STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard METHODS OF TESTING BITUMEN AND RELATED ROADMAKING PRODUCTS

AS 2341.18

DETERMINATION OF SOFTENING POINT OF TAR* (RING AND BALL METHOD)

1 SCOPE. This standard sets out two procedures which use a ring and ball apparatus for the determination of the softening point of residues from the distillation of tar. The residues concerned have a softening point in the range 30°C to 200°C.

2 REFERENCES. This standard requires reference to the following standard:

ASTM E1 ASTM Thermometers

3 PRINCIPLE. A specimen of the tar under test is formed into a disc which is inserted in a horizontal ring. The horizontal ring is supported above a bottom plate and a steel ball is placed on the top of the test specimen.

The assembly is suspended in a liquid bath which is heated at a standard uniform rate. The softening point is measured as the temperature of the bath when the tar disc supporting the steel ball touches the bottom plate.

4 APPARATUS AND MATERIALS. The following apparatus and materials are required:

(a) *Two shouldered metal rings*, conforming to the dimensions shown in Fig. 1 (the ring shoulder may be straight or tapered).

(b) *Steel ball*, 9.53 mm in diameter, of mass 3.45 g to 3.55 g.

(c) *Ball centring guide*, constructed of brass and having the general shape and dimensions shown in Fig. 2.

(d) *Glass vessel*, capable of being heated, not less than 85 mm in diameter and not less than 120 mm in depth from the bottom of the flare; to be used as a bath.

(e) *Metal ring holder*, conforming to the dimensions shown in Fig. 3.

(f) *Support frame* (for the rings), similar to that shown in Fig. 4.

(g) *Thermometers*. An ASTM low softening point thermometer, having a range of −2°C to +80°C and conforming to the requirements for thermometer 15C as prescribed in ASTM E1; an ASTM high softening point thermometer, having a range of 30°C to 200°C and conforming to the requirements for thermometer 16C as prescribed in ASTM E1.

(h) *Distilled water*, freshly boiled.

(j) *Glycerine*, USP.

5 PREPARATION OF TEST SPECIMEN. The test specimen shall be prepared as follows:

(a) Heat the thoroughly mixed sample carefully to prevent local overheating; stir constantly until it has become sufficiently fluid to pour (avoid incorporating air in the sample).

NOTES:

1. Distillation residue should be brought to pouring condition in not more than 2 h.
2. Coal tar pitch should be brought to pouring condition in not more than 30 min.
3. In no case should the temperature of the sample rise to more than 56°C above the expected softening point.

(b) Pour the sample into two rings which have been pre-heated to approximately the pouring temperature. (While being filled, the rings should rest on a brass plate which has been sprayed with a silicone release material to prevent the bituminous substance adhering to it.)

(c) Cool the sample for at least 30 min but do not allow more than 4 h to elapse from pouring of the sample to completion of the test.

NOTE: Samples that are soft at room temperature should be cooled to a minimum of 8°C below the expected softening point.

(d) After the sample has cooled, cut off the excess material cleanly with a warm knife or spatula.

(e) Use a clean container and fresh sample for any repetition of the test.

6 PRECAUTIONS. The use of freshly boiled distilled water is essential, as air bubbles otherwise may form on the specimen and affect the results. Rigid adherence to the prescribed rate of heating is absolutely essential for reproducibility of results.

7 PROCEDURE.

7.1 For Determining Softening Points 80°C or Below. The procedure for determining the softening point of materials having a softening point at 80°C or below shall be as follows:

*Derived from ASTM D36, Method of Test for Softening Point of Asphalts and Tar Pitches (Ring-and-Ball Apparatus).