

# SURFACE VEHICLE STANDARD

**SAE** J530

REV.  
MAY94

Issued 1948-02  
Revised 1994-05

Superseding J530 JUN93

Submitted for recognition as an American National Standard

## AUTOMOTIVE PIPE FITTINGS

**1. Scope**—This SAE Standard includes complete general and dimensional specifications for those types of pipe fittings commonly used in the automotive and other mass production industries where the use of lubricants or sealers is objectionable. The automotive pipe fittings shown in Figures 1 to 17 and Tables 1 to 6 are intended for general automotive and similar applications involving low or medium pressures or in conjunction with automotive tube fittings in piping systems.

### 2. References

**2.1 Applicable Documents**—The following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply.

**2.1.1 SAE PUBLICATIONS**—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J476—Dryseal Pipe Threads

SAE J846—Coding Systems for Identification of Fluid Conductors and Connectors

SAE J1615—Thread Sealants

**2.1.2 ASTM PUBLICATION**—Available from ASTM, 1916 Race Street, Philadelphia, PA 19103-1187.

ASTM B 117—Method of Salt Spray (Fog) Testing

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# AUTOMOTIVE PIPE FITTINGS

NOTES: UNSPECIFIED DETAIL WITH RESPECT TO DIMENSIONS, TOLERANCES, CONTOURS, MATERIAL, WORKMANSHIP, ETC., MUST CONFORM TO GENERAL SPECIFICATIONS FOR AUTOMOTIVE PIPE FITTINGS. CODES SHOWN IN BRACKETS ADJACENT TO FIGURE NUMBERS REPRESENT RESPECTIVE FITTING IDENTIFICATION IN ACCORDANCE WITH SAE J846 (FEBRUARY, 1979).

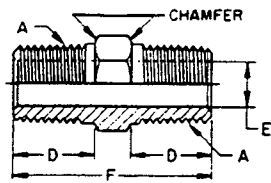


FIGURE 1—HEXAGON NIPPLE  
(130137)

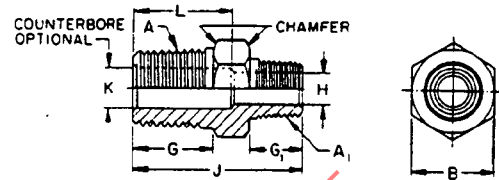


FIGURE 2—HEXAGON REDUCER NIPPLE  
(130137)

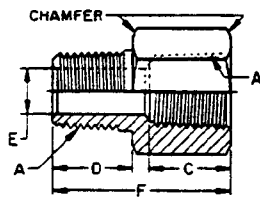


FIGURE 3—ADAPTER  
(130139)

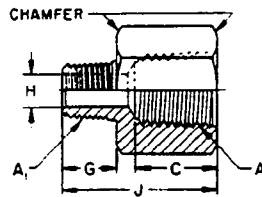


FIGURE 4—REDUCER  
ADAPTER (130139)

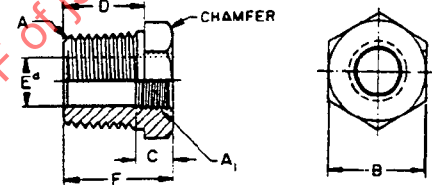


FIGURE 5—REDUCER  
BUSHING (130140)

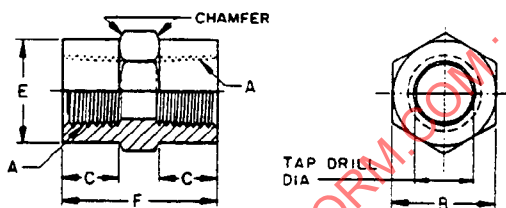


FIGURE 6—COUPLING (130138)

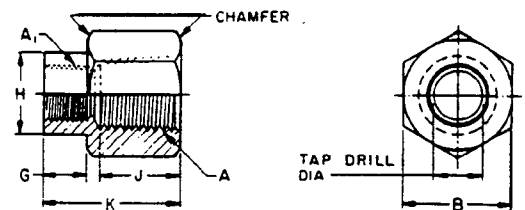


FIGURE 7—REDUCER COUPLING  
(130138)

TABLE 1—DIMENSIONS OF HEXAGON NIPPLES AND REDUCER NIPPLES (FIGURES 1 AND 2)

| Dryseal Taper<br>Thread NPTFA<br>In<br>A | Hexagon<br>Reducer<br>Nipples<br>In | All Nipples<br>B              |                               | All Nipples<br>B              |                               | All Nipples<br>B              |                               | Nipples<br>D<br>Shoulder<br>Length <sup>b</sup><br>mm | Nipples<br>D<br>Shoulder<br>Length <sup>b</sup><br>In | Nipples<br>E<br>Drill<br>Dia<br>mm | Nipples<br>E<br>Drill<br>Dia<br>In | Nipples<br>F<br>Overall<br>Length <sup>b</sup><br>mm | Nipples<br>F<br>Overall<br>Length <sup>b</sup><br>In |
|------------------------------------------|-------------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------------------------------|-------------------------------------------------------|------------------------------------|------------------------------------|------------------------------------------------------|------------------------------------------------------|
|                                          |                                     | Hexagon<br>Width<br>Max<br>mm | Hexagon<br>Width<br>Min<br>mm | Hexagon<br>Width<br>Max<br>In | Hexagon<br>Width<br>Min<br>In | Hexagon<br>Width<br>Max<br>mm | Hexagon<br>Width<br>Min<br>mm |                                                       |                                                       |                                    |                                    |                                                      |                                                      |
| 1/16-27                                  | —                                   | 8.03                          | 7.87                          | 0.316                         | 0.310                         | 8.03                          | 7.87                          | 9.7                                                   | 0.38                                                  | 3.58                               | 0.141                              | 23.9                                                 | 0.94                                                 |
| 1/8-27                                   | 1/8 x 1/16                          | 11.18                         | 11.02                         | 0.440                         | 0.434                         | 11.18                         | 11.02                         | 9.7                                                   | 0.38                                                  | 5.56                               | 0.219                              | 24.6                                                 | 0.97                                                 |
| 1/4-18                                   | 1/4 x 1/8                           | 14.38                         | 14.17                         | 0.566                         | 0.558                         | 14.38                         | 14.17                         | 14.2                                                  | 0.56                                                  | 7.92                               | 0.312                              | 35.1                                                 | 1.38                                                 |
| 3/8-18                                   | 3/8 x 1/8                           | 17.58                         | 17.37                         | 0.692                         | 0.684                         | 17.58                         | 17.37                         | 14.2                                                  | 0.56                                                  | 11.13                              | 0.438                              | 35.8                                                 | 1.41                                                 |
| 1/2-14                                   | 1/2 x 3/8                           | 22.33                         | 22.12                         | 0.879                         | 0.871                         | 22.33                         | 22.12                         | 19.0                                                  | 0.75                                                  | 14.27                              | 0.562                              | 46.0                                                 | 1.81                                                 |

