

**STANDARDS OF WORKMANSHIP AND QUALITY
FOR MANUFACTURED PARTS**

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STANDARDS OF WORKMANSHIP AND QUALITY FOR MANUFACTURED PARTS

1 INTRODUCTION

a) Purpose and Scope

This specification is intended to establish minimum standards of workmanship acceptable to EDO, and our customers. It is issued in order to clarify areas not specifically called out on drawings and/or specifications but which are essential to the acceptable quality of EDO's products. **In the event of conflict between this standard and any drawing or engineering specified requirement, the latter shall take precedence.** Any reference to a military or commercial specification in this report or on any EDO engineering document shall be considered to refer to the most recent revision of the cited specification. Furthermore, should any cited specification become inactive and replaced by another specification, the latter shall apply.

b) Application

The provisions of this standard, together with all references and appendices hereto, shall be mandatory on deliverable parts, assemblies, sub-assemblies and complete equipment.

c) Compliance

The decision as to satisfactory compliance with the provisions of this report shall rest with the Quality Assurance Department of EDO, and where applicable, through Material Review Board action. Compliance will be established by inspection and/or test functions, the frequency and location of which shall be at the discretion of the EDO Quality Assurance Department.

d) Alternate Materials and Alternate Methods of Manufacture

All parts shall be fabricated as specified on the drawing. Alternate materials and/or methods of manufacture, unless specifically permitted on the drawing, require EDO engineering approval *prior* to implementation. This approval shall take the form of a drawing change, or shall be stated on EDO's purchase order.

2 DIMENSIONS

- a) Reference (Ref.) dimensions are not to be used for checking by inspection, but are to serve as a guide.
- b) Interpret drawing in accordance with MIL-STD-100 and ASME Y14.5M-1994.
- c) All dimensions on parts must be met after all processing has been completed (except as noted in section 2d of this report). Processing includes all manufacturing operations such as; stabilizing, heat treating, machining, deburring, grinding, lapping and polishing, plating and chemical finishes.
- d) Where dry film lube, paints, lacquers, enamels or other top-coats are specified, all dimensions must be met prior to application.

3 NOTES

- a) The order of the notes on a drawing do not imply that processing shall proceed in the same order as the notes. If there is uncertainty about the sequence of processing, EDO engineering shall be consulted.
- b) When dye penetrant or magnetic particle inspections are specified, the inspection shall be performed after all machining and/or forming operations are completed, unless the inspection is specifically required for the raw material.
- c) When passivation is specified without a specific class of passivation, any class that is suitable for the material being passivated is acceptable. Specification SAE AMS-QQ-P-35 shall be consulted for the appropriate class of passivation.

4 RAW MATERIALS

- a) Raw materials must have certification, test reports or any other data required by the purchase order.
- b) Raw material tolerances shall conform to the applicable governing specification, unless otherwise specified.
- c) The material received shall be sound, commercially flat and/or straight, uniform in quality, free from laps, cracks, pipes, seams, twists, damaged ends, scale, buckles or other injurious defects.
- d) All material shall be properly identified in conformance with the applicable specification covering the particular material received.
- e) The material temper or heat treatment called out on the drawing shall be the final condition. For example, a part which is specified as 7075-T73 aluminum may be procured in the T6 condition (or a lower temper), then brought to the T73 temper.

5 MACHINED SURFACES

a) Finish.

All sharp edges and corners shall be removed and free from burrs. Where the finish on machined surfaces or hole diameters is not indicated on drawings, the surface roughness in **Table 1** shall be considered standard.

Dimension Having A Total tolerance (in.)	Maximum Micro-Inch Finish
Under .0005	32
.0005 to .002	63
Over .002	125

Table 1: Surface Roughness With Respect To Tolerance

The entire surface designated for a given RMS value shall receive the required finish or finer. No partial or residual areas shall receive a finish coarser than that specified. Unless otherwise specified on drawing, surface roughness values apply prior to plating.

- b) Straightness/Flatness. Unless otherwise specified, all plane machined surfaces must be flat to within .005 F.I.M. in each 2 square inches of surface.
- c) Parallelism. Unless otherwise specified, all surfaces machined in the same plane shall be located within the tolerances on the dimensions which locate the surfaces. However, any such variation from parallelism shall not exceed .005 F.I.M. in each 2 square inches of surface.
- d) Squareness. Unless otherwise specified, squareness of a machined surface located perpendicular to another machined surface shall be within the tolerance on the dimension which locates the surface. **See Figure 1: Squareness of Machined Surfaces**

The axial squareness of drilled or tapped holes located at 90° to a machined surface shall be held within plus or minus 0.5°. **See Figure 2: Axial Squareness of Holes**

The squareness of formed surfaces (sheet metal and punch press work) shall be held within the tolerance on the dimension or within plus or minus 0.5°. **See Figure 3: Squareness of Formed Surfaces**

