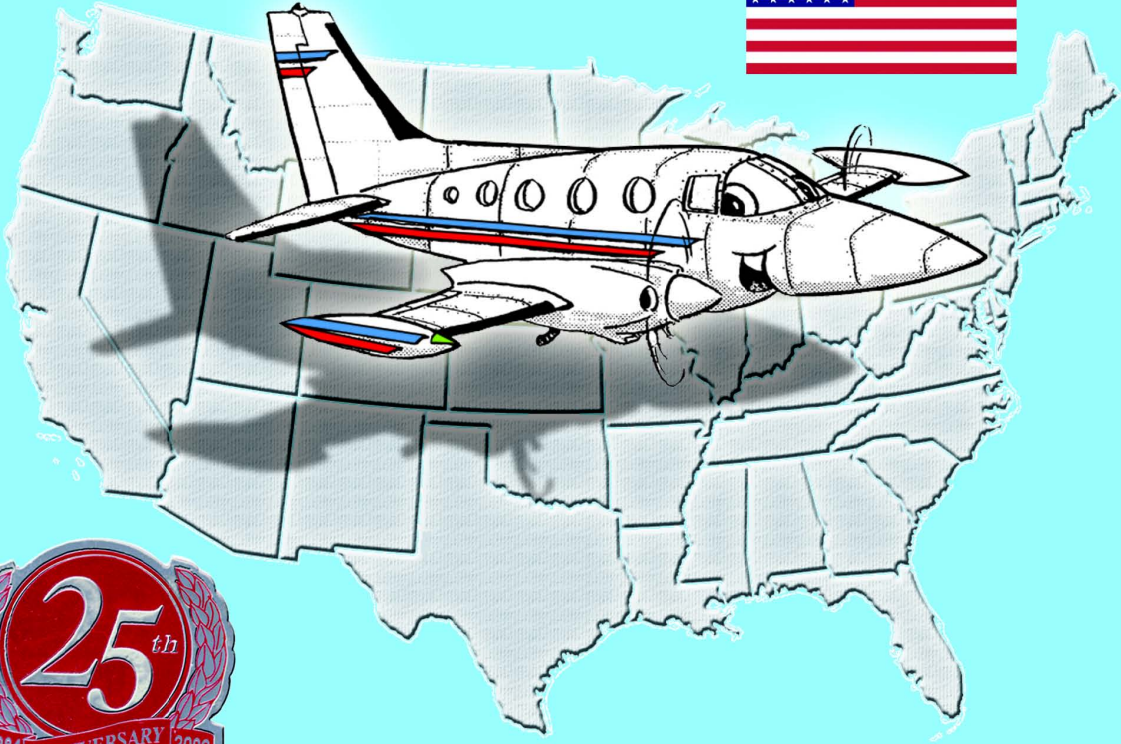


Get Those Planes in The Sky, Where They Belong !

GENUINE AIRCRAFT HARDWARE Co.



We have two locations, for your Nationwide convenience
and a Webstore for Sales & Tech support

Western States Contact: Toll Free (888)247-2738 Fax (805) 239-4871

Eastern States Contact: Toll Free (877) 434-6889 Fax (770) 683-4192

www.gen-aircraft-hardware.com

Helping Aviation Stay Together



Genuine Aircraft Hardware Co.

Silver Anniversary Edition, 25 years

Established, March 1984



Dear Customer,

Having been in business officially since March of 1984. I, Tom Brink, the President and Founder was at that time working as the Director of Maintenance for an Airframe and Powerplant Repair Station in Lompoc California. In a maintenance facility there are many challenges; Schedules, regulations, personnel, and the customers requirements. There is always a need for replacement parts of all kinds for the aircraft being repaired. Not having what you need when you need it, or as close as possible is a big schedule disruption. This under-supplied condition has a tremendous negative effect on all aspects of the business. Using the suppliers of those times, I found that it was frequently easier to obtain the larger and more expensive products while the smaller loose stock items were not often stocked at the practical levels they should have been. With my boss's consent I started Genuine Aircraft Hardware as a part time venture that was non-competing with Lompoc Aviation. It actually became very beneficial for both the new business GAHco. and the one I was Director of Maintenance of. With more hardware available to them and at least enough business to pay my rent with every month we were able to stay afloat and even grow.

My tasks were planning, development and construction, while my wife was the store clerk, purchasing and packaging. Add a few years and two children, we were growing enough to venture out and try having Genuine Aircraft Hardware Co. support itself and our little family at our new location about 100 miles north of Lompoc.

With many struggles and much patience the venture survived and maintained moderate growth each year. There were special occasions when I had to take side jobs to pay for things like child #3, but with patient progress, diligence and marketing, things were progressing at ever increasing rates.

Ten years later after teaching thousands of people how to measure fasteners while on the phone, we produced our first Aircraft Hardware Reference Book. This has been a very helpful tool for both us and our customers. The book has been saving countless hours on the phone and fax. It is now also on the web.

We have progressed over the years to be bigger and better. We started out in 200 sq ft., then, 600, 1,200 3,500, and now we are in 9,000 sq ft, plus our warehouse in central Georgia.

September of 2002 we opened a new facility in Georgia, specifically to better serve our Eastern States customers. In 2005 we expanded our inventory and re-located into a larger newly constructed facility.

In late April of 2008 we went to considerable expense to upgrade all our business systems to better serve you the customer as we continue to grow. We will continually seek to improve our systems and service.

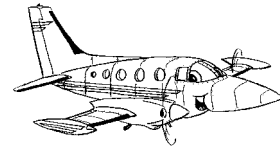
We have always received good responses, and hope this has worked out for you personally as well.

All of us at Genuine Aircraft Hardware Co. would like to thank all of you, our customers for doing business with us and for giving us the feedback on how to better serve you.

Tom Brink, President



Genuine Aircraft Hardware Co.



Mission Statement **(How we will treat you!)**

Our mission here at Genuine Aircraft Hardware Co. is to provide our customers with High Quality New Traceable Aircraft Fasteners that meet specifications. We will also supply other related items that may not require certification such as Non-Structural Commercial Fasteners, Tools, or Non-Critical Rubber Goods.

With our primary customer base of General Aviation, Helicopter and Agricultural Aviation, Fixed Base and Corporate Operators, and many Others who may need quality aircraft fasteners, we will work with the customers and make every effort possible to meet or exceed the requirements of an ever changing aviation business.

Customers, nation wide and internationally, can expect to be treated with high levels of service whether placing a Stock, Repair, or A.O.G. order, without prejudice or indifference, We will aid the customer in their requirements for fasteners from our extensive in-house inventory and our efficient outsourcing when needed. We value every customer, small or large, and deal with them professionally, while holding our employees and/or agents to the highest standards of obtainable excellence.

We will be diligent in our efforts to service our customers ethically and honestly in all of our business endeavors.

We will strive to supply the customer with quality service and quality products in a timely manner, pursuant to the customer's specific requirements, within our ability and personal convictions.



President, GAHco.

Genuine Aircraft Hardware Co.

Policies

Hours, California: We are open Monday-Friday, Our telephone hours are 7:30 am to 4:30 pm for Monday -Thursday, please note on Friday we close at 4:00pm /this is Pacific time, Standard or Daylight savings as per the season. The fax machine is always on..

Hours, Georgia: Orders are accepted from either place and then shipped from applicable locations. The Telephone hours (Eastern Time) are 8:30am to 7:00pm Monday-Friday. SEE NEXT PAGE!

Will Call Hours:all locations, **8:30am- 3:30pm** Monday-Friday. Please call ahead to verify stock, and if possible we will have your order waiting.

Orders: We will be happy to take your order or quote by phone fax or e-mail. We also have a terrific Webstore Sorry we have no printed price list,(prices are on the Webstore) We can quote the items we have in stock, usually within the same business day as they are received. We now have the ability to import a list of **Items** and **Qty's** from a 2 column Excel Spreadsheet *without a header row*. For us to be able to process your orders and quotes within the same business day, we will need them in by 2:00 pm Pacific Time *or sooner if there is a long list of items,special requests or high Qty's.*

For Items shipping from the West to the Eastern states, U.P.S. Red labels, and all Federal Express orders need to be in by 12:00 pm. (See East-West map on the next page for your state)
We will do our best to get your order out as soon after receipt as possible. Most orders are shipped within hours of receipt.

Shipments: *Unless otherwise* instructed we will ship all items that are available to ship in an effort to completely fill your order. We will then ship the back ordered items as they become available.
We can if instructed to:

- 1) Hold **your order until complete**, or 2) **Ship available items** and hold the back orders until complete.
- 3) Schedule shipments or delayed deliveries up to six months after receipt of order. \$300 dollars min per shipment applies.
- 4) A combination of the above. Please be specific and verify that the order clerk understands your instructions so you get what you asked for.

Please specify method of shipment desired at the time of placing the order, verify the order clerk has specified your requested method of shipment. There is less chance for error when utilizing a faxed purchase order. The methods of shipment we do are:

U.P.S.: Next Day, 2-Day, 3-Day, Ground

Federal Express: All levels *except Fed X Ground*.
Priority one, Standard overnight, 2-Day, Saver

US Mail:Priority, Priority Flat Rate, Express
DHL: All levels

International: UPS, Fed-Ex, DHL, US Mail (All levels offered)

.....
All Printed Policies are subject to revision without notice,
see www.gen-aircraft-hardware.com, for latest status
.....



Sorry, We do not ship for Saturday Deliveries

Payment: The methods of payment we accept are 1% ten, net 30 after date of invoice with approved credit. *We also accept Visa / Master Card and American Express, and C.O.D.* for COD Company Checks are accepted for established customers. We reserve the right to require a Certified Check for any high value order. If you have time and wish to save normal shipping costs we do accept payment in advance. We will need to have a current reference number (less than 30 days old) to process your advance payment properly. See Prepayment below.

Prepayment: If an order is to be prepaid by cash or check and amounts to \$100 dollars or more^{*}, we will ship it (with no shipping charges)by UPS Ground, or US Mail upon your request. On any shipments with (no shipping charges)we reserve the right to choose the method of shipment. We also reserve the right to allow time for checks to clear before shipping any order. We also reserve the right to hold until the order is complete, this is only available in the US or its territories.
^{*} *Items excluded from prepayment free shipping are the same items listed as exceptions on our Backorder Policy, even though this may be an initial order.*

Returns: All returns require prior authorization. Requests for an RMA(returned materials authorization) must be made within 15 working days after receipt of product. Returned goods that are not authorized will be refused. Proof of authorization must be visible on the exterior of the package in the form of an RMA number given by us when return is authorized. We reserve the right to determine who will be responsible for return freight and the amount that may be reimbursed. **See Return Policy Pages.**

Call us! If you have any questions, comments, or suggestions. We welcome your input. **We are here to serve you!**

California Ph (805) 239-3169 fax (805) 239-4871 toll free (888) 247-2738
Georgia Ph (770) 683- 4190 fax (770) 683- 4192 toll free (877) 434-6889

Genuine Aircraft Hardware Co.

For us to be able to process your orders within the same business day, we will need them in by 2:00 pm Pacific Time, or sooner, if there is a long list of items or high quantities. In any case we will complete your order or quote as soon as possible.

All Printed Policies are subject to revision without notice,
see www.gen-aircraft-hardware.com, for latest status



Eastern* U.P.S. Red labels, and all Federal Express orders need to be in by 12:00 noon Pacific Time If you feel you have an emergency CALL NOW!

*From our California location, UPS considers the states of Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, New Mexico, Nevada, Oregon, Utah, Washington and Wyoming to be Western States.

All others States are Eastern, as far as our shipping logistics are concerned.

Some *very rural* regions in any state are also treated **as Eastern States**

Due to the potential for occasional extreme volume of orders,

We reserve the right to ship any order to fit our carriers requirements.

We will do our best to get your order out as soon after receipt as possible.

Genuine Aircraft Hardware Co.

All Printed Policies are subject to revision without notice,
see www.gen-aircraft-hardware.com, for latest status



Return Policy

*In cases where **You** have ordered incorrectly*

Normally there is no restocking fee for our standard stock Items *if you are ordering replacement Items of greater or equivalent value within 7 days from your actual receipt date.

All returns must be in original, UN-opened, traceable packaging, with a copy of the Invoice they were billed on showing the returned Items.

YOU ALWAYS NEED TO CALL FOR AN RMA # "RETURN MATERIALS AUTHORIZATION" BEFORE RETURNING ANYTHING. The RMA # will then need to be plainly marked on the outside of the package that the Items are being returned in.

The RMA # will become in-valid 14 days after it is issued, make certain that your return shipment will reach us within that time period.

We should have returned items in our facility within 30 days after invoice date.

There will be a restock fee if the return is not due to GAHco's error and you have not replaced the order with Items of greater or equivalent value within 7 days from your actual receipt date. see rate schedule.

If you bought it a very long time ago we may not take it back, or we may charge a higher fee, because accepting older orders back puts us in an excess position for that item.

Any Modification by the customer of any product renders items as not returnable or refundable regardless of other circumstances.

Restock Fee, Rate Schedule, GAHco.		
Authorized Within (Days after receipt)	Percentage Of Item Invoice value	Restock Fee / Notes / Considerations
7 days	0%	None if replacing with Items of greater or equivalent value
8 to 30	25%	Standard restock fee within customary time
31- 35	35%	Slight additional fee due to late return authorization
36-45	45%	Additional fee due to late return authorization
46-60	60%	Extra additional fee due to late return authorization
61 and up	90%	Suggestion, Consider keeping the product

Unauthorized returns will be **refused** at our receiving dock. We do not accept returns for special ordered "MISC" items.

* All special order Items (on our invoice as " Misc.") are non-returnable, non-refundable and Non Cancelable once ordered. They will only be accepted back as if they are proven to be defective. We retain the right to re-supply conforming Items or refund the price of the non-conforming Items at GAHco's discretion.

Please feel free to contact us anytime you have ideas or concerns that might help either one of us.

Respectfully Tom Brink, President, GAHco.
phone (805) 239-3169 **fax (805) 239-4871**

Genuine Aircraft Hardware Co.

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Return Policy

In cases where **GAHco.** has sent incorrect or defective product

We require that the customer notifies GAHco. within 15 days from the date of delivery at the customers facility, then GAHco. will replace the product with acceptable product at no additional cost to the customer.

If the item/items are not replaceable, a refund will be made in full for the item/items. GAHco. Will arrange and pay for the actual shipping costs of the returned goods when it has been determined that GAHco. has sent **incorrect** or **defective product**.

Incorrect product is: (Product that has a part # different from that listed on our **Certificate of Conformance / Terms of Acceptance**, or Product that has a part # different from that listed on the fax that the customer has sent over for their order.) We reserve the right to provide superseding part numbers in place of the originally requested part numbers.

Defective product is: (Product that is shown to be defective by comparing it to the Manufacturing Drawing, or Prints of the part number the product is supposed to conform to.)

After comparison, the non-conforming attributes of the product must be documented and presented to GAHco, either verbally over the phone or in more difficult to explain situations, by fax.

The customer may have us re-check parts of the same lot on our shelf, or by checking the returned item if that becomes necessary, such as when we are sold out of the item or the customer does not have the ability to verify the suspicion of the product in their possession.

Obvious physical defects such as; Poor Plating, Cracks, Gouges, Dings, Distortion, or incomplete machining will be determined valid or invalid after GAHco inspects the product at our facility.

Any Modification by the customer of any product renders items as not returnable or refundable regardless of other circumstances.

The customer will be notified of the determination and appropriate corrective action will be taken.

If we have sent incorrect or defective product, we apologize for any inconvenience, and will do our best to rectify the current problem, as well as to make our best effort to prevent things of this nature in the future.

Please feel free to contact us anytime you have ideas or concerns that might help either one of us.

Respectfully Tom Brink, President, GAHco.

phone (805) 239-3169

fax (805) 239-4871

Genuine Aircraft Hardware Co.

Backorder Policy

When you place an order with us for a normally stock item / items and we do not have enough to fill your order completely we will ship the backordered item / items by either UPS Ground or by US mail (our choice) with ***no additional charges to you for the shipping costs.**

There are some exceptions. For full details see www.gen-aircraft-hardware.com/handling.asp



Special order or (MISC.) items

.....
All Printed Policies are subject to revision without notice,
see www.gen-aircraft-hardware.com, for latest status
.....



Tubing and Hinge shipments.



Hose shipments in excess of 15 lbs.



Shipments outside of the United States or its Territories.



When You require freight other than UPS Ground or US mail.



Oversized, or items that must be Trucked.



COD fees still apply to each shipment, if terms are COD.

If you want us to ship the backorders for a specific order, in multiple shipments, you will be charged for the subsequent shipments beyond the first free backorder shipment.

*** Shipping is free** for backorders, **when the backorders are shipped complete** (all together).

We make strong efforts to anticipate usage, and stock sufficient quantities of popular or critical items for aircraft maintenance and repair.

We do not accept cancellations for special ordered "MISC" Items once we have ordered them in from our supplier/manufacturer. You will need to sign an acknowledgement for such.

When you accept a backordered amount on your original order, we consider this as your forgiveness for us not having enough in stock on hand, for your initial order.

We appreciate your patience while we make efforts to fill your order as soon as possible.

Genuine Aircraft Hardware Co.

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Is a Drug and Alcohol free workplace.

That doesn't mean we give it away for nothing, it means we don't allow anyone under the influence to work here.

WESTERN AEROMEDICAL CONSORTIUM

P. O. Box 3019
Santa Maria, CA 93457

This is to CERTIFY that:

Genuine Aircraft Hardware
4250 Aerotech Center Way, Unit B
Paso Robles, CA 93446

is an ACTIVE MEMBER of WESTERN AEROMEDICAL
CONSORTIUM'S Drug and Alcohol Program and desires
a safe and healthy workplace free from drugs and alcohol.

Member Account Code: WAC-GAH

This CERTIFICATE is renewable as specified by Consortium policy.

Member Since: September 12, 2000

Expiration Date: September 12, 2009

Kimberly LeClaire

Executive Director:

Western Aeromedical Consortium

Date Printed: 9/25/2008

This CERTIFICATE may be revoked upon evidence of non-compliance with Consortium policy.

Genuine Aircraft Hardware Co. New WebStore Info.

Our Website has recently been upgraded to a WebStore.

The new Webstore has even more technical information than the old Website.

(You may be eligible for FREE SHIPPING) see details on our Webstore www.gen-aircraft-hardware.com

Genuine Aircraft Hardware Company
 Prices are valid ONLY in USA and its Territories, for International Requests please E-mail us directly.
 *** If your order is A.O.G. or of an Urgent Nature, Please Call us directly ***
 Ph (805) 239-3169 Fax (805) 239-4871 Toll Free ph (888) 247-2738 or (888) AIR-CRFT

Welcome Customer [Logout](#)
 All prices subject to Availability on Hand at GAHCo. We will notify if any change.

Select AN Bolts, Regular AN3 -3 Basic Image Detailed Image

Bolt / Aircraft
 Typically Stocked: Yes (pkg/25)
 If prices are zero and the description reads, ***See Info***, then item is normally available with a short lead time at a local manufacturer we represent.

Quantity ea	25	50	100	250	500
Discount Percentage	50.00%	55.00%	60.00%	62.50%	65.00%
Cost Per ea	\$0.423	\$0.380	\$0.338	\$0.317	\$0.296
Cost Per pkg/25	\$10.563	\$9.506	\$8.450	\$7.922	\$7.394
List Per ea	\$0.845				
List Price: pkg/25	\$21.125				

[No Alternate] AN3-3 Related Items

All prices subject to Availability on Hand at GAHCo. We will notify if any change.

AN3-3 Qty. to Buy (ea) 1 Add To Cart
 Your order will be rounded to the nearest pkg/25

Searched 16,509 items, found 150 matches in 3.656 seconds

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Navigation menu:
 Home Page
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 Our Policies
 Certifications
 Distributors
 Website Tips
 Enter The Store
 EZ Entry Order Form
 Upload Item List
 Search Our Inventory
 Request For Quote
 View Cart
 ...or Click a Category
 Assortments / Kits
 1/4 Turn Fasteners
 Anti-Abrasion
 Bearings
 Bolts
 AN Hex Head Bolts
 AN Bolts, Regular
 AN Close
 Tolerance Bolts
 Drilled Head
 Engine Bolts
 AN Clevis Bolts

Our WebStore has been carefully designed to provide the maximum availability of Technical Information while making Shopping for, and the Verifying of available Items, as easy as possible.

All of the old features that made our site such a good technical resource are still on our home page.

The Technical Reference portions of our site are always available 24/7 logged in or not!

An easy to use Search for Part Numbers feature.

Advanced features for registered users that have logged in are;

Upload Item List, let our site match up items and figure out the details.

Unlimited use of the EZ-Entry Order Form.

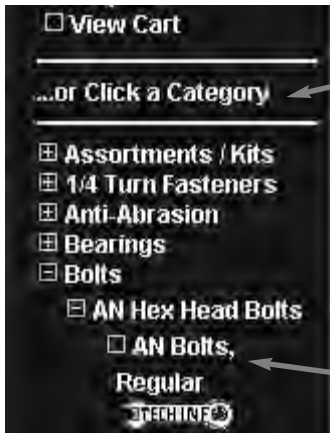
One of the most popular features of our WebStore is the Advanced Pricing Feature.

The advanced pricing feature operates in the active cart / basket. The server has special programming to review the prices of ALL the ITEMS in the cart, as items are added or taken out. You will always get the applicable qty discount for each line item based on how many of that item you have selected. You can then, after reaching certain dollar amounts, get an additional discount based on the total order value, this will be shown under the major column heading of |Discounts| in the right sub-column |Order|. You

Genuine Aircraft Hardware Co.

may also get an additional Discount for being a registered customer, how much depends on your purchasing history and your potential. This is set manually from the home office. This additional discount is under |Discounts| in the center column of |Cust.| (see Cart Example Screenshot at page Web_4 and note (A) also)

To Start Shopping you must Log-In, click on Enter Online Store, to the left of our name at the top, or Enter the Store, on the left side menu. If you do not already have a USER ID: and would like to be more than an Anonymous Shopper, click on the 2nd class Ribbon, and fill in the form, after our processing, you will become a 1st Class customer with full Webstore privileges. *If you are in a hurry to order and you have submitted your 2nd Class Form through the web, you can call us at 888-247-2738 to expedite processing, or just shop, our system automatically logs you in as 3rd class when you have completed the 2nd class form submission.*



You may find the items and details by using the Categories on the left side, and clicking on the sub levels until you see what you are looking for.

Once you get to the Category and Title of the Item/Items you are interested in you can click on the (TECH INFO) wrench to open up a PDF document. Typically it will be a page or pages from our Reference Book that relates specifically to that category items.

Once you have logged in, and the store is open, (Sunday 12:01 am to Friday 4:00 pm, Pacific Time).

You may then click on the text (just above the little wrench, when shown) this will take you to a window where you select from items in this category ie: once you have clicked through the category Bolt, Hex Head Bolts, and then Regular AN Bolts, you then select the item number you are looking for in the dropdown lists found in the upper gray horizontal rectangle.



The first list on the left is the Prefix box, the one just to the right of it is the Suffix box. The Item Numbers are split into two sections to reduce selection time for the item you are looking for. Once selecting the Prefix and the Suffix, you will then see the Available Information for that item directly on the screen. (see previous page)

(we know the pictures below are not part number AN3-3, we just used bigger bolts for clarity)



In the upper horizontal rectangle on the left, you will see the Category of your Selected item. To the right, if available, will be buttons for [Basic Image] and [Detailed Image]. Clicking on these may take the mystery out of what you are buying or just re-assure you that you are getting what you thought you needed. The Basic Image is self explanatory.

GENUINE AIRCRAFT HARDWARE Co.
 Helping Aviation Stay Together 

P/N, **AN5-15**
AN Bolt

Head:HEX Drive:1/2 Wrench
 Thread Dia/Pitch: 5/16-24
 Grip Length: 1.188"
 Overall Length: 1.719"

Drilled: Head=NO Threads=YES
 Material: Steel Cad II Plated
 Tensile Strength: 125k,psi



ALL Documents, Images and Data are for Reference Only. Not intended for design. Not guaranteed for accuracy.
 Tolerances are not listed, see Reference Book pages for tolerances if applicable.
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The Detailed Image typically has the same picture as the Basic image plus the applicable data from our reference book.

Genuine Aircraft Hardware Co.

Below the upper horizontal rectangle you will also see a lot of other information, whether the Items are Typically Stocked, what size of package (pkg/qty) they are stocked in, the Pricing Information including the Quantity Breaks.

Select AN Bolts, Regular AN3 -3 Basic Image Detailed Image

Bolt / Aircraft
Typically Stocked: Yes (pkg/25)
If prices are zero and the description reads, ***See Info***, then item is normally available with a short lead time at a local manufacturer we represent.

Quantity ea	25	50	100	250	500
Discount Percentage	50.00%	55.00%	60.00%	62.50%	65.00%
Cost Per ea	\$0.423	\$0.380	\$0.338	\$0.317	\$0.296
Cost Per pkg/25	\$10.563	\$9.506	\$8.450	\$7.922	\$7.394
List Per ea	\$0.845				
List Price: pkg/25	\$21.125				

No Alternate AN3-3 Related Items

AN3-3 Qty. to Buy (ea) 1 Add To Cart
Your order will be rounded to the nearest pkg/25

Discount Percentage

Possible Alternate

When the item you selected has a message below the upper horizontal rectangle stating Typically Stocked: No Try Alternate Shown Below, then you will need to:

Select an Alternate that indicates that it is Typically Stocked,

(original item in this illustration was NAS464P3-22)

Discount Percentage

Possible Alternate

Possible Alternate

NAS1103-22D

NAS6203-22D Typically Stocked

Once you select a Typically Stocked item, then you will see all the pricing and packaging information for that item.

AN3-3 Related Items

AN3-3 Related Items

- NAS1149F0363P (Washers)
- NAS1149F0332P (Washers)
- AN310-3 (Nuts Non Locking)
- MS14144L3 (Nuts Locking)
- MS24665-132 (Cotter Pins)

150 matches

Some items also have Related Items. The related Items are usually things that are used with the original item selected, such as Washers, Nuts, or Cotter Pins, that could be used with a Drilled Shank Bolt. This is the most common relation. A relation like this is created in our system to show the items related to the primary fastener such as a Bolt or Screw. We will then show what could be installed with them, but we do not show all the items that could be used with a Nut or a Washer, because they would be too numerous to list or even figure out. These

Relations are only suggested items, it is still your responsibility to verify that the items or combination of items are appropriate, approved and/or legal for installation on your equipment.

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No Alternate AN3-3 Related Items

All prices subject to Availability on Hand at GAHCo. We will notify if any change.

AN3-3 Qty. to Buy (ea) : 1 **Add To Cart**

Your order will be rounded to the nearest pkg/25

The lower horizontal rectangle is where the purchase quantity desired is put, just to the left of the [Add To] Cart button. If you put any qty in the box less that the indicated packaged amount, and then press Add To Cart, the system will automatically increase the qty to the nearest packaged amount. The Solid Rivets, are typically packaged in by the 1/4 #, you may order these by putting in whole numbers, IE 1= .25#, 4 = 1 full #. Some of the uncommon rivets may be sold by the piece as indicated.

Current Items in your basket 

This is the Cart Example screenshot
 Note: this cart does not have enough for additional discounts

P/N	Description	Quantity	List Price	Discounts			Item Cost	Line Total	Check To Remove
				Qty.	Cust.	Order			
AN3-3	AN Bolts	25	ea \$0.8450 per ea	50.0%	0.0%	0.0%	\$0.4225 per ea	\$10.56	<input type="checkbox"/>
NAS1149F0363P	Washers	100	ea \$0.0760 per ea	40.0%	0.0%	0.0%	\$0.0456 per ea	\$4.56	<input type="checkbox"/>
AN310-3	Nuts Non Locking	25	ea \$0.8925 per ea	50.0%	0.0%	0.0%	\$0.4463 per ea	\$11.16	<input type="checkbox"/>
MS24665-132	Cotter Pins	100	ea \$0.0336 per ea	40.0%	0.0%	0.0%	\$0.0202 per ea	\$2.02	<input type="checkbox"/>
Total Price								\$28.29	

You may change quantities or click "Check To Remove" then press "Update Basket" below.

Update Basket

Proceed to Checkout

Once you have verified that you have the correct item and quantity, click on [Add To Cart], Then you will be looking into the actual Shopping Cart. While in the Cart you may;

- (A) View the pricing of your total order. (these prices may not be actual prices. Note: this cart does not have enough for additional discounts)
- (B) Change the quantities on any item in the cart. (Cart will round up to nearest package qty automatically)
- (C) Click on items in the P/N column and see details about the item you may have missed.
- (D) Remove an unwanted Item from the Cart / Basket, place check at in box, and [Update Basket]
- (E) When you are satisfied with the items in you basket press [Proceed To Checkout] and follow further directions after that.

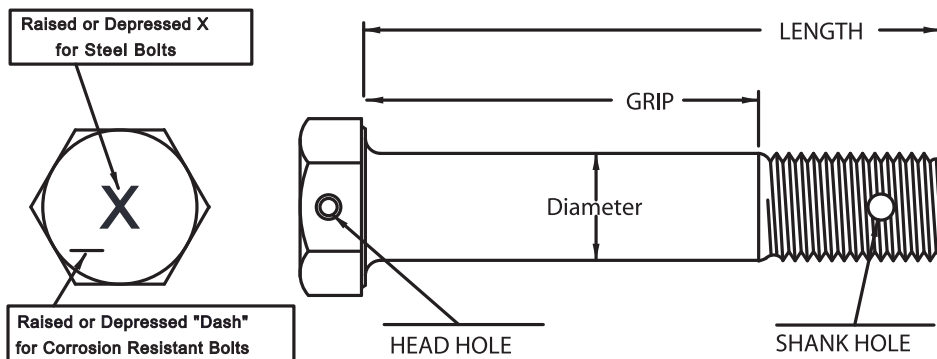
If you have questions try the [Website Tips](#) link in the left upper side of our site.

If you have trouble and it is during business hours, please call and we will do our best to assist you.

If after hours please send e-mail to techanswers@gen-aircraft-hardware.com, we will reply a.s.a.p.

Genuine Aircraft Hardware Co.

AN3 - AN20 Bolts Diameter / Head Size / Hole Sizes



HELP WITH THE SELECTION OF PART NUMBERS

The first number after "AN" designates the (Diameter). The next symbol designates material and head drill if applicable.

USE (-) After the diameter for (Steel, Cad II plated). No hole in the head.

USE (C) In place of (-) for (Corrosion Resistant Steel).

ADD (H) In place of (-) or after (C) for a hole in the head.

THE (A) The presence of the (A) at the very end of all the numbers means that there will be no hole in the shank.

The last number, either single or double digit denotes length. If it is a single digit this is the nominal length in 1/8ths of an inch. If it is a two digit number, the first is whole inches, the second is additional 1/8ths; this is a nominal sizing. SEE THE CHARTS!

Kits Available pages 265,266

Examples of part numbers:

AN4-14 = 1/4 DIAMETER, 28 THREADS PER INCH, STEEL, CAD II PLATING, 1.063 GRIP, 1.531 OVERALL LENGTH, NO HOLE IN HEAD, HOLE IN SHANK.

AN4-14A = 1/4 DIAMETER, 28 THREADS PER INCH, STEEL, CAD II PLATING, 1.063 GRIP, 1.531 OVERALL LENGTH, NO HOLE IN HEAD OR SHANK.

AN4C14 = 1/4 DIAMETER, 28 THREADS PER INCH, CORROSION RESISTANT STEEL, UNPLATED, 1.063 GRIP, 1.531 O.A.L., NO HOLE IN HEAD, HOLE IN SHANK.

AN4C14A = 1/4 DIAMETER, 28 THREADS PER INCH, CORROSION RESISTANT STEEL, UNPLATED, 1.063 GRIP, 1.531 O.A.L., NO HOLE IN HEAD OR SHANK.

AN4CH14A = 1/4 DIAMETER, 28 THREADS PER INCH, CORROSION RESISTANT STEEL, UNPLATED, 1.063 GRIP, 1.531 O.A.L., HOLE IN HEAD AND NO HOLE IN SHANK.

AN4H14 = 1/4 DIAMETER, 28 THREADS PER INCH, STEEL, CAD II PLATING, 1.063 GRIP, 1.531 OVERALL LENGTH, HOLE IN HEAD, HOLE IN SHANK.

AN4H14A = 1/4 DIAMETER, 28 THREADS PER INCH, STEEL, CAD II PLATING, 1.063 GRIP, 1.531 OVERALL LENGTH, HOLE IN HEAD, NO HOLE IN SHANK.

NOTE: all dimensions in inches

AN # BASIC	THREAD DIA/PITCH	DIA. MAX	DIA. MIN	WRENCH SIZE	HOLE,SHANK +.010, -.000	HOLE,HEAD +.010, -.000	COMMONLY USED STEEL COTTER	COMMONLY USED STAINLESS COTTER
AN3	10-32	.189	.186	3/8"	.070	.046	MS24665-132	MS24665-151
AN4	1/4-28	.249	.246	7/16"	.076	.046	MS24665-132	MS24665-151
AN5	5/16-24	.312	.309	1/2"	.076	.070	MS24665-210	MS24665-229
AN6	3/8-24	.374	.371	9/16"	.106	.070	MS24665-283	MS24665-300
AN7	7/16-20	.437	.433	5/8"	.106	.070	MS24665-283	MS24665-300
AN8	1/2-20	.499	.495	3/4"	.106	.070	MS24665-285	MS24665-302
AN9	9/16-18	.562	.558	7/8"	.141	.070	MS24665-353	MS24665-370
AN10	5/8-18	.624	.620	15/16"	.141	.070	MS24665-355	MS24665-372
AN12	3/4-16	.749	.744	1+1/16"	.141	.070	MS24665-355	MS24665-372
AN14	7/8-14	.874	.869	1+1/4"	.141	.070	MS24665-357	MS24665-374
AN16*	1"-14	.999	.993	1+1/2"	.141	.070	MS24665-359	MS24665-376
AN17	1"-12	.999	.993	1+1/2"	.141	.070	MS24665-359	MS24665-376
AN18	1 1/8-12	1.124	1.118	1+5/8"	.141	.070	MS24665-359	MS24665-376
AN20	1 1/4-12	1.249	1.243	1+7/8"	.141	.070	MS24665-360	MS24665-377

* The thread pitch 1"-14 became INACTIVE FOR DESIGN after June 1966.

Genuine Aircraft Hardware Co.

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AN Bolts Dash # / Grip Length / Overall Length

NOTE: all dimensions in inches

-Nu.	AN3-GRIP + or - 1/64"	AN3-O.A.L. +1/32 -1/64	AN4-GRIP + or - 1/64"	AN4-O.A.L. +1/32 -1/64	AN5-GRIP + or - 1/64"	AN5-O.A.L. +1/32 -1/64	AN6-GRIP + or - 1/64"	AN6-O.A.L. +1/32 -1/64	AN7-GRIP + or - 1/64"	AN7-O.A.L. +1/32 -1/64	AN8-GRIP + or - 1/64"	AN8-O.A.L. +1/32 -1/64
3	0.063	0.469	0.063	0.469								
4	0.125	0.531	0.063	0.531	0.063	0.594						
5	0.250	0.656	0.188	0.656	0.188	0.719	0.063	0.703	0.063	0.719		
6	0.375	0.781	0.313	0.781	0.313	0.844	0.188	0.828	0.188	0.844	0.063	0.844
7	0.500	0.906	0.438	0.906	0.438	0.969	0.313	0.953	0.313	0.969	0.188	0.969
10	0.625	1.031	0.563	1.031	0.563	1.094	0.438	1.078	0.438	1.094	0.313	1.094
11	0.750	1.156	0.688	1.156	0.688	1.219	0.563	1.203	0.563	1.219	0.438	1.219
12	0.875	1.281	0.813	1.281	0.813	1.344	0.688	1.328	0.688	1.344	0.563	1.344
13	1.000	1.406	0.938	1.406	0.938	1.469	0.813	1.453	0.813	1.469	0.688	1.469
14	1.125	1.531	1.063	1.531	1.063	1.594	0.938	1.578	0.938	1.594	0.813	1.594
15	1.250	1.656	1.188	1.656	1.188	1.719	1.063	1.703	1.063	1.719	0.938	1.719
16	1.375	1.781	1.313	1.781	1.313	1.844	1.188	1.828	1.188	1.844	1.063	1.844
17	1.500	1.906	1.438	1.906	1.438	1.969	1.313	1.953	1.313	1.969	1.188	1.969
20	1.625	2.031	1.563	2.031	1.563	2.094	1.438	2.078	1.438	2.094	1.313	2.094
21	1.750	2.156	1.688	2.156	1.688	2.219	1.563	2.203	1.563	2.219	1.438	2.219
22	1.875	2.281	1.813	2.281	1.813	2.344	1.688	2.328	1.688	2.344	1.563	2.344
23	2.000	2.406	1.938	2.406	1.938	2.469	1.813	2.453	1.813	2.469	1.688	2.469
24	2.125	2.531	2.063	2.531	2.063	2.594	1.938	2.578	1.938	2.594	1.813	2.594
25	2.250	2.656	2.188	2.656	2.188	2.719	2.063	2.703	2.063	2.719	1.938	2.719
26	2.375	2.781	2.313	2.781	2.313	2.844	2.188	2.828	2.188	2.844	2.063	2.844
27	2.500	2.906	2.438	2.906	2.438	2.969	2.313	2.953	2.313	2.969	2.188	2.969
30	2.625	3.031	2.563	3.031	2.563	3.094	2.438	3.078	2.438	3.094	2.313	3.094
31	2.750	3.156	2.688	3.156	2.688	3.219	2.563	3.203	2.563	3.219	2.438	3.219
32	2.875	3.281	2.813	3.281	2.813	3.344	2.688	3.328	2.688	3.344	2.563	3.344
33	3.000	3.406	2.938	3.406	2.938	3.469	2.813	3.453	2.813	3.469	2.688	3.469
34	3.125	3.531	3.063	3.531	3.063	3.594	2.938	3.578	2.938	3.594	2.813	3.594
35	3.250	3.656	3.188	3.656	3.188	3.719	3.063	3.703	3.063	3.719	2.938	3.719
36	3.375	3.781	3.313	3.781	3.313	3.844	3.188	3.828	3.188	3.844	3.063	3.844
37	3.500	3.906	3.438	3.906	3.438	3.969	3.313	3.953	3.313	3.969	3.188	3.969
40	3.625	4.031	3.563	4.031	3.563	4.094	3.438	4.078	3.438	4.094	3.313	4.094
41	3.750	4.156	3.688	4.156	3.688	4.219	3.563	4.203	3.563	4.219	3.438	4.219
42	3.875	4.281	3.813	4.281	3.813	4.344	3.688	4.328	3.688	4.344	3.563	4.344
43	4.000	4.406	3.938	4.406	3.938	4.469	3.813	4.453	3.813	4.469	3.688	4.469
44	4.125	4.531	4.063	4.531	4.063	4.594	3.938	4.578	3.938	4.594	3.813	4.594
45	4.250	4.656	4.188	4.656	4.188	4.719	4.063	4.703	4.063	4.719	3.938	4.719
46	4.375	4.781	4.313	4.781	4.313	4.844	4.188	4.828	4.188	4.844	4.063	4.844
47	4.500	4.906	4.438	4.906	4.438	4.969	4.313	4.953	4.313	4.969	4.188	4.969
50	4.625	5.031	4.563	5.031	4.563	5.094	4.438	5.078	4.438	5.094	4.313	5.094
51	4.750	5.156	4.688	5.156	4.688	5.219	4.563	5.203	4.563	5.219	4.438	5.219
52	4.875	5.281	4.813	5.281	4.813	5.344	4.688	5.328	4.688	5.344	4.563	5.344
53	5.000	5.406	4.938	5.406	4.938	5.469	4.813	5.453	4.813	5.469	4.688	5.469
54	5.125	5.531	5.063	5.531	5.063	5.594	4.938	5.578	4.938	5.594	4.813	5.594
55	5.250	5.656	5.188	5.656	5.188	5.719	5.063	5.703	5.063	5.719	4.938	5.719
56	5.375	5.781	5.313	5.781	5.313	5.844	5.188	5.828	5.188	5.844	5.063	5.844
57	5.500	5.906	5.438	5.906	5.438	5.969	5.313	5.953	5.313	5.969	5.188	5.969
60	5.625	6.031	5.563	6.031	5.563	6.094	5.438	6.078	5.438	6.094	5.313	6.094
61	5.750	6.156	5.688	6.156	5.688	6.219	5.563	6.203	5.563	6.219	5.438	6.219
62	5.875	6.281	5.813	6.281	5.813	6.344	5.688	6.328	5.688	6.344	5.563	6.344
63	6.000	6.406	5.938	6.406	5.938	6.469	5.813	6.453	5.813	6.469	5.688	6.469
64	6.125	6.531	6.063	6.531	6.063	6.594	5.938	6.578	5.938	6.594	5.813	6.594
65	6.250	6.656	6.188	6.656	6.188	6.719	6.063	6.703	6.063	6.719	5.938	6.719
66	6.375	6.781	6.313	6.781	6.313	6.844	6.188	6.828	6.188	6.844	6.063	6.844
67	6.500	6.906	6.438	6.906	6.438	6.969	6.313	6.953	6.313	6.969	6.188	6.969
70	6.625	7.031	6.563	7.031	6.563	7.094	6.438	7.078	6.438	7.094	6.313	7.094
71	6.750	7.156	6.688	7.156	6.688	7.219	6.563	7.203	6.563	7.219	6.438	7.219
72	6.875	7.281	6.813	7.281	6.813	7.344	6.688	7.328	6.688	7.344	6.563	7.344
73	7.000	7.406	6.938	7.406	6.938	7.469	6.813	7.453	6.813	7.469	6.688	7.469
74	7.125	7.531	7.063	7.531	7.063	7.594	6.938	7.578	6.938	7.594	6.813	7.594
75	7.250	7.656	7.188	7.656	7.188	7.719	7.063	7.703	7.063	7.719	6.938	7.719
76	7.375	7.781	7.313	7.781	7.313	7.844	7.188	7.828	7.188	7.844	7.063	7.844
77	7.500	7.906	7.438	7.906	7.438	7.969	7.313	7.953	7.313	7.969	7.188	7.969
80	7.625	8.031	7.563	8.031	7.563	8.094	7.438	8.078	7.438	8.094	7.313	8.094

Genuine Aircraft Hardware Co.

AN Bolts

Dash # / Grip Length / Overall Length

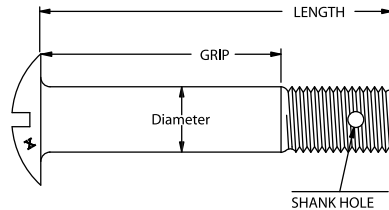
NOTE: all dimensions in inches

-Nu.	AN9-GRIP	AN9-O.A.L.	AN10-GRIP	AN10-O.A.L.	AN12-GRIP	AN12-O.A.L.	AN14-GRIP	AN14-O.A.L.	AN16,17GR	AN16,17OA	AN18-GRIP	AN18-O.A.L.	AN20-GRIP	AN20-O.A.L.
	+ or - 1/64"	+1/32 -1/64"	+ or - 1/64"	+1/32 -1/64"	+ or - 1/64"	+1/32 -1/64"	+ or - 1/64"	+1/32 -1/64"	+ or - 1/64"	+1/32 -1/64"	+ or - 1/64"	+1/32 -1/64"	+ or - 1/64"	+1/32 -1/64"
6	0.063	0.969												
7	0.125	1.031	0.063	1.016										
10	0.250	1.156	0.188	1.141	0.063	1.156								
11	0.375	1.281	0.313	1.266	0.188	1.281	0.063	1.313						
12	0.500	1.406	0.438	1.391	0.313	1.406	0.188	1.438	0.125	1.500				
13	0.625	1.531	0.563	1.516	0.438	1.531	0.313	1.563	0.250	1.625	0.063	1.563		
14	0.750	1.656	0.688	1.641	0.563	1.656	0.438	1.688	0.375	1.750	0.188	1.688		
15	0.875	1.781	0.813	1.766	0.688	1.781	0.563	1.813	0.500	1.875	0.313	1.813	0.125	1.813
16	1.000	1.906	0.938	1.891	0.813	1.906	0.688	1.938	0.625	2.000	0.438	1.938	0.250	1.938
17	1.125	2.031	1.063	2.016	0.938	2.031	0.813	2.063	0.750	2.125	0.563	2.063	0.375	2.063
20	1.250	2.156	1.188	2.141	1.063	2.156	0.938	2.188	0.875	2.250	0.688	2.188	0.500	2.188
21	1.375	2.281	1.313	2.266	1.188	2.281	1.063	2.313	1.000	2.375	0.813	2.313	0.625	2.313
22	1.500	2.406	1.438	2.391	1.313	2.406	1.188	2.438	1.125	2.500	0.938	2.438	0.750	2.438
23	1.625	2.531	1.563	2.516	1.438	2.531	1.313	2.563	1.250	2.625	1.063	2.563	0.875	2.563
24	1.750	2.656	1.688	2.641	1.563	2.656	1.438	2.688	1.375	2.750	1.188	2.688	1.000	2.688
25	1.875	2.781	1.813	2.766	1.688	2.781	1.563	2.813	1.500	2.875	1.313	2.813	1.125	2.813
26	2.000	2.906	1.938	2.891	1.813	2.906	1.688	2.938	1.625	3.000	1.438	2.938	1.250	2.938
27	2.125	3.031	2.063	3.016	1.938	3.031	1.813	3.063	1.750	3.125	1.563	3.063	1.375	3.063
30	2.250	3.156	2.188	3.141	2.063	3.156	1.938	3.188	1.875	3.250	1.688	3.188	1.500	3.188
31	2.375	3.281	2.313	3.266	2.188	3.281	2.063	3.313	2.000	3.375	1.813	3.313	1.625	3.313
32	2.500	3.406	2.438	3.391	2.313	3.406	2.188	3.438	2.125	3.500	1.938	3.438	1.750	3.438
33	2.625	3.531	2.563	3.516	2.438	3.531	2.313	3.563	2.250	3.625	2.063	3.563	1.875	3.563
34	2.750	3.656	2.688	3.641	2.563	3.656	2.438	3.688	2.375	3.750	2.188	3.688	2.000	3.688
35	2.875	3.781	2.813	3.766	2.688	3.781	2.563	3.813	2.500	3.875	2.313	3.813	2.125	3.813
36	3.000	3.906	2.938	3.891	2.813	3.906	2.688	3.938	2.625	4.000	2.438	3.938	2.250	3.938
37	3.125	4.031	3.063	4.016	2.938	4.031	2.813	4.063	2.750	4.125	2.563	4.063	2.375	4.063
40	3.250	4.156	3.188	4.141	3.063	4.156	2.938	4.188	2.875	4.250	2.688	4.188	2.500	4.188
41	3.375	4.281	3.313	4.266	3.188	4.281	3.063	4.313	3.000	4.375	2.813	4.313	2.625	4.313
42	3.500	4.406	3.438	4.391	3.313	4.406	3.188	4.438	3.125	4.500	2.938	4.438	2.750	4.438
43	3.625	4.531	3.563	4.516	3.438	4.531	3.313	4.563	3.250	4.625	3.063	4.563	2.875	4.563
44	3.750	4.656	3.688	4.641	3.563	4.656	3.438	4.688	3.375	4.750	3.188	4.688	3.000	4.688
45	3.875	4.781	3.813	4.766	3.688	4.781	3.563	4.813	3.500	4.875	3.313	4.813	3.125	4.813
46	4.000	4.906	3.938	4.891	3.813	4.906	3.688	4.938	3.625	5.000	3.438	4.938	3.250	4.938
47	4.125	5.031	4.063	5.016	3.938	5.031	3.813	5.063	3.750	5.125	3.563	5.063	3.375	5.063
50	4.250	5.156	4.188	5.141	4.063	5.156	3.938	5.188	3.875	5.250	3.688	5.188	3.500	5.188
51	4.375	5.281	4.313	5.266	4.188	5.281	4.063	5.313	4.000	5.375	3.813	5.313	3.625	5.313
52	4.500	5.406	4.438	5.391	4.313	5.406	4.188	5.438	4.125	5.500	3.938	5.438	3.750	5.438
53	4.625	5.531	4.563	5.516	4.438	5.531	4.313	5.563	4.250	5.625	4.063	5.563	3.875	5.563
54	4.750	5.656	4.688	5.641	4.563	5.656	4.438	5.688	4.375	5.750	4.188	5.688	4.000	5.688
55	4.875	5.781	4.813	5.766	4.688	5.781	4.563	5.813	4.500	5.875	4.313	5.813	4.125	5.813
56	5.000	5.906	4.938	5.891	4.813	5.906	4.688	5.938	4.625	6.000	4.438	5.938	4.250	5.938
57	5.125	6.031	5.063	6.016	4.938	6.031	4.813	6.063	4.750	6.125	4.563	6.063	4.375	6.063
60	5.250	6.156	5.188	6.141	5.063	6.156	4.938	6.188	4.875	6.250	4.688	6.188	4.500	6.188
61	5.375	6.281	5.313	6.266	5.188	6.281	5.063	6.313	5.000	6.375	4.813	6.313	4.625	6.313
62	5.500	6.406	5.438	6.391	5.313	6.406	5.188	6.438	5.125	6.500	4.938	6.438	4.750	6.438
63	5.625	6.531	5.563	6.516	5.438	6.531	5.313	6.563	5.250	6.625	5.063	6.563	4.875	6.563
64	5.750	6.656	5.688	6.641	5.563	6.656	5.438	6.688	5.375	6.750	5.188	6.688	5.000	6.688
65	5.875	6.781	5.813	6.766	5.688	6.781	5.563	6.813	5.500	6.875	5.313	6.813	5.125	6.813
66	6.000	6.906	5.938	6.891	5.813	6.906	5.688	6.938	5.625	7.000	5.438	6.938	5.250	6.938
67	6.125	7.031	6.063	7.016	5.938	7.031	5.813	7.063	5.750	7.125	5.563	7.063	5.375	7.063
70	6.250	7.156	6.188	7.141	6.063	7.156	5.938	7.188	5.875	7.250	5.688	7.188	5.500	7.188
71	6.375	7.281	6.313	7.266	6.188	7.281	6.063	7.313	6.000	7.375	5.813	7.313	5.625	7.313
72	6.500	7.406	6.438	7.391	6.313	7.406	6.188	7.438	6.125	7.500	5.938	7.438	5.750	7.438
73	6.625	7.531	6.563	7.516	6.438	7.531	6.313	7.563	6.250	7.625	6.063	7.563	5.875	7.563
74	6.750	7.656	6.688	7.641	6.563	7.656	6.438	7.688	6.375	7.750	6.188	7.688	6.000	7.688
75	6.875	7.781	6.813	7.766	6.688	7.781	6.563	7.813	6.500	7.875	6.313	7.813	6.125	7.813
76	7.000	7.906	6.938	7.891	6.813	7.906	6.688	7.938	6.625	8.000	6.438	7.938	6.250	7.938
77	7.125	8.031	7.063	8.016	6.938	8.031	6.813	8.063	6.750	8.125	6.563	8.063	6.375	8.063
80	7.250	8.156	7.188	8.141	7.063	8.156	6.938	8.188	6.875	8.250	6.688	8.188	6.500	8.188

Genuine Aircraft Hardware Co.

AN23 - AN26 Clevis Bolts

Diameter / Head Size / Hole Size



HELP WITH THE SELECTION OF PART NUMBERS

The first number after "AN" designates the (Diameter). The next symbol designates the material.
 USE (-) After the diameter for (Steel, Cad II plated). Not made of any other material.
 THE (A) The presence of the (A) at the very end of all the numbers means that there will be no hole in the shank.
 The last number, either single or double digit denotes length. This number denotes the nominal overall length from under the head in 1/16" increments. Not including the amount for standard washer allowance. SEE THE CHARTS!

Examples of part numbers:

AN24-16 = 1/4 DIAMETER, 28 THREADS PER INCH, STEEL, CAD II PLATING, 688 GRIP, 1.033 OVERALL LENGTH, HOLE IN SHANK.
 AN24-16A = 1/4 DIAMETER, 28 THREADS PER INCH, STEEL, CAD II PLATING, 688 GRIP, 1.033 OVERALL LENGTH, NO HOLE IN SHANK

NOTE: all dimensions in inches

AN # BASIC	THREAD DIA/PITCH	DIA. +.000 -.002	HOLE,SHANK +.010, -.000	HEAD DIAMETER	NYLON LOCKNUT	CASTLE NUT	COMMONLY USED STEEL COTTER	COMMONLY USED STAINLESS COTTER
AN23	10-32	.186	.070	3/8"	MS21083N3	AN320-3	MS24665-132	MS24665-151
AN24	1/4-28	.248	.076	1/2"	MS21083N4	AN320-4	MS24665-132	MS24665-151
AN25	5/16-24	.311	.076	5/8"	MS21083N5	AN320-5	MS24665-210	MS24665-229
AN26	3/8-24	.373	.106	1 1/16"	MS21083N6	AN320-6	MS24665-283	MS24665-300

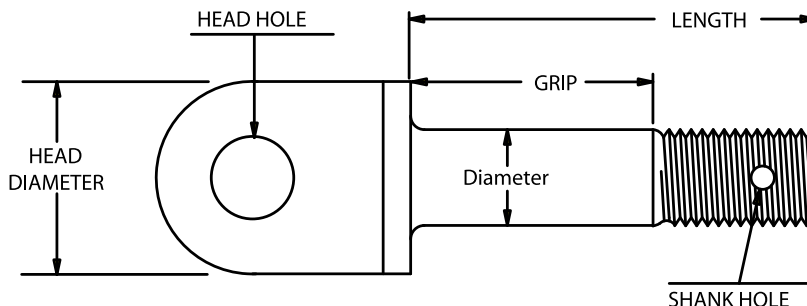
Dash # / Grip Length / Overall Length

-Nu	AN23-GRIP + or - 1/64"	AN23-OAL + or - 1/64"	AN24-GRIP + or - 1/64"	AN24-OAL + or - 1/64"	AN25-GRIP + or - 1/64"	AN25-OAL + or - 1/64"	AN26-GRIP + or - 1/64"	AN26-OAL + or - 1/64"
8	0.188	0.531	0.188	0.531				
9	0.250	0.594	0.250	0.594	0.250	0.609	0.250	0.609
10	0.313	0.656	0.313	0.656	0.313	0.672	0.313	0.672
11	0.375	0.719	0.375	0.719	0.375	0.734	0.375	0.734
12	0.438	0.781	0.438	0.781	0.438	0.797	0.438	0.797
13	0.500	0.844	0.500	0.844	0.500	0.859	0.500	0.859
14	0.563	0.906	0.563	0.906	0.563	0.922	0.563	0.922
15	0.625	0.969	0.625	0.969	0.625	0.984	0.625	0.984
16	0.688	1.031	0.688	1.031	0.688	1.047	0.688	1.047
17	0.750	1.094	0.750	1.094	0.750	1.109	0.750	1.109
18	0.813	1.156	0.813	1.156	0.813	1.172	0.813	1.172
19	0.875	1.219	0.875	1.219	0.875	1.234	0.875	1.234
20	0.938	1.281	0.938	1.281	0.938	1.297	0.938	1.297
21	1.000	1.344	1.000	1.344	1.000	1.359	1.000	1.359
22	1.063	1.406	1.063	1.406	1.063	1.422	1.063	1.422
23	1.125	1.469	1.125	1.469	1.125	1.484	1.125	1.484
24	1.188	1.531	1.188	1.531	1.188	1.547	1.188	1.547
25	1.250	1.594	1.250	1.594	1.250	1.609	1.250	1.609
26	1.313	1.656	1.313	1.656	1.313	1.672	1.313	1.672
27	1.375	1.719	1.375	1.719	1.375	1.734	1.375	1.734
28	1.438	1.781	1.438	1.781	1.438	1.797	1.438	1.797
29	1.500	1.844	1.500	1.844	1.500	1.859	1.500	1.859
30	1.563	1.906	1.563	1.906	1.563	1.922	1.563	1.922
31	1.625	1.969	1.625	1.969	1.625	1.984	1.625	1.984
32	1.688	2.031	1.688	2.031	1.688	2.047	1.688	2.047
33	1.750	2.094	1.750	2.094	1.750	2.109	1.750	2.109
34	1.813	2.156	1.813	2.156	1.813	2.172	1.813	2.172
35	1.875	2.219	1.875	2.219	1.875	2.234	1.875	2.234
36	1.938	2.281	1.938	2.281	1.938	2.297	1.938	2.297
37	2.000	2.344	2.000	2.344	2.000	2.359	2.000	2.359
38	2.063	2.406	2.063	2.406	2.063	2.422	2.063	2.422
39	2.125	2.469	2.125	2.469	2.125	2.484	2.125	2.484
40	2.188	2.531	2.188	2.531	2.188	2.547	2.188	2.547

Genuine Aircraft Hardware Co.

AN42B - AN49 Eyebolts

Diameter / Head Size / Hole Sizes



HELP WITH THE SELECTION OF PART NUMBERS

The first number after "AN4" designates the (Diameter). SEE THE CHART.

The next symbol designates material.

THE (B) Is after AN42 and AN43 always. It denotes a revision in hole size after 1982.

THE (-) Goes after the basic number to designate steel.

USE (C) After (B) or in place of (-) for (Corrosion Resistant Steel).

THE (A) The presence of the (A) at the very end of all the numbers means that there will be no hole in the shank.

The last number, either single or double digit denotes length. If it is a single digit this is the nominal length in 1/8ths of an inch. If it is a two digit number, the first is Whole Inches, the second is additional 1/8ths; this is a nominal sizing. SEE THE CHARTS (next page).

Examples of part numbers:

AN43B14 = 1/4 DIAMETER, 28 THREADS PER INCH, STEEL, CAD II PLATING, 1.063 GRIP, 1.531 OVERALL LENGTH, HOLE IN SHANK.

AN43B14A = 1/4 DIAMETER, 28 THREADS PER INCH, STEEL, CAD II PLATING, 1.063 GRIP, 1.531 OVERALL LENGTH, NO HOLE IN SHANK.

AN43BC14 = 1/4 DIAMETER, 28 THREADS PER INCH, CORROSION RESISTANT STEEL, UNPLATED, 1.063 GRIP, 1.531 O.A.L., HOLE IN SHANK.

AN43BC14A = 1/4 DIAMETER, 28 THREADS PER INCH, CORROSION RESISTANT STEEL, UNPLATED, 1.063 GRIP, 1.531 O.A.L., NO HOLE IN SHANK.

NOTE: all dimensions in inches

AN # BASIC	THREAD DIA/PITCH	DIA. MAX	DIA. MIN	HEAD DIA.	HOLE, SHANK + or - .010	HOLE, HEAD Nominal	COMMONLY USED STEEL COTTER	COMMONLY USED STAINLESS COTTER
AN42B	10-32	.189	.186	7/16"	.070	3/16"	MS24665-132	MS24665-151
AN43B	1/4-28	.249	.246	1/2"	.076	3/16"	MS24665-132	MS24665-151
AN44	5/16-24	.312	.309	5/8"	.076	1/4"	MS24665-210	MS24665-229
AN45	5/16-24	.312	.309	11/16"	.076	5/16"	MS24665-210	MS24665-229
AN46	3/8-24	.374	.371	3/4"	.106	3/8"	MS24665-283	MS24665-300
AN47	7/16-20	.437	.433	7/8"	.106	3/8"	MS24665-283	MS24665-300
AN48	1/2-20	.499	.495	1"	.106	7/16"	MS24665-285	MS24665-302
AN49	9/16-18	.562	.558	1 3/16"	.141	1/2"	MS24665-355	MS24665-372

Genuine Aircraft Hardware Co.

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AN42B - AN49 Eyebolts Dash # / Grip Length / Overall Length

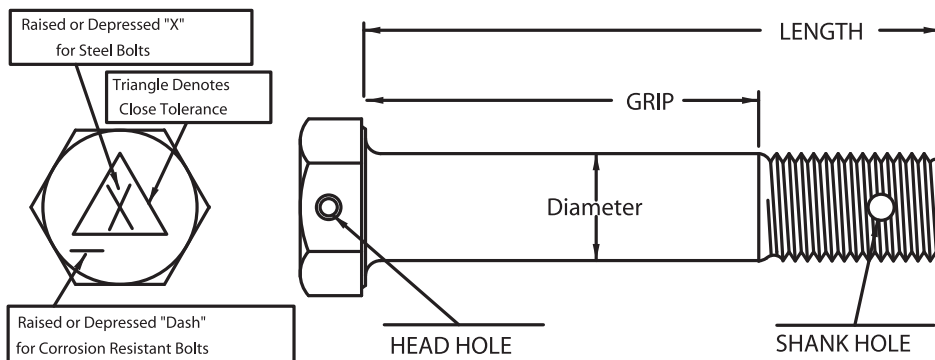
NOTE: all dimensions in inches

-Nu.	AN42B-GR	AN42B-OAL	AN43B-GR	AN43B-OAL	AN44.45-GR	AN44.45-OAL	AN46-GR	AN46-OAL	AN47-GR	AN47-OAL	AN48-GR	AN48-OAL	AN49-GR	AN49-OAL
	+ or - 1/64"	+1/32 -1/64	+ or - 1/64"	+1/32 -1/64	+ or - 1/64"	+1/32 -1/64	+ or - 1/64"	+1/32 -1/64	+ or - 1/64"	+1/32 -1/64	+ or - 1/64"	+1/32 -1/64	+ or - 1/64"	+1/32 -1/64
3	0.063	0.469	0.063	0.469										
4	0.125	0.531	0.063	0.531	0.063	0.594								
5	0.250	0.656	0.188	0.656	0.188	0.719	0.063	0.703	0.063	0.719				
6	0.375	0.781	0.313	0.781	0.313	0.844	0.188	0.828	0.188	0.844	0.063	0.844	0.062	1.016
7	0.500	0.906	0.438	0.906	0.438	0.969	0.313	0.953	0.313	0.969	0.188	0.969	0.125	1.094
10	0.625	1.031	0.563	1.031	0.563	1.094	0.438	1.078	0.438	1.094	0.313	1.094	0.250	1.219
11	0.750	1.156	0.688	1.156	0.688	1.219	0.563	1.203	0.563	1.219	0.438	1.219	0.375	1.344
12	0.875	1.281	0.813	1.281	0.813	1.344	0.688	1.328	0.688	1.344	0.563	1.344	0.500	1.469
13	1.000	1.406	0.938	1.406	0.938	1.469	0.813	1.453	0.813	1.469	0.688	1.469	0.625	1.594
14	1.125	1.531	1.063	1.531	1.063	1.594	0.938	1.578	0.938	1.594	0.813	1.594	0.750	1.719
15	1.250	1.656	1.188	1.656	1.188	1.719	1.063	1.703	1.063	1.719	0.938	1.719	0.875	1.844
16	1.375	1.781	1.313	1.781	1.313	1.844	1.188	1.828	1.188	1.844	1.063	1.844	1.000	1.969
17	1.500	1.906	1.438	1.906	1.438	1.969	1.313	1.953	1.313	1.969	1.188	1.969	1.125	2.094
20	1.625	2.031	1.563	2.031	1.563	2.094	1.438	2.078	1.438	2.094	1.313	2.094	1.250	2.219
21	1.750	2.156	1.688	2.156	1.688	2.219	1.563	2.203	1.563	2.219	1.438	2.219	1.375	2.344
22	1.875	2.281	1.813	2.281	1.813	2.344	1.688	2.328	1.688	2.344	1.563	2.344	1.500	2.469
23	2.000	2.406	1.938	2.406	1.938	2.469	1.813	2.453	1.813	2.469	1.688	2.469	1.625	2.594
24	2.125	2.531	2.063	2.531	2.063	2.594	1.938	2.578	1.938	2.594	1.813	2.594	1.750	2.719
25	2.250	2.656	2.188	2.656	2.188	2.719	2.063	2.703	2.063	2.719	1.938	2.719	1.875	2.844
26	2.375	2.781	2.313	2.781	2.313	2.844	2.188	2.828	2.188	2.844	2.063	2.844	2.000	2.969
27	2.500	2.906	2.438	2.906	2.438	2.969	2.313	2.953	2.313	2.969	2.188	2.969	2.125	3.094
30	2.625	3.031	2.563	3.031	2.563	3.094	2.438	3.078	2.438	3.094	2.313	3.094	2.250	3.219
31	2.750	3.156	2.688	3.156	2.688	3.219	2.563	3.203	2.563	3.219	2.438	3.219	2.375	3.344
32	2.875	3.281	2.813	3.281	2.813	3.344	2.688	3.328	2.688	3.344	2.563	3.344	2.500	3.469
33	3.000	3.406	2.938	3.406	2.938	3.469	2.813	3.453	2.813	3.469	2.688	3.469	2.625	3.594
34	3.125	3.531	3.063	3.531	3.063	3.594	2.938	3.578	2.938	3.594	2.813	3.594	2.750	3.719
35	3.250	3.656	3.188	3.656	3.188	3.719	3.063	3.703	3.063	3.719	2.938	3.719	2.875	3.844
36	3.375	3.781	3.313	3.781	3.313	3.844	3.188	3.828	3.188	3.844	3.063	3.844	3.000	3.969
37	3.500	3.906	3.438	3.906	3.438	3.969	3.313	3.953	3.313	3.969	3.188	3.969	3.125	4.094
40	3.625	4.031	3.563	4.031	3.563	4.094	3.438	4.078	3.438	4.094	3.313	4.094	3.250	4.219
41	3.750	4.156	3.688	4.156	3.688	4.219	3.563	4.203	3.563	4.219	3.438	4.219	3.375	4.344
42	3.875	4.281	3.813	4.281	3.813	4.344	3.688	4.328	3.688	4.344	3.563	4.344	3.500	4.469
43	4.000	4.406	3.938	4.406	3.938	4.469	3.813	4.453	3.813	4.469	3.688	4.469	3.625	4.594
44	4.125	4.531	4.063	4.531	4.063	4.594	3.938	4.578	3.938	4.594	3.813	4.594	3.750	4.719
45	4.250	4.656	4.188	4.656	4.188	4.719	4.063	4.703	4.063	4.719	3.938	4.719	3.875	4.844
46	4.375	4.781	4.313	4.781	4.313	4.844	4.188	4.828	4.188	4.844	4.063	4.844	4.000	4.969
47	4.500	4.906	4.438	4.906	4.438	4.969	4.313	4.953	4.313	4.969	4.188	4.969	4.125	5.094
50	4.625	5.031	4.563	5.031	4.563	5.094	4.438	5.078	4.438	5.094	4.313	5.094	4.250	5.219
51	4.750	5.156	4.688	5.156	4.688	5.219	4.563	5.203	4.563	5.219	4.438	5.219	4.375	5.344
52	4.875	5.281	4.813	5.281	4.813	5.344	4.688	5.328	4.688	5.344	4.563	5.344	4.500	5.469
53	5.000	5.406	4.938	5.406	4.938	5.469	4.813	5.453	4.813	5.469	4.688	5.469	4.625	5.594
54	5.125	5.531	5.063	5.531	5.063	5.594	4.938	5.578	4.938	5.594	4.813	5.594	4.750	5.719
55	5.250	5.656	5.188	5.656	5.188	5.719	5.063	5.703	5.063	5.719	4.938	5.719	4.875	5.844
56	5.375	5.781	5.313	5.781	5.313	5.844	5.188	5.828	5.188	5.844	5.063	5.844	5.000	5.969
57	5.500	5.906	5.438	5.906	5.438	5.969	5.313	5.953	5.313	5.969	5.188	5.969	5.125	6.094
60	5.625	6.031	5.563	6.031	5.563	6.094	5.438	6.078	5.438	6.094	5.313	6.094	5.250	6.219
61	5.750	6.156	5.688	6.156	5.688	6.219	5.563	6.203	5.563	6.219	5.438	6.219	5.375	6.344
62	5.875	6.281	5.813	6.281	5.813	6.344	5.688	6.328	5.688	6.344	5.563	6.344	5.500	6.469
63	6.000	6.406	5.938	6.406	5.938	6.469	5.813	6.453	5.813	6.469	5.688	6.469	5.625	6.594
64	6.125	6.531	6.063	6.531	6.063	6.594	5.938	6.578	5.938	6.594	5.813	6.594	5.750	6.719
65	6.250	6.656	6.188	6.656	6.188	6.719	6.063	6.703	6.063	6.719	5.938	6.719	5.875	6.844
66	6.375	6.781	6.313	6.781	6.313	6.844	6.188	6.828	6.188	6.844	6.063	6.844	6.000	6.969
67	6.500	6.906	6.438	6.906	6.438	6.969	6.313	6.953	6.313	6.969	6.188	6.969	6.125	7.094
70	6.625	7.031	6.563	7.031	6.563	7.094	6.438	7.078	6.438	7.094	6.313	7.094	6.250	7.219
71	6.750	7.156	6.688	7.156	6.688	7.219	6.563	7.203	6.563	7.219	6.438	7.219	6.375	7.344
72	6.875	7.281	6.813	7.281	6.813	7.344	6.688	7.328	6.688	7.344	6.563	7.344	6.500	7.469
73	7.000	7.406	6.938	7.406	6.938	7.469	6.813	7.453	6.813	7.469	6.688	7.469	6.625	7.594
74	7.125	7.531	7.063	7.531	7.063	7.594	6.938	7.578	6.938	7.594	6.813	7.594	6.750	7.719
75	7.250	7.656	7.188	7.656	7.188	7.719	7.063	7.703	7.063	7.719	6.938	7.719	6.875	7.844
76	7.375	7.781	7.313	7.781	7.313	7.844	7.188	7.828	7.188	7.844	7.063	7.844	7.000	7.969
77	7.500	7.906	7.438	7.906	7.438	7.969	7.313	7.953	7.313	7.969	7.188	7.969	7.125	8.094
80	7.625	8.031	7.563	8.031	7.563	8.094	7.438	8.078	7.438	8.094	7.313	8.094	7.250	8.219

Genuine Aircraft Hardware Co.

Close Tolerance AN Bolts

Diameter / Head Size / Hole Sizes



HELP WITH THE SELECTION OF PART NUMBERS

The first number after "AN17" designates the (Diameter) up to 9/16 diameter. 5/8 diameter and above start with "AN18".

The next symbol designates material and head drill if applicable.

USE (-) After the diameter for (Steel, Cad II plated), no hole in the head.

USE (C) In place of (-) for (Corrosion Resistant Steel).

ADD (H) In place of (-), or after (C) for a hole in the head.

THE (A) The presence of the (A) at the very end of all the numbers means that there will be no hole in the shank.

The last number, either single or double digit denotes length. If it is a single digit this is the nominal length in 1/8ths of an inch. If it is a two digit number, the first is Whole Inches, the second is additional 1/8ths; this is a nominal sizing. SEE THE CHARTS!

Examples of part numbers:

- AN174-14* = 1/4 DIAMETER, 28 THREADS PER INCH, STEEL, CAD II PLATING, 1.063 GRIP, 1.531 OVERALL LENGTH, NO HOLE IN HEAD, HOLE IN SHANK.
- AN174-14A* = 1/4 DIAMETER, 28 THREADS PER INCH, STEEL, CAD II PLATING, 1.063 GRIP, 1.531 OVERALL LENGTH, NO HOLE IN HEAD OR SHANK.
- AN174C14 = 1/4 DIAMETER, 28 THREADS PER INCH, CORROSION RESISTANT STEEL, UNPLATED, 1.063 GRIP, 1.531 O.A.L., NO HOLE IN HEAD, HOLE IN SHANK.
- AN174C14A = 1/4 DIAMETER, 28 THREADS PER INCH, CORROSION RESISTANT STEEL, UNPLATED, 1.063 GRIP, 1.531 O.A.L., NO HOLE IN HEAD OR SHANK.
- AN174CH14 = 1/4 DIAMETER, 28 THREADS PER INCH, CORROSION RESISTANT STEEL, UNPLATED, 1.063 GRIP, 1.531 O.A.L., HOLE IN HEAD AND SHANK.
- AN174H14 = 1/4 DIAMETER, 28 THREADS PER INCH, STEEL, CAD II PLATING, 1.063 GRIP, 1.531 OVERALL LENGTH, HOLE IN HEAD, HOLE IN SHANK.
- AN174H14A = 1/4 DIAMETER, 28 THREADS PER INCH, STEEL, CAD II PLATING, 1.063 GRIP, 1.531 OVERALL LENGTH, HOLE IN HEAD, NO HOLE IN SHANK.

NOTE: all dimensions in inches

AN # BASIC	THREAD DIA/PITCH	DIA. MAX	DIA. MIN	WRENCH SIZE	HOLE,SHANK +.010, -.000	HOLE,HEAD +.010, -.000	COMMONLY USED STEEL COTTER	COMMONLY USED STAINLESS COTTER
AN173	10-32	.1894	.1889	3/8"	.070	.046	MS24665-132	MS24665-151
AN174	1/4-28	.2492	.2487	7/16"			MS24665-132	MS24665-151
AN175	5/16-24	.3117	.3112	1/2"			MS24665-210	MS24665-229
AN176	3/8-24	.3742	.3737	9/16"	.106	.070	MS24665-283	MS24665-300
AN177	7/16-20	.4367	.4362	5/8"			MS24665-283	MS24665-300
AN178	1/2-20	.4991	.4986	3/4"			MS24665-285	MS24665-302
AN180	5/8-18	.6240	.6234	15/16"			MS24665-355	MS24665-372

* Prior to April of 1990, this series of bolts in the steel material were manufactured with unplated shanks. If a plated fastener was removed it should be replaced with a plated fastener.

Genuine Aircraft Hardware Co.

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Close Tolerance AN Bolts

Dash # / Grip Length / Overall Length

NOTE: all dimensions in inches

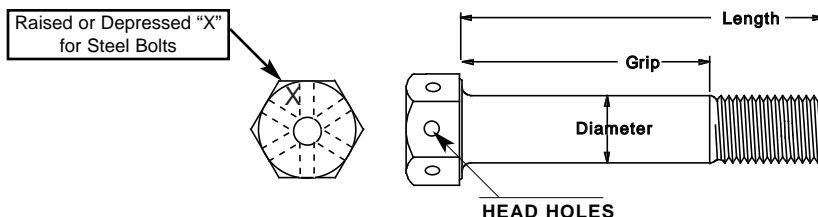
-Nu.	AN173-GR + or - 1/64"	AN173-OA +1/32 -1/64	AN174-GR + or - 1/64"	AN174-OA +1/32 -1/64	AN175-GR + or - 1/64"	AN175-OA +1/32 -1/64	AN176-GR + or - 1/64"	AN176-OA +1/32 -1/64	AN177-GR + or - 1/64"	AN177-OA +1/32 -1/64	AN178-GR + or - 1/64"	AN178-OA +1/32 -1/64	AN180-GR + or - 1/64"	AN180-OA +1/32 -1/64
3	0.063	0.469	0.063	0.469										
4	0.125	0.531	0.063	0.531	0.063	0.594								
5	0.250	0.656	0.188	0.656	0.188	0.719	0.063	0.703	0.063	0.719				
6	0.375	0.781	0.313	0.781	0.313	0.844	0.188	0.828	0.188	0.844	0.063	0.844		
7	0.500	0.906	0.438	0.906	0.438	0.969	0.313	0.953	0.313	0.969	0.188	0.969	0.062	1.016
10	0.625	1.031	0.563	1.031	0.563	1.094	0.438	1.078	0.438	1.094	0.313	1.094	0.188	1.410
11	0.750	1.156	0.688	1.156	0.688	1.219	0.563	1.203	0.563	1.219	0.438	1.219	0.313	1.535
12	0.875	1.281	0.813	1.281	0.813	1.344	0.688	1.328	0.688	1.344	0.563	1.344	0.438	1.660
13	1.000	1.406	0.938	1.406	0.938	1.469	0.813	1.453	0.813	1.469	0.688	1.469	0.563	1.785
14	1.125	1.531	1.063	1.531	1.063	1.594	0.938	1.578	0.938	1.594	0.813	1.594	0.688	1.910
15	1.250	1.656	1.188	1.656	1.188	1.719	1.063	1.703	1.063	1.719	0.938	1.719	0.813	2.035
16	1.375	1.781	1.313	1.781	1.313	1.844	1.188	1.828	1.188	1.844	1.063	1.844	0.938	2.160
17	1.500	1.906	1.438	1.906	1.438	1.969	1.313	1.953	1.313	1.969	1.188	1.969	1.063	2.285
20	1.625	2.031	1.563	2.031	1.563	2.094	1.438	2.078	1.438	2.094	1.313	2.094	1.188	2.410
21	1.750	2.156	1.688	2.156	1.688	2.219	1.563	2.203	1.563	2.219	1.438	2.219	1.313	2.535
22	1.875	2.281	1.813	2.281	1.813	2.344	1.688	2.328	1.688	2.344	1.563	2.344	1.438	2.660
23	2.000	2.406	1.938	2.406	1.938	2.469	1.813	2.453	1.813	2.469	1.688	2.469	1.563	2.785
24	2.125	2.531	2.063	2.531	2.063	2.594	1.938	2.578	1.938	2.594	1.813	2.594	1.688	2.910
25	2.250	2.656	2.188	2.656	2.188	2.719	2.063	2.703	2.063	2.719	1.938	2.719	1.813	3.035
26	2.375	2.781	2.313	2.781	2.313	2.844	2.188	2.828	2.188	2.844	2.063	2.844	1.938	3.160
27	2.500	2.906	2.438	2.906	2.438	2.969	2.313	2.953	2.313	2.969	2.188	2.969	2.063	3.285
30	2.625	3.031	2.563	3.031	2.563	3.094	2.438	3.078	2.438	3.094	2.313	3.094	2.188	3.410
31	2.750	3.156	2.688	3.156	2.688	3.219	2.563	3.203	2.563	3.219	2.438	3.219	2.313	3.535
32	2.875	3.281	2.813	3.281	2.813	3.344	2.688	3.328	2.688	3.344	2.563	3.344	2.438	3.660
33	3.000	3.406	2.938	3.406	2.938	3.469	2.813	3.453	2.813	3.469	2.688	3.469	2.563	3.785
34	3.125	3.531	3.063	3.531	3.063	3.594	2.938	3.578	2.938	3.594	2.813	3.594	2.688	3.910
35	3.250	3.656	3.188	3.656	3.188	3.719	3.063	3.703	3.063	3.719	2.938	3.719	2.813	4.035
36	3.375	3.781	3.313	3.781	3.313	3.844	3.188	3.828	3.188	3.844	3.063	3.844	2.938	4.160
37	3.500	3.906	3.438	3.906	3.438	3.969	3.313	3.953	3.313	3.969	3.188	3.969	3.063	4.285
40	3.625	4.031	3.563	4.031	3.563	4.094	3.438	4.078	3.438	4.094	3.313	4.094	3.188	4.410
41	3.750	4.156	3.688	4.156	3.688	4.219	3.563	4.203	3.563	4.219	3.438	4.219	3.313	4.535
42	3.875	4.281	3.813	4.281	3.813	4.344	3.688	4.328	3.688	4.344	3.563	4.344	3.438	4.660
43	4.000	4.406	3.938	4.406	3.938	4.469	3.813	4.453	3.813	4.469	3.688	4.469	3.563	4.785
44	4.125	4.531	4.063	4.531	4.063	4.594	3.938	4.578	3.938	4.594	3.813	4.594	3.688	4.910
45	4.250	4.656	4.188	4.656	4.188	4.719	4.063	4.703	4.063	4.719	3.938	4.719	3.813	5.035
46	4.375	4.781	4.313	4.781	4.313	4.844	4.188	4.828	4.188	4.844	4.063	4.844	3.938	5.160
47	4.500	4.906	4.438	4.906	4.438	4.969	4.313	4.953	4.313	4.969	4.188	4.969	4.063	5.285
50	4.625	5.031	4.563	5.031	4.563	5.094	4.438	5.078	4.438	5.094	4.313	5.094	4.188	5.410
51	4.750	5.156	4.688	5.156	4.688	5.219	4.563	5.203	4.563	5.219	4.438	5.219	4.313	5.535
52	4.875	5.281	4.813	5.281	4.813	5.344	4.688	5.328	4.688	5.344	4.563	5.344	4.438	5.660
53	5.000	5.406	4.938	5.406	4.938	5.469	4.813	5.453	4.813	5.469	4.688	5.469	4.563	5.785
54	5.125	5.531	5.063	5.531	5.063	5.594	4.938	5.578	4.938	5.594	4.813	5.594	4.688	5.910
55	5.250	5.656	5.188	5.656	5.188	5.719	5.063	5.703	5.063	5.719	4.938	5.719	4.813	6.035
56	5.375	5.781	5.313	5.781	5.313	5.844	5.188	5.828	5.188	5.844	5.063	5.844	4.938	6.160
57	5.500	5.906	5.438	5.906	5.438	5.969	5.313	5.953	5.313	5.969	5.188	5.969	5.063	6.285
60	5.625	6.031	5.563	6.031	5.563	6.094	5.438	6.078	5.438	6.094	5.313	6.094	5.188	6.410
61	5.750	6.156	5.688	6.156	5.688	6.219	5.563	6.203	5.563	6.219	5.438	6.219	5.313	6.535
62	5.875	6.281	5.813	6.281	5.813	6.344	5.688	6.328	5.688	6.344	5.563	6.344	5.438	6.660
63	6.000	6.406	5.938	6.406	5.938	6.469	5.813	6.453	5.813	6.469	5.688	6.469	5.563	6.785
64	6.125	6.531	6.063	6.531	6.063	6.594	5.938	6.578	5.938	6.594	5.813	6.594	5.688	6.910
65	6.250	6.656	6.188	6.656	6.188	6.719	6.063	6.703	6.063	6.719	5.938	6.719	5.813	7.035
66	6.375	6.781	6.313	6.781	6.313	6.844	6.188	6.828	6.188	6.844	6.063	6.844	5.938	7.160
67	6.500	6.906	6.438	6.906	6.438	6.969	6.313	6.953	6.313	6.969	6.188	6.969	6.063	7.285
70	6.625	7.031	6.563	7.031	6.563	7.094	6.438	7.078	6.438	7.094	6.313	7.094	6.188	7.410
71	6.750	7.156	6.688	7.156	6.688	7.219	6.563	7.203	6.563	7.219	6.438	7.219	6.313	7.535
72	6.875	7.281	6.813	7.281	6.813	7.344	6.688	7.328	6.688	7.344	6.563	7.344	6.438	7.660
73	7.000	7.406	6.938	7.406	6.938	7.469	6.813	7.453	6.813	7.469	6.688	7.469	6.563	7.785
74	7.125	7.531	7.063	7.531	7.063	7.594	6.938	7.578	6.938	7.594	6.813	7.594	6.688	7.910
75	7.250	7.656	7.188	7.656	7.188	7.719	7.063	7.703	7.063	7.719	6.938	7.719	6.813	8.035
76	7.375	7.781	7.313	7.781	7.313	7.844	7.188	7.828	7.188	7.844	7.063	7.844	6.938	8.160
77	7.500	7.906	7.438	7.906	7.438	7.969	7.313	7.953	7.313	7.969	7.188	7.969	7.063	8.285
80	7.625	8.031	7.563	8.031	7.563	8.094	7.438	8.078	7.438	8.094	7.313	8.094	7.188	8.410

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Genuine Aircraft Hardware Co.

MS20073 and MS20074 Series

Supersedes AN73 Thru AN81 Fine, and AN73A Thru AN81A Coarse
Diameter / Head Size / Hole Sizes



HELP WITH THE SELECTION OF PART NUMBERS

MS20073 (Fine) - (Diameter in 1/16ths, two digits) - (Length)
MS20074 (Coarse) - (Diameter in 1/16ths, two digits) - (Length)

The (Length) is denoted by the two digit number AFTER the last - (dash). The first digit of this two digit number is overall length in whole inches. The second digit is additional 1/8ths of an inch to the first digit, this is a nominal sizing. SEE THE CHARTS ON NEXT PAGE!
Material is Alloy Steel per Mil-B-6812. Strength is 125,000 psi Minimum Tensile. All of these bolts are Cadmium II plated.

Examples of part numbers:

FINE THREAD
MS20073-04-14 = 1/4 DIA., 28 THREADS PER INCH, STEEL, CAD II PLATING, 1,000 GRIP, 1,531 OVERALL LENGTH, HOLES IN HEAD.
MS20073-06-27 = 3/8 DIA., 24 THREADS PER INCH, STEEL, CAD II PLATING, 2,250 GRIP, 2,922 OVERALL LENGTH, HOLES IN HEAD.

Old Numbers
Was AN74-14
Was AN76-27

COARSE THREAD
MS20074-04-14 = 1/4 DIA., 20 THREADS PER INCH, STEEL, CAD II PLATING, 1,000 GRIP, 1,531 OVERALL LENGTH, HOLES IN HEAD.
MS20074-06-27 = 3/8 DIA., 16 THREADS PER INCH, STEEL, CAD II PLATING, 2,250 GRIP, 2,922 OVERALL LENGTH, HOLES IN HEAD.

Old Numbers
Was AN74A14
Was AN76A27

Help converting old AN numbers:

To start converting an AN number first determine if there is a "-" (dash) or if there is an "A" in the part number. "-" denotes a fine thread, an "A" denotes coarse thread. The second digit after AN denotes diameter in 1/16", except AN81 is 3/4" diameter. The lengths are figured the same as the MS superseding numbers.

NOTE: all dimensions in inches

See examples of old numbers above.

DIAMETER	MS20073	MS20074	DIA. MAX	DIA. MIN	WRENCH SIZE	HEAD HEIGHT		HEAD HOLES
	DIA/PITCH	DIA/PITCH				MAXIMUM	MINIMUM	
-03	10-32	10-24	.189	.186	3/8"	.203	.172	will all be .070 with a tolerance of + or -.005
-04	1/4-28	1/4-20	.249	.246	7/16"	.234	.203	
-05	5/16-24	5/16-18	.312	.309	1/2"	.297	.266	
-06	3/8-24	3/8-16	.374	.371	9/16"	.297	.266	
-07	7/16-20	7/16-14	.437	.433	5/8"	.344	.313	
-08	1/2-20	1/2-13	.499	.495	3/4"	.391	.359	
-09	9/16-18	9/16-12	.562	.558	7/8"	.438	.406	
-10	5/8-18	5/8-11	.624	.620	15/16"	.484	.453	
-12	3/4-16	3/4-10	.749	.744	1+1/16"	.578	.547	

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MS20073 and MS20074 Series

Dash # / Grip Length / Overall Length

NOTE: all dimensions in inches

-Nu.	GRIP -03,-04,-05	O.A.L. -03,-04	O.A.L. -05	GRIP -06	O.A.L. -06	GRIP -07	O.A.L. -07	GRIP -08	O.A.L. -08	GRIP -09	O.A.L. -09	GRIP -10	O.A.L. -10	GRIP -12	O.A.L. -12
	+ or -.016	+031-.016	+ or -.016	+031-.016	+ or -.016	+031-.016	+ or -.016	+031-.016	+ or -.016	+031-.016	+ or -.016	+031-.016	+ or -.016	+031-.016	+ or -.016
03	0.062	0.469													
04	0.062	0.594	0.609												
05	0.125	0.656	0.672	0.062	0.734										
06	0.250	0.781	0.797	0.125	0.797	0.062	0.797								
07	0.375	0.906	0.922	0.250	0.922	0.188	0.922								
10	0.500	1.031	1.047	0.375	1.047	0.313	1.047	0.250	1.047						
11	0.625	1.156	1.172	0.500	1.172	0.438	1.172	0.375	1.172						
12	0.750	1.281	1.297	0.625	1.297	0.563	1.297	0.500	1.297	0.438	1.312				
13	0.875	1.406	1.422	0.750	1.422	0.688	1.422	0.625	1.422	0.562	1.438				
14	1.000	1.531	1.547	0.875	1.547	0.813	1.547	0.750	1.547	0.687	1.563	0.562	1.562		
15	1.125	1.656	1.672	1.000	1.672	0.938	1.672	0.875	1.672	0.812	1.688	0.688	1.688		
16	1.250	1.781	1.797	1.125	1.797	1.063	1.797	1.000	1.797	0.937	1.813	0.813	1.813	0.750	1.812
17	1.375	1.906	1.922	1.250	1.922	1.188	1.922	1.125	1.922	1.062	1.938	0.938	1.938	0.875	1.938
20	1.500	2.031	2.047	1.375	2.047	1.313	2.047	1.250	2.047	1.187	2.063	1.063	2.063	1.000	2.063
21	1.625	2.156	2.172	1.500	2.172	1.438	2.172	1.375	2.172	1.312	2.188	1.188	2.188	1.125	2.188
22	1.750	2.281	2.297	1.625	2.297	1.563	2.297	1.500	2.297	1.437	2.313	1.313	2.313	1.250	2.313
23	1.875	2.406	2.422	1.750	2.422	1.688	2.422	1.625	2.422	1.562	2.438	1.438	2.438	1.375	2.438
24	2.000	2.531	2.547	1.875	2.547	1.813	2.547	1.750	2.547	1.687	2.563	1.563	2.563	1.500	2.563
25	2.125	2.656	2.672	2.000	2.672	1.938	2.672	1.875	2.672	1.812	2.688	1.688	2.688	1.625	2.688
26	2.250	2.781	2.797	2.125	2.797	2.063	2.797	2.000	2.797	1.937	2.813	1.813	2.813	1.750	2.813
27	2.375	2.906	2.922	2.250	2.922	2.188	2.922	2.125	2.922	2.062	2.938	1.938	2.938	1.875	2.938
30	2.500	3.031	3.047	2.375	3.047	2.313	3.047	2.250	3.047	2.187	3.063	2.063	3.063	2.000	3.063
31	2.625	3.156	3.172	2.500	3.172	2.438	3.172	2.375	3.172	2.312	3.188	2.188	3.188	2.125	3.188
32	2.750	3.281	3.297	2.625	3.297	2.563	3.297	2.500	3.297	2.437	3.313	2.313	3.313	2.250	3.313
33	2.875	3.406	3.422	2.750	3.422	2.688	3.422	2.625	3.422	2.562	3.438	2.438	3.438	2.375	3.438
34	3.000	3.531	3.547	2.875	3.547	2.813	3.547	2.750	3.547	2.687	3.563	2.563	3.563	2.500	3.563
35	3.125	3.656	3.672	3.000	3.672	2.938	3.672	2.875	3.672	2.812	3.688	2.688	3.688	2.625	3.688
36	3.250	3.781	3.797	3.125	3.797	3.063	3.797	3.000	3.797	2.937	3.813	2.813	3.813	2.750	3.813
37	3.375	3.906	3.922	3.250	3.922	3.188	3.922	3.125	3.922	3.062	3.938	2.938	3.938	2.875	3.938
40	3.500	4.031	4.047	3.375	4.047	3.313	4.047	3.250	4.047	3.187	4.063	3.063	4.063	3.000	4.063
41	3.625	4.156	4.172	3.500	4.172	3.438	4.172	3.375	4.172	3.312	4.188	3.188	4.188	3.125	4.188
42	3.750	4.281	4.297	3.625	4.297	3.563	4.297	3.500	4.297	3.437	4.313	3.313	4.313	3.250	4.313
43	3.875	4.406	4.422	3.750	4.422	3.688	4.422	3.625	4.422	3.562	4.438	3.438	4.438	3.375	4.438
44	4.000	4.531	4.547	3.875	4.547	3.813	4.547	3.750	4.547	3.687	4.563	3.563	4.563	3.500	4.563
45	4.125	4.656	4.672	4.000	4.672	3.938	4.672	3.875	4.672	3.812	4.688	3.688	4.688	3.625	4.688
46	4.250	4.781	4.797	4.125	4.797	4.063	4.797	4.000	4.797	3.937	4.813	3.813	4.813	3.750	4.813
47	4.375	4.906	4.922	4.250	4.922	4.188	4.922	4.125	4.922	4.062	4.938	3.938	4.938	3.875	4.938
50	4.500	5.031	5.047	4.375	5.047	4.313	5.047	4.250	5.047	4.187	5.063	4.063	5.063	4.000	5.063
51	4.625	5.156	5.172	4.500	5.172	4.438	5.172	4.375	5.172	4.312	5.188	4.188	5.188	4.125	5.188
52	4.750	5.281	5.297	4.625	5.297	4.563	5.297	4.500	5.297	4.437	5.313	4.313	5.313	4.250	5.313
53	4.875	5.406	5.422	4.750	5.422	4.688	5.422	4.625	5.422	4.562	5.438	4.438	5.438	4.375	5.438
54	5.000	5.531	5.547	4.875	5.547	4.813	5.547	4.750	5.547	4.687	5.563	4.563	5.563	4.500	5.563
55	5.125	5.656	5.672	5.000	5.672	4.938	5.672	4.875	5.672	4.812	5.688	4.688	5.688	4.625	5.688
56	5.250	5.781	5.797	5.125	5.797	5.063	5.797	5.000	5.797	4.937	5.813	4.813	5.813	4.750	5.813
57	5.375	5.906	5.922	5.250	5.922	5.188	5.922	5.125	5.922	5.062	5.938	4.938	5.938	4.875	5.938
60	5.500	6.031	6.047	5.375	6.047	5.313	6.047	5.250	6.047	5.187	6.063	5.063	6.063	5.000	6.063

Genuine Aircraft Hardware Co.

Helping Aviation Stay Together



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Paso Robles, Ca. 93446**

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Web Site: <http://www.gen-aircraft-hardware.com>

Measurement of NAS Hex head bolts, in these and some other series

NAS1103-1120

NAS1303-1320

NAS6203-6220

NAS6603-6620

If this is not clear enough, supplement by reading Fastener Math & Terminology, near the end of this book.

1) **Put your AN bolt gauge back in the drawer.**

2) Determine the diameter in 1/16ths of an inch. This will be the last two numerals in the part # prefix i.e.: NAS1303-16. The underlined of the example part # is 03, this represents a nominal diameter of 3/16 of an inch.

3) Using a machinists ruler (6") or calipers. Measure from under the head to the end of the full cylindrical portion of the bolt.

Do not include the threads or the transition area between the threads and the full cylindrical portion of the bolt.

This measurement will be the Grip Length of the bolt, it is expressed in 1/16ths of an inch. The grip length is denoted as the last numerals in the parts # i.e.: NAS1303-16. The underlined of the example part # is 16, this represents a grip length of 16/16 of an inch, or 1 inch.

4) If you do not have a bolt to measure you can take the same measurements from the place where the bolt is going. Please allow in the calculation of the final grip length, any washers that will be used also.

Tips: To convert from a decimal readout to 16ths, multiply by 16

To convert from 16ths to decimals divide by 16

If this is not clear enough, supplement by reading the section Fastener Math & Terminology.

I hope this helps, if you still have questions call us?


Thanks, Tom

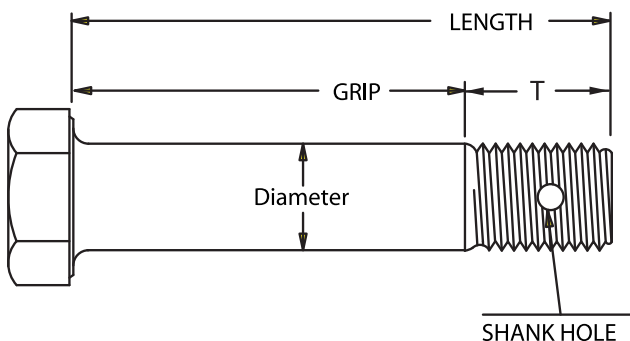
Genuine Aircraft Hardware Co.

NAS 464 Series Bolts

Diameter / Head Size / Hole Sizes / Thread Lengths

These bolts are for replacements only, they are inactive for design. See NAS6203 thru 6220

Mark with Basic #
 NAS464, Unplated
 NAS464P, Plated
 Must also have Symbol 



HELP WITH THE SELECTION OF PART NUMBERS

The first three numbers after "NAS" designates the Design and Material of the bolt.

NAS464 BOLT SHEAR, CLOSE TOLERANCE, ALLOY STEEL 160 - 180kpsi, tensile, Plated or Unplated Shank

Use either a (-) for an unplated shank or a (P) for a plated shank. Right after NAS464, Plating is Cad II.

The next number after the (-) or the (P) denotes the diameter in 1/16ths of an inch.

An (L) after the diameter designates a slightly longer thread length. An (A) just before the grip length denotes no hole for cotter pin.

The last numerals { } { } in the part number designate grip lengths in 1/16ths of an inch. Add the "T" dimension to get overall length.

Grip length of bolts shall be measured from the underside of the head to the end of the full cylindrical portion of the shank.

Examples of Part Numbers

- NAS464-5-20 = Unplated Grip, 5/16 diameter, 1.250 Grip, 1.606 overall length, Hole for cotter pin
- NAS464-5A20 = Unplated Grip, 5/16 diameter, 1.250 Grip, 1.606 overall length, No Hole for cotter pin
- NAS464-5L20 = Unplated Grip, 5/16 diameter, 1.250 Grip, 1.656 overall length, Hole for cotter pin
- NAS464-5LA20 = Unplated Grip, 5/16 diameter, 1.250 Grip, 1.656 overall length, No Hole for cotter pin
- NAS464P5-20 = Plated Grip, 5/16 diameter, 1.250 Grip, 1.606 overall length, Hole for cotter pin
- NAS464P5A20 = Plated Grip, 5/16 diameter, 1.250 Grip, 1.606 overall length, No Hole for cotter pin
- NAS464P5L20 = Plated Grip, 5/16 diameter, 1.250 Grip, 1.656 overall length, Hole for cotter pin
- NAS464P5LA20 = Plated Grip, 5/16 diameter, 1.250 Grip, 1.656 overall length, No Hole for cotter pin

NOTE: all dimensions in inches

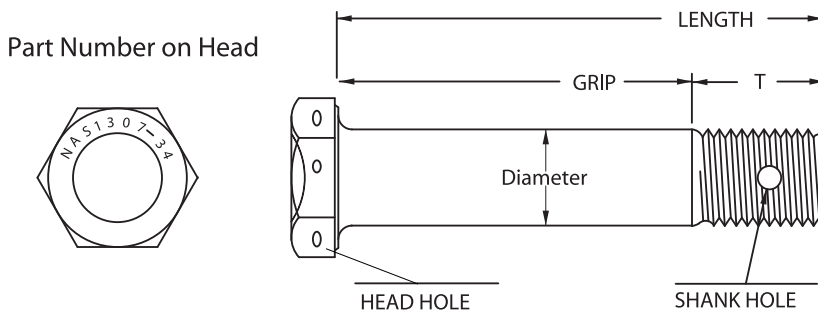
NAS464 DIA. #	THREAD DIA/PITCH	DIA. +.0000	DIA. MINUS TOL. (UNPLATED) / (PLATED)	WRENCH SIZE	HOLE,SHANK +.010, -.000	NO (L) "T" length	WITH (L) "T" length	COMMONLY USED COTTER, REG / SS
3	10-32	.1894	.0005 / .0009	3/8"	.070	0.344	N/A	MS24665-132 / 151
4	1/4-28	.2492	.0005 / .0009	7/16"	.076	0.344	N/A	MS24665-132 / 151
5	5/16-24	.3117	.0005 / .0009	1/2"	.076	0.359	0.406	MS24665-210 / 229
6	3/8-24	.3742	.0005 / .0009	9/16"	.106	0.359	0.438	MS24665-283 / 300
7	7/16-20	.4367	.0005 / .0009	5/8"	.106	0.422	0.469	MS24665-283 / 300
8	1/2-20	.4991	.0005 / .0009	3/4"	.106	0.422	0.469	MS24665-285 / 302
9	9/16-18	.5616	.0005 / .0009	7/8"	.141	0.500	N/A	MS24665-353 / 370
10	5/8-18	.6240	.0006 / .0010	15/16"	.141	0.500	0.563	MS24665-355 / 372
12	3/4-16	.7488	.0007 / .0011	1 1/16"	.141	0.563	N/A	MS24665-355 / 372
14	7/8-14	.8737	.0008 / .0012	1 1/4"	.141	0.641	N/A	MS24665-357 / 374
16	1"-12	.9985	.0010 / .0014	1 1/2"	.141	0.703	0.750	MS24665-359 / 376

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Genuine Aircraft Hardware Co.

NAS HEX Head Bolts

Diameter / Head Size / Hole Sizes/ Thread Lengths



Kits Available, pages 267 & 268

HELP WITH THE SELECTION OF PART NUMBERS:

The first two numbers after "NAS" designates the Design and Material of the bolt.

The third and fourth number after "NAS" designates the diameter in 1/16" increments.

NAS11 {} {} BOLT, SHEAR-HEXAGON HEAD, SHORT THREAD, Alloy steel 160-180 ksi. Cad II plated.

NAS13 {} {} BOLT, SHEAR-HEXAGON HEAD, LONG THREAD, Alloy steel 160-180 ksi. Cad II plated.

NAS62 {} {} BOLT, HEX HEAD, CLOSE TOL., MEDIUM THREAD LENGTH. Alloy steel 160-180 ksi, Oversize and Self Locking available. Cad II Plated

NAS66 {} {} BOLT, HEX HEAD, CLOSE TOL., LONG THREAD LENGTH. Alloy steel 160-180 ksi, Oversize and Self Locking available. Cad II Plated

Inactive for design, 7/1/76 See NAS62 {} {}

Inactive for design, 10/81 See NAS66 {} {}

The last numerals {} {} in the part number designate grip lengths in 1/16ths of an inch. Add the "T" dimension to get overall length.

Grip length of bolts shall be measured from the underside of the head to the end of the full cylindrical portion of the shank.

Add "D" in the proper location for shank drill. If "D" is used then "L" or "P" are not. Add "H" in the proper location for head drill.

Add "W" in the proper location for Cad I (silver colored) plating. Add a "C" for chrome plated shank.

Add "X" or "Y" at the very end to designate an oversize bolt, X = .0156 Oversize, Y = .0312 Oversize diameter shank. The threads are normal size.

Add "P" for patch type locking element on threads. An "L" would allow patch or pellet type locking element.

Examples of Part Numbers:

Listing options and placement of option code letters; omit undesirable options from your part numbers.

Not all options are available for all bolts.

NAS1104-16, NAS1104-16D, NAS1104-16H, NAS1104-16DH, NAS1104-16DHW

Chrome, Oversize, or Locking not available.

NAS1304-16, NAS1304-16D, NAS1304-16H, NAS1304-16DH, NAS1304-16DHW

Chrome, Oversize, or Locking not available.

NAS6204-16, NAS6204-16D, NAS6204-16H, NAS6204-16DH, NAS6204L16, NAS6204P16, NAS6204C16, NAS6204-16X, NAS6204-16Y, ETC

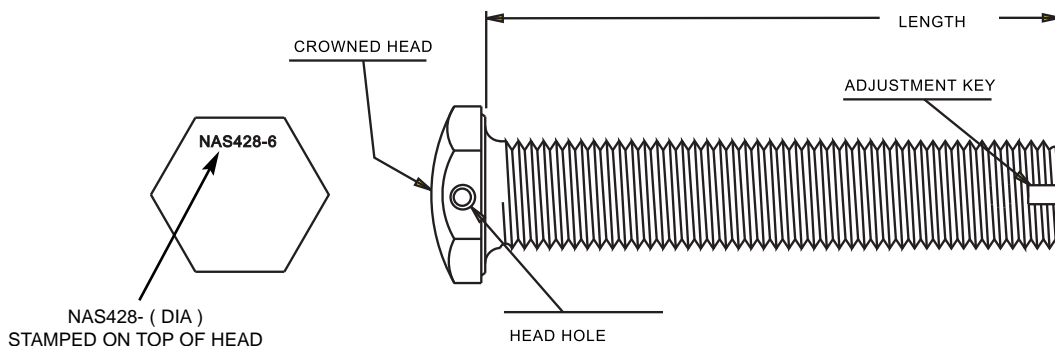
NAS6604-16, NAS6604D16, NAS6604H16, NAS6604DH16, NAS6604L16, NAS6604P16, NAS6604C16, NAS6604-16X, NAS6604-16Y, ETC

NOTE: all dimensions in inches

NAS??{} {}	THREAD	DIA.	DIA.	WRENCH	HOLE, SHANK	HOLE, HEAD	NAS11{} {}	NAS13{} {}	NAS62{} {}	NAS66{} {}
DIA	DIA/PITCH	MAX	MIN	SIZE	+ .010, -.000	+ .010, -.000	"T" length	"T" length	"T" length	"T" length
03	10-32	.1895	.1885	3/8"	.070	.046	0.276	0.338	0.323	0.345
04	1/4-28	.2495	.2485	7/16"			0.316	0.425	0.370	0.425
05	5/16-24	.3112	.3110	1/2"			0.375	0.469	0.438	0.469
06	3/8-24	.3745	.3735	9/16"	.106		0.391	0.578	0.454	0.578
07	7/16-20	.4370	.4360	5/8"			0.453	0.594	0.528	0.694
08	1/2-20	.4995	.4985	3/4"			0.453	0.735	0.528	0.735
09	9/16-18	.5615	.5605	7/8"		.070	0.511	0.840	0.594	0.840
10	5/8-18	.6240	.6230	15/16"			0.543	0.902	0.626	0.902
12	3/4-16	.7490	.7480	1 1/16"			0.572	1.041	0.666	1.041
14	7/8-14	.8740	.8730	1 1/4"	.141		0.652	1.184	0.759	1.184
16	1"-12	.9990	.9980	1 1/2"			0.770	1.309	0.895	1.309
18	1 1/8-12	1.124	1.1225	1 5/8"			0.864	1.458	0.969	1.458
20	1 1/4-12	1.249	1.2475	1 7/8"			0.958	1.646	1.063	1.646

Genuine Aircraft Hardware Co.

NAS428 Series Bolts Adjustment Bolt Specifications



HELP WITH THE SELECTION OF PART NUMBERS

The numbers NAS428 denotes a fully threaded, crowned hexagon head, adjustment bolt. Steel, CAD II plated or A286 cres.
 The number after NAS428 (-), (H), (K), or (HK) denotes the thread size in 1/16th inch increments.
 The number after the last (-) is the overall length under the head. If this number is a single digit it is 1/8 of an inch.
 If it is a two digit number, the first is whole inches, the second is additional 1/8ths. This is (OVERALL) length under the head.

- USE (-) After NAS428 for no hole in the head, or adjustment key in the end of threads, steel.
- USE (C) After NAS428 for no hole in the head, or adjustment key in the end of threads, A286, cres.
- USE (H) After NAS428 for a hole in the head, and no adjustment key in the end of threads.
- USE (K) After NAS428 for no hole in the head, with an adjustment key in the end of threads.
- USE (HK) After NAS428 for a hole in the head, and an adjustment key in the end of threads.
- USE (A) After the diameter number, in place of the dash to designate UNJF threads, replaces the second dash which used to designate UNF threads.

Examples of part numbers:

- NAS428-4-25 = 1/4 DIAMETER, 28 THREADS PER INCH, 2 5/8" LONG, NO HOLE IN HEAD, NO KEY IN THE END, UNF THREADS, STEEL.
- NAS428H4-25 = 1/4 DIAMETER, 28 THREADS PER INCH, 2 5/8" LONG, A HOLE IN HEAD, NO KEY IN THE END, UNF THREADS, STEEL.
- NAS428K4-25 = 1/4 DIAMETER, 28 THREADS PER INCH, 2 5/8" LONG, NO HOLE IN HEAD, A KEY IN THE END, UNF THREADS, STEEL.
- NAS428HK4-25 = 1/4 DIAMETER, 28 THREADS PER INCH, 2 5/8" LONG, A HOLE IN HEAD, AND A KEY IN THE END, UNF THREADS, STEEL.
- NAS428CK4A14 = 1/4 DIAMETER, 28 THREADS PER INCH, 2 5/8" LONG, NO HOLE IN HEAD, KEY IN THE END, UNJF THREADS, CRES.

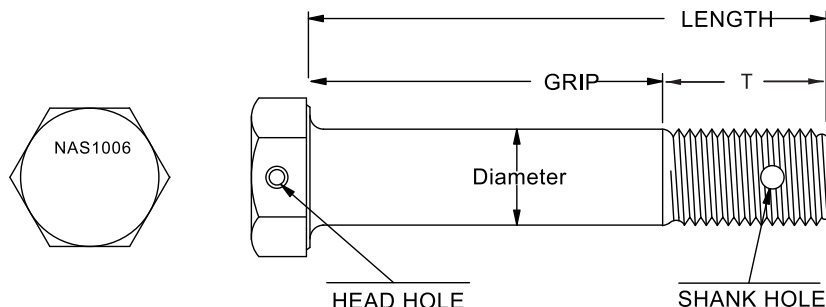
NOTE: all dimensions in inches

part # NAS428	THREAD DIA/PITCH	WRENCH SIZE	HEAD HEIGHT	HOLE DIAMETER	KEY DEPTH	KEY WIDTH
-3	10-32	3/8"	.109	.031	.047 - .031	.062 - .074
-4	1/4-28	7/16"	.141	.031	.097 - .130	.122 - .154
-5	5/16-24	1/2"	.172	.047	.097 - .130	.122 - .154
-6	3/8-24	9/16"	.203	.047	.097 - .130	.122 - .154

Genuine Aircraft Hardware Co.

NAS 1003 thru 1020 Bolts

Diameter / Head Size / Hole Sizes / Thread Lengths



HELP WITH THE SELECTION OF PART NUMBERS

The first two numbers after "NAS" designates the Design and Material of the Bolt.

The third and fourth number after "NAS" designates the (Diameter) in 1/16" increments. SEE THE CHART!

NAS10 {} {} BOLT, HEXAGON HEAD, NON MAGNETIC, & HEAT RESISTANT, NOT PLATED

Corrosion Resistant Steel, A-286 Stainless, 140Kpsi. Tensile at room temperature.

The last numerals {} {} in the part number designate grip lengths in 1/16ths of an inch. Add the "T" dimension to get overall length. Grip length of bolts shall be measured from the underside of the head to the end of the full cylindrical portion of the shank.

ADD (A) To the very end of all numbers for an undrilled shank.

ADD (H) To the very end of all numbers for a drilled head.

Examples of part numbers:

NAS1006-24 = 3/8 DIAMETER, 24 THREADS PER INCH, 1.500 GRIP, 2.163 OVERALL LENGTH, DRILLED SHANK ONLY

NAS1006-24A = 3/8 DIAMETER, 24 THREADS PER INCH, 1.500 GRIP, 2.163 OVERALL LENGTH, NO HOLES

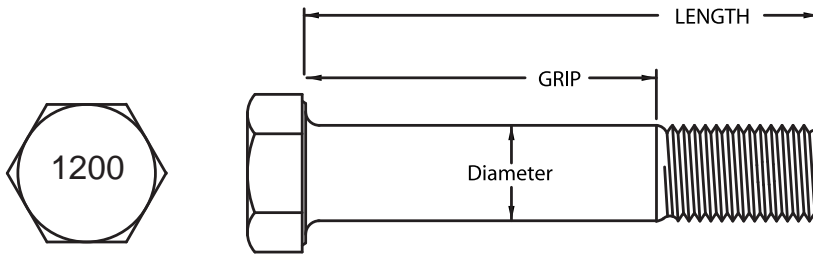
NAS1006-24H = 3/8 DIAMETER, 24 THREADS PER INCH, 1.500 GRIP, 2.163 OVERALL LENGTH, DRILLED HEAD ONLY

NOTE: all dimensions in inches

NAS BASIC PART #	THREAD DIA/PITCH	DIA. MAX	DIA. MIN	WRENCH SIZE	HOLE,SHANK +.010, -.000	HOLE,HEAD +.010, -.000	NAS10{}{} "T" length	COMMONLY USED STAINLESS COTTER
1003	10-32	.1895	.1870	3/8"	.070	.046	0.481	MS24665-151
1004	1/4-28	.2495	.2470	7/16"	.076	.046	0.544	MS24665-151
1005	5/16-24	.3120	.3095	1/2"	.076	.070	0.632	MS24665-229
1006	3/8-24	.3745	.3720	9/16"	.106	.070	0.663	MS24665-300
1007	7/16-20	.4370	.4345	5/8"	.106	.070	0.745	MS24665-300
1008	1/2-20	.4995	.4970	3/4"	.106	.070	0.842	MS24665-302
1009	9/16-18	.5615	.5585	7/8"	.141	.070	0.947	MS24665-370
1010	5/8-18	.6240	.6210	15/16"	.141	.070	1.042	MS24665-372
1012	3/4-16	.7490	.7460	1 1/16"	.141	.070	1.189	MS24665-372
1014	7/8-14	.8740	.8710	1 1/4"	.141	.070	1.356	MS24665-374
1016	1"-12	.9990	.9960	1 1/2"	.141	.070	1.481	MS24665-376
1018	1 1/8-12	1.124	1.1200	1 5/8"	.141	.070	1.658	MS24665-376
1020	1 1/4-12	1.249	1.2450	1 7/8"	.141	.070	1.846	MS24665-377

Genuine Aircraft Hardware Co.

MS20033 thru 36, 1200 Degree Bolts and High Beam Nuts Diameter / Head Size / Lengths



HELP WITH THE SELECTION OF PART NUMBERS

The first four numbers after "MS" designate type of bolt, 1200 degree, Corrosion resistant steel, unplated.

The last number, either single or double digit denotes (GRIP) length; if it is a single digit this is the (GRIP) length in 1/8th of an inch; if it is a two digit number, the first is whole inches, the second is additional 1/8ths, this is (GRIP) length. SEE THE CHART!

Grip length of bolts shall be measured from the underside of the head to the end of the full cylindrical portion of the shank.

Examples of part numbers:

- MS20034-6 = 1/4" DIAMETER, 3/4" GRIP, 1.266 OVERALL LENGTH
- MS20036-7 = 3/8" DIAMETER, 7/8" GRIP, 1.547 OVERALL LENGTH
- MS20036-10 = 3/8" DIAMETER, 1" GRIP, 1.672 OVERALL LENGTH

NOTE: all dimensions in inches

BASIC #	THREAD DIA/PITCH	DIA. MAX	DIA. MIN	WRENCH SIZE	RECOMENDED LOCKNUT	COMMONLY USED WASHER 1200 deg	COMMONLY USED WASHER 800 deg	RECOMENDED NUTPLATE
MS20033	10-32	.189	.186	3/8"	MS20500-1032	NAS1587-3	AN960C10	MS20501-1032
MS20034	1/4-28	.249	.246	7/16"	MS20500-428	NAS1587-4	AN960C416	MS20501-428
MS20035	5/16-24	.312	.309	1/2"	MS20500-524	NAS1587-5	AN960C516	MS20501-524
MS20036	3/8-24	.374	.371	9/16"	MS20500-624	NAS1587-6	AN960C616	MS20501-624

Dash # / Grip Length / Overall Length

NOTE: all dimensions in inches

Longer lengths and larger diameters are available.

DASH NO.	GRIP = OR - 1/64"	OVERALL LENGTH, +1/32 - 1/64	MS20033	MS20034	MS20035	MS20036
1	0.125	0.547	0.641	0.688	0.797	
2	0.250	0.672	0.766	0.813	0.922	
3	0.375	0.797	0.891	0.938	1.047	
4	0.500	0.922	1.016	1.063	1.172	
5	0.625	1.047	1.141	1.188	1.297	
6	0.750	1.172	1.266	1.313	1.422	
7	0.875	1.297	1.391	1.438	1.547	
10	1.000	1.422	1.516	1.563	1.672	
11	1.125	1.547	1.641	1.688	1.797	
12	1.250	1.672	1.766	1.813	1.922	
13	1.375	1.797	1.891	1.938	2.047	
14	1.500	1.922	2.016	2.063	2.172	
15	1.625	2.047	2.141	2.188	2.297	
16	1.750	2.172	2.266	2.313	2.422	
17	1.875	2.297	2.391	2.438	2.547	
20	2.000	2.422	2.516	2.563	2.672	

We may supply equivalent P/N of different manufacturer on this item. This part number is manufactured by SPS.

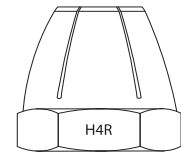
Frequently used for

Turbo Bolts,

"V" Band Clamps,

Waste Gate Bolts

Hi-Temp 125ksi Nuts
Silver Plated.



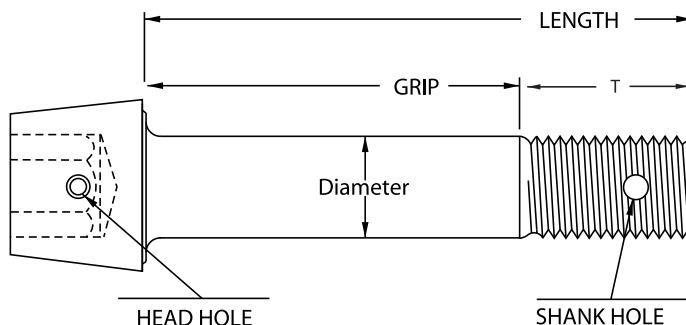
990FR12-(XX)
1200° HI-BEAM
LOCKNUT

Part number	Thread Size	Wrench Size	Height <small>+ .005 or - .010</small>
990FR12-832	8-32	11/32	.297
990FR12-1032	10-32	3/8	.350
990FR12-428	1/4-28	7/16	.406
990FR12-524	5/16-24	1/2	.469
990FR12-624	3/8-24	9/16	.500

Genuine Aircraft Hardware Co.

NAS144 thru 158 Bolts

Diameter / Head Size / Hole Sizes / Thread Lengths



HELP WITH THE SELECTION OF PART NUMBERS

The first three numbers after "NAS" designates the Design and Diameter of the bolt.

NAS144 thru 158, BOLT INTERNAL WRENCHING, ALLOY STEEL 160 - 180Kpsi. Tensile, Plated Cad II.

INACTIVE FOR NEW DESIGN AFTER OCTOBER 1, 1986, USE MS20004 THRU MS20024

ADD (A) After the first three numbers for a cotter pin hole in the threads.

ADD (DH) After the (A), if present, or after the first three numbers for safety wire holes in the head.

The last numerals { } { } in the part # designate (OVERALL) lengths in 1/16ths of an inch. SUBTRACT the "T" dimension to get (GRIP) length. Grip length of bolts shall be measured from the underside of the head to the end of the full cylindrical portion of the shank.

Examples of part numbers:

NAS147-16 7/16 DIAMETER, 20 THREADS PER INCH, 1.00 INCHES OVERALL LENGTH, 3/16" GRIP, NO HOLES IN SHANK OR HEAD.

NAS147A-16 7/16 DIAMETER, 20 THREADS PER INCH, 1.00 INCHES OVERALL LENGTH, 3/16" GRIP, HOLE IN SHANK, NONE IN HEAD.

NAS147DH-16 7/16 DIAMETER, 20 THREADS PER INCH, 1.00 INCHES OVERALL LENGTH, 3/16" GRIP, NO HOLES IN SHANK, HOLES IN HEAD.

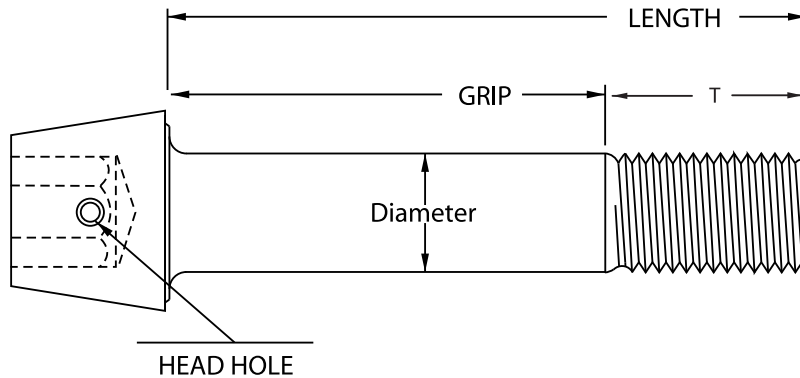
NAS147ADH16 7/16 DIAMETER, 20 THREADS PER INCH, 1.00 INCHES OVERALL LENGTH, 3/16" GRIP, HOLES IN SHANK AND HEAD.

NOTE: all dimensions in inches

NAS #	THREAD DIA/PITCH	DIA. MAX	DIA. MIN	WRENCH SIZE	HOLE,SHANK +.010, -.000	" T " DIMENSION	HEAD DIAMETER	COMMONLY USED COTTER, REG / SS
144	1/4-28	.2490	.2460	7/32	.076	0.500	7/16	MS24665-132 / 151
145	5/16-24	.3115	.3085	5/16	.076	0.563	17/32	MS24665-210 / 229
146	3/8-24	.3740	.3710	3/8	.106	0.688	5/8	MS24665-283 / 300
147	7/16-20	.4365	.4330	3/8	.106	0.813	3/4	MS24665-283 / 300
148	1/2-20	.4990	.4995	1/2	.106	0.813	13/32	MS24665-285 / 302
149	9/16-18	.5615	.5565	1/2	.141	0.875	15/16	MS24665-353 / 370
150	5/8-18	.6240	.6200	9/16	.141	0.938	1 "	MS24665-355 / 372
152	3/4-16	.7490	.7445	5/8	.141	1.063	1 3/16	MS24665-355 / 372
154	7/8-14	.8740	.8690	3/4	.141	1.188	1 7/16	MS24665-357 / 374
156	1"-14	.9990	.9935	1 "	.141	1.313	1 5/8	MS24665-359 / 376
158	1 1/8"-12	1.124	1.118	1 "	.141	1.500	1 13/16	MS24665-359 / 376

MS20004 thru MS20024

Diameter / Head Size / Thread Lengths



HELP WITH THE SELECTION OF PART NUMBERS

The first three numbers after "MS" designates the Design of the bolt. Alloy Steel 160 Ksi. Tensile, 96 Ksi shear; CAD II Plated.
The two numbers after MS200 designate the diameter of the bolt.

- ADD (-)** After the first five numbers for no safety wire holes in the head..
- ADD (H)** After the first five numbers for safety wire holes in the head.
- NOTE:** THIS SERIES BOLT IS NOT AVAILABLE WITH HOLES IN THE SHANK. Supersedes NAS144 thru 158.

The last numerals { } { } in the part # designate (GRIP) length in 1/16ths of an inch. ADD the "T" dimension to get (OVERALL) length.
Grip length of bolts shall be measured from the underside of the head to the end of the full cylindrical portion of the shank.

Examples of part numbers:

- MS20007-16 7/16 DIAMETER, 20 THREADS PER INCH, 1.00 INCHES GRIP LENGTH, 1.812 OVERALL, NO HOLES IN HEAD.
- MS20007H16 7/16 DIAMETER, 20 THREADS PER INCH, 1.00 INCHES GRIP LENGTH, 1.812 OVERALL, HOLES IN HEAD.

NOTE: all dimensions in inches

MS200{ } { }	THREAD DIA/PITCH	DIA. MAX	DIA. MIN	WRENCH SIZE	" T " DIMENSION	HEAD DIA. + 0R - .005	REC. WASHER UNDER HEAD	REC. WASHER UNDER NUT
04	1/4-28	.2492	.2477	3/16	0.437	0.433	MS20002C4	MS20002-4
05	5/16-24	.3117	.3102	7/32	0.537	0.526	MS20002C5	MS20002-5
06	3/8-24	.3742	.3727	5/16	0.662	0.645	MS20002C6	MS20002-6
07	7/16-20	.4367	.4347	5/16	0.787	0.730	MS20002C7	MS20002-7
08	1/2-20	.4991	.4971	3/8	0.787	0.823	MS20002C8	MS20002-8
09	9/16-18	.5616	.5596	7/16	0.850	0.933	MS20002C9	MS20002-9
10	5/8-18	.6240	.6220	1/2	0.912	1.045	MS20002C10	MS20002-10
12	3/4-16	.7488	.7468	9/16	1.037	1.225	MS20002C12	MS20002-12
14	7/8-14	.8737	.8707	5/8	1.162	1.443	MS20002C14	MS20002-14
16 *	1 "-14	.9985	.9955	3/4	1.287	1.620	MS20002C16	MS20002-16
17	1 "-12	.9985	.9955	3/4	1.287	1.620	MS20002C16	MS20002-16
18	1 1/8"-12	1.124	1.121	3/4	1.475	1.870	MS20002C18	MS20002-18
20	1 1/4"-12	1.249	1.246	1 "	1.600	2.120	MS20002C20	MS20002-20
22	1 3/8"-12	1.374	1.370	1 1/8	1.725	2.308	MS20002C22	MS20002-22
24	1 1/2"-12	1.499	1.495	1 1/4	1.850	2.495	MS20002C24	MS20002-24

* 1"-14 thread pitch inactive for new design.

