

SURFACE VEHICLE STANDARD

Submitted for recognition as an American National Standard

SAE J533

**REV.
JUN92**

Issued 1947-02
Revised 1992-06

Superseding J533b

(R) FLARES FOR TUBING

1. Scope—This SAE Standard covers specifications for 37 degree and 45 degree single and double flares for tube ends intended for use with 37 degree flared tube fittings and 45 degree flared or inverted flared tube fittings, respectively.

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 J514—Hydraulic Tube Fittings

SAE TSB 003—Rules for Use of SI (Metric) Units

3. General Specifications

3.1 Dimensions—Dimensions in this Standard are based on and, unless designated otherwise, are specified in metric units, with inch equivalents shown in parentheses located adjacent to respective metric dimensions on illustrations or designated "in" in text and tables, in accordance with SAE TSB 003.

Single and double 45 degree flares shall conform to the dimensions specified in Figure 2 and Table 1.

Single and double 37 degree flares shall conform to the dimensions specified in Figure 3 and Table 2.

The following general specifications supplement the dimensional data with respect to unspecified detail and apply to both 37 degree and 45 degree flares for tubing.

SAE Technical Standards Board Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

SAE reviews each technical report at least every five years at which time it may be reaffirmed, revised, or cancelled. SAE invites your written comments and suggestions.

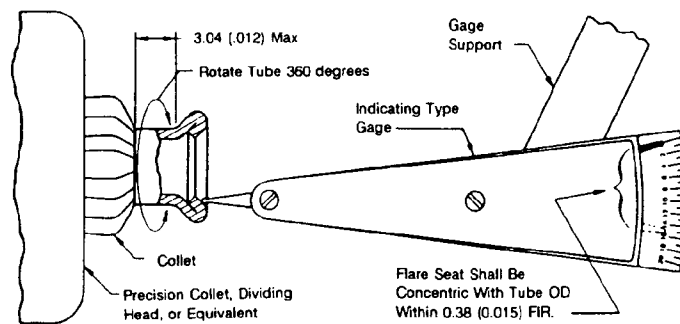


FIGURE 1—TYPICAL FLARE CONCENTRICITY GAGE

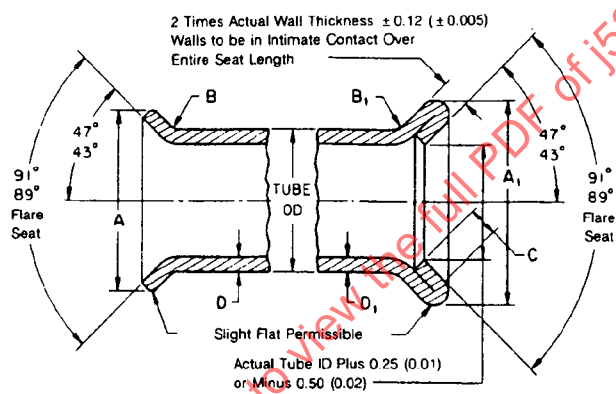


FIGURE 2—SINGLE AND DOUBLE 45 DEGREE FLARES FOR TUBING

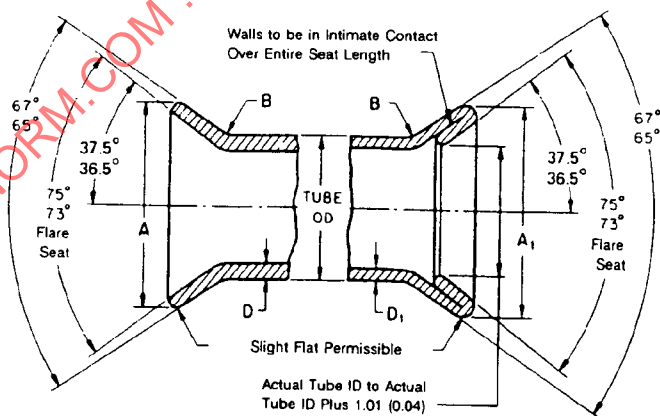


FIGURE 3—SINGLE AND DOUBLE 37 DEGREE FLARES FOR TUBING

SAE J533 Revised JUN92

TABLE 1—DIMENSIONS OF SINGLE AND DOUBLE 45-DEGREE FLARES FOR TUBING¹ (FIGURE 2)