Figure 1: Squareness of Machined Surfaces

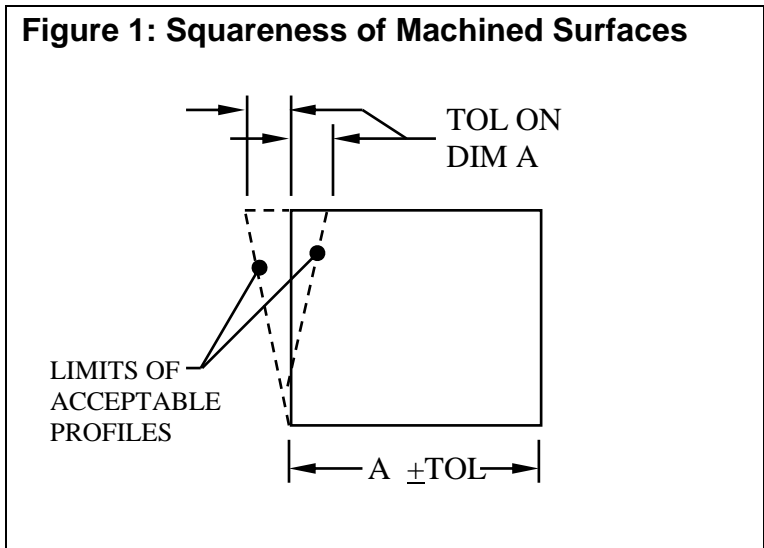


Figure 2: Axial Squareness of Holes

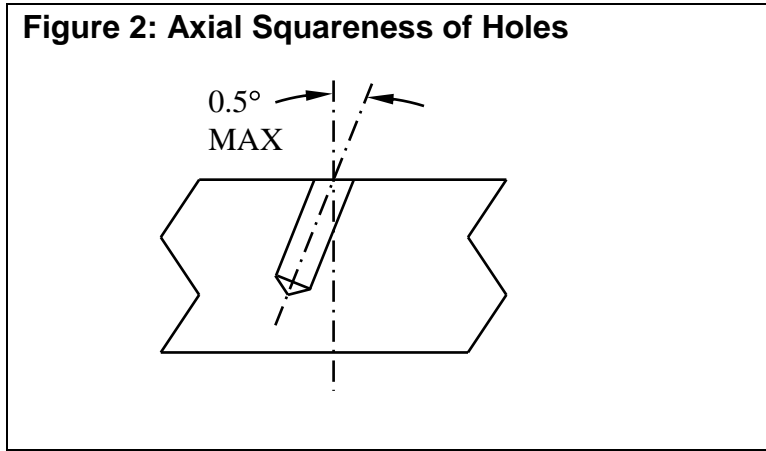
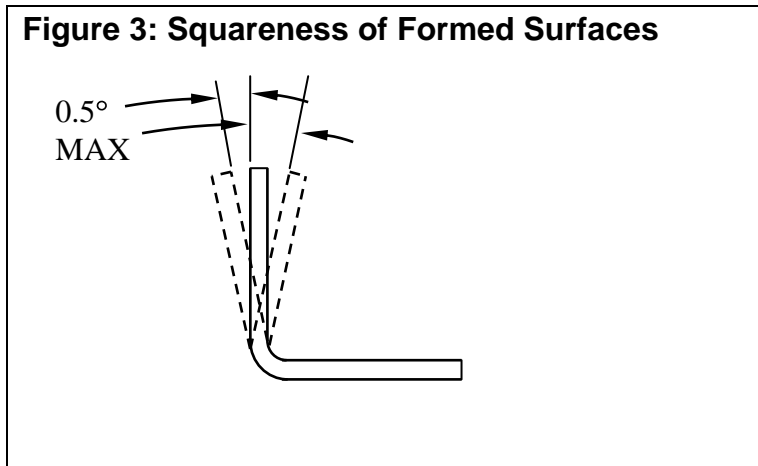


Figure 3: Squareness of Formed Surfaces



5 Machined Surfaces (cont'd)

- e) Machined Corners. Unless otherwise specified, all internal and external corners shall be machined to a maximum radius or chamfer of .015 and a minimum of .005. When a corner is specified as "sharp corner", it shall be machined to a maximum of .005 radius or chamfer.
- f) Runout. Unless otherwise specified, all diameters shown on a drawing as being concentric shall be checked against each other and shall have a maximum runout of .005 F.I.M.
- g) Lines depicted as parallel or perpendicular to other lines on the drawing shall be within $\pm 0.5^\circ$ of parallel or perpendicular, unless otherwise stated on the drawing.
- h) Tool Marks. All machined surfaces shall be free of tool marks, burrs, gouges, chuck marks, scribe lines or other defects detrimental to the function or appearance of the parts.
- i) If aluminum is machined after anodize or chemical conversion coating, the bare surface shall be touched up IAW MIL-C-5541 CLASS 1A. This requirement does not apply to holes that are being prepared for rivets.

6 THREADS: (INTERNAL)

- a) Unless otherwise specified, all internal threads shall conform to FED-STD-H28, Class 2, unified.
- b) Threads must be clean cut, and free from burrs and fractures.
- c) All internal threads shall have a lead chamber of approximately 45° , extending approximately one thread.
- d) Tapped blind holes: Where tapping is required to a specified depth in blind holes, full threads must extend to the depth specified using bottom taps where necessary. The tap drill shall not break through the material.
- e) With respect to the entry of the "Not Go" gage into a threaded hole, a maximum of three full threads shall be acceptable provided that a definite drag results from metal to metal contact on or before the third turn of entry.
- f) Unless otherwise specified, threads shall be free of primer and/or paint.

