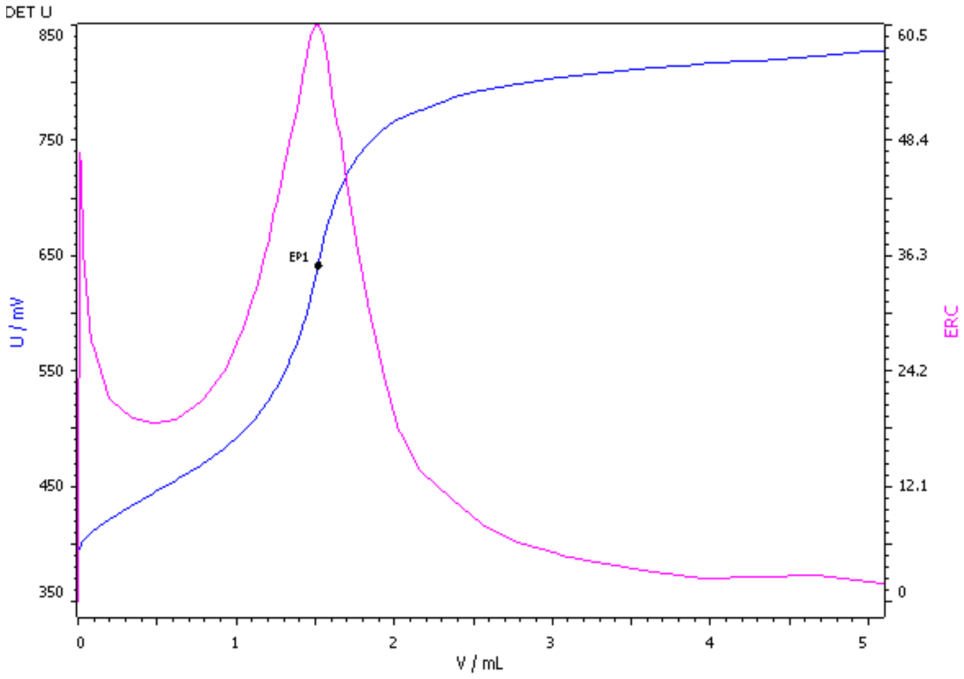
Titration Application Note T-097

Potentiometric determination of TBN in petroleum products according to ISO 3771, ASTM D2896, and IP 276



Basic constitutes are added to petroleum products to prevent corrosion as they neutralize acidic components, which can occur during the use and ageing of the petroleum products. The total base number (TBN) gives an indication on the amount of these basic additives present and it can be used as a measure for the degradation of the petroleum product.

This Application Note describes the potentiometric determination of the TBN according to ISO 3771, ASTM D2896 and IP 276 using the Solvotrode easyClean. The investigated sample is a lubricating oil.

Metrohm

Method description

Sample

Lubricating oil

Sample preparation

No sample preparation is required.

Configuration

907 Titrando	2.907.0010
800 Dosino 2 ×	2.800.0010
Dosing unit 10 mL	6.3032.210
Dosing unit 50 mL	6.3032.250
804 Ti-Stand	2.804.0010
802 Stirrer	2.802.0020
Solvotrode easyClean	6.0229.010

Solutions

Titrant	$c(HClO_4)$ = 0.1 mol/L in glacial acetic acid. If possible this solution should be bought from a supplier
Solvent	Φ(toluene) = 60%, Φ(glacial acetic acid) = 30% and Φ(acetone) = 10%

Analysis

An appropriate amount of well-mixed sample is weighed into the titration vessel and 60 to 100 mL solvent are added. After dissolution the sample is titrated with standardized $c(HClO_4)$ = 0.1 mol/L until after the equivalence point.

After the titration, the electrode and burette tips are rinsed first with the solvent mixture followed by deionized H_2O. In order to rehydrate the membrane of the electrode, it is placed for 3 to 5 min in deionized H_2O. Before the next measurement, the electrode is rinsed shortly with solvent mixture.

Parameters

Mode	DET U
Stirrer speed	8
Meas. point density	4
Min. increment*	10 µL
Max. increment *	500 µL
Signal drift	10 mV/min
Max. waiting time	20 s
EP criterion	15
EP recognition	all

Results

	TBN / (mg KOH/g sample)
Mean (n = 3)	0.3968
s(rel)	0.03%