



Transport
Roads & Maritime
Services

Test method T239

Fractured faces of coarse aggregate

OCTOBER 2012



Revision Summary

Ed/Rev Number	Clause Number	Description of Revision	Authorisation	Date
		Reformatted and Revision Summary added.	D. Dash	May 1999
		Date on Test Method revised to agree with date on revision summary.	D. Dash	Feb 2001
Ed 2/ Rev 0	All	New issue. Subscripts changed, groups changed.	J Friedrich	May 2011
Ed 2/ Rev 1	Table 1	Corrected 14 mm or greater	J Friedrich	Oct 2011
Ed 3/ Rev 0	All	Reformatted RMS template	J Friedrich	October 2012

Note that Roads and Maritime Services is hereafter referred to as 'RMS'.

The most recent revision to Test method T239 (other than minor editorial changes) are indicated by a vertical line in the margin as shown here.

Test method T239

Fractured faces of coarse aggregate

1. Scope

This Test Method sets out the procedure to determine the percentage by mass of aggregate containing, no fractured faces, at least one fractured face and two or more fractured faces.

2. General

- (a) This test is applicable to aggregate used for pavements
- (b) The following term and definition is used in this Test Method

Term	Definition
fractured face	The relatively planar surface of an aggregate particle which appears broken (as by crushing action) and not rounded, and the area of which is significant enough to affect the physical characteristics of the particle.

- (c) The following documents are referred to in this Test Method:
 - (i) T100 Sampling of Road Construction Materials (Soil, Gravel, Sand, Aggregate and Rock)
 - (ii) AS 1152 Test Sieves

3. Apparatus

- (a) Sample divider (e.g. riffle box) or suitable quartering equipment
- (b) Balance of not less than 1 kg capacity readable to 0.1 g and with a limit of performance of $\pm 1g$
- (c) Sieve of required size that conforms to AS 1152 (refer to Table 1)
- (d) Suitable dishes

4. Sampling and Preparation

- (a) Sample the aggregate according to T100
- (b) Quarter or riffle the sample to obtain sufficient sub-sample for 200 to 300 coarse aggregate particles
- (c) Dry the sub-sample to constant mass in an oven at a temperature within the range of 105°C to 110°C. When complete cover sub-sample and allow cooling

5. Procedure

- (a) Determine the mass of the sub-sample (M) to the nearest 1 g
- (b) Sieve the sub-sample through the AS sieve required for the nominal size aggregate according to Table 1

Table 1—Sieve Required for Aggregate Nominal Size

Aggregate Nominal Size	AS sieve
14 mm or greater	6.70 mm
10 mm	4.75 mm
7 and 5 mm	1.18 mm

- (c) Determine the mass of the portion passing the required sieve (M_P) to the nearest 1 g
- (d) Determine the mass of the portion retained on the required sieve (M_R) to the nearest 1 g

- (e) From the portion retained on the sieve, visually examine each aggregate particle and separate into the following 3 groups based on the number of fractured faces:
- (i) Group 0 - aggregate particles with no fractured faces
 - (ii) Group 1 - aggregate particles with one fractured face
 - (iii) Group 2 - aggregate particles with two or more fractured faces
- (f) Separately determine the mass of aggregate in each of the 3 groups (M_0 , M_1 and M_2 respectively) to the nearest 1 g

6. Calculations

- (a) Determine the percentage by mass of aggregate passing (P) the required sieve to the nearest 1% as follows:

$$P = \frac{M_P}{M} \times 100\%$$

- Where
- P = Proportion of aggregate passing the required sieve (%)
 - M_P = Mass of aggregate passing the coarse sieve (g)
 - M = Total mass of aggregate sample (g)

- (b) Determine the percentage by mass of aggregate retained with no fractured faces (F_0) to the nearest 1% as follows:

$$F_0 = \frac{M_0}{M_R} \times 100\%$$

- Where
- F_0 = Percentage of aggregate with no fractured faces (%)
 - M_0 = Mass of aggregate with no fractured faces (g)
 - M_R = Mass of aggregate retained on the sieve (g)

- (c) Determine the percentage by mass of aggregate retained with one or more fractured faces (F_1) to the nearest 1% as follows:

$$F_1 = \frac{(M_1 + M_2)}{M_R} \times 100\%$$

- Where
- F_1 = Percentage of aggregate with one or more fractured faces (%)
 - M_1 = Mass of aggregate with one or more fractured faces (g)
 - M_R = Mass of aggregate retained on the coarse sieve (g)

- (d) Determine the percentage by mass of aggregate retained with two or more fractured faces (F_2) to the nearest 1% as follows:

$$F_2 = \frac{M_2}{M_R} \times 100\%$$

- Where
- F_2 = Percentage of aggregate with two or more fractured faces (%)
 - M_2 = Mass of aggregate with two or more fractured faces (g).
 - M_R = Mass of aggregate retained on the coarse sieve (g)

7. Reporting

Include the following results in the report:

- (a) Type and nominal size of aggregate
- (b) Sieve size used
- (c) Percentage of aggregate passing the sieve (P) to the nearest 1%
- (d) Percentage of aggregate with the following number of fractured face to the nearest 1%:
 - (i) No fractured face (F_0)
 - (ii) At least one fractured face (F_1)
 - (iii) Two or more fractured face (F_2)
- (e) Reference to this test method