7 THREADS: (EXTERNAL)

- a) Unless otherwise specified, all external threads shall conform to FED-STD-H28, Class 2, unified.
- b) All external threads shall have a lead chamfer of approximately 45° extending approximately one thread. Threads adjacent to thread relief features (i.e. undercuts or radii) shall also be so chamfered.
- c) With respect to the entry of external threads into a "Not Go" gage, a maximum of three full threads shall be acceptable provided that a definite drag results from metal to metal contact on or before the third turn of entry.
- d) Unless otherwise specified, threads shall be free of primer and/or paint.

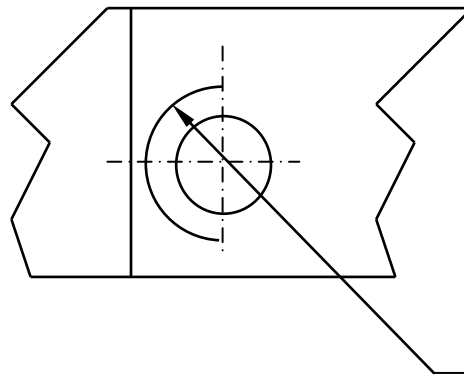
8 SPOTFACING

- a) Where "spotface" is specified with no specified depth, it shall be interpreted to mean the removal of a minimum of metal, paint, primer and/or anodize to accomplish (a) a clean true surface or (b) bare metal for a satisfactory electrical ground.

See Figure 4 for standard spotfacing practices.

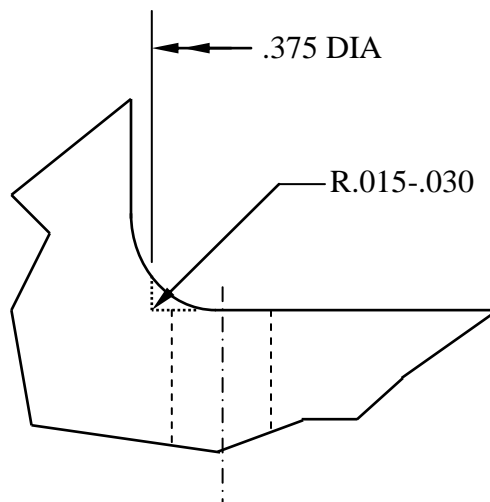
Figure 4: Spotfacing Practices

A spotface call out shall be interpreted as per the following example:



SPOTFACE .375 DIA

shall be interpreted as:



9 SHEET METAL

- a) The sheet metal shall be free of cracks, splits and any other stress hazards after bending or stamping operations are completed.
- b) Burred edges from stamping, shearing, routing etc., shall be removed.

10 RIVETING

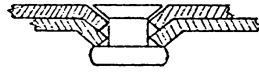
- a) Before riveting, all chips and foreign material must be removed from between material and from rivet holes and countersinks.
- b) Unless specified on drawings to the contrary, on interior surfaces, manufactured heads on rivets may be located optionally.
- c) The manufactured (pre-existing) head of all rivets shall be on the outside of all exterior surfaces. The upset, or driven head shall be on the interior surfaces. If a determination cannot be made with respect to this requirement, EDO engineering shall be consulted.
- d) Dents, scratches, gouges, etc., made by bucking tools or rivet peens, should be avoided where possible and in any event kept to a minimum.
- e) Install rivets with one coat of wet prime per MIL-P-23377.
- f) Unless otherwise specified on the engineering drawing, the upset head dimensions shall be as specified in **Table 2** below (REF MIL-STD-4000).

Rivet Dia (inch)	Head Dia		Head Height	
	Min	Max	Min	Max
1/16	.081	.104	.021	.042
3/32	.122	.157	.031	.062
1/8	.163	.208	.042	.083
5/32	.203	.260	.052	.104
3/16	.245	.312	.063	.125
1/4	.325	.416	.083	.167
5/16	.406	.520	.104	.208
3/8	.487	.625	.125	.250

Table 2: Upset Rivet Head Dimensions

- g) Rivet Length: Rivet length shall be as specified in the engineering drawing. In order to meet the upset head requirements of Table 2, the use of one size longer or shorter than specified in the engineering drawing is permissible. Any other deviation shall require an engineering order or design approval.
- h) **See Figure 5 for examples of unacceptable riveting practices.**

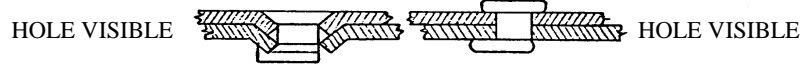
Figure 5: Unacceptable Riveting Practices



Floating Rivet: Floating rivets or loose flush rivets are usually caused by too deep a countersink or dimple and cannot be driven tight and remain flush.



Tipped or stepped heads. Usually caused by misalignment or slippage of tools.



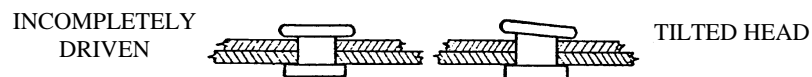
Clinched or offset heads. Usually caused by misalignment of parts or holes drilled at an angle.