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Genuine Aircraft Hardware Co.

Cross Reference Chart

NAS144-148 TO MS20004-MS20008

ORDER BY MS2000(x) NUMBERS

SEE PREVIOUS PAGES FOR PART NUMBER BREAKDOWN

Note:

This Chart makes an effort to match GRIP LENGTHS.

The overall length on the NAS bolts is slightly longer. See page 17.

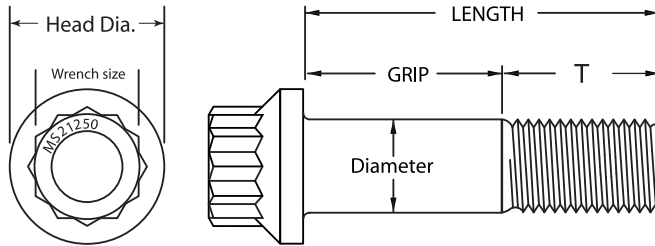
This should help figure out if thread length is critical.

Measure this NAS series by O.A.L. Under the head					MS by Grip in 1/16"	
MS20004-(X)	MS20005-(X)	MS20006-(X)	MS20007-(X)	MS20008-(X)	Replace (x) for dia. in prefix, for grip suffix	
OLD NAS144 DASH NUMBER	OLD NAS145 DASH NUMBER	OLD NAS146 DASH NUMBER	OLD NAS147 DASH NUMBER	OLD NAS148 DASH NUMBER	NEW MS2000(x)-(x) Dash Number	DECIMAL GRIP LENGTH
NAS144-9	NAS145-10	NAS146-12	NAS147-14	NAS148-14	1	0.063
NAS144-10	NAS145-11	NAS146-13	NAS147-15	NAS148-15	2	0.125
NAS144-11	NAS145-12	NAS146-14	NAS147-16	NAS148-16	3	0.188
NAS144-12	NAS145-13	NAS146-15	NAS147-17	NAS148-17	4	0.250
NAS144-13	NAS145-14	NAS146-16	NAS147-18	NAS148-18	5	0.313
NAS144-14	NAS145-15	NAS146-17	NAS147-19	NAS148-19	6	0.375
NAS144-15	NAS145-16	NAS146-18	NAS147-20	NAS148-20	7	0.438
NAS144-16	NAS145-17	NAS146-19	NAS147-21	NAS148-21	8	0.500
NAS144-17	NAS145-18	NAS146-20	NAS147-22	NAS148-22	9	0.563
NAS144-18	NAS145-19	NAS146-21	NAS147-23	NAS148-23	10	0.625
NAS144-19	NAS145-20	NAS146-22	NAS147-24	NAS148-24	11	0.688
NAS144-20	NAS145-21	NAS146-23	NAS147-25	NAS148-25	12	0.750
NAS144-21	NAS145-22	NAS146-24	NAS147-26	NAS148-26	13	0.813
NAS144-22	NAS145-23	NAS146-25	NAS147-27	NAS148-27	14	0.875
NAS144-23	NAS145-24	NAS146-26	NAS147-28	NAS148-28	15	0.938
NAS144-24	NAS145-25	NAS146-27	NAS147-29	NAS148-29	16	1.000
NAS144-25	NAS145-26	NAS146-28	NAS147-30	NAS148-30	17	1.063
NAS144-26	NAS145-27	NAS146-29	NAS147-31	NAS148-31	18	1.125
NAS144-27	NAS145-28	NAS146-30	NAS147-32	NAS148-32	19	1.188
NAS144-28	NAS145-29	NAS146-31	NAS147-33	NAS148-33	20	1.250
NAS144-29	NAS145-30	NAS146-32	NAS147-34	NAS148-34	21	1.313
NAS144-30	NAS145-31	NAS146-33	NAS147-35	NAS148-35	22	1.375
NAS144-31	NAS145-32	NAS146-34	NAS147-36	NAS148-36	23	1.438
NAS144-32	NAS145-33	NAS146-35	NAS147-37	NAS148-37	24	1.500
NAS144-33	NAS145-34	NAS146-36	NAS147-38	NAS148-38	25	1.563
NAS144-34	NAS145-35	NAS146-37	NAS147-39	NAS148-39	26	1.625
NAS144-35	NAS145-36	NAS146-38	NAS147-40	NAS148-40	27	1.688
NAS144-36	NAS145-37	NAS146-39	NAS147-41	NAS148-41	28	1.750
NAS144-37	NAS145-38	NAS146-40	NAS147-42	NAS148-42	29	1.813
NAS144-38	NAS145-39	NAS146-41	NAS147-43	NAS148-43	30	1.875
NAS144-39	NAS145-40	NAS146-42	NAS147-44	NAS148-44	31	1.938
NAS144-40	NAS145-41	NAS146-43	NAS147-45	NAS148-45	32	2.000
NAS144-41	NAS145-42	NAS146-44	NAS147-46	NAS148-46	33	2.063
NAS144-42	NAS145-43	NAS146-45	NAS147-47	NAS148-47	34	2.125
NAS144-43	NAS145-44	NAS146-46	NAS147-48	NAS148-48	35	2.188
NAS144-44	NAS145-45	NAS146-47	NAS147-49	NAS148-49	36	2.250
NAS144-45	NAS145-46	NAS146-48	NAS147-50	NAS148-50	37	2.313
NAS144-46	NAS145-47	NAS146-49	NAS147-51	NAS148-51	38	2.375
NAS144-47	NAS145-48	NAS146-50	NAS147-52	NAS148-52	39	2.438
NAS144-48	NAS145-49	NAS146-51	NAS147-53	NAS148-53	40	2.500
NAS144-49	NAS145-50	NAS146-52	NAS147-54	NAS148-54	41	2.563
NAS144-50	NAS145-51	NAS146-53	NAS147-55	NAS148-55	42	2.625
NAS144-51	NAS145-52	NAS146-54	NAS147-56	NAS148-56	43	2.688
NAS144-52	NAS145-53	NAS146-55	NAS147-57	NAS148-57	44	2.750
NAS144-53	NAS145-54	NAS146-56	NAS147-58	NAS148-58	45	2.813
NAS144-54	NAS145-55	NAS146-57	NAS147-59	NAS148-59	46	2.875
NAS144-55	NAS145-56	NAS146-58	NAS147-60	NAS148-60	47	2.938
NAS144-56	NAS145-57	NAS146-59	NAS147-61	NAS148-61	48	3.000
NAS144-57	NAS145-58	NAS146-60	NAS147-62	NAS148-62	49	3.063
NAS144-58	NAS145-59	NAS146-61	NAS147-63	NAS148-63	50	3.125

Genuine Aircraft Hardware Co.

MS21250, 12 Point Bolts

Diameter / Head Size / Thread Lengths



HELP WITH THE SELECTION OF PART NUMBERS

The first five numbers after MS designates the Design of the bolt.

12 point, Alloy Steel, Heat Treated to 180 to 200 ksi Tensile Strength, Cadmium II, type 2 plate per QQP416.

The next two numbers after the (-) or the (H) designates the Diameter.

The next three numbers directly after the Diameter number designates the Grip length.

There is no dash or other characters in between the Diameter number and the Grip length number.

Examples of part numbers:

MS21250 (" - " for no holes in head, "H" for safety holes in head) (Diameter #) (Grip Length Number)

MS21250 - 04012 =1/4 DIAMETER, 28 THREADS PER INCH, .750 GRIP, 1.260 OVERALL LENGTH NO SAFETY HOLES IN HEAD.

MS21250H10020 =5/8 DIAMETER, 16 THREADS PER INCH, 1.250 GRIP, 2.169 OVERALL LENGTH SAFETY HOLES IN HEAD.

Diameter #	THREAD DIA/PITCH	DIA. MAX	DIA. MIN	WRENCH SIZE	" T " DIMENSION	HEAD DIA. + OR - .005
02	8-32	.1635	.1625	7/32	.375	.295
03	10-32	.1895	.1885	1/4	.420	.345
04	1/4-28	.2495	.2485	5/16	.492	.433
05	5/16-24	.3120	.3110	3/8	.579	.526
06	3/8-24	.3745	.3735	7/16	.625	.645
07	7/16-20	.4370	.4360	1/2	.721	.730
08	1/2-20	.4995	.4985	9/16	.768	.825
09	9/16-18	.5615	.5605	5/8	.852	.933
10	5/8-18	.6240	.6230	11/16	.899	1.045
12	3/4-16	.7490	.7480	13/16	1.036	1.225
14	7/8-14	.8740	.8730	15/16	1.244	1.433
16	1"-12	.9990	.9980	1 1/16	1.479	1.620
18	1 1/8"-12	1.1240	1.235	1 1/4	1.650	1.870
20	1 1/4"-12	1.2490	1.2475	1 5/16	1.760	2.120
22	1 3/8"-12	1.3740	1.3725	1 7/16	1.885	2.308

Genuine Aircraft Hardware Co.

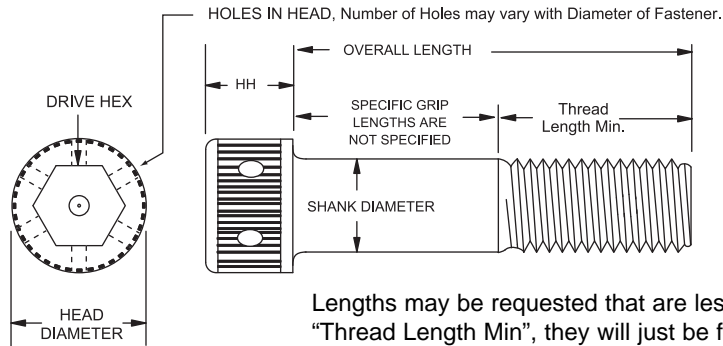
MS21250, 12 Point Bolts

Grip Lengths / Overall Lengths

Grip Dash Number	Grip + or-.010	For Overall Lengths see below																						
		Diameter Dash Numbers																						
		02	03	04	05	06	07	08	09	10	12	14	16	18	20	22	24							
004	0.250	0.655	0.690	0.762	0.849	0.895	0.991	1.038	Not Available															
005	0.313	0.718	0.753	0.825	0.912	0.958	1.054	1.101																
006	0.375	0.780	0.815	0.887	0.974	1.020	1.116	1.163														1.247	1.294	1.431
007	0.438	0.843	0.878	0.950	1.037	1.083	1.179	1.226														1.310	1.357	1.494
008	0.500	0.905	0.940	1.012	1.099	1.145	1.241	1.288	1.372	1.419	1.556	1.764 1.999 2.170												
009	0.563	0.968	1.003	1.075	1.162	1.208	1.304	1.351	1.435	1.482	1.619							1.827	2.062	2.233				
010	0.625	1.030	1.065	1.137	1.224	1.270	1.366	1.413	1.497	1.544	1.681	1.889	2.124	2.295	2.405	2.530	2.655							
011	0.688	1.093	1.128	1.200	1.287	1.333	1.429	1.476	1.560	1.607	1.744	1.952	2.187	2.358	2.468	2.593	2.718							
012	0.750	1.155	1.190	1.262	1.349	1.395	1.491	1.538	1.622	1.669	1.806	2.014	2.249	2.420	2.530	2.655	2.780							
013	0.813	1.218	1.253	1.325	1.412	1.458	1.554	1.601	1.685	1.732	1.869	2.077	2.312	2.483	2.593	2.718	2.843							
014	0.875	1.280	1.315	1.387	1.474	1.520	1.616	1.663	1.747	1.794	1.931	2.139	2.374	2.545	2.655	2.780	2.905							
015	0.938	1.343	1.378	1.450	1.537	1.583	1.679	1.726	1.810	1.857	1.994	2.202	2.437	2.608	2.718	2.843	2.968							
016	1.000	1.405	1.440	1.512	1.599	1.645	1.741	1.788	1.872	1.919	2.056	2.264	2.499	2.670	2.780	2.905	3.030							
017	1.063	1.468	1.503	1.575	1.662	1.708	1.804	1.851	1.935	1.982	2.119	2.327	2.562	2.733	2.843	2.968	3.093							
018	1.125	1.530	1.565	1.637	1.724	1.770	1.866	1.913	1.997	2.044	2.181	2.389	2.624	2.795	2.905	3.030	3.155							
019	1.188	1.593	1.628	1.700	1.787	1.833	1.929	1.976	2.060	2.107	2.244	2.452	2.687	2.858	2.968	3.093	3.218							
020	1.250	1.655	1.690	1.762	1.849	1.895	1.991	2.038	2.122	2.169	2.306	2.514	2.749	2.920	3.030	3.155	3.280							
021	1.313	1.718	1.753	1.825	1.912	1.958	2.054	2.101	2.185	2.232	2.369	2.577	2.812	2.983	3.093	3.218	3.343							
022	1.375	1.780	1.815	1.887	1.974	2.020	2.116	2.163	2.247	2.294	2.431	2.639	2.874	3.045	3.155	3.280	3.405							
023	1.438	1.843	1.878	1.950	2.037	2.083	2.179	2.226	2.310	2.357	2.494	2.702	2.937	3.108	3.218	3.343	3.468							
024	1.500	1.905	1.940	2.012	2.099	2.145	2.241	2.288	2.372	2.419	2.556	2.764	2.999	3.170	3.280	3.405	3.530							
025	1.563	1.968	2.003	2.075	2.162	2.208	2.304	2.351	2.435	2.482	2.619	2.827	3.062	3.233	3.343	3.468	3.593							
026	1.625	2.030	2.065	2.137	2.224	2.270	2.366	2.413	2.497	2.544	2.681	2.889	3.124	3.295	3.405	3.530	3.655							
027	1.688	2.093	2.128	2.200	2.287	2.333	2.429	2.476	2.560	2.607	2.744	2.952	3.187	3.358	3.468	3.593	3.718							
028	1.750	2.155	2.190	2.262	2.349	2.395	2.491	2.538	2.622	2.669	2.806	3.014	3.249	3.420	3.530	3.655	3.780							
029	1.813	2.218	2.253	2.325	2.412	2.458	2.554	2.601	2.685	2.732	2.869	3.077	3.312	3.483	3.593	3.718	3.843							
030	1.875	2.280	2.315	2.387	2.474	2.520	2.616	2.663	2.747	2.794	2.931	3.139	3.374	3.545	3.655	3.780	3.905							
031	1.938	2.343	2.378	2.450	2.537	2.583	2.679	2.726	2.810	2.857	2.994	3.202	3.437	3.608	3.718	3.843	3.968							
032	2.000	2.405	2.440	2.512	2.599	2.645	2.741	2.788	2.872	2.919	3.056	3.264	3.499	3.670	3.780	3.905	4.030							
034	2.125	2.530	2.565	2.637	2.724	2.770	2.866	2.913	2.997	3.044	3.181	3.389	3.624	3.795	3.905	4.030	4.155							
036	2.250	2.655	2.690	2.762	2.849	2.895	2.991	3.038	3.122	3.169	3.306	3.514	3.749	3.920	4.030	4.155	4.280							
038	2.375	2.780	2.815	2.887	2.974	3.020	3.116	3.163	3.247	3.294	3.431	3.639	3.874	4.045	4.155	4.280	4.405							
040	2.500	2.905	2.940	3.012	3.099	3.145	3.241	3.288	3.372	3.419	3.556	3.764	3.999	4.170	4.280	4.405	4.530							
042	2.625	3.030	3.065	3.137	3.224	3.270	3.366	3.413	3.497	3.544	3.681	3.889	4.124	4.295	4.405	4.530	4.655							
044	2.750	3.155	3.190	3.262	3.349	3.395	3.491	3.538	3.622	3.669	3.806	4.014	4.249	4.420	4.530	4.655	4.780							
046	2.875	3.280	3.315	3.387	3.474	3.520	3.616	3.663	3.747	3.794	3.931	4.139	4.374	4.545	4.655	4.780	4.905							
048	3.000	3.405	3.440	3.512	3.599	3.645	3.741	3.788	3.872	3.919	4.056	4.264	4.499	4.670	4.780	4.905	5.030							
050	3.125	3.530	3.565	3.637	3.724	3.770	3.866	3.913	3.997	4.044	4.181	4.389	4.624	4.795	4.905	5.030	5.155							
052	3.250	3.655	3.690	3.762	3.849	3.895	3.991	4.038	4.122	4.169	4.306	4.514	4.749	4.920	5.030	5.155	5.280							
054	3.375	3.780	3.815	3.887	3.974	4.020	4.116	4.163	4.247	4.294	4.431	4.639	4.874	5.045	5.155	5.280	5.405							
056	3.500	3.905	3.940	4.012	4.099	4.145	4.241	4.288	4.372	4.419	4.556	4.764	4.999	5.170	5.280	5.405	5.530							
058	3.625	4.030	4.065	4.137	4.224	4.270	4.366	4.413	4.497	4.544	4.681	4.889	5.124	5.295	5.405	5.530	5.655							
060	3.750	4.155	4.190	4.262	4.349	4.395	4.491	4.538	4.622	4.669	4.806	5.014	5.249	5.420	5.530	5.655	5.780							
062	3.875	4.280	4.315	4.387	4.474	4.520	4.616	4.663	4.747	4.794	4.931	5.139	5.374	5.545	5.655	5.780	5.905							
064	4.000	4.405	4.440	4.512	4.599	4.645	4.741	4.788	4.872	4.919	5.056	5.264	5.499	5.670	5.780	5.905	6.030							
066	4.125	4.530	4.565	4.637	4.724	4.770	4.866	4.913	4.997	5.044	5.181	5.389	5.624	5.795	5.905	6.030	6.155							
068	4.250	4.655	4.690	4.762	4.849	4.895	4.991	5.038	5.122	5.169	5.306	5.514	5.749	5.920	6.030	6.155	6.280							
070	4.375	4.780	4.815	4.887	4.974	5.020	5.116	5.163	5.247	5.294	5.431	5.639	5.874	6.045	6.155	6.280	6.405							
072	4.500	4.905	4.940	5.012	5.099	5.145	5.241	5.288	5.372	5.419	5.556	5.764	5.999	6.170	6.280	6.405	6.530							

Genuine Aircraft Hardware Co.

Socket Head Cap Screws NAS1351 (Fine) and NAS1352(Coarse)



HELP WITH THE SELECTION OF PART NUMBERS

The four numbers after "NAS" denote "Fine" or "Course" Threads

Then to designate material add a (-) for Alloy Steel 180KSI, or a (C) for Corrosion Resistant Steel (18-8) 80KSI, or an (N) 140-160KSI for Heat Resisting Steel per AMS5731 or 5737 (A286).

After the (- , C, or N) for material, place the **Diameter Designation** for your desired Shank Diameter that corresponds with your desired **Thread Size**.

Features for rotational security.

- (H) for Drilled Head, or
- (LE) for self locking element *any type*
- (LL) for self locking element *Strip Type*
- (LN) for self locking element *Pellet Type*
- (LB) for self locking element *Patch Type*

After all that but before the Length add **Features** if desired. After features (if any) then the Overall Length is stated in 1/16ths of an inch. The last designation is for **plating or finish**.

P= Cadmium II Plating Type 2, class 2, All materials
S= Silver Flashed for (C) and (N) materials.

No Suffix = Black oxide for (Alloy Steel) and Passivated for (C) and (N) Materials

Example of Part Number: NAS1351-4H14

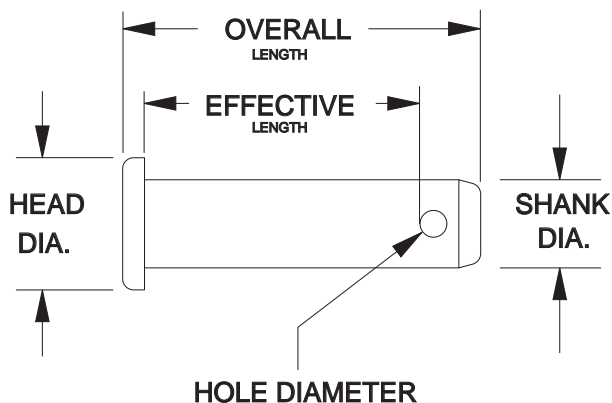
Socket Head Cap Screw, 1/4-28 Threads, Alloy Steel, Holes in Head , 7/8" Overall Length, Black Oxide Coated.

Thread Sizes		Diameter Designation	Shank Diameter	Head Diameter	"HH" Head Height	Thread Length "Min"
NAS1351 Fine	NAS1352 Coarse					
#4-56	#4-40	04	.1075 -.1120	.176 -.183	7/64	3/4"
#6-40	#6-32	06	.1329 - .1380	.218 -.226	9/64	
#8-36	#8-32	08	.1585 - .1640	.262 -.270	5/32	7/8"
#10-32	#10-24	3	.1840 -.1900	.303 -.312	3/16	
1/4-28	1/4-20	4	.2435 -.2500	.365 -.375	1/4	1"
5/16-24	5/16-18	5	.3053 -.3125	.457 - .469	5/16	1 1/8"
3/8-24	3/8-16	6	.3678 - .3750	.550 -.562	3/8	1 1/4"
7/16-20	7/16-14	7	.4294 - .4375	.642 -.656	7/16	1 3/8"
1/2-20	1/2-13	8	.4919 - 5000	.735 -.750	1/2	1 1/2"

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Clevis Pins

Diameter / Head Size / Hole Sizes



HELP WITH THE SELECTION OF PART NUMBERS

All of this series clevis pins start with the part number MS20392-, the next number designates diameter, the "C" designates alloy steel (4037, 4130, or 8630) as the material. All steel pins are Cadmium II plated. The number after "C" designates the effective length in 1/32" increments. SEE EFFECTIVE LENGTH CHART next page.

To replace an AN clevis pin with an MS20392 clevis pin, the effective length designation is identical, but the numbers before that are different. SEE CHART BELOW !

To calculate "Overall Length" add "L" factor to effective length.

Examples of part numbers:

MS20392-3C47 = 1/4" diameter pin, 1.469 effective length, 1.672 overall length, was AN394-47

ORDER BY MS20392 NUMBERS ONLY

NOTE: all dimensions in inches

DIAMETER MS20392-(dia)	SHANK DIAMETER	DIA. MAX	DIA. MIN	HOLE, DIA. + or - .010	HEAD DIAMETER	"L" FACTOR	OLD AN #
1C	1/8	.125	.123	.070	.250	.172	AN392-
2C	3/16	.188	.186	.076	.312	.172	AN393-
3C	1/4	.250	.248	.076	.375	.203	AN394-
4C	5/16	.312	.310	.106	.437	.250	AN395-
5C	3/8	.375	.373	.106	.500	.250	AN396-
6C	7/16	.438	.436	.106	.562	.281	AN397-
7C	1/2	.500	.498	.106	.625	.281	AN398-

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Clevis Pins

MS20392 Series

Dash # / Effective Length / Overall Length

NOTE: all dimensions in inches

Dash Number	Effective Length + or - .010	1C, overall + or - .010	2C, overall + or - .010	3C, overall + or - .010	4C, overall + or - .010	5C, overall + or - .010	6C, overall + or - .010	7C, overall + or - .010
7	0.219	0.391	0.391					
9	0.281	0.453	0.453					
11	0.344	0.516	0.516	0.547	0.594			
13	0.406	0.578	0.578	0.609	0.656			
15	0.469	0.641	0.641	0.672	0.719	0.719	0.750	0.750
17	0.531	0.703	0.703	0.734	0.781	0.781	0.812	0.812
19	0.594	0.766	0.766	0.797	0.844	0.844	0.875	0.875
21	0.656	0.828	0.828	0.859	0.906	0.906	0.937	0.937
23	0.719	0.891	0.891	0.922	0.969	0.969	1.000	1.000
25	0.781	0.953	0.953	0.984	1.031	1.031	1.062	1.062
27	0.844	1.016	1.016	1.047	1.094	1.094	1.125	1.125
29	0.906	1.078	1.078	1.109	1.156	1.156	1.187	1.187
31	0.969	1.141	1.141	1.172	1.219	1.219	1.250	1.250
33	1.031	1.203	1.203	1.234	1.281	1.281	1.312	1.312
35	1.094	1.266	1.266	1.297	1.344	1.344	1.375	1.375
37	1.156	1.328	1.328	1.359	1.406	1.406	1.437	1.437
39	1.219	1.391	1.391	1.422	1.469	1.469	1.500	1.500
41	1.281	1.453	1.453	1.484	1.531	1.531	1.562	1.562
43	1.344	1.516	1.516	1.547	1.594	1.594	1.625	1.625
45	1.406	1.578	1.578	1.609	1.656	1.656	1.687	1.687
47	1.469	1.641	1.641	1.672	1.719	1.719	1.750	1.750
49	1.531	1.703	1.703	1.734	1.781	1.781	1.812	1.812
51	1.594	1.766	1.766	1.797	1.844	1.844	1.875	1.875
53	1.656	1.828	1.828	1.859	1.906	1.906	1.937	1.937
55	1.719	1.891	1.891	1.922	1.969	1.969	2.000	2.000
57	1.781	1.953	1.953	1.984	2.031	2.031	2.062	2.062
59	1.844	2.016	2.016	2.047	2.094	2.094	2.125	2.125
61	1.906	2.078	2.078	2.109	2.156	2.156	2.187	2.187
63	1.969	2.141	2.141	2.172	2.219	2.219	2.250	2.250
65	2.031	2.203	2.203	2.234	2.281	2.281	2.312	2.312

To get longer lengths, see incremental info in row below.

add 2

Add .0625 or 1/16" to all of the columns above for each increase in dash #'s (Lengths) of "2"

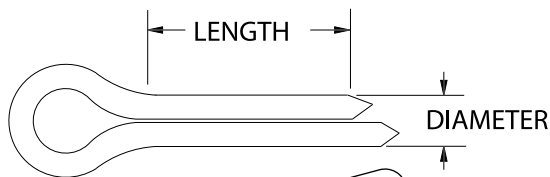
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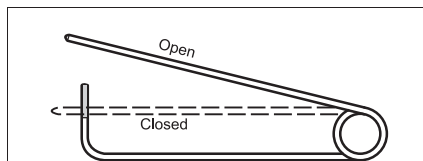
Cotter/Safety Pins

MS24665 Series, Replaces AN380 and AN381

AN416, Replaced by AA55488



Kits Available, page 282



We will supply the Old AN Part Numbers until depleted then we will supply the New AA numbers. AN parts are Steel Cad II Plated, AA parts are Stainless.

Old AN Part #	New AA Part #	Length	Loop	Wire Dia.
AN416-1	AA55488-1	1.062	.156	.051
AN416-2	AA55488-2	.750	.156	.041
AN416-3	AA55488-3	2.156	.250	.080

Length in Inches	NOMINAL DIAMETERS - STEEL, CADMIUM PLATED MS24665-(XXX)							
	1/32"	3/64"	1/16"	5/64"	3/32"	1/8"	5/32"	3/16"
1/4	001	065						
3/8	003	067	130					
1/2	005	069	132	208	281	349	417	
3/4	007	071	134	210	283	351	418	490
1"	009	073	136	212	285	353	419	491
1 1/4	010	074	138	214	287	355	421	493
1 1/2	011	075	140	216	289	357	423	495
1 3/4	012	076	142	218	291	359	425	497
2"	013	077	143	219	292	360	426	498
2 1/4					293	361	427	499
2 1/2	014	078	144	220	294	362	428	500
2 3/4							429	501
3"	015	079	145	221	295	363	430	502

Length in Inches	NOMINAL DIAMETERS - STAINLESS STEEL MS24665-(XXX)							
	1/32"	3/64"	1/16"	5/64"	3/32"	1/8"	5/32"	3/16"
1/4	018	082	1010					
5/16	1001	083	148 (1011)					
3/8	20(1002)	084	149 (1012)					
7/16	1003	085	150 (1013)					
1/2	022	086	151	227	298	366	435	
5/8		087	152		299			
3/4	024	088	153	229	300	368	436	508
7/8		089	154	230	301	369		
1"	026	090	155	231	302	370	437	509
1 1/8				232	303	371	438	
1 1/4	027	091	157	233	304	372	439	511
1 3/8				234	305	373	440	
1 1/2	028	092	159	235	306	374	441	513
1 5/8				236	307	375	442	514
1 3/4			161	237	308	376	443	515
2"			162	238	309	377	444	516
2 1/4					310	378	445	517
2 1/2			163	239	311	379	446	518

Cross Reference Chart

AN380 and AN381 to MS24665

ORDER BY MS24665 NUMBERS

SEE PREVIOUS PAGE FOR PART NUMBER BREAKDOWN

STEEL, CAD II PLATED			
OLD AN380 NUMBER	MS24665 DASH #	OLD AN380 NUMBER	MS24665 DASH #
-1 -1	-3		
-1 -2	-5	-4 -2	-349
-1 -3	-7	-4 -3	-351
-1 -4	-9	-4 -4	-353
-1 -5	-10	-4 -5	-355
-1 -6	-11	-4 -6	-357
-1 -7	-12	-4 -7	-359
-1 -8	-13	-4 -8	-360
-1 -10	-14	-4 -10	-362
-1 -12	-15	-4 -12	-363
-2 -1	-130		
-2 -2	-132	-5 -2	-417
-2 -3	-134	-5 -3	-418
-2 -4	-136	-5 -4	-419
-2 -5	-138	-5 -5	-421
-2 -6	-140	-5 -6	-423
-2 -7	-142	-5 -7	-425
-2 -8	-143	-5 -8	-426
-2 -10	-144	-5 -10	-428
-2 -12	-145	-5 -12	-430
-3 -2	-281		
-3 -3	-283	-6 -3	-490
-3 -4	-285	-6 -4	-491
-3 -5	-287	-6 -5	-493
-3 -6	-289	-6 -6	-495
-3 -7	-291	-6 -7	-497
-3 -8	-292	-6 -8	-498
-3 -10	-294	-6 -10	-500
-3 -12	-295	-6 -12	-502

STAINLESS STEEL					
OLD AN381 NUMBER	MS24665 DASH #	OLD AN381 NUMBER	MS24665 DASH #	OLD AN381 NUMBER	MS24665 DASH #
-1 -4	-18				
-1 -6	-20 or (1002)	-25 -8	-227	-4 -8	-366
-1 -8	-22	-25 -10	-228	-4 -12	-368
-1 -12	-24	-25 -12	-229	-4 -16	-370
-1 -16	-26	-25 -14	-230	-4 -20	-372
		-25 -16	-231	-4 -24	-374
-15 -6	-84	-25 -20	-233	-4 -28	-376
-15 -8	-86	-25 -24	-235	-4 -32	-377
-15 -10	-87	-25 -28	-237	-4 -36	-378
-15 -12	-88	-25 -32	-238		
-15 -14	-89	-25 -40	-239		
-15 -16	-90	-25 -48	-240	-5 -12	-436
-15 -20	-91			-5 -16	-437
-15 -24	-92	-3 -8	-298	-5 -20	-439
-15 -28	-93	-3 -10	-299	-5 -24	-441
-15 -32	-94	-3 -12	-300	-5 -28	-443
		-3 -14	-301	-5 -32	-444
-2 -6	-149 or (1001)	-3 -16	-302	-5 -36	-445
-2 -8	-151	-3 -18	-303	-5 -40	-446
-2 10	-152	-3 -20	-304		
-2 -12	-153	-3 -22	-305		
-2 -14	-154	-3 -24	-306	-6 -24	-513
-2 -16	-155	-3 -26	-307	-6 -28	-515
-2 -20	-157	-3 -28	-308	-6 -32	-516
-2 -24	-159	-3 -32	-309	-6 -36	-517
-2 -28	-161	-3 -36	-310	-6 -40	-518
-2 -32	-162	-3 -40	-311	-6 -48	-520
-2 -40	-163	-3 -48	-312		
-2 -48	-164				

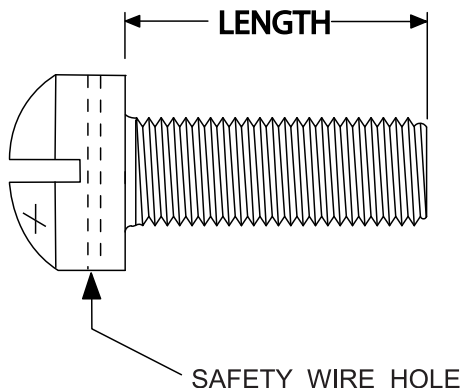
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Phillister Head, Alloy Steel AN502 and AN503 Series

TENSILE STRENGTH, 125,000 TO 145,000 PSI. (ALLOY STEEL) Cadmium I Plating

These screws are commonly used where strength and retention are a prime concern. They are fully threaded and have a hole in the Slotted Phillister Head for safety wire.

Cadmium I plating is silver in appearance.



Examples of Part Numbers:

AN502-10-12 = 10-32 THREADS, 3/4" OVERALL LENGTH UNDER THE SLOTTED AND DRILLED PHILLISTER HEAD
 AN503-10-12 = 10-24 THREADS, 3/4" OVERALL LENGTH UNDER THE SLOTTED AND DRILLED PHILLISTER HEAD

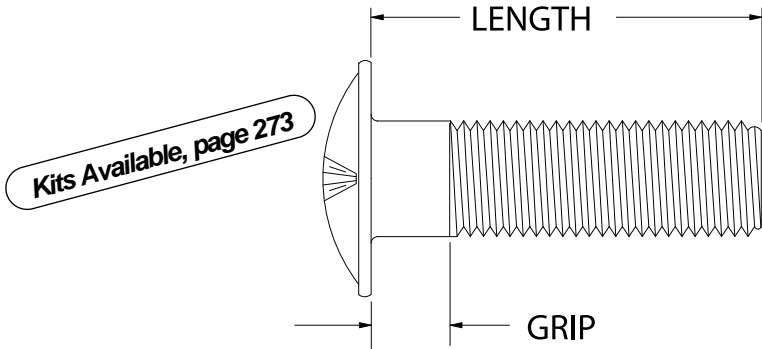
DIA. - PITCH > L= (Length)	6-32	8-32	10-24	10-32	1/4-20	1/4-28
	COARSE THREAD	COARSE THREAD	COARSE THREAD	FINE THREAD	COARSE THREAD	FINE THREAD
	AN503	AN503	AN503	AN502	AN503	AN502
1/4	- 6 - 4	- 8 - 4		- 10 - 4		
3/8	- 6 - 6	- 8 - 6	- 10 - 6	- 10 - 6	- 416 - 6	
1/2	- 6 - 8	- 8 - 8	- 10 - 8	- 10 - 8	- 416 - 8	- 416 - 8
5/8		- 8 - 10	- 10 - 10	- 10 - 10	- 416 - 10	- 416 - 10
3/4		- 8 - 12	- 10 - 12	- 10 - 12	- 416 - 12	- 416 - 12
7/8		- 8 - 14	- 10 - 14	- 10 - 14	- 416 - 14	- 416 - 14
1"		- 8 - 16	- 10 - 16	- 10 - 16	- 416 - 16	- 416 - 16
1 1/8			- 10 - 18	- 10 - 18	- 416 - 18	- 416 - 18
1 1/4			- 10 - 20	- 10 - 20	- 416 - 20	- 416 - 20
1 3/8			- 10 - 22	- 10 - 22	- 416 - 22	- 416 - 22
1 1/2			- 10 - 24	- 10 - 24	- 416 - 24	- 416 - 24
1 5/8			- 10 - 26	- 10 - 26	- 416 - 26	- 416 - 26
1 3/4					- 416 - 28	- 416 - 28
1 7/8				- 10 - 30	- 416 - 30	- 416 - 30
2"					- 416 - 32	- 416 - 32

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AN525 Series

Washer Head, Structural Screws, Phillips Drive, Alloy Steel

TENSILE STRENGTH, 125,000 PSI (Minimum), one (X) on head
PLATED CADMIUM II OR ZINC II, (BOTH GOLD IN APPEARANCE)



Example of Part Number:

AN525-832R9 = 8-32 threads, 9/16 Overall Length under the head, 5/32" grip.

The tolerance for Overall Length is $\pm 1/32"$. The tolerance for Grip Length is $\pm 1/64"$.

D= Threads, Dia - Pitch Overall (Length)	AN525-(DIA./THREADS) R (LENGTH)					
	8-32 Grip Length	8-32 Size Number	10-32 Grip Length	10-32 Size Number	1/4-28 Grip Length	1/4-28 Size Number
3/8	1/32	832R6	1/32	10R6	1/32	416R6
7/16	1/16	832R7	1/16	10R7	1/16	416R7
1/2	1/8	832R8	1/8	10R8	1/8	416R8
9/16	5/32	832R9	5/32	10R9	5/32	416R9
5/8	7/32	832R10	7/32	10R10	7/32	416R10
11/16	9/32	832R11	9/32	10R11	9/32	416R11
3/4	11/32	832R12	11/32	10R12	11/32	416R12
13/16	13/32	832R13	13/32	10R13	13/32	416R13
7/8	15/32	832R14	15/32	10R14	15/32	416R14
15/16	17/32	832R15	17/32	10R15	17/32	416R15
1"	19/32	832R16	19/32	10R16	19/32	416R16
1 1/8	23/32	832R18	23/32	10R18	23/32	416R18
1 1/4	27/32	832R20	27/32	10R20	27/32	416R20
1 3/8	31/32	832R22	31/32	10R22	31/32	416R22
1 1/2	1 3/32	832R24	1 3/32	10R24	1 3/32	416R24
1 5/8	1 7/32	832R26	1 7/32	10R26	1 7/32	416R26
1 3/4	1 11/32	832R28	1 11/32	10R28	1 11/32	416R28
1 7/8	1 15/32	832R30	1 15/32	10R30	1 15/32	416R30
2"	1 19/32	832R32	1 19/32	10R32	1 19/32	416R32

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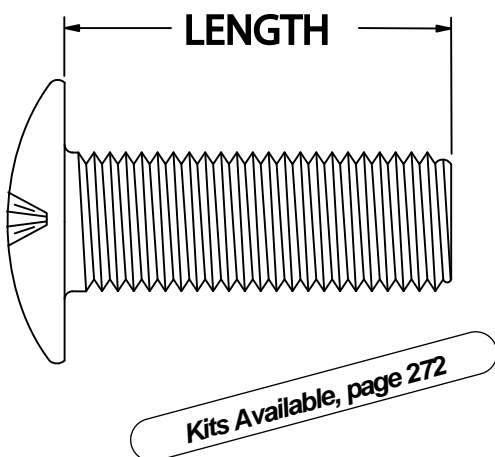
Truss Head, Non Structural

AN526 Series, Low Carbon Steel or Stainless.

TENSILE STRENGTH, 55,000 psi. (Low Carbon Steel) Cadmium I Plating
TENSILE STRENGTH, 80,000 psi. (Stainless Steel)

These screws are commonly used for general purpose NON STRUCTURAL fastening. The United States Government considers them to be obsolete for design or replacement effective 9/1/65. However due to popular demand they are still made and sold in quantity.

Cadmium I plating is silver in appearance.



Part # **GAH-2139**
4 way Screwdriver
Small & Handy

Examples of Part Number:

AN526-1032R12 = 10-32 THREADS, 3/4" OVERALL LENGTH UNDER THE TRUSS HEAD
PHILLIPS DRIVE, LOW CARBON STEEL, CAD I PLATED

AN526C832R8 = 8-32 THREADS, 1/2" OVERALL LENGTH UNDER THE TRUSS HEAD
PHILLIPS DRIVE, STAINLESS STEEL, UNPLATED

AN526 (Material, - or C)(Length)		
STEEL, CAD I	STAINLESS	THREAD SIZE
AN526-632	AN526C632	6-32
AN526-832	AN526C832	8-32
AN526-1032	AN526C1032	10-32
AN526-428	AN526C428	1/4-28

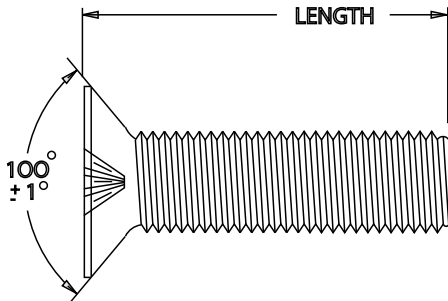
Gray shaded part numbers are NON STANDARD sizes.	
L= (Length)	Last Number
1/4	R4
5/16	R5
3/8	R6
7/16	R7
1/2	R8
9/16	R9
5/8	R10
11/16	R11
3/4	R12
13/16	R13
7/8	R14
15/16	R15
1"	R16
1 1/16	R17
1 1/8	R18
1 3/16	R19
1 1/4	R20
1 5/16	R21
1 3/8	R22
1 7/16	R23
1 1/2	R24
1 9/16	R25
1 5/8	R26
1 11/16	R27
1 3/4	R28
1 13/16	R29
1 7/8	R30
1 15/16	R31
2"	R32

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MS24693 Series

Fully Threaded, 100 Deg.. Countersunk, Non Structural Screws, Phillips Drive
These are NON STRUCTURAL fasteners that replace the AN507 Series.



Use the MS24693 series to replace AN507 screws of like material and finish. SEE THE CHARTS for desired size numbers. SEE CROSS REFERENCE on next page for Superseding Part Numbers

Kits Available, pages 270,272,275

Do Not Order By AN507 Numbers

Shaded part numbers are not stocked; special order only.

HELP WITH THE SELECTION OF PART NUMBERS

- USE (S) AFTER MS24693 & BEFORE (SIZE NUMBER), FOR LOW CARBON STEEL CAD II PLATED
- USE (C) AFTER MS24693 & BEFORE (SIZE NUMBER), FOR 300 SERIES STAINLESS STEEL, UNPLATED
- USE (BB) AFTER MS24693 & BEFORE (SIZE NUMBER), FOR BRASS WITH BLACK CHEMICAL FINISH

Examples of Part Numbers:

- MS24693S28 = 6-32 Threads, 1/2" Overall length including the head, Cadmium II plated, Steel
- MS24693BB51 = 8-32 Threads, 5/8" Overall length including the head, Black chemical finish, Brass
- MS24693C272 = 10-32 Threads, 1/2" Overall length including the head, Unplated, 300 series Stainless

D = Threads, Dia. - Pitch (Length)	MS 24693 (material) (size)						
	Coarse Threads					Fine Threads	
	4-40 Size Number	6-32 Size Number	8-32 Size Number	10-24 Size Number	1/4-20 Size Number	10-32 Size Number	1/4-28 Size Number
1/4	2	24	46			268	
5/16	3	25	47	69	91	269	
3/8	4	26	48	70	92	270	292
7/16	5	27	49	71	93	271	293
1/2	6	28	50	72	94	272	294
5/8	7	29	51	73	95	273	295
3/4	8	30	52	74	96	274	296
7/8	9	31	53	75	97	275	297
1"	10	32	54	76	98	276	298
1+1/8	11	33	55	77	99	277	299
1+1/4	12	34	56	78	100	278	300
1+1/2	14	36	58	80	102	280	302
1+3/4		38	60	82	104	282	304
2"		40	62	84	106	284	306

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Cross Reference Chart

AN507 to MS24693 SCREWS

ORDER BY MS24693 NUMBERS

SEE PREVIOUS PAGE FOR PART NUMBER BREAKDOWN

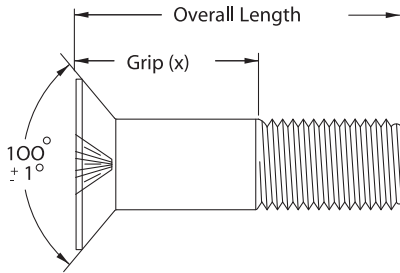
OLD AN507 DASH NUMBER	NEW MS24693 SIZE NUMBER	OLD AN507 DASH NUMBER	NEW MS24693 SIZE NUMBER	OLD AN507 DASH NUMBER	NEW MS24693 SIZE NUMBER	OLD AN507 DASH NUMBER	NEW MS24693 SIZE NUMBER
440R 4	2	632R 31	no replacement	1024R 22	no replacement	420R 13	no replacement
440R 5	3	632R 32	40	1024R 23	no replacement	420R 14	97
440R 6	4	832R 4	46	1024R 24	80	420R 15	no replacement
440R 7	5	832R 5	47	1024R 25	no replacement	420R 16	98
440R 8	6	832R 6	48	1024R 26	no replacement	420R 17	no replacement
440R 9	no replacement	832R 7	49	1024R 27	no replacement	420R 18	99
440R 10	7	832R 8	50	1024R 28	82	420R 19	no replacement
440R 11	no replacement	832R 9	no replacement	1024R 29	no replacement	420R 20	100
440R 12	8	832R 10	51	1024R 30	no replacement	420R 21	no replacement
440R 13	no replacement	832R 11	no replacement	1024R 31	no replacement	420R 22	101
440R 14	9	832R 12	52	1024R 32	84	420R 23	no replacement
440R 15	no replacement	832R 13	no replacement	1032R 4	268	420R 24	102
440R 16	10	832R 14	53	1032R 5	269	420R 25	no replacement
440R 17	no replacement	832R 15	no replacement	1032R 6	270	420R 26	no replacement
440R 18	11	832R 16	54	1032R 7	271	420R 27	no replacement
440R 19	no replacement	832R 17	no replacement	1032R 8	272	420R 28	104
440R 20	12	832R 18	55	1032R 9	no replacement	420R 29	no replacement
440R 21	no replacement	832R 19	no replacement	1032R 10	273	420R 30	no replacement
440R 22	no replacement	832R 20	56	1032R 11	no replacement	420R 31	no replacement
440R 23	no replacement	832R 21	no replacement	1032R 12	274	420R 32	106
440R 24	14	832R 22	no replacement	1032R 13	no replacement	428R 4	no replacement
632R 3	23	832R 23	no replacement	1032R 14	275	428R 5	no replacement
632R 4	24	832R 24	58	1032R 15	no replacement	428R 6	292
632R 5	25	832R 25	no replacement	1032R 16	276	428R 7	293
632R 6	26	832R 26	no replacement	1032R 17	no replacement	428R 8	294
632R 7	27	832R 27	no replacement	1032R 18	277	428R 9	no replacement
632R 8	28	832R 28	60	1032R 19	no replacement	428R 10	295
632R 9	no replacement	832R 29	no replacement	1032R 20	278	428R 11	no replacement
632R 10	29	832R 30	no replacement	1032R 21	no replacement	428R 12	296
632R 11	no replacement	832R 31	no replacement	1032R 22	279	428R 13	no replacement
632R 12	30	832R 32	62	1032R 23	no replacement	428R 14	297
632R 13	no replacement	1024R 4	no replacement	1032R 24	280	428R 15	no replacement
632R 14	31	1024R 5	69	1032R 25	no replacement	428R 16	298
632R 15	no replacement	1024R 6	70	1032R 26	281	428R 17	no replacement
632R 16	32	1024R 7	71	1032R 27	no replacement	428R 18	299
632R 17	no replacement	1024R 8	72	1032R 28	282	428R 19	no replacement
632R 18	33	1024R 9	no replacement	1032R 29	no replacement	428R 20	300
632R 19	no replacement	1024R 10	73	1032R 30	283	428R 21	no replacement
632R 20	34	1024R 11	no replacement	1032R 31	no replacement	428R 22	301
632R 21	no replacement	1024R 12	74	1032R 32	284	428R 23	no replacement
632R 22	no replacement	1024R 13	no replacement	420R 4	no replacement	428R 24	302
632R 23	no replacement	1024R 14	75	420R 5	91	428R 25	no replacement
632R 24	36	1024R 15	no replacement	420R 6	92	428R 26	303
632R 25	no replacement	1024R 16	76	420R 7	93	428R 27	no replacement
632R 26	no replacement	1024R 17	no replacement	420R 8	94	428R 28	304
632R 27	no replacement	1024R 18	77	420R 9	no replacement	428R 29	no replacement
632R 28	38	1024R 19	no replacement	420R 10	95	428R 30	305
632R 29	no replacement	1024R 20	78	420R 11	no replacement	428R 31	no replacement
632R 30	no replacement	1024R 21	no replacement	420R 12	96	428R 32	306

Genuine Aircraft Hardware Co.

MS24694 Series

100 Deg.. Countersunk, Structural Screws, Phillips Drive

These are STRUCTURAL fasteners that replace the AN509 Series.



Use the MS24694 series to replace AN509 screws of like material and finish. SEE THE CHARTS for desired size numbers. SEE CROSS REFERENCE on next page for Superseding Part Numbers.

Do Not Order By AN509 Numbers

Kits Available, page 271

TENSILE STRENGTH, 125,000 TO 145,000 PSI. (ALLOY STEEL) one (X) on head.
TENSILE STRENGTH, 85,000 PSI (STAINLESS STEEL) one (dash) on head.

HELP WITH THE SELECTION OF PART NUMBERS

- USE (S) AFTER MS24694 AND BEFORE (SIZE NUMBER), FOR ALLOY STEEL, CAD II PLATED.
- USE (C) AFTER MS24694 AND BEFORE (SIZE NUMBER), FOR 300 SERIES STAINLESS STEEL, UNPLATED.

Examples of Part Numbers:

- MS24694S50 = 10 - 32 Threads, 17/32" Overall length including the head, 7/64" Grip, Cadmium II plated, Steel.
 - MS24694C101 = 1/4 - 28 Threads, 29/32" Overall length including the head, 11/32" Grip, Unplated, 300 Series Stainless.
- For actual screw length add 1/32 of an inch to overall length.

D= Threads, Dia - Pitch Overall (Length)	MS24694 (material)(size)					
	8-32		10-32		1/4-28	
	Grip Length	Size Number	Grip Length	Size Number	Grip Length	Size Number
1/4	0.094	1	0.109	46		
5/16	0.094	2	0.109	47	0.141	92
3/8	0.094	3	0.109	48	0.141	93
7/16	0.094	4	0.109	49	0.141	94
1/2	0.094	5	0.109	50	0.141	95
9/16	0.156	6	0.109	51	0.141	96
5/8	0.219	7	0.188	52	0.141	97
11/16	0.281	8	0.250	53	0.188	98
3/4	0.344	9	0.313	54	0.250	99
13/16	0.406	10	0.375	55	0.313	100
7/8	0.469	11	0.438	56	0.375	101
15/16	0.531	12	0.500	57	0.438	102
1	0.594	13	0.563	58	0.500	103
1 1/16	0.656	14	0.625	59	0.563	104
1 1/8	0.719	15	0.688	60	0.625	105
1 3/16	0.781	16	0.750	61	0.688	106
1 1/4	0.844	17	0.813	62	0.750	107
1 5/16	0.906	18	0.875	63	0.813	108
1 3/8	0.969	19	0.938	64	0.875	109
1 7/16	1.031	20	1.000	65	0.938	110
1 1/2	1.094	21	1.063	66	1.000	111
1 9/16	1.217	22	1.125	67	1.063	112
1 5/8	1.219	23	1.188	68	1.125	113
1 11/16	1.281	24	1.250	69	1.188	114
1 3/4	1.344	25	1.313	70	1.250	115
1 13/16	1.406	26	1.375	71	1.312	116
1 7/8	1.469	27	1.438	72	1.375	117
1 15/16	1.531	28	1.500	73	1.438	118
2	1.594	29	1.563	74	1.500	119

Genuine Aircraft Hardware Co.

Cross Reference Chart

AN509 to MS24694 Screws

ORDER BY MS24694 NUMBERS

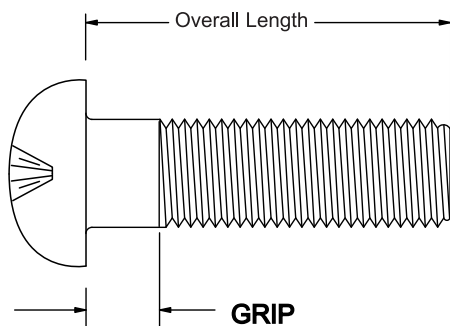
SEE PREVIOUS PAGE FOR PART NUMBER BREAKDOWN

OLD AN509 DASH NUMBER	NEW MS24694 SIZE NUMBER	OLD AN509 DASH NUMBER	NEW MS24694 SIZE NUMBER	OLD AN509 DASH NUMBER	NEW MS24694 SIZE NUMBER
832R 4	1	1032R 4	46	416R 4	NOT AVAILABLE
832R 5	2	1032R 5	47	416R 5	92
832R 6	3	1032R 6	48	416R 6	93
832R 7	4	1032R 7	49	416R 7	94
832R 8	5	1032R 8	50	416R 8	95
832R 9	6	1032R 9	51	416R 9	96
832R 10	7	1032R 10	52	416R 10	97
832R 11	8	1032R 11	53	416R 11	98
832R 12	9	1032R 12	54	416R 12	99
832R 13	10	1032R 13	55	416R 13	100
832R 14	11	1032R 14	56	416R 14	101
832R 15	12	1032R 15	57	416R 15	102
832R 16	13	1032R 16	58	416R 16	103
832R 17	14	1032R 17	59	416R 17	104
832R 18	15	1032R 18	60	416R 18	105
832R 19	16	1032R 19	61	416R 19	106
832R 20	17	1032R 20	62	416R 20	107
832R 21	18	1032R 21	63	416R 21	108
832R 22	19	1032R 22	64	416R 22	109
832R 23	20	1032R 23	65	416R 23	110
832R 24	21	1032R 24	66	416R 24	111
832R 25	22	1032R 25	67	416R 25	112
832R 26	23	1032R 26	68	416R 26	113
832R 27	24	1032R 27	69	416R 27	114
832R 28	25	1032R 28	70	416R 28	115
832R 29	26	1032R 29	71	416R 29	116
832R 30	27	1032R 30	72	416R 30	117
832R 31	28	1032R 31	73	416R 31	118
832R 32	29	1032R 32	74	416R 32	119

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MS27039 Series Pan Head, Structural Screws, Phillips Drive



ORDER BY MS27039 NUMBERS	
Last two numbers (XX) are the same for both.	
Old NAS Part #	New MS Part #
NAS220 - (XX)	MS27039 - 08 (XX)
NAS221 - (XX)	MS27039 - 1- (XX)
NAS222 - (XX)	MS27039 - 4- (XX)

TENSILE STRENGTH, 125,000 PSI. (Minimum), Head Marking (-) for Alloy steel, (C) for Corrosion resistant steel "A286"
 MS27039 - (SIZE) = ALLOY STEEL PARTS ARE PLATED, CADMIUM II (GOLD IN APPEARANCE)
 MS27039C (SIZE) = CORROSION RESISTANT STEEL, PARTS ARE UNPLATED
 Supersedes NAS220 - NAS222 SEE THE CHART

Example of Part Numbers:

MS27039 - 0809 = 8-32 Threads, .594 Overall length under the head, .094 grip length. Alloy steel, Cadmium II plating
MS27039C0809 = 8-32 Threads, .594 Overall length under the head, .094 grip length. Corrosion and heat resistant steel (A286)

The tolerance for Overall Length is plus .032, minus .015 The tolerance for Grip Length is + or - .015

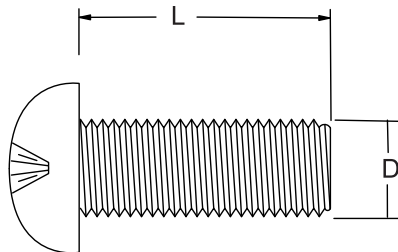
Kits Available. page 274

D=Threads, Dia - Pitch Overall (Length)	8-32 Grip Length	8-32 Size Number	10-32 Grip Length	10-32 Size Number	1/4-28 Grip Length	1/4-28 Size Number
.281	.032, +.032 -.000	0804	.032, +.032 -.000	-1-04	.032, +.032 -.000	-4-04
.344		0805		-1-05		-4-05
.406		0806		-1-06		-4-06
.469		0807		-1-07		-4-07
.531	.094	0808	.062	-1-08		-4-08
.594	.156	0809	.125	-1-09	.062	-4-09
.656	.219	0810	.187	-1-10	.125	-4-10
.719	.281	0811	.250	-1-11	.187	-4-11
.781	.344	0812	.312	-1-12	.250	-4-12
.844	.406	0813	.375	-1-13	.312	-4-13
.906	.469	0814	.437	-1-14	.375	-4-14
.969	.531	0815	.500	-1-15	.437	-4-15
1.031	.594	0816	.562	-1-16	.500	-4-16
1.094	.656	0817	.625	-1-17	.562	-4-17
1.156	.719	0818	.687	-1-18	.625	-4-18
1.219	.781	0819	.750	-1-19	.687	-4-19
1.281	.844	0820	.812	-1-20	.750	-4-20
1.344	.906	0821	.875	-1-21	.812	-4-21
1.406	.969	0822	.937	-1-22	.875	-4-22
1.469	1.031	0823	1.000	-1-23	.937	-4-23
1.531	1.094	0824	1.062	-1-24	1.000	-4-24
1.594	1.156	0825	1.125	-1-25	1.062	-4-25
1.656	1.219	0826	1.187	-1-26	1.125	-4-26
1.719	1.281	0827	1.250	-1-27	1.187	-4-27
1.781	1.344	0828	1.312	-1-28	1.250	-4-28
1.844	1.406	0829	1.375	-1-29	1.312	-4-29
1.906	1.469	0830	1.437	-1-30	1.375	-4-30
1.969	1.531	0831	1.500	-1-31	1.437	-4-31
2.031	1.594	0832	1.562	-1-32	1.500	-4-32

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Genuine Aircraft Hardware Co.

Pan Head, Low Carbon Steel Cadmium II Plated, Phillips Drive, Fully Threaded, Screws



These are NON STRUCTURAL fasteners that replace the AN515 (coarse), and the AN520 (fine) of like diameters and thread lengths.



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Part # GAH-2139
4 way Screwdriver
Small & Handy

Shaded part numbers are NON STANDARD sizes.

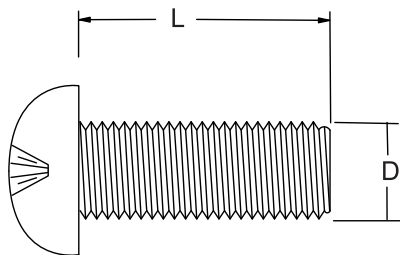
D= Threads, Dia - Pitch Overall (Length)	MS35206-() Coarse Threads					MS35207-() Fine Threads	
	4-40 Dash Number	6-32 Dash Number	8-32 Dash Number	10-24 Dash Number	1/4-20 Dash Number	10-32 Dash Number	1/4-28 Dash Number
1/4	213	226	241	259		259	
5/16	214	227	242	260	276	260	276
3/8	215	228	243	261	277	261	277
7/16	216	229	244	262	278	262	278
1/2	217	230	245	263	279	263	279
9/16	323	327	331	337	343		
5/8	218	231	246	264	280	264	280
11/16							
3/4	219	232	247	265	281	265	281
13/16							
7/8	220	233	248	266	282	266	282
15/16							
1	221	234	249	267	283	267	283
1 1/16							
1 1/8	324	328	332	338	344		
1 3/16							
1 1/4	222	235	250	268	284	268	284
1 5/16							
1 3/8	325	329	333	339	345		
1 7/16							
1 1/2	223	236	251	269	285	269	285
1 9/16							
1 5/8							
1 11/16							
1 3/4	326	237	252	270	286	270	286
1 13/16							
1 7/8		361	334	340	346		
1 15/16							
2		238	253	271	287	271	287

Genuine Aircraft Hardware Co.

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Pan Head, Brass

Black Oxide Finish, Phillips Drive, Fully Threaded, Screws



Commonly used for mounting instruments.

These are NON STRUCTURAL fasteners that replace the AN515B (coarse), and the AN520B (fine) of like diameters and thread lengths.

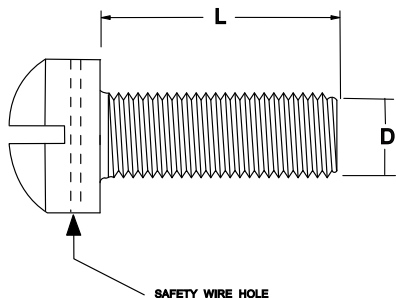
Kits Available, page 275

Shaded part numbers are NON STANDARD sizes.

D= Threads, Dia - Pitch Overall (Length)	MS35214-() Coarse Threads					MS35215-() Fine Threads	
	4-40 Dash Number	6-32 Dash Number	8-32 Dash Number	10-24 Dash Number	1/4-20 Dash Number	10-32 Dash Number	1/4-28 Dash Number
1/4	12	23	38	51		51	
5/16	13	24	39	52	66	52	66
3/8	14	25	40	53	67	53	67
7/16	15	26	41	54	68	54	68
1/2	16	27	42	55	69	55	69
9/16	106	108	114	120	124		
5/8	17	28	43	56	70	56	70
11/16							
3/4	18	29	44	57	71	57	71
13/16							
7/8	19	30	45	58	72	58	72
15/16							
1	20	31	46	59	73	59	73
1 1/16							
1 1/8	107	109	115	121	125		
1 3/16							
1 1/4		32	47	60	74	60	74
1 5/16							
1 3/8	137	110	116	122	126		
1 7/16							
1 1/2		33	48	61	75	61	75
1 9/16							
1 5/8							
1 11/16							
1 3/4		34	49	62	76	62	76
1 13/16							
1 7/8		111	117	123	127		
1 15/16							
2		35	50	63	77	63	77

Genuine Aircraft Hardware Co.

Phillister Head, Low Carbon Steel Cadmium II Plated, Slot Drive, Fully Threaded, Screws



DRILLED HEAD FOR SAFETY WIRE

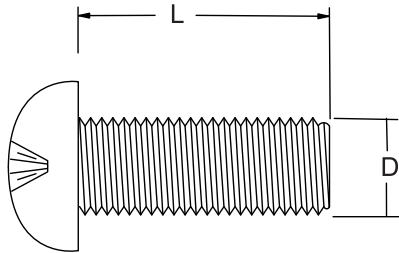
These are NON STRUCTURAL fasteners that replace the AN500A (coarse), and the AN501A (fine) of like diameters and thread lengths.

D= Threads, Dia - Pitch
Overall (Length)

	MS35265-() Coarse Threads					MS35266-() Fine Threads	
	4-40 Dash Number	6-32 Dash Number	8-32 Dash Number	10-24 Dash Number	1/4-20 Dash Number	10-32 Dash Number	1/4-28 Dash Number
1/4	13	26	41	59		59	
5/16	14	27	42	60	76	60	76
3/8	15	28	43	61	77	61	77
7/16	16	29	44	62	78	62	78
1/2	17	30	45	63	79	63	79
9/16							
5/8	18	31	46	64	80	64	80
11/16							
3/4	19	32	47	65	81	65	81
13/16							
7/8	20	33	48	66	82	66	82
15/16							
1	21	34	49	67	83	67	83
1 1/16							
1 1/8							
1 3/16							
1 1/4	22	35	50	68	84	68	84
1 5/16							
1 3/8							
1 7/16							
1 1/2	23	36	51	69	85	69	85
1 9/16							
1 5/8							
1 11/16							
1 3/4		37	52	70	86	70	86
1 13/16							
1 7/8							
1 15/16							
2		38	53	71	87	71	87

Pan Head, Stainless Steel

Unplated, Phillips Drive, Fully Threaded, Screws



These are NON STRUCTURAL fasteners that replace the AN515C (coarse), and the AN520C (fine) of like diameters and thread lengths.

Shaded part numbers are NON STANDARD sizes.

D= Threads, Dia - Pitch
L= (Length)

	MS51957-() Coarse Threads							MS51958-() Fine Threads	
	4-40	6-32	8-32	10-24	1/4-20	10-32	1/4-28		
	Dash Number	Dash Number	Dash Number	Dash Number	Dash Number	Dash Number	Dash Number	Dash Number	Dash Number
1/4	13	26	41	59		59			
5/16	14	27	42	60	76	60	76		
3/8	15	28	43	61	77	61	77		
7/16	16	29	44	62	78	62	78		
1/2	17	30	45	63	79	63	79		
9/16	120	123	126	129	132				
5/8	18	31	46	64	80	64	80		
11/16									
3/4	19	32	47	65	81	65	81		
13/16									
7/8	20	33	48	66	82	66	82		
15/16									
1	2 1	34	49	67	83	67	83		
1 1/16									
1 1/8	121	124	127	130	133				
1 3/16									
1 1/4	22	35	50	68	84	68	84		
1 5/16									
1 3/8	122	125	128	131	134				
1 7/16									
1 1/2	23	36	51	69	85	69	85		
1 9/16									
1 5/8									
1 11/16									
1 3/4		37	52	70	86	70	86		
1 13/16									
1 7/8									
1 15/16									
2		38	53	71	87	71	87		

Genuine Aircraft Hardware Co.

Alloy Steel, Full Threads

NAS514P Series (Countersunk), NAS600 thru 606 (Pan Head)

TENSILE STRENGTH, 125,000 TO 140,000 PSI. (COUNTERSUNK)

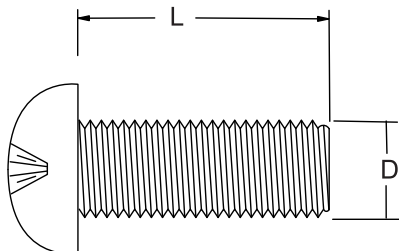
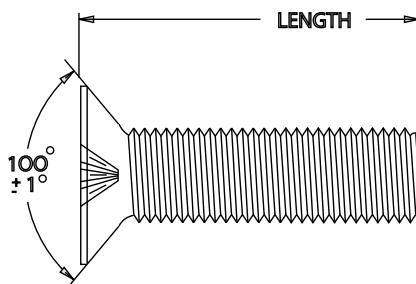
TENSILE STRENGTH, 160,000 TO 180,000 PSI. (PAN HEAD)

These screws are commonly used for general purpose fastening when durability and resistance to wear due to repeated installation and removal might be a problem. Both types are Cad II plated and Phillips drive.

Examples of Part Numbers

NAS603-12P = 10-32 THREADS, 3/4" OVERALL LENGTH UNDER THE PAN HEAD, PHILLIPS DRIVE, ALLOY STEEL, CAD II PLATED

NAS514P832-9P = 8-32 THREADS, 9/16" OVERALL LENGTH INCLUDING THE COUNTERSUNK HEAD, PHILLIPS DRIVE, ALLOY STEEL, CAD II PLATED



Shaded part numbers are NON STANDARD sizes.

L = (Length)	Dash Number
1/4	4P
5/16	5P
3/8	6P
7/16	7P
1/2	8P
9/16	9P
5/8	10P
11/16	11P
3/4	12P
13/16	13P
7/8	14P
15/16	15P
1"	16P
1 1/16	17P
1 1/8	18P
1 3/16	19P
1 1/4	20P
1 5/16	21P
1 3/8	22P
1 7/16	23P
1 1/2	24P
1 9/16	25P
1 5/8	26P
1 11/16	27P
1 3/4	28P
1 13/16	29P
1 7/8	30P
1 15/16	31P
2"	32P

PAN HEAD	COUNTERSUNK HEAD	THREAD SIZE
NAS600	NAS514P 440-	4-40
NAS601	NAS514P 632-	6-32
NAS602	NAS514P 832-	8-32
NAS603	NAS514P1032-	10-32
NAS604	NAS514P 428-	1/4-28
NAS605	NAS514P 524-	5/16-24
NAS606	NAS514P 624-	3/8-24

Genuine Aircraft Hardware Co.

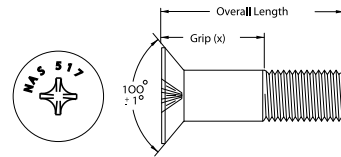
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NAS517 Series Screws

High Strength Countersunk Screws

Example of Part Numbers:

NAS517-4-9 = 1/4-28 100 degree countersunk, Alloy Steel, (160 - 180Ksi. Tensile)
 .5625 Grip, 1.032 Overall Length, Cadmium II Plated.



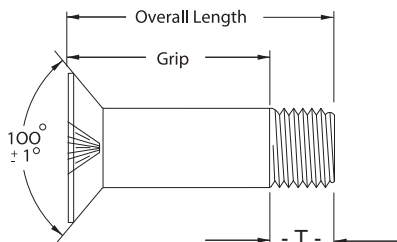
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Thread Size		8-32	10-32	1/4-28	5/16-24	3/8-24
Shank Dia.		.161 to .164	.186 to .189	.246 to .249	.3085 to .3115	.371 to .374
Part # ->		NAS517-2-(x)	NAS517-3-(x)	NAS517-4-(x)	NAS517-5-(x)	NAS517-6-(x)
Grip Length (x)		Overall Lengths Listed Below				
0.1250	2	0.531	0.531	0.594	0.656	0.750
0.1875	3	0.594	0.594	0.657	0.719	0.813
0.2500	4	0.656	0.656	0.719	0.781	0.875
0.3125	5	0.719	0.719	0.782	0.844	0.938
0.3750	6	0.781	0.781	0.844	0.906	1.000
0.4375	7	0.844	0.844	0.907	0.969	1.063
0.5000	8	0.906	0.906	0.969	1.031	1.125
0.5625	9	0.969	0.969	1.032	1.094	1.188
0.6250	10	1.031	1.031	1.094	1.156	1.250
0.6875	11	1.094	1.094	1.157	1.219	1.313
0.7500	12	1.156	1.156	1.219	1.281	1.375
0.8125	13	1.219	1.219	1.282	1.344	1.438
0.8750	14	1.281	1.281	1.344	1.406	1.500
0.9375	15	1.344	1.344	1.407	1.469	1.563
1.0000	16	1.406	1.406	1.469	1.531	1.625
1.0625	17	1.469	1.469	1.532	1.594	1.688
1.1250	18	1.531	1.531	1.594	1.656	1.750
1.1875	19	1.594	1.594	1.657	1.719	1.813
1.2500	20	1.656	1.656	1.719	1.781	1.875
1.3125	21	1.719	1.719	1.782	1.844	1.938
1.3750	22	1.781	1.781	1.844	1.906	2.000
1.4375	23	1.844	1.844	1.907	1.969	2.063
1.5000	24	1.906	1.906	1.969	2.031	2.125
1.5625	25	1.969	1.969	2.032	2.094	2.188
1.6250	26	2.031	2.031	2.094	2.156	2.250
1.6875	27	2.094	2.094	2.157	2.219	2.313
1.7500	28	2.156	2.156	2.219	2.281	2.375
1.8125	29	2.219	2.219	2.282	2.344	2.438
1.8750	30	2.281	2.281	2.344	2.406	2.500
1.9375	31	2.344	2.344	2.407	2.469	2.563
2.0000	32	2.406	2.406	2.469	2.531	2.625

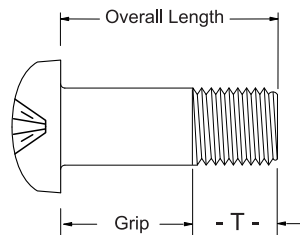
Genuine Aircraft Hardware Co.

NAS, Short Thread

Countersunk Bolt NAS1203 thru NAS1206



Pan Head Screw NAS623



HELP WITH THE SELECTION OF PART NUMBERS

For the **Countersunk Bolt** NAS120(size #) - (length in 1/16ths") (Option "D" or "no D")

For the **Pan Head Screw** NAS623-(size #) - (length in 1/16ths") (Options not available)

Material for both: Alloy Steel Heat Treated to 160-180 ksi.

Plating for both: Cadmium Plated per QQP416, Type II, Class 2

Options: Shank drill for NAS120(x), add a "D" at the very end. Not available for NAS623.

Examples of part numbers:

NAS1203-11 = COUNTERSUNK BOLT, 3/16", DIAMETER, 32 THREADS PER INCH, 11/16" GRIP, .976 OVERALL LENGTH, UNDRILLED

NAS1203-11D = COUNTERSUNK BOLT, 3/16" DIAMETER, 32 THREADS PER INCH, 11/16" GRIP, .976 OVERALL LENGTH, DRILLED

NAS1205-24 = COUNTERSUNK BOLT, 5/16" DIAMETER, 24 THREADS PER INCH, 1+1/2" GRIP, 1.875 OVERALL LENGTH, UNDRILLED

NAS623-2-5 = PAN HEAD, SHORT THREAD SCREW, 8-32, BY 5/16" GRIP, .5880 OVERALL LENGTH

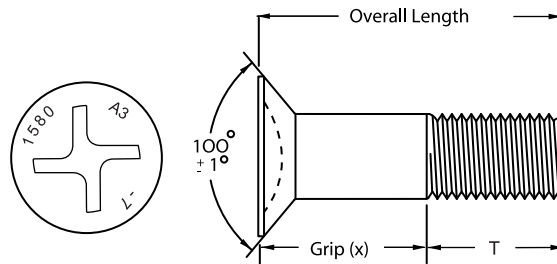
NAS623-4-12 = PAN HEAD, SHORT THREAD SCREW, 1/4-28, BY 3/4" GRIP, 1.066 OVERALL LENGTH

Size #	Dia / Pitch	Dia. Max Both Types	Dia. Min NAS120(X)	Dia. Min NAS623-(X)	"T" length Both Types	Shank Hole Dia. NAS120(X)	Ultimate Tensile Min. in Lbs. Undrilled
2	8-32	.1635	.1625	.1610	.276	N/A	1740
3	10-32	.1895	.1885	.1870	.276	.070	2490
4	1/4-28	.2495	.2485	.2470	.316	.076	4520
5	5/16-24	.3120	.3110	.3095	.375	.076	7240
6	3/8-24	.3745	.3735	.3720	.391	.106	10950

Genuine Aircraft Hardware Co.

NAS1580

High Strength, Close Tolerance, Full Size Head, Countersunk Screw



Item Number Details

NAS1580(material)(diameter)(drive style)(grip length)(option)

MATERIALS

- (A) = Alloy Steel, 4140 or 8740, Heat treated to 160-180ksi. Cad 2 plated
- (C) = Corrosion Resistant (A286) Steel, Heat treated to 160-190ksi. Cad 2 (optional)
- (V) = Titanium (6al-4v) Heat treated to 160-180ksi. No finish

Details Relating to <u>DIAMETER</u>							<u>DRIVE STYLE's</u>
Dia. #	Thread Size	Shank Dia (min)	Shank Dia (max)	Head Dia (min)	Head Dia (max)	T length	(R)*= Offset Cruciform (Torq-set) ^R applicable dia.'s 3,4 & 5.
3	10-32	.1885	.1895	.339	.3813	.363	(T) = Offset Cruciform (Torq-set) ^R applicable dia.'s 6 and up.
4	1/4-28	.2485	.2495	.464	.5066	.403	(H) = Dovetail Slot
5	5/16-24	.3110	.3120	.578	.6335	.501	
6	3/8-24	.3735	.3745	.717	.7604	.594	
7 thru 10	Information Available, 7/16 thru 5/8 diameter.						

* With dia.'s -3, -4 and -5 the drive styles R or T are functionally interchangeable even though R is listed as preferred on the print

GRIP LENGTH

The Grip length for Countersunk Head Fasteners, includes the head and extends to the full cylindrical portion of the shank. The Grip Length for this series is measured in 1/16ths of an inch. + or - .010

IE: a grip of -4 = .240 to .260 or 1/4"
or a grip of -12 = .740 to .760 or 3/4"

OPTION's

The options are after the Grip Length. If more than one option is used they are to be placed in order, if one is not used, maintain the order and skip the unused option.

- Option 1, (D) = Drilled Shank (for cotter pin)
- Option 2, (P) = Cad 2 plating (valid with C material only)
- Option 4, (X) = .0156 1st Oversize shank for repairs.
- Option 4, (Y) = .0312 2nd Oversize shank for repairs.

Examples of Part Numbers

NAS1580A3R4 = Alloy Steel, Cad 2 plated, 3/16 dia. (#10), 32 threads per inch, Offset Cruciform (Torq-set)^R drive, 1/4" grip.

NAS1580C6T12X = Corrosion Res. (A286), 3/8 dia, 24 threads per inch, Offset Cruciform (Torq-set)^R drive, 3/4" grip, 1st Oversize.

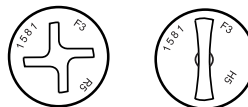
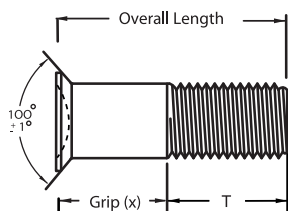
® Torq-Set is a registered Trademark of Phillips Screw Company.

Genuine Aircraft Hardware Co.

NAS1581

High Strength, Close Tolerance, Reduced (Shear) Head, Countersunk Screw

Important Note! this type of fastener uses the next smaller size driver than the dia. IE: for -3 dia use TS212-8 or similar.



NAS1581(M)(X)(Drive)(XX)

Kits Available, page 277

Item Number Details

NAS1581(material)(diameter)(drive style)(grip length)(option)

MATERIALS

(A)* or (F) = Alloy Steel, 4140,4340 or 8740, Heat treated to 160-180ksi. Cad 2 plated
 (C) = Corrosion Resistant (A286) Steel, Heat treated to 160-190ksi. Cad 2 (optional)
 (V)* = Titanium (6al-4v) Heat treated to 160-180ksi. No finish

* Material Code (A) has been superseded by Code (F), Material Code (V) has been cancelled Dec.1991

Details Relating to <u>DIAMETER</u>						
Dia. #	Thread Size	Shank Dia (min)	Shank Dia (max)	Head Dia (min)	Head Dia (max)	T length
3	10-32	.1885	.1895	.2578	.3047	.363
4	1/4-28	.2485	.2495	.3504	.3988	.403
5	5/16-24	.3110	.3120	.4289	.4787	.501
6	3/8-24	.3735	.3745	.5149	.5662	.594
7 thru 10	Information Available, 7/16 thru 5/8 diameter.					

DRIVE STYLE's
 (R)*= Offset Cruciform (Torq-set)^R applicable dia.'s 3,4 & 5.
 (T) = Offset Cruciform (Torq-set)^R applicable dia.'s 6 and up.
 (H) = Dovetail Slot

* With dia.'s -3, -4 and -5 the drive styles R or T are functionally interchangeable even though R is listed as preferred on the print

GRIP LENGTH
 The Grip length for Countersunk Head Fasteners, includes the head and extends to the full cylindrical portion of the shank. The Grip Length for this series is measured in 1/16ths of an inch. + or - .010

IE: a grip of -4 = .240 to .260 or 1/4"
 or a grip of -12 = .740 to .760 or 3/4"

OPTION's
 The options are after the Grip Length. If more than one option is used they are to be placed in order, if one is not used, maintain the order and skip the unused option.

Option 1, (P) = Cad 2 plating (valid with C material only)
 Option 2, (X) = .0156 1st Oversize shank for repairs.
 Option 3, (Y) = .0312 2nd Oversize shank for repairs.

Examples of Part Numbers

NAS1581F3R4 = Alloy Steel,Cad 2 plated,3/16 dia.(#10), 32 threads per inch, Offset Cruciform (Torq-set)^R drive, 1/4" grip.

NAS1581C6T12X = Corrosion Res.(A286),3/8 dia, 24 threads per inch,Offset Cruciform (Torq-set)^R drive, 3/4" grip, 1st Oversize.

^RTorq-Set is a registered Trademark of Phillips Screw Company.

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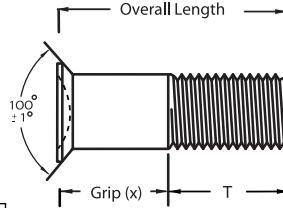
NAS Shear Head

High Strength, Close Tolerance, Reduced (Shear) Head, Countersunk Screws

Important Note! this type of fastener uses the next smaller size driver than the dia. IE: for -.03 dia use TS212-8 or similar.



NAS860(X)-(XX)
NAS870(X)-(XX)



Note, not all sizes and configurations are shown, these fasteners go up to 1" dia on the actual NAS print

Kits Available, page 277

HELP WITH THE SELECTION OF PART NUMBERS

For the **Alloy Steel Screw** NAS860(size #) - (grip length in 1/16ths")
For the **A286 (Cres.) Screw** NAS870(size #) - (grip length in 1/16ths")

Material for NAS8602-8616 Alloy Steel, Heat Treated to 160-180 ksi. Cad 2 Plated
Material for NAS8702-8716 A286 Corrosion Resistant Steel, 160-180 ksi.
Options: both series Shank Drill, add a "D" in place of the dash before the length.

Plating/Coating Options NAS8702-8716

The absence of code (A) or (U) in the number indicates Cad 2 plated, threads will be painted/dyed green.

An (A) after the basic part # prefix and (D), if applicable, indicates an Aluminum Coating.

A (U) after the basic part # prefix and (D), if applicable, indicates Unplated and Passivated.

Examples of part numbers:

NAS8603-10 = SHEAR HEAD, COUNTERSUNK BOLT, .189" DIA. 5/8 GRIP, ALLOY STEEL, CAD 2 PLATED .948 O.A.L. UNDRILLED.

NAS8702A4 = SHEAR HEAD, COUNTERSUNK BOLT, .1635" DIA. 1/4 GRIP, CRES STEEL, ALUMINUM COATED .573 O.A.L. UNDRILLED.

NAS8704DU13 = SHEAR HEAD, COUNTERSUNK BOLT, .249" DIA. 13/16 GRIP, CRES STEEL, UNPLATED .1.245 O.A.L. DRILLED THREADS.

Size #	Dia / Pitch	Shank Dia. Min	Shank Dia. Max	"T" Length	Head Dia.	Shank Hole Dia.
2	8-32	.1625	.1635	.323	.226 -.257	N/A
3	10-32	.1885	.1895	.323	.266 -.303	.070
4	1/4-28	.2485	.2495	.370	.355 -.397	.076
5	5/16-24	.3110	.3120	.438	.429 -.477	.076
6	3/8-24	.3735	.3745	.454	.510 -.564	.106

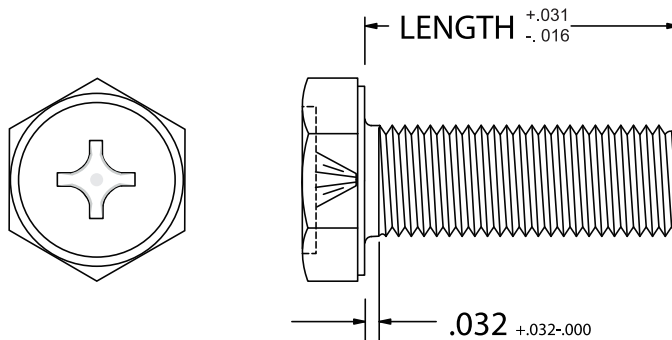
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NAS1801 and NAS 1802

Screw, Hex Head, Cruciform Recess, Full Thread, 160,000 PSI Tensile Minimum Alloy Steel and A286 Corrosion Resistant Steel

These replace NAS1096 of same sizes.



FIRST DASH NO.	THREAD SIZE	HEX SIZE	DRIVER #
04	4 - 40	3/16	1
06	6 - 32	1/4	2
08	8 - 32	1/4	
3	10 - 32	5/16	3
4	1/4 - 28	3/8	
5	5/16 - 24	7/16	
6	3/8 - 24	1/2	4



Part # GAH-2139
4 way Screwdriver
Small & Handy

MATERIAL:

NAS1801 -- ALLOY STEEL, 160-180 KSI TENSILE STRENGTH
NAS1802 -- CRES-A286, PRECIPITATION HARDENED TO 160-190 KSI

FINISH: CADMIUM PLATE PER QQ-P-416, TYPE II, CLOSE 2, ALL NAS1801, NAS1802 WITH (P) CODE AT END.
PASSIVATE PER QQ-P-35, NAS1802 WITH NO (P) CODE AT END.

CODE: FIRST DASH NUMBER INDICATES DIAMETER; SECOND DASH NUMBER INDICATES LENGTH IN 1/16 INCH INCREMENTS.
NO LETTER AFTER FIRST DASH NUMBER INDICATES UNDRILLED HEAD.
LETTER "D" AFTER FIRST DASH NUMBER INDICATES DRILLED HEAD (-3 THRU -6 SIZES ONLY).
LETTER "P" FOLLOWING SECOND DASH NUMBER INDICATES CADMIUM PLATE (NAS1802 ONLY).

EXAMPLE OF PART NUMBERS:

NAS1801-4-16 = 1/4 - 28, SCREW, ONE INCH LONG, ALLOY STEEL
NAS1801-04-12 = 4 - 40, SCREW, .750 INCH LONG, ALLOY STEEL
NAS1802-4-16 = 1/4 - 28 UNJF-3A SCREW, 1.000 LONG, PASSIVATED, STEEL
NAS1802-4D16P = 1/4 - 28 UNJF-3A SCREW, DRILLED HEAD, 1.000 LONG, CADMIUM PLATED, A286 MATERIAL

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Tinnerman Sheet Metal Nuts

Commonly Used For Non Structural Fastening

Please order these by the Tinnerman Part Numbers
The NAS Numbers are for reference only!

Some items on this page are no longer available, we will supply the closest functional equivalent that we are aware of, if Available.

Tinnerman 2 lug Nutplate, Sheet Metal Nuts

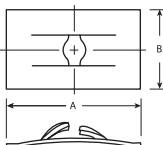
Screw Size	Fits Type of Sheet Metal Screws	Tinnerman Part #	Rivet Hole Dia./ Design
6	#6 Protruding	A6195-6Z1D	.105, Dimpled
8	#8 Protruding	A6195-8Z1D	.105, Dimpled
8	#8 Protruding	A6191-8Z1D	.105, Plain
8	#8, 100 deg, C/S	A8577-8Z1D	.105, Dimpled
8	#8, 100 deg, C/S	A6162-8Z1D	.135, Dimpled



Use with Sheets Dimpled for 100° Flat Head Rivets




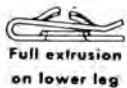



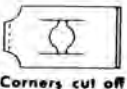
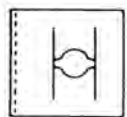
Use with Sheets Dimpled for 100° Flat Head Rivets



Tinnerman Flat Type, Sheet Metal Nuts

Screw Size	"A" Length	"B" Width	Tinnerman Part Number	NAS Part Number
4	.500	.31	A1776-4Z1D	NAS446-1
6	.510		A1181-6Z1D	NAS446-2
8	.630	.44	A1778-8Z1D	NAS446-4
10	.880	.50	A1779-10Z1D	NAS446-5

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- A  No extrusion on lower leg
- B  Full extrusion on lower leg
- C  Straight upper leg
- D  Corner turned up
- E  Relief notch
- F  Corners cut off
- H 

Tinnerman "U" Type Clip on, Sheet Metal Nuts

Screw Size	Panel Thickness	Design Variation	Tinnerman Part Number	NAS Part Number	"A" Length	"B" Width	Max. Panel Edge Distance	Panel Hole Diameter
6	.025-.051	E	A1784-6Z1D	NAS395-6	.610	.44	.281	.250
	.025-.064	E	A1785-6Z1D	NAS395-7	.840	.44	.500	.281
8	.025-.032	D E H	D1274-8-1	NAS395-14	.50	.50	.250	.281
	.025-.051	E	A1789-8Z1D	NAS395-16	.610	.44	.281	.250
	.025-.064	A E	A1348-8Z1D	NAS395-17	.730	.50	.343	.170
	.032-.051	BE	A1932-8Z1D	NAS396-4	.580		.265	.343
	.040-.051	C E H	A1786-8Z1D	NAS395-12	.530		.218	.250
		.025-.064	E	A1787-8Z1D	NAS395-18	.840	.44	.500
10	.025-.064	A E	A1350-10Z1D	NAS395-25	.730	.50	.343	.218
			A1787-10Z1D	NONE	.840	.44	.500	.281
	.081-.094	E	A1758-10Z-1D	NAS395-24	.620		.281	.281
	.045-.062		C8145-10-1	NONE	.950		.50	.562

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Commercial Stainless Screws

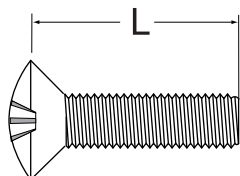
Commonly Used For Interiors and Non Structural Fastening

PHILLIPS DRIVE ONLY

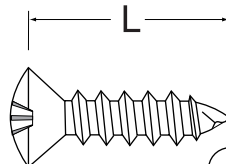
Available Lengths

1/4
3/8
1/2
5/8
3/4
1
1+1/4
1+1/2

Available Styles

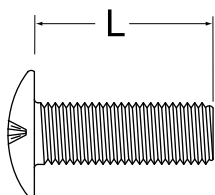


OH

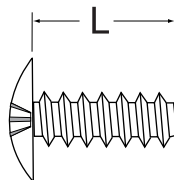


OHA

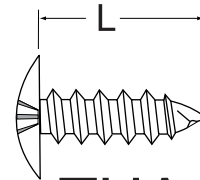
Kits Available, page 272



TH



THB



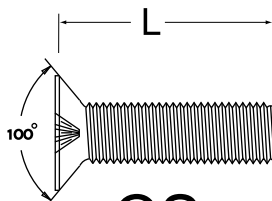
THA

Available Threads Sheet Metal

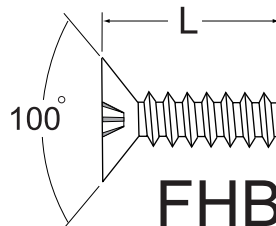
4R
6R
8R
10R

Available Threads Machine Screws

4-40
6-32
8-32
10-32



CS



FHB

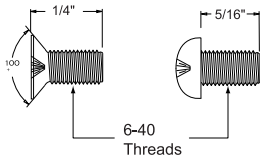
HELP WITH THE SELECTION OF PART NUMBERS

We will supply the AN or MS equivalent if we have stock.

(Threads)	X	(Length)	(Style of Screw)	(Material)	PART NUMBER
(8 - 32)	X	(1")	(TH)	(SS)	= 8-32X1/2THSS
(8 - 32)	X	(1/2)	(OH)	(SS)	= 8-32X1/2OHSS
(8 - 32)	X	(1/2)	(CS)	(SS)	= 8-32X1/2CSSS
(8R)	X	(5/8)	(OHA)	(SS)	= 8RX5/80HA,SS
(8R)	X	(1/2)	(THA)	(SS)	= 8RX1/2THA,SS
(8R)	X	(1/2)	(FHB)	(SS)	= 8RX1/2FHB,SS
(8R)	X	(1/2)	(THB)	(SS)	= 8RX1/2THB,SS

Special Purpose Screws

Pitot Tube Screws, Drive Screws



Most Pitot tubes DO NOT use 6-32 screws for mounting and many people have tried to make the wrong size screw work, costing time and money to repair. We have the 4 most common types of screws for PROPERLY mounting pitot tubes that require the 6-40 thread pitch.

Countersunk Phillips 6-40 Pan Head Phillips 6-40

Stainless Steel = MS24693C224 Stainless Steel = MS51958-27

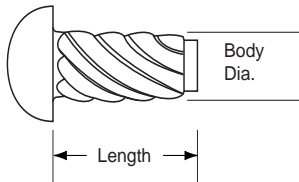
Cad II, Steel = MS24693S224 Cad II, Steel = MS35207-227

Drive Screws are most commonly used for attaching Data Plates or plugging holes in 4130 tube structures after corrosion proofing.

The **AN535** part numbers have been superseded by **MS21318**

The new number parts are fully interchangeable.

To install these, select desired part number, drill the structure with recommended drill, drive in with hammer or round head rivet set.



For **MS21318** part numbers **SEE CHART BELOW**.

Old Part number example AN535-(Dia.)-(length in 1/16th")

Compare dimensions to cross IE: MS21318-8 = AN535-0-3

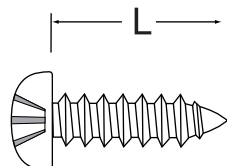
Dia. Nominal Size	#00	#0	#2	#4	#6	#8
Body Dia. Max	.060	.075	.100	.116	.140	0.154
Body Dia. Min	.057	.072	.097	.112	.136	.162
Recommended Hole size	.052	.067	.086	.104	.120	.144
Drill size	#55	#51	#44	#37	#31	#27

Lengths Manufactured Listed Below	#00	#0	#2	#4	#6	#8
	See MS21318 - #, below					
1/8"	-1	-7	-13	-19		
3/16"	-2	-8	-14	-20		
1/4"	-3	-9	-15	-21	-27	
5/16"				-22	-28	
3/8"					-29	-41
1/2"					-30	-42
5/8"						-43

Genuine Aircraft Hardware Co. **MS51861 Series**

Certified Sheet Metal Screws, Pan Head Phillips, Steel Cad II, 410 stainless

These Pan Head Sheet Metal Screws with type "AB" threads supersede many older numbers such as the very old AN530 Series and,
MS24617 & 8 Series, MS24621 & 2 Series
MS24637 & 8 Series, MS24641 & 2 Series



MS51861
Type AB

The "AB" designates pointed tip (A), and the (B) is for closer spaced (most often associated with blunt tip), sheet metal screw threads.

These are formally known as "self tapping screws".

Examples of Part Number:

MS51861-35 = Pan Head, Phillips Drive, #8 diameter, 18 threads per inch, Sheet Metal Screw threads type "AB", 1/2" Overall Length under the head, Material is Hardened carbon Steel, Cadmium II Plated.

MS51861-35C = Pan Head, Phillips Drive, #8 diameter, 18 threads per inch, Sheet Metal Screw threads type "AB", 1/2" Overall Length under the head, Material is Hardened 410 Stainless Steel, not Plated. (Please note that 410 stainless is slightly magnetic)

DIA. - PITCH > L= (Length)	#4 .112 - 24	#6 .138 - 20	#8 .164 - 18	#10 .190 - 16	#14 .250 - 14
Use Dash number below to select diameter and length, dash # shown is for Steel, add "C" for "Cres"					
1/4	12	22			
5/16	13C (only)	23C (only)	33C (only)		
3/8	14	24	34	44	
1/2	15	25	35	45	65
5/8	16	26	36	46	66
3/4	17	27	37	47	67
7/8		28	38	48	68
1"		29	39	49	69
1 1/4			40	50	70
1 1/2			41	51	71
1 3/4				52	72
2"				53	73
2 1/4					74
2 1/2					75

The Popular and therefore more available numbers are in the un-shaded areas of the table.

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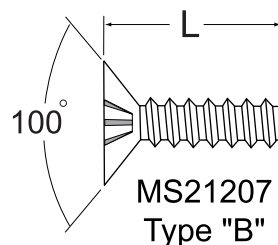
MS21207 Series

Certified Sheet Metal Screws, 100 degree C/S, Steel Cad II, 410 stainless

These 100 degree Countersunk Head Sheet Metal Screws with type "B" threads supersede older numbers such as NAS548P(Dia) x(Length) is superseded by the MS21207-(Dia) x(Length), and the NAS548C(Dia) x(Length) is superseded by the MS21207C(Dia) x(Length)

Kits Available, page 272

The "B" designates closer spaced sheet metal screw threads, and the blunt tip.



These are formally known as "self tapping screws".

Examples of Part Number:

MS21207- 8 - 8 = 100 degree Countersunk Head, Phillips Drive, #8 diameter, 18 threads per inch, Sheet Metal Screw threads type "B", 1/2" Overall Length under the head, Material is Hardened carbon Steel, Cadmium II Plated.

MS21207C8-10 = 100 degree Countersunk Head, Phillips Drive, #8 diameter, 18 threads per inch, Sheet Metal Screw threads type "B", 5/8" Overall Length under the head, Material is Hardened 410 Stainless Steel, not Plated. (Please note that 410 stainless is slightly magnetic)

DIA. - PITCH > L= (Length)	#4 .112 - 24	#6 .138 - 20	#8 .164 - 18	#10 .190 - 16	#14 .250 - 14
Use Dash number below to select diameter and length, dash # shown is for Steel, sub first " - " with "C" for "Cres"					
1/4	-4-4				
3/8	-4-6	-6-6	-8-6		
1/2	-4-8	-6-8	-8-8	-10-8	
5/8		-6-10	-8-10	-10-10	-14-10
3/4		-6-12	-8-12	-10-12	-14-12
7/8		-6-14	-8-14	-10-14	-14-14
1"		-6-16	-8-16	-10-16	-14-16
1 1/4		-6-20	-8-20	-10-20	-14-20
1 1/2		-6-24	-8-24	-10-24	-14-24
1 3/4			-8-28	-10-28	-14-28
2"	The Popular and therefore more available numbers are in the un-shaded areas of the table.		-8-32	-10-32	-14-32
2 1/4			-8-36	-10-36	-14-36
2 1/2			-8-40	-10-40	-14-40

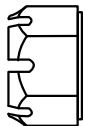
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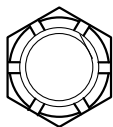
Kits Available, page 279

AN 310, 315, 316 & 320

Nut, Plain, Castellated, Airframe; Nut, Plain Castellated, Shear; Nut, Plain, Hexagon, Airframe; Nut, Jam, Hexagon



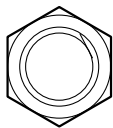
AN310



AN320



AN315



AN316



Type of Nut and Basic Part Number		Threads / Wrench			Heights			Strengths / Materials				
Castellated Nut, Full Height	Castellated Nut, Low Height	Airframe Hex Nut Full Height	Hexagon Jam Nut Low Height	Thread Size per MIL-S-7742	Wrench Size, All	Height AN310 approx.	Height AN315 approx.	Height AN316 approx.	Min Tensile AN310 and AN315, Steel	Min Tensile AN310 and AN315, Alum.	Min Tensile AN320 and AN316, Steel	Min Tensile AN320 Alum.
N/A	AN320-1	AN315-640	N/A	#6-40 UNF-3B	5/16	N/A	0.109	N/A	not rated	not rated	not rated	not rated
N/A	AN320-2	N/A	N/A	#8-36 UNF-3B	11/32	N/A	N/A	N/A	N/A	N/A	not rated	not rated
AN310-3	AN320-3	AN315-3	N/A	#10-32 UNF-3B	3/8	0.250	0.141	N/A	2,210	1,100	1,105, (AN320)	550
AN310-4	AN320-4	AN315-4	AN316-4	1/4-28 UNF-3B	7/16	0.281	0.188	0.125	4,080	2,030	2,040	1,015
AN310-5	AN320-5	AN315-5	AN316-5	5/16-24 UNF-3B	1/2	0.328	0.234	0.156	6,500	3,220	3,250	1,610
AN310-6	AN320-6	AN315-6	AN316-6	3/8-24 UNF-3B	9/16	0.406	0.281	0.188	10,100	5,020	5,050	2,510
AN310-7	AN320-7	AN315-7	AN316-7	7/16-20 UNF-3B	5/8	0.453	0.328	0.219	13,600	6,750	6,800	3,375
AN310-8	AN320-8	AN315-8	AN316-8	1/2-20 UNF-3B	3/4	0.563	0.375	0.250	18,500	9,180	9,250	4,590
AN310-9	AN320-9	AN315-9	AN316-9	9/16-18 UNF-3B	7/8	0.609	0.422	0.281	23,600	1,170	11,800	580
AN310-10	AN320-10	AN315-10	AN316-10	5/8-18 UNF-3B	1"	0.719	0.469	0.313	30,100	14,900	15,050	7,450
AN310-12	AN320-12	AN315-12	AN316-12	3/4-16 UNF-3B	1+1/8"	0.813	0.625	0.375	44,000	21,800	22,000	10,900
AN310-14	AN320-14	AN315-14	AN316-14	7/8-14 UNF-3B	1+5/16"	0.906	0.656	0.438	60,000	29,800	30,000	14,900
AN310-15	AN320-15	AN315-15	AN316-18	1"-12 UNF-3B	1+1/2"	1.000	0.750	0.500	80,700	40,000	40,350	20,000
AN310-16	AN320-16	AN315-16	AN316-16	1"-14 UNF-3								
AN310-18	AN320-18	AN315-18	N/A	1+1/8"-12 UNF-3B	1+11/16"	1.156	0.813	N/A	101,800	50,500	50,900 (AN320)	25,250
AN310-20	AN320-20	AN315-20	N/A	1+1/4" UNF-3B	1+7/8"	1.250	0.875	N/A	130,200	64,400	65,100 (AN320)	32,200

EXAMPLES OF PART NUMBERS:

- AN310C3, CASTLE NUT, FULL HEIGHT, CORROSION RESISTANT STEEL, 10-32 THREADS, R/H
- AN320-6, CASTLE NUT, LOW-HEIGHT, STEEL, CAD. II PLATED, 3/8-24 THREADS RIGHT HAND
- AN315DSR, AIRFRAME HEX NUT, FULL HEIGHT, ALUMINUM, ANODIZED, 5/16-24 THREADS R/H
- AN316C8L, HEX JAM NUT, CORROSION RESISTANT STEEL, 1/2-20 THREADS, LEFT HAND

ADDITIONAL NOTES:

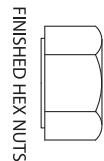
- ALL OF THESE NUTS ORIGINALLY MADE TO PROCUREMENT SPECIFICATION FF-N-836.
 - ALL INFORMATION DERIVED FROM AN310, 315, 316 & 320 PRINTS; SOME THINGS MAY HAVE BEEN OMITTED OR CHANGED IN FORM FOR CLARITY.
- NOTES:**
- MATERIAL: STEEL, ALUMINUM ALLOY, 300 SERIES CORROSION RESISTANT STEEL, EXC AN316 (NO ALUMINUM) NUMBERS LISTED ABOVE ARE STEEL. FOR CORROSION RESISTANT REPLACE THE DASH WITH A "C." FOR ALUMINUM REPLACE THE DASH WITH A "D." ALUMINUM IS NOT AVAILABLE FOR THE AN316 JAM NUT SERIES.
 - CASTLE NUTS AVAILABLE IN RIGHT-HAND THREAD ONLY. HEX & JAM NUTS AVAILABLE R/H OR L/H TO SELECT RIGHT HAND OR LEFT HAND ADD AN "R" (RIGHT HAND) OR AN "L" (LEFT HAND) AT THE VERY END.
 - 1" -14 NF THREAD SIZE BECAME INACTIVE FOR NEW DESIGN AFTER MARCH 27, 1967, FOR REPLACEMENT ONLY!
 - ALL AN310 NUTS ARE UNIVERSALLY INTERCHANGEABLE WITH AN355 NUTS, AN355 NUTS ARE NOT INTERCHANGEABLE WITH AN310 NUTS.

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Nuts, Non Locking Selection / Dimensions / Strengths



Part #	AN340	AN340B	AN345	AN345B	MS35649	MS35649	MS35650	MS35650	MS35650	MS35671	MS35671	MS9356	MS9357
Description	USE MS35649 Steel Grade "A"	USE MS35649 Brass	USE MS35650 Steel Grade "A"	USE MS35650 Brass	Coarse, Machine Steel Grade "A"	Coarse, Machine Brass	Fine, Machine Steel Grade "A"	Fine, Machine Brass	Fine, Machine Steel Grade "A"	MS35671 Small Pattern Hex Steel / Brass / Case, A286 Stainless	MS35671 Small Pattern Hex Steel / Brass / Case, A286 Stainless	MS9356 Fine, Fin, Hex NONE	MS9357 Fine, Fin, Hex SILVER
Material	Cadmium I	Black Oxide	Cadmium I	Black Oxide	Cadmium II	Black Oxide	Cadmium II	Black Oxide	Cadmium II	Cad II / Cad II / None	Cad II / Cad II / None	NONE	SILVER
Plating	90 KSI/FTU	Not Listed	90 KSI/FTU	Not Listed	90 KSI/FTU	Not Listed	90 KSI/FTU	Not Listed	90 KSI/FTU	Not Listed	Not Listed	145 KSI/FTU	145 KSI/FTU
Material Strength	450 Degrees	450 Degrees	450 Degrees	450 Degrees	450 Degrees	450 Degrees	450 Degrees	450 Degrees	450 Degrees	450 Degrees	450 Degrees	800 Deg	1200 Deg
Max. Temp.													

	DASH NUMBERS, ORDER BY UNSHADED MS PART NUMBERS ONLY I														
4-40	-4	B4	-4	B4	-242	245B	-342	345B					-4 / -4B / -4C	-04	-04
4-48															
6-32	-6	B6	-6	B6	-262	265B	-362	365B					-6 / -6B / -6C	-06	-06
6-40															
8-32	-8	B8	-8	B8	-282	286B	-382	386B					-8 / -8B / -8C	-08	-08
8-36															
10-24	-10	B10	-10	B10	-202	205B	-302	305B					-10 / -10B / 10C	-09	-09
10-32															
1/4-20	-416	B416	-416	B416	-2252	2255B	-3252	3255B					-2	-2	-3
1/4-28															
5/16-18	-516	B516	-516	B516	-2312	2315B	-3312	3315B					-5	-5	-6
5/16-24															
3/8-16	-616	B616	-616	B616	-2382	2385B	-3382	3385B					-8	-8	-9
3/8-24															
7/16-14															
7/16-20															
1/2-13							-3392							-11	-12
1/2-20														-11	-12
9/16-12														-14	-15
9/16-12														-14	-15
9/16-18														-17	-18
5/8-11														-17	-18
5/8-18							-3402							-20	-21
3/4-14														-20	-21
7/18-14														-18	-18
1"-12														-19	-19

These different Nut Types may have different Wrench Sizes !! BE AWARE !!

DIMENSIONS, WIDTH ACROSS FLATS (wrench size)	Thread Diameters														
	SMALL PATTERN HEX	MACHINE NUTS	FINISHED HEX	SMALL PATTERN HEX	MACHINE NUTS	FINISHED HEX	SMALL PATTERN HEX	MACHINE NUTS	FINISHED HEX	SMALL PATTERN HEX	MACHINE NUTS	FINISHED HEX	SMALL PATTERN HEX	MACHINE NUTS	FINISHED HEX
#4	3/16	1/4	1/4	5/16	11/32	3/8	7/16	9/16	5/8	13/16	1	5/8			
#6	1/4	5/16	5/16	11/32	3/8	7/16	9/16	5/8	13/16	1	5/8				
#8	5/16	11/32	11/32	3/8	7/16	9/16	5/8	13/16	1	5/8					
#10	3/8	7/16	7/16	9/16	5/8	13/16	1	5/8	13/16	1	5/8				
#12	7/16	9/16	9/16	5/8	13/16	1	5/8	13/16	1	5/8					
#14	9/16	5/8	5/8	13/16	1	5/8	13/16	1	5/8	13/16	1	5/8			
#16	5/8	13/16	13/16	1	5/8	13/16	1	5/8	13/16	1	5/8				
#18	13/16	1	1	5/8	13/16	1	5/8	13/16	1	5/8					
#20	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8	1 1/8

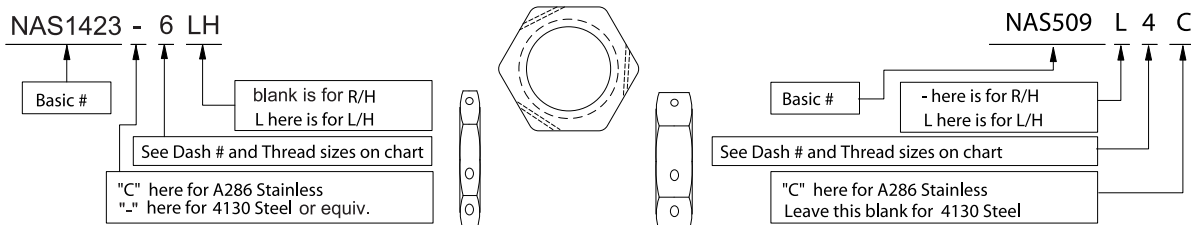
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NAS 509 / NAS1423

Corner Drilled Jam Nuts

4130,4340 Steel, or A286 Stainless. Both, 150 Ksi. material.



Stainless Nuts are unplated / Steel Nuts are Cadmium II plated

Dash #	Thread Size	Wrench Size	HEIGHT	
			NAS509	NAS1423
06	6-32	5/16	.125	.100
08	8-32	11/32	.125	.112
3	10-32	3/8"	.156	.125
4	1/4-28	7/16"	.188	.125
5	5/16-24	1/2"	.219	.125
6	3/8-24	9/16"	.250	.125
7	7/16-20	5/8"	.281	.156
8	1/2-20	3/4"	.313	.156
9	9/16-18	7/8"	.375	.203
10	5/8-18	15/16"	.406	.203
12	3/4-16	1+1/16"	.469	.250
14	7/8-14	1+1/4"	.500	.250
17	1"-12	1+1/2"	.500	.250
18	1 1/8-12	1+5/8"	.531	.265

Genuine Aircraft Hardware Co.

Locknuts, Styles & Sizes

See Locknut Selection chart for design details and available sizes.

ORDER PART NUMBERS IN UNSHADED AREAS ONLY !

<div style="border: 1px solid black; border-radius: 15px; padding: 5px; display: inline-block;">Kits Available, page 278</div> OLD STYLE(XXX)	NEW STYLE(XX)	MS14144-(XX)
		MS14145-(XX)
		MS17825-(XX)
		MS17826-(XX)
		NAS1804-(XX)
		NAS1805-(XX)
		NAS 679(A)(XX)
NAS1291 - (XX)	MS21040 - (XX)	
NAS1291C(XX)	MS21042L (XX)	
AN365 - (XXX)A MS20365 - (XXX)A	NAS1021N(XX)	MS21044N(XX)
AN365 - (XXX)C MS20365-(XXX)C AN363 - (XXX)	NAS1021AX(XX)	MS21045 - (XX)
AN363C(XXX)	NAS1021C(XX)	MS21046C(XX)
AN364 - (XXX)A MS20364 - (XXX)A	NAS1022N(XX)	MS21083N(XX)
AN364 - (XXX)C MS20364 - (XXX)C	NAS1022AX(XX)	MS21245(-) (XX)
MS20500 - (XXX)		
OLD STYLE(XXX) - NUMBER	NEW STYLE(XX) - NUMBER	Thread Dia / Pitch
256	02	2-56
440	04	4-40
632	06	6-32
832	08	8-32
1024	N/A	10-24
1032	3	10-32
420	N/A	1/4-20
428	4	1/4-28
518	N/A	5/16-18
524	5	5/16-24
616	N/A	3/8-16
624	6	3/8-24
720	7	7/16-20
820	8	1/2-20
918	9	9/16-18
1018	10	5/8-18
1216	12	3/4-16
1414	14	7/8-14
1612	16	1"-12
1812	18	1 1/8-12
2012	20	1 1/4-12



MS14144 - (XX)



MS14145 - (XX)



MS17825 - (XX)



MS17826 - (XX)



MS21042 - (XX)
MS21043 - (XX)
NAS1291(-)OR(C) (XX)



MS21044(C) or (N) (XX)



MS20500 - (XXX)
MS21045 (-) or (L) (XX)
MS21046C (XX)



MS21083 (C) or (N) (XX)



MS21245 (-) or (L) (XX)



NAS679 (A) or (C) (XX)



NAS1804 - (XX)
NAS1805 - (XX)

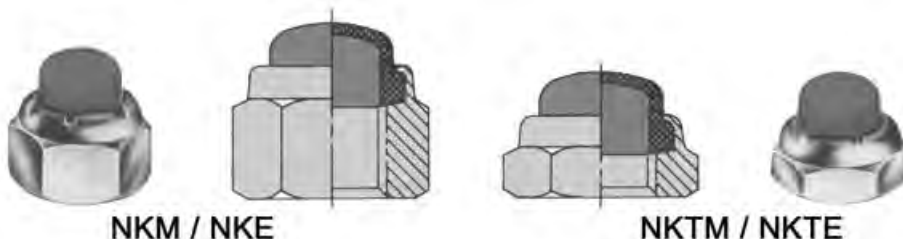
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PART #	Supersedures / Notes	Locking Element	Pattern	Material	Plating	Max Temp.	Design Usage	Rated Tensile
AN363 - (XXX)	MS20365-(XXX)C M S21045-(XX)	All Metal	Full Height	STEEL	CAD II	450 deg.	Tension	125ksi
AN363C(XXX)	AN363C720 Still good MS21046C(XX)	All Metal	Full Height	CRES	Silver	800 deg.	Tension	125ksi
AN364 - (XXX)A	MS20364 - (XXX)A M S21083N(XX)	Nylon	Low Height	STEEL	CAD II	250 deg.	Shear	N/A
AN364 - (XXX)C	See MS20364 - (XXX)C For more Supersedures	All Metal	Low Height	STEEL	CAD II	250 deg.	Shear	N/A
AN365 - (XXX)A	MS20365 - (XXX)A M S21044N(XX)	Nylon	Full Height	STEEL	CAD II	250 deg.	Tension	125ksi
MS14144(L or -)(XX)	Available in Sizes 3 Thru 20 CASTELLATED Miniature, Black Moly or Cad II	All Metal	Full Height	STEEL	CAD II / Black Moly	450 deg.	Tension	160ksi
MS14145(L or -)(XX)	Available in Sizes 3 Thru 20 CASTELLATED Miniature, Black Moly or Cad II	All Metal	Low Height	STEEL	CAD II / Black Moly	450 deg.	Shear	N/A
MS17825-(XX)	Available in Sizes 3 Thru 20 CASTELLATED Nylon Insert	Nylon	High Castle	STEEL	CAD II	250 deg.	Tension	125ksi
MS17826-(XX)	Available in Sizes 3 Thru 20 CASTELLATED Nylon Insert	Nylon	Low Castle	STEEL	CAD II	250 deg.	Shear	N/A
MS20364 - (XXX)A	MS21083N(XX)	Nylon	Low Height	STEEL	CAD II	250 deg.	Shear	N/A
MS20364 - (XXX)C	MS21042 up to 3/8", MS21245L, 7/16" and Up	All Metal	Low Height	STEEL	CAD II	450 deg.	Shear	N/A
MS20365 - (XXX)A	MS20365 - 720A Still good	Nylon	Low Height	STEEL	CAD II	250 deg.	Tension	125ksi
MS20365 - (XXX)C	MS20365 - 720C Still good	All Metal	Full Height	STEEL	CAD II	450 deg.	Tension	125ksi
MS20500 - (XXX)	Available in sizes 1032 Thru 1612	All Metal	Full Height	A286	Silver	1200 deg.	Tension	125ksi
MS21040 - (XX)	NAS679AX	All Metal	Low Height	STEEL	CADII	450 deg.	Tension	125ksi
MS21040L(XX)	NAS679A	All Metal	Low Height	STEEL	CAD II / Black Moly	450 deg.	Tension	125ksi
MS21042(L or -)(XX)	Available in Sizes 02 Thru 6 Only	All Metal	Miniature Pattern	STEEL	CAD II / Black Moly	450 deg.	Tension	160ksi
MS21043 - (XX)	Available in Sizes 02 Thru 6 Only	All Metal	Miniature Pattern	CRES	Silver	800 deg.	Tension	125ksi
MS21044C(XX)	Available in Sizes 04 Thru 20	Nylon	Full Height	CRES	NONE	250 deg.	Tension	125ksi
MS21044N(XX)	Supersedes MS20365 - (XXX)A, Exc. - 720A	Nylon	Full Height	STEEL	CAD II	250 deg.	Tension	125ksi
MS21045 - (XX)	Supersedes MS20365 - (XXX)C, Exc. -720C	All Metal	Full Height	STEEL	CAD II	450 deg.	Tension	125ksi
MS21046C(XX)	Supersedes AN363C(XXX), Exc. 720	All Metal	Full Height	CRES	Silver	800 deg.	Tension	125ksi
MS21083C(XX)	Available in Sizes 04 Thru 24	Nylon	Low Height	CRES	CAD II	250 deg.	Shear	N/A
MS21083N(XX)	Supersedes MS20364 - (XXX)A	Nylon	Low Height	STEEL	CAD II	250 deg.	Shear	N/A
MS21245(L or -)(XX)	Available in Sizes 7 Thru 24	All Metal	Low Height	STEEL	CAD II / Black Moly	450 deg.	Shear	N/A
NAS 679A(XX)	Same as MS21040L - Series Avail Sizes 4-40 thru 7/16-20	All Metal	Low Height	STEEL	CAD II / Black Moly	450 deg.	Tension	125ksi
NAS 679AX(XX)	Same as MS21040L - Series Avail Sizes 4-40 thru 7/16-20	All Metal	Low Height	STEEL	CAD II	450 deg.	Tension	125ksi
NAS1021AX(XX)	MS21045-(XX)	All Metal	Full Height	STEEL	CAD II	450 deg.	Tension	125ksi
NAS1021N(XX)	MS21044N(XX)	Nylon	Full Height	STEEL	CAD II	250 deg.	Tension	125ksi
NAS1022AX(XX)	MS21042 up to 3/8", MS21245-, 7/16" and Up	All Metal	Low Height	STEEL	CAD II	450 deg.	Shear	N/A
NAS1022N(XX)	MS21083N(XX)	Nylon	Low Height	STEEL	CAD II	250 deg.	Shear	N/A
NAS1291 - (XX)	-7 Thru -10, Use MS21042L(XX) For -02 Thru -6	All Metal	Miniature Pattern	STEEL	CAD II / Black Moly	450 deg.	Tension	160ksi
NAS1291C(XX)	C7 Thru C10 Use MS21043-(XX) For -02 Thru -6	All Metal	Miniature Pattern	CRES	Silver	800 deg.	Tension	125ksi
NAS1804-(XX)	-3 Thru -32 add "N" at very end for No Black Moly Lube	All Metal	12 point Full Ht.	STEEL	CAD II / Black Moly	450 deg.	Tension	180ksi
NAS1805-(XX)	-3 Thru -32 Finish, add at end "N" for Cad II, "P" for Silver, "L" for Cad+Moly, No codes= Moly	All Metal	12 point Full Ht.	CRES	CAD II / Silver / Moly	450-850	Tension	180ksi

Locknut Selection Chart

Shaded areas are for reference only, ORDER PART NUMBERS IN UNSHADED AREAS ONLY!

Bubble Top Nuts Hex Nuts with Nylon Cap



The Bubble Top Nylon Insert locknut is used where ever a self locking nut is used and it is advantageous for the threads to be covered to protect people or equipment from abrasion. They also will perform a sealing action, internal or external, of up to 80 psi. for air. Do not use with liquids or sealants unless compatibility has been verified by testing.

The nut performance is per MIL-N-25027

Because of the Nylon Insert the maximum performance of this nut is achieved at temperatures below 250 degrees F.

Usually we provide these products made by ESNA with the Red insert, however if availability becomes an issue we supply the with other colored inserts such as Yellow or Green depending on the alternate manufacturer.

Other sizes and maybe heights are available upon special request (4-40 thru 7/16-20)

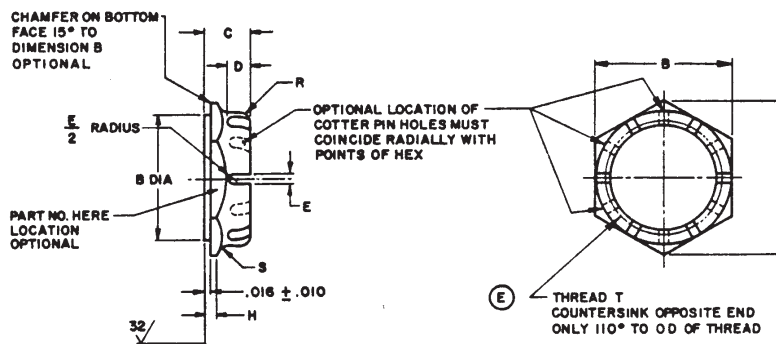
The ones listed below are Cadmium II plated (gold colored), to special order Cad 1 plating (silver colored), delete the "F" from the part number.

ESNA PART NUMBER	THREAD SIZE	APPROX HEIGHT	WRENCH SIZE	BOLT PROTRUSION BEFORE INSTALLING NUT MIN / MAX	NON BUBBLE-TOP EQUIVALENT
F22NKM-62	6-32	.297	5/16	.179 / .239	MS21044N06
F22NKM-82	8-32	.353	11/32	.236 / .295	MS21044N08
F22NKTM-02	10-32	.308	3/8	.207 / .259	MS21083N3
F22NKM-02	10-32	.363	3/8	.262 / .314	MS21044N3
F52NKTE-048	1/4-28	.380	7/16	.244 / .335	MS21083N4
F42NKE-048	1/4-28	.480	7/16	.344 / .435	MS21044N4
F42NKE-054	5/16-24	.525	1/2	.400 / .462	MS21044N5
F52NKE-064	3/8-24	.622	9/16	.498 / .575	MS21044N6

Genuine Aircraft Hardware Co.

Axle Nuts - MS21025

Nut, Castellated, Hexagon



DASH NO.	THREAD T		B	C	D	E	F REF	H	R RAD	S RAD
	SIZE DESIGNATION	PITCH DIA								
-15	15/16 - 16	.8969	1.250	.531	.219		1.448			.094
-16	1 - 16	.9594		.500	.250		.156			1.732
-20	1+1/4 - 16	1.2094	1.500	.562				1.948	.250	
-23	1+7/16 - 16	1.3969	1.688		.312			2.021		
-24	1+1/2 - 16	1.4594	1.750	.594				2.454		
-28	1+3/4 - 16	1.7094	2.125		.656			2.596		
-31	1+15/16 - 16	1.8969	2.250	.812		.406		3.319		
-32	2 - 16	1.9594			.375		.203	4.060		
-39	2+7/16 - 16	2.3969	2.875	1.000		.438		4.619		
-47	2+15/16 - 16	2.8969	3.500		1.500		.625	5.774		
-55	3+7/16 - 16	3.3969	4.000							
-71	4+7/16 - 16	4.3969	5.000							

NOTES:

1. MATERIAL: ALLOY STEEL FED. STD. NO. 66 STEEL NO. 4140 OR 8740.
2. PLATING: CADMIUM PLATE QQ-P-416 TYPE II, CLASS 2.
3. HEAT TREAT: ROCKWELL HARDNESS C-30-34.
4. SURFACE TEXTURE: IN ACCORDANCE WITH AN51 B46.1-78.
5. BREAK ALL SHARP EDGES .003 TO .005 AND REMOVE ALL HANGING BURRS AND SLIVERS.
6. THREADS TO BE IN ACCORDANCE WITH FED-STD-H28/2.
7. DIMENSIONS IN INCHES. UNLESS OTHERWISE SPECIFIED, TOLERANCE: DECIMAL ± .016.
8. EXAMPLE OF PART NUMBER: MS21025-16 = 1.000-16 NUT, ALLOY STEEL, CADMIUM PLATED.
9. FOR DESIGN FEATURE PURPOSES, THIS STANDARD TAKES PRECEDENCE OVER PROCUREMENT DOCUMENTS REFERENCED HEREIN.
10. REFERENCED DOCUMENTS SHALL BE OF THE ISSUE IN EFFECT ON DATE OF INVITATIONS FOR BIDS, OR REQUEST FOR PROPOSAL, EXCEPT THAT REFERENCED ADOPTED INDUSTRY DOCUMENTS SHALL GIVE THE DATE OF THE ISSUE ADOPTED.

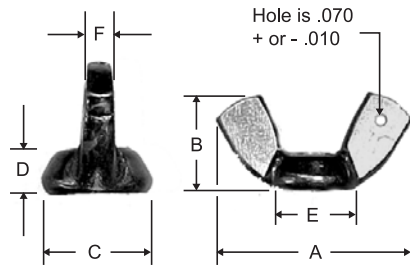
ADDITIONAL NOTES:

- PROCUREMENT SPECIFICATION FF-N-836
- SUPERSEDES AN7502
- THIS INFORMATION FROM MILITARY STANDARD MS21025, REVISION "E" APRIL 9, 1983, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.

Genuine Aircraft Hardware Co.

Wing Nut - MS35426

Nut, Plain, Wing, UNF-2B



***Due to fluctuating availability of these items we may offer Commercial Non-Certified Functional Equivalents to the MS #'s / Ask your sales person.**

DASH NUMBER		SIZE	MATERIAL	T	DIMENSIONS											
					A		B		C		D		E		F	
NO HOLE	WITH HOLE				MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
25	13*	.190	STEEL	32UNF-2B	.91	.78	.47	.34	.43	.39	.18	.14	.27	.22	.14	.10
26	2*	(#10)	BRASS													
27	14*	.250	STEEL	28UNF-2B	1.10	.97	.57	.43	.50	.45	.22	.17	.39	.26	.18	.14
28	4*	(1/4)	BRASS													
29	15*	.3125	STEEL	24UNF-2B	1.25	1.12	.66	.53	.58	.51	.25	.20	.39	.32	.21	.17
30	6*	(5/16)	BRASS													
31	16*	.3750	STEEL	24UNF-2B	1.44	1.31	.79	.65	.70	.64	.30	.26	.48	.42	.24	.20
32	8*	(3/8)	BRASS													
--	17*	.4375	STEEL	20UNF-2B	1.94	1.81	1.00	.87	.93	.86	.39	.35	.65	.54	.33	.26
--	10*	(7/16)	BRASS													
35	18*	.500	STEEL	20UNF-2B	1.94	1.81	1.00	.87	.93	.86	.39	.35	.65	.54	.33	.26
36	12*	(1/2)	BRASS													

* WING NUTS WITH HOLE IN WING ARE INACTIVE FOR DESIGN AFTER MARCH 14, 1977. They are still available and commonly used for replacement items. *SEE ABOVE!

