Method of Test for
BONDING PROPERTIES OF JOINT FORMER/SEALER
DOTD Designation: TR 636-88
METHOD A
BOND OF PLASTIC FRAME TO CEMENT MORTAR

Scope

1. This method of test covers the procedure for determining the bond strength between mortar and the plastic frame of the joint former/sealer.

Apparatus

2. (a) *Saw* - Capable of cutting plastic.

(b) *Measuring device* - Accurate to 0.1 inch.

(c) *Portland cement mortar mixing apparatus* - Conforming to AASHTO Designation T 162.

(d) *Type III cement and standard sand* - Proportioned as specified by AASHTO Designation: T 132.

(e) *Mold* - In accordance with Figure 1.

(f) *Two "T" bars* - In accordance with Figure 2.

(g) *Metal blade* - Approximately 6 x 1/4 inches x depth of seal.

(h) *Moist room* - Capable of maintaining a temperature of 73 ± 3°F at minimum 95% relative humidity.

(i) *Adhesive* - Moisture insensitive, capable of developing a bond strength which exceeds that of the plastic frame to the mortar. (Epoxy Resin Systems are recommended.)

(j) *Testing machine meeting the following requirements:*

(1) Speed adjustable to 0.5 inch per minute.
(2) Accuracy within ± 1% of indicated load in pounds.
(3) Suitable jaws for gripping specimen.
(4) Load range of 500 pounds minimum.

Sample

3. A sample of the joint former/sealer shall be cut to 6.0 ± 0.1 inches.

Procedure

4. (a) The temperature of the test area shall be room temperature.

(b) Measure and record the length of three specimens to the nearest 0.1 inch.

(c) Apply adhesive to inner faces of each of the plastic frames of each specimen and cure.

(d) Place "T" bars into mold. (See Figure 1.)

(e) Mix the batch of mortar in accordance with AASHTO Designation: T 162 and place in mold.

(f) Place sealer into slot and with suitable vibration consolidate the mortar to the sides of the sealer. Repeat for the two additional specimens.

(g) Cure specimens in moist room for 3 days. Remove the specimens from the mold and submerge in water in moist room for 4 days.

(h) Remove each prepared specimen from water and securely clamp the "T" bars in the jaws of the testing machine.

(i) Apply a continuous tensile load to ensure a separation rate of approximately 0.5 inch/minute to each specimen.

(j) Record the load at which failure occurs for each specimen on the worksheet to the nearest pound. (See Figure 3.)

Calculations

5. Calculate bond strength between the plastic frame to cement mortar using the following formula:

$$\text{Bond Strength (C)} = \frac{A}{B}$$

where:

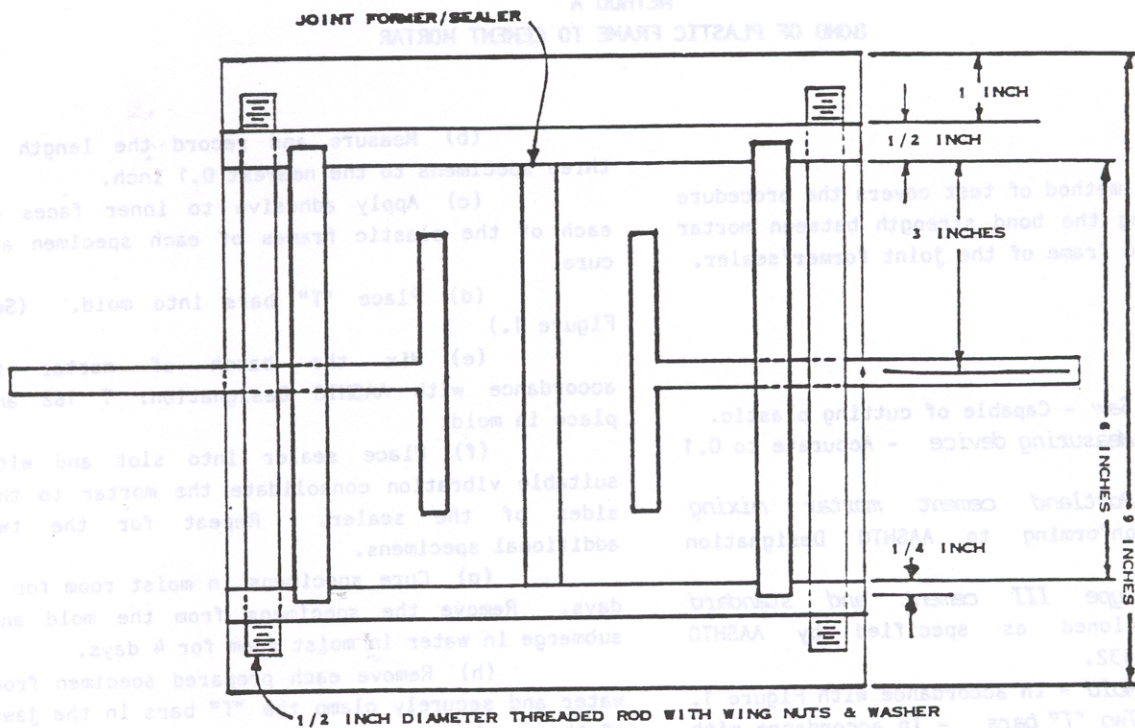A = load, pounds
B = length of specimen, inches