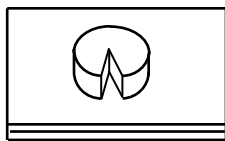
Bell head. Head underdriven or do not fill holes. Sometimes caused by the selection of too long a rivet.



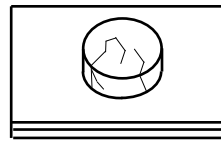
Bellied rivets. Usually caused by allowing parts to separate adjacent to rivet hole.



Open heads. Usually caused by driving rivet in undersize holes or improper angle on rivet set.



Burst cracks. Usually caused by overheating rivet or incorrect rivet material.



Head cracks. Diagonal cracks in the sides of flat driven heads usually caused by cold working rivets. In the case of ice box rivets, overdriving rivets which have been in the box too long will cause severe cracking.

11 PIECEMARKING

- a) Piecemarking shall be in accordance with EF-130, EDO Report 5370.
- b) Unless otherwise specified, all parts must bear the appropriate part number except (1) Parts which become inseparably attached (welded, riveted, soldered, etc.) to other parts, (2) Parts whose physical nature is such that they would be damaged by the stamping of part numbers and (3) Parts too small in size to support part numbers.
- c) Part numbers shall not be stamped on mating surfaces or other surfaces where the function of the part might be adversely affected.

12 SOLDERING

- a) Soldering for wire and cable assemblies shall be in accordance with SAE AS4461.
- b) Other electrical and electronic assemblies (including printed circuit boards) shall be in accordance with J-STD-001.

13 ASSEMBLIES/DETAILS

- a) The entire equipment shall be finished in a thoroughly workmanlike manner. Special attention shall be paid to neatness, good soldering, welding, painting, assembly, and freedom of parts from burrs and sharp edges, pits, dents, cracks, misalignments, foreign material, and other defects that would adversely affect life, serviceability, or appearance.
- b) Threaded fasteners shall be torqued as per the torque values listed in Table 3.

14 LIGHTENING HOLES

- a) Lightening holes are used to provide accessibility in assembly or inspection; to allow for cable runs, electrical or other installations; to provide stiffness where required; or to remove an appreciable amount of weight. **Refer to Figure 6 and Table 4** for the forming requirements and drawing call-out. To achieve to bend radii requirement, annealing of the material may be necessary in some cases.

15 JOGGLES

- a) Joggles are used whenever offsetting of material is required to allow parts to overlap. **Tables 5 through 8** cover standard joggles for aluminum sheet stock and shapes. For materials and cases not covered by the tables, refer to **Figure 7** to calculate the jog length. The engineering drawing shall specify the joggle depth J and dimension A as defined in **Figure 7**.

16 SAFETY WIRING AND COTTER PINNING

- a) Safety wiring and cotter pinning shall be in accordance with MS33540.

17 FINISHING

- (a) When paint, primer, lacquer, enamel, or other surface coating is specified, the finished coating shall be dry, adherent, continuous, uniform in appearance and shall be free from pin holes, voids, sags, blisters, or any other defects that would adversely affect its appearance or protective capability.
- (b) Unless specified on the drawing, the interior of all holes shall be free of such surface coatings.

18 PASSIVATION

- (a) When passivation is specified on the drawing, it shall be performed in accordance with AMS-QQ-P-35. When passivation is specified on the drawing without a specific class of passivation cited, the passivation shall be performed to any class appropriate for the material, according to AMS-QQ-P-35.
- (b) Surface Discoloration. Parts that exhibit welding scale, oxide, heat treat discoloration, etc., shall be vapor blast cleaned *prior* to passivation, per EF 97, EDO REPORT 5370.

19 INSPECTION AND TESTING

- (a) Unless otherwise specified on the drawing, inspections and tests shall be performed such that the part is not distorted or degraded by the test.
- (b) The upset material resulting from hardness tests shall not cause the part to be out of tolerance.
- (c) When possible, 125 ✓ surfaces shall be used for hardness testing.

20 SPECIAL MACHINING METHODS

- (a) Due to potential adverse affects on material properties associated with fatigue and durability, the use of non-standard machining methods (such as grinding, EDM, plasma cutting, laser drilling, water jet machining, etc.) must be approved by Engineering prior to implementation.

21 ANTI-SEIZE THREAD COMPOUND

To prevent thread galling or seizing of fasteners anti-seize thread compound, part number 5150-1 may be used. It can be applied to the threads of bolts, screws and any external threads. Threads shall be clean before application and the compound is to be used sparingly and any excess is to be removed. For fasteners with locking patches/nylon inserts, anti-seize thread compound can be used. It can also be applied to bolts and screws engaging locking helical coil inserts, locking nuts, locking nut plates and self-clinching nuts. Anti-seize thread compound is not to be used where thread locking compounds are employed and where special cleanliness requirements apply. Torque values shown in table 3 are adequate for when anti-seize compound is used.