TABLE 1—DIMENSIONS OF HEXAGON NIPPLES AND REDUCER NIPPLES (Figures 1 and 2) (Continued)

| Dryseal Taper<br>Thread NPTFA<br>In<br>A x A <sub>1</sub> | Hexagon<br>Reducer<br>Nipples<br>In | Reducer<br>Nipples<br>G                      |                                              | Reducer<br>Nipples<br>G <sub>1</sub>         |                                              | Reducer<br>Nipples<br>H         |                                 | Reducer<br>Nipples<br>J              |                                      | Reducer<br>Nipples<br>K       |                               | Reducer<br>Nipples<br>L           |                                   |
|-----------------------------------------------------------|-------------------------------------|----------------------------------------------|----------------------------------------------|----------------------------------------------|----------------------------------------------|---------------------------------|---------------------------------|--------------------------------------|--------------------------------------|-------------------------------|-------------------------------|-----------------------------------|-----------------------------------|
|                                                           |                                     | Shoulder<br>Length <sup>b</sup><br>Min<br>mm | Shoulder<br>Length <sup>b</sup><br>Max<br>mm | Shoulder<br>Length <sup>b</sup><br>Min<br>In | Shoulder<br>Length <sup>b</sup><br>Max<br>In | Drill<br>Dia <sup>c</sup><br>mm | Drill<br>Dia <sup>c</sup><br>In | Overall<br>Length <sup>b</sup><br>mm | Overall<br>Length <sup>b</sup><br>In | Max<br>Dia <sup>c</sup><br>mm | Max<br>Dia <sup>c</sup><br>In | Max<br>Depth <sup>b,c</sup><br>mm | Max<br>Depth <sup>b,c</sup><br>In |
| 1/8 x 1/16                                                | 9.7                                 | 0.38                                         | 9.7                                          | 0.38                                         | 9.7                                          | 3.58                            | 1.141                           | 24.6                                 | 0.97                                 | 5.66                          | 0.223                         | 11.9                              | 0.47                              |
| 1/4 x 1/8                                                 | 14.2                                | 0.56                                         | 14.2                                         | 0.56                                         | 14.2                                         | 5.56                            | 0.219                           | 30.2                                 | 1.19                                 | 8.08                          | 0.310                         | 17.5                              | 0.69                              |
| 3/8 x 1/4                                                 | 14.2                                | 0.56                                         | 14.2                                         | 0.56                                         | 14.2                                         | 7.92                            | 0.312                           | 35.8                                 | 1.41                                 | 11.28                         | 0.444                         | 17.5                              | 0.69                              |
| 1/2 x 3/8                                                 | 19.0                                | 0.75                                         | 19.0                                         | 0.75                                         | 19.0                                         | 11.13                           | 0.438                           | 41.1                                 | 1.62                                 | 14.43                         | 0.568                         | 23.1                              | 0.91                              |

a Dryseal American Standard Taper Pipe Thread. See General Specifications.

b Where SAE Short Pipe Thread is authorized by purchaser, dimensions D, F, G, G<sub>1</sub>, J, and L are reduced in accordance with reduction of pipe thread length. See General Specifications.

c At manufacturers option, through passages may conform with the smaller diameter specified or be counterbored to the larger diameter for the depth specified.

TABLE 2—DIMENSIONS OF ADAPTERS AND REDUCER ADAPTERS (FIGURES 3 AND 4)

| Dryseal Taper<br>Thread NPTfa<br>In<br>A | Dryseal Taper<br>Thread NPTfa<br>In<br>A x A <sub>1</sub><br>Reducer<br>Adapters | All Adapters<br>B             |                               | All Adapters<br>B             |                               | All Adapters<br>C                       |                                         | All Adapters<br>C                       |                                         | All Adapters<br>D                     |                                       | All Adapters<br>E  |                    |
|------------------------------------------|----------------------------------------------------------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-----------------------------------------|-----------------------------------------|-----------------------------------------|-----------------------------------------|---------------------------------------|---------------------------------------|--------------------|--------------------|
|                                          |                                                                                  | Hexagon<br>Width<br>Max<br>mm | Hexagon<br>Width<br>Min<br>mm | Hexagon<br>Width<br>Max<br>mm | Hexagon<br>Width<br>Min<br>mm | Tap Drill<br>Depth <sup>b,c</sup><br>mm | Tap Drill<br>Depth <sup>b,c</sup><br>In | Tap Drill<br>Depth <sup>b,c</sup><br>mm | Tap Drill<br>Depth <sup>b,c</sup><br>In | Shoulder<br>Length <sup>b</sup><br>mm | Shoulder<br>Length <sup>b</sup><br>In | Dia<br>Drill<br>mm | Dia<br>Drill<br>In |
| 1/16-27                                  | —                                                                                | 11.18                         | 11.02                         | 0.440                         | 0.434                         | 9.7                                     | 0.38                                    | 9.7                                     | 0.38                                    | 3.58                                  | 0.141                                 | 3.58               | 0.141              |
| 1/8-27                                   | 1/8 x 1/16                                                                       | 14.38                         | 14.17                         | 0.566                         | 0.558                         | 9.7                                     | 0.38                                    | 9.7                                     | 0.38                                    | 5.56                                  | 0.219                                 | 5.56               | 0.219              |
| 1/4-18                                   | 1/4 x 1/8                                                                        | 19.15                         | 18.95                         | 0.754                         | 0.746                         | 14.2                                    | 0.56                                    | 14.2                                    | 0.56                                    | 7.92                                  | 0.312                                 | 7.92               | 0.312              |
| 3/8-18                                   | 3/8 x 1/4                                                                        | 22.33                         | 22.12                         | 0.879                         | 0.871                         | 14.2                                    | 0.56                                    | 14.2                                    | 0.56                                    | 11.13                                 | 0.438                                 | 11.13              | 0.438              |
| 1/2-14                                   | 1/2 x 3/8                                                                        | 27.13                         | 26.87                         | 1.068                         | 1.058                         | 19.0                                    | 0.75                                    | 19.0                                    | 0.75                                    | 14.27                                 | 0.562                                 | 14.27              | 0.562              |
| 3/4-14                                   | 3/4 x 1/2                                                                        | 35.05                         | 34.80                         | 1.380                         | 1.370                         | 19.0                                    | 0.75                                    | 19.0                                    | 0.75                                    | 19.05                                 | 0.750                                 | 19.05              | 0.750              |
| 1-11-1/2                                 | 1 x 3/4                                                                          | 41.40                         | 41.15                         | 1.630                         | 1.620                         | 23.9                                    | 0.94                                    | 23.9                                    | 0.94                                    | 23.82                                 | 0.938                                 | 23.82              | 0.938              |

