

AS 2758.2:2021



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Australia



Aggregates and rock for engineering purposes

Part 2: Specification for sealing aggregate



AS 2758.2:2021

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Part 2: Specification for sealing aggregate

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Preface

This Standard was prepared by the Standards Australia Committee CE-012, Aggregates and Rock for Engineering Purposes, to supersede AS 2758.2:2009, *Aggregates and rock for engineering purposes, Part 2: Specification for sealing aggregate*.

This document is part of the AS 2758 series that covers specification for aggregates and rock for engineering purposes. A list of all parts in this series can be found in the Standards Australia online catalogue.

The objective of this document is to provide a basis for specifying the properties and test procedures for coarse aggregates intended for use in sprayed bituminous surfacing.

Major changes in this edition of the document are:

- (a) Removal of the Application clause.
- (b) Inclusion of an Introduction.
- (c) All terms now defined in AS 2758.0.

The terms “normative” and “informative” are used in Standards to define the application of the appendices to which they apply. An “informative” appendix is only for information and guidance.

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Introduction

This document nominates a series of test procedures and limits to be used in different geographic areas of Australia. The procedures and limits have proved suitable for specifying aggregates for use in sprayed seal applications in roadworks up to and including major highways.

This document should be used in combination with a works specification or a supply agreement or both for contract purposes. It should not be used on its own in order to control a works project or the supply of aggregate materials.

It is recommended that aggregates supplied using this document are also supplied under a quality management system such as the AS/NZS ISO 9001 series.

Although the tests and limits specified in this document are considered adequate for most applications, the works specification for individual projects may include different tests or limits (which may be from Australian Standards or other appropriate Standards). For contractual purposes, it is the works specification and the supply agreement that are binding.

Testing frequencies are not specified in this document as they vary dependent upon the importance of the work, the perceived variability of the source or sources, and the likelihood of specification non-compliance among other factors. It is usual that the testing frequency is specified in either the works specification or the supply agreement or both. However, in the event that a frequency is not nominated, the testing frequency listed in either the supplier's quality system documentation or AS 2758.0:2020 Appendix A may be used.

Where a contract document uses terms such as "material conforming to AS 2758.2" without providing a works specification or supply agreement and attempts to obtain such information have been exhausted, material would be deemed to satisfy the requirements of this document if data are provided showing that the material conforms to [Clauses 5](#) to [10](#) using one shape method and one durability set option.

Australian Standard®

Aggregates and rock for engineering purposes

Part 2: Specification for sealing aggregate

1 Scope

This document provides a basis for specifying requirements for aggregates intended for use in sprayed bituminous surfacing. The requirements relate to quality of rock and other properties of coarse aggregate. A coarse aggregate may be produced from rock, gravel, metallurgical slag or suitable synthetic materials.

This document is intended for use by —

- (a) federal, state and local government authorities (whether or not they are specifiers);
- (b) consultant engineers (whether specifiers or not);
- (c) suppliers and purchasers of asphalt aggregates;
- (d) testing authorities;
- (e) quality system certifiers and accreditation authorities; and
- (f) educational organisations.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document.

NOTE Documents referenced for informative purposes are listed in the Bibliography.

AS 1141.3.1, *Methods for sampling and testing aggregates, Method 3.1: Sampling—Aggregates*

AS 1141.11.1, *Methods for sampling and testing aggregates, Method 11.1: Particle size distribution — Sieving method*

AS 1141.11.2, *Methods for sampling and testing aggregates, Method 11.2: Particle size distribution for vision sizing systems*

AS 1141.14, *Methods for sampling and testing aggregates, Method 14: Particle shape, by proportional calliper*

AS 1141.15, *Methods for sampling and testing aggregates, Method 15: Flakiness index*

AS 1141.18, *Methods for sampling and testing aggregates, Method 18: Crushed particles in coarse aggregate derived from gravel*

