

Cosmetics  
Soup

## Water Content of Lipstick

Volumetric titration (Direct Method) by  
**Karl Fischer Moisture Titrator**

Standard	JIS	K 0113
	ASTM	E 203
	ISO	760

### 1. Abstract

Moisture titration using Karl Fischer reagent is popularly practiced water determination worldwide as the most reliable method. The procedure is adopted in many official standards as test method specified in ISO, ASTM, DIN, BS and JIS.

The test conducted this time is an example of volumetric moisture titration according to JIS K 0113-2005 for measurement of water content of lipstick (rouge), which dissolves in MI (for general purpose) extracting medium added with n-Hexane.

### 2. Reference

- 1) JIS K 0113-2005 : Standard Test Method by Potentiometric, Amperometric, Coulometric and Karl Fischer Titration
- 2) ASTM E 203-16 Standard Test Method for Water Using Volumetric Karl Fischer Titration
- 3) ISO 760:1978 Determination of Water-Karl Fischer method (General method)
- 4) Hydranal manual published by Riedel de Haen

### 3. Cautions in measurement

- 1) In order to refrain from the effect of ambient humidity, the test must be conducted in a well air-conditioned room.
- 2) Handle with care when you work on test sample.
- 3) For high water content of sample, minimize sample size and use KF reagent of higher factor.
- 4) Obtain the factor of Karl Fischer reagent using the solvent in advance.

## 4. Post-measurement care

After the reagent is drained out and the electrode is cleaned, keep the titration flask filled with extracting solvent.

## 5. Test equipment

Main unit : Karl Fischer moisture titration volumetric system

Electrode : Twin platinum electrode for KF titration

## 6. Reagent

Titrant : Hydranal Composit 5 (Riedel de Haen)

Solvent : Extracting medium MI (for general purpose) (Hayashi Chemicals)  
n-Hexane

## 7. Measurement procedure

-Pretreatment-

- 1) Prepare approximately 30mL MI solvent and 20mL n-Hexane in titration cell.
- 2) Dehydrate the measuring cell by performing pre-titration in advance.

-Measurement-

- 1) Prepare approximately 0.1~0.5g sample with an appropriate sampler.
- 2) Weigh the sampler on an electronic balance of which precision is to the nearest 0.1mg.
- 3) Transfer the sample in sampler to titration cell to dissolve.
- 4) Press Start key of titration unit.
- 5) Weigh the sampler of the above 3).
- 6) Enter the weight of item 2) for Wt1, and 5) for Wt2.
- 7) Obtain water content from titration volume, of which EP is detected automatically.

## 8. Formula

$$\text{Moisture (\%)} = ((\text{Data} \times F - \text{Blank}) / (\text{Wt1} - \text{Wt2})) \times 0.1$$

Data : Titration volume ( mL )

F : Factor of titrant ( mg H<sub>2</sub>O /mL )

Blank : Blank level ( mg )

Wt1 : Sample + Sampler ( g )

Wt2 : Empty sampler ( g )

## 9. Example of measurement

### -Titration parameter-

MKV-710M/S,MKA-610	MKA-520	MKS-500
Method No. 1 [Titration] Titr.mode Normal t(stir) 0 s t(wait) 10 s t(max) 0 s t(interval) 0 s Max.volume 10 mL Titr.bur.No. 1 Dose mode Off [Control] End time 30 s Final vol. 0.01 mL Titr.speed 3 Detect.mode 1 Drift titr. On Start mode Manual End level 75 mV Samp.time 5 s Stir.speed 4	[Titration] Method 1 Titr Mode Normal Titr Buret No. 1 End Time 30 s Final Vol. 0.01 mL Titr.Speed 3 Detector Mode 1 t(stir) 0 s t(wait) 10 s t(max) 0 s Drift Titr On Start Manual Max.Volume 10 mL Dose mode Off Oven Off	[Titration] Method Driect Titr.Speed 3 End Time 30 s Final Vol. 0.01 mL Detector Mode Normal t(stir) 0 s t(max) 0 s Drift Titr. On Max.Volume 10 mL

### -Calculation parameter-

MKV-710M/S,MKA-610	MKA-520	MKS-500
[Calculation] Calc.type Sample Blank No. 1 Calc.No. 2 Unit % Decimal 2 Fraction Round (Half adjust) Drift comp. Off Evaluation Off	[Calculation] Calc. 2 Unit % Weight Variable	[Calculation] g->%

–Measurement results–

Sample name	Sample (g)	Extracting medium	Water content	
			mg	%
Lip stick	0.2420	Solvent MI and n-Hexane	2.1345	0.88

## 10.Summary

Lipstick or rouge is a cosmetic to make up lip color. Generally the lipstick is made of natural colored pigment like safflower or cochineal or synthetic pigment like tar color dissolved in wax. The product rouge contains also surfactant, antioxidant and fragrant material.

The test sample in this application dissolves in solvent MI and n-Hexane, which makes moisture titration performed with ease.

Stable measurement of water content is assured by Karl Fischer moisture titration.