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SURFACE VEHICLE STANDARD

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Submitted for recognition as an American National Standard

(R) AUTOMOTIVE HYDRAULIC BRAKE SYSTEM - METRIC TUBE CONNECTIONS

Foreword—This Document has not changed other than to put it into the new SAE Technical Standards Board Format.

1. Scope—This standard documents dimensional metric specifications for hydraulic brake system tubing with flared ends, threaded ports, and male tube nuts for the interconnection of major components in automotive hydraulic brake systems.

The purpose of this document is to recommend preferred metrically dimensioned components (including alternative choices), that are intended to be functionally compatible with International Organization for Standardization Specification, ISO 4038-1977 (E). Some applications may require sizes of forms other than those shown herein, and this document does not preclude such other details when they are required.

2. References

2.1 Applicable Publications—The following publications form a part of the specification to the extent specified herein. Unless otherwise indicated the latest revision of SAE publications shall apply.

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

SAE J512 OCT80—Automotive Tube Fittings
SAE J527 JAN83—Brazed Double Wall Low Carbon Steel Tubing
SAE J533 JAN72—Flares for Tubing
SAE J1047 OCT74—Tubing—Motor Vehicle Brake System Hydraulic
SAE J1291 MAR85—Automotive Hydraulic Brake System—Metric Banjo Bolt Connections

2.1.2 ANSI PUBLICATIONS—Available from ANSI, 11 West 42nd Street, New York, NY 10036-8002.

ISO 4038-1977 (E)—Road vehicles—Hydraulic braking systems—Pipes, tapped holes, males fittings and hose end fittings

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3. Tubing And Flares—Tubing and tubing end flares should be dimensioned as shown in Figure 1 and Table 1.

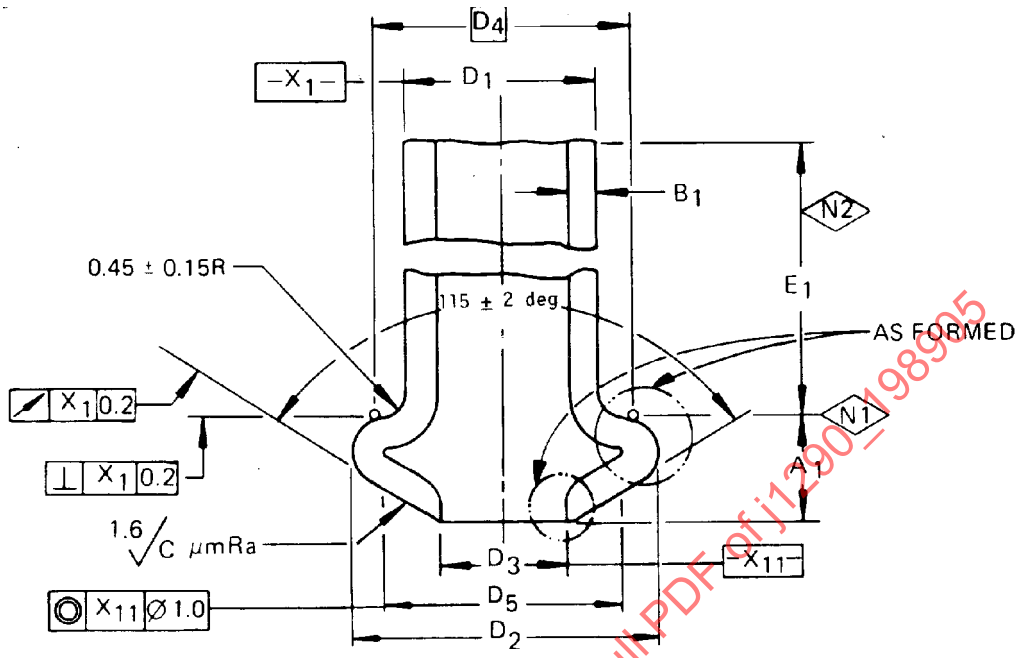

FIGURE 1—END FLARE (mm)

TABLE 1—DIMENSIONS AND TOLERANCES—FOR TUBING AND END FLARE (mm)

D_1		D_2	D_3	D_4	D_5	A_1	B_1	E_1
Bare Tube ±0.07	Coated Tube ϕ max	±0.18	+0.3 −0.2		min	±0.3	±0.07	min
4.75	4.87	7.1	3.2	6.0	5.5	2.5	0.70	16
6.00	6.12	8.4	4.5	7.3	6.8	2.5	0.70	18
8.00	8.12	10.7	6.5	9.3	8.8	2.7	0.70	24
10.00	10.12	12.7	8.5	11.3	10.8	3.0	0.70	28

N1 Datum line

N2 Squareness and runout applies about diameter D_1 over length E_1

For information relative to brazed double-wall low-carbon steel tubing, refer to SAE J527 JAN83 and SAE J1047 OCT74. For additional information on flares, refer to SAE J533 JAN72 and ISO 4038-1977.

