



Application Note AN-T-178

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Pyridine-free, fully automated determination according to ASTM E1899, EN 15168, and DIN 53240-3

The hydroxyl number (HN) is an important sum parameter for quantifying the presence of hydroxyl groups. As a key quality parameter, it is regularly determined in resins, paints, polyesterols, fats, and solvents. Unlike other standards, ASTM E1899 is free from pyridine and does not require refluxing samples at high temperatures for extended periods. It is performed at room temperature, requires only a small sample size, is applicable to extremely low HN, and can be performed fully automatically.

This Application Note describes the potentiometric determination of HN in 1-octanol and polyethylene glycol according to ASTM E1899, EN 15168, and DIN 53240-3. Using the OMNIS Dis-Cover technique, all sample preparation steps can be fully automated. Moreover, the use of an OMNIS Sample Robot allows parallel analysis of multiple samples, reducing the time per analysis for one sample from approximately 24 min to 12 min, and increasing productivity in the laboratory considerably.

SAMPLE AND SAMPLE PREPARATION

This application is demonstrated on 1-octanol (theoretical HN of 430.08 mg KOH/g) and

polyethylene glycol (PEG) 3000. No sample preparation is required.

EXPERIMENTAL

The determinations are performed on an automated system consisting of an OMNIS Sample Robot S equipped with Dis-cover, an OMNIS Professional Titrator equipped with two dSolvotrodes, and multiple OMNIS Dosing Modules for the addition of the auxiliary solutions.

An appropriate amount of sample is weighed into the titration beaker, acetonitrile is added, and the beaker is capped with the Dis-Cover lid. After dissolution of the sample, TSI solution is added, the beaker is covered and solution is stirred for the stipulated time. Then deionized water is added, and after stirring shortly, acetonitrile is added. The solution is titrated until after the second equivalence point with standardized tetrabutylammonium hydroxide in isopropanol.



Figure 2. Sample Robot S with Dis-cover, OMNIS Dosing Modules and OMNIS Titrator Professional equipped with two dSolvotrodes.

RESULTS

Well-defined titration curves are obtained for the tested samples. The result for 1-octanol is well within the acceptable limit for the standard with a low standard deviation. For PEG 3000, which is

analyzed on both work stations in parallel, acceptable results with low standard deviations are obtained. Results are summarized in **Table 1**. An example titration curve is displayed in **Figure 2**.

Table 1. Results for the hydroxyl number determination according to ASTM E1899 on a fully automated OMNIS system equipped for the parallel analysis on two workstations.

Hydroxyl number (n = 6)	Mean in mg KOH/g sample	SD(rel) in %
1-Octanol	435.63	0.3
PEG 3000 (WS 1)	36.56	0.3
PEG 3000 (WS 2)	36.22	0.5

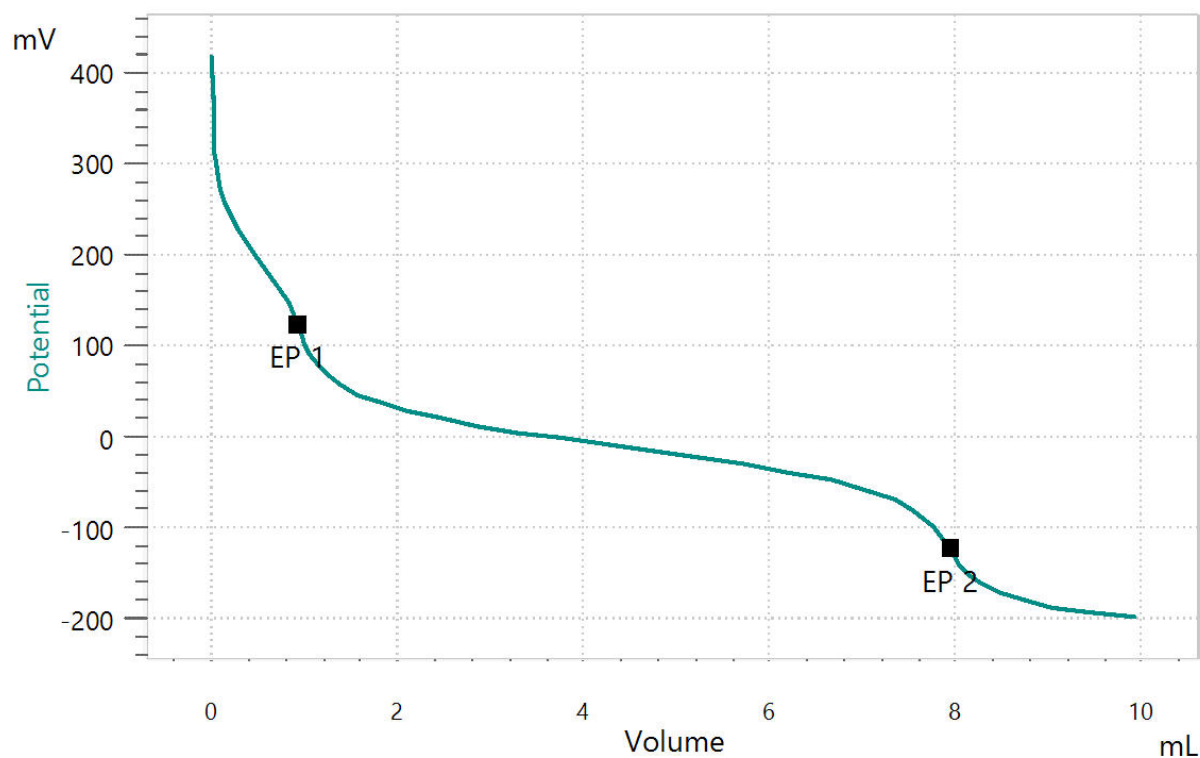


Figure 2. Titration curve of the determination of the hydroxyl number of 1-octanol.

CONCLUSION

Precise and reliable determination of the hydroxyl number according to **ASTM E1899**, **EN 15168**, and **DIN 53240-3** can be achieved using a fully automated OMNIS system. With the option to analyze up to four samples simultaneously, the

productivity of a laboratory can be significantly improved. Furthermore, the OMNIS system can be customized according to your needs and expanded for other titration applications required for quality control.

Internal reference: AW TI CH1-1274-042019

CONTACT

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CONFIGURATION



OMNIS Professional Titrator

OMNIS Titrator, (I) 3S OMNIS Liquid Adapter ,,
“Professional”

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-
- /
- :51020 50 mL
- 3S OMNIS Liquid Adapter: ,
- :
- :“Basic”
- (I):“Advanced”
- (I), 5 :“Professional”



OMNIS Dosing Module

OMNIS Titrator ,//, 51020 50 mL



Pick and Place S

S OMNIS Sample Robot Pick&Place Sample
Robot , Pick&Place



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