



Transport
Roads & Maritime
Services

Test method T199

Deflection testing of road formation

JUNE 2014



Revision Summary

Ed/Rev Number	Clause Number	Description of Revision	Authorisation	Date
Ed 1 /Rev 0		New issue	G. Donald	Feb 2005
Ed 2 /Rev 0		New edition. Revised and reformatted to be consistent with T160. Sample Pattern defined. Corrected CV formula. Added Characteristic Deflection.	D Hazell	July 2008
Ed 2 /Rev 1	3(iv), 4(c)(v)	Clarify accuracy of calculations	D Hazell	Sept 2009
Ed 3/ Rev 0	All	Reformatted Roads and Maritime template	D Hazell	October 2012
Ed 3/ Rev 1	1, 2(b), 5(c)	New sentence on Testing Officer Remove Part (b) Use of data capture device.	G Vorobieff	August 2013
Ed 3/ Rev2	Revision Summary	Date changed for manual reading of dial gauge	J Friedrich	June 2014

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

The most recent revision to Test method T199 (other than minor editorial changes) are indicated by a vertical line in the margin as shown here.

With the introduction of the new WHS Act 2011, electronic data capture devices are recommended for use with this test method. After 31 December 2014 the manual reading of dial gauges near the deflection beam will be not permitted on Roads and Maritime projects.

The time to perform the test is specified in Roads and Maritime R44 specification. Where no information is provided by the contract documents, the default period is within 3 days of compaction of the lot being completed.

Test method T199

Deflection testing of road formation

1. Scope

This test method sets out the procedure for determining the stiffness and homogeneity of a road formation using a portable deflection beam under a standard wheel load and tyre pressure. It is recommended that the Testing Officer uses a data capture device for the measurement of deflections.

2. General

- (a) The procedure is to be used on a road formation and consists of a sample of deflection tests that are statistically analysed
- (b) The surface under the beam must be sound and free of excessive loose material, large protruding objects or significant surface depressions
- (c) Where an electronic data acquisition system is used to directly capture and record test data, it must have a precision at least equivalent to the apparatus replaced

3. Apparatus, Preparation, Procedure

This test method is identical to T160 except for the following amendments:

- (a) Use the same vehicle configuration and type of beam for all testing to ensure consistency between results
- (b) Sample each lot using at least 12 test points in one of the following patterns:
 - (i) A grid pattern at 10 m spacing according to Appendix: Grid Sampling Pattern;
 - (ii) A random pattern over the area or lot to be tested
- (c) Only the initial and final readings for each test point are required to determine the maximum deflection (D_0) at each test point

4. Calculations

Calculate the mean (M) and standard deviation (SD) to 0.01 mm, and the coefficient of variation (CV) to nearest 1% of the maximum deflection readings of each lot as follows:

$$CV = \frac{SD}{M} \times 100\%$$

Where:

- CV = Coefficient of Variation for the lot (%)
 M = Mean of the maximum deflections (mm)
 SD = Standard Deviation of the maximum deflections (mm)

- (i) Calculate the Characteristic Deflection for each lot as follows:

$$CD = M + f \times SD$$

Where:

- CD = Characteristic Deflection (mm)
 M = Mean of the maximum deflections (mm)
 f = Factor = 1.65
 SD = Standard Deviation of the maximum deflections (mm)

5. Reporting

Include the following data and results in the report:

- (a) Type of beam and beam ratio (*BR*)
- (b) Test vehicle identification
- (c) The results tabulated for each lot:
 - (i) Date and time of start and end of testing
 - (ii) Location of lot represented
 - (iii) Layer and time that compaction was completed on the layer tested
 - (iv) Location of each test point and Maximum Deflections (D_0) to 0.01 mm for each test
 - (v) When using data capture devices, submit the data with the report.
 - (vi) The Mean (M) and Standard Deviation (SD) to 0.01 mm, and Coefficient of Variation (CV) to nearest 1% of the maximum deflections for the lot
 - (vii) The Characteristic Deflection (CD) for the lot
- (d) Reference to this test method

Appendix: Grid Sampling Pattern

The grid sampling pattern has the following minimum requirements (refer to Figure 1):

- Consists of test points along a series in runs parallel to the road centreline
- Alternate the test point between left and right wheel paths of the test vehicle with a spacing of no more than 10 m apart
- Position runs to equally cover the lot at no more than 3.6 m transversely apart (i.e. $T \leq 3.6$ m). Adjust a run to ensure that test points are approximately 0.5 m from the boundary of the lot

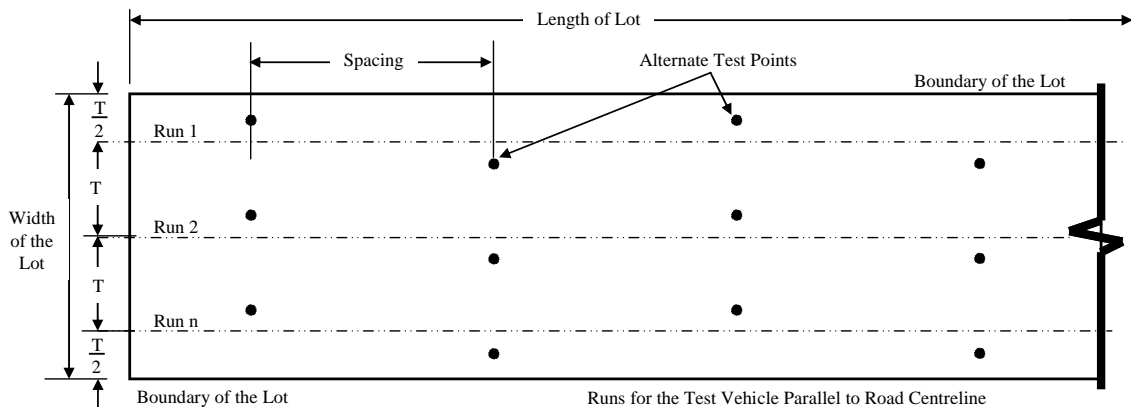


Figure 1 Sample Pattern for Test Points within a Lot