NOTES:

1. **TYPE:** Cold forged (Type A, Style I of procurement specification).
2. **MATERIAL:** Steel, carbon, 50,000 PSI tensile strength. Brass, commercial.
3. **PROTECTIVE COATING:** Steel nuts are cadmium plated, specification QQ-416, Type II, Class 3.
4. **THREADS:** The threads shall be in accordance with Screw-Thread Standards for Federal Services, Handbook H-28.
5. Referenced documents of issue in effect on date of invitation for bids shall apply.
6. In case of conflict with any referenced document, this standard will govern.
7. The MS part number consists of the MS sheet number, plus the dash number. Example: MS35246-25.
8. All dimensions are in inches.

INTERCHANGEABILITY RELATIONSHIP WITH AN350 - After February 3, 1965, NF and UNF threaded wing nuts of AN350 are inactive for new design and replacement. The existing stocks should be used until depleted. For new design and replacement use only applicable superseding wing nuts listed above.

ADDITIONAL NOTES:

- PROCUREMENT SPECIFICATION FF-N-845
- SUPERSEDES AN350 IN PART.
- THIS INFORMATION FROM MILITARY STANDARD MS35426, REVISION "E" MARCH 14, 1977, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.

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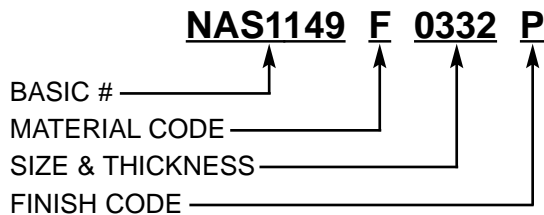
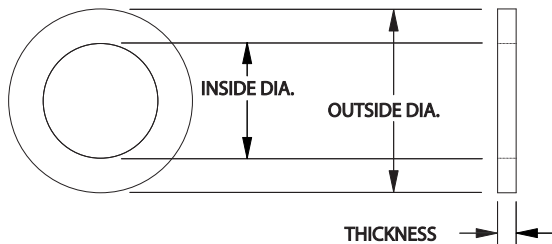
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Washers Aircraft

NAS1149 Series, Replaces AN960 Series

See next page for Crossover Chart

Kits Available, page 280



MATERIAL SPECIFICATION	CODE	FINISH SPECIFICATION (color)	CODE
300 STAINLESS, (75 KSI MIN UTS) .032 thru .090	C	PASSIVATE per QQ-P-35 (plain)	R
301 STAINLESS, (125 KSI MIN UTS) .016 ONLY	C	PASSIVATE per QQ-P-35 (plain)	R
2024 T3 ALUMINUM (58 KSI MN UTS)	D	CHEMICAL TREAT per MIL-C-5541 Class 3, Conductive (gold)	J
2024 T3 ALUMINUM (58 KSI MN UTS)	D	ANODIZE per MIL-A-8625 Class 2, non conductive (gray)	K
2024 T3 ALUMINUM (58 KSI MN UTS)	D	NONE, (natural appearance of material)	H
A 286 HIGH TEMP STAINLESS, (160 KSI MN UTS)	E	CADMIUM PLATE per QQ-P-416, Type II Class 2, (gold)	P
A 286 HIGH TEMP STAINLESS, (160 KSI MN UTS)	E	PASSIVATE per QQ-P-35 (plain)	R
1020 CARBON STEEL, (55 KSI MN UTS)	F	CADMIUM PLATE per QQ-P-416, Type II Class 2, (gold)	P
4130 ALLOY STEEL, (90 KSI MN UTS)	G	CADMIUM PLATE per QQ-P-416, Type II Class 2, (gold)	P

Important Note: When asking for washers to fit most screws, see nominal I.D.s that start with (#) / For bolts see fractional I.D.'s
 I.E. a 3/8" bolt does NOT USE a #6 washer Many washers are ordered incorrectly such as when ordering as a washer that will fit a #4 bolt instead of a 1/4" bolt.

Fastener Type	NOMINAL INSIDE DIA.	INSIDE DIA. + or - .010	OUTSIDE DIA. +.020, -.005	SIZE AND THICKNESS NUMBER			
				.016 Thick	.032 Thick	.063 Thick	.090 Thick
SCREWS	# 2	.099	0.25	N216	N232		
	# 3	.105	.250	N316	N332		
	# 4	.125	.312	N416	N432		
	# 5	.140	.438	N516	N532	N542 (.042 Thickness)	
	# 6	.149	.375	N616	N632		
	# 8	.174	.375	N816	N832		
	# 9	.188	.500		N949 (.049 Thickness)		
	# 10 or 3/16	.203	.438	0316	0332	0363	
	# 11	.234	.625		N1165 (.065 Thickness)		
	BOLTS	1/4	.265	.500	0416	0432	0463
5/16		.328	.562	0516	0532	0563	
3/8		.390	.625	0616	0632	0663	
7/16		.453	.750	0716	0732	0763	
1/2		.515	.875	0816	0832	0863	
9/16		.578	1.062	0916	0932	0963	
5/8		.640	1.188	1016	1032	1063	
3/4		.765	1.312	1216	1232		1290
7/8		.890	1.500	1416	1432		1490
1"		1.015	1.750	1616	1632		1690
1 1/16		1.078	1.812	1716	1732		1790
1 1/8		1.140	1.875	1816	1832		1890
1 1/4		1.265	2.000	2016	2032		2090

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Cross Reference Chart AN960 to NAS1149 Washers

ORDER BY AN960 or NAS1149 #; we will supply the AN960s until depleted.

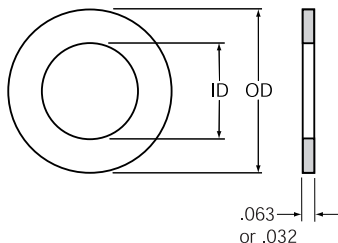
SEE PREVIOUS PAGE FOR PART NUMBER BREAKDOWN

OLD AN960 DASH NUMBER	NEW NAS1149 SIZE NUMBER	OLD AN960 DASH NUMBER	NEW NAS1149 SIZE NUMBER	OLD AN960 DASH NUMBER	NEW NAS1149 SIZE NUMBER	OLD AN960 DASH NUMBER	NEW NAS1149 SIZE NUMBER
AN960- 2	NAS1149F N232P	AN960C 2	NAS1149C N232R	AN960JD 2	NAS1149D N232J	AN960KD 2	NAS1149D N232K
AN960- 2L	NAS1149F N216P	AN960C 2L	NAS1149C N216R	AN960JD 2L	NAS1149D N216J	AN960KD 2L	NAS1149D N216K
AN960- 3	NAS1149F N332P	AN960C 3	NAS1149C N332R	AN960JD 3	NAS1149D N332J	AN960KD 3	NAS1149D N332K
AN960- 3L	NAS1149F N316P	AN960C 3L	NAS1149C N316R	AN960JD 3L	NAS1149D N316J	AN960KD 3L	NAS1149D N316K
AN960- 4	NAS1149F N432P	AN960C 4	NAS1149C N432R	AN960JD 4	NAS1149D N432J	AN960KD 4	NAS1149D N432K
AN960- 4L	NAS1149F N416P	AN960C 4L	NAS1149C N416R	AN960JD 4L	NAS1149D N416J	AN960KD 4L	NAS1149D N416K
AN960- 5	NAS1149F N542P	AN960C 5	NAS1149C N542R	AN960JD 5	NAS1149D N542J	AN960KD 5	NAS1149D N542K
AN960- 6	NAS1149F N632P	AN960C 6	NAS1149C N632R	AN960JD 6	NAS1149D N632J	AN960KD 6	NAS1149D N632K
AN960- 6L	NAS1149F N616P	AN960C 6L	NAS1149C N616R	AN960JD 6L	NAS1149D N616J	AN960KD 6L	NAS1149D N616K
AN960- 8	NAS1149F N832P	AN960C 8	NAS1149C N832R	AN960JD 8	NAS1149D N832J	AN960KD 8	NAS1149D N832K
AN960- 8L	NAS1149F N816P	AN960C 8L	NAS1149C N816R	AN960JD 8L	NAS1149D N816J	AN960KD 8L	NAS1149D N816K
AN960- 9	NAS1149F N949P	AN960C 9	NAS1149C N949R	AN960JD 9	NAS1149D N949J	AN960KD 9	NAS1149D N949K
AN960- 10	NAS1149F 0363P	AN960C 10	NAS1149C 0363R	AN960JD 10	NAS1149D 0363J	AN960KD 10	NAS1149D 0363K
AN960- 10L	NAS1149F 0332P	AN960C 10L	NAS1149C 0332R	AN960JD 10L	NAS1149D 0332J	AN960KD 10L	NAS1149D 0332K
				AN960JD 10LL	NAS1149D 0316J	AN960KD 10LL	NAS1149D 0316K
AN960- 11	NAS1149F N1165P	AN960C 11	NAS1149C N1165R	AN960JD 11	NAS1149D N1165J	AN960KD 11	NAS1149D N1165K
AN960- 416	NAS1149F 0463P	AN960C 416	NAS1149C 0463R	AN960JD 416	NAS1149D 0463J	AN960KD 416	NAS1149D 0463K
AN960- 416L	NAS1149F 0432P	AN960C 416L	NAS1149C 0432R	AN960JD 416L	NAS1149D 0416J	AN960KD 416L	NAS1149D 0416K
AN960- 516	NAS1149F 0563P	AN960C 516	NAS1149C 0563R	AN960JD 516	NAS1149D 0563J	AN960KD 516	NAS1149D 0563K
AN960- 516L	NAS1149F 0532P	AN960C 516L	NAS1149C 0532R	AN960JD 516L	NAS1149D 0516J	AN960KD 516L	NAS1149D 0516K
AN960- 616	NAS1149F 0663P	AN960C 616	NAS1149C 0663R	AN960JD 616	NAS1149D 0663J	AN960KD 616	NAS1149D 0663K
AN960- 616L	NAS1149F 0632P	AN960C 616L	NAS1149C 0632R	AN960JD 616L	NAS1149D 0616J	AN960KD 616L	NAS1149D 0616K
AN960- 616LL	NAS1149F 0616P	AN960C 616LL	NAS1149C 0616R	AN960JD 616LL	NAS1149D 0616J	AN960KD 616LL	NAS1149D 0616K
AN960- 716	NAS1149F 0763P	AN960C 716	NAS1149C 0763R	AN960JD 716	NAS1149D 0763J	AN960KD 716	NAS1149D 0763K
AN960- 716L	NAS1149F 0732P	AN960C 716L	NAS1149C 0732R	AN960JD 716L	NAS1149D 0716J	AN960KD 716L	NAS1149D 0716K
				AN960JD 716LL	NAS1149D 0716J	AN960KD 716LL	NAS1149D 0716K
AN960- 816	NAS1149F 0863P	AN960C 816	NAS1149C 0863R	AN960JD 816	NAS1149D 0863J	AN960KD 816	NAS1149D 0863K
AN960- 816L	NAS1149F 0832P	AN960C 816L	NAS1149C 0832R	AN960JD 816L	NAS1149D 0816J	AN960KD 816L	NAS1149D 0816K
AN960- 916	NAS1149F 0963P	AN960C 916	NAS1149C 0963R	AN960JD 916	NAS1149D 0963J	AN960KD 916	NAS1149D 0963K
AN960- 916L	NAS1149F 0932P	AN960C 916L	NAS1149C 0932R	AN960JD 916L	NAS1149D 0916J	AN960KD 916L	NAS1149D 0916K
AN960- 1016	NAS1149F 1063P	AN960C 1016	NAS1149C 1063R	AN960JD 1016	NAS1149D 1063J	AN960KD 1016	NAS1149D 1063K
AN960- 1016L	NAS1149F 1032P	AN960C 1016L	NAS1149C 1032R	AN960JD 1016L	NAS1149D 1016J	AN960KD 1016L	NAS1149D 1016K
AN960- 1216	NAS1149F 1290P	AN960C 1216	NAS1149C 1290R	AN960JD 1216	NAS1149D 1290J	AN960KD 1216	NAS1149D 1290K
AN960- 1216L	NAS1149F 1232P	AN960C 1216L	NAS1149C 1232R	AN960JD 1216L	NAS1149D 1216J	AN960KD 1216L	NAS1149D 1216K
AN960- 1416	NAS1149F 1490P	AN960C 1416	NAS1149C 1490R	AN960JD 1416	NAS1149D 1490J	AN960KD 1416	NAS1149D 1490K
AN960- 1416L	NAS1149F 1432P	AN960C 1416L	NAS1149C 1432R	AN960JD 1416L	NAS1149D 1416J	AN960KD 1416L	NAS1149D 1416K
AN960- 1616	NAS1149F 1690P	AN960C 1616	NAS1149C 1690R	AN960JD 1616	NAS1149D 1690J	AN960KD 1616	NAS1149D 1690K
AN960- 1616L	NAS1149F 1632P	AN960C 1616L	NAS1149C 1632R	AN960JD 1616L	NAS1149D 1616J	AN960KD 1616L	NAS1149D 1616K
AN960- 1716	NAS1149F 1790P	AN960C 1716	NAS1149C 1790R	AN960JD 1716	NAS1149D 1790J	AN960KD 1716	NAS1149D 1790K
AN960- 1716L	NAS1149F 1732P			AN960JD 1716L	NAS1149D 1716J	AN960KD 1716L	NAS1149D 1716K
AN960- 1816	NAS1149F 1890P	AN960C 1816	NAS1149C 1890R	AN960JD 1816	NAS1149D 1890J	AN960KD 1816	NAS1149D 1890K
AN960- 1816L	NAS1149F 1832P			AN960JD 1816L	NAS1149D 1816J	AN960KD 1816L	NAS1149D 1816K
AN960- 2016	NAS1149F 2090P	AN960C 2016	NAS1149C 2090R	AN960JD 2016	NAS1149D 2090J	AN960KD 2016	NAS1149D 2090K
AN960- 2016L	NAS1149F 2032P			AN960JD 2016L	NAS1149D 2016J	AN960KD 2016L	NAS1149D 2016K

Genuine Aircraft Hardware Co.

Oversize I.D. Washers

For Oversize Diameter Fasteners



See charts

see example under note #9

MS14226 (thickness) (Oversize code) (Material & Coating) (size)

Thickness, L=.032, omit L for .064

Oversize Codes

64= first oversize of 1/64th"
32= 2nd oversize of 1/32nd"

Material and Coating,

C = Corrosion Resistant Steel (Cres)
YC = Cres with Black Oxide.
JD = Chem Film Coated Aluminum
KD = Anodized Aluminum

Size, see chart for sizes and related dimensions.

Dimensions of Washers for Oversize Fasteners					
Size	Fastener Diameter 1st Oversize	Inside Dia. 1/64th Oversize + .005 - .000	Fastener Diameter 2nd Oversize	Inside Dia. 1/32nd Oversize + .005 - .000	Outside Dia. ALL + .020- .005
8	#8 (.185)	.190	#8 (.200)	.205	.375
10	# 10 (.210)	.215	# 10 (.226)	.231	.438
416	1/4 (.270)	.275	1/4 (.286)	.291	.500
516	5/16 (.333)	.338	5/16 (.348)	.353	.562
616	3/8 (.395)	.400	3/8 (.411)	.416	.625
716	7/16 (.458)	.463	7/16 (.474)	.479	.750
816	1/2 (.520)	.525	1/2 (.536)	.541	.875

NOTES:

- MATERIAL: -C CODE CORROSION RESISTANT STEEL PER MIL-S-5059 OR MIL-S-6721
-D CODE ALUMINUM ALLOY PER QQ-A-250/5 CONDITION T3 OR T4
- COATING: -NO CODE PASSIVATION PER QQ-P-35 (FOR UNCOATED CRES)
-Y CODE BLACK OXIDE COAT PER MIL-C-13924 (FOR CRES)
-J CODE CHEMICAL CONVERSION PER MIL-C-5541, CLASS 3 (ALUMINUM ALLOY)
-K CODE ANODIZE PER MIL-A-8625 (ALUMINUM ALLOY)
- DIMENSIONS IN INCHES.
- REMOVE ALL BURRS AND SHARP EDGES.
- TOLERANCES ON: THICKNESS: .032 +/- .004; .063 +/- .006
ALL OTHER DIMENSIONS: +/- .010
- SURFACE CHARACTERISTICS:
WASHER FACES SHALL BE PARALLEL WITHIN .002 INCHES.
WASHER FACES SHALL BE FLAT WITHIN .007 INCHES.
- USE (J) CODE WASHERS WHERE LOW ELECTRICAL RESISTANCE REQUIRED
- USE (K) CODE WASHERS WHERE CORROSION PROTECTION PRIME CONSIDERATION
- EXAMPLE OF PART NUMBER: MS14226L64C516 = WASHER, FLAT, LIGHT SERIES, 1/64 OVERSIZE, PASSIVATION PER QQ-P-35 CRES, FOR 5/16 DIAMETER (PIN OR SLEEVE)

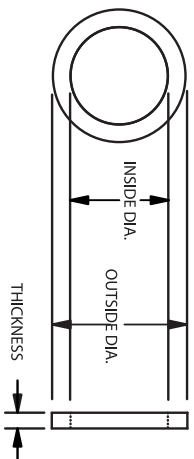
ADDITIONAL NOTES:

PROCUREMENT SPECIFICATION: FF-W-92
THIS INFORMATION FROM MILITARY STANDARD MS14226 DATED SEPTEMBER 24, 1982
SOME DETAILS MAY HAVE BEEN OMITTED OR ADDED FOR CLARITY.

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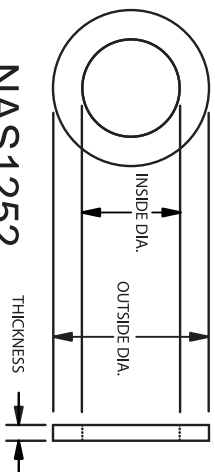
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NAS620 and NAS1252



NAS620

Reduced dim. O.D.



NAS1252

7075 Aluminum

NAS620 (Material) (Dash#) (Finish)

Screw Size	Screw Dia.	Inside Dia. +.010 -.000	Outside Dia. +.015 -.005	Nominal Thickness	Use Dash#
0	.060	.063	.099		0
2	.086	.089	.149		2
3	.099	.102	.180		3L
4	.112	.115	.209	.016	4L
5	.125	.128	.238		5L
6	.138	.143	.267		6L
8	.164	.169	.304		8L
3	.099	.102	.180		3
4	.112	.115	.209		4
5	.125	.128	.238		5
6	.138	.143	.267	.032	6
8	.164	.169	.304		8
10	.190	.195	.354		10L
1/4	.250	.255	.468		416L
10	.190	.195	.354	.063	10
1/4	.250	.255	.468		416

MATERIAL CODES:

- (-) = low carbon steel, Cadmium II plated
- (A) = Aluminum Alloy 5052 unfinished.
- (B) = Brass per ASTM B36 or B121. Dyed light Blue after Cad II
- (C) = Corrosion Resistant Steel 300 series. Passivated per QQ-p-35

Primarily used where normal washers are too large of O.D. and will not fit due to close proximity to edges, radius's or other component. Wherever practical use NAS1149 series washers.

(Thin) NAS1252-XX

Screw Size	Screw Dia.	Inside Dia. +.010 -.000	Outside Dia. +.015 -.005	Nominal Thickness	Use Dash#
4	.112	.125	.312		4L
6	.138	.149	.375		6L
8	.164	.174	.375		8L
10	.190	.203	.438	.032	10L
1/4	.250	.265	.500		416L
5/16	.312	.328	.562		516L
3/8	.375	.390	.625		616L

(Thick) NAS1252-XX

Screw Size	Screw Dia.	Inside Dia. +.010 -.000	Outside Dia. +.015 -.005	Nominal Thickness	Use Dash#
4	.112	.125	.312		4H
6	.138	.149	.375		6H
8	.164	.174	.375		8H
10	.190	.203	.438	.063	10H
1/4	.250	.265	.500		416H
5/16	.312	.328	.562		516H
3/8	.375	.390	.625		616H

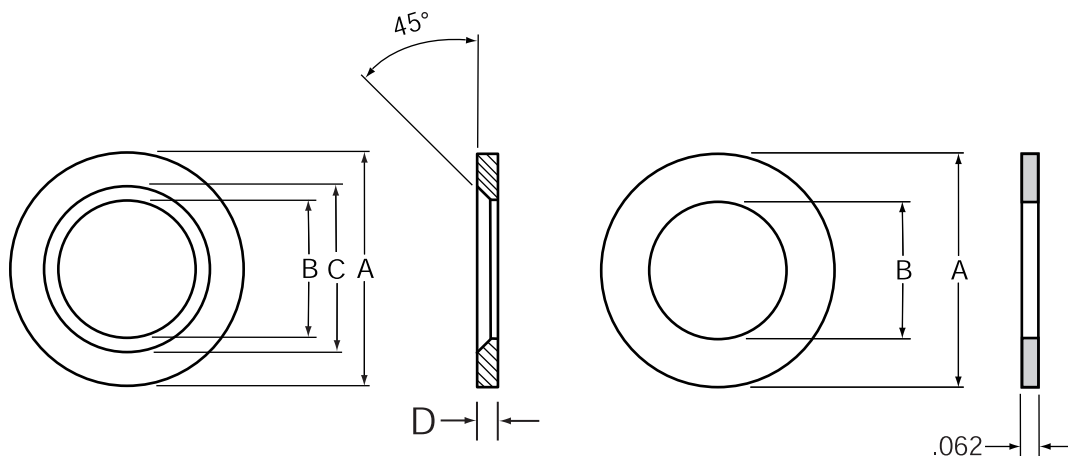
MATERIAL: 7075 ALUMINUM ALLOY PER QQ-A-250/12

FINISH: ANODIZE PER MIL -A-8625 Type II CLASS 2 (YELLOW/GREEN)

Genuine Aircraft Hardware Co.

MS20002

Washer, Countersunk and Plain, High Strength



THREAD SIZE	MS PART NO.		A DIA	B DIA		C DIA		D	FLATNESS TOLERANCE
	COUNTERSUNK	PLAIN		MAX	MIN	MAX	MIN		MAX
1/4	MS20002C4	MS20002-4	.531	.260	.252	.344	.334	.078	.007
5/16	MS20002C5	MS20002-5	.593	.324	.315	.406	.396		
3/8	MS20002C6	MS20002-6	.687	.388	.378	.495	.483		
7/16	MS20002C7	MS20002-7	.781	.451	.441	.557	.543	.078	.007
1/2	MS20002C8	MS20002-8	.875	.515	.504	.620	.604		
9/16	MS20002C9	MS20002-9	.968	.579	.568	.687	.667		
5/8	MS20002C10	MS20002-10	1.062	.643	.631	.785	.765	.078	.010
3/4	MS20002C12	MS20002-12	1.250	.770	.757	.910	.890		
7/8	MS20002C14	MS20002-14	1.437	.897	.884	1.035	1.015		
1	MS20002C16	MS20002-16	1.625	1.025	1.010	1.160	1.140	.078	.010
1+1/8	MS20002C18	MS20002-18	1.875	1.150	1.135	1.285	1.265		
1+1/4	MS20002C20	MS20002-20	2.125	1.275	1.260	1.447	1.427		
1+3/8	MS20002C22	MS20002-22	2.313	1.400	1.385	1.572	1.552	.094	.015
1+1/2	MS20002C24	MS20002-24	2.500	1.525	1.510	1.697	1.677		

NOTES:

1. MATERIAL: ALLOY STEEL FED. STD. NO. 66, STEEL NO. 1330 OR 4130.
2. HEAT TREAT: 125,000 to 145,000 PSI, SPECIFICATION MIL-H-6875.
3. FINISH: CADMIUM PLATING PER QQ-P-416, TYPE II, CLASS 2. PARTS WITH CLASS 3 PLATING MAY BE FURNISHED FROM SUPPLIER'S STOCK UNTIL JANUARY 1, 1975.
4. WASHERS SHALL BE FREE FROM ALL HANGING BURRS AND SLIVERS WHICH MIGHT BECOME DISLODGED UNDER USAGE.
5. WASHER FACES SHALL BE PARALLEL WITHIN .002 INCH.
6. DIMENSIONS IN INCHES. UNLESS OTHERWISE SPECIFIED, TOLERANCES: DECIMALS ± .010, ANGLES ± 1".
7. THESE WASHERS ARE PRIMARILY FOR USE WITH THE 160,000-PSI INTERNAL WRENCHING BOLTS SHOWN ON MS20004 THROUGH MS20024.

ADDITIONAL NOTES:

- PROCUREMENT SPECIFICATION: NONE
- SUPERSEDES: NAS143
- THIS INFORMATION FROM MILITARY STANDARD MS20002, REVISION "E" DECEMBER 29, 1972, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.

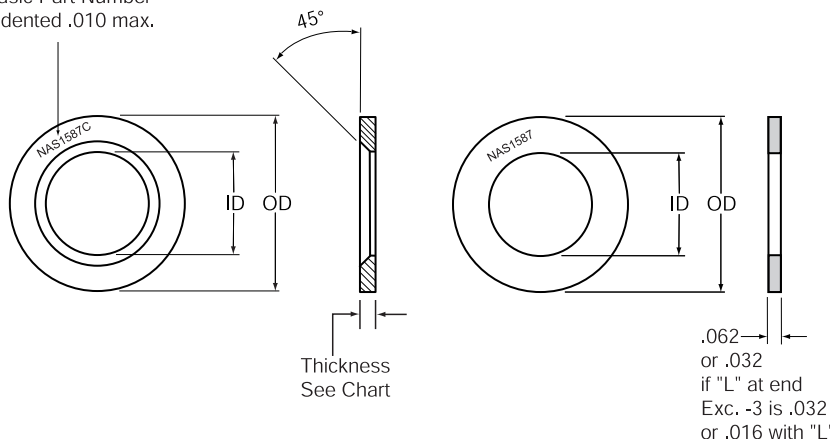
Genuine Aircraft Hardware Co.

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NAS1587

Washer, Countersunk and Plain, High Temp, 1200 degree F.

Basic Part Number Indented .010 max.



DASH NO.	NOMINAL SIZE I.D.	OUTSIDE DIA	INSIDE DIA		THICKNESS COUNTERSUNK WASHER	THICKNESS FLAT WASHER
			MAX	MIN		
A3C	3/16"	.469	.198	.192	.062	N/A
-3	3/16"	.469	.198	.192	N/A	.032
-4	1/4"	.531	.260	.252	.078	.062
-5	5/16"	.593	.324	.315		
-6	3/8"	.687	.388	.378		
-7	7/16"	.781	.451	.441		
-8	1/2"	.875	.515	.504		
-9	9/16"	.968	.579	.568		
-10	5/8"	1.062	.643	.631		
-12	3/4"	1.250	.770	.757		
-14	7/8"	1.437	.897	.884		
-16	1"	1.625	1.025	1.010		
-18	1 1/8"	1.875	1.150	1.135	.094	
-20	1 1/4"	2.125	1.275	1.260		

Material 321 or 347 stainless steel, AMS5510 or AMS 5512. 75 KSI UTS. Passivated.

Example of Part# **NAS1587-(SIZE)(“BLANK”, “C”, or L”)**

Select size from DASH NO. column.

“Blank” after the size designation for a standard thickness non-countersunk flat washer.

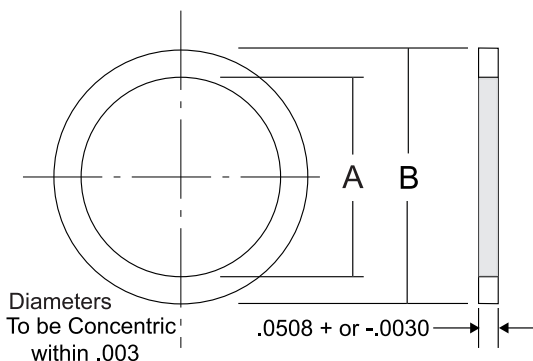
Add “**C**” after the size designation for a Countersunk Washer.

Add “**L**” after the size designation for an half thickness non-countersunk flat washer.

Genuine Aircraft Hardware Co.

AN901

Gasket - Metal Tube Connection Seal



DASH NUMBER		TUBING OD	A +.010 -.000 DIA	B +.010 -.000 DIA
ALUMINUM	COPPER			
4A	4C	1/4	.443	.683
5A	5C	5/16	.505	.745
6A	6C	3/8	.568	.808
8A	8C	1/2	.755	.995
10A	10C	5/8	.880	1.120
12A	12C	3/4	1.068	1.370
16A	16C	1	1.318	1.620
20A	20C	1+1/4	1.630	1.870
24A	24C	1+1/2	1.880	2.120
28A	28C	1+3/4	2.255	2.495
32A	32C	2	2.505	2.745

NOTES:

1. MATERIAL: ALUMINUM, SPECIFICATION QQ-A-250/1, TEMPER H14. COPPER, SPECIFICATION QQ-C-576 CONDITION COLD ROLLED, SOFT ANNEALED.
2. FINISH: COPPER, CADMIUM PLATE, SPECIFICATION QQ-P-416, TYPE II, CLASS 3.
3. COLOR: COPPER, YELLOW.
4. HEAT TREATMENT: COPPER GASKETS SHALL BE ANNEALED AFTER FABRICATION AND PRIOR TO PLATING.
5. SURFACES SHALL BE SMOOTH, FLAT AND FREE FROM NICKS AND SCRATCHES.
6. EXAMPLES OF PART NUMBERS: AN901-4A = ALUMINUM GASKET FOR 1/4 OD TUBING.
AN901-4C = COPPER GASKET FOR 1/4 OD TUBING.
7. BREAK ALL SHARP EDGES AND REMOVE ALL HANGING BURRS AND SLIVERS WHICH MIGHT BECOME DISLODGED UNDER USAGE.
8. DIMENSIONS IN INCHES.

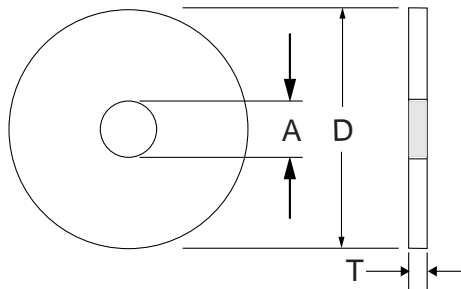
ADDITIONAL NOTES:

- PROCUREMENT SPECIFICATION: NONE
- THIS INFORMATION FROM MILITARY STANDARD AN901, REVISION "8" JUNE 11, 1968, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.

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AN970 Washer, Flat, Large Area



DASH NUMBERS	BOLT SIZE	A	D	T	SUPERSEDED PART
3	NO. 10	.203	.875	.063	MS63040-3
4	1/4	.265	1.125	.063	-4
5	5/16	.328	1.375	.063	-5
6	3/8	.390	1.625	.063	-6
7	7/16	.453	1.812	.109	-7
8	1/2	.515	2.000	.109	-8
9	9/16	.578	2.188	.125	-9
10	5/8	.640	2.375	.125	-10

NOTES:

1. EXAMPLE OF PART NUMBERS: AN970 -4 = 1/4 BOLT SIZE, .265 ID AND .063 THICK.
2. MATERIAL: STEEL
3. FINISH: CADMIUM PLATE, QQ-P-416, TYPE II, CLASS 2.
4. DIMENSIONS IN INCHES. UNLESS OTHERWISE SPECIFIED, TOLERANCES: DECIMALS $\pm .010$.
5. WASHERS MUST BE FLAT WITHIN 0.005 FOR SIZES UP TO .875 INCH O.D. AND WITHIN 0.010 FOR LARGER SIZES.
6. FOR DESIGN FEATURE PURPOSES, THIS STANDARD TAKES PRECEDENCE OVER PROCUREMENT DOCUMENTS REFERENCED HEREIN.
7. REFERENCED DOCUMENTS SHALL BE OF THE ISSUE IN EFFECT ON DATE OF INVITATIONS FOR BIDS, OR REQUEST FOR PROPOSAL, EXCEPT THAT REFERENCED ADOPTED INDUSTRY DOCUMENTS SHALL GIVE THE DATE OF THE ISSUE ADOPTED.
8. NOT INTENDED FOR AIRCRAFT USE.

ADDITIONAL NOTES:

- PROCUREMENT SPECIFICATION: FF-W-92
- SUPERSEDES: MS63040 (ORD)
- THIS INFORMATION FROM MILITARY STANDARD AN970, REVISION "6" DECEMBER 4, 1984, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.

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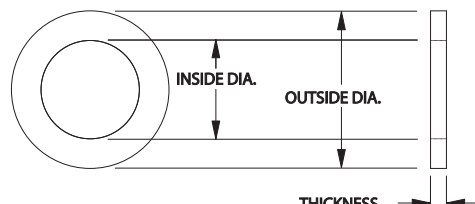
Washers

MS15795 (Alum.-Cres.), and MS27183 (Steel) General Purpose Flat Washers, Commercial Sizes for Aircraft Sizes see NAS1149 Series

Aluminum washers are anodized per MIL-A-8625, type 1 or 2, class 1.

Stainless washers are not plated; they have a tumble finish.

Steel washers are mild steel (1008 - 1020) and are Cadmium II plated.



NOTE: all dimensions in inches

MS27183-(XX)	MS15795-(XXX)		INSIDE DIAMETER		OUTSIDE DIAMETER		THICKNESS		
	STEEL	ALUMINUM	STAINLESS	MAX	MIN	MAX	MIN	MAX	MIN
5	705	805		0.164	0.151	0.320	0.307	0.048	0.027
6	706	806		0.164	0.151	0.390	0.370	0.065	0.036
N/A	N/A	845		0.172	0.177	0.281	0.286	0.039	0.029
N/A	745	N/A		0.182	0.167	1.010	0.990	0.044	0.036
7	707	807		0.196	0.183	0.390	0.370	0.065	0.036
41	741	841		0.196	0.183	0.453	0.433	0.065	0.036
N/A	N/A	847		0.208	0.198	0.572	0.552	0.035	0.029
N/A	749	N/A		0.213	0.193	1.198	1.178	0.069	0.059
8	708	808		0.227	0.214	0.453	0.433	0.065	0.036
9	709	809		0.265	0.245	0.577	0.547	0.080	0.051
N/A	751	N/A		0.276	0.256	1.160	1.140	0.070	0.058
10	710	810		0.296	0.276	0.640	0.620	0.080	0.051
11	711	811		0.327	0.307	0.749	0.727	0.080	0.051
12	712	812		0.359	0.339	0.703	0.681	0.080	0.051
13	713	813		0.390	0.370	0.905	0.868	0.104	0.064
14	714	814		0.421	0.411	0.827	0.805	0.080	0.051
15	715	815		0.453	0.433	1.030	1.007	0.104	0.064
16	716	816		0.484	0.464	0.937	0.915	0.080	0.051
17	717	817		0.515	0.495	1.280	1.243	0.104	0.064
18	718	818		0.546	0.526	1.092	1.055	0.121	0.074
19	719	819		0.577	0.567	1.405	1.367	0.132	0.086
20	N/A	N/A		0.609	0.589	1.186	1.149	0.121	0.074
21	720	820		0.686	0.649	1.342	1.305	0.121	0.074
22	721	821		0.718	0.675	1.805	1.680	0.160	0.108
23	722	822		0.842	0.805	1.499	1.462	0.160	0.108
24	723	823		0.842	0.805	2.030	1.993	0.177	0.122
25	724	824		0.958	0.931	1.720	1.743	0.160	0.108
26	725	825		0.958	0.931	2.280	2.243	0.192	0.136
27	726	826		1.092	1.055	2.030	1.993	0.160	0.108
28	727	827		1.092	1.055	2.530	2.493	0.192	0.136

Genuine Aircraft Hardware Co.

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Lockwashers

MS35333, MS35335, MS35338
Supersedes AN935 and AN936

Kits Available, page 280

Use the listed MS part numbers to replace AN part numbers of like material and finish.

SEE THE CHARTS for desired size numbers.

SEE CROSS REFERENCE on next page for Superseding Part Numbers.



INTERNAL STAR



EXTERNAL STAR



HELICAL SPLIT

The Popular and therefore more available numbers are in the un-shaded areas of the table.

Material > Style > Part # >	Steel, Cadmium Plated			Stainless	
	Internal Star	External Star	Helical Split	Internal Star	Helical Split
	MS35333-(XX)	MS35335-(XX)	MS35338-(XX)	MS35333-(XX)	MS35338-(XXX)
Nom ID.	for (XX) see below	for (XX) see below	for (XX) see below	for (XX) see below	for (XXX) see below
#2	35	N/A	39	69	134
#4	36	29	40	70	135
#6	37	30	41	71	136
#8	38	31	42	72	137
#10	39	32	43	73	138
1/4	40	33	44	74	139
5/16	41	34	45	75	140
3/8	42	35	46	76	141
7/16	43	36	47	77	142
1/2	44	37	48	78	143
9/16	45 (obsolete)	38	49	N/A	144
5/8	46	39	50	80	145
3/4	47	40	51	81	146
7/8	48	41	52	82	147
1"	49	42	53	83	148

The Popular and therefore more available numbers are in the un-shaded areas of the table.

Genuine Aircraft Hardware Co.

Cross Reference Chart

Star and Split Lockwashers

ORDER BY MS PART NUMBERS ONLY!

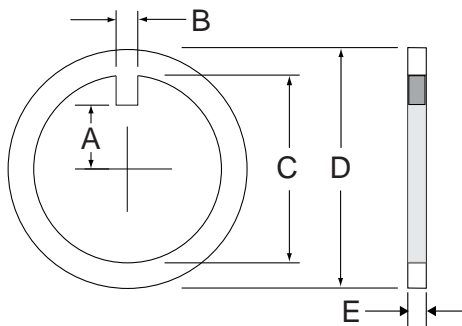
SEE PREVIOUS PAGE FOR PART NUMBER BREAKDOWN

OLD AN935 DASH NUMBER	NEW MS35338 SIZE NUMBER	OLD AN936A DASH NUMBER	NEW MS35333 SIZE NUMBER	OLD AN936B DASH NUMBER	NEW MS35335 SIZE NUMBER
AN935- 2	MS35338- 39	AN936A 2	MS35333- 35	AN936B 2	NOT AVAILABLE
AN935- 4	MS35338- 40	AN936A 4	MS35333- 36	AN936B 4	MS35335- 29
AN935- 6	MS35338- 41	AN936A 6	MS35333- 37	AN936B 6	MS35335- 30
AN935- 8	MS35338- 42	AN936A 8	MS35333- 38	AN936B 8	MS35335- 31
AN935- 10	MS35338- 43	AN936A 10	MS35333- 39	AN936B 10	MS35335- 32
AN935- 416	MS35338- 44	AN936A 416	MS35333- 40	AN936B 416	MS35335- 33
AN935- 516	MS35338- 45	AN936A 516	MS35333- 41	AN936B 516	MS35335- 34
AN935- 616	MS35338- 46	AN936A 616	MS35333- 42	AN936B 616	MS35335- 35
AN935- 716	MS35338- 47	AN936A 716	MS35333- 43	AN936B 716	MS35335- 36
AN935- 816	MS35338- 48	AN936A 816	MS35333- 44	AN936B 816	MS35335- 37
AN935- 916	MS35338- 49	AN936A 916	NOT AVAILABLE	AN936B 916	MS35335- 38
AN935- 1016	MS35338- 50	AN936A 1016	MS35333- 46	AN936B 1016	MS35335- 39
AN935- 1216	MS35338- 51	AN936A 1216	MS35333- 47	AN936B 1216	MS35335- 40
AN935- 1416	MS35338- 52	AN936A 1416	MS35333- 48	AN936B 1416	MS35335- 41
AN935- 1616	MS35338- 53	AN936A 1616	MS35333- 49	AN936B 1616	MS35335- 42

Genuine Aircraft Hardware Co.

MS21258

Washer, Key, Retaining, Wheel Bearing



DASH NO.	A +/- .005	B +/- .010	C +/- .005	D +/- .030	E +/- .005
-15	.393	.125	.949	1.375	.093
-16	.424	.156	1.010	1.500	.125
-20	.546		1.260	1.750	
-23	.635		1.445	1.875	
-24	.670		1.515		
-28	.755		1.760	2.250	
-31	.850	.219	1.950	2.375	
-32	.880		2.010	2.625	
-39	1.105		2.450	3.062	
-47	1.307		2.948	3.688	
-55	1.557	.281	3.448	4.750	
-71	2.057		4.450	5.375	.187

NOTES:

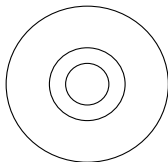



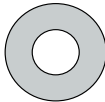
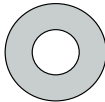
1. MATERIAL: STEEL, ASTM A575, A663, A576, A675, A108, 1020, OR 1025.
2. FINISH: CADMIUM PLATE, QQ-P-416, TYPE II, CLASS 3, OR ZINC PLATE ASTM B633, TYPE II CLASS SC3.
3. DIMENSIONS IN INCHES.
4. REMOVE ALL BURRS.
5. ADD " C " IN PLACE OF " - " TO INDICATE CADMIUM PLATE.
6. ADD " Z " IN PLACE OF DASH TO INDICATE ZINC PLATE.
7. EXAMPLE OF PART NUMBERS:
MS21258 C15 = WASHER, KEY, RETAINING, WHEEL BEARING, CADMIUM PLATED.
MS21258 Z15 = WASHER, KEY, RETAINING, WHEEL BEARING, ZINC PLATED.
8. INTERCHANGEABILITY RELATION WITH AN7503 WASHERS: MS21258 WASHERS AND AN7503 WASHERS OF LIKE DASH NUMBERS ARE UNIVERSALLY, FUNCTIONALLY AND DIMENSIONALLY INTERCHANGEABLE.
9. THIS STANDARD TAKES PRECEDENCE OVER DOCUMENTS REFERENCED HEREIN.
10. REFERENCED DOCUMENTS SHALL BE OF THE ISSUE IN EFFECT ON DATE OF INVITATIONS FOR BID.

ADDITIONAL NOTES:

- PROCUREMENT SPECIFICATION: NONE
- SUPERSEDES: AN7503
- THIS INFORMATION FROM MILITARY STANDARD MS21258, REVISION "A" DECEMBER 28, 1984, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.

Genuine Aircraft Hardware Co. Specialty Washers

Kits Available, page 281

Screw Size	Outside Dia.	Material	Part #	
# 4	.375	Shiny Stainless	#4 CSW,SS SH	<p>New Item</p>  <p>Countersunk Large Area</p> 
# 6	.475	2024 Aluminum .016	NAS1169DD6L	
# 6	.475	2024 Aluminum .025	NAS1169DD6	
# 6	.475	Cad Plated Steel .016	NAS1169-6L	
# 6	.475	Cad Plated Steel .025	NAS1169-6	
# 6	.500	Shiny Stainless	#6 CSW,SS SH	
# 6	.500	Cad 1 Plated Steel .012	A3236-012-24A	
# 8	.562	2024 Aluminum .025	NAS1169DD8	
# 8	.562	Cad 2 Plated Steel .016	NAS1169-8L	
# 8	.560	Dull Stainless	#8 CSW,SS	
# 8	.560	Shiny Stainless	#8 CSW,SS SH	
# 8	.560	Cad 1 Plated Steel .017	A3135-017-24A	
#10	.625	2024 Aluminum .025	NAS1169DD10	
#10	.625	2024 Aluminum .016	NAS1169DD10L	
#10	.750	Cad 2 Plated Steel .020	NAS1169-10M	
#10	.750	Dull Stainless	#10 CSW,SS	
#10	.750	Shiny Stainless	#10 CSW,SS SH	
#10	.750	Cad 1 Plated Steel .020	A3235-020-24A	
#10	.750	Cad 1 Plated Steel .028	A3235-028-24A	
1/4"	.750	Cad 2 Plated Steel .025	NAS1169-416	
1/4"	.812	Cad 2 Plated Steel .028	NAS1169-416N	
# 4	.300		NAS390B4P	<p>Flush / Finishing</p> 
# 6	.370	Chrome Plated Brass or Commercial Equiv. Part #'s	NAS390B6P	
# 8	.423		NAS390B8P	
#10	.480		NAS390B10P	
# 4	.375		NAS391B4P	<p>Cup / Finishing</p> 
# 6	.438	Chrome Plated Brass or Commercial Equiv. Part #'s	NAS391B6P	
# 8	.531		NAS391B8P	
#10	.593		NAS391B10P	
# 6	.438		#6 CUP SS	<p>Vulcanized Fiber White</p> 
# 8	.531	Shiny Stainless	#8 CUP SS	
#10	.593		#10 CUP SS	
# 6	.156		#6 VFW WHITE	<p>Nylon / Natural Color</p> 
# 8	.375	White Vulcanized Fiber per Mil-F-1148CH .032 thick	# 8 VFW, WHITE	
#10	.425		#10 VFW, WHITE	
1/4"	.258		1/4 VFW WHITE	
#4	0.312		NAS1515H04L	<p>Nylon / Natural Color</p>
# 6	0.375		NAS1515H06L	
# 8	.375	Nylon: Type 6/6 .031 thick	NAS1515H08L	
#10	.425		NAS1515H3L	
1/4"	.258		NAS1515H4L	

Genuine Aircraft Hardware Co.

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We stock the Parker Stat-O-Seals®



Stat-O-Seal®, Sizing Chart

600-001-(size), Old # 600-0000-(size)	NAS1523(size)	Thread Major O.D.	Stat-O-Seal I.D. + or - .010	Stat-O-Seal O.D. + or - .010
-6	-06	0.138	0.130	0.385
-8	-08	0.164	0.156	0.385
-10	-3	0.190	0.180	0.443
1/4	-4	0.250	0.240	0.505
5/16	-5	0.312	0.301	0.603
3/8	-6	0.375	0.364	0.666
7/16	-7	0.438	0.427	0.760
1/2	-8	0.500	0.490	0.880
9/16	-9	0.562	0.552	1.067
5/8	-10	0.625	0.615	1.193
3/4	-12	0.750	0.740	1.322
7/8	-14	0.875	0.864	1.510
1"	-16	1	0.988	1.760

Sometimes called Lock-O-Seals® although the difference is that the Stat-O-Seals® are designed to go under the head of bolts or screws and the series 250 Lock-O-Seals® are designed to go under Hydraulic Fittings with ends per MS33656 or a Banjo fitting, both into a Boss per MS33649.

The 600-0000-(size) is the most popular general purpose use Stat-O-Seal® and has a 4130 cad 1 plated steel retainer (washer) and a Buna-N seal, per MIL-R-6855 Class 1 & 2, Grade 60. The seal is compatible with Air, petroleum Fluids, (fuels, oils, gases) silicon lubricants and di-ester base lubricants. -65Deg. F. to +225Deg. F. select the desired (size) and put it after the part number 600-0000 and your done.

Example of part number

600-0000-10 = Parker Stat-O-Seal for .190 od. fastener, 4130 cad 1 plated steel retainer (washer) and a Buna-N seal, per MIL-R-6855. for the **NAS1523** parts there are more options to choose from see chart below.

part number breakdown: NAS1523(Retainer Code) (Size) (Seal Code)

Basic part Number	Retainer (Washer) code / Material	Seal code	use with washer code	Rubber compound (specification)	Color code on edge of washer	
NAS1523	- 4130 chrome- moly steel per MIL-S-18729 heat treated to Rockwell C26-C33. Cadmium plated per QQ-P-416 class 2 type II and dyed BLACK	B	(-) or AA	Nitrile (Buna-N) (MIL-R-6855 Class 2 Grade 60)	Black	
		E	C	Fluorocarbon (MIL-R-83248 Type 1 Class 1)	Grey	
		F	(-) or AA	Nitrile (Buna-N) (MIL-R-6855 Class 1 Grade 60)	None	
	AA	7075-T6 Aluminum Alloy per QQ-A-250/12 anodized per MIL-A-8625 Type II, class 1 or 2	N	C	Butyl (AMS 3238)	Green
			R	(-),AA or C	Fluorosilicone (MIL-R-25988, Type 1, class 1, Grade 60)	Red
	C	301,302 or 304 stainless steel per LIL-5059, half hard to annealed; passivated per QQ-P-35	W	C	Silicone (AMS 3304)	White
Y			(-),AA or C	Nitrile (Buna-N) (MIL-R-7362 Type 1)	Yellow	

We Stock with sizes of the 600-0000 series and are starting to stock some NAS1523's, Contact us with your requirements we will do our best to help you get what you need.

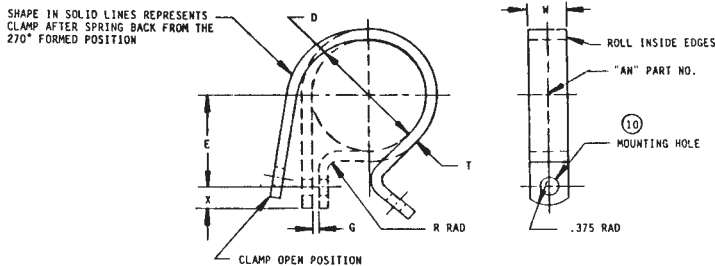
Both Stat-O-Seal and Lock-O-Seal are registered trademarks of Parker Hannifin Corp. Irvine Ca.

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Genuine Aircraft Hardware Co.

AN742

Clamp, Loop, Plain, Support, Aircraft



DASH NUMBERS	RIGID TUBE NOMINAL OD (REF)	D +/- .010 DIA	E		G	R +/- .010 DIA	T		W ALUMINUM ALLOY	MTG HOLE +/- .005	W ALL STEELS		X
			ALUMINUM ALLOY	ALL STEELS			ALUMINUM ALLOY	CARBON STEEL			HIGH TEMP AND CRES STEEL	MTG HOLE +/- .005	
2	1/8	.125	.360	.360	.062	.062	.0320 +/- .0025	.020 +/- .003			.375	.204	.188
3	3/16	.188	.423	.423									
4	1/4	.250	.457	.457									
5	5/16	.313	.498	.498									
6	3/8	.375	.529	.529									
7	7/16	.438	.560	.560									
8	1/2	.500	.592	.592									
9	9/16	.563	.623	.623									
10	5/8	.625	.654	.654									
11	11/16	.688	.752	.749									
12	3/4	.750	.783	.780									
13	13/16	.813	.814	.811									
14	7/8	.875	.845	.842									
15	15/16	.938	.877	.858									
16	1	1.000	.908	.889									
17	1-1/16	1.063	.939	.920									
18	1-1/8	1.125	.970	.951									
19	1-3/16	1.188	1.002	.983									
20	1-1/4	1.250	1.062	1.030	.094 +/- .031 -0.000		.032 +/- .004						
21	1-5/16	1.313	1.093	1.061									
22	1-3/8	1.375	1.124	1.092									
23	1-7/16	1.438	1.156	1.124									
24	1-1/2	1.500	1.187	1.155									
25	1-9/16	1.563	1.218	1.186									
26	1-5/8	1.625	1.249	1.217									
27	1-11/16	1.688	1.281	1.249									
28	1-3/4	1.750	1.312	1.280									
29	1-13/16	1.812	1.344	1.312									
30	1-7/8	1.875	1.374	1.342									
31	1-15/16	1.938	1.406	1.374									
32	2	2.000	1.437	1.405									
33	2-1/16	2.062	1.468	1.444									
34	2-1/8	2.125	1.499	1.475									
35	2-3/16	2.188	1.531	1.507									
36	2-1/4	2.250	1.562	1.538									
37	2-5/16	2.312	1.594	1.570									
38	2-3/8	2.375	1.624	1.600									
40	2-1/2	2.500	1.687	1.663									
42	2-5/8	2.625	1.752	1.728									
43	2-11/16	2.688	1.778	1.754									
44	2-3/4	2.750	1.812	1.788									
45	2-13/16	2.812	1.844	1.820									
46	2-7/8	2.875	1.875	1.851									
48	3	3.000	1.937	1.913									
50	3-1/8	3.125	2.000	1.976									
52	3-1/4	3.250	2.062	2.038									
54	3-3/8	3.375	2.125	2.101									
56	3-1/2	3.500	2.187	2.163									
58	3-5/8	3.625	2.250	2.226									
64	4	4.000	2.437	2.413									
66	4-1/8	4.125	2.500	2.476									

- NOTES:**
- PROCUREMENT SPECIFICATION: MIL-C-8603
 - SUPERSEDES: USAF DWG 742, AND (WITH AN743) NAF DWG 1051, TYPES 1 AND 2
 - THIS INFORMATION FROM MILITARY STANDARD AN742 PAGE 1 OF 2 REVISED AUGUST 28, 1987, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.

Genuine Aircraft Hardware Co.

AN742

Clamp, Loop, Plain, Support, Aircraft

REQUIREMENT:

MATERIALS AND FINISH

- (-) = ANSI-1010 STEEL, TEMPER 4 PER ASTM A109-85
FINISH - CADMIUM PLATED PER QQ-P-416, TYPE II, CLASS 2

- (D) = ALCLAD 2024-O, ALUMINUM ALLOY PER QQ-A-250/5
HEAT TREAT PER MIL-M-6088 TO T42 CONDITION
FINISH - CHEMICAL FILM PER MIL-C-5541, CLASS 1A

- (F) = ANSI-321 CORROSION RESISTANT STEEL PER AMS 5510
FINISH - PASSIVATED PER QQ-P-35

NOTES:

1. EXAMPLES OF PART NUMBERS:

AN742-8 = CLAMP, STEEL, .500 ID

AN742D8 = CLAMP, ALUMINUM ALLOY, .500 ID

AN742F8 = CLAMP, CRES STEEL, .500 ID

2. THE PART NUMBER AND THE MANUFACTURER'S IDENTIFICATION SHALL BE MARKED ON EACH CLAMP.

3. REMOVE ALL BURRS AND SHARP EDGES.

4. DIMENSIONS IN INCHES. UNLESS OTHERWISE SPECIFIED, TOLERANCES: $\pm .015$.

5. CLAMPS SHALL BE FURNISHED IN THE OPEN POSITION

6. FOR DESIGN FEATURE PURPOSES, THIS STANDARD TAKES PRECEDENCE OVER PROCUREMENT DOCUMENTS REFERENCED HEREIN. REFERENCED DOCUMENTS SHALL BE OF THE ISSUE IN EFFECT ON DATE OF INVITATIONS FOR BID.

7. CLAMPS WITH EXISTING MOUNTING HOLE MAY BE USED UNTIL DECEMBER 31, 1989. HOWEVER CLAMPS WITH 0.218 DIA MOUNTING HOLE SHALL BE REPLACED WHEREVER NEW CLAMPS ARE REQUIRED.

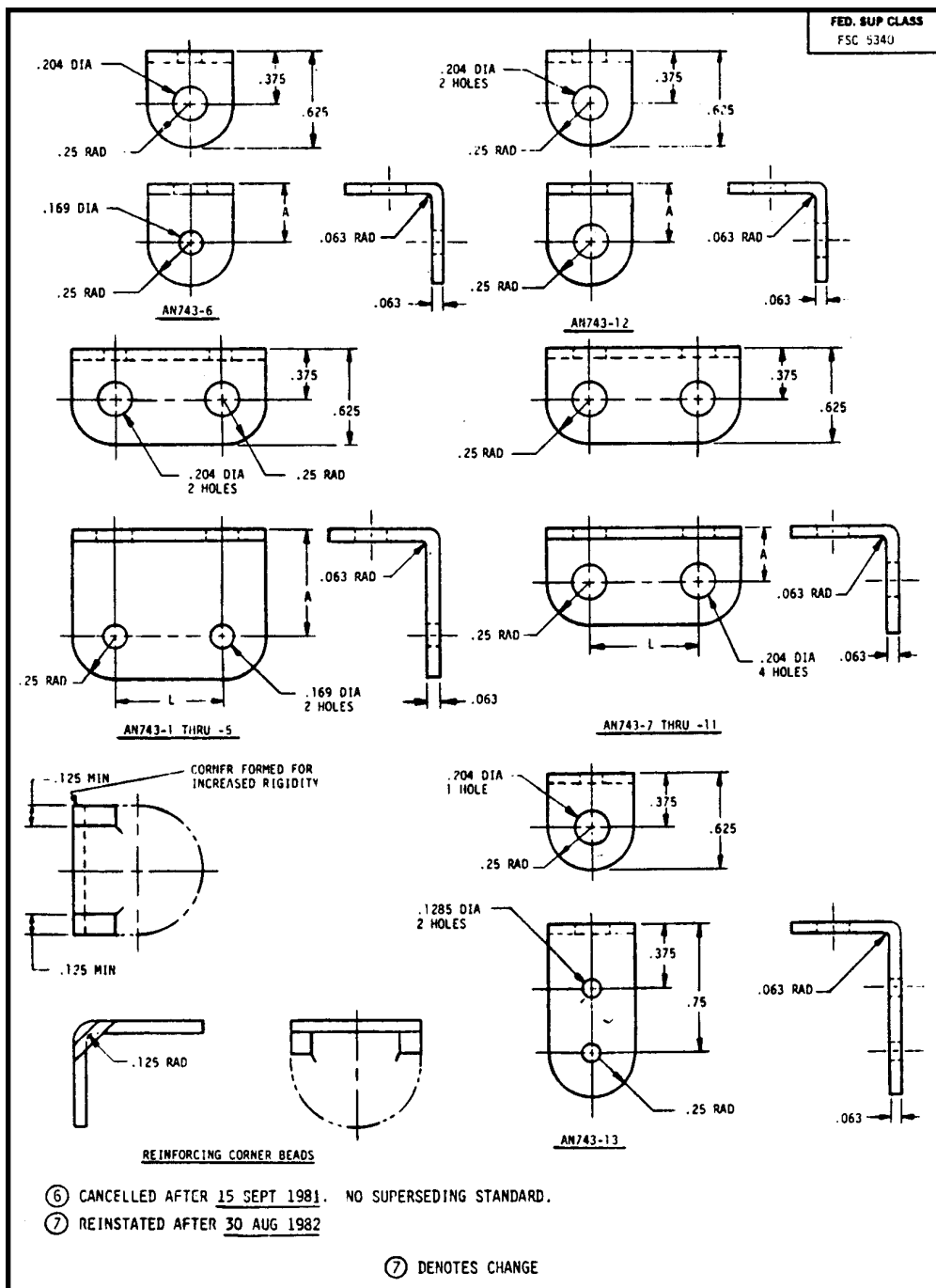
ADDITIONAL NOTES:

- PROCUREMENT SPECIFICATION: MIL-C-8603
- SUPERSEDES: USAF DWG 742, AND (WITH AN743)
NAF DWG 1051, TYPES 1 AND 2
- THIS INFORMATION FROM MILITARY STANDARD AN742 PAGE 2 OF 2 REVISED AUGUST 28, 1987, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.

Genuine Aircraft Hardware Co.

AN743

Bracket, Support Clamp



- NOTES:
- PROCUREMENT SPECIFICATION: NONE
 - SUPERSEDES: NONE
 - THIS INFORMATION FROM MILITARY STANDARD AN743 PAGE 1 OF 2 REVISED AUGUST 16, 1982, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.

Genuine Aircraft Hardware Co.

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AN743 Bracket, Support Clamp

AN PART NO.	A	L +/.005	RECOMMENDED FOR USE WITH AN742	
			PLAIN CLAMP	CUSHION CLAMP
AN743-1	.59	.305	-2 TO -8 INCL.	-4C TO 10C INCL.
AN743-2	.59	.450	-9 TO -16 INCL.	-11C TO -18C INCL.
AN743-3	.59	1.180	-17 TO -32 INCL.	-19C TO -34C INCL.
AN743-4	.59	1.680	-34 TO -48 INCL.	-36C TO -50C INCL.
AN743-5	.59	2.180	-52 TO -64 INCL.	-54C TO -86C INCL.
AN743-6	.44		FOR ONE HOLE MOUNTING	
AN743-7	.38	.500	-8 TO -11 INCL.	-10C TO -13C INCL.
AN743-8		.625	-12 TO -15 INCL.	-14C TO -17C INCL.
AN743-9		.750	-16 TO -24 INCL.	-18C TO -26C INCL.
AN743-10		1.000	-25 TO -40 INCL.	-27C TO -42C INCL.
AN743-11		1.500	FOR LONG BASE MOUNTING	
AN743-12	.44		FOR ONE HOLE MOUNTING	
AN743-13				

- (a) PART NUMBERS AN743-1, -2, -3, -4, AND -5. INACTIVE FOR DESIGN AFTER JULY 31, 1945. PART NUMBERS AN743-7, -8, -9, -10, AND -11 REPLACE AND ARE INTERCHANGEABLE WITH AN743-1, -2, -3, -4, AND -5 RESPECTIVELY.
- (b) PART NUMBER AN743-6 INACTIVE FOR DESIGN AFTER APRIL 21, 1950. PART NUMBER AN743-12 REPLACES AND IS INTERCHANGEABLE WITH AN743-6.

NOTES:

- MATERIAL: ALUMINUM ALLOY 2024; SPECIFICATION QQ-A-362, CONDITION T3 OR EXTRUDED SHAPES. AND10134-0602 AND AND10134-1001 SPECIFICATION QQ-A-267, TEMPER T4.
STEEL; SPECIFICATION MIL-S-18729, CONDITION N.
CORROSION RESISTANT STEEL; SPECIFICATION MIL-5-5059, COMPOSITION 302, ANNEALED.
- HEAT TREAT: SPECIFICATION MIL-R-6088, 50,000 PSI TENSILE STRENGTH MINIMUM.
- FINISH: ALUMINUM ALLOY: ANODIZE, SPECIFICATION MIL-A-8625, TYPE I OR TYPE II, WHEN SPECIFIED.
STEEL: CADMIUM PLATE, SPECIFICATION QQ-P-416, TYPE II, CLASS 3.
CORROSION RESISTANT STEEL: NONE.

ADD C BEFORE DASH NUMBER FOR CORROSION RESISTANT STEEL BRACKET.
ADD P BEFORE DASH NUMBER FOR STEEL BRACKET, CADMIUM PLATED.
ADD B IN PLACE OF DASH TO DESIGNATE INCORPORATION OF REINFORCING CORNER BEADS.
ADD Z IN PLACE OF DASH FOR ANODIZED ALUMINUM ALLOY.

EXAMPLES OF PART NUMBERS: AN743-7 = BRACKET, SUPPORT CLAMP, ALUMINUM ALLOY
AN743-C7 = BRACKET, SUPPORT CLAMP, CORROSION RESISTANT STEEL
AN743-P7 = BRACKET, SUPPORT CLAMP, STEEL, CADMIUM PLATED
AN743BP7 = BRACKET, SUPPORT CLAMP, STEEL CADMIUM PLATED, INCORPORATING REINFORCING CORNER BEADS.

ALUMINUM ALLOY PARTS CODED R WILL HAVE THICKNESS REDUCED TO .050.
STEEL PARTS CODED R WILL HAVE THICKNESS REDUCED TO .040.
REMOVE ALL BURRS AND SHARP EDGES.
DIMENSIONS IN INCHES: UNLESS OTHERWISE SPECIFIED, TOLERANCES:
THREE PLACE DECIMALS = .010, TWO PLACE DECIMALS = .02.

ADDITIONAL NOTES:

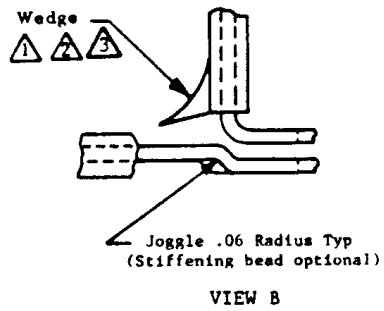
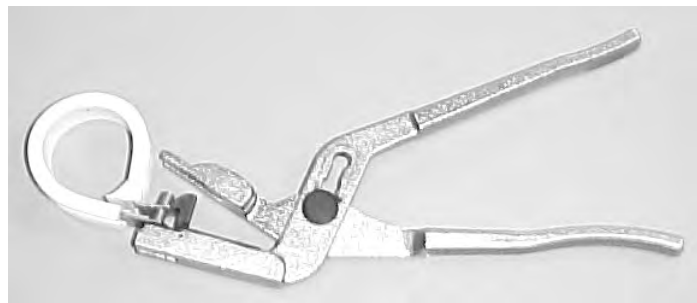
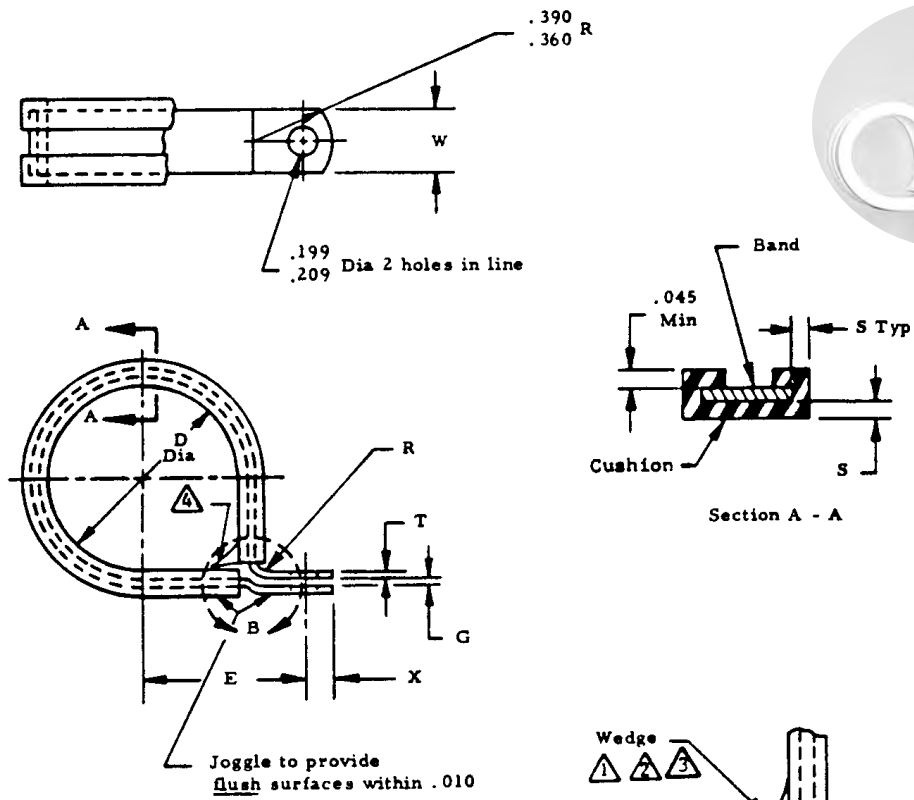
- PROCUREMENT SPECIFICATION: NONE
- SUPERSEDES: NONE
- THIS INFORMATION FROM MILITARY STANDARD AN743 PAGE 2 OF 2 REVISED AUGUST 16, 1982, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.

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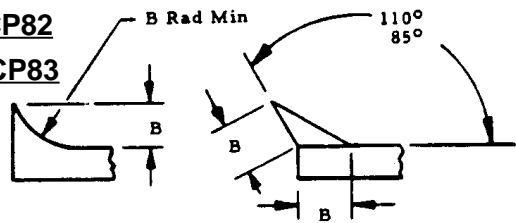
Genuine Aircraft Hardware Co.

MS 21919

Clamp, Loop Type, Cushioned, Support



Shown above are Line Clamp Pliers part # **LCP82**
 Also available with reverse jaws part# **LCP83**
 The LCP82 and the LCP83 are for #10 screws or bolts. A limited supply of LCP84 for #8 screws may be available.



NOTES:

- PROCUREMENT SPECIFICATION: MIL-C-8603
- SUPERSEDES: NONE
- THIS INFORMATION FROM MILITARY STANDARD MS21919 PAGE 1 OF 4, REVISED SEPTEMBER 30, 1981, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.

Genuine Aircraft Hardware Co.

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MS 21919

Clamp, Loop Type, Cushioned, Support

Dash Nos.	Rigid Tube Nom. OD (Ref)	DIMENSIONS												
		B	D +/--.015 Dia.	E +/--.015		G	R +/--.016 Rad.	S +.020 .000	T		W +/--.010		X +/--.015	
				Alum.	Steel & Cres.				Alum.	Steel & Cres.	Alum.	Steel & Cres.	Alum.	Steel & Cres.
-1	1/16	(2)	.062	.436	.436				.020	.020	.375		.188	
-2	1/8	.046	.125	.457	.457									
-3	3/16	.110	.188	.498	.498									
-4	1/4	.093 .125	.250	.529	.529		.062					.375		.188
-5	5/16		.313	.560	.560				.032					
-6	3/8		.375	.592	.592									
-7	7/16		.438	.623	.623									
-8	1/2		.500	.654	.654	.062								
-9	9/16		.563	.752	.749	+016		.040						
-10	5/8	.625	.783	.780	-000									
-11	11/16	.155 .312	.688	.814	.811									
-12	3/4		.750	.845	.842									
-13	13/16		.813	.877	.858		.109		.050					
-14	7/8		.875	.908	.889									
-15	15/16		.938	.939	.920									
-16	1		1.000	.970	.951					.032				
-17	1-1/16		1.063	1.002	.983									
-18	1-1/8		1.125	1.062	1.030									
-19	1-3/16		1.188	1.093	1.061									
-20	1-1/4		1.250	1.124	1.092									
-21	1-5/16		1.313	1.156	1.124									
-22	1-3/8		1.375	1.187	1.155									
-23	1-7/16		1.438	1.218	1.186	.094								
-24	1-1/2		1.500	1.249	1.217	+031								
-25	1-9/16	1.563	1.281	1.259	-000									
-26	1-5/8	1.625	1.312	1.280							.500		.218	
-27		1.688	1.344	1.312										
-28	1-3/4	1.750	1.374	1.342								.500	.218	
-29		1.813	1.406	1.374										
-30	1-7/8	1.875	1.437	1.405										
-31		1.938	1.468	1.444										
-32	2	2.000	1.499	1.475										
-33		2.062	1.531	1.507										
-34	2-1/8	2.125	1.562	1.538										
-35		2.188	1.594	1.570		.125	.060	.062						
-36	2-1/4	2.250	1.624	1.600										
-37		2.312	1.655	1.631										
-38	2-3/8	2.375	1.687	1.663										
-40	2-1/2	2.500	1.752	1.728										
-42		2.625	1.812	1.788										
-43		2.688	1.844	1.820	.125									
-44	2-3/4	2.750	1.875	1.851	+031				.040					
-45		2.812	1.906	1.882	-000									
-46		2.875	1.937	1.913										
-48	3	3.000	2.000	1.976										
-50		3.125	2.062	2.038										
-52	3-1/4	3.250	2.125	2.101										
-54		3.375	2.187	2.163										
-56	3-1/2	(2)	3.500	2.250	2.226									
-58			3.625	2.312	2.288									
-64	4		4.000	2.500	2.476									
-66			4.125	2.562	2.538									

- NOTES:
- PROCUREMENT SPECIFICATION: MIL-C-8603
 - SUPERSEDES: NONE
 - THIS INFORMATION FROM MILITARY STANDARD MS21919 PAGE 2 OF 4, REVISED SEPTEMBER 30, 1981, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.

Genuine Aircraft Hardware Co.

MS 21919

Clamp, Loop Type, Cushioned, Support

REQUIREMENT:

1. MATERIALS:

BAND --- ALUMINUM ALLOY
CORROSION RESISTANT STEEL
LOW CARBON STEEL

CUSHION --- ETHYLENE PROPYLENE
NITRILE
CHLOROPRENE
SILICONE
FLUOROSILICONE

2. FINISH:

CHEMICAL CONVERSION
PASSIVATED
CADMIUM PLATED

3. MATERIAL CODES:

LETTER (S) INDICATES BAND AND CUSHION MATERIALS. DO NOT SPECIFY BAND / CUSHION COMBINATIONS NOT LISTED. MAXIMUM RECOMMENDED TEMPERATURE IS INDICATED IN PARENTHESIS.

DE = ALUMINUM BAND WITH ETHYLENE PROPYLENE CUSHION (212° F)
DF = ALUMINUM BAND WITH NITRILE CUSHION (212° F)
DG = ALUMINUM BAND WITH CHLOROPRENE CUSHION (212° F)
CE = CRES BAND WITH ETHYLENE PROPYLENE CUSHION (275° F)
CF = CRES BAND WITH NITRILE CUSHION (212° F)
CH = CRES BAND WITH SILICONE CUSHION (400° F)
CG = CRES BAND WITH CHLOROPRENE CUSHION (212° F)
CJ = CRES BAND WITH FLUOROSILICONE CUSHION (450° F)
F = LOW CARBON STEEL BAND WITH NITRILE CUSHION (212° F)
G = LOW CARBON STEEL BAND WITH CHLOROPRENE CUSHION (212° F)
H = LOW CARBON STEEL BAND WITH SILICONE CUSHION (400° F)

4. CUSHION APPLICATION AND COLOR INFORMATION

ETHYLENE PROPYLENE - FOR USE IN AREAS CONTAMINATED WITH PHOSPHATE ESTER HYDRAULIC FLUID AND OTHER SYNTHETIC FLUIDS. EXCELLENT OZONE RESISTANCE. NOT RESISTANT TO PETROLEUM BASED FLUIDS. COLOR SHALL BE SOLID PURPLE.

NITRILE - FOR USE PRIMARILY IN FUEL IMMERSION AND FUEL VAPORS. GOOD OZONE RESISTANCE. NOT RESISTANT TO PHOSPHATE ESTER BASED FLUIDS. NOT FOR USE ON TITANIUM TUBING. COLOR SHALL BE SOLID YELLOW.

CHLOROPRENE - FOR GENERAL PURPOSE USE IN AREAS CONTAMINATED WITH PETROLEUM BASED HYDRAULIC FLUIDS AND OCCASIONAL FUEL SPLASH. EXCELLENT OZONE RESISTANT. NOT RESISTANT TO PHOSPHATE ESTER BASED FLUIDS. NOT FOR USE ON TITANIUM TUBING. COLOR SHALL BE BLACK WITH A BLUE IDENTIFIER PER THE PROCUREMENT SPECIFICATION.

SILICONE - FOR ELEVATED TEMPERATURE USAGE IN PHOSPHATE ESTER BASED FLUID AND OTHER SYNTHETIC FLUID CONTAMINATED AREAS. UNAFFECTED BY OZONE. NOT RESISTANT TO PETROLEUM BASED FLUIDS. COLOR SHALL BE NATURAL WHITE.

FLUOROSILICONE - FOR ELEVATED TEMPERATURE USAGE IN PETROLEUM BASED FLUID CONTAMINATED AREAS. UNAFFECTED BY OZONE. NOT RESISTANT TO PHOSPHATE ESTER BASED FLUIDS. COLOR SHALL BE SOLID BLUE.

NOTES:

- PROCUREMENT SPECIFICATION: MIL-C-8603
- SUPERSEDES: NONE
- THIS INFORMATION FROM MILITARY STANDARD MS21919 PAGE 3 OF 4, REVISED SEPTEMBER 30, 1981, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.

* SEE PROCUREMENT SPECIFICATION



See page 73 for info

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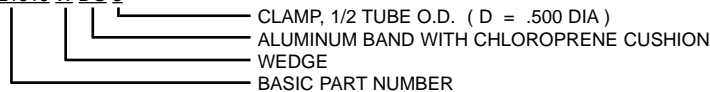
MS 21919 Clamp, Loop Type, Cushioned, Support

NOTES:

- [1] LETTER W INDICATES WEDGE TYPE CUSHION. WEDGE (W) IS MANDATORY FOR -2 THRU -48 SIZE CLAMPS.
- [2] WEDGE IS PROHIBITED ON -1 AND -50 THRU -66 SIZE CLAMPS.
- [3] WEDGE SHALL BE INTEGRALLY MOLDED TO CUSHION OR VULCANIZED USING PRESSURE AND HEAT TO ACCOMPLISH A BOND BETWEEN CUSHION AND WEDGE.
- [4] WEDGE SHALL OVERLAP AND TOUCH OPPOSITE END OF CUSHION WHEN CLAMP MOUNTING HOLES ARE ALIGNED AND DIMENSION G IS 0.00 (CLAMP COMPLETELY CLOSED).
- 5. THE CLAMP BAND SHALL BE FINISHED DURING MANUFACTURE SUCH AS TO REMOVE ALL TOOL AND DIE MARKS, SHARP EDGES AND BURRS.
- [6] CLAMPS WITH LOW CARBON STEEL BANDS ARE INACTIVE FOR NEW AIRCRAFT DESIGN AS OF OCTOBER 1, 1982.
- [7] CANCELLED P / N LISTED IN INTERCHANGEABILITY TABLE, ARE CANCELLED AFTER OCTOBER 1, 1982. REPLACEMENT P / N CAN REPLACE CANCELLED P / N UNIVERSALLY BUT CANCELLED P / N CANNOT REPLACE REPLACEMENT P / N UNIVERSALLY.
- 8. DIMENSIONS ARE IN INCHES.
- 9. INTENDED USE: THESE CLAMPS ARE INTENDED FOR GENERAL PURPOSE CLAMPING APPLICATIONS INCLUDING ELECTRICAL WIRE BUNDLE CLAMPING. FOR HIGH PERFORMANCE LOOP STYLE CLAMPS FOR USE IN MIL-H-5440 HYDRAULIC SYSTEMS; SEE MIL-C-85052.
- 10. EXAMPLE PART NUMBERS:

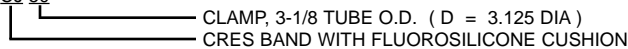
FOR -2 THRU -48 SIZE CLAMPS (WEDGE MANDATORY) [1]

MS21919 W DG 8



FOR -50 THRU -66 SIZE CLAMPS (WEDGE PROHIBITED) [2]

MS21919 CJ 50



- 11. REFERENCED DOCUMENTS SHALL BE OF THE ISSUE IN EFFECT ON DATE OF INVITATIONS FOR BIDS OR REQUEST FOR PROPOSAL, EXCEPT THAT REFERENCED ADOPTED INDUSTRY DOCUMENTS SHALL GIVE THE DATE OF THE ISSUE ADOPTED.
- 12. FOR DESIGN FEATURE PURPOSES, THIS STANDARD TAKES PRECEDENCE OVER PROCUREMENT DOCUMENTS REFERENCED HEREIN.

INTERCHANGEABILITY TABLE [7]

FOR -2 THRU -48		FOR -50 THRU -66	
CANCELLED PART NUMBER	REPLACEMENT PART NUMBER	CANCELLED PART NUMBER	REPLACEMENT PART NUMBER
MS21919WB (F, G, H) ()	MS21919W (F, G, H) () [6]	MS21919WC (F, G, H) ()	MS21919C (F, G, H) ()
MS21919B (F, G, H) ()	MS21919W (F, G, H) () [6]	MS21919WD (F, G, H) ()	MS21919D (F, G, H) ()
MS21919D (F, G,) ()	MS21919WD (F, G,) ()	MS21919WB (F, G, H) ()	MS21919 (F, G, H) () [6]
MS21919C (F, G, H) ()	MS21919WC (F, G, H) ()	MS21919B (F, G, H) ()	MS21919 (F, G, H) () [6]
MS21919 (F, G, H) ()	MS21919WD (F, G, H) () [6]	MS21919DH ()	MS21919CH ()
MS21919DH ()	MS21919WCH ()	MS21919WDH ()	MS21919CH ()
MS21919WDH ()	MS21919WCH ()	MS21919W (F, G, H) ()	MS21919 (F, G, H) () [6]

INSERT APPROPRIATE SIZE (DASH NUMBER) IN PARENTHESIS AT END OF PART NUMBER.

ADDITIONAL NOTES:

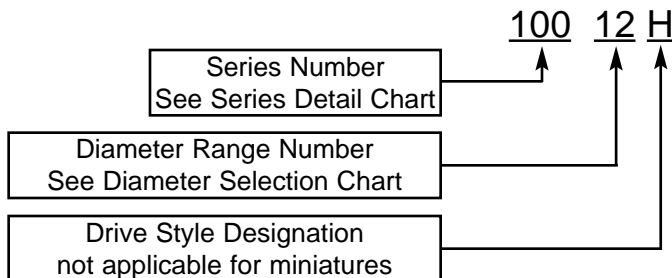
- PROCUREMENT SPECIFICATION: MIL-C-8603
- SUPERSEDES: NONE
- THIS INFORMATION FROM MILITARY STANDARD MS21919 PAGE 4 OF 4, REVISED SEPTEMBER 30, 1981, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.

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Genuine Aircraft Hardware Co.

Breeze Clamps

Worm Drive Hose Clamps, Regular Size and Miniature



Aero-Seal

Industrial/Aircraft Clamps



MINIATURE CLAMPS



LINER CLAMPS for Soft/Silicone Hose

Items in grey shading are not stocked by GAHco., but may be available as factory order. We stock the 100 series in (S), and the 200 series in (H). All miniatures are (H) drive style.

Series Detail Chart				
Series #	Style	Screw	Quality	Sizes Available
35	Miniature	Plated	Standard	04 thru 32
36	Miniature	S.S.	Standard	04 thru 32
37	Miniature	305 SS	Standard	04 thru 32
65	Miniature	Plated	Premium	04 thru 10
66	Miniature	S.S.	Premium	04 thru 10
67	Miniature	305 SS	Premium	04 thru 10
92	Liner	Plated	Aircraft	06 thru 188
94	Liner	S.S.	Aircraft	06 thru 188
100	Aeroseal	Plated	Aircraft	06 thru 188
200	Aeroseal	S.S.	Aircraft	06 thru 188
300	Aeroseal	305 SS	Aircraft	06 thru 188

Diameter Selection Chart			
Dia. #	Minimum	Maximum	Styles Available
04	7/32	5/8	Min Only
06	7/16	25/32	Min / Reg
08	1/2	29/32	Min / Reg
10	9/16	1 + 1/16	Min / Reg
12	11/16	1 + 1/4	Min / Reg
16	13/16	1 + 1/2	Min / Reg
20	13/16	1 + 3/4	Min / Reg
24	1 + 1/16	2	Min / Reg
28	1 + 5/16	2 + 1/4	Min / Reg
32	1 + 9/16	2 + 1/2	Min / Reg
36	1 + 13/16	2 + 3/4	Regular
40	2 + 1/16	3"	Regular
44	2 + 5/16	3 + 1/4	Regular
48	2 + 9/16	3 + 1/2	Regular
52	2 + 13/16	3 3/4	Regular
56	3 + 1/16	4"	Regular
60	3 + 5/16	4 + 1/4	Regular

Drive Style Chart	
Dr. Ltr.	Miniature and Liner clamps come with Hex drive
H	5/16 Hes Screw with Slot, no collar
S	Slotted Screw with Collar, no hex
W	Flat Thumb Screw, not always available.

Genuine Aircraft Hardware Co.

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MS 35842

Clamp, Hose: Low Pressure



MILITARY SPECIFICATION CLAMPS

DASH NUMBER	HOSE DIAMETER RANGE	
	MINIMUM	MAXIMUM
10	7/16	25/32
11	11/16	1+1/4
12	1+1/16	2
13	1+13/16	2+3/4
14	2+9/16	3+1/2
15	3+5/16	4+1/4
16	4+1/8	7

NOTES:

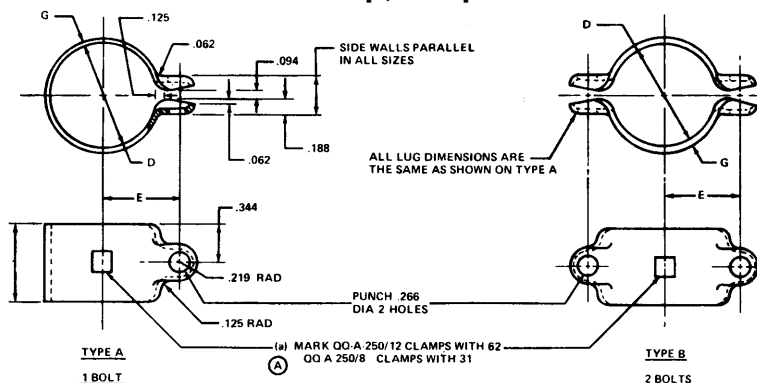
- MATERIAL:
SCREW: STEEL, CORROSION-RESISTING, 301 THRU 305, 410, 416, 420, 430, 430F, OR 431, FEDERAL STD. NO. 66.
BAND AND OTHER PARTS: STEEL, CORROSION-RESISTING, 201, 202, 301 THRU 305, FEDERAL STD. NO. 66.
- THE MS PART NUMBER CONSISTS OF THE MS NUMBER PLUS THE DASH NUMBER.
EXAMPLE: MS35842-10.
- MARKING SHALL CONSIST OF THE MS PART NUMBER AND THE MANUFACTURER'S IDENTIFICATION IN ACCORDANCE WITH MIL-STD-130.

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MS 27405

Clamp, Loop



MS PART NUMBER						DIMENSIONS			
TYPE A			TYPE B			D DIA	E	G	
STEEL		ALUMINUM ALLOY	STEEL		ALUMINUM ALLOY			STEEL	ALUM ALLOY
UNPLATED	PLATED		UNPLATED	PLATED					
MS27405 4	MS27405 4P	MS27405 D4	MS27405 T4	MS27405 T4P	MS27405 TD4	.500	.453	.050	.051
MS27405 5	MS27405 5P	MS27405 D5	MS27405 T5	MS27405 T5P	MS27405 TD5	.625	.562		
MS27405 6	MS27405 6P	MS27405 D6	MS27405 T6	MS27405 T6P	MS27405 TD6	.750	.641		
MS27405 7	MS27405 7P	MS27405 D7	MS27405 T7	MS27405 T7P	MS27405 TD7	.875	.719		
MS27405 8	MS27405 8P	MS27405 D8	MS27405 T8	MS27405 T8P	MS27405 TD8	1.000	.781		
MS27405 9	MS27405 9P	MS27405 D9	MS27405 T9	MS27405 T9P	MS27405 TD9	1.125	.859		
MS27405 10	MS27405 10P	MS27405 D10	MS27405 T10	MS27405 T10P	MS27405 TD10	1.250	.922		
MS27405 11	MS27405 11P	MS27405 D11	MS27405 T11	MS27405 T11P	MS27405 TD11	1.375	1.000		
MS27405 12	MS27405 12P	MS27405 D12	MS27405 T12	MS27405 T12P	MS27405 TD12	1.500	1.062		
MS27405 13	MS27405 13P	MS27405 D13	MS27405 T13	MS27405 T13P	MS27405 TD13	1.625	1.125		
MS27405 14	MS27405 14P	MS27405 D14	MS27405 T14	MS27405 T14P	MS27405 TD14	1.750	1.188		
MS27405 15	MS27405 15P	MS27405 D15	MS27405 T15	MS27405 T15P	MS27405 TD15	1.875	1.250		
MS27405 16	MS27405 16P	MS27405 D16	MS27405 T16	MS27405 T16P	MS27405 TD16	2.000	1.328		
MS27405 17	MS27405 17P	MS27405 D17	MS27405 T17	MS27405 T17P	MS27405 TD17	2.125	1.391		
MS27405 18	MS27405 18P	MS27405 D18	MS27405 T18	MS27405 T18P	MS27405 TD18	2.250	1.453		
MS27405 19	MS27405 19P	MS27405 D19	MS27405 T19	MS27405 T19P	MS27405 TD19	2.375	1.516		
MS27405 20	MS27405 20P	MS27405 D20	MS27405 T20	MS27405 T20P	MS27405 TD20	2.500	1.578		

NOTES:

MATERIAL: ALUM. ALLOY SPEC. QQ A 250 / 12 (7075) TEMPER, TEN. STRENGTH. REQUIREMENTS OF 62,000 PSI IN.
ALUM. ALLOY. SPEC. QQ A 250 / 8, H32 TEN. STRENGTH. REQUIREMENTS OF 31,000 PSI MIN.
STEEL. SPEC. QQ 698 1015, T4

FINISH: ALUM. ALLOY ANODIZE. SPEC. MIL. A-8625, TYPES I OR II
STEEL CADMIUM PLATE PER SPEC. QQ P 416, TYPE II, CLASS 2

ADD H BEFORE DASH NUMBERS FOR CLAMP, ALUM. ALLOY, SPEC. QQ-A 250 / 8

EXAMPLE PART NUMBERS: MS27405 6 CLAMP, TYPE A, STEEL, UNPLATED
MS27405 6P CLAMP, TYPE A, STEEL, PLATED
MS27405 D6 CLAMP, TYPE A, ALUM. ALLOY. SPEC. QQ-A 250 / 12
MS27405 T6 CLAMP, TYPE B, STEEL, UNPLATED
MS27405 T6P CLAMP, TYPE B, STEEL, PLATED
MS27405 HD6 CLAMP, TYPE A, ALUM. ALLOY. SPEC. QQ-A 250 / 8
MS27405 TD6 CLAMP, TYPE B, ALUM. ALLOY. SPEC. QQ-A 250 / 12
MS27405 HTD6 CLAMP, TYPE B, ALUM. ALLOY. SPEC. QQ-A 250 / 8

IDENTIFICATION MARKING SHALL BE IN ACCORDANCE WITH MIL STD 130.

(MARK BOTH HALVES OF TYPE B CLAMP)

MARKING FOR SHIPMENT SHALL BE IN ACCORDANCE WITH MIL STD 129.

DIMENSIONS IN DECIMALS TOLERANCES DECIMALS: .010

REMOVE BURRS AND SHARP EDGES.

MS27405 ITEMS ARE UNIVERSALLY INTERCHANGEABLE WITH AN741 ITEMS OF LIKE DASH NUMBERS.

ADDITIONAL NOTES:

- PROCUREMENT SPECIFICATION: NONE
- SUPERSEDES: AN741
- THIS INFORMATION FROM MILITARY STANDARD MS27405 PAGE 1 OF 1, REVISED DEC. 23, 1971, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.

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MS21333 Clamps

Clamp, Loop-Steel, Plain and Cushioned

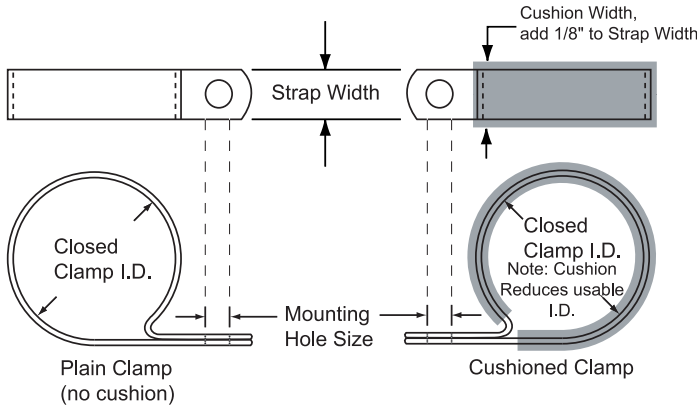
Use **AN742** and **MS21919** when practical

These are made of mild steel and are Cad or Zinc yellow plated. They are for general purpose Non Critical clamping.

Strap width for these is based on mounting hole size.

Strap width for
 3/16" Mounting Hole = 1/2"
 1/4" Mounting Hole = 1/2"
 5/16" Mounting Hole = 9/16"
 3/8" Mounting Hole = 5/8"

Add an "A" at the very end for a Plastisol cushion .032 thick, otherwise either a Plastisol or Synthetic Rubber .062 thick. Applicable to cushioned numbers only!



Example of Part # MS21333-107

Clamp, Loop, Steel 1/4" Mounting Hole, 1" Closed ID, 1/2" Strap width, Cushion is 5/8" wide and is .062 thick, making the functional Closed ID of the clamp 7/8" ID.

MS21333 - (select from below)								
Closed Clamp I.D.	Mounting Hole Size							
	3/16		1/4		5/16		3/8	
	Plain	Cushioned	Plain	Cushioned	Plain	Cushioned	Plain	Cushioned
1/8"	1	65	32	96	44	108	53	117
3/16"	2	66	33	97			54	118
1/4"	3	67	34	98	45	109	55	119
5/16"	4	68	35	99	46	110	56	120
3/8"	5	69	36	100	47	111	57	121
7/16"	6	70	37	101			58	122
1/2"	7	71	38	102	48	112	59	123
9/16"	8	72	39	103			60	124
5/8"	9	73	40	104	49	113	61	125
11/16"	10	74						
3/4"	11	75	41	105	50	114	62	126
7/8"	12	76	42	106	51	115	63	127
1"	13	77	43	107			64	128
1 1/8"	14	78						
1 3/16"					52	116		
1 1/4"	15	79						129

Genuine Aircraft Hardware Co.

Tubing Seamless Rigid Tubing

SEAMLESS WW-T-700/4 5052-0

SEAMLESS MIL-T-8808 321 SS

PART NUMBER	MATERIAL	OUTSIDE DIA.	WALL
MT 8504.125X.016	304, Stainless Steel	1/8	.016
MT 8504.188X.020	304, Stainless Steel	3/16	.020
MT 8504.250X.020	304, Stainless Steel	1/4	.020
MT 8504.313X.020	304, Stainless Steel	5/16	.020
MT 8504.375X.020	304, Stainless Steel	3/8	.020
MT 8504.500X.028	304, Stainless Steel	1/2	.028
MT 8808.125X.016	321, Stainless, Steel	1/8	.016
MT 8808.188X.020	321, Stainless, Steel	3/16	.020
MT 8808.250X.020	321, Stainless, Steel	1/4	.020
MT 8808.313X.020	321, Stainless, Steel	5/16	.020
MT 8808.375X.020	321, Stainless, Steel	3/8	.020
MT 8808.375X.028	321, Stainless, Steel	3/8	.028
MT 8808.500X.028	321, Stainless, Steel	1/2	.028
WWT-700/4X.125	5052-0, Aluminum	1/8	.035
WWT-700/4X.190	5052-0, Aluminum	3/16	.035
WWT-700/4X.250	5052-0, Aluminum	1/4	.035
WWT-700/4X.313	5052-0, Aluminum	5/16	.035
WWT-700/4X.375	5052-0, Aluminum	3/8	.035
WWT-700/4X.500	5052-0, Aluminum	1/2	.035
WWT-700/4X.500HW	5052-0, Aluminum	1/2	.040
WWT-700/4X.625	5052-0, Aluminum	5/8	.035
WWT-700/4X.750	5052-0, Aluminum	3/4	.035

See page 87 for Theoretical Strength of Tubing

NOTES:

321 stainless tubing is titanium stabilized for better handling / forming properties.

All the tubing listed here is seamless, it may be bent or flared with the proper tools.*

*The 3/8 stainless with .020 wall should not be bent past 45 degrees unless special tooling is used.

Genuine Aircraft Hardware Co.

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Aluminum and Stainless Steel Tubing Ordering and Shipping Policy

Our Stock Aluminum Tubing: Can only be shipped in Six foot sticks. That's all we carry. We will not cut aluminum tubing. The customer can only have 6 foot or multiples of 6 foot pieces (6, 12, 18, 24, 30, 36 and so on).

(with a special order amount and customer paid trucking, we can supply 12 ft lengths)*

* Typically 120 feet or more of one size.

Our Stock Stainless Steel Tubing: Will only be sold in Six foot, Eight foot, or remnants shorter than 6 foot (subject to stock on hand).

8 feet is our length limit for UPS shipping.



If you want a length of stainless tubing that is shorter than 6 feet, we will check our remnant lengths and TRY to get you one that is your requested length or a little longer. If there is not a remnant that meets your requirement, we *will not re-cut pieces to fit your exact need*, you will be supplied the next longer length that we have in stock, it may end up being a full 6 foot piece if that is all we have that will meet or exceed your requested length.

(Stainless Steel Tubing comes from the factory in random lengths. It is not pre-cut when it is sent to us.)

Note: We will make every effort to meet the customers needs, without incurring too much non-sellable stock. (Short Unusable Pieces)

What we need to know from you, the customer:

What are the shortest and longest length/ lengths you can use?

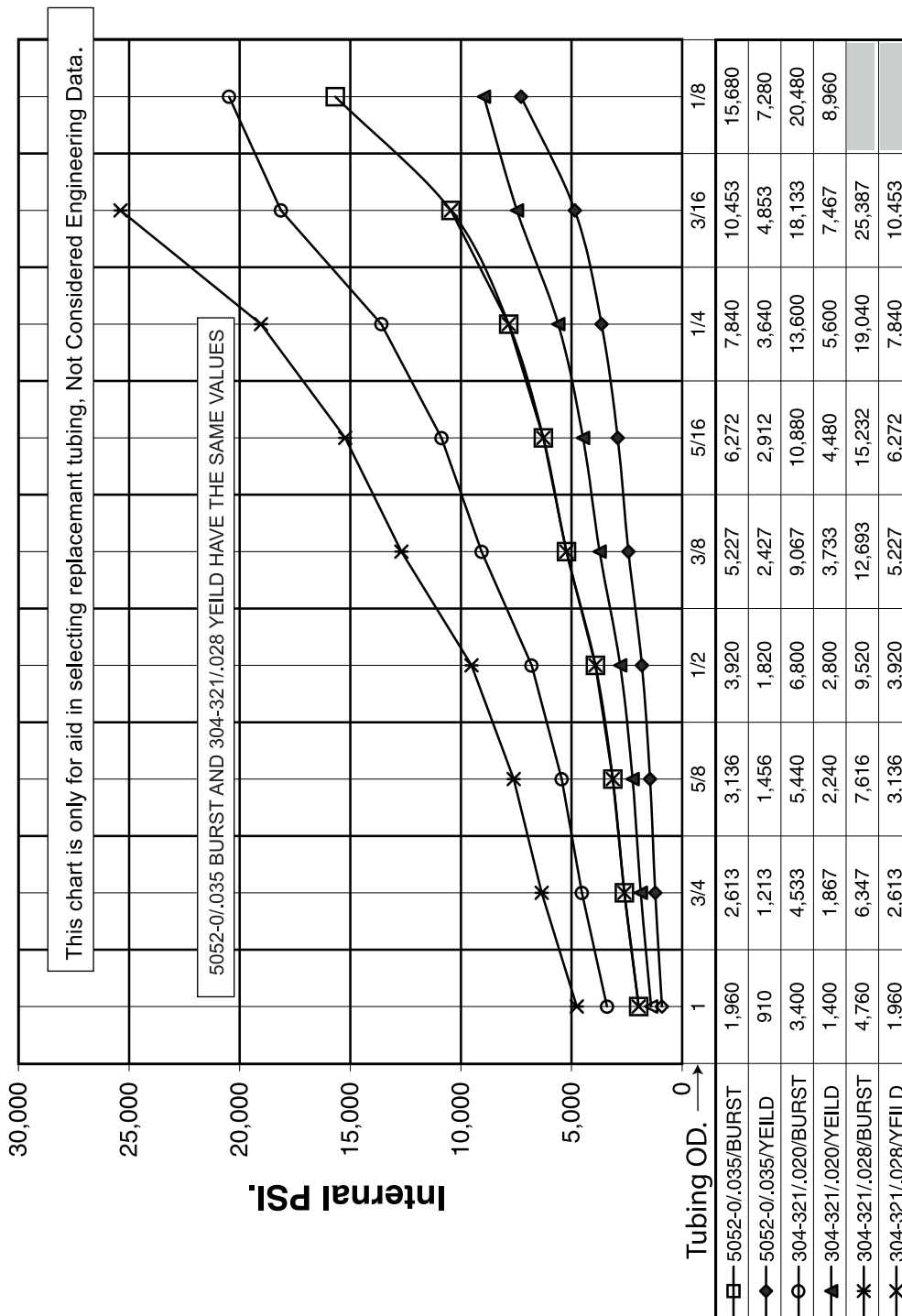
Are you aware that *you will be shipped any overage per our policy?*

Example of Stainless Steel Tubing Lengths, when shipped UPS:

Customer Wants	Closest Lengths We Have	Customer Gets
30 inches	29" and 37"	37 inches
50 inches	44" and 72"	6 feet (72")
6 and 1/2 feet	6 foot and 8 foot	8 feet (96")

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SEAMLESS TUBING THEORETICAL STRENGTHS



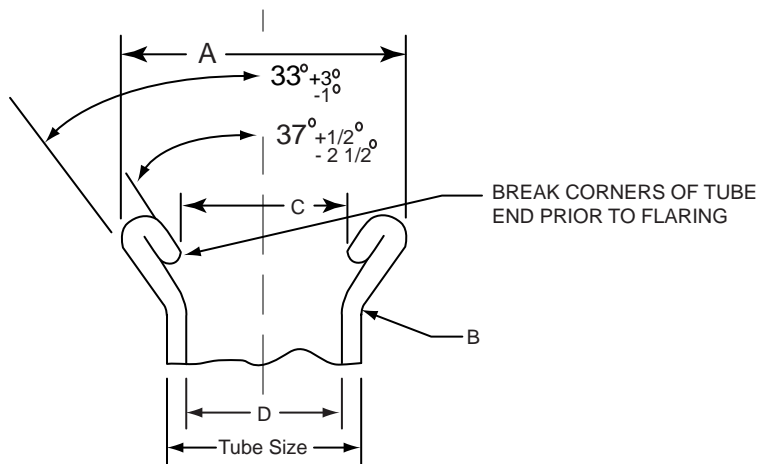
Tubing Outside Diameter in Inches

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MS 33583

Tubing End - Double Flare, Standard Dimensions & Specs.



DASH NUMBER	TUBE SIZE NOMINAL OD	A +.000 -.010 DIA	B RAD +/- .010	C DIA		D DIA REF	NOMINAL WALL THICKNESS
				MAX	MIN		
2	1/8	.200	.032	.096	.062	.062	.028
				.086	.048	.048	.035
3	3/16	.302		.168	.124	.124	.028
				.158	.110	.110	.035
4	1/4	.359		.230	.187	.187	.028
				.219	.173	.173	.035
5	5/16	.421		.292	.250	.250	.028
				.281	.235	.235	.035
				.259	.205	.205	.049
6	3/8	.484		.354	.312	.312	.028
				.344	.298	.298	.035
				.322	.268	.268	.049

- NOTES:**
1. FLARE SHALL BE SQUARE WITH CENTERLINE OF TUBE WITHIN 1/2".
 2. FLARE SHALL BE CONCENTRIC WITH TUBE OD WITHIN .005 TIR WHEN MEASURED .250 INCH FROM THE POINT OF TANGENCY OF B RADIUS OF THE TUBE OD.
 3. FLARE SEALING SURFACE SHALL BE A SMOOTH, UNIFORM CONICAL SURFACE FREE OF PITS, CRACKS, NICKS, FLAT SPOTS, BURRS, DENTS, SCRATCHES, CHATTER OR LONGITUDINAL AND SPIRAL TOOL MARKS THAT MIGHT RESULT IN A LEAK PATH. FLARE SEALING SURFACE SHALL NOT EXCEED 32 MICRO-INCH RHR PER ASA B46.1-1962. NON-SEALING SURFACE OF FLARE SHALL BE FREE OF CRACKS AND PIT MARKS.
 4. FOR USE WITH STANDARD FLARED TUBE FITTINGS.
 5. DIMENSIONS IN INCHES.

ADDITIONAL NOTES:

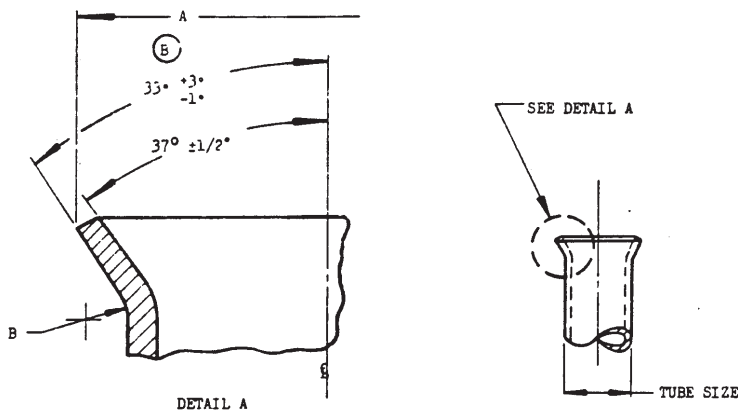
- PROCUREMENT SPECIFICATION: NONE
- SUPERSEDES: AND10078
- THIS INFORMATION FROM MILITARY STANDARD MS33583 PAGE 1 OF 1, REVISED JUNE 28, 1993, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.

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Genuine Aircraft Hardware Co.

MS 33584

Tubing End - Standard Dimensions for Single Flare



TUBE SIZE NOMINAL OD	A DIAMETER		B +/- .010 RAD		
	AL ALLOY TUBING	STEEL TUBING			
1/8	.200	+ .000 - .010	.200	+ .000 - .010	.032
3/16	.302				
1/4	.359				
5/16	.421				
3/8	.484				
1/2	.656				
5/8	.781				
3/4	.937				
1	1.187	+ .000 - .015	1.187	+ .000 - .015	.093
1+1/4	1.500		1.500		
1+1/2	1.721		1.721		
1+3/4	2.106		2.106		
2	2.356		2.356		
2+1/2	2.856		2.856		
3	3.356		3.356		

NOTES:

FLARE SHALL BE SQUARE WITH CENTERLINE OF TUBE WITHIN 1/2°.
 FLARE SHALL BE CONCENTRIC WITH OD OF TUBE WITHIN .005 TIR.
 FLARE SHALL BE FREE OF CRACKS AND PIT MARKS.
 FOR USE WITH STANDARD FLARED TUBE FITTINGS.
 DIMENSIONS IN INCHES.

ADDITIONAL NOTES:

- PROCUREMENT SPECIFICATION: NONE
- SUPERSEDES: AND10061
- THIS INFORMATION FROM MILITARY STANDARD MS33584 PAGE 1 OF 1, REVISED DECEMBER 9, 1960, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.

Genuine Aircraft Hardware Co.

Tube and Hose Tools

For hard or soft copper, aluminum, brass, thin wall steel, stainless steel, monel, titanium and other metal tubing



367-FH



368-FH

Imp® Triple Header Benders

For annealed copper, aluminum, steel, stainless steel and hard copper tubing of bending temper.

Lever type, multiple size benders. Calibrated markings for making accurate left-hand, right-hand, and offset bends. Ninety degree start requires less effort; makes bending fast and easy.

	BENDING RANGE			
	Tube O.D.		Radius to Center of Tube	
	(Inches)	(mm)	(Inches)	(mm)
367-FH	1/8, 3/16, and 1/4	3, 4, and 6	9/16	14.2
368-FH	1/4, 5/16, and 3/8	4, 6 and 8	11/16	17.5



127-FB/
TC 1050

Imp® Tube Cutters

For 1/8" to 5/8" (4 to 15 mm) O.D. tubing, (1/8" to 1/2" nom.). Requires only 1 1/4" swing radius. (Requires only 1 3/8" swing radius with 5/8" tube.)

Repositioned rollers to bottom of tool allows for easier cutter engagement on tubing. Enclosed feed screw minimizes contamination, assuring continued free operation. Redesigned feed mechanism improves overall cutting action.

Junior Tube Cutter

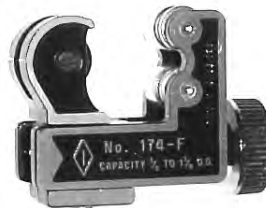
For 1/8" to 3/4" O.D. tubing



227-FA

Big-Imp™ Tube Cutter

For 3/8" to 1 1/8" O.D. tubing



174-F

Requires only 1 15/16" swing radius. (Requires only 2 1/4" swing radius with 1 1/8" tube.)



Hose Fitting Assembly Tool

These are made by Parker and work well for assembling MS24587 hose ends on Mil H 8794 hose.

We stock -4, -5, -6, -8, -10, and -12.

Part numbers are 631073-(size).

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Genuine Aircraft Hardware Co.

Miscellaneous

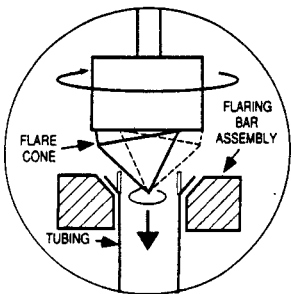
Tools & Baffle Rivets

Part # RFT-37 DEGREE

Flaring Tool -- These precision tools provide smooth, uniform flares with minimum effort. A large feed screw handle turns easily. Hardened steel flaring cone, eccentrically mounted in needle bearings, produces rolling action for even metal flow, giving uniform flare walls without galling.

"The BEST single flaring tool I've ever seen." Tom Brink, Pres., GAHco.

Flares 3/16" to 3/4"



Helpful Hints for using the Flaring Tool.

When using this on Seamless Stainless Steel aircraft Tubing, **DO NOT use a tubing cutter**, it will pinch down the diameter of the tubing and work harden it very quickly. What you should do is use the Bar of the cutter as a holding fixture for the tubing as you cut it with a fine toothed hacksaw, by hand. You do not want to use anything that will heat or work harden the tubing.

The best method I have found for flawless looking flare ends, is to separate the Head from the Bar and place the tubing in the bar and close the bar before placing it in a vise to hold it closed. This should be done so the hacksaw will be cutting the tubing on the Non funneled "Flat" side of the bar. Cut the tubing off as square as you can, it won't look so perfect yet but don't worry. When done cutting, loosen the vise and open the bar, slide the tubing back until the newly cut portion just barely sticks out of the flat back of the bar, put it back in the vise. Now using a fine and fairly good mill cut file file the protruding portion of the tubing end until it is totally level with the back side "flat" part of the Bar. Take your tubing out of the bar and inspect, it should appear flat and perfectly even all the way around, it will still need cleaning up though.

To clean up the end, hold the mill file at an angle and either rotate the tube so as to knock off any sharp edges from the outside or move the file around the tube to the same effect if the tube cannot be rotated. You will need to clean up the inside with a de-burring tool or a countersink tool that is just held by the hand for this operation.

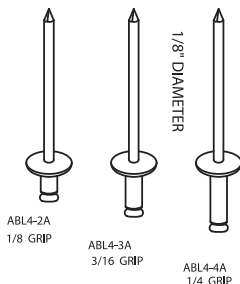
Make sure that the tubing and tools are clean of all metal dust or any other possible contaminant's that may affect the performance of the tool or your assembly both before and after you are done making your tube assembly.

There are other basic instructions that come with the tool.

This tool when used properly makes the finest and most consistent single flares of all the flaring tools I have seen.

AN BOLT GAUGE						
	AN3	AN4	AN5	AN6	AN7	AN8
3/16						
7/16						
1/2						
9/16						
5/8						
11/16						
13/16						
15/16						
1						
1 1/16						
1 1/8						
1 1/4						
1 1/2						
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9 5/8						
9 3/4						
9 7/8						
10						

LARGE AREA HEAD, ALUMINUM
BAFFLE INSTALLATION RIVETS
FOR FLEXIBLE BAFFLING STRIPS



Marson's best hand plier-style riveter.
Heavy duty construction features a patented bearing design,
includes four nose-pieces that are housed in the tool body.



For more Marson Commercial Blind Rivets, see page 220
For Hand Operated Hydraulic Rivet Puller, see next page

Genuine Aircraft Hardware Co. **Hydraulic Hand Rivet / Blind Nut Tool**

Made for Easy Installation of Serrated Stem Blind Rivets, or Rivet Nuts up to 1/4" dia.

This Handy after market Rivet & Rivet Nut puller operates by hand, hydraulically giving the tool a tremendous pulling strength advantage over simple hand operated mechanical pullers.

The **D-100-RN** comes in a convenient case along with all the necessary nose pieces for serrated stem rivets and all the Rivet Nut Nose Adapters necessary to install the most popular threaded Rivet Nuts.

Instructions and a Parts List are included.



Standard Serrated Stem, Nose Setup



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Genuine Aircraft Hardware Co.

Safety Wire and Pliers

MS20995 Series

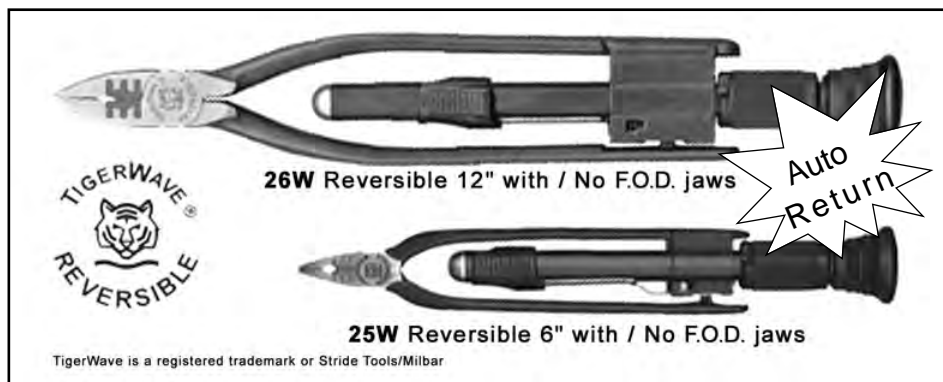
304 Stainless, Monel, Inconel, and Copper

Diameter Selection / Replace (XX) with material code		
MS20995(XX)25	MS20995(XX)32	MS20995(XX)41
.025" Diameter For small screws with hole diameter of less than .045"	.032" Diameter General purpose #10 to 3/8 diameter bolts & Secondary Turnbuckles	.041" Diameter Primary Turnbuckles Propeller Bolts Large Fasteners

Material Selection

MS20995 C (dia.) 304 Stainless Steel, not temperature rated.	Sold by the #.
MS20995 NC (dia.) Monel, for use up to 700 degrees.	Sold by the #.
MS20995 N (dia.) Inconel, for use at temperature 700 degrees and above.	Sold by the #.
MS20995 CY (dia.) Cadmium Plated Copper Wire for Break-Away usage.	Sold by 10 ft. or by the #.

We stock for immediate shipment MS20995C15, C20, C25, C32, C41, NC20, NC25, NC32, N20, NC20, and CY20. Other sizes and Materials are available by request.
















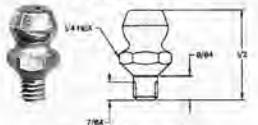
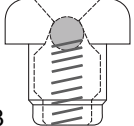
PART #	MADE BY
SWP-MB-6	MILBAR 6"

Standard SAFETY WIRE PLIERS, Non Reversible.

SWP-MB-9	MILBAR 9"
SWP-MB-12	MILBAR 12"
SWP-RR-9	ROBINSON 9"

Genuine Aircraft Hardware Co.

Grease Fittings / Picture Guide

<p>(A)</p>  <p>AS15001-1P AS15004-1 AS15720-1</p>	<p>(B)</p>  <p>AS15001-2P</p>	<p>(C)</p>  <p>AS15001-3P AS15004-2 AS15720-2</p>	<p>(D)</p>  <p>AS15001-4P AS15001-3 AS15720-3</p>	<p>(E)</p>  <p>AS15002-1P</p>
<p>1/4 - 28 Tapered Threads</p>				<p>1/4 -28 Straight</p>
<p>(F)</p>  <p>AS15002-3P</p>	<p>(G)</p>  <p>AS15003-1P AS15005-1 AS15721-1</p>	<p>(H)</p>  <p>AS15003-2P</p>	<p>(I)</p>  <p>AS15003-3P AS15005-3</p>	
<p>1/4 -28 Straight</p>	<p>1/8" N.P.T. Tapered Threads</p>			
<p>(J)</p>  <p>AS15003-4P</p>	<p>(K)</p>  <p>AS15003-5P AS150005-4 AS15721-4</p>	<p>(L)</p>  <p>AS15003-6P AS15005-5 AS15721-5</p>	<p>(M)</p>  <p>3016 10-32 UNF-2A no check ball</p> <hr/>  <p>3018 Threads are #6-40</p>	
<p>1/8" N.P.T. Tapered Threads</p>				
<p>An Assortment is Available see page 297</p>				<p>Enlarged Greatly for Detail</p> <p>(N)</p>  <p>1877 1877AS3 Fits in Hole .123 - .125</p>

Genuine Aircraft Hardware Co.

Grease Fittings / Selection Guide

ALEMITE will no longer certify their Grease Fittings to the MS or NAS part #'s. The latest numbers that are certified to an Aerospace Specification start with "AS"

We still have some certified MS #'s and some Commercial Alemite part #'s. We will be replacing the old #'s with the new AS #'s, as the old #'s are depleted.

Use the chart below to assist you in finding the Grease Fitting appropriate for your application.

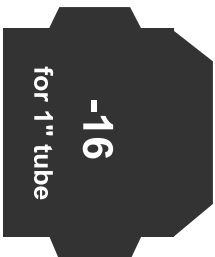
Picture Guide See Chart	Thread Size & Type	Nipple Angle	O.A.L. inches	Material and Finish	Original Military Specification <small>When exhausted use AS for certified purposes.</small>	Alemite MS/NAS/AS Commercial Equivalent Item # <small>NOT CERTIFIED to MS or AS</small>	Current S.A.E Aerospace Specification USE FOR CERTIFIED APPLICATIONS	Alemite Commercial Item #'s, for AIRCRAFT AEROSPACE CERTIFIED USE AS PART #'S
A	1/4-28 taper	Straight	35/64	Steel / Zinc	MS15001-1	1641-B	AS15001-1P	1641-AS
A	1/4-28 taper	Straight	17/32	Monel / Bright	MS15004-1	1966-B	AS15004-1	1966-AS3
A	1/4-28 taper	Straight	17/32	303 SS	MS15720-1	1966-S	AS15720-1	1966-AS2
B	1/4-28 taper	Straight	31/32	Steel / Zinc	MS15001-2	1680-B	AS15001-2P	1680-AS
C	1/4-28 taper	45 deg.	13/16	Steel / Zinc	MS15001-3	1637-B1	AS15001-3P	1637-AS
C	1/4-28 taper	45 deg.	3/4	Monel / Bright	MS15004-2	1968-B	AS15004-2	1968-AS3
C	1/4-28 taper	45 deg.	3/4	303 SS	MS15720-2	1968-S	AS15720-2	1968-AS2
D	1/4-28 taper	90 deg.	3/4	Steel / Zinc	MS15001-4	1911-B1	AS15001-4P	1911-AS
D	1/4-28 taper	90 deg.	3/4	Monel / Bright	MS15004-3	1969-B	AS15004-3	1969-AS3
D	1/4-28 taper	90 deg.	3/4	303 SS	MS15720-3	1969-S	AS15720-3	1969-AS2
E	1/4-28-str.	Straight	33/64	Steel / Zinc	MS15002-1	1792-B	AS15002-1P	1792-AS
F	1/4-28 str.	45 deg.	39/64	Steel / Zinc	MS15002-3	1770-B1	AS15002-3P	1770-AS
G	1/8-npt.	Straight	11/16	Steel / Zinc	MS15003-1	1610-BL	AS15003-1P	1610-AS
G	1/8-npt.	Straight	3/4	Monel / Bright	MS15005-1	1961-B	AS15005-1	1961-AS3
G	1/8-npt.	Straight	3/4	303 SS	MS15721-1	1961-S	AS15721-1	1961-AS2
H	1/8-npt.	Straight	1+1/4	Steel / Zinc	MS15003-2	1607-B	AS15003-2P	1607-AS
I	1/8-npt.	30 deg.	19/64	Steel / Zinc	MS15003-3	1611-B	AS15003-3P	1611-AS
I	1/8-npt.	30 deg.	1+1/4	Monel / Bright	MS15005-3	1921-B	AS15005-3	1921-AS3
J	1/8-npt.	45 deg.	57/64	Steel / Zinc	MS15003-4	1688-B	AS15003-4P	1688-AS
K	1/8-npt.	65 deg.	27/32	Steel / Zinc	MS15003-5	1612-B	AS15003-5P	1612-AS
K	1/8-npt.	67.5 deg.	61/64	Monel / Bright	MS15005-4	1922-B	AS15005-4	1922-AS3
K	1/8-npt.	67.5 deg.	61/64	303 SS	MS15721-4	1922-S	AS15721-4	1922-AS2
L	1/8-npt.	90 deg.	27/37	Steel / Zinc	MS15003-6	1613-B	AS15003-6P	1613-AS
L	1/8-npt.	90 deg.	7/8	Monel / Bright	MS15005-5	1923-B	AS15005-5	1923-AS3
L	1/8-npt.	90 deg.	7/8	303 SS	MS15721-5	1923-S	AS15721-5	1923-AS2
M	10-32	Straight	1/2	Steel / Zinc	None	3016	None	None
M	6-40	Straight	1/2	Steel / Zinc	None	3018	None	None
N	press in	Straight	11/64	Steel / Zinc	NAS516-1	1877	None	None
N	press in	Straight	11/64	Monel / Bright	NAS516-M1	None	None	1877-AS3

Hydraulic Fittings Size Silhouettes

This is a scaled drawing and this box is supposed to be approx. 7 + 1/2 inches wide in this direction

AN 37° Flared Cone End, Fitting Silhouettes

Flareless Fitting ends use the same sizes as the Flared fittings for sizing



for 1" tube

1+5/16-12



for 3/4" tube

1+1/16-12



for 5/8" tube

7/8-14



for 1/2" tube

3/4-16



for 3/8" tube

9/16-18



for 5/16" tube

1/2-20



for 1/4" tube

7/16-20



for 3/16" tube

3/8-24



for 1/8" tube

5/16-24

For Straight thread fittings such as AN O-ring Seal or MS Flareless, match thread sizes to chart above to get desired Dash Numbers

Male, National Pipe Thread Silhouettes

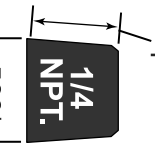
tpi. = Threads per inch.



27 tpi.

1/8 NPT.

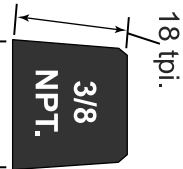
.405*



18 tpi.

1/4 NPT.

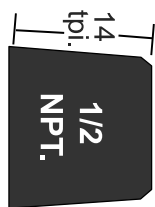
.560*



18 tpi.

3/8 NPT.

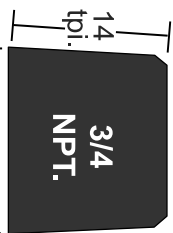
.675*



14 tpi.

1/2 NPT.

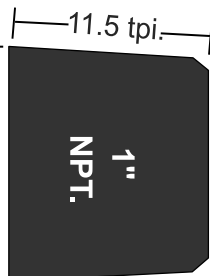
.840*



14 tpi.

3/4 NPT.

1.05*



11.5 tpi.

1" NPT.

1.32*

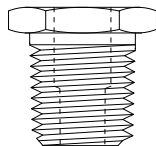
* Approximate Dimensions at Large end of pipe thread

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Genuine Aircraft Hardware Co.

Hydraulic Fittings

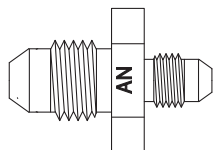
Adapters, One Size to Another



AN912
Pipe To Pipe
Bushing

AN912, Pipe to Pipe, Bushing

Male Pipe Size	Female Pipe Size	MATERIAL		
		ALUMINUM	BRASS	STAINLESS
1/4	1/8	-1D	-1	-1J
3/8	1/4	-2D	-2	-2J
3/8	1/8	-3D	-3	-3J
1/2	3/8	-4D	-4	-4J
1/2	1/4	-5D	-5	-5J
1/2	1/8	-6D	-6	-6J
3/4	1/2	-7D	-7	-7J
3/4	3/8	-8D	-8	-8J
3/4	1/4	-9D	-9	-9J
1"	3/4	-10D	-10	-10J
1"	1/2	-11D	-11	-11J
1"	3/8	-12D	-12	-12J
1+1/4	3/4	-13D	-13	-13J

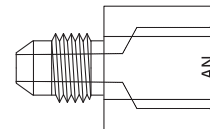


AN919
Male To Male
37 Degree Flare

AN919, Male to Male, 37 Degree Flare

TUBE SIZE	TUBE SIZE	MATERIAL		
		ALUMINUM	STEEL	STAINLESS
3/16	1/8	-0D	-0	-0J
1/4	1/8	-1D	-1	-1J
1/4	3/16	-2D	-2	-2J
5/16	1/4	-3D	-3	-3J
3/8	1/8	-4D	-4	-4J
3/8	3/16	-5D	-5	-5J
3/8	1/4	-6D	-6	-6J
3/8	5/16	-7D	-7	-7J
1/2	1/8	-8D	-8	-8J
1/2	3/16	-9D	-9	-9J
1/2	1/4	-10D	-10	-10J
1/2	5/16	-11D	-11	-11J
1/2	3/8	-12D	-12	-12J
5/8	1/4	-13D	-13	-13J
5/8	3/8	-14D	-14	-14J
5/8	1/2	-15D	-15	-15J
3/4	1/4	-16D	-16	-16J
3/4	5/16	-17D	-17	-17J
3/4	3/8	-18D	-18	-18J
3/4	1/2	-19D	-19	-19J
3/4	5/8	-20D	-20	-20J
1"	1/4	-21D	-21	-21J
1"	5/8	-22D	-22	-22J
1"	3/4	-23D	-23	-23J

AN894
Female Straight
To Male 37 Degree



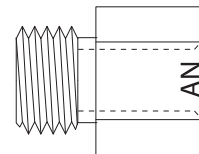
AN894, Female Straight to Male 37 Degree

Female portion to be sealed with boss O-ring or metal gasket.