Example

6. See worksheet (Figure 3.)

Report

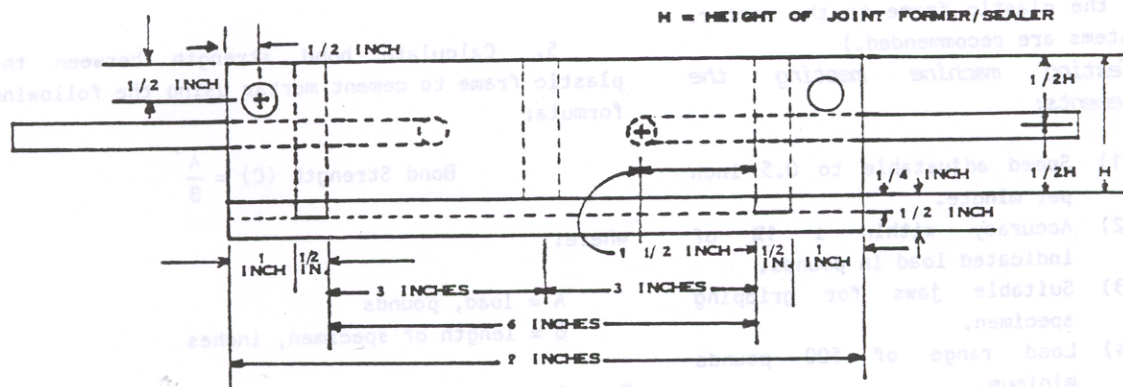7. Report the median bond strength to the nearest tenth (0.1) of a pound per linear inch of sealer.

Normal testing time is 8 days.

TOP VIEW

JOINT FORMER/SEALER

1 INCH

1/2 INCH

3 INCHES

6 INCHES

1/4 INCH

9 INCHES

1/2 INCH DIAMETER THREADED ROD WITH WING NUTS & WASHER

NOTE: MATERIAL - 1/2 INCH MARINE PLYWOOD

SIDE VIEW

H = HEIGHT OF JOINT FORMER/SEALER

1/2 INCH

1/2 INCH

1/2H

1/4 INCH

1/2H   H

1/2 INCH

1 1/2 INCH   1/2 IN   1 INCH

1 INCH   1/2 IN

3 INCHES   3 INCHES

6 INCHES

9 INCHES

Figure 1

(Top and Side View of Mold With "T" Bars)

" T " BAR (2 REQUIRED)

NO. 3 REINFORCING STEEL (3/8 INCH DIAMETER)

