Standard Method of Test for

Softening Point of Bitumen (Ring-and-Ball Apparatus)

AASHTO Designation: T 53-11
ASTM Designation: D 36-06

American Association of State Highway and Transportation Officials
444 North Capitol Street N.W., Suite 249
Washington, D.C. 20001

Standard Method of Test for

Softening Point of Asphalt Binder (Ring and Ball Apparatus)

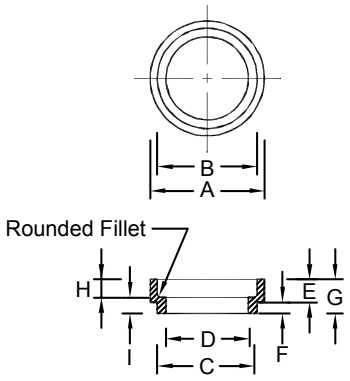
AASHTO Designation: T 53-11
ASTM Designation: D 36-06

AASHTO T 53-11 is identical to ASTM D 36-06 except for the following provisions:

1. Replace all references to the ASTM standards listed in the following table with the corresponding AASHTO standard:

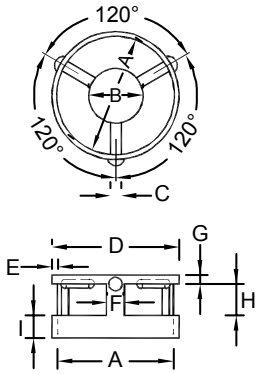
Referenced Standards	
ASTM	AASHTO
D 92	T 48
D 140	T 40

2. Replace Figure 1 with the following figure:



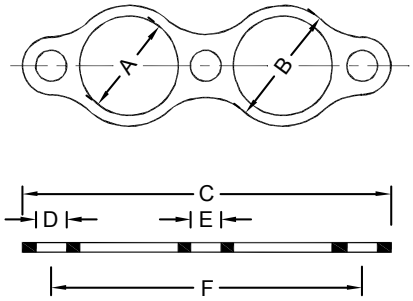
(a) Shouldered Ring

A	23.0 ± 0.3 mm	(0.91 ± 0.01 in.)
B	19.8 ± 0.3 mm	(0.78 ± 0.01 in.)
C	18.8 ± 0.3 mm	(0.74 ± 0.01 in.)
D	15.9 ± 0.3 mm	(0.63 ± 0.01 in.)
E	4.4 ± 0.3 mm	(0.17 ± 0.01 in.)
F	2.0 ± 0.3 mm	(0.08 ± 0.01 in.)
G	6.4 ± 0.4 mm	(0.25 ± 0.02 in.)
H	3.6 ± 0.3 mm	(0.14 ± 0.01 in.)
I	2.8 ± 0.3 mm	(0.11 ± 0.01 in.)



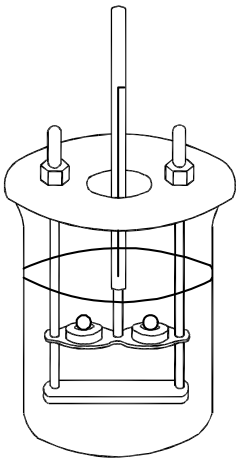
(c) Ball-Centering Guide

A	23.1 mm (see Note 3)	(0.91 in. (see Note 3))
B	9.7 mm (see Note 4)	(0.38 in. (see Note 4))
C	1.5 ± 0.5 mm	(0.06 ± 0.02 in.)
D	24.6 ± 0.3 mm	(0.97 ± 0.01 in.)
E	0.8 ± 0.5 mm	(0.03 ± 0.02 in.)
F	3.0 ± 0.5 mm	(0.12 ± 0.02 in.)
G	1.5 ± 0.3 mm	(0.06 ± 0.01 in.)
H	4.8 ± 0.3 mm	(0.19 ± 0.01 in.)
I	4.3 ± 0.3 mm	(0.17 ± 0.01 in.)



