



Test method T1223

Slant shear strength of adhesives for raised pavement markers

NOVEMBER 2012



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 T1223 (other than minor editorial changes) are indicated by a vertical line in the margin as shown here.

Test method T1223

Slant shear strength of adhesives for raised pavement markers

1. Scope

This Method sets out the procedure for determining the slant shear bond strength of cured adhesive and the quality of the adhesive bond to concrete.

2. Apparatus

The following apparatus is required:

- (a) Pairs of matched steel and matched concrete blocks-(as shown in Fig.1).
- (b) Compression testing machine-with a range of 0-250 kN (minimum) and complying with the Grade B requirements of AS 2193.
- (c) Grit blasting cabinet for the preparation of steel bonding surfaces.
- (d) Cleaning solvent, (toluene, xylene, or similar) for the preparation of steel bonding surfaces.
- (e) Water bath maintained at a temperature of $23 \pm 2^\circ\text{C}$.

3. Preparation of Test Assembly

3.1 "Dry" Test Assembly.

- (a) For Steel
 - (i) Prepare the mating surfaces of the steel blocks by thoroughly cleaning, first by grit blasting, and then, just before conditioning to the test temperature, by solvent cleaning. The mating surface shall be as specified in AS 1627 Pt 0. After solvent cleaning, do not touch the prepared surface.

Note: ONE FINGERPRINT WILL VOID THE TEST.

- (ii) Condition the blocks at $23 \pm 1^\circ\text{C}$.
- (iii) Mix a sufficient quantity of adhesive.
- (iv) Without delay, place a sufficient quantity of the mixed adhesive on the diagonal face of one block so that when the blocks are pressed together the adhesive completely covers both faces.
- (v) Press the blocks together to form a rectangular assembly and remove excess adhesive from the bond line.
- (vi) Place the assembly in such a manner that the position of the blocks relative to one another is maintained. (see Fig 2)
- (vii) Cure for 24 ± 2 h at $23 \pm 1^\circ\text{C}$.
- (b) For concrete
 - (i) Prepare two concrete blocks by casting, as shown in Figure 3 using the following micro concrete mix:

Sand.....	2400 g
Cement.....	.800 g
WRDA.....	38 ml
Water.	..234 ml
 - (ii) Allow the blocks to set for a minimum of 7 days at a temperature of $23 \pm 2^\circ\text{C}$.
 - (iii) Condition the blocks at $23 \pm 1^\circ\text{C}$.

- (iv) Using 80 grade abrasive paper on a level glass surface, grind down the mating surface of the blocks to give a smooth fresh surface.
- (v) Mix a sufficient quantity of adhesive.
- (vi) Without delay, place a sufficient quantity of the mixed adhesive on the diagonal face of one block so that when the blocks are pressed together the adhesive completely covers both faces.
- (vii) Press the blocks together to form a rectangular assembly and remove excess adhesive from the bond line.
- (viii) Place the assembly in such a manner that the position of the blocks relative to one another is maintained.
- (ix) Allow the adhesive to cure for 24 ± 2 h at $23 \pm 1^\circ\text{C}$.

1.2. "Wet" Test Assembly.

- (a) For concrete
 - (i) Prepare two concrete blocks by casting, as for 3.1(ii) points (a) and (b).
 - (ii) Condition the blocks at $23 \pm 1^\circ\text{C}$.
 - (iii) Pre-saturate the blocks by placing in a water bath at the preconditioning temperature.
 - (iv) Mix a sufficient quantity of adhesive.
 - (v) Without delay, place a sufficient quantity of the mixed adhesive on the diagonal face of one block so that when the blocks are pressed together the adhesive completely covers both faces.
 - (vi) Press the blocks together to form a rectangular assembly and remove excess adhesive from the bond line.
 - (vii) Place the assembly in such a manner that the position of the blocks relative to one another is maintained.
 - (viii) Allow the adhesive to cure for 24 ± 2 h at $23 \pm 1^\circ\text{C}$.

4. Procedure

4.1 For Dry Steel and Dry Concrete Assembly.

- (a) Place the assembly vertically in the testing machine and apply a compressive load at the rate of 6 kN/s until failure.
- (b) Record the failure load to the nearest kilo-newton.
- (c) Inspect the faces of the fracture for areas to which the adhesive had failed to bond.
- (d) Record as a percentage of total bond area those areas to which the adhesive had failed to bond.

4.2 For any Assembly Where the Bonds are Subjected to immersion.

- (a) Immerse the assembly in a water bath for the period specified.
- (b) Immediately lightly dry and place the assembly vertically in the testing machine.
- (c) Apply a compressive load at the rate of 6kN/s until failure.
- (d) Record the failure load in kilo-newtons. Inspect the faces of the fracture for areas to which the adhesive had failed to bond.

