



Dow Coating Materials

TEST REPORT

Author: Danny Ma

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Subject:

Determine the formaldehyde absorption on dry paint:
Sample ID: G4-1 paint "SPEKTRA Active Air".

Reference:

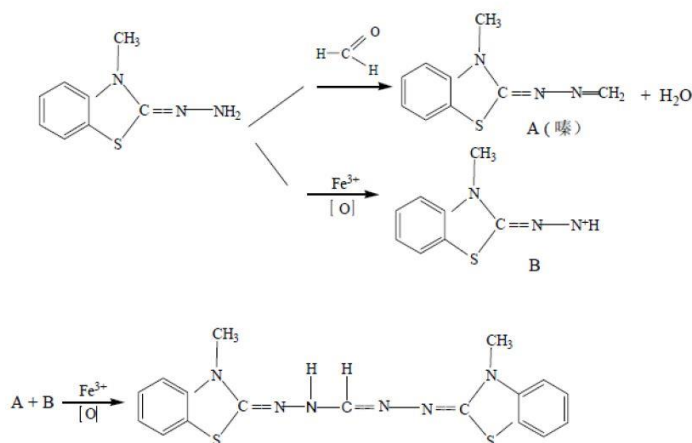
Methods for determination of formaldehyde in air of public places (GB/T 18204.26-2000).
Purificatory Performance of Coatings with Air Purification JC/T 1074-2008.

Methods:

MBTH spectrophotometry 【C₆H₄SN(CH₃)C:NNH₂·HCL】

Mechanism:

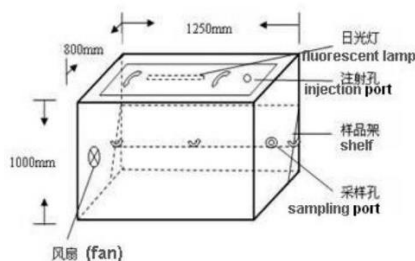
The total formaldehyde is determined spectrophotometrically. Formaldehyde is reacted with excess 3-methyl-2-benzothiazolinone hydrazone (MBTH) to form azines. An aqueous solution of iron (III) sulphate is added, causing the oxidation of the excess MBTH to a reactive cation, which reacts with the previously formed azines producing bluish-green cations. The absorbance of the test solution is measured spectrophotometrically at 635 nm. The amount of formaldehyde present in the test solution is derived from a previously prepared calibration graph. The formaldehyde content of the sample is calculated from the data obtained.



Apparatus

Chamber

- Volume: 1 m³
- Quantity: two (one is for reference; the other is for sample panel)
- Size: 1250mm X 800mm X 1000mm



Sampling instrument:

Flow rate range 0-1 l/min

Spectrophotometer

Spectrophotometer, suitable for measurement at a wavelength of 635 nm, provided with cells with a path-length of 10mm.

[SDC use UV3600 ultraviolet radiation spectrophotometer]

Procedure

Make Calibration Graph

Table1 standard formaldehyde series.

Cell No.	0	1	2	3	4	5	6	7
Standard formaldehyde solution / mL	0	0.10	0.20	0.40	0.60	0.80	1.00	1.50
Absorbing solution / mL	5.00	4.90	4.80	4.60	4.40	4.20	4.00	3.50
Formaldehyde contents / μg	0	0.10	0.20	0.40	0.60	0.80	1.00	1.50

1. Into each cell listed in Table 1, 0.4ml 1% iron (III) sulphate is added separately. Shake even.
2. After 15min, their absorbance is measured at 630nm, water as reference.
3. Draw absorbance Vs formaldehyde contents standard curve and calculate its slope.
4. Calculate index Bg is recorded as slope's inverse.

Sample test

1. Put 4 sample panels in sample chamber and 4 blank glass panels in reference chamber. Seal the chambers.
2. Inject $(4 \pm 0.25) \mu\text{l}$ $250 \mu\text{g}/\mu\text{l}$ standard formaldehyde solution through injection port.
3. After 1h, 20-liter air is collected separately from both sample chamber and reference chamber. And formaldehyde contents in them are measured, which is recorded as formaldehyde initial contents. n0 for reference chamber, while n0' for sample chamber.

4. After 24h, repeat step 3. And this formaldehyde contents are recorded as final data. Record n1 for reference chamber and n1' for sample chamber.

5. Result Calculation:

a. Decay rate R is calculated as below (JC/T 1074-2008 require $R \leq 30\%$)

$$R = (n_0 - n_1) / n_0 \times 100\%$$

b. Sample purification efficiency r is calculated as below (JC/T 1074-2008 require $r \geq 75\%$)

$$r = (n_1 - n_1') / n_1 \times 100\%$$

Results

Table 2. Formaldehyde abatement efficiency test result.

SAMPLE ID	STANDARD	TEST RESULT	CONCLUSION
Paint "SPEKTRA Active Air"	$\geq 75\%$	91.4%	PASS

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