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REV.  
A

SAE AS1960/1

FEDERAL SUPPLY CLASS  
5340

## RATIONALE

AS1960/1A HAS BEEN REAFFIRMED TO COMPLY WITH THE SAE FIVE-YEAR REVIEW POLICY.

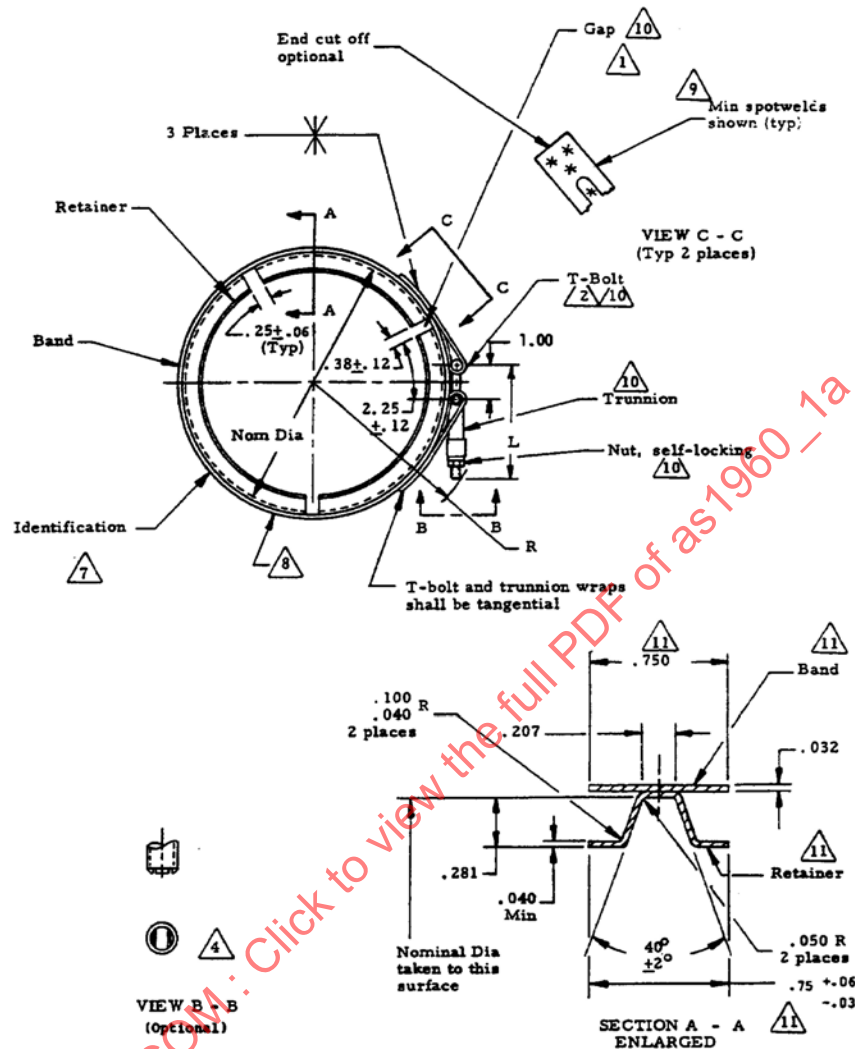


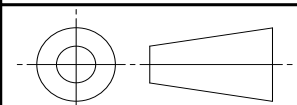
FIGURE 1



FIGURE 2

SAE values your input. To provide feedback  
on this Technical Report, please visit  
<http://www.sae.org/technical/standards/AS1960/1A>

THIRD ANGLE PROJECTION



CUSTODIAN: G-3/G-3A

PROCUREMENT SPECIFICATION: AS1960

**SAE Aerospace**  
An SAE International Group

## AEROSPACE STANDARD

COUPLING, SHEET METAL,  
40° V-BAND, STANDARD LATCH

**SAE AS1960/1**  
SHEET 1 OF 5

REV.  
A

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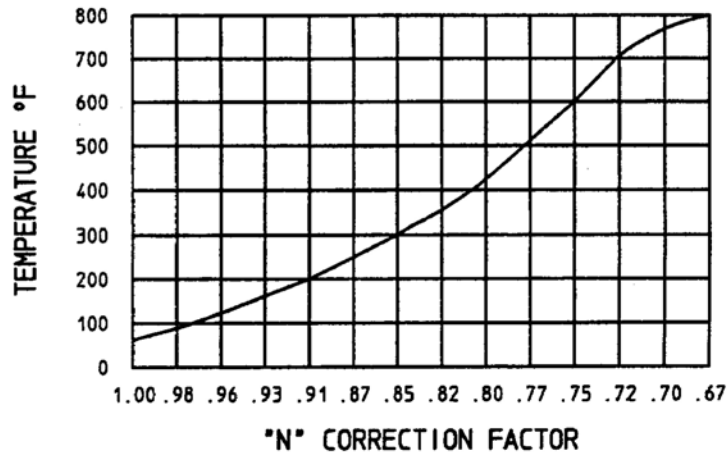