22 WASHER INSTALLATION AND USAGE

A minimum number of washers are to be used in bolted joint installations. Two washers are to be used in bolted joints with loose hardware, one under the protruding head fastener one under the nut. One washer shall be located under the fastener end that is being tightened for helical coil inserts, locking nuts, locking nut plates and self-clinching nuts. No more than three washers for a total thickness of 0.188 in. are to be used. This paragraph applies to washers used to obtain the correct relationship between the bolt threads and nut, to washers to adjust the position of castellated nuts with respect to drilled cotter pin holes in bolts, and to washers to adjust tolerance accumulations in an assembly. When three washers are required, at least one washer shall be installed at each end of the fastener assembly.

Manufacturing may add washers or vary the thickness of the washer(s) to overcome tolerances and obtaining correct adjustment including correct fastener grip engagement in joint and bolt thread protrusion per paragraph 23. It will be the responsibility of Manufacturing to notify Engineering of any variation to washer callouts on drawings so that the appropriate drawing review can be made to see if any changes are necessary.

23 THREAD PROTRUSION

In order to ensure satisfactory operation of prevailing torque self-locking nuts, it is essential that the locking feature in the nut engage fully formed external thread on the mating part. To ensure this, the external thread shall, unless otherwise specified, project through the self-locking nut for a minimum length equal to two threads. This length includes the chamfer.

Recommended Installation Torque Values -Min/Max(Inch-Pounds)					
	Tensile Strength Class				
	A	B	C	D	E
Thd Size	75KSI	125KSI	160KSI	180KSI	220KSI
(#2) .086-56	N/A	3.6 – 4.6	4.6 – 5.6	N/A	N/A
(#4) .112-40	N/A	5.0 – 6.0	6.4 – 7.4	N/A	N/A
(#6) .138-32	N/A	9.5 – 10.0	12.2 – 13.2	N/A	N/A
(#8) .164.32	N/A	19.5 – 21.0	25.0 - 26.0	N/A	N/A
#10	15/20	20/30	30/40	45/55	50/65
1/4	35/45	65/75	80/105	90/120	100/150
5/16	60/75	100/150	150/200	170/250	200/300
3/8	100/150	200/300	260/400	320/480	380/560
7/16	190/250	300/450	400/600	500/760	590/880
1/2	220/340	460/700	640/960	770/1150	900/1350
9/16	320/550	660/1000	900/1350	1100/1650	1250/1900
5/8	450/700	950/1400	1250/1900	1500/2300	1750/2650
3/4	- - - -	1650/2450	2350/3450	2650/4000	3100/4650
7/8	- - - -	2950/4400	3750/5650	4250/6350	5200/7800
1	- - - -	4400/6600	5600/8400	6300/9500	7700/11600

FASTENER TYPES BY TENSILE STRENGTH CLASS				
A	B	C	D	E
AN316	AN317	MS16998	MS21042	NAS1758
AN320	MS9358	MS20004/24	MS21250	NAS1759
MS14145	MS14144	NAS623	NAS1804	
MS24671	MS20500	NAS673/78		
MS24693	MS21044	NAS1102		
MS24694C	MS21045	NAS1121/28		
MS35275	MS21047	NAS1131/38		
MS35276	MS24694S	NAS1141/48		
MS35307	MS27039C	NAS1151/58		
MS35308	MS51975	NAS1190		
MS51957	MS90725	NAS1219		
MS51958	NAS333/40	NAS1221		
MS51959	NAS1223C/28C	NAS1223/28		
MS51960	NAS1291C	NAS1291		
		NAS1578		
		NAS1580		
		NAS1581		
		NAS1620/28		
		NAS1630/34		
		NAS16303/20		
		NAS6603/20		
		NAS6703/16		
		NAS7700/06.		
		NAS7800/06		
		NAS8602/16		

Table 3: Recommended Installation Torque Values
(SEE NOTES NEXT PAGE)

Notes for Table 3

1. RECOMMENDED TORQUE VALUES FOR COMMONLY USED FASTENERS ARE INDICATED IN TABLE 3. FOR BOLTS AND NUTS NOT LISTED IN THE TABLE, CONSULT THE APPROPRIATE STANDARD TO DETERMINE THE TENSILE STRENGTH AND TIGHTENING TORQUE.
2. TORQUE VALUES IN THE TABLE ARE BASED ON ROTATION OF THE NUT. WHEN TORQUE IS APPLIED TO THE HEAD OF A BOLT, THE BOLT SHALL BE TORQUED TO THE HIGHER VALUE IN THE TABLE WITHIN A $\pm 10\%$ TOLERANCE.
3. RECOMMENDED TORQUE VALUES APPLY ONLY WHERE EITHER BOLT OR NUT IS PLATED OR DRY FILM LUBRICATED.
4. RECOMMENDED TORQUE VALUES ARE NOT APPLICABLE WHEN LUBRICATION, SEALANT OR WET PRIMER IS APPLIED TO BOLT OR NUT THREADS BY USER.
5. TORQUE VALUES SPECIFIED ON ENGINEERING DRAWINGS HAVE PRECEDENCE OVER TABLE 3.
6. WHEN THE TORQUE RANGE FOR A BOLT DIFFERS FROM THAT FOR THE MATING NUT, THE LOWER RANGE SHALL BE USED.
7. CASTELLATED NUT PROCEDURE:
TIGHTEN NUT TO MAXIMUM VALUE SPECIFIED IN TABLE 3. IF COTTER PIN CANNOT BE INSTALLED, BACK OFF UNTIL SLOT IN NUT ALIGNS WITH HOLE IN BOLT.
8. TIGHTENING TORQUE VALUES DO NOT APPLY TO ALUMINUM NUTS/BOLTS.
9. A SLASH (/) IN THE SPECIFICATION NUMBER OF A FASTENER INDICATES A RANGE FROM THE LOWER TO THE HIGHER SPEC. (i.e., NAS6303/20 =NAS6303 THRU NAS 6320)
10. TORQUE VALUES ARE BASED ON DEVELOPING A PRELOAD OF 50-75% OF THE ULTIMATE TENSILE STRENGTH OF THE BOLT/NUT COMBINATION.

