

Determination of Water Content in Lubricating Oils

This application method is applicable for the determination of water in Lubricating oils. The use of the oil evaporator is recommended since the lubricating oils may contain additives like metals and salts that interfere the Karl Fischer reaction.

Titration	AQV-2100/AQV-200 (Volumetric titrator) AQ-2100/AQ-200 (Coulometric titrator)	
KF Oven	EV-2000L Oil Evaporator	
Azeotropic solvent	Dehydrated Toluene	
Reagents for Volumetric Titrator	Titration medium	Dehydrated methanol
	Titration reagent	HYDRANAL [®] Composite 5 or equivalent
Reagents for Coulometric Titrator	Anode solution	HYDRANAL [®] Coulomat AG or equivalent
	Cathode solution	HYDRANAL [®] Coulomat CG or equivalent

PARAMETER SETTINGS for the Titrator

Volumetric Titrator		Coulometric Titrator	
End Mode	1	CAL Mode	0
CAL Mode	0	Interval	20 sec
Interval	20 sec	Current	Slow or Medium
MIN Feed	0.01 ml	S-timer	2 min
S-timer	2 min	T-timer	0 min
T-timer	0 min		

PARAMETER SETTINGS for Oven

Temperature	110 °C
Carrier flow rate	50 ml/min

PROCEDURE:

1. Fill a 5 ml glass syringe with the sample. Before filling, rinse the syringe with the sample 2 – 3 times.
2. Fill the evaporation chamber of EV-2000L with 10ml of dehydrated toluene.
3. Let the carrier gas flow.
4. Lift up the heating block.
5. Titrate the titration medium to zero. (Blanking)
6. Press SAMPLE key.
7. Inject approx. 2 ml of the sample into the evaporation chamber by piercing the rubber septum.
8. Press TITRATION key.
9. Press S.SIZE key and enter the sample size.

OPERATING NOTES:

1. Stop the end of the syringe needle with a small silicon block. This prevents the loss of the sample caused by evaporation.
2. After injection of the sample, pull slightly the syringe plunger to suck the sample drops sticking on the end of syringe needle.
3. Injected sample size is calculated by subtracting AFTER injection syringe weight from BEFORE injection syringe weight.
4. Pierce different part of the rubber septum for each injection. If the same part is pierced for many times, atmospheric moisture will get into the titration cell, which will result in a high background or taking a long time for blanking.
5. To get the most accurate result, the titrant should be consumed around 5 ml. To make titrant consumption into this range, calculate the optimum sample size by this equation ;

$$\text{SIZE (g)} = 5 \times F / (C \times 10)$$

Where ;

F : Factor of titrant. ex. Factor of Composite 5 is 5 (mgH₂O/ml).

C : Sample moisture in %

For example, sample moisture is 1%, and Factor is 5, then optimum sample size is,

$$5 \times 5 / (1 \times 10) = 2.5\text{g}$$