

DETERMINATION OF NON-VOLATILE CONTENT IN UV CURABLE PAINT**Application**

This procedure is a modification of FLTM BI 102-01 and ASTM D 2369. Since the coating contains reactive monomers and oligomers that will evaporate during the forced air drying, a cure cycle must be incorporated before drying.

Equipment Required

- . Laboratory balance
- . Desiccator with desiccant
- . 10 mL disposable syringe
- . Cotton gloves
- . Laboratory UV Curing Unit capable of 300 watts output. Required features are: A power on indicator light, a latching control power switch to prevent accidental start-up, and an integral exhaust cooling system. Highly desired options are a teflon conveyor with variable speed control, variable lamp power switching and an elapsed time indicator. Conrad Hanovia Inc. Lab Curing Unit #45084-001 is suitable.
- . Aluminum Foil Dish 45 mm diameter - three dishes per sample.
- . Forced Draft Oven, Type IIA or Type IIB as specified in ASTM E 145.

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

Method A - Coatings having a non-volatile content > 60 %

1. Determine weight of an aluminum foil dish. Record weight as (W1).

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2001 03 13	Revised	Editorial – no technical change A. Cockman
1994 04 14		

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2. Mix the sample until homogeneous. If air bubbles are observed stir by hand until the air is removed.
3. Use the syringe to transfer 0.30 +/- 0.10 g of the coating into a tared aluminum foil dish. Record weight as (S).
4. Place the sample immediately into a UV curing unit capable of 300 watts output. Cure the sample for 45 seconds at full power. Go to Step 5.
5. Remove the sample from the UV Curing cabinet, then place the sample into a forced air oven set at 175 °C for five minutes to volatilize residual photoinitiators. Air should be present to inhibit thermal polymerization of residual reactive diluent.
6. Remove the sample from the oven, place into a desiccator. When cool, weigh the sample and record as (W2).
7. Calculate non-volatiles (NV %):

$$NV \% = \frac{W2 - W1}{S} \times 100$$

Method B - Coatings having a non-volatile content < 60 %

1. Determine weight of an aluminum foil dish. Record weight as (W1).
2. Mix the sample until homogeneous. If air bubbles are observed stir by hand until the air is removed.
3. For lower non-volatile coatings: Use the syringe to transfer 0.50 +/- 0.10 g of the coating into a tared aluminum foil dish. Record weight as (S).
4. Flash sample for at least 5 minutes, then place the sample into a UV curing unit capable of 300 watts output. Cure the sample for 45 seconds at full power. Go to Step 5.
5. Remove the sample from the UV Curing cabinet, then place the sample into a forced air oven set at 175 °C for five minutes to volatilize residual photoinitiators. Air should be present to inhibit thermal polymerization of residual reactive diluent.
6. Remove the sample from the oven, place into a desiccator. When cool, weigh the sample and record as (W2).
7. Calculate non-volatiles (NV %):

$$NV \% = \frac{W2 - W1}{S} \times 100$$

Chemicals, materials, parts, and equipment referenced in this document must be used and handled properly. Each party is responsible for determining proper use and handling in its facilities.