

State of Nevada  
Department of Transportation  
Materials Division

**PROPOSED METHOD OF TEST FOR POLYMER FILMS – CHANGE IN MASS UPON  
EXPOSURE TO REJUVENATING AGENT**

**SCOPE**

This method is to test polymer films to qualify polymers for use in asphalt rejuvenating emulsions.

**SUMMARY OF METHOD**

This method provides a procedure for exposing test specimens to the influence of liquids under definite conditions of temperature and time. The resulting deterioration is determined by measuring the change in mass.

**APPARATUS**

1. Suitable equipment for polymer film formation as described under test specimens.
2. Containers - 240 mL (8 oz.) covered cylindrical seamless metal containers, with an approximate diameter of 76 mm (3 in.) and depth of 51 mm (2 in.).
3. Balance – conforming to the requirements of AASHTO M 231, Class G2.
4. Oven – convection oven capable of maintaining required temperatures.
5. Chamber - capable of maintaining required temperature and humidity for sample curing.
6. Calipers.

**TEST SPECIMENS**

Polymer films shall be prepared from latex in a single application using a drawdown bar or other suitable means to provide a uniform thickness. Suitable substrate for film formation shall be polyethylene boards, silicone rubber sheeting, glass, or any substrate which produces a cured film of uniform cross-section. Polymer films shall be formed to provide a dry thickness of  $0.70 \pm 0.1$  mm ( $0.028 \pm 0.004$  in.).

Films shall be cured for 14 days at  $23 \pm 2^{\circ}\text{C}$  ( $73 \pm 4^{\circ}\text{F}$ ) and approximately 50% humidity. Samples for change in mass upon exposure to rejuvenating agent shall be 25 by 50 mm (1 by 2 in.) rectangles cut from the cured film.

**PROCEDURE**

Cut three specimens of the cured polymer film for each sample to be tested. Fill three 240 ml (8 oz.) cylindrical seamless metal containers to a minimum of 12.7 mm (0.5 in.) deep with rejuvenating agent. The rejuvenating agent shall be the same as that to be used in the asphalt emulsion. Samples shall be weighed to the nearest 1 mg and then placed in the containers on top of the rejuvenating agent. Add a minimum of 12.7 mm (0.5 in.) of the rejuvenating agent over each of the latex samples. The containers shall be covered and placed in an oven at  $40 \pm$

2°C (104 ± 4°F) for 48 hours ± 15 minutes. Allow the containers to cool to 23 ± 2°C (73 ± 4°F) and then remove the latex films from the tins. Unabsorbed rejuvenating agent is removed from the intact latex film by scraping the film with a rubber policeman and blotting the film with filter paper or paper towels. If the latex film does not remain intact during removal from the tins or while removing the unabsorbed rejuvenating agent, the sample shall be considered failing. After the rejuvenating agent is removed from the samples, weigh the samples to the nearest 1 mg. Calculate the mass increase after exposure of the films to the rejuvenating agent as a percent of the original polymer film mass. Average the test results of the three specimens and report the average to the nearest 0.1 percent.

## **CALCULATION**

Calculate the percent change in mass as follows:

$$\text{Change in mass, percent} = ((B - A) / A) \times 100$$

Where:

A = initial mass of specimen, g

B = mass of specimen after immersion, g