

INCH-POUND

MS27087D  
1 May 2013  
SUPERSEDING  
MS27087C  
25 September 2003

DETAIL SPECIFICATION SHEET

ELBOW, NIPPLE END, FLARED, TUBE TO HOSE - 45° SWIVEL NUT

This specification sheet is approved for use by all Departments and Agencies of the Department of Defense.

The requirements for acquiring the product described herein shall consist of this specification sheet and MIL-DTL-27272.

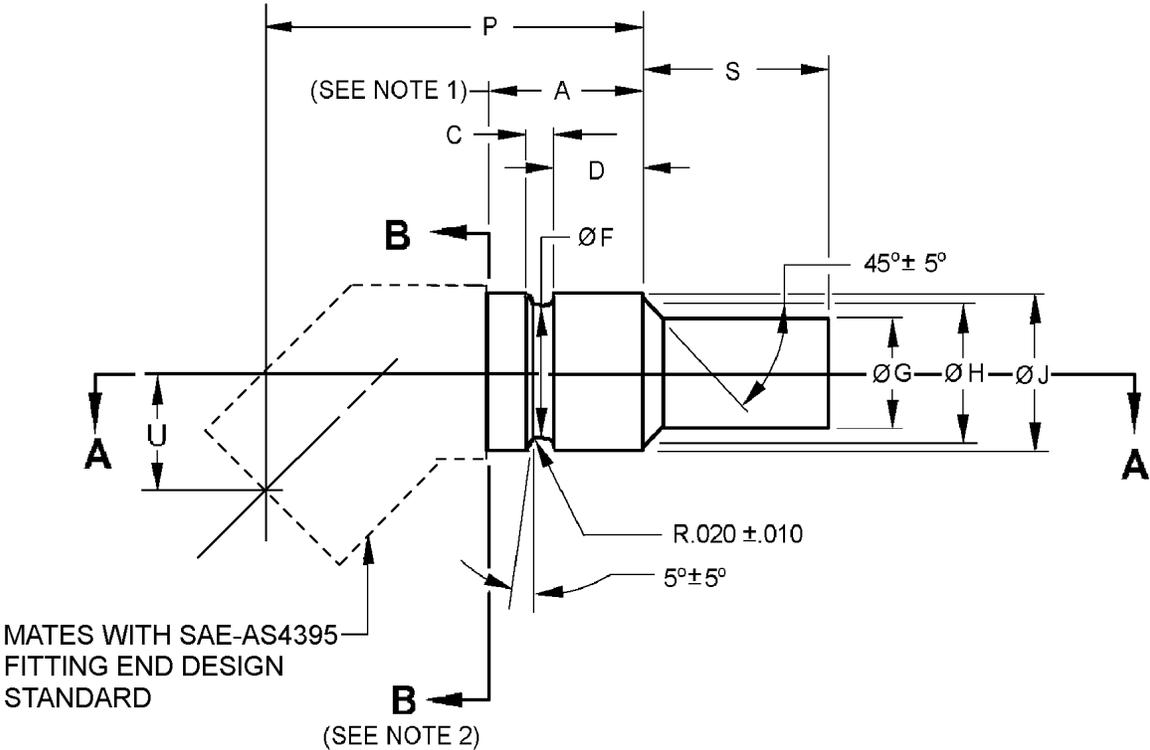


FIGURE 1. Elbow illustration.

