

## CRD-C 575-74

METHOD OF TEST FOR CHANGE IN WEIGHT OF  
RUBBER ON IMMERSION IN WATER

## 1. Scope

1.1 This method is intended for use in determining the change in weight of vulcanized rubber compounds due to immersion in water. The amount of water absorbed is based on the increase in weight and expressed in percent of the dry weight after immersion and drying.

## 2. Specimen

2.1 The specimen shall consist of a portion of the test unit approximately 1 by 2 in. (25 by 50 mm).

2.1.1 The thickness of the specimen shall be the thickness of the material undergoing test, but shall not exceed 1/16 in. (1.6 mm).

## 3. Apparatus

3.1 The apparatus shall be as follows:

3.1.1 Balance and weights.

3.1.2 Container with tightly fitting cover for immersion of the specimen.

3.1.3 Air oven.- A circulating-air oven with suitable controls for maintaining the required temperature throughout the oven during the immersion and drying period.

3.1.4 Apparatus such as thermometers, copper-constantan thermocouple and potentiometer, or other device for measuring the temperature of the water and air oven within  $\pm 1.0$  C (1.8 F).

3.1.5 Filter paper or other absorbent material.

3.1.6 Soft brush.

3.1.7 Glass rods, 1/8 in. (3.2 mm) in diameter.

3.1.8 Alcohol, ethyl, 95 percent.

3.1.9 Distilled water.

3.1.10 Soap.

## 4. Procedure

4.1 The specimen shall be immersed in distilled water at a temperature of  $23 \pm 1.1$  C ( $73.4 \pm 2$  F) for 7 days.

4.2 Preparation of specimen.- The specimen shall be prepared as described in CRD-C 515.

4.3 The average thickness of the specimen shall be determined.

4.4 The specimen shall be washed with soap and water, using a soft brush to remove loose material, and rinsed with water. The washed specimen shall be blotted dry with filter paper or other absorbent material and suspended by means of small glass rods in the oven at a temperature of  $70 \pm 2$  C ( $158 \pm 3.6$  F) for  $22 \pm 1/4$  hr. The specimen shall be removed from the oven, allowed to cool to room temperature in air, weighed, and the weight recorded to the nearest milligram as  $W_1$ .

4.5 The specimen shall be dipped into 95 percent ethyl alcohol and suspended in distilled water at least 1/2 in. (13 mm) below the surface by means of glass rods so that the water will circulate freely around the specimen. The container with specimen immersed shall be covered tightly to prevent evaporation of the liquid, and maintained for the required time at the required temperature, 4.1.

4.6 The specimen shall be removed from the distilled water, the excess water shaken off, dipped quickly into 95 percent ethyl alcohol, blotted dry with filter paper or other absorbent material, weighed immediately, and the weight recorded to the nearest milligram as  $W_2$ .

4.7 The weighed specimen shall again be dried in the oven as described in 4.4. At the end of the drying period, the specimen shall be immediately removed from the oven, allowed to cool to room temperature in air, weighed immediately, and the weight recorded to the nearest milligram as  $W_3$ .

## 5. Results

## 5.1 Calculation.

5.1.1 The amount of water absorbed by the specimen due to immersion in water shall be calculated as follows:

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$$\text{Water absorbed, \%} = \frac{W_2 - W_3}{W_3} \times 100$$

where:

$W_2$  = weight of the specimen after immersion in water, grams.

$W_3$  = weight of the specimen after immersion in water and drying, grams.

5.2 Two specimens from each test unit shall be tested.

5.3 The water absorbed by the test unit shall be the average of the values obtained from the specimens tested.