AS 1141.20.1, *Methods for sampling and testing aggregates, Method 20.1: Average least dimension—Direct measurement (nominal size 10 mm and greater)*

AS 1141.20.2, *Methods for sampling and testing aggregates, Method 20.2: Average least dimension—Direct measurement (nominal sizes 5 mm and 7 mm)*

AS 1141.20.3, *Methods for sampling and testing aggregates, Method 20.3: Average least dimension—Calculation (nomograph)*

AS 1141.22, *Methods for sampling and testing aggregates, Method 22: Wet/dry strength variation*

AS 1141.23, *Methods for sampling and testing aggregates, Method 23: Los Angeles value*

AS 1141.24, *Methods for sampling and testing aggregates, Method 24: Aggregate soundness—Evaluation by exposure to sodium sulfate solution*

AS 1141.30.1, *Methods for sampling and testing aggregates, Method 30.1: Coarse aggregate quality by visual comparison*

AS 1141.32, *Methods for sampling and testing aggregates, Method 32: Weak particles (including clay lumps, soft and friable particles) in coarse aggregates*

AS 1141.50, *Methods for sampling and testing aggregates, Method 50: Resistance to stripping of cover aggregates from binders*

AS 2758.0, *Aggregates and rock for engineering purposes, Part 0: Definitions and classification*

AS ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*

3 Terms and definitions

For the purpose of this document, the terms and definitions in AS 2758.0 apply.

4 Aggregate classification

Aggregate requirements are specified for the following three aggregate classes:

- (a) *Class A* — Premium quality aggregates suitable for freeways, heavily trafficked highways or pavements carrying a high volume of heavy vehicles.
- (b) *Class B* — Aggregates suitable for highways or main roads carrying medium traffic volumes, medium to lightly trafficked pavements, general parking areas and similar.
- (c) *Class C* — Aggregates suitable for lightly trafficked roads.

NOTE For the purposes of the above classifications—

- (a) heavy traffic describes a road with greater than 2 000 vehicles/lane/day;
- (b) medium traffic describes a road with greater than 600 but less than 2 000 vehicles/lane/day; and
- (c) light traffic describes a road with less than 600 vehicles/lane/day.

Unless it is practical to supply different classes of aggregate to the same project, specifiers should determine the required aggregate class based on the most severe requirements for any road to be sealed under works specification.

The works specification should also consider the type of vehicles when nominating any aggregate classification.

5 Sampling

Where lot testing is referenced in [Tables 1, 2, 3 and 4](#), a lot shall consist of not less than 5 samples.

Sampling of an aggregate shall be carried out in accordance with one of the methods described in AS 1141.3.1.

NOTE 1 The frequency of sampling should be nominated in the works specification or the supply agreement or as agreed with the supplier. In the absence of any of these documents, refer to AS 2758.0:2020 Appendix A for a sampling scheme.

NOTE 2 Reference samples may be taken during the course of supply and retained for later testing.

6 Testing

Testing of aggregates shall be carried out in accordance with the relevant requirements of the applicable methods.

Laboratories that perform the tests outlined in this document shall meet the requirements of AS ISO/IEC 17025.

The testing requirements and specified limits for all sealing aggregates are prescribed in [Clauses 5 to 11](#).

NOTE A number of requirements in this document are fundamental and this specification provides a single test method and limits for these properties. Alternative test procedures and limits are presented for the determination of both shape and durability. For these properties, it is recommended that the test procedure and limits that are particular to the geographic area in which the aggregate source is located should be used in specifying supply.

7 Dimensional requirements

7.1 Grading requirements for aggregates

When determined in accordance with AS 1141.11.1 or AS 1141.11.2, each lot shall conform to the grading envelopes given in [Table 1](#).