FIGURE 3 - TEMPERATURE CORRECTION FOR  
300 SERIES STAINLESS STEEL /19/

TABLE 1

| PART<br>NUMBER | TUBE<br>OD | NOMINAL<br>DIA | WEIGHT<br>(LBS) | 7/8" NUT<br>TORQUE ±5<br>IN. - LBS. | L<br>± 12 | R<br>MAX |
|----------------|------------|----------------|-----------------|-------------------------------------|-----------|----------|
| AS1960/1 - 200 | 2.000      | 2.636          | .26             | 35                                  | 2.75      | 3.26     |
| AS1960/1 - 225 | 2.250      | 2.886          | .27             |                                     |           | 3.32     |
| AS1960/1 - 250 | 2.500      | 3.136          | .29             |                                     |           | 3.36     |
| AS1960/1 - 275 | 2.750      | 3.386          | .30             |                                     |           | 3.42     |
| AS1960/1 - 300 | 3.000      | 3.636          | .31             | 40                                  |           | 3.50     |
| AS1960/1 - 350 | 3.500      | 4.136          | .35             |                                     |           | 3.39     |
| AS1960/1 - 400 | 4.000      | 4.636          | .38             |                                     |           | 3.57     |
| AS1960/1 - 450 | 4.500      | 5.136          | .40             |                                     |           | 3.77     |
| AS1960/1 - 500 | 5.000      | 5.636          | .44             | 45                                  | 3.00      | 4.00     |
| AS1960/1 - 550 | 5.500      | 6.136          | .47             |                                     |           | 4.32     |
| AS1960/1 - 600 | 6.000      | 6.636          | .50             |                                     |           | 4.52     |
| AS1960/1 - 650 | 6.500      | 7.136          | .52             |                                     |           | 4.73     |
| AS1960/1 - 700 | 7.000      | 7.636          | .55             | 50                                  |           | 4.95     |
| AS1960/1 - 750 | 7.500      | 8.136          | .58             |                                     |           | 5.16     |
| AS1960/1 - 800 | 8.000      | 8.636          | .61             |                                     |           | 5.40     |
| AS1960/1 - 850 | 8.500      | 9.136          | .63             |                                     |           | 5.62     |
| AS1960/1 - 900 | 9.000      | 9.636          | .67             |                                     |           | 5.84     |

TABLE 2

| TUBE<br>OD | D<br>DIA | "N" LBS/INCH (LIMIT<br>AT ROOM TEMPERATURE /17/<br>TO -65 °F |
|------------|----------|--------------------------------------------------------------|
| 2.00       | 2.582    | 355                                                          |
| 2.25       | 2.832    | 326                                                          |
| 2.50       | 3.082    | 303                                                          |
| 2.75       | 3.332    | 283                                                          |
| 3.00       | 3.582    | 267                                                          |
| 3.50       | 4.082    | 241                                                          |
| 4.00       | 4.582    | 221                                                          |
| 4.50       | 5.082    | 206                                                          |
| 5.00       | 5.582    | 193                                                          |
| 5.50       | 6.082    | 183                                                          |
| 6.00       | 6.582    | 175                                                          |
| 6.50       | 7.082    | 167                                                          |
| 7.00       | 7.582    | 161                                                          |
| 7.50       | 8.082    | 155                                                          |
| 8.00       | 8.582    | 150                                                          |

## NOTES:

- /1/ RETAINER GAP TO BE ROTATED TO CENTERLINE OF LATCH FOR TUBE OD 3.00 AND UNDER.
- /2/ T-BOLT SHALL BE CURVED FOR TUBE OD 3.00 AND UNDER.
3. TOLERANCES: .XX ± .03, .XXX ± .010 OR AS NOTED.
- /4/ T-BOLT FACE TO BE MARKED AS SHOWN IN VIEW B-B OR EQUIVALENT TYPE MARKING.
5. MATERIAL: STRAP - MIL-S-5059 COMP 301 1/2H (STAINLESS STEEL)  
 RETAINER - MIL-S-5059 COMP 301 1/4H (STAINLESS STEEL)  
 TRUNNION - MIL-S-5059 COMP 301/302 ANNEALED OR EQUIVALENT (STAINLESS STEEL)  
 T-BOLT - A-286 PER AMS 5732 OR AMS 5737 (STAINLESS STEEL)  
 NUT-Z1200J048 (ELASTIC STOP NUT CORP FED SUPPLY CODE 72962) STAINLESS STEEL SILVER  
 PLATED OR EQUIVALENT.
6. THREADS: T-BOLT AND NUT THREAD SHALL CONFORM TO MIL-S-8879.  
 T-BOLT: .2500-28 UNJF-3A  
 NUT: .2500-28 UNJF-3B
- /7/ IDENTIFICATION: THE COUPLING SHALL BE MARKED WITH THE FOLLOWING MINIMUM INFORMATION:  
 AS PART NO. AS1960/1-XXX  
 MANUFACTURER'S NAME AND/OR TRADEMARK  
 DATE OF MANUFACTURE
- /8/ TORQUE MARKING SHALL BE PERMANENTLY MARKED IN 1/8" MINIMUM HIGH LETTERS LOCATED AS SHOWN:  
 "CAUTION TORQUE TO (XX ±5) INCH LBS."
- /9/ SPOTWELD PER MIL-W-6858, CLASS B.
- /10/ LATCH COMPONENTS (RETAINERS, STRAPS, TRUNNION, ETC.) SHALL NOT BIND OR INTERFERE WITH OPERATION OF T-BOLT.
- /11/ BAND AND RETAINER LOCATION AND FORMING SHALL BE SYMMETRICAL ABOUT CENTERLINE WITHIN .020 TIR.

