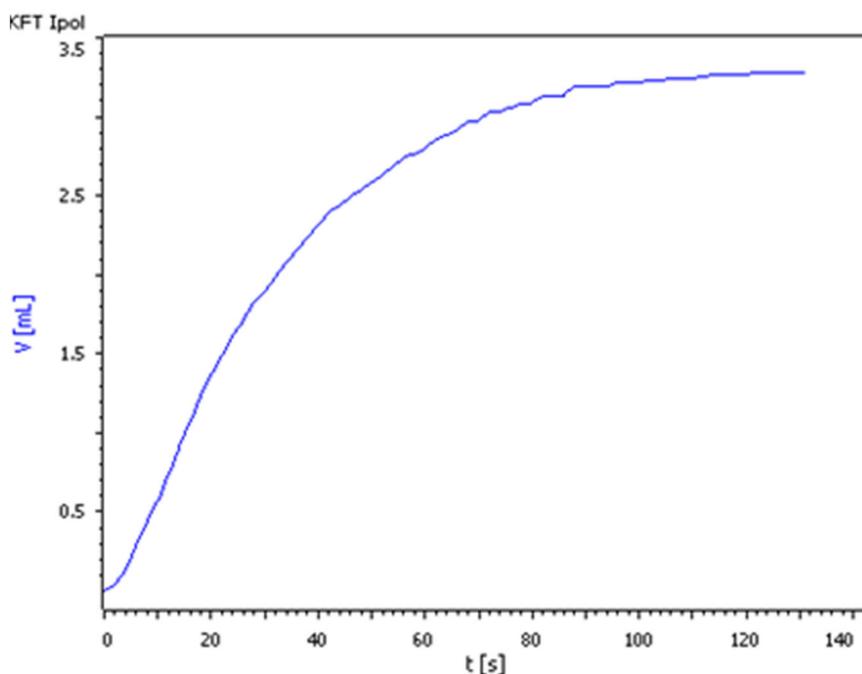


Water in E-liquids

Fully automatic determination by volumetric Karl Fischer titration



The vaping and electronic cigarette industries are growing. The mixtures used in these products are usually called e-liquid, e-fluid, or e-juice. To ensure the quality of these e-liquids, testing the most important parameters is required. One important quality control parameter is water or moisture content.

Water/moisture content determination by Karl Fischer titration (KFT) is an established and reliable procedure. Compared to other methods the advantages of KFT are its accuracy, speed, and selectivity. For high water content samples, such as e-liquids, volumetric KFT is the method of choice.

In this Application Note a system for the fast and reliable determination of the water content in E-liquids is presented. This fully automated system performs the analysis including system preparation, blank, titer, and sample determination completely unattended. Hence, the workload of the operator is reduced to only weighing in the sample and placing the sealed sample vessels on the system.

Method description

Sample

E-liquids

Sample preparation

No sample preparation is required.

Configuration

814 USB Sample Processor	2.814.0030
901 Titrand	2.901.0010
802 Rod stirrer	2.802.0010
800 Dosino, 3x	2.800.0010
Dosing unit 50 mL	6.3032.250
Dosing unit 10 mL	6.3032.210
Sample rack 24 x 75 mL	6.2041.340
Sample beaker 75 mL, 24x	6.1432.210
Karl Fischer equipment	6.5610.020
Double Pt-wire electrode for sample changer (fixed cable)	6.0340.000

Solutions

Titrant	Hydranal Composite 5
Solvent	Hydranal Methanol Rapid

Analysis

Approximately 0.1 g sample is weighed into a 75 mL glass beaker, which is then sealed with a foil cap and a foil holder. The beaker is placed on the rack of the system. The system is loaded with two beakers for the system preparation, three beakers for the blank determination, and three beakers for titer determination, followed by the samples. The system automatically punctures the foil cap, adds solvent, and titrates to dryness with Hydranal Composite 5.

Parameters

Titration mode	KFT Ipol
Stirring rate	8
I(pol)	50 μ A
EP at	250 mV
Dynamics	100 mV
Max. rate	5 mL/min
Min. volume increment	5 μ L
Stop criterion	Drift
Stop drift	20 μ L/min
Titration direction	-
Extraction time	30 s
Stop volume	20 mL

Results

Sample (n = 3)	Water content / %	s(rel) / %
E-liquid 1	11.26	0.74
E-liquid 2	60.29	0.67
E-liquid 3	64.48	0.52
E-liquid 4	54.82	0.37