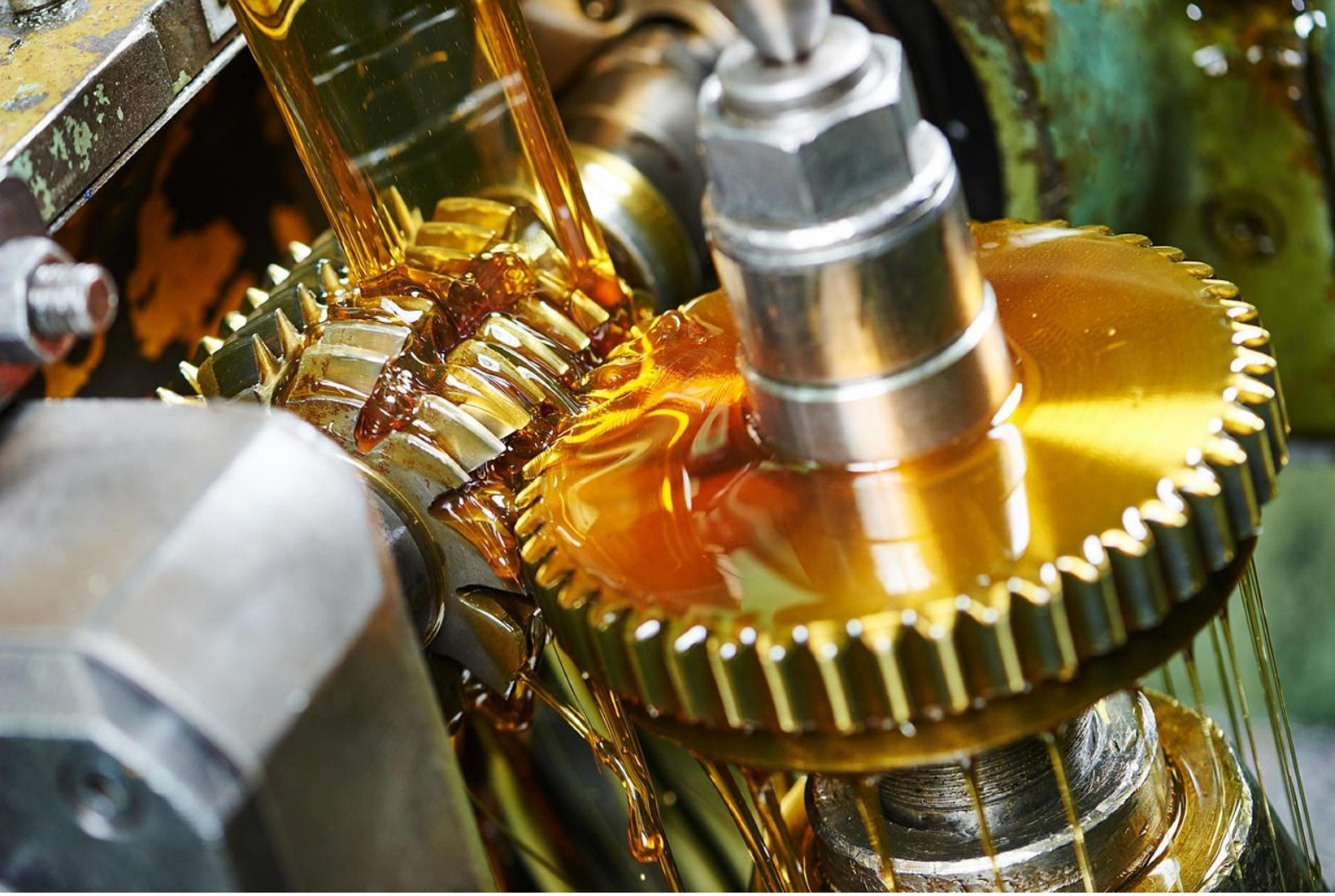

Application Note AN-H-141

Acid number in crude oil and gas oil according to ASTM D8045

Fast and reliable analysis of various oil products used in the petrochemical industry by thermometric titration

Accurate knowledge of the total acid number in crude oil is important for the determination of its price. Additionally, by monitoring the acidity of crude oil and the associated process oils, unexpected shutdowns can be prevented, and thus costly treatment chemicals preserved.

Thermometric titration is a reliable method for the analysis of the total acid number (TAN) in assorted petroleum products. During thermometric titration (TET), the enthalpy change of the reaction is monitored rather than the potential. The titration endpoint is revealed by an inflection in the temperature curve.

In this Application Note, the acid number of multiple oil products is determined with titration as per ASTM D8045 by using catalytic thermometric titration. Compared to potentiometric titration, TET is faster and more convenient.

SAMPLE AND SAMPLE PREPARATION

This application is demonstrated on miscellaneous crude oil products.
Usually, sample preparation is not required. However, some samples may require slight warming or dissolution in xylene prior to titration. It is possible to titrate warm samples (<60 ° C) without a loss of resolution or precision.