TABLE 2—DIMENSIONS OF ADAPTERS AND REDUCER ADAPTERS (FIGURES 3 AND 4) (CONTINUED)

| Dryseal Taper<br>Thread NPTfa<br>In<br>A | Dryseal Taper<br>Thread NPTfa<br>In<br>A x A <sub>1</sub><br>Reducer<br>Adapters | All Adapters<br>F                    |                                      | All Adapters<br>G                     |                                       | All Adapters<br>H  |                    | All Adapters<br>J                    |                                      | All Adapters<br>J                    |                                      |
|------------------------------------------|----------------------------------------------------------------------------------|--------------------------------------|--------------------------------------|---------------------------------------|---------------------------------------|--------------------|--------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
|                                          |                                                                                  | Overall<br>Length <sup>b</sup><br>mm | Overall<br>Length <sup>b</sup><br>In | Shoulder<br>Length <sup>b</sup><br>mm | Shoulder<br>Length <sup>b</sup><br>In | Dia<br>Drill<br>mm | Dia<br>Drill<br>In | Overall<br>Length <sup>b</sup><br>mm | Overall<br>Length <sup>b</sup><br>In | Overall<br>Length <sup>b</sup><br>mm | Overall<br>Length <sup>b</sup><br>In |
| 1/16-27                                  | —                                                                                | 21.3                                 | 0.84                                 | 9.7                                   | 0.38                                  | 3.58               | 0.141              | 21.3                                 | 0.84                                 | 21.3                                 | 0.84                                 |
| 1/8-27                                   | 1/8 x 1/16                                                                       | 22.4                                 | 0.88                                 | 9.7                                   | 0.38                                  | 5.56               | 0.219              | 26.9                                 | 1.06                                 | 26.9                                 | 1.06                                 |
| 1/4-18                                   | 1/4 x 1/8                                                                        | 31.8                                 | 1.25                                 | 14.2                                  | 0.56                                  | 7.92               | 0.312              | 31.8                                 | 1.25                                 | 31.8                                 | 1.25                                 |
| 3/8-18                                   | 3/8 x 1/4                                                                        | 42.2                                 | 1.66                                 | 19.0                                  | 0.75                                  | 11.13              | 0.438              | 47.8                                 | 1.88                                 | 47.8                                 | 1.88                                 |
| 1/2-14                                   | 1/2 x 3/8                                                                        | 42.9                                 | 1.69                                 | 19.0                                  | 0.75                                  | 14.27              | 0.562              | 47.8                                 | 1.88                                 | 47.8                                 | 1.88                                 |
| 3/4-14                                   | 3/4 x 1/2                                                                        | 52.3                                 | 2.06                                 | 19.0                                  | 0.75                                  | 19.05              | 0.750              | 47.8                                 | 1.88                                 | 47.8                                 | 1.88                                 |
| 1-11-1/2                                 | 1 x 3/4                                                                          | 52.3                                 | 2.06                                 | 19.0                                  | 0.75                                  | 19.05              | 0.750              | 47.8                                 | 1.88                                 | 47.8                                 | 1.88                                 |

a Dryseal American Standard Taper Pipe Thread. See General Specifications.

b Where SAE Short Pipe Thread is authorized by purchaser, dimensions C, F, G, and J are reduced in accordance with reduction of pipe thread length. See General Specifications.

c Tap drill depths given require use of bottoming taps to produce standard full thread lengths. See General Specifications.

# AUTOMOTIVE PIPE FITTINGS—CAST TYPE

NOTES: UNSPECIFIED DETAIL WITH RESPECT TO DIMENSIONS, TOLERANCES, CONTOURS, MATERIAL, WORKMANSHIP, ETC., MUST CONFORM TO GENERAL SPECIFICATIONS FOR AUTOMOTIVE PIPE FITTINGS. THE DIMENSIONAL DESIGNATIONS ON THE FIRST FIGURE IN EACH GROUP SHALL APPLY TO ALL OTHER FIGURES IN THAT GROUP EXCEPT AS SHOWN OTHERWISE. CODES SHOWN IN BRACKETS ADJACENT TO FIGURE NUMBERS REPRESENT RESPECTIVE FITTING IDENTIFICATION IN ACCORDANCE WITH SAE J846 (FEBRUARY, 1979).

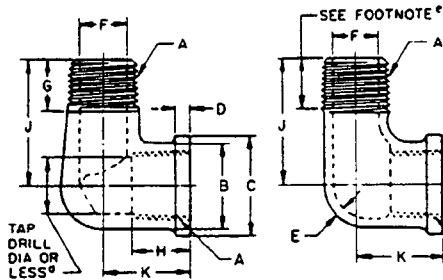


FIGURE 8—90 DEGREE STREET ELBOWS (130239)

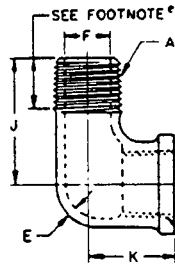


FIGURE 9—45 DEGREE STREET ELBOWS (130339)

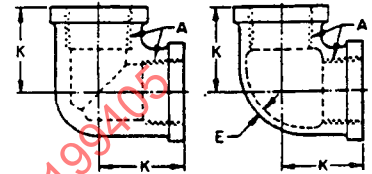
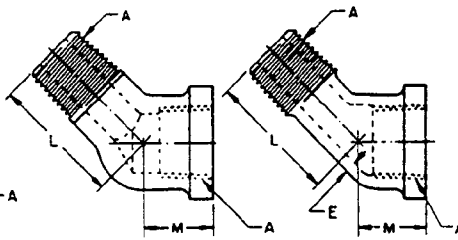


FIGURE 10—90 DEGREE PIPE ELBOWS (130238)

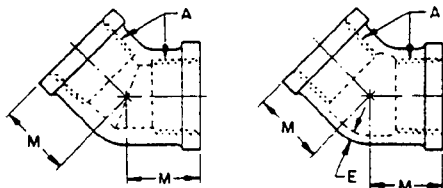


FIGURE 11—45 DEGREE PIPE ELBOWS (130338)

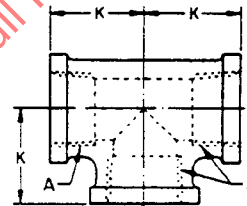


FIGURE 12A—INTERNAL, INTERNAL, INTERNAL TEES (130438)

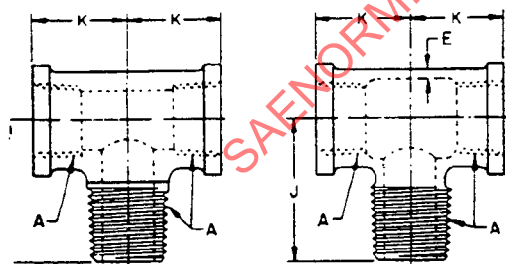
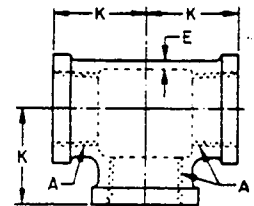


