Methods of sampling and testing asphalt Method 5: Compaction of asphalt by Marshall method and determination of stability and flow— Marshall procedure

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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee CE-006, Asphalt and Sprayed Surfacing, to supersede AS 2891.5—2004, *Methods of sampling and testing asphalt*—Determination of stability and flow—Marshall procedure.

The term 'informative' has been used in this Standard to define the application of the appendices to which it applies. An 'informative' appendix is only for information and guidance.

METHOD

1 SCOPE

This Standard sets out the method for preparing specimens of asphalt (either produced in the laboratory or at a mixing plant) by the Marshall procedure and determining stability and flow values of the specimens using the Marshall apparatus. It is applicable to asphalt mixes not exceeding 20 mm nominal size.

2 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS 2008	Bitumen for p	pavements
2193	Calibration and classification of force-measuring systems	
AS/NZS 2891 2891.1.1 2891.2.1	Methods of sa Method 1.1: Method 2.1:	ampling and testing asphalt Sampling—Loose asphalt Sample preparation—Mixing, quartering and conditioning of asphalt in the laboratory
2891.9.1	Method 9.1	Determination of bulk density of compacted asphalt— Waxing procedure
2891.9.2	Method 9.2:	Determination of bulk density of compacted asphalt— Presaturation method
2891.9.3	Method 9.3:	Determination of bulk density of compacted asphalt— Mensuration method



Austroads AGPT/T190 Specification framework for polymer modified binders

New Zealand Transport Agency NZTA M/1 Specification for roading bitumens

3 DEFINITIONS

For the purpose of this Standard, the definitions in AS/NZS 2891.1.1 apply.

4 APPARATUS

The following apparatus is required:

- (a) Balance Of suitable capacity with a limit of performance not exceeding ± 0.5 g.
- (b) *Breaking head* Consisting of upper and lower cylindrical segments having an inside cylinder face accurately machined. The lower segment is to be mounted on a base having two perpendicular guide rods or posts extending upwards. Guide bushes on the upper segment are to be in such a position as to direct the segments together without binding or loose motion of the guide rods. The breaking head shall have an internal diameter of 101.6 ± 0.2 mm. A typical breaking head is shown in Figure 1.



NOTE: Frequent checks on the inner radius of segments and on the alignment of guideposts are necessary as high loads may permanently distort the breaking head.

DIMENSIONS IN MILLIMETRES

FIGURE 1 TYPICAL BREAKING HEAD

(c) Compaction hammer Mechanical or hand and consisting of a 98.5 mm diameter flat circular tamping face and a 4.53 ±0.02 kg sliding weight with a free fall of 457 ±1 mm. A suitable design for a hand compaction hammer is shown in Figure 2. Designs for mechanical compaction hammers may vary as long as the essential dimensions are met.

NOTE: Although the design, dimensions, mass and height of mass drop for hammers may comply with this specification, variations in efficiency may mean density achieved in compacted specimens with the same number of blows may vary between compaction apparatus. It is up to individual users to ensure the compaction apparatus is operating correctly and efficiently. This may be achieved through inter laboratory assessments or proficiency testing schemes.

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FIGURE 2 TYPICAL HAND COMPACTION HAMMER

(d) Compaction pedestal Consisting wooden block approximately of а 200 mm 200 mm 450 mm capped by a steel plate approximately 300 mm 300 mm 25 mm. A typical compaction pedestal is shown in Figure 3. The air dry density of the wooden block shall be 670 kg/m³ to 770 kg/m³. The plate shall be level and securely attached to the block, which in turn shall be secured to a solid concrete floor or slab. A suitable framework shall be secured to the pedestal to ensure that the compaction hammer is kept vertical. Wooden block dimensions for length may vary to accommodate multi-head compactors.

NOTE: Certain designs of dual head compactors are supplied fitted to a steel plate approximately 400 mm 400 mm 25 mm and are bolted directly to a dense concrete block approximately 400 mm 400 mm 450 mm which is secured to the solid concrete floor or slab. This type of pedestal has been found to be an acceptable alternative.

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