Nominal Tube OD mm	Nominal Tube OD in	A Single Flare Diameter mm Max	A Single Flare Diameter mm Min	A Single Flare Diameter in Max	A Single Flare Diameter in Min	A ₁ Double Flare Diameter mm Max	A ₁ Double Flare Diameter mm Min	A ₁ Double Flare Diameter in Max	A ₁ Double Flare Diameter in Min	B Single Flare Radius mm ±0.25	B Single Flare Radius in ±0.01
3.18	1/8	4.59	4.35	0.181	0.171	5.41	5.03	0.213	0.198	0.51	0.02
4.76	3/16	6.32	6.08	0.249	0.239	7.11	6.74	0.280	0.265	0.51	0.02
6.35	1/4	8.25	8.01	0.325	0.315	9.14	8.77	0.360	0.345	0.51	0.02
7.94	5/16	10.26	9.86	0.404	0.388	10.79	10.42	0.425	0.410	0.51	0.02
9.52	3/8	12.36	11.97	0.487	0.471	12.70	12.32	0.500	0.485	0.51	0.02
11.11	7/16	14.24	13.85	0.561	0.545	14.47	14.10	0.570	0.555	0.51	0.02
12.70	1/2	15.82	15.42	0.623	0.607	16.25	15.88	0.640	0.625	0.51	0.02
14.29	9/16	17.17	16.77	0.676	0.660	18.08	17.71	0.712	0.697	0.51	0.02
15.88	5/8	18.99	18.60	0.748	0.732	19.60	19.23	0.772	0.757	0.51	0.02
19.05	3/4	23.26	22.86	0.916	0.900	23.16	22.79	0.912	0.897	0.51	0.02
22.22	7/8	26.44	26.04	1.041	1.025	—	—	—	—	0.51	0.02
25.40	1	29.38	28.99	1.157	1.141	—	—	—	—	0.51	0.02

Nominal Tube OD mm	Nominal Tube OD in	B ₁ Double Flare Radius mm ±0.25	B ₁ Double Flare Radius in ±0.01	C Double Flare Coined Seat Length mm Min	C Double Flare Coined Seat Length in Min	D ₁ ² Single Flare Wall Thickness mm Max	D ₁ ² Single Flare Wall Thickness in Max	D ₁ ² Double Flare Wall Thickness mm Max	D ₁ ² Double Flare Wall Thickness in Max
3.18	1/8	1.02	0.04	1.02	0.040	0.88	0.035	0.63	0.025
4.76	3/16	1.02	0.04	1.02	0.040	0.88	0.035	0.71	0.028
6.35	1/4	1.02	0.04	1.02	0.040	1.24	0.049	0.83	0.035
7.94	5/16	1.02	0.04	1.57	0.062	1.24	0.049	0.88	0.035
9.52	3/8	1.02	0.04	1.57	0.062	1.65	0.065	1.24	0.049
11.11	7/16	1.02	0.04	1.57	0.062	1.65	0.065	1.24	0.049
12.70	1/2	1.02	0.04	1.57	0.062	2.10	0.083	1.24	0.049
14.29	9/16	1.02	0.04	1.57	0.062	2.10	0.083	1.24	0.049
15.88	5/8	1.02	0.04	1.57	0.062	2.41	0.095	1.24	0.049
19.05	3/4	1.02	0.04	1.57	0.062	2.76	0.109	1.24	0.049
22.22	7/8	—	—	—	—	2.76	0.109	—	—
25.40	1	—	—	—	—	3.04	0.120	—	—

¹ It is not the intent of this document to define the appropriateness of fittings to be used in conjunction with the flares specified. Considerations such as the effects of wall thickness on working pressures, length of thread engagements, etc., shall be the responsibility of the user. See SAE J514.