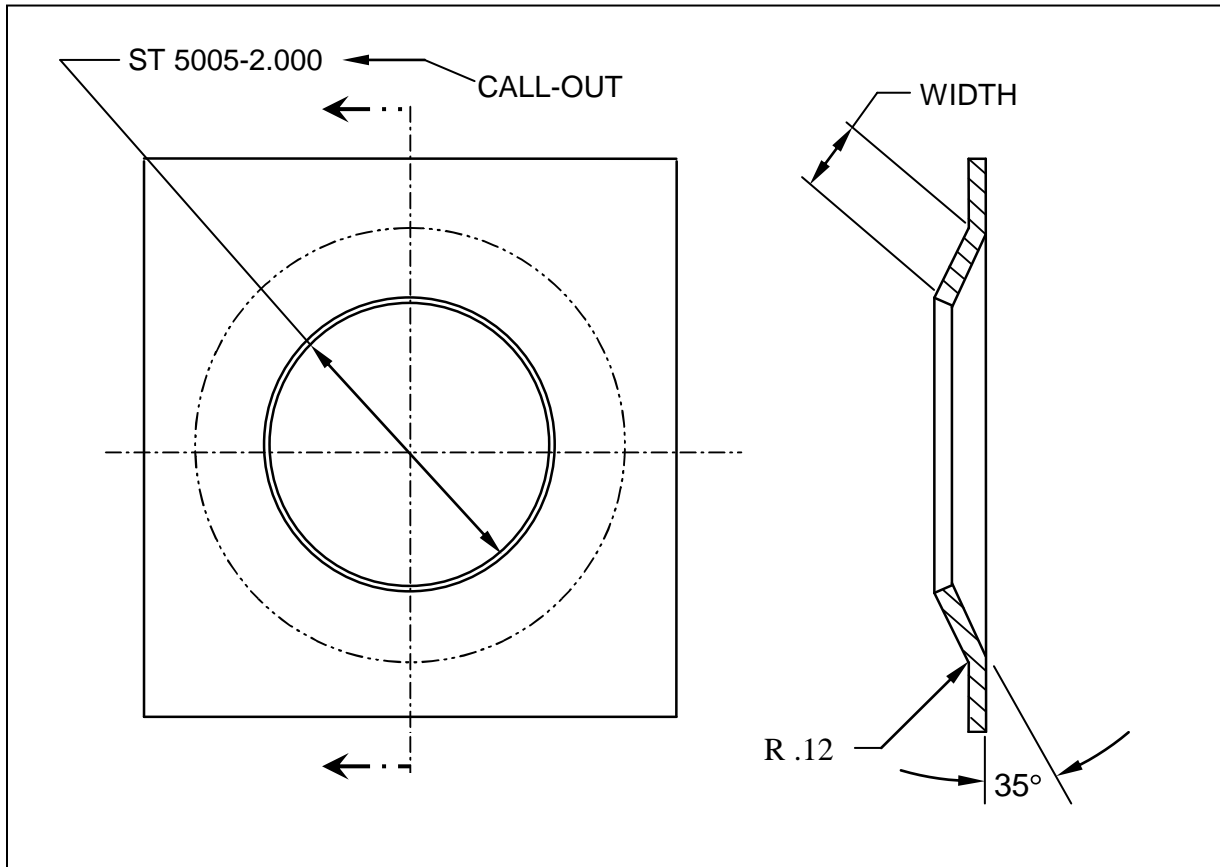
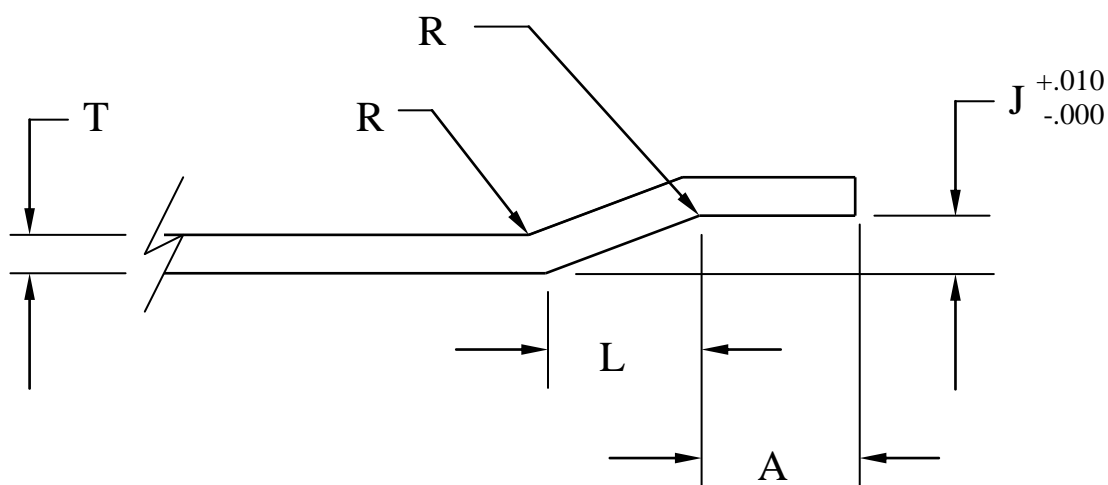