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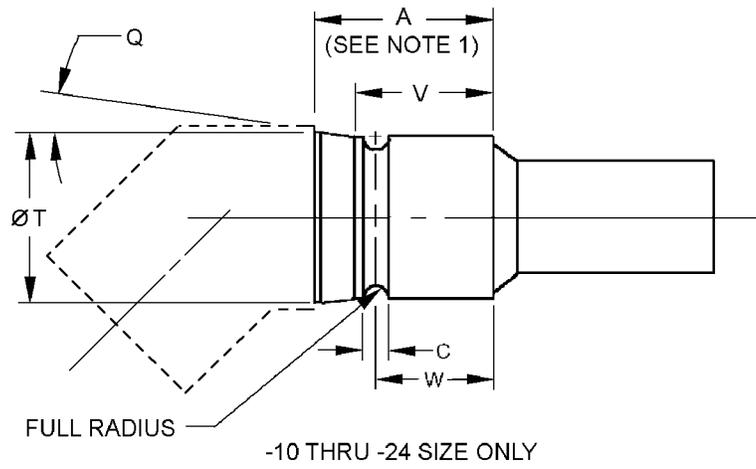
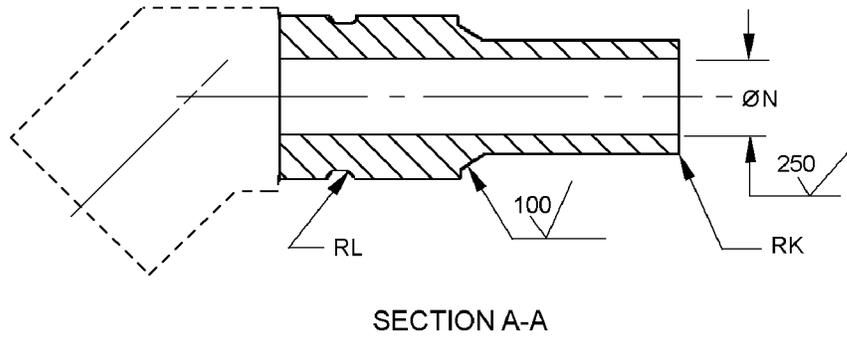


FIGURE 1. Elbow illustration - Continued.

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| Size and material code |      | A min<br>(see note 1) | C    |                 | D<br>+.005<br>-.000 | F               |       | G<br>+.005<br>-.000 | H<br>±.005 | J<br>+.005<br>-.000 |
|------------------------|------|-----------------------|------|-----------------|---------------------|-----------------|-------|---------------------|------------|---------------------|
| CRES                   | Al   |                       |      |                 |                     |                 |       |                     |            |                     |
| -3/-4C                 | ---  | .515                  | .106 | ±.010           | .307                | .288            |       | .205                | .295       | .373                |
| -4C                    | ---  |                       |      |                 |                     |                 |       |                     |            |                     |
| -5C                    | ---  | .520                  | .116 |                 | .322                | .316            |       | .268                | .360       | .416                |
| -6C                    | ---  | .555                  |      |                 |                     |                 |       |                     |            |                     |
| -8C                    | -8D  | .630                  | .140 | ±.020           | .335                | .497            |       | .426                | .530       | .616                |
| -10C                   | -10D | .654                  | .098 | +0.004<br>-.000 | ---                 | .586            |       |                     |            |                     |
| -12C                   | -12D | .755                  |      |                 | ---                 | .674            |       | .650                | .760       | .826                |
| -16C                   | -16D | .831                  |      |                 | .128                | +0.005<br>-.000 |       |                     |            |                     |
| -20C                   | -20D | .881                  |      |                 |                     |                 | ---   | 1.255               | +0.005     | 1.151               |
| -24C                   | -24D | 1.035                 |      |                 | ---                 | 1.490           | -.000 | 1.401               | 1.550      | 1.635               |