(b) Ring Holder (see Note 2)

A	19.0 mm (see Note 1)	(0.75 in. (see Note 1))
B	23.9 ± 0.5 mm	(0.94 ± 0.02 in.)
C	76.2 ± 0.5 mm	(3.00 ± 0.02 in.)
D	5.6 ± 0.5 mm	(0.22 ± 0.02 in.)
E	5.6 ± 0.5 mm	(0.22 ± 0.02 in.)
F	66.5 ± 0.5 mm	(2.62 ± 0.02 in.)



(d) Two-Ring Assembly

Notes:

1. This diameter is to be slightly larger (approximately 0.05 mm (0.002 in.)) than dimension "C" of Figure 1(a) to permit insertion of the ring. In the final assembly, the thermometer bulb shall be within 12.7 mm (0.50 in.) of, but not touching, the ball-centering guide.
2. The shape of the ring holder in Figure 1(b) is not critical with respect to the test results; therefore, any shape is acceptable provided it is suitable to support the test apparatus.
3. This diameter is to be slightly larger (approximately 0.05 mm (0.002 in.)) than dimension "A" of Figure 1(a) to slide over the ring.
4. This diameter is to be slightly larger (approximately 0.05 mm (0.002 in.)) than 9.7 mm (0.38 in.) to allow placing and centering of the steel ball.

Figure 1—Shouldered Ring, Ring Holder, Ball-Centering Guide, and Assembly of Apparatus Showing Two Rings

3. Replace Section 5.2 with the following:

   Pouring Plate—A flat, smooth brass plate.

4. Replace the last sentence of Section 5.7.1 with the following:

   As an alternative, other thermometric devices may be used provided they: (1) have a maximum scale error no greater than that of the thermometer specified in ASTM E 1, and (2) are capable of indicating temperature within 0.2°C (0.5°F).

5. Replace the last sentence of Section 5.7.2 with the following:

   As an alternative, other thermometric devices may be used provided they: (1) have a maximum scale error no greater than that of the thermometer specified in ASTM E 1, and (2) are capable of indicating temperature within 0.5°C (1.0°F).

6. The final two sentences of Section 5.7.3 are not included.

7. Add an additional subsection to Section 5.7 that reads as follows:

   An ASTM Wide Range Softening Point Thermometer, having a range from –1 to +175°C or 30 to 350°F and conforming to the requirements for Thermometer 113C or 113F as prescribed in ASTM E 1. As an alternative, other thermometric devices may be used provided they: (1) have a maximum scale error no greater than that of the thermometer specified in ASTM E 1, and (2) are capable of indicating temperature within 0.5°C (1.0°F).

8. Replace the first sentence of Section 6.1.3 with the following:

   Ethylene Glycol, with a boiling point between 193 and 204°C (379 and 399°F).

9. Replace the first sentence of Section 9.1.1 with the following:

   For softening points between 30 and 80°C (86 and 176°F), use freshly boiled distilled water and Thermometer 15C or 15F or an alternative thermometric device as specified in Section 5.7.1.

10. Replace the first sentence of Section 9.1.2 with the following:

    For softening points above 80°C (176°F) and up to 157°C (315°F), use USP glycerin and Thermometer 16C or 16F or an alternative thermometric device as specified in Section 5.7.2.

11. Replace the first sentence of Section 9.1.3 with the following:

    For softening points between 30 and 110°C (86 and 230°F), use ethylene glycol and Thermometer 113C or 113F or an alternative thermometric device as specified in Section 5.7.2.

12. Replace Section 11.1 with the following:

    When using Thermometer 15C or 15F or an alternative thermometric device as specified in Section 5.7.1, report the mean or corrected mean of the temperatures recorded in Section 9.6 to the nearest 0.2°C (0.5°F) as the softening point.

13. Replace Section 11.2 with the following:

    When using Thermometer 16C, 16F, 113C, or 113F or an alternative thermometric device as specified in Section 5.7.2, report the mean or corrected mean of the temperatures recorded in Section 9.6 to the nearest 0.5°C (1.0°F) as the softening point.