Figure 6: Flanged Lightning Hole

For Aluminum Alloy Sheet (.032 to .063 thk.)				
Drawing Call-Out	Hole \varnothing Before forming ($\pm.03$)	Flange Width ($\pm.06$)	Flange Angle ($\pm 5^\circ$)	Bend Radii (+.03/-.00)
ST 5005-1.000	1.00	.19	35	.12
ST 5005-1.500	1.50	.19	35	.12
ST 5005-2.000	2.00	.25	35	.12
ST 5005-2.500	2.50	.25	35	.12
ST 5005-3.000	3.00	.25	35	.12
ST 5005-3.500	3.50	.25	35	.12
ST 5005-4.000	4.00	.31	35	.12
ST 5005-4.500	4.50	.31	35	.12
ST 5005-5.000	5.00	.38	35	.12
ST 5005-5.500	5.50	.38	35	.12
ST 5005-6.000	6.00	.38	35	.12

Table 4: Forming Data for Internally Flanged Lightning Holes

Figure 7: Standard Joggle



The L dimension listed in tables 5 thru 8 are as computed from the following formula:

$$L = 2.75J + .35R + .17T$$

Where:

R = bend radius (4 x T)

T = material thickness

Table 5: Dimensions For Standard Joggles, Al Aly 2024s-0, 5052-0 And 6061-0

TABLE FOR "L" (TO THE NEAREST .03)															
GAGE "T"	JOGGLE DEPTH "J"														
	.020	.025	.032	.040	.050	.063	.071	.080	.090	.100	.125	.160	.190	.250	.312
.012	.06	.09	.09	.12	.15	.18	.21	.24	.27	.30	.36	.45	.54	.69	.87
.016	.06	.09	.09	.12	.15	.18	.21	.24	.27	.30	.36	.45	.54	.69	.87
.020	.06	.09	.09	.12	.15	.18	.21	.24	.27	.30	.36	.45	.54	.69	.87
.025	.06	.09	.09	.12	.15	.18	.21	.24	.27	.30	.36	.45	.54	.69	.87
.032	.09	.09	.12	.15	.18	.21	.21	.24	.27	.30	.36	.45	.54	.72	.87
.040	.09	.09	.12	.15	.18	.21	.24	.24	.27	.30	.36	.45	.54	.72	.90
.050	.09	.09	.12	.15	.18	.21	.24	.24	.27	.33	.36	.45	.54	.72	.90
.063	.12	.12	.15	.15	.18	.24	.24	.27	.30	.33	.39	.48	.57	.75	.90
.071	.12	.12	.15	.15	.18	.24	.24	.27	.30	.33	.39	.48	.57	.75	.90
.080	.12	.12	.15	.18	.21	.24	.24	.27	.30	.33	.39	.48	.57	.75	.90
.090	.15	.15	.18	.18	.21	.27	.27	.30	.33	.36	.42	.51	.60	.78	.93
.100	.15	.15	.18	.18	.21	.27	.27	.30	.33	.36	.42	.51	.60	.78	.93
.125	.15	.15	.18	.21	.24	.27	.30	.30	.33	.36	.42	.51	.60	.78	.96
.160	.18	.18	.21	.24	.27	.30	.30	.33	.36	.39	.45	.54	.63	.81	.96
.190	.18	.18	.21	.24	.27	.30	.33	.33	.36	.42	.45	.54	.63	.81	.99
.250	.18	.21	.21	.24	.27	.30	.33	.36	.39	.42	.48	.57	.66	.81	.99

