



#### Application Note AN-T-187

## 石油分中的数

### Ecological determination according to ASTM D1159 with toluene as solvent

The bromine number indicates the degree of unsaturation and relies on the simple addition of bromine to the double bond of alkenes. One mole of bromine is consumed for each mole of carbon-carbon double ( $C=C$ ) bond present in a substance. In petroleum products, the bromine number corresponds to the olefin content. Normally, chlorinated solvents are used for the determination of the bromine number. In this

Application Note they have been replaced by toluene. This makes the determination more ecological. The titration is performed automatically on an OMNIS system in combination with a double Pt-wire electrode. With this setup, a fast and accurate determination by potentiometric titration can be realized.

The analysis is demonstrated on petroleum distillate.

According to the expected bromine number, an

appropriate amount of sample is dissolved in toluene.

## EXPERIMENTAL

The analysis is carried out on an OMNIS system consisting of an OMNIS Advanced Titrator, an OMNIS Dosing Module, and a double Pt-wire electrode.

Sample and titration solvent (consisting of toluene, methanol, sulfuric acid, and glacial acetic acid) are pipetted into a thermostated vessel. While stirring, the solution is cooled to between 0–5 °C. After reaching this temperature, the solution is titrated with standardized bromine until after the equivalence point is reached.

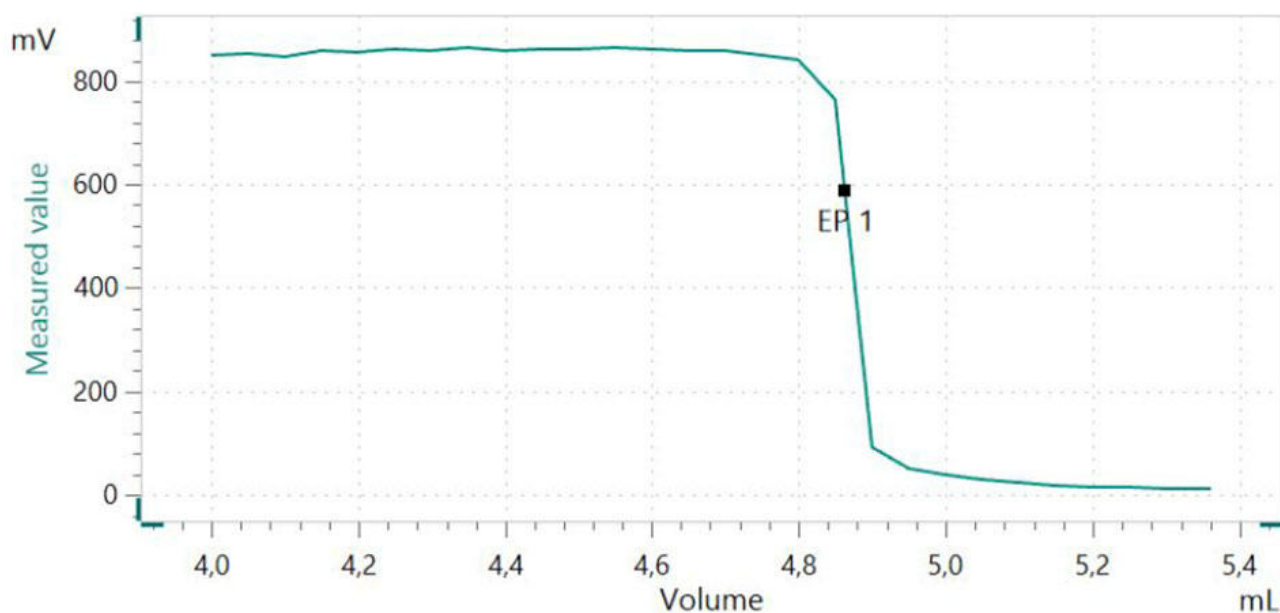


**Figure 1.** OMNIS system consisting of an OMNIS Advanced Titrator and an OMNIS Dosing Module equipped with a double Pt-wire electrode for indication.

## RESULTS

Steep and smooth curves are achieved with this setup. The results are very reproducible with relative standard deviations < 0.2 %.

With the presented analysis, a bromine number of 10.80 g bromine/100 g petroleum distillate ( $n = 5$ ;  $SD(\text{rel}) = 0.19\%$ ) is obtained.



**Figure 2.** Titration curve of the determination of the bromine number of a petroleum distillate sample.

## CONCLUSION

After reaching the temperature of 0–5 °C, the titration is automatically started. There is therefore no further need to observe the temperature. The titration curves are steep and easy to evaluate. Due to this point, the reproducibility is very good and the

criteria of **ASTM D1159** regarding reproducibility is fulfilled.

Additionally, the exchange of chlorinated solvents by toluene leads to a more environmentally friendly application with a comparable precision.

Internal reference: AW TI CH1 1245-122017

## CONTACT

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## CONFIGURATION



### OMNIS Advanced 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,用于使用 OMNIS Sample Robot 行点和等当点滴定(一/)。由于采用 3S 瓶配器技,理化学品很安全。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平行滴定升 OMNIS Advanced Titrator。

- 通算机或本地网控制
- 可以其他用或助溶液外接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



### OMNIS Dosing Module

用于与 OMNIS Titrator 滴定相的加液模,以展外用于滴定/加液的滴定管。可以展磁力拌器和/或螺旋拌器,以作独的滴定台使用。可自由 5、10、20 或 50 mL 量管元。



指示,用于法休滴定。



#### **Pt1000 12.5 cm**

玻璃材 Pt1000 温度感器(B )。

物品号 6.1110.110 的 Pt1000 温度感器也有 17.8 cm 安装度的版本可供。