NOTES (CONTINUED):

12. MAXIMUM OPERATING TEMPERATURE: FLUID (INTERNAL) 800 °F (427 °C)  
AMBIENT (EXTERNAL) 500 °F (260 °C)
13. DO NOT USE THIS COUPLING OR FLANGES 15 IN A COMPRESSION TYPE DUCT SYSTEM.
14. DRAWING CALLOUT SHALL INCLUDE THE APPROVED CALLOUT AND NOTE: "NUT TORQUE AS SPECIFIED ON COUPLING".
- /15/ THIS COUPLING SHALL BE USED WITH FLANGES CONFORMING TO AS1960/3 OR ONE AS1960/3 AND FLANGE END PER AS1960/4.
16. THIS COUPLING MEETS THE REQUIREMENTS OF AS1960.
- /17/ PRESSURE LIMITATION IS DEPENDENT ON DESIGN LOADS. "N" LOAD PER TABLE 2 IS THE MAXIMUM TOTAL LOAD PER INCH OF CIRCUMFERENCE AT WHICH THE LEAKAGE 18 WILL NOT BE EXCEEDED. THIS VALUE, "N", IS NOT THE STRUCTURAL YIELD POINT OF THE COUPLING.
- /18/ MAXIMUM JOINT LEAKAGE RATE AT DESIGN TEMPERATURE AND PROOF PRESSURE IS .01 STANDARD CUBIC FEET PER MINUTE PER INCH OF TUBE DIAMETER.
- /19/ FIGURE 3 CORRECTS THE "N" VALUE FOR ELEVATED TEMPERATURES. SEE EXAMPLE.
20. DETERMINE JOINT LOADING USING THESE VALUES:

$$(a) \quad N_a = \frac{E}{\pi D}; N_p = \frac{PD}{4}; N_b = \frac{4M}{\pi D^2}; N_t = N_a + N_p + N_b$$

(b) WHERE:

$$N = /17/ /19/$$

NA = LOAD (POUNDS) PER INCH OF CIRCUMFERENCE AT FLANGE TO RETAINER POINT DUE TO AXIAL LOADING. (LIMIT)

NP = LOAD PER INCH OF CIRCUMFERENCE AT FLANGE TO RETAINER POINT DUE TO PROOF PRESSURE.

NB = LOAD PER INCH OF CIRCUMFERENCE AT FLANGE TO RETAINER POINT DUE TO BENDING. (LIMIT)

Nt = TOTAL LOAD PER INCH OF CIRCUMFERENCE AT FLANGE TO RETAINER POINT.

P = DESIGN PROOF PRESSURE (PSIG).

D = FLANGE OUTSIDE DIA IN INCHES.

E = AXIAL TENSION LOAD IN POUNDS (NOT DUE TO BENDING OR PRESSURE). (LIMIT)

M = BENDING MOMENT IN INCH POUNDS (NOT DUE TO PRESSURE OR AXIAL LOAD). (LIMIT)

EXAMPLE: 2.00 DIA JOINT; 200 PSIG PROOF PRESSURE, 400 °F MAX TEMPERATURE

100 INCH LB BENDING MOMENT NO AXIAL LOAD

FROM TABLE 2 D = 2.582 INCHES, N = 355 LBS/IN.

FROM FIGURE 3 CORRECTION FACTOR AT 400 °F = .81

N CORRECTED = 355 X .81 = 287 LBS/IN. (JOINT CAPABILITY)

$$N_p = \frac{PD}{4} = \frac{200 \times 2.582}{4} = 129 \text{ lb / in. } N_b = \frac{4M}{\pi D^2} = \frac{4 \times 100}{\pi \times (2.582)^2} = 19 \text{ lb / in.}$$

Nt = Np + Nb + Na = 129 + 19 + 0 = 148 lb/in. DESIGN LOAD

148 LB/IN. IS LESS THAN 287 LB/IN. THEREFORE THIS IS A SATISFACTORY APPLICATION.

|                                                                   |                                                                                       |                                     |                         |
|-------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------|-------------------------|
| <b>SAE Aerospace</b><br><small>An SAE International Group</small> | <b>AEROSPACE STANDARD</b><br><br>COUPLING, SHEET METAL,<br>40° V-BAND, STANDARD LATCH | <b>SAE AS1960/1</b><br>SHEET 4 OF 5 | <b>REV.</b><br><b>A</b> |
|-------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------|-------------------------|