² Recommended maximum nominal wall thickness of tubing normally considered suitable for flaring to the above specifications.

TABLE 2—DIMENSIONS OF SINGLE AND DOUBLE 37-DEGREE FLARES FOR TUBING¹ (FIGURE 3)

Nominal Tube OD mm	Nominal Tube OD in	A Single Flare Diameter mm Max	A Single Flare Diameter mm Min	A Single Flare Diameter in Max	A Single Flare Diameter in Min	A ₁ Double Flare Diameter mm Max	A ₁ Double Flare Diameter mm Min	A ₁ Double Flare Diameter in Max	A ₁ Double Flare Diameter in Min
3.18	1/8	5.08	4.58	0.200	0.180	5.08	4.58	0.200	0.180
4.76	3/16	7.11	6.61	0.280	0.260	7.11	6.61	0.280	0.260
6.35	1/4	9.14	8.64	0.360	0.340	9.14	8.64	0.360	0.340
7.94	5/16	10.92	10.16	0.430	0.400	10.92	10.16	0.430	0.400
9.52	3/8	12.44	11.69	0.490	0.460	12.44	11.69	0.490	0.460
12.70	1/2	16.76	16.01	0.660	0.630	16.76	16.01	0.660	0.630
15.88	5/8	20.06	19.31	0.790	0.760	20.06	19.31	0.790	0.760
19.05	3/4	24.13	23.37	0.950	0.920	24.13	23.37	0.950	0.920
22.22	7/8	27.17	26.42	1.070	1.040	27.17	26.42	1.070	1.040
25.40	1	30.48	29.72	1.200	1.170	30.48	29.72	1.200	1.170
28.58	1-1/8	35.05	34.29	1.380	1.350	35.05	34.29	1.380	1.350
31.75	1-1/4	38.35	37.60	1.510	1.480	38.35	37.60	1.510	1.480
38.10	1-1/2	43.94	43.18	1.730	1.700	43.94	43.18	1.730	1.700
44.45	1-3/4	53.59	52.84	2.110	2.080	53.59	52.84	2.110	2.080
50.80	2	59.94	59.19	2.360	2.330	59.94	59.19	2.360	2.330

Nominal Tube OD mm	Nominal Tube OD in	B Radius mm ±0.5	B Radius in ±0.02	D ² Single Flare Wall Thickness mm Max	D ² Single Flare Wall Thickness in Max	D ₁ ² Double Flare Wall Thickness mm Max	D ₁ ² Double Flare Wall Thickness in Max
3.18	1/8	0.8	0.03	0.88	0.035	0.63	0.025
4.76	3/16	0.8	0.03	0.88	0.035	0.71	0.028
6.35	1/4	0.8	0.03	1.65	0.065	0.88	0.035
7.94	5/16	0.8	0.03	1.65	0.065	0.88	0.035
9.52	3/8	1.0	0.04	1.65	0.065	1.24	0.049
12.70	1/2	1.5	0.06	2.10	0.083	1.24	0.049
15.88	5/8	1.5	0.06	2.41	0.095	1.24	0.049
19.05	3/4	2.0	0.08	2.76	0.109	1.24	0.049
22.22	7/8	2.0	0.08	2.76	0.109	1.65	0.065
25.40	1	2.3	0.09	3.04	0.120	1.65	0.065
28.58	1-1/8	2.3	0.09	3.04	0.120	1.65	0.065
31.75	1-1/4	2.3	0.09	3.04	0.120	1.65	0.065
38.10	1-1/2	2.8	0.11	3.04	0.120	1.65	0.065
44.45	1-3/4	2.8	0.11	3.04	0.120	1.65	0.065
50.80	2	2.8	0.11	3.40	0.134	1.65	0.065

¹ It is not the intent of this document to define the appropriateness of fittings to be used in conjunction with the flares specified. Considerations such as the effects of wall thickness on working pressures, length of thread engagements, etc., shall be the responsibility of the user.

² Recommended maximum nominal wall thickness of tubing normally considered suitable for flaring to the above specifications.