
Standard Method of Test for

Non-Instrumental Determination of Metallic Zinc in Zinc-Rich Primers

AASHTO Designation: TP 65-03 (2006)¹



1. SCOPE

- 1.1. This test method determines the amount of metallic zinc in the dried paint film (nonvolatile matter) of inorganic zinc-rich and organic zinc-rich primers.
- 1.2. The values stated in SI units are to be regarded as the standard.
- 1.3. *This standard does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this standard to consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. REFERENCED DOCUMENTS

- 2.1. *ASTM Standards:*
 - D 521, Test Methods for Chemical Analysis of Zinc Dust (Metallic Zinc Powder)
 - D 2369, Test Method for Volatile Content of Coatings
 - D 2371, Test Method for Pigment Content of Solvent-Reducible Paints

3. PROCEDURES

- 3.1. *Procedure A—Individual Components:*

Note 1—Procedure A does not purport to determine the percent metallic zinc of the total pigment. Procedure A does not take into account any additional pigmentation that may be present in the mixed primer.

 - 3.1.1. Prepare a sample of the liquid primer by mixing weighed amounts of the zinc-dust pigment component with weighed amounts of the liquid component(s), using mix ratios (by mass) supplied by the manufacturer. The quantity of mixed primer shall be a minimum of 100 grams, with the mass of each component determined to the nearest 0.1 g.
 - 3.1.2. Determine the nonvolatile matter percent by mass of the mixed primer in accordance with ASTM D 2369.

Note 2—It is extremely important to keep the mixed primer sample well agitated immediately prior to performing the ASTM D 2369 or D 2371 test method(s) so as not to allow the zinc dust to appreciably settle out of the sample.
 - 3.1.3. Determine the percent metallic zinc in the initial, dry zinc dust pigment component in accordance with ASTM D 521.

- 3.2. *Procedure B—Premixed Components:*
- 3.2.1. Prepare a sample of the liquid primer by mixing weighed amounts of the liquid components (the zinc dust pigment will be supplied incorporated in one of the liquid components) using the mix ratios by mass supplied by the manufacturer. The quantity of mixed primer shall be a minimum of 100 g, with the mass of each component determined to the nearest $\frac{1}{10}$ of a gram.
- 3.2.2. Determine the nonvolatile matter percent by mass of the mixed primer in accordance with ASTM D 2369. See Note 2.
- 3.2.3. Determine the pigment content percent by mass of the mixed primer in accordance with ASTM D 2371 (high-speed centrifugation). See Note 2.
- 3.2.4. Determine the metallic zinc percent by mass of the pigment in accordance with ASTM D 521 using the extracted dried pigment obtained from the ASTM D 2371 test method.

4. CALCULATIONS

- 4.1. *Procedure A Calculations:*
- 4.1.1. Calculate the percent volatile matter, V , in the mixed primer as follows (ASTM D 2369):
- $$V_A = 100 - [(W_2 - W_1)/S_A] \times 100 \quad (1)$$
- where:
- V_A = percent volatiles (first determination),
- W_1 = weight of dish,
- W_2 = weight of dish plus specimen after heating,
- S_A = specimen weight,
- V_B = percent volatiles (duplicate determination, calculated in same manner as V_A).
- $$V = (V_A + V_B)/2$$
- 4.1.2. Calculate the percent of nonvolatile matter, N , in the mixed primer as follows (ASTM D 2369):
- $$N = (N_A + N_B)/2 \quad (2)$$
- where:
- N_A = $100 - V_A$
- N_B = $100 - V_B$
- 4.1.3. Calculate the percent zinc dust by mass of the mixed primer, Zn_{PT} , as follows:
- $$Zn_{PT} = (Z/(Z + L)) \times 100 \quad (3)$$
- where:
- Z = mass of zinc dust component,
- L = mass of liquid component(s).
- 4.1.4. Calculate the percent metallic zinc, Zn_{PG} , by mass of the zinc dust component as follows (ASTM D 521):