FIGURE 12B—INTERNAL, INTERNAL, EXTERNAL TEES (130425)

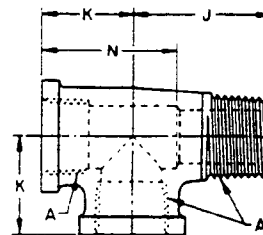


FIGURE 12C—INTERNAL, EXTERNAL, INTERNAL TEES (130424)

TABLE 3—DIMENSIONS OF REDUCER BUSHINGS (FIGURE 5)

| Dryseal<br>Taper<br>Thread<br>NPT <sup>a</sup> In | B                       |       | B                       |       | B                       |       | C                                        |      | C                                        |      | D                                      |      | E                   |       | F                                    |                                      |
|---------------------------------------------------|-------------------------|-------|-------------------------|-------|-------------------------|-------|------------------------------------------|------|------------------------------------------|------|----------------------------------------|------|---------------------|-------|--------------------------------------|--------------------------------------|
|                                                   | Hexagon<br>Width<br>Max | In    | Hexagon<br>Width<br>Min | In    | Hexagon<br>Width<br>Max | In    | Tap Drill<br>Depth <sup>b,c</sup><br>Min | mm   | Tap Drill<br>Depth <sup>b,c</sup><br>Min | mm   | Shoulder<br>Length <sup>b</sup><br>Min | In   | Hole<br>Diam<br>Min | mm    | Overall<br>Length <sup>b</sup><br>mm | Overall<br>Length <sup>b</sup><br>In |
| 1/8 x 1/16                                        | 11.18                   | 0.440 | 11.02                   | 0.434 | 14.17                   | 0.558 | 9.7                                      | 9.7  | 0.38                                     | 9.7  | 0.38                                   | 0.38 | 3.53                | 0.139 | 14.2                                 | 0.56                                 |
| 1/4 x 1/8                                         | 14.38                   | 0.566 | 14.17                   | 0.558 | 17.37                   | 0.684 | 9.7                                      | 9.7  | 0.38                                     | 14.2 | 0.56                                   | 0.56 | 5.51                | 0.217 | 19.0                                 | 0.75                                 |
| 3/8 x 1/8                                         | 17.58                   | 0.692 | 17.37                   | 0.684 | 19.15                   | 0.754 | 14.2                                     | 14.2 | 0.56                                     | 14.2 | 0.56                                   | 0.56 | 7.85                | 0.309 | 19.0                                 | 0.75                                 |
| 1/2 x 1/8                                         | 22.33                   | 0.879 | 22.12                   | 0.871 | 22.12                   | 0.871 | 14.2                                     | 14.2 | 0.56                                     | 19.0 | 0.75                                   | 0.75 | 7.85                | 0.309 | 25.4                                 | 1.00                                 |
| 1/2 x 1/4                                         | 22.33                   | 0.879 | 22.12                   | 0.871 | 22.12                   | 0.871 | 14.2                                     | 14.2 | 0.56                                     | 19.0 | 0.75                                   | 0.75 | 7.85                | 0.309 | 25.4                                 | 1.00                                 |
| 1/2 x 3/8                                         | 22.33                   | 0.879 | 22.12                   | 0.871 | 22.12                   | 0.871 | 14.2                                     | 14.2 | 0.56                                     | 19.0 | 0.75                                   | 0.75 | 11.05               | 0.435 | 25.4                                 | 1.00                                 |
| 3/4 x 1/4                                         | 28.70                   | 1.130 | 28.45                   | 1.120 | 28.45                   | 1.120 | 14.2                                     | 14.2 | 0.56                                     | 19.0 | 0.75                                   | 0.75 | 7.85                | 0.309 | 25.4                                 | 1.00                                 |
| 3/4 x 3/8                                         | 28.70                   | 1.130 | 28.45                   | 1.120 | 28.45                   | 1.120 | 14.2                                     | 14.2 | 0.56                                     | 19.0 | 0.75                                   | 0.75 | 11.05               | 0.435 | 25.4                                 | 1.00                                 |
| 3/4 x 1/2                                         | 28.70                   | 1.130 | 28.45                   | 1.120 | 28.45                   | 1.120 | 19.0                                     | 19.0 | 0.75                                     | 19.0 | 0.75                                   | 0.75 | 14.20               | 0.559 | 25.4                                 | 1.00                                 |
| 1 x 1/2                                           | 36.63                   | 1.442 | 36.37                   | 1.432 | 36.37                   | 1.432 | 19.0                                     | 19.0 | 0.75                                     | 23.9 | 0.94                                   | 0.94 | 14.20               | 0.559 | 33.3                                 | 1.31                                 |
| 1 x 3/4                                           | 36.63                   | 1.442 | 36.37                   | 1.432 | 36.37                   | 1.432 | 19.0                                     | 19.0 | 0.75                                     | 23.9 | 0.94                                   | 0.94 | 18.98               | 0.747 | 33.3                                 | 1.31                                 |

<sup>a</sup> Dryseal American Standard Pipe Thread. See General Specifications.

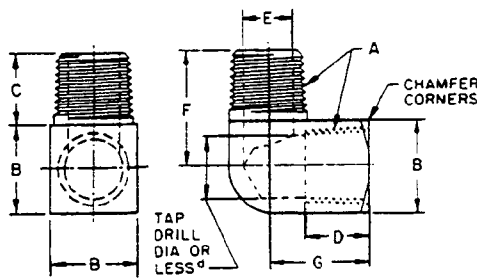
<sup>b</sup> Where SAE Short Pipe Thread is authorized by purchaser, dimensions C, D, and F are reduced in accordance with reduction of pipe thread length. See General Specifications.

<sup>c</sup> Tap drill depths given require use of bottoming taps to produce standard full thread lengths. See General Specifications.

<sup>d</sup> At manufacturer's option, hole may conform to tap drill diameter or may be reduced beyond tap drill depth C, but in no case shall it be smaller than E diameter specified.

# AUTOMOTIVE PIPE FITTINGS—EXTRUDED OR BAR STOCK TYPE

NOTES: UNSPECIFIED DETAIL WITH RESPECT TO DIMENSIONS, TOLERANCES, CONTOURS, MATERIAL, WORKMANSHIP, ETC., MUST CONFORM TO GENERAL SPECIFICATIONS FOR AUTOMOTIVE PIPE FITTINGS. THE DIMENSIONAL DESIGNATIONS ON THE FIRST FIGURE IN EACH GROUP SHALL APPLY TO ALL OTHER FIGURES IN THAT GROUP EXCEPT AS SHOWN OTHERWISE. CODES SHOWN IN BRACKETS ADJACENT TO FIGURE NUMBERS REPRESENT RESPECTIVE FITTING IDENTIFICATION IN ACCORDANCE WITH SAE J846 (FEBRUARY, 1979).



