AS 2891.3.2—1991

Australian Standard®

Method of sampling and testing asphalt

Method 3.2: Bitumen content and aggregate grading—Centrifugal extraction method

1 SCOPE This Standard sets out the method for determining, by centrifugal extraction, the binder content of mixes containing residual bitumen, and subsequently the particle size distribution of aggregate by sieve analysis. This method may not be satisfactory when used with mixes made of highly absorptive aggregates.

2 REFERENCED DOCUMENTS The following documents are referred to in this Standard:

AS

1141 Methods for sampling and testing aggregates
1141.11 Method 11: Particle size distribution by dry sieving

1152 Test sieves

1681 Electrically-heated ovens in which flammable volatiles occur—Type 1 Ovens

2243 Safety in laboratories
2243.8 Part 8: Fume cupboards

2891 Methods of sampling and testing asphalt
2891.1 Method 1: Sampling of asphalt
2891.10 Method 10: Water and volatile oils content

ASTM
D 2172 Test method for quantitative extraction of bitumen from bituminous paving mixtures

Worksafe Australia Standard
Exposure standards for atmospheric contaminants in the occupational environment

3 DEFINITIONS For the purpose of this Standard, the definitions given in AS 2891.1 apply.

4 MATERIALS The following materials are required:

(a) *Filter paper*—filter paper suitable for use with the bitumen centrifuge extractor.

(b) *Solvent*—toluene or 1,1,1-trichloroethane, commercial grade.

5 APPARATUS

5.1 Balances—complying with the following requirements:

(a) Approximately 5 kg capacity, readable to 0.1 g and with a limit of performance of not greater than ±0.5 g.

(b) Approximately 200 g capacity, readable to 0.2 mg and with a limit of performance of not greater than ±1 mg.

5.2 Bitumen centrifuge extractor*—complying with ASTM D 2172.

5.3 Centrifuge—to accommodate tubes of suitable capacity (see Clause 7.1(j)).

* A Rotarex extractor or similar apparatus is satisfactory.

5.4 Metal containers—flat-bottomed, having a capacity of at least 60 mL and fitted with press-over lids. Alternatively, suitable glass containers such as Petri dishes may be used.

NOTE: Aluminium containers should not be used with 1,1,1-trichoroethane as it causes accelerated oxidation of the aluminium.

5.5 Dish—shallow metal

5.6 Flask—a 2 L Erlenmeyer or round bottle type, provided with a reflux condenser and an additional stopper for sealing the flask during weighing.

5.7 Fume cupboard—fume cupboard in accordance with the appropriate requirements specified in AS 2243.8.

5.8 Heating device—a hotplate or heating mantle with adjustable temperature control. The hotplate shall be covered with a mat of appropriate material to diffuse the heat evenly.

5.9 Drying oven—complying with AS 1681, thermostatically controlled, with good air circulation, capable of maintaining a temperature within the range 105 °C to 110 °C.

5.10 Sieves—as required, complying with AS 1152.

5.11 Tongs (laboratory)

5.12 Spatula (laboratory)

5.13 Wash bottle—suitable for containing solvent.

6 SAMPLE PREPARATION The test sample shall be prepared as follows:

(a) If necessary, warm the test sample just sufficiently by heating, preferably in an oven, to loosen the mass of material.

(b) Reduce the size of the test sample by quartering to obtain the amounts given in Table 1.

TABLE 1
MINIMUM MASS OF TEST SAMPLE

Nominal size of mix mm	Minimum mass of test sample g
<10	600
10	800
14	800
20	1000
>20	1200

7 METHOD FOR DETERMINING BITUMEN CONTENT

7.1 Procedure The procedure shall be as follows:

(a) Weigh the flask with stopper, and record the mass (m_1) to the nearest 0.1 g.

(b) Either—

(i) dry the test sample to constant mass at a temperature of 105 °C to 110 °C; or

(ii) on a separate portion of about 2000 g of the test sample, determine the moisture content (w_1) in accordance with AS 2891.10.

(c) Weigh and record the mass of the mix (m_2) to the nearest 0.1 g and transfer it to the filter bowl of the bitumen centrifuge extractor.

(d) Add sufficient solvent to cover the test sample to a depth of about 10 mm. Allow the test sample to soak for about 5 min covered by the filter bowl cover plate.

(e) Lift the filter bowl cover plate and insert the filter paper underneath. Secure the whole assembly by screwing down tightly, by hand, the hollow flanged fitting to the filter bowl.

(f) Secure the outer bowl lid to the outer bowl. Place the 2 L flask at the discharge spout of the outer bowl.

(g) Adjust revolutions of filter bowl to ensure a steady and constant discharge of solvent/bitumen solution. When the discharge has ceased, stop the machine and introduce about 150 mL of solvent to the filter bowl through the hollow flanged fitting.

(h) Repeat Step (g) until the discharge liquid is a light straw colour.