



Application Note AN-T-173

pHe value of denatured ethanol fuel

Fast and accurate measurement according to ASTM D6423

The pHe is a measure of acid strength in alcohol fuels and in ethanol. It can be used as predictor of the corrosion potential of an ethanol-based fuel. The determination of the pHe is preferred over the total acidity, because total acidity overestimates the contribution of weak acids (e.g., carbonic acid) and underestimates the contribution of strong acids (e.g., sulfuric acid). Furthermore, the acid strength is an important parameter to determine in order to reduce the risk of failing motors.

The pHe is not to be confused with the pH value. The pH value is only applicable for aqueous

solutions, whereas the pHe value is a measure for alcoholic solutions.

The pHe value is highly dependent on the sample itself, but also on the stirring rate and the time the electrode is immersed into solution. Therefore, both the stirring rate and measuring time need to be fixed.

This Application Note describes the determination of the pHe value using the 913 pH Meter and the EtOH Trode according to ASTM D6423, which covers denatured fuel ethanol and ethanol fuel blends.

SAMPLE AND SAMPLE PREPARATION

The method is demonstrated for denatured ethanol fuel.

Temperature has a strong influence on the

obtained results. Therefore, sample temperatures are first adjusted to be at the same value in order to be able to compare results.

EXPERIMENTAL

This application is performed on a 913 pH Meter equipped with an EtOH Trode, a temperature sensor, and an external stirring plate. The EtOH Trode is conditioned and calibrated prior to use. A defined amount of sample is poured into a 100 mL beaker and placed on an external stirring plate. The EtOH Trode and the temperature sensor are immersed, and the measurement is started immediately. The value after 30 seconds is considered to be the acid strength of the sample.



Figure 1. 913 pH Meter equipped with a pH electrode. Example setup for the determination of the pHe value.

RESULTS

The analysis demonstrates acceptable and reproducible pHe values. For the tested denatured ethanol fuel, a pHe value of 8.08 (n =

10, SD(rel) = 0.45%) is obtained. An example measurement curve is displayed in **Figure 2**.

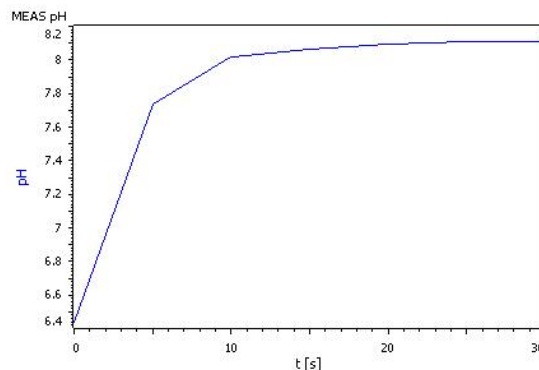


Figure 2. Example curve of a pHe measurement in denatured ethanol fuel.

CONCLUSION

With a 913 pH Meter it is possible to assess quick and easily the pHe of an ethanol fuel according to **ASTM D6423**. The used EtOH Trode is specifically mentioned in the standard, and is therefore fully compliant.

Internal reference: AW TI CH1-1232-102016

By using a 913 pH/DO meter or a 914 pH/Conductometer, it is also possible to assess the dissolved oxygen concentration or the conductivity in parallel, if necessary.

CONTACT

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CONFIGURATION



913 pH Meter

便携式双通道 pH 量,用于量 pH/mV 和温度。通池供的量,便可以面向量的最佳装。

- 内置池和个流隔 pH 量入端的便携式 pH
- 模 pH 量入端,用于万通准 pH
- 数字 pH 量入端,用于万通智能 pH
- 固耐用的防水防外 (IP67),合外及室使用
- 背光 LCD 彩色示屏,用于方便取果
- USB 接口,用于方便将数据从计算机出到打印机上
- 更大的内存(10'000 数据)
- 引保型用和家模式,防止了不必要的参数修改
- GLP 打印和数据出,用 ID 和戳



EtOH-Trode

用于非水介(例如,用于乙醇中的 pHe)中 pH 量的双系的 pH。

配有防染的固定磨口隔膜,可以自由中解(水性或非水性)。

当使用 $c(\text{KCl}) = 3 \text{ mol / L}$ 作外参比液解,建在保存液中存。当使用其他外参比液解,建存放在相用的解液中。

个用于内参比液解 ("INNER FILLING") 和外参比液解 ("OUTER FILLING") 的腔体在交付分填充有 $c(\text{KCl}) = 3 \text{ mol/l}$ 。