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DIVISION OF ENGINEERING SERVICES
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METHOD OF TEST FOR DETERMINING MOVEMENT RATING OF TYPE B1 AND B2 PREFORMED ELASTOMERIC JOINT SEALS

A. SCOPE

This test method describes the procedure for determining the movement rating of Type B preformed elastomeric joint seals.

B. REFERENCES

California Standard Specifications – Section 51-1.12, “Expansion and Fixed Joints and Bearings”

C. APPARATUS

1. A compression-testing machine with a minimum capacity of 2200 lbs and a rate of loading capability of ½ in./min is required.
2. A dial micrometer with 0.001 in. divisions and 4 in. range is required.
3. A steel rule 6 to 12 in. in length with 0.01 in. divisions is required.

D. SAMPLES

1. When the minimum uncompressed width, as specified by the manufacturer, is referred to in this test method, it will be abbreviated as MUWASBM.
2. From each seal to be tested, cut a specimen 5 in. ± 0.1 in. along its length. Use steel rule for this and all future measurements. Record the length to the nearest ± 0.01 in.

E. PROCEDURE

1. Perform tests at an ambient temperature of 73°F ± 5°F.
2. For Type B1 and B2 joint seal, measure the actual minimum and maximum uncompressed widths between the faces of the seal intended to be in contact with the sides of the expansion joint. The minimum uncompressed width, as measured here, shall be at least equal to or greater than the MUWASBM. Next, measure the minimum height of contact face to the nearest 0.01 in. Record these values.
3. For Type B2 joint seal, compress the specimen to 85 % of the minimum uncompressed width and measure the depth of seal at the contact surface. Record this value.
4. Center test specimen with a contact face down on the base of compression testing machine.

5. Attach micrometer dial via suitable means (e.g., a magnetic base) to the moving head of the testing machine. Position the dial so that it may be read easily, to the nearest 0.01 inch, during the compression test cycles.
6. Advance moving head slowly until specimen just contacts both faces of the testing machine. Stop motion of machine. Bring the micrometer dial to zero. The distance between test machine faces at this point should equal the maximum uncompressed width of the specimen as measured in step 2.
7. Set test machine to advance at the rate of $\frac{1}{2}$ in./min.
8. Compress specimen to 50 % of the minimum uncompressed width as measured in step 2.
9. Release compression at the rate of $\frac{1}{2}$ in./min. Repeat 50 % compression and release cycle. Observe to ensure that the top and bottom edges of the seal do not lose contact with testing machine face while under compression.
10. On the third compression cycle, load the specimen at the same rate of $\frac{1}{2}$ in./min, but also record total load in pounds at each 0.1 in. of deflection (reading to the nearest 0.01 in.).
11. Continue taking readings on the third cycle to a point sufficient to determine W2 (see Section F-7).
12. Release the load at any convenient rate.
13. Ink one end of the seal, as received, on a rubber stamp pad and make a print of the cross-section on the test data sheet.

F. CALCULATIONS

1. Calculate the contact area of the specimen as height of contact face by length.
2. Calculate actual width of specimen in inches at each load reading as width measured in test procedure step 5 minus the micrometer deflection reading.
3. Calculate the applied pressure at each reading in psi (pounds per square inch) as total load divided by contact area.
4. Plot the pressure-deflection curve as actual width in inches for each reading versus psi.
5. Determine width W1 as follows:
 - a. For Type B1 (heavy wall) seal, W1 shall be the smaller of the following two values:
 - (1) 0.85 times the MUWASBM.
 - (2) The width of seal on the third successive cycle of the pressure-deflection test when compressed to an average of 3.0 psi.

- b. For Type B2 (thin wall) seal, W1 shall be the smallest of the following three values:
 - (1) 0.85 times the MUWASBM.
 - (2) 1.15 times the minimum depth of seal measured along the contact surface when compressed to 85 % of the minimum uncompressed width of seal.
 - (3) The width of seal on the third successive cycle of the pressure-deflection test when compressed to an average pressure of 2.0 psi.
- 6. Read the pressure developed at width W1 from the pressure-deflection curve.
- 7. Read W2 from the pressure-deflection curve as the width of seal corresponding to pressure of four times the pressure measured at W1.
- 8. Calculate the movement rating to the nearest 0.1 in. as W1 minus W2.
- 9. As an alternate to plotting the pressure-deflection curve, the values of W1 and W2 may be obtained by interpolation between data points.

G. REPORTING OF RESULTS

Create a form for the test results showing the test number, the MUWASBM, height of contact face, length, contact area, actual minimum uncompressed width, the minimum depth at 85 % of minimum uncompressed width for Type B2 seal, W1, W2, movement rating, and any other pertinent comments regarding the physical properties of the seal that might be detrimental to the intended performance characteristics.

H. HEALTH AND SAFETY

It is the responsibility of the user of this test method to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use. Prior to handling, testing or disposing of any materials, testers must be knowledgeable about safe laboratory practices, hazards and exposure, chemical procurement and storage, and personal protective apparel and equipment.

Caltrans Laboratory Safety Manual is available at:

http://www.dot.ca.gov/hq/esc/ctms/pdf/lab_safety_manual.pdf

End of Text
(California Test 673 contains 3 pages)