

**Bureau of Materials and Physical Research**

Illinois Laboratory Test Procedure

Effective Date: January 1, 2007

Revised: March 30, 2012

**Bond Strength – Elastomer to Steel Laminate**

(formerly Illinois Test Procedure 603)

This test procedure applies to Article 1083.02(a) of the Standard Specifications for Road and Bridge Construction ([current year issued](#)).

**1.0 GENERAL**

- 1.1 This procedure covers the testing required to determine the bond strength of elastomer to steel laminates used to manufacture Elastomeric Bridge Bearings.

**2.0 REFERENCED DOCUMENTS**

- 2.1 ASTM E 4
- 2.2 ASTM D 429, Method B

**3.0 TEST EQUIPMENT**

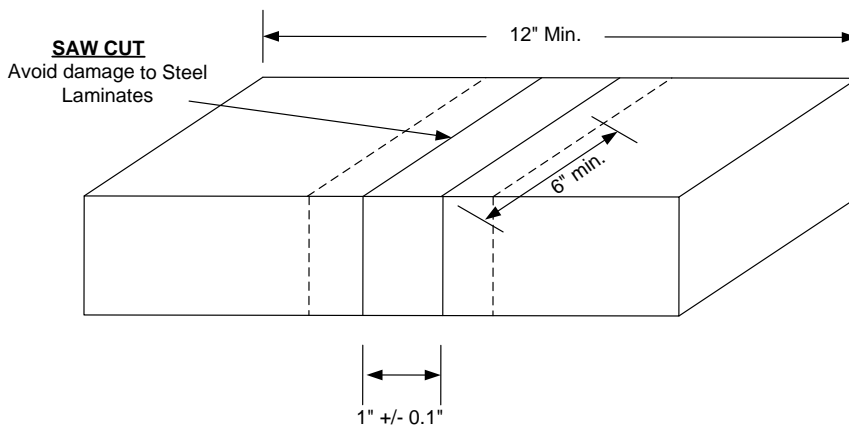
- 3.1 A testing machine capable of measuring loads up to 100 lbs (445 N) and calibrated to ASTM E 4.
- 3.1.1 The platen speed shall be  $2 \pm 0.2$  in. ( $50 \pm 5$  mm) per minute.
- 3.1.2 The machine shall be equipped with grips designed for holding rubber without cutting or slipping.
- 3.1.3 The grips shall have faces at least 1 in. (25 mm) wide.
- 3.2 A saw capable of cutting smoothly through steel laminate bearing pads.

**4.0 TEST PROCEDURE**

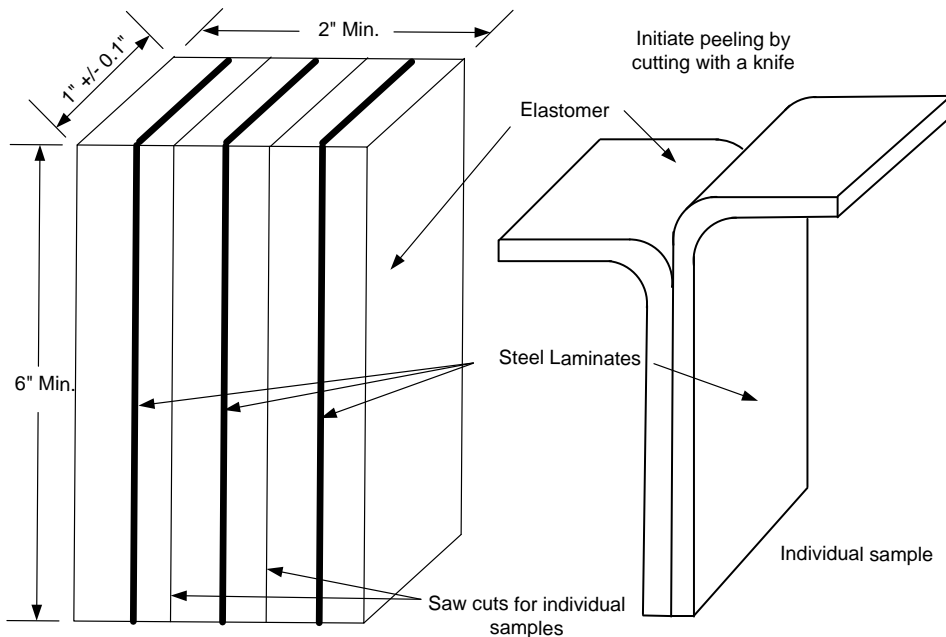
- 4.1 Sample preparation.
- 4.1.1 The samples shall be cut from finished bearings.
- 4.1.2 A 1 in. (25 mm) wide (full thickness) sample shall be taken from the center 1/3 of the pad as shown in Figure 1.
- 4.1.3 The minimum length shall be 6 in. (150 mm).
- 4.1.4 Cut this sample section into test specimens as shown in Figure 2; and initiate peeling by neatly cutting the elastomer back to elastomer-laminate interface as shown in Figure 2. Continue peeling in a uniform manner far enough to allow placement of the sample into the grips of the testing machine. Bend the steel laminate 90° as shown in Figure 2.

## 4.2 Test Procedure.

- 4.2.1 Install the sample into the grips of the testing machine so symmetrical tension is applied.
- 4.2.2 Apply sufficient tension to sample to remove all slack in sample. Stop loading and draw two lines across the sample, 2 in. (50 mm) apart, starting where the peeled portion of the elastomer meets the laminate.
- 4.2.3 Apply the load at the required rate until the elastomer peels back beyond the 2 in. (50 mm) mark while recording the load.
- 4.2.4 Record the bond strength in pounds of load per inch of width.
- 4.2.5 Perform visual inspection and estimate the adhesion failure according to ASTM D 429, Method B. Record the "R" value using the "Adhesion Failure Terminology" in D 429.



**Figure 1**  
**Full Size Bearing Pad**  
**Sample**



**Figure 2**  
**Preparation of Bond Strength**  
**Specimens**