Table 1 — Percentage Passing

Sieve size (mm)	Aggregate nominal size (mm)				
	20	14	10	7	5
26.5	100				
19.0	85 - 100	100			
13.2	0 - 35	85 - 100	100		
9.5	0 - 10	0 - 30	85 - 100	100	
6.7		0 - 10	0 - 40	85 - 100	100
4.75			0 - 15	0 - 35	85 - 100
2.36	0 - 2	0 - 2	0 - 3		0 - 35
1.18					0 - 15
0.600				0 - 3	0 - 5
0.075	0 - 1	0 - 1	0 - 1	0 - 1	0 - 2

[Table 1](#) lists the common nominal aggregate sizes that are typically produced and in-line with with coarse aggregates specified in AS2758.1. However, the works specification may include other nominal sized aggregates where they are locally available and considered appropriate for a particular application.

7.2 Particle shape of aggregates

The shape of aggregate particles shall be determined by one of the following methods:

- (a) *Particle shape* — When determined in accordance with AS 1141.14, the proportion of misshapen particles in the fraction of coarse aggregate retained on the 9.5 mm test sieve, using a 3:1 ratio, shall not exceed 10 % and using a 2:1 ratio shall not exceed 35 %.
- (b) *Flakiness index* — When determined in accordance with AS 1141.15, the flakiness index of aggregate for each class shall not exceed 35 %.

7.3 Average least dimension

The average least dimension (ALD) of the aggregate particles shall be determined by either —

- (a) AS 1141.20.1 — ALD by direct measurement (nominal size 10 mm and greater;
- (b) AS 1141.20.2 — ALD by direct measurement (nominal sizes 5 mm and 7 mm); or
- (c) AS 1141.20.3 — ALD by calculation (nomograph).

When determined by one of the specified methods, the aggregate shall conform to the relevant requirements given in [Table 2](#).

Table 2 — Minimum average least dimension (ALD)

Nominal size	Minimum ALD
20	10.0
14	7.0
10	5.0
7	3.5

7.4 Crushed particles of coarse aggregate

When determined in accordance with AS 1141.18, coarse aggregate that is derived from gravels or conglomerates shall consist of at least 75 % by mass of particles with at least two crushed faces.

NOTE With the exclusion of quarries in hard conglomerates, coarse aggregates derived from a hard rock quarrying process where all particles are crushed do not require testing.

8 Durability

8.1 General

Not more than one of the three sets of methods for the assessment of aggregate durability shall be specified. These sets of methods represent those most commonly used in Australia and are provided in this document. The set of methods specified should be the one which has been shown by local experience to be valid for rock sources likely to be used in the works.

NOTE All available tests and associated specification limits attempt to ensure adequate durability in service by measuring a change in properties over a short period of time (varying from minutes to days). This necessarily involves the imposition of conditions (e.g. loadings, temperature, exposure to reagents) that are unlikely to be met in service, in order to accelerate the change. Some aggregates may behave differently in service than predicted by a given durability testing regime. These differences arise from the different responses of the rock mineralogy and texture to the actual conditions. Experience with the material in service is essential in interpreting the testing results.

If aggregate is to be supplied from a source for which no experience is available with any of these assessment methods, the assessment procedure considered most appropriate for that source shall be specified. This decision will require some level of investigation before the appropriate procedure is determined.

The durability assessment method options require the use of one of the following sets of test methods:

- (a) Wet strength and wet/dry strength variation (see [Clause 8.2](#)).
- (b) Los Angeles value and sodium sulfate soundness (see [Clause 8.3](#)).
- (c) Los Angeles value and unsound stone content (see [Clause 8.4](#)).

8.2 Wet strength and wet/dry strength variation

When tested in accordance with AS 1141.22 and for all pavement classifications, the aggregate wet strength shall be not less than 100 kN and wet/dry strength variation shall not exceed 35 %.

8.3 Los Angeles value and sodium sulfate soundness

The Los Angeles value of the aggregate, when determined in accordance with AS 1141.23, shall conform to the relevant requirements in [Table 3](#).

In addition, the sodium sulfate soundness, when determined in accordance with AS 1141.24, shall show a weighted average loss not greater than 12 %.