FEMALE TUBE SIZE	MALE TUBE SIZE	MATERIAL		
		ALUMINUM	STEEL	STAINLESS
3/16	1/8	D3-2	-3-2	J3-2
1/4	1/8	D4-2	-4-2	J4-2
1/4	3/16	D4-3	-4-3	J4-3
5/16	1/4	D5-4	-5-4	J5-4
3/8	1/4	D6-4	-6-4	J6-4
3/8	5/16	D6-5	-6-5	J6-5
1/2	1/4	D8-4	-8-4	J8-4
1/2	5/16	D8-5	-8-5	J8-5
1/2	3/8	D8-6	-8-6	J8-6

Larger sizes of this part number are available. CALL US!

AN893
Female Straight
To Male Straight



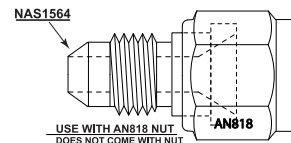
AN893, Female Straight to Male Straight

Both portions to be sealed with boss O-ring or metal gasket.

Female Tube Size	Male Tube Size	MATERIAL		
		ALUMINUM	STEEL	STAINLESS
1/4	5/16	-1D	-1	-1J
1/4	3/8	-2D	-2	-2J
1/4	1/2	-3D	-3	-3J
1/4	5/8	-31D	-31	-31J
5/16	3/8	-7D	-7	-7J
5/16	1/2	-8D	-8	-8J
5/16	5/8	-81D	-81	-81J
3/8	1/2	-12D	-12	-12J
3/8	5/8	-121D	-121	-121J
3/8	3/4	-13D	-13	-13J

Other sizes of this part number are available. CALL US!

NAS1564
Female 37 Degree
To Male 37 Degree



NAS1564, Female 37 Degree to Male 37 Degree

Use with AN818 nut of same size and material as female tube size.

Female Tube Size	Male Tube Size	MATERIAL		
		ALUMINUM	STEEL	STAINLESS
3/8	1/4	-6-4D	-6-4	-6-4J
1/2	1/4	-8-4D	-8-4	-8-4J
1/2	3/8	-8-6D	-8-6	-8-6J
5/8	3/8	-10-6D	-10-6	-10-6J
3/4	1/2	-12-8D	-12-8	-12-8J

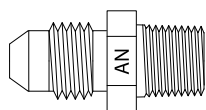
Other sizes of this part number are available. CALL US!

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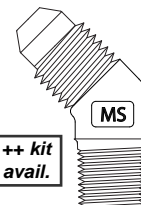
Hydraulic Fittings

Adapters, Pipe to 37 Degree Flare



++ kit avail.

Kits Available page 293 ++



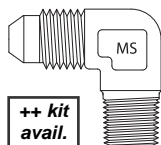
++ kit avail.

AN816, Pipe to Flare, Straight

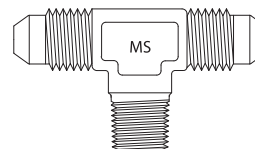
PIPE SIZE	TUBE SIZE	MATERIAL		
		ALUMINUM	STEEL	STAINLESS
1/8	1/8	- 2D	- 2	- 2J
1/8	3/16	- 3D	- 3	- 3J
1/8	1/4	- 4D	- 4	- 4J
1/4	1/4	- 4-4D	- 4-4	- 4-4J
1/8	5/16	- 5D	- 5	- 5J
1/4	5/16	- 5-4D	- 5-4	- 5-4J
1/8	3/8	- 6-2D	- 6-2	- 6-2J
1/4	3/8	- 6D	- 6	- 6J
3/8	3/8	- 6-6D	- 6-6	- 6-6J
1/4	1/2	- 7D	- 7	- 7J
3/8	1/2	- 8D	- 8	- 8J
1/2	5/8	- 10D	- 10	- 10J
3/4	5/8	- 10-12D	- 10-12	- 10-12J
1/2	3/4	- 12-8D	- 12-8	- 12-8J
3/4	3/4	- 12D	- 12	- 12J
1"	3/4	- 12-16D	- 12-16	- 12-16J
3/4	1"	- 16-12D	- 16-12	- 16-12J
1"	1"	- 16D	- 16	- 16J

MS20823, Pipe to Flare, 45 Degree

PIPE SIZE	TUBE SIZE	MATERIAL		
		ALUMINUM	STEEL	STAINLESS
1/8	1/8	- 2D	- 2	- 2J
1/8	3/16	- 3D	- 3	- 3J
1/8	1/4	- 4D	- 4	- 4J
1/8	5/16	- 5D	- 5	- 5J
1/4	3/8	- 6D	- 6	- 6J
3/8	1/2	- 8D	- 8	- 8J
1/2	5/8	- 10D	- 10	- 10J
3/4	3/4	- 12D	- 12	- 12J
3/4	1"	- 16-12D	- 16-12	- 16-12J
1"	1"	- 16D	- 16	- 16J



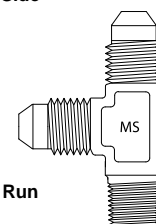
++ kit avail.



MS20825 Pipe On Side

MS20822, Pipe to Flare, 90 Degree

PIPE SIZE	TUBE SIZE	MATERIAL		
		ALUMINUM	STEEL	STAINLESS
1/8	1/8	- 2D	- 2	- 2J
1/8	3/16	- 3D	- 3	- 3J
1/8	1/4	- 4D	- 4	- 4J
1/4	1/4	- 4-4D	- 4-4	- 4-4J
1/8	5/16	- 5D	- 5	- 5J
1/4	5/16	- 5-4D	- 5-4	- 5-4J
1/8	3/8	- 6-2D	- 6-2	- 6-2J
1/4	3/8	- 6D	- 6	- 6J
3/8	3/8	- 6-6D	- 6-6	- 6-6J
3/8	1/2	- 8D	- 8	- 8J
1/2	5/8	- 10D	- 10	- 10J
3/4	5/8	- 10-12D	- 10-12	- 10-12J
1/2	3/4	- 12-8D	- 12-8	- 12-8J
3/4	3/4	- 12D	- 12	- 12J
1"	3/4	- 12-16D	- 12-16	- 12-16J
3/4	1"	- 16-12D	- 16-12	- 16-12J
1"	1"	- 16D	- 16	- 16J



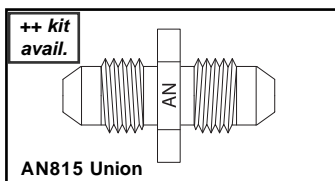
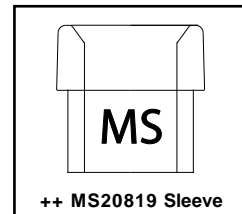
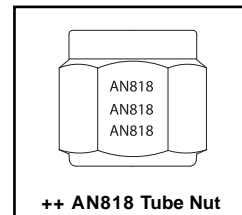
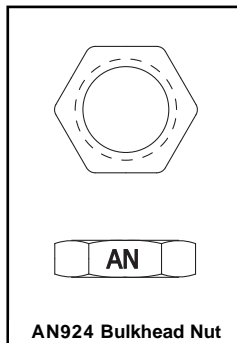
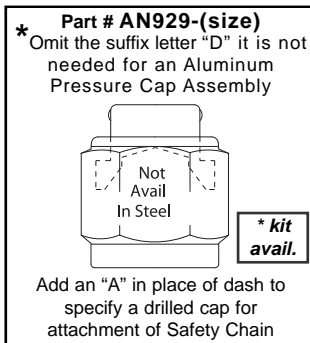
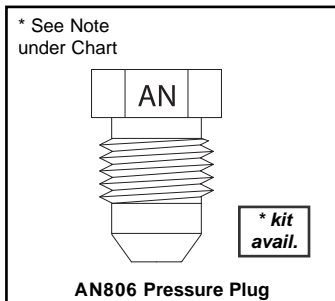
MS20826 Pipe On Run

MS20825 and MS20826, Adapter Tees

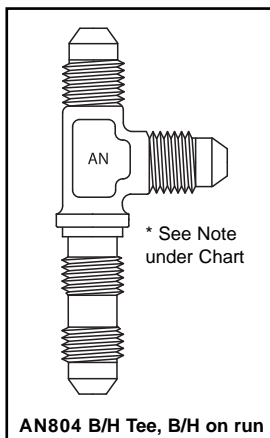
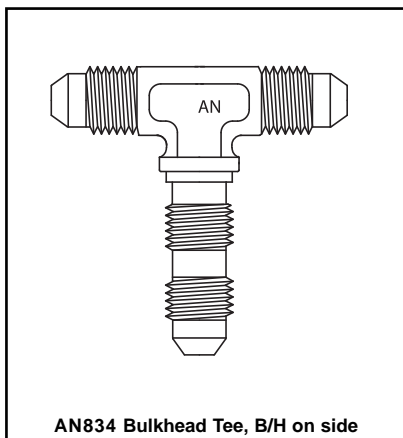
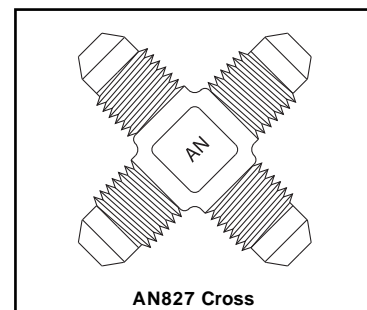
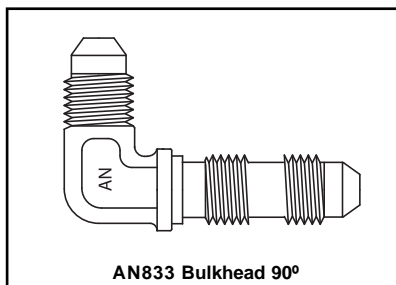
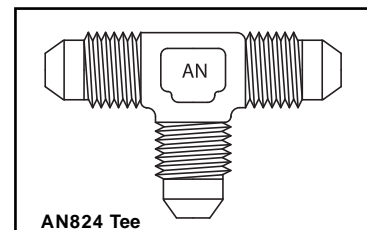
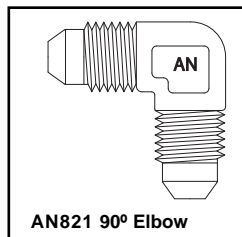
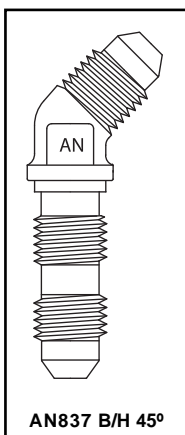
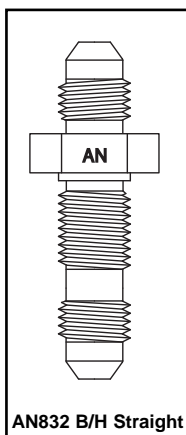
PIPE SIZE	TUBE SIZE	MATERIAL		
		ALUMINUM	STEEL	STAINLESS
1/8	1/8	- 2D	- 2	- 2J
1/8	3/16	- 3D	- 3	- 3J
1/8	1/4	- 4D	- 4	- 4J
1/8	5/16	- 5D	- 5	- 5J
1/4	3/8	- 6D	- 6	- 6J
3/8	1/2	- 8D	- 8	- 8J
1/2	5/8	- 10D	- 10	- 10J
3/4	3/4	- 12D	- 12	- 12J
3/4	1"	- 16-12D	- 16-12	- 16-12J
1"	1"	- 16D	- 16	- 16J

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Hydraulic Fittings Adapters, 37 Degree Flare



Kits Available page 293++, 294*



Fittings, 37 degree To 37 degree

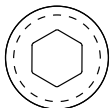
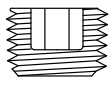
TUBE SIZE	MATERIAL		
	*ALUMINUM	STEEL	STAINLESS
1/8	- 2D	- 2	- 2J
3/16	- 3D	- 3	- 3J
1/4	- 4D	- 4	- 4J
5/16	- 5D	- 5	- 5J
3/8	- 6D	- 6	- 6J
1/2	- 8D	- 8	- 8J
5/8	- 10D	- 10	- 10J
3/4	- 12D	- 12	- 12J
1"	- 16D	- 16	- 16J

Note: for AN804 & AN806 the material code is directly after the item# I.E. AN804D4=Aluminum, AN804-4=Steel, AN804J4= SS

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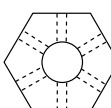
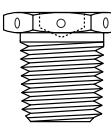
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Hydraulic Fittings Pipe, Plugs and Unions

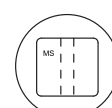
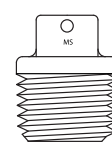



MS27769

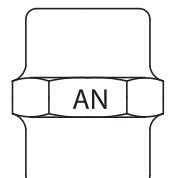
MS27769 Hex Plug REPLACES AN932				
NPT SIZE	MATERIAL			
	ALUM.	BRASS (Copper Alloy)	STEEL	CRES.
1/16	- 1D	- 1C	- 1	- 1S
1/8	- 2D	- 2C	- 2	- 2S
1/4	- 3D	- 3C	- 3	- 3S
3/8	- 4D	- 4C	- 4	- 4S
1/2	- 5D	- 5C	- 5	- 5S
3/4	- 6D	- 6C	- 6	- 6S
1"	- 7D	- 7C	- 7	- 7S

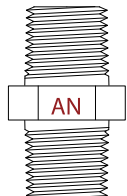
AN933 Ext Hex Plug

**MS20913 Sq Plug
REPLACES AN913**

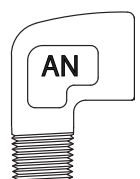


AN910 Female Straight

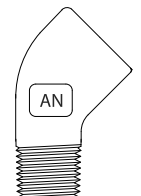


AN911 Male Straight

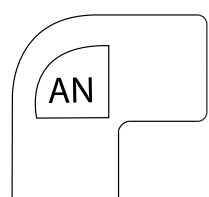
NPT SIZE	MATERIALS / note: Brass is a Copper Alloy			
	ALUMINUM	STEEL	BRASS	STAINLESS
1/16	- 0D	- 0S	- 0	- 0J
1/8	- 1D	- 1S	- 1	- 1J
1/4	- 2D	- 2S	- 2	- 2J
3/8	- 3D	- 3S	- 3	- 3J
1/2	- 4D	- 4S	- 4	- 4J
3/4	- 6D	- 6S	- 5	- 6J
1"	- 8D	- 8S	- 8	- 8J



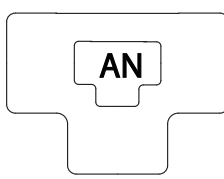
AN914 M/F 90 Degree



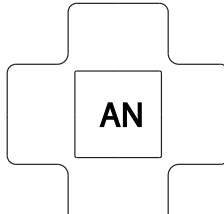
AN915 M/F 45 Degree



AN916 Female 90 Degree



AN917 Female Tee

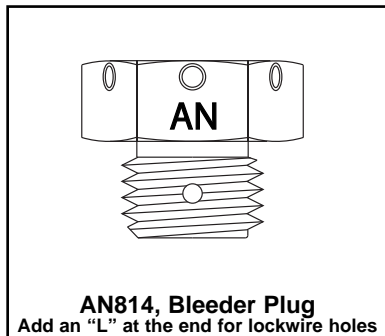


AN918 Female Cross

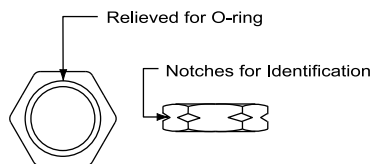
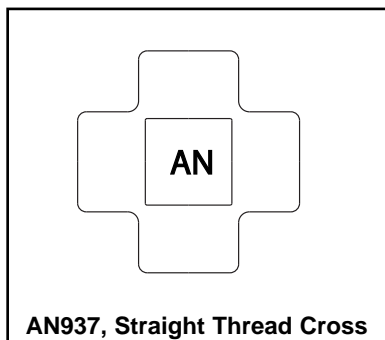
NPT SIZE	MATERIALS / note: Brass is a Copper Alloy		
	ALUM.	BRASS	CRES.
1/8	- 1D	- 1	- 1J
1/4	- 2D	- 2	- 2J
3/8	- 3D	- 3	- 3J
1/2	- 4D	- 4	- 4J
3/4	- 6D	- 6	- 6J
1"	- 8D	- 8	- 8J

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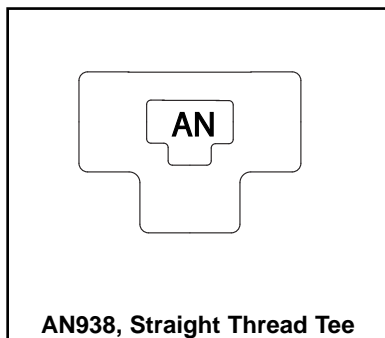
Hydraulic Fittings Straight Threads, O-ring Sealing Type



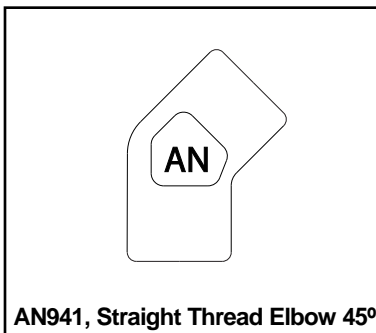
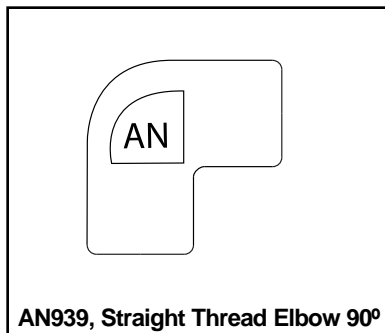
AN814, PLUG STRAIGHT THREADS, O-ring Sealing Type				
TUBE SIZE	THREAD SIZE	MATERIAL		
		ALUMINUM	STEEL	STAINLESS
1/8	5/16-24	-2D	-2	-2J
3/16	3/8-24	-3D	-3	-3J
1/4	7/16-20	-4D	-4	-4J
5/16	1/2-20	-5D	-5	-5J
3/8	9/16-18	-6D	-6	-6J
1/2	3/4-16	-8D	-8	-8J
5/8	7/8-14	-10D	-10	-10J
3/4	1+1/6-12	-12D	-12	-12J
1"	1+5/16-12	-16D	-16	-16J



AN6289 B/H Nut



FITTINGS, STRAIGHT THREADS, O-ring Sealing Type				
TUBE SIZE	THREAD SIZE	MATERIAL		
		ALUMINUM	STEEL	STAINLESS
1/4	7/16-20	D4	-4	J4
5/16	1/2-20	D5	-5	J5
3/8	9/16-18	D6	-6	J6
1/2	3/4-16	D8	-8	J8
5/8	7/8-14	D10	-10	J10
3/4	1+1/6-12	D12	-12	J12
1"	1+5/16-12	D16	-16	J16

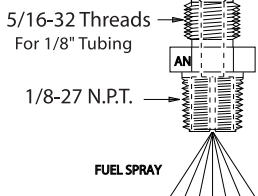


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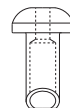
Hydraulic Fittings Primer / Oxygen, Weld Bungs, Hose Nipples

PRIMER / OXYGEN HDWR			
FOR TUBE O.D.	MATERIAL		
	BRASS PLATED	BRASS	CRES
		UNPLATED	
1/8	P2	-2	C2
3/16	P3	-3	C3
1/4	P4	-4	C4

For larger sizes use 37 degree flare



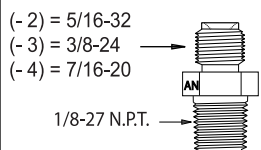
AN4022-1, Primer Nozzle



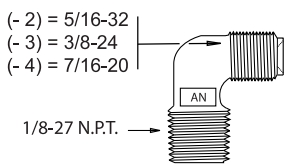
AN800, CONE
SOLDER / BRAZE



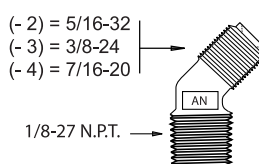
AN805, NUT
USE ONLY WITH AN800 CONE



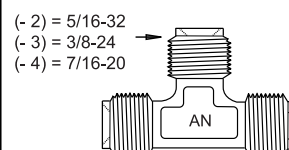
AN780-(x), Straight



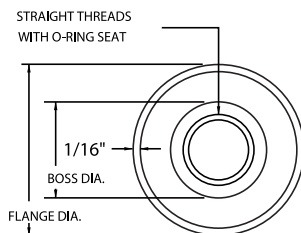
AN790 -(x), 90° Elbow



AN791-(x), 45° Elbow

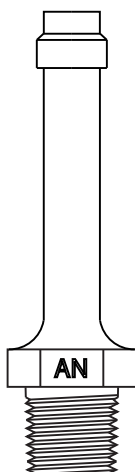


AN795-(x), Tee

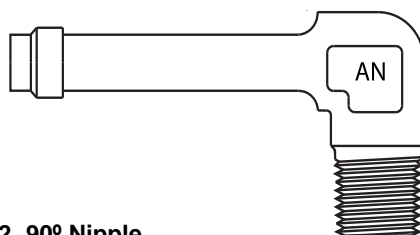


AN871 Welding Bung

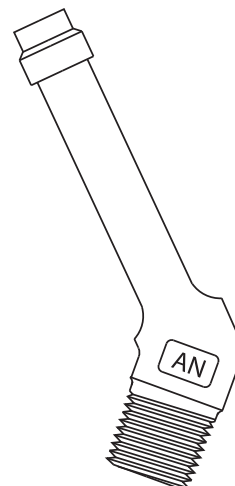
AN871, WELDING BUNG, STRAIGHT THREADS				HEIGHT NOT SHOWN	BOSS DIA. BOTH	THREAD DIA. PITCH
TUBE SIZE	MATERIAL		FLANGE DIA.			
	ALUMINUM	STEEL				
1/4	- 4D	- 4	1.437	.593	.750	7/16-20
3/8	- 6D	- 6	1.562	.593	.875	9/16-18
1/2	- 8D	- 8	1.750	.687	1.062	3/4-16
5/8	- 10D	- 10	1.875	.750	1.187	7/8-14
3/4	- 12D	- 12	2.000	.906	1.437	1+1/16-1



AN840 Straight Nipple



AN842 90° Nipple



AN844 45° Nipple

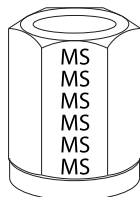
PIPE TO HOSE FITTINGS				
NPT MALE	HOSE I.D.	MATERIAL		
		ALUMINUM	BRASS	STEEL
1/8	1/4	- 4D	- 4	- 4S
1/4	3/8	- 6D	- 6	- 6S
3/8	1/2	- 8D	- 8	- 8S
1/2	5/8	- 10D	- 10	- 10S
3/4	3/4	- 12D	- 12	- 12S
3/4	1"	- 16D	- 16	- 16S

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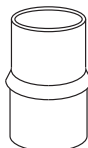
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Hydraulic Fittings

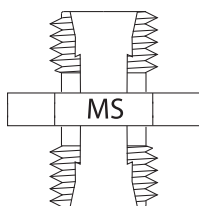
Flareless, Tube Fittings and Adapters



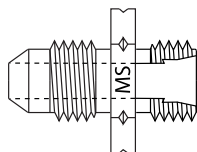
MS21921, Flareless Nut



MS21922, Flareless Sleeve



MS21902, Flareless Union



MS21900, 37° Flare to Flareless

Flareless Tube Fittings Size Chart				
TUBE SIZE	MATERIAL			
	Applicable to all MS Fittings, except use (17-4PH) for <u>SS Sleeves</u>			MS21922-?C <u>SS Sleeves</u>
	ALUMINUM	STEEL	SS (304)	SS (17-4PH)
1/8	D2	-2	J2	-2C
3/16	D3	-3	J3	-3C
1/4	D4	-4	J4	-4C
5/16	D5	-5	J5	-5C
3/8	D6	-6	J6	-6C
1/2	D8	-8	J8	-8C
5/8	D10	-10	J10	-10C
3/4	D12	-12	J12	-12C

Other Flareless Fittings Not Shown			
MS21904	Elbow	Union	90 Degree
MS21905	Tee	Union	FL/FL/FL
MS21906	Cross	Union	FL/FL/FL/FL
MS21907	Bulkhead	Union	45 Degree
MS21908	Bulkhead	Union	90 Degree
MS21909	Bulkhead	Tee	B/H on Side
MS21910	B/H Tee	Fem Boss on Side, B/H on Run	
MS21911	B/H Tee	Fem Boss on Run, B/H on Run	
MS21912	Bulkhead	Tee	B/H on Run
MS21913	Plug	Male	Pressure
MS21914	Cap	Female	Pressure
MS21915	Fem/Male	Reducer	1st - # Fem, 2nd - # Male
MS21916	Male/Male	Reducer	1st - # Large, 2nd - # Small
MS21924	Bulkhead	Union	Straight

Preset Tools for MS21922 / Flareless Bite Type Sleeves. *Instructions from manufacturer are included*

These come in individual sizes for pre-setting from as small as -2, up to -24 Sleeves onto 1/8" to 1&1/2" tubing. The Part#'s are respective of the size of tubing.

For the 1/2" Tubing dia. preset tool, order # **NAFPT-8**

We stock the -3,-4,-5,-6,-8,-10 & -12, (Other sizes may be Available.)









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Drain Valves made by the **Curtis Superior Valve Company** have long been the standard for quality and reliability. They are all manufactured to precise standards and applicable specifications. Shown below are some of the more popular valves we stock. We have these available and many more. For a complete listing of all the valves manufactured by Curtis Superior Valve visit their website listed at the bottom of the page.

<p style="text-align: center;">CCA-1550</p>  <p style="text-align: center;">Thread Size - 1/8" NPT Brass Length - 1.358" Action - Push to Open, Turn to Lock Open Conforms To: USAF Spec. 28208, USAF 49F9798-49 NSN 2915-00-202-6420 TSO-C76</p>	<p style="text-align: center;">CCA-1600</p>  <p style="text-align: center;">Thread Size - 1/4" NPT Brass Length - 1.690" Action - Push to Open, Turn to Lock Open Conforms To: USAF Spec. 28208, USAF 49F9798-50 NSN 4820-00-903-6953 TSO-C76</p>	<p style="text-align: center;">CCA-1650</p>  <p style="text-align: center;">Thread Size - 3/8" NPT Brass Length - 1.920" Action - Push to Open, Turn to Lock Open Conforms To: USAF Spec. 28208, USAF 49F9798-51, TSO-C76</p>
<p style="text-align: center;">CCA-3400</p>  <p style="text-align: center;">1/2" I.D. Hose Brass Length - 1.643" Action - Spiral, Lock Open Conforms Functionally To: USAF Spec. 28208, MIL-V-25023, NSN 2915-00-533-6592 TSO-C76</p>	<p style="text-align: center;">CCA-39550</p>  <p style="text-align: center;">Thread Size - 5/8" - 18 NF3 Brass Length - 1.625" Lock wire drilled Action - Spiral, Lock Open TSO-C76</p>	<p style="text-align: center;">CCB-37000</p>  <p style="text-align: center;">Thread Size - 1/2" NPT Brass Body Length - 2.128" Stem Length - 1.125" Lock-wire drilled Action - Push to Open, Turn to Lock Open Conforms Functionally To: USAF Spec. 28208, MIL-V-25023 TSO-C76</p>

www.CurtisSuperiorValve.com

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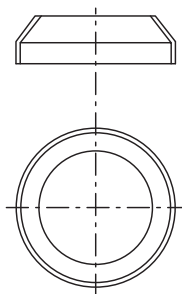
Conical Seals

AS4824 CONICAL SEAL - FLARED FITTING

These parts are for use on AN/MS and 37Deg. JIC flared fittings with cone ends per MS33656, MS33657, MS24385 and/or MS24386, when mated with the 37Deg. fitting / tubing cone end, to eliminate leakage due to scratches or poor finish on the sealing surface. Use when component replacement is impractical or cost prohibitive.

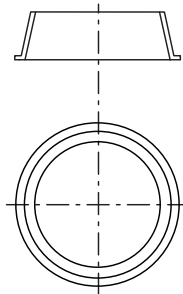
Kits Available page 296

AS4824



For 37 degree Flared Fittings

AS4825



For MS Flareless Fittings

Selection of Part Numbers

AS482 (4 or 5) (Material) (Ftg Size)

Example: AS4824N04

Conical seal for -4 flared end, material, Aluminum.

Please note that to designate a size for fittings -2 thru -8 please omit the dash and replace it with a 0 (zero). For the sizes above that just omit the dash

AS4825 TAPERED SEAL - FLARELESS FITTING

These parts are for use on MS and AS flareless fittings with ends per AS33514, AS33515, MS33514, or MS33515, when mated with the Flareless Nut and Sleeve or appropriate fitting / end, to eliminate leakage due to scratches or poor finish on the sealing surface. Use when component replacement is impractical or cost prohibitive.

SEAL SELECTION

- 1) Determine the End Style of the fitting you are working with Flared, or Flareless.
- 2) Select a seal material compatible with the fitting, Tubing and Fluids being used.
- 3) Determine the End Size of the fitting, see the chart, based on the thread size.

Note: Use only if all component materials and fluids or gasses are known to be compatible with one another. For one time use only; discard and replace upon reassembly.

Hydraulic Fitting Dash Number to Thread Size Chart								
-2	-3	-4	-5	-6	-8	-10	-12	-16
5/16-24	3/8-24	7/16-20	1/2-20	9/16-18	3/4-16	7/8-14	1+1/16-12	1+5/16-12

Note, the AS4825 is not available in -2 or -3 sizes

Material Codes For Conical Seals / Flare Savers, Identification and Availability.				
Seal Type	Aluminum	Copper	Stainless	Nickel
AS4824, (Flared)	A	C	S	N
AS4825 (Flareless)	A	Not available		N

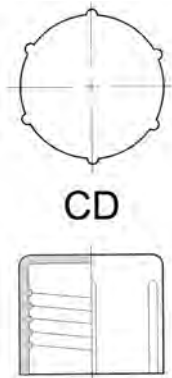
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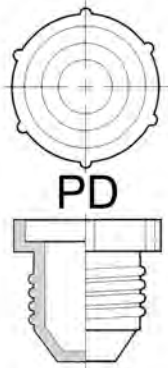
Plastic Caps and Plugs

Low Density Polyethylene / Red

Kits Available, pages 294 & 295



CD



PD



PDE

Female caps fit over 37 Deg. male fittings and externally threaded flareless fittings. Male plugs fit into female 37 Deg. fittings.

These assemble into MS flareless nuts.

Plastic Cap / Plug, Selection Chart

Thread Size	Fitting / Tube Size	AN Flared		MS Flareless		Standard Package
		Female Part #	Male Part #	Female Part #	Male Part #	
5/16-24	-2 AN or Flareless MS	EC-5	PD20	EC-5	N/A	10
3/8-24	-3 AN or Flareless MS	CD3	PD30	CD3	PDE-3	25
7/16-20	-4 AN or Flareless MS	CD4	PD40	CD4	PDE-4	25
1/2-20	-5 AN or Flareless MS	CD5	PD50	CD5	PDE-5	10
9/16-18	-6 AN or Flareless MS	CD6	PD60	CD6	PDE-6	10
5/8-18	-6 SAE	CD6A	PD65	N/A	N/A	10
3/4-16	-8 AN or Flareless MS	CD8	PD80	CD8	PDE-8	10
7/8-14	-10 AN or Flareless MS	CD10	PD100	CD10	PDE-10	5
1+1/16-12	-12 AN or Flareless MS	CD12	PD120	CD12	PDE-12	5
1+5/16-12	-16 AN or Flareless MS	CD16	PD160	CD16	PDE-16	5

Special Purpose Plastic Protectors

Part #

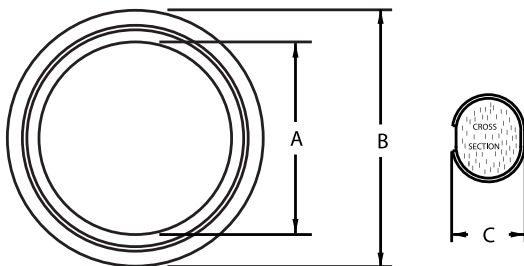
Standard Crankshaft Cap for Aircraft Engines, Yellow Polyethylene.	EP-36	5
Grease Fitting Protective Cap. Polyethylene	GC-5	100
Aircraft Spark Plug Hole Plug. Polyethylene.	18MM X 1.5 PLUG	25

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MS35769 Series

Copper-Non Asbestos Fiber Filler, Crush Gaskets, replaces AN900 series

ORDER BY MS35769 NUMBER



OLD AN900 Dash #	MS 35769 Dash #	Tolerance + 1/64, -0 A Inside Diameter	Tolerance + 0, -1/64 B Outside Diameter	Tolerance + or - 1/64 C Thickness
6	6	3/8	5/8	3/32
7	8	7/16	11/16	3/32
8	9	1/2	3/4	3/32
9	10	9/16	13/16	3/32
10	11	5/8	7/8	3/32
11	13	11/16	15/16	3/32
12	15	3/4	1"	3/32
13	17	13/16	1 1/16	3/32
14	18	7/8	1 1/8	3/32
15	20	15/16	1 3/16	3/32
16	21	1"	1 1/4	3/32
17	24	1 1/16	1 5/16	3/32
18	26	1 1/8	1 3/8	3/32
19	29	1 3/16	1 7/16	3/32
20	31	1 1/4	1 1/2	3/32
21	33	1 5/16	1 9/16	3/32
22	35	1 3/8	1 5/8	3/32
23	38	1 7/16	1 11/16	3/32
24	39	1 1/2	1 3/4	3/32
25	41	1 9/16	1 13/16	3/32
26	42	1 5/8	1 7/8	3/32
27	46	1 11/16	1 15/16	3/32
28	48	1 3/4	2"	3/32
29	51	1 13/16	2 1/16	3/32
30	52	1 7/8	2 1/8	3/32
31	54	1 15/16	2 3/16	3/32
32	55	2"	2 1/4	3/32

O-Rings Specifications and Properties

To select a suitable replacement O-ring:

- 1) Always try to obtain recommended part # from manufacturers parts manual or service documentation.
 - 2) Call equipment manufacturer or an FAA-DER (designated engineering representative) for a recommended replacement O-ring part #.
 - 3) Only after steps 1 and 2 listed above have completely failed, select an O-ring part # from this chart that will meet your requirements.
 - a) Determine if it is a Boss (B) or a Standard (A) size O-ring.
 - b) Determine what fluid compatibility is necessary.
 - c) Determine that the temperature range is acceptable.
- Durometer is also a factor (60 = squishy, 90 = hard). To select the last dash # see charts "A" or "B" on the following pages for dimensions.

Part Numbers	Sizing Chart	Specification / Material	Durometer	Temperature	Application, Compatibility / Sizing
MS 28775-(XXX)	A	MIL-P-25732 / Nitrile	70	-65 Thru +275 deg F.	Aircraft hydraulic fluid MIL-H-5606 / Standard sizes
MS 29651-3-(XXX)	A	MIL-P-5315 / Nitrile	65	-65 Thru +200 deg F.	Aircraft fuels / Standard sizes
MS 9021-(XXX)	A	AMS1271 / Nitrile	65	-65 Thru +225 deg F.	Aircraft fuels / Standard sizes
MS 29661-(XXX)	A	MIL-R-7362 Type 1 / Nitrile	75	-65 Thru +250 deg F.	Aircraft lubricating oil MIL-L-7808 / Standard sizes
MS 29681-(XXX)	A	MIL-R-25988 Class 1 / Fluoro-silicone	70	-80 Thru +400 deg F.	Petroleum oil and fuel, static seals / Standard sizes
MS 29682-(XXX)	A	MIL-R-25988 Class 1 / Fluoro-silicone	60	-80 Thru +400 deg F.	Petroleum oil and fuel, static seals / Standard sizes
MS 1593-(XXX)	A	MIL-R-25897 Class 1 / Viton	75	-40 Thru +450 deg F.	Pneumatic, Hydraulic, Fuel / Standard sizes
MS 1594-(XXX)	A	MIL-R-25897 Class 1 / Viton	90	-40 Thru +450 deg F.	Pneumatic, Hydraulic, Fuel / Standard sizes
MS 28778-(XX)	B	MIL-P-5510 / Nitrile	90	-65 Thru +200 deg F.	Aircraft hydraulic fluid MIL-H-5606 / Boss sizes
MS 29512-(XX)	B	MIL-P-5315 / Nitrile	65	-65 Thru +200 deg F.	Aircraft fuels / Boss sizes
MS 9020-(XX)	B	AMS1271 / Nitrile	65	-65 Thru +225 deg F.	Aircraft fuels / Boss sizes
MS 617-(XX)	B	MIL-R-7362 Type 1 / Nitrile	75	-65 Thru +250 deg F.	Aircraft lubricating oil MIL-L-7808 / Boss sizes
MS 29681-9-(XX)	B	MIL-R-25988 Class 1 / Fluoro-silicone	70	-80 Thru +400 deg F.	Petroleum oil and fuel, static seals / Boss sizes
MS 29682-9-(XX)	B	MIL-R-25988 Class 1 / Fluoro-silicone	60	-80 Thru +400 deg F.	Petroleum oil and fuel, static seals / Boss sizes
MS 1595-(XX)	B	MIL-R-25897 Class 1 / Viton	75	-40 Thru +450 deg F.	Pneumatic, Hydraulic, Fuel / Boss sizes
MS 1596-(XX)	B	MIL-R-25897 Class 1 / Viton	90	-40 Thru +450 deg F.	Pneumatic, Hydraulic, Fuel / Boss sizes

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O-Rings

Static Boss Packing for Tube Fittings MS28778 for (HYD) / MS29512 for (FUEL)

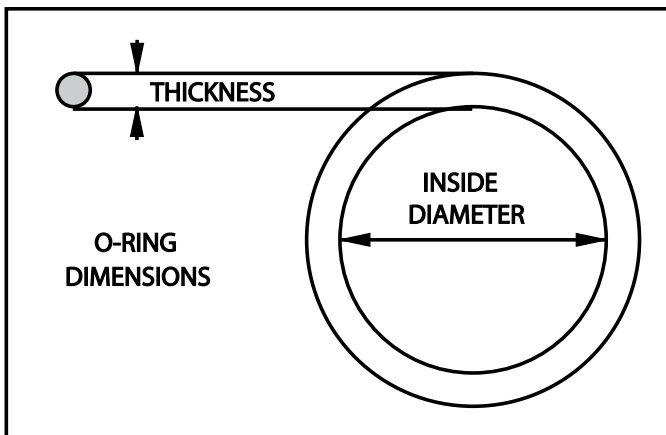
These use "B" series chart, for sizing.

MS28778 Series

For use in static applications with aircraft hydraulic fluid, Mil-H-5606
Made from compound per Mil-P-5510
For service temperatures of -65 Deg. to +200 Deg. F.

MS29512 Series

For use in static applications with hydrocarbon fuels, JP-4. JP-5
Made from compound per Mil-P-5315
For service temperatures of -65 Deg. to +200 Deg. F.



" B " Series Chart
NOTE: all dimensions in inches

* When sizing the series MS9020, MS29512, M25988, place a zero in front of the single digit size numbers. Example: -2 should be -.02.

FITTING SIZE or "B" Series Size (XX)*	TUBING OUTSIDE DIAMETER	O-RING THICKNESS	TOLERANCE FOR THICKNESS	O-RING INSIDE DIAMETER	TOLERANCE FOR O-RING I.D.	
2	1/8	.064	+ OR -.003	.239	+ OR -.005	
3	3/16			.301		
4	1/4	.072		.351		
5	5/16			.414		
6	3/8	.078		.468		
8	1/2	.087		.644		
10	5/8	.097		.755		
12	3/4	.116	+ OR -.004	.924	+ OR -.006	
14	7/8			1.047		
16	1"			1.171		
20	1"+1/4	.118		1.475		+ OR -.010
24	1"+1/2			1.720		
28	1"+3/4			2.090		
32	2"		2.337			

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O-Rings

Dynamic (Actuator), and Static (Gland)

MS28775 for Hydraulic Service with Mil-H-5606

ORDER by the MS28775 number; use the "A" series chart for sizing.

Example MS28775-(XXX), * = static use only, ns = non standard

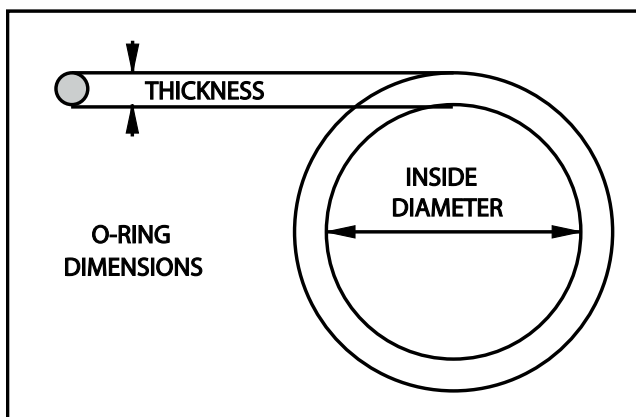
MS28775 series

For use in static and dynamic applications with aircraft hydraulic fluid, Mil-H-5606

Made from compound per Mil-P27532

For service temperatures of -65 Deg. to +275 Deg. F.

REPLACES AN6227 and AN6230 series.



"A" Series Chart

NOTE: All dimensions in inches

MS28775-(XXX) "A" SERIES CHART SIZE (XXX)	OLD AN6227 OR AN6230 #	O-RING THICKNESS	TOLERANCE THICKNESS + OR -	O-RING INSIDE DIAMETER	TOLERANCE O-RING I.D. + OR -
-001 *		.040	.003	0.029	0.004
-002 *		.050	.003	0.042	0.004
-003 *		.060	.003	0.056	0.004
-004		.070	.003	0.070	0.005
-005		.070	.003	0.101	0.005
-006	AN6227-1	.070	.003	0.114	0.005
-007	AN6227-2	.070	.003	0.145	0.005
-008	AN6227-3	.070	.003	0.177	0.005
-009	AN6227-4	.070	.003	0.208	0.005
-010	AN6227-5	.070	.003	0.239	0.005
-011	AN6227-6	.070	.003	0.301	0.005
-012	AN6227-7	.070	.003	0.364	0.005

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O-Rings

Dynamic (Actuator), and Static (Gland)
MS28775 for Hydraulic Service with Mil-H-5606

ORDER by the MS28775 number; use the "A" series chart for sizing.

Example MS28775-(XXX), * = static use only, ns = non standard

MS28775-(XXX) "A" SERIES CHART SIZE (XXX)	OLD AN6227 OR AN6230 #	O-RING THICKNESS	TOLERANCE THICKNESS + OR -	O-RING INSIDE DIAMETER	TOLERANCE O-RING I.D. + OR -
-013 *	* = Static Only	.070	.003	0.426	0.005
-014 *	* = Static Only	.070	.003	0.489	0.005
-015 *	* = Static Only	.070	.003	0.551	0.005
-016 *	* = Static Only	.070	.003	0.614	0.005
-017 *	* = Static Only	.070	.003	0.676	0.005
-018 *	* = Static Only	.070	.003	0.739	0.005
-019 *	* = Static Only	.070	.003	0.801	0.006
-020 *	* = Static Only	.070	.003	0.864	0.006
-021 *	* = Static Only	.070	.003	0.926	0.006
-022 *	* = Static Only	.070	.003	0.989	0.006
-023 *	* = Static Only	.070	.003	1.051	0.006
-024 *	* = Static Only	.070	.003	1.114	0.006
-025 *	* = Static Only	.070	.003	1.176	0.006
-026 *	* = Static Only	.070	.003	1.239	0.006
-027 *	* = Static Only	.070	.003	1.301	0.006
-028 *	* = Static Only	.070	.003	1.364	0.006
-029 ns *	* = Static Only	.070	.003	1.489	0.010
-030 ns *	* = Static Only	.070	.003	1.614	0.010
-031 ns *	* = Static Only	.070	.003	1.739	0.010
-032 ns *	* = Static Only	.070	.003	1.864	0.010
-033 ns *	* = Static Only	.070	.003	1.989	0.010
-034 ns *	* = Static Only	.070	.003	2.114	0.010
-035 ns *	* = Static Only	.070	.003	2.239	0.010
-036 ns *	* = Static Only	.070	.003	2.364	0.010
-037 ns *	* = Static Only	.070	.003	2.489	0.010
-038 ns *	* = Static Only	.070	.003	2.614	0.010

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O-Rings

Dynamic (Actuator), and Static (Gland)

MS28775 for Hydraulic Service with Mil-H-5606

ORDER by the MS28775 number; use the "A" series chart for sizing.

Example MS28775-(XXX), * = static use only, ns = non standard

MS28775-(XXX) "A" SERIES CHART SIZE (XXX)	OLD AN6227 OR AN6230 #	O-RING THICKNESS	TOLERANCE THICKNESS + OR -	O-RING INSIDE DIAMETER	TOLERANCE O-RING I.D. + OR -
-039 ns *	* = Static Only	.070	.003	2.739	0.015
-040 ns *	* = Static Only	.070	.003	2.864	0.015
-041 ns *	* = Static Only	.070	.003	2.989	0.015
-042 ns *	* = Static Only	.070	.003	3.239	0.015
-043 ns *	* = Static Only	.070	.003	3.489	0.015
-044 ns *	* = Static Only	.070	.003	3.739	0.015
-045 ns *	* = Static Only	.070	.003	3.989	0.015
-046 ns *	* = Static Only	.070	.003	4.239	0.015
-047 ns *	* = Static Only	.070	.003	4.489	0.015
-048 ns *	* = Static Only	.070	.003	4.739	0.015
-049 ns *	* = Static Only	.070	.003	4.989	0.023
-050 ns *	* = Static Only	.070	.003	5.239	0.023
-110	AN6227-8	.103	.003	0.362	0.005
-111	AN6227-9	.103	.003	0.424	0.005
-112	AN6227-10	.103	.003	0.487	0.005
-113	AN6227-11	.103	.003	0.549	0.005
-114	AN6227-12	.103	.003	0.612	0.005
-115	AN6227-13	.103	.003	0.674	0.005
-116	AN6227-14	.103	.003	0.737	0.005
-117 *	* = Static Only	.103	.003	0.799	0.006
-118 *	* = Static Only	.103	.003	0.862	0.006
-119 *	* = Static Only	.103	.003	0.924	0.006
-120 *	* = Static Only	.103	.003	0.987	0.006
-121 *	* = Static Only	.103	.003	1.049	0.006
-122 *	* = Static Only	.103	.003	1.112	0.006
-123 *	* = Static Only	.103	.003	1.174	0.006

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O-Rings

Dynamic (Actuator), and Static (Gland)

MS28775 for Hydraulic Service with Mil-H-5606

ORDER by the MS28775 number; use the "A" series chart for sizing.

Example MS28775-(XXX), * = static use only, ns = non standard

MS28775-(XXX) "A" SERIES CHART SIZE (XXX)	OLD AN6227 OR AN6230 #	O-RING THICKNESS	TOLERANCE THICKNESS + OR -	O-RING INSIDE DIAMETER	TOLERANCE O-RING I.D. + OR -
-124 *	* = Static Only	.103	.003	1.237	0.006
-125 *	* = Static Only	.103	.003	1.299	0.006
-126 *	* = Static Only	.103	.003	1.362	0.006
-127 *	* = Static Only	.103	.003	1.424	0.006
-128 *	* = Static Only	.103	.003	1.487	0.006
-129 *	* = Static Only	.103	.003	1.549	0.010
-130 *	* = Static Only	.103	.003	1.612	0.010
-131 *	* = Static Only	.103	.003	1.674	0.010
-132 *	* = Static Only	.103	.003	1.737	0.010
-133 *	* = Static Only	.103	.003	1.799	0.010
-134 *	* = Static Only	.103	.003	1.862	0.010
-135 *	* = Static Only	.103	.003	1.925	0.010
-136 *	* = Static Only	.103	.003	1.987	0.010
-137 *	* = Static Only	.103	.003	2.050	0.010
-138 *	* = Static Only	.103	.003	2.112	0.010
-139 *	* = Static Only	.103	.003	2.175	0.010
-140 *	* = Static Only	.103	.003	2.237	0.010
-141 *	* = Static Only	.103	.003	2.300	0.010
-142 *	* = Static Only	.103	.003	2.362	0.010
-143 *	* = Static Only	.103	.003	2.425	0.010
-144 *	* = Static Only	.103	.003	2.487	0.010
-145 *	* = Static Only	.103	.003	2.550	0.010
-146 *	* = Static Only	.103	.003	2.612	0.010
-147 *	* = Static Only	.103	.003	2.675	0.015
-148 *	* = Static Only	.103	.003	2.737	0.015
-149 *	* = Static Only	.103	.003	2.800	0.015

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O-Rings

Dynamic (Actuator), and Static (Gland)

MS28775 for Hydraulic Service with Mil-H-5606

ORDER by the MS28775 number; use the "A" series chart for sizing.

Example MS28775-(XXX), * = static use only, ns = non standard

MS28775-(XXX) "A" SERIES CHART SIZE (XXX)	OLD AN6227 OR AN6230 #	O-RING THICKNESS	TOLERANCE THICKNESS + OR -	O-RING INSIDE DIAMETER	TOLERANCE O-RING I.D. + OR -
-150 ns *	* = Static Only	.103	.003	2.862	0.015
-151 ns *	* = Static Only	.103	.003	2.987	0.015
-152 ns *	* = Static Only	.103	.003	3.237	0.015
-153 ns *	* = Static Only	.103	.003	3.487	0.015
-154 ns *	* = Static Only	.103	.003	3.737	0.015
-155 ns *	* = Static Only	.103	.003	3.987	0.015
-156 ns *	* = Static Only	.103	.003	4.237	0.015
-157 ns *	* = Static Only	.103	.003	4.487	0.015
-158 ns *	* = Static Only	.103	.003	4.737	0.015
-159 ns *	* = Static Only	.103	.003	4.987	0.015
-160 ns *	* = Static Only	.103	.003	5.237	0.023
-161 ns *	* = Static Only	.103	.003	5.487	0.023
-162 ns *	* = Static Only	.103	.003	5.737	0.023
-163 ns *	* = Static Only	.103	.003	5.987	0.023
-210	AN6227-15	.139	.004	0.734	0.006
-211	AN6227-16	.139	.004	0.796	0.006
-212	AN6227-17	.139	.004	0.859	0.006
-213	AN6227-18	.139	.004	0.921	0.006
-214	AN6227-19	.139	.004	0.984	0.006
-215	AN6227-20	.139	.004	1.046	0.006
-216	AN6227-21	.139	.004	1.109	0.006
-217	AN6227-22	.139	.004	1.171	0.006
-218	AN6227-23	.139	.004	1.234	0.006
-219	AN6227-24	.139	.004	1.296	0.006
-220	AN6227-25	.139	.004	1.359	0.006
-221	AN6227-26	.139	.004	1.421	0.006

Genuine Aircraft Hardware Co.

O-Rings

Dynamic (Actuator), and Static (Gland)

MS28775 for Hydraulic Service with Mil-H-5606

ORDER by the MS28775 number; use the "A" series chart for sizing.

Example MS28775-(XXX), * = static use only, ns = non standard

MS28775-(XXX) "A" SERIES CHART SIZE (XXX)	OLD AN6227 OR AN6230 #	O-RING THICKNESS	TOLERANCE THICKNESS + OR -	O-RING INSIDE DIAMETER	TOLERANCE O-RING I.D. + OR -
-222	AN6227-27	.139	.004	1.484	0.010
-223 *	AN6230-1	.139	.004	1.609	0.010
-224 *	AN6230-2	.139	.004	1.734	0.010
-225 *	AN6230-3	.139	.004	1.859	0.010
-226 *	AN6230-4	.139	.004	1.984	0.010
-227 *	AN6230-5	.139	.004	2.109	0.010
-228 *	AN6230-6	.139	.004	2.234	0.010
-229 *	AN6230-7	.139	.004	2.359	0.010
-230 *	AN6230-8	.139	.004	2.484	0.010
-231 *	AN6230-9	.139	.004	2.609	0.010
-232 *	AN6230-10	.139	.004	2.734	0.015
-233 *	AN6230-11	.139	.004	2.859	0.015
-234 *	AN6230-12	.139	.004	2.984	0.015
-235 *	AN6230-13	.139	.004	3.109	0.015
-236 *	AN6230-14	.139	.004	3.234	0.015
-237 *	AN6230-15	.139	.004	3.359	0.015
-238 *	AN6230-16	.139	.004	3.484	0.015
-239 *	AN6230-17	.139	.004	3.609	0.015
-240 *	AN6230-18	.139	.004	3.734	0.015
-241 *	AN6230-19	.139	.004	3.859	0.015
-242 *	AN6230-20	.139	.004	3.984	0.015
-243 *	AN6230-21	.139	.004	4.109	0.015
-244 *	AN6230-22	.139	.004	4.234	0.015
-245 *	AN6230-23	.139	.004	4.359	0.015
-246 *	AN6230-24	.139	.004	4.484	0.015
-247 *	AN6230-25	.139	.004	4.609	0.015

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O-Rings

Dynamic (Actuator), and Static (Gland)

MS28775 for Hydraulic Service with Mil-H-5606

ORDER by the MS28775 number; use the "A" series chart for sizing.

Example MS28775-(XXX), * = static use only, ns = non standard

MS28775-(XXX) "A" SERIES CHART SIZE (XXX)	OLD AN6227 OR AN6230 #	O-RING THICKNESS	TOLERANCE THICKNESS + OR -	O-RING INSIDE DIAMETER	TOLERANCE O-RING I.D. + OR -
-248 ns *	AN6230-26	.139	.004	4.734	0.015
-249 ns *	AN6230-27	.139	.004	4.859	0.015
-250 ns *	AN6230-28	.139	.004	4.984	0.015
-251 ns *	AN6230-29	.139	.004	5.109	0.023
-252 ns *	AN6230-30	.139	.004	5.234	0.023
-253 ns *	AN6230-31	.139	.004	5.359	0.023
-254 ns *	AN6230-32	.139	.004	5.484	0.023
-255 ns *	AN6230-33	.139	.004	5.609	0.023
-256 ns *	AN6230-34	.139	.004	5.734	0.023
-257 ns *	AN6230-35	.139	.004	5.859	0.023
-258 ns *	AN6230-36	.139	.004	5.984	0.023
-325	AN6227-28	.210	.005	1.475	0.010
-326	AN6227-29	.210	.005	1.600	0.010
-327	AN6227-30	.210	.005	1.725	0.010
-328	AN6227-31	.210	.005	1.850	0.010
-329	AN6227-32	.210	.005	1.975	0.010
-330	AN6227-33	.210	.005	2.100	0.010
-331	AN6227-34	.210	.005	2.225	0.010
-332	AN6227-35	.210	.005	2.350	0.010
-333	AN6227-36	.210	.005	2.475	0.010
-334	AN6227-37	.210	.005	2.600	0.010
-335	AN6227-38	.210	.005	2.725	0.015
-336	AN6227-39	.210	.005	2.850	0.015
-337	AN6227-40	.210	.005	2.975	0.015
-338	AN6227-41	.210	.005	3.100	0.015
-339	AN6227-42	.210	.005	3.225	0.015

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O-Rings

Dynamic (Actuator), and Static (Gland)
MS28775 for Hydraulic Service with Mil-H-5606

ORDER by the MS28775 number; use the "A" series chart for sizing.

Example MS28775-(XXX), * = static use only, ns = non standard

MS28775-(XXX) "A" SERIES CHART SIZE (XXX)	OLD AN6227 OR AN6230 #	O-RING THICKNESS	TOLERANCE THICKNESS + OR -	O-RING INSIDE DIAMETER	TOLERANCE O-RING I.D. + OR -
-340	AN6227-43	.210	.005	3.350	0.015
-341	AN6227-44	.210	.005	3.475	0.015
-342	AN6227-45	.210	.005	3.600	0.015
-343	AN6227-46	.210	.005	3.725	0.015
-344	AN6227-47	.210	.005	3.850	0.015
-345	AN6227-48	.210	.005	3.975	0.015
-346	AN6227-49	.210	.005	4.100	0.015
-347	AN6227-50	.210	.005	4.225	0.015
-348	AN6227-51	.210	.005	4.350	0.015
-349	AN6227-52	.210	.005	4.475	0.015
-350 ns *	* = Static Only	.210	.005	4.600	0.015
-351 ns *	* = Static Only	.210	.005	4.725	0.015
-352 ns *	* = Static Only	.210	.005	4.850	0.015
-352 ns *	* = Static Only	.210	.005	4.850	0.015
-353 ns *	* = Static Only	.210	.005	4.975	0.015
-354 ns *	* = Static Only	.210	.005	5.100	0.023
-355 ns *	* = Static Only	.210	.005	5.225	0.023
-356 ns *	* = Static Only	.210	.005	5.350	0.023
-357 ns *	* = Static Only	.210	.005	5.475	0.023
-358 ns *	* = Static Only	.210	.005	5.600	0.023
-359 ns *	* = Static Only	.210	.005	5.725	0.023
-360 ns *	* = Static Only	.210	.005	5.850	0.023
-361 ns *	* = Static Only	.210	.005	5.975	0.023

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Hydraulic Hose Selection and Comparison Chart



MIL H 8794, Fuel, Oil, Hydraulic Hose



MIL H 5593 Instrument Hose

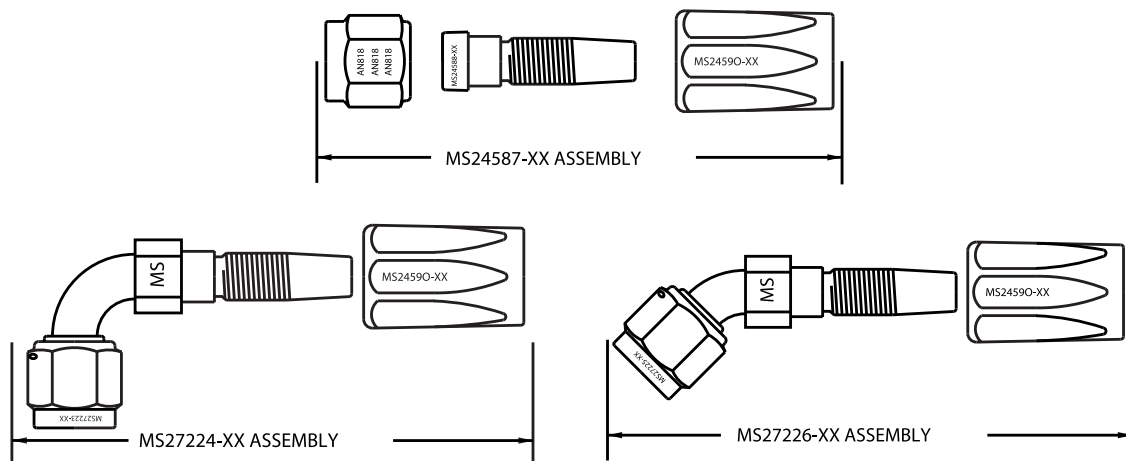
LPI = Low Pressure Instrument.
 MPH = Medium Pressure Hydraulic.
 *These hoses are compatible with commonly used fuel, oil, and coolants found in General Aviation.

MIL H (PART #)	TYPE	AEROGUIP #	STATOFLEX #	LINER	REINFORCEMENT	COVER	WORKING PSI	COMPATIBLE FITTINGS		
MIL H 5593-2	LPI	306-2	193-2	BUNA	NON METALLIC FIBER	SYNTHETIC RUBBER	300	MS 27404, Straight		
MIL H 5593-3	LPI	306-3	193-3				250			
MIL H 5593-4	LPI	306-4	193-4				200			
MIL H 5593-6	LPI	306-6	193-6				150			
MIL H 5593-8	LPI	306-8	193-8				150			
MIL H 5593-10	LPI	306-10	193-10				150			
MIL H 8794-3	MPH	303-3	111-3				3,000		STEEL WIRE	MS 24587, Straight
MIL H 8794-4	MPH	303-4	111-4				3,000			
MIL H 8794-5	MPH	303-5	111-5				3,000			
MIL H 8794-6	MPH	303-6	111-6				2,000			
MIL H 8794-8	MPH	303-8	111-8	2,000						
MIL H 8794-10	MPH	303-10	111-10	1,750						
MIL H 8794-12	MPH	303-12	111-12	1,500						
MIL H 8794-16	MPH	303-16	111-16	800						
MIL H 83796-4	MPH	AE701-4	176-4	1,500	IMPROVED ELASTOMER	STAINLESS STEEL WIRE				
MIL H 83796-6	MPH	AE701-6	176-6	1,500						
MIL H 83796-8	MPH	AE701-8	176-8	1,250						
MIL H 83796-10	MPH	AE701-10	176-10	1,250						
MIL H 83796-12	MPH	AE701-12	176-12	1,250						
MIL H 83796-12	MPH	AE701-12	176-12	1,250						

Genuine Aircraft Hardware Co.

Hose Fittings

FOR MIL H 8794 Specification Hose, Straight, 45 Deg., 90 Deg..



FITS THREAD SIZE	ASSEMBLY # Straight	ASSEMBLY # 90 Degree	ASSEMBLY # 45 Degree
3/8 - 24	MS 24587-3		
7/16 - 20	MS 24587-4	MS 27224-4	MS 27226-4
1/2 - 20	MS 24587-5	MS 27224-5	MS 27226-5
9/16 - 18	MS 24587-6	MS 27224-6	MS 27226-6
3/4 - 16	MS 24587-8	MS 27224-8	MS 27226-8
7/8 - 14	MS 24587-10	MS 27224-10	MS 27226-10
1+1/16 - 12	MS 24587-12	MS 27224-12	MS 27226-12

NOTES:

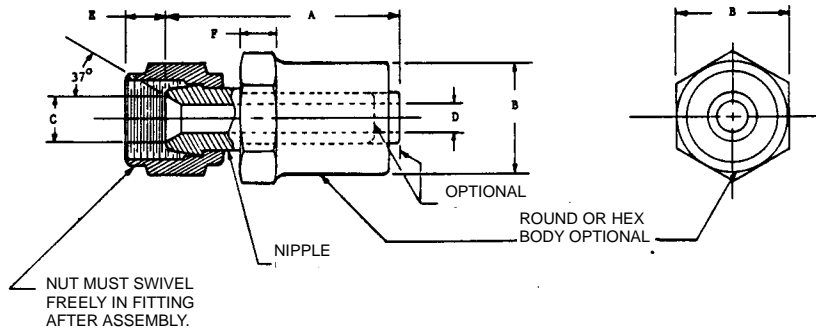
- 1) All fittings shown have steel nipples and nuts sizes -6 and smaller, -8 and larger are all aluminum.
- 2) All fittings shown use sockets part # MS24590-(XX). The (XX) corresponds with the fitting dash numbers.
- 3) All fittings shown on this page are designed for use only with hose meeting the specifications Mil-H-8794, commonly known as Aeroquip part # 303, or Stratoflex part # 111, or Deutsch part # 3H8794. They are all made to the same government specification.

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MS 27404

Adapter, Straight, Reusable, Tube to Hose, Low Pressure



MS PART NUMBER	HOSE ID	A MAX	B (a) MAX	C (b) +.008 -.000	D MIN	E +1/64 0	F MIN	NUT
MS27404-2	1/8	1+5/32	1/2	.189	.052	21/64	3/16	AN818-2
MS27404-3	3/16	1+7/32	9/16	.245	.109	5/16		AN818-3
MS27404-4	1/4	1+1/4	5/8	.295	.156	11/32		AN818-4
MS27404-6	3/8	1+5/8	13/16	.435	.281	3/8	1/4	AN818-6
MS27404-8	1/2	1+3/4	1	.570	.375	27/64		AN818-8
MS27404-10	5/8	1+7/8	1+1/8	.690	.453	1/2	5/16	AN818-10

- (a) Dimension B shall fit standard wrench opening.
 (b) Dimension C applies to machined parts only. Conical seat to be concentric with O.D. of nipple within .005 total indicator reading. When a flared tubing end is used the flare shall be in accordance with MS33584. Fitting assembly shall withstand all tests specified in Specification MIL-A-387216 when assembled with hose conforming to MIL-H-5593.

Material: Aluminum Alloy - Bars, Shapes or Forgings
 Steel - Bars or Rods

Finish: See procurement specification.

Example Part Numbers: MS27404-4P - Fitting Assembly for 1/4 tubing, Steel, Plated
 MS27404-4D - Fitting Assembly for 1/4 tubing, Aluminum Alloy

NOTES:

- MS27404 items made from Aluminum Alloy are universally interchangeable with AN773 items of like dash numbers.
- Sampling for inspection: See procurement specification.
- Dimension in inches: Unless otherwise specified, tolerance: Decimals ± .010 Fractions ± 1/64 Angles ± 1/2°.
- Remove all burrs and sharp edges.

ADDITIONAL NOTES:

- PROCUREMENT SPECIFICATION: MIL-A-38726
- SUPERSEDES: AN773
- THIS INFORMATION FROM MILITARY STANDARD MS27404, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.

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MIL H 6000 B or MIL-DTL-6000

The new spec MIL-DTL-6000 is so similar, there is a note that the part numbers are functionally interchangeable and no changes are necessary on existing prints or callout's. The markings on the later spec are slightly different. We stock it under the MIL H 6000 number because it is easier to relate to. The new number uses a letter for the ID designation (see the chart), this will help you identify if not marked with the old and more functional MIL H 6000-(size)

This oil-resistant tube is reinforced with a high strength, mildew-resistant yarn designed to withstand oil, alcohol, coolant, fuel, water and temperatures from -40° to 250°F. MIL H 6000B is lightweight, flexible and easy to handle. It is always to be secured by an appropriate clamp such as Breeze Aero seal or equivalent.

This hose is not designed to use attached end fittings. It is for push on and clamp applications.



MIL DTL I.D. designator	Hose sizes "inches" (inside diameter)	Burst pressure Minimum	Proof pressure Minimum	Lengths Avail.
Shaded are Special Order, and are not normally stocked				
A	1/4	1,000 psi.	500 psi.	5ft or 10ft
B	5/16			
C	3/8			
D	1/2			
E	5/8			
F	3/4			
G	7/8			
H	1			
J	1 1/4	800 psi.	400 psi.	5ft only or Special Order with extra charges.
K	1 1/2	600 psi.	300 psi	
L	1 3/4			
M	2	400 psi.	200 psi.	
N	2 1/2			
P	3			
Q	3 1/2	350 psi.	175 psi.	
R	4	300 psi.	150 psi.	

To order MIL H 6000 hose use Part # MIL H 6000-(size). ie: MIL H 6000-3/4

Sizes available are indicative of the fractional inner diameter of the hose. We sell cut lengths of 5 or 10feet. See the Lengths Avail. column on the chart. *Longer lengths may be available with significant lead times and an undetermined minimum dollar amount, price will then be on application.*

Genuine Aircraft Hardware Co.

Fyrejacket®/Firesleeve and Clamps

Fyrejacket® is a registered trademark of Bentley-Harris,® a division of Federal-Mogul
AS1072 Silicone Covered Fiberglass Braided Fire Protection Sleeve



Preformed BAND-IT JR® Tool Part # J020



Preformed BAND-IT Clamps



AS1072-(SIZE)-SIL-FG

BAND-IT Jr. Preformed Clamps		
Thickness .020" (.51mm)		
Stainless Steel		
Clamp I.D.		Order Part #
inches	mm	sold by ea.
1	25.4	JS242
1 1/2	38.1	JS252
2	50.8	JS253
3	76.2	JS244

Type of Hose by MIL spec & Manufactures #							
Mil Spec for hose	MIL H 8794	MIL H 8788	MIL H 83797	MIL H 27267	MIL H 38360A	AS1072 Fyrejacket Firesleeve SIZE and Inside Dia.	
Aeroquip # for hose	303 / 302A	309	601 / 701	666 / 667	AE246		
Stratoflex # for hose	111	112	156 / 176	124	170 / 171		
INSTRUCTIONS : Determine what type of hose you want to put the FyreJacket/Firsleeve on Go Down until you see the dash # for your hose under your hose's spec. Go Right until you see the dash # for the AS1072 Fyrejacket/Firesleeve						06 3/8	
				-3			07 7/16
		-3,-4		-4	-3,-4,-5	-4	08 1/2
				-5			09 9/16
		-5		-6			10 5/8
					-6	-6	11 11/16
		-6	-4	-8			12 3/4
					-8	-8	13 13/16
		-8	-6	-10	-10	-10	14 7/8
		-10	-8	-10	-12		16 1"
		-12	-10	-12			18 1 1/8
			-12				20 1 1/4
		-16		-16			22 1 3/8
Order using part number				-16		24 1 1/2	
AS1072-(SIZE)-SIL-FG		-16				26 1 5/8	

Temperature: Fyrejacket® is used to protect hoses and hose assemblies, tubing, piping, wires, wire assemblies and cables from exposure up to 500°F (260°C) and from molten splash. Aerospace grade Fyrejacket will withstand short term flame exposure to 2000°F (1093°C) with proper hose assembly.

Specifications: Aerospace Fyrejacket meets SAE Aerospace Standard AS1072 Type 2 for "Sleeve, Hose Assembly, Fire Protection".
Sizes: Fyrejacket is available in a full range of sizes from 1/4" to 4" inner diameter (6mm to 102mm), on spools or in coils.

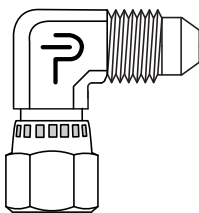
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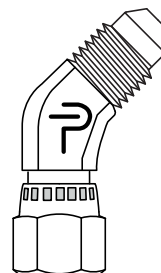
Test Fittings

Made by Parker Industrial Tube Fittings

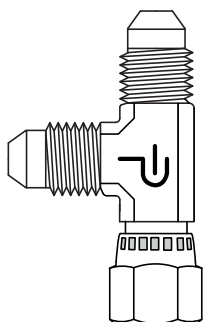
37° JIC Flared Tube End / Swivel Nut Ends



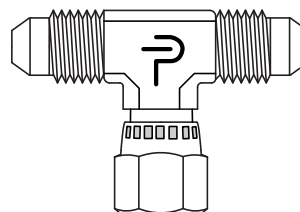
(tube size)-C6X-(material)



(tube size)-V6X-(material)



(tube size)-R6X-(material)



(tube size)-S6X-(material)

Material Codes: (S) = Steel, Cad or Zinc Yellow Plated
(SS) = Stainless Steel Unplated

Note: Not all materials are stocked or available in all configurations.

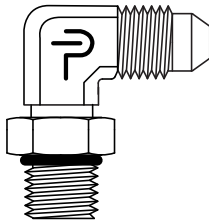
Tube Size designator in part number	tube size	tubing end and nut thread size
4	1/4	7/16-20
5	5/16	1/2-20
6	3/8	9/16-18
8	1/2	3/4-16

These fittings are for use in test situations or on ground support equipment. They are functionally fitting to aircraft 37 degree flare end fittings. If you need these certified to MS part numbers some of them are available as special order items. They may require minimum orders and there will be a lead time when requesting the MS numbers. **These parts shown are NOT FOR USE IN CERTIFIED AIRCRAFT unless specific approval is obtained for each usage or installation.**

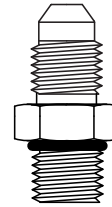
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Test Fittings

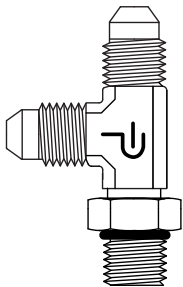
Made by Parker Industrial Tube Fittings
Straight Thread O-ring Seal to 37° JIC Flare



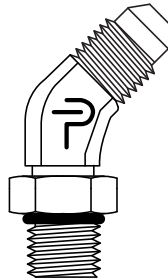
(Tube Size)- C5OX-(material)



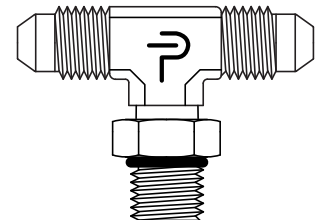
(tube size)-F5OX-(material)



(tube size)-R5OX-(material)



(tube size)-V5OX-(material)



(tube size)-S5OX-(material)

Material Codes: (S) = Steel, Cad or Zinc Yellow Plated
(SS) = Stainless Steel Unplated

Note: Not all materials are stocked or available in all configurations.

Tube Size designator in part number	tube size	tubing end threads	O-ring end threads	Availability of sizes and styles		
				C5OX	F5OX	R5OX S5OX V5OX
2	1/8	5/16-24	5/16-24	Y		N
3	3/16	3/8-24	3/8-24			Y
4	1/4	7/16-20	7/16-20			N
4-5			1/2-20	Y	N	
4-6			9/16-18		Y	
5-4	5/16	1/2-20	7/16-20		Y	Y
5			1/2-20	Y		
5-6			9/16-18	N		
6-4	3/8	9/16-18	7/16-20	Y	Y	N
6-5			1/2-20			Y
6			9/16-18			Y

These fittings are for use in test situations or on ground support equipment. They are functionally fitting to aircraft 37 degree flare end fittings. If you need these certified to MS part numbers some of them are available as special order items. They may require minimum orders and there will be a lead time when requesting the MS numbers.

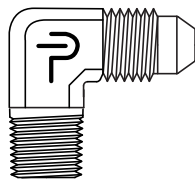
These parts shown are NOT FOR USE IN CERTIFIED AIRCRAFT unless specific approval is obtained for each usage or installation.

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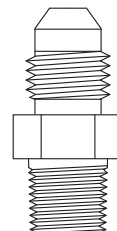
Genuine Aircraft Hardware Co.

Test Fittings

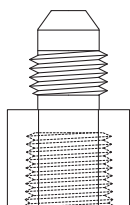
Made by Parker Industrial Tube Fittings
37° JIC Flared Tube End / Pipe Thread



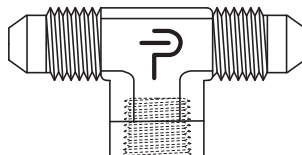
(size)-CTX-(material)



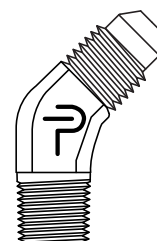
(size)-FTX-(material)



(size)-GTX-(material)



(size)-OTX-(material)



(size)-VTX-(material)

Material Codes: (S) = Steel, Cad or Zinc Yellow Plated
(SS) = Stainless Steel Unplated
(B) = Brass, Unplated

Note: Not all materials are stocked or available in all configurations.

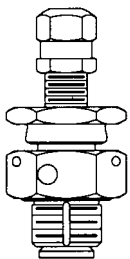
Tube Size designator in part number	tube size	tubing end threads	Pipe End NPT Size	Availability of sizes and styles					
				CTX	FTX	GTX	OTX	VTX	
2	1/8	5/16-24	1/8-27	Y			N		
3	3/16	3/8-24					Y		
4	1/4	7/16-20					N		
4-4			Y						
4-6			N						
4-8			N						
5	5/16	1/2-20	1/8-27				Y		
5-4			1/4-18				N		
6-2	3/8	9/16-18	1/8-27				N		
6			1/4-18				Y		
6-6			3/8-18	N					
6-8			1/2-14	Y					

These fittings are for use in test situations or on ground support equipment. They are functionally fitting to aircraft 37 degree flare end fittings. If you need these certified to MS part numbers some of them are available as special order items. They may require minimum orders and there will be a lead time when requesting the MS numbers. **These parts shown are NOT FOR USE IN CERTIFIED AIRCRAFT unless specific approval is obtained for each usage or installation.**

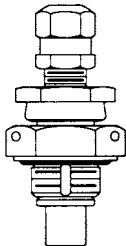
Genuine Aircraft Hardware Co. High Pressure Valves

These Valves are commonly used for Landing Gear Struts.

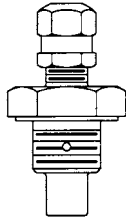
They allow the high-pressure gas to be put into the strut and then in the case of all but the AN812-1 you must close the valve completely by tightening the swivel nut above the hex on the body of the valve. The AN valves both have valve cores in them to prevent blowback when the pressure chuck is removed. The Swivel nut on the AN6287-1 should be tightened if at all possible before removing the pressure chuck with any pressure 2,000 psi. or below. If the pressure is 2,000 – 3,000 then the swivel nut must be tightened before removing the pressure chuck, because the valve core inside of both of the AN valves is only rated to 2,000 psi. The Swivel Nut must always be tightened on the MS28889-2 because it has no valve core at all. The AN812-1 can only be used where the pressure will not exceed 1,500 psi. because it has no swivel nut valve and only a valve core. They all use cap part # MS20813-1 which comes with the new valves when purchased. They all have 1/2-20 threads and are sealed with an O-ring that comes with it. The exception is the AN812-1 will sometimes be sealed with an AN901-5C metal gasket depending on the installation requirements.



MS28889-2



AN6287-1



AN812-1

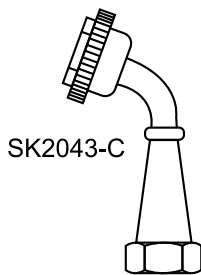
Valve Assy Part #	Pressure Rating	Valve Core Part #
AN812-1	1500 psi.	AN809-1
AN6287-1	3000 psi	AN809-1
MS28889-2	5000 ps1	NONE

Strut Valve, Filler Chucks

Not for Oxygen!

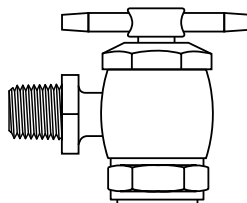
Dill Air Controls

This is the most common Strut Valve filler in General Aviation.
1/8" female npt. threads to use with hose or fitting.
5,000 psi. working pressure with a 10,000 psi proof pressure.



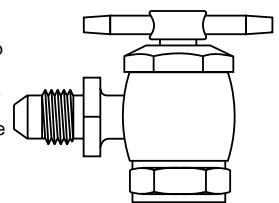
SK2043-C

Lock Chuck with "T" handle to depress valve core when necessary. This Filler Valve will withstand pressure up to 5000 psi. 1/8" male npt. to use with hose or fitting.



8921

Lock Chuck with "T" handle to depress valve core when necessary. This Filler Valve will withstand pressure up to 5000 psi. -3, 37deg. Flare to use with hose fitting.

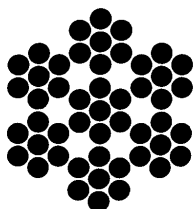


9043

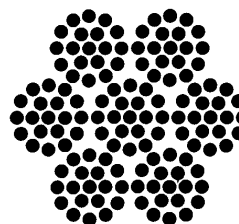
Genuine Aircraft Hardware Co.

Aircraft Cable 7 x 19

Mil W 83420, or MIL-DTL-83420, Flexible Wire Rope



7 X 7



7 X 19

Cable is sold "Cut To Length," minimum sale per length is 10 feet.

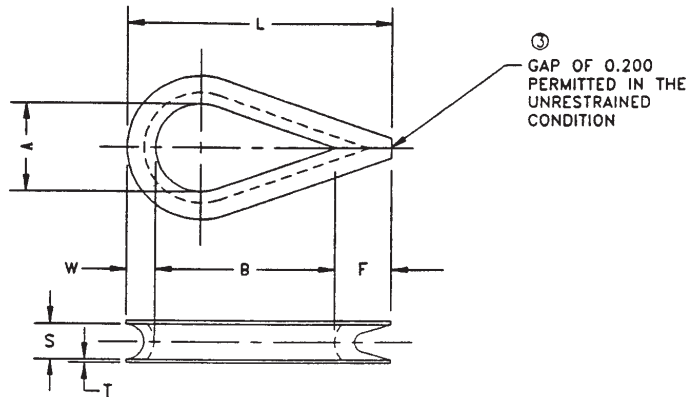
NOTE: Unless noted all dimensions are in inches.

PART #	NOMINAL DIAMETER	MINIMUM DIAMETER	MAXIMUM DIAMETER	CONSTRUCTION MATERIAL	MINIMUM BREAKING STRENGTH Lbs.	APPROX WEIGHT 100/FEET
CABLE .063,GALV	1/16	0.0625	0.0715	7 x 7 Galvanized	480	0.75
CABLE .063,SS	1/16	0.0625	0.0715	7 x 7 Stainless	480	0.75
CABLE .094,GALV	3/32	0.0938	0.1038	7 x 19 Galvanized	1000	1.74
CABLE .094,SS	3/32	0.0938	0.1038	7 x 19 Stainless	920	1.74
CABLE .125,GALV	1/8	0.1250	0.1360	7 x 19 Galvanized	2000	0.29
CABLE .125,SS	1/8	0.1250	0.1360	7 x 19 Stainless	1760	0.29
CABLE .156,GALV	5/32	0.1563	0.1733	7 x 19 Galvanized	2800	4.50
CABLE .156,SS	5/32	0.1563	0.1733	7 x 19 Stainless	2400	4.50
CABLE .188,GALV	3/16	0.1875	0.2065	7 x 19 Galvanized	4200	8.60
CABLE .188,SS	3/16	0.1875	0.2065	7 x 19 Stainless	3700	8.60
CABLE .250,GALV	1/4	0.2500	0.2710	7 x 19 Galvanized	7000	11.00
CABLE .250,SS	1/4	0.2500	0.2710	7 x 19 Stainless	6400	11.00

Genuine Aircraft Hardware Co.

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AN100 Thimble - Wire Cable



AN PART NO.			CABLE DIA.	A	B	F MIN.	L APPROX.	S +.016 -.000	T	W +.016 -.000
LOW CARBON STEEL	CORROSION RESISTING STEEL	PHOSPHOR BRONZE								
			(3)		(3)	(3)	(3)	(3)		(3)
AN100-3	AN100C-3	AN100B-3	.063	.350	.703	.188		.094		.078
AN100-4	AN100C-4	AN100B-4	.094	.350	.703	.219		.141	.032+/--.003	.078
			.109							
			.125							
AN100-5	AN100C-5	AN100B-5	.156	.400	.797	.219	.172		.109	
AN100-6	AN100C-6	AN100B-6	.188	.500	1.000	.313	.203		.141	
AN100-7	AN100C-7	AN100B-7	.219	.600	1.203	.375	.234		.156	
AN100-8	AN100C-8	AN100B-8	.250	.700	1.406	.406	.266		.172	
AN100-9	AN100C-9	AN100B-9	.281	.800	1.609	.406	.297	.040+/--.004	.203	
AN100-10	AN100C-10	AN100B-10	.313	.900	1.797	.438	.328	.040+/--.004	.219	
AN100-12	AN100C-12	AN100B-12	.375	1.000	2.000	.625	.391	.060+/--.004	.266	
AN100-14	AN100C-14	AN100B-14	.438	1.125	2.250	.813	.453	.080+/--.004	.328	
AN100-16	AN100C-16	AN100B-16	.500	1.250	2.500	1.000	.516	.080+/--.004	.406	
(a) AN100-18			.563	1.500	2.750		4.000	.578	.156+/--.016	
				(MIN)	(MIN)					
(a) AN100-20			.625	1.750	3.250		5.375	.641	.156+/--.016	
				(MIN)	(MIN)					

NOTES:

(a) FOR -18 AND -20, THE FINISH REQUIREMENT ONLY, OF THE PROCUREMENT SPECIFICATION SHALL APPLY. THE MATERIAL SHALL BE OF COMMERCIAL WROUGHT STEEL SUITABLE FOR THE PURPOSE.

- MATERIAL: SEE PROCUREMENT SPECIFICATION.
- FINISH: SEE PROCUREMENT SPECIFICATION.
- DIMENSIONS IN INCHES, UNLESS OTHERWISE SPECIFIED, TOLERANCES: ± .010.

ADDITIONAL NOTES:

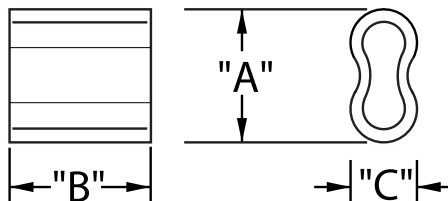
- PROCUREMENT SPECIFICATION: MIL-T-5677
- SUPERSEDES: AN100, REV 2
- THIS INFORMATION FROM MILITARY STANDARD AN100 PAGE 1 OF 1, REVISED MAY 3, 1983, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.

Genuine Aircraft Hardware Co.

Oval Splices

MS51844, Sleeve, Swaging, Wire Rope

ORDER BY MS51844 NUMBERS ONLY



We stock most Item Numbers for the sleeves listed in the chart. They are **made of Copper** and are plated as indicated in the chart.

Other materials may be available by special order.

For special orders there will be minimum qty's required and a lead time, it can vary by item.

MS51844	NICOPRESS #	LOOS & CO. #	PLATING	CABLE SIZE	"A"	"B"	"C"
-22	28-1-C	SL2-2P	ZINC	1/16	.270	.440	.180
-23	28-2-G	SL2-3P	ZINC	3/32	.380	.440	.240
-24	28-3-M	SL2-4P	ZINC	1/8	.512	.750	.340
-25	28-4-P	SL2-5P	ZINC	5/32	.600	.750	.370
-26	28-6-X	SL2-6P	ZINC	3/16	.710	1.00	.450
-42	18-1-C	SL2-2	NONE	1/16	.270	.440	.180
-43	18-2-G	SL2-3	NONE	3/32	.380	.440	.240
-44	18-3-M	SL2-4	NONE	1/8	.512	.750	.340
-45	18-4-P	SL2-5	NONE	5/32	.600	.750	.370
-46	18-6-X	SL2-6	NONE	3/16	.710	1.00	.450
-82	428-2-VC	SL2-2TP	TIN	1/16	.270	.440	.180
-83	428-3-VG	SL2-3TP	TIN	3/32	.380	.440	.240
-84	428-4-VM	SL2-4TP	TIN	1/8	.512	.750	.340
-85	428-5-VP	SL2-5TP	TIN	5/32	.600	.750	.370
-86	428-6-VX	SL2-6TP	TIN	3/16	.710	1.00	.450

Genuine Aircraft Hardware Co.

Oval Splice Crimpers / Cable Cutters

Loos and Co Swager-Crimpers / Felco Cutters, made in Switzerland.

FELCO C-7

8" long, 10oz.



This cutter is small and fits well in the hand. It comfortably cuts 1/8" Aircraft Cable and with a little more effort will cut up to 3/16" Aircraft Cable. Not for solid material

imported

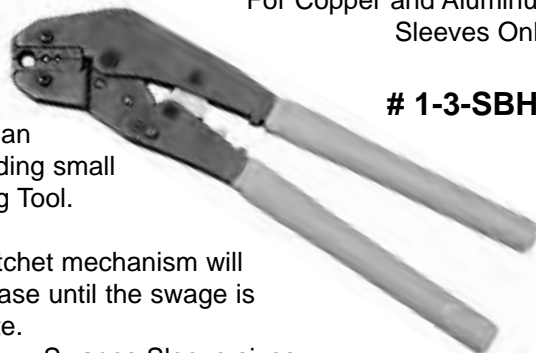
For Copper and Aluminum Sleeves Only!

1-3-SBHS

This is an outstanding small Swaging Tool.

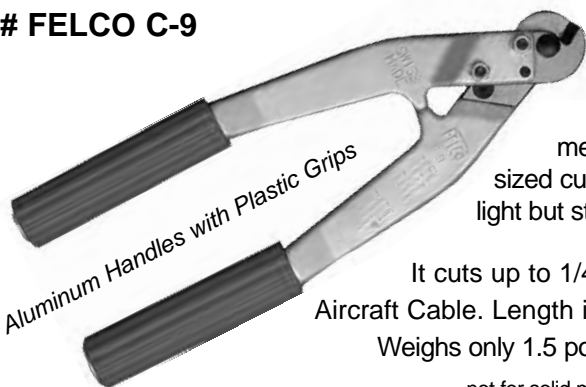
The Ratchet mechanism will not release until the swage is complete.

Swages Sleeve sizes 1/32" 3/64" 1/16" and 3/32"



FELCO C-9

Aluminum Handles with Plastic Grips



This medium sized cutter is light but strong.

It cuts up to 1/4" dia. Aircraft Cable. Length is 13" Weighs only 1.5 pounds

not for solid material

1-SC SWAGER WITH CUTTER

Made in the U.S.A.

This Tool has Swaging & Cutting capabilities.

Swages 1/16" 3/32" 1/8" 5/32" and 3/16" Oval Sleeves.

Cuts Aircraft Cable up to 7/32 diameter.



FELCO C-12

Aluminum Handles with Plastic Grips



This medium sized cutter is light but strong.

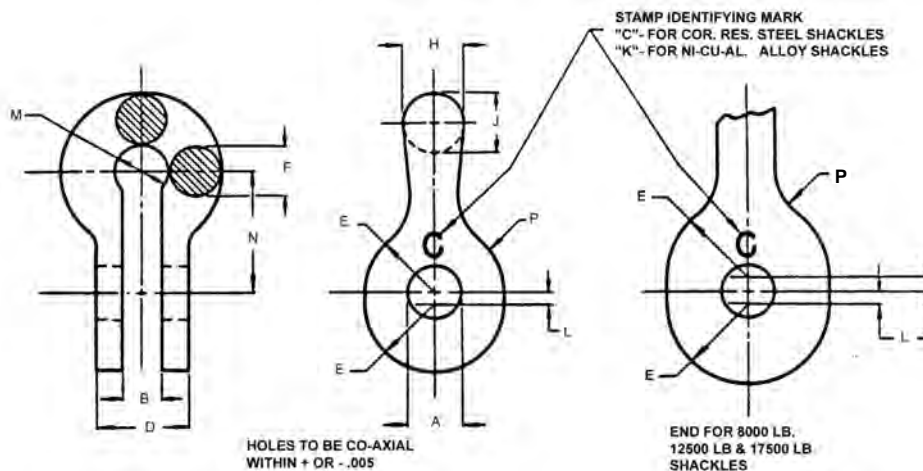
It cuts up to 3/8" dia. Aircraft Cable. Length is 19" Weighs 3 pounds

not for solid material

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Genuine Aircraft Hardware Co.

AN115 Shackle-Wire Rope



AN PART NUMBER	SHACKLE AND CABLE STRENGTH POUNDS	A +.010 -.000 DIA	B +.010 -.000	D	E RAD	F DIA	H	J	L	M DIA	N	P RAD						
AN115 -8	800	.188	.109	1/4	1/4	11/64	11/64	11/64	1/32	1/4	9/16	3/8						
AN115 -16	1,600		.150	5/16														
AN115 -21	2,100		9/32															
AN115 -32	3,200	.250	.203	7/16	5/16	7/32	1/4	1/4	1/16	3/8	3/4	7/16						
AN115 -46	4,600	.313		1/2	3/8		9/32	9/32		7/16	13/16							
AN115 -61	6,100	.375		9/16		9/32	5/16	5/16		1/2	7/8	1/2						
AN115 -80	8,000	.438	.266	23/32	17/32	15/32	19/32	15/32	3/32	7/16	1	13/32						
AN115 -125	12,500		.344										13/32	3/8	7/16	3/8	7/16	1
AN115 -175	17,500		.500										.406	13/16	5/8	9/16	11/16	9/16
											1+1/4	1/2						

NOTE:

- PART NUMBERS LISTED ARE FOR CADMIUM OR ZINC PLATED STEEL.
- ADD "C" BEFORE EACH NO. FOR CORROSION RESISTING STEEL.
- ADD "K" BEFORE EACH NO. FOR NI-CU-AL. ALLOY.
- EXAMPLES OF PART NUMBERS:
 - AN115-21 = SHACKLE, STRENGTH 2100 LBS., CADMIUM OR ZINC PLATED STEEL
 - AN115C-21 = SHACKLE, STRENGTH 2100 LBS., COR. RES. STEEL
 - AN115K-21 = SHACKLE, STRENGTH 2100 LBS., NI-CU-AL. ALLOY
- MATERIAL: CADMIUM OR ZINC PLATED STEEL, CORROSION RESISTING STEEL OR NI-CU-AL. ALLOY
- DIMENSIONS IN INCHES, TOLERANCES: FRACTIONS: ±1/64, DECIMALS: .010, UNLESS OTHERWISE SPECIFIED

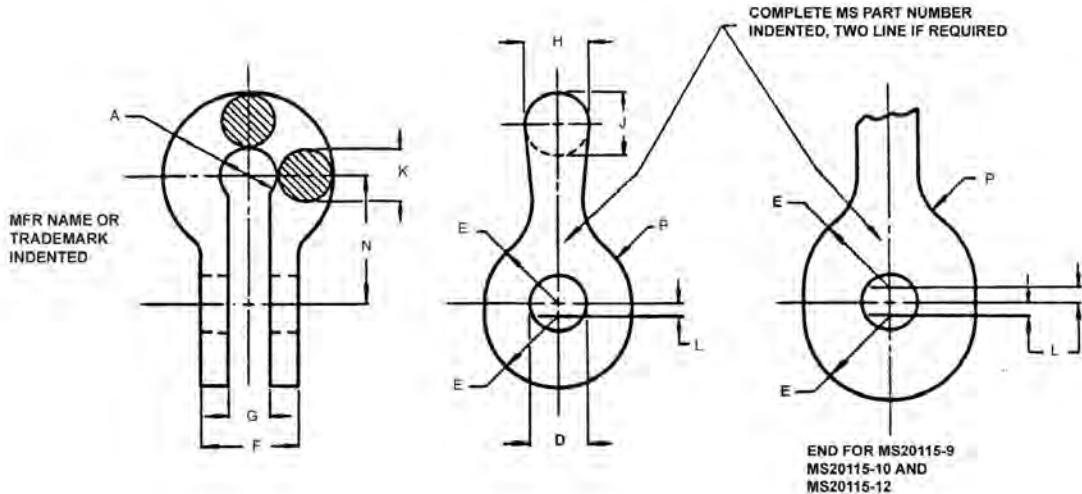
ADDITIONAL NOTES:

- PROCUREMENT SPECIFICATION: MIL-S-5675
- SUPERSEDES: NONE
- THIS INFORMATION FROM MILITARY STANDARD AN115 PAGE 1 OF 1, REVISED DECEMBER 1, 1959. SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.

Genuine Aircraft Hardware Co.

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MS20115 Shackle-Wire Rope



DASH NUMBERS			NOMINAL WIRE ROPE DIA (REF)	MINIMUM BREAKING STRENGTH LB	A	D	E	F	G	H	J	K	L	N	P				
CORROSION RESISTANT STEEL	NON-CORROSION RESISTANT STEEL	NICKLE COPPER ALUMINUM ALLOY			+0.016 -0.000 DIA	+0.005 -0.000 DIA	RAD	+0.010 -0.005	+0.007 -0.003	+/- .016	+/- .016	+/- .016		+/- .016	+/- .016 RAD				
-2	F2	K2	1/16	480	.188	.190	.172	.218	.093	.156	.156	.156	.031	.562	.375				
-3	F3	K3	3/32	920	.219		.219	.254	.108										
-4	F4	K4	1/8	2 000	.250		.274	.383	.195										
-5	F5	K5	5/32	2 800	.281	.250	.344	.406	.202	.062	.250	.219	.750	.438					
-6	F6	K6	3/16	4 200	.375	.313	.391	.543	.260						.312	.312	.281	.812	.500
-7	F7	K7	7/32	5 600	.406		.453	.625	.296						.344	.344	.312		
-8	F8	K8	1/4	7 000	.438	.375	.484	.688	.313	.406	.359	.359	1.000	.406					
-9	F9	K9	9/32	8 000	.500	.438	.578	.719	.327	.438	.391	.391							
-10	F10	K10	5/16	9 800	.594		.633	.765	.348	.469	.422	.422	.094	1.125	.500				
-12	F12	K12	3/8	14 000	.625	.500	.750	.830	.380	.562	.500	.500	.125	1.250					

NOTE:

- MATERIAL: CORROSION RESISTANT STEEL, CHROME STEEL, NICKEL COPPER, ALUMINUM ALLOY. SEE PROCUREMENT SPECIFICATION.
- FINISH: SEE PROCUREMENT SPECIFICATION
- DIMENSIONS IN INCHES: UNLESS OTHERWISE SPECIFIED, TOLERANCE: DECIMALS: .010.
- HOLES TO BE CO-AXIAL WITHIN: .005
- PLAIN DASH NUMBERS ARE FOR CORROSION RESISTANT STEEL SHACKLES
- ADD "F" BEFORE DASH NUMBER FOR NON-CORROSION RESISTANT STEEL SHACKLES
- ADD "K" BEFORE DASH NUMBER FOR NICKEL-COPPER-ALUMINUM ALLOY SHACKLES
- EXAMPLES OF MS PART NUMBERS:
 MS20115-6 = SHACKLE, CORROSION RESISTANT STEEL, 6/32 DIA WIRE ROPE
 MS20115F6 = SHACKLE, NON-CORROSION RESISTANT STEEL, 6/32 DIA WIRE ROPE
 MS20115K6 = SHACKLE, NICKEL-COPPER-ALUMINUM ALLOY, 6/32 DIA WIRE ROPE

ADDITIONAL NOTES:

- PROCUREMENT SPECIFICATION: MIL-S-5675
- SUPERSEDES: AN115
- THIS INFORMATION FROM MILITARY STANDARD MS20115 PAGE 1 OF 1, REVISED NOVEMBER 17, 1972, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.

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Genuine Aircraft Hardware Co.

Cable Terminal Swager Loos & Co, Hand Swager for MS Terminals

This portable, hand operated roll type swaging machine, shown below, will swage MS type terminals onto galvanized and stainless steel cables from 1/16" diameter up to and including 3/16" diameter. Marine-industrial terminals can also be assembled if the terminals have the same outside diameter and bore diameters as standard MS terminals before swaging. The **LOCOLOC®**-Kearney Type I Roll Swaging Kit, which includes the machine, a full set of roll dies, terminal gauges, and feed guide adapters in a steel carrying and storage case, is pictured and itemized below.

LOCOLOC® HAND SWAGER - TYPE I Conforms to MIL-Spec MIL-S-6180



type I portable swaging machine kit — part no. M1-K*

Index No.	Part No.	Old Kearney Part No.	Part Name	Qty.
1	M1(74)*	7-4	Swaging Machine with Case, Allen Wrench, Feed Guide Assembly and Feed Guide Adapters	1
2	M1-B2*	12748-10	Shank-Type Ball Terminal Roll Assy. (for 1/16 inch cable)	1
3	M1-B3*	12748-11	Shank-Type Ball Terminal Roll Assy. (for 3/32 inch cable)	1
4	M1-B4*	12748-12	Shank-Type Ball Terminal Roll Assy. (for 1/8 inch cable)	1
5	GA-B24*	12971-1	Ball-Type Terminal Gage (1/16-1/8 inch cable)	1
6	M1-S2*	13655-7	Straight-Shank Terminal Roll Assy. (for 1/16 inch cable)	1
7	M1-S3*	13655-17	Straight-Shank Terminal Roll Assy. (for 3/32 inch cable)	1
8	M1-S4*	13655-27	Straight-Shank Terminal Roll Assy. (for 1/8 inch cable)	1
9	M1-S5*	13655-37	Straight-Shank Terminal Roll Assy. (for 5/32 inch cable)	1
10	M1-S6*	13655-47	Straight-Shank Terminal Roll Assy. (for 3/16 inch cable)	1
11	GA-S26*	12971-2	Staight-Shank Terminal Gauge (1/16-3/16 inch cable)	1

LOCOLOC®-KEARNEY Portable Swaging Machine Kit (As illustrated) contains the following:

- 1 ea. M1 LOCOLOC®-KEARNEY Type I Portable Swaging Machine
- 3 ea. Ball Terminal Rolls (Dies) to fit 1/16", 3/32" & 1/8" Cable
- 5 ea. Shank Terminal Rolls (Dies) to fit 1/16", 3/32", 1/8", 5/32" & 3/16" Cable
- 1 ea. Gauge for Ball Terminals (Part No. GA-B24)
- 1 ea. Gauge for Straight Shank Terminals (Part No. GA-S26)
- 1 ea. Steel Carrying Case

PART NO. M1-K* TYPE I PORTABLE SWAGING MACHINE KIT AS DESCRIBED ABOVE

(Shipping Wgt. 64 lbs.)

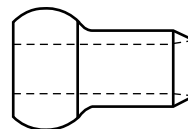
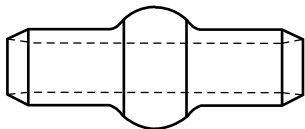
Genuine Aircraft Hardware Co.

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MS20663 and MS20664

Ball End, Wire Rope, Swaging, Double and Single Shank

MATERIAL: STEEL, CORROSION RESISTANT IN ACCORDANCE WITH FEDERAL STANDARD 66, STEEL NO. 303se OR 305 STEEL, CARBON, FED-STD-66, STEEL NO. 1020

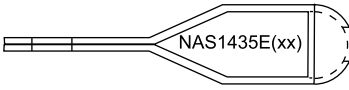
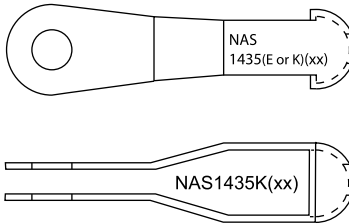


MS20663, Double Shank, Ball End, Swaging				
Cable Size	Part Number	Ball Dia. Tol. +.0 -.004	Cable Hole Dia.	Length B4 Swaging
1/16	MS20663C2	.207	.073	.362
3/32	MS20663C3	.277	.104	.525
1/8	MS20663C4	.345	.139	.688
5/32	MS20663C5	.419	.169	.850
3/16	MS20663C6	.487	.201	1.012

MS20664, Single Shank, Ball End, Swaging				
Cable Size	Part Number	Ball Dia. Tol. +.0 -.004	Cable Hole Dia.	Length B4 Swaging
1/16	MS20664C2	.212	.073	.2685
3/32	MS20664C3	.282	.104	.384
1/8	MS20664C4	.350	.139	.500
5/32	MS20664C5	.424	.169	.616
3/16	MS20664C6	.492	.201	.730

NAS1435E and NAS1435K

Material is 301,302, or 304 Stainless, Stamped Wire Rope Terminal, Closed (Strap) Eye End, Open Fork End, use with MS20664 Single Shank Ball End

PART#	Length, End to Hole Center	Fork Opening	Eye Hole Dia.	Cable Size
NAS1435E, eye end 	NAS1435E2	1+1/16"	N / A	1/16"
	NAS1435E3	1+1/2"	N / A	3/32"
	NAS1435E4	1+5/8"	N / A	1/8"
NAS1435K, fork end 	NAS1435E5	1+31/32"	N / A	1/4"
	NAS1435E6	2+3/16"	N / A	5/16"
	NAS1435K2	1+1/16"	.094	3/16"
	NAS1435K3	1+1/2"	.108	3/32"
	NAS1435K4	1+5/8"	.195	1/8"
	NAS1435K5	1+31/32"	.202	1/4"
NAS1435K6	2+3/16"	.260	5/16"	3/16"

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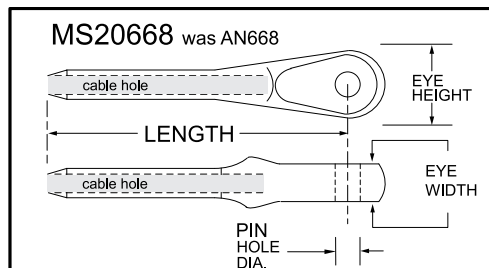
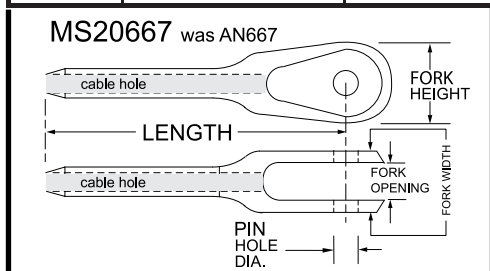
MS20667 and MS20668

Terminal, Wire Rope, Swaging, Fork End and Eye End

MATERIAL: STEEL, CORROSION RESISTANT FED-STD-66 STEEL NO. 303se OR 305
STEEL, CARBON, FED-STD-66 STEEL No's. 1035, 4037, 4130, OR 8630

MS 20667, Terminal, Fork End, Swaging

Cable Size	Part Number	Pin Hole Dia. Tol. +.002 -.000	Fork Width	Fork Opening	Fork Height	Cable Hole Dia.	Length
1/16	MS20667-2	.190	.218	.093	.344	.078	1.572
3/32	MS20667-3	.190	.254	.108	.438	.109	1.945
1/8	MS20667-4	.190	.383	.195	.547	.141	2.352
5/32	MS20667-5	.250	.406	.202	.688	.172	2.655
3/16	MS20667-6	.313	.543	.260	.781	.203	3.071
7/32	MS20667-7	.313	.625	.296	.906	.234	3.440
1/4	MS20667-8	.375	.688	.313	.969	.265	3.806



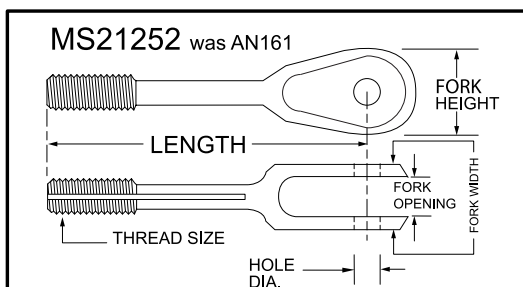
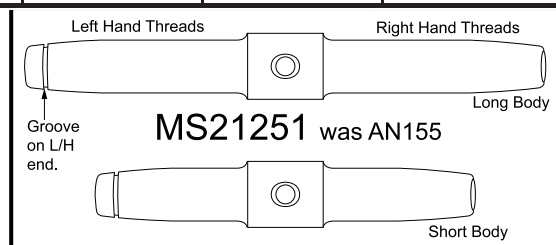
MS 20668, Terminal, Eye End, Swaging

Cable Size	Part Number	Pin Hole Dia. Tol. +.002 -.000	Eye Width	Eye Height	Cable Hole Dia.	Length
1/16	MS20668-2	.190	.088	.359	.078	1.631
3/32	MS20668-3	.190	.103	.438	.109	2.043
1/8	MS20668-4	.190	.190	.500	.141	2.337
5/32	MS20668-5	.250	.197	.640	.172	2.684
3/16	MS20668-6	.313	.255	.781	.203	3.019
7/32	MS20668-7	.313	.291	.813	.234	3.382
1/4	MS20668-8	.375	.307	.968	.265	3.763

MS21251 and MS21252

Clevis, Rod End, Turnbuckle, Clip Locking

MS21251 Turnbarrels, Brass (for Aluminum: sub. "A" for "B")						
Cable Size	Part Number	Minimum Breaking Strength Lb.	Overall Length	Thread Size	Body Dia.	Applicable Locking Clip MS21256
1/16	MS21251B2S	800	2.250	No. 6-40	.219	-1
	MS21251B2L		4.000			-2
3/32	MS21251B3S	1600	2.250	No.10-32	.281	-1
	MS21251B3L		4.000			-2
5/32	MS21251B5S	3200	2.250	1/4-28	.391	-1
	MS21251B5L		4.000			-2
3/16	MS21251B6S	4600	2.250	5/16-24	.438	-1
	MS21251B6L		4.000			-2
1/4	MS21251B8L	8000	4.000	3/8-24	.594	-2



MATERIAL: STEEL, CARBON OR ALLOY IN ACCORDANCE WITH PROCUREMENT SPECIFICATION.

MS21252 Clevis, Rod End, Turnbuckle, Clip Locking								
Cable Size	Part Number		Length + or -.047	Thread Size	Pin Hole Dia. +.002 -.001	Fork Opening +.010 -.000	Fork Width +.010 -.005	Fork Height
	RH Thread	LH Thread						
1/16	MS21252-2RS	MS21252-2LS	1.500	No. 6 - 40	.190	.109	.250	.375
3/32	MS21252-3RS	MS21252-3LS	1.625	No. 10 - 32		.156	.319	.500
		MS21252-3RL	MS21252-3LL		2.500	1/4 - 28	.195	.383
1/8	MS21252-4RS	MS21252-4LS	1.844	1/4 - 28	.250		.218	.452
		MS21252-4RL	MS21252-4LL			2.734		
5/32	MS21252-5RS	MS21252-5LS	1.844	5/16 - 24	.313	.250	.547	.734
		MS21252-5RL	MS21252-5LL					
3/16	MS21252-6RS	MS21252-6LS	2.031	5/16 - 24	.313	.250	.547	.734
		MS21252-6RL	MS21252-6LL					
1/4	MS21252-8RL	MS21252-8LL	3.188	3/8 - 24	.375	.312	.687	.922

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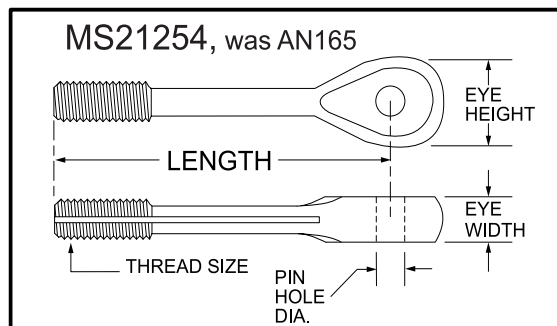
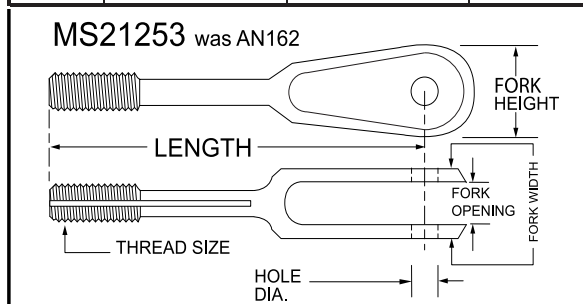
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MS21253 and MS21254

Clevis End for Bearings, Eye End for Pin, Turnbuckle, Clip Locking

MATERIAL: STEEL, CARBON OR ALLOY

MS21253 Clevis End, Turnbuckle, Clip Locking								
Cable Size	Part Number		Length + or - .031	Matches Bearing Part #	Thread Size	Pin Hole Dia. +.002 -.000	Fork Width +.010 -.005	Fork Opening + or - .005
3/32	MS21253-3RS	MS21253-3LS	2.312	MS27640-3	.1900 (#10) - 32	.190	.500	.312
	MS21253-3RL	MS21253-3LL	3.187					
1/8	MS21253-4RS	MS21253-4LS	2.562	MS27640-4	.2500 (1/4) -28	.250	.750	.500
	MS21253-4RL	MS21253-4LL	3.437					
5/32	MS21253-5RS	MS21253-5LS	2.687	MS27640-5	.3125 (5/16) -24	.250	.750	.500
	MS21253-5RL	MS21253-5LL	3.562					
3/16	MS21253-6RS	MS21253-6LS	2.750	MS27640-5	.3125 (5/16) -24	.313	.813	.563
	MS21253-6RL	MS21253-6LL	3.625					



MS21254 Turnbuckle, Eye End, Threaded, for Pin								
Cable Size	Part Number		Length +.031 -.015	Thread Size	Pin Hole Dia. +.002 -.000	Eye Width + or - .005	Eye Height	
	RH Thread	LH Thread						
1/16	MS21254-2RS	MS21254-2LS	1.500	No. 6 - 40	.190	.125	.375	
	MS21254-2RL	MS21254-2LL	2.375					
3/32	MS21254-3RS	MS21254-3LS	1.625	No. 10 - 32	.250	.188	.500	
	MS21254-3RL	MS21254-3LL	2.500					
5/32	MS21254-5RS	MS21254-5LS	1.750	1/4 - 28	.313	.219	.625	
	MS21254-5RL	MS21254-5LL	2.625					
3/16	MS21254-6RS	MS21254-6LS	1.875	5/16 - 24	.375	.281	.688	
	MS21254-6RL	MS21254-6LL	2.750					
1/4	MS21254-8RL	MS21254-8LL	2.875	3/8 - 24	.328	.875		

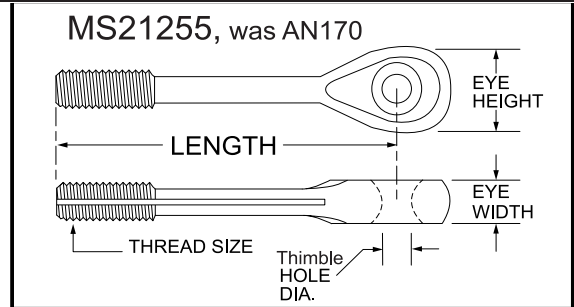
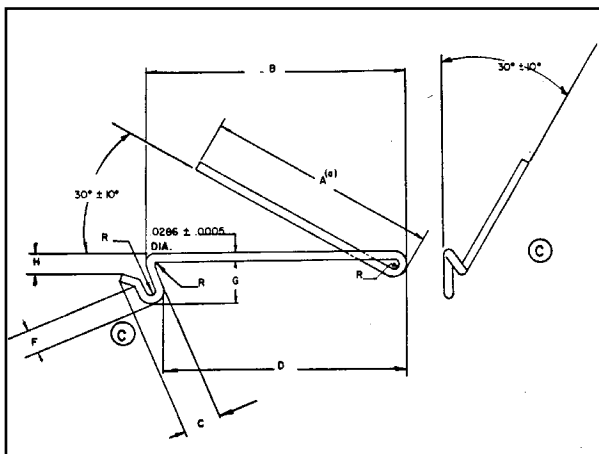
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MS21255 and MS21256
Connector, Rod End, Turnbuckle, Clip Locking

MATERIAL: STEEL, CARBON OR ALLOY IN ACCORDANCE WITH PROCUREMENT SPECIFICATION.

MS21255 Turnbuckle, Eye End, Threaded, for Thimble							
Cable Size	Part Number		Length +.031 .015	Thread Size	Thimble Hole Dia. +.010 -.000	Eye Width + or -.005	Eye Height
	RH Thread	LH Thread					
1/16	MS21255-2RS	MS21255-2LS	1.500	6 - 40	.188	.125	.375
	MS21255-2RL	MS21255-2LL	2.375				
3/32	MS21255-3RS	MS21255-3LS	1.625	10 - 32	.219	.188	.500
	MS21255-3RL	MS21255-3LL	2.500				
5/32	MS21255-5RS	MS21255-5LS	1.750	1/4 - 28	.218	.219	.625
	MS21255-5RL	MS21255-5LL	2.625				
3/16	MS21255-6RS	MS21255-6LS	1.875	5/16 - 24	.313	.281	.688
	MS21255-6RL	MS21255-6LL	2.750				
1/4	MS21255-8RL	MS21255-8LL	2.875	3/8 - 24	.375	.328	.875



MS21256, CLIP, LOCKING, TURNBUCKLE								
DASH NO.	(a) A	B	C +.010 -.015	D	F	G	H	R RAD
-1	.965	1.115	.150	1.078	.125	.300	.165	.032
-2	1.875	2.000		1.955		.315	.180	
-3	2.045	2.140	.215	2.015	.150	.430	.275	

- MATERIAL: CORROSION RESISTANT STEEL WIRE, QQ-W-423, COMPOSITION FS302, CONDITION B.
- LOCKING CLIPS ARE FOR ONE TIME USE ONLY AND SHALL NOT BE REUSED.
- FOR LOCK CLIPPING OF AIRCRAFT TURNBUCKLES, SEE MS33736.

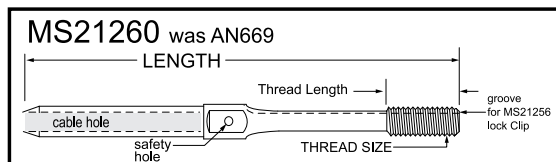
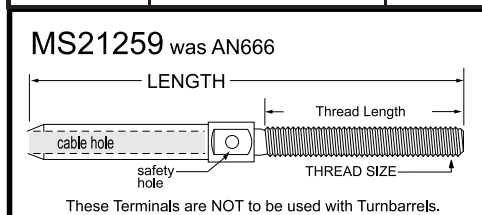
Genuine Aircraft Hardware Co.

MS21259 and MS21260

Terminal, Wire Rope, Swaging, Stud

MATERIAL: STEEL, CORROSION RESISTANT STEEL FED-STD-66, STEEL NO. 303se OR 305
STEEL, CARBON, FED-STD-66 STEEL No's. 1035, 4037, 4130, OR 8430.

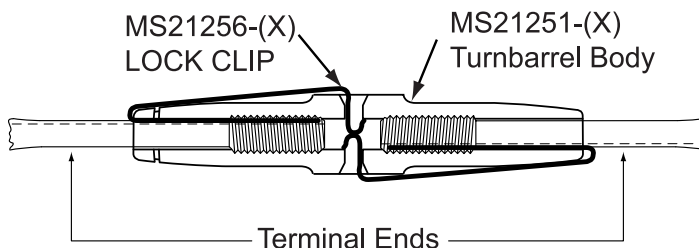
MS 21259, Terminal, Wire Rope, Stud. Not for use with MS21251 turnbarrel						
Cable Size	Part Number		Thread	Cable Hole Dia.	Thread Length +.083 -.020	Overall Length +.016 -.000
	RH Thread	LH Thread				
1/16	MS21259-2RH	MS21259-2LH	No. 6-40	.078	1.045	2.473
3/32	MS21259-3RH	MS21259-3LH	No. 10-32	.109	1.204	2.879
1/8	MS21259-4RH	MS21259-4LH	1/4 - 28	.141	1.376	3.333
5/32	MS21259-5RH	MS21259-5LH		.172	1.376	3.627
3/16	MS21259-6RH	MS21259-6LH	5/16 - 24	.203	1.453	4.002
7/32	MS21259-7RH	MS21259-7LH	3/8 - 24	.234	1.625	4.516
1/4	MS21259-8RH	MS21259-8LH		.265	1.750	4.937



MS 21260, Terminal, Wire Rope, Stud. For use with MS21251 turnbarrel						
Cable Size	Part Number		Thread Size	Cable Hole Dia. +.005 -.000	Thread Length + or- .047	Overall Length + or- .063
	RH Thread	LH Thread				
1/16	MS21260L2RH	MS21260L2LH	NO. 6-40	.078	.375	3.491
	MS21260S2RH	MS21260S2LH				2.616
3/32	MS21260L3RH	MS21260L3LH	NO.10-32	.109	.500	3.738
	MS21260S3RH	MS21260S3LH				2.863
1/8	MS21260L4RH	MS21260L4LH	1/4 - 28	.141	.563	4.020
	MS21260S4RH	MS21260S4LH				3.145
5/32	MS21260L5RH	MS21260L5LH	1/4 - 28	.172	.625	4.314
	MS21260S5RH	MS21260S5LH				3.439
3/16	MS21260L6RH	MS21260L6LH	5/16 - 24	.203	.750	4.612
	MS21260S6RH	MS21260S6LH				3.737
7/32	MS21260-7RH	MS21260-7LH	3/8 - 24	.234	.875	4.914
1/4	MS21260-8RH	MS21260-8LH		.265		5.218

MS33736

Not A Part number, This Is A Reference Spec.
Turnbuckle Assemblies, Clip Locking of



Any combination of MS21252, MS21253, MS21254, MS21255, or MS21260

MS 33736, TURNBUCKLE ASSEMBLIES NOT A PART NUMBER, THIS IS A REFERENCE SPEC.			
NOMINAL CABLE DIA	THREAD UNF-3	USE LOCKING CLIP MS21256	TURNBUCKLE BODY MS21251
1/16	NO. 6-40	-1	2S
3/32	NO. 10-32		-3S
1/8	1/4-28	-2	-3L
		-1	-4S
-2		-4L	
5/32		-1	-5S
3/16	5/16-24	-2	-5L
	3/8-24	-1	-6S
-2		-6L	
-		-7L	
1/4	7/16-20	-3	8L
9/32			-9L
5/16	1/2-20		-10L

PRIOR TO SAFETYING, BOTH THREADED TERMINALS SHALL BE SCREWED AT EQUAL DISTANCE INTO THE TURNBUCKLE BODY AND SHALL BE SCREWED IN AT LEAST SO FAR THAT NOT MORE THAN THREE THREADS OF ANY TERMINAL ARE EXPOSED OUTSIDE THE BODY.

AFTER THE TURNBUCKLE HAS BEEN ADJUSTED TO ITS LOCKING POSITION, WITH THE SLOT INDICATOR GROOVE ON TERMINAL AND SLOT INDICATOR NOTCH ON BODY ALIGNED, INSERT THE END OF THE LOCKING CLIP INTO THE TERMINAL AND BODY, AS ILLUSTRATED ABOVE, UNTIL THE U CURVED END OF THE LOCKING CLIP IS OVER THE HOLE IN THE CENTER OF THE BODY. PRESS THE LOCKING CLIP INTO THE HOLE TO ITS FULL EXTENT. THE CURVED END OF THE LOCKING CLIP WILL EXPAND AND LATCH IN THE BODY SLOT. TO CHECK PROPER SEATING OF LOCKING CLIP, ATTEMPT TO REMOVE U END FROM BODY HOLE WITH FINGERS ONLY, (DO NOT USE TOOLS AS LOCKING CLIP COULD BECOME PERMANENTLY DISTORTED).

LOCKING CLIPS ARE FOR ONE TIME USE ONLY, AND SHALL NOT BE REUSED.

BOTH LOCKING CLIPS MAY BE INSERTED IN THE SAME HOLE OF THE TURNBUCKLE BODY OR IN OPPOSITE HOLES.

TWO LOCKING CLIPS REQUIRED FOR EACH TURNBUCKLE.

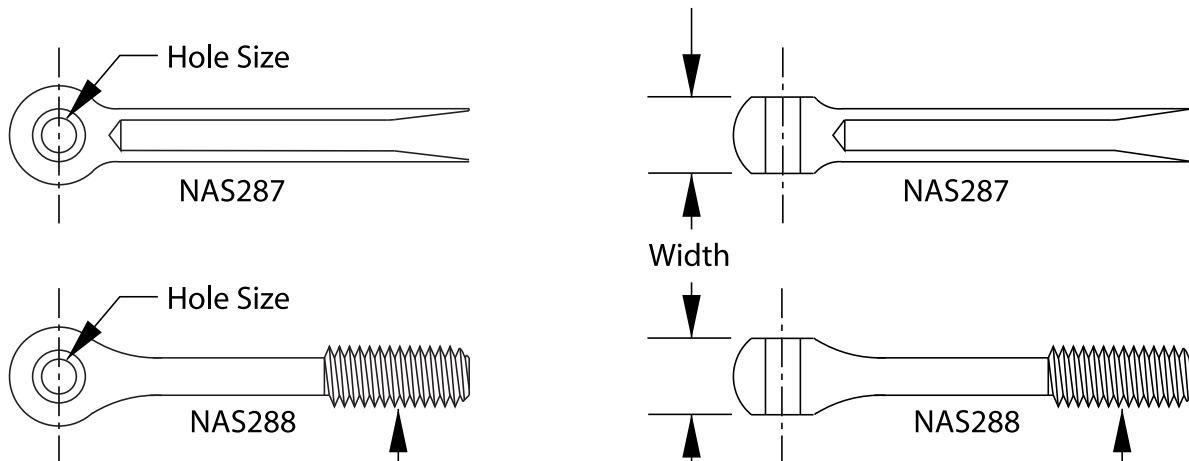
- PROCUREMENT SPECIFICATION: NONE
- SUPERSEDES: N/A
- THIS INFORMATION FROM MILITARY STANDARD MS33736 PAGE 1 OF 1, REVISED NOVEMBER 25, 1963, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.

