



Application Note AN-T-201

发动机冷却液或防锈剂的 pH 值

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

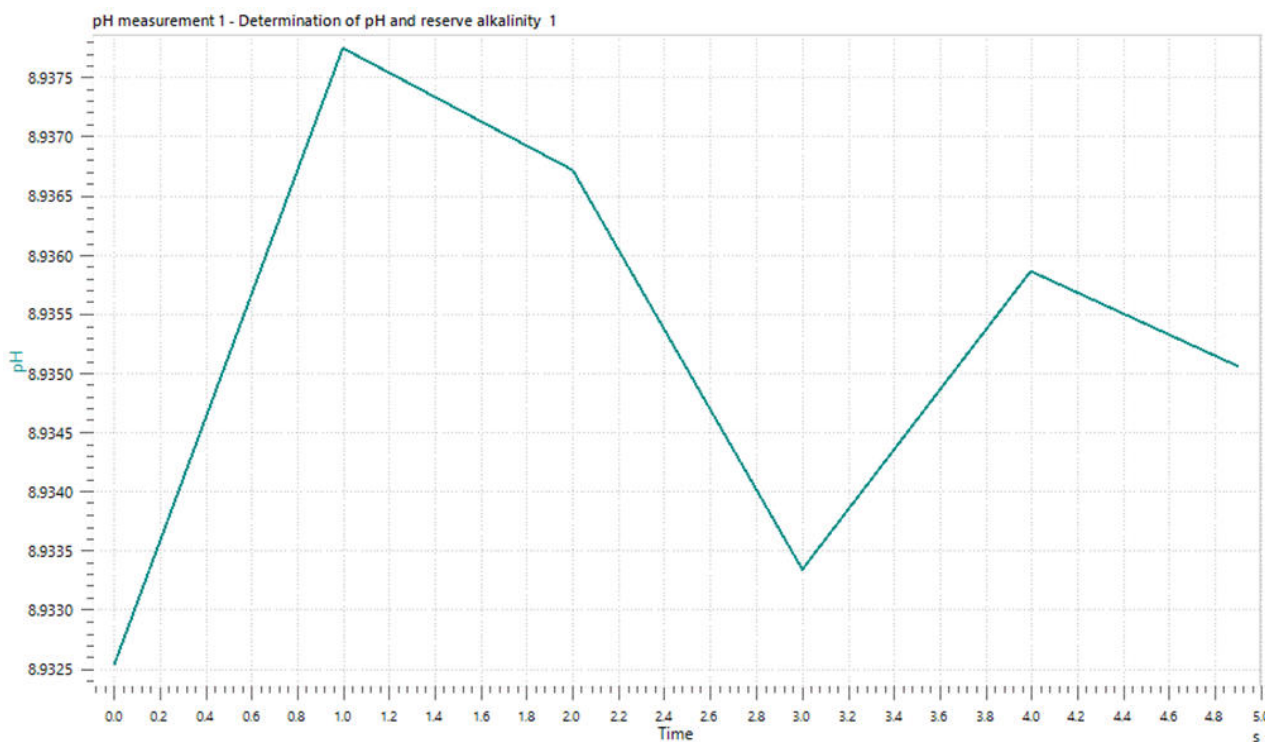


Figure 2. Example measurement chart for the pH value of engine coolant.

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

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CONFIGURATION



OMNIS Basic Titrator

创新型、模块式电位分析 OMNIS Titrator 滴定仪,适于独立运行或作为 OMNIS 滴定系统的核心元件运行,用于终点设定滴定。由于采用 3S 试剂瓶适配器技术,处理化学品很安全。可以使用测量模块和计量管单元自由配置滴定仪,并在需要时扩展一台螺旋搅拌器。在需要时可以通过相应的软件功能许可证扩展 OMNIS Basic Titrator 的功能范围。

- 通过计算机或本地网络控制
- 可以为其他应用或辅助溶液另外连接四个滴定模块或加液模块
- 螺旋搅拌器的连接方式
- 可提供不同大小的计量管:5、10、20 或 50 mL
- 采用 3S 技术的试剂瓶适配器:安全处理化学品,自动传输生产商的原始试剂数据

测量模式和软件选项:

- 终点设定滴定:“Basic” 功能许可证
- 终点和等当点滴定(单一/动态):“Advanced” 功能许可证
- 终点和等当点滴定(单一/动态),包括平行滴定:“Professional” 功能许可证



Profitrode 12.5 cm

带双结系统的组合 pH 电极,安装长度 11.3 cm。此电极适用于样品的 pH 测量/滴定,

- 污染传感器的参比系统(例如,浴液、含硫化物的样品)
- 其中氯化钾 $c(\text{KCl}) = 3 \text{ mol / L}$ 不能用作参比电解质(例如,钾或氯化物与样品的反应)

此电极配备了可以抵抗污染的灵活磨口隔膜,如有必要可以更换。

当使用 $c(\text{KCl}) = 3 \text{ mol / L}$ 作为外参比液电解质时,建议在保存液中储存。

中间电解质可以用合适的电解质(例如硝酸钾 $c(\text{KNO}_3) = 1 \text{ mol/L}$ (6.2310.010))代替。存储在用过的电解质中。

以下物品编号的 Profitrode 有更多长度的版本可供选购:

- 6.0255.110:长度 17.8 cm
- 6.0255.120:长度 31.0 cm