Application Note AN-T-201

pH value of engine coolants or antirust

Fast determination according to ASTM D1287

Corrosion of metallic components is an inherent problem for engines, because metals naturally tend to oxidize in the presence of water and/or acids. Increased acid content is indicated by a low pH value, and could lead to a variety of problems like a shorter storage life (stability) or a reduced buffer capacity of the used engine coolant or antirust. This in turn leads to a reduced lifetime of engines, for example. Without proper coolants and antirust agents, engines can overheat and seize up, resulting in costly damage and extra maintenance, or even necessitating a full replacement of the affected parts.

In this Application Note, engine coolants or antirust samples are dissolved in water, and the pH measurement using the Profitrode is carried out according to ASTM D1287.

SAMPLE AND SAMPLE PREPARATION

The application is demonstrated for anhydrous ethylene glycol, anhydrous glycerol, engine coolant, and antirust oil.
No sample preparation is required.

EXPERIMENTAL

This analysis is performed on an OMNIS Basic Titrator equipped with a Profitrode and a temperature sensor.
An aliquot of sample is pipetted into the sample beaker. While stirring, deionized water is added. After stirring for 1 minute, the pH value is measured until a stable drift is reached. Afterwards, the sensors are rinsed with deionized water for cleaning. The Profitrode is then conditioned for 2 minutes by immersing the glass membrane alone in deionized water.

Figure 1. OMNIS Basic Titrator. Example setup for the determination of the pH value.

RESULTS

The analysis demonstrates reproducible results with a SD(rel) smaller than 1%, which are summarized in Table 1. An exemplary measurement chart is displayed in Figure 2.

Table 1. Mean pH value for different samples determined by an OMNIS titration system (n = 6).

Sample	pH	SD(rel) in %
Ethylene glycol	5.69	0.5
Glycerol	6.11	0.5
Engine Coolant	8.94	0.2
Antirust oil	3.13	0.8

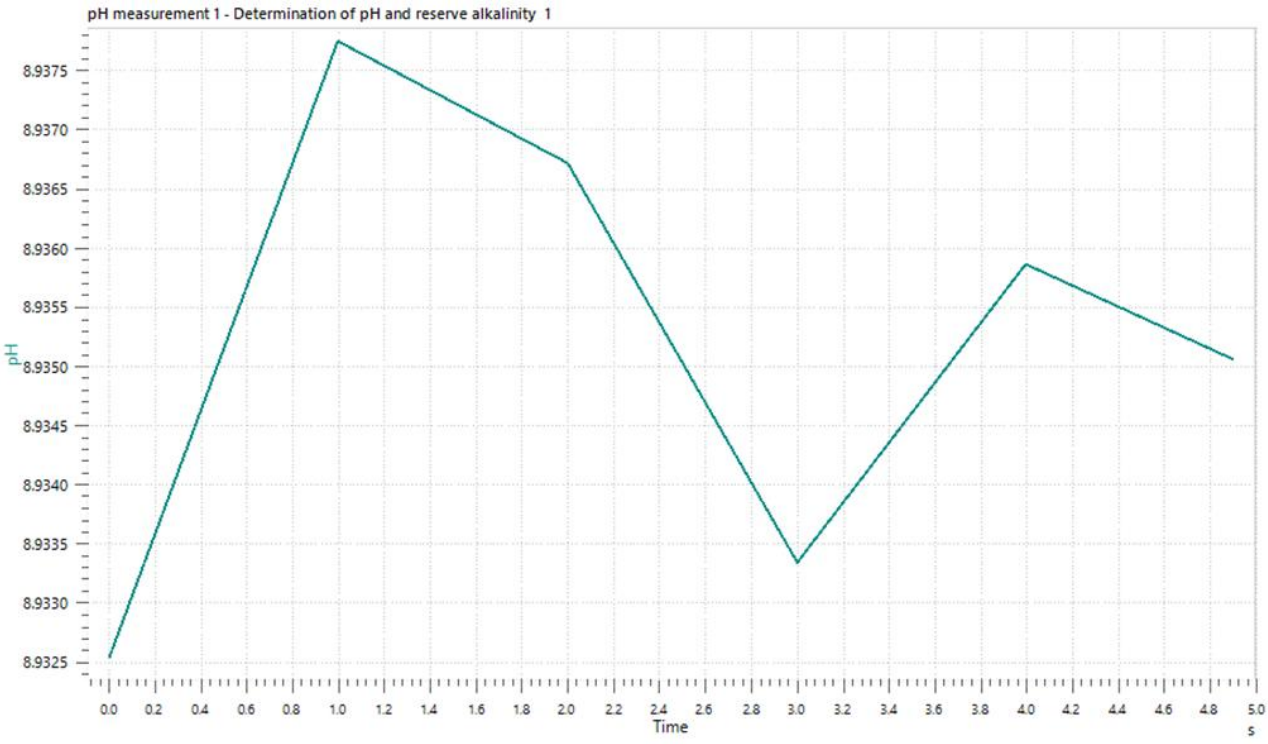

Figure 2. Example measurement chart for the pH value of engine coolant.

CONCLUSION

Using an OMNIS Basic Titrator equipped with a Profitrode allows operators to measure the pH value of engine coolants and antirust according to ASTM D1287 efficiently and reliably. Due to the modularity of OMNIS, the system can easily be upgraded to perform other applications for the analysis of engine coolants or antirust such as the determination of the reserve alkalinity or the moisture content.

Internal reference: AW TI CH1-1251-112018

CONTACT

瑞士万通中国
北京市海淀区上地路1号院
1号楼7702
100085 北京

marketing@metrohm.com.cn

CONFIGURATION

OMNIS Basic Titrator

新型、模式位分析 OMNIS Titrator 滴定,于独立行或作 OMNIS 滴定系的核心元件行,用于点定滴定。由于采用 3S 瓶配器技,理化学品从未像在一安全。可以使用量模和量管元自由配置滴定,并在需要展一台螺旋拌器。在需要可以通相的件功能可展 OMNIS Basic Titrator 的功能范。

- 通算机或本地网控制
- 可以其他用或助溶液外接最多四个滴定模或加液模
- 螺旋拌器的接方式
- 可提供不同大小的量管:5、10、20 或 50 mL
- 采用 3S 技的瓶配器:安全理化学品,自生商的原始数据

量模式和件:

- 点定滴定:"Basic" 功能可
- 点和等当点滴定(一/):"Advanced" 功能可
- 点和等当点滴定(一/),包括平行滴定:"Professional" 功能可

Profitrode 12.5 cm

双系的合 pH ,安装度 11.3 cm。此用于品的 pH 量/滴定,

- 染感器的参比系(例如,浴液、含硫化物的品)
- 其中化 c(KCl)= 3mol / L 不能用作参比解(例如,或化物与品的反)

此配了可以抵抗染的活磨口隔膜,如有必要可以更。
当使用 c(KCl) = 3 mol / L 作外参比液解,建在保存液中存。
中解可以用合的解(例如硝酸 $c(KNO_3)$ = 1 mol/L (6.2310.010))代替。存在用的解中。
以下物品号的 Profitrode 有更多度的版本可供:
- 6.0255.110:度 17.8 cm
- 6.0255.120:度 31.0 cm