EMSFITURE 13—90 DEGREE  
EMSTREET ELBOW (130239)

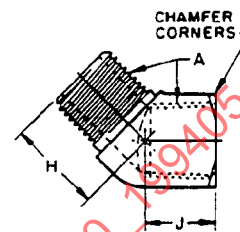
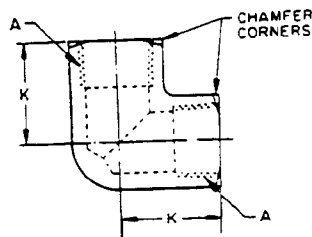


FIGURE 14—45 DEGREE  
STREET ELBOW (130339)



EMSFITURE 15—90 DEGREE  
EMPIPE ELBOW (130238)

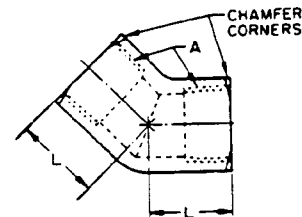


FIGURE 16—45 DEGREE,  
PIPE ELBOW (130338)

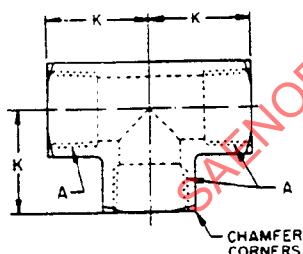


FIGURE 17A—INTERNAL,  
INTERNAL, INTERNAL  
(130438)

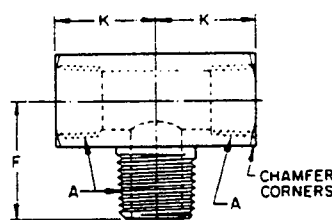


FIGURE 17B—INTERNAL,  
INTERNAL, EXTERNAL  
(130425)

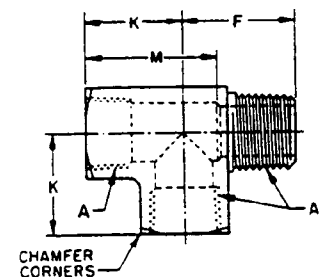


FIGURE 17C—INTERNAL,  
EXTERNAL, INTERNAL  
(130424)

FIGURE 17—TEES

(R) TABLE 4—DIMENSIONS OF COUPLINGS AND REDUCER COUPLINGS (FIGURES 6 AND 7)

| Dryseal<br>Taper<br>Thread<br>NPTF <sup>a</sup> , In<br>A | Dryseal<br>Taper<br>Thread<br>NPTF <sup>a</sup> , In<br>A | All<br>Couplings<br>B |       | All<br>Couplings<br>B |       | All<br>Couplings<br>B |      | All<br>Couplings<br>B |      | Couplings<br>C      |          | Couplings<br>E |                     | Couplings<br>F      |         |
|-----------------------------------------------------------|-----------------------------------------------------------|-----------------------|-------|-----------------------|-------|-----------------------|------|-----------------------|------|---------------------|----------|----------------|---------------------|---------------------|---------|
|                                                           |                                                           | Hexagon               |       | Hexagon               |       | Hexagon               |      | Hexagon               |      | Shoulder            |          | Min Body       |                     | Overall             |         |
|                                                           |                                                           | Width                 | Max   | Width                 | Max   | Width                 | Min  | Width                 | Min  | Length <sup>b</sup> | Shoulder | Dia            | Length <sup>b</sup> | Length <sup>b</sup> | Overall |
| Coupling                                                  | Coupling                                                  | mm                    | In    | mm                    | In    | mm                    | In   | mm                    | In   | mm                  | In       | mm             | mm                  | mm                  | In      |
| 1/16-27                                                   | -----                                                     | 11.18                 | 0.440 | 11.02                 | 0.434 | 7.1                   | 0.28 | 11.2                  | 0.44 | 19.0                | 0.75     | 19.0           | 0.75                | 19.0                | 0.75    |
| 1/8-27                                                    | 1/8 x 1/16                                                | 14.38                 | 0.566 | 14.17                 | 0.558 | 6.9                   | 0.27 | 14.2                  | 0.56 | 19.0                | 0.75     | 19.0           | 0.75                | 19.0                | 0.75    |
| 1/4-18                                                    | 1/4 x 1/8                                                 | 19.15                 | 0.754 | 18.95                 | 0.746 | 11.2                  | 0.44 | 19.0                  | 0.75 | 28.4                | 1.12     | 28.4           | 1.12                | 28.4                | 1.12    |
| 3/8-18                                                    | 3/8 x 1/8                                                 | 22.33                 | 0.879 | 22.12                 | 0.871 | 10.7                  | 0.42 | 22.4                  | 0.88 | 28.4                | 1.12     | 28.4           | 1.12                | 28.4                | 1.12    |
| —                                                         | 3/8 x 1/4                                                 | 22.33                 | 0.879 | 22.12                 | 0.871 | —                     | —    | —                     | —    | —                   | —        | —              | —                   | —                   | —       |
| 1/2-14                                                    | 1/2 x 1/8                                                 | 27.13                 | 1.068 | 26.87                 | 1.058 | 15.0                  | 0.59 | 26.9                  | 1.06 | 38.1                | 1.50     | 38.1           | 1.50                | 38.1                | 1.50    |
| —                                                         | 1/2 x 1/4                                                 | 27.13                 | 1.068 | 26.87                 | 1.058 | —                     | —    | —                     | —    | —                   | —        | —              | —                   | —                   | —       |
| —                                                         | 1/2 x 3/8                                                 | 27.13                 | 1.068 | 26.87                 | 1.058 | —                     | —    | —                     | —    | —                   | —        | —              | —                   | —                   | —       |