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Chain Terminals

Cable & Turnbuckle

Length is measured from centerline of Head Hole to end of the fitting

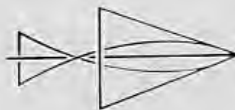


NAS287- (Chain #) - (Cable)			Both Part Numbers			NAS288 - (Chain #)(LH or RH)		
Corrosion Resistant Steel			Common Dimensions			Carbon Steel Cad II Plated		
NAS287	Length	Cable Size	Chain #	Width	Hole	NAS288	Length	Threads
-25-2	1.35	1/16"	#25	.186	.094	-25	1.60	10-32
-25-3	1.58	3/32"						
-35-4	1.95	1/8"	#35	.293	.144	-35	1.70	1/4-28
-41-4			#41			.355		
-40-6	2.43	3/16"	#40	.436	.159	-40	1.90	5/16-24
-50-8	3.05	1/4"	#50	.540	.203	-50	2.90	3/8-24
N50-8	3.15		#N50	.415	.203	N50		

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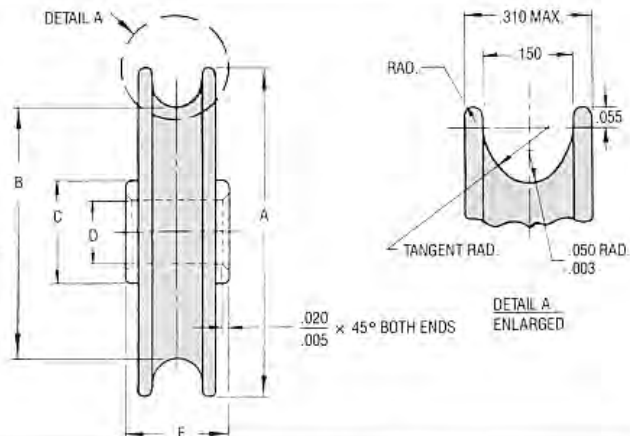
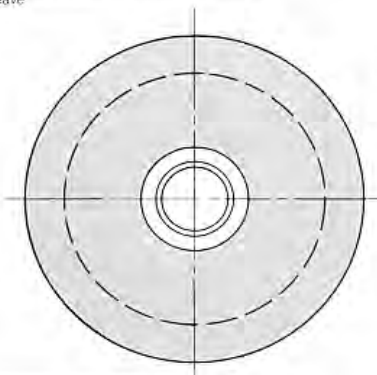
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RALMARK C O M P A N Y



AIRCRAFT PULLEYS

Hub may be added to pulley sheave where width of bearing outer race is greater than maximum width of pulley sheave



DASH NO.		CABLE SIZE	A	B	C	D	E	WEIGHT LB. MAX.	BEARING NUMBERS	
PHENOLIC SHEAVE	ALUMINUM SHEAVE		± .005 DIA.	± .005 DIA.	DIA. REF.	-.0005 DIA.	-.005			
-1	A1	1/16 AND 3/32	1.312	1.000	.423	.2500	.438	.058	W4AK	P4K
-2	A2		1.750	1.438	.769	.6250		.066	P4K	
-3	A3		.423	.2500	.096	P10K				
-4	A4		2.625	2.312	.769	.6250		.110	P4K	
-5	A5		.125	P10K						

DASH NO.		PULLEY STRENGTH		
PHENOLIC SHEAVE	ALUMINUM SHEAVE	ALLOWABLE LIMIT LOAD ON PULLEY	MAX. LIMIT LOAD ON CABLE INDEP. OF WRAP ANGLE	
			1/16 CABLE	3/32 CABLE
-1	A1	480	307	460
-2	A2			
-3	A3			
-4	A4	920		
-5	A5			

Example of part numbers: MS20219-2 — Pulley with high pressure laminated phenolic sheave and fixed ball bearing with contact seal. MS20219A2 — Pulley with aluminum alloy sheave and fixed ball bearing with contact seal. Sheave anodized per MIL-A-8625. NOTES: Compression type molded pulleys available on special order. -1 Pulley shall not be installed in flight control systems. MS20219 Pulleys are universally, functionally and dimensionally interchangeable with AN219 Pulleys of like dash numbers. DIMENSIONS: Unless otherwise specified, -.010. End faces of bearing hubs are flat and square within ± 1°. BEARING DATA — Page 11.

TITLE: PULLEY, GROOVE, SECONDARY CONTROL, AIRCRAFT

PROCUREMENT SPECIFICATION — MIL-P-7034

3

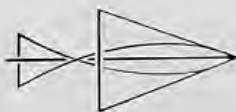
MILITARY STANDARD

MS20219

SUPERSEDES: AN219

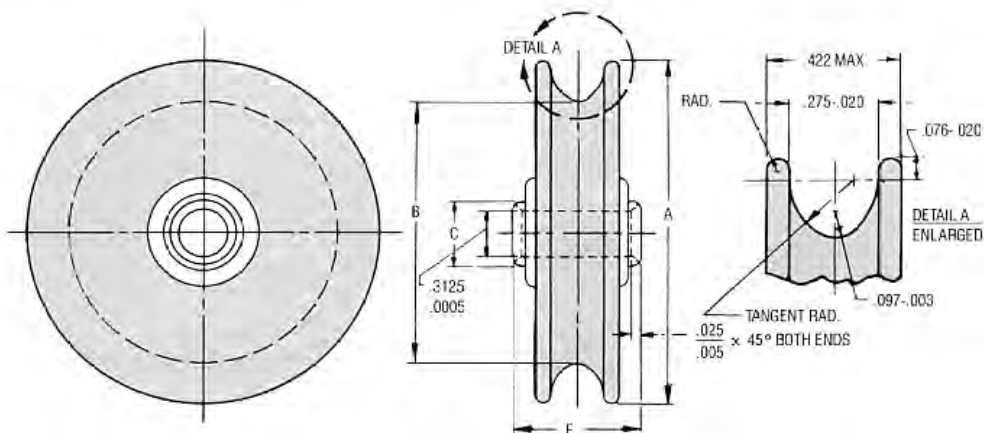
Genuine Aircraft Hardware Co.

RALMARK
C O M P A N Y



AIRCRAFT PULLEYS

Hub may be added to pulley sheave where width of bearing outer race is greater than maximum width of pulley sheave



DASH NO.		CABLE SIZE	A DIA.	B DIA.	C REF.	E -.005	WEIGHT MAX. LBS.	PULLEY STRENGTH			BEARING NUMBERS	
PHENOLIC	ALUMINUM							ALLOWABLE LIMIT LOADS ON PULLEY	MAX. LIMIT LOAD ON CABLE INDEPEND. OF WRAP ANGLE			
									1/8 CABLE	5/32 CABLE		3/16 CABLE
-1	A1	1/8	1.755	1.255	.465	.070	500 (A)				P5K	
-2	A2	5/32	3.005	2.505		.175	1680	830	1040	1250	PD5K	
-3	A3	AND	4.255	3.755	.475	.260	2500				PD5K	
-4	A4	3/16	5.505	5.005		.370						PD5K

Example of part numbers: MS20220-1 — Pulley with high pressure laminated phenolic sheave and fixed ball bearing with contact seal. MS20220A1 — Pulley with aluminum alloy sheave and fixed ball bearing with contact seal. Anodized per MIL-A-8625. DIMENSIONS IN INCHES: Unless otherwise specified, tolerances $\pm .010$. End faces of all bearing hubs are flat and square within $\pm 1^\circ$. INTERCHANGEABILITY RELATIONSHIP WITH AN220 PULLEYS: AN220 Pulleys and MS20220 Pulleys of like dash numbers are universally, functionally and dimensionally interchangeable. (A) The low allowable limit load of the -1 Pulley is based on cable fatigue. When used on frequently used aircraft controls the cable wrap angle should not be more than 15° from a straight line. Compression type molded pulleys available on special order. BEARING DATA — Page 11.

MILITARY STANDARD

MS20220

SUPERSEDES: AN220

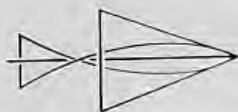
TITLE: PULLEY, GROOVE, FLIGHT CONTROL, AIRCRAFT

PROCUREMENT SPECIFICATION — MIL-P-7034

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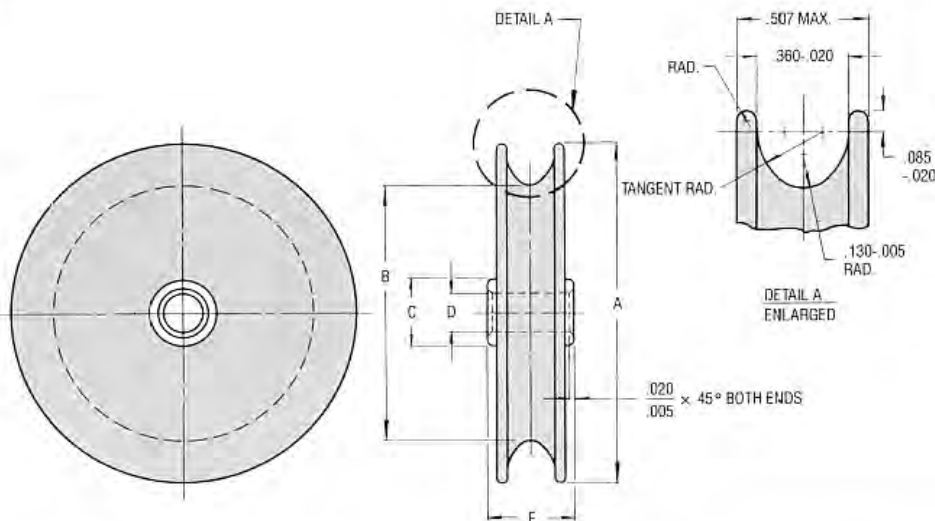
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RALMARK
C O M P A N Y



AIRCRAFT PULLEYS

Hub may be added to pulley sheave where width of bearing outer race is greater than maximum width of pulley sheave.



DASH NO.		CABLE SIZE	A DIA.	B DIA.	C DIA. REF.	D DIA. -.0005	E -.005	WEIGHT MAX. LB.	PULLEY STRENGTH			BEARING NUMBERS	
PHENOLIC	ALUMINUM								ALLOW. LIMIT LOAD ON PULLEY	MAX. LIMIT LOAD ON CABLE INDEP. OF WRAP ANGLE			
										3/16 CABLE	7/32 CABLE		1/4 CABLE
	A1	3/16	2.630	2.005	.500	.3125	.625	.165	2800				PD5K
-2	A2	7/32 AND	4.130	3.505				450	4900	2620	3060	3500	P8
-3	A3	1/4	5.630	5.005	.800	.5000	.750	680	7000				P8

Example of part numbers: MS20221-2 — Pulley with high pressure laminated phenolic sheave and fixed ball bearing with contact seal. MS20221A2 — Pulley with aluminum alloy sheave and fixed ball bearing with contact seal. Anodized per MIL-A-8625. DIMENSIONS IN INCHES: Unless otherwise specified, tolerances $\pm .010$. End Faces of bearing hubs are flat and square within $\pm 1^\circ$. INTERCHANGEABILITY RELATIONSHIP WITH AN221 PULLEYS: AN221 and MS20221 Pulleys of like dash numbers are universally, functionally and dimensionally interchangeable. Compression type molded pulleys available on special order. BEARING DATA — Page 11.

TITLE: PULLEY, GROOVE, HEAVY DUTY, CONTROL, AIRCRAFT

PROCUREMENT SPECIFICATION — MIL-P-7034

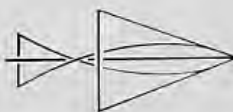
MILITARY STANDARD

MS20221

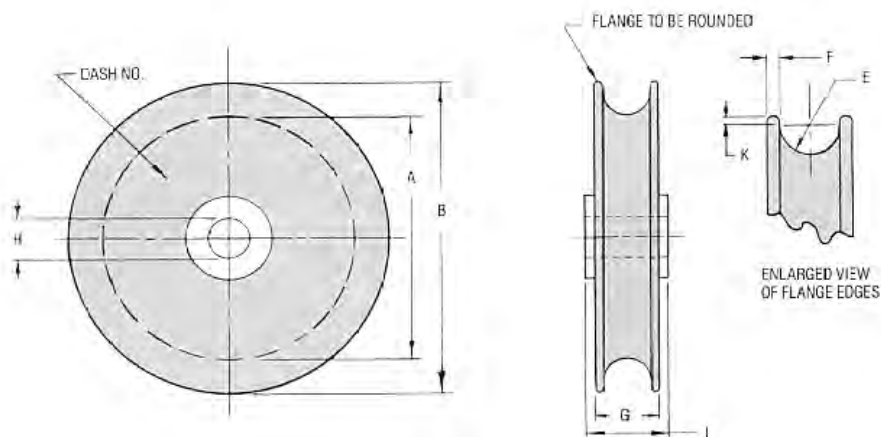
SUPERSEDES: AN221

Genuine Aircraft Hardware Co.

RALMARK
C O M P A N Y



AIRCRAFT PULLEYS



DASH NO.	CABLE SIZE	A GROOVE +.000 -.010 DIA.	B +.000 -.010 DIA.	E RAD.	F	G	H +.0000 -.0005 DIA.	J +.000 -.005	K ±.005	WEIGHT MAX. LB.	PULLEY LIMIT LOAD LBS.	BEARING NOS.
-1B	1/16, 5/64, 3/32	.972	1.250	+.003	.060	+.000	.1900	.297	.040	.026	300	KP3AK
-2B		2.222	2.500									
-3B	1/8, 5/32, 3/16	1.510	2.000	+.003	.086	+.000	.2500	.484	.086	.090	600	KP4K
-4B		3.010	3.500									
-5B	3/16, 7/32, 1/4	4.374	5.000	+.005	.092	.500 ± .007	.3750	.620	.092	.500	3000	KP6
-6B		5.374	6.000									

Example of part numbers: MS24566-1B — Pulley with high pressure laminated phenolic sheave and fixed ball bearing with contact seal. Pulleys with aluminum sheaves are not covered by this Military Standard or Specification. (For aluminum equivalent, see "M" series, page 9.) — ENGINEERING INFORMATION: MS24566-1B and MS24566-3B shall not be installed on frequently used aircraft controls to bend the cable more than 15° from a straight line. INTERCHANGEABILITY RELATIONSHIP — MS24566 parts can replace the inactivated AN210 parts identified by the same dash numbers. Use only the superseding MS24566 parts of the same dash numbers for Design and Replacement.
Compression type molded pulleys available on special order.
BEARING DIMENSIONS — Page 11.

MILITARY STANDARD

MS24566

SUPERSEDES: AN210 SERIES

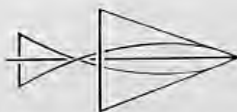
TITLE: PULLEYS — CONTROL, ANTI-FRICTION BEARING

PROCUREMENT SPECIFICATION — MIL-P-7034

Genuine Aircraft Hardware Co.

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RALMARK
C O M P A N Y

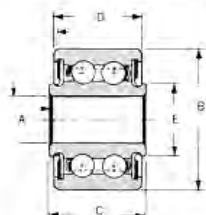


AIRCRAFT PULLEYS

BEARING DATA: MIL-P-7034 PULLEYS

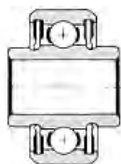
Precision type. Seals and lubrication as specified in the current issue of specification MIL-P-7034.

Special greases available when required.



DOUBLE ROW
CAGE TYPE

PD5K



SINGLE ROW
CAGE TYPE

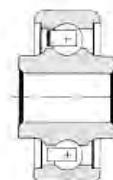
P4K KP3K
P5K KP3AK
P10K KP4K
W4AK



SINGLE ROW,
FULL BALL
COMPLEMENT

P8
KP6

SERIES II
METAL SHIELDS



SINGLE ROW
NYLON CAGE

K3K
K3AK
K4K

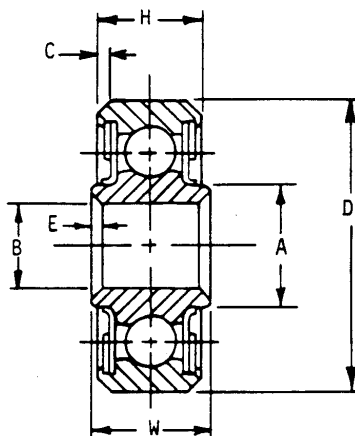
PLATING — Except for bore, all exposed surfaces are cadmium plated in accordance with latest specification requirements.

DIMENSIONS (Inches)					
	A	B	C	D	E
BEARING NUMBER	BORE +.0000 -.0005	O.D. +.0000 -.0005	WIDTH (I.R.) +.000 -.005	WIDTH (O.R.) +.000 -.005	APPROX. SHOULDER DIA. (I.R.)
KP3K	.1900	.7774	.297	.270	.332
KP3AK	.1900	.6250	.297	.234	.297
KP4K	.2500	.9014	.484	.335	.390
KP6	.3750	1.4375	.620	.469	.591
P4K	.2500	.8750	.438	.375	.423
W4AK	.2500	.7500	.438	.312	.375
P5K	.3125	.8750	.625	.375	.465
PD5K	.3125	.9375	.625	.563	.475
P8	.5000	1.6875	.750	.563	.768
P10K	.6250	1.1875	.438	.375	.769
K3K	.1900	.7774	.297	.270	.332
K3AK	.1900	.6250	.297	.234	.344
K4K	.2500	.9014	.484	.335	.420

Genuine Aircraft Hardware Co.

MS27640

Bearing, Ball, Airframe, Antifriction, Heavy Duty



DIMENSIONS IN INCHES

MS DASH NO.	REF P/N	B BORE (b)	D OUTSIDE DIAMETER (a) (b)		W WIDTH RING (a) (b)		H WIDTH OUTER RING (a) (b)		A SHOULDER DIAMETER INNER APPROX.	E INNER (d) BORE CHAMFER +.015 -.000	C OUTER (c) RING OD CHAMFER +.015 -.000	RADIAL LIMIT LOAD RATING LBS.	THRUST LIMIT LOAD RATING LBS.	(e) RADIAL LOAD RATING (lbs) FOR AVERAGE LIFE OF 10,000 COMPLETE 90 DEGREE CYCLES		WEIGHT POUNDS APPROX.
			(a)	(b)	(a)	(b)	CASE I	CASE II								
-3A	KP3L	.1900	.6250	.245	.203	.280						1560	700	1520	1260	.01
-3	KP3L		.7774	.297	.270	.331				.005	.022	1880	900	1700	1450	.03
-4	KP4	.2500	.9014	.484	.335	.390						2680	1200	2410	2030	.04
-5	KP5	.3125	1.2500	.558	.375	.469					.032	5620	2500	4900	3970	.09
-6	KP6	.3750	1.4375	.620	.469	.591						7910	3500	6540	5410	.15
-8	KP8	.5000	1.6875	.620	.500	.768				.015	.044	11800	5200	9320	7700	.21
-10	KP10	.6250	1.9375			.850						14100	6200	11000	9060	.28

NOTES:

- (a) DIMENSIONS TO BE MET AFTER PLATING.
- (b) OUT-OF-ROUND TOLERANCES: +.0002, -.0007; OUTER DIA: +.0005, -.0010.
- (c) 45° CHAMFER OR A RADIUS GIVING APPROXIMATELY THE SAME GRIP FOR STAKING THE BEARING IN THE HOUSING WILL BE ACCEPTABLE.
- (d) 45° CHAMFER OR A RADIUS GIVING APPROXIMATELY THE SAME FILLET CLEARANCE WILL BE ACCEPTABLE.
- (e) CASE I = LOAD FIXED WITH RESPECT TO OUTER RACE.
CASE II = LOAD FIXED WITH RESPECT TO INNER RACE
- (f) THESE RATINGS ARE FOR OPERATION UP TO 250°F. FOR OPERATION UP TO 350°F, THE RATINGS SHALL BE REDUCED BY 20%.

1. MATERIALS: RINGS: STEEL, FED-STD-66, E52100.
BALLS: STEEL, FED-STD-66, E51100 OR E52100
2. SEALS: POLYTETRAFLUOROETHYLENE PER AMS3652 OR POLYTETRAFLUOROETHYLENE SHEET, GLASS FABRIC REINFORCED PER AMS3666.
3. SEAL RETAINERS: STEEL, CORROSION RESISTANT.
4. LUBRICANT: MIL-G-81322 OR MIL-G-23827. MIL-G-81322 SHALL BE USED FOR OPERATION ABOVE 250°F. ALL BEARINGS SHALL BE PRE PACKED WITH GREASE CONFORMING TO MIL-G-81322 UNLESS OTHERWISE SPECIFIED. IF MIL-G-23827 IS REQUIRED, ADD THE LETTER "G" AFTER THE MS PART NUMBER. BEARINGS SHALL BE FILLED 80% MIN.
5. HARDNESS: HEAT TREAT RINGS AND BALLS TO ROCKWELL "C" 60 TO 66 AND STABILIZE FOR OPERATION AT 250°F.
6. SURFACE ROUGHNESS: RACEWAYS AND BALLS - 8 MICROINCHES AA PER ANSI 846.1.
7. PLATING: ALL EXTERNAL SURFACES EXCEPT BORE, SEALS AND SEAL RETAINERS, CADMIUM PLATED PER QQ-P-416, TYPE 1, CLASS 2.
8. RADIAL PLAY: WITHOUT SUFFIX R: .0004 TO .0010
WITH SUFFIX R: .0002 TO .0005
9. RADIAL ECCENTRICITY: INNER RING: .0010 MAX, OUTER RING: .0016 MAX
10. FACE RUNOUT: INNER RING: .0010 MAX, OUTER RING: .0016 MAX
11. PART NUMBER = MS NUMBER AND DASH NUMBER WITH SUFFIX AS APPLICABLE. EXAMPLE MS27640-3, MS27640-3G
12. MS -3A METAL SHIELDS ARE ACCEPTABLE.

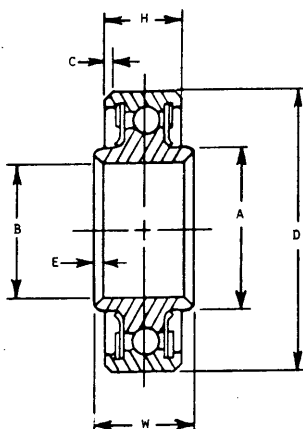
ADDITIONAL NOTES:

- PROCUREMENT SPECIFICATION: MIL-B-7949
- SUPERSEDES: NONE
- THIS INFORMATION FROM MILITARY STANDARD MS27640 PAGE 1 OF 1, REVISED APRIL 9, 1981, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY
- THE PARTS COVERED BY MS20200 ARE CANCELLED BY MS27640. USE MS20200 PARTS UNTIL EXISTING STOCK IS DEPLETED.
- USE MS27640 FOR NEW DESIGN AND REPLACEMENT.

Genuine Aircraft Hardware Co.

MS27641

Bearing, Ball, Airframe, Antifriction, Intermediate Duty



DIMENSIONS IN INCHES

MS DASH NO.	REF P/N	B BORE (b)	D OUTSIDE DIAMETER (a) (b)		W WIDTH RING (a) (b)		H WIDTH OUTER RING (a) (b)		A SHOULDER DIAMETER INNER RING APPROX.	E INNER (d) RING CHAMFER BORE	C OUTER (c) RING CHAMFER OD	RADIAL LIMIT LOAD RATING LBS.	THRUST LIMIT LOAD RATING LBS.	(f) RADIAL LOAD RATING (lbs) FOR AVERAGE LIFE OF 10,000 COMPLETE 90 DEGREE CYCLES		WEIGHT POUNDS APPROX.
			+.0000	-.0005	+.000	-.005	+.000	-.005	+.015	-.000	+.015			-.000	CASE I	
-3	KP3A	.1900	.6250	.297	.254	.297	.254	.297	.297	.005	.016	1560	700	1500	1250	.01
-4	KP4A	.2500	.7500	.281	.219	.281	.219	.281	.380	.005	.016	1880	900	1690	1450	.02
-5	KP5A	.3125	.8125	.297	.234	.297	.234	.297	.415	.015	.016	2190	1000	1820	1600	.02
-6	KP6A	.3750	.8750	.313	.250	.313	.250	.313	.495	.015	.016	2500	1100	1920	1710	.03
-8	KP8A	.5000	1.1250	.375	.313	.375	.313	.375	.616	.015	.016	3910	1700	2870	2550	.05
-10	KP10A	.6250	1.3750	.406	.344	.406	.344	.406	.768	.015	.016	6700	3000	4980	4360	.08
-12	KP12A	.7500	1.6250	.437	.375	.437	.375	.437	.919	.015	.016	8790	3900	5980	5320	.13
-16	KP16A	1.0000	2.0000	.500	.438	.500	.438	.500	1.241	.015	.016	11900	5200	7070	6400	.22
-20	KP20A	1.2500	2.2500	.500	.438	.500	.438	.500	1.478	.015	.016	13800	6100	7400	6810	.26

NOTES:

- (a) DIMENSIONS TO BE MET AFTER PLATING.
- (b) OUT-OF-ROUND TOLERANCES: BORE: +.0002, -.0007; OUTER DIA: +.0005, -.0010.
- (c) 45° CHAMFER OR A RADIUS GIVING APPROXIMATELY THE SAME GRIP FOR STAKING THE BEARING IN THE HOUSING WILL BE ACCEPTABLE.
- (d) 45° CHAMFER OR A RADIUS GIVING APPROXIMATELY THE SAME FILLET CLEARANCE WILL BE ACCEPTABLE.
- (e) CASE I = LOAD FIXED WITH RESPECT TO OUTER RACE.
CASE II = LOAD FIXED WITH RESPECT TO INNER RACE
- (f) THESE RATINGS ARE FOR OPERATION UP TO 250°F. FOR OPERATION UP TO 350°F, THE RATINGS SHALL BE REDUCED BY 20%.

1. MATERIALS: RINGS: STEEL, FED-STD-66, E52100.
BALLS: STEEL, FED-STD-66, E51100 OR E52100
2. SEALS: POLYTETRAFLUOROETHYLENE PER AMS3652 OR POLYTETRAFLUOROETHYLENE SHEET, GLASS FABRIC REINFORCED PER AMS3666.
3. SEAL RETAINERS: STEEL, CORROSION RESISTANT.
4. LUBRICANT: MIL-G-81322 OR MIL-G-23827. MIL-G-81322 SHALL BE USED FOR OPERATION ABOVE 250°F. ALL BEARINGS SHALL BE PRE PACKED WITH GREASE CONFORMING TO MIL-G-81322 UNLESS OTHERWISE SPECIFIED. IF MIL-G-23827 IS REQUIRED, THE LETTER "G" AFTER THE MS PART NUMBER. BEARINGS SHALL BE FILLED 80% MIN.
- ADD
5. HARDNESS: HEAT TREAT RINGS AND BALLS TO ROCKWELL "C" 60 TO 66 AND STABILIZE FOR OPERATION AT 250°F.
6. SURFACE ROUGHNESS: RACEWAYS AND BALLS - 8 MICROINCHES AA PER ANSI 846.1.
7. PLATING: ALL EXTERNAL SURFACES EXCEPT BORE, SEALS AND SEAL RETAINERS, CADMIUM PLATED PER QQ-P-416, TYPE 1, CLASS 2.
8. RADIAL PLAY: WITHOUT SUFFIX R: .0004 TO .0010
WITH SUFFIX R: .0002 TO .0005
9. RADIAL ECCENTRICITY: INNER RING: .0010 MAX, OUTER RING: .0016 MAX
10. FACE RUNOUT: INNER RING: .0010 MAX, OUTER RING: .0016 MAX
11. PART NUMBER = MS NUMBER AND DASH NUMBER WITH SUFFIX AS APPLICABLE. EXAMPLES: MS27641-3, MS27641-3R, MS27641-3RG.
12. MS -3A METAL SHIELDS ARE ACCEPTABLE.

ADDITIONAL NOTES:

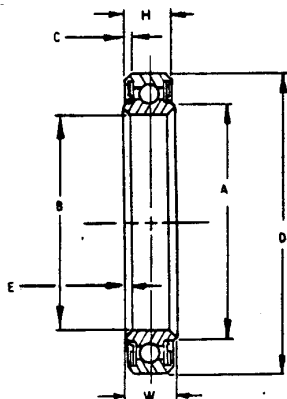
- PROCUREMENT SPECIFICATION: MIL-B-7949
- SUPERSEDES: NONE
- THIS INFORMATION FROM MILITARY STANDARD MS27641 PAGE 1 OF 1, REVISED APRIL 9, 1981, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.
- THE PARTS COVERED BY MS20201 ARE CANCELLED BY MS27641. USE MS20201 PARTS UNTIL EXISTING STOCK IS DEPLETED.
- USE MS27641 FOR NEW DESIGN AND REPLACEMENT.

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Genuine Aircraft Hardware Co.

MS27642

Bearing, Ball, Airframe, Extra Light Duty



DIMENSIONS IN INCHES

MS DASH NO.	REF P/N	BORE (b)	BORE TOLERANCE		OUTSIDE DIAMETER (a) (b)	WIDTH INNER RING (a)	WIDTH OUTER RING (a)	A SHOULDER DIAMETER INNER RING APPROX.	E AND C INNER & OUTER RING CORNER CHAMFER 45 DEGREE		INTERNAL RADIAL CLEARANCE		WEIGHT POUNDS APPROX.
			WITHOUT SUFFIX S	WITH SUFFIX S					(c)	(d)	WITHOUT SUFFIX S	WITH SUFFIX S	
-16	KP16B	1.0000	+.0000		1.7500			1.141					.14
-21	KP21B	1.3130			2.0625			1.454					.16
-23	KP23B	1.4380			2.1875			1.575					.17
-25	KP25B	1.5630			2.3125	.437	.375	1.693	.024		.0003 TO .0010		.19
-29	KP29B	1.8231			2.5625			1.931					.21
-33	KP33B	2.0630			2.8125			2.231					.23
-37	KP37B	2.3130			3.0625			2.468					.26
-47	KP47B	2.9380			3.8750			3.093					.49
-49	KP49B	3.0630			4.0000			3.222					.53
-52	KP52B	3.2500	+.0000	+.0010	4.1875	.531	.469	3.479			.0001 TO .0005		.55
-56	KP56B	3.5000			4.4375			3.775					.58
-60	KP60B	3.7500	+.0000	.0010	4.6875			4.014					.61
-64	KP64B	4.0000			4.9375			4.253					.64
-68	KP68B	4.2500			5.3125			4.517	.039		.0003 TO .0015		.73
-72	KP72B	4.5000			5.5625			4.774					.76
-76	KP76B	4.7500			5.8125			5.046					1.00
-80	KP80B	5.0000			6.0625	.593	.531	5.246					1.04
-84	KP84B	5.2500			6.3125			5.506					1.09
-88	KP88B	5.5000			6.5625			5.770					1.14
-92	KP92B	5.7500			6.8125			6.033					1.18
-96	KP96B	6.0000			7.0625			6.303					1.23

NOTES:

- (a) DIMENSIONS TO BE MET AFTER PLATING.
- (b) OUT-OF-ROUND TOLERANCES: BORE: -16 THRU -49 +.0003, -.0013; -52 THRU -96 +.0005 -.0015. OUTER DIA: +.0010, -.0021.
- (c) A RADIUS GIVING APPROXIMATELY THE SAME GRIP FOR STAKING THE BEARING IN THE HOUSING WILL BE ACCEPTABLE.
- (d) A RADIUS GIVING APPROXIMATELY THE SAME FILLET CLEARANCE WILL BE ACCEPTABLE.
- (e) CASE I = LOAD FIXED WITH RESPECT TO OUTER RACE.
CASE II = LOAD FIXED WITH RESPECT TO INNER RACE
- (f) THESE RATINGS ARE FOR OPERATION UP TO 250°F. FOR OPERATION UP TO 350°F, THE RATINGS SHALL BE REDUCED BY 20%.

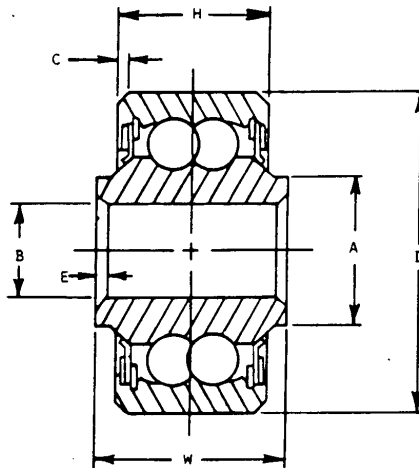
ADDITIONAL NOTES:

- PROCUREMENT SPECIFICATION: MIL-B-7949
- SUPERSEDES: 20202
- THIS INFORMATION FROM MILITARY STANDARD MS27642 PAGE 1 OF 1, REVISED APRIL 9, 1981, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.
- THE PARTS COVERED BY MS20202 ARE CANCELLED BY MS27642. USE MS20202 PARTS UNTIL EXISTING STOCK IS DEPLETED.
- USE MS27642 FOR NEW DESIGN AND REPLACEMENT.

Genuine Aircraft Hardware Co.

MS27643

Bearing, Ball, Airframe, Antifriction, Self-Aligning, Double Row, Heavy Duty



DIMENSIONS IN INCHES

MS DASH NO.	REF P/N	B BORE (b)	D OUTSIDE DIAMETER (a) (b)	W WIDTH INNER RING (d)	H WIDTH OUTER RING (d)	A SHOULDER DIAMETER INNER RING APPROX.	C OUTER RACE CHAMFER (d)	E INNER RACE CHAMFER (d)	LIMIT LOAD RATING		(f) RADIAL LOAD RATING LBS FOR AVERAGE LIFE OF 10,000 COMPLETE 90 DEGREE CYCLES		WEIGHT POUNDS APPROX.
									RADIAL LB.	THRUST LB.	CASE I	CASE II	
-3	DSP3	.1900	.7774	.500	.392	.304	.022	.005	1420	200	1420	1220	.04
-4	DSP4	.2500	.9014	.687	.464	.430			1780	300	1780	1600	.06
-5	DSP5	.3125	1.2500	.812	.656	.515	.032	.015	3740	600	3740	3300	.16
-6	DSP6	.3750	1.4375	.937	.750	.564			5100	800	4980	4370	.24
-8	DSP8	.5000	1.6875	1.000	.812	.775	.044		7120	1000	6340	5570	.36
-10	DSP10	.6250	1.9375	1.125	.937	.869			9000	1300	7780	6860	.53

NOTES:

- (a) DIMENSIONS TO BE MET AFTER PLATING.
- (b) OUT-OF-ROUND TOLERANCES: BORE: +.0002, -.0007; OUTER DIA: +.0005, -.0010.
- (c) 45° CHAMFER OR A RADIUS GIVING APPROXIMATELY THE SAME GRIP FOR STAKING THE BEARING IN THE HOUSING WILL BE ACCEPTABLE.
- (d) 45° CHAMFER OR A RADIUS GIVING APPROXIMATELY THE SAME FILLET CLEARANCE WILL BE ACCEPTABLE.
- (e) CASE I = LOAD FIXED WITH RESPECT TO OUTER RACE.
CASE II = LOAD FIXED WITH RESPECT TO INNER RACE
- (f) THESE RATINGS ARE FOR OPERATION UP TO 250°F. FOR OPERATION UP TO 350°F, THE RATINGS SHALL BE REDUCED BY 20%.

1. MATERIALS: RINGS: STEEL, FED-STD-66, E52100.
BALLS: STEEL, FED-STD-66, E51100 OR E52100
SEALS: POLYTETRAFLUOROETHYLENE PER AMS3652 OR POLYTETRAFLUOROETHYLENE SHEET, GLASS FABRIC REINFORCED PER AMS3666.
SEAL RETAINERS: STEEL, CORROSION RESISTANT.
LUBRICANT: MIL-G-81322 OR MIL-G-23827. MIL-G-81322 SHALL BE USED FOR OPERATION ABOVE 250°F. ALL BEARINGS SHALL BE PRE PACKED WITH GREASE CONFORMING TO MIL-G-81322 UNLESS OTHERWISE SPECIFIED. IF MIL-G-23827 IS REQUIRED,

ADD

- THE LETTER "G" AFTER THE MS PART NUMBER. BEARINGS SHALL BE FILLED 80% MIN.
- 2. HARDNESS: HEAT TREAT RINGS AND BALLS TO ROCKWELL "C" 60 TO 66 AND STABILIZE FOR OPERATION AT 250°F.
- 3. SURFACE ROUGHNESS: RACEWAYS AND BALLS - 8 MICRONS AA PER ANSI 846.1.
- 4. PLATING: ALL EXTERNAL SURFACES EXCEPT BORE, SEALS AND SEAL RETAINERS, CADMIUM PLATED PER QQ-P-416, TYPE 1, CLASS 2.
- 5. RADIAL PLAY: WITHOUT SUFFIX R: .0000 TO .0010 WITH SUFFIX R: .0002 TO .0005
- 6. RADIAL ECCENTRICITY: INNER RING: .0010 MAX, OUTER RING: .0016 MAX
- 7. FACE RUNOUT: INNER RING: .0010 MAX, OUTER RING: .0016 MAX
- 8. PART NUMBER = MS NUMBER AND DASH NUMBER WITH SUFFIX AS APPLICABLE. EXAMPLES: MS27643-3, MS27643-3R, MS27643-3RG.
- 9. MS -3A METAL SHIELDS ARE ACCEPTABLE.

ADDITIONAL NOTES:

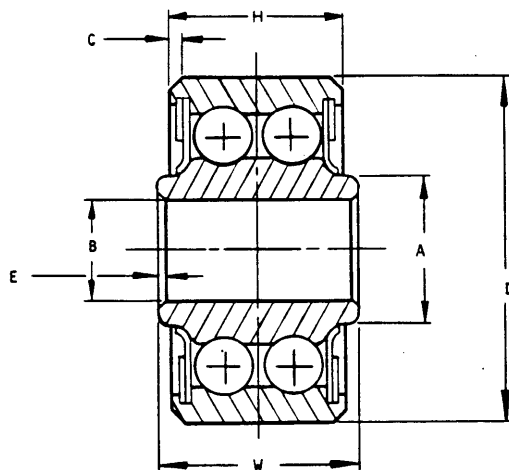
- PROCUREMENT SPECIFICATION: MIL-B-7949
- SUPERSEDES: NONE
- THIS INFORMATION FROM MILITARY STANDARD MS27643 PAGE 1 OF 1, REVISED APRIL 9, 1981, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.
- THE PARTS COVERED BY MS20206 ARE CANCELLED BY MS27643. USE MS20206 PARTS UNTIL EXISTING STOCK IS DEPLETED.
- USE MS27643 FOR NEW DESIGN AND REPLACEMENT.

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Genuine Aircraft Hardware Co.

MS27644

Bearing, Ball, Airframe, Antifriction, Double Row, Heavy Duty



DIMENSIONS IN INCHES

MS DASH NO.	REF P/N	B BORE (b)	D OUTSIDE DIAMETER (a) (b)	W WIDTH INNER RING (a)	H WIDTH OUTER RING (a)	A SHOULDER DIAMETER INNER RING APPROX.	E INNER (d) RING CHAMFER BORE	C OUTER (c) RING CHAMFER OD	AXIAL PLAY INCH MAX	RADIAL LIMIT LOAD RATING LBS.	THRUST LIMIT LOAD RATING LBS.	(f) RADIAL LOAD RATING (lbs) FOR AVERAGE LIFE OF 10,000 COMPLETE 90 DEGREE CYCLES		WEIGHT POUNDS APPROX.
												CASE I	CASE II	
(g)-3	DPP3	.1900	.7774	.495	.473	.302		.018	.005	2950	1700	2950	2830	.04
(h)-4	DPP4	.2500	.9014	.620	.491	.410	.005			5370	1800	3550	3020	.06
(g)-5	DPP5	.3125	1.2500	.745	.687	.459		.032	.006	11000	4000	7360	6250	.17
(g)-6	DPP6	.3750	1.4375	.870	.794	.551	.015			15760	5300	9690	8120	.26
-8	DPP8	.5000	1.6875	.932	.856	.735		.044	.007	23600	7800	14100	11600	.38
-10	DPP10	.6250	1.9375	.995	.920	.890				28400	9400	15300	13100	.53

NOTES:

- (a) DIMENSIONS TO BE MET AFTER PLATING.
- (b) OUT-OF-ROUND TOLERANCES: BORE: +.0002, -.0007; OUTER DIA: +.0005, -.0010.
- (c) 45° CHAMFER OR A RADIUS GIVING APPROXIMATELY THE SAME GRIP FOR STAKING THE BEARING IN THE HOUSING WILL BE ACCEPTABLE.
- (d) 45° CHAMFER OR A RADIUS GIVING APPROXIMATELY THE SAME FILLET CLEARANCE WILL BE ACCEPTABLE.
- (e) CASE I = LOAD FIXED WITH RESPECT TO OUTER RACE.
CASE II = LOAD FIXED WITH RESPECT TO INNER RACE
- (f) THESE RATINGS ARE FOR OPERATION UP TO 250°F. FOR OPERATION UP TO 350°F, THE RATINGS SHALL BE REDUCED BY 20%.
- (g) BOLTS OF 180,000 PSI TENSILE STRENGTH ARE REQUIRED TO DEVELOP THE RADIAL LIMIT LOAD SHOWN.
- (h) BOLTS OF 160,000 PSI TENSILE STRENGTH ARE REQUIRED TO DEVELOP THE RADIAL LIMIT LOAD SHOWN.

1. MATERIALS: RINGS: STEEL, FED-STD-66, E52100.
BALLS: STEEL, FED-STD-66, E51100 OR E52100
SEALS: POLYTETRAFLUOROETHYLENE PER AMS3652 OR POLYTETRAFLUOROETHYLENE SHEET, GLASS FABRIC REINFORCED PER AMS3666.
SEAL RETAINERS: STEEL, CORROSION RESISTANT.
LUBRICANT: MIL-G-81322 OR MIL-G-23827. MIL-G-81322 SHALL BE USED FOR OPERATION ABOVE 250°F. ALL BEARINGS SHALL BE PRE PACKED WITH GREASE CONFORMING TO MIL-G-81322 UNLESS OTHERWISE SPECIFIED. IF MIL-G-23827 IS REQUIRED, ADD THE LETTER "G" AFTER THE MS PART NUMBER. BEARINGS SHALL BE FILLED 80% MIN.
2. HARDNESS: HEAT TREAT RINGS AND BALLS TO ROCKWELL "C" 60 TO 66 AND STABILIZE FOR OPERATION AT 250°F.
3. SURFACE ROUGHNESS: RACEWAYS AND BALLS - 8 MICROINCHES AA PER ANSI 846.1.
4. PLATING: ALL EXTERNAL SURFACES EXCEPT BORE AND SEAL RETAINERS, CADMIUM PLATED PER QQ-P-416, TYPE 1, CLASS 2.
5. RADIAL PLAY: .0004 TO .0010
WITH SUFFIX R: .0002 TO .0005
6. RADIAL ECCENTRICITY: INNER RING: .0010 MAX, OUTER RING: .0016 MAX
7. FACE RUNOUT: INNER RING: .0010 MAX, OUTER RING: .0016 MAX
8. PART NUMBER = MS NUMBER AND DASH NUMBER. EXAMPLES: MS27644-3, MS27644-3C.
9. REMOVABLE SEALS ARE REQUIRED..

ADDITIONAL NOTES:

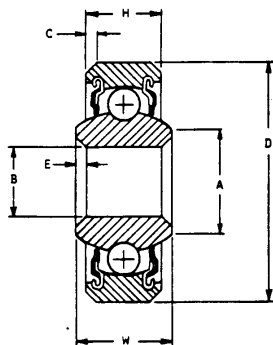
- PROCUREMENT SPECIFICATION: MIL-9-7949
- SUPERSEDES: MS20207
- THIS INFORMATION FROM MILITARY STANDARD MS27644 PAGE 1 OF 1, REVISED APRIL 9, 1981, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.
- THE PARTS COVERED BY MS20207 ARE CANCELLED BY MS27644. USE MS20207 PARTS UNTIL EXISTING STOCK IS DEPLETED.
- USE MS27644 FOR NEW DESIGN AND REPLACEMENT

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MS27645

Bearing, Ball, Airframe, Antifriction, Self-Aligning, Light and Heavy Duty



DIMENSIONS IN INCHES

MS DASH NO.	REF P/N	B BORE (b)	D OUTSIDE DIAMETER (a) (b)		W WIDTH INNER RING (a)	H WIDTH OUTER RING (a)	A SHOULDER DIAMETER INNER RING APPROX.	E INNER (d) RING CHAMFER BORE +.015 -0.000	C OUTER (c) RING CHAMFER OD +.015 -0.000	RADIAL LIMIT LOAD RATING LBS.	THRUST LIMIT LOAD RATING LBS.	(f) RADIAL LOAD RATING (lbs) FOR AVERAGE LIFE OF 10,000 COMPLETE 90 DEGREE CYCLES		AXIAL PLAY INCH MAX	WEIGHT POUNDS APPROX.
			(a)	(b)								(e)			
		+0.000 -0.0005	+0.0000 -0.0005	+0.000 -0.005	+0.000 -0.005							CASE I	CASE II		
-3A	KSP3L	.1900	.6250	.245	.203	.253				550	100	550	480	.023	.01
-4A	KSP4A	.2500	.7500	.281	.219	.321	.005	.016		900		900	770	.025	
-5A	KSP5A	.3125	.8125	.297	.234	.381	.015			1000	200	950	815	.028	.02
-6A	KSP6A	.3750	.8750	.313	.250	.453	.016			1120		1120	990	.030	
-3	KSP3	.1900	.7774	.297	.270	.290		.022		900		900	770	.023	.03
-4	KSP4	.2500	.9014	.484	.335	.390	.005			1410	300	1230	1230	.025	.04
-5	KSP5	.3125	1.2500	.558	.375	.561		.032		2190		2190	1890	.028	.10
-6	KSP6	.3750	1.4375	.620	.469	.607	.015			2980	400	2980	2580	.030	.15
-8	KSP8	.5000	1.6875	.620	.500	.791		.044		3670	500	3670	3290	.032	.23
-10	KSP10	.6250	1.9375	.813	.625	.916				5320	600	4980	4360	.034	.37

NOTES:

- (a) DIMENSIONS TO BE MET AFTER PLATING.
- (b) OUT-OF-ROUND TOLERANCES: BORE: +.0002, -.0007; OUTER DIA: +.0005, -.0010.
- (c) 45° CHAMFER OR A RADIUS GIVING APPROXIMATELY THE SAME GRIP FOR STAKING THE BEARING IN THE HOUSING WILL BE ACCEPTABLE.
- (d) 45° CHAMFER OR A RADIUS GIVING APPROXIMATELY THE SAME FILLET CLEARANCE WILL BE ACCEPTABLE.
- (e) CASE I = LOAD FIXED WITH RESPECT TO OUTER RACE.
CASE II = LOAD FIXED WITH RESPECT TO INNER RACE
- (f) THESE RATINGS ARE FOR OPERATION UP TO 250°F. FOR OPERATION UP TO 350°F, THE RATINGS SHALL BE REDUCED BY 20%.
- (g) THESE BEARINGS ARE SELF-ALIGNING FOR 10° IN EITHER DIRECTION EXCEPT MS-4A, -5A, AND -6A WHICH ARE SELF-ALIGNING FOR 8° IN EITHER DIRECTION.

1. MATERIALS: RINGS: STEEL, FED-STD-66, E52100.
BALLS: STEEL, FED-STD-66, E51100 OR E52100
SEALS: POLYTETRAFLUOROETHYLENE PER AMS3652 OR POLYTETRAFLUOROETHYLENE SHEET, GLASS FABRIC REINFORCED PER AMS3666.
SEAL RETAINERS: STEEL, CORROSION RESISTANT.
LUBRICANT: MIL-G-81322 OR MIL-G-23827. MIL-G-81322 SHALL BE USED FOR OPERATION ABOVE 250°F. ALL BEARINGS SHALL BE PRE PACKED WITH GREASE CONFORMING TO MIL-G-81322 UNLESS OTHERWISE SPECIFIED. IF MIL-G-23827 IS REQUIRED, THE LETTER "G" AFTER THE MS PART NUMBER. BEARINGS SHALL BE FILLED 80% MIN.
2. HARDNESS: HEAT TREAT RINGS AND BALLS TO ROCKWELL "C" 60 TO 66 AND STABILIZE FOR OPERATION AT 250°F.
3. SURFACE ROUGHNESS: RACEWAYS AND BALLS - 8 MICROINCHES AA PER ANSI 846.1.
4. PLATING: ALL EXTERNAL SURFACES EXCEPT BORE, SEALS AND SEAL RETAINERS, CADMIUM PLATED PER QQ-P-416, TYPE 1, CLASS 2.
5. RADIAL PLAY: WITHOUT SUFFIX R: .0000 TO .0010
WITH SUFFIX R: .0002 TO .0005
6. RADIAL ECCENTRICITY: INNER RING: .0010 MAX, OUTER RING: .0016 MAX
7. FACE RUNOUT: INNER RING: .0010 MAX, OUTER RING: .0016 MAX
8. PART NUMBER = MS NUMBER AND DASH NUMBER WITH SUFFIX AS APPLICABLE. EXAMPLES: MS27645-3, MS27645-3R, MS27645-3RG

ADDITIONAL NOTES:

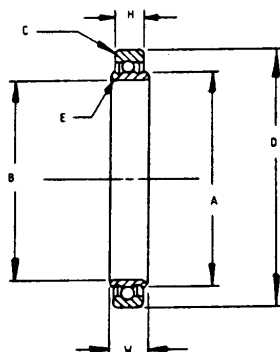
- PROCUREMENT SPECIFICATION: MIL-B-7949
- SUPERSEDES: MS27261
- THIS INFORMATION FROM MILITARY STANDARD MS27645 PAGE 1 OF 1, REVISED APRIL 9, 1981, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.
- THE PARTS COVERED BY MS27261 ARE CANCELLED BY MS27645. USE MS27261 PARTS UNTIL EXISTING STOCK IS DEPLETED.
- USE MS27645 FOR NEW DESIGN AND REPLACEMENT.

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Genuine Aircraft Hardware Co.

MS27646

Bearing, Ball, Airframe, Antifriction, Extra Light Duty



DIMENSIONS IN INCHES

MS DASH NO.	REF P/N	B	D	W	H	A	E AND C	RADIAL LIMIT LOAD RATING LBS.	THRUST LIMIT LOAD RATING LBS.	(f) RADIAL LOAD RATING (lbs) FOR AVERAGE LIFE OF 10,000 COMPLETE 90 DEGREE CYCLES		WEIGHT POUNDS APPROX.
		(a)	(a)	(a)	(a)	(a)	(c)			(b)	(d) CASE I	
		+ .0007 - .0007 [D]	+ .0000 - .0010	+ .000 - .005	+ .000 - .005	APPROX.	+ .020 - .000					
-38	B538DD	.6250	1.0625			.777		3280	1500	1990	1820	.03
-39	B539XX	.7500	1.1875			.895		3750	1700	2050	1900	.04
-40	B540DD	.8750	1.3125			1.016		4220	1900	2110	1970	.05
-41	B541DD	1.0625	1.5000			1.216		5000	2200	2170	2020	.06
-42	B542DD	1.3125	1.7500	.281	.250	1.451	.015	5950	2700	220	2130	.09
-43	B543DD	1.5625	2.0000			1.702		6880	3200	2260	2180	.10
-44	B544DD	1.8125	2.2500			1.970		7980	3600	2300	2220	.11
-45	B545DD	2.0625	2.6250			2.286		9220	4000	2340	2260	.15
-46	B546DD	2.3125	2.8750			2.527		10150	4400	2360	2280	.17

NOTES:

- (a) DIMENSIONS TO BE MET AFTER PLATING.
- (b) A RADIUS GIVING APPROXIMATELY THE SAME GRIP FOR STAKING THE BEARING IN THE HOUSING WILL BE ACCEPTABLE.
- (c) A RADIUS GIVING APPROXIMATELY THE SAME FILLET CLEARANCE WILL BE ACCEPTABLE.
- (d) CASE I = LOAD FIXED WITH RESPECT TO OUTER RACE.
CASE II = LOAD FIXED WITH RESPECT TO INNER RACE
- (e) THESE RATINGS ARE FOR OPERATION UP TO 250°F. FOR OPERATION UP TO 350°F, THE RATINGS SHALL BE REDUCED BY 20%.
- (g) OUT-OF-ROUND TOLERANCES: BORE: -38 thru -43 ± .0010; -44 thru -46: ± .0016;
OUTSIDE DIAMETER: -38 THRU -43 +.0005, -.0015; -44 THRU -46; +.0008, -.0023
- (h) FOR DASH NUMBER SIZES -44, -45 AND -46, THE OUTSIDE DIAMETER TOLERANCE SHALL BE +.0000 TO -.0015
- (i) FOR DASH NUMBER SIZES -44, -45, AND -46 THE BORE TOLERANCE SHALL BE +.0010 TO -.0010 INCHES.
- (j) DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.

REQUIREMENTS:

1. MATERIALS: RINGS: STEEL, FED-STD-66, E52100.
BALLS: STEEL, FED-STD-66, E51100 OR E52100
2. SEALS: POLYTETRAFLUOROETHYLENE PER AMS3652 OR POLYTETRAFLUOROETHYLENE SHEET, GLASS FABRIC REINFORCED PER AMS3666.
3. LUBRICANT: MIL-G-81322 OR MIL-G-23827. MIL-G-81322 SHALL BE USED FOR OPERATION ABOVE 250°F. ALL BEARINGS SHALL BE PRE PACKED WITH GREASE CONFORMING TO MIL-G-81322 UNLESS OTHERWISE SPECIFIED. IF MIL-G-23827 IS REQUIRED, ADD THE LETTER "G" AFTER THE MS PART NUMBER. BEARINGS SHALL BE FILLED 80% MIN.
4. HARDNESS: HEAT TREAT RINGS AND BALLS TO ROCKWELL "C" 60 TO 66 AND STABILIZE FOR OPERATION AT 250°F.
5. SURFACE ROUGHNESS: RACEWAYS AND BALLS - 8 MICROINCHES AA PER ANSI 846.1.
6. PLATING: ALL EXTERNAL SURFACES EXCEPT BORE, SEALS AND SEAL RETAINERS, CADMIUM PLATED PER QQ-P-416, TYPE 1, CLASS 2.
7. INTERNAL RADIAL CLEARANCE: .0008 TO .0018
8. RADIAL AND LATERAL ECCENTRICITY: INNER RING: .0020 INCH MAX., OUTER RING: .0016 INCH MAX.
9. PART NUMBER = MS NUMBER AND DASH NUMBER. EXAMPLES: MS27646-38, MS27646-38G.
10. REMOVABLE SHIELDS ARE OPTIONAL.

ADDITIONAL NOTES:

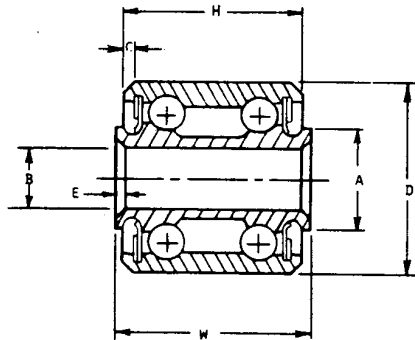
- PROCUREMENT SPECIFICATION: MIL-B-7949
- SUPERSEDES: NONE
- THIS INFORMATION FROM MILITARY STANDARD MS27646 PAGE 1 OF 1, REVISED, JUNE 21, 1995, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.

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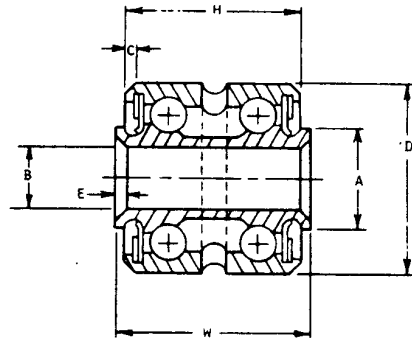
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MS27647

Bearings, Ball, Airframe, Antifriction, Extra Wide, Double Row, Intermediate Duty



DW - WITHOUT RELUBRICATION GROOVE



GDW - WITH RELUBRICATION GROOVE

DIMENSIONS IN INCHES

MS DASH NO.	REF. P/N		B	D	W	H	A	E	C	RADIAL LIMIT LOAD RATING LBS.	THRUST LIMIT LOAD RATING LBS.	(f) RADIAL LOAD RATING (lbs) FOR AVERAGE LIFE OF 10,000 COMPLETE 90 DEGREE CYCLES		WEIGHT POUNDS APPROX.
	RELUBRICANT GROOVE		(b)	(a) (b)	(a)	(a)	INNER RING APPROX.	(d) RING CHAMFER BORE	(c) RING CHAMFER OD			CASE I	CASE II	
	WITHOUT	WITH	+0.000 -0.005	+0.000 -0.005	+0.000 -0.005	+0.000 -0.005		+0.015 -0.000	+0.015 -0.000					
-4A	DW4K2	GDW4K2	.2500	.6250	.562	.500	.338			1400	500	1050	960	.025
-4	DW4K	GDW4K	.2500	.7500	.875	.750	.372			2700	900	2070	1850	.04
-5	DW5	GDW5	.3125	.8750	.938	.813	.466	.005	.016	5140	1600	2600	2320	.07
-6	DW6	GDW6	.3750	1.0625	1.188	1.063	.570			8440	2600	4220	3740	.12
-8	DW8	GDW8	.5000	1.4375	1.500	1.3750	.709		.032	15520	4700	7610	6520	.29

NOTES:

- (a) DIMENSIONS TO BE MET AFTER PLATING.
- (b) OUT-OF-ROUND TOLERANCES: BORE: +.0002, -.0007; OUTER DIA: +.0005, -.0010.
- (c) 45° CHAMFER OR A RADIUS GIVING APPROXIMATELY THE SAME GRIP FOR STAKING THE BEARING IN THE HOUSING WILL BE ACCEPTABLE.
- (d) 45° CHAMFER OR A RADIUS GIVING APPROXIMATELY THE SAME FILLET CLEARANCE WILL BE ACCEPTABLE.
- (e) CASE I = LOAD FIXED WITH RESPECT TO OUTER RACE.
CASE II = LOAD FIXED WITH RESPECT TO INNER RACE
- (f) THESE RATINGS ARE FOR OPERATION UP TO 250°F. FOR OPERATION UP TO 350°F, THE RATINGS SHALL BE REDUCED BY 20%.

1. MATERIALS: RINGS: STEEL, FED-STD-66, E52100.
BALLS: STEEL, FED-STD-66, E51100 OR E52100
SEALS: POLYTETRAFLUOROETHYLENE PER AMS3652 OR POLYTETRAFLUOROETHYLENE SHEET, GLASS FABRIC REINFORCED PER AMS3666.
SEAL RETAINERS: STEEL, CORROSION RESISTANT.
LUBRICANT: MIL-G-81322 OR MIL-G-23827. MIL-G-81322 SHALL BE USED FOR OPERATION ABOVE 250°F. ALL BEARINGS SHALL BE PRE PACKED WITH GREASE CONFORMING TO MIL-G-81322 UNLESS OTHERWISE SPECIFIED. IF MIL-G-23827 IS REQUIRED, THE LETTER "G" AFTER THE MS PART NUMBER. BEARINGS SHALL BE FILLED 80% MIN.
2. HARDNESS: HEAT TREAT RINGS AND BALLS TO ROCKWELL "C" 60 TO 66 AND STABILIZE FOR OPERATION AT 250°F.
3. SURFACE ROUGHNESS: RACEWAYS AND BALLS - 8 MICRORINCHES AA PER ANSI 846.1.
4. PLATING: ALL EXTERNAL SURFACES EXCEPT BORE, SEALS AND SEAL RETAINERS, CADMIUM PLATED PER QQ-P-416, TYPE 1, CLASS 2.
5. RADIAL PLAY: WITHOUT SUFFIX R: .0004 TO .0010
WITH SUFFIX R: .0002 TO .0005
6. RADIAL ECCENTRICITY: INNER RING: .0010 MAX, OUTER RING: .0016 MAX
7. FACE RUNOUT: INNER RING: .0010 MAX, OUTER RING: .0016 MAX
8. PART NUMBER = MS NUMBER AND DASH NUMBER WITH SUFFIX AS APPLICABLE. SUFFIX "G" INDICATES LUBRICANT GROVE. SUFFIX "R" INDICATES CLOSE TOLERANCE. EXAMPLES: MS27647-4, MS27647-4G, MS27647-4R, MS27647-4GR, MS27647-4AR, MS27647-4AR, MS27647-4L, MS27647-4GL, MS27647-4RL, MS27647-4RGL.
9. REMOVABLE SEALS ARE REQUIRED.

ADDITIONAL NOTES:

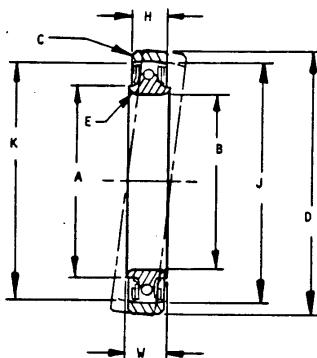
- PROCUREMENT SPECIFICATION: MIL-B-7949
- SUPERSEDES: NONE
- THIS INFORMATION FROM MILITARY STANDARD MS27647 PAGE 1 OF 1, REVISED APRIL 9, 1981, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.

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MS27648

Bearing, Ball, Airframe, Antifriction, External Self-Aligning, Extra Light Duty



DIMENSIONS IN INCHES

MS DASH NO.	REF. PART NO.	B	D	W	H	A	E AND C	K	J	PERMISSIBLE MISALIGNMENT EITHER DIRECTION	RADIAL LIMIT LOAD RATING LBS.	THRUST LIMIT LOAD RATING LBS.	(f)		WT. LBS. (APPX)
		BORE (b)	OUTSIDE DIAMETER (a) (b)	WIDTH INNER RING (a)	WIDTH OUTER RING (a)	SHOULDER DIAMETER INNER RING	INNER & OUTER RING CORNER X 45 DEGREES (c)	IQ SHARP CORNER (REF)	BRG SPHERE Q.D.				RADIAL LOAD RATING (lbs) FOR AVERAGE LIFE OF 10,000 COMPLETE 90 DEGREE CYCLES		
		+0.000 -0.0010	+0.000 -0.0010	+0.000 -0.005	+0.000 -0.005	REF.	(d) +0.015 -0.000						(e) CASE I	(e) CASE II	
-16	KP16BS	1.0000	1.9375	.437	.375	1.141	.024	1.709	1.740	7 DEG. 25'	8085	1600	4260	3960	.18
-21	KP21BS	1.3130	2.2500	.437	.375	1.477	.024	2.028	2.052	6 DEG. 30'	9840	2000	4590	4290	.20
-23	KP23BS	1.4380	2.3750	.437	.375	1.575	.024	2.155	2.178	6 DEG. 30'	10500	2200	4650	4360	.22
-25	KP25BS	1.5630	2.5000	.437	.375	1.693	.024	2.282	2.302	5 DEG. 45'	11300	2300	4680	4420	.25
-29	KP29BS	1.8130	2.7500	.437	.375	1.931	.024	2.535	2.552	5 DEG.	12700	2600	4760	4530	.27
-33	KP33BS	2.0630	3.0000	.437	.375	2.247	.024	2.787	2.802	5 DEG.	14400	2900	4820	4630	.30
-37	KP37BS	2.3130	3.2500	.437	.375	2.468	.024	3.039	3.052	4 DEG. 30'	15800	3200	4880	4690	.33
-47	KP47BS	2.9380	4.1250	.531	.469	3.093	.039	3.846	3.865	4 DEG. 30'	24700	5000	6660	6390	.64
-48	KP48BS	3.0000	4.2500	.531	.469	3.222	.039	3.972	3.990	4 DEG	27500	5500	6150	7840	.69
-49	KP49BS	3.0630	4.2500	.531	.469	3.222	.039	3.972	3.990	4 DEG	27500	5500	8150	7840	.69

NOTES:

- (a) ALL DIMENSIONS TO BE MET AFTER PLATING.
- (b) OUT-OF-ROUND TOLERANCES: BORE: +.0010, -.0020
OUTSIDE DIAMETER: +.0010, -.0020
- (c) A RADIUS GIVING APPROXIMATELY THE SAME GRIP FOR STAKING THE BEARING IN THE HOUSING WILL BE ACCEPTABLE.
- (d) A RADIUS GIVING APPROXIMATELY THE SAME FILLET CLEARANCE WILL BE ACCEPTABLE.
- (e) CASE I = LOAD FIXED WITH RESPECT TO OUTER RACE.
CASE II = LOAD FIXED WITH RESPECT TO INNER RACE
- (f) THESE RATINGS ARE FOR OPERATION UP TO 250°F. FOR OPERATION UP TO 350°F, THE RATINGS SHALL BE REDUCED BY 20%.

1. MATERIALS: RINGS: STEEL, FED-STD-66, E52100.
BALLS: STEEL, FED-STD-66, E51100 OR E52100
2. SEALS: POLYTETRAFLUOROETHYLENE PER AMS3652 OR POLYTETRAFLUOROETHYLENE SHEET, GLASS FABRIC REINFORCED PER AMS3666.
3. SEAL RETAINERS: STEEL, CORROSION RESISTANT
4. LUBRICANT: MIL-G-81322 OR MIL-G-23827. MIL-G-81322 SHALL BE USED FOR OPERATION ABOVE 250°F. ALL BEARINGS SHALL BE PRE PACKED WITH GREASE CONFORMING TO MIL-G-81322 UNLESS OTHERWISE SPECIFIED. IF MIL-G-23827 IS REQUIRED, ADD THE LETTER "G" AFTER THE MS PART NUMBER. BEARINGS SHALL BE FILLED 80% MIN.
5. HARDNESS: HEAT TREAT RINGS AND BALLS TO ROCKWELL "C" 60 TO 66 AND STABILIZE FOR OPERATION AT 250°F.
6. SURFACE ROUGHNESS: RACEWAYS AND BALLS - 8 MICRINCHES AA PER ANSI 846.1.
7. PLATING: ALL EXTERNAL SURFACES EXCEPT BORE, ID OF SELF-ALIGNING OUTER RING AND OD OF OUTER RACE SEALS AND SEAL RETAINERS, CADMIUM PLATED PER QQ-P-416, TYPE 1, CLASS 2.
8. INTERNAL RADIAL CLEARANCE: .0003 TO .0010 - (DOES NOT INCLUDE RADIAL LOOSENESS BETWEEN BEARING OUTER RING AND SELF-ALIGNING RING.)
9. PART NUMBER = MS NUMBER AND DASH NUMBER. EXAMPLES: MS27648-16, MS27648-16C.
10. REMOVABLE SHIELDS ARE REQUIRED.

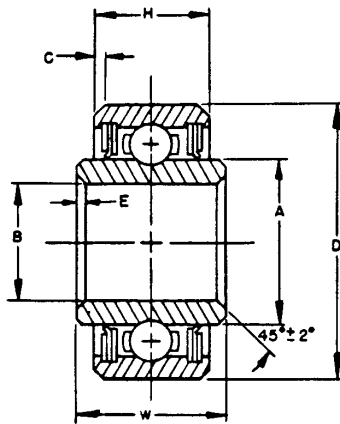
ADDITIONAL NOTES:

- PROCUREMENT SPECIFICATION: MIL-B-7949
- SUPERSEDES: NONE
- THIS INFORMATION FROM MILITARY STANDARD MS27648 PAGE 1 OF 1, REVISED APRIL 9, 1981, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.

Genuine Aircraft Hardware Co.

MS27649

Bearing, Ball, Airframe, Antifriction, Intermediate Duty



DIMENSIONS IN INCHES

MS DASH NO.	REF. PART NO.	B BORE (b)	D OUTSIDE DIAMETER (a) (b)		W WIDTH INNER RING (a)	H WIDTH OUTER RING (a)	A SHOULDER DIAMETER INNER RING (APPROX)	E AND C CORNER CHAMFER X 45 DEGREES		RADIAL LIMIT LOAD RATING LBS.	THRUST LIMIT LOAD RATING LBS.	(f) RADIAL LOAD RATING (lbs) FOR AVERAGE LIFE OF 10,000 COMPLETE 90 DEGREE CYCLES		WT. LBS. (APPX)
			+0.000 -0.005	+0.000 -0.005				+0.015 -0.000	+0.015 -0.000			(d) CASE I	(d) CASE II	
-3	AW3AK	.1900	.6250	.406	.312	.317	.005	.016	450	210	440	440	.018	
-4	AW4AK	.2500	.7500	.438	.312	.415	.005	.016	525	250	510	510	.028	
-5	AW5AK	.3125	.8125	.469	.344	.462	.015	.016	820	380	800	800	.033	
-6	AW6AK	.3750	.8750	.469	.344	.520	.015	.016	820	380	800	800	.034	
-8	AW8AK	.5000	1.1250	.562	.438	.681	.015	.016	1350	630	1310	1310	.075	
-10	AW10AK	.6250	1.3750	.594	.469	.848	.015	.032	1840	860	1790	1790	.119	
-12	AW12AK	.7500	1.6250	.656	.531	1.052	.015	.032	2400	1120	2340	2340	.189	
-16	AW16AK	1.0000	2.0000	.688	.562	1.334	.015	.032	3000	1400	2920	2920	.296	
-20	AW20AK	1.2500	2.2500	.688	.562	1.615	.015	.032	3600	1680	3500	3500	.355	

NOTES:

- (a) OUT-OF-ROUND TOLERANCES: BORE: +.0002, -.0007; OUTER DIA: +.0005, -.0010.
- (b) A RADIUS GIVING APPROXIMATELY THE SAME GRIP FOR STAKING THE BEARING IN THE HOUSING WILL BE ACCEPTABLE.
- (c) A RADIUS GIVING APPROXIMATELY THE SAME FILLET CLEARANCE WILL BE ACCEPTABLE.
- (d) CASE I = LOAD FIXED WITH RESPECT TO OUTER RACE.
CASE II = LOAD FIXED WITH RESPECT TO INNER RACE
- (e) THESE RATINGS ARE FOR OPERATION UP TO 250°F. FOR OPERATION UP TO 350°F, THE RATINGS SHALL BE REDUCED BY 20%.

1. MATERIALS: RINGS: ANSI 440C, CORROSION RESISTANT STEEL
BALLS: ANSI 440C, CORROSION RESISTANT STEEL
2. SEALS: POLYTETRAFLUOROETHYLENE PER AMS3652 OR POLYTETRAFLUOROETHYLENE SHEET, GLASS FABRIC REINFORCED PER AMS3666.
3. SEAL RETAINERS: STEEL, CORROSION RESISTANT.
4. LUBRICANT: MIL-G-81322 OR MIL-G-23827. MIL-G-81322 SHALL BE USED FOR OPERATION ABOVE 250°F. ALL BEARINGS SHALL BE PRE PACKED WITH GREASE CONFORMING TO MIL-G-81322 UNLESS OTHERWISE SPECIFIED. IF MIL-G-23827 IS REQUIRED, ADD THE LETTER "G" AFTER THE MS PART NUMBER. BEARINGS SHALL BE FILLED 80% MIN.
5. HARDNESS: HEAT TREAT RINGS AND BALLS TO ROCKWELL "C" 57 TO 63 AND STABILIZED FOR OPERATION AT 250°F.
6. SURFACE ROUGHNESS: RACEWAYS AND BALLS - 8 MICROINCHES AA PER ANSI 846.1.
7. RADIAL PLAY: .0003 TO .0009
8. RADIAL ECCENTRICITY: INNER RING: .0010 MAXIMUM, OUTER RING: .0016 MAXIMUM.
9. FACE RUNOUT: INNER RING: .0010 MAXIMUM, OUTER RING: .0016 MAXIMUM.
10. PART NUMBER = MS NUMBER AND DASH NUMBER. EXAMPLES: MS27649-3, MS27649-3G.
11. REMOVABLE SEALS ARE REQUIRED.

ADDITIONAL NOTES:

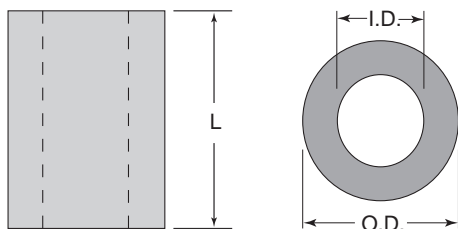
- PROCUREMENT SPECIFICATION: MIL-B-7949
- SUPERSEDES: NONE
- THIS INFORMATION FROM MILITARY STANDARD MS27649 PAGE 1 OF 1, REVISED MAY 28, 1982, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.

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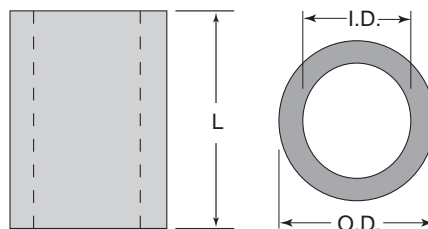
Spacers

For Use with Rivets, Screws, and Bolts

NAS 42



NAS 43



NAS42 (Material) (Length) (Finish)

DIAMETER DASH NO.	RIVET DIA (reference)		OD		ID		
			DIA	TOL + or -	DIA	TOL + or -	
3	.093	3/32	.188	.010	.0995	.0025	
4A	.125	1/8	.188		.13	.003	
4			.250		.163		
5	.156	5/32	.312		.193		
6A	.188	3/16	.250		.0035	.015	
6B			.312				.2595
6			.375				.375
8A	.250	1/4	.438				.3185
8			.438				.3795
10A	.313	5/16	.438				.500
10			.563	.625			
12A	.375	3/8	.500	.750			
12B			.563	.875			
12			.625	1.000			

NAS43 (Material) (Length) (Finish)

DIAMETER DASH NO.	SCREW OR BOLT DIA (reference)		OD		ID		
			DIA	TOL + or -	DIA	TOL + or -	
0	.112	#4	.188	.010	.1315	.0165	
1	.138	#6	.250		.1575	.0145	
2	.164	#8	.250		.1705	.0015	
3	.164 & .190	# 8 & # 10	.312		.015	.214	.020
5	.313	5/16	.438			.340	.020
6	.375	3/8	.500			.402	.025
7	.438	7/16	.563			.465	.025
8	.500	1/2	.625			.542	.050
9	.563	9/16	.687			.589	.025
10	.625	5/8	.750	.652		.050	
12	.750	3/4	.875	.777		.025	
14	.875	7/8	1.000	.902		.025	
16	1.000	1"	1.125	1.027	.050		

FINISH: HEAT TREATED STEEL SPACERS ARE CADMIUM PLATE PER QQ-P-416, TYPE II, CLASS 2, DYED TO AN IRIDESCENT BRONZE COLOR. NO FINISH CODE IS REQUIRED WITH (HT) PARTS. THE SALT SPRAY REQUIREMENT AND TESTS SHALL NOT APPLY.

LENGTH CODE: SECOND DASH NUMBER DESIGNATES LENGTH IN 1/64 INCH INCREMENTS, + OR - .005.

MATERIAL CODE: FOR 2024-T ALUMINUM ALLOY SPACERS ADD SUFFIX "DD" TO BASIC PART NUMBER. FOR HEAT TREATED ALLOY STEEL SPACERS ADD SUFFIX "HT" TO BASIC PART NUMBER.

FINISH CODE: FOR 2024-T ALUMINUM WITH GRAY ANODIZE, ADD SUFFIX "N" TO COMPLETE PART NUMBER. FOR 2024-T ALUMINUM WITH CHEMICAL FILM, ADD SUFFIX "FC" TO COMPLETE PART NUMBER. FOR ALUMINUM SPACERS WITH NO FINISH, ADD SUFFIX "A" TO COMPLETE PART NUMBER.

EXAMPLES OF PART NUMBERS:

NAS42DD6-32FC

SPACER FOR 3/16 DIA. RIVET, ALUMINUM 32/64" OR .500 LONG, .193 ID. X .375 OD, CHEMICAL FILM FINISH WITH BLUE DYE.

NAS42HT4-8

SPACER FOR 1/8" DIA. RIVET, STEEL, 8/64" OR .125 LONG, .13 ID. X .25 OD., CAD II PLATED.

NAS43DD6-32FC

SPACER FOR 3/8 DIA. BOLT, ALUMINUM 32/64" OR .500 LONG, .402 ID. X .500 OD, CHEMICAL FILM FINISH WITH BLUE DYE.

NAS43DD4-8N

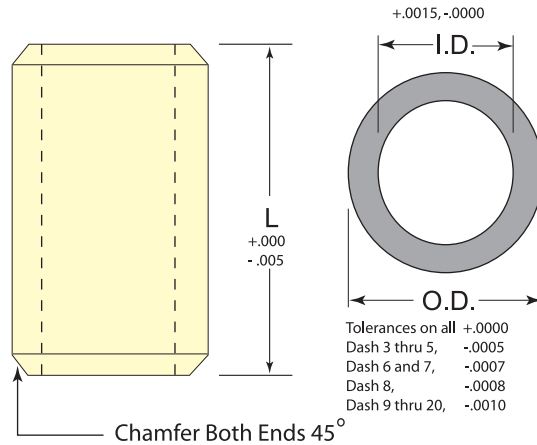
SPACER FOR 1/4" DIA. BOLT, ALUMINUM, 8/64" OR .125 LONG, .2765 ID. X .375OD., GRAY ANODIZED FINISH.

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NAS75

Bushing - Plain, Press Fit, Steel



SIZE DASH NO.	BOLT SIZE (REF.)	INSIDE DIA	OUTSIDE DIA
3	10	.190	.3136
4	1/4	.250	.3761
5	5/16	.3125	.4386
6	3/8	.375	.5013
7	7/16	.4375	.5638
8	1/2	.500	.6265
9	9/16	.5625	.6892
10	5/8	.625	.8142
11	-	.6875	.8767
12	3/4	.750	.9393
14	7/8	.875	1.0648
16	1	1.000	1.1898

LENGTH CODE: THESE BUSHINGS NOT INTENDED FOR REAMING ON ASSEMBLY. LENGTH TO BE SPECIFIED IN INCHES AND 1/32 OF AN INCH.

GENERAL CODE: NAS75 - (SIZE DASH NO.) - (LENGTH DASH NO.)

MATERIAL: ALLOY STEEL HEAT TREATED TO 125,000 - 145,000 PSI

FINISH: CADMIUM PLATING PER QQ-P-416, TYPE II, CLASS 2

EXAMPLES OF PART NUMBERS:

NAS75-8-030 BUSHING PLAIN, PRESS FIT, ALLOY STEEL CAD II PLATED, .500 ID., .625 OD., 30/32 OR .9375 LONG.

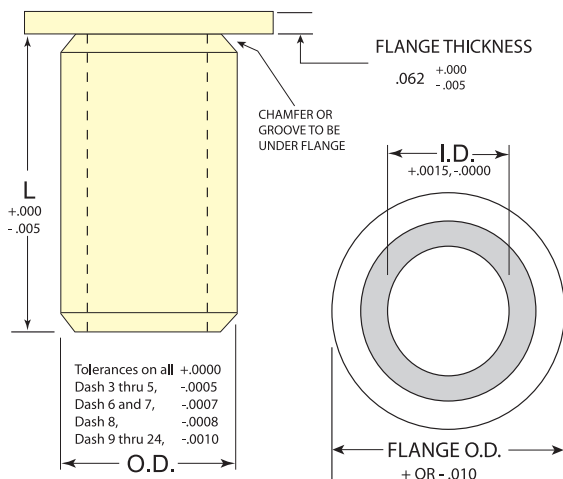
NAS75-6-104 BUSHING PLAIN, PRESS FIT, ALLOY STEEL CAD II PLATED, .375 ID., .5013 OD., 1 AND 4/32 OR 1.125 LONG.

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NAS77

Bushing - Flanged, Press Fit, Steel, Bronze, & Copper



SIZE DASH NO.	BOLT SIZE (REF.)	INSIDE DIA	OUTSIDE DIA	FLANGE
-3	#10	.1900	.3136	.437
-4	1/4	.2500	.3761	.500
-5	5/16	.3125	.4386	.562
-6	3/8	.3750	.5013	.625
-7	7/16	.4375	.5638	.687
-8	1/2	.5000	.6265	.750
-9	9/16	.5625	.6892	.812
-10	5/8	.6250	.8142	1.000
-11	-	.6875	.8767	1.062
-12	3/4	.7500	.9393	1.125
-14	7/8	.8750	1.0648	1.250
-16	1	1.0000	1.1898	1.375
-18	1 - 1/8	1.1250	1.3148	1.500
-20	1 - 1/4	1.2500	1.4399	1.625
-22	1 - 3/8	1.3750	1.5649	1.750
-24	1 - 1/2	1.5000	1.6899	1.875

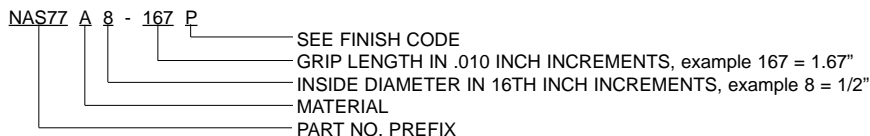
MATERIAL:

FIRST DASH ("-" AFTER BASIC NUMBER INDICATES ALLOY STEEL, CADMIUM PLATED, ALL SURFACES. ADD "A" AFTER BASIC NUMBER FOR ALUMINUM BRONZE. ADD "B" AFTER BASIC NUMBER FOR BERYLLIUM COPPER. SECOND DASH NUMBER INDICATES GRIP IN .010 INCH INCREMENTS. (USE THREE DIGIT CALLOUT.)

FINISH:

ADD "P" AFTER SECOND DASH NUMBER FOR CADMIUM PLATED ALL SURFACES (APPLICABLE TO "A" AND "B" CODES ONLY.) ADD "N" AFTER SECOND DASH NUMBER FOR CADMIUM PLATED OUTSIDE SURFACES ONLY AND NO PLATING INSIDE DIAMETER (ID). (APPLICABLE TO "A" AND "B" CODES ONLY.)

EXAMPLE OF PART NO.



Please Note:

**We stock hinges and hinge pins in
6 foot lengths only.**

“-7200” equals 72.00 inches.

**See Part # Examples on
following pages.**

**MS Hinges are stocked as complete
assemblies including the pin.**

**With Minimum Qty's and lead times,
we can supply Custom Lengths / Materials and Styles.
We would need your engineering drawing to quote.**

**NAS40 Hinges are stocked by the
Half Hinge without the pin.**

**For the NAS40
YOU MUST ORDER THE PIN
SEPARATELY**

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MS20001

Hinge, Butt, Structural, Extruded

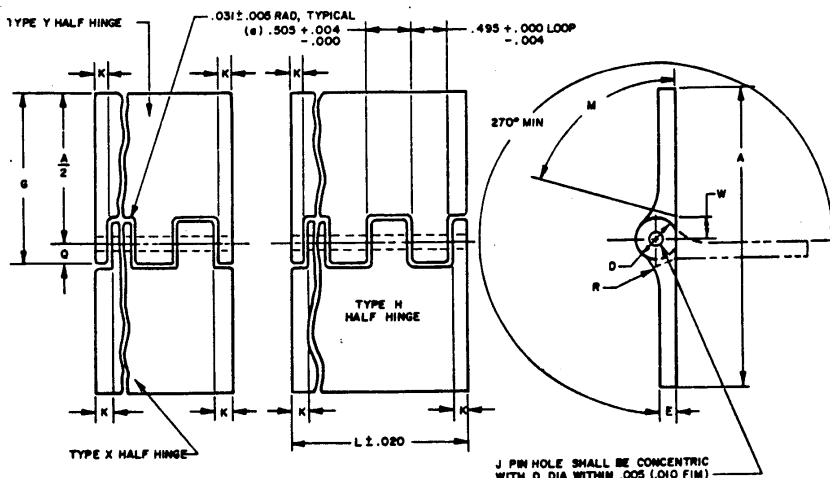


TABLE I

DASH NO.	A REF WIDTH	E		G		Q +/- .005	J DIA +.005 / -.000	(b) K MIN	D DIA		R +/- .031 RAD	W +/- .016	PIN DIA REF	M +/- 2 DEG.
		MAX	MIN	MAX	MIN				MAX	MIN				
-2	1.062	.056	.044	.630	.612	.090	.093	.188	.187	.173	.174	.135	.090	75 DEG
-3	1.250			.724	.706									
-4	1.500			.850	.830									
-5	1.750			.975	.955									
-6	2.000			1.102	1.078									
-8	2.000	.076	.064	1.167	1.143	.155	.183		.318	.302	.297	.200	.180	
-9	2.500	.056	.044	1.352	1.328	.090	.093		.187	.173	.174	.135	.090	
-10	2.750			1.477	1.453				.60 DEG					
-12	3.375			.115	.103				1.860	1.828	.156	.320	.304	
-14	3.719	.163	.149	2.086	2.038	.203	.133		.414	.398	.625	.240	.1320	
-16	3.938	.210	.196	2.243	2.195	.250	.183	.509	.491	.750	.287	.180		
-17	4.820	.066	.044	4.102	4.070	.090	.090	.107	.173	.174	.135	.090	75 DEG	

* CANCELLED - NO SUPERSEDING PART NUMBER

(a) TOLERANCES FOR DIMENSIONS ON PITCH SHALL NOT BE CUMULATIVE.

(b) DIMENSIONS K MUST NEVER EXCEED A FULL LOOP OR TANG, AND BOTH ENDS MUST BE EQUAL WITHIN .020 INCH.

INTERCHANGEABILITY RELATIONSHIP: MS20001 HINGES ARE NOT UNIVERSALLY INTERCHANGEABLE WITH AN252 HINGES. FOR INTERCHANGEABILITY RELATIONSHIP SEE TABLE II.

- PROCUREMENT SPECIFICATION: NONE
- SUPERSEDES: AN252
- THIS INFORMATION FROM MILITARY STANDARD MS20001L PAGE 1 OF 1, REVISED OCTOBER 30, 1989, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.

TABLE II

INTERCHANGEABILITY TABLE		
INACTIVE AND CANCELLED	UNIVERSALLY INTERCHANGEABLE	REPLACEABLE WITH
AN252-1	-----	-----
AN252-2	MS20001-2	-----
AN252-4	MS20001-4	-----
AN252-6	MS20001-6	-----
AN252-8	MS20001-8	-----
AN252-10	MS20001-10	-----

Continued...

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MS20001

Hinge, Butt, Structural, Extruded

Continued...

REQUIREMENTS:

1. MATERIAL: ALUMINUM ALLOY 2024-T3511, PER QQ-A-200/3, OR ALUMINUM ALLOY 7075-T3511, PER QQ-A-200/11 (SEE PART NUMBERING).
2. FINISH: ANODIZED IN ACCORDANCE WITH MIL-A-8625, TYPE II; CHEMICAL SURFACE TREAT IN ACCORDANCE WITH MIL-C-5541; (ENDS OF ALL HINGES SHALL BE FINISHED).
3. MARKING: INK STAMP MS20001 (DASH NUMBER) REGULAR INTERVALS ALONG LENGTH OF HINGE SO THAT ANY THREE INCH LENGTH WILL HAVE AT LEAST ONE COMPLETE IDENTIFICATION IN FIGURES NOT LESS THAN .060 INCHES HIGH. SEE NOTE 5.
4. COMPLETE HINGES SHALL BE FURNISHED AS AN ASSEMBLY WITH CAD PLATED CRES HINGE PINS OF THE SAME LENGTH IN ACCORDANCE WITH MS20253.
5. DESIGNATION FOR ANODIZING, CHEMICAL SURFACE TREATMENT, HINGE STYLE, AND LENGTH SHALL NOT BE INCLUDED IN MARKING.
6. ONLY COMPLETE HINGES TO BE STOCKED BY SERVICES.
7. USE MS 20257 HINGE WHEREVER LOAD REQUIREMENTS PERMIT.

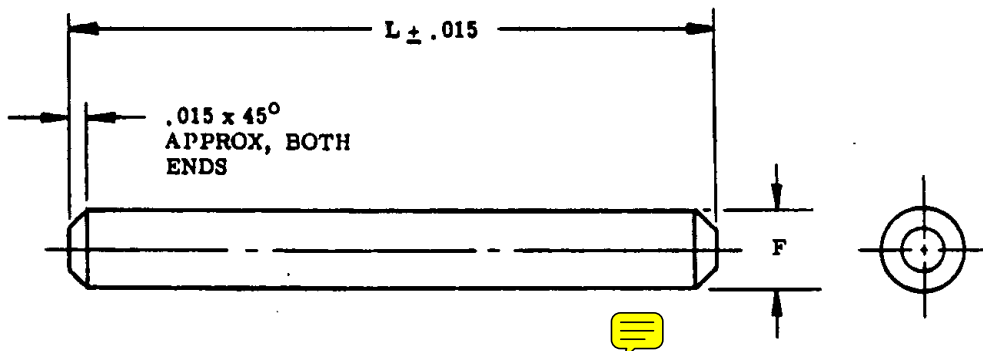
NOTES:

1. DIMENSIONS ARE IN INCHES.
 2. REMOVE ALL BURRS AND SHARP EDGES.
 3. TYPE X HALF HINGE MATES WITH TYPE Y HALF HINGE, AS SHOWN.
 4. TYPE H HALF HINGE MATES WITH TYPE H HALF HINGE.
 5. FOR SERVICE PROCUREMENT, THE PREFERRED STOCK LENGTH OF COMPLETE HINGES IS 72 INCHES.
 6. PART NUMBERING: (NOMENCLATURE TO BE INCLUDED ON SHIPPING DOCUMENTS ONLY).
 - a. MS2001
 - b. "P" FOR ANODIZED FINISH; "C" FOR CHEMICAL SURFACE TREATMENT; OMISSION OF CODE LETTER WILL INDICATE BARE FINISH.
 - c. "H", "X", OR "Y" TO DESIGNATE HALF HINGE STYLE; OMISSION OF CODE LETTER WILL INDICATE COMPLETE HINGE.
 - d. "A" FOR 7075-T73511 ALUMINUM ALLOY HINGE; OMISSION OF "A" WILL INDICATE 2024-T3511 ALUMINUM ALLOY.
 - e. ~~"T" FOR TITANIUM HINGE PIN (FOR COMPLETE HINGE ONLY); OMISSION OF "T" WILL INDICATE CADMIUM PLATED CRES HINGE PIN~~
 - f. DASH NUMBER (TABLE I); OMIT DASH IF PRECEDED BY CODE LETTER.
 - g. A DASH FOLLOWED BY LENGTH "L" EXPRESSED IN INCHES AND HUNDREDTH'S.
 7. EXAMPLES OF PART NUMBERS:
 - MS20001-4-1200 = COMPLETE HINGE, BARE FINISH, ALUMINUM 2024-T3511, CAD PLATED CRES HINGE PIN, 1.500 INCHES WIDE, 12.00 INCHES LONG.
 - MS20001CHA4-900 = TYPE H HALF HINGE, CHEMICAL SURFACE TREATMENT, ALUMINUM 7075-T73511, 1.500 INCHES WIDE, 9.00 INCHES LONG.
 8. DO NOT SPECIFY "P" FOR ANODIZE IF HINGE IS TO BE SPOT WELDED.
 9. REFERENCED DOCUMENTS SHALL BE OF THE ISSUE IN EFFECT ON DATE OF INVITATION FOR BIDS, OR REQUEST FOR PROPOSAL EXCEPT THAT REFERENCED ADOPTED INDUSTRY DOCUMENTS SHALL GIVE THE DATE OF THE ISSUE ADOPTED.
 10. FOR DESIGN FEATURE PURPOSES, THIS STANDARD TAKES PRECEDENCE OVER PROCUREMENT DOCUMENTS REFERENCED.
- ADDITIONAL NOTES:
- PROCUREMENT SPECIFICATION: NONE
 - SUPERSEDES: **AN252** and all previous revisions.
 - THIS INFORMATION FROM MILITARY STANDARD MS20001L PAGE 2 OF 2, REVISED OCTOBER 30, 1989, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.

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MS20253

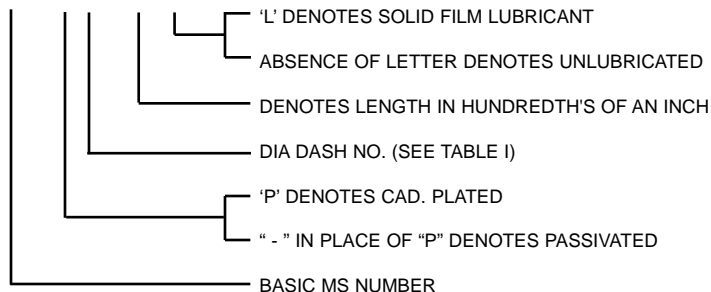
Hinge, Pin



DASH NO.	1	2	3	4	5
F + .001	.062	.089	.117	.179	.129

REQUIREMENTS:

- MATERIAL: CORROSION RESISTANT STEEL PER QQ-W-423, FORM I, CONDITION B (STRAIGHTENED AND CUT LENGTHS) COMPOSITION FS 302, FS 304, OR FS 316.
- FINISH: CADMIUM PLATE PER QQ-P-416, TYPE II, CLASS 2, OR PASSIVATE PER QQ-P-35.
- LUBRICATION: WHEN SPECIFIED, SOLID FILM LUBRICANT PER MIL-L-46010.
- EXAMPLE OF PART NUMBER:
MS20253 P 1 - 625 L = PIN, CRES, CAD. PLATED, .063 DIA., 6.250 LONG, SOLID FILM LUBRICANT



NOTES:

- DIMENSIONS IN INCHES, UNLESS OTHERWISE SPECIFIED.
- REMOVE ALL BURRS AND SHARP EDGES.
- FOR USE WITH HINGES COVERED BY MS20257 AND MS20001:
AL ALLOY HINGE HALVES: USE CAD. PLATED PIN,
CRES HINGE HALVES: USE PASSIVATED PIN.
- MS20253 SUPERSEDES AN253.
- NOT TO BE STOCKED BY THE SERVICES.
- INTERCHANGEABILITY RELATIONSHIP: MS20253 AND AN253 PARTS OF LIKE DASH NUMBERS ARE UNIVERSALLY, FUNCTIONALLY AND DIMENSIONALLY INTERCHANGEABLE.
- FOR DESIGN FEATURE PURPOSES THIS STANDARD TAKES PRECEDENCE OVER PROCUREMENT DOCUMENTS REFERENCED HEREIN.
- REFERENCED DOCUMENTS SHALL BE OF THE ISSUE IN EFFECT ON DATE OF INVITATIONS FOR BID.

ADDITIONAL NOTES:

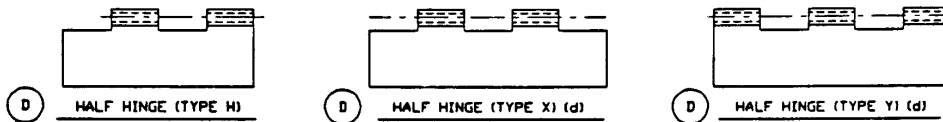
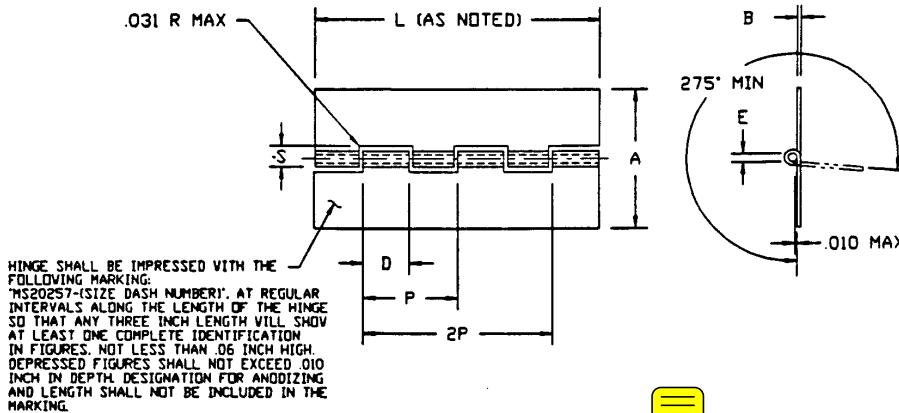
- PROCUREMENT SPECIFICATION: NONE
- SUPERSEDES: AN253
- THIS INFORMATION FROM MILITARY STANDARD MS20253 PAGE 1 OF 1, REVISED OCTOBER 6, 1993, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.

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MS20257

Hinge, Continuous, Roll Formed



(D)

DASH NUMBER FOR COMPLETE HINGE			A WIDTH (OPEN) +/- .016	B THICKNESS		D LOOP +.001 -.008	O E HOLE DIAMETER +.007		P PITCH (c)	PIN DIAMETER (REF) (e)		S SLOT DEPTH		STOCK LENGTH (b)			
ALUMINUM 1/ 2/	(g) CRES			AL ALLOY	CRES		AL ALLOY	CRES		AL 3/	CRES 4/	AL ALLOY	CRES	AL ALLOY	CRES		
-1	P1	C1	.750	.032	.031	.490	.066	.066	1.000	.063	.063	.169	.166	36	48		
-2	P2	C2	1.062	.040	.037		.093	.090		.090	.220	.213	.278			.314	72
-3	P3	C3	1.250		.050												
-4	P4	C4	1.500	.051	.062		.183	.180		.180	.253	.376	.382	.376		72	
-5	P5	C5	2.0000														.064
-6	P6	C6															

- (a) COMPLETE HINGES ARE FURNISHED WITH A PIN OF THE SAME LENGTH.
- (b) SECOND DASH NUMBER INDICATES (L) EXPRESSED IN INCHES AND HUNDREDTH'S NOT EXCEEDING STOCK LENGTH OF TABLE. END LOOPS AND OR TANGS MUST NEVER EXCEED A FULL LOOP OR TANG, AND BOTH ENDS MUST BE EQUAL WITHIN .020 INCH.
- (c) TOLERANCES MUST BE ± .008 ON EACH DIMENSION FOR P, 2P, 3P, ETC., AND SHALL NOT BE CUMULATIVE.
- (d) TYPES X AND Y HALF HINGES CAN BE MADE FROM TYPE H HALF HINGES BUT WILL NOT BE STOCKED OR PROCURED BY SERVICE ACTIVITIES.
- (e) HINGE PINS SHALL BE IN ACCORDANCE WITH MS20253, USE CADMIUM PLATED CORROSION RESISTANT STEEL PIN WITH ALUMINUM ALLOY HINGE. USE PASSIVATED CORROSION RESISTANT STEEL PIN WITH CORROSION RESISTANT STEEL HINGE.

- (D) 1/ UNANODIZED ALUMINUM
- 2/ ANODIZED ALUMINUM
- 3/ FOR ALUMINUM ALLOY HINGE.
- 4/ FOR CORROSION RESISTANT STEEL (CRES) HINGE

- PROCUREMENT SPECIFICATION: NONE
 - SUPERSEDES: MS20257C
 - THIS INFORMATION FROM MILITARY STANDARD MS20257 PAGE 1 OF 2, REVISED APRIL 13, 1984, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.
- (D) DENOTES CHANGE Continued...

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MS20257
Hinge, Continuous, Roll Formed

Continued...

REQUIREMENTS:

1. MATERIAL: AL ALLOY, 5052, H24 OR H34 PER QQ-A-250/8
CORROSION RESISTANT STEEL PER ASTM A167, K A176, A240, A412, A666 AND A693. TYPE 301, 302 OR 304.
2. FINISH: ALUMINUM ALLOY, ANODIZED, MIL-A-8625 TYPE II, OR NONE, DEPENDING ON CODING.
CORROSION RESISTANT STEEL, NONE.

NOTES:

1. REMOVE ALL BURRS AND SHARP EDGES.
2. DIMENSIONS IN INCHES, UNLESS OTHERWISE SPECIFIED. TOLERANCES: DECIMALS ± 0.10 . ANGLES $\pm 1/2$
3. PART NUMBER: ADD H, X, OR Y BEFORE FIRST DASH NO. FOR HALF HINGE WITHOUT PIN.
EXAMPLES OF PART No's.:

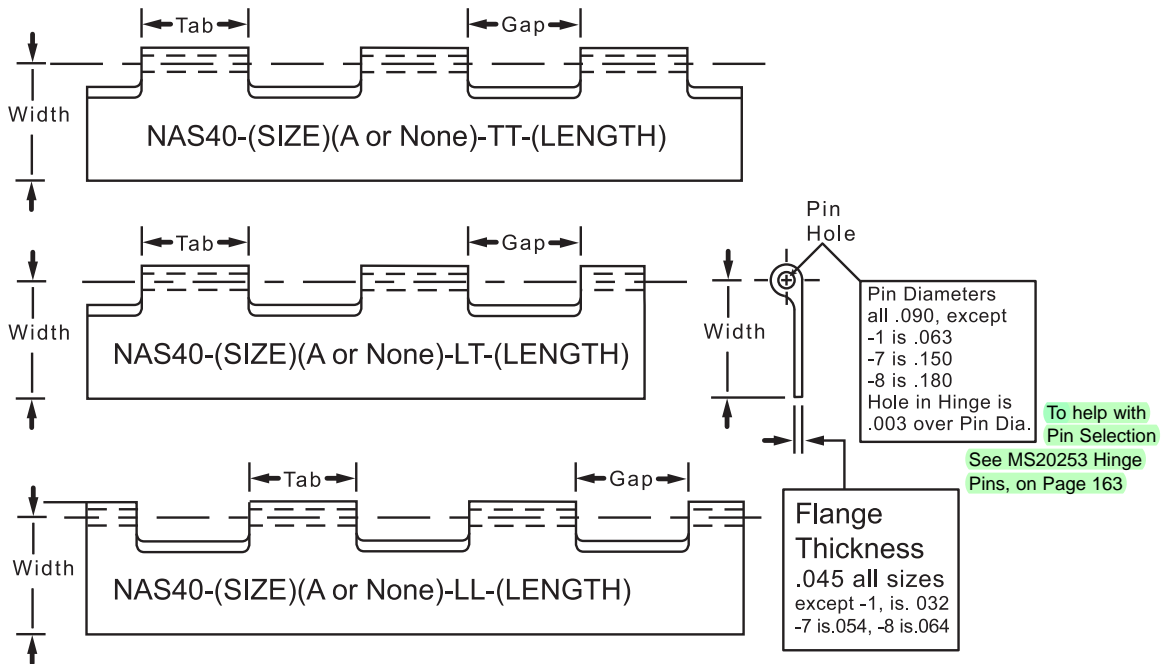
MS20257-2-800 = COMPLETE HINGE, AL ALLOY, UNANODIZED, 1.062 WIDE X 8.00 LONG WITH COR RES STEEL PIN.
MS20257P2-800 = COMPLETE HINGE, AL ALLOY, ANODIZED, 1.062 WIDE X 8.00 LONG WITH CADMIUM PLATED COR RES STEEL PIN.
MS20257C2-850 = COMPLETE HINGE, COR RES STEEL, 1.062 WIDE X 8.00 LONG WITH COR RES STEEL PIN.
MS20257H2-800 = TYPE H HALF HINGE, AL ALLOY, ANODIZED, 1.062 WIDE (OPEN WIDTH OF COMPLETE HINGE) X 8.75 LONG WITHOUT PIN.
MS20257HP2-800 = TYPE H HALF HINGE, AL ALLOY, ANODIZED, 1.062 WIDE (OPEN WIDTH OF COMPLETE HINGE) X 8.75 LONG WITHOUT PIN.
MS20257HC2-875 = TYPE H HALF HINGE, COR RES STEEL, 1.062 WIDE (OPEN WIDTH OF COMPLETE HINGE) X 8.75 LONG WITHOUT PIN.
4. IN EVENT OF A CONFLICT BETWEEN THE TEXT OF THIS STANDARD AND THE REFERENCES CITED HEREIN. THE TEXT OF THIS STANDARD SHALL TAKE PRECEDENCE.
5. REFERENCED GOVERNMENT (OR NON-GOVERNMENT) DOCUMENTS OF THIS ISSUE LISTED IN THAT ISSUE OF THE DEPARTMENT OF DEFENSE INDEX OF SPECIFICATIONS AND STANDARDS (DODISS) SPECIFIED IN THE SOLICITATION FORM A PART OF THIS STANDARD TO THE EXTENT SPECIFIED HEREIN.

ADDITIONAL NOTES:

- PROCUREMENT SPECIFICATION: NONE
- SUPERSEDES: MS20257C
- THIS INFORMATION FROM MILITARY STANDARD MS20257 PAGE 2 OF 2, REVISED APRIL 13, 1984, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.

Genuine Aircraft Hardware Co.

NAS40, Extruded Hinge Halves, Old Style



NAS40-(size)(finish)-(end type)-(length in whole inches and then three digits 1/10th's, 1/100ths, 1/1,000ths)

This style hinge is still used as replacement hinge on some older aircraft, for things such as Cowl Flaps and Landing Gear Doors etc. These are obsolete for new design.

For new style Extruded hinge use **MS20001**. For hinge pins, select from **MS20253** Hinge Pins.

For **SIZE** select from Chart.

For the **FINISH** add an "A" for anodized and leave blank for an unanodized finish such as is used for spot welding.

Select **END TYPE** from diagram above, **TT, LT, or LL**.

The **LENGTH** is in whole inches, decimal point and then remainder to the thousandth.

These are made from Aluminum Alloy 61S-T6, QQ-A-270, T6

Anodized if specified, to AN-QQ-A-696

Recommended stock length is 72.000, but availability is getting difficult and sometimes requires special order to get specific sizes, end styles, and finishes, we stock what we can.

Size Dash Number	Width + or - .020	Tab +.000 -.004	Gap +.004 -.000
-1	.375	.610	.640
-2	.531		
-3	.625		
-4	.750		
-5	.875	.985	1.015
-6	1.00		
-7	1.00		
-8	1.00	.610	.640
-9	1.25		
-10	1.375		

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HI-LOK® Pins Selection and Identification

Hi-Lok® is a registered trademark of Hi-Shear Corporation, Torrance, California. This chart is only a small list of items manufactured by the Hi-Shear Corporation. This is a listing of the most popular Hi-Loks® for General Aviation. Call if additional information is needed.

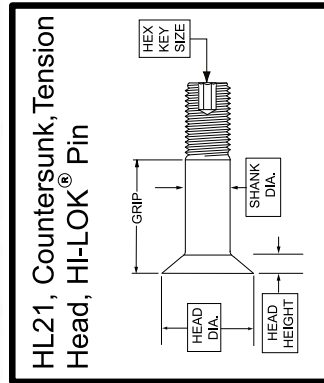
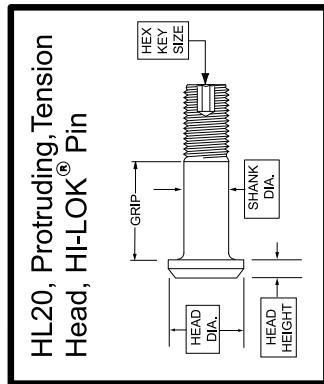
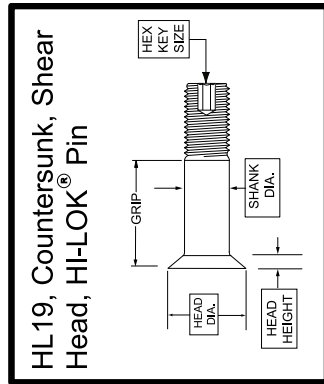
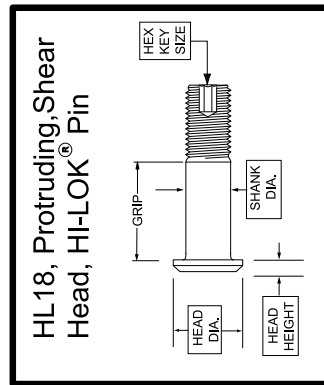
HI-LOK PIN PART NO.	TYPE DESIGN APPLICATION	HEAT TREAT (Pins)	SUGGESTED MAXIMUM TEMPERATURE FOR USE	RECOMMENDED COMPANION HI-LOK COLLARS	FIRST OVERSIZE PIN PART #	SECOND OVERSIZE PIN PART #
HL18	Pin Protruding Shear	95,000 psi Shear Minimum	450 deq F	HL70 HL94 HL79 HL97 HL82 HL175	HL62	HL218
HL19	Pin 100 degree Flush Shear	95,000 psi Shear Minimum	450 deq F		HL63	HL 219
HL20	Pin Protruding Tension	160 - 180,000 psi Tensile Minimum	450 deq F	HL86 HL87 HL75	HL64	HL220
HL21	Pin 100 degree Flush Tension	160 - 180,000 psi Tensile Minimum	450 deq F		HL65	HL221

MATERIAL: Alloy / Steel
SHANK DIAMETER TOLERANCE: .001"
GRIP VARIATION: 1/16"

CHARACTERISTICS: Used where pin shank and hole close tolerances are required.

EXAMPLE of PART NUMBER: HL (# 18,19,20,etc) (PB for cad II plating) (DIA in 1/32nds) (grip length in 16ths of an inch)
HL20PB8-15 = Protruding tension Hd HI-LOK Pin, 1/4" diameter, 15/16" grip length, 160 ksi Alloy Steel Cad II Plated.

P/N 2-612, Hi-Lok Grip Gauge Std / Metric



Genuine Aircraft Hardware Co.

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HI-LOCK® Pins Dimensions & Specs

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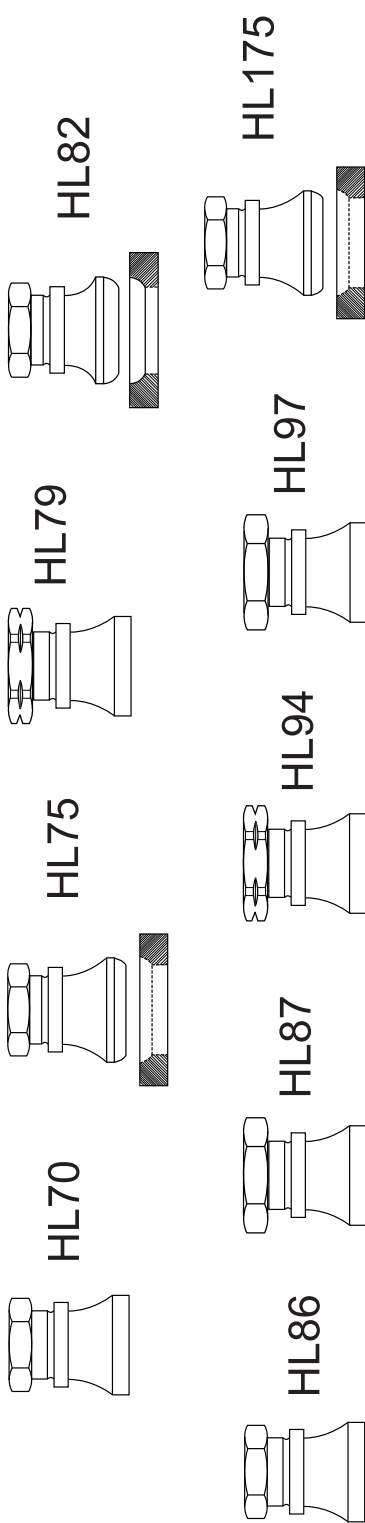
FIRST DASH NO.	NOM. DIA.	HEAD DIA. HL18	HEAD DIA. HL20	HEAD DIA. HL19	HEAD DIA. HL21	SHANK DIA. ALL	HEAD HEIGHT HL18	HEAD HEIGHT HL20	HEAD HEIGHT HL19	HEAD HEIGHT HL21	THREAD SIZE ALL	HEX KEY SIZE	DOUBLE SHEAR ALL (MIN)	TENSION POUNDS (MIN) HL18	TENSION POUNDS (MIN) HL19	TENSION POUNDS (MIN) HL20 & 21
-5	5/32	.242	.306	.2564	.3256	.1625	.037	.055	.0390	.0680	8-32	5/64	4.010	1,940	1,290	2,180
-6	3/16	.295	.357	.2966	.3765	.1885	.045	.064	.0450	.0785	10-32	5/64	5.380	2,500	2,000	3,180
-8	1/4	.387	.415	.3898	.5018	.2485	.059	.077	.0590	.106	1/4-28	3/32	9.300	4,300	3,700	5,820
-10	5/16	.475	.472	.4689	.6287	.3110	.068	.098	.0660	.133	5/16-24	1/8	14,600	6,300	5,000	9,200
-12	3/8	.565	.530	.5554	.7556	.3735	.078	.130	.0680	.160	3/8-24	5/32	21,000	8,700	7,200	14,000
for 1st oversize on 5/32 pins, use next standard size 3/16 pin. (-6)																
1st Oversize (1/64)	HL62	HL64	HL63	HL65	Shank Dia.	HL62	HL64	HL63	HL65							
-5	3/16	HL18-6	HL20-6	HL19-6	HL21-6	N/A	HL18-6	HL20-6	HL19-6	HL21-6	Threads	Hex Key	Double Shear	HL62	HL63	HL64 & 65
-6	13/64	.295	.357	.2966	.3765	.2016	.045	.064	.0394	.0730	10-32	5/64	6,130	2,500	2,000	3,180
-8	17/64	.387	.415	.3898	.5018	.2641	.059	.077	.0523	.0993	1/4-28	3/32	10,490	4,300	3,700	5,820
-10	21/64	.475	.472	.4689	.6287	.3266	.068	.098	.0593	.1263	5/16-24	1/8	16,000	6,300	5,000	9,200
-12	25/64	.565	.530	.5554	.7556	.3891	.078	.130	.0693	.1533	3/8-24	5/32	22,700	8,700	7,200	14,000
for 2nd oversize (1/32)																
2nd Oversize (1/32)	HL218	HL220	HL219	HL221	Shank Dia.	HL218	HL220	HL219	HL221							
-5	13/64	HL62-6	HL64-6	HL63-6	HL65-6	N/A	HL62-6	HL64-6	HL63-6	HL65-6	Threads	Hex Key	Double Shear	HL218	HL219	HL220 & 221
-6	7/32	.295	.357	.2966	.3765	.2172	.045	.064	.0449	.0664	10-32	5/64	7,100	2,500	2,000	3,180
-8	9/32	.387	.415	.3898	.5018	.2797	.059	.077	.0589	.0928	1/4-28	3/32	11,800	4,300	3,700	5,820
-10	11/32	.475	.472	.4689	.6287	.3422	.068	.098	.0658	.1198	5/16-24	1/8	17,600	6,300	5,000	9,200
-12	13/32	.565	.530	.5554	.7556	.4047	.078	.130	.0759	.1468	3/8-24	5/32	24,600	8,700	7,200	14,000

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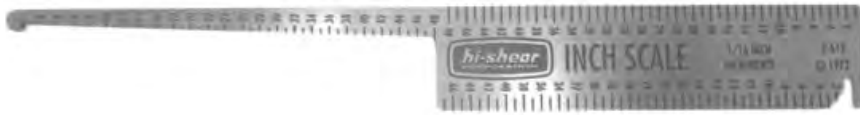
HI-LOK® Collars Selection and Identification

HI-LOK® is a registered trademark of HI-Shear Corporation, Torrance, California. This chart is only a small list of items manufactured by the HI-Shear Corporation. This is a listing of the most popular HI-Loks for General Aviation. Call if additional information is needed.



HI-LOK COLLAR PART NO.	COLLAR MATERIAL	COLLAR FINISH	WASHER MATERIAL	WASHER FINISH COLOR OR PLATING	SUGGESTED MAXIMUM TEMP. FOR USE	APPLICATION COLLAR	FIRST OVERSIZE PART #	SECOND OVERSIZE PART #	CHARACTERISTICS
HL70	2024-T6 Aluminum Alloy	Red Anodize		Blue or Gray	300 deg. F.	Shear	HL79	HL84	For use with shear head pins, except those made of aluminum alloy.
HL75	303 Series Stainless Steel	CAD I	17-4PH, 17-7PH or PH15-7Mo Stainless Steel		700 deg. F. or Subject to Finish	Tension	HL75	HL375	Self-aligning collar assembly. For use on sloped surfaces up to 7 degrees maximum. Fits standard and 1/64" oversize tension head pins.
HL79	2024-T6 Aluminum Alloy	Red Anodize			300 deg. F.	Shear	HL79	HL84	For standard and 1/64" oversize for HL70(R). For use with HI-Lok(R) Automatic Feed Driver Tools and shear head pins except those made of aluminum alloy.
HL82	2024-T6 Aluminum Alloy	Red Anodize	17-4PH, 17-7PH or PH15-7Mo Stainless Steel		300 deg. F.	Shear	HL82	HL382	Self-aligning collar assembly. For use on sloped surfaces up to 7 degrees maximum. Fits standard and 1/64" oversize pins. Use with shear head pins except those made of aluminum alloy.
HL86	303 Series Stainless Steel	CAD I		Cadmium Plate Blue	700 deg. F. or Subject to Finish	Tension	HL87	HL93	For use with tension head pins.
HL87	303 Series Stainless Steel	CAD II	300 Series Stainless Steel	Cadmium Plate	700 deg. F. or Subject to Finish	Tension	HL87	HL93	For standard and 1/64" oversize for HL86. Optional washer.
HL94	303 Series Stainless Steel	CAD II			700 deg. F. or Subject to Finish	Shear	HL94	HL294	For standard and 1/64" oversize shear head pins except those made of aluminum alloy. Optional washer.
HL97	A-286 HI-Temp Alloy	Silver	300 Series Stainless Steel		1200 deg. F. or Subject to Finish	Shear	HL97	HL197	Used in high temperature applications on standard shear head pins.
HL175	303 Series Stainless Steel	CAD	17-4PH, 17-7PH or PH15-7Mo Stainless Steel		700 deg. F. or Subject to Finish	Shear	HL175	HL675	Self-aligning collar assembly. For use on sloped surfaces up to 7 degrees maximum. Fits standard and 1/64" oversize shear head pins.

P/N 2-612, Hi-Lok Grip Gauge Std / Metric



**If you need an actual HI-LOK
print please call or fax a request.
If we have it we will fax you a copy.**

**Toll free: 888-247-2738
Or: 888-AIR-CRFT
Regular Phone: 805-239-3169
FAX: 805-239-4871**

**Or You may also download
an HL print
directly from Hi-Shear's website
http://www.hi-shear.com/fastener_hl_stds**

**for a copy of HI-LOK
Installation Data (16 pages)**

www.hi-shear.com/brochures/Hilok_Hitigue_Installation.PDF

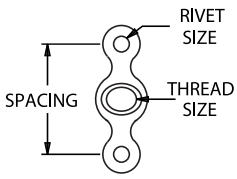
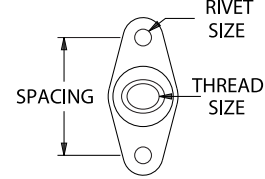
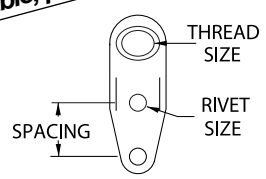
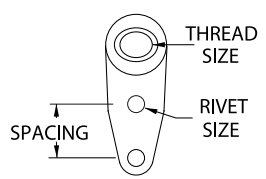
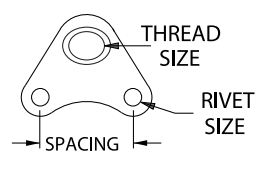
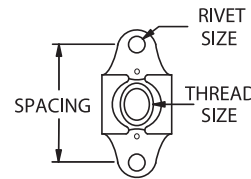
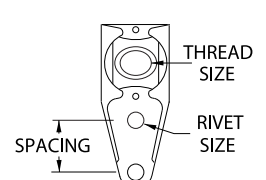
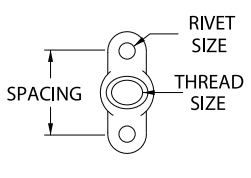
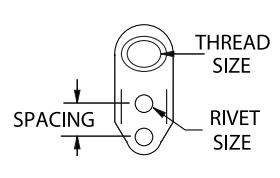
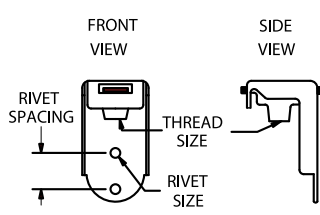
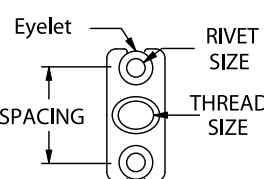
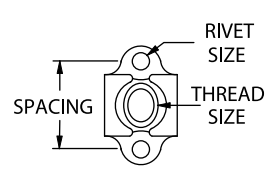
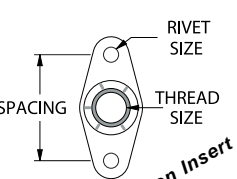
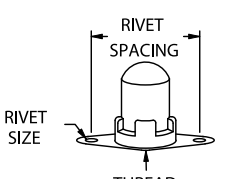
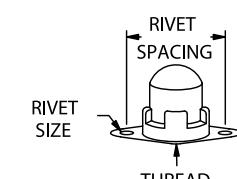
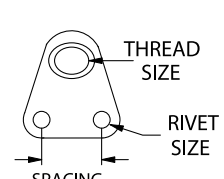
Genuine Aircraft Hardware Co.

Nutplates

Visual Identification Chart

See Specification and Size Charts for Nutplates

Kits Available, page 283

 <p>MS21047 Steel, Fixed MS21048 Cres., Fixed</p>	 <p>MS21049 Steel, Fixed, Countersunk MS21050 Cres., Fixed, Countersunk</p>	 <p>MS21051 Steel, Fixed, Std Spacing, One Leg MS21052 Cres., Fixed, Std Spacing, One Leg</p>	
 <p>MS21053 Steel, Fixed, Countersunk, One Leg MS21054 Cres., Fixed, Countersunk, One Leg</p>	 <p>MS21055 Steel, Fixed, Std Spacing, Corner MS21056 Cres., Fixed, Std Spacing, Corner MS21057 Steel, Fixed, Countersunk, Corner MS21058 Cres., Fixed, Countersunk, Corner MS21073 Steel, Fixed, Mini Pattern, Corner MS21074 Cres., Fixed, Mini Pattern, Corner</p>	 <p>MS21059 Steel MS21060 Cres., Floating Type, Standard Spacing</p>	
 <p>MS21061 Steel, Floating, Std Spacing, One Leg MS21062 Cres., Floating, Std Spacing, One Leg</p>	 <p>MS21069 Steel, Miniature MS21070 Cres., Miniature</p>	 <p>MS21071 Steel, Mini, One Leg MS21072 Cres., Mini, One Leg</p>	
 <p>FRONT VIEW SIDE VIEW</p> <p>NAS1033 Steel, Floating, Right Angle</p>	 <p>MS21075-(XX)E, Steel, Mini Floater, Eyelets MS21076-(XX)E, Cres., Mini Floater, Eyelets</p>	 <p>MS21075-(XX)N, Steel, Mini Floater, No Eyelets MS21076-(XX)N, Cres., Mini Floater, No Eyelets</p>	
 <p>MS21078 Steel Nylon Ins., Std Spacing</p>	 <p>NAS1473 Self Sealing, Std Spacing</p>	 <p>NAS1474 Self Sealing, Mini Pattern</p>	 <p>MS21086 Steel, Side by Side Pattern MS21087 Cres., Side by Side Pattern</p>

Genuine Aircraft Hardware Co.

Shaded areas are for reference only; ORDER PART NUMBERS IN UNSHADED AREAS ONLY !

