Methods of sampling and testing asphalt Method 2.2: Sample preparation—Compaction of asphalt test specimens using a gyratory compactor

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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 2891.2.2—1995.

The objective of this Standard is to set out the method for compacting asphalt specimens using a gyratory compactor.

The objective of this revision is to allow the use of a wider range of asphalt binders by specifying an equi-viscous compaction temperature. Editorial changes have also been made to aid interpretation and use of the method.

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

METHOD

1 SCOPE

This Standard sets out a method for compacting asphalt specimens using a gyratory compactor.

2 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS 2008	Bitumen for pavements			
2000	Ditalien for pavements			
2193	Calibration and classification of force-measuring systems			
2891	Methods of sampling and testing asphalt			
2891.2.1	Method 2.1 Sample preparation—Mixing, quartering and conditioning of asphalt in the laboratory			
AS/NZS				
2891	Methods of sampling and testing asphalt			
2891.1.1	Method 1.1: Sampling—Loose asphalt			
2891.9.1	Method 9.1: Determination of bulk density of compacted asphalt—Waxing procedure			



2891.9.2	Method 9.2:	Determination Presaturation m	of etho	bulk d	density	of	compacted	asphalt—
AS/NZS								
2891.9.3	Method 9.3:	Determination Mensuration me	of ethoc	bulk l	density	of	compacted	asphalt—
Austroads								

AGPT/T190 Specification framework for polymer modified binders and multigrade bitumens

New Zealand Transport Agency

NZTA M1 Specification for roading bitumens

3 APPARATUS

The following apparatus is required:

- (a) Specimen mould assembly—capable of producing cylindrical specimens with smooth and uniform curved surfaces with dimensions dependent upon the nominal size of the mix as shown in Table 1. The mould shall have a removable base.
- (b) Gyratory compactor—pneumatic or hydraulic, capable of applying a vertical loading stress of 240 kPa to a specimen in the mould at a rate of 60 ± 5 rev/min, at a total fixed gyratory angle set between 0° and 3°, measured at the centre of the height of the mould. The compactor shall be fitted with a revolution counter, a force-measuring device meeting the requirements of an AS 2193 grade C testing machine, and sensors which are capable of stopping the application of the applied pressure at a set number of revolutions (within ±1 revolution) or on the achievement of the height of the specimen.

The compactor shall be capable of locking the mould into place during gyratory movement.

TABLE1

	Nominal size of mix, mm			
Specimen and equipment details	>20 and ≤40	≤20		
		Either	Or	
Diameter of specimen (mm)	150 ±2	100 ±2	150 ±2	
Nominal height of specimen (mm)	85	65	85	
Gyratory angle (°)	3 ±0.1	2 ±0.1	3 ±0.1	
Vertical loading stress (kPa)	240 ±10	240 ±10	240 ±10	
Diameter of top platen and baseplate (mm)	149.5 ±0.3	99.5 ±0.3	149.5 ±0.3	

SPECIMEN AND TESTING EQUIPMENT REQUIREMENTS

(c) Steel wearing discs—about 0.9 mm thick, and diameter 99.8 ± 0.1 mm or 149.8 ± 0.1 mm, as appropriate for the mould.

NOTE: Some gyratory compactors do not require the use of wearing discs. If used, the discs should be tested when the mould is heated to ensure that adequate clearance is still maintained.

- (d) Oven—forced draught, thermostatically controlled, capable of maintaining temperatures up to 200 °C within 3°C of the set temperature.
- (e) *Thermometer*—or other suitable temperature-measuring device, readable and accurate to 1°C.

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- (f) Balance—of sufficient capacity readable to 1 g, with a limit of performance not exceeding ± 5 g.
- (g) Specimen extractor—to remove the asphalt specimen from the mould.
- (h) *Circular paper discs*—cut to fit the mould.
- (i) *Heat-resistant boards*—on which to place the specimens when turning them.
- (j) *Mixing apparatus*—such as steel tray, trowel, spatulas and scoop.
- (k) *Gyratory angle indicator*—or another means to monitor compaction angle.

4 COMPACTION TEMPERATURES

Unless otherwise specified, the temperatures for the mix to be compacted shall be in accordance with Tables 2, 3 or 4.

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COMPACTION TEMPERATURES FOR AS 2008 BINDERS

Class	Stone mastic asphalt, °C	Dense graded asphalt, °C	Open graded asphalt, °C
C170	n/a	142 ±3°C	n/a
C320	150 ±3°C	150 ±3°C	125 ±3°C
C450	150 ±3°C	150 ±3°C	n/a
C600	n/a	155 ±3°C	n/a
M1000	n/a	155 ±3°C	n/a

TABLE3

COMPACTION TEMPERATURES FOR AUSTROADS AGPT/T190 BINDERS

Bitumen class	Stone mastic asphalt, °C	Dense graded asphalt, °C	Open graded asphalt, °C
A10E	160 ±3°C	160 ±3°C	135 ±3°C
A15E	160 ±3°C	160 ±3°C	135 ±3°C
A20E	160 ±3°C	160 ±3°C	135 ±3°C
A25E	n/a	160 ±3°C	135 ±3°C
A35P	n/a	160 ±3°C	135 ±3°C

TABLE4

COMPACTION TEMPERATURES FOR NZTA M1 BINDERS

Bitumen grade	Stone mastic asphalt, °C	Dense graded asphalt, °C	Open graded asphalt, °C
40-50	157 ±3°C	157 ±3°C	118 ±3°C
60-70	150 ±3°C	150 ±3°C	113 ±3°C
80-100	142 ±3°C	142 ±3°C	107 ±3°C

NOTE: Refer to Appendix A and Appendix B for guidance in establishing compaction temperatures for binders not included in Tables 2, 3 or 4, or for warm mix asphalt.

5 SPECIMEN PREPARATION

5.1 Laboratory prepared mixes

Laboratory prepared mix shall be prepared as follows:

(a) Preheat the compaction moulds.

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