(R) TABLE 4—DIMENSIONS OF COUPLINGS AND REDUCER COUPLINGS (Figures 6 and 7) (continued)

| Dryseal<br>Taper<br>Thread<br>NPTF <sup>a</sup> , In<br>A | Coupling<br>A | Dryseal<br>Taper<br>Thread<br>NPTF <sup>a</sup> , In<br>A x A <sub>1</sub> |      | Reducer<br>Couplings<br>G |      | Reducer<br>Couplings<br>H |      | Reducer<br>Couplings<br>J |      | Reducer<br>Couplings<br>K |      |
|-----------------------------------------------------------|---------------|----------------------------------------------------------------------------|------|---------------------------|------|---------------------------|------|---------------------------|------|---------------------------|------|
|                                                           |               | Shoulder                                                                   |      | Shoulder                  |      | Min Body                  |      | Min Tap                   |      | Min Tap                   |      |
|                                                           |               | Length <sup>b</sup>                                                        | mm   | Length <sup>b</sup>       | mm   | Dia                       | In   | Depth <sup>b,c</sup>      | In   | Depth <sup>b,c</sup>      | In   |
| 1/16-27                                                   | ----          | —                                                                          | —    | —                         | —    | —                         | —    | —                         | —    | —                         | —    |
| 1/8-27                                                    | 1/8 x 1/16    | 7.9                                                                        | 0.31 | 12.7                      | 0.50 | 9.7                       | 0.38 | 14.2                      | 0.56 | 19.8                      | 0.78 |
| 1/4-18                                                    | 1/4 x 1/8     | 7.9                                                                        | 0.31 | 14.2                      | 0.56 | 14.2                      | 0.56 | 14.2                      | 0.56 | 24.6                      | 0.97 |
| 3/8-18                                                    | 3/8 x 1/8     | 6.4                                                                        | 0.25 | 14.2                      | 0.56 | 14.2                      | 0.56 | 14.2                      | 0.56 | 23.9                      | 0.94 |
| —                                                         | 3/8 x 1/4     | 11.9                                                                       | 0.47 | 19.0                      | 0.75 | 14.2                      | 0.56 | 14.2                      | 0.56 | 29.5                      | 1.16 |
| 1/2-14                                                    | 1/2 x 1/8     | 6.4                                                                        | 0.25 | 14.2                      | 0.56 | 19.0                      | 0.75 | 19.0                      | 0.75 | 30.2                      | 1.19 |
| —                                                         | 1/2 x 1/4     | 8.6                                                                        | 0.34 | 19.0                      | 0.75 | 19.0                      | 0.75 | 19.0                      | 0.75 | 32.5                      | 1.28 |
| —                                                         | 1/2 x 3/8     | 11.2                                                                       | 0.44 | 22.4                      | 0.88 | 19.0                      | 0.75 | 19.0                      | 0.75 | 35.1                      | 1.38 |

a Dryseal American Standard Taper Pipe Thread. See General Specifications.

b Where SAE Short Pipe Thread is authorized by purchaser, dimensions C, F, G, J, and K are reduced in accordance with reduction of pipe thread length. See General Specifications.

c Tap drill depths given require use of bottoming taps to produce standard full thread length. See General Specifications.

TABLE 5—DIMENSIONS OF CAST TYPE STREET ELBOWS, PIPE ELBOWS, AND PIPE TEES  
(Figures 8 to 12)

| A<br>Dryseal<br>Taper<br>Thread<br>NPTF <sup>a</sup><br>In | B<br>Min<br>Body<br>Dia<br>mm | B<br>Min<br>Body<br>Dia<br>In | C<br>Min<br>Collar<br>Dia<br>mm | C<br>Min<br>Collar<br>Dia<br>In | D<br>Min<br>Collar<br>Thick-<br>ness<br>mm | D<br>Min<br>Collar<br>Thick-<br>ness<br>In | E<br>Min<br>Wall<br>Thick-<br>ness<br>mm | E<br>Min<br>Wall<br>Thick-<br>ness<br>In | F<br>Drill<br>Dia <sup>f</sup><br>mm | F<br>Drill<br>Dia <sup>f</sup><br>In | G<br>Turned<br>Length <sup>b</sup><br>Min<br>mm | G<br>Turned<br>Length <sup>b</sup><br>Min<br>In | H<br>Min<br>Tap<br>Drill<br>Depth <sup>b,c</sup><br>mm | H<br>Min<br>Tap<br>Drill<br>Depth <sup>b,c</sup><br>In | J<br>Center<br>to<br>End <sup>b</sup><br>Max<br>mm | J<br>Center<br>to<br>End <sup>b</sup><br>Max<br>In |
|------------------------------------------------------------|-------------------------------|-------------------------------|---------------------------------|---------------------------------|--------------------------------------------|--------------------------------------------|------------------------------------------|------------------------------------------|--------------------------------------|--------------------------------------|-------------------------------------------------|-------------------------------------------------|--------------------------------------------------------|--------------------------------------------------------|----------------------------------------------------|----------------------------------------------------|
|                                                            |                               |                               |                                 |                                 |                                            |                                            |                                          |                                          |                                      |                                      |                                                 |                                                 |                                                        |                                                        |                                                    |                                                    |
| 1/16-27                                                    | 11.2                          | 0.44                          | 13.5                            | 0.53                            | 3.0                                        | 0.12                                       | 2.0                                      | 0.08                                     | 3.58                                 | 0.141                                | 9.7                                             | 0.38                                            | 9.7                                                    | 0.38                                                   | 21.3                                               | 0.84                                               |
| 1/8-27                                                     | 14.2                          | 0.56                          | 17.0                            | 0.67                            | 3.6                                        | 0.14                                       | 2.0                                      | 0.08                                     | 5.56                                 | 0.219                                | 9.7                                             | 0.38                                            | 9.7                                                    | 0.38                                                   | 24.1                                               | 0.95                                               |
| 1/4-18                                                     | 19.3                          | 0.72                          | 20.6                            | 0.81                            | 4.1                                        | 0.16                                       | 2.0                                      | 0.08                                     | 7.92                                 | 0.312                                | 14.2                                            | 0.56                                            | 14.2                                                   | 0.56                                                   | 29.2                                               | 1.15                                               |
| 3/8-18                                                     | 22.4                          | 0.88                          | 25.4                            | 1.00                            | 4.3                                        | 0.17                                       | 2.3                                      | 0.09                                     | 11.13                                | 0.438                                | 14.2                                            | 0.56                                            | 14.2                                                   | 0.56                                                   | 33.0                                               | 1.30                                               |
| 1/2-14                                                     | 26.2                          | 1.03                          | 29.7                            | 1.17                            | 4.8                                        | 0.19                                       | 2.3                                      | 0.09                                     | 14.27                                | 0.562                                | 19.0                                            | 0.75                                            | 19.0                                                   | 0.75                                                   | 39.6                                               | 1.56                                               |

