
Standard Method of Test for Softening Point of Bitumen (Ring-and-Ball Apparatus)

AASHTO Designation: T 53-09 (2018)

Technically Revised; 2009

Reviewed but Not Updated: 2018

Editorially Revised: 2021

Technical Subcommittee: 2b, Liquid Asphalt

ASTM Designation: D36-06



**American Association of State Highway and Transportation Officials
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AASHTO T 53-09 (2018) is identical to ASTM D36-06 except for the following provisions:

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

<i>Referenced Standards</i>	
ASTM	AASHTO
D92	T 48
D140	R 66

2. Replace Section 5.2 with the following:
Pouring Plate—A flat, smooth brass plate.
3. 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 $+175^{\circ}\text{C}$ or 30 to 350°F and conforming to the requirements for Thermometer 113C or 113F as prescribed in ASTM E1. 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 E1, and (2) are capable of indicating temperature within 0.5°C (1.0°F).
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 E1, 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 E1, and (2) are capable of indicating temperature within 0.5°C (1.0°F).
6. Delete the final two sentences of Section 5.7.3.
7. Replace Figure 1 with the figure shown on page 3.
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:
Freshly boiled distilled water for softening points between 30 and 80°C (86 and 176°F); use 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:

USP glycerin for softening points above 80°C (176°F) and up to 157°C (315°F); use 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:

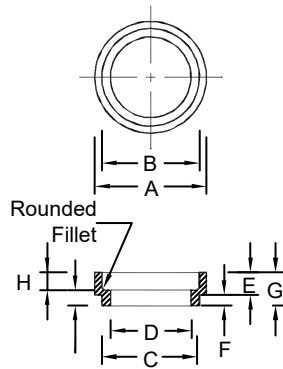
Ethylene glycol for softening points between 30 and 110°C (86 and 230°F); use Thermometer 113C or 113F, or an alternative thermometric device as specified in Section 5.7.2.

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.

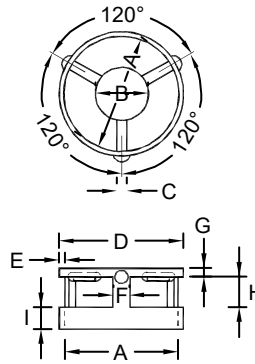
13. Replace Section 11.2 with the following:

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.



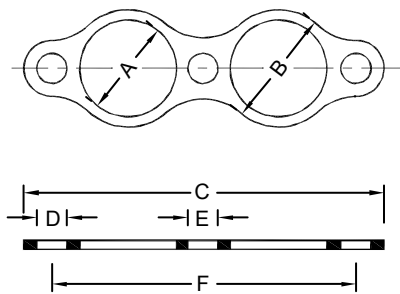
1(a) Shouldered Ring

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 ± 0.01 in.)
H	3.6 ± 0.3 mm	(0.14 ± 0.01 in.)
I	2.8 ± 0.3 mm	(0.11 ± 0.01 in.)



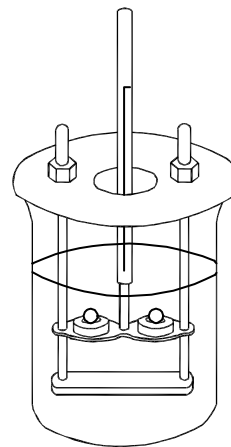
1(c) Ball-Centering Guide

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.)



1(b) Ring Holder

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 ± 0.3 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.)



1(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