

Australian Standard®

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

This Standard incorporates Amendment No. 1 (April 2016) and Amendment No. 2 (August 2019). The changes required by the Amendments are indicated in the text by a marginal bar and amendment number against the clause, note, table, figure or part thereof affected.

1 SCOPE

This Standard sets out a method for determining the flakiness index of an aggregate. The Method applies to aggregates having a nominal size not greater than 63.0 mm and having at least 80% by mass retained on a 4.75 mm sieve. The Method makes reference to a particle size distribution procedure which is required for determination of flakiness index.

2 REFERENCED DOCUMENTS

The documents below are referred to in this Standard:

AS

1141 Methods for sampling and testing aggregates

1141.2 Method 2: Basic testing equipment

A2 | 1141.11.1 Method 11.1: Particle size distribution—Sieving method

1141.12 Method 12: Material finer than 75 µm in aggregates (by washing)

A2 | **[Text deleted]**

3 DEFINITIONS

For the purpose of this Standard, the definitions below apply:

3.1 ‘Mean dimension

The mean of the smallest sieve aperture through which the particle passes and the largest sieve on which the particle is retained.

3.2 Flaky particle

A particle with a least dimension (thickness) less than 0.6 of its mean dimension.

3.3 Flakiness index

The percentage by mass of flaky particles.

NOTE: For all shape factors the relative effect between size fractions is volumetric and not gravimetric but, in practice, testing and calculations are carried out on a ‘per mass’ basis. This does not introduce significant error unless the test sample contains particles of markedly different densities.

4 APPARATUS

A2 | The following apparatus, conforming to the relevant provisions of AS 1141.2 and the requirements given below, is required:

(a) *Sample dividers (riffle splitters)*

(b) *Balance* Balance of adequate capacity, having a limit of performance not exceeding ± 5 g.

A1 | (c) *Oven* Thermostatically controlled oven to operate at a temperature of 105°C to 110°C.

NOTE: If the stones in the aggregate are precoated with a precoating material care has to be taken to ensure there are no adverse reactions.

(d) *Slotted sieves* Slotted sieve sizes with rectangular apertures as shown in Table 1.

Alternatively, a thickness gauge with apertures conforming to the dimensions shown in Figure 1 may be used. It is usual for a thickness gauge to be used for particles larger than 26.5 mm. However, the standard thickness gauge as shown in Figure 1, is not suitable for aggregates that require the fraction passing 6.70 mm and 4.75 mm to be measured.

A2 | (e) *Sieves* Sieve sizes as required.

(f) *Sieve brushes*

(g) *Dishes and trays*

(h) *Optional equipment:*

(i) Sieve shaker

(ii) Vibrating table or vibrating sieve shaker, having a high lateral and vertical motion.

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TABLE 1
SLOTTED SIEVES

millimetres					
Test fractions		Size of rectangular apertures		Minimum recommended	Minimum recommended
Passing	Retained	Minimum length	Width*	Bridge width between slots†	Plate thickness†
63.0	53.0	90	34.80 ± 0.30	30	2.0
53.0	37.5	80	27.15 ± 0.30	30	2.0
37.5	31.5	70	20.70 ± 0.20	19	2.0
31.5	26.5	60	17.40 ± 0.20	17	2.0
26.5	19.0	50	13.65 ± 0.20	13	2.0
19.0	13.2	40	9.66 ± 0.20	10	2.0
13.2	9.50	30	6.81 ± 0.10	7	2.0
9.50	6.70	20	4.86 ± 0.10	5	2.0
6.70	4.75	15	3.44 ± 0.10	4	2.0

* These widths are 0.6 times the mean of the limiting sieve apertures used for the determination of the size of particles.

† To provide support, the rows of apertures should be staggered.

5 PROCEDURE

5.1 Particle size distribution

The particle size distribution shall be determined as follows:

- (a) Obtain a representative test portion of material. The mass of the sample shall be in accordance with Table 2.
- (b) Determine the particle size distribution of the sample by using the procedures set out in AS 1141.12 (if required) and AS 1141.11.1.

NOTE: For ease in determining the flakiness index, it is advisable to keep the fractions retained on each sieve separated during the test procedure of AS 1141.11.1.

TABLE 2
SAMPLE MASS REQUIREMENTS

Maximum particle size mm	Mass of sample kg
63.0	25 to 30
53.0	20 to 25
37.5	10 to 15
31.5	8 to 10
26.5	4 to 6
19.0	1.5 to 2
16.0	1.2 to 1.5
13.2	0.7 to 1.0
9.50	0.3 to 0.5
6.70	0.2 to 0.4

5.2 Flakiness index

The flakiness index shall be determined as follow:

- (a) Combine the size fractions retained on the sieve as necessary, into the fractions shown in Table 1. Take these test fractions from the coarsest downwards until at least 80% of the sample is obtained. Record the mass of each test fraction as (m_1) to the nearest 1 g.
- (b) Test each fraction using the appropriate slotted sieve or gauge as shown in Table 1. When sieving by hand, keep the sample moving continuously over the surface of the sieve by use of a lateral and vertical motion accompanied by a jarring action. Continue sieving until the mass passing the sieve in 1 min is less than 1% of the mass of material retained on the sieve.

In the case of mechanical sieving, determine the minimum sieving time by comparison with hand sieving. Generally about 15 min sieving is required. Remove particles caught in the sieve openings and add to material retained on the sieve.

NOTE: Slotted sieves are intended to measure one dimension only. Any very long or very wide particles that would otherwise pass through, but are retained solely because the slots are not long enough, should be removed and placed with the other flat particles.

- (c) Weigh the material passing each slotted sieve or passing the appropriate gauge slot and record the masses (m_2) to the nearest 1 g.