



Transport
Roads & Maritime
Services

Test method T1109

Compression stiffness of large elastomeric bearings

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Revision Summary

Ed/Rev Number	Clause Number	Description of Revision	Authorisation	Date
		Reformatted and Revision Summary Added	D. Dash	June 2001
Ed 2/ Rev 0	All	Reformatted RMS template	J Friedrich	November 2012

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

The most recent revision to Test method T1109 (other than minor editorial changes) are indicated by a vertical line in the margin as shown here.

Test method T1109

Compression stiffness of large elastomeric bearings

1. Scope

This method sets out the procedure for determining the compression stiffness of large elastomeric bearings in accordance with the Australian Standard AS 1523.

2. Apparatus

- (a) A compression testing machine calibrated in technical units of force in accordance with AS 2193. The vertical force and the side (shear) loading facility to be maintained to Grade A standard.
- (b) The size of the test frame should be sufficient to test all the bearings covered by AS 1523.
- (c) Dial gauges, potentiometers and LVDTs (Linear voltage displacement transducers) shall all be calibrated to the appropriate Standard and maintained within 0.1 % accuracy.
- (d) A shear plate of sufficient dimensions to be greater in size than the bearings being tested and be able to resist the applied forces without distortion.

3. Procedure

- (a) Place one bearing centrally on the loading/test bed on top of which is placed a shear plate which must be at least 25 mm greater in size than the bearing. On top of the shear plate is placed a second bearing if 2 bearings are being tested together in compression. The second bearing is also placed centrally on this shear plate.
- (b) The loading table, if retractable, is moved into the test frame and the vertical (compressive) load is then applied.
- (c) The following test procedure is then applied.
 - (i) Load bearings to $1.5 \times$ the design load.
 - (ii) Reduce load to $0.1 \times$ the design load.
 - (iii) Increase load to $1.5 \times$ the design load.
 - (iv) Reduce load to $0.1 \times$ the design load.
 - (v) If one bearing is being tested fix the magnetic base of all 4 LVDTs or dial gauges to bottom platen and adjust the height of the LVDTs or dial gauges so that contact is made with the top platen. If 2 bearings are being tested fix all 4 LVDTs or dial gauges to the centre shear plate with 2 in contact with the bottom platen and 2 with the top platen, each pair being across the diagonals of the rectangular bearings or the diameters of circular bearings.
 - (vi) After holding the load at $0.1 \times$ design load for 1 minute adjust the 4 LVDTs or dial gauges to read between 0 - 0.5 mm. Note all 4 readings.
 - (vii) Increase the load to $1.1 \times$ design load, hold for 1 minute then record the readings of the 4 LVDTs or dial gauges.
 - (viii) Lower the bottom platen to the zero position and remove the LVDTs or dial gauges.

4. Calculation

- (a) When testing 1 bearing the compression stiffness is calculated as follows:

$$\text{Compression stiffness (kN/m)} = \frac{1.1 \times DL - 0.1 \times DL}{\text{Extn at } 1.1 \times DL - \text{Extn at } 0.1 \times DL}$$

Where DL = Design load of bearing (or rated load)

Extension values are the average of all 4 LVDTs or dial gauges.

- (b) When testing 2 bearings the compression stiffness of the 2 bearings are calculated as follows:

$$\text{Compression stiffness (top bearing)} = \frac{1.1 \times DL - 0.1 \times DL}{\text{Extn at } 1.1 \times DL - \text{Extn at } 0.1 \times DL}$$

Where DL = Design load of bearing (or rated load).

Extension values are the average of the 2 LVDTs or dial gauges in contact with the upper platen.

$$\text{Compression stiffness (bottom bearing)} = \frac{1.1 \times DL - 0.1 \times DL}{\text{Extn at } 1.1 \times DL - \text{Extn at } 0.1 \times DL}$$

Where DL = Design load of bearing (or rated load).

Extension values are the average of the 2 LVDTs or dial gauges in contact with the bottom platen.