TABLE 5—DIMENSIONS OF CAST TYPE STREET ELBOWS, PIPE ELBOWS, AND PIPE  
TEES (Figures 8 to 12) (Continued)

| A<br>Dryseal<br>Taper<br>Thread<br>NPTF <sup>a</sup><br>In | J<br>Center<br>to<br>End <sup>b</sup><br>Min<br>mm | J<br>Center<br>to<br>End <sup>b</sup><br>Min<br>In | K<br>Center<br>to<br>End <sup>b</sup><br>Max<br>mm | K<br>Center<br>to<br>End <sup>b</sup><br>Max<br>In | L<br>Center<br>to<br>End <sup>b</sup><br>Max<br>mm | L<br>Center<br>to<br>End <sup>b</sup><br>Max<br>In | L<br>Center<br>to<br>End <sup>b</sup><br>Min<br>mm | L<br>Center<br>to<br>End <sup>b</sup><br>Min<br>In | M<br>Center<br>to<br>End <sup>b</sup><br>Max<br>mm | M<br>Center<br>to<br>End <sup>b</sup><br>Max<br>In | N<br>Drill<br>Depth<br>mm | N<br>Drill<br>Depth<br>In |
|------------------------------------------------------------|----------------------------------------------------|----------------------------------------------------|----------------------------------------------------|----------------------------------------------------|----------------------------------------------------|----------------------------------------------------|----------------------------------------------------|----------------------------------------------------|----------------------------------------------------|----------------------------------------------------|---------------------------|---------------------------|
|                                                            |                                                    |                                                    |                                                    |                                                    |                                                    |                                                    |                                                    |                                                    |                                                    |                                                    |                           |                           |
| 1/16-27                                                    | 19.8                                               | 0.78                                               | 13.5                                               | 0.53                                               | 18.3                                               | 0.72                                               | 16.8                                               | 0.66                                               | 11.2                                               | 0.44                                               | 16.8                      | 0.66                      |
| 1/8-27                                                     | 22.6                                               | 0.89                                               | 14.7                                               | 0.58                                               | 20.6                                               | 0.81                                               | 19.0                                               | 0.75                                               | 11.4                                               | 0.45                                               | 19.0                      | 0.75                      |
| 1/4-18                                                     | 27.2                                               | 1.07                                               | 19.3                                               | 0.76                                               | 23.4                                               | 0.92                                               | 21.3                                               | 0.84                                               | 15.2                                               | 0.60                                               | 24.6                      | 0.97                      |
| 3/8-18                                                     | 30.5                                               | 1.20                                               | 22.4                                               | 0.88                                               | 24.6                                               | 0.97                                               | 22.1                                               | 0.87                                               | 17.0                                               | 0.67                                               | —                         | —                         |
| 1/2-14                                                     | 36.6                                               | 1.44                                               | 27.4                                               | 1.08                                               | 28.4                                               | 1.12                                               | 25.4                                               | 1.00                                               | 21.3                                               | 0.84                                               | —                         | —                         |

<sup>a</sup> Dryseal American Standard Taper Pipe Thread. See General Specifications.

<sup>b</sup> Where SAE Short Pipe Thread is authorized by purchaser, dimensions G, H, J, K, L, and M are reduced in accordance with reduction of pipe thread length. See General Specifications.

<sup>c</sup> Tap drill depths given require use of bottoming taps to produce standard full thread length. See General Specifications.

<sup>d</sup> Hole diameters may be reduced beyond tap drill depth H, but shall not be less than F specified for corresponding size. (See Figure 8.)

<sup>e</sup> Minimum pipe thread length where body is relieved or undercut shall not be shorter than L<sub>2</sub> plus one turn (thread) full thread. Thread length may be reduced one pitch (thread) if thread is cut through into relief or undercut. See SAE J478 and Figure 8.

<sup>f</sup> 1/16, 1/8, and 1/4 in size cast fittings are generally produced from solid castings and have drilled passage holes, 3/8 and 1/2 in size cast fittings are generally produced with cored passage holes and may have internal minimum full thread length of 9.1 and 10.9 mm (0.36 and 0.43 in), respectively.

TABLE 6—DIMENSIONS OF EXTRUDED AND FORGED TYPE STREET ELBOWS, PIPE ELBOWS, AND PIPE TEES (Figures 13 to 17)

| A<br>Dryseal<br>Taper<br>Thread<br>NPTFa, In | B<br>Body<br>Size<br>mm | B<br>Body<br>Size<br>In | C                                    |                                     | D                                              |                                                | E                                |                                  | F                                           |                                              | G                                           |                                              |
|----------------------------------------------|-------------------------|-------------------------|--------------------------------------|-------------------------------------|------------------------------------------------|------------------------------------------------|----------------------------------|----------------------------------|---------------------------------------------|----------------------------------------------|---------------------------------------------|----------------------------------------------|
|                                              |                         |                         | Turned<br>Length <sup>b</sup><br>Min | Turned<br>Length <sup>b</sup><br>In | Min Tap<br>Drill<br>Depth <sup>b,c</sup><br>mm | Min Tap<br>Drill<br>Depth <sup>b,c</sup><br>In | Drill<br>Dial <sup>d</sup><br>mm | Drill<br>Dial <sup>d</sup><br>In | Center<br>to End <sup>b</sup><br>±0.8<br>mm | Center<br>to End <sup>b</sup><br>±0.03<br>In | Center<br>to End <sup>b</sup><br>±0.8<br>mm | Center<br>to End <sup>b</sup><br>±0.03<br>In |
| 1/16-27                                      | 11.11                   | 7/16                    | 9.7                                  | 0.38                                | 9.7                                            | 0.38                                           | 3.58                             | 0.141                            | 5.0                                         | 0.59                                         | 11.4                                        | 0.45                                         |
| 1/8-27                                       | 14.29                   | 9/16                    | 9.7                                  | 0.38                                | 9.7                                            | 0.38                                           | 5.56                             | 0.219                            | 16.8                                        | 0.66                                         | 12.2                                        | 0.48                                         |
| 1/4-18                                       | 17.46                   | 1 1/16                  | 14.2                                 | 0.56                                | 14.2                                           | 0.56                                           | 7.92                             | 0.312                            | 23.1                                        | 0.91                                         | 18.3                                        | 0.72                                         |
| 3/8-18                                       | 20.64                   | 13/16                   | 14.2                                 | 0.56                                | 14.2                                           | 0.56                                           | 11.13                            | 0.438                            | 24.6                                        | 0.97                                         | 19.8                                        | 0.78                                         |
| 1/2-14                                       | 25.40                   | 1                       | 19.0                                 | 0.75                                | 19.0                                           | 0.75                                           | 14.27                            | 0.562                            | 31.8                                        | 1.25                                         | 26.2                                        | 1.03                                         |
| 3/4-14                                       | 31.75                   | 1-1/4                   | 19.0                                 | 0.75                                | 19.0                                           | 0.75                                           | 19.05                            | 0.750                            | 35.1                                        | 1.38                                         | 28.4                                        | 1.12                                         |
| 1-11-1/2                                     | 38.10                   | 1-1/2                   | 23.9                                 | 0.94                                | 23.9                                           | 0.94                                           | 23.82                            | 0.938                            | 42.9                                        | 1.69                                         | 35.8                                        | 1.41                                         |