5. Calculations

Record failure load to the nearest Newton and calculate the slant shear strength from:

Slant shear strength (MPa)=Load(Newtons)/Area(square millimetre).

NOTES

- (i) When using the test blocks of 40 mm x 40 mm with a slant shear angle of 30 from the direction of application of the compressive load, calculate for each test assembly the slant shear bond strength at failure in megapascals, as follows:

$$0.271 \times \text{failure load (kN)} \dots\dots\dots \text{MPa.}$$

- (ii) Individual test results having a variability greater than 10 percent of the averaged result ($V > 10$ percent) may be rejected.

6. Reporting

The report shall include the following:

- (a) The identification of the adhesive, manufacturer and type.
- (b) Bonding conditions and any variation from this Method.
- (c) Test assembly material.
- (d) Temperature and period of immersion of test assemblies.
- (e) The average (arithmetic mean) value of slant shear bond strength in MPa.
- (f) Surface area to which adhesive failed to bond.

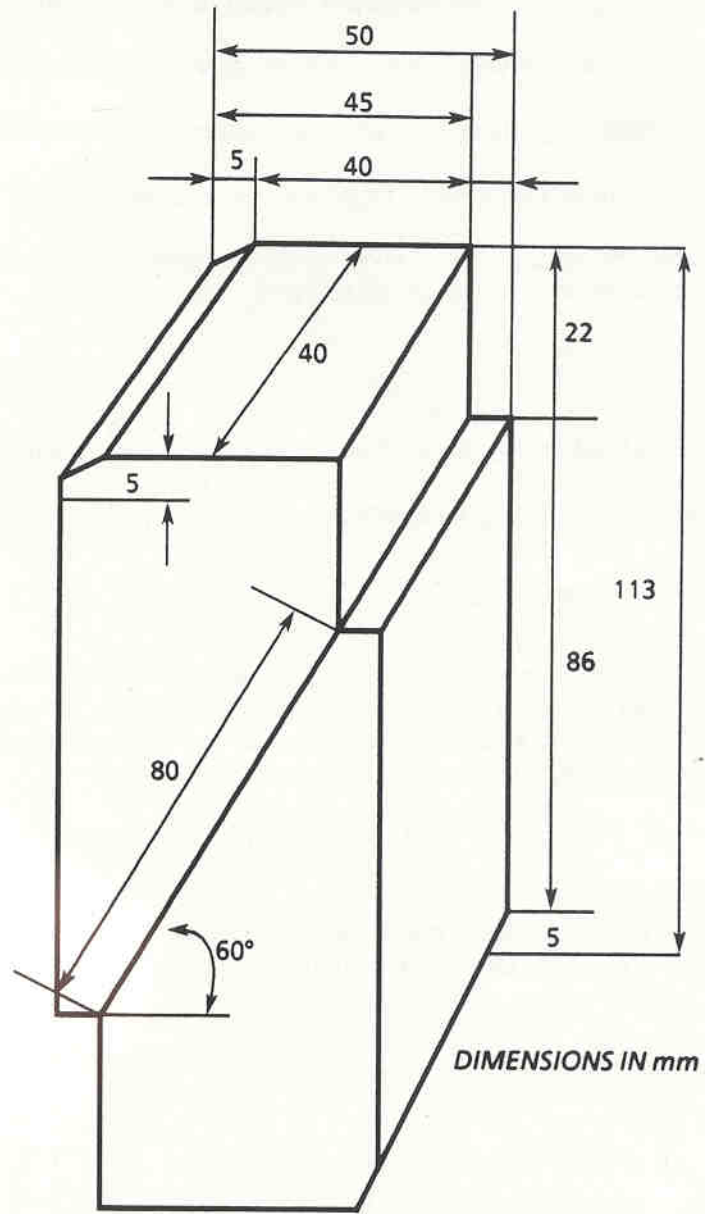


Fig. 1. Dimensions of steel blocks

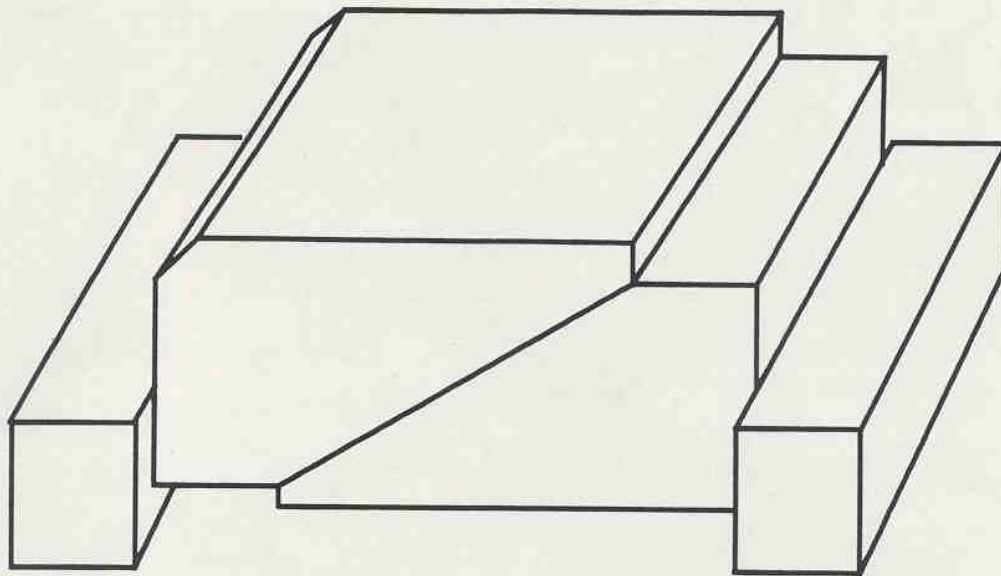


Fig. 2 Positioning of steel blocks and end stops

**CONCRETE BLOCK DIMENSIONS
SLANT SHEAR STRENGTH**

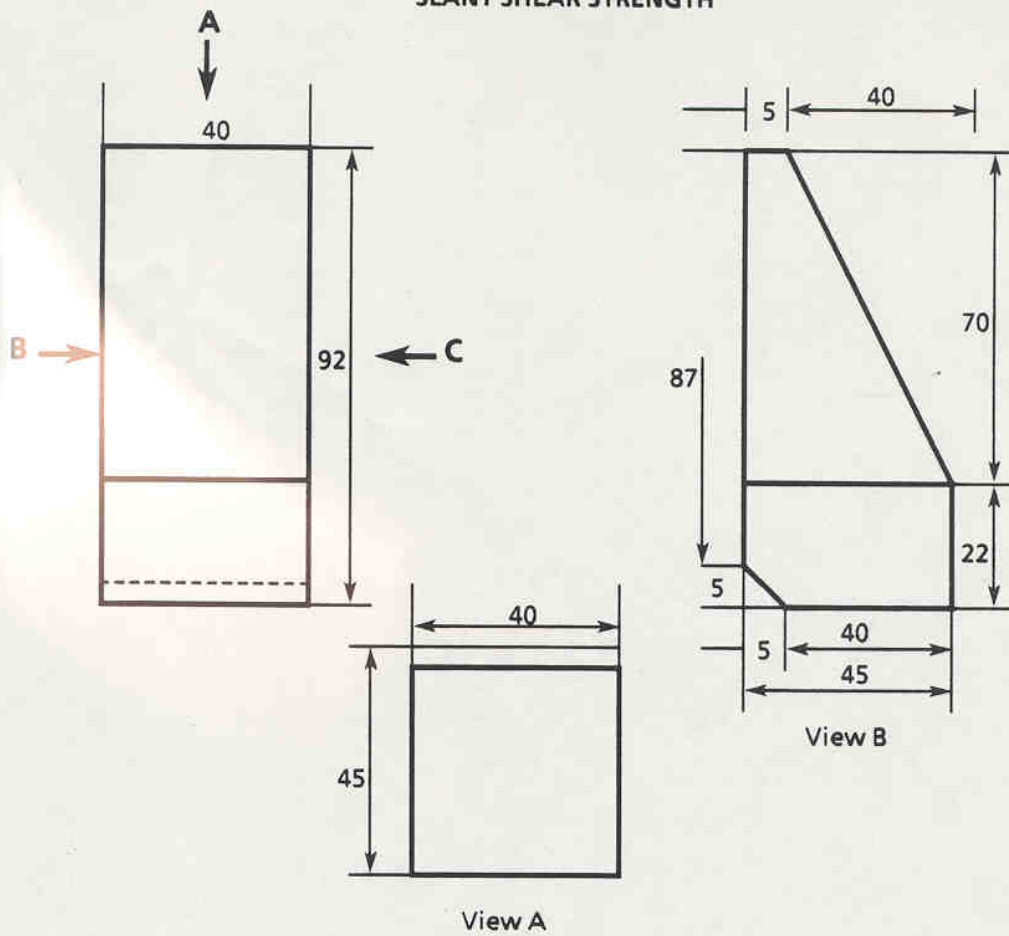


Figure 3