PART#	Supersedures / Notes	Spacing Chart	Pattern	Material	Plating	Max Temp	Rated Tensile
MS21047 (XX)	AN362F, AN366F, NAS6890A, NAS1023A	A	Standard, Fixed	Steel	CAD II / Black Moly	450 Deg	125 Ksi.
MS21048 (XX)	AN362CW, AN366CW, NAS6890C, NAS1023C	A	Standard, Fixed	Cres.	Silver	800 Deg	125 Ksi.
MS21049 (XX)	AN361, AN373F, NAS6891A / Sizes 8-32 thru 5/16-24	A	Std, Fixed, C/S	Steel	CAD II / Black Moly	450 Deg	125 Ksi.
MS21050 (XX)	AN361C, NAS6891C / Sizes 8-32 thru 5/16-24	A	Std, Fixed, C/S	Cres.	Silver	800 Deg	125 Ksi.
MS21051 (XX)	NAS682A, NAS1025A	C	Std, Fixed, 1 Leg	Steel	CAD II / Black Moly	450 Deg	125 Ksi.
MS21052 (XX)	NAS682C, NAS1025C	C	Std, Fixed, 1 Leg	Cres.	Silver	800 Deg	125 Ksi.
MS21053 (XX)	NAS683A / Sizes 8-32 Thru 5/16-24	C	Fixed, C/S, 1 Leg	Steel	CAD II / Black Moly	450 Deg	125 Ksi.
MS21054 (XX)	NAS683C / Sizes 8-32 Thru 5/16-24	C	Fixed, C/S, 1 Leg	Cres.	Silver	800 Deg	125 Ksi.
MS21055 (XX)	NAS684A, NAS1027A	D	Std, Fixed, Corner	Steel	CAD II / Black Moly	450 Deg	125 Ksi.
MS21056 (XX)	NAS684C, NAS1027C	D	Std, Fixed, Corner	Cres.	Silver	800 Deg	125 Ksi.
MS21057 (XX)	NAS688A / Sizes 8-32 Thru 5/16-24	D	Fixed, Corner, C/S	Steel	CAD II / Black Moly	450 Deg	125 Ksi.
MS21058 (XX)	NAS688C / Sizes 8-32 Thru 5/16-24	D	Fixed, Corner, C/S	Cres.	Silver	800 Deg	125 Ksi.
MS21059 (XX)	NAS686A, NAS1031A	A	Standard, Floater	Steel	CAD II / Black Moly	450 Deg	125 Ksi.
MS21060 (XX)	NAS686C, NAS1031C	A	Standard, Floater	Cres.	Silver	800 Deg	125 Ksi.
MS21061 (XX)	NAS687A, NAS1032A	C	Std, Floater, 1 Leg	Steel	CAD II / Black Moly	450 Deg	125 Ksi.
MS21062 (XX)	NAS687C, NAS1032C	C	Std, Floater, 1 Leg	Cres.	Silver	800 Deg	125 Ksi.
MS21069 (XX)	NAS697A	B	Fixed, Mini	Steel	CAD II / Black Moly	450 Deg	125 Ksi.
MS21070 (XX)	NAS697C	B	Fixed, Mini	Cres.	Silver	800 Deg	125 Ksi.
MS21071 (XX)	NAS696A	E	Fixed, Mini, 1 Leg	Steel	CAD II / Black Moly	450 Deg	125 Ksi.
MS21072 (XX)	NAS696C	E	Fixed, Mini, 1 Leg	Cres.	Silver	800 Deg	125 Ksi.
MS21073 (XX)	NAS698A	F	Fixed, Mini, Corner	Steel	CAD II / Black Moly	450 Deg	125 Ksi.
MS21074 (XX)	NAS698C	F	Fixed, Mini, Corner	Cres.	Silver	800 Deg	125 Ksi.
MS21075 (XX)	NAS1066A	B	Mini, Floater	Steel	CAD II / Black Moly	450 Deg	125 Ksi.
MS21076 (XX)	NAS1066C	B	Mini, Floater	Cres.	Silver	800 Deg	125 Ksi.
MS21078 (XX)	Nylon Locking Element / NAS1023N	A	Standard, Fixed	Steel / Nylon	Cadmium II	250 Deg	125 Ksi.
MS21086 (XX)	NAS1067A / Sizes 8-32 Thru 3/8-24	G	Side by Side	Steel	CAD II / Black Moly	450 Deg	125 Ksi.
MS21087 (XX)	NAS1067C / Sizes 8-32 Thru 3/8-24	G	Side by Side	Cres.	Silver	800 Deg	125 Ksi.
NAS1033A (XX)	Available in 6-32, 8-32, 10-32	N/A	Right Angle, Floater	Steel & Cres.	Nut-Cad, Cage None	450 Deg	125 Ksi.
NAS1473A (XX)	Available in 8-32 thru 5/16-24	A	Std, Self Sealing	Steel	Cadmium II	225 Deg	125 Ksi.
NAS1474A (XX)	Available in 4-40 thru 1/4-28	H	Mini, Self Sealing	Steel	Cadmium II	225 Deg	125 Ksi.

Nutplate Selection Chart

Genuine Aircraft Hardware Co.

Nutplates

Spacing Charts / Size Charts / Part Number Examples

Please refer to VISUAL IDENTIFICATION chart and SELECTION chart on previous pages to assist in determining the proper PART #.

Nut Threads Dia. - Pitch	Rivet Spacing
4-40 Thru 10-32	.688
1/4-28 Thru 3/8-24	1.00

Nut Threads Dia. - Pitch	Rivet Spacing
4-40 Thru 10-32	.486
1/4-28 Thru 3/8-24	.707

Nut Threads Dia. - Pitch	Rivet Spacing
8-32 Thru 1/4-28	.219
5/16-24 Thru 3/8-24	1.00

Nut Threads Dia. - Pitch	Rivet Spacing
4-40	.406
6-32	.437
8-32	.469
10-32	.500
1/4-28	.562
5/16-24	.718
3/8-24	.828

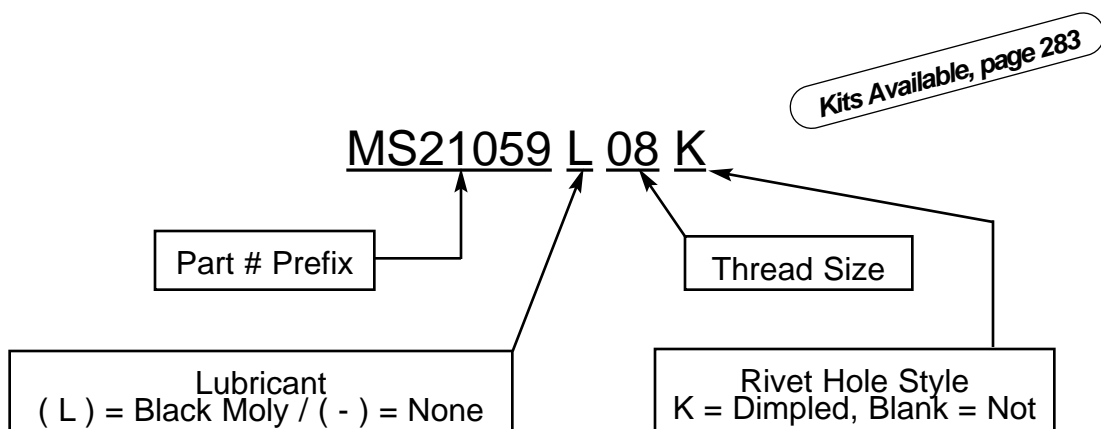
Nut Threads Dia. - Pitch	Rivet Spacing
4-40 Thru 10-32	.219
1/4-28 Thru 3/8-24	.269

Nut Threads Dia. - Pitch	Rivet Spacing
4-40 Thru 10-32	.590
1/4-28	.752

Nut Threads Dia. - Pitch	Rivet Spacing
4-40 Thru 3/8-24	.312

Nut Threads Dia. - Pitch	Rivet Spacing
4-40	.287
6-32	.308
8-32	.331
10-32	.354
1/4-28	.398
5/16-24	.508
3/8-24	.585

Dash #	Dia. - Pitch
04	4-40
06	6-32
08	8-32
3	10-32
4	1/4-28
5	5/16-24
6	3/8-24



Dimpled rivet holes are NOT available for the following part numbers: MS21075, MS21076, NAS1033, NAS1473, NAS1474.
 Rivet size is 3/32 for nutplates sizes 4-40 thru 1/4-28. Rivet size is 1/8" for nutplates sizes 5/16-24 and 3/8-24.
 If Black Moly is used with Corrosion Resistant nutplates the maximum temperature is 450 degrees F.

Genuine Aircraft Hardware Co.

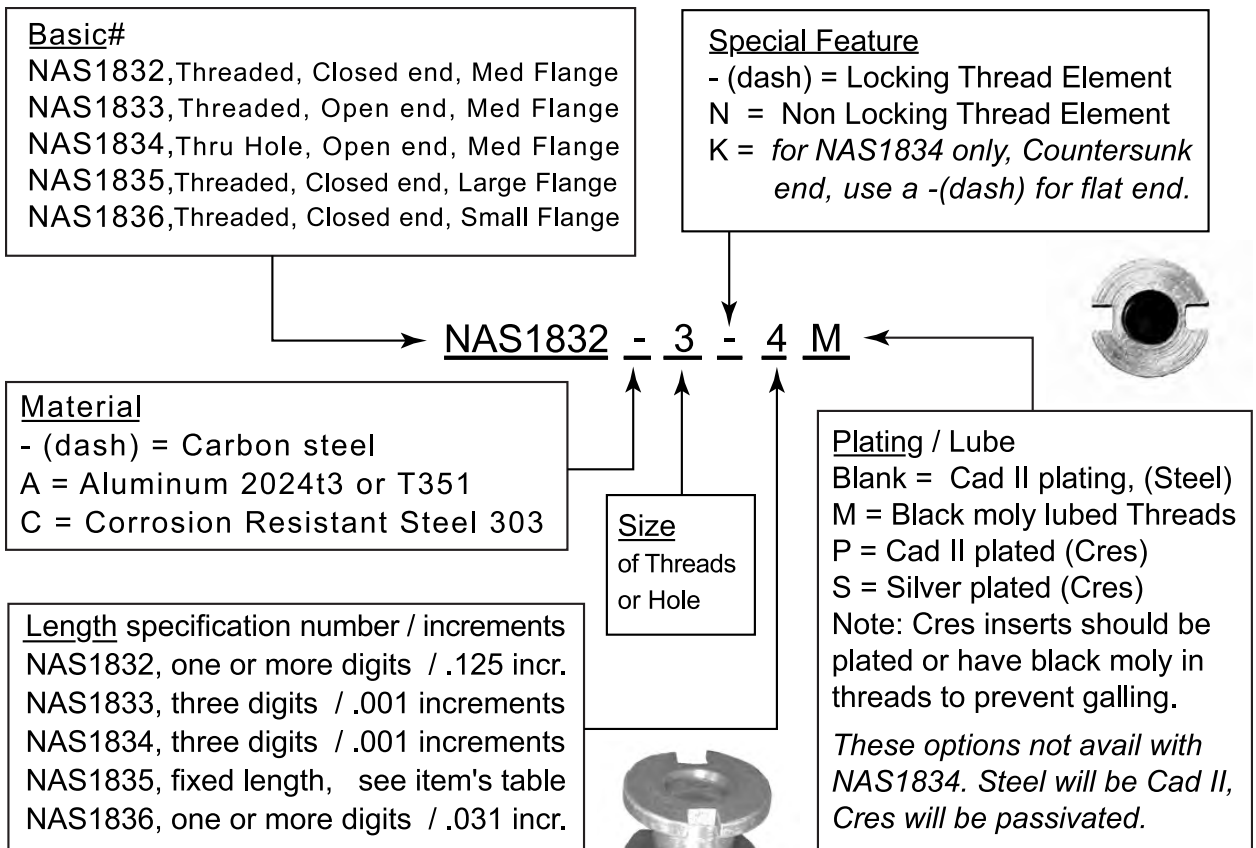
NAS1832 thru NAS1836, Inserts

For Composite or Honeycomb Panel Fastening

These **NAS1832 thru NAS1836**, Potted in Inserts are the standard for fastening in composite or honeycomb panels. The panel is first prepared by drilling or routing a hole or holes in the panel as necessary, depending on whether or not the insert is a through hole insert or a closed end insert. After preparing the hole and securing the insert in place with the NAS1837 adhesive tab (comes with inserts), then the adhesive or epoxy as recommended by the panel or aircraft manufacturer is forced in through one of the potting holes until it is forced out of the other hole or slot which acts as a vent hole. After the proper curing time and procedures are followed, remove the tab, clean up as required and then fasten items to the newly installed insert as appropriate.

Please use Part Number Diagram, Tables and pictures, to select inserts

When selecting length on all except NAS1833 and NAS1834, allow .040"min between insert and back skin



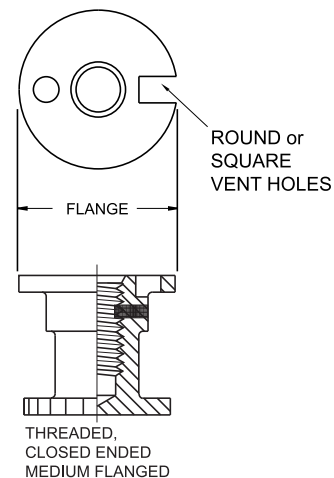
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Genuine Aircraft Hardware Co.

NAS1832 thru NAS1836, Inserts

For Composite or Honeycomb Panel Fastening....Continued

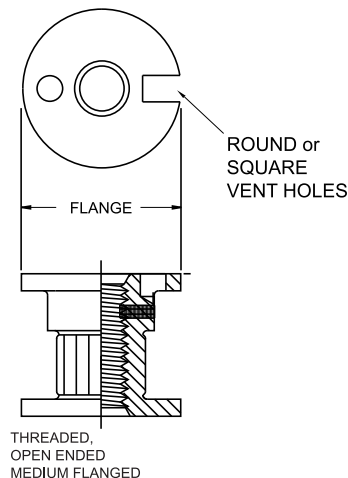
NAS1832 series, Potted in Insert, Medium Flange, Threaded with Closed End				
NAS1832	Threads	Flange	Installation Hole size	Length Minimum
-06	6-32	.560	.561-.566	.370
-08	8-32			
-3	10-32			
-4	1/4-28	.685	.686-.691	.500
-5	5/16-24			
-6	3/8-24	.841	.842-.847	



Note:

Do not specify less than minimum lengths shown on Tables !

NAS1833 series, Potted in Insert, Medium Flange, Threaded with Open End				
NAS1833	Threads	Flange	Installation Hole size	Length Minimum
-06	6-32	.560	.561-.566	.250
-08	8-32			
-3	10-32			
-4	1/4-28	.685	.686-.691	.312
-5	5/16-24			
-6	3/8-24	.841	.842-.847	.375



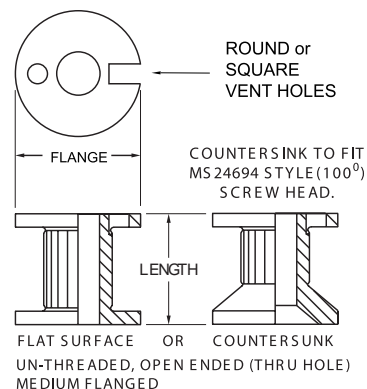
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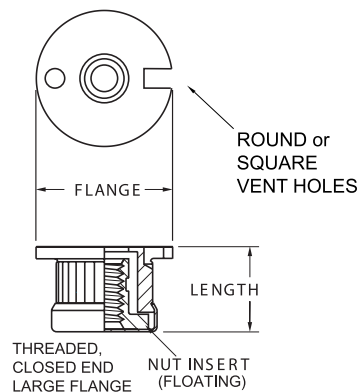
NAS1832 thru NAS1836, Inserts

For Composite or Honeycomb Panel Fastening....Continued

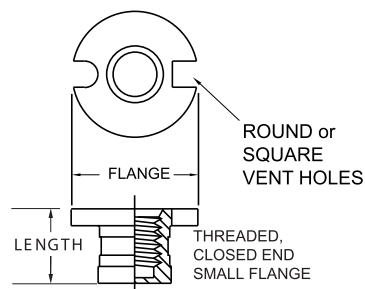
NAS1834 series, Potted in Insert, Medium Flange, UN-Threaded with Open End, Plain or Countersunk Bottom				
NAS1834	Thru-Hole Size	Flange	Installation Hole size	Length Minimum
-06	.139-.145	.560	.561-.566	.250
-08	.168-.174			
-3	.195-.201	.685	.686-.691	.312
-4	.256-.263			
-5	.315-.322			
-6	-.376-.383	.841	.842-.847	.375



NAS1835 series, Potted in Insert, Large Flange, Floating Nut Element, Closed End.				
NAS1835	Threads	Flange	Installation Hole size	Length
-08	8-32	.685	.686-.691	.37
-3	10-32			.43
-4	1/4-28	.748	.749-.755	.56
-5	5/16-24	.810	.811-.817	.75
-6	3/8-24	.873	.874-.880	.81



NAS1836 series, Potted in Insert, Small Flange, Threaded with Closed End				
NAS1836	Threads	Flange	Installation Hole size	Length Minimum
-06	6-32	.358	.452-.457	.217
-08	8-32			
-3	10-32			
-4	1/4-28	.405	.499-.504	.279



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Genuine Aircraft Hardware Co.

MS21063

Nut, Self-locking Gang Channel, Floating, Low Height, Steel, 125 Ksi. Ft. 250°F

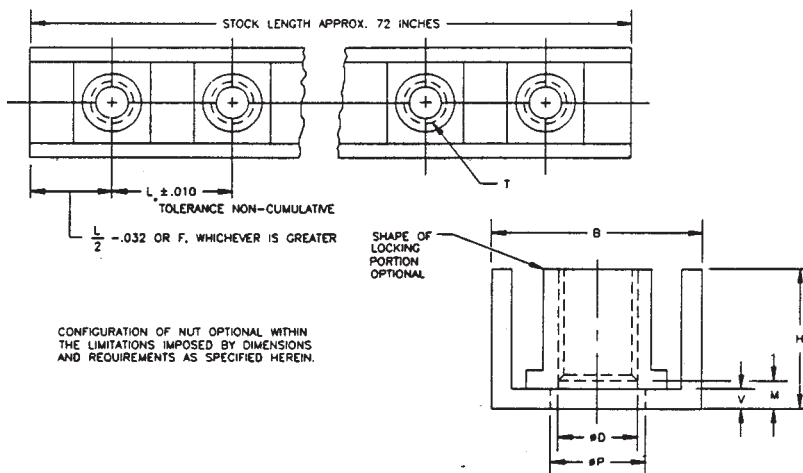


TABLE I. DASH NUMBERS AND DIMENSIONS

FIRST DASH NUMBERS		T THREAD SIZES	B MAX	D MIN	F MIN	1/ H MAX	L MIN SPACING AVAILABLE	M	2/ P		V MAX	STRENGTH LBS/MIN	WEIGHT	
NON-DRY FILM LUBRICANT	DRY FILM LUBRICANT								MAX	MIN			ELEMENTS LBS/100	CHANNEL LBS/INCH
-08	L08	.164-32 UNJC-38	.416	.168	.343	.250	.625	.062	.270	.184	.035	1.720	.19	.0028
-3	L3	.190-32 UNJF-38		.194					.210	2.460				
-4	L4	.250-28 UNJF-38	.516	.254	.406	.281	.750		.330	.270	.045	4.580	.43	.0032
-5	L5	.3125-24 UNJF-38	.609	.317	.469	.328	.875		.393	.333		7.390	.64	.0053
-6	L6	24 UNJF-38	.726	.379	.562	.344	1.0000		.455	.395	.055	211.450	1.08	.0073

1/ "H" MAX APPLIES TO NUT ELEMENT AND CHANNEL. MIN "H" NOT SPECIFIED, LIMITED ONLY BY STRENGTH REQUIREMENTS OF SPECIFICATION.

2/ HOLE IN CHANNEL MUST PROVIDE FOR FULL FLOAT OF NUT ELEMENT BUT NEED NOT BE CIRCULAR.

TABLE II. DASH NUMBERS AND DIMENSIONS

TABLE II. DASH NUMBERS AND DIMENSIONS

SECOND DASH NUMBER	L NUT ELEMENT SPACING	MAXIMUM NUMBER OF NUT ELEMENT(S)
- 5	.625	115
- 6	.750	96
- 7	.875	82
- 8	1.000	72
- 9	1.125	64
- 10	1.250	57
- 11	1.375	52
- 12	1.500	48
- 13	1.625	44
- 14	1.750	41
- 15	1.875	38
- 16	2.000	36
- 18	2.250	32
- 20	2.500	28
- 24	3.000	24

ADDITIONAL NOTES:

- PROCUREMENT SPECIFICATION: NONE
- SUPERSEDES: MS21063G
- THIS INFORMATION FROM MILITARY STANDARD MS21063 H PAGE 1 OF 3, REVISED APRIL 15, 1994, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.

Continued...

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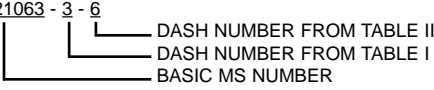
MS21063

Nut, Self-locking Gang Channel, Floating, Low Height, Steel, 125 Ksi. Ft. 250°F

Continued...

REQUIREMENTS:

1. **MATERIAL:**
 NUT ELEMENT - CARBON STEEL COMPOSITIONS 1035 (UNS G10350), 1040 (UNS G10400) AND 1050 (UNS G10500), IN ACCORDANCE WITH ASTM A29, ASTM A827 OR QQ-S-700, 1042 (UNS G10420, IN ACCORDANCE WITH ASTM A29. ALLOY STEEL, GRADES 4130 (UNS G41300), 4340 (UNS G43400) AND 8740 (UNS G87400) IN ACCORDANCE WITH ASTM A29.

 CHANNEL - ALUMINUM, ALLOY 1100, ANNEALED (UNS A91100), IN ACCORDANCE WITH QQ-A-250/1. ALUMINUM, ALLOY 2024, TEMPER T4 (UNSA92024), IN ACCORDANCE WITH QQ-A-250/4. ALUMINUM, ALLOY 7075, TEMPER T6 (UNS A97075), IN ACCORDANCE WITH QQ-A-250/12 OR QQ-A-250/13 (ALCLAD).
 2. **LENGTH:** TO BE STOCKED IN 72-INCH LENGTHS ONLY.
 3. **FINISH:**
 NUT ELEMENTS - CADMIUM PLATE IN ACCORDANCE WITH QQ-P-416. TYPE II, CLASS 2. DRY FILM LUBRICATED NUT ELEMENTS IN ACCORDANCE WITH QQ-P-416. TYPE AND CLASS ARE OPTIONAL IF THE NUT ELEMENTS WILL MEET THE SALT SPRAY REQUIREMENTS OF QQ-P-416, TYPE II.
 CHANNEL - IN ACCORDANCE WITH PROCUREMENT SPECIFICATION.
 4. **LUBRICANT:** DRY FILM LUBRICANT ON NUT ELEMENT ONLY, APPROVED IN ACCORDANCE WITH MIL-N-S-8802.
 5. **DIMENSIONING AND TOLERANCING:** DIMENSIONING AND TOLERANCING SHALL BE IN ACCORDANCE WITH ANSI Y14.5M.
 6. **HARDNESS:** NUT ELEMENTS SHALL HAVE A HARDNESS OF 49HRC, MAX.
 7. **THREADS:** THREADS BEFORE LUBRICATION IN ACCORDANCE WITH MIL-S-8879.
 8. **SURFACE TEXTURE:** SURFACE TEXTURE, UNLESS OTHERWISE SPECIFIED, SHALL NOT EXCEED 125 MICROINCHES, IN ACCORDANCE WITH ANSI/ASME 846.1.
 9. **FLOAT OF NUT ELEMENT:** FLOAT OF NUT ELEMENT PORTION OF ASSEMBLY SHALL NOT BE LESS THAN .030 NOR MORE THAN .040 LONGITUDINALLY AND NOT LESS THAN .010 NOR MORE THAN .030 Laterally FROM CENTERED POSITION. NUT ELEMENT SHALL BE CAPABLE OF ENGAGEMENT WITH A BOLT IN THE MAXIMUM MISALIGNMENT POSITION. MAXIMUM AXIAL FLOAT .020 INCH FOR -.08 AND -.3. .030 FOR LARGER SIZES.
 10. **ASSEMBLY:** THE ASSEMBLY SHALL PROVIDE A BEARING SURFACE FOR THE NUT ELEMENT WITHIN THE HOUSING. THE CENTER LINE OF THE CHANNEL SHALL NOT DEVIATE FROM A STRAIGHT LINE BY MORE THAN .015 IN ANY 12 INCHES. THE NUT ELEMENT AND BASE PORTION OF THE ASSEMBLY SHALL FORM ONE INTEGRAL UNIT.
 11. **EDGES:** BREAK SHARP CORNERS AND REMOVE ALL BURRS.
 12. **CODE:** FIRST DASH NUMBER DESIGNATES THREAD SIZE.
 SECOND DASH NUMBER DESIGNATES NUT ELEMENT SPACING IN EIGHTHS OF AN INCH.
 THIRD DASH NUMBER INDICATES NUMBER OF NUT ELEMENTS WHEN LESS THAN STOCK LENGTH (APPROX. 72 INCHES) IS DESIRED. LETTER "L" BEFORE FIRST DASH NUMBER DESIGNATES DRY FILM LUBRICATED NUT ELEMENTS.
 13. **PART NUMBER:** THE PART NUMBER SHALL CONSIST OF THE BASIC MS NUMBER FOLLOWED BY A DASH NUMBER FROM TABLE I AND TABLE II AND A THIRD DASH NUMBER, IF SPECIFIED (SEE REQUIREMENT 12).
 EXAMPLE: $MS21063 - 3 - 6$

 MS21063-3-6 INDICATES: NUT, SELF-LOCKING GANG CHANNEL, FLOATING, LOW HEIGHT, STEEL; 125 KSI FTU, 250°F; GANG CHANNEL ASSEMBLY CONSISTING OF NINETY-SIX 190-32 UNJF -3B. CADMIUM PLATED NUT ELEMENTS, SPACED AT .750 INCH.
 MS210633L4-7-10 INDICATES: NUT, SELF-LOCKING GANG CHANNEL, FLOATING, LOW HEIGHT, STEEL; 125 KSI FTU, 250°F; GANG CHANNEL ASSEMBLY CONSISTING OF TEN .250-28 UNJF -3B. CADMIUM PLATED DRY FILM LUBRICATED NUT ELEMENTS, SPACED AT .875 INCH.
- PROCUREMENT SPECIFICATION: NONE
 - SUPERSEDES: MS21063G
 - THIS INFORMATION FROM MILITARY STANDARD MS21063 H PAGE 2 OF 3, REVISED APRIL 15, 1994, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.

Continued...

Genuine Aircraft Hardware Co.

MS21063

Nut, Self-locking Gang Channel, Floating, Low Height, Steel, 125 Ksi. Ft. 250°F

Continued...

NOTES:

1. ALL DIMENSIONS ARE IN INCHES. DIMENSIONS TO BE MET PRIOR TO LUBRICATION.
2. IN THE EVENT OF A CONFLICT BETWEEN THE TEXT OF THIS STANDARD AND THE REFERENCES CITED HEREIN, THE TEXT OF THIS STANDARD SHALL TAKE PRECEDENCE.
3. REFERENCED GOVERNMENT (OR NON-GOVERNMENT) DOCUMENTS OF THE ISSUE LISTED IN THAT ISSUE OF THE DEPARTMENT OF DEFENSE INDEX OF SPECIFICATIONS AND STANDARDS (DODISS) SPECIFIED IN THE SOLICITATION FORM A PART OF THIS STANDARD TO THE EXTENT SPECIFIED HEREIN.
4. DESIGN AND USAGE LIMITATIONS: THESE NUTS ARE DESIGNED TO DEVELOP THE TENSILE STRENGTHS OF BOLTS AND SCREWS WITH AN ULTIMATE TENSILE STRENGTH OF 125 KSI BASED ON THE CROSS SECTION AREA AT THE BASIC ROOT DIAMETER OF THE THREADS. THESE NUTS ARE DESIGNED TO BE USED ON 3A EXTERNAL THREADS. THESE NUTS SHALL BE USED IN ACCORDANCE WITH THE LIMITATIONS OF MS33588. ONLY NUTS FOR WHICH THERE ARE QUALIFIED PRODUCTS LISTED ON QPL 25027 SHALL BE USED.

INTERCHANGEABILITY RELATIONSHIP

MS21063 NUTS CAN UNIVERSALLY REPLACE NAS688 THRU NAS692 AND NAS1034 THRU NAS1038 NUTS OF LIKE THREAD SIZE. LUBRICANT (DRY FILM OR NON-DRY FILM), PLATING, NUT ELEMENT SPACING, NUMBER OF NUT ELEMENTS AND MATERIAL; BUT THESE NAS688 THRU NAS692 AND NAS1034 THRU NAS1038 NUTS CANNOT UNIVERSALLY REPLACE MS21063 NUTS.

INTERCHANGEABILITY TABLE

CANCELLED PART NUMBERS ^{1/}		SUBSTITUTIVE PART NUMBERS ^{1/}
NAS1034PX	NAS688PX	MS21063-08
NAS1035PX	NAS689PX	MS21063-08-3
NAS1036PX	NAS690PX	MS21063-08-4
NAS1037PX	NAS691PX	MS21063-08-5
NAS1038PX	NAS692PX	MS21063-08-6
NAS1034P	NAS688P	MS21063L08
NAS1035P	NAS689P	MS21063L3
NAS1036P	NAS690P	MS21063L4
NAS1037P	NAS691P	MS21063L5
NAS1038P	NAS692P	MS21063L6

^{1/} NUT ELEMENT SPACING DASH NUMBER IS IDENTICAL FOR BOTH CANCELLED AND CORRESPONDING SUBSTITUTIVE PART NUMBERS.

ADDITIONAL NOTES:

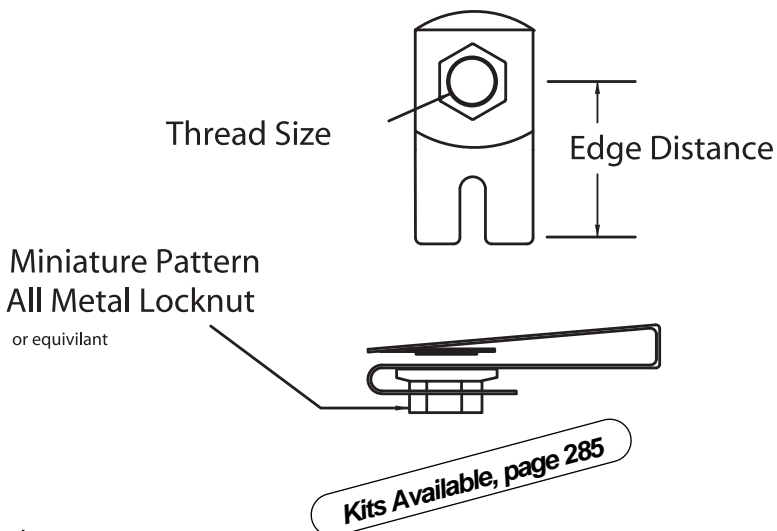
- PROCUREMENT SPECIFICATION: NONE
- SUPERSEDES: MS21063G
- THIS INFORMATION FROM MILITARY STANDARD MS21063 H PAGE 3 OF 3, REVISED APRIL 15, 1994, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.

Genuine Aircraft Hardware Co.

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Nut Clips

These are some of the most useful fasteners to have been designed in the 20th century. They can frequently be used in place of nutplates on new installations that are on the edge of the material just by making a hole, de-burring and then slipping the right Nut Clip on.



The cage is made from Carbon Steel and are Cad II plated.

The Nut is usually a nut similar to the MS21042 style locknut, it is Cad plated Alloy Steel and the Black Moly Coated.

These are available in all corrosion resistant versions as special order items with a minimum qty purchase implying for each item.

Nut Clip Selection Chart

Order by the **Bold** Part Numbers please.

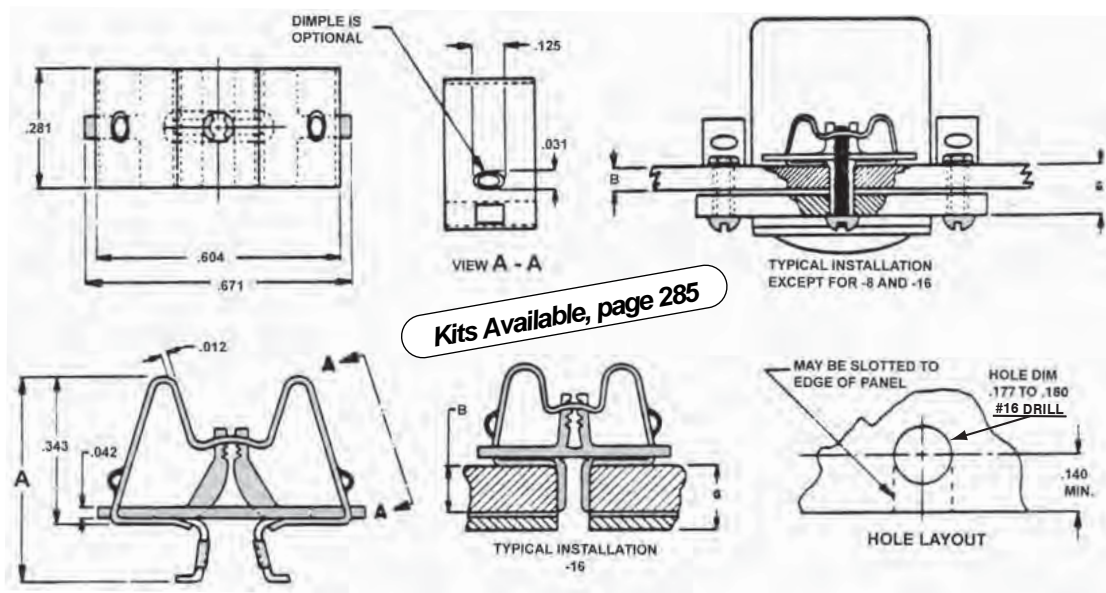
Thread Size	Nominal Edge Distance	Approximate Panel Thickness	Esna RM52LH #	Monadnock #	Shurelock #
4-40	.170	.032 - .070		13040004	
6-32	.281	.030 - .062	A4972-5-62	294667	
6-32	.500	.020 - .160		13060000-4-3	SL213-06-1
8-32	.250	.020 - .120	A4972-4A-82	13080000-1	SL210-08-2
8-32	.281	.020 - .120	A4972-5A82	13080000-2	SL231-08-1-281
8-32	.375	.020 - .070	A4972-6-82	130008	SL211-08-1
8-32	.500	.020 - .090	A4972-8-82	130007	
8-32	.500	.020 - .120		13080000-4	SL213-08-1-500
8-32	.625	.020 - .120	A4972-10-82	13080000-5	SL231-08-1-625
10-32	.250	.020 - .120	A4972-4-73	13100000-1	SL231-08-1-250
10-32	.281	.020 - .120	A4972-5-3	13100000-2	SL231-08-1-281
10-32	.375	.020 - .090	A4972-6-02	130069	SL211-3-1
10-32	.500	.020 - .120	A4972-8-02	13100000-4	SL231-3-1-500
10-32	.625	.020 - .120	A4972-10-02	130062	SL215-3-1
10-32	.705	.140 - .250	A4972-11-02	130068	
1/4-28	.500	.050 - .125		13400000-4	

Genuine Aircraft Hardware Co.

MS33737

Nut, Sheet Spring, Instrument Mounting

ORDER BY MS33737 NUMBERS ONLY



Kits Available, page 285

Conversion Chart and Dimensions

MS 33737-(XX)	TINNERMAN #	Old NAS #	"A"	"B"
MS 33737- 9C	A8938-632-493	NAS487-13	.438	.062
MS 33737-10C	A8939-632-493	NAS487-14	.469	.093
MS 33737-11C	A6939-632-493	NAS487-15	.500	.125
MS 33737-12C	A8940-632-493	NAS487-16	.562	.187
MS 33737-13C	A8941-632-493	NAS487-17	.625	.250
MS 33737-14C	A8942-632-493	NAS487-18	.688	.312
MS 33737-15C	A8943-632-493	NAS487-20	.750	.375
MS 33737-16C	A8944-632-493	NAS487-21	.750	.375+

NOTES:

- PROCUREMENT SPECIFICATION: MIL-N-3336
- SUPERSEDES: NAS487
- THIS INFORMATION FROM MILITARY STANDARD MS33737 PAGE 1 REVISED JANUARY 18, 1988, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.

Genuine Aircraft Hardware Co. Tyco AMP®

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PIDG (Pre-insulated Diamond Grip) Terminal

Kits Available, page 298

Here is a pre-insulated terminal designed for complete and uniform reliability in the most difficult circuit environments. Each PIDG Terminal consists of a tin plated copper body or a tin plated phosphor bronze body for spring spades with a specially designed copper sleeve and insulation sleeve fitted over the terminal barrel. The design of the tool dies and the construction of the terminal insures uniform insulation thickness under crimping pressure, transmitting this pressure evenly to the center of the crimp area.

The AMP Mated Tool/Terminal Concept

AMP compression crimping produces crimps for a given size wire and terminal that are precisely alike in appearance and performance. This is a calculated result made possible by designing the terminal and the crimping tool as precisely matched devices. The dies are precision-engineered from the finest hard-metal alloys. Crimping pressure is controlled by a ratchet device on the hand tool or a corresponding pre-calibration in the crimping jaws of AMP automated crimping machines.

The Crimp

Crimping pressure can neither overstress nor understress the terminal barrel — machined dies fully bottom to the precise crimp height.

The resulting termination is free of contamination, is extremely resistant to shock and critical environments, and its tensile strength approaches that of the wire itself.

PIDG Terminals meet or exceed the requirements of MIL-T-7928, Type II, Class 1 and 2

Refer to **AMP Qualified Products for Military Application**, Catalog 73-159 for Military Specification Number to AMP part Number cross reference.

Nylon Insulation: Nylon sleeves assures high dielectric strength. See page 19 for PVF₂ Radiation Resistant Insulation.

Color Coding: Terminal insulation is color-coded by wire range to eliminate errors during installation. For wire sizes 26-22, yellow; 24-20 natural (clear); 22-16, red; 16-14 blue; 12-10 yellow and 16-14 H.D., yellow with black stripe.

Basic Terminal Material. The basic terminal is constructed of fine grade high conductivity copper per QQ-C-576 and tin-plated per MIL-T-10727. Basic material for Spring Spade Tongue Terminals is phosphor bronze per QQ-B-750 and tin-plated per MIL-T-10727. AMP's special plating process creates durable corrosion resistance to salt spray and most chemical fumes.

Copper Sleeve. The specially designed copper sleeve, fitted over the terminal barrel, provides circumferential insulation support to the wire and allows the wire to be bent in any direction, without fraying the wire's insulation or breaking the conductor.

Serrations. Serrations inside barrel provide maximum contact and tensile strength after crimping.

Funnel Ramp Entry. Guarantees against a turned back strand and permits rapid wire insertion during high speed production.

Temperature Rating: 105°C Max.

AMP PIDG Terminals (Use PIDG Tooling)				AMP PIDG Nylon Butt Window Splice (Use PIDG Tooling)			
AMP Wire Range	UL Listed	SF LR7189 Certified		AMP Wire Range	UL Listed	SF LR7189 Certified	
22-16	22-16 Solid or Stranded			22-16	22-16 Stranded or Solid	300 V Max., 105°C Max.	
16-14	16-14 Solid or Stranded	300 V Max., 105°C Max.		16-14	16-14 Stranded or Solid	300 V Max., 105°C Max.	
12-10	12-10 Solid or Stranded			12-10	12-10 Stranded or Solid	300 V Max., 105°C Max.	

Note: 22-16 splices are stamped 22-18 in accordance with MIL-T-7928.
 *UL & CSA — Nylon

Over size expansions are provided in vinyl insulation only.

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Genuine Aircraft Hardware Co. Tyco AMP®

SOLISTRAND Terminal

SOLISTRAND terminals and splices are especially designed to terminate solid and stranded wire, irregular shaped conductors, and combination of these — still retaining the superior performance characteristics of single-purpose terminals and splices. Because AMP matches the terminal to the tool each termination is uniform making quality control easy and performance consistent. Corrosion resistance, vibration resistance and tensile strength of these terminals and splices are well within the limits of commercial and military specifications. The SOLISTRAND line includes parallel, and butt splices, and ring, spade, hooked and flanged spade terminals in sizes from 26 AWG through 2/0 AWG.

The Crimp

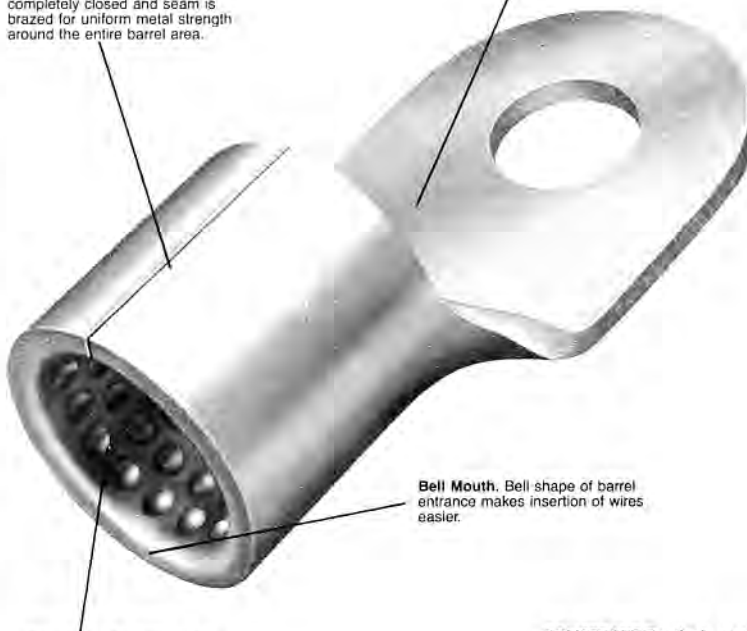
The "W" Crimp is one of several time-proven crimp types developed by AMP. It is not just a "kink" in a metal barrel; not something pinched over the electrical wire ends. The "W" Crimp is actually two longitudinal crimps applied with precisely controlled pressure so that the conductor within the barrel flows together into the dimples or serrations of the terminal barrel creating one homogeneous mass of metal. The two indents also help to center conductors within the barrel for uniform crimping of the barrel around the wire. Furthermore, the "W" Crimp permits the use of a shorter terminal barrel, an excellent feature for confined area termination.

The "W" Crimp creates terminations of optimum electrical properties and is completely reliable, giving long service in punishing environments.

Kits Available, page 298

Basic Terminal Material. The basic terminal is constructed of fine grade high conductivity copper per QQ-C-576 and tin-plated per MIL-T-10727. Basic material for Spring Spade Tongue Terminals is phosphor bronze per QQ-B-750 and tin-plated per MIL-T-10727. AMP's special plating process creates durable corrosion resistance to salt spray and most chemical fumes.

Brazed Seam. The barrel is completely closed and seam is brazed for uniform metal strength around the entire barrel area.



Bell Mouth. Bell shape of barrel entrance makes insertion of wires easier.

Dimples or Serrations. Inner surface either dimpled or serrated for optimum tensile strength and maximum electrical contact area after crimping.

SOLISTRAND Terminals meet or exceed the requirements of MIL-T-7928, Type 1, Class 1 and 2.

Refer to AMP Qualified Products for Military Application, Catalog 73-159 for Military Specification Number to AMP Part Number cross reference.

Temperature Rating: 170°C Max.

SOLISTRAND Terminals and Splices (Use SOLISTRAND Tooling)

AMP Wire Range	UL Listed	LR 7199 Certified
22-16 Solid or Stranded	22-16 Solid or Stranded	22-16 Solid or Stranded
16-14 Solid or Stranded	16-14 Solid or Stranded	16-14 Solid or Stranded
12-10 Solid or Stranded	12-10 Solid or Stranded	12-10 Solid or Stranded
8 thru 2/0 Solid or Stranded	8 thru 2/0 Stranded	8 thru 2/0 Solid or Stranded

Note: 22-16 splices are stamped 22-18 in accordance with MIL-T-7928.

Genuine Aircraft Hardware Co. Tyco AMP®

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AMPLI-BOND Terminal

Designed to accommodate wire gauges 8 AWG through 2/0 AWG. AMPLI-BOND terminals were the first large wire terminals to feature vinyl insulation bonded to the terminal sleeve. Terminals for wire sizes 8 AWG through 2/0 AWG meet the requirements of MIL-T-7928, Type II, Class 2.

This is a precision-engineered terminal offering the heavy-duty wire user uniformly high quality connections with permanent insulation support and complete protection against flash over. AMPLI-BOND terminals can be applied in a single effortless operation with the AMP DYNA-CRIMP tool.

Why Bonding?

Terminal insulators must withstand intense crimping pressures necessary for today's high wire-to-terminal contact requirements. Bonded insulation transmits this pressure evenly to the center of the crimp area. A positive bond assures uniform insulation thickness, maintains proper dielectric and tensile values and controls the extrusion of plastic under the crimping dies in the finished connection.

The Crimp

Because both wire and terminal are confined over a greater area during the crimp, a homogeneous mass is achieved. Crimp is applied gradually to encourage full movement of the wire with minimum extrusion. Compare this AMP method of applying pre-insulated solderless terminals to large gauge wires with the cumbersome mechanical fitting, brazing and manual insulating techniques still used in many plants.

Barrel with Brazed Seam, Dimpled Inner Surface. Each AMPLI-BOND terminal body is individually brazed for ruggedness and deformation control during the crimping operation. Dimpling on inner barrel surface provides more contact area of wire to terminal and additional tensile strength.

Basic Terminal Material. The basic terminal is constructed of fine grade high conductivity copper per QQ-C-576 and tin-plated per MIL-T-10727. AMP's special plating process creates durable corrosion resistance to salt spray and most chemical fumes.

Inner Bonding Sleeve. Insulation is bonded to this (QQ-C-576) copper sleeve ... the secret of superior AMPLI-BOND terminal construction.

Fully Protected Rear Insulation Support Ring. Separate metal ring provides insulation support to dampen vibration and prevent sharp bends on conductor. Steel (QQ-C-698 or ASTM A109, Tin plated per MIL-T-10727)

Insulation Proofmarked and Color Coded. Color coding of terminals provides rapid identification, assures selection of proper terminal. For additional quality control, crimping die embosses wire size number on insulation. Vinyl insulation extends minimum distance beyond terminal barrel to prevent exposure of conductor during stress and vibration.

Temperature Rating: 105°C Max.

AMPLI-BOND Terminals meet or exceed the requirements of MIL-T-7928, Type II, Class 2.

Refer to AMP Qualified Products for Military Application, Catalog 73-159 for Military Specification Number to AMP Part Number cross reference.

Kits Available, page 298

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Genuine Aircraft Hardware Co.

Tyco AMP® Ring Terminal Selection Chart

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Kits Available, page 298



Please order Ring Terminals by AMP # (in **BOLD** print)

WIRE SIZE	STYLE/COLOR	STUD SIZE	PKG	AMP #	MS PART #
22 - 18 AWG	PIDG / RED	# 4	100	320553	MS25036-148
22 - 18 AWG	PIDG / RED	# 6	100	51863	MS25036-102
22 - 18 AWG	PIDG / RED	# 8	100	320551	MS25036-149
22 - 18 AWG	PIDG / RED	#10	100	36153	MS25036-103
22 - 18 AWG	PIDG / RED	1/4	100	320571	MS25036-150
16 - 14 AWG	PIDG / BLUE	# 4	50	324159	MS25036-152
16 - 14 AWG	PIDG / BLUE	# 6	50	320561	MS25036-106
16 - 14 AWG	PIDG / BLUE	# 8	50	51864-1	MS25036-153
16 - 14 AWG	PIDG / BLUE	#10	50	51864-2	MS25036-108
16 - 14 AWG	PIDG / BLUE	1/4	50	320563	MS25036-154
16 - 14 AWG	PIDG / BLUE	5/16	50	320575	MS25036-109
12 - 10 AWG	PIDG / YELLOW	# 8	25	320568	MS25036-156
12 - 10 AWG	PIDG / YELLOW	#10	25	36161	MS25036-112
12 - 10 AWG	PIDG / YELLOW	1/4	25	320569	MS25036-157
12 - 10 AWG	PIDG / YELLOW	5/16	25	320576	MS25036-113
8 AWG	AMPLI-BOND / RED	#10	10	322128	MS25036-115
8 AWG	AMPLI-BOND / RED	1/4	10	322049	MS25036-116
8 AWG	AMPLI-BOND / RED	5/16	10	322003	MS25036-117
8 AWG	AMPLI-BOND / RED	3/8	10	322004	MS25036-118
8 AWG	SOLISTRAND / NONE	#10	10	31807	MS20659-107
8 AWG	SOLISTRAND / NONE	1/4	10	33461	MS20659-141
8 AWG	SOLISTRAND / NONE	5/16	10	31808	MS20659-108
8 AWG	SOLISTRAND / NONE	3/8	10	33463	MS20659-129
6 AWG	AMPLI-BOND / BLUE	#10	5	322153	MS25036-119
6 AWG	AMPLI-BOND / BLUE	1/4	5	322051	MS25036-120
6 AWG	AMPLI-BOND / BLUE	5/16	5	322006	MS25036-121
6 AWG	AMPLI-BOND / BLUE	3/8	5	322007	MS25036-122
6 AWG	SOLISTRAND / NONE	#10	5	321298	MS20659-130
6 AWG	SOLISTRAND / NONE	1/4	5	33465	NO MS PART #
6 AWG	SOLISTRAND / NONE	1/4	5	321598	MS20659-109
6 AWG	SOLISTRAND / NONE	5/16	5	33466	MS20659-131
6 AWG	SOLISTRAND / NONE	3/8	5	33467	MS20659-110
4 AWG	AMPLI-BOND / YELLOW	1/4	5	322053	MS25036-123
4 AWG	AMPLI-BOND / YELLOW	5/16	5	322010	MS25036-124
4 AWG	AMPLI-BOND / YELLOW	3/8	5	322011	MS25036-125
4 AWG	SOLISTRAND / NONE	1/4	5	31811	MS20659-111
4 AWG	SOLISTRAND / NONE	5/16	5	33470	NO MS PART #
4 AWG	SOLISTRAND / NONE	3/8	5	31812	MS20659-112
2 AWG	AMPLI-BOND / RED	1/4	5	322125	MS25036-126
2 AWG	AMPLI-BOND / RED	3/8	5	322055	MS25036-127
2 AWG	SOLISTRAND / NONE	5/16	5	322870	MS20659-147
2 AWG	SOLISTRAND / NONE	3/8	5	321600	MS20659-114
1/0 AWG	SOLISTRAND / NONE	1/4	5	321866	MS20659-115
1/0 AWG	SOLISTRAND / NONE	5/16	5	321867	NO MS PART #
1/0 AWG	SOLISTRAND / NONE	3/8	5	321868	MS20659-116
1/0 AWG	SOLISTRAND / NONE	1/2	5	36919	NO MS PART #

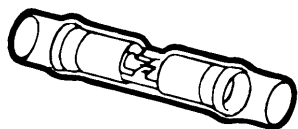
For Installation Tooling See AMP TOOLING GUIDE in this catalog.

Documents in this book for REFERENCE ONLY, not intended for design. Not guaranteed for accuracy.

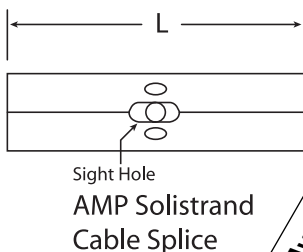
Genuine Aircraft Hardware Co.

Tyco AMP[®] Splice and Cap Selection Charts

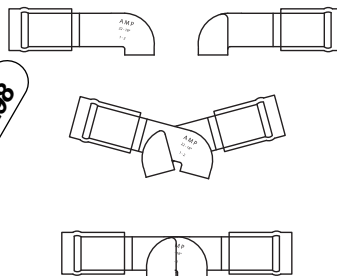
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WINDOW SPLICE



Kits Available, page 298



KNIFE SPLICE / DISCONNECT

Please order Splices by AMP #

WIRE SIZE	STYLE/COLOR	Type	pkg	AMP #	Mil Part #
26 - 24 AWG	PIDG / YELLOW	BUTT SPLICE	25	323994	M7928/5-1
24 - 20 AWG	PIDG / CLEAR	BUTT SPLICE	25	323975	M7928/5-2
22 - 18 AWG	PIDG / RED	BUTT SPLICE	25	320559	M7928/5-3
16 - 14 AWG	PIDG / BLUE	BUTT SPLICE	25	320562	M7928/5-4
12 - 10 AWG	PIDG / YELLOW	BUTT SPLICE	25	320570	M7928/5-5
22 - 18 AWG	PIDG / RED	KNIFE SPLICE	25	32446	NONE
16 - 14 AWG	PIDG / BLUE	KNIFE SPLICE	25	32448	NONE
12 - 10 AWG	PIDG / YELLOW	KNIFE SPLICE	25	35762	NONE

For Installation Tooling see AMP TOOLING GUIDE pages 187 and 188.



Wire Cap

Please order Wire Caps by AMP #

WIRE SIZE	STYLE/COLOR	Type	pkg	AMP #	MS PART#
22 - 18 AWG	PIDG / RED	WIRE CAP	25	328307	MS25274-2
16 - 14 AWG	PIDG / BLUE	WIRE CAP	25	328308	MS25274-3
12 - 10 AWG	PIDG / YELLOW	WIRE CAP	25	328309	MS25274-4

For Installation Tooling see AMP TOOLING GUIDE in this Reference Book

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Tyco AMP® Tooling Guide

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#59824-1

This one tool, can produce **Certified Crimps** for PIDG sizes,
22-18, Red
16-14, Blue
12-10, Yellow

Ring Terminals
and Splices



Most Popular



This Multi Range Tool is made specifically to crimp Uninsulated Solistrand Terminals and splices for sizes 8ga thru 2ga.

The Head Contains all 4 dies integral to itself as an integral part of the tool.

59975-1

Hydraulic Hand Tool
Self Contained Dies



This type of single size single action tool has been the standard for durability and ease of use.

This type of tool works on PIDG Terminals, Slices and Caps.

See Tool part#
for different Sizes

#47386, 22-18, Red
#47387, 16-14, Blue



This Heavy Duty Hand Tool is the workhorse for medium sized terminals and splices.

Each tool works on one size and type of connector.

See Tool part#
for different Types / Sizes

#59239-4,
12-10, PIDG, yellow
#69959,
8ga, AMPLIBOND, red
#69339,
8ga, Solistrand, Uninsulated

Genuine Aircraft Hardware Co.

Tyco AMP® Tooling Guide, New, U-Die

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**1"
Stroke**

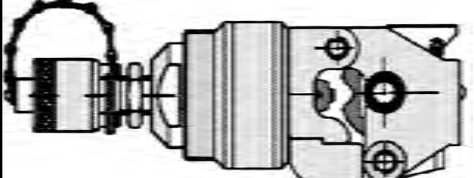
12 ton Head
1490745-1
Steel Yoke

1490747-1
Titanium Yoke



**1+1/2"
Stroke**

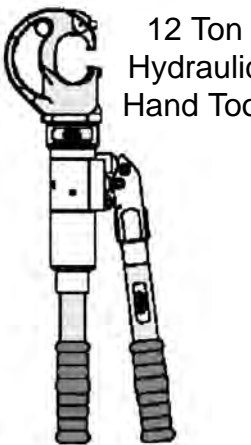
14 Ton head
1490746-1
Steel Yoke



**#8ga - #2ga Solistrand
Compression Head with Dies
P/N 1673672-1**

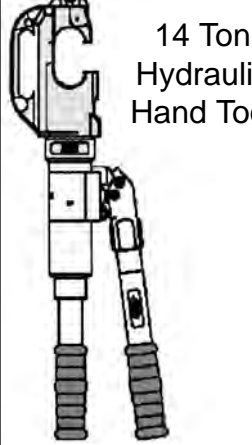
All heads must be powered by a Pump, either Electric, Hand, or Foot, which is connected to the Head with a Hose. There are also remote controls available for the Electric Pump. See table below for Part #'s

Electric Pump 110V 1583660-1	Electric Pump 220V 1583660-2	Hand Pump 1583661-1
Hand Control 1583657-1	Foot Control 1583658-1	Foot Pump 1583659-1
Hose Assy. 6 ft 1583662-1	Hose Assy. 10 ft 1583662-2	Hose Assy. 20 ft 1583662-3



**12 Ton
Hydraulic
Hand Tool**

Includes Head 1" stroke
P/N 1490748-1



**14 Ton
Hydraulic
Hand Tool**

Includes Head, 1+1/2" stroke
P/N 1490749-1

**Die selection for New
U-Die Hand Tools**
for crimping Solistrand Terminals
Order Nest and Indenter for each size.
These Dies work with
1490748-1, 1490749-1
Hydraulic Hand Tool or
1490745-1, 1490746-1 Remote Head

Wire Size	Nest Die	Indenter Die
#8	1490413-1	1490414-1
#6	1490413-2	1490414-2
#4	1490413-3	
#2	1490413-4	1490414-3
(1/0)	1490413-5	
(2/0)	1490413-6	
(3/0)	1490413-7	
(4/0)	1490413-8	

**Die selection for New
U-Die Hand Tools**
for crimping Amplibond Terminals
These Dies work with 1490749-1
Hydraulic Hand Tool or 1490746-1
Remote Head

Wire Size	Die Assy
#8	1490534-1
#6	1490535-1
#4	1490536-1
#2	1490410-1

Genuine Aircraft Hardware Co. **Heat Shrink Tubing**

3 To 1 Shrink Ratio, with and without Sealant / Adhesive



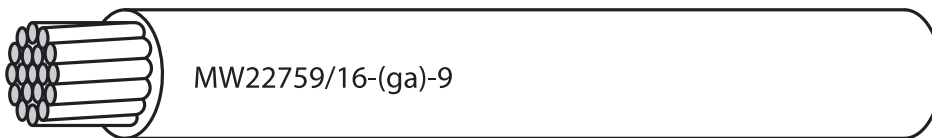
Part #	Diameter	Color	Length	Wall Type	Adhesive
M23053/5-105-0	3/16	Black	4 feet	Thin Wall	No Adhesive
M23053/5-106-0	1/4				
M23053/5-107-0	3/8				
M23053/5-108-0	1/2				
M23053/5-109-0	3/4				
M23053/15-101-0	3/4	Red	1 ft	Thick Wall	With Adhesive
M23053/15-101-2	3/4				

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Electrical Wire

Unshielded / Shielded



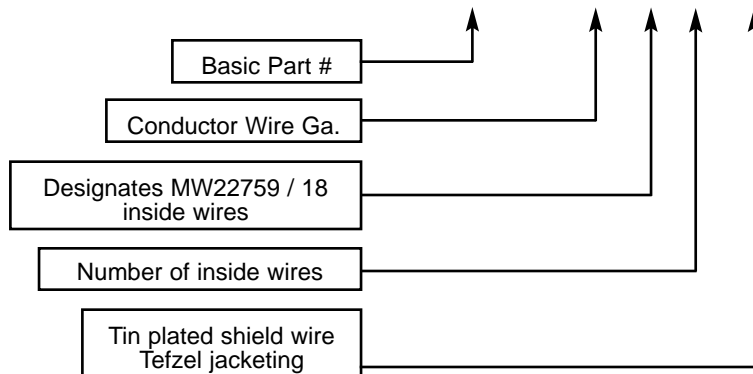
PART #	Gauge	MAX AMP RATING CIRCUIT BREAKER	FREE AIR MAX AMPS	BUNDLED MAX AMPS	WEIGHT 1,000 FT	OUTSIDE DIAMETER	DIAMETER TOL. + or -
MW22759/16-24-9	24 ga	To be used only for low amperage applications			2.57	.045	.002
MW22759/16-22-9	22 ga	5	not listed		.68	.052	
MW22759/16-20-9	20 ga	7.5	11	7.5	5.36	.060	
MW22759/16-18-9	18 ga	10	16	10	7.89	.071	
MW22759/16-16-9	16 ga	15	22	13	9.95	.079	
MW22759/16-14-9	14 ga	20	32	17	14.90	.093	
MW22759/16-12-9	12 ga	30	41	23	22.60	.114	.003
MW22759/16-10-9	10 ga	40	55	33	35.10	.139	
MW22759/16- 8 -9	8 ga	50	73	46	63.50	.199	
MW22759/16- 6 -9	6 ga	80	101	60	99.90	.250	
MW22759/16- 4 -9	4 ga	100	135	80	157.0	.312	.004
MW22759/16- 2 -9	2 ga	125	181	100	245.0	.388	

Mil-W-27500

Shielded, single or multi conductor, tefzel jacketed, cable

See part # breakdown below, alter to meet your requirements.
Wire meets MW22759/18 specs except "FREE AIR MAX AMPS."

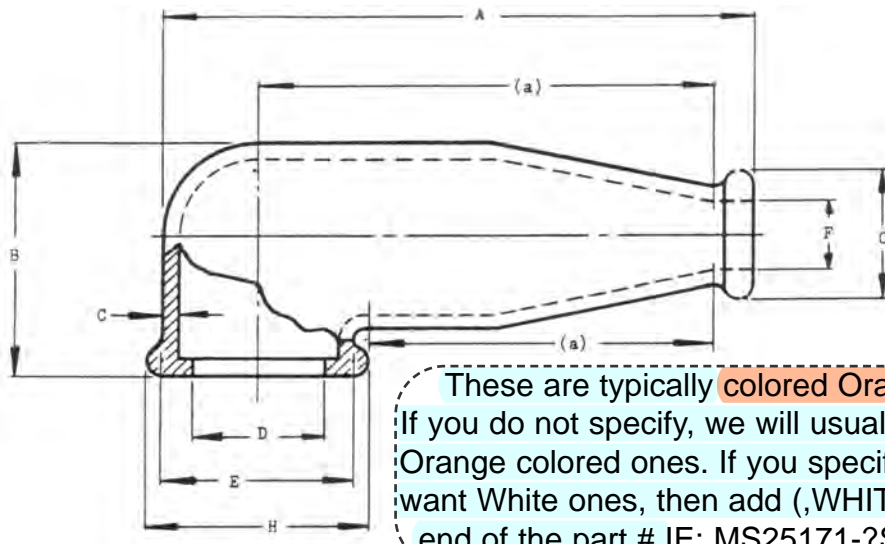
M27500 - 20 TG 3 T14



Genuine Aircraft Hardware Co.

MS25171

Nipple, Electrical Terminal



These are typically colored Orange. If you do not specify, we will usually ship Orange colored ones. If you specifically want White ones, then add (,WHITE) at the end of the part # IE: MS25171-?S,WHITE

MS PART NO.	(C)								MATERIAL
	A MAX	B	C	D DIA	E DIA	F DIA	G DIA	H DIA	
MS25171-1 (b)	1.38	.56	.06	.40	.63	.16	.41	.76	MIL-R-6855
MS25171-1S									MIL-R-5847
MS25171-2 (b)	2.50	1.0	.06	.56	.82	.31	.56	.95	MIL-R-6855
MS25171-2S									MIL-R-5847
MS25171-3 (b)						.43	.68		MIL-R-6855
MS25171-3S									MIL-R-5847
MS25171-4 (b)	.56	.82	MIL-R-6855						
MS25171-4S			MIL-R-5847						

(a) CONTOUR WITHIN THESE LIMITS MAY VARY FROM THAT SHOWN TO SUIT INDIVIDUAL MANUFACTURER'S DESIGN.

(b) PART NUMBERS MS25171-1, -2, -3, AND -4 INACTIVE FOR DESIGN AFTER AUGUST 2, 1957.
PART NUMBERS MS25171-1S, -2S, -3S, AND -4S REPLACE AND ARE INTERCHANGEABLE WITH PART NUMBERS MS25171-1, -2, -3, AND -4, RESPECTIVELY.

MATERIAL: RUBBER, SILICONE, SPECIFICATION MIL-R-5847, CLASS II, GRADE 50.

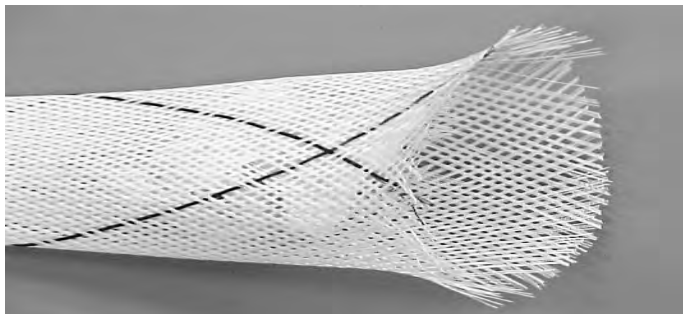
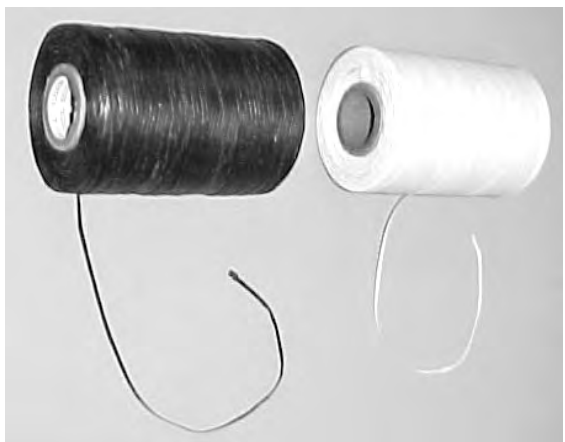
(C) DIMENSIONS IN INCHES. UNLESS OTHERWISE SPECIFIED, TOLERANCES: DECIMALS ±.02.

(C) MS PART NUMBER AND MANUFACTURER'S IDENTIFICATION SHALL BE LEGIBLY MOLDED ON EACH NIPPLE.

- PROCUREMENT SPECIFICATION: NONE
- SUPERSEDES: AN781
- THIS INFORMATION FROM MILITARY STANDARD MS25171 PAGE 1 OF 1, REVISED MAY 19, 1959, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.

Wire Harnessing

Harnessing Tape and Expandable Sleeving



Both the Expandable Sleeving and the Wire Harnessing Tape, also known as Wire Lacing cord, are very useful for organizing bundles of wires and controlling your electrical harnesses.

You will note that the sleeving also provides some abrasion resistance for the bundle of wires both during installation and in service. Neither of these is heat resistant enough to use in engine compartments. The term Fire Retardant is NOT the same as Fire Resistant. For **Sleeving** selection see bottom table. --To order Wire **Harness Tape** see table below.--

Harness Tape, Waxed .011-.017th x .077-.094 wide	Color	Harness Tape, Waxed .012-.018th x .099-.121 wide	Color
Part #, AA52081-B-3/WHT	WHITE	Part #, AA52081-B-2/WHT	WHITE
Part #, AA52081-B-3/BLK	BLACK	Part #, AA52081-B-2/BLK	BLACK



FIRE RETARDANT EXPANDABLE SLEEVING

Round braided tubular sleeving manufactured from strands of fire retardant monofilament. The material is self-extinguishing and meets the requirements of VW-1 and FR-1 material. Fire retardant sleeving is identified with a crisscross tracer. Manufactured by Breyden Products Inc.

COLORS: Natural or Black , suffix to Part# **-N** = Natural, **-B**=Black
 TEMPERATURE RANGE: -94°F TO 257°F (-70°F to 125°C)

*Expandable Sleeving can be ordered by the foot, in 10ft increments.

Part Number <small>Add suffix for color</small>	Size	Expandable Sleeving	Pounds Per 1,000 Ft.	Standard Spool *
22501-	1/8"	3/32-1/8"	1.8	1,000 Ft.
22502-	1/4"	1/8"-3/8"	2.6	1,000 Ft.
22503-	1/2"	1/4"-3/4"	7.4	500 Ft.
22504-	3/4"	1/2"-1 1/4"	12.5	250 Ft.
22505-	1 1/4"	3/4"-1 1/2"	15.8	250 Ft.
22506-	1 3/4"	1 1/4"-2 3/4"	26.3	200 Ft.
22507-	2"	1 1/2"-3"	34.2	100 Ft.
22508-	2 1/2"	1 3/4"-3 1/2"	37.5	100 Ft.

Genuine Aircraft Hardware Co.

Wire Tie Cross Reference Chart

ORDER BY MS3367 NUMBER ONLY

For more details see the actual MS3367 print.

MS PART # (natural)	PANDUIT PLT	PANDUIT SST	T & B	TYTON	BURNDY	DENNISON	CATAMOUNT
MS3367-1-9	PLM 2S	SSM 2S	TY525M	IT 50R	TF 5L	08413	L-7-50
MS3367-2-9	PLT 4S	SST 4S	TY528M	T 50L	TF 8	08427	L-14-50
MS3367-3-9	PLT 4H	SST 4H	TY527M	T 120R	TF 7	08378	L-14-120
MS3367-4-9	PLT 1M	SST 1M	TY523M	T 18R	TF 3	08374 08342	L-4-18
MS3367-5-9	PLT 1.5M PLTR 1.5I	SST 1.5M SST 1.5I SST 1.5S	TY524M	T 30R T 50S	TF 4	08376	L-5-30
MS3367-6-9			TY529M				L-32-120
MS3367-7-9	PLT 3I PLT 3S	SST 3I SST 3S	TY5253M	T 50I	NONE	08741	L-11-50

MS3367

Strap, Tiedown, Electrical Components, Adjustable, Self-clinching, Plastic, Type I, Class 1

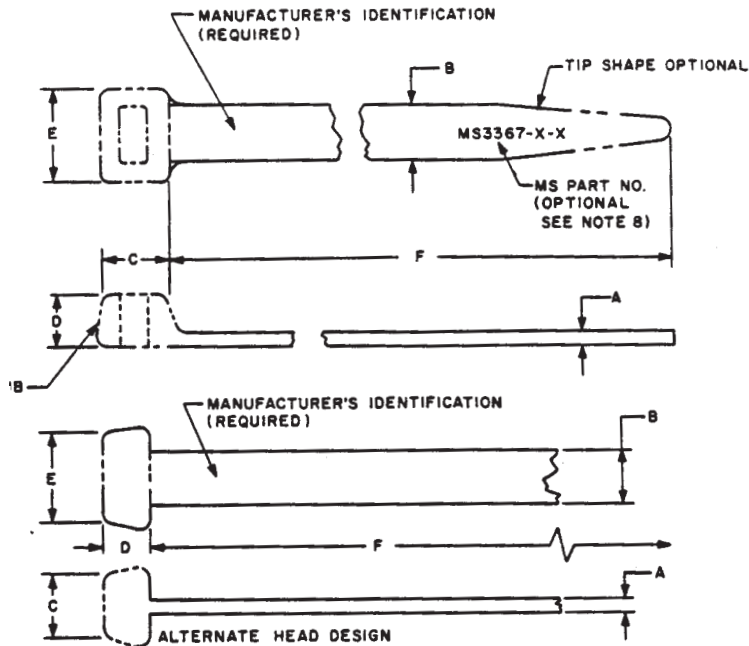


TABLE I

DASH NUMBR	BUNDLE DIA INCH		A MAX	B MAX	C MAX	D MAX	E MAX	F MIN	MIN. TENSILE STRENGTH LB.	STRAP ID. CODE (SEE NOTE 9)	MS INSTALLATION TOOL	TOOL TENSION SETTING RANGE (SEE NOTES 6 AND 10)
	MIN	MAX										
-1	1/16	1+3/4	.055	.190	.275	.240	.320	6.30	50	STD (STANDARD)	MS90387-1	6 TO 8
-2	1/16	4	.055	.192	.275	.240	.365	13.35	50	STD (STANDARD)	MS90387-1	6 TO 8
-3	3/16	3+1/2	.083	.310	.375	.330	.535	12.00	120	HVY (HEAVY)	MS90387-2	5 TO 8
-4	1/16	5/8	.046	.100	.175	.170	.195	2.72	18	MIN (MINIATURE)	MS90387-1	1 TO 3
-5	1/16	1+1/4	.055	.146	.220	.200	.260	4.68	30	INT (INTERMEDIATE)	MS90387-1	3 TO 5
-6	3/16	8	.083	.310	.375	.330	.550	26.25	120	HVY (HEAVY)	MS90387-2	5 TO 8
-7	1/16	3	.055	.192	.275	.240	.365	10.20	50	STD (STANDARD)	MS90387-1	6 TO 8

NOTES:

- PROCUREMENT SPECIFICATION: MIL-S-23190
- SUPERSEDES: MS17821 AND MS18034
- THIS INFORMATION FROM MILITARY STANDARD MS3367 H PAGE 1 OF 3, REVISED AUGUST 16, 1978, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.

Continued...

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MS3367

Strap, Tiedown, Electrical Components, Adjustable, Self-clinching, Plastic, Type I, Class 1

Continued...

INCH	MM	INCH	MM	INCH	MM	INCH	MM
.046	1.17	.192	4.88	.365	9.27	4	101.60
.055	1.40	.195	4.95	.375	9.53	4.68	118.87
.0625	1.59	.200	5.08	.535	13.59	6.30	160.02
.083	2.11	.220	5.59	.550	13.97	8	203.20
.100	2.54	.240	6.10	.625	15.88	10.20	259.08
.146	3.71	.260	6.60	1.25	31.75	12.00	304.80
.170	4.32	.275	6.99	1.75	44.45	13.35	339.09
.175	4.45	.310	7.87	2.72	69.09	26.25	666.75
.1875	4.76	.320	8.13	3	76.20		
.190	4.83	.330	8.38	3.50	88.90		

TABLE II

COLOR DASH NO.	COLOR	COLOR DASH NO.	COLOR
-0 1/	BLACK	-5	GREEN
-1	BROWN	-6	BLUE
-2	RED	-7	PURPLE
-3	ORANGE	-8	GRAY
-4	YELLOW	-9 1/	NATURAL

1/ ONLY STRAPS IN NATURAL AND BLACK COLORS SHALL BE STOCKED BY THE GOVERNMENT.

TABLE III

SUPERSESION BY PART NUMBER		
PART NO.	PART NO.	PART NO. 2/
MS3367	MS17821	MS18034
MS3367-1	MS17821-1	MS18034-1
MS3367-2	MS17821-2	MS18034-2
MS3367-3	MS17821-3	MS18034-3
MS3367-4	MS17821-4	MS18034-4
MS3367-5	-----	MS18034-5
MS3367-6	-----	MS18034-6
MS3367-7	-----	MS18034-7

2/ SUPERSEDED MS18034 COLORED STRAPS WERE DESIGNATED BY ALPHABETICAL DESIGNATORS IN LIEU OF NUMERICAL DESIGNATORS AS SHOWN IN TABLE II.

REQUIREMENTS:

1. MATERIAL
 - (a) STRAP: NYLON, PER MIL-M-20693, TYPE I, OR TYPE III, EXCEPT FOR BLACK WHICH SHALL BE TYPE II (WEATHER RESISTANT).
 - (b) STRAP LOCK:
 - (1) METAL, TYPE PER QQ-S-766, CLASS 301 OR 302 (SEE NOTE 5).
 - (2) PLASTIC, TYPE PER MIL-M-20693, TYPE I, OR TYPE III, EXCEPT FOR BLACK WHICH SHALL BE TYPE II (WEATHER RESISTANT) (SEE NOT 5).
 - (c) COLOR:
 - (1) COLOR SHALL CONFORM TO MIL-STD-1-4, EXCEPT BLACK AND NATURAL.

NOTES:

1. ALL DIMENSIONS ARE IN INCHES.
2. STRAPS SHALL HAVE NO BURRS, SHARP EDGES OR SHARP CORNERS.
3. METRIC EQUIVALENTS (TO THE NEAREST .01 MM) ARE GIVEN FOR GENERAL INFORMATION ONLY AND ARE BASED UPON 1 INCH = 25.4 MM.
4. THE GOVERNMENT HAS A ROYALTY FREE LICENSE UNDER THE FOLLOWING U.S. PATENT AND U.S. PATENT APPLICATION NUMBERS 3,022,557; 3,186,047; 173,866; 178,331; FOR THE BENEFIT OF MANUFACTURERS OF THE ITEMS CALLED FOR IN THIS STANDARD, EITHER FOR THE GOVERNMENT OR FOR USE IN EQUIPMENT TO BE DELIVERED TO THE GOVERNMENT.
5. LOCKING DEVICES OF ANY DESIGN ARE ACCEPTABLE PROVIDED THEY MEET PERFORMANCE REQUIREMENTS OF THE PROCUREMENT SPECIFICATION. WHEN METAL LOCKING DEVICES ARE USED, THEY MUST BE SECURELY ANCHORED AND SHALL NOT BE EXPOSED OUTSIDE OF THE HUB.
6. TYPE I TIE DOWN STRAPS MAY BE USED ON WIRE BUNDLES CONTAINING SOLID DIELECTRIC COAXIAL CABLES PROVIDED THAT THE TENSION SETTING ON THE MS90387 INSTALLING TOOL IS NOT GREATER THAN THAT REQUIRED TO PREVENT AXIAL SLIPPAGE.
7. CONTOUR INDICATED BY PHANTOM LINES MAY VARY FROM THAT SHOWN TO SUIT INDIVIDUAL MANUFACTURER'S DESIGN. SLIGHT MOULDING TAPER IS PERMITTED.

ADDITIONAL NOTES:

- PROCUREMENT SPECIFICATION: MIL-S-23190
- SUPERSEDES: MS17821 AND MS18034
- THIS INFORMATION FROM MILITARY STANDARD MS3367 H PAGE 2 OF 3, REVISED AUGUST 16, 1978, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.

Continued...

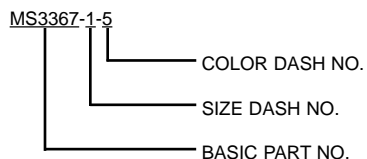
Genuine Aircraft Hardware Co.

MS3367

Strap, Tiedown, Electrical Components, Adjustable, Self-clinching, Plastic, Type I, Class 1

Continued...

8. EXAMPLE OF PART NUMBER



9. UNIT PACKAGE MARKING - IN ADDITION TO THE PART NUMBER SHOWN IN NOTE 8. THE UNIT PACKAGE SHALL HAVE THE FOLLOWING TYPICAL INFORMATION MARKED ON THE PACKAGE OR CONTAINED WITHIN THE PACKAGE:

EXAMPLE

STRAP IDENTIFICATION CODE	STANDARD
MS INSTALLATION TOOL	90387-1
TOOL TENSION SETTING RANGE	6 TO 8

10. TOOL TENSION SETTINGS - THE TOOL TENSION SETTING RANGES SPECIFIED IN TABLE I ARE FOR TYPICAL WIRE BUNDLE APPLICATIONS. SETTINGS LESS OR GREATER THAN THE RANGES SPECIFIED MAY BE NECESSARY FOR SPECIAL APPLICATIONS.

11. FOR DESIGN FEATURE PURPOSES, THIS STANDARD TAKES PRECEDENCE OVER PROCUREMENT DOCUMENTS REFERENCED HEREIN.

12. REFERENCED DOCUMENTS SHALL BE OF THE ISSUE IN EFFECT ON DATE OF INVITATION FOR BIDS, OR REQUEST FOR PROPOSAL EXCEPT THAT REFERENCED ADOPTED INDUSTRY DOCUMENTS SHALL GIVE THE DATE OF THE ISSUE ADOPTED.

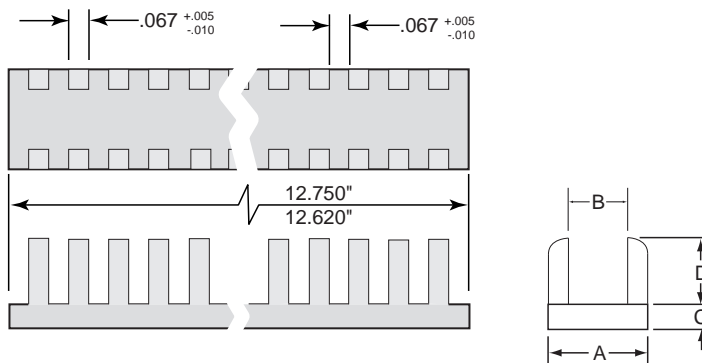
ADDITIONAL NOTES:

- PROCUREMENT SPECIFICATION: MIL-S-23190
- SUPERSEDES: MS17821 AND MS18034
- THIS INFORMATION FROM MILITARY STANDARD MS3367 H PAGE 3 OF 3, REVISED AUGUST 16, 1978, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.

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MS21266

Grommet, Plastic, Edging



DASH NO.	SHEET THICKNESS (REF)	A +.015 -.005	B +.015 -.005	C +.015 -.005	D +.020 -.005
-1	.015-.052	.150	.056		
-2	.052-.085	.175	.090	.055	.100
-3	.085-.128	.220	.131		
-4	.128-.192	.325	.195	.070	.160
-5	.192-.255	.385	.260		.170
-6	.255-.318	.445	.320		
-7	.318-.380	.515	.390	.075	.180
-8	.380-.510	.640	.515		

(E) (E) (E) (E)

STRUCTURAL HOLE DIA (REF)	LENGTH OF GROMMET MAX (REF)
1.000	3.141
1.125	3.534
1.250	3.927
1.375	4.319
1.500	4.712
1.625	5.105
1.750	5.497
1.875	5.890
2.000	6.283

REQUIREMENTS:

- MATERIALS: NYLON PER SPECIFICATION MIL-M-20693. TYPE 1.
POLYTETRAFLUOROETHYLENE (TFE) PER SPECIFICATION L-P-403.
POLYFLUOROETHYLENEPROPYLENE (FEP) PER SPECIFICATION L-P-389.

(3)
NOTES:

- REMOVE ALL BURRS AND SHARP EDGES.
- DIMENSIONS IN INCHES.
- THE GOVERNMENT SHALL ACQUIRE AND STOCK EDGING GROMMETS IN 12.750-12.620 LENGTHS. (3)
- THE INSTALLING ACTIVITY SHALL FABRICATE GROMMETS FROM THE PARTS TO BE STOCKED.
- EDGING GROMMETS ARE TO BE USED FOR ODD SHAPE HOLES IN ADDITION TO THE CIRCULAR HOLE SIZES SPECIFIED IN ABOVE TABLE.
- MAXIMUM ALLOWABLE END GAP AFTER EDGING GROMMET IS INSTALLED FLUSH AGAINST HOLE PERIPHERY IS .025 INCH.
- FOR POSITIVE POSITIONING IN ODD SHAPE HOLES APPLY ARMSTRONG TYPE A-12 ADHESIVE CEMENT, OR EQUIVALENT, TO THE CLEANED EDGES OF THE MATERIAL AND GROMMET.
- PATENT NOTICE: THE GOVERNMENT HAS A ROYALTY FREE LICENSE FOR GROMMETS UNDER U.S. PATENT APPLICATION SERIAL NO. 524.070 FOR THE BENEFIT OF MANUFACTURERS OF THE ITEM CALLED FOR IN SPECIFICATION MIL-G-22529 AND THIS MILITARY STANDARD EITHER FOR THE GOVERNMENT OR FOR USE IN EQUIPMENT TO BE DELIVERED TO THE GOVERNMENT.
- LETTERS SHALL NOT PROTRUDE BEYOND THE OUTER SURFACE.
ADD "N" AFTER DASH NUMBER FOR NYLON MATERIAL
ADD "T" AFTER DASH NUMBER FOR (TFE) MATERIAL
ADD "F" AFTER DASH NUMBER FOR (FEP) MATERIAL (3)
EXAMPLE OF PART NUMBER: MS21266 -2N GROMMET OF NYLON MATERIAL FOR .052-.085 SHEET THICKNESS.
MS21266 -2T GROMMET OF (TFE) MATERIAL FOR .052-.085 SHEET THICKNESS.
MS21266 -2F GROMMET OF (FEP) MATERIAL FOR .052-.085 SHEET THICKNESS.
- POLYTETRAFLUOROETHYLENE (TFE) GROMMETS SHALL BE SUPPLIED ETCHED AFTER DECEMBER 16, 1977.
- POLYTETRAFLUOROETHYLENE (TFE) PER SPECIFICATION AMS 3651 IS INACTIVE FOR DESIGN AFTER DECEMBER 16, 1977.

ADDITIONAL NOTES:

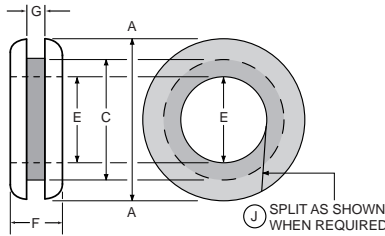
- PROCUREMENT SPECIFICATION: MIL-G-22529
- SUPERSEDES: MS21266 (WEP)
- THIS INFORMATION FROM MILITARY STANDARD MS21266 H PAGE 1 of 1, REVISED JUNE 15, 1981, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.

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MS35489

Grommets, Synthetic and Silicone Rubber, Hot - Oil and Coolant Resistant



Kits Available, page 301

TABLE I. DASH NUMBERS AND DIMENSIONS

E HOLE	C GROOVE	A OUTSIDE	GROOVE WIDTH G									
			.062		.094		.125		.188		.250	
			DASH NO.	F	DASH NO.	F	DASH NO.	F	DASH NO.	F	DASH NO.	F
.125	.188	.312	140	.188								
.125	.250	.344	1	.188	142	.218						
.125	.375	.500			143	.312						
.125	.562	.750	2	.188			31	.250	60	.312	89	.375
.125	1.000	1.250	3	.250			32	.312	61	.375	90	.438
.188	.312	.438	4	.188	144	.250	33	.250	62	.312	91	.375
.188	.562	.750	134	.188	145	.468	137	.250	138	.312	139	.375
.188	.625	.875	5	.188			34	.250	63	.312	92	.375
.250	.438	.562			146	.219						
.250	.438	.625	6	.188			35	.250	64	.312	93	.375
.250	.750	1.000	7	.250			366	.312	65	.375	94	.438
.250	1.000	1.250	8	.250			37	.312	66	.375	95	.438
.312	.562	.812	9	.312			38	.375	67	.438	96	.500
.312	.750	1.000	10	.312			39	.375	68	.438	97	.500
.312	.812	1.062	118	.312			122	.375	136	.438	130	.500
.375	.500	.641			147	.250						
.375	.500	.656	141	.250								
.375	.625	.875	11	.312			40	.375	69	.438	98	.500
.375	1.000	1.250	12	.250	148	.281	41	.312	70	.375	99	.438
.438	.688	.938	13	.312			42	.375	71	.438	100	.500
.500	.750	1.000	149	.250	150	.281						
.500	.812	1.062	14	.312			43	.375	72	.438	101	.500
.500	1.250	1.000	15	.250			44	.312	73	.375	102	.438
.562	.812	1.062	16	.312			45	.375	74	.438	103	.500
.625	.875	1.125	17	.312	151	.344	46	.375	75	.438	104	.500
.625	.969	1.250			152	.438						
.625	1.250	1.500	18	.250			47	.312	76	.375	105	.438
.688	1.000	1.312	19	.375	153	.406	48	.438	77	.500	106	.562
.750	1.062	1.375	20	.375	154	.312	49	.438	78	.500	107	.562
.750	1.250	1.627	135	.250			123	.312	127	.375	131	.438
.750	1.438	1.812	21	.375			50	.438	79	.500	108	.562
.750	1.625	2.000	120	.375			124	.438	128	.500	132	.562
.875	1.125	1.500			155	.344						
.875	1.250	1.625	22	.438			51	.500	80	.562	109	.625
.875	1.625	2.000	121	.438			125	.500	129	.562	133	.625
1.000	1.375	1.750	23	.438	156	.375	52	.500	81	.562	110	.625
1.000	1.875	2.250	24	.438			53	.500	82	.562	111	.625
1.250	2.375	2.750	25	.438			54	.500	83	.562	112	.625
1.250	2.500	2.875	26	.438			55	.500	84	.562	113	.625
1.500	1.750	2.125	27	.438			56	.500	85	.562	114	.625
1.500	2.750	3.250	28	.438			57	.500	86	.562	115	.625
1.750	3.250	3.750	29	.500			58	.562	87	.625	116	.688
2.000	3.500	4.000	30	.500			59	.562	88	.625	117	.688

- NOTES:**
- PROCUREMENT SPECIFICATION: MIL-G-3036
 - SUPERSEDES: MS35490 and AN931
 - THIS INFORMATION FROM MILITARY STANDARD MS35489 PAGE 1 OF 3, REVISED FEB. 17, 1989, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.

Continued...

Genuine Aircraft Hardware Co.

MS35489

Grommets, Synthetic and Silicone Rubber, Hot - Oil and Coolant Resistant

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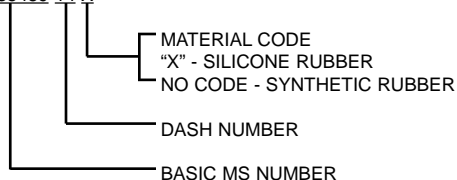
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REQUIREMENTS:

- MATERIAL:** RUBBER, SYNTHETIC, COMPOSITION A, IN ACCORDANCE WITH PROCUREMENT DOCUMENT, RUBBER, SILICONE, COMPOSITION B, IN ACCORDANCE WITH PROCUREMENT DOCUMENT.
- COLOR:** BLACK (COMPOSITION A). RED OR ORANGE (COMPOSITION B).
- PART NUMBER:** THE PART NUMBER SHALL CONSIST OF THE BASIC MS NUMBER FOLLOWED BY A DASH NUMBER FROM TABLE I, PLUS A MATERIAL CODE LETTER "X" FOR SILICONE RUBBER, NO CODE LETTER FOR SYNTHETIC RUBBER.

EXAMPLE:

MS35489-14 X



MS35489-14X INDICATES - GROMMET, SILICONE RUBBER, HOT-OIL AND COOLANT RESISTANT; GROOVE WIDTH .062; HOLE DIAMETER .500; GROOVE DIAMETER .812; OUTSIDE DIAMETER 1.062; THICKNESS .312.

- TOLERANCE:** TOLERANCES SHALL BE ± .031 INCH FOR THICKNESS (F) AND OUTSIDE DIAMETER (ØA); ± .016 INCH FOR ALL OTHER DIMENSIONS.

NOTES:

- ALL DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED.
- SUPERSESSON:** REPLACEMENT PART NUMBER RELATIONSHIPS SHALL BE IN ACCORDANCE WITH TABLE II. CANCELLED MS35490 GROMMETS MAY BE USED UNTIL EXISTING STOCKS ARE DEPLETED. DO NOT USE MS35490 GROMMETS TO REPLACE MS35489 OR AN931 GROMMETS. AN931 GROMMETS AND SUPERSEDING MS35489 GROMMETS ARE UNIVERSALLY, FUNCTIONALLY AND DIMENSIONALLY INTERCHANGEABLE.
- IN THE EVENT OF A CONFLICT BETWEEN THE TEXT OF THIS STANDARD AND THE REFERENCES CITED HEREIN, THE TEXT OF THIS STANDARD SHALL TAKE PRECEDENCE.
- REFERENCED GOVERNMENT (OR NON GOVERNMENT) DOCUMENTS OF THE ISSUE LISTED IN THAT ISSUE OF THE DEPARTMENT OF DEFENSE INDEX OF SPECIFICATIONS AND STANDARDS (DODISS) SPECIFIED IN THE SOLICITATION FORM A PART OF THIS STANDARD TO THE EXTENT SPECIFIED HEREIN.
- GROMMETS PREVIOUSLY PROCURED WITH A SPLIT (SUFFIX "S") ARE NO LONGER PROCURED OR STOCKED BY SERVICES. FOR REPLACEMENT USE SOLID GROMMETS, AND SPLIT AT ASSEMBLY.

ADDITIONAL NOTES:

- PROCUREMENT SPECIFICATION: MIL-G-3036
- SUPERSEDES: MS35490 and AN931
- THIS INFORMATION FROM MILITARY STANDARD MS35489 PAGE 2 OF 3, REVISED FEBRUARY 17, 1989, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.

Continued...

Genuine Aircraft Hardware Co.

MS35489

Grommets, Synthetic and Silicone Rubber, Hot - Oil and Coolant Resistant

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Continued...

TABLE II. REPLACEMENT PART NUMBERS

PART NUMBER				PART NUMBER				PART NUMBER				PART NUMBER			
CANCELLED AN931	CANCELLED MS35490 1/L	SUPERSEDED BY MS35489	CANCELLED AN931	CANCELLED MS35490 1/L	SUPERSEDED BY MS35489	CANCELLED AN931	CANCELLED MS35490 1/L	SUPERSEDED BY MS35489	CANCELLED AN931	CANCELLED MS35490 1/L	SUPERSEDED BY MS35489	CANCELLED AN931	CANCELLED MS35490 1/L	SUPERSEDED BY MS35489	
2-9	1	2	A2-9	25	31	B2-9	48	60	C2-9	71	89				
2-16	3	3	A2-16	26	32	B2-16	49	61	C2-16	72	90				
3-5	4	4	A3-5	27	33	B3-5	50	62	C3-5	73	91				
3-9	5	134	A3-9	28	137	B3-9	51	138	C3-9	74	139				
3-10	6	5	A3-10	29	34	B3-10	52	63	C3-10	75	92				
4-7	7	6	A4-7	30	35	B4-7	53	64	C4-7	76	93				
4-12	8	7	A4-12	31	36	B4-12	54	65	C4-12	77	94				
4-16	9	8	A4-16	32	37	4-16	55	66	C4-16	78	95				
5-9	10	9	A5-9	33	38	B5-9	56	67	C5-9	79	96				
5-12	11	10	A5-12	34	39	B5-12	57	68	C5-12	80	97				
5-13	12	118	A5-13	35	122	B5-13	58	136	C5-13	81	130				
6-10	13	11	A6-10	36	40	B6-10	59	69	C6-10	82	98				
6-16	14	12	A6-16	37	41	B6-16	60	70	C6-16	83	99				
7-11	15	13	A7-11	38	42	B7-11	61	71	C7-11	84	100				
8-13	16	14	A8-13	39	43	B8-13	62	72	C8-13	85	101				
8-20	17	15	A8-20	40	44	B8-20	63	73	C8-20	86	102				
9-13	18	16	A9-13	41	45	B9-13	64	74	C9-13	87	103				
10-14	19	17	A10-14	42	46	B10-14	65	75	C10-14	88	104				
10-20	20	18	A10-20	43	47	B10-20	66	76	C10-20	89	105				
11-16	21	19	A11-16	44	48	B11-16	67	77	C11-16	90	106				
12-17	22	20	A12-17	45	49	B12-17	68	78	C12-17	91	107				
12-20	23	20	A12-20	46	123	B12-20	69	78	C12-20	92	131				
12-23	24	21	A12-23	47	50	B12-23	70	79	C12-23	93	108				
12-26	25	22	A12-26	48	124	B12-26	71	128	C12-26	94	132				
14-20	26	22	A14-20	49	51	B14-20	72	80	C14-20	95	109				
14-26	27	23	A14-26	50	125	B14-26	73	129	C14-26	96	133				
16-22	28	23	A16-22	51	52	B16-22	74	81	C16-22	97	110				
16-30	29	24	A16-30	52	53	B16-30	75	82	C16-30	98	111				
20-38	30	25	A20-38	53	54	B20-38	76	83	C20-38	99	112				
20-40		26	A20-40	54	55	B20-40	77	84	C20-40	100	113				
24-28	24	27	A24-28	55	56	B24-28	78	85	C24-28	101	114				
24-44		28	A24-44	56	57	B24-44	79	86	C24-44	102	115				
28-52		29	A28-52	57	58	B28-52	80	87	C28-52	103	116				
32-56		30	A32-56	58	59	B32-56	81	88	C32-56	104	117				

* MS35489 SOLID GROMMETS SHOULD BE SPLIT AT ASSEMBLY WHEN NECESSARY FOR REPLACEMENT OF MS35490 SPLIT GROMMETS.

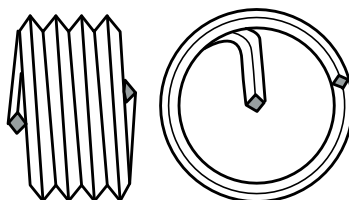
NOTES:

- PROCUREMENT SPECIFICATION: MIL-G-3036
- SUPERSEDES: MS35490 and AN931
- THIS INFORMATION FROM MILITARY STANDARD MS35489 PAGE 3 OF 3, REVISED FEBRUARY 17, 1969, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.

Genuine Aircraft Hardware Co.

Helical Wire Inserts

General Purpose



Helical Coil Wire Inserts are available in locking and non locking. They are also available in different lengths in increments of one half the major thread diameter of the design thread size. Many of the MS21208 and MS21209 part numbers have been superseded by later and more confusing part numbers, so please order using these numbers and we will notify you if supersedure is applicable, based on our inventory and the availability of the various applicable part numbers.

THREAD SIZE	LENGTH 1 X	LENGTH 1.5 X	LENGTH 2 X
4-40	C0410	C0415	C0420
6-32	C0610	C0615	C0620
8-32	C0810	C0815	C0820
10-24	C1-10	C1-15	C1-20
10-32	F1-10	F1-15	F1-20
1/4-20	C4-10	C4-15	C4-20
1/4-28	F4-10	F4-15	F4-20
5/16-18	C5-10	C5-15	C5-20
5/16-24	F5-10	F5-15	F5-20
3/8-16	C6-10	C6-15	C6-20
3/8-24	F6-10	F6-15	F6-20
7/16-14	C7-10	C7-15	C7-20
7/16-20	F7-10	F7-15	F7-20
1/2-13	C8-10	C8-15	C8-20
1/2-20	F8-10	F815	F820

To select a part number use the prefix

MS21208 for non locking
MS21209 for locking

then use the column on the left to find the thread size for the fastener that will be installed in the insert during final assembly.

The suffix will be found on the same row as the thread size under the desired length of the insert. This is an installed length.

Example of part #
MS21209F410*

Locking Helical Coiled Wire Insert, for 1/4-28 threads, .250" installed length or 1x diameter.

*Drylube or plating is available if required.

*Add an (L) for drylube or a (P) for plated to end.

Genuine Aircraft Hardware Co.

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Helical Wire Inserts

18mm x 1.5mm Inserts for Aircraft Spark Plug Holes



MS9018-01

Insert Long Reach



MS9018-05

Insert Short Reach

These Helical Wire inserts are specifically designed for new installation into Aircraft Piston Engine cylinder Spark Plug Holes. There are two lengths available in the standard size as pictured above.

There are oversize inserts called out on the actual MS9018 print, but they are not readily available except by special order and large minimum quantities with lead times.

Data is shown for all part numbers, but only the **Bold** ones or their equivilants are normally stocked

We stock either the MS#'s or the Commercial Equivilant part numbers.

Part Number	TYPE	SIZE	Number of free Coils*
MS9018-01	Long Reach	Standard	9+1/4 to 9+3/4
MS9018-02		+ .003	
MS9018-03		+ .005	
MS9018-04		+ .010	
MS9018-09		+ .015	
MS9018-10		+ .020	
MS9018-11		+ .025	
MS9018-05	Short Reach	Standard	4+1/8 to 4+5/8
MS9018-06		+ .003	
MS9018-07		+ .005	
MS9018-08		+ .010	
MS9018-12		+ .015	
MS9018-13		+ .020	
MS9018-14		+ .025	

See MS9071 for information on tapped hole for insert, insert assembly, thread dimensions after assembly, and assemble length of insert.

Material is Corrosion Resistant Steel per AMS7245.

* Number of free coils to be counted from notch.

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Form Approved
OMB No. 0704-0188

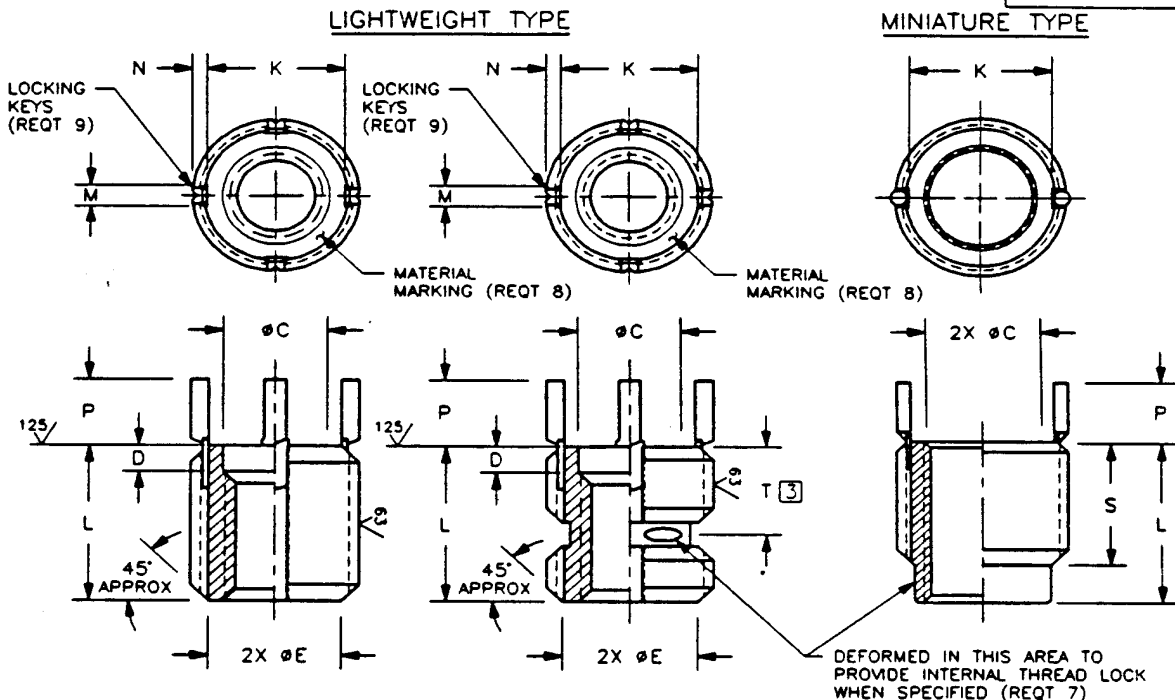


TABLE I. COARSE INTERNAL THREADS

DASH NO.	INTERNAL THREAD MIL-S-8879 UNJC-3B	EXTERNAL THREAD FED-STD-H28/2 EXCEPT MODIFIED MINOR DIA.		ØC	D	ØE	K	L	KEY DIMENSIONS			S	T
		SIZE	ØMINOR						M REF	N REF	P REF		
101	.086-56	.164-32UNC-2A	.127 .124	.089	---	---	109	.120	---	---	.060	.090	---
102	.112-40	.190-32UNF-2A	.153 .150	.114	---	---	134	.170	---	---	.080	.125	---
103	.138-32	.216-28UNF-2A	.174 .171	.141	---	---	160	.170	---	---	.080	.125	---
104	.164-32	.250-28UNF-2A	.215 .212	.169	---	---	196	.220	---	---	.100	.175	---
105	.190-24	.3125-18UNC-2A	.256 .249	.196	.070	.250	220	.312	.068	.040	.160	---	.220
106	.250-20	.375-16UNC-2A	.320 .312	.257	.070	.310	.284	.375	.068	.040	.190	---	.220
107	.3125-18	.4375-14UNC-2A	.383 .375	.316	.070	.375	.345	.437	.068	.040	.190	---	.220
108	.375-16	.500-13UNC-2A	.440 .432	.380	.070	.430	.407	.500	.068	.040	.190	---	.240
109	.4375-14	.5625-12UNC-2A	.503 .495	.445	.070	.495	.469	.562	.068	.040	.190	---	.270
110	.500-13	.625-11UNC-2A	.565 .551	.507	.070	.550	.532	.625	.068	.040	.190	---	.280

Ⓔ ENTIRE STANDARD REVISED

INCH-POUND

PREPARING ACTIVITY: ARMY-AR
CUSTODIANS: ARMY- AR NAVY- AS
AIR FORCE- 99 DLA-
REVIEW: AV, MI, 82, IS, NS
USER: AT, GL, EC, MC
PROJECT NUMBER: 5340-2051

MILITARY SPECIFICATION SHEET
TITLE
INSERT, SCREW-THREAD,
LOCKED IN, KEY-LOCKED,
MINIATURE AND LIGHTWEIGHT

SPECIFICATION SHEET NUMBER
MS51830E 9 MAR 92
SUPERSEDING
MS51830D 7 DEC 84
AMSC- N/A FSC- 5340

DISTRIBUTION STATEMENT

Ⓐ Approved for public release; distribution is unlimited.

Page 1 of 3

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OMB No. 0704-0188

LIGHTWEIGHT TYPE

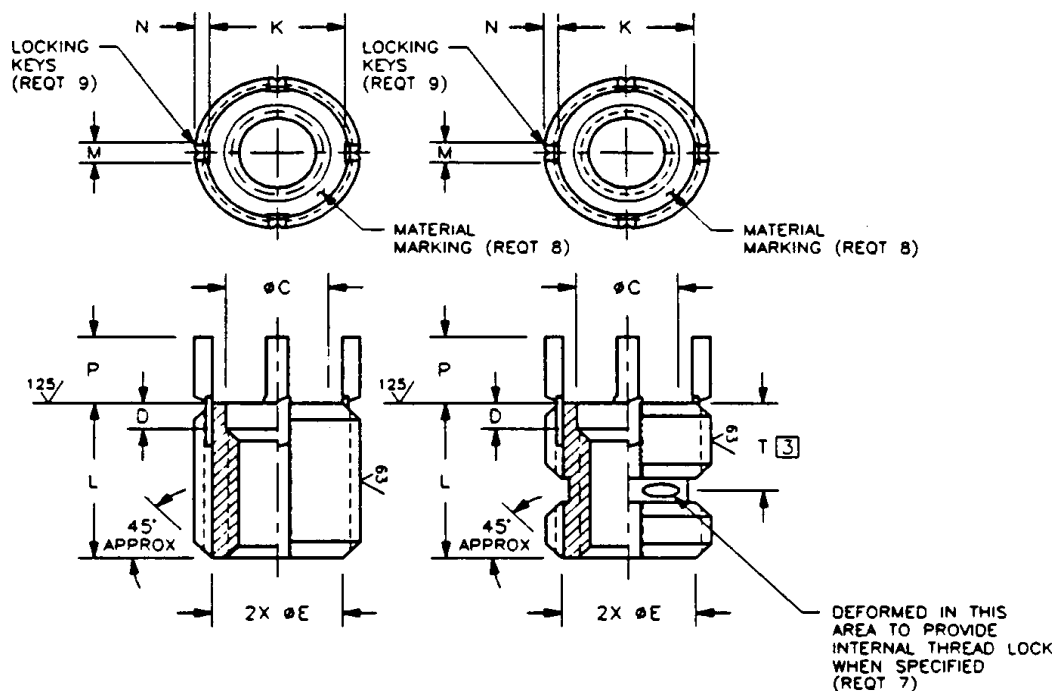


TABLE II FINE INTERNAL THREADS

DASH NO.	INTERNAL THREAD MIL-S-8879 UNJF-3B	EXTERNAL THREAD FED-STD-H28/2 EXCEPT MODIFIED MINOR DIA		ØC	D	ØE	K	L	KEY DIMENSIONS			T
		SIZE	ØMINOR						M REF	N REF	P REF	
201	.190-32	3125-18UNC-2A	256 249	.196	.070	.250	.220	.312	.068	.040	.160	.220
202	.250-28	375-16UNC-2A	320 312	.257	.070	.310	.284	.375	.068	.040	.190	.220
203	.3125-24	.4375-14UNC-2A	383 375	.316	.070	.375	.345	.437	.068	.040	.190	.220
204	.375-24	500-13UNC-2A	440 432	.380	.070	.430	.407	.500	.068	.040	.190	.240
205	.4375-20	.5625-12UNC-2A	503 495	.445	.070	.495	.469	.562	.068	.040	.190	.270
206	.500-20	.625-11UNC-2A	565 551	.507	.070	.550	.532	.625	.068	.040	.190	.280

We stock the Installation Tool for these inserts

LDS-08 for 8-32		
LDS-3 for 10-32	LDS-4 for 1/4-28	LDS-5 for 5/16-24
LDS-6 for 5/16-24	LDS-7 for 7/16-20	LDS-8 for 1/2-20

PREPARING ACTIVITY: ARMY-AR	MILITARY SPECIFICATION SHEET	SPECIFICATION SHEET NUMBER
CUSTODIANS: ARMY- AR NAVY- AS	TITLE	MS51830E 9 MAR 92
AIR FORCE- 99 OLA-	INSERT, SCREW-THREAD, LOCKED IN, KEY-LOCKED, MINIATURE AND LIGHTWEIGHT	SUPERSEDING MS51830D 7 DEC 84
REVIEW: AV, MI, 82, IS, NS		AMSC- N/A FSC- 5340
USER: AT, GL, EC, MC		
PROJECT NUMBER: 5340-2051		

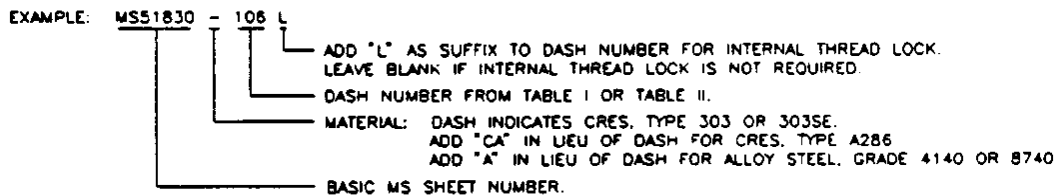
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Form Approved
OMB No. 0704-0188

REQUIREMENTS:

1. **MATERIAL:** STEEL, CORROSION-RESISTANT, TYPE 303 (UNS S30300) IN ACCORDANCE WITH AMS 5640 (TYPE 1) OR ASTM A 582, OR 303SE (UNS S30323) IN ACCORDANCE WITH AMS 5640 (TYPE 2), AMS 5738 OR ASTM A 582. STEEL, CORROSION-RESISTANT, TYPE A286 (UNS S66286) IN ACCORDANCE WITH AMS 5734 OR AMS 5737. STEEL, ALLOY, GRADE 4140 (UNS G41400) IN ACCORDANCE WITH MIL-S-5626 OR GRADE 8740 (UNS G87400) IN ACCORDANCE WITH AMS 6322. LOCKING KEYS: STEEL, CORROSION-RESISTANT, TYPE 302 CHEMICAL COMPOSITION OF ASTM A 580 ONLY.
2. **CADMIUM PLATING AND SURFACE TREATMENT:** CORROSION-RESISTANT STEEL SHALL BE PASSIVATED IN ACCORDANCE WITH QQ-P-35. ALLOY STEEL SHALL BE CADMIUM PLATED IN ACCORDANCE WITH QQ-P-416, TYPE II, CLASS 3. THE LOCKING KEYS MAY OR MAY NOT BE CADMIUM PLATED.
3. **LUBRICATION:** INSERTS WITH SELF-LOCKING INTERNAL THREADS SHALL BE DRY FILM LUBRICATED IN ACCORDANCE WITH MIL-L-46010, TYPE I. THE LOCKING KEYS MAY OR MAY NOT BE LUBRICATED.
4. **SURFACE TEXTURE:** MACHINED SURFACES SHALL BE IN ACCORDANCE WITH ANSI/ASME B46.1.
5. **HEAT TREATMENT:** ALLOY STEEL INSERTS SHALL BE HEAT TREATED TO 160,000 psi Ft_u MINIMUM IN ACCORDANCE WITH MIL-H-6875. CORROSION-RESISTANT STEEL INSERTS, TYPE A286 (AMS 5734), SHALL BE HEAT TREATED TO 140,000 psi Ft_u MINIMUM.
6. **HARDNESS:** ALLOY STEEL INSERTS SHALL HAVE A HARDNESS RANGE OF 36-40 HRC. CORROSION-RESISTANT STEEL INSERTS, TYPE A286, SHALL HAVE A HARDNESS RANGE OF 29-38 HRC.
7. **PART NUMBER:** THE PART NUMBER SHALL CONSIST OF THE BASIC MS SHEET NUMBER PLUS THE DASH NUMBER TAKEN FROM TABLE I OR TABLE II, AS APPLICABLE:



EXAMPLE: MS51830CA106L INDICATES - INSERT, SCREW-THREAD, LOCKED IN, KEY-LOCKED, LIGHTWEIGHT, CRES A286, .250-20UNC-3B INTERNAL THREAD WITH INTERNAL THREAD LOCK FEATURE

8. **MATERIAL MARKING:** CRES 303 OR 303SE HAS NO IDENTIFYING MARK. CRES A286 SHALL BE IDENTIFIED ON TOP OF INSERT BY ONE (1) LINE OR DASH MARK. ALLOY STEEL 4140 OR 8740 SHALL BE IDENTIFIED ON TOP OF INSERT BY TWO (2) PARALLEL LINES OR DASH MARKS. MATERIAL MARKING OF MINIATURE TYPE INSERTS OPTIONAL.
9. INSERTS WITH INTERNAL THREAD SIZE .250 AND SMALLER SHALL BE SUPPLIED WITH TWO (2) LOCKING KEYS SPACED 180° APART. INSERTS WITH INTERNAL THREAD SIZE .3125 AND GREATER SHALL BE SUPPLIED WITH FOUR (4) LOCKING KEYS SPACED 90° APART.
10. INSERTS SHALL BE FREE OF ALL HANGING BURRS AND SLIVERS WHICH MIGHT BECOME DISLODGED UNDER USAGE.
11. **SOURCE IDENTIFICATION MARK:** SOURCE IDENTIFICATION MARK SHALL BE IN ACCORDANCE WITH MIL-I-45914.
12. ALL DIMENSIONS ARE AFTER CADMIUM PLATING OR SURFACE TREATMENT AND PRIOR TO THE ADDITION OF THE LUBRICATION
13. FILLETS ARE R.015 MAXIMUM.

NOTES:

1. ALL DIMENSIONS ARE IN INCHES.
2. INSTALLATION OF INSERTS SHALL BE IN ACCORDANCE WITH MS51835.
3. DISTANCE TO CENTER OF INTERNAL THREAD LOCK.
4. IN THE EVENT OF A CONFLICT BETWEEN THE TEXT OF THIS STANDARD AND THE REFERENCES CITED HEREIN, THE TEXT OF THIS STANDARD SHALL TAKE PRECEDENCE.
5. REFERENCED GOVERNMENT (OR NON-GOVERNMENT) DOCUMENTS OF THE ISSUE LISTED IN THAT ISSUE OF THE DEPARTMENT OF DEFENSE INDEX OF SPECIFICATIONS AND STANDARDS (DODISS) SPECIFIED IN THE SOLICITATION FORM A PART OF THIS STANDARD TO THE EXTENT SPECIFIED HEREIN.

PREPARING ACTIVITY: ARMY-AR CUSTODIANS: ARMY- AR NAVY- AS AIR FORCE- 99 DLA- REVIEW: AV, MI, 82, IS, NS USER: AT, GL, EC, MC PROJECT NUMBER: 5340-2051	MILITARY SPECIFICATION SHEET TITLE INSERT, SCREW-THREAD, LOCKED IN, KEY-LOCKED, MINIATURE AND LIGHTWEIGHT	SPECIFICATION SHEET NUMBER MS51830E 9 MAR 92
		SUPERSEDING MS51830D 7 DEC 84
		AMSC- N/A FSC- 5340

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Form Approved
OMB No. 0704-0155

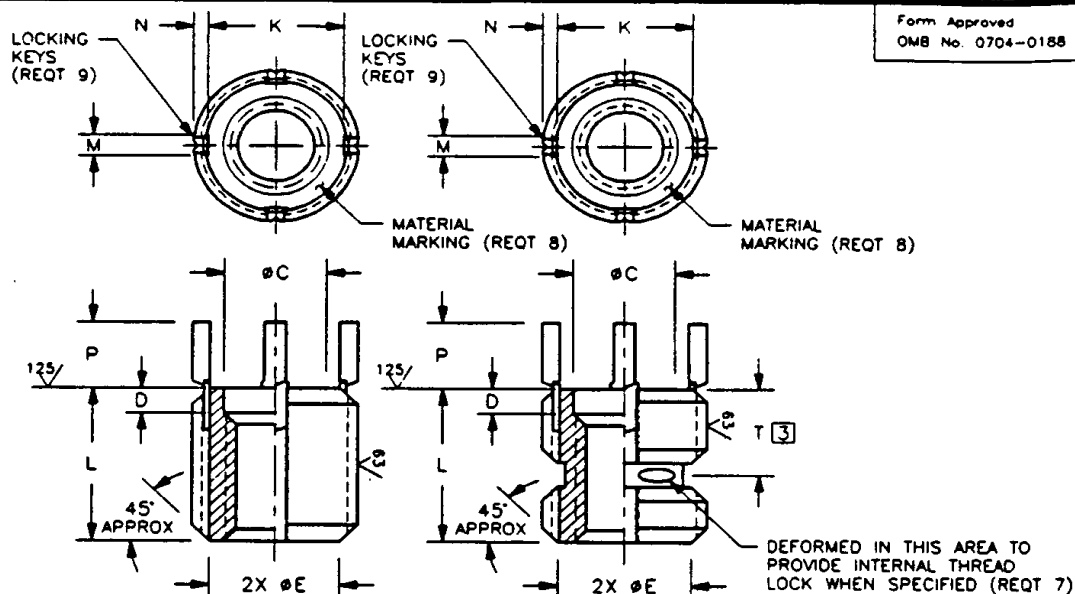


TABLE I. COARSE INTERNAL THREADS

DASH NO.	INTERNAL THREAD MIL-S-8879 UNJC-3B	EXTERNAL THREAD FED-STD-H28/2 EXCEPT MODIFIED MINOR DIA.		øC ±.005	D ±.010	øE REF	K REF	L ±.015	KEY DIMENSIONS			T ±.030
		SIZE	øMINOR						M REF	N REF	P REF	
101	.190-24	.375-16UNC-2A	.320 .312	.196	.070	.310	.284	.312	.068	.040	.130	.220
102	.250-20	.4375-14UNC-2A	.383 .375	.257	.070	.375	.344	.375	.068	.040	.190	.220
103	.3125-18	.500-13UNC-2A	.440 .432	.316	.070	.430	.407	.437	.068	.040	.190	.220
104	.375-16	.5625-12UNC-2A	.503 .495	.380	.070	.495	.469	.500	.068	.040	.190	.250
105	.4375-14	.625-11UNC-2A	.565 .551	.445	.100	.550	.532	.625	.068	.040	.190	.280
106	.500-13	.6875-11NS-2A	.625 .615	.507	.100	.615	.595	.688	.068	.040	.190	.280
107	.5625-12	.8125-16UN-2A	.752 .744	.580	.100	.745	.720	.812	.068	.040	.190	.320
108	.625-11	.875-14UNF-2A	.815 .807	.640	.100	.805	.782	.875	.068	.040	.190	.330
109	.750-10	1.125-12UNF-2A	1.050 1.040	.763	.100	1.040	.975	1.125	.103	.070	.250	---
109L	.750-10	1.125-12UNF-2A	1.050 1.040	.763	.100	1.040	.975	1.250	.103	.070	.250	.490
110	.875-9	1.250-12UNF-2A	1.175 1.165	.888	.100	1.165	1.100	1.250	.103	.070	.250	---
110L	.875-9	1.250-12UNF-2A	1.175 1.165	.888	.100	1.165	1.100	1.375	.103	.070	.250	.490
111	1.000-8	1.375-12UNF-2A	1.300 1.290	1.015	.100	1.290	1.225	1.375	.103	.070	.250	---
111L	1.000-8	1.375-12UNF-2A	1.300 1.290	1.015	.100	1.290	1.225	1.500	.103	.070	.250	.550

Ⓡ ENTIRE STANDARD REVISED

INCH-POUND

PREPARING ACTIVITY: ARMY-AR
CUSTODIANS: ARMY- AR NAVY- AS
AIR FORCE- 99 OLA-
REVIEW: AV, SH, 82, IS, NS
USER: AT, GL, MC
PROJECT NUMBER: 5340-2052

MILITARY SPECIFICATION SHEET
TITLE
INSERT, SCREW-THREAD,
LOCKED IN, KEY-LOCKED,
HEAVY DUTY

SPECIFICATION SHEET NUMBER
MS51831F 9 MAR 92
SUPERSEDING
MS51831E 6 SEPT 85
AMSC- N/A FSC- 5340

DISTRIBUTION STATEMENT
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OMB No. 0704-0188

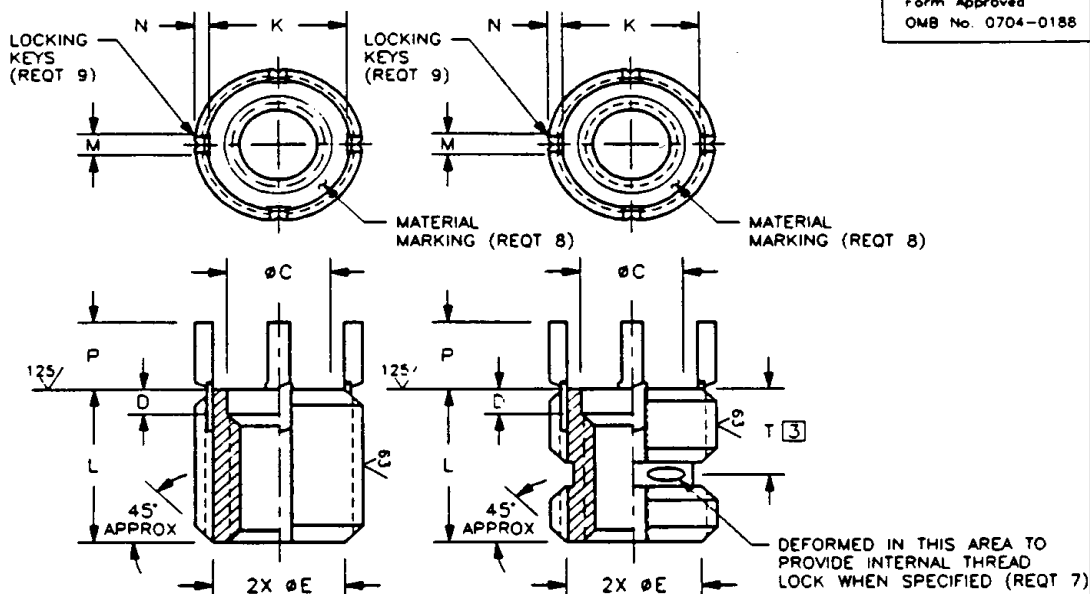


TABLE II. FINE INTERNAL THREADS

DASH NO.	INTERNAL THREAD MIL-S-8879 UNJF-3B	EXTERNAL THREAD FED-STD-H28/2 EXCEPT MODIFIED MINOR DIA.		ØC	D	ØE	K	L	KEY DIMENSIONS			T
		SIZE	ØMINOR						M REF	N REF	P REF	
201	.190-32	.375-16UNC-2A	.320 .312	.196	.070	.310	.284	.312	.068	.040	.130	.220
202	.250-28	.4375-14UNC-2A	.383 .375	.257	.070	.375	.344	.375	.068	.040	.190	.220
203	.3125-24	.500-13UNC-2A	.440 .432	.316	.070	.430	.407	.437	.068	.040	.190	.220
204	.375-24	.5625-12UNC-2A	.503 .495	.380	.070	.495	.469	.500	.068	.040	.190	.250
205	.4375-20	.625-11UNC-2A	.565 .551	.445	.100	.550	.532	.625	.068	.040	.190	.280
20E	.500-20	.6875-11NS-2A	.625 .615	.507	.100	.615	.595	.688	.068	.040	.190	.280
207	.5625-18	.8125-16UN-2A	.752 .744	.580	.100	.745	.720	.812	.068	.040	.190	.320
208	.625-18	.875-14UNF-2A	.815 .807	.640	.100	.805	.782	.875	.068	.040	.190	.330
209	.750-16	1.125-12UNF-2A	1.050 1.040	.763	.100	1.040	.975	1.125	.103	.070	.250	---
209L	.750-16	1.125-12UNF-2A	1.050 1.040	.763	.100	1.040	.975	1.250	.103	.070	.250	.490
210	.875-14	1.250-12UNF-2A	1.175 1.165	.888	.100	1.165	1.100	1.250	.103	.070	.250	---
210L	.875-14	1.250-12UNF-2A	1.175 1.165	.888	.100	1.165	1.100	1.375	.103	.070	.250	.490
211	1.000-12	1.375-12UNF-2A	1.300 1.290	1.015	.100	1.290	1.225	1.375	.103	.070	.250	---
211L	1.000-12	1.375-12UNF-2A	1.300 1.290	1.015	.100	1.290	1.225	1.500	.103	.070	.250	.550

PREPARING ACTIVITY: ARMY-AR
CUSTODIANS: ARMY- AR NAVY- AS
AIR FORCE- 99 DLA-
REVIEW: AV, SH, 82, IS, NS
USER: AT, GL, MC
PROJECT NUMBER: 5340-2052

MILITARY SPECIFICATION SHEET
TITLE
INSERT, SCREW-THREAD,
LOCKED IN, KEY-LOCKED,
HEAVY DUTY

SPECIFICATION SHEET NUMBER
MS51831F 9 MAR 92
SUPERSEDING
MS51831E 6 SEPT 85
AMSC- N/A FSC- 5340

DISTRIBUTION STATEMENT

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Form Approved
OMB No. 0704-0188

REQUIREMENTS:

1. **MATERIAL:** STEEL, CORROSION-RESISTANT, TYPE 303 (UNS S30300) IN ACCORDANCE WITH AMS 5640 (TYPE 1) OR ASTM A 582, OR 303SE (UNS S30323) IN ACCORDANCE WITH AMS 5640 (TYPE 2), AMS 5738 OR ASTM A 582. STEEL, CORROSION-RESISTANT, TYPE A286 (UNS S66286) IN ACCORDANCE WITH AMS 5734 OR AMS 5737. STEEL, ALLOY, GRADE 4140 (UNS G41400) IN ACCORDANCE WITH MIL-S-5626 OR GRADE 8740 (UNS G87400) IN ACCORDANCE WITH AMS 6322.
LOCKING KEYS: STEEL, CORROSION-RESISTANT, TYPE 302 CHEMICAL COMPOSITION OF ASTM A 580 ONLY.
 2. **CADMIUM PLATING AND SURFACE TREATMENT:** CORROSION-RESISTANT STEEL SHALL BE PASSIVATED IN ACCORDANCE WITH QQ-P-35.
ALLOY STEEL SHALL BE CADMIUM PLATED IN ACCORDANCE WITH QQ-P-416, TYPE II, CLASS 3. THE LOCKING KEYS MAY OR MAY NOT BE CADMIUM PLATED.
 3. **LUBRICATION:** INSERTS WITH SELF-LOCKING INTERNAL THREADS SHALL BE DRY FILM LUBRICATED IN ACCORDANCE WITH MIL-L-46010, TYPE I. THE LOCKING KEYS MAY OR MAY NOT BE LUBRICATED.
 4. **SURFACE TEXTURE:** MACHINED SURFACES SHALL BE IN ACCORDANCE WITH ANSI/ASME B46.1.
 5. **HEAT TREATMENT:** ALLOY STEEL INSERTS SHALL BE HEAT TREATED TO 160,000 psi Ft_u MINIMUM IN ACCORDANCE WITH MIL-H-6875.
CORROSION-RESISTANT STEEL INSERTS, TYPE A286 (AMS 5734), SHALL BE HEAT TREATED TO 140,000 psi Ft_u MINIMUM.
 6. **HARDNESS:** ALLOY STEEL INSERTS SHALL HAVE A HARDNESS RANGE OF 36-40 HRC.
CORROSION-RESISTANT STEEL INSERTS, TYPE A286, SHALL HAVE A HARDNESS RANGE OF 29-38 HRC.
 7. **PART NUMBER:** THE PART NUMBER SHALL CONSIST OF THE BASIC MS SHEET NUMBER PLUS THE DASH NUMBER TAKEN FROM TABLE I OR TABLE II, AS APPLICABLE:
EXAMPLE: MS51831 - 102 L

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ADD "L" AS SUFFIX TO DASH NUMBER FOR INTERNAL THREAD LOCK.
LEAVE BLANK IF INTERNAL THREAD LOCK IS NOT REQUIRED.
DASH NUMBER FROM TABLE I OR TABLE II.
MATERIAL: DASH INDICATES CRES, TYPE 303 OR 303SE.
ADD "CA" IN LIEU OF DASH FOR CRES, TYPE A286.
ADD "A" IN LIEU OF DASH FOR ALLOY STEEL, GRADE 4140 OR 8740.
BASIC MS SHEET NUMBER.
- EXAMPLE: MS51831CA102L INDICATES - INSERT, SCREW-THREAD, LOCKED IN, KEY-LOCKED, HEAVY DUTY, CRES A286, .250-20UNC-3B INTERNAL THREAD WITH INTERNAL THREAD LOCK FEATURE.
8. **MATERIAL MARKING:** CRES 303 OR 303SE HAS NO IDENTIFYING MARK.
CRES A286 SHALL BE IDENTIFIED ON TOP OF INSERT BY ONE (1) LINE OR DASH MARK.
ALLOY STEEL 4140 OR 8740 SHALL BE IDENTIFIED ON TOP OF INSERT BY TWO (2) PARALLEL LINES OR DASH MARKS.
 9. INSERTS WITH INTERNAL THREAD SIZE .250 AND SMALLER SHALL BE SUPPLIED WITH TWO (2) LOCKING KEYS SPACED 180° APART.
INSERTS WITH INTERNAL THREAD SIZE .3125 AND GREATER SHALL BE SUPPLIED WITH FOUR (4) LOCKING KEYS SPACED 90° APART.
 10. INSERTS SHALL BE FREE OF ALL HANGING BURRS AND SLIVERS WHICH MIGHT BECOME DISLODGED UNDER USAGE.
 11. **SOURCE IDENTIFICATION MARK:** SOURCE IDENTIFICATION MARK SHALL BE IN ACCORDANCE WITH MIL-I-45914.
 12. ALL DIMENSIONS ARE AFTER CADMIUM PLATING OR SURFACE TREATMENT AND PRIOR TO THE ADDITION OF THE LUBRICATION.
 13. FILLETS ARE R.015 MAXIMUM.