TABLE 6—DIMENSIONS OF EXTRUDED AND FORGED TYPE STREET ELBOWS, PIPE ELBOWS, AND PIPE TEES (Figures 13 to 17) (Continued)

| A<br>Dryseal<br>Taper<br>Thread<br>NPTFa, In | H<br>Center<br>to End <sup>b</sup><br>±0.8<br>mm | H<br>Center<br>to End <sup>b</sup><br>±0.03<br>In | J<br>Center<br>to End <sup>b</sup><br>±0.8<br>mm | J<br>Center<br>to End <sup>b</sup><br>±0.03<br>In | K<br>Center<br>to End <sup>b</sup><br>±0.8<br>mm | K<br>Center<br>to End <sup>b</sup><br>±0.03<br>In | L<br>Center<br>to End <sup>b</sup><br>±0.8<br>mm | L<br>Center<br>to End <sup>b</sup><br>±0.03<br>In | M<br>Drill<br>Depth<br>mm | M<br>Drill<br>Depth<br>In |
|----------------------------------------------|--------------------------------------------------|---------------------------------------------------|--------------------------------------------------|---------------------------------------------------|--------------------------------------------------|---------------------------------------------------|--------------------------------------------------|---------------------------------------------------|---------------------------|---------------------------|
|                                              |                                                  |                                                   |                                                  |                                                   |                                                  |                                                   |                                                  |                                                   |                           |                           |
| 1/16-27                                      | 11.9                                             | 0.47                                              | 9.7                                              | 0.38                                              | 12.7                                             | 0.50                                              | 11.2                                             | 0.44                                              | 16.8                      | 0.66                      |
| 1/8-27                                       | 12.7                                             | 0.50                                              | 9.7                                              | 0.38                                              | 14.0                                             | 0.55                                              | 11.4                                             | 0.45                                              | 19.0                      | 0.75                      |
| 1/4-18                                       | 18.3                                             | 0.72                                              | 14.2                                             | 0.56                                              | 19.8                                             | 0.78                                              | 16.8                                             | 0.66                                              | 26.2                      | 1.03                      |
| 3/8-18                                       | 19.8                                             | 0.78                                              | 14.2                                             | 0.56                                              | 21.3                                             | 0.84                                              | 17.5                                             | 0.69                                              | 29.7                      | 1.17                      |
| 1/2-14                                       | 25.4                                             | 1.00                                              | 19.0                                             | 0.75                                              | 27.7                                             | 1.09                                              | 23.1                                             | 0.91                                              | 37.6                      | 1.48                      |
| 3/4-14                                       | 26.9                                             | 1.06                                              | 19.0                                             | 0.75                                              | 29.5                                             | 1.16                                              | 23.9                                             | 0.94                                              | 42.2                      | 1.66                      |
| 1-11-1/2                                     | 34.0                                             | 1.34                                              | 23.9                                             | 0.94                                              | 38.6                                             | 1.52                                              | 30.2                                             | 1.19                                              | 53.8                      | 2.12                      |

a Dryseal American Standard Taper Pipe Thread. See General Specifications.

b Where SAE Short Pipe Thread is authorized by purchaser, dimensions C, D, F, G, H, J, K, and L are reduced in accordance with reduction of pipe thread length. See General Specifications.

c Tap drill depths given require use of bottoming taps to produce standard full thread length. See General Specifications.

d Hole diameter may be reduced beyond tap drill depth D but shall not be less than E specified for corresponding size. (See Figure 13.)

### 3. General Specifications

- 3.1 Dimensions and Tolerances**—Except for nominal sizes and thread specifications, dimensions and tolerances are given in both SI and U.S. customary units as designated. Tabulated dimensions shall apply to the finished fittings, plated or otherwise processed, as specified by the purchaser. Unless otherwise specified, maximum and minimum across flats dimensions shall be within the commercial tolerance of bar or extruded stock from which the fittings are produced. The minimum across corner dimensions of external hexagons shall be 1.092 times the nominal width across flats, but shall not result in a side flat width less than 0.43 times the nominal width across flats. The minimum across corner dimensions of external squares shall be 1.25 times the nominal width across flats, but shall not result in a side flat width less than 0.75 times the nominal width across flats. Unless otherwise specified, tolerance on hole diameters designated drill in the dimensional tables shall be as tabulated in Table 7.

TABLE 7—DRILL TOLERANCES

| Drill<br>Size<br>Range<br>mm | Drill<br>Size<br>Range<br>in | Tolerance<br>on Hole<br>Diameter<br>Plus<br>mm | Tolerance<br>on Hole<br>Diameter<br>Plus<br>in | Tolerance<br>on Hole<br>Diameter<br>Minus<br>mm | Tolerance<br>on Hole<br>Diameter<br>Minus<br>in |
|------------------------------|------------------------------|------------------------------------------------|------------------------------------------------|-------------------------------------------------|-------------------------------------------------|
| 0.343 thru 4.699             | 0.0135 thru 0.1850           | 0.08                                           | 0.003                                          | 0.05                                            | 0.002                                           |
| 4.762 thru 6.299             | 0.1875 thru 0.2480           | 0.10                                           | 0.004                                          | 0.05                                            | 0.002                                           |
| 6.350 thru 19.050            | 0.2500 thru 0.7500           | 0.15                                           | 0.006                                          | 0.08                                            | 0.003                                           |
| 19.25 thru 25.400            | 0.7579 thru 1.0000           | 0.18                                           | 0.007                                          | 0.10                                            | 0.004                                           |

Tolerance on all dimensions not otherwise limited, shall be  $\pm 0.25$  mm ( $\pm 0.010$  in). Angular tolerance on axis of ends on elbows and tees shall be  $\pm 2.50$  degrees for sizes up to and including  $3/8$  in, and  $\pm 1.50$  degrees for sizes larger than  $3/8$  in.

- 3.2 Wall Thickness**—Unless otherwise designated, the wall thickness at any point on fittings shall not be less than the thickness established by the specified dimensions, tolerances, and eccentricities for inner and outer surfaces.
- 3.3 Contour**—Details of contour shall be optional with the manufacturer provided the tabulated dimensions are maintained and serviceability of the fittings is not impaired. Wrench flats on elbows and tees shall be optional. Where extruded or forged shapes are reduced to conserve material, the wall thickness, unless otherwise specified, shall not be less than the respective minimum values tabulated in Table 8.
- 3.4 Passages**—Where passages in straight fittings are machined from opposite ends, the offset at the meeting point shall not exceed 0.38 mm (0.015 in). The cross-sectional area at the junction of passages in angle fittings shall not be less than that of the smaller passage.
- 3.5 Pipe Threads**—The pipe threads, unless there is specific authorization to the contrary, shall conform with the Dryseal American Standard Taper Pipe Thread (NPTF). At purchaser's option, the pipe thread may be shortened in conformity with the SAE Short Dryseal Taper Pipe Thread (PTF-SAE Short). Specifications for pipe threads are given in detail in SAE J476 (June, 1961). The pipe fitting dimensions tabulated herein are based on length of the Dryseal American Standard Taper Pipe Thread (NPTF), it being the consensus of manufacturers and users that trouble-free assembly and pressure-tight joints without lubricant or sealer cannot be assured.