

Application Note

Quantitative determination of glycerin

Industry	Petrochemicals
Instrument	Automatic potentiometric titrator
Measurement method	Potentiometric titration / Neutralization titration
Reference	ASTM D7637

1. Scope

Glycerin is produced by the hydrolysis of natural fats and oils, and by the synthesis of petroleum ingredients. It is used in a variety of products such as moisturizers, sweeteners, and thickening and stabilizing agents. This Application Note introduces an example of measuring the concentration of glycerin.

2. Apparatus

Main unit	Automatic potentiometric titrator (Preamplifier STD)
Electrode	Combined glass electrode (Electrolyte 3.3 mol/L aqueous potassium chloride solution)

3. Reagents

Titrant	0.05 mol/L Sodium hydroxide solution
Additive reagents	Potassium periodate solution (3g/L) Propylene glycol

4. Procedure

-Measurement-

- 1) Collect 1 g of glycerin sample and make a precise measurement of its mass.
- 2) Add enough pure water to accurately make up 100 mL.
- 3) Accurately weigh 5 mL of the sample from 2), add 100 mL of potassium periodate solution (3g/L), mix well, and let stand at room temperature for 1 hour.
- 4) Add 1 mL of propylene glycol and allow it to stand at room temperature for 10 minutes.
- 5) Titrate with 0.05 mol/L sodium hydroxide solution.

5. Calculation

$$\text{Glycerin concentration (\%)} = (\text{EP1} - \text{BL1}) \times \text{TF} \times \text{C1} \times \text{K1/S}$$

EP1	Titration amount (mL)
BL1	Titration amount (mL) of blank test = 0 (mL)
TF	Factor of titrant = 0.98098
C1	Concentration conversion coefficient = 92.100
K1	Unit conversion factor = 0.10
S	Sample size (g)

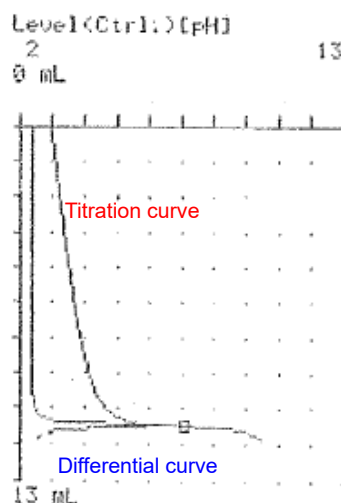
6. Example

— Parameter —

<Titration Mode>	Auto Intermit	<Control Parameter>	
<Titration Form>	EP Stop	Number of EP	1
<Titration Parameter>		End Sense	Auto
Max Volume	20 (mL)	Gain	1
Channel, Unit	Ch1, mV	Data Sampling	Auto
Wait Time	3 (s)	Control Speed Mode	Standard
Dose Mode	Off	Other Control	Standard
		Auto Int. Mode	Standard
		Stirrer Speed	3

(Listed above are example settings. Availability of settings may vary by instrument model.)

— Example of titration curve —



— Measurement results —

	Sample (g)	Titration amount (mL)	Glycerin (%)
1	1.0025	10.9135	98.35
2		10.8942	98.17
3		10.9259	98.46
Mean	-	10.9112	98.33
SD	-	0.0160	0.15
RSD(%)	-	0.1464	0.15

7. Reference

ASTM D7637 Standard Test Method for Determination of Glycerin Assay by Titration (Sodium Meta Periodate)