Method of Test for

COMPRESSION-DEFLECTION OF PREFORMED COMPRESSION JOINT SEALS

DOTD Designation: TR 612M-97

I. Scope

This method of test describes the procedure for determining the sidewall pressure exerted by preformed elastomeric compression joint seals.

II. Apparatus

A. **Testing machine** - with the following capabilities:
   1. Deflection speed adjustable to 12.5 mm per minute.
   2. Accuracy: within ±1% of indicated load.
   3. Recording Chart with ability to plot load-deflection curves.
   4. Spacer plates if needed.

B. **Calipers** - accurate to 0.02 mm.

C. **Worksheet** - Elastomeric Compression Joint Seal (Figure 1).

III. Sample

A sample of preformed compression joint seal in as-received condition shall be trimmed to 100±5 mm so that the sheared ends are perpendicular to the long axis of the specimen.

IV. Health Precautions

Exercise caution when testing joint seals due to hazards of compression equipment.

V. Procedure

A. The test temperature shall be 23±2°C.

B. Determination of Sidewall Pressure at 50% of Nominal Width
   1. Measure the length, width, and depth of the specimen to the nearest 0.2 mm and record on the worksheet.
   2. Use the recording chart to record the load-deflection curves.
   3. Set the load application rate at 12.5 mm per minute.
   4. Place the specimen on its side atop the base plate and apply the load at a transverse rate of 12.5 mm per minute until the specimen has reached 50% deformation from its nominal width.
   5. Reverse the machine at the same rate.
   6. Each specimen shall be subjected to three such compression cycles; the first two cycles provide conditioning and the third cycle constitutes the qualifying pressure cycle.

C. Determination of Sidewall Pressure at 80% of Nominal Width
   1. Measure the length, width, and depth of the specimen to the nearest 0.2 mm and record on the worksheet.
   2. Use the recording chart to record the load-deflection curves.
   3. Set the load application rate at 12.5 mm per minute.
   4. Place the specimen on its side atop the base plate and apply the load at a transverse rate of 12.5 mm per minute until the specimen has reached 80% deformation from its nominal width.
   5. Reverse the machine at the same rate.
   6. Each specimen shall be subjected to three such compression cycles; the first two cycles provide conditioning and the third cycle constitutes the qualifying pressure cycle.

VI. Calculations

D. Calculate the sidewall pressure at 50% nominal width to the nearest 1 kPa using the following formula:

$$\text{Sidewall pressure @ 50\% nominal width} = \frac{(F_{50})}{l \times w} \times 1000$$

where:

F_{50} = force as recorded on the chart to the nearest 0.5 N when seal is compressed to 50% of nominal width.

l = length of the sidewall of the seal to the nearest 0.1 mm

w = depth of the sidewall of the seal to the nearest 0.1 mm (that part of the seal in contact with the base plate).

example:

F_{50} = 749.5 N
l = 102.4 mm
w = 66.0 mm

$$\frac{749.5}{102.4 \times 66.0} \times 1000$$

$$= \frac{749.5}{6758.4} \times 1000$$

$$= 0.110 \times 1000$$

Sidewall pressure @ 50% nominal width = 110

E. Calculate the sidewall pressure at 80% nominal width to the nearest 1 kPa using the following formula:

Sidewall pressure @ 80% nominal width =

$$\frac{(F_{80})}{l \times w} \times 1000$$

where:

F_{80} = Force as recorded on the chart to the nearest 0.5 N when seal is compressed to 80% of nominal width.
l = Length of the sidewall of the seal to the nearest 0.1 mm
w = Depth of the sidewall of the seal to the nearest 0.1 mm (that part of the seal in contact with the base plate).

example:

F_{80} = 305.0 N
l = 102.4 mm
w = 66.0 mm

$$\frac{305.0}{102.4 \times 66.0} \times 1000$$

$$= \frac{305.0}{6758.4} \times 1000$$

$$= 0.0451 \times 1000$$

$$= 45.1$$

Sidewall pressure @ 80% nominal width = 45

VII. Report

Report the sidewall pressure on the seal to the nearest kPa and the corresponding width, expressed as a percent of nominal width, shall be noted. Report the manufacturer's name, the seal's identifying shape or model name, and the seal's nominal width.