Table 3 — Los Angeles abrasion loss, maximum percentage

Rock type	LA (maximum %)		
	Class A	Class B	Class C
ACID IGNEOUS			
Granitic rocks	*	35	40
Others	20	25	30
INTERMEDIATE IGNEOUS	20	25	30
BASIC IGNEOUS	20	25	30
METAMORPHIC	20	25	30
SEDIMENTARY			
Sedimentary rocks	*	25	30
River gravel	*	30	35
Dense metallurgical slags	20	25	30
Scoria			35
Vesicular slags			35
* Not usually recommended			
NOTE 1 Some very coarse-grained rocks (e.g. granite), have been known to lose whole crystals. Therefore, care should be exercised when interpreting the results of Los Angeles value tests from quarries containing rock of this type.			
NOTE 2 Refer to AS 2758.0 for terminology and classification of rock type.			

8.4 Los Angeles value and unsound stone content

When determined in accordance with AS 1141.23, the Los Angeles value shall conform to the relevant values in [Table 3](#).

In addition, when determined in accordance with AS 1141.30.1, the unsound stone content shall conform to the test values in [Table 4](#).

Table 4 — Unsound stone content

Class of aggregate	Total of marginal and unsound rock (% maximum by mass)		Unsound rock (% maximum by mass)
	Individual test	Mean of lot	Individual test
A	12	10	5
B	18	15	7
C	24	20	10

NOTE A scheme for determining unsound marginal and weak stone content is suggested in AS 2758.0 if these properties are not defined in contract documents.

9 Weak particles

When tested in accordance with AS 1141.32, the proportion of weak particles shall not exceed 1 %.

10 Resistance to stripping

When tested in accordance with AS 1141.50 in the “as received but dried to constant mass” condition, the maximum quantity of particles which have been stripped in an untreated aggregate shall not exceed 10 %.

NOTE 1 The plate stripping test, AS 1141.50, should be used as an early “upstream” process indicator of potential aggregate adhesion problems. Unless the works specification requires otherwise, the plate stripping test should be conducted using Class 170 binder conforming to AS 2008 from the same source as the binder proposed for use in the works.

NOTE 2 If the untreated aggregate fails to conform to the required limit, the stripping test be repeated with the use of appropriate precoat or adhesion agents or both. If conformity with the limit is reached, in such a test, the aggregate may be classed as acceptable provided that the treatment(s) applied are reported.

11 Frictional characteristics

NOTE Guidance for determination of susceptibility of aggregate to polishing is given in [Appendix A](#).

Appendix A **(informative)**

Determination of susceptibility of aggregate to polishing

Aggregate to be used for sprayed seal may, at the option of the purchaser, be tested to determine the susceptibility to polishing expressed as the polished aggregate friction value (PAFV) or the polished stone value (PSV). The minimum acceptable PAFV or PSV, or the basis on which the PAFV or PSV will be taken into consideration, should be specified or explained.

NOTE 1 The selection of a satisfactory and available polishing resistant aggregate can be made by comparing the PAFV or PSV data for aggregates from the area of interest.

NOTE 2 Mandatory PAFV or PSV limits for aggregates are not universally specified, as both the rate of polishing and the acceptable service life of an aggregate are dependent upon several interrelated factors. Such factors include road geometry, environmental conditions, economic life, type, volume and speed of traffic.

Suitable test methods for the determination of PAFV are AS 1141.40, AS 1141.41, and AS 1141.42.

Bibliography

AS 1141.40, *Methods for sampling and testing aggregates, Method 40: Polished aggregate friction value—Vertical road-wheel machine*

AS 1141.41, *Methods for sampling and testing aggregates, Method 41: Polished aggregate friction value—Horizontal bed machine*

AS 1141.42, *Methods for sampling and testing aggregates, Method 42: Pendulum friction test*

AS 2008, *Residual bitumen for pavements*

AS/NZS ISO 9001, *Quality Management Systems — Requirements*

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