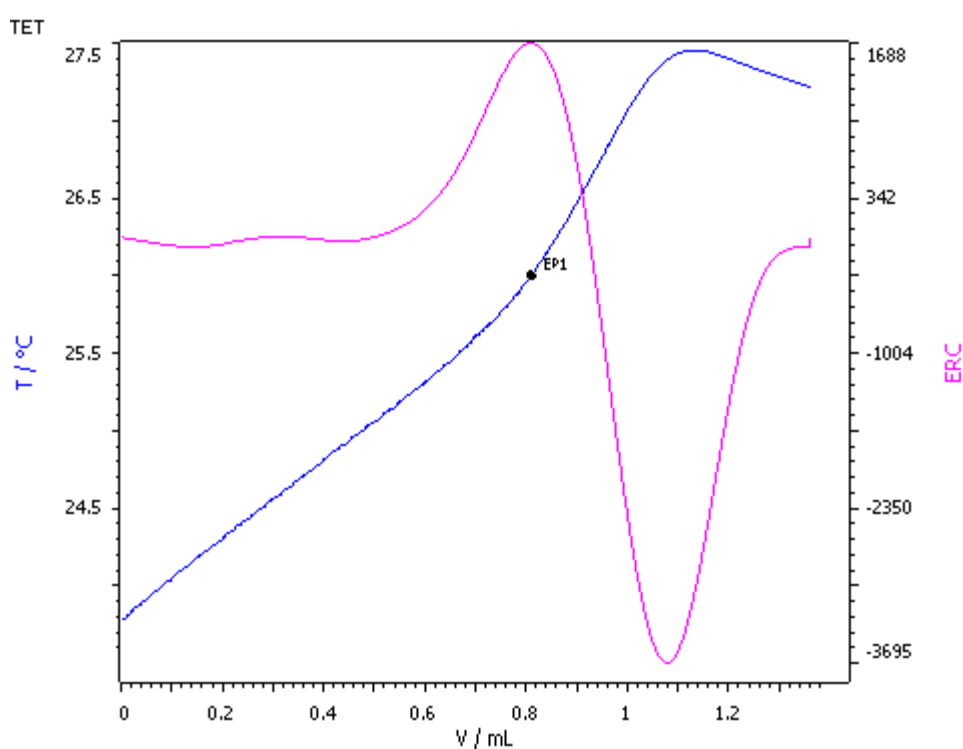


Total base number (TBN) in used motor oil



Titration with a standard solution of trifluoromethanesulfonic acid in glacial acetic acid, using isobutyl vinyl ether as an endpoint enhancement agent.

Method description

Sample

Used motor oil

Sample preparation

No sample preparation is required.

Configuration

814 USB Sample Processor	2.814.0030
859 Titrotherm	2.859.0010
802 Rod Stirrer	2.802.0010
800 Dosino, 3x	2.800.0010
5 mL Dosing unit (titrant)	6.3032.150
10 mL Dosing unit (indicator)	6.3032.210
50 mL Dosing unit (solvent)	6.3032.250
Thermoprobe	6.9011.020
Titration Head for Titrotherm	6.9914.159
Sample rack	6.2041.470
Sample beaker 120 PP	6.1459.300
Stirring propeller (96 mm)	6.1909.010
Bottle holder for Dosino	6.2061.010
Stacking frame for 846	6.2065.000
<i>tiamo</i> TM	6.6056.222

Solutions

Titrant	0.1 mol/L trifluoromethane-sulfonic acid (TFMSA) in glacial acetic acid or perchloric acid
Indicator	Isobutyl vinyl ether
Solvent	Toluene, anhydrous

Analysis

An appropriate amount of oil sample, 2 g for new, unused oils or 3 g for old oils is accurately weighed into clean and dry titration vessel. 40 mL dry toluene and 1 mL isobutyl vinyl ether are added into the vessel. The sample is then titrated with $c(\text{TFMSA}) = 0.1 \text{ mol/L}$ until after the single endothermic endpoint..

Tip: The titration assembly can be rinsed with a cheap hydrocarbon solvent such as mineral turpentine, rather than expensive toluene.

Parameters

Pause	20 s
Stirring rate	12
Dosing rate	2 mL/min
Filter factor	95
Damping until	0.2 mL
Evaluation start	0.2 mL
Reaction type	Endothermic
EP criterion	120

Results

TBN measured as mg KOH/g sample

TBN / (mg KOH/g sample)	s(rel) / %, n = 3
4.73	0.60

References

Authors who investigated a number of polymerizable solvents are Greenhow, E. J., Spencer, L. E., *Chem. Ind. (London)* 466 (1972).