EXPERIMENTAL

The determinations are carried out on an OMNIS Professional Titrator equipped with a dThermoprobe (Figure 1). To avoid manually handling chemicals, all solutions can be automatically added using an OMNIS Dosing Module.
An appropriate amount of sample is weighed into the titration vessel, and solvent as well as paraformaldehyde are added. Afterwards, the solution is titrated until after the first exothermic endpoint with standardized potassium hydroxide (Figure 2).

Figure 1. OMNIS Titrator Professional equipped with a dThermoprobe and a rod stirrer.

RESULTS

This method offers very accurate results for TAN as displayed in Table 1.

Table 1. Results for the total acid number determination according to ASTM D8045 on an OMNIS system equipped for the thermometric titration.

TAN (n = 6)	Mean in mg KOH/g sample	SD(rel) in %
Cutting oil	0.96	0.2
Desalted Crude	0.76	2.1
Raw Crude	0.73	1.1
Vac. Light Gas	1.23	0.0
Vac. Heavy Gas	1.25	0.8
Atm. Heavy Gas	1.15	1.2
650 Endpoint Gas	0.73	1.1

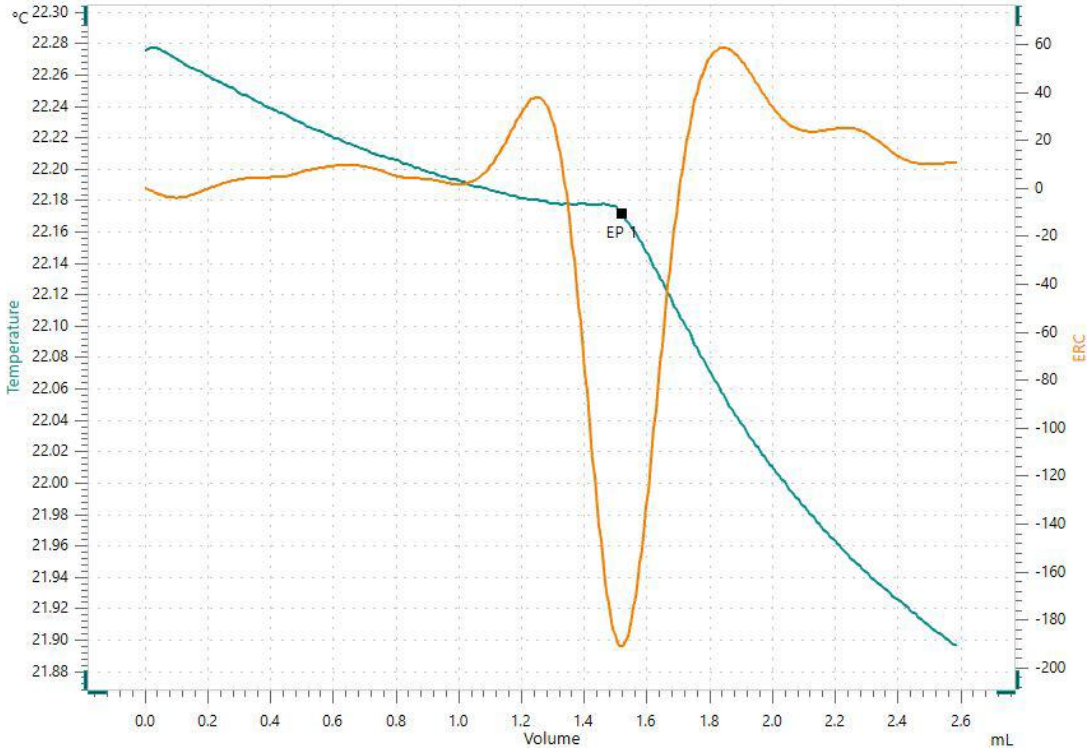

Figure 2. Titration curve of the thermometric determination of a raw crude oil sample.

CONCLUSION

Thermometric titration is a very fast and accurate method that can determine the TAN of various crude oil products in one easy titration. No sensor maintenance is required, making TET a robust alternative to other color indicator titration test methods.

CONTACT

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CONFIGURATION

OMNIS Professional Titrator

新型、模式位分析 OMNIS Titrator 滴定,用于行点和等当点滴定(一/)。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,并在需要展一台拌器。包括用于使用其他滴定或加液模平行滴定的"Professional"功能可。

- 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
- 可以展磁力拌器和/或螺旋拌器
- 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

dThermoprobe

高敏性数字温度探,用于使用 OMNIS 行滴定。Thermoprobe 温度具有短的和高的分辨率,能精最小的温度化。

感器可以用于不含 HF 的水溶液和非水溶液,例如,定:

- 酸 (TAN) 根据 ASTM D8045
- 基数 (TBN)
- 游脂肪酸
- Ca/Mg 定
- 酸

30 mm ETFE

拌螺旋 30 mm,ETFE,高度可,用于棒式拌"Titrator"(滴定)或棒式拌"Sample Robot"