| Size and material code |      | K    | L<br>±.004      | M min<br>(see note 1) | N     |      |      | P               |       | Q max | S    |      |       |      |      |       |       |       |                 |       |  |       |      |       |
|------------------------|------|------|-----------------|-----------------------|-------|------|------|-----------------|-------|-------|------|------|-------|------|------|-------|-------|-------|-----------------|-------|--|-------|------|-------|
| CRES                   | Al   |      |                 |                       | Steel | Alum |      |                 |       |       |      |      |       |      |      |       |       |       |                 |       |  |       |      |       |
| -3/-4C                 | ---  | .015 | +0.005<br>-.000 | .036                  | .485  | .161 | ---  | +0.005<br>-.000 | 1.078 | ±.020 | ---  | .480 | ±.010 |      |      |       |       |       |                 |       |  |       |      |       |
| -4C                    | ---  |      |                 |                       |       |      |      |                 |       |       |      |      |       |      |      |       |       |       |                 |       |  |       |      |       |
| -5C                    | ---  |      |                 |                       |       |      |      |                 |       |       |      |      |       | .040 | .501 | .224  |       | 1.117 |                 |       |  |       |      |       |
| -6C                    | ---  |      |                 |                       |       |      |      |                 |       |       |      |      |       | .521 | .261 |       | 1.150 |       |                 |       |  |       |      |       |
| -8C                    | -8D  | .020 |                 | .047                  | .583  | .345 | .345 |                 | 1.224 |       | ---  | .600 |       |      |      |       |       |       |                 |       |  |       |      |       |
| -10C                   | -10D |      |                 |                       |       |      |      |                 |       |       |      |      |       |      |      |       |       |       |                 |       |  |       |      |       |
| -12C                   | -12D | .030 | ±.005           | ---                   | .620  | .440 | .440 | +0.006<br>-.000 | 1.486 | ±.035 | ---  | .650 | ±.015 |      |      |       |       |       |                 |       |  |       |      |       |
| -16C                   | -16D |      |                 |                       |       |      |      |                 |       |       |      |      |       |      |      |       |       |       |                 |       |  |       |      |       |
| -20C                   | -20D |      |                 |                       |       |      |      |                 |       |       |      |      |       |      |      |       |       | 1.720 |                 | 1.937 |  | 15.5° | .675 | ±.025 |
| -24C                   | -24D |      |                 |                       |       |      |      |                 |       |       |      |      |       | .035 | ---  | 1.000 | 1.253 | 1.282 | +0.005<br>-.000 | 2.252 |  | 10.5° | .730 |       |
|                        |      |      |                 |                       |       |      |      | 2.561           |       | 15.5° | .935 |      |       |      |      |       |       |       |                 |       |  |       |      |       |
|                        |      |      |                 |                       |       |      |      |                 |       |       | .980 |      |       |      |      |       |       |       |                 |       |  |       |      |       |

FIGURE 1. Elbow illustration - Continued.

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| Size and material code |      | T max | U    | V     |      | W<br>+.005 -.000 |      |      |
|------------------------|------|-------|------|-------|------|------------------|------|------|
| CRES                   | AI   |       |      |       |      | CRES             | AI   |      |
| -3/-4C                 | ---  | ---   | .283 | ±.020 | ---  | ---              | ---  | ---  |
| -4C                    | ---  | ---   | .322 |       | ---  | ---              | ---  | ---  |
| -5C                    | ---  | ---   | .340 |       | ---  | ---              | ---  | ---  |
| -6C                    | ---  | ---   | .389 |       | ---  | ---              | ---  | ---  |
| -8C                    | -8D  | ---   | .465 |       | ---  | ---              | ---  | ---  |
| -10C                   | -10D | ---   | .536 | ±.035 | ---  | ---              | .420 | .427 |
| -12C                   | -12D | .900  | .623 |       | .625 | ±.010            | .500 | .500 |
| -16C                   | -16D | 1.190 | .660 |       | .670 |                  | .545 | .545 |
| -20C                   | -20D | 1.485 | .768 |       | .695 |                  | .565 | .571 |
| -24C                   | -24D | 1.750 | .867 |       | .795 |                  | .665 | .665 |

NOTES:

1. Use A dimension when the adjacent diameter to the left of plane B-B is greater than J dimension. When the adjacent diameter is equal to or less than J dimension, M dimension may be used in place of A dimension.
2. Any design of the elbow to the left of plane B-B is acceptable provided the dimensions P and U and the requirements of this specification sheet and the procurement specification are met.
3. Any forged design is acceptable for -3/-4 through -8 size.
4. Any bent tube design is acceptable for -10 through -24 size. The inside diameter (ID) of the elbow for the -10 through -24 sizes shall not be less than the ID of the nipple end of the adapter.
5. Ovality shall not exceed 7.5 percent of nominal tubing OD.
6. Unless otherwise specified, break or radius all corners .005, +.005, -.000 inch.
7. All diameters within length A plus S must be concentric within .005 inch total indicator movement.
8. Unless otherwise specified, maximum surface roughness shall not exceed 125 µin. Ra in accordance with ASME B46.1.
9. Remove all burrs and slivers.

FIGURE 1. Elbow illustration - Continued.

REQUIREMENTS

Elbow illustration, see figure 1.