NOTES:

1. ALL DIMENSIONS ARE IN INCHES.
2. INSTALLATION OF INSERTS SHALL BE IN ACCORDANCE WITH MS51835.
3. DISTANCE TO CENTER OF INTERNAL THREAD LOCK.
4. IN THE EVENT OF A CONFLICT BETWEEN THE TEXT OF THIS STANDARD AND THE REFERENCES CITED HEREIN, THE TEXT OF THIS STANDARD SHALL TAKE PRECEDENCE.
5. REFERENCED GOVERNMENT (OR NON-GOVERNMENT) DOCUMENTS OF THE ISSUE LISTED IN THAT ISSUE OF THE DEPARTMENT OF DEFENSE INDEX OF SPECIFICATIONS AND STANDARDS (DODISS) SPECIFIED IN THE SOLICITATION FORM A PART OF THIS STANDARD TO THE EXTENT SPECIFIED HEREIN.

PREPARING ACTIVITY: ARMY-AR CUSTODIANS: ARMY- AR NAVY- AS AIR FORCE- 99 OLA- REVIEW: AV, SH, 82, IS, NS USER: AT, GL, MC PROJECT NUMBER: 5340-2052	MILITARY SPECIFICATION SHEET TITLE INSERT, SCREW-THREAD, LOCKED IN, KEY-LOCKED, HEAVY DUTY	SPECIFICATION SHEET NUMBER MS51831F 9 MAR 92 SUPERSEDING MS51831E 6 SEPT 85 AMSC- N/A FSC- 5340
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Genuine Aircraft Hardware Co.

Threaded Insert Repair Kits



Each kit comes with several inserts!

We stock ALL the Standard Thread Repair Kits! Fine and Course!

You can order replacement Insert Packs or Helical Wire inserts by the MS part numbers to replace the ones used from the kits, or because you want or need certified inserts.

All of the Installation Kits come with the proper Tap and Installation Tool, also the pre-winder is included when it is required.

Part Number	Description of Installation Kit	Part Number	Description of Insert Pack
1208-014	PermaThread Installation Kit 4-40	208-014	PermaThread Insert Pack 4-40x.168 12ea
1208-015	PermaThread Installation Kit 5-40	208-015	PermaThread Insert Pack 5-40x.188 12ea
1208-016	PermaThread Installation Kit 6/32	208-016	PermaThread Insert Pack 6-32x.270 12ea
1208-018	PermaThread Installation Kit 8-32	208-018	PermaThread Insert Pack 8-32x.246 12ea
1208-101	PermaThread Installation Kit 10-24	208-101	PermaThread Insert Pack 10-24x.285 12ea
1208-102	PermaThread Installation Kit 12-24	208-102	PermaThread Insert Pack 12-24x.324 12ea
1208-104	PermaThread Installation Kit 1/4-20	208-104	PermaThread Insert Pack 1/4-20x.375 12ea
1208-105	PermaThread Installation Kit 5/16-18	208-105	PermaThread Insert Pkg 5/16-18x.469 12ea
1208-106	PermaThread Installation Kit 3/8-16	208-106	PermaThread Insert Pack 3/8-16x.562 12ea
1208-107	PermaThread Installation Kit 7/16-14	208-107	PermaThread Insert Pack 7/16-14x.656 6ea
1208-108	PermaThread Installation Kit 1/2-13	208-108	PermaThread Insert Pack 1/2-13x.750 6ea
1208-109	PermaThread Installation Kit 9/16-12	208-109	PermaThread Insert Pack 9/16-18x.844 6ea
1208-110	PermaThread Installation Kit 5/8-11	208-110	PermaThread Insert Pack 5/8-11x.938 6ea
1208-112	PermaThread Installation Kit 3/4-10	208-112	PermaThread Insert Pack 3/4-10x1.125 6ea
1208-201	PermaThread Installation Kit 10-32	208-201	PermaThread Insert Pack 10-32x.285 12ea
1208-204	PermaThread Installation Kit 1/4-28	208-204	PermaThread Insert Pack 1/4-28x.375 12ea
1208-205	PermaThread Installation Kit 5/16-24	208-205	PermaThread Insert Pkg 5/16-24x.469 12ea
1208-206	PermaThread Installation Kit 3/8-24	208-206	PermaThread Insert Pack 3/8-24x.562 12ea
1208-207	PermaThread Installation Kit 7/16-20	208-207	PermaThread Insert Pack 7/16-20x.656 6ea
1208-208	PermaThread Installation Kit 1/2-20	208-208	PermaThread Insert Pack 1/2-20x.750 6ea
1208-210	PermaThread Installation Kit 5/8-18	208-210	PermaThread Insert Pack 5/8-18x.938 6ea
3218-2	1/8-27 npt. Threaded Insert Kit		
3218-4	1/4-18 npt. Threaded Insert Kit		

Genuine Aircraft Hardware Co.

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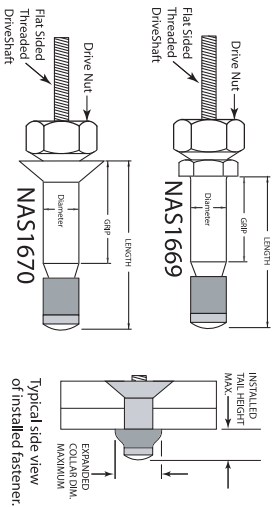


Visu-Lok Gauge VLS-1

Blind Bolts

NAS1669 & NAS1670 Known as Visu-Loks or Jo-Bolts

Diameter Number	Diameter Minimum	Diameter Maximum	Expanded Collar Dim. Max.	Installed Tail Height Max.	(D) drive nut across flats	Single Shear Strength*	NAS1669 Head Hex Size	NAS1770 Countersunk Head Size
08	.1625	.1645	.244	.246		1.678	1/4"	.296 - .332
3	.1970	.1990	.300	.300	3/8"	2.620	5/16"	.342 - .385
4	.2580	.2600	.384	.384		4.500	3/8"	.463 - .507
5	.3095	.3115	.427	.427		6.000	7/16"	.577 - .635
6	.3725	.3745	.516	.516	1/2"	9.750	1/2"	.696 - .762



*Single shear strengths listed are maximum amounts. Yield amounts would be less than 70% of maximum. Actual installed strengths will vary based on material thickness and types of material fasteners are installed into.

Grip Length Number	Grip Minimum All Dia's.	Grip Maximum All Dia's.	Length Approx. Uninstalled					
			-08	-3	-4	-5	-6	
-2	.094	.156	0.496	0.541	0.603	0.706	N/A	
-3	.157	.219	0.559	0.604	0.666	0.769	0.879	
-4	.220	.281	0.621	0.666	0.728	0.831	0.941	
-5	.282	.344	0.684	0.729	0.791	0.894	1.004	
-6	.345	.406	0.746	0.791	0.853	0.956	1.066	
-7	.407	.469	0.809	0.854	0.916	1.019	1.129	
-8	.470	.531	0.871	0.916	0.978	1.081	1.191	
-9	.532	.593	0.935	0.980	1.042	1.145	1.255	
-10	.595	.656	0.996	1.041	1.103	1.206	1.316	
-11	.657	.719	1.059	1.104	1.166	1.269	1.379	
-12	.720	.781	1.121	1.166	1.228	1.331	1.441	
-13	.782	.844	1.184	1.229	1.291	1.394	1.504	
-14	.845	.906	1.246	1.291	1.353	1.456	1.566	
-15	.907	.969	1.309	1.354	1.416	1.519	1.629	
-16	.970	1.031	1.371	1.416	1.478	1.581	1.691	
-17	1.032	1.094	1.434	1.479	1.541	1.644	1.754	
-18	1.095	1.156	1.497	1.541	1.603	1.706	1.816	
-19	1.157	1.219	1.560	1.604	1.666	1.769	1.879	
-20	1.220	1.281	1.623	1.666	1.728	1.831	1.941	
-21	1.282	1.344	1.686	1.729	1.791	1.894	2.004	
-22	1.345	1.406	1.749	1.791	1.853	1.956	2.066	
-23	1.407	1.469	1.812	1.854	1.916	2.019	2.129	
-24	1.470	1.531	1.875	1.916	1.978	2.081	2.191	
-25	1.532	1.594	1.938	1.979	2.041	2.144	2.254	
-26	1.595	1.656	2.001	2.041	2.103	2.206	2.316	
-27	1.657	1.719	2.064	2.104	2.166	2.269	2.379	
-28	1.720	1.781	2.127	2.166	2.228	2.331	2.441	
-29	1.782	1.844	2.190	2.229	2.291	2.394	2.504	
-30	1.845	1.906	2.253	2.291	2.353	2.456	2.566	
-31	1.907	1.969	2.316	2.354	2.416	2.519	2.629	
-32	1.970	2.031	2.379	2.416	2.478	2.581	2.691	

Fasteners are made from Alloy Steel for the Body and Drive shaft, Mild Steel for the Drive nut and Stainless for the Expansion Sleeve. All parts are Cadmium Plated.

Example of Part Number Breakdown

NAS16(69 or 70)-(dia #)DL(Grip)

- NAS1669-3DL5=HEX HEAD BLIND BOLT, 3/16" DIA. 282-344 GRIP, WITH DRIVE NUT
- NAS1669-3L5=HEX HEAD BLIND BOLT, 3/16" DIA. 282-344 GRIP, WITHOUT DRIVE NUT
- NAS 1670-5DL10=C/S HEAD BLIND BOLT, 5/16" DIA. 595-.656 GRIP, WITH DRIVE NUT
- Fasteners without Drive nut are old style and not preferred.
- For 1/64" Oversize use NAS1750 (C/S head), and NAS1751 (Hex Head)

Tool Selection Chart

Diameter Number	Use Tool Handle Assy.	Use Drive Nut Adapter	Use Drive Nut Adapter
08	MHC75A	MHC-05	MHCPCDN-1
3	MHC75A	MHC-06	MHCPCDN-2
4	MHC75B	MHC-08	MHCPCDN-2
5	MHC75B	MHC-10	MHCPCDN-3
6	MHC75B	MHC-12	MHCPCDN-3

Power tools are available for installation of production quantities of this type of fasteners.

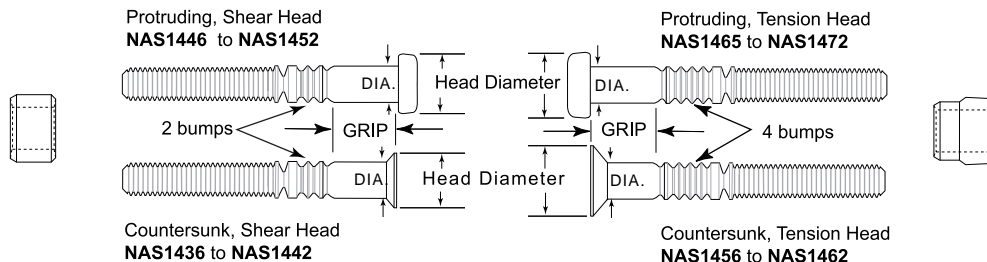
For Hand operated tooling see table of components needed to install various sizes with Drive nuts.

Under normal conditions these fasteners may be installed with hand tools. They are actually tested only using the power tooling.

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Genuine Aircraft Hardware Co. Lockbolts & Collars

Serrated Stem, Alloy Steel, Shear and Tension Heads



Pin Part Numbers				Nominal Diameter	Shank Diameter	Oversize Available
Head Diameters						
Recommended Collars, NAS1080 (suffixes listed)				5/32"	.1635 to .1650	None
C/S SHEAR	PROT. SHEAR	C/S TENSION	PROT. TENSION			
N/A	N/A	N/A	NAS1465 .258 to .282 -05, R05, AT05	3/16"	.1880 to .1890	.0130
NAS1436 .263 to .305 C06, E06, G06, AG06	NAS1446 .288 to .302	NAS1456 .344 to .386 -06, R06, AT06	NAS1466 .297 to .327			
NAS1438 .346 to .399 C08, E08, G08, AG08	NAS1448 .363 to .377	NAS1458 .455 to .507 -08, R08, AT08	NAS1468 .390 to .430	1/4"	.2480 to .2495	.0155
NAS1440 .417 to .479 C10, E10, G10, AG10	NAS1450 .455 to .471	NAS1460 .574 to .634 P10, R10, AT10	NAS1470 .485 to .535			
NAS1442 .496 to .566 C12, E12, G12, AG12	NAS1452 .549 to .565	NAS1462 .693 to .762 P12, R12, AT12	NAS1472 .595 to .655	3/8"	.3730 to .3745	.0155

Help with the Selection of Lockbolt / Pin, Part Numbers *A.K.A. Huck Bolts*

The four numbers after NAS are the basic#, (see above table) designate the Lockbolt Type and Diameter

The next characters after the basic# designate plating and a sealant groove option.

For Cad II plating and no sealant groove put a (-), For Cad II plating and a sealant groove put a (H) For Nickel Cadmium and no sealant groove put an (N), For Nickel Cadmium Plating and a sealant groove put an (HN)

The next two numbers (02, thru 32) designates the max grip length in 1/16ths of an inch. To select a grip number, measure the amount of material being fastened, use a fastener that matches the amount of material, or is up to, but not exceeding .062, longer than the material being fastened. Do Not use a fastener which has a grip designation less than the material amount.

For oversize fastener add an (A) at the very end.

SEE EXAMPLES OF PART NUMBERS BELOW

NAS1468-09 = Protruding Tension Head Pin, 1/4" nom. dia., Cad II Plated Steel, No Sealant Groove, 9/16 maximum Grip Length.

NAS1436H11A = Countersunk Shear Head Pin, 3/16" nom dia., Cad II Plated Steel, with Sealant Groove, 11/16 maximum Grip Length, Oversize.

CODE	Material	Type	Color
C	2024-H13,T4	SHEAR	YELLOW
E	Carbon Steel	SHEAR	GOLD
G	2024-H13,T4	SHEAR	BEIGE
AG	2219-H13,T6	SHEAR	VIOLET

Collar Selection

Use Table above and associated tables to the left or right to aid in the selection of the collars material and size code.

EXAMPLE OF PART NUMBER

NAS1080R08 = Carbon Steel, Tension Collar, Cad II Plated (GOLD), for 1/4" nominal diameter Lockbolt / Pin.

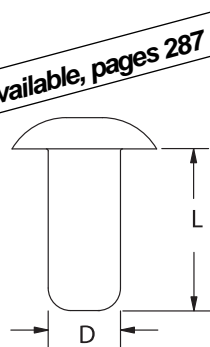
CODE	Material	Type	Color
-	2024-H13,T4	TENSION	GREEN
P	2024-H13,T4	TENSION	BLUE
R	Carbon Steel	TENSION	GOLD
AP	2219-H13,T6	TENSION	BROWN
AT	2219-H13,T6	TENSION	VIOLET

Genuine Aircraft Hardware Co.

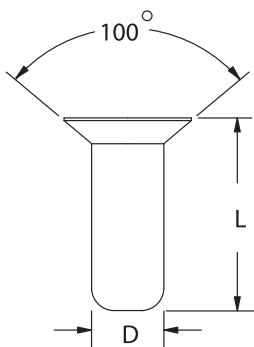
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Solid Rivets, Standard Sizes

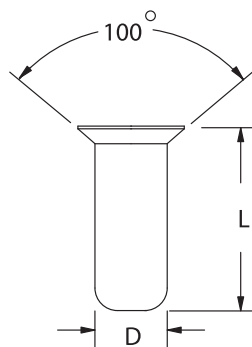
Kits Available, pages 287 - 290



Universal Head



Countersunk Head



Reduced Countersunk Head

Part # Formula: (D) = Diameter in 1/32" (L) = Length in 1/16"

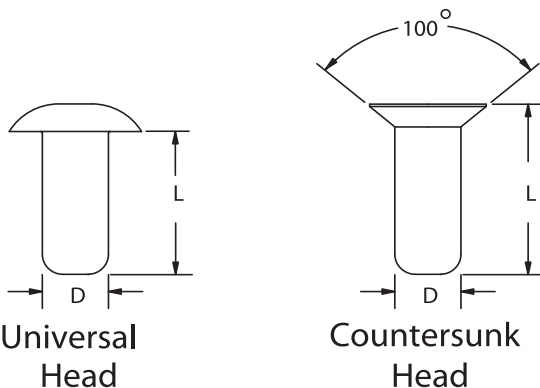
Material	Head Mark/Conversion	Shear Strength	Universal Head	Countersunk Head	Reduced C/S Head
Aluminum 1100-F	NONE / NONE	10 ksi	MS 20470A (D)-(L)	MS 20426A (D)-(L)	N/A
Aluminum 2117-T4	DIMPLE / NONE	30 ksi	MS 20470AD (D)-(L)	MS 20426AD (D)-(L)	NAS 1097AD (D)-(L)
Aluminum 5056-H32	RAISED CROSS / NONE	28 ksi	MS 20470B (D)-(L)	MS 20426B (D)-(L)	NAS 1097B (D)-(L)
Steel, Cad II Plated	REC. TRIANGLE / .353	25 to 42 ksi	MS 20613-(D)P (L)	MS 20427-(D)C (L)	N/A
Stainless Steel	NONE / .360	65 to 85 ksi	MS 20613C (D)-(L)	MS 20427F (D)-(L)	N/A
Monel, No Plating	DOUBLE DIMPLE / .313	49 to 59 ksi	MS 20615-(D)M (L)	MS 20427M (D)-(L)	N/A
Monel Cad II Plated	DOUBLE DIMPLE / .313	49 to 59 ksi	MS 20615-(D)MP (L)	MS 20427M (D)C (L)	N/A

DIAMETER DETAILS and PIECES PER POUND

Pieces per pound listed are for aluminum; multiply by conversion factor for other materials.

Diameter #	3		4		5		6		8	
Diameter	.094		.125		.156		.188		.250	
Use Drill	#40		#30		#21		#11		Letter F	
Length in 1/16"	Pieces per Pound		Pieces per Pound		Pieces per Pound		Pieces per Pound		Pieces per Pound	
	Universal	Countersunk	Universal	Countersunk	Universal	Countersunk	Universal	Countersunk	Universal	Countersunk
2	6242	8519	3047	4798	1703		1134			
2.5	5496	7183	2725	4048	1545		1032			
3	4909	6209	2464	3497	1413	2097	947		426	
3.5	4435	5468	2249	3080	1302	1862	875		400	
4	4045	4885	2069	2751	1208	1674	813	1094	376	
4.5	3718	4414	1915	2486	1126	1521	760	999	356	
5	3440	4026	1782	2268	1054	1393	713	920	337	
5.5	3200	3701	1667	2085	991	1285	671	852	320	
6	2992	3424	1566	1929	936	1193	634	793	305	412
7	2648	2979	1396	1678	841	1043	571	697	279	365
8	2374	2636	1259	1485	763	927	519	622	257	328
9	2152	2364	1147	1331	699	834	476	561	238	298
10	1968	2143	1053	1207	645	757	440	511	221	273
11	1812	1959	974	1104	598	694	408	469	207	252
12	1680	1805	905	1017	558	641	381	434	194	234
13	1565	1673	846	942	523	595	358	404	183	218
14	1466	1559	794	878	492	555	337	377	173	204
16	1300	1372	706	773	440	489	301	333	157	181
18	1168	1225	637	690	398	438	273	299	143	163
20	1060	1107	579	624	363	396	249	271	131	148
24	895	928	491	522	309	333	213	228	113	125

Solid Rivets, Oversize Shank



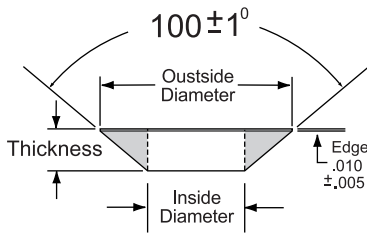
Oversize Shank Repair Rivets Head Diameters are Standard

Material	Head Mark	Shear Strength	Universal Head	Countersunk Head
Aluminum 2117-T4	DIMPLE	30 ksi	NAS1242AD(D)-(L)	NAS1241AD(D)-(L)
Aluminum 5056-H32	RAISED CROSS	28 ksi	NAS1242B(D)-(L)	NAS1241B(D)-(L)

Rivet Dia (D)	3	4	5	6	8					
Nominal Diameter	7/64	9/64	11/64	7/32	9/32					
Actual Diameter	.109	.140	.172	.219	.281					
Diameter Tol.	+0.003 -0.001	+0.003 -0.001	+0.004 -0.001	+0.004 -0.001	+0.004 -0.001					
Use Drill	#33	#27	#16	5.7mm	7.3mm					
Length in 1/16" (L)	Sizes listed as available to manufacture on NAS Print, (may or may not be in stock)									
	Universal	Countersunk	Universal	Countersunk	Universal	Countersunk	Universal	Countersunk	Universal	Countersunk
2	N	Y	N	N	N	N	N	N	N	N
3	Y	Y	Y	Y	N	N	N	N	N	N
4	Y	Y	Y	Y	Y	Y	Y	N	N	N
5	Y	Y	Y	Y	Y	Y	Y	Y	N	N
6	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
7	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
8	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
9	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
10	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
12	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
14	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
18	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
20	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
22	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
24	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
28	N	N	N	Y	Y	Y	Y	Y	Y	Y
32	N	N	N	N	N	Y	32, 40 & 48	32, 40 & 48	32, 40, 48 & 56	32, 40 & 48

Genuine Aircraft Hardware Co. Countersunk Repair Washers/Plugs

Used to fill countersink when overlaying additional material
or when changing from flush to protruding fasteners.



HELP WITH THE SELECTION OF PART NUMBERS

To select the washer you will need for your specific repair, you must know the fastener that was removed, and the material of the countersunk sheet you are plugging. Use the chart below for sizing and then select A or C for the desired materials. We stock what we have found popular but others may be available with possible minimums and lead times. Materials listed below.

A = Aluminum, 6061-T6, Chem Film Coated, 200 degree F. service limit.
C = Cres. (A286), 140ksi Heat Treated, Passivated, 450 degree F. service limit.

Approximate Image	Part #	This Repair Washer fills the open recess left by listed Fastener Type and Size	Inside Dia. +.005 - .000	Outside Dia. + or - .005	Thickness + or - .005	
	LS5931 (A or C) 2	Tension Head Full Size Countersunk Heads, such as MS24694, NAS517, Screws, and Others with same Dimension heads	5/32" or #8	.164	.313	.073
	LS5931 (A or C) 3		3/16" or #10	.190	.361	.082
	LS5931 (A or C) 4		1/4"	.250	.483	.108
	LS5931 (A or C) 5		5/16"	.312	.611	.136
	LS5931 (A or C) 6		3/8"	.375	.738	.162
	LS5931 (A or C) 7		7/16"	.437	.866	.190
	LS593 -(A or C) 8		1/2"	.500	.993	.217
	LS5931 (A or C) 11	Shear Head Reduced Size C/S, such as LS35272 and HL19 pins and NAS1581 screws and Others with same Dimension heads Also NAS1097 Rivets	1/8"	.127	.172	.029
	LS5931 (A or C) 12		1/8"	.138	.198	.035
	LS5931 (A or C) 21		5/32" or #8	.158	.223	.037
	LS5931 (A or C) 22		5/32" or #8	.164	.237	.041
	LS5931 (A or C) 31		3/16" or #10	.190	.290	.047
	LS5931 (A or C) 51		1/4"	.250	.371	.061
	LS5931 (A or C) 61		5/16"	.312	.450	.068
	LS5931 (A or C) 71	Standard Head Countersunk Rivets such as MS20426, and MS20427, and Others with same Dimension heads	1/8"	.127	.205	.043
	LS5931 (A or C) 72		5/32"	.156	.266	.056
	LS5931 (A or C) 73		3/16"	.190	.333	.070
	LS5931 (A or C) 74		1/4"	.250	.456	.096
	LS5931 (A or C) 75		5/16"	.312	.544	.107

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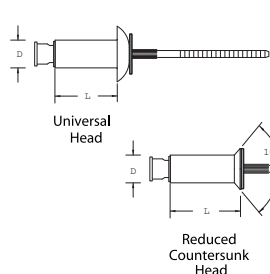


Cherry Grip Gauge
Order Part # 269C3

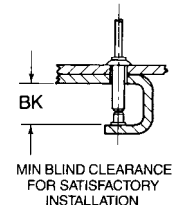
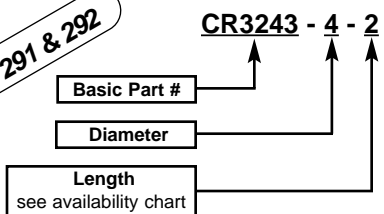
Tooling on Pages
218 & 219

CherryMAX® Rivets

CherryMAX is a registered trademark Textron Inc.



Kits Available, pages 291 & 292



For even more of the manufacturers data see www.textronfasteningsystems.com/aerospace/index.html

HEAD STYLE / DIA. TYPE

Minimum grip chart is in the double line at the bottom of this chart.

Universal Nominal	Universal Oversize	Countersunk Nominal	Countersunk Oversize	Reduced C/S Nominal	Materials	
Select Desired Part Number Prefix					Sleeve	Stem
CR3213	CR3243	CR3212	CR3242	CR3214	5056 Aluminum	8740 Steel
CR3223	CR3253	CR3222	CR3252	CR3224	5056 Aluminum	15-7PH Cres
CR3523	CR3553	CR3522	CR3552	CR3524	Monel, Plain	15-7PH Cres
CR3523P	CR3553P	CR3522P	CR3552P	CR3524P	Monel, Coated	15-7PH Cres
N/A	CR3853	N/A	CR3852	N/A	Inconel	Inconel
					-4 dia. This chart is for minimum grip lengths	
					-5 dia. for each type and diameter of rivet	
					-6 dia. use with the LENGTH DETAILS Chart.	

DIAMETER DETAILS

Diameter Dash #	Actual Dia. +.003 -.001		Hole Limits		"BK" Minimum	Recommended Drill
	Nominal	Oversize	Nominal	Oversize	Nominal / Oversize	Nominal / Oversize
-4	.126	.140	.129 - .132	.143 - .146	.355 / .390	30 / 2
-5	.157	.173	.160 - .164	.176 - .180	.370 / .395	20 / 1
-6	.189	.201	.192 - .196	.205 - .209	.415 / .410	10 / 5
-8	.253	.267	.256 - .261	.271 - .275	.485 / .490	letter "F" / letter "I"

LENGTH DETAILS

And availability chart

Last dash # (length)	Grip Range		First dash # (diameter)			
	Univ C/S	x	-4	-5	-6	-8
		All	Univ. / C,sunk	Univ. / C,sunk	Univ. / C,sunk	Univ. / C,sunk
-1	N/A	.062	yes / no	yes / no	yes / no	no / no
-2	chart	.125	yes / yes	yes / yes	yes / yes	no / no
-3	.126	.187	yes / yes	yes / yes	yes / yes	yes / yes
-4	.188	.250	yes / yes	yes / yes	yes / yes	yes / yes
-5	.251	.312	yes / yes	yes / yes	yes / yes	yes / yes
-6	.313	.375	yes / yes	yes / yes	yes / yes	yes / yes
-7	.376	.437	yes / yes	yes / yes	yes / yes	yes / yes
-8	.438	.500	yes / yes	yes / yes	yes / yes	yes / yes
-9	.501	.562	yes / yes	yes / yes	yes / yes	yes / yes
-10	.563	.625	no / no	yes / yes	yes / yes	yes / yes
-11	.626	.687	no / no	yes / yes	yes / yes	yes / yes
-12	.688	.750	no / no	no / no	yes / yes	yes / yes
-13	.750	.812	no / no	no / no	no / no	yes / yes
-14	.813	.875	no / no	no / no	no / no	yes / yes

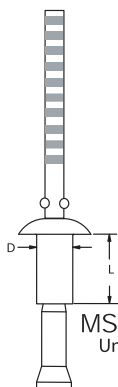
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MS20600 and MS20601

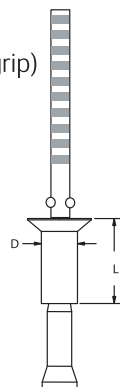
Self-plugging Rivets -- Universal Head and Countersunk Head

Tooling on Pages 218 & 219



MS20600 (material)(dia) W (grip)
Universal Head

MS20601 (material)(dia)W(grip)
Countersunk Head



MATERIAL CHART

Use This Code	For This Material
AD	Aluminum Alloy 2117
B	Aluminum Alloy 5052
M	Nickel Copper Alloy (Monel), Unplated
MP	Nickel Copper Alloy (Monel), Plated

MS Number	Cherry Number
MS20600AD	CR9163
MS20600B	CR9157
MS20600M	CR9563M
MS20600MP	CR9563
MS20601AD	CR9162
MS20601B	CR9156
MS20601M	CR9562M
MS20601MP	CR9562

DIAMETER DETAILS

Diameter	Dia. +.003 -.001	Hole Limits	Recommended Drill
Dash #	Only Nominal Diameters Available in MS		
-4	.126	.129 - .132	30
-5	.157	.160 - .164	20
-6	.189	.192 - .196	10
-8	.253	.256 - .261	letter "F"

The "W" denotes the serrated stem that replaces the knob style stem.

LENGTH DETAILS

And availability chart, as manufactured. We stock only within the Un-shaded areas.

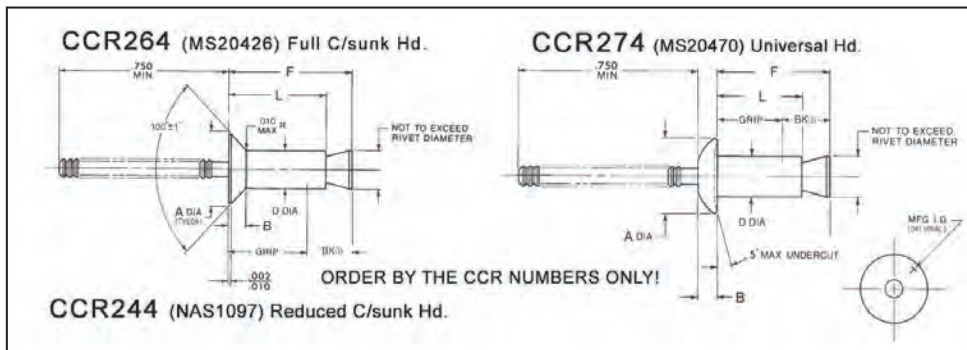
last dash # (length)	Grip Range		first dash # (diameter)			
	Min	Max	-4	-5	-6	-8
	Univ C/S	All	Univ. / C,sunk	Univ. / C,sunk	Univ. / C,sunk	Univ. / C,sunk
-1	up to >	.062	yes / no	yes / no	yes / no	no / no
-2	.063	.125	yes / yes	yes / yes	yes / yes	no / no
-3	.126	.187	yes / yes	yes / yes	yes / yes	yes / yes
-4	.188	.250	yes / yes	yes / yes	yes / yes	yes / yes
-5	.251	.312	yes / yes	yes / yes	yes / yes	yes / yes
-6	.313	.375	yes / yes	yes / yes	yes / yes	yes / yes
-7	.376	.437	yes / yes	yes / yes	yes / yes	yes / yes
-8	.438	.500	yes / yes	yes / yes	yes / yes	yes / yes
-9	.501	.562	yes / yes	yes / yes	yes / yes	yes / yes
-10	.563	.625	no / no	yes / yes	yes / yes	yes / yes
-11	.626	.687	no / no	yes / yes	yes / yes	yes / yes
-12	.688	.751	no / no	no / no	yes / yes	yes / yes
-13	.751	.812	no / no	no / no	no / no	yes / yes
-14	.813	.875	no / no	no / no	no / no	yes / yes

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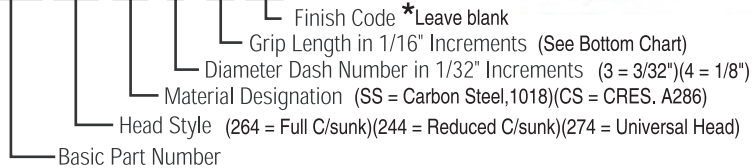
Genuine Aircraft Hardware Co.

Nut-Plate Rivets

CCR244, CCR264, CCR274 Rivets with Pull Through Stems, Specifically designed for Nutplates
 These are Textron Fastening Systems Inc. part numbers, and may meet the specifications of MS20604 and MS20605 as applicable, depending on the style and finish selected.



CCR 264 CS -4 -04



Tooling on 218

* if special requirements, visit www.textronfasteningsystems.com/aerospace/index.html for more details
 Standard Rivet Sleeve finishes, when code is left blank, are Cad II plated for Steel, and Solid Film Lube for Cres.

CCR264 DIMENSIONS, except for (L) and (F), see below.

DIA. DASH NO.	A MAX	A' ACTUAL MIN	B REF	D		BK	HOLE SIZE	
				MAX	MIN		MAX	MIN
-3	.179	.151	.036	.097	.092	.140	.101	.097
-4	.225	.197	.042	.128	.123	.170	.132	.129

CCR244 DIMENSIONS, except for (L) and (F), see below.

DIA. DASH NO.	A MAX	A' ACTUAL MIN	B MAX	D		BK	HOLE SIZE	
				MAX	MIN		MAX	MIN
-3	.148	.126	.021	.097	.092	.140	.101	.097
-4	.196	.174	.028	.128	.123	.170	.132	.129

CCR274 DIMENSIONS, except for (L) and (F), see below.

DIA. DASH NO.	A		B		D		BK	HOLE SIZE	
	MAX	MIN	MAX	MIN	MAX	MIN		MAX	MIN
-3	.196	.178	.050	.040	.097	.092	.140	.101	.097
-4	.262	.238	.064	.054	.128	.123	.170	.132	.129

GRIP DASH NUMBER	GRIP RANGE		CCR264 & CCR274				CCR244 (Reduced C/Sunk)			
			-3 DIAMETER		-4 DIAMETER		-3 DIAMETER		-4 DIAMETER	
	MIN	MAX	L MAX	F MAX	L MAX	F MAX	L ±.010	F MAX	L ±.010	F MAX
-01	.015	.062	.140	.218	.170	.256	.130	.250	.160	.343
-02	.063	.125	.203	.281	.232	.318	.193	.313	.222	.406
-03	.126	.187	.265	.343	.295	.381	.255	.375	.285	.468
-04	.188	.250	.328	.405	.357	.443	.318	.437	.347	.531
-05	.251	.312	.390	.468	.420	.506	.380	.500	.410	.593
-06	.313	.375	.453	.530	.482	.568	.443	.562	.472	.656
-07	.376	.437	.515	.592	.544	.630	.505	.625	.535	.718
-08	.438	.500	.578	.655	.607	.693	.568	.688	.597	.781

Genuine Aircraft Hardware Co.

Cherry Installation Tools

Manufactured by Textron Aerospace Fastening Systems

For even more see www.textronfasteningsystems.com/aerospace/index.html

G27 HAND RIVETER

Designed to pull 1/8" Nominal and Oversize **CherryMAX**.[®] The G27 is a light-weight (13 oz) hand tool for use in low production applications such as repair, maintenance or prototype work. The pulling head is an integral part of this riveter.



G29 HAND RIVETER

The Cherry G29 Hand Riveter is designed as an efficient, compact, lightweight tool for installing **Cherry Nut-plate Rivets** where access or power limitations prevent the use of power tools. VIt comes equipped with a 728A9-3 nosepiece for installing 3/32" rivets and a 728A9-104 nosepiece for installing 1/8" rivets.

Overall length of the G29 is 9 1/4", and weighs just 13 oz. The pulling head is an integral part of the tool.

G902 POWER RIVETER

The Cherry G902 is a pneumatic tool designed specifically for the most efficient installation of **Cherry Nut-plate Rivets**. It weighs just over 2 lbs. and can be operated in any position with one hand. It has a 3/4" stroke and a rated pull load of 550 lbs. on 90psi and 730 lbs. on 120psi air pressure at the air inlet. Stems feed through this tool system.

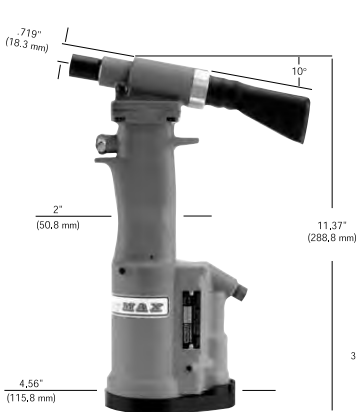
Pulling heads are not furnished with this riveter and must be ordered separately.

For the 3/32" rivets, order Pulling Head **H902-3NPR**, for 1/8" rivets, order **H902-4NPR**.



G747

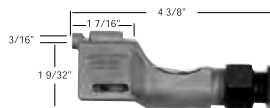
The G747 weighs 3.5 lbs. and can be operated in any position. It has a rivet setting stroke of .437", and a pulling capacity of 1/8" to 3/16" Nominal and Oversize **CherryMAX** Rivets. This Rivet Puller comes without the Pulling Heads, they must be ordered separately. See below for picture of G747 gun and available Pulling Heads.



H701B-456 STRAIGHT



H753A-456 RIGHT ANGLE



H781-456 OFFSET

G750A

The Cherry G750A hand hydraulic riveting tool provides the versatility of a pneumatic-hydraulic riveter but with the lightweight, high pull strength ratio not found in other hand riveters. The Cherry G750A has a unique, patentable, 2-stage hydraulic power cylinder that provides the user with the ease of pulling the handle without the strain normally endured to install a high strength fastener. The Cherry G750A hand riveter can install a variety of blind fastener styles, diameters, head configurations, and material combinations. The G750A with the standard pulling head can install **CherryMAX** and SST[®] blind rivets in -4, -5, -6, diameters, and -04, -05, -06 diameter MaxiBOLT blind bolts or threaded inserts by simply changing the pulling head.



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Genuine Aircraft Hardware Co.

Hydraulic Hand Rivet / Blind Nut Tool

Made for Easy Installation of Serrated Stem Blind Rivets, or Rivet Nuts up to 1/4" dia.

This Handy after market Rivet & Rivet Nut puller operates by hand, hydraulically giving the tool a tremendous pulling strength advantage over simple hand operated mechanical pullers.

The **D-100-RN** comes in a convenient case along with all the necessary nose pieces for serrated stem rivets and all the Rivet Nut Nose Adapters necessary to install the most popular threaded Rivet Nuts.

Instructions and a Parts List are included.



Standard Serrated Stem, Nose Setup

Rivet Nut Adapter Installed Below

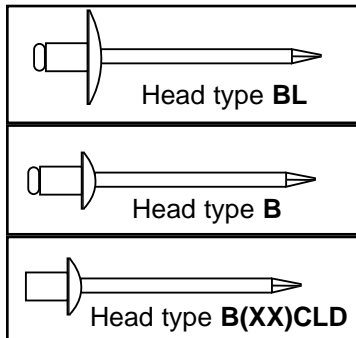


Genuine Aircraft Hardware Co.

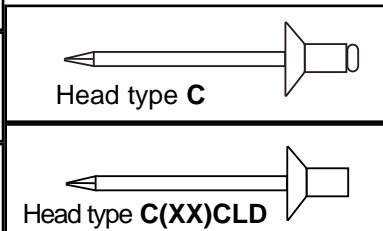
Commercial Blind Rivets

Marson / Alcoa Fasteners , meets standard IFI-114

NOT FOR ANY STRUCTURAL AIRCRAFT REPAIR OR ASSEMBLY.



For Marson Commercial Blind Rivet, Hand Pullers, see page 91



Material Codes

- (A) = Aluminum
- (S) = Steel, Plated
- (SS) = Stainless Steel

Diameter Codes

- (3) = 3/32" diameter. #40 drill
- (4) = 1/8" diameter. #30 drill
- (5) = 5/32" diameter. #20 drill
- (6) = 3/16" diameter. #11 drill

Note: A slightly smaller mandrel diameter is required for closed-end rivets; therefore when setting closed-end rivets using Marson brand rivet setting tools, we recommend you use one size smaller nosepiece when possible (i.e., to set 1/8" closed-end rivets, use 3/32" nosepiece).

Part Number Breakdown (Material)(Head Type)(Diameter)(Max Grip in 1/16"ths)(CLD if applicable)*

EXAMPLE: **AC4-3CLD** = ALUMINUM COUNTERSUNK, 1/8" DIA. x 3/16 MAX GRIP, CLOSED END, STEEL STEM

EXAMPLE: **AB4-1A** =ALUMINUM BUTTON HEAD,1/8" DIA. x 1/16" MAX GRIP, ALUMINUM STEM

The Chart to the right shows all of the Head Types and the Stem Materials. They are printed vertically at the top of the chart. The Stem Materials are Steel if they are not shown. Otherwise they are shown as (A) for an Aluminum Stem or (S) for a Stainless Stem. If they have a closed end the letters *(CLD) will be just after the Stem Material. Remember that if no stem Material is designated then the stem is made of Steel.

The single letter in the table designate the the availability of the Item.

(S) = We stock or are willing to stock

(M) = The manufacturer typically stocks, these are generally available by special order, there may be a lead time.

(U) = Not made, Un-Available.

Diameter 1/32nds	Grip length 1/16ths	AB	AB-A	AB-ACL	AB-CLD	ABL	ABL-A	AC	AC-A	AC-CLD	SB	SBL	SC	SSB	SBL	SSBL-S	SSB-S	SSB-SCLD	SSC	SSC-S	
		3	-2	S	U	U	U	U	U	U	U	U	S	U	U	U	U	U	U	U	U
	-4	S	U	U	U	U	U	U	U	U	M	U	U	M	U	U	M	U	U	U	U
4	-1	S	M	U	S	U	U	S	U	U	M	U	U	M	U	U	M	U	U	U	U
	-2	S	S	M	S	M	S	S	M	S	S	M	M	M	M	M	S	M	M	M	M
	-3	S	S	M	M	M	S	S	M	S	S	M	M	M	M	M	S	M	M	M	M
	-4	S	S	M	M	M	S	S	M	M	S	M	M	M	M	M	M	M	M	M	M
	-5	M	M	U	M	U	U	U	U	U	M	U	U	M	U	U	M	U	U	U	U
	-6	M	M	U	M	M	U	U	U	U	M	U	U	M	U	U	M	U	U	U	U
	-8	M	M	U	U	U	U	U	U	U	M	U	U	M	U	U	M	U	U	U	U
-10	M	M	U	U	U	U	U	U	U	M	U	U	U	U	U	M	U	U	U	U	
5	-2	M	M	U	M	U	U	U	U	M	U	U	M	U	U	M	U	U	U	U	
	-3	S	M	U	M	U	U	U	U	S	U	U	U	U	U	M	U	U	U	U	
	-4	S	M	M	U	S	M	M	M	U	S	M	M	M	U	U	S	U	U	U	
	-5	U	U	U	M	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	
	-6	M	M	U	U	U	U	M	M	U	M	M	U	M	U	U	M	U	U	U	
	-8	M	M	U	U	U	U	U	U	U	M	M	U	M	U	U	M	U	U	U	
-10	M	M	U	U	U	U	U	U	U	M	U	U	U	U	U	M	U	U	U		
-12	M	M	U	U	U	U	U	U	U	M	U	U	U	U	U	M	U	U	U		
6	-2	M	M	M	M	U	U	U	U	M	U	U	M	U	U	M	M	U	U		
	-4	S	M	M	M	S	M	M	M	M	M	M	M	M	M	M	S	M	M		
	-6	M	M	M	M	S	M	M	M	U	M	M	M	S	M	M	M	U	U		
	-8	M	M	M	M	M	M	M	U	M	M	U	M	S	M	M	U	U	U		
	-10	M	M	M	M	M	U	U	U	M	M	U	M	M	M	M	U	U	U		
	-12	M	M	U	U	M	M	U	U	U	M	M	U	M	M	M	U	U	U		
	-14	M	M	U	U	M	M	U	U	U	M	M	U	M	U	M	U	U	U		
	-16	M	M	U	U	M	M	U	U	U	M	M	U	M	U	M	U	U	U		
-20	M	M	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U			

Genuine Aircraft Hardware Co.

Temporary - Reusable Fasteners

"C" SERIES

The "C" series fasteners are the standard (button) plunger type "cleco." Plier operated, spring-loaded with a strong, durable steel, plated body; designed for sheets that require precise holding of the material while other operations are completed.

PART NO.	COLOR CODE	G (GRIP)	D (DIAMETER)	DRILL SIZE
C-3/32	Zinc	0-1/4"	3/32"	#40
C-1/8	Copper	0-1/4"	1/8"	#30
C-5/32	Black	0-1/4"	5/32"	#21
C-3/16	Brass	0-1/4"	3/16"	#10
CL-3/32	Zinc	1/4" - 1/2"	3/32"	#40
CL-1/8	Copper	1/4" - 1/2"	1/8"	#30
CL-5/32	Black	1/4" - 1/2"	5/32"	#21
CL-3/16	Brass	1/4" - 1/2"	3/16"	#10



C-1/8



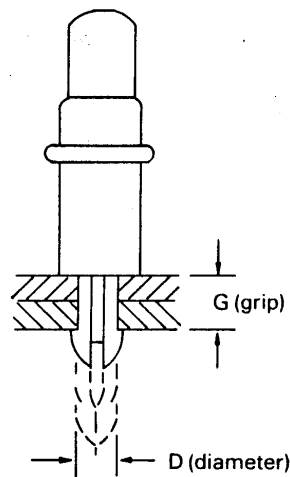
C-5/32



CL-5/32

Our "C" series fasteners are interchangeable with Kwik-Lok "K" and Monogram "M" part numbers.

CROSS REFERENCE CHART		
CLEKO-LOC	KWIK-LOC	MONOGRAM
C	K	M
CL	KL	ML
CC	KK	MM
CHD	KHD	MHD



MANUALLY OPERATED FASTENERS INSTALLATION TOOL

MODEL C-200

For installing all Cleko-Loc plier-operated fasteners. Fabricated from forged steel, nickel plated to resist corrosion and extend the life of the pliers.



Genuine Aircraft Hardware Co. Temporary - Reusable Fasteners

“CC” SERIES

The “CC series fasteners are designed for normal clamping force in more confined areas.

- Plier-operated -- Use C-200 installation plier
- Spring-loaded
- Color coded by size for easy identification



PART NO.	COLOR CODE	G (GRIP)	D (DIAMETER)	DRILL SIZE
CC-3/32	Zinc	0-1/4"	3/32"	#40
CC-1/8	Copper	0-1/4"	1/8"	#30
CC-5/32	Black	0-1/4"	5/32"	#21
CC-3/16	Brass	0-1/4"	3/16"	#10

“CHD” SERIES

The “CHD” series fasteners are designed for applications requiring an extended grip range not available in the standard “C” and “CC” series.

- Plier-operated -- Use C-200 installation plier
- Spring-loaded
- Color coded by size for easy identification



PART NO.	COLOR CODE	G (GRIP)	D (DIAMETER)	DRILL SIZE
CHD-3/32	Zinc	0-1/2"	3/32"	#40
CHD-1/8	Copper	0-1/2"	1/8"	#30
CHD-5/32	Black	0-1/2"	5/32"	#21
CHD-3/16	Brass	0-1/2"	3/16"	#10

SIDE-GRIP CLAMPS

Side grip clamps are designed to clamp at the edge of the work area. Ideal for holding workpieces of all types particularly during bonding, sealing or gluing operations.

- Plier-operated -- Use C-200 installation plier
- Spring-loaded
- Constant clamping force
- Color coded for easy identification



**CSG 3/4 X 1/2
Brass**

**CSG 1/2 X 1
Copper**



PART NUMBER	BARREL COLOR	CLAMPING CAPACITY	EFFECTIVE JAW REACH	BODY LENGTH
CSG 1/2 X 1/2	COPPER	0 - 1/2"	1/2"	2 3/16"
CSG 3/4 X 1/2	BRASS	0 - 3/4"	1/2"	2 7/16"
CSG 1/2 X 1	COPPER	0 - 1/2"	1"	2 3/16"
CSG 3/4 X 1	BRASS	0 - 3/4"	1"	2 7/16"

*Also available with specially developed plastic jaw; for use on exotic metals to eliminate any possible reaction between composition of jaw and metals being clamped. Suited for composite applications. Min's & Lead Times apply

Genuine Aircraft Hardware Co.

Temporary - Reusable Fasteners

Part No.	Cross Ref.	Color Code	Grip	Diameter	Drill Size
CHN-3/32	HNX-SF-3/32	Zinc	0-1/2"	3/32"	#40
CHN-1/8	HNX-SF-1/8	Copper	0-1/2"	1/8"	#30
CHN-5/32	HNX-SF-5/32	Black	0-1/2"	5/32"	#21
CHN-3/16	HNX-SF-3/16	Brass	0-1/2"	3/16"	#10



Power-Hex Nut Style - Standard Grip 0-1/2"

Hex Nut Fasteners are recommended for high production applications that require a consistent clamping force. They are pneumatic driven with the US7381HX Power Nut Runner.

Part No.	Cross Ref.	Color Code	Grip	Diameter	Drill Size
CHNL-3/32	HNL-SF-3/32	Zinc	0-1"	3/32"	#40
CHNL-1/8	HNL-SF-1/8	Copper	0-1"	1/8"	#30
CHNL-5/32	HNL-SF-5/32	Black	0-1"	5/32"	#21
CHNL-3/16	HNL-SF-3/16	Brass	0-1"	3/16"	#10



Power-Hex Nut Style - Long Grip 0-1"

Part No.	Cross Ref.	Color Code	Grip	Diameter	Drill Size
CWN-3/32	WNX-3/32	Zinc	0-1/2"	3/32"	#40
CWN-1/8	WNX-1/8	Copper	0-1/2"	1/8"	#30
CWN-5/32	WNX-5/32	Black	0-1/2"	5/32"	#21
CWN-3/16	WNX-3/16	Brass	0-1/2"	3/16"	#10



Manual Wing Nut Style - Standard Grip 0-1/2"

Wing Nut Fasteners are recommended for low production applications where high clamping force is required. The clamping force ranges from zero to 300 lbs.

Part No.	Cross Ref.	Color Code	Grip	Diameter	Drill Size
CWNL-3/32	WNXL-3/32	Zinc	0-1"	3/32"	#40
CWNL-1/8	WNXL-1/8	Copper	0-1"	1/8"	#30
CWNL-5/32	WNXL-5/32	Black	0-1"	5/32"	#21
CWNL-3/16	WNXL-3/16	Brass	0-1"	3/16"	#10



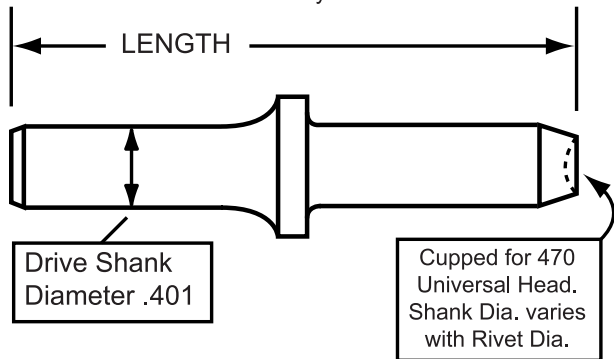
Manual Wing Nut Style - Long Grip 0-1"

Riveting Tools

Rivet Sets, for Universal Head (470), for use with Percussion Rivet Guns

RS 470-(rivet dia.)-(length)

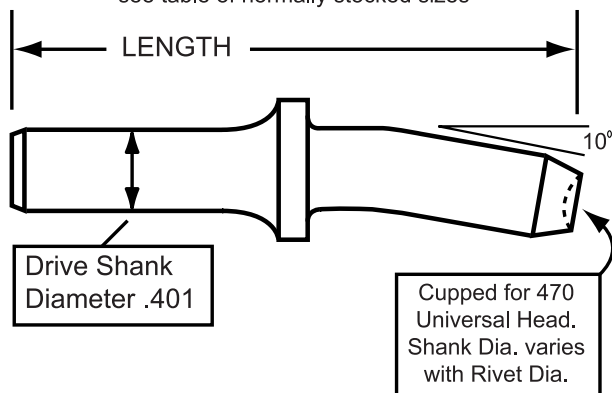
see table of normally stocked sizes



RS470 Stocked Sizes	
RS470-3-3.5	RS470-3-5.5
RS470-4-3.5	RS470-4-5.5
RS470-5-3.5	RS470-5-5.5
RS470-6-3.5	RS470-6-5.5
RS470-8-3.5	RS470-8-5.5

RSA470-(rivet dia.)-(length)

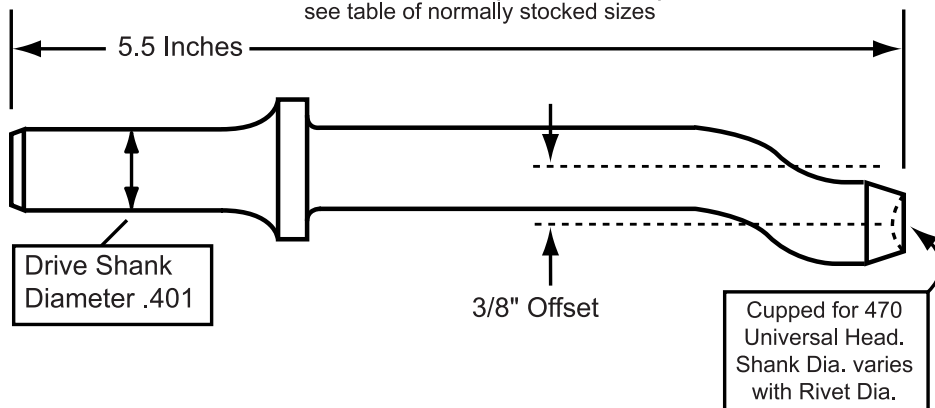
see table of normally stocked sizes



RSA470 Stocked Sizes
RSA470-3-3.5
RSA470-4-3.5
RSA470-5-3.5
RSA470-6-3.5
RSA470-8-3.5

RSOS470-(rivet dia.)

see table of normally stocked sizes



RSO470 Stocked Sizes
RSO470-3
RSO470-4
RSO470-5
RSO470-6

Longer Lengths Available as Special Order!

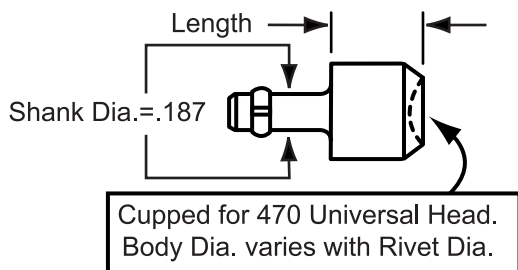
Genuine Aircraft Hardware Co.

Riveting Tools

Rivet Sets, for Universal Head (470), for use with Pneumatic Rivet Squeezers

SQS470-(length)-(rivet dia.)

see table of normally stocked sizes

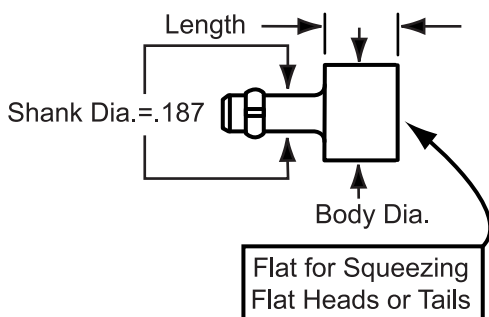


SQS470 Stocked Sizes	
SQS470-.125-3	SQS470-.25-6
SQS470-.125-4	SQS470-.375-3
SQS470-.25-3	SQS470-.375-4
SQS470-.25-4	SQS470-.375-5
SQS470-.25-5	SQS470-.375-6

Rivet Sets, for Flat Head (426), for use with Hand or Pneumatic Squeezers

SQSFL-(body dia.)-(length)

see table of normally stocked sizes



SQSFL Stocked Sizes	
SQSFL-.375-.125	SQSFL-.500-.125
SQSFL-.375-.190	SQSFL-.500-.190
SQSFL-.375-.250	SQSFL-.500-.250
SQSFL-.375-.312	SQSFL-.500-.312
SQSFL-.375-.375	SQSFL-.500-.375
SQSFL-.375-.437	SQSFL-.500-.437
SQSFL-.375-.500	SQSFL-.500-.500
SQSFL-.375-.563	SQSFL-.500-.563

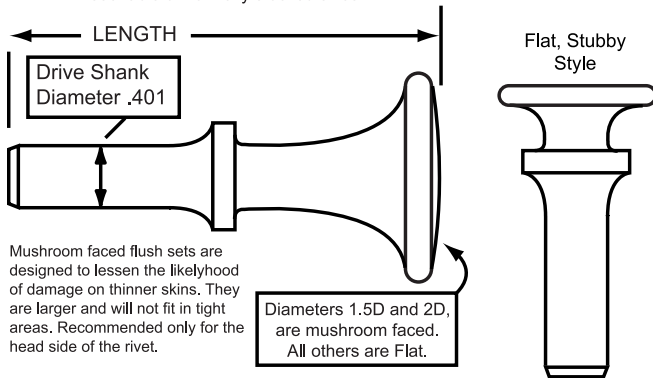
Genuine Aircraft Hardware Co.

Riveting Tools

Rivet Sets, for Flat Head (426), for use with Percussion Rivet Guns

RS426-(length)-(face dia.)

see table of normally stocked sizes



Use Flat faced or special sets made for back riveting if you plan to drive the rivet from the tail side.

RS426	
Stocked Sizes	
RS426-2L-1D	
RS426-2L-1.25D	
RS426-3L-1.5D	
RS426-3L-2D	
RS426-3.5L-.5D	
RS426-5.5-.5D	

We stock the best Dimple Die sets that I have seen.

They are made by **Cleaveland Aircraft Tool**

The Dimple Dies and Flat sets are High Strength Stainless Steel.

The Cup Sets are Heat Treated Carbon Steel from another manufacturer.



You can buy them by individual M & F sets, or

as the assortment shown below,

Item# **DIEKITW**. has the following

contents except the* marked items.

Part# **DDS(426 or 509) - Size**

Example *DDS426-4*, is a Dimple Die Set for a -4 Countersunk Rivet (1/8th")

For a Countersunk Screw dimple use

DDS 509-size. 4*, 6, 8, or 10

DDS = dimple die set (m & f)

DDS426-3

DDS426-4

DDS426-5*

DDS426-6*

DIE = Female die

red. dia for clearance.

DIE426-3S

DIE426-4S

SSC = Single set cup

for universal head rivets

SSC-3, SSC-4

SSC-5, SSC-6

SSF = Single Set Flat

SSF-1 1/2 wide x 1/8" thick.

SSF-2, through, -8 are 3/8" w

the - # is x 1/16" thickness.

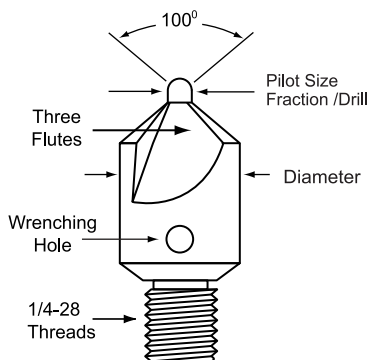


Item # **DIEKITW**
Assorted Popular Sets
All in a cool Lucite holder.

Genuine Aircraft Hardware Co.

Threaded Cutting Tools

Piloted Countersinks, Deburring Bits



TCS100(dia)(-fraction)
or TCS100(dia)(#drill)

TCS100 Stocked or Available Sizes		
TCS100.312#40	TCS100.375#30	TCS100.375-3/16
TCS100.312#30	TCS100.375#21	TCS100.625-1/4
TCS100.312#21	TCS100.375#10	TCS100.625-5/16
TCS100.375#40	TCS100.375-5/32	TCS100.625-3/8



TDBB-(dia)

The **Threaded De-Burring Bits** are available in several diameters. All have a 1/4-28 male threaded drive.

The Stocked or Available Sizes are
TDBB-3/8 TDBB-7/16 TDBB-1/2

DE-BURR BITS
ARE NOT CONSIDERED COUNTERSINKS

Special Tip! If you have lots of small holes to hand deburr put the bit on the right hand end of a MS21251B5L turnbarrel, for comfortable fit, and easy to spin by hand!

Genuine Aircraft Hardware Co. Countersink Tools and Drill Collets

Microstop Countersink Cages, Drill Collets and Angle Drill Attachments.



CSC350*
Rated 3,000 rpm

* The Compact Countersink Cage shown is without the nylon foot piece. The part# with it is **CSC350-ISN**. Replacement footpieces are p/n **S350-IS**



CSC560-IFN
Rated 3,000 rpm

The Standard Countersink Cage will take up to a 9/16" dia bit. with footpiece or 5/8" without it. The one shown has the footpiece. Replacement footpieces are P/N **S560-IF**



CSC575
Rated 10,000 rpm

This is a double bearing, double sealed unit, specially designed for the rugged duties of High-Tech composite work. Has permanent metal foot.



CSC565-IFN
Same as above exc. rated 10,000 rpm

The Standard Countersink Cage will take up to a 9/16" dia bit. with footpiece or 5/8" without it. The one shown has the footpiece. Replacement footpieces are P/N **S560-IF**

DCOL-(SIZE)

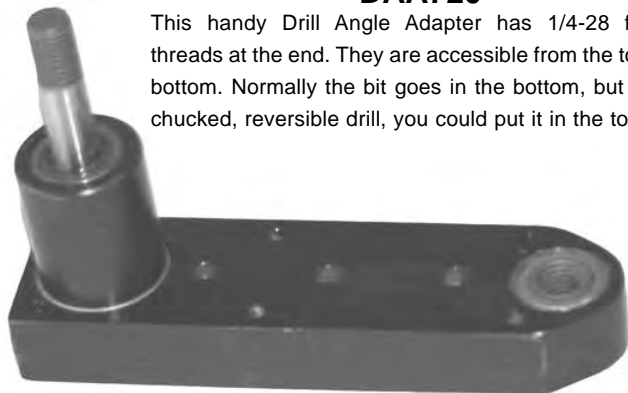
Adapts any length straight shank drill to work with 1/4-28 threaded drive equipment. We stock the popular sizes.

#40, #30, #27
#20, #16, #10
and 1/4"



DAA720

This handy Drill Angle Adapter has 1/4-28 female threads at the end. They are accessible from the top and bottom. Normally the bit goes in the bottom, but with a chucked, reversible drill, you could put it in the top



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Genuine Aircraft Hardware Co.

Pneumatic Squeezers

MADE IN THE U.S.A. by General Pneumatic.



C-Type Rivet Squeezer, 3000C

The **3000C** shown here with a **1&1/2"** reach standard yoke, is the workhorse of rivet installation. Producing 3000 lbs of compression force at the end of its stroke. This model will give consistent results squeezing up to 1/8" aluminum or 3/32" Steel, Stainless, or Monel rivets.

ALWAYS OPERATE AT 90-100psi.

Other special purpose yokes are available.



Alligator Type Rivet Squeezer, 3000A-1-1/2

The **3000A** shown here with a **1&1/2"** reach standard yoke, is for use in limited access areas. Producing 3000 lbs of compression force at the end of its stroke. This model will give consistent results squeezing up to 1/8" aluminum or 3/32" Steel, Stainless, or Monel rivets.

ALWAYS OPERATE AT 90-100psi.

Other length yokes are available. *Be advised longer reach yokes decrease the available squeezing pressure.*



C-Type Rivet Squeezer, 6000C

The **6000C** is the same as the 3000C except it has a longer housing for the **double power pistons** inside. This model will give consistent results squeezing up to 3/16" aluminum or 5/32" Steel, Stainless, or Monel rivets. ALWAYS OPERATE AT 90-100psi.

Other special purpose yokes are available.

The **6000A** is the same as the 3000A except it has a longer housing for the double power piston inside. This model will give consistent results squeezing up to 3/16" aluminum or 5/32" Steel, Stainless, or Monel rivets. ALWAYS OPERATE AT 90-100psi.

Other length yokes are available.

Be advised longer reach yokes decrease the available squeezing pressure.



Alligator Type Rivet Squeezer, 6000A-3

For Alternate yoke selections see Subsequent pages

SELECTING A YOKE

Four factors will determine how to select the proper yoke for your application.

1. The gap dimension ("B") on our yoke drawing, the length of your rivet determines minimum gap.
2. The reach (dimension "A") edge distance determines reach.
3. Allowances must be made for rivet material such as aluminum, brass, copper, steel, stainless steel, monel and whether solid or semi-tubular. The rivet diameter directly affects your choice of yoke.
4. Tool power rating (maximum compressive force).

Because of these variables our yokes are manufactured as either light or heavy duty types.

All General Pneumatic yokes are made of chromemoly steel, precision machined, heat treated and ground for long life.

In general it's best to select a yoke with the smallest gap and shortest reach consistent with your application. Go as light as possible. It saves both weight and money.

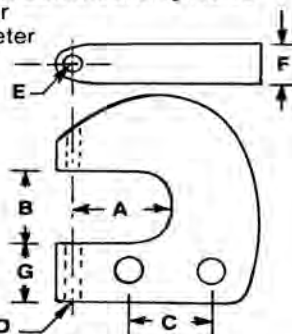
As the rivet length increases it is necessary to increase the gap of the yoke. Consult our chart for gap requirements based on rivet length.

RIVET LENGTH	MINIMUM GAP
1/4"	1-1/4"
1/2"	1-1/2"
3/4"	1-3/4"
1.00"	2.00"
1.25"	2.25"
1.5"	2.50"
1.75"	2.75"
2.00"	3.00"

It can be readily seen that the minimum yoke gap must always be one inch greater than the longest rivet. This allows for two 1/4 inch high rivet sets and a 1/16th squeeze on the rivet plus the stroke of the tool.

C-YOKE NOMENCLATURE

- A Reach
- B Gap
- C Center Line Between Bolt Mounting Holes
- D Set Holder Diameter
- E Top Set Hole Diameter
- F Thickness of Yoke
- G Base Height

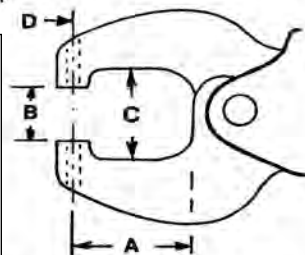


STANDARD C-YOKE TYPES

Yoke Part No.	A	B	C	D	E	F	G
060.000	1-1/2	1-1/4	1-5/16	3/8	3/16	9/16	1
060.001	2	1-1/4	1-5/16	3/8	3/16	9/16	1
060.002	2-1/2	1-1/4	1-5/16	3/8	3/16	9/16	1
060.004	3	1-1/2	1-5/16	3/8	3/16	1	1-1/4
060.005	3-1/2	1-1/2	1-5/16	3/8	3/16	1	1-1/4

ALLIGATOR NOMENCLATURE

- A Reach
- B Total Yoke Gap
- C Closed Height
- D Set Hole Diameter



Be Advised

The Alligator type squeezers take both a Moving and a Stationary jaw to make a complete yoke. There is also the option for a 1/4" set holder in addition to the more common 3/16" set holder.

STANDARD ALLIGATOR TYPES

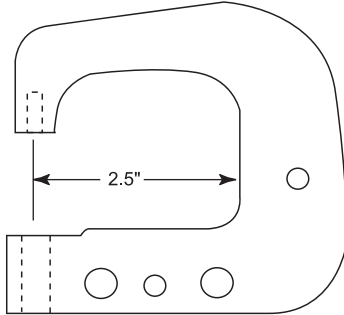
Part No.	Jaw	A	B	C	D
275.001	Moving	1-1/2	7/8	1-5/8	3/16
285.001	Stationary	1-1/2	7/8	1-5/8	3/16
275.002	Moving	1-1/2	7/8	1-5/8	1/4
285.002	Stationary	1-1/2	7/8	1-5/8	1/4
275.003	Moving	2-1/4	7/8	1-3/4	3/16
285.003	Stationary	2-1/4	7/8	1-3/4	3/16
275.004	Moving	2-1/4	7/8	1-3/4	1/4
285.004	Stationary	2-1/4	7/8	1-3/4	1/4
275.005	Moving	3	7/8	2-1/8	3/16
285.005	Stationary	3	7/8	2-1/8	3/16
275.006	Moving	3	7/8	2-1/8	1/4
285.006	Stationary	3	7/8	2-1/8	1/4

The Yokes on this page are made by General Pneumatic and are excellent quality. They are all designed to withstand the full forces developed by any of the hand held squeezers that General Pneumatic manufactures.

For Special Purpose Yokes from an other manufacturers please see next page.

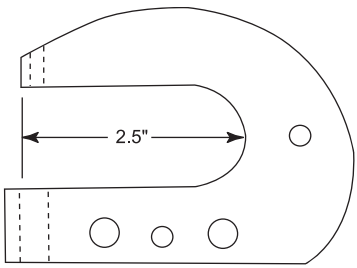
Genuine Aircraft Hardware Co. Squeezer Yokes

Custom designed yokes fit all "C" type pneumatic rivet squeezers.
All compatible with the Standard length set holders



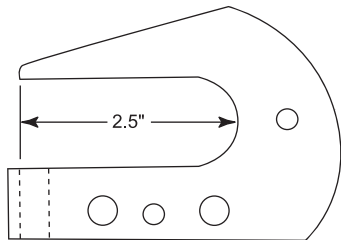
PR-LY
This yoke is designed specifically to work around longerons of large joggles. You may find it handy for regular riveting too.
Capacity 5/32" aluminum rivet.

2.5"



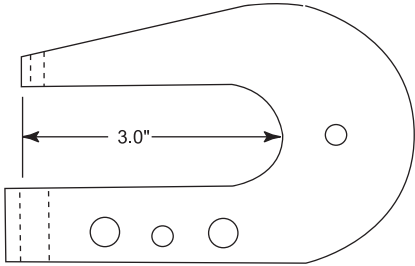
PR-2.5S
A standard yoke for a pneumatic riveter
Capacity 3/16" aluminum rivet

2.5"



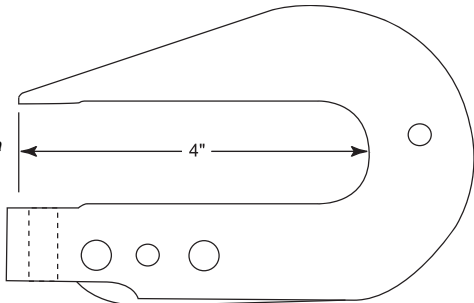
PR-2.5THN
A thin nose yoke for a pneumatic riveter
Capacity 3/16" aluminum rivet
gets into tight places when a deep reach is required.

2.5"



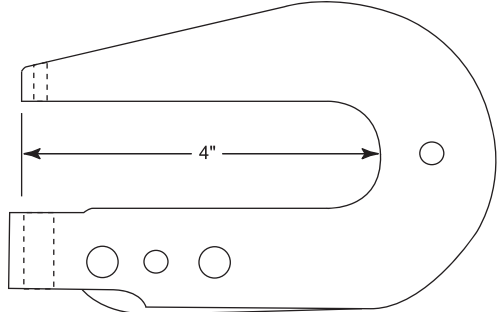
PR-3S
A standard yoke for a pneumatic riveter
Capacity 3/16" aluminum rivet

3.0"



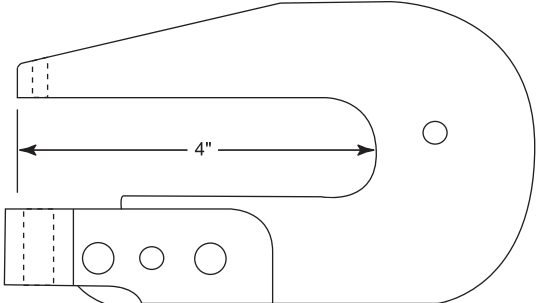
PR-4THN
A thin nose yoke for a pneumatic riveter
Capacity 1/8" aluminum rivet
gets into tight places when a deep reach is required.

4"



PR-4S
A standard yoke for a pneumatic riveter
Capacity 1/8" aluminum rivet

4"



PR-4HD
A standard yoke for a pneumatic riveter
Capacity 3/16" aluminum rivet.

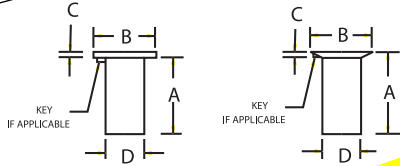
4"

Genuine Aircraft Hardware Co.

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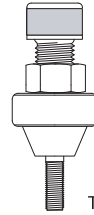
Blind Rivet Nuts

Kits Available, page 286



For More Installation Tools, see pg 219 & 259

Rivnut Installation Tool part numbers



- C845-440
- C845-632
- C845-832
- C845-1032
- C845-428

Top quality-all metal comes with hex key

Basic #
NAS1329, Protruding Flathead
NAS1330, Countersunk Head

Material
A= Aluminum
C= Corrosion Resistant Steel
H= Alloy Steel, Cadmium Plated
S= Carbon Steel, Cadmium Plated

Thread Size
06= 6-32 threads
08= 8-32 threads
3 = 10-32 threads
4 = 1/4-28 threads

Maximum Grip Length
See chart for selection of this #

Design Details
K= Keyed with an open end
- = No key, open end
KB= Keyed with a closed end

For Equivilant BF Goodrich and MS part numbers see next page.

These are not exact dimensions.

First # Basic #	Second # Thread Size	Last # Max Grip	Grip Range		Dimensions				Installation Drill Size
			MIN	MAX	A *	B	C	D	
NAS1329- Protruding Flathead	(04)	60	.010	.060	.345	.270	.025	.155	5/32
		85	.060	.085	.370				
		110	.085	.110	.400				
		135	.110	.135	.425				
		160	.135	.160	.450				
NAS1329- Protruding Flathead	(06) or (08)	75	.010	.075	.438	.325, (06)	.032	.189, (06)	#12, (06)
		120	.075	.120	.500				
		160	.120	.160	.500	.357, (08)		.221, (08)	#2, (08)
		200	.160	.200	.625				
		240	.200	.240	.625				
NAS1329- Protruding Flathead	(3)	80	.010	.080	.531	.406	.038	.250	Letter "E"
		130	.080	.130	.594				
		180	.130	.180	.641				
		230	.180	.230	.703				
		280	.230	.280	.750				
NAS1329- Protruding Flathead	(4)	80	.020	.080	.625	.475	.058	.332	Letter "Q"
		140	.080	.140	.687				
		200	.140	.200	.750				
		260	.200	.260	.812				
		320	.260	.320	.875				
NAS1330- Countersunk Head	(06) or (08)	106	.065	.106	.500	.323, (06)	.063	.189, (06)	#12, (06)
		161	.106	.161	.500				
		201	.161	.201	.562	.355, (08)		.221, (08)	#2, (08)
		241	.201	.241	.625				
		281	.241	.281	.687				
NAS1330- Countersunk Head	(3)	116	.065	.116	.578	.391	.065	.250	Letter "E"
		166	.116	.166	.625				
		216	.166	.216	.687				
		266	.216	.266	.734				
		316	.266	.316	.781				
NAS1330- Countersunk Head	(4)	151	.089	.151	.687	.529	.089	.332	Letter "Q"
		211	.151	.211	.750				
		271	.211	.271	.812				
		331	.271	.331	.875				
		391	.331	.391	.937				

A * : This dimension is ten to twenty percent longer for rivet nuts with closed ends.

Genuine Aircraft Hardware Co.

Cross Reference Chart

Rivet Nuts to BFG and MS

ORDER BY NAS NUMBERS

SEE PREVIOUS PAGE FOR PART NUMBER BREAKDOWN

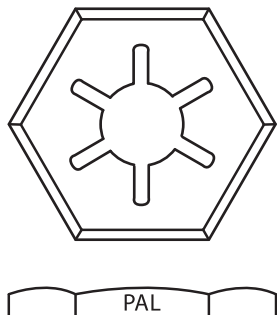
This is a list of aluminum rivet nuts only, call for help on other materials if you need them crossed over

BFG #	NAS #	MS #	BFG #	NAS #	MS #	BFG #	NAS #	MS #
A6- 75	NAS1329A06- 75	MS27130-A7	A6KB 106	NAS1330A06KB106	no equivalent #	A2528K 80	NAS1329A4K80	MS27130-A37K
A6- 120	NAS1329A06-120	MS27130-A8	A6KB 161	NAS1330A06KB161	no equivalent #	A2528K 140	NAS1329A4K140	MS27130-A38K
A6- 160	NAS1329A06-160	MS27130-A9	A6KB 201	NAS1330A06KB201	no equivalent #	A2528K 200	NAS1329A4K200	MS27130-A39K
A6- 200	NAS1329A06-200	MS27130-A10	A6KB 241	NAS1330A06KB241	no equivalent #	A2528K 260	NAS1329A4K260	MS27130-A40K
A6- 240	NAS1329A06-240	MS27130-A11	A6KB 281	NAS1330A06KB281	no equivalent #	A2528K 320	NAS1329A4K320	MS27130-A41K
A6K 75	NAS1329A06K 75	MS27130-A7K	A8- 106	NAS1330A08-106	MS27130-A93	A2528KB 80	NAS1329A4KB80	MS27131-26
A6K 120	NAS1329A06K120	MS27130-A8K	A8- 161	NAS1330A08-161	MS27130-A94	A2528KB 140	NAS1329A4KB140	MS27131-28
A6K 160	NAS1329A06K160	MS27130-A9K	A8- 201	NAS1330A08-201	MS27130-A95	A2528KB 200	NAS1329A4KB200	MS27131-30
A6K 200	NAS1329A06K200	MS27130-A10K	A8- 241	NAS1330A08-241	MS27130-A96	A2528KB 260	NAS1329A4KB260	no equivalent #
A6K 240	NAS1329A06K240	MS27130-A11K	A8- 281	NAS1330A08-281	MS27130-A97	A2528KB 320	NAS1329A4KB320	no equivalent #
A6KB 75	NAS1329A06KB75	MS27131-8	A8K 106	NAS1330A08K106	MS27130-A93K	A10- 116	NAS1330A3-116	MS27130-A99
A6KB 120	NAS1329A06KB120	MS27131-10	A8K 161	NAS1330A08K161	MS27130-A94K	A10- 166	NAS1330A3-166	MS27130-A100
A6KB 160	NAS1329A06KB160	MS27131-12	A8K 201	NAS1330A08K201	MS27130-A95K	A10- 216	NAS1330A3-216	MS27130-A101
A6KB 200	NAS1329A06KB200	no equivalent #	A8K 241	NAS1330A08K241	MS27130-A96K	A10- 266	NAS1330A3-266	MS27130-A102
A6KB 240	NAS1329A06KB240	no equivalent #	A8K 281	NAS1330A08K281	MS27130-A97K	A10- 316	NAS1330A3-316	MS27130-A103
A8- 75	NAS1329A08- 75	MS27130-A13	A8KB 106	NAS1330A08KB106	no equivalent #	A10K 116	NAS1330A3K116	MS27130-A99K
A8- 120	NAS1329A08-120	MS27130-A14	A8KB 161	NAS1330A08KB161	no equivalent #	A10K 166	NAS1330A3K166	MS27130-A100K
A8- 160	NAS1329A08-160	MS27130-A15	A8KB 201	NAS1330A08KB201	no equivalent #	A10K 216	NAS1330A3K216	MS27130-A101K
A8- 200	NAS1329A08-200	MS27130-A16	A8KB 241	NAS1330A08KB241	no equivalent #	A10K 266	NAS1330A3K266	MS27130-A102K
A8- 240	NAS1329A08-240	MS27130-A17	A8KB 281	NAS1330A08KB281	no equivalent #	A10K 316	NAS1330A3K316	MS27130-A103K
A8K 75	NAS1329A08K 75	MS27130-A13K	A10- 80	NAS1329A3-80	MS27130-A25	A10KB 116	NAS1330A3KB116	no equivalent #
A8K 120	NAS1329A08K120	MS27130-A14K	A10- 130	NAS1329A3-130	MS27130-A26	A10KB 166	NAS1330A3KB166	no equivalent #
A8K 160	NAS1329A08K160	MS27130-A15K	A10- 180	NAS1329A3-180	MS27130-A27	A10KB 216	NAS1330A3KB216	no equivalent #
A8K 200	NAS1329A08K200	MS27130-A16K	A10- 230	NAS1329A3-230	MS27130-A28	A10KB 266	NAS1330A3KB266	no equivalent #
A8K 240	NAS1329A08K240	MS27130-A17K	A10- 280	NAS1329A3-280	MS27130-A29	A10KB 316	NAS1330A3KB316	no equivalent #
A8KB 75	NAS1329A08KB 75	MS27131-14	A10K 80	NAS1329A3K80	MS27130-A25K	A2528- 151	NAS1330A4-151	MS27130-A105
A8KB 120	NAS1329A08KB120	MS27131-16	A10K 130	NAS1329A3K130	MS27130-A26K	A2528- 211	NAS1330A4-211	MS27130-A106
A8KB 160	NAS1329A08KB160	MS27131-18	A10K 180	NAS1329A3K180	MS27130-A27K	A2528- 271	NAS1330A4-271	MS27130-A107
A8KB 200	NAS1329A08KB200	no equivalent #	A10K 230	NAS1329A3K230	MS27130-A28K	A2528- 331	NAS1330A4-331	MS27130-A108
A8KB 240	NAS1329A08KB240	no equivalent #	A10K 280	NAS1329A3K280	MS27130-A29K	A2528- 391	NAS1330A4-391	MS27130-A109
A6- 106	NAS1330A06-106	MS27130-A87	A10KB 80	NAS1329A3KB80	MS27131-20	A2528K 151	NAS1330A4K151	MS27130-A105K
A6- 161	NAS1330A06-161	MS27130-A88	A10KB 130	NAS1329A3KB130	MS27131-22	A2528K 211	NAS1330A4K211	MS27130-A106K
A6- 201	NAS1330A06-201	MS27130-A89	A10KB 180	NAS1329A3KB180	MS27131-24	A2528K 271	NAS1330A4K271	MS27130-A107K
A6- 241	NAS1330A06-241	MS27130-A90	A10KB 230	NAS1329A3KB230	no equivalent #	A2528K 331	NAS1330A4K331	MS27130-A108K
A6- 281	NAS1330A06-281	MS27130-A91	A10KB 280	NAS1329A3KB280	no equivalent #	A2528K 391	NAS1330A4K391	MS27130-A109K
A6K 106	NAS1330A06K106	MS27130-A87K	A2528- 80	NAS1329A4-80	MS27130-A37	A2528KB 151	NAS1330A4KB151	no equivalent #
A6K 161	NAS1330A06K161	MS27130-A88K	A2528- 140	NAS1329A4-140	MS27130-A38	A2528KB 211	NAS1330A4KB211	no equivalent #
A6K 201	NAS1330A06K201	MS27130-A89K	A2528- 200	NAS1329A4-200	MS27130-A39	A2528KB 271	NAS1330A4KB271	no equivalent #
A6K 241	NAS1330A06K241	MS27130-A90K	A2528- 260	NAS1329A4-260	MS27130-A40	A2528KB 331	NAS1330A4KB331	no equivalent #
A6K 281	NAS1330A06K281	MS27130-A91K	A2528- 320	NAS1329A4-320	MS27130-A41	A2528KB 391	NAS1330A4KB391	no equivalent #

PAL nuts & Wellnuts

PAL nuts are stamped sheet metal nuts that are used as non-critical safety or “check” nuts. They used to be commonly available under the MS numbers, but now they are difficult to come by. We offer functional equivalents under the PAL numbers. The main difference between MS and PAL numbers is the plating. The MS numbers were Cadmium plated, the PAL numbers we can supply are Zinc plated.

Order by PAL Part Numbers



Thread Size	Type threads	Width Across Flats	Approx Height	MS part # (reference only!)	Order By PAL Part #
10-32	Fine Thread	3/8	.105	MS27151-7	RM103200-SOG
1/4-28		7/16	.118	MS27151-13	RF142800-SOG
5/16-24		1/2	.129	MS27151-16	RF516240-SOG
3/8-24		9/16	.140	MS27151-19	RF382400-SOG
7/16-20		5/8	.150	MS27151-21	RL716200-SOG
1/2-20		3/4	.172	MS27151-24	RF122000-SOG
1/4-20	Coarse Thread	7/16	.123	MS27151-12	RF142000-SOG
5/16-18		1/2	.134	MS27151-15	RF516180-SOG
3/8-16		9/16	.145	MS27151-18	RF381600-SOG



Wellnuts

I think of these as kind of like rubber rivet nuts. Just push them in the right size hole put a washer or other attachment over them, install a screw and they tighten up just like a miniature boat plug.

We stock three part numbers

WELLNUT E-632 ,015-.156 grip

WELLNUT B-832 ,015-.156 grip

WELLNUT Q-1032 ,035-.232 grip

We can get other sizes on request, there will be minimums and lead times for all special orders

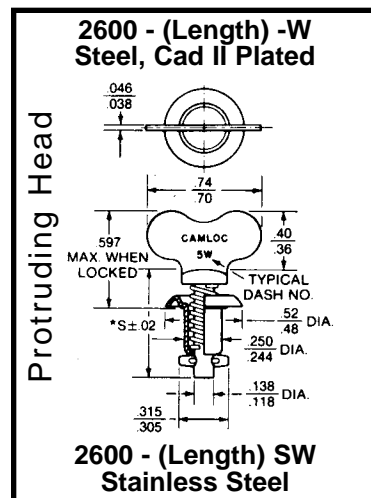
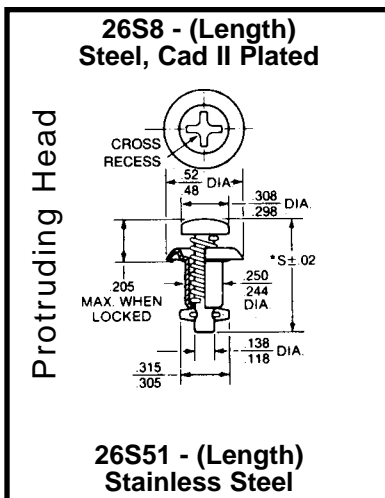
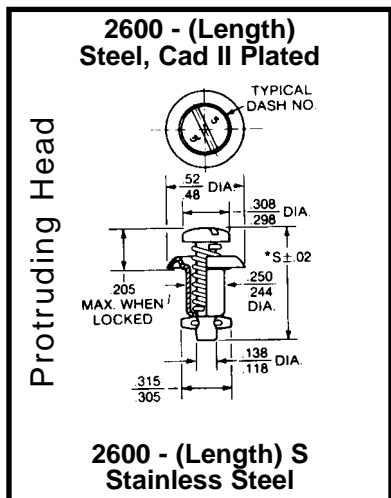
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Genuine Aircraft Hardware Co.

CAMLOC® 2600/2700 Series

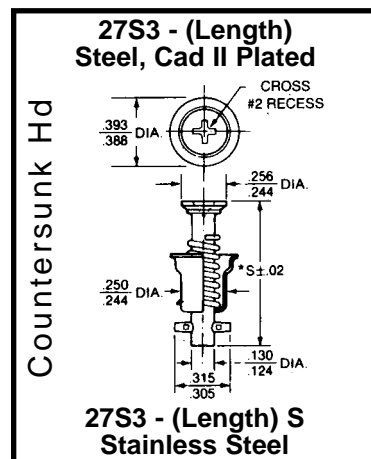
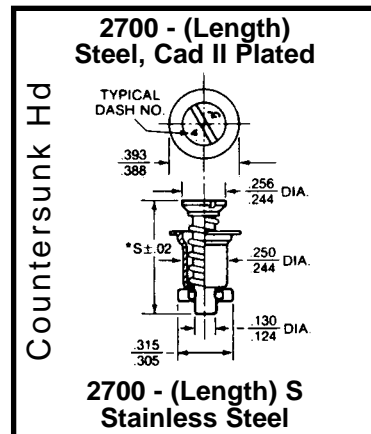
Stud Selection and Identification

CAMLOC is a registered trademark



To select a new or replacement stud you may utilize available information. First, match the type to the pictures shown. Part numbers on top are Steel; part numbers on bottom are Stainless. To get the correct length, there may be a very small number on top of the head. You may also calculate it by the **Combined Panel Thickness**, or by actually measuring your existing part and using the **"S" Dimension**, provided it fit correctly with your existing installation.

Note the combined panel thickness chart works only with the receptacles like the ones shown on the next page.

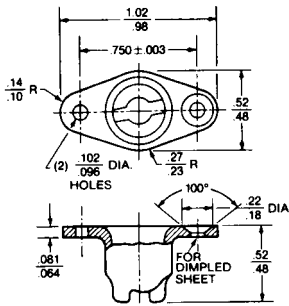


Combined Panel Thickness		"S" Dimension		Length #
Min.	Max.	Countersunk Hd	Protruding Hd	
.060	.089	.64	.79	2
.090	.119	.67	.82	3
.120	.149	.70	.85	4
.150	.179	.73	.88	5
.180	.209	.76	.91	6
.210	.239	.79	.94	7
.240	.269	.82	.97	8
.270	.299	.85	1.00	9
.300	.329	.88	1.03	10
.330	.359	.91	1.06	11
.360	.389	.94	1.09	12
.390	.419	.97	1.12	13
.420	.449	1.00	1.15	14
.450	.479	1.03	1.18	15

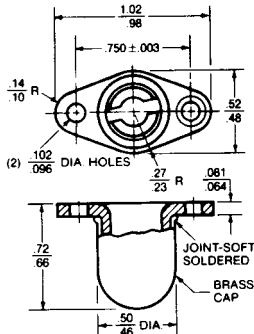
Genuine Aircraft Hardware Co.

CAMLOC® 2600/2700 Series Receptacles and Retainers Selection and Identification

CAMLOC is a registered trademark



Standard Receptacle

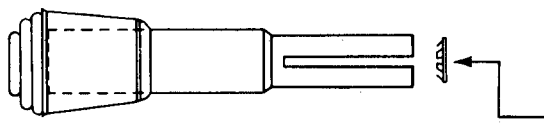
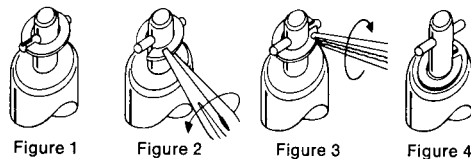


Encapsulated Receptacle

Part #	Desc. / Application
2600-LW (Steel) 2600-LW-7 (Stainless)	Solid Ring Gen. Purpose
27S5-1 (Steel)	Solid Ring for Dimpled Panel
2600-SW2 (Steel) 2600-SW (Stainless)	Split Ring General Purpose, allows stud to pull back when unlatched

PART #	Rivet Holes	DESIGN	MATERIAL
212-12	PLAIN	Fixed	CAD PLATED BRONZE
212-12D	C/Sunk	Fixed	CAD PLATED BRONZE
212-12S	PLAIN	Fixed	STAINLESS
212-12SD	C/Sunk	Fixed	STAINLESS
212-12N	PLAIN	Fixed Narrow	CAD PLATED BRONZE
212-12ND	C/Sunk	Fixed Narrow	CAD PLATED BRONZE
26R16-1	PLAIN	Encapsulated	CAD PLATED BRONZE
26R16-2	C/Sunk	Encapsulated	CAD PLATED BRONZE

Installation of split ring retainer

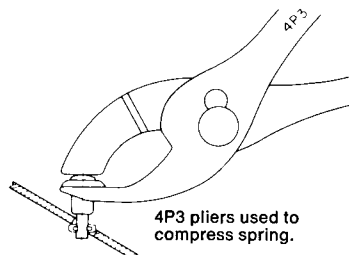


Retaining Ring Installation Tool T98-1
(For use with Solid Rings Only)

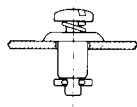
RETAINING RING

Installing Stud Into Panel

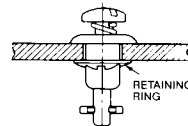
Compress stud assembly spring using Camloc pliers, P/N 4P3, as shown. Insert stud into panel and release when cross pin clears panel.



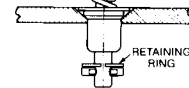
4P3 pliers used to compress spring.



Dash "4" studs and smaller are self-captivating. (Except 26S97, 26S98 and 26S99)



2600 Series
Protruding stud and solid retaining ring. Installed with T-98-1 tool.



2700 Series
Flush mounting stud and split retaining ring.

Typical Installations

Note: If float is required, all dash lengths require retaining rings as described in "Float" above.

Note: Pliers work for 4000 Series also!

CAMLOC® 2600/2700 Series Panel Preparation for Receptacles and Studs

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CAMLOC® 2600 Receptacle Installation

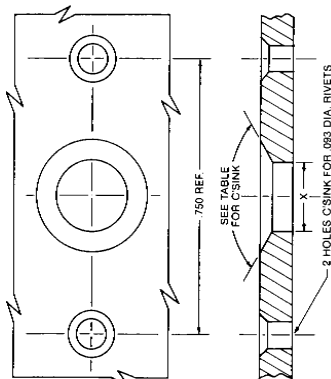
Standard Mounting Versions

1. Drill #30 (.1285) dia. pilot hole.
2. Drill holes for .093 dia. rivets using drill jig P/N T12 or equivalent.
3. Enlarge pilot hole to X diameter and countersink if required.
4. Rivet receptacle in place.

Important Note: 1100F aluminum alloy rivets should be used with aluminum receptacles.

Typical Installation

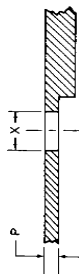
(Thin panels may be dimpled)



Receptacle	"X" Dia.	C/Sink	Hole Saw*
Encapsulated P/N's 26R16-1, 26R16-2	.437	90° x 500 Dia.	HS-437
All Other Standard Mount Receptacles	.500	None Required	HS-500 or HS-500D

CAMLOC® 2600 Hole Preparation

2600 Series Protruding Head Studs

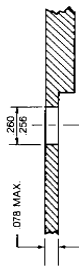


Determine panel thickness "P" and form through hole to corresponding "X" diameter. Note: Panels with thicknesses greater than .125 inch must be back counterbored to a concentric .375 inch diameter with a remaining maximum material thickness of .125 inch. Use split style retaining rings with back counterbore.

P	X Dia. Ref.
.030 to .065	.257
.066 to .125	.281

Float:

To provide float for stud assembly, increase "X" diameter to .312 inch. This hole diameter allows "P" thickness to be increased to .187 inch without back counterboring. Larger hole requires use of solid retaining ring, P/N 2600-LW.



2600/2700 Series Snap-in Studs

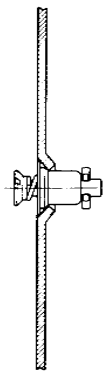
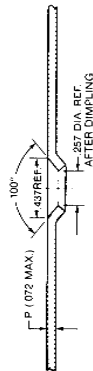
Form through hole to .260-.256 diameter. Note: Panels with panel thicknesses greater than .078 must be back counterbored to a concentric .375" diameter with a remaining maximum material thickness of .078.

CAMLOC® 2700 Thin Panel Installation

2700 Series Flush Mounting Studs

Installation in "Thin" Panel

For panel thicknesses "P" up to .072 inch maximum, form through hole to .213 diameter. Then dimple using tools shown below. Through hole after dimpling to be .257; ream if necessary.



Stud Assembly Seats Flush

1/8 INCH P/N 25200M-1



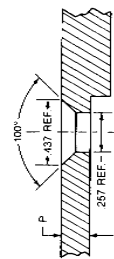
Dimpling Tool Both Punch and Die Required

Installation in "Thick" Panel

For panel thickness "P" larger than .072 inch, form through hole to .257 diameter and 100° C Sink to a diameter of .437.

Panels with thicknesses greater than .140 inch must be back counterbored to a concentric .375 inch diameter with a remaining material thickness of .140 inch maximum.

Use split style retaining ring with back counterbore.



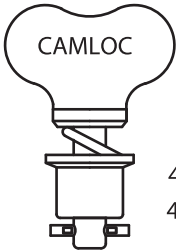


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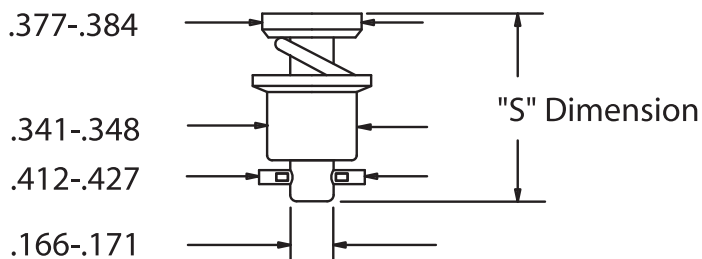
CAMLOC® 4000 Series

STUD - Part Numbers and Details

CAMLOC is a registered trademark

WINGED HEAD		<p>Kits Available, page 300</p> <p>4002-(XX)W, STEEL, CAD PLATED 4002-(XX)SW, STAINLESS, WINGED</p>
SLOTTED HEAD		<p>4002-(XX), STEEL, CAD PLATED 4002-(XX)S, STAINLESS, SLOTTED</p>
#2 PHILLIPS HEAD		<p>40S5-(XX), STEEL, CAD PLATED 40S5-(XX)S, STAINLESS, PHILLIPS</p>

COMBINED PANEL THICKNESS		(XX) Table USE STUD DASH # FOR RECEPTACLE TYPE		"S" DIMENSION	DASH #
MIN	MAX	FIXED /STANDARD	FLOATING or RT ANGLE		
.051	.080	N/A	2	.69	2
.081	.110	2	3	.72	3
.111	.140	3	4	.75	4
.141	.170	4	5	.78	5
.171	.200	5	6	.81	6
.201	.230	6	7	.84	7
.231	.260	7	8	.87	8
.261	.290	8	9	.90	9
.291	.320	9	10	.93	10
.321	.350	10	11	.96	11
.351	.380	11	12	.99	12
.381	.410	12	13	1.02	13
.411	.440	13	14	1.05	14
.441	.470	14	15	1.08	15
.471	.500	15	16	1.11	16



To select a new or replacement stud you may utilize available information. First, match the type to the pictures shown. To get the correct length, there may be a very small number on top of the head. You may also calculate it by the combined panel thickness or using the "S" dimension by actually measuring your existing part, provided it fits correctly. Note the combined panel thickness chart works only with the receptacles like the ones shown on the next page.

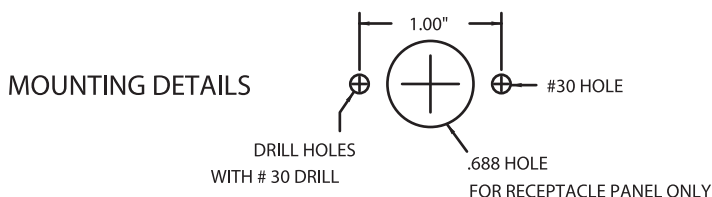
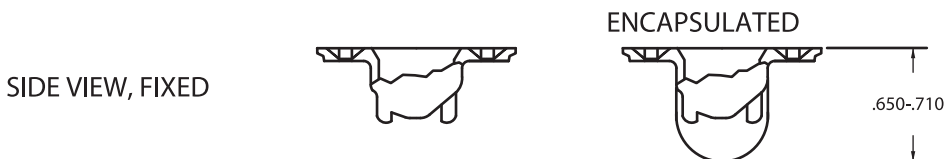
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CAMLOC® 4000 Series

RECEPTACLES and RETAINERS - Selection and Identification

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Kits Available, page 300



PART #	RIVET HOLES	DESIGN	MATERIAL
214-16	PLAIN	Fixed	CAD PLATED BRONZE
214-16D	C/Sunk	Fixed	CAD PLATED BRONZE
214-16S	PLAIN	Fixed	STAINLESS
214-16SD	C/Sunk	Fixed	STAINLESS
214-16N	PLAIN	Fixed Narrow	CAD PLATED BRONZE
244-16	PLAIN	Floating	CAD PLATED STEEL/BRONZE
244-16D	C/Sunk	Floating	CAD PLATED STEEL/BRONZE
244-16S	PLAIN	Floating	STAINLESS
244-16SD	C/Sunk	Floating	STAINLESS
40R17-5	PLAIN	Lightweight	CAD PLATED STEEL
40R17-6	C/Sunk	Lightweight	CAD PLATED STEEL
40R17-1	PLAIN	Lightweight	STAINLESS
40R17-2	C/Sunk	Lightweight	STAINLESS
40R12-1	PLAIN	Encapsulated	CAD PLATED BRONZE
40R12-2	C/Sunk	Encapsulated	CAD PLATED BRONZE

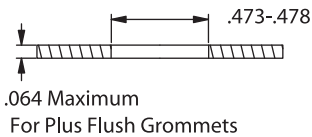
Genuine Aircraft Hardware Co.

CAMLOC® 4000 Series

GROMMET - Selection and Identification

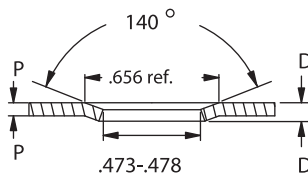
CAMLOC is a registered trademark

Kits Available, page 300

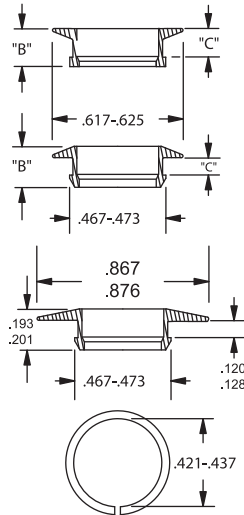


"P" for dimpled panels

.064 MAX, -G grommet
.086 MAX, -H grommet



.074 MAX, -G grommet
.117 MAX, -H grommet



"D" for dimpled panels

"P" and "D" for countersunk panels, Spotface back of panel if required for "D"

FLUSH TYPE GROMMET

For Panels with Countersink

PLUS FLUSH TYPE GROMMET

Slightly Raised for Non Countersunk panels

PLUS FLUSH OVERSIZE GROMMET

Slightly Raised for Non Countersunk panels

RETAINING RING

Part # R4G (Steel, Cad Plated)

Part # 40G26-1 (Stainless, Non Magnetic)

Our Own Hole Saw for Camlocs .471 dia. PART# **PHS-471**



PART #	Grommet Max Panel	STYLE	MATERIAL	Approx "B" Dim.	Approx "C" Dim.	Fixed Receptacle Minimum Combined Panels	Floating Receptacle Minimum Combined Panels
4002-N2	.025	Plus Flush	CAD PLATED STEEL	.197	.078	.053	.023
4002-N2S	.025	Plus Flush	STAINLESS	.197	.078	.053	.023
4002-N	.065	Plus Flush	CAD PLATED STEEL	.197	.118	.091	.061
4002-NS	.065	Plus Flush	STAINLESS	.197	.118	.091	.061
4002-O	.094	Plus Flush	CAD PLATED STEEL	.198	.147	.116	.086
4002-OS	.094	Plus Flush	STAINLESS	.198	.147	.116	.086
4002-N3	.128	Lg Area Plus Flush	CAD PLATED STEEL	.197	.124	.150	.061
4002-GS	.074	Flush	STAINLESS	.187	.128	.090	.060
4002-G	.074	Flush	CAD PLATED STEEL	.187	.128	.090	.060
4002-H	.117	Flush	CAD PLATED STEEL	.197	.170	.150	.120
4002-HS	.117	Flush	STAINLESS	.197	.170	.150	.120

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Genuine Aircraft Hardware Co.

SOUTHCO® Fasteners

NOTES: When ordering, Series # should be the same for studs, receptacles and rings.
Diameter is measured just under the head.

Stud Part # Breakdown

Diameter	Series #
.198	82
.245	85

Designates Diameter/Series

Designates Head Type

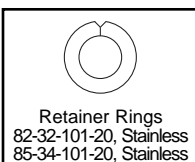
Kits Available, page 299

Material: -16 = Plated Steel
-20 = Stainless Steel

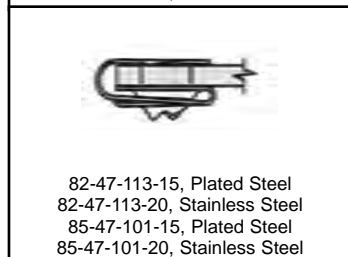
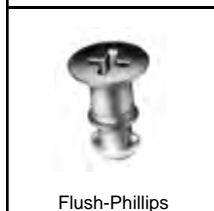
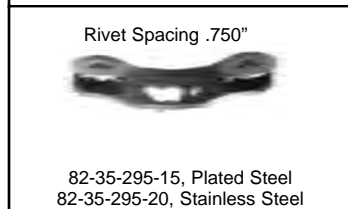
Functional grip length in thousandth's of an inch

82 - 19 - 120 - 16

Head Type	2nd -#
Oval-Slotted	-11
Oval-Winged	-12
Flush-Slotted	-14
Oval-Phillips	-19
Flush-Phillips	-28



Head Types



TOTAL MATERIAL THICKNESS		3rd - #
MIN	MAX	
.070	.089	-80
.090	.109	-100
.110	.129	-120
.130	.149	-140
.150	.169	-160
.170	.189	-180
.190	.209	-200
.210	.229	-220
.230	.249	-240
.250	.269	-260
.270	.289	-280
.290	.309	-300

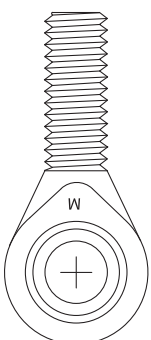
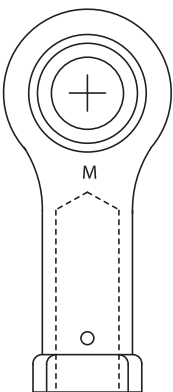
Genuine Aircraft Hardware Co.

HEIM Rod Ends

TYPE and MATERIAL REFERENCE TABLE

We will be supplying TSO'd parts as they become available.

The part Numbers will be the same with the exception of the suffix of (TSO) after the standard part number. If the item is has been not manufactured to the TSO, then there will be no suffix of (TSO), or there will be a suffix of (/COMM), designating the item as having been manufactured to the Commercial Specification, which was prior to the TSO spec.



Series	Type / Specs.	Outer Member	Ball	Race or Insert / Liner
FE	Female / M81935/2	4340 steel	440C Stainless, Heat Treated	17-4PH Stainless/Uniflon
HFE-M	Female / Heim Specs	Aircraft carbon steel	Chrome Steel-heat treated	Aluminum / Uniflon
F-M				brass
HF-M				
ME	Male / M81935/1	4340 steel	440C Stainless, Heat Treated	17-4PH Stainless/Uniflon
HME-M	Male / Heim Specs	Aircraft carbon steel	Chrome Steel-heat treated	Aluminum / Uniflon
HM-M				brass
M-M				

Uniflon® is a registered trademark of HEIM Bearings Co.

Make your selection for replacement Rod Ends by comparing yours with the ones on the chart.

Genuine Aircraft Hardware Co.

Rod Ends HM-M and HF-M

Aircraft Series, Brass Inserts

Material Specifications

Outer Member

Aircraft quality carbon steel, magnetic particle inspected, cadmium plating or equivalent alternative coating.

Ball

Chrome steel - heat treated

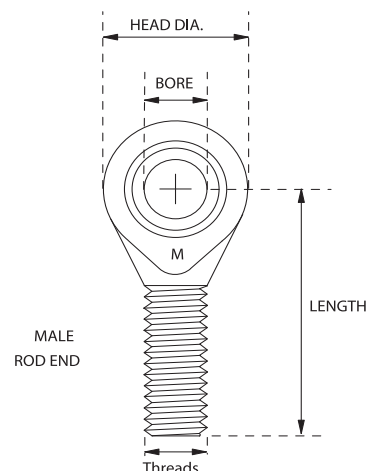
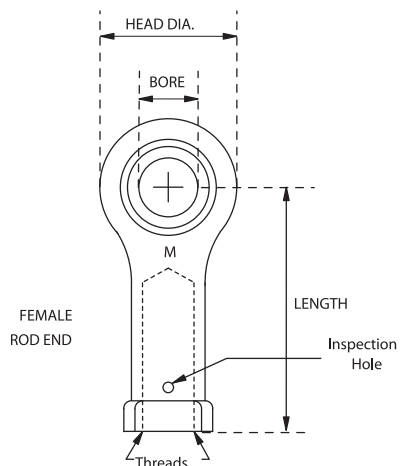
Race or Inserts

Brass on all sizes except - 16M, it has a carbon steel cartridge race.

Notes

Add letter (L) to prefix to indicate left hand threads.
Example: HFL-4M

Optional grease fittings available on sizes -4M thru -16M
Add (G) at very end for standard grease Zerk.
Add (FG) at very end for flush type lubricator.



HEIM PART #	BORE	BALL WIDTH	HEAD DIAMETER	LENGTH	THREADS DIA. - PITCH	BALL DIAMETER	MAX STATIC RADIAL LOAD Lbs.
HF- 2 M	1/8	.250	.469	.812	#6-32 Female	.312	1,200
HF-2AM	5/32	.281	.562	.875	#8-32 Female	.375	1,700
HF- 3M	3/16	.312	.625	1.062	#10-32 Female	.437	1,850
HF- 4M	1/4	.375	.750	1.312	1/4-28 Female	.515	2,700
HF- 5M	5/16	.437	.875	1.375	5/16-24 Female	.625	3,350
HF- 6M	3/8	.500	1.000	1.625	3/8-24 Female	.718	4,450
HF- 7M	7/16	.562	1.125	1.812	7/16-20 Female	.812	5,350
HF- 8M	1/2	.625	1.312	2.125	1/2-20 Female	.937	7,400
HF-10M	5/8	.750	1.500	2.500	5/8-18 Female	1.125	8,050
HF-12M	3/4	.875	1.750	2.875	3/4-16 Female	1.312	11,300
HF-16M	1"	1.375	2.750	4.125	1"-12 Female	1.875	28,400

HEIM PART #	BORE	BALL WIDTH	HEAD DIAMETER	LENGTH	THREADS DIA. - PITCH	BALL DIAMETER	MAX STATIC RADIAL LOAD Lbs.
HM- 2 M	1/8	.250	.469	.937	#6-32 Male	.312	450
HM-2AM	5/32	.281	.562	1.125	#8-32 Male	.375	650
HM- 3M	3/16	.312	.625	1.250	#10-32 Male	.437	900
HM- 4M	1/4	.375	.750	1.562	1/4-28 Male	.515	1,700
HM- 5M	5/16	.437	.875	1.875	5/16-24 Male	.625	2,500
HM- 6M	3/8	.500	1.000	1.938	3/8-24 Male	.718	4,000
HM- 7M	7/16	.562	1.125	2.125	7/16-20 Male	.812	5,000
HM- 8M	1/2	.625	1.312	2.438	1/2-20 Male	.937	7,000
HM-10M	5/8	.750	1.500	2.625	5/8-18 Male	1.125	8,050
HM-12M	3/4	.875	1.750	2.875	3/4-16 Male	1.312	11,300
HM-16M	1"	1.375	2.750	4.125	1"-12 Male	1.875	28,400

Genuine Aircraft Hardware Co.

Rod Ends F-M and M-M Aircraft Series, Brass Inserts, Special Purpose

Material Specifications

Outer Member

Aircraft quality carbon steel, magnetic particle inspected, cadmium plating or equivalent alternative coating.

Ball

Chrome steel - heat treated

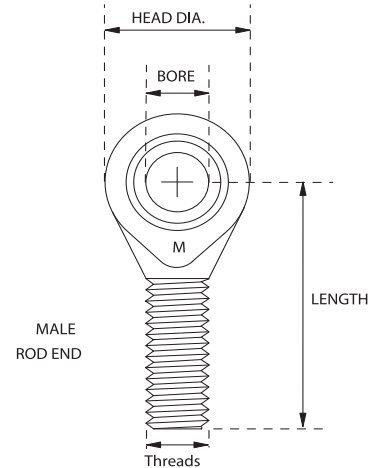
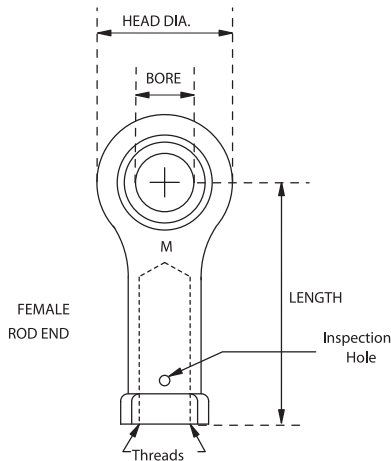
Race or Inserts

Brass; add (T) at the very end for "tight fit" if desired.

Notes

Add letter (L) to prefix to indicate left hand threads.
Example: MDL46-15M, FL34-14M

In the male rod ends of this series the (D) in the first segment of the part number denotes a drilled hole in the shank for the transfer of lubricant to the race and ball area.



HEIM PART #	BORE	BALL WIDTH	HEAD DIAMETER	LENGTH	THREADS DIA. - PITCH	BALL DIAMETER	MAX STATIC RADIAL LOAD Lbs.
F34-14M	3/16	.437	.750	1.375	1/4-28 Female	.515	2,850
F347-14M	3/16	.437	.750	1.062	1/4-28 Female	.515	2,850
F34-16M	3/16	.500	.812	1.375	1/4-28 Female	.593	2,750
F35-14M	3/16	.437	.750	1.375	5/16-24 Female	.515	2,850
F44-14M	1/4	.437	.812	1.375	1/4-28 Female	.562	2,950
F45-19M	1/4	.593	.938	1.469	5/16-24 Female	.687	3,700

HEIM PART #	BORE	BALL WIDTH	HEAD DIAMETER	LENGTH	THREADS DIA. - PITCH	BALL DIAMETER	MAX STATIC RADIAL LOAD Lbs.
M34-14M	3/16	.437	.750	1.560	1/4-28 Male	.515	1,700
MD35-14M	3/16	.437	.875	1.375	5/16-24 Male	.515	2,150
MD36-14M	3/16	.437	.750	1.375	3/8-24 Male	.515	2,850
MD36-16M	3/16	.500	.812	1.812	3/8-24 Male	.593	2,750
M44-14M	1/4	.437	.812	1.562	1/4-28 Male	.562	1,700
MD46-15M	1/4	.484	.875	2.312	3/8-24 Male	.625	3,150
MD46-16M	1/4	.500	.875	2.062	3/8-24 Male	.625	2,750

Genuine Aircraft Hardware Co.

Rod Ends HME-M and HFE-M

Aircraft Series, Self Lubricating

Material Specifications

Outer Member

Aircraft quality carbon steel, magnetic particle inspected, cadmium plating or equivalent alternative coating.

Ball

Chrome steel - heat treated

Race and Liner

The race is aluminum. The liner is self lubricating UNIFLON®. Uniflon® is a registered trademark of HEIM Bearings Co.

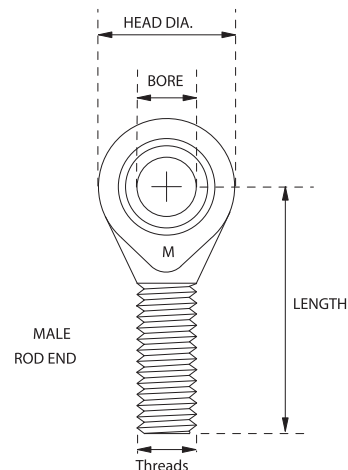
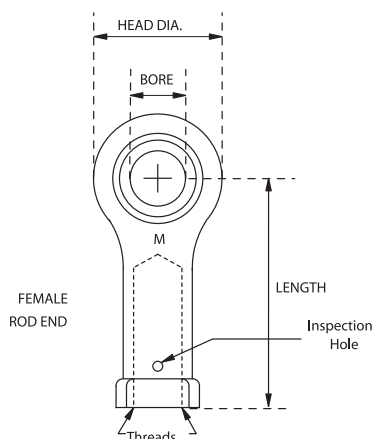
Notes

Add letter (L) to prefix to indicate left hand threads.
Example: HMLE-4M Teflon® is a registered trademark of E.I. duPont de Nemours & Co. Inc.

Uniflon® is the standard liner, for temperatures of 100Deg. to 350Deg. F.

Use carbon filled Teflon® liner for temperatures of -85 Deg. to 500Deg. F.

The load rating for carbon filled Teflon® is less than for Uniflon®.



HEIM PART #	BORE	BALL WIDTH	HEAD DIAMETER	LENGTH	THREADS DIA. - PITCH	BALL DIAMETER	MAX STATIC RADIAL LOAD Lbs.
HFE- 3M	3/16	.312	.625	1.062	#10-32 Female	.437	865
HFE- 4M	1/4	.375	.750	1.312	1/4-28 Female	.515	1,550
HFE- 5M	5/16	.437	.875	1.375	5/16-24 Female	.625	2,080
HFE- 6M	3/8	.500	1.000	1.625	3/8-24 Female	.718	2,950
HFE- 7M	7/16	.562	1.125	1.812	7/16-20 Female	.812	3,160
HFE- 8M	1/2	.625	1.312	2.125	1/2-20 Female	.937	4,925
HFE-10M	5/8	.750	1.500	2.500	5/8-18 Female	1.125	5,465
HFE-12M	3/4	.875	1.750	2.875	3/4-16 Female	1.312	8,300
HFE-16M	1"	1.375	2.750	4.125	1"-12 Female	1.875	28,400

HEIM PART #	BORE	BALL WIDTH	HEAD DIAMETER	LENGTH	THREADS DIA. - PITCH	BALL DIAMETER	MAX STATIC RADIAL LOAD Lbs.
HME- 3M	3/16	.312	.625	1.250	#10-32 Male	.437	865
HME- 4M	1/4	.375	.750	1.562	1/4-28 Male	.515	1,550
HME- 5M	5/16	.437	.875	1.875	5/16-24 Male	.625	2,080
HME- 6M	3/8	.500	1.000	1.938	3/8-24 Male	.718	2,950
HME- 7M	7/16	.562	1.125	2.125	7/16-20 Male	.812	3,160
HME- 8M	1/2	.625	1.312	2.438	1/2-20 Male	.937	4,925
HME-10M	5/8	.750	1.500	2.625	5/8-18 Male	1.125	5,465
HME-12M	3/4	.875	1.750	2.875	3/4-16 Male	1.312	8,300
HME-16M	1"	1.375	2.750	4.125	1"-12 Male	1.875	28,400

Genuine Aircraft Hardware Co.

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Rod Ends ME and FE

Aircraft Series, MS, Self Lubricating

Material Specifications

Outer Member

4340 Alloy steel (Mil-S-5000) - heat treated, cadmium plated.

Ball

440C Stainless, Heat Treated (AMS 5630)

Race and Liner

The race is 17-4PH stainless; the liner is UNIFLON®. Per Mil-B-81820. Uniflon® is a registered trademark of HEIM Bearings Co.

Notes

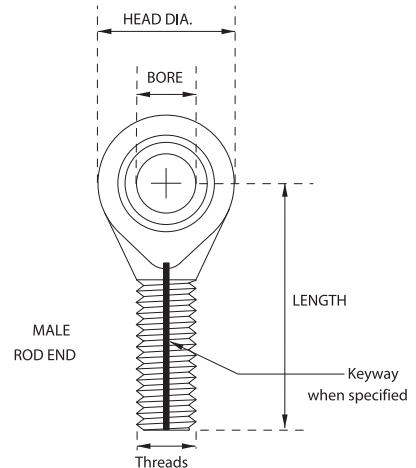
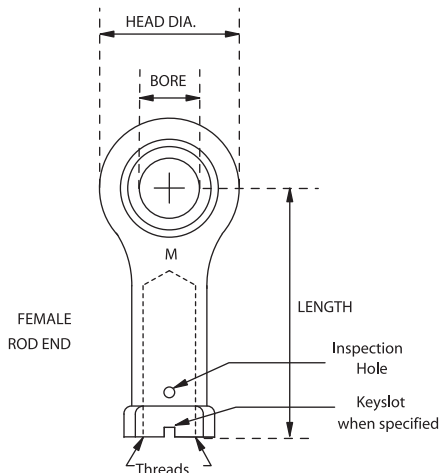
Add letter (L) to prefix to indicate left hand threads.