4. ***Threaded Ports (Tube Nuts)—***Threaded ports for disc brake calipers, drum brake wheel cylinders, combination valves, pressure switches, metering valves, proportioning valves, master cylinders, brake hose end fittings, tubing fittings, and other brake circuit components should be dimensioned as shown in Figure 2 and Table 2.

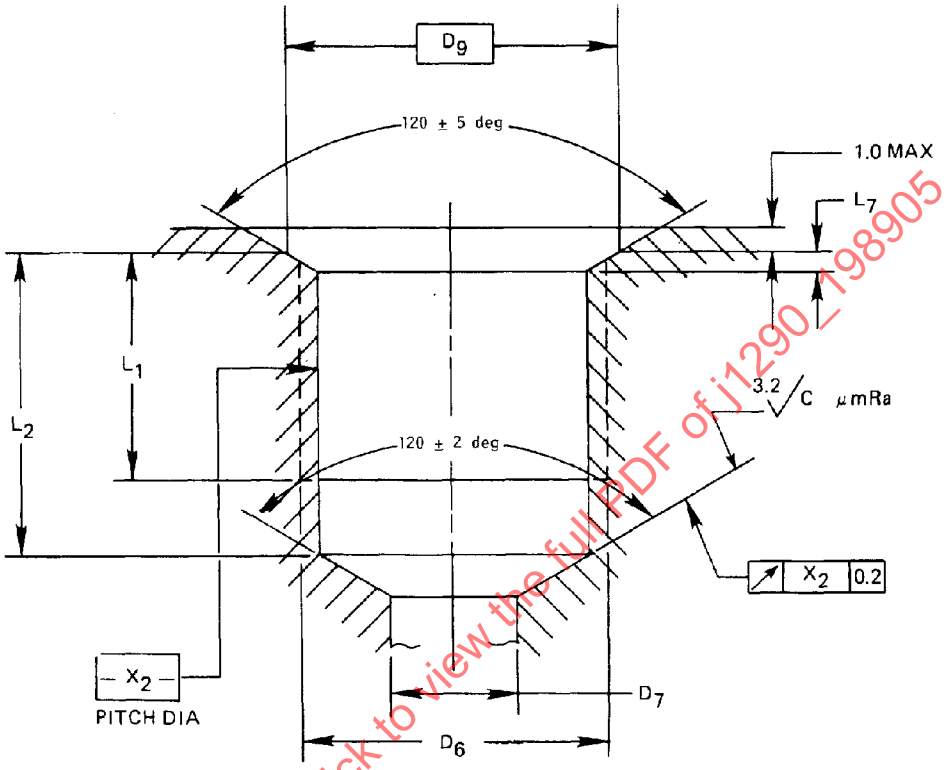

FIGURE 2—THREADED PORTS FOR TUBE NUTS (mm)

TABLE 2—DIMENSIONS AND TOLERANCES FOR THREADED PORTS FOR TUBE NUTS (mm)

D_1 Nom Tube OD	D_2 Straight Thread						Selection Preference (1)	D_7	$\|D_9\|$	L_1 Full Thread	L_2	L_7	
	Nom Size	Pitch	Pitch 6H		Minor 6H			+0.0 −0.4		min	+0.0 −0.5	min	max
			max	min (2)	max	min							
4.75	M10	1	9.500	9.350	9.153	8.917	1	3.3	10.5	7.0	10.0	0.35	0.50
	M12	1	11.510	11.350	11.153	10.917		3.3	12.5	7.0	10.0	0.35	0.50
	M12	1.5	11.216	11.026	10.676	10.376	2	3.3	12.5	6.0	10.0	0.47	0.63
	M14	1.5	13.216	13.026	12.676	12.376		3.3	14.5	6.0	10.0	0.47	0.63
	M11	1	10.500	10.350	10.153	9.917		3.3	11.5	7.0	10.0	0.35	0.50
	M11	1.5	10.206	10.026	9.676	9.376		3.3	11.5	6.0	10.0	0.47	0.63
	M13	1	12.510	12.350	12.153	11.917	3	3.3	13.5	7.0	10.0	0.35	0.50
	M13	1.5	12.216	12.026	11.676	11.376		3.3	13.5	6.0	10.0	0.47	0.63
	M15	1.5	14.216	14.026	13.676	13.376		3.3	15.5	6.0	10.0	0.47	0.63
6.00	M12	1	11.510	11.350	11.153	10.917	1	4.6	12.5	9.0	12.0	0.35	0.50
	M12	1.5	11.216	11.026	10.676	10.376		4.6	12.5	8.0	12.0	0.47	0.63
	M14	1.5	13.216	13.026	12.676	12.376	2	4.6	14.5	8.0	12.0	0.47	0.63
	M16	1.5	15.216	15.026	14.676	14.376		4.6	16.5	8.0	12.0	0.47	0.63
	M13	1	12.510	12.350	12.153	11.917		4.6	13.5	9.0	12.0	0.35	0.50
	M13	1.5	12.216	12.026	11.676	11.376	3	4.6	13.5	8.0	12.0	0.47	0.63
	M15	1.5	14.216	14.026	13.676	13.376		4.6	15.5	8.0	12.0	0.47	0.63
8.00	M14	1.5	13.216	13.026	12.676	12.376	1	6.6	14.5	12.5	16.5	0.47	0.63
	M16	1.5	15.216	15.026	14.676	14.376	2	6.6	16.5	12.5	16.5	0.47	0.63
	M15	1.5	14.216	14.026	13.676	13.376	3	6.6	15.5	12.5	16.5	0.47	0.63
	M17	1.5	16.216	16.026	15.676	15.376		6.6	17.5	12.5	16.5	0.47	0.63
10.00	M16	1.5	15.216	15.026	14.676	14.376	1	8.6	16.5	13.5	17.5	0.47	0.63
	M18	1.5	17.216	17.026	16.676	16.376	2	8.6	18.5	13.5	17.5	0.47	0.63
	M17	1.5	16.216	16.026	15.676	15.376	3	8.6	17.5	13.5	17.5	0.47	0.63