Intended use. This part is a component of MS27067 for sizes -3/-4 through -8, and MS27063 for sizes -10 through -24. This is a design standard for manufacturing purposes. The item is only procured as an integral part of adapter assemblies.

Materials. Material and material codes see table I.

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TABLE I. Materials and material codes.

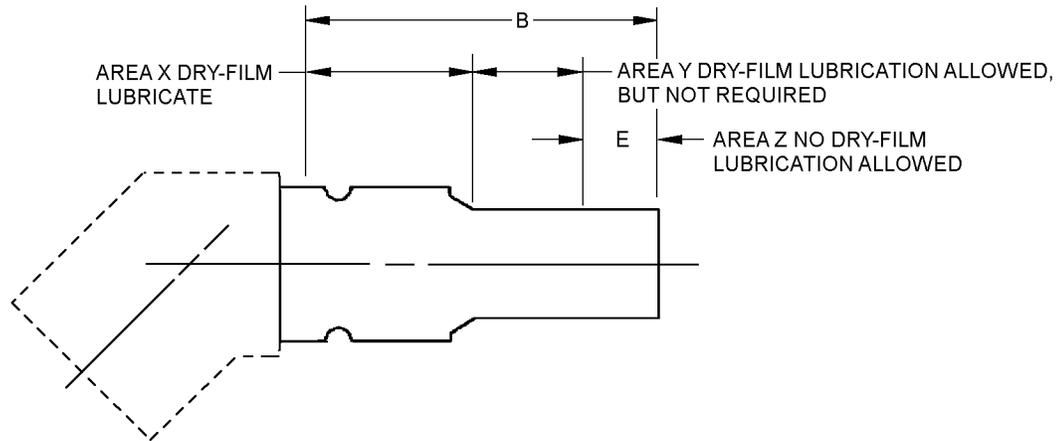
| Material code | Material  |
|---------------|---|
| C             | CRES, class 304 or 321 cold drawn or cold rolled, in accordance with SAE-AMS-QQ-S-763, SAE-AMS5639 or SAE-AMS5645.  |
| D             | Aluminum alloy, 6061-T6 or T651, in accordance with SAE-AMS-QQ-A-367, SAE-AMS-4117 or alloy 7075-T73, 7075-T7351 in accordance with SAE-AMS-QQ-A-225/9 or alloy 7055-T7351 in accordance with SAE-AMS-4124. |

Finish. Corrosion-resistant steel, passivate in accordance with SAE-AMS2700, method 1, type 6 or 7.

Aluminum alloy. Anodize in accordance with MIL-A-8625, type II, dye blue.

NOTE: Avoid using graphite dry film lubes with aluminum nipples because in a wet environment, graphite becomes corrosive to aluminum.

Dry-film lubrication. Dry film lubricant in accordance with figure 2 and table II.



| Size and material code |      | B min | E   |      |
|------------------------|------|-------|-----|------|
| CRES                   | Al   |       |     |      |
| -3/-4C                 | ---  | .870  | .25 | ±.05 |
| -4C                    | ---  |       |     |      |
| -5C                    | ---  | .890  | .32 | ±.12 |
| -6C                    | ---  |       |     |      |
| -8C                    | -8D  | 1.030 | .35 | ±.15 |
| -10C                   | -10D | 1.130 |     |      |
| -12C                   | -12D | 1.240 | .39 | ±.19 |
| -16C                   | -16D | 1.340 |     |      |
| -20C                   | -20D | 1.570 | .48 | ±.28 |
| -24C                   | -24D | 1.720 | .50 | ±.30 |

FIGURE 2. Dry-film lubrication area.