VIII. Normal Test Reporting Time

The normal test reporting time is 2 hours.

E = 121 12/96

Louisiana Department of Transportation and Development
Materials & Testing Section

ELASTOMERIC COMPRESSION JOINT SEAL

REMARKS 2

	TEST RESULTS (Max. of 15 characters)	P/F
SERIES OR MODEL NUMBER		xxx
NOMINAL WIDTH, mm		xxx
TYPE		xxx
LOT NO.		xxx
MEASURED WIDTH, mm		
ORIGINAL PROPERTIES:	xxxxxxxxxxxxxxxxxxxx	xxx
TENSILE STRENGTH, MPa (ASTM D412) (MEDIAN OF _____ VALUES)		
ELONGATION @ BREAK, % (ASTM D412) (MEDIAN OF _____ VALUES)		

Specimen No.	Thickness mm	Width mm	Load N	Tensile Strength MPa	Elongation %
1					
2					
3					
4					
5					

Tensile Strength = Load ÷ (Thickness x Width)

HARDNESS, TYPE A (ASTM D2240)

AGED PROPERTIES: (70 HRS. @ 100°C) (ASTM D573) xxxxxxxxxxxxxxxxxxxx xxx

TENSILE STRENGTH, % LOSS

ELONGATION @ BREAK, % LOSS

Specimen No.	Thickness mm	Width mm	Load N	Tensile Strength MPa	Elongation %
6					
7					
8					
9					
10					

% Change = [(Aged - Original) ÷ Original] x 100
% Change ≥ 0, then % Loss = 0
% Change < 0, then % Loss = % Change

09/ _____ /571/ 12 |2 |- _____ /N (OVER)

Figure 1
Elastomeric Compression Joint Seal - (Front)

HARDNESS, PTS. CHG., 70 HRS. @ 100°C . . . . . |___|___|___| |___|

HARDNESS, PTS. CHG., 7 DAYS @ -10°C . . . . . |___|___|___| |___|

PTS Change = (Aged - Original)
Hardness @ 100°C _____ -10°C _____

OZONE RESISTANCE (70 HRS. @ 300 PPHM 40°C) (ASTM D1149) . . xxxxxxxxxxxxxxxxxxxx |___|

WEIGHT CHANGE IN OIL, % (ASTM D471) . . . . . |___|___|___| |___|

Specimen No.	1	2	3
Final Weight, g (A)			
Original Weight, g (B)			
Change in Weight, g (A-B) = (C)			
Change in Weight, % = C/B x 100			
Avg. Change in Weight, %			

RECOVERY, 50% DEFLECTION: (ASTM D2628) xxxxxxxxxxxxxxxxxxxx |xxx|

72 HRS. @ -10°C, % . . . . . |___|___|___| |___|

22 HRS. @ -28.9°C, % . . . . . |___|___|___| |___|

70 HRS. @ 100°C, % . . . . . |___|___|___| |___|

TEMPERATURE	-10°C		-28.9°C		100°C	
Specimen No.	1	2	1	2	1	2
Original Width mm (A)						
Recovered Width mm (B)						
Recovery % = (B ÷ A)						
Avg. Recovery %						

COMPRESSION DEFLECTION: (DOTD TR 612) xxxxxxxxxxxxxxxxxxxx |xxx|

FORCE @ 80% NOMINAL WIDTH, kPa . . . . . |___|___|___|___|___| |___|

FORCE @ 50% NOMINAL WIDTH, kPa . . . . . |/|/|/|___|___| |___|

Load at 80% Nominal Width _____ Load at 50% Nominal Width 749.5
Length 102.4 Width 66.0
Comp./Defl. =[Load ÷ (Length x Width)] x 100

Tested by: K.D.B Date: 8/26/97 Checked by: M.A.T. Date: 8/27/97

APPROVED by: M.L.M. Date: 8/28/97

Figure 1
Elastomeric Compression Joint Seal - (Back)