1. Ports recognized as standard for respective tube diameters are listed as preference 1. To avoid proliferation where ports having other thread diameter pitch combination must be used to satisfy design or installation requirements, it is recommended they be selected from sizes listed under preferences 2 and 3, respectively.
   For information relative to tube nut ports, refer to SAE Standard J512 OCT80 and International Standard, Road Vehicles - Hydraulic Braking Systems - Pipes, Tapped Holes and Male Fittings - ISO 4038-1977.
2. These values are also the basic pitch diameter.

5. Male Tube Nuts (Fittings)—Male tube nuts should be dimensioned as shown in Figure 3 and Table 3.

NOTE—This standard supersedes SAE J1258 (Cancelled 1980). Threaded ports for banjo bolts, and banjo bolts are covered by SAE Recommended Practice J1291 MAR85.

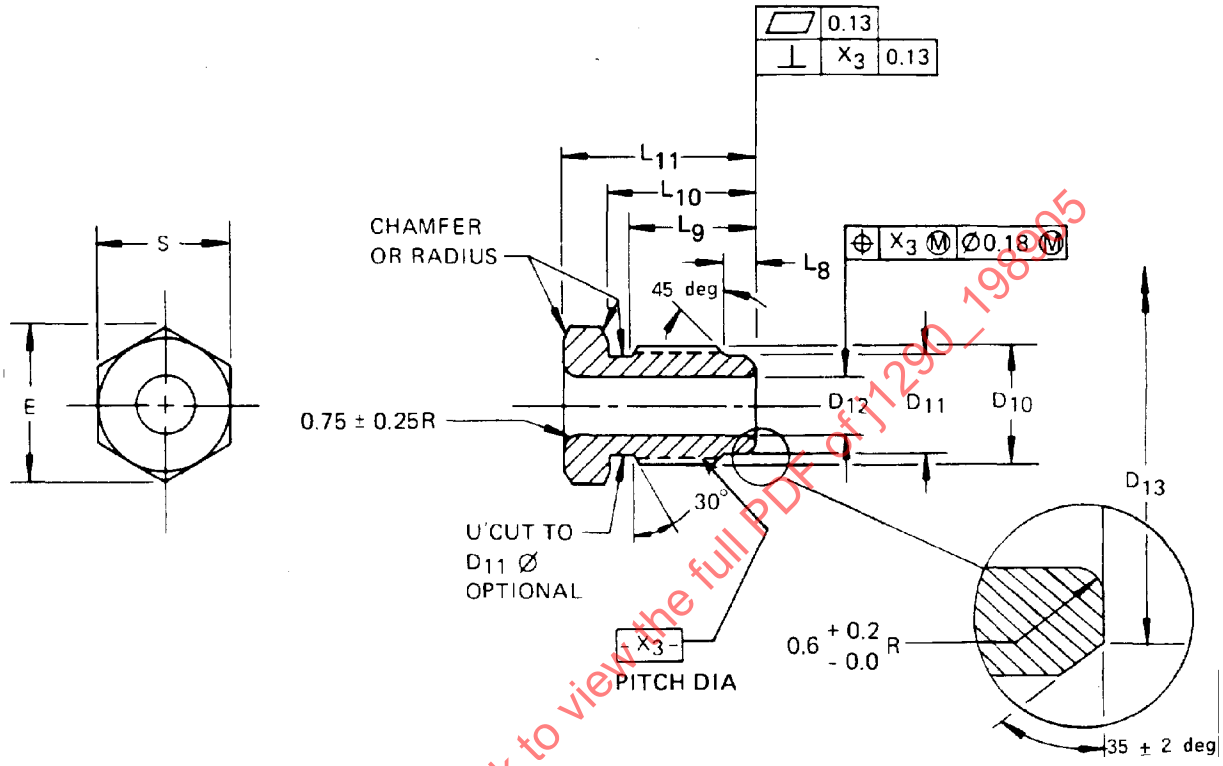

FIGURE 3—MALE TUBE NUT (mm)