Example: FEL7 left handed female.
MEL7 left handed male.

Add letter (K) to indicate keyslot (female) or keyway (male).

Example: FEK7 female with keyslot
FEKL7 female L/H with keyslot
Example: MEK7 male with keyway
MEKL7 male L/H with keyway

ME series, male rod ends meet the requirements of Mil-B-81935/1.
FE series, female rod ends meet the requirements of Mil-B-81935/2.

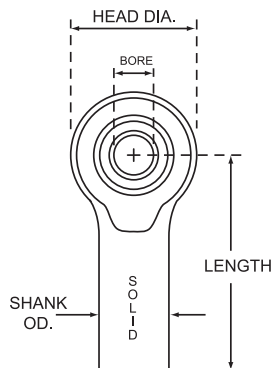


HEIM PART #	BORE	BALL WIDTH	HEAD DIAMETER	LENGTH	THREADS DIA. - PITCH	BALL DIAMETER	MAX STATIC RADIAL LOAD Lbs.
FE3	3/16	.437	.806	1.375	5/16-24 Female	.531	2,360
FE4	1/4	.437	.806	1.469	5/16-24 Female	.531	4,860
FE5	5/16	.437	.900	1.625	3/8-24 Female	.593	7,180
FE6	3/8	.500	1.025	1.812	3/8-24 Female	.687	8,550
FE7	7/16	.562	1.150	2.000	7/16-20 Female	.781	12,000
FE8	1/2	.625	1.337	2.250	1/2-20 Female	.875	19,500
FE10	5/8	.750	1.525	2.500	5/8-18 Female	1.062	21,900
FE12	3/4	.875	1.775	2.875	3/4-16 Female	1.250	29,300
FE14	7/8	.875	2.025	3.375	7/8-16 Female	1.375	34,500
FE16	1"	1.375	2.775	4.125	1"-12 Female	1.875	80,300

HEIM PART #	BORE	BALL WIDTH	HEAD DIAMETER	LENGTH	THREADS DIA. - PITCH	BALL DIAMETER	MAX STATIC RADIAL LOAD Lbs.
ME3	3/16	.437	.806	1.562	5/16-24 Male	.531	2,360
ME4	1/4	.437	.806	1.562	5/16-24 Male	.531	4,860
ME5	5/16	.437	.900	1.875	5/16-24 Male	.593	7,180
ME6	3/8	.500	1.025	1.938	3/8-24 Male	.687	8,550
ME7	7/16	.562	1.150	2.125	7/16-20 Male	.781	12,000
ME8	1/2	.625	1.337	2.438	1/2-20 Male	.875	19,500
ME10	5/8	.750	1.525	2.625	5/8-18 Male	1.062	21,900
ME12	3/4	.875	1.775	2.875	3/4-16 Male	1.250	29,300
ME14	7/8	.875	2.025	3.375	7/8-16 Male	1.375	34,500
ME16	1"	1.375	2.775	4.125	1"-12 Male	1.875	80,300

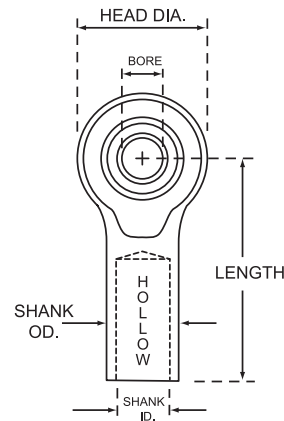
Genuine Aircraft Hardware Co.

Rod Ends, Ball Bearing Type, Un-threaded Shank



MS21150

These must be fastened with Rivets or Pins to the control Rods or Tubes.



MS21152

These have **double row ball bearings** that support the central spherical bearing, unlike the more common rod ends that have a liner of metal, fabric or teflon.

These are more common in control systems where friction reduction is a factor.

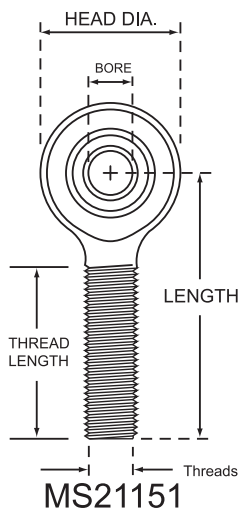
The mis-alignment is 10 degrees minimum off center for each direction.

These are Steel, Cad I plated and come pre-greased. They are rated for service temp's of -65 to 250 degrees F. Up to 300 F with a 20% performance reduction.

MS21150 Dash#	BORE	BALL WIDTH	HEAD DIAMETER	LENGTH + or - .010	SHANK DIA. (OD.) + .000 - .002	Radial Load	
						Limit #'s	Fracture #'s
1	3/16	7/16	.781 +or-.010	1.375	.430	1,000	1,500
2	1/4	19/32	.938 +or-.010	1.875	.625	1,7200	2,580

MS21152 Dash#	BORE	BALL WIDTH	HEAD DIAMETER	LENGTH + or - .031	SHANK DIA. (OD.) + .000 - .002	SHANK (ID.) + .or - .010	Radial Load
							Limit / Fracture #'s
1	3/16	7/16	.781 +or-.010	1.375	.430	.272	1,000 / 1,500
2	1/4	19/32	.938 +or-.010	1.875	.625	.386	1,720 / 2,680
3				1.625		.500	
4				.442		.488	
5				1.875		.625	

Rod Ends, Ball Bearing Type, Threaded Shank

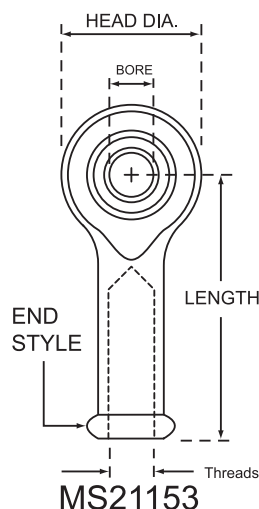


These have **double row ball bearings** that support the central spherical bearing, unlike the more common rod ends that have a liner of metal, fabric or teflon. These are more common in control systems where friction reduction is a factor.

The mis-alignment is 10 degrees minimum off center for each direction.

These are Steel, Cad I plated and come pre-greased. They are rated for service temp's of -65 to 250 degrees F. Up to 300 F with a 20% performance reduction.

Add a "C" to end of part # for Keyway Slot.

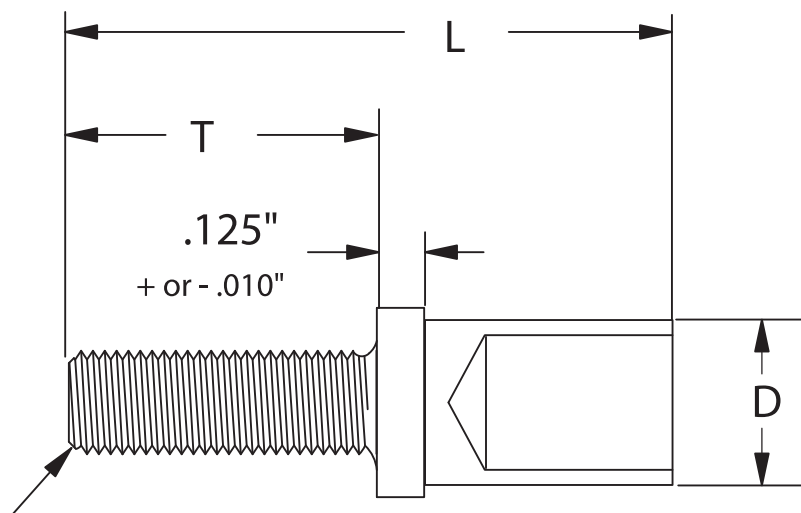


MS 21153 Dash#	BORE	BALL WIDTH	HEAD DIAMETER	LENGTH + or -.010	THREADS DIA. - PITCH	End Style	Radial Load Limit / Fracture #'s	
1	3/16	7/16	.781 +or-.010	1.375	1/4-28 Female R/H	BEAD	1,000 / 1,500	
2		5/16-24 Female R/H			HEX			
3		1/2			1/4-28 Female R/H	BEAD		
4								1/4-28 Female L/H
5								1/4-28 Female L/H
6	1/4	19/32	.938 +or-.010	1.469	5/16-24 Female R/H	HEX	1,720 / 2,580	
7				5/16-24 Female L/H				
8				1.875	7/16-20 Female R/H	HEX or Straight		
9					7/16-20 Female L/H			
10	5/16	7/8	1.250 +or-.010	5/16-24 Female R/H	HEX or Straight	2,920 / 4,375		
11				5/16-24 Female L/H				

MS 21151 Dash#	BORE	BALL WIDTH	HEAD DIAMETER	LENGTH + or -.031	THREADS DIA. - PITCH	Thread Length + or -.031	Radial Load Limit / Fracture #'s
1	3/16	7/16	.781 +or-.010	1.375	10-32 Male L/H	.750	1,000 / 1,500
2				10-32 Male R/H			
3		1/2	.969	2.031	3/8-24 Male R/H	1.313	1,200 / 1,800
4		7/16	.781 +or-.010	1.375	3/8-24 Male L/H	.750	1,000 / 1,500
5							
6	1/2						
7	7/16	1.563	1/4-28 Male R/H	1.00			
8	1/4	19/32	.938 +or-.010	1.875	3/8-24 Male R/H	1.125	1,720 / 2,580
9					3/8-24 Male L/H		
10	5/16	7/8	1.25 +or-.010	2.438	3/8-24 Male L/H	1.563	2,920 / 4,375
11					7/16-20 Male R/H		
12							
13	5/8	1 + 1/8	2.00	2.750	5/8-18 R/H	1.500	7,090 / 10,600

Genuine Aircraft Hardware Co.

AN490 Threaded Rod Ends



Thread Size

Material is 4130 Steel, heat treated to Rockwell C25 to C30, then Cadmium II plated. Unplated parts are available by special order just delete the "P" from the end.

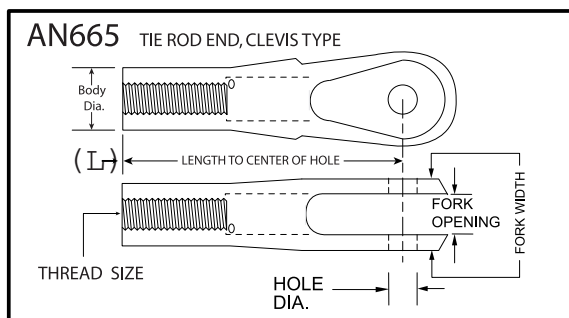
PART #	"D" Diameter	For Tube Size	Thread Size	"T" Thread Length	"L" Overall Length
AN490HT5P	.242	5/16 x .035	1/4-28 UNF-3A	1.00" + or - .010	1.750" + or - .010
AN490HT6P	.305	3/8 x .035			
AN490HT8P	.430	1/2 x .035			
AN490HT10P	.555	5/8 x .035	5/16-24 UNF-3A	1.062" + or - .010	1.812" + or - .010
AN490HT11P	.680	3/4 x .035			
AN490HT13P	.555	5/8 x .035	3/8-24 UNF-3A	1.062" + or - .010	1.812" + or - .010
AN490HT14P	.680	3/4 x .035			
AN490HT15P	.372	1/2 x .058	5/16-24 UNF-3A	1.062" + or - .010	1.812" + or - .010
AN490HT16P	.372	1/2 x .058	3/8-24 UNF-3A		

Genuine Aircraft Hardware Co.

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AN665

Terminal - Threaded Clevis Type Tie Rod



DASH NO.	RATED TIE ROD STGTH. MIN (LB)	THREAD SIZE	(L)	HOLE DIA +.003 -.000	FORK WIDTH	BODY DIA
10L 10R	1,200	6-40	1.313	.190	.250	.250
21L 21R	2,400	10-32	1.531		.313	.281
34L 34R	4,200	1/4-28	1.813	.250	.438	.375
46L 46R	(a) 4,600	5/16-24	1.875	.313	.500	.438
61L 61R	6,900		2.000	.375	.563	.453
(b) 80L 80R	10,000	3/8-24	2,250		.375	.625
80LA 80RA						
115L 115R	13,700	7/16-20	2,500	.438	.719	.625
155L 155R	18,500	1/2-20	2,813	.500	.813	.703
202L 202R	24,000	9/16-18	3,125	.563	.922	.796
247L 247R	29,500	5/8-18	3,375	.625	1.032	.875
430L 430R	42,000	3/4-16	4,125	.750	1.250	1.063
580L 580R	58,000	7/8-14	4,875	.875	1,500	1,250
(c) 780L 780R	76,000	1-12	5,750	1.000	1,750	1,438

(a) SPECIAL FOR USE WITH 6900 LB ROD WITH 4600 LB RATING.

(b) -60L AND -80R SIZES INACTIVE FOR DESIGN AFTER NOV. 28, 1944.

(c) -760L and -760R SIZES INACTIVE FOR DESIGN AFTER OCT. 30, 1964. USE 780L OR 780R FOR NEW DESIGN.

MATERIAL: STEEL

ADD L AFTER DASH NUMBER FOR LEFT HAND THREAD.

ADD R AFTER DASH NUMBER FOR RIGHT HAND THREAD.

DIMENSIONS IN INCHES. UNLESS OTHERWISE SPECIFIED, TOLERANCES: FRACTIONS ± 1/64, DECIMALS ± 0.10.

REMOVE ALL BURRS AND SHARP EDGES.

• PROCUREMENT SPECIFICATION: MIL-T-5683

• THIS INFORMATION FROM MILITARY STANDARD AN665 PAGE 1 OF 1, REVISED NOVEMBER 25, 1965, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.

EXAMPLES OF PART NO.: AN665-10L = LEFT HAND THREAD

AN665-10R = RIGHT HAND THREAD

Genuine Aircraft Hardware Co.

MS27975

Clevis, Rod End-adjusting, Wide and Narrow Forks

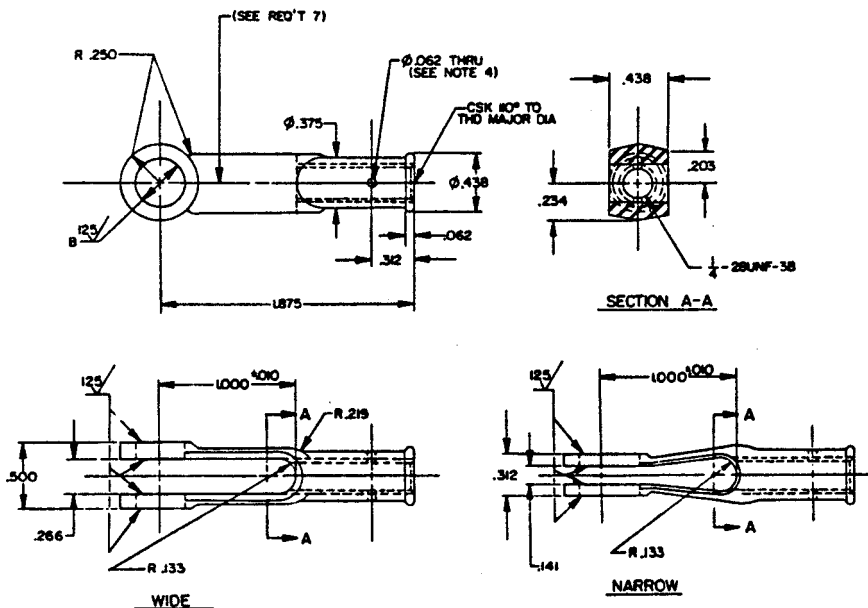


TABLE I. DASH NUMBERS AND DIMENSIONS

DASH NO.	TYPE OF FORK	Ø B +/- .001	WEIGHT (APPROX) LBS	ULTIMATE (MIN) AXIAL LOAD LBS
1	WIDE	.250	.051	3800
2	NARROW	.250	.051	2850
3	WIDE	.188	.052	4700
4	NARROW	.188	.052	3500

REQUIREMENTS:

- MATERIAL** -- STEEL, ALLOY, GRADE 4130 (UNS G41300) IN ACCORDANCE WITH MIL-S-6758. THE STEEL SHALL HAVE A MINIMUM TENSILE STRENGTH OF 90,000 PSI.
- PROTECTIVE COATING** -- CADMIUM PLATING IN ACCORDANCE WITH QQ-P-416, TYPE 2, CLASS 3.
- THREAD** -- THE THREAD SHALL BE IN ACCORDANCE WITH MIL-S-7742.
- SURFACE TEXTURE** -- SURFACE MARKED SHALL HAVE THE INDICATED MICROINCH FINISH IN ACCORDANCE WITH ANSI/ASME B46.1.
- TOLERANCES** -- UNLESS OTHERWISE SPECIFIED, DECIMAL TOLERANCES SHALL BE ±.015; DEGREE TOLERANCES SHALL BE ±5°.
- REMOVE ALL BURRS AND SHARP EDGES.
- MARKING** -- MARKING SHALL BE AT THE LOCATION INDICATED, CONSISTING OF SPECIFICATION SHEET NUMBER AND MANUFACTURER'S IDENTIFICATION OR CAGE CODE, IN ACCORDANCE WITH MIL-STD-130.
- PART NUMBER** -- THE PART NUMBER CONSISTS OF THE BASIC SPECIFICATION SHEET NUMBER PLUS THE DASH NUMBER FROM TABLE I.

EXAMPLE: MS27975-1 INDICATES - CLEVIS, ROD END-ADJUSTING, WIDE FORK, .250 DIAMETER, CADMIUM PLATED.

- PROCUREMENT SPECIFICATION: MIL-C-45918
- SUPERSEDES: AN486 and previous revisions of MS27975
- THIS INFORMATION FROM MILITARY STANDARD MS27975D PAGE 1 OF 1, REVISED JAN. 22, 1990, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.

Genuine Aircraft Hardware Co.

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MS27976

Clevis, Rod End-plain, Wide and Narrow Forks

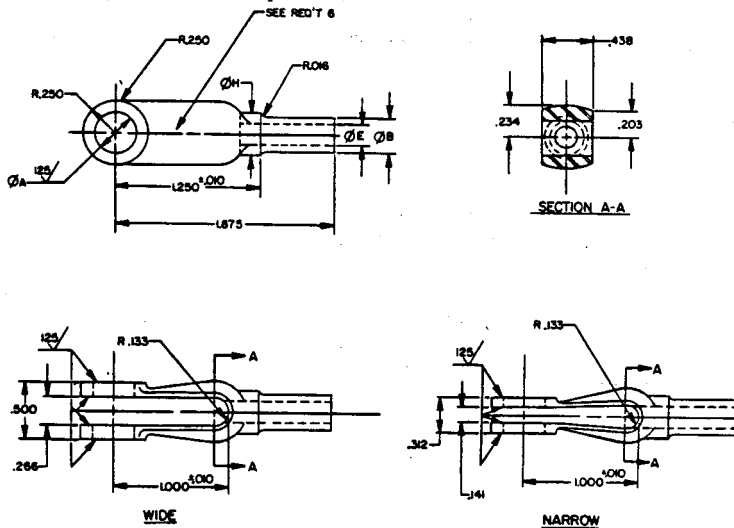


TABLE I. DASH NUMBERS AND DIMENSIONS

DASH NO.		TYPE OF FORK	Ø A +/- .001	Ø B + .000 - .002	Ø E	Ø H	WEIGHT (APPROX) LBS	ULTIMATE (MIN) AXIAL LOAD LBS
CAD PLATE	PLAIN							
1	21	WIDE	.250	.305	.188	.375	.046	3800
2	22	NARROW	.250	.305	.188	.375	.046	2850
3	23	WIDE	.188	.305	.188	.375	.047	4700
4	24	NARROW	.188	.305	.188	.375	.047	3500
5	25	WIDE	.250	.242	.125	.375	.046	3800
6	26	NARROW	.250	.242	.125	.375	.046	2850
7	27	WIDE	.188	.242	.125	.375	.047	4700
8	28	NARROW	.188	.242	.125	.375	.047	3500
9	29	WIDE	.250	.430	.281	.500	.048	3800
10	30	NARROW	.250	.430	.281	.500	.048	2850
11	31	WIDE	.188	.430	.281	.500	.049	4700
12	32	NARROW	.188	.430	.281	.500	.049	3500

REQUIREMENTS:

- MATERIAL** -- STEEL, ALLOY, GRADE 4130 (UNS G41300) IN ACCORDANCE WITH MIL-S-6758. THE STEEL SHALL HAVE A MINIMUM TENSILE STRENGTH OF 90,000 PSI.
- PROTECTIVE COATING** -- CADMIUM PLATING IN ACCORDANCE WITH QQ-P-416, TYPE 2, CLASS 3.
- THREAD** -- THE THREAD SHALL BE IN ACCORDANCE WITH MIL-S-7742.
- SURFACE TEXTURE** -- SURFACE MARKED SHALL HAVE THE INDICATED MICROINCH FINISH IN ACCORDANCE WITH ANSI / ASME B46.1.
- TOLERANCES** -- UNLESS OTHERWISE SPECIFIED, DECIMAL TOLERANCES SHALL BE ±.015; DEGREE TOLERANCES SHALL BE ±9°.
- REMOVE ALL BURRS AND SHARP EDGES.
- MARKING** -- MARKING SHALL BE AT THE LOCATION INDICATED, CONSISTING OF SPECIFICATION SHEET NUMBER AND MANUFACTURER'S IDENTIFICATION OR CAGE CODE, IN ACCORDANCE WITH MIL-STD-130.
- PART NUMBER** -- THE PART NUMBER CONSISTS OF THE BASIC SPECIFICATION SHEET NUMBER PLUS THE DASH NUMBER FROM TABLE I.

EXAMPLE: MS27976-1 INDICATES - CLEVIS, ROD END-PLAIN, WIDE FORK, .250 DIAMETER, CADMIUM PLATED.

- PROCUREMENT SPECIFICATION: MIL-C-45918
- SUPERSEDES: AN481 and previous revisions of MS27976
- THIS INFORMATION FROM MILITARY STANDARD MS27976E PAGE 1 OF 1, REVISED JAN. 22, 1990, SOME DETAILS MAY HAVE BEEN OMITTED FOR CLARITY.

Genuine Aircraft Hardware Co.

MS20271 Universal Joints

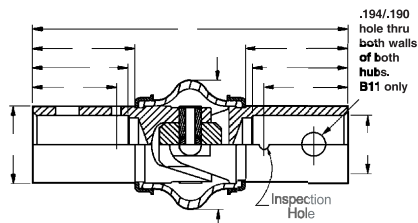
Military Standard Universal Joints

Heavy-Duty



MS 20271 Series

Heavy-duty MS 271 military standard universal joints have undergone qualification testing and meet or exceed the requirements of Military Specification MIL-J-6193 and Standard Drawing MS20271.



MS 271 Series

Part Number	A +.000, -.002 (+.000, -.051) Outside Dia.		B +/-0.015 (+/-381) Overall Length		C +.031, -.000 (+.787, -.000) Bore Depth		D Min		G +.004, -.001 (+.102, -.025) Bore Diameter		H +/- .015 (+/-381) Insp. Hole Loc.		J Max Dia. (+.102, -.025) Cover Dia.		L +/--.015 (+/-381) X-Hole Loc.		Weight Max	
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	Lbs.	kg
Dimensions																		
MS-20271-B6	0.372	9.45	2.000	50.80	0.500	12.70	0.563	14.30	0.250	6.35	0.437	11.10	0.781	19.84			0.07	0.032
MS-20271-B8	0.495	12.57	2.625	66.67	0.625	15.88	0.688	17.48	0.375	9.52	0.562	14.27	1.031	26.19			0.09	0.041
MS-20271-B10	0.620	15.75	2.750	69.85	0.750	19.05	0.813	20.65	0.500	12.70	0.687	17.45	1.156	29.36			0.18	0.082
MS-20271-B11	0.620	15.75	2.750	69.85	0.750	19.05	0.813	20.65	0.500	12.70	0.687	17.45	1.156	29.36	0.312	7.92	0.18	0.082
MS-20271-B12	0.745	18.92	3.187	80.95	0.875	22.22	0.938	23.83	0.625	15.88	0.812	20.62	1.437	36.50			0.24	0.109
MS-20271-B14	0.870	22.10	3.625	92.07	1.000	25.40	1.063	27.00	0.750	19.05	0.937	23.80	1.562	39.67			0.35	0.159
MS-20271-B16	0.995	25.27	4.062	103.17	1.187	30.15	1.188	30.18	0.812	20.62	1.062	26.97	1.906	48.41			0.55	0.250
MS-20271-B20	1.245	31.62	4.625	117.47	1.125	28.57	1.313	33.35	1.062	26.97	1.125	28.57	2.187	55.55			0.90	0.409
MS-20271-B24	1.495	37.97	5.250	133.35	1.312	33.32	1.438	36.53	1.250	31.75	1.250	31.75	2.750	69.85			1.50	0.682

Part Number	Angle	Torsional play			Minimum Ultimate Static Torque				Axial Tension & Compression		Endurance Torque Tests		
		Test Torque		Maximum Degrees	Specifications		Apex Average		Lbs.-in	N	Operating Angle	Torque	
		Lbs.-in	N-m		Lbs.-in	N-m	Lbs.-in	N-m				Lbs.-in	N-m
Performance Specifications													
MS-20271-B6	0	4	0.452	0.83	200	22.60	275	31.08	500	2,224	15°	30	3.39
MS-20271-B8	0	4	0.452	0.62	600	67.80	675	76.28	1,000	4,448	15°	90	10.17
MS-20271-B10	0	4	0.452	0.50	1,080	122.04	1,200	135.60	1,500	6,672	15°	162	18.31
MS-20271-B12	0	4	0.452	0.42	1,900	214.70	2,100	237.30	2,000	8,896	15°	285	32.21
MS-20271-B14	0	8	0.904	0.36	3,000	339.00	3,500	395.50	3,500	15,568	15°	450	50.85
MS-20271-B16	0	8	0.904	0.32	4,700	531.10	5,500	621.50	5,700	25,354	15°	705	79.67
MS-20271-B20	0	8	0.904	0.24	9,500	1,073.50	10,500	1,186.50	7,000	31,136	15°	1,425	161.03
MS-20271-B24	0	8	0.904	0.20	14,500	1,638.50	15,500	1,751.50	9,000	40,032	15°	2,175	245.78

Genuine Aircraft Hardware Co.

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Installation Bits

Manufactured in the USA by Zephyr Manufacturing.



TRI-WING [®]



PHILLIPS



SLOTTED



TORQ-SET [®]

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To Select: Consider Screw size, Shank size, and, Drive Type.

Standard Bits



Screw size	Shank Size	Phillips	Torq-Set	Tri-Wing	Slotted
#2	1/4	D1221AA	TS212-2	TW-1D	N/A
#4	1/4		TS212-4	TW-2D	H3211A
#6	1/4	D1222AA	TS212-6	TW-3D	H3212A
#8	1/4		TS212-8	TW-4D	H3213A
#10	1/4		TS212-10	TW-5D	
1/4	1/4	D1223AA	TS212-1/4	N/A	H3225A
#4 Shear Hd. C/S	1/4	N/A	TS212-3	TW-1D	N/A
#6 Shear Hd. C/S	1/4		TS212-5	TW-2D	
#8 Shear Hd. C/S	1/4		TS212-6	TW-3D	
#10 Shear Hd. C/S	1/4		TS212-8	TW-4D	
1/4 Shear Hd. C/S	1/4		TS212-10	TW-5D	
5/16 Shear Hd. C/S	1/4		TS212-1/4	TW6AD	
3/8 Shear Hd. C/S	5/16		TS212-5/16A	TW7B5D	
1/4	5/16	D1233AA	TS212-1/4A	TW-6AD	H3235A
5/16	5/16	D1234AA	TS212-5/16A	TW7B5D	H3236A
3/8	5/16	D1234AA	TS212-3/8A	TW8B5D	N/A

To Select: Consider Screw size, Shank size, and, Drive Type.

Power Bits



Screw size	Shank Size	Phillips	Torq-Set	Tri-Wing-ACR	Slotted
#4	1/4	E1101AA	TS273-4	N/A	E3101A
#6	1/4	E1102AA	TS273-6	TW-3R	E3103A
#8	1/4		TS273-8	TW-4R	E3104A
#10	1/4		TS273-10	TW-5R	E3105A
1/4	1/4	E1103AA	N/A	TW-6B4R	E3106A
#6 Shear Hd. C/S	1/4	N/A	TS273-4	N/A	E3102A
#8 Shear Hd. C/S	1/4		TS273-6	TW-3R	N/A
#10 Shear Hd. C/S	1/4		TS273-8	TW-3R	
1/4 Shear Hd. C/S	1/4		TS273-10	TW-5R	
1/4	5/16	E1203AA	TS170-1/4A	N/A	E3208A

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Genuine Aircraft Hardware Co.

High Speed Steel and Cobalt Drill Bits

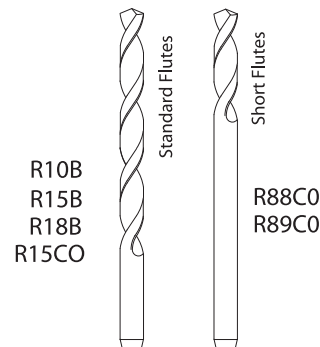


Jobber length

100% made in the United States of America.

Decimal	Fraction	# or Letter	PART NUMBERS	
			Hi-speed Steel	Cobalt
.0625	1/16		10204	58704
.0635		52	18252	58852
.0670		51	18251	58851
.0700		50	18250	58850
.0730		49	18249	58849
.0760		48	18248	Not Avail.
.0781	5/64		10205	58705
.0785		47	18247	Not Avail.
.0810		46	18246	58846
.0820		45	18245	58845
.0860		44	18244	58844
.0890		43	18243	58843
.0935		42	18242	58842
.0938	3/32		10206	58706
.0960		41	18241	58841
.0980		40	18240	58840
.0995		39	18239	58839
.1015		38	18238	Not Avail.
.1040		37	18237	Not Avail.
.1065		36	18236	58836
.1094	7/64		10207	58707
.1100		35	18235	Not Avail.
.1110		34	18234	Not Avail.
.1130		33	18233	Not Avail.
.1160		32	18232	Not Avail.
.1200		31	18231	58831
.1250	1/8		10208	58708
.1285		30	18230	58830
.1360		29	18229	58829
.1405		28	18228	58828
.1406	9/64		10209	58709
.1440		27	18227	58827
.1470		26	18226	58826
.1495		25	18225	58825
.1520		24	18224	58824
.1540		23	18223	Not Avail.
.1562	5/32		10240	58710
.1570		22	18222	58822
.1590		21	18221	58821
.1610		20	18220	58820
.1660		19	18219	Not Avail.
.1695		18	18218	Not Avail.
.1719	11/64		10211	58711
.1730		17	18217	Not Avail.
.1770		16	18216	58816
.1800		15	18215	Not Avail.
.1820		14	18214	Not Avail.
.1850		13	18213	58813
.1875	3/16		10212	58712
.1890		12	18212	58812
.1910		11	18211	58811
.1935		10	18210	58810
.1960		9	18209	58809

Decimal	Fraction	# or Letter	PART NUMBERS	
			Hi-speed Steel	Cobalt
.1990		8	18208	58808
.2010		7	18207	58807
.2031	13/64		10213	58713
.2040		6	18206	58806
.2055		5	18205	58805
.2090		4	18204	Not Avail.
.2130		3	18203	58803
.2188	7/32		10214	58714
.2210		2	18202	Not Avail.
.2280		1	18201	Not Avail.
.2340		A	15201	15301
.2344	15/64		10215	58715
.2380		B	15202	15302
.2420		C	15203	15303
.2460		D	15303	15304
.2500	1/4	E	10216	58716 / 15305
.2570		F	15206	15306
.2610		G	15207	15307
.2656	17/64		10217	58717
.2660		H	15208	15308
.2720		I	15209	15309
.2770		J	15210	15310
.2810		K	15211	15311
.2812	9/32		10218	58718
.2900		L	15212	18312
.2950		M	15213	15313
.2969	19/64		10219	58719
.3020		N	15214	15314
.3125	5/16		10220	58720
.3160		O	15215	15315
.3230		P	15216	15316
.3281	21/64		10221	58721
.3320		Q	15217	15317
.3390		R	15218	15318
.3438	11/32		10222	58722
.3480		S	15219	15319
.3580		T	15220	15320
.3594	23/64		10223	58723
.3680		U	15221	15321
.3750	3/8		10224	58724
.3770		V	15222	15322
.3860		W	15223	15323
.3906	25/64		10225	58725
.3970		X	15224	15324
.4040		Y	15225	15325
.4062	13/32		10226	58726
.4130		Z	15226	15326
.4219	27/64		10227	58727
.4375	7/16		10228	58728
.4531	29/64		10229	58729
.4688	15/32		10230	58730
.4844	31/64		10231	58731
.5000	1/2		10232	58732



Use the charts on the left to help in selection of the drills you require.

The High-Speed drill bits are all made to *NAS907 type B*. They have a *135 degree split point and a black surface treated finish*. The Precision Twist Drill series numbers are:

- Fractional **R10B**
- Alphabetical **R15B**
- Numerical **R18B**

They all have *standard flute lengths*.

The Cobalt Numerical and Fractional drill bits are made to *NAS907 type D*. The Alphabetical drill bits are made to *NAS907 type J*. They all have a *135 degree split point and a bronze colored oxide finish*. The Precision Twist Drill series numbers are:

- Fractional **R88CO**
- Numerical **R89CO**

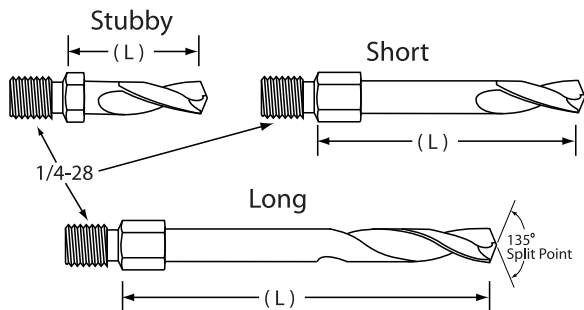
The above two have *screw machine length (short) flutes for greater rigidity*. The below series has *standard flute lengths*.

- Alphabetical **R15CO**

Genuine Aircraft Hardware Co.

High Speed Steel and Cobalt Drill Bits

Threaded Shank Drill Bits NAS965B, NAS965D & Other Sizes



Part Numbers for Threaded Drill Bits NAS965 (B) or (D) - (dia.) - (L)

B =Hex Shank, HSS Drill 135 deg. Split Point.
D =Square Shank, Cobalt Drill, 135deg, Split Point.

dia =See charts for available Diameters listed.
L =is the length code, see below ST,SH,LG,& EL.
ST = Stubby, between 1/2" & 5/8" depending on diameter.
SH =Short, between 1" & 1+1/4" depending on diameter.
LG =Long, all long drills are 2+1/8" regardless of diameter.
EL =Extra Long, limited sizes avail., all are 3" see charts

Specification	# or Ltr	Diameter	Stubby (L)	Short (L)	Long (L)	Xtra (L)
NAS965(B) or (D)	1/16	0.0625	1/2"	1"	2+1/8"	N/A
	#52	0.0635				
	#51	0.0670				
	#50	0.0700				
	#49	0.0730				
	#48	0.0760				
	5/64	0.0781				
	#47	0.0785				
	#46	0.0810				
	#45	0.0820				
	#44	0.0860				
	#43	0.0890				
	#42	0.0935				
	3/32	0.0938				
	#41	0.0960				
	#40	0.0980				
	#39	0.0995				
	#38	0.1015				
	#37	0.1040				
	#36	0.1065				
	7/64	0.1094				
	#35	0.1100				
	#34	0.1110				
	#33	0.1130				
	#32	0.1160				
	#31	0.1200				
	1/8	0.1250				
	#30	0.1285				
	#29	0.1360				
	#28	0.1405				
	#27	0.1406				
	9/64	0.1406				
	#26	0.1440				
#25	0.1495					
#24	0.1520					
#23	0.1540					
5/32	0.1563					
#22	0.1570					
#21	0.1590					
#20	0.1610					
#19	0.1660					
#18	0.1695					
11/64	0.1719					
#17	0.1730					
#16	0.1770					
#15	0.1800					
#14	0.1820					
#13	0.1850					

Example or Part Number.

NAS965B-#10-SH = Threaded, High Speed Steel, Drill Bit, Hex Shank, .1935 diameter, 1+1/4" length, 135 degree split point.

NOTE:

Diameters Greater than .2570 are not listed on the NAS965 Spec. Substitute "NAS965" with "THD135" SEE CHART

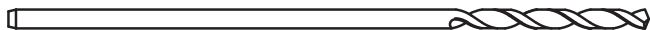
Specification	# or Ltr	Diameter	Stubby (L)	Short (L)	Long (L)	Xtra (L)
NAS965(B) or (D)	3/16	0.1875	9/16"	1+1/4"	2 1/8"	N/A
	#12	0.1890				
	#11	0.1910				
	#10	0.1935				
	#9	0.1960				
	#8	0.1990				
	#7	0.2010				
	13/64	0.2031	5/8"	1+1/4"	2 1/8"	N/A
	#6	0.2040				
	#5	0.2050				
	#4	0.2090				
	#3	0.2130				
	7/32	0.2188				
	#2	0.2210				
	#1	0.2280				
	A	0.2340				
	15/64	0.2344				
	B	0.2380				
C	0.2420					
D	0.2460					
1/4	0.2500					
F	0.2570					
THD135 (B) OR (D)	17/64	0.2656	5/8"	1+1/4"	2+1/8"	N/A
	9/32	0.2813				
	19/64	0.2969				
	5/16	0.3125				
	21/64	0.3281				
	11/32	0.3438				
	23/64	0.3594	N/A	1+1/4"	2+1/8"	N/A
	3/8	0.3750				
	25/64	0.3906				
	13/32	0.4063				
	27/64	0.4219				
	7/16	0.4375				
	29/64	0.4531				
	15/32	0.4688				
	31/64	0.4844				
1/2	0.5000					

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Genuine Aircraft Hardware Co.

Extension Drills and Jobber Length Drill Sets

501-6 CO501-6



501-12 CO501-12



PTD SERIES		501-6	501-12	CO501-6	CO501-12
Decimal	# Size	Part # Hi-Speed Steel 6" Length	Part # Hi-Speed Steel 12" Length	Part # Cobalt 6" Length	Part # Cobalt 12" Length
.0980	40	58140	59140	53740	52840
.1285	30	58130	59130	53730	52830
.1440	27	58127	59127	53727	52827
.1610	20	58120	59120	53720	52820
.1770	16	58116	59116	53716	52816
.1935	10	58110	59110	53710	52810
.1910	11	58111	59111	53711	52811
.1890	12	58112	59112	53712	52812
.2055	5	58105	59105	53705	52805

The long drill bits are made to NAS907 B (High-Speed) NAS907 J (Cobalt).

They have a 135 degree split point. The Hi-Speed have a black surface treated finish.

The Cobalt have a bronze oxide finish.

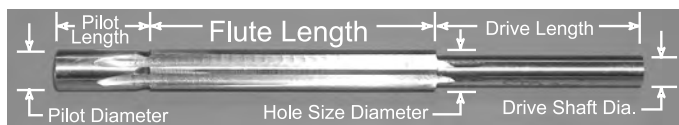


Jobber Length Drill Sets

All the sets that we stock are Hi-Speed steel with a black surface treated finish and a 118 degree conventional point for general purpose drilling.

Part # 99976 Wire Sizes 1 - 60 60 pieces in metal index	Part # 99977 Fractional Sizes 1/16 - 1/2 by 1/64ths 29 pieces in metal index
Part # 99981 Wire Sizes 61 - 80 20 pieces in metal index	Part # 99983 Letter Sizes A - Z 26 pieces in metal index

Precision Piloted Reamers



Threaded Shank Reamer

Standard	Long	Threaded	Application / Size
PPR-.1620	N/A	PPRT-.1620	Fits 5/32" diameters, Standard Size Hi-Lok and Close Tolerance Bolts
PPR-.1880	PPRL-.1880	PPRT-.1880	Fits 3/16" diameters, Standard Size Hi-Lok and Close Tolerance Bolts
PPR-.2010	PPRL-.2010	PPRT-.2010	Fits 3/16" diameters, 1st Oversize Hi-Lok and Close Tolerance Bolts
PPR-.2160	PPRL-.2160	PPRT-.2160	Fits 3/16" diameters, 2nd Oversize Hi-Lok and Close Tolerance Bolts
PPR-.2480	PPRL-.2480	PPRT-.2480	Fits 1/4" diameters, Standard Size Hi-Lok and Close Tolerance Bolts
PPR-.2636	PPRL-.2636	PPRT-.2636	Fits 1/4" diameters, 1st Oversize Hi-Lok and Close Tolerance Bolts
PPR-.2792	PPRL-.2792	PPRT-.2792	Fits 1/4" diameters, 2nd Oversize Hi-Lok and Close Tolerance Bolts
PPR-.3105	PPRL-.3105	PPRT-.3105	Fits 5/16" diameters, Standard Size Hi-Lok and Close Tolerance Bolts
PPR-.3261	PPRL-.3261	PPRT-.3261	Fits 5/16" diameters, 1st Oversize Hi-Lok and Close Tolerance Bolts
PPR-.3417	PPRL-.3417	PPRT-.3417	Fits 5/16" diameters, 2nd Oversize Hi-Lok and Close Tolerance Bolts
PPR-.3730	PPRL-.3730	N/A	Fits 3/8" diameters, Standard Size Hi-Lok and Close Tolerance Bolts
PPR-.3886	PPRL-.3886		Fits 3/8" diameters, 1st Oversize Hi-Lok and Close Tolerance Bolts
PPR-.4042	PPRL-.4042		Fits 3/8" diameters, 2nd Oversize Hi-Lok and Close Tolerance Bolts

These tools were specifically designed for Airbus aircraft manufacture and repair, they are also suitable for any requirement where a precision interference fit hole for a close tolerance fastener is desired. The M42 material has an (8%cobalt) content which is better suited for titanium and steel, they will easily fly through aluminum. They are all flute ground and ground between centers for absolute concentricity. The materials they will not cut very well are composite and carbon fiber (Kevlar etc) for this we recommend solid carbide. They can be chucked in a quality air drill if operated at lower speeds. All of the drive shanks are 3/16" or 1/4 inch, depending on the size of the reamer. These are the only solid piloted reamers (sizes.1880 an up) of this high of quality that we have been able to find. The Standard Length Reamers are manufactured in England to Airbus Specification STD-236F. The Long and Threaded Reamers are also manufactured to the same specification with the exceptions of the length and the drive style being threaded, They are made to provide .0005 or .0006 interference fit on the low end diameter tolerance of a close tolerance fastener such as a Hi-Lok, Hi-Tigue, or NAS close tolerance Bolts. The interference could be up to .0015 if the fastener is manufactured to the high end (large) of the diameter tolerances.

As with any precision tool that is going to be cutting or making holes in expensive, maybe irreplaceable parts, you should always make a test hole first in similar material, and determine if the final fit will be acceptable for your installation or usage.

PPR-DIA	.1620	.1880	.2010	.2160	.2480	.2636	.2792	.3105	.3261	.3417	.3730	.3886	.4042
Pilot Dia.	.151	.171	.187	.200	.233	.247	.262	.295	.309	.325	.358	.372	.387
Pilot Length	Approx 9/16" on all Reamers listed												
Hole Size	.1620	.1880	.2010	.2160	.2480	.2636	.2792	.3105	.3261	.3417	.3730	.3886	.4042
Flute Length	Approx 1+3/4" on Standard and Threaded Reamers. Approx 3" on Long Reamers.												
Drive Shaft Dia.	3/16" Nominal Diameter										1/4" Nominal Diameter		
Drive Length	Approx 1+1/4", except the threaded ones are only long enough to attach the drive threads.												

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Genuine Aircraft Hardware Co. Pneumatic Tools

We are a Distributor for Taylor Pneumatic Tool Company

Here is what we find the most useful for Aviation Maintenance and Repair.

We can supply many other items from taylorpneumatic.com at a decent discount. In many cases we can drop ship a Taylor item direct when terms are Open Account, Credit Card, or Pre-Paid

Important, All Air tools are 90psi. Max Operating Pressure

For many tasks, best results are when the tool is used with a regulated pressure less than 90 psi.

for Squeezers see page 229



T-5120

QR Set Holder



T-5210

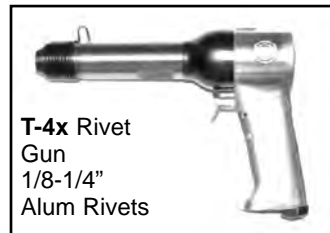
Beehive Holder



T-2x Rivet Gun
3/32-1/8"
Alum Rivets



T-3x Rivet Gun
3/32-3/16"
Alum Rivets



T-4x Rivet Gun
1/8-1/4"
Alum Rivets

We recommend using a quality air pressure regulator before the hose, for safe/best riveting



T-78881B

1/4" Palm Drill
2800 rpm.
w/Jacobs 1B chuck



T-7454HPR

3/4 HP. Heavy Duty,
Reversible Air Drill,
with 3/8 chuck.



T-9750, 90 degree Angle Drill
T-9751, 45 degree Angle Drill
(note) 45 degree drill is not shown.
1/3 HP. 2800 rpm, 1/4-28 drive.



T-7711, Nibbler

Rotable Head, 1/2 HP.
cuts 7/32 wide x 18gauge.



T-7825, 1/4" Dr. Air Ratchet, Compact



T-7826, 3/8" Dr. Air Ratchet, Compact



T-7015

Touchup Gun

8oz. Alum. Cup.
Perfect for shading spotting
and general touchup work.
2-4 cfm.

Adjustable Nozzle from Fan to small point. 40-90 psi Max.



T-1010 Pointed
Tip Grease Gun

T-7767RN600/(Size), (6-32), (8-32), or (10-32) 600 rpm
T-7767RN350/(Size), (10-24),(1/4-20), or (5/16-18) 350 rpm
Interchangeable Heads are available ! see below.

Head Assy' Part #'s
T-7767RN52-(letter)
(F) = 6-32 (G) = 8-32
(H) = 10-24 (I) = 10-32
(J) = 1/4-20 (K) = 5/16-18



Installs
Rivet-Nuts



T-7761

1/4" drive, Pneumatic Screwdriver, Internally Adjustable Clutch 30-70 in. #'s
Reversible, with Rear Exhaust. Only 8-7/8" long. Up to 1600 rpm.

Genuine Aircraft Hardware Co.

Pneumatic Tools

We sell Genuine Sioux Specialty Tools

for Squeezers see page 229

Here is what we find the most useful for Aviation Maintenance and Repair.

We Can supply many other items from www.siouxtools.com at a decent discount. In some cases we can drop ship the items direct when terms are open account, Credit Card or or Pre-Paid



DR1412

This little gem is my personal favorite.
1/3 Horsepower, 3600 rpm. Non-Reversible. I have one at home and it is so easy to use.

It is Quiet and light, yet torky enough to get most aircraft sheet metal work done quickly and cleanly! Tom Brink



21019A



DR1422

This is basically the same as the DR1412 without the right angle handle. 1/3 Horsepower, 3600 rpm. Non-Reversible. They both come standard with the smooth barrel 1/4" precision chuck.

This is the answer to your close quarter drilling issues, This series uses 1/4-28 threaded shank drill bits, such as NAS965 series.



Sioux 1AM1511

It will also drive smaller threaded reamers for the installation of close tolerance fasteners such as Hi-Lok's or NAS Bolts. The model shown goes up to 2200 free rpm at max recommended air pressure. Other speeds are available. The more speed the less torque.

1AM1111=800rpm
1AM1611=3400rpm

1AM1411=2200rpm
1AM17111=4300rpm

Same as the one above but with a 45 degree head instead of a 90 degree head.

I have never needed one, but I imagine that if you do need one, nothing else will do !

Comes in two speeds, one shown is 2800rpm The other is **1AM1141**, it is 800rpm.



Sioux 1AM1541

Genuine Aircraft Hardware Co.

Hose Reels by REELCRAFT

We are an Authorized dealer of all REELCRAFT products.

We stock items applicable to the Aircraft Industry, but have available their other products as well.

See www.reelcraft.com for the full and latest selection.



S Series

REELCRAFT

S Series

Economical, Lightweight and Easy to handle. This series is highly corrosion resistant because of its tough polypropylene construction. Everything about this series is easy, Easy to Mount, Easy to Clean, and Easy to use. An easy to install wire stand is available P/N SGA3650-OLP if you need this hose reel to be portable. Max working temp. 150 degrees F.

SGA3650 50ft x 3/8" id, Air/Water, 232 max psi.

Shipping weight, 23#

SGA3850 50ft x 1/2" id, Air/Water, 232 max psi.

Shipping weight, 27#

RT435-OLP

Air/Water, 300 psi. max, Reel Dia 16.5" Height 17+7/8", 5+3/4" wide.

Comes with 35ft of 1/4" id hose.

Replacement hose # 601001-35

Shipping Weight is 22#

RT650-OLP

Air/Water, 300 psi. max, Reel Dia 16.5" Height 17+7/8", 6+1/4" wide.

Comes with 50ft of 3/8" id hose.

Replacement hose # 601013-50

Shipping Weight is 29#



REELCRAFT

ReelTek series

A decent and cost effective alternative to the all metal 4000 and 5000 series. These are lightweight, versatile mounting, corrosion resistant, strong and virtually maintenance free. They also retract every time, even at full extension. You will see that though the reel spool is Heavy Duty plastic the rest is the Reelcraft standard, high quality powder coated steel.

Genuine Aircraft Hardware Co.

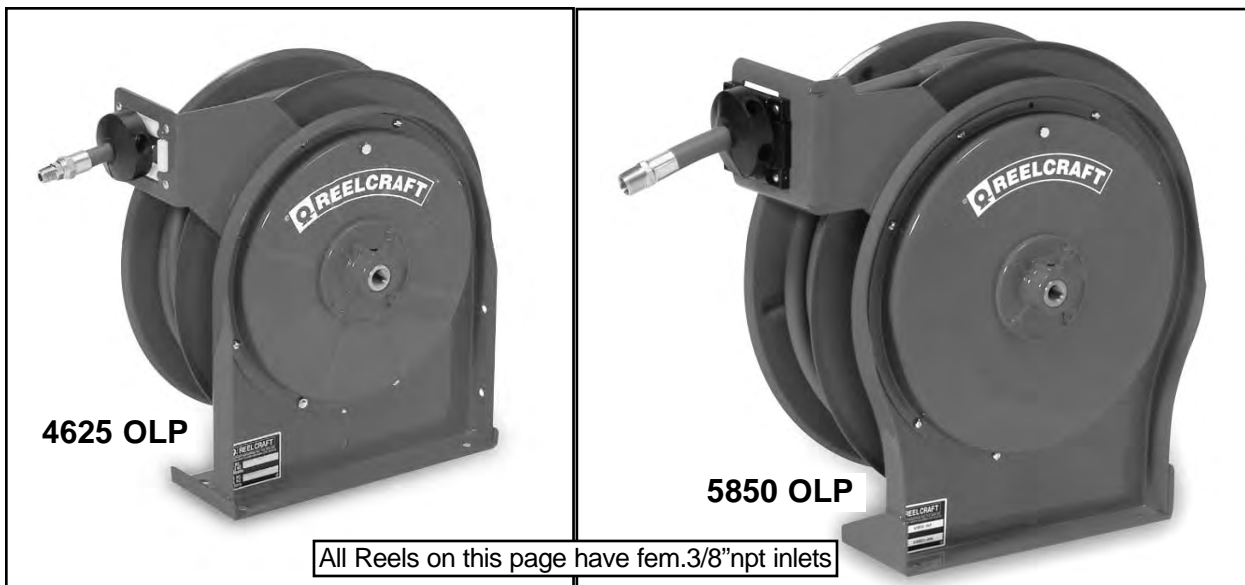
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Hose Reels by REELCRAFT

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See www.reelcraft.com for the full and latest selection.



Compact Speed Latch, 4000, 5000, 5005, Series

The 4000 and 5000 are smaller than the 5005 series. They are well suited for bench or equipment mounted work stations. The †5005 series are the big brothers, and being larger have more hose capacity, it does not have the cover option and is a little large to mount at a work bench.

All of the air / water reels work well with the overhead and wall mounting accessories.

Model / Item #	Weight #s	Hose id.	Hose Length	Max psi.	Outlet size	Dimensions" L x W x H
4425 OLP	17	1/4"	25 ft, supplied	300 psi.	1/4" male npt.	12.63 x 5.38 x 12.88
4435 OLP	19		35 ft, supplied			
4625 OLP	22	3/8"	35 ft, supplied			
† 5605 OLP	31		50 ft, NOT supplied			
† 5650 OLP	36		50 ft, supplied			
† A5850 OLP	44	1/2"		1/2" npt.	(56xx) 16.5 x 6 x 17.5 (5850) 16.5 x 7 x 17.5	

Above models are **Low Pressure Air / Water Reels**, Max Temp 150 deg F. Max Pressure 300 psi.

Below models are **Medium Pressure Oil Reels**, Max Temp 210 deg. F. Max Pressure (3/8") 2,250 / (1/2") 2,000 psi

OMP signifies "Open Medium Pressure" / **EMP** signifies "Enclosed Medium Pressure"

**model 5825, not for overhead or wall mounting. Mount on Floor or Floor Tank only.





Model / Item #	Weight #s	Hose id.	Hose Length	Max psi.	Outlet size	Dimensions" L x W x H
5630 OMP	30	3/8"	30 ft, supplied	2,250	3/8" male npt.	13.5 x 9 x 14.5
5630 EMP	38					15 x 9.75 x 18.5
** 5825 OMP	31	1/2"	25 ft, supplied	2,000	1/2" male npt.	13.5 x 9 x 14.5
** 5825 EMP	39					15 x 9.75 x 18.5

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Genuine Aircraft Hardware Co. REELCRAFT Accessories

We are an Authorized dealer of all REELCRAFT products.

We stock items applicable to the Aircraft Industry, but have available their other products as well. See www.reelcraft.com for the full and latest selection.

 <p style="text-align: center;">600626 Hang it on the wall</p> <p style="text-align: center;">not for overhead or floor mounting</p>	<p style="text-align: center;">Top Mounting Channels and Beam Clamps</p>  <p style="text-align: center;">600370 for 1 overhead mounted reel 600295 for 2 overhead mounted reels</p>
 <p style="text-align: center;">600230, used with 600370 or 600295 for mounting each reel overhead.</p>	 <p style="text-align: center;">600608 Mount it on the floor, or.. ..Hang it from the ceiling.</p>



Air/ Water Hose Assemblies
Replacement hose P/N's See Chart

Replacement Hose Assemblies / Partial list.

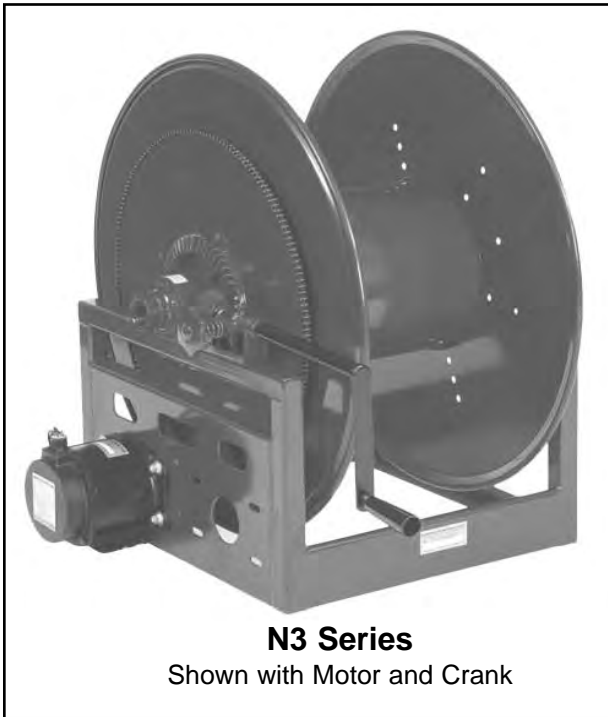
Low Pressure Air / Water							
Part #	I.D.	O.D.	Length	P.S.I.	Reinforcement	End Ftgs	Weight
601001-25	1/4"	.500"	25 feet	300 psi. max working pressure	Nylon Braid	1/4 x 1/4 male npt	3.0
601001-35			35 feet				3.2
601013-25	3/8	.640"	25 feet				4.5
S601013-35			35 feet				4.7
601013-50			50 feet			6.0	
601021-50	1/2"	.781"	50 feet			1/2 x 3/8 m/npt.	10.5
Medium Pressure Oil / Petroleum fluids							
16-260043	3/8"	.713	30 feet	2250 psi	1 layer wire	3/8 x 3/8 m/npt	7.1

Genuine Aircraft Hardware Co. REELCRAFT Fuel / Grounding

We are an Authorized dealer of all REELCRAFT products.

We stock items applicable to the Aircraft Industry, but have available their other products as well.

See www.reelcraft.com for the full and latest selection.



N3 Series

Shown with Motor and Crank



G3050Y
50 foot cable
2 clips on "Y"

G3050
50 foot cable
1 clip

The spring driven Static Discharge reels are used to ground equipment operating in hazardous atmospheres, such as fuel trucks or carts when transferring flammable materials. When properly clamped to ground, the static discharge reel dissipates static electrical buildup, reduces chances of sparking and the potential for explosion.

N3, Steel, Large Frame Hose Reel

Inlet: 2"

Straight victaulic x 1=1/2" npt female is standard

Gooseneck:

1+1/2" standard fem/male npt. others by order.

Options:

- a) 1+1/2" male npt. swivel joint may be specified at no extra cost.
- b) 2" victaulic 90deg elbow at additional cost.

An Aluminum fluid path is standard.

Specifications for Steel Large Frame Fuel Hose Reels

Item #	Hose Capacity (this type of reel does not come with hose)			Dimensions	Weight
	Hose I.D.	Hose O.D.	Hose Length	L x W x H	
Bevel Crank Reels, length dimension does not include crank.					
N33121BGLC	1+1/2"	2+1/16"	50 ft	25 x 22 x 26.5	89 lbs
N33161BGLC			75 ft	25 x 26 x 26.5	93 lbs
N34121BGLC			105 ft	31 x 22 x 32.5	92 lbs
Electric Motor Driven Reels, length dimension does not include crank.					
N33121XHLC	1+1/2"	2+1/16"	50 ft	25 x 25 x 26.5	131
N33161XHLC			75 ft	31 x 29 x 26.5	135
N34121XHLC			105 ft	31 x 25 x 32.5	134

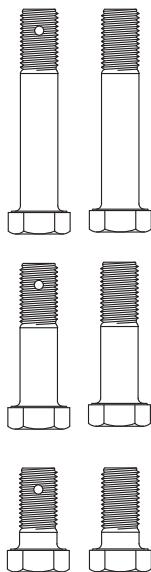
Genuine Aircraft Hardware Co.

Assortment Kits

AN Bolts, Short, Drilled and Undrilled

All kit boxes are made from virtually unbreakable K-Resin. They are translucent and have decent hinges. The boxes are made by Flambeau Products Corporation.

Look closely! this page represents 8 different Kits



For Details on Part Numbers See Pages 1 and 2

AN SHORT BOLT KITS

AN()-3A	AN()-4A	AN()-5A	AN()-6A	AN()-7A	AN()-10A
AN()-11A	AN()-12A	AN()-13A	AN()-14A	AN()-15A	AN()-16A
AN()-17A	AN()-20A	AN()-21A	AN()-22A	AN()-23A	AN()-24A

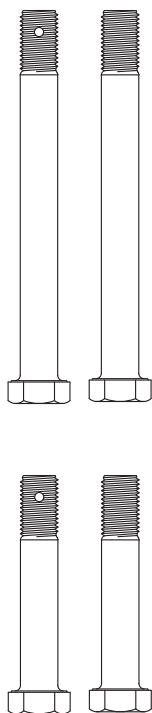
Part # is in Bold print	
AN3BAKIT	50ea AN3-3A thru 6A
AN3 Short Bolts	25ea AN3-7A thru 14A
Undrilled	10ea AN3-15A thru 24A
AN3SBDKIT	25ea AN3-3 thru -10
AN3 Short Bolts	10ea AN3-11 thru -20
Drilled for Cotter key	5ea AN3-21 thru AN3-24
AN4BAKIT	
AN4 Short Bolts	25ea AN4-3A thru 10A
Undrilled	10 ea AN4-11A thru 24A
AN4SBDKIT	
AN4 Short Bolts	10ea AN4-3 thru -20
Drilled for Cotter key	5 ea AN4-21 thru -24
AN5BAKIT	
AN5 Short Bolts	10ea AN5-4A thru 20A
Undrilled	5ea AN5-21A thru 24A
AN5SBDKIT	Drilled for Cotter key
AN5 Short Bolts	5ea AN5-4 thru -24
AN6BAKIT	
AN6 Short Bolts	10ea AN6-5A thru 14A
Undrilled	5ea AN6-15A thru 24A
AN6SBDKIT	Drilled for Cotter key
AN6 Short Bolts	5ea AN6-5 thru AN6-24

Assortment Kits

AN Bolts, Long, Drilled and Undrilled

All kit boxes are made from virtually unbreakable K-Resin. They are translucent and have decent hinges. The boxes are made by Flambeau Products Corporation.

Look closely! [this page represents 8 different Kits](#)



For Details on Part Numbers
See Pages **1 and 2**

Part # is in Bold print	AN3LBAKIT	Undrilled	5ea AN3-25A thru 40A
	AN3LBDKIT	Drilled for Cotter key	5ea AN3-25 thru -40
	AN4LBAKIT	Undrilled	5ea AN4-25A thru 40A
	AN4LBDKIT	Drilled for Cotter key	5ea AN4-25 thru -40
	AN5LBAKIT	Undrilled	5ea AN5-25A thru 40A
	AN5LBDKIT	Drilled for Cotter key	5ea AN5-25 thru -40
	AN6LBAKIT	Undrilled	5ea AN6-25A thru 40A
	AN6LBDKIT	Drilled for Cotter key	5ea AN6-25 thru -40

AN LONG BOLT KITS

AN()-25A	AN()-26A	AN()-27A	AN()-30A	AN()-31A	AN()-32A
AN()-33A	AN()-34A	AN()-35A	AN()-36A	AN()-37A	AN()-40A

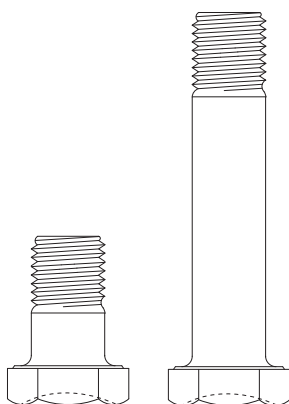
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Assortment Kits

NAS Hex Head Bolts, Short Thread

Look closely! this page represents 8 different Kits



For Details on Part Numbers See Page 13

NAS Short Thread, Dimpled Hex Head, Undrilled / Drilled, Bolt Kits

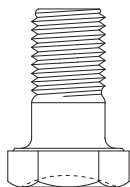
NAS620()-2	NAS620()-3	NAS620()-4	NAS620()-5	NAS620()-6	NAS620()-7
NAS620()-8	NAS620()-9	NAS620()-10	NAS620()-11	NAS620()-12	NAS620()-14
NAS620()-15	NAS620()-16	NAS620()-18	NAS620()-20	NAS620()-22	NAS620()-24

Part # is in Bold print			
NAS6203-KIT	25 ea	Dash 2 thru-16	
Undrilled	10 ea	Dash 18 thru-24	
NAS6203DKIT			
Drilled for Cotter key			
NAS6204-KIT	10 ea	All Sizes	
Undrilled			
NAS6204DKIT			
Drilled for Cotter key			
NAS6205-KIT			
Undrilled			
NAS6205DKIT			
Drilled for Cotter key	10 ea	Dash 2 thru-16	
NAS6206-KIT	5 ea	Dash 18 thru-24	
Undrilled			
NAS6206DKIT			
Drilled for Cotter key			

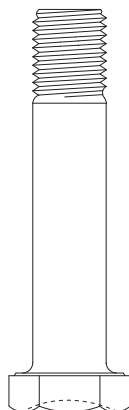
Assortment Kits

NAS Hex Head Bolts, Long Threads

Look closely! this page represents 8 different Kits



For Details on Part Numbers See Page 13



NAS Long Thread, Dimpled Hex Head, Undrilled / Drilled, Bolt Kits

Part # is in Bold print			
NAS 6603-KIT	25 ea	Dash 2 thru-16	
Undrilled	10 ea	Dash 18 thru-24	
NAS 6603DKIT			
Drilled for Cotter key			
NAS 6604-KIT	10 ea	All Sizes	
Undrilled			
NAS 6604DKIT			
Drilled for Cotter key			
NAS 6605-KIT			
Undrilled			
NAS 6605DKIT *			
Drilled for Cotter key	10 ea	Dash 2 thru-16	
NAS 6606-KIT	5 ea	Dash 18 thru-24	
Undrilled		*See Exceptions	
NAS 6606DKIT *			
Drilled for Cotter key			

NAS660()-2	NAS660()-3	NAS660()-4	NAS660()-5	NAS660()-6	NAS660()-7
NAS660()-8	NAS660()-9	NAS660()-10	NAS660()-11	NAS660()-12	NAS660()-14
NAS660()-15	NAS660()-16	NAS660()-18	NAS660()-20	NAS660()-22	NAS660()-24

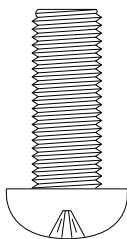
*Exceptions, NAS6605DKIT, will be minus -2D and -3D, but -13D and -17D are added. NAS6606DKIT, will be minus -2D, -3D and -4D, but -13D, -17D and -19D are added.

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Assortment Kits

Screws: MS35206 and MS35207

All kit boxes are made from virtually unbreakable K-Resin They are translucent and have decent hinges. The boxes are made by Flambeau Products Corporation



For Details on Part Numbers See **Page 35**

Kit part # is in **bold** print.
All quantities are 100 per part number.

Non Structural Screws, Panhead Steel

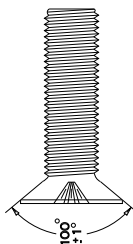
MS35206&7KIT

MS35206-213	MS35206-215	MS35206-216	MS35206-217	MS35206-218	MS35206-219
MS35206-226	MS35206-228	MS35206-229	MS35206-230	MS35206-231	MS35206-232
MS35206-241	MS35206-243	MS35206-244	MS35206-245	MS35206-246	MS35206-247
MS35207-259	MS35207-261	MS35207-262	MS35207-263	MS35207-264	MS35207-265

Assortment Kits

Screws: MS24693

All kit boxes are made from virtually unbreakable K-Resin They are translucent and have decent hinges. The boxes are made by Flambeau Products Corporation.



For Details on Part Numbers See Page 30

Kit part # is in **bold** print.
All quantities are 100 per part number.

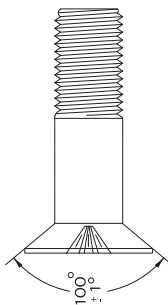
Non Structural Screws, 100 degree Countersunk

				MS24693KIT	
MS24693S2	MS24693S3	MS24693S4	MS24693S5	MS24693S6	MS24693S7
MS24693S25	MS24693S26	MS24693S27	MS24693S28	MS24693S29	MS24693S30
MS24693S47	MS24693S48	MS24693S49	MS24693S50	MS24693S51	MS24693S52
MS24693S270	MS24693S271	MS24693S272	MS24693S273	MS24693S274	MS24693S276

Assortment Kits

Screws: MS24694

All kit boxes are made from virtually unbreakable K-Resin They are translucent and have decent hinges. The boxes are made by Flambeau Products Corporation.



For Details on Part Numbers See Page 32

Kit part # is in **bold** print.
All quantities are 100 per part number.

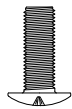
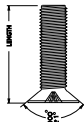
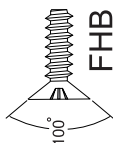
Structural 100 degree C/S, Alloy Steel

MS24694KIT					
MS24694S2	MS24694S3	MS24694S4	MS24694S5	MS24694S6	MS24694S7
MS24694S8	MS24694S9	MS24694S10	MS24694S11	MS24694S12	MS24694S13
MS24694S47	MS24694S48	MS24694S49	MS24694S50	MS24694S51	MS24694S52
MS24694S53	MS24694S54	MS24694S55	MS24694S56	MS24694S57	MS24694S58

Assortment Kits

Screws, Stainless Steel

All kit boxes are made from virtually unbreakable K-Resin They are translucent and have decent hinges. The boxes are made by Flambeau Products Corporation.



For Details on Part Numbers
See Page 29,30,47, & 50

Kit part # is in bold print.
All quantities are 100 per part number.

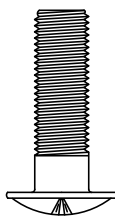
Assorted Popular Non-Structural Stainless Screws

Assorted Popular Non-Structural Stainless Screws		SCREWKIT,SS			
6RX1/2OHA,SS	8RX5/8OHA,SS	10RX5/8OHA,SS	MS24693C26	MS24693C50	MS24693C272
6RX1/2FHB,SS	8RX1/2FHB,SS	10RX1/2FHB,SS	MS24693C28	MS24693C51	MS24693C273
6RX1/2THA,SS	8RX1/2THA,SS	10RX1/2THA,SS	AN526C632R6	AN526C832R8	AN526C1032R8
6RX1/2THB,SS	8RX1/2THB,SS	10RX1/2THB,SS	AN526C632R8	AN526C832R10	AN526C1032R12

Assortment Kits

Screws: AN525

All kit boxes are made from virtually unbreakable K-Resin They are translucent and have decent hinges. The boxes are made by Flambeau Products Corporation.



For Details on Part Numbers See Page 28

Kit part # is in **bold** print.
Unless noted all quantities are 100 per part number.

Structural Washer Head Screws, Alloy

		AN525KIT	
AN525-832R6	AN525-832R10	AN525-10R6	AN525-10R10
AN525-832R7	AN525-832R12	AN525-10R7	AN525-10R11
AN525-832R8	AN525-832R14	AN525-10R8	AN525-10R12
AN525-832R9	AN525-832R16	AN525-10R9	AN525-10R13
		50ea	50ea
		AN525-10R14	AN525-10R15
		AN525-10R15	AN525-10R16
		AN525-10R16	AN525-10R17
		AN525-10R17	AN525-10R18
		AN525-10R18	AN525-10R19
		AN525-10R19	AN525-10R20
		AN525-10R20	AN525-10R21
		AN525-10R21	AN525-10R22
		AN525-10R22	AN525-10R23
		AN525-10R23	AN525-10R24
		AN525-10R24	AN525-10R25
		AN525-10R25	AN525-10R26
		AN525-10R26	AN525-10R27
		AN525-10R27	AN525-10R28
		AN525-10R28	AN525-10R29
		AN525-10R29	AN525-10R30
		AN525-10R30	AN525-10R31
		AN525-10R31	AN525-10R32
		AN525-10R32	AN525-10R33
		AN525-10R33	AN525-10R34
		AN525-10R34	AN525-10R35
		AN525-10R35	AN525-10R36
		AN525-10R36	AN525-10R37
		AN525-10R37	AN525-10R38
		AN525-10R38	AN525-10R39
		AN525-10R39	AN525-10R40
		AN525-10R40	AN525-10R41
		AN525-10R41	AN525-10R42
		AN525-10R42	AN525-10R43
		AN525-10R43	AN525-10R44
		AN525-10R44	AN525-10R45
		AN525-10R45	AN525-10R46
		AN525-10R46	AN525-10R47
		AN525-10R47	AN525-10R48
		AN525-10R48	AN525-10R49
		AN525-10R49	AN525-10R50
		AN525-10R50	AN525-10R51
		AN525-10R51	AN525-10R52
		AN525-10R52	AN525-10R53
		AN525-10R53	AN525-10R54
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		AN525-10R58	AN525-10R59
		AN525-10R59	AN525-10R60
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		AN525-10R63	AN525-10R64
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		AN525-10R194	AN525-10R195
		AN525-10R195	AN525-10R196
		AN525-10R196	AN525-10R197
		AN525-10R197	AN525-10R198
		AN525-10R198	AN525-10R199
		AN525-10R199	AN525-10R200

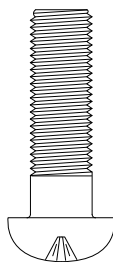
Genuine Aircraft Hardware Co.

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Assortment Kits

Screws: MS27039

All kit boxes are made from virtually unbreakable K-Resin They are translucent and have decent hinges. The boxes are made by Flambeau Products Corporation.



For Details on Part Numbers See Page 34

Kit part # is in **bold** print.
Unless noted all quantities are 100 per part number.

Structural Pan Head, Alloy		MS27039KIT	
MS27039-0806	MS27039-0810	MS27039-1-06	MS27039-1-10
MS27039-0807	MS27039-0812	MS27039-1-07	MS27039-1-11
MS27039-0808	50ea MS27039-0814	MS27039-1-08	MS27039-1-12
MS27039-0809	50ea MS27039-0816	MS27039-1-09	MS27039-1-13
		50ea MS27039-1-14	MS27039-4-10
		25ea MS27039-1-15	MS27039-4-12
		25ea MS27039-1-16	MS27039-4-14
		25ea MS27039-1-20	MS27039-4-16

Assortment Kits

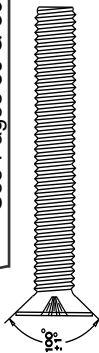
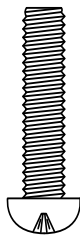
Screws: MS24693BB and MS35214, Both are Black Brass Instrument Screws.

All kit boxes are made from virtually unbreakable K-Resin

They are translucent and have decent hinges. The boxes are made by Flambeau Products Corporation.

For Details on Part Numbers See Pages 30 & 36

For Instrument Clip Nuts, see Pages 181, Reference page 285, Assortment Kits



Kit part # is in **bold print**.

Popular Black Brass Instrument Screws

INSTSCREWKIT

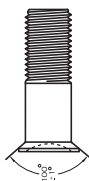
100 ea MS35214-14 Pan Head, 4-40 x 3/8	100 ea MS35214-28 Pan Head, 6-32 x 5/8	100 ea MS35214-43 Pan Head, 8-32 x 5/8	100 ea MS24693BB4 Countersunk, 4-40 x 3/8	100 ea MS24693BB29 Countersunk, 6-32 x 5/8	100 ea MS24693BB51 Countersunk, 8-32 x 5/8
100 ea MS35214-16 Pan Head, 4-40 x 1/2	100 ea MS35214-29 Pan Head, 6-32 x 3/4	50 ea MS35214-44 Pan Head, 8-32 x 3/4	100 ea MS24683BB6 Countersunk, 4-40 x 1/2	100 ea MS24683BB30 Countersunk, 6-32 x 3/4	100 ea MS24683BB52 Countersunk, 8-32 x 3/4
100 ea MS35214-18 Pan Head, 4-40 x 3/4	100 ea MS35214-31 Pan Head, 6-32 x 1"	50 ea MS35214-46 Pan Head, 8-32 x 1"	50 ea MS24683BB8 Countersunk, 4-40 x 3/4	100 ea MS24683BB32 Countersunk, 6-32 x 1"	100 ea MS24683BB54 Countersunk, 8-32 x 1"
50 ea MS35214-20 Pan Head, 4-40 x 1"	50 ea MS35214-32 Pan Head, 6-32 x 1+1/4	50 ea MS35214-47 Pan Head, 8-32 x 1+1/4	50 ea MS24683BB10 Countersunk, 4-40 x 1"	50 ea MS24683BB34 Countersunk, 6-32 x 1+1/4	25 ea MS24683BB56 Countersunk, 8-32 x 1+1/4

Assortment Kits

Screws: NAS1581 and NAS8602s, 03s, High Strength Reduced Head size, Countersunk Screws

All kit boxes are made from virtually unbreakable K-Resin

They are translucent and have decent hinges. The boxes are made by Flambeau Products Corporation.



NAS1581

For Details on Part Numbers See Page 43

Popular Shear Head Countersunk NAS Screws

NASSHEARHDKIT

50 ea	50 ea	50 ea	50 ea	25 ea	25 ea
NAS8602-2	NAS8602-3	NAS8602-4	NAS8602-5	NAS8602-6	NAS8602-8
Phillips, Alloy Steel	Phillips, Alloy Steel	Phillips, Alloy Steel	Phillips, Alloy Steel	Phillips, Alloy Steel	Phillips, Alloy Steel
50 ea	50 ea	50 ea	25 ea	25 ea	25 ea
NAS8603-2	NAS8603-3	NAS8603-4	NAS8603-5	NAS8603-6	NAS8603-8
Phillips, Alloy Steel	Phillips, Alloy Steel	Phillips, Alloy Steel	Phillips, Alloy Steel	Phillips, Alloy Steel	Phillips, Alloy Steel
50 ea	50 ea	50 ea	25 ea	25 ea	25 ea
NAS1581F3R2	NAS1581F3R3	NAS1581F3R4	NAS1581F3R5	NAS1581F3R6	NAS1581F3R8
Torq-Set, Alloy Steel	Torq-Set, Alloy Steel	Torq-Set, Alloy Steel	Torq-Set, Alloy Steel	Torq-Set, Alloy Steel	Torq-Set, Alloy Steel
25 ea	25 ea	25 ea	25 ea	25 ea	25 ea
NAS1581C3T2	NAS1581C3T3	NAS1581C3T4	NAS1581C3T5	NAS1581C3T6	NAS1581C3T8
Torq-Set, A-286 Cres	Torq-Set, A-286 Cres	Torq-Set, A-286 Cres	Torq-Set, A-286 Cres	Torq-Set, A-286 Cres	Torq-Set, A-286 Cres

Assortment Kits

Locknuts

All kit boxes are made from virtually unbreakable K-Resin They are translucent and have decent hinges. The boxes are made by Flambeau Products Corporation.



For Details on Part Numbers See Page 54

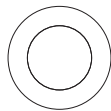
Kit part # is in **bold** print.

Locknuts, 250, 450, Degree					LOCKNUTKIT
100ea	100ea	100ea	50ea	25ea	
MS21042L06	MS21042L08	MS21042L3	MS21042L4	MS21042L5	MS21042L6
100ea	100ea	100ea	50ea	25ea	
MS21044N06	MS21044N08	MS21044N3	MS21044N4	MS21044N5	MS21044N6
100ea	100ea	100ea	50ea	25ea	
MS21045-06	MS21045-08	MS21045-3	MS21045-4	MS21045-5	MS21045-6
100ea	100ea	100ea	50ea	25ea	
MS21083N06	MS21083N08	MS21083N3	MS21083N4	MS21083N5	MS21083N6

Assortment Kits

Washers

All kit boxes are made from virtually unbreakable K-Resin They are translucent and have decent hinges. The boxes are made by Flambeau Products Corporation.



For Details on Part Numbers See Pages **59 & 68**

Kit part # is in **bold** print.

Popular Washers, Steel		100 per compartment		WASHERKIT	
AN960-6L	AN960-8L	AN960-10L	AN960-416L	AN960-516L	AN960-616L
NAS1149FN616P	NAS1149FN816P	NAS1149F0332P	NAS1149F0432P	NAS1149F0532P	NAS1149F0632P
AN960-6	AN960-8	AN960-10	AN960-416	AN960-516	AN960-616
NAS1149FN632P	NAS1149FN832P	NAS1149F0363P	NAS1149F0463P	NAS1149F0563P	NAS1149F0663P
MS353333-37	MS353333-38	MS353333-39	MS353333-40	MS353333-41	MS353333-42
MS353338-41	MS353338-42	MS353338-43	MS353338-44	MS353338-45	MS353338-46

Genuine Aircraft Hardware Co.

Assortment Kits Specialty Washers

For Details on Part Numbers
See Page 71

All kit boxes are made from virtually unbreakable K-Resin They are translucent and have decent hinges. The boxes are made by Flambeau Products Corporation.



Popular and very useful Specialty Washers

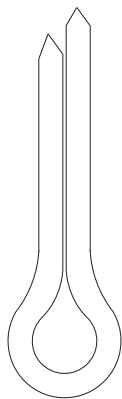
100ea NAS1169DD6 C/S, Large Area, Aluminum	100ea NAS1169DD8 C/S, Large Area, Aluminum	100ea NAS1169DD10 C/S, Large Area, Aluminum	100ea NAS390B6P C/S Upholstery, Nickel Plated	100ea #6 CUP SS SS, Upholstery	100ea #8 CUP SS SS, Upholstery
100ea #6 CSW,SS SH C/S, Large Area, Stainless	100ea #8 CSW,SS SH C/S, Large Area, Stainless	100ea #10 CSW,SS SH C/S, Large Area, Stainless	100ea A3236-012-24A C/S, Large Area, Cad 1 plated	100ea A3135-017-24A C/S, Large Area, Cad 1 plated	100ea A3235-020-24A C/S, Large Area, Cad 1 plated
500ea #6 VFW, WHITE White Vulcanized Fiber	500ea #8 VFW, WHITE White Vulcanized Fiber	500ea #10 VFW, WHITE White Vulcanized Fiber	500ea NAS1515H06L Nylon, Natural Color .031	500ea NAS1515H08L Nylon, Natural Color .031	500ea NAS1515H3L Nylon, Natural Color .031

SPCLWASHKIT

Assortment Kits

Cotter Pins

All kit boxes are made from virtually unbreakable K-Resin They are translucent and have decent hinges. The boxes are made by Flambeau Products Corporation.



For Details on Part Numbers See Page 25

Kit part # is in **bold print**.

Cotter Pins, Steel & Stainless

Cotter Pins, Steel & Stainless			COTTERKIT		
For AN 3 & 4 Bolts MS24665-132 100ea Steel	For AN 5 Bolts MS24665-210 100ea Steel	For Axle Nuts MS24665-361 50 ea Steel	For AN 3 & 4 Bolts MS24665-151 100ea Stainless	For AN 5 Bolts MS24665-229 100ea Stainless	For AN 8 Bolts MS24665-302 100ea Stainless
For AN 6 & 7 Bolts MS24665-283 100ea Steel	For AN 8 Bolts MS24665-285 100ea Steel		For AN 6 & 7 Bolts MS24665-300 100ea Stainless		

Assortment Kits

Nutplates

For Details on Part Numbers
See Pages 171 - 173

All kit boxes are made from virtually unbreakable K-Resin They are translucent and have decent hinges. The boxes are made by Flambeau Products Corporation.



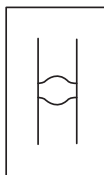
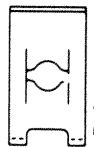
Kit part # is in **bold** print.

Nutplates, Popular Sizes, Steel

Nutplates, Popular Sizes, Steel				NUTPLATEKIT	
50 ea	25ea	10ea	50ea	25ea	50ea
MS21047L06	MS21051L06	MS21055L06	MS21059L06	MS21061L06	MS21069L06
50 ea	25ea	10ea	50ea	25ea	50ea
MS21047L08	MS21051L08	MS21055L08	MS21059L08	MS21061L08	MS21069L08
50 ea	25ea	10ea	50ea	25ea	50ea
MS21047L3	MS21051L3	MS21055L3	MS21059L3	MS21061L3	MS21069L3
25ea	10ea	10ea	25ea	10ea	10ea
MS21047L4	MS21051L4	MS21055L4	MS21059L4	MS21061L4	MS21069L4

Assortment Kits
Tinnerman Sheet Metal Nuts

For Details on Part Numbers See Page 46



Popular Stamped Sheet Metal Screw Nuts of Various Designs

TINNERMANKIT	
25 ea A6195-6Z1D Nutplate	25 ea A6191-8Z1D Nutplate
50 ea A1787-8Z1D U-Type	50 ea A1789-8Z1D U-Type
25 ea A1779-10Z1D Flat Type	50 ea A1777-6Z1D Flat Type
50 ea A1785-6Z1D U-Type	50 ea C7000-8-24 Flat Type Cad Plated
50 ea A1784-6Z1D U Type	50 ea A1776-4Z1D Flat Type
50 ea D1274-8-1 U-Type	50 ea A1786-8Z1D U-Type
50 ea A1758-10Z-1D U-Type	50 ea C8125-10-1 U-Type
25 ea A1348-8Z1D U-Type	25 ea A1787-10Z1D U-Type

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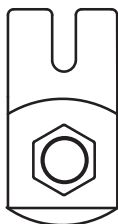
Genuine Aircraft Hardware Co.

Assortment Kits

Nut Clips

For Details on Part Numbers See Pages 180 & 181

All kit boxes are made from virtually unbreakable K-Resin They are translucent and have decent hinges. The boxes are made by Flambeau Products Corporation.



Nut Clips, 50 per p/n

CLIPNUTKIT

294667 6-32 clipnut .281 edge	130008 8-32 clipnut .375 edge	130007 8-32 clipnut .500 edge	130069 10-32 clipnut .375 edge	13100000-4 10-32 clipnut .500 edge	130068 10-32 clipnut .705 edge
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Kit part # is in **bold** print.

Instrument Mounting Nut Clips, 20 per p/n

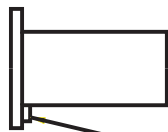
INSTNUTKIT

MS33737-9C	MS33737-11C	MS33737-13C	MS33737-14C	MS33737-15C	MS33737-16C
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Assortment Kits

Rivnuts

All kit boxes are made from virtually unbreakable K-Resin They are translucent and have decent hinges. The boxes are made by Flambeau Products Corporation.



KEY
IF APPLICABLE



KEY
IF APPLICABLE

For Details on Part Numbers
See Page 232

Kit part # is in **bold** print.
All quantities are 100 per part number.

Assorted Popular Aluminum Rivet Nuts

RIVNUTKIT

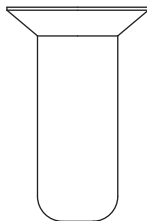
NAS1329A06K75 A6K75 50 ea	NAS1329A06-75 A6-75 50 ea	NAS1329A06K120 A6K120 50 ea	NAS1329A08K75 A8K75 50 ea	NAS1329A08-75 A8-75 50 ea	NAS1329A08K120 A8K120 25 ea
NAS1329A3K80 A10K80 25 ea	NAS1329A3-80 A10-80 25 ea	NAS1329A4K80 A2528K80 10 ea	NAS1330A06-106 A6-106 25 ea	NAS1330A08-106 A8-106 25 ea	NAS1330A3-116 A10-116 25 ea

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Assortment Kits

100 Deg., C/S Head Rivets 3s and 4s

All kit boxes are made from virtually unbreakable K-Resin They are translucent and have decent hinges. The boxes are made by Flambeau Products Corporation.



For Details on Part Numbers See Page 212

Kit part # is in **bold** print.

Unless noted quantities are 1/4 lb. per size.

Aluminum, 100deg C/S Head Rivets 3s & 4s

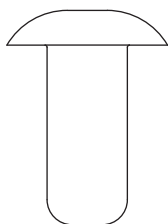
426AD3&4KIT

1/4# MS20426AD3-2	1/4# MS20426AD3-2.5	1/4# MS20426AD3-3	1/4# MS20426AD3-3.5	1/4# MS20426AD3-4	1/4# MS20426AD3-5
1/4# MS20426AD3-6	1/4# MS20426AD3-7	1/4# MS20426AD3-8	1/4# MS20426AD3-9	1/4# MS20426AD3-10	1/4# MS20426AD3-20
1/4# MS20426AD4-2	1/4# MS20426AD4-2.5	1/4# MS20426AD4-3	1/4# MS20426AD4-3.5	1/4# MS20426AD4-4	1/4# MS20426AD4-5
1/4# MS20426AD4-6	1/4# MS20426AD4-7	1/4# MS20426AD4-8	1/4# MS20426AD4-9	1/4# MS20426AD4-10	1/4# MS20426AD4-20

Assortment Kits

Universal Head Rivets 3s and 4s

All kit boxes are made from virtually unbreakable K-Resin They are translucent and have decent hinges. The boxes are made by Flambeau Products Corporation.



For Details on Part Numbers See Page 212

Kit part # is in **bold print**.
Unless noted quantities are 1/4 lb. per size.

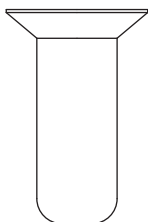
Aluminum, Universal Head Rivets 3s & 4s				470AD3&4KIT	
1/4# MS20470AD3-2	1/4# MS20470AD3-2.5	1/4# MS20470AD3-3	1/4# MS20470AD3-3.5	1/4# MS20470AD3-4	1/4# MS20470AD3-5
1/4# MS20470AD3-6	1/4# MS20470AD3-7	1/4# MS20470AD3-8	1/4# MS20470AD3-9	1/4# MS20470AD3-10	1/4# MS20470AD3-20
1/4# MS20470AD4-2	1/4# MS20470AD4-2.5	1/4# MS20470AD4-3	1/4# MS20470AD4-3.5	1/4# MS20470AD4-4	1/4# MS20470AD4-5
1/4# MS20470AD4-6	1/4# MS20470AD4-7	1/4# MS20470AD4-8	1/4# MS20470AD4-9	1/4# MS20470AD4-10	1/4# MS20470AD4-20

Genuine Aircraft Hardware Co.

Assortment Kits

100 Deg.. C/S Head Rivets 5s and 6s

All kit boxes are made from virtually unbreakable K-Resin They are translucent and have decent hinges. The boxes are made by Flambeau Products Corporation.



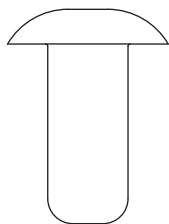
For Details on Part Numbers See Page 212

Kit part # in **bold print**.
Unless noted quantities are 1/4 lb. per size.

Aluminum, 100 deg C/S Head Rivets 5s & 6s				426AD5&6KIT	
1/4# MS20426AD5-3	1/4# MS20426AD5-3-5	1/4# MS20426AD5-4	1/4# MS20426AD5-5	1/4# MS20426AD5-6	1/4# MS20426AD5-7
1/4# MS20426AD5-8	1/4# MS20426AD5-9	1/4# MS20426AD5-10	1/4# MS20426AD5-12	1/4# MS20426AD5-16	1/4# MS20426AD5-20
1/4# MS20426AD6-4	1/4# MS20426AD6-5	1/4# MS20426AD6-6	1/4# MS20426AD6-7	1/4# MS20426AD6-8	1/4# MS20426AD6-9
1/4# MS20426AD6-10	1/4# MS20426AD6-12	1/4# MS20426AD6-14	1/4# MS20426AD6-16	1/4# MS20426AD6-18	1/4# MS20426AD6-20

Assortment Kits Universal Head Rivets 5s and 6s

All kit boxes are made from virtually unbreakable K-Resin They are translucent and have decent hinges. The boxes are made by Flambeau Products Corporation.



For Details on Part Numbers
See Page 212

Kit part # is in **bold** print.
Unless noted quantities are 1/4 lb. per size.

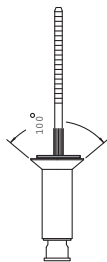
Aluminum, Universal Head Rivets 5s & 6s						470AD5&6KIT					
1/4#	MS20470AD5-3	1/4#	MS20470AD5-3.5	1/4#	MS20470AD5-4	1/4#	MS20470AD5-5	1/4#	MS20470AD5-6	1/4#	MS20470AD5-7
1/4#	MS20470AD5-8	1/4#	MS20470AD5-9	1/4#	MS20470AD5-10	1/4#	MS20470AD5-12	1/4#	MS20470AD5-16	1/4#	MS20470AD5-20
1/4#	MS20470AD6-4	1/4#	MS20470AD6-5	1/4#	MS20470AD6-6	1/4#	MS20470AD6-7	1/4#	MS20470AD6-8	1/4#	MS20470AD6-9
1/4#	MS20470AD6-10	1/4#	MS20470AD6-12	1/4#	MS20470AD6-14	1/4#	MS20470AD6-16	1/4#	MS20470AD6-18	1/4#	MS20470AD6-20

Genuine Aircraft Hardware Co.

Assortment Kits

Cherry-MAX® Rivets, 100 Deg.. Countersunk

All kit boxes are made from virtually unbreakable K-Resin They are translucent and have decent hinges. The boxes are made by Flambeau Products Corporation.



Kit part # is in **bold print**.

For Details on Part Numbers See Page 215

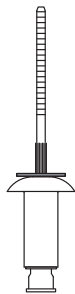
Cherry-MAX® Rivets, 100 degree Countersunk					426CMAKKIT	
50ea CR3212-4-2	25ea CR3212-5-2	10ea CR3212-6-2	50ea CR3242-4-2	25ea CR3242-5-2	10ea CR3242-6-2	
50ea CR3212-4-3	25ea CR3212-5-3	10ea CR3212-6-3	50ea CR3242-4-3	25ea CR3242-5-3	10ea CR3242-6-3	
50ea CR3212-4-4	25ea CR3212-5-4	10ea CR3212-6-4	50ea CR3242-4-4	25ea CR3242-5-4	10ea CR3242-6-4	
50ea CR3212-4-5	25ea CR3212-5-5	10ea CR3212-6-5	50ea CR3242-4-5	25ea CR3242-5-5	10ea CR3242-6-5	

Cherry-MAX® assortments are made up from new and traceable parts, but traceability is lost when bags are opened to make up kits. Cherry-MAX® is a registered trademark of Cherry Aerospace Fasteners, a division of Textron Inc.

Assortment Kits

Cherry-MAX® Rivets, Universal Head

All kit boxes are made from virtually unbreakable K-Resin They are translucent and have decent hinges. The boxes are made by Flambeau Products Corporation.



For Details on Part Numbers See Page 215

Kit part # is in **bold print**.

Cherry-MAX® Rivets, Universal Head		470CMAXKIT	
50ea CR3213-4-1	25ea CR3213-5-1	10ea CR3213-6-2	50ea CR3243-4-1
50ea CR3213-4-2	25ea CR3213-5-2	10ea CR3213-6-3	50ea CR3243-4-2
50ea CR3213-4-3	25ea CR3213-5-3	10ea CR3213-6-4	50ea CR3243-4-3
50ea CR3213-4-4	25ea CR3213-5-4	10ea CR3213-6-5	50ea CR3243-4-4
			25ea CR3243-5-1
			25ea CR3243-5-2
			25ea CR3243-5-3
			25ea CR3243-5-4
			10ea CR3243-6-2
			10ea CR3243-6-3
			10ea CR3243-6-4
			10ea CR3243-6-5

Cherry-MAX® assortments are made up from new and traceable parts, but traceability is lost when bags are opened to make up kits. Cherry-MAX® is a registered trademark of Cherry Aerospace Fasteners, a division of Textron Inc.

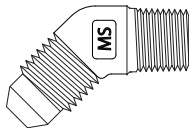
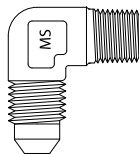
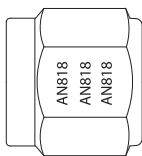
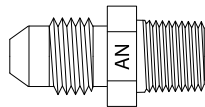
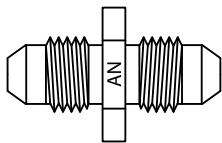
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Assortment Kits

AN/MS Hydraulic Fittings

For Details on Part Numbers See Pages 98 & 99

All kit boxes are made from virtually unbreakable K-Resin They are translucent and have decent hinges. The boxes are made by Flambeau Products Corporation.



Kit part # is in **bold print**.

Aluminum AN/MS Hydraulic Fittings

ANMSFTGKIT

5ea	AN815-3D	5ea	AN816-3D	25ea	AN818-3D	25ea	MS20819-3D	2ea	MS20822-3D	2ea	MS20823-3D
5ea	AN815-4D	5ea	AN816-4D	25ea	AN818-4D	25ea	MS20819-4D	2ea	MS20822-4D	2ea	MS20823-4D
5ea	AN815-6D	5ea	AN816-6D	10ea	AN818-6D	10ea	MS20819-6D	2ea	MS20822-6D	2ea	MS20823-6D
2ea	AN815-8D	3ea	AN816-8D	5ea	AN818-8D	5ea	MS20819-8D	2ea	MS20822-8D	2ea	MS20823-8D

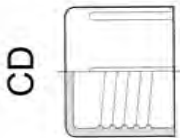
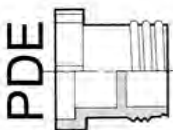
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Assortment Kits

Protective Caps and Plugs

For Details on Part Numbers See Pages 103 & 106

All kit boxes are made from virtually unbreakable K-Resin They are translucent and have decent hinges. The boxes are made by Flambeau Products Corporation.



Kit part # is in bold print.

Protective Caps and Plugs, Alum. & Plastic MS Flareless.

MSCAPLUGKIT

4 ea MS21913D3	4 ea MS21913D4	4 ea MS21913D5	4 ea MS21913D6	4 ea MS21913D8	2 ea MS21913D10
4 ea MS21914-3D	4 ea MS21914-4D	4 ea MS21914-5D	4 ea MS21914-6D	4 ea MS21914-8D	2 ea MS21914-10D
25ea CD3	25ea CD4	10ea CD5	10ea CD6	10ea CD8	5ea CD10
25ea PDE-3	25ea PDE-4	10ea PDE-5	10ea PDE-6	10ea PDE-8	5ea PDE-10

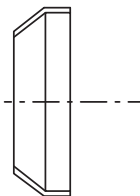
Assortment Kits

Fitting Gaskets for use when fitting Replacement is Impractical or cost prohibitive

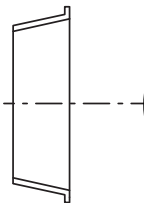
All kit boxes are made from virtually unbreakable K-Resin They are translucent and have decent hinges. The boxes are made by Flambeau Products Corporation.

for 37 degree,
cone type flares

AS4824



AS4825



for MS Flareless

For Details on Part Numbers
See Page 105

Kit part # is in bold print.

Conical Seals for 37degree Flares and MS Flareless Fittings

FLAVERKIT

5 ea AS4824A03 Seal, Aluminum	10 ea AS4824A04 Seal, Aluminum	5 ea AS4824A05 Seal, Aluminum	10 ea AS4824A06 Seal, Aluminum	10 ea AS4824A08 Seal, Aluminum	10 ea AS4824A10 Seal, Aluminum
5 ea AS4824C03 Seal, Copper	10 ea AS4824C04 Seal, Copper	5 ea AS4824C05 Seal, Copper	10 ea AS4824C06 Seal, Copper	10 ea AS4824C08 Seal, Copper	5 ea AS4824C10 Seal, Copper
10 ea AS4825A04 Seal, Aluminum	5 ea AS4825A05 Seal, Aluminum	10 ea AS4825A06 Seal, Aluminum	5 ea AS4825A08 Seal, Aluminum	5 ea AS4825A10 Seal, Aluminum	5 ea AS4825A12 Seal, Aluminum
10 ea AS4825N04 Seal, Nickel	5 ea AS4825N05 Seal, Nickel	10 ea AS4825N06 Seal, Nickel	5 ea AS4825N08 Seal, Nickel	5 ea AS4825N10 Seal, Nickel	5 ea AS4825N12 Seal, Nickel

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Genuine Aircraft Hardware Co.

Assortment Kits








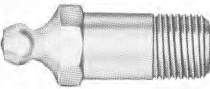




Protective Caps and Plugs

All kit boxes are made from virtually unbreakable K-Resin They are translucent and have decent hinges. The boxes are made by Flambeau Products Corporation.

Kit part # is in **bold print**.

For Details on Part Numbers See Page **94**

Popular Steel Grease Fittings

Popular Steel Grease Fittings		GREASEFTGKIT	
	AS15001-1P or # 1641 25 ea		AS15001-2P or # 1680 10 ea
	AS15001-3P or # 1637B1 10 ea		AS15001-3P or # 1911B1 10 ea
	AS15002-1P or # 1792B 10 ea		AS15002-2P or # 1770B1 5 ea
	AS15003-1P or # 1610BL 5 ea		AS15003-2P or # 1607B 5 ea
	AS15003-3P or # 1611B 5 ea		AS15003-4P or # 1688B 5 ea
	AS15003-5P or # 1612B 5 ea		AS15003-6P or # 1613B 5 ea

We will supply the AS part numbers when we have depleted the MS or Commercial equivalent numbers we have in stock.

Assortment Kits

Southco Quarter Turn Fasteners, Retainers & Washers

All kit boxes are made from virtually unbreakable K-Resin They are translucent and have decent hinges. The boxes are made by Flambeau Products Corporation.

For Details on Part Numbers See Page 241



Popular Southco Fastener Items

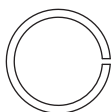
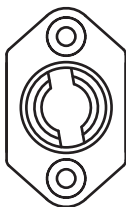
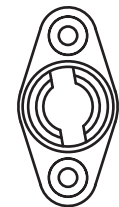
		SOUTHCOKIT			
Winged Stud	Winged Stud	C/Sunk Phillips	C/Sunk Phillips	C/Sunk Phillips	C/Sunk Phillips
82-12-100-16	82-12-120-16	82-28-120-16	82-28-140-16	82-28-160-16	82-28-180-16
5ea	10ea	10ea	10ea	10ea	10ea
Oval Hd Phillips	Oval Hd Phillips	Oval Hd Phillips	Oval Hd Phillips	Oval Hd Phillips	Oval Hd Phillips
82-19-080-16	82-19-100-16	82-19-120-16	82-19-140-16	82-19-160-16	82-19-180-16
10ea	10ea	20ea	10ea	10ea	10ea
Retainer	Wear Washer	Receptacle	Receptacle	Retainer	Wear Washer
82-32-101-20	82-46-101-41	82-35-295-15	82-35-302-15	85-34-101-20	85-46-101-41
50ea	25ea	10ea	10ea	25ea	25ea
Oval Hd Slotted	Oval Hd Slotted	Oval Hd Slotted	Oval Hd Slotted	Receptacle	Receptacle, Clip
85-11-140-16	85-11-200-16	85-11-220-16	85-11-240-16	85-35-295-15	85-47-101-15
10ea	10ea	10ea	10ea	10ea	10ea

Assortment Kits

Camloc® 4000 Series

All kit boxes are made from virtually unbreakable K-Resin They are translucent and have decent hinges. The boxes are made by Flambeau Products Corporation.

For Details on Part Numbers See Pages 237 - 240



Kit part # is in **bold print**.

Camloc 4000 Series, Phillips Drive

CAMLOCKIT

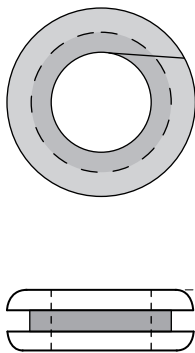
5ea	5ea	5ea	5ea	5ea	5ea	10ea
40S5-2	40S5-3	40S5-4	40S5-5	40S5-6	40S5-7	4002NS
Stud, Steel	Stud, Steel	Stud, Steel	Stud, Steel	Stud, Steel	Stud, Steel	Grom, Stainless
5ea	5ea	5ea	5ea	5ea	5ea	10ea
40S5-6	40S5-7	40S5-8	40S5-10	40S5-10	4002-O	4002-OS
Stud, Steel	Stud, Steel	Stud, Steel	Stud, Steel	Stud, Steel	Grom, Steel	Grom, Stainless
5ea	5ea	5ea	5ea	5ea	5ea	10ea
40S5-2S	40S5-3S	40S5-4S	40S5-5S	40S5-5S	4002-G	4002-GS
Stud, Stainless	Stud, Stainless	Stud, Stainless	Stud, Stainless	Stud, Stainless	Grom, Steel	Grom, Stainless
5ea	5ea	5ea	10ea	10ea	10ea	100ea
40S5-6S	40S5-7S	40S5-8S	214-16N	214-16N	244-16	R4G
Stud, Stainless	Stud, Stainless	Stud, Stainless	Receptacle Fixed	Receptacle Fixed	Receptacle Floating	Snap Ring

Assortment Kits

Rubber Grommets

For Details on Part Numbers See Pages **198 - 200**

All kit boxes are made from virtually unbreakable K-Resin They are translucent and have decent hinges. The boxes are made by Flambeau Products Corporation.



Kit part # is in **bold** print.

Rubber Grommets, MS 35489 Series

				MS 35489KIT	
10ea	10ea	10ea	10ea	10ea	10ea
MS35489-3	MS35489-4	MS35489-134	MS35489-5	MS35489-6	MS35489-7
Was AN 931-2-16	Was AN 931-3-5	Was AN 931-3-9	Was AN 931-3-10	Was AN 931-4-7	Was AN 931-4-12
10ea	10ea	10ea	10ea	10ea	10ea
MS35489-8	MS35489-9	MS35489-10	MS35489-118	MS35489-11	MS35489-12
Was AN 931-4-16	Was AN 931-5-9	Was AN 931-5-12	Was AN 931-5-13	Was AN 931-6-10	Was AN 931-6-16
10ea	10ea	5ea	10ea	10ea	10ea
MS35489-13	MS35489-14	MS35489-15	MS35489-16	MS35489-17	MS35489-18
Was AN 931-7-11	Was AN 931-8-13	Was AN 931-8-20	Was AN 931-9-13	Was AN 931-10-14	Was AN 931-10-20
5ea	5ea	10ea	4ea	3ea	2ea
MS35489-19	MS35489-20	MS35489-135	MS35489-21	MS35489-22	MS35489-23
Was AN 931-11-16	Was AN 931-12-17	Was AN 931-12-20	Was AN 931-12-23	Was AN 931-14-20	Was AN 931-16-22

Genuine Aircraft Hardware Co.

Make Your Own Assortments

With These Sturdy Boxes

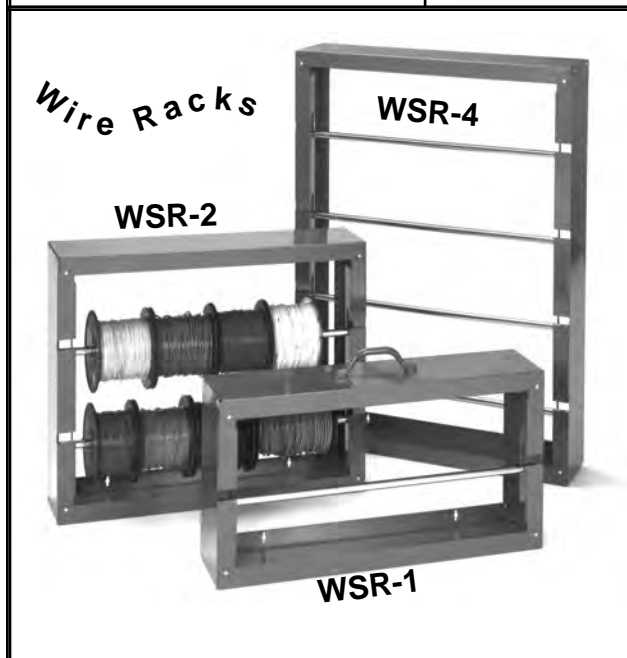
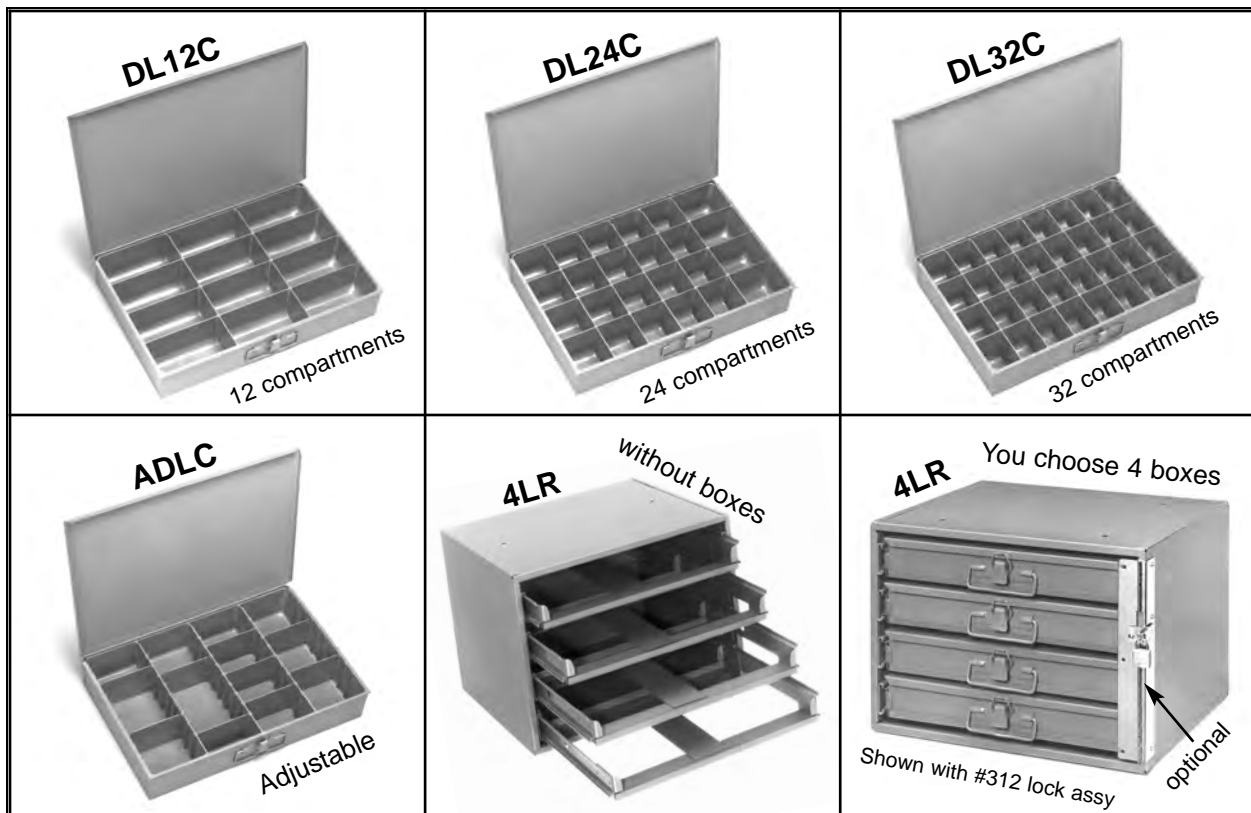
All kit boxes are made from virtually unbreakable K-Resin they are translucent and have decent hinges.
The boxes are made by Flambeau Products Corporation



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Genuine Aircraft Hardware Co. Storage Boxes & Wire Racks

Manufactured by the Durham Manufacturing Co.



DURHAM Industrial / Commercial Large Scoop Compartment Boxes (DL..C) and Box Racks (4LR). Are part of a storage system especially designed for storage of items such as small parts, hardware, and related items.

The boxes are 18"w x 12"d x 3"h and weigh approx. 8# each. They have a gray baked enamel finish and are made of prime cold rolled steel.

We are a distributor for **DURHAM MFG. Industrial / Commercial items**, and while we show what has been popular for our customers we can supply other items found on their website

www.durhammfg.com

Genuine Aircraft Hardware Co.

Shop Supplies, short list, check our website for additional Items

Loctite Thread Locking Compound



50 ML



10 ML

222MS Loctite
Compound is ideal for fasteners that are 1/4" in diameter and smaller.
Temp Range-65f to 300f
Torque Break = 53 in lb.
Color is PURPLE
Full cure, 24hrs @ 77f
Order by Item #'s
LOCTITE 22MS-10ML
LOCTITE 22MS-50ML

243 Loctite
Compound is ideal for fasteners that are 1/4" to 3/4 inch in diameter.
Temp Range-65f to 300f
Torque Break =180 in lb.
Color is BLUE
Full cure, 24hrs @ 77f
Order by Item #'s
LOCTITE 243-10ML
LOCTITE 243-50ML

266 High Temp Loctite
Compound is ideal for fasteners that are 1/4" to 3/4 inch in diameter.
Temp Range-65f to 450f
Torque Break =270 in lb.
Color is RED/ORANGE
Full cure, 24hrs @ 77f
Order by Item #'s
LOCTITE 266-10ML
LOCTITE 266-50ML

ScotchBrite Abrasive Pads.



The Industry Standard for Flexible and Durable Abrasive Pads. Scotch-Brite works exceptionally well for cleaning and smoothing Aluminum Panels and their edges.

Wet or Dry, these durable Abrasive Pads hold up to vigorous handling, .

We sell these by ea. and by the box/20

Order using Item Numbers:

3M-ABR-7447 for the fine (Maroon) pads.

3M-ABR-7448 for the ultra fine (Gray) pads.

P/N	size	Description	Thickness
HDL-	(size)	= Heavy Duty & Long Latex	14 mil
RDL-	(size)	=Regular Duty Latex	8 mil
LDL-	(size)	=Lite Duty Latex <i>*lightly powdered*</i>	5 mil
GPV-	(size)	=General Purple Synthetic Vinyl	5 mil
SGL-	(size)	=Shop Grade Latex	5 mil
RDN-	(size)	=Regular Duty Nitrile	5 mil
HDN-	(size)	=Heavy Duty & Long Nitrile	8 mil
RBL-	(size)	=Regular Black Latex	5 mil

Example; HDN-X= Heavy Duty, Long, Extra Large, Nitrile Gloves, 8 mil thick

All gloves are **Powder Free** unless noted.

Warning: Prolonged contact with Latex can produce allergic reactions in some individuals.

Caution: Do not use on or near extreme temperatures, these gloves do not protect the user from heat or cold.

Disposable Gloves

Size	Description
(M)	= Medium
(L)	= Large
(X)	= Extra Large



Packaged in 100's
Except Long, 50's

Genuine Aircraft Hardware Co.
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For additional Items that may have been added after this book was published see

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Fastener Math and Terminology

There are some things about dealing with fasteners that will be easier if you understand the terms and mathematics associated with them. To many of you this will be a review, to some of you it will be new. It is my hope that it will help all of you, at least with your fastener aspects.

Terminology

Grip Length:

The grip length of a fastener is always the unthreaded (solid) part of the shank. The grip length does not include the head on a protruding head fastener, however the grip length does include the head on a countersunk head fastener. The Grip of a fastener starts at the head (included or excluded as applicable) and continues to the full cylindrical portion of the shank. The Grip Length does not include the Transition Area or the Threaded part of the fastener. In the case where the fastener has no threads but has a cross-drilled hole for retention, such as a clevis pin, then the grip ends at the beginning of the hole. Some fasteners such as Hi-Shear Rivets or Lockbolts with collars have neither hole nor threads. In this case the grip ends at the end of the full cylindrical portion of the shank or a little earlier if the manufacturer allows room for collar installation. Fasteners that are fully threaded *do not* have a grip length.

Shank:

The unthreaded part of a fastener. The shank is always a part of, if not all of the Grip Length of the fastener. The shank does not include the head of the fastener.

Transition Area:

The part of the fastener where the Shank starts to reduce in dimension to allow the threads to be formed. The Transition Area includes the imperfect threads and extends just until the threads are fully formed.

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Threads:

This is the part of the fastener that is best described as a helical formed triangular strip. On a male fastener such as a bolt or screw it usually starts at the end of the grip or just under the Head of the fastener. The threads are formed by a process called rolling or by an older process called cutting. The threads are the part of the male fastener that the nut screws or threads onto by rotating its matching internal threads until both the nut and the fastener have fully engaged.

Thread Area:

This includes the Transition area (between the Shank and the Threads) and the Threads. This is measured from the end of the full cylindrical portion of the shank (where the Grip ends), to the end of the fastener.

Overall Length:

The overall length is the sum of the Grip Length, The Transition Area and the Thread Length. The Overall length of a fastener starts at the head (included or excluded as applicable) and continues to the end of the fastener. The Overall Length does include the Grip, the Transition Area, and the Threaded part of the fastener. In the case where the fastener has no threads but has a cross-drilled hole for retention, such as a clevis pin, then the Overall Length ends at the end of the fastener regardless of the hole.

Decimal/Fractional Charts have been made in many styles and forms. Sometimes the Chart helps to put things into perspective. Remember, people think about values in many different ways.

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Fastener Math

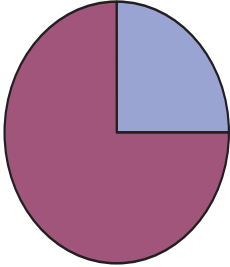
For some of you this will be a review, for some it will be a numerical revelation. So in either case be patient, with yourself or with me whichever the case may be.

It may help some people to refer to the Summary on page 7 for the formulas without the instructions.

Some of us were raised in times when math was stressed more in school and some of us only learned how to add and subtract. For this reason we will do all of our exercises using a calculator or Decimal/fractional chart.

The first thing is to realize that there are so many different ways a number or a fraction may be written or looked at that it surprises most people. For example:

One quarter could be looked at in so many ways, and some people are accustomed to relating to it in only one way. See below:

$\frac{1}{4}$	One Fourth	.250		<table border="1"><tr><td>■ One Quarter</td></tr><tr><td>■ Remainder</td></tr></table>	■ One Quarter	■ Remainder
■ One Quarter						
■ Remainder						
$1/4$	$2/8$	$4/16$	$8/32$	$16/64$		

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Fractional Terms

The number in a fraction that is to the left of the division sign \div , or /, or on the top of the division line as in $\frac{1}{16}$ is called the **numerator**.

The number on the bottom or the right is called the **denominator**.

Examples of one 16th are: $\frac{1}{16}$, 1/16 or $1 \div 16$.

Converting Numbers with Decimals into Fractions

- 1) Select the desired denominator you are looking for such as 16^{ths} of an inch, which is a useful denominator because most of the MS and NAS bolts grip lengths are measured in 16^{ths}.
- 2) Using the calculator multiply your decimal figure by your fractional denominator.

For an example we will use .8125 for our decimal figure.

On the calculator input .8125, then the x key, then input 16, then the = key.

The answer you should have come up with is 13 on the display of the calculator.

Or as we will complete the mathematical statement on paper, 13/16^{ths} of an inch.

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Converting Fractions into Decimals

- 1) Using the calculator enter the numerator, then the \div key, then enter the denominator, then the = key. This will give you a decimal number.
- 2) As an example we will convert the fraction $\frac{13}{16}$ or 13/16 or 13 \div 16.
- 3) Using the calculator enter 13, then \div , then 16, then =

The answer you should have come up with is .8125, that is the decimal equivalent for 13/16^{ths}.

Decimal/Fractional Charts

For the ease of use and to cover situations where a calculator is not handy, Decimal/Fractional Charts have been made in many styles and forms. Sometimes the Chart helps to put things into perspective. Remember, people think about values in many different ways.

Please see the Decimal/Fraction Chart on the following page.

Notice that it goes all the way to 1/64^{ths}.

Please see the Thread Pitch Chart on page Inf8 It has information about Diameters Pitches and Tap Hole Drill Sizes.

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Decimal / Fractional Chart

Decimal	Fraction	1/64	1/32	1/16	1/8	1/4	1/2
0.0156	1/64	1					
0.0313	1/32	2	1				
0.0469	3/64	3					
0.0625	1/16	4	2	1			
0.0781	5/64	5					
0.0938	3/32	6	3				
0.1094	7/64	7					
0.1250	1/8	8	4	2	1		
0.1406	9/64	9					
0.1563	5/32	10	5				
0.1719	11/64	11					
0.1875	3/16	12	6	3			
0.2031	13/64	13					
0.2188	7/32	14	7				
0.2344	15/64	15					
0.2500	1/4	16	8	4	2	1	
0.2656	17/64	17					
0.2813	9/32	18	9				
0.2969	19/64	19					
0.3125	5/16	20	10	5			
0.3281	21/64	21					
0.3438	11/32	22	11				
0.3594	23/64	23					
0.3750	3/8	24	12	6	3		
0.3906	25/64	25					
0.4063	13/32	26	13				
0.4219	27/64	27					
0.4375	7/16	28	14	7			
0.4531	29/64	29					
0.4688	15/32	30	15				
0.4844	31/64	31					
0.5000	1/2	32	16	8	4	2	1
0.5156	33/64	33					
0.5313	17/32	34	17				
0.5469	35/64	35					
0.5625	9/16	36	18	9			
0.5781	37/64	37					
0.5938	19/32	38	19				
0.6094	39/64	39					
0.6250	5/8	40	20	10	5		
0.6406	41/64	41					
0.6563	21/32	42	21				
0.6719	43/64	43					
0.6875	11/16	44	22	11			
0.7031	45/64	45					
0.7188	23/32	46	23				
0.7344	47/64	47					
0.7500	3/4	48	24	12	6	3	
0.7656	49/64	49					
0.7813	25/32	50	25				
0.7969	51/64	51					
0.8125	13/16	52	26	13			
0.8281	53/64	53					
0.8438	27/32	54	27				
0.8594	55/64	55					
0.8750	7/8	56	28	14	7		
0.8906	57/64	57					
0.9063	29/32	58	29				
0.9219	59/64	59					
0.9375	15/16	60	30	15			
0.9531	61/64	61					
0.9688	31/32	62	31				
0.9844	63/64	63					
1.0000	1	64	32	16	8	4	2

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Summary

The Overall Length of a fastener is:

$$\begin{array}{r} \text{Grip Length} \\ + \text{ Transition Area} \\ \pm \text{ Thread Length} \\ \hline \text{Overall Length} \end{array}$$

To convert decimals into fractions, multiply the decimal by the desired fractional denominator. This will become the numerator.

Decimal x Fractional Denominator = Numerator. Or...

Multiples of the Denominator = Numerator

To convert fractions into decimals, divide the numerator by the denominator.

$$\frac{\text{Numerator}}{\text{Denominator}} = \text{Decimal Number}$$

Additional Information:

Whenever, in a fraction, the numerator is larger than the denominator, then the value is greater than one. This is called an Improper Fraction.

You will need to simplify it by separating the Whole numbers out and simplifying or converting the remaining proper fraction.

$$\begin{array}{l} \text{l.e. } 24/16 = 1.5 \\ \text{Compare} \end{array} \quad \text{or} \quad \frac{24}{16} = \frac{((16/16) + (8/16))}{1} \\ 1.5 = 1 + .5$$

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Thread Size Information Chart.

Helpful Hints:

Use the chart below to help determine what standard thread sizes are available.

The thread sizes that are more commonly used are in **bold text**.

The sizes that are infrequently used are **not** in bold text. They were designed and used at one time, but after a while they were found to not be as useful as they thought they might be.

They may still be used today, but typically that would be in *limited* applications.

Under the Columns *Fine Thread* and *Course Thread* are the *thread sizes*, the number before the dash is the *Nominal Diameter*, the number after the dash is the # of *threads per inch*.

The Drill Sizes listed may have more than one size, the first # allows for a smaller hole and thus a slightly greater percent of thread engagement once the hole is drilled and the threads are tapped.

The rest of the chart should be self explanatory.

Style >	Fine Thread	Dril Sizes	Course Thread	Dril Size	Approx Thread
Nom Dia	Identifier #	for tap holes (FINE)	Identifier #	for tap holes (COURSE)	Outside Dia. Inches
#2	2-64	#50 or 51	2-56	#50 or 51	.086
#3	3-56	#45 or 46	3-48	#48 or 5/64	.099
#4	4-48	#42 or 2.35mm	4-40	#43 or 44	.112
#5	5-44	#37 or 38	5-40	#39 or 40	.125
#6	6-40	#33 or 34	6-32	#36 or 7/64	.138
#8	8-36	#29 or 3.5mm	8-32	3.4mm or 29	.164
#10	10-32	#21 or 22	10-24	#25 or 26	.190
#12	12-28	#15 or 16	12-24	#16 or 17	.216
1/4	1/4-28	#3	1/4-20	#7 or 8	.250
5/16	5/16-24	H or I	5/16-18	F	.312
3/8	3/8-24	21/64 or Q	3/8-16	5/16 or O	.375
7/16	7/16-20	W or 25/64	7/16-14	23/64 or U	.437
1/2	1/2-20	29/64	1/2-13	27/64 or 10.5mm	.500
9/16	9/16-18	1/2	9/16-12	31/64	.563
5/8	5/8-18	9/16	5/8-11	17/32	.625
3/4	3/4-16	11/16	3/4-10	21/32	.750
7/8	7/8-14	27/32	7/8-9	49/64	.875
1" (old)	1"-14	59/64	1"-8	7/8	1.00
1" (new)	1"-12	29/32			

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