WELD

4
INCHES

6 INCH MINIMUM
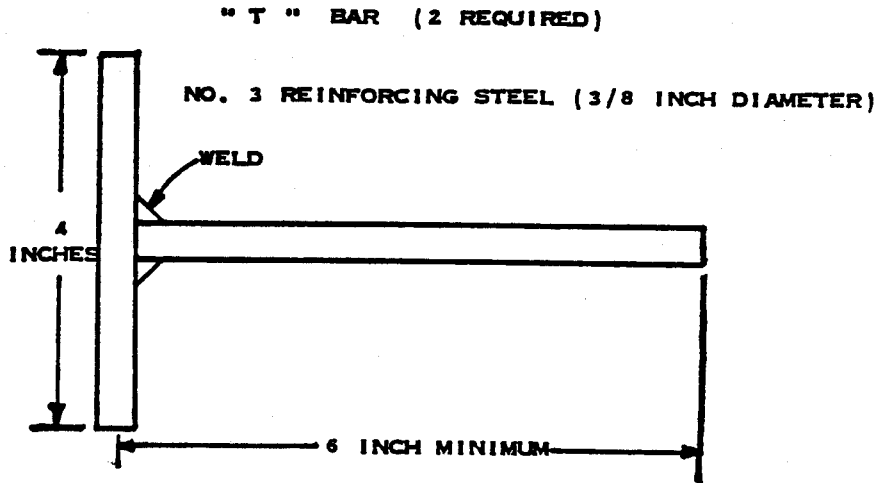
Figure 2

BOND OF PLASTIC FRAME TO CEMENT MORTAR, LB/LIN. IN. .... | 20.3 | | P |

Specimen No.	Length, In. (B)	Load, Lb. (A)	Lb./Linear In.
1	6.0	115	19.2
2	6.0	140	23.3
3	5.9	120	20.3

Lb./Linear In. = Load, Lb. (A) ÷ Length, In. (B)

Figure 3
Example of Worksheet

DOTD Designation: TR 636-88
METHOD B
BOND OF ELASTOMER TO PLASTIC

Scope

1. This method of test covers the procedure for determining the bond strength between the elastomer and the plastic.

Apparatus

2. (a) *Saw* - Capable of cutting plastic.

(b) *Measuring device* - Accurate to 0.1 inch.

(c) *Tensile testing machine meeting the following requirements:*

(1) Speed adjustable to 0.5 inch per minute.

(2) Accuracy within ± 1% of indicated load.

(3) Suitable jaws for gripping specimen.

(4) Load range of 500 pounds minimum.

Sample

3. A sample of the joint former/sealer shall be cut to 4.0 ± 0.1 inches so that the cut ends are perpendicular to the long axis of the specimen.

Procedure

4. (a) The temperature of the test area shall be room temperature.

(b) Measure and record the length of three specimens to the nearest 0.1 inch.

(c) Set the speed of the tensile testing machine at 0.5 inch per minute.

(d) Open the plastic frames 180° and clamp each strip securely in the jaws of the testing machine.

(e) Pull the plastic frames apart so as to apply a shear stress to the bond of the elastomer to the plastic.

(f) Record the load at which separating failure occurs between the plastic frames and elastomer to the nearest pound on the worksheet. (See Figure 1.)

(g) Repeat steps (d)-(f) for the two additional specimens.

Calculations

5. Calculate bond of elastomer to plastic of each specimen using the following formula:

$$\text{Bond Strength (C)} = \frac{A}{B}$$

where:

A = load, pounds
B = length of specimen, inches

Example

6. See worksheet (Figure 1).

Report

7. Report the median bond strength to the nearest tenth (0.1) of a pound per linear inch of sealer.

Normal testing time is 2 hours.

BOND OF ELASTOMER TO PLASTIC, LB/LIN.IN. .... | 12.8 | | P |

Specimen No.	Length, In. (B)	Load, Lb. (A)	Lb./Linear In.
1	3.9	53	13.6
2	4.0	51	12.8
3	4.0	44	11.0

Lb./Linear In. = Load, Lb. (A) ÷ Length, In. (B)

Figure 1
Example of Worksheet