Table 6: Dimensions For Standard Joggles, Al Aly 2014-T3 And 2024-T3

TABLE FOR "L" (TO THE NEAREST .03)															
GAGE "T"	JOGGLE DEPTH "J"														
	.020	.025	.032	.040	.050	.063	.071	.080	.090	.100	.125	.160	.190	.250	.312
.012	.09	.09	.12	.12	.15	.21	.21	.24	.27	.30	.36	.45	.54	.72	.87
.016	.09	.09	.12	.12	.15	.21	.21	.24	.27	.30	.36	.45	.54	.72	.87
.020	.09	.09	.12	.15	.18	.21	.24	.27	.30	.33	.39	.45	.54	.72	.90
.025	.09	.12	.12	.15	.18	.21	.24	.27	.30	.33	.39	.45	.54	.72	.90
.032	.09	.12	.15	.15	.18	.21	.24	.27	.30	.33	.39	.48	.57	.75	.90
.040	.09	.12	.15	.15	.18	.24	.24	.27	.30	.33	.39	.48	.57	.75	.90
.050	.12	.15	.15	.18	.21	.24	.27	.30	.33	.36	.42	.51	.60	.75	.93
.063	.12	.15	.18	.18	.21	.24	.27	.30	.33	.36	.42	.51	.60	.78	.93
.071	.15	.18	.18	.21	.24	.27	.30	.33	.36	.39	.45	.54	.63	.78	.96
.080	.15	.18	.18	.21	.24	.27	.30	.33	.36	.39	.45	.54	.63	.78	.96
.090	.21	.21	.24	.27	.30	.33	.36	.36	.39	.42	.48	.57	.66	.84	.99
.100	.21	.21	.24	.27	.30	.33	.36	.36	.39	.45	.48	.57	.66	.84	1.02
.125	.24	.27	.27	.30	.33	.36	.39	.42	.45	.48	.54	.63	.72	.87	1.05
.160	.30	.30	.33	.36	.39	.42	.45	.48	.48	.54	.60	.66	.75	.93	1.11
.190	.36	.36	.39	.39	.45	.48	.48	.51	.54	.57	.63	.72	.81	.99	1.14
.250	.45	.45	.48	.51	.54	.57	.60	.63	.63	.69	.75	.81	.90	1.08	1.26

Table 7: Dimensions For Standard Joggles, Al Aly 7075-0

TABLE FOR "L" (TO THE NEAREST .03)															
GAGE "T"	JOGGLE DEPTH "J"														
	.020	.025	.032	.040	.050	.063	.071	.080	.090	.100	.125	.160	.190	.250	.312
.020	.06	.09	.09	.12	.15	.18	.21	.24	.27	.30	.36	.45	.54	.69	.87
.025	.06	.09	.09	.12	.15	.18	.21	.24	.27	.30	.36	.45	.54	.69	.87
.032	.09	.09	.12	.15	.18	.21	.21	.24	.27	.30	.36	.45	.54	.72	.90
.040	.09	.09	.12	.15	.18	.21	.24	.24	.27	.30	.36	.45	.54	.72	.90
.050	.09	.09	.12	.15	.18	.21	.24	.24	.27	.33	.36	.45	.54	.72	.90
.063	.12	.12	.15	.15	.18	.24	.24	.27	.30	.33	.39	.48	.57	.75	.90
.071	.12	.12	.15	.15	.18	.24	.24	.27	.30	.33	.39	.48	.57	.75	.90
.080	.12	.15	.15	.18	.21	.24	.27	.30	.33	.36	.42	.51	.60	.75	.93
.090	.15	.15	.18	.18	.21	.27	.27	.30	.33	.36	.42	.51	.60	.78	.93
.100	.15	.15	.18	.18	.21	.27	.27	.30	.33	.36	.42	.51	.60	.78	.93
.125	.15	.15	.18	.21	.24	.27	.30	.30	.33	.36	.42	.51	.60	.78	.96
.160	.18	.18	.21	.24	.27	.30	.30	.33	.36	.39	.45	.54	.63	.81	.96
.190	.24	.24	.27	.30	.33	.36	.39	.42	.45	.48	.54	.60	.69	.87	1.05
.250	.27	.30	.30	.33	.36	.39	.42	.45	.48	.51	.57	.66	.75	.90	1.08

Table 8: Dimensions For Standard Joggles, Al Aly 2014-T6 And 7075-T6 / T73

TABLE FOR "L" (TO THE NEAREST .03)															
GAGE "T"	JOGGLE DEPTH "J"														
	.020	.025	.032	.040	.050	.063	.071	.080	.090	.100	.125	.160	.190	.250	.312
.025	.09	.12	.12	.15	.18	.21	.24	.27	.30	.33	.39	.45	.54	.72	.90
.032	.09	.12	.15	.15	.18	.21	.24	.27	.30	.33	.39	.48	.57	.75	.90
.040	.12	.12	.15	.18	.21	.24	.27	.30	.30	.36	.39	.48	.57	.75	.93
.050	.12	.15	.15	.18	.21	.24	.27	.30	.33	.36	.42	.51	.60	.75	.93
.063	.15	.18	.18	.21	.24	.27	.30	.33	.36	.39	.45	.54	.63	.78	.96
.071	.18	.18	.21	.24	.27	.30	.33	.33	.36	.42	.48	.54	.63	.81	.99
.080	.21	.21	.24	.27	.30	.33	.36	.36	.39	.42	.48	.57	.66	.84	.99
.090	.24	.24	.27	.27	.30	.36	.36	.39	.42	.45	.51	.60	.69	.87	1.02
.100	.27	.27	.30	.33	.36	.39	.42	.45	.45	.51	.57	.63	.72	.90	1.08
.125	.33	.33	.36	.36	.39	.45	.45	.48	.51	.54	.60	.69	.78	.96	1.11
.160	.39	.42	.42	.45	.48	.51	.54	.57	.60	.63	.69	.78	.87	1.02	1.20
.190	.45	.45	.48	.48	.51	.57	.57	.60	.63	.66	.72	.81	.90	1.08	1.23
.250	.54	.54	.57	.60	.63	.66	.69	.69	.72	.78	.84	.90	.99	1.17	1.35