AQUACOUNTER Application Sheet	COM series	DATA No. L7	1st edition

Petroleum Products — Measurement of reserve alkalinity in antifreeze

1. Measurement outline

Antifreeze is a type of coolant for liquid-cooled internal combustion engines with the main component being ethylene glycol, and it is used for preventing freezing and corrosion of the cooling system. The quality evaluation test for antifreeze is stipulated in JIS K 2234, and the measurement item for reserve alkalinity is specified in the metal corrosiveness test. Reserve alkalinity is evaluated by the amount of hydrochloric acid titrant used for titration. This section introduces an example in which the reserve alkalinity for antifreeze was measured using an automatic titration system according to JIS K 2234.

In this measurement, sample is collected using a 10mL whole pipette and added with 90mL purified water for titration with 0.1mol/L hydrochloric acid titrant to pH5.5. Reserve alkalinity is calculated by the following formula:

$$\text{Reserve alkalinity} = A \times F \times \frac{1000}{B \times V}$$

A : Titration value (mL)

B : Sample concentration (Vol%)

F : Factor for titrant

V : Sample volume (mL)

2. Reagents and Electrodes

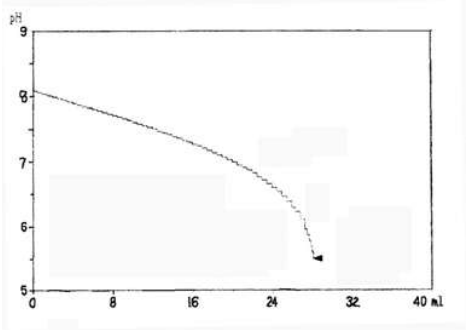
(1) Reagents	Titrant	0.1mol/L hydrochloric acid titrant
(2) Electrodes *standard accessories	Indicator electrode	*Glass electrode GE-101B to IE-1 jack
	Reference electrode	*Reference electrode RE-201 to RE-1 jack
	Thermistor electrode	*Thermistor electrode TE-401 to TE jack

3. Measurement conditions example (for COM-1600S)

Master File No.1 Condition file: 1	
Parameters for Condition file 1	
Method	Set
Buret No.	1
Meas Unit	pH
S-Timer	5 sec
CP pH	12.00 pH
Direction	Down
DP pH	12.00 pH
End pH	5.50 pH
Over mL	0.00 mL
Max Vol	40 mL
Mode No.	1
Unit	N/A
Formula	D×F
Blank	0
Molarity	0.1
Factor	Titre of the titrant
K	0

Mode No.1	
Pre Int	0 sec
Del K	9
Del Sens	0 mV
Int Time	1 sec
Int Sens	3 mV
Brt Speed	2
Pulse	40

4. Measurement example



Measurement results on reserve alkalinity in antifreeze

Sample No.	Sample volume (mL)	Titration value (mL)	Reserve alkalinity
1	10	28.078	28.078
2	10	28.274	28.274
	Avg.		**28.176**

5. Outline

About sample collection method

The sample collection method according to JIS K 2234 is stipulated so that a whole pipette is used. Since the actual sample has high viscosity and it adheres to the inner wall of the whole pipette in large amount, it tends to cause measurement errors. Better results can be obtained by weighing the sample weight using a balance.

Key words

Antifreeze, reserve alkalinity, neutralization titration

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