## MS27087D

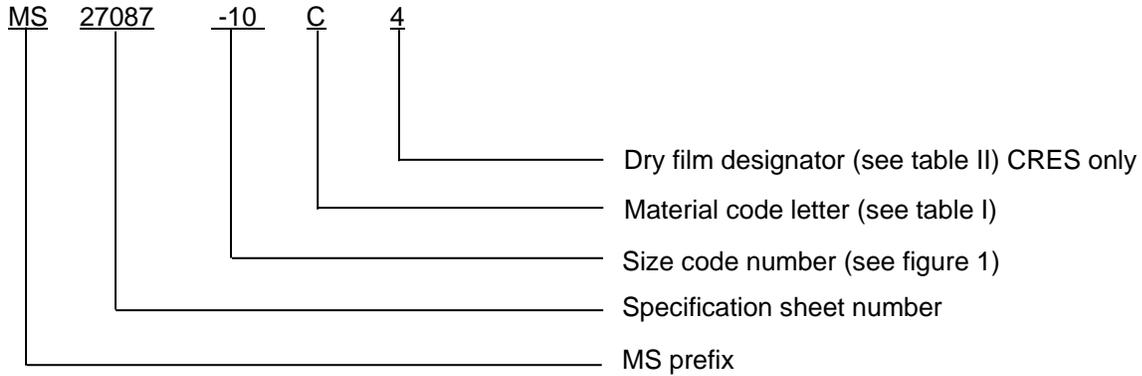
TABLE II. Dry film designator.

| Dry film designator | SAE class or type designator | Dry film characteristics   |
|---------------------|------------------------------|--|
| Blank               | Any SAE class or type below  | N/A  |
| SAE-AS1701          | SAE-AS1701 class             | SAE-AS1701 temperature ranges °F (°C)  |
| 4                   | 4                            | -65° to +1400°F (-54° to 760°C)  |
| 5                   | 5                            | -65° to +850°F (-54° to 454°C)   |
| 6                   | 6                            | -375° to +850°F (-226° to 454°C)   |
| SAE-AS5272          | SAE-AS5272 type              | SAE-AS5272 temperature ranges. °F (°C)   |
| 7                   | Type I                       | -90° to 400°F (-68 to 204°C) endurance life of 250 min minimum   |
| 8                   | Type II                      | -90° to 400°F (-68° to 204°C) endurance life of 450 min minimum  |
| 9                   | Type III                     | Color 1 - Natural product color -90° to 400°F (-68 to 204°C) low Volatile organic compound with an endurance life of 450 min minimum |
| 10                  | Type III                     | Color 2 - Black color -90° to 400°F (-68 to 204°C) low Volatile organic compound with an endurance life of 450 min minimum           |
| Dry film designator | MIL classification           | Dry film characteristics   |
| MIL-PRF-46010<br>1/ | ---                          | MIL-PRF-46010 temperature ranges. °F (°C)  |
| 11                  | 1                            | Color 1 natural product color, -90° to 400°F ( -68 to 204°C) solvent resisting   |
| 12                  | 2                            | Color 2 - Black color -90° to 400°F ( -68 to 204°C) solvent resisting  |

1/ Not for aerospace usage.

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Part or Identifying Number (PIN): The PIN consists of prefix "MS," the specification sheet number, dash number for 45° elbow, nipple end size, letter for material, and a blank or number for dry film lubricant. Unassigned PIN's shall not be used.



PIN examples:

MS27087-10C indicates a 45° elbow, nipple end size 10, CRES with dry film class designator.  
MS27087-10C4 indicates a 45° elbow, nipple end size 10, CRES with dry film class designator 4.

Order of precedence. Unless otherwise noted herein or in the contract, in the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

Referenced documents shall be of the issue in effect on date of invitations for bid.

Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue, due to the extent of the changes.

Referenced documents. In addition to MIL-DTL-27272, this document references the following:

|                    |              |
|--------------------|--------------|
| MIL-A-8625         | SAE-AMS2700  |
| MIL-PRF-46010      | SAE-AMS-4117 |
| MS27063            | SAE-AMS-4124 |
| MS27067            | SAE-AMS5639  |
| ASME B46.1         | SAE-AMS5645  |
| SAE-AMS-QQ-A-225/9 | SAE-AS1701   |
| SAE-AMS-QQ-A-367   | SAE-AS4395   |
| SAE-AMS-QQ-S-763   | SAE AS5272   |

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CONCLUDING MATERIAL

Custodians:

Army - AV  
Navy - AS  
Air Force - 99  
DLA - CC

Preparing activity:

DLA - CC

(Project 4730-2013-035)

Review activities:

Army - AR, AT, MI  
Navy - MC, SA, SH  
Air Force - 71

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at <https://assist.dla.mil>.