

DETERMINATION OF THE VOLUME OF NON-VOLATILE SOLIDS IN PAINT**Application**

This method is used to determine the volume percent of the non-volatile content of solvent-type paints.

Apparatus Required**Analytical Balance with Bridge**

Precision +/- 0.0001 g

Glass Beaker

600 mL

Fine Wire Suspending Hook**Suction Feed Spray Gun**

De Vilbiss type JGA 502 or equivalent.

Mechanical Convection Oven

Capable of maintaining a temperature up to 180 +/- 2 °C (for determination of the non-volatile weight and for curing of painted stainless steel disc, both at equal temperature).

Materials Required**Wetting Agent**

(Phosphate-free)

Stainless Steel Discs

(60 mm diameter x 1 mm thickness) with a 2 mm hole, 1 - 2 mm from circumference.

Deionized or Distilled Water

20 micromhos/cm at 25 °C maximum conductivity (ASTM D 1125).

Date	Action	Revisions
2001 03 20	Revised	Editorial – no technical change A. Cockman
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Conditioning and Test Conditions

All test values indicated herein are based on material conditioned in a controlled atmosphere of 23 +/- 2 °C and 50 +/- 5 % relative humidity for not less than 24 h prior to testing and tested under the same conditions unless otherwise specified.

Procedure

1. Stir the sample of paint thoroughly.
2. Dry 3 stainless steel discs each to constant weight using the fine wire suspending hook and record their weights.

Determination of Volume of Discs

3. Fill beaker with deionized water and using the bridge, weigh the discs (to constant weight) suspended in the deionized water. Two or three drops of wetting agent are added to the deionized water to ensure rapid wetting of the disc.

The level of water in the beaker should be a minimum of 20 mm above the disc and this level must be maintained in subsequent weighings to ensure accuracy of readings. Record temperature of water during test and establish its specific gravity from Chemical Handbook Tables. Blot water from discs with absorbent paper and dry in a mechanical convection oven for 5 minutes at 130 +/- 2 °C.

$$\text{Volume of disc} = \frac{\text{Weight of disc in air} - \text{weight of disc in water}}{\text{Specific gravity of deionized water}}$$

4. Measure viscosity of test paint according to FLTM BI 111-01 and reduce to test viscosity if required, with the appropriate solvent.
5. Determine the non-volatile weight content of 1 g of wet paint at test viscosity, according to FLTM BI 102-01, but cure according to Engineering Material Specification requirements.
6. Determine the specific gravity of paint as delivered, according to ASTM D 1475. This operation is to be performed in triplicate. If the individual results of the three determinations differ from the mean by more than 0.01, repeat the determination.
7. Reduce the test paint to spraying viscosity with the appropriate solvent and spray the discs with test paint to a dry film thickness of 40 – 50 micrometre.

It has been found that attaching the discs to a steel panel allows easy measurement of dry film thickness and even coating of the discs. Cure according to Engineering Material Specification requirements.