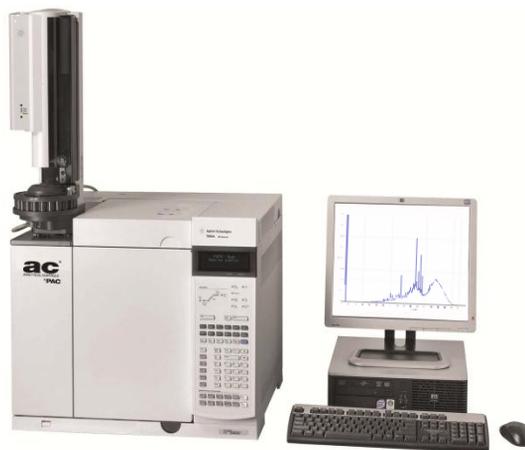


EXTENDED HYDROCARBON OIL INDEX ACCORDING TO ISO 9377-2 AND DIN H53 BY GAS CHROMATOGRAPHY

- Complete Gas Chromatographic Solution
- Additional Reporting for Aromatics
- Specialized AC TPI- Injector for perfect results

Keywords:

Hydrocarbon Oil index, ISO 9377-2, DIN H53, Gas Chromatography



INTRODUCTION

This method specifies a technique for the determination of the content of dispersed mineral oil between n-C7 and n-C40 in water by means of gas chromatography. The application is an extension of the standard ISO 9377-2 method, that only reports from n-Decane (C10) upwards. The method is designed for surface water and other types of waste water discharged from gas, condensate and oil platforms and allows the determination of the dispersed mineral oil content in concentrations above 0,1 mg/l.

PRINCIPLE

The water is extracted with n-pentane. Polar substances are removed by clean-up on Florisil. The purified aliquot is analyzed by capillary gas chromatography using a non-polar column and a flame ionisation detector (FID). The total peak area between n-heptane and n-tetracontane is measured. The concentration of mineral oil is quantified against an external standard consisting of a mineral oil, and the content of dispersed mineral oil is calculated. Optionally, the peak areas of the aromatic hydrocarbons toluene, ethyl benzene and the three isomers of xylene can be subtracted from the total area.

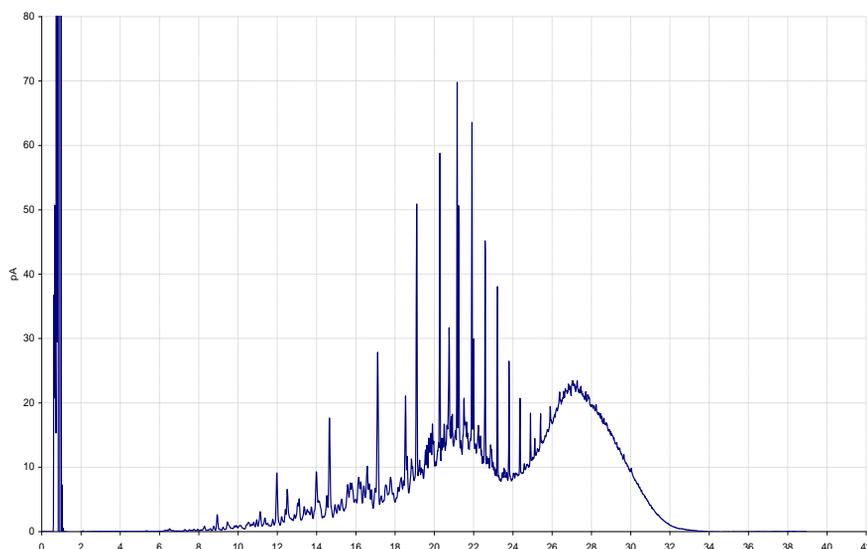


Figure 1. Chromatogram of an Extended Hydrocarbon Oil

INSTRUMENT PARAMETERS

Oven temperature	35 °C for 5 min • then 5 °C/min to 100 °C for 0 min • then 15 °C/min to 340 °C for 5 min
AC TPI Inlet	100 °C for 0 min • then 35 °C/min to 300 °C
Detector (FID)	320 °C
Analytical Column	15m x 0.53mm x 0,15µm
Carrier Gas	Helium
	Carrier Gas 7.3 ml/min Constant Flow Mode
Injection Mode	Automated Fast Injection
Injection Volume	1.0µl

INLET DISCRIMINATION

Discrimination of the oil in the inlet system is a problem seen quite often for the analysis of a wide range of boiling points. The recovery of higher boiling compounds with respect to the ones with lower boiling points is usually observed to be inadequate in standard split/splitless injectors. This is the reason why the method specifically prescribes a “non-discriminating injection system” at section 7.2 and that the relative response (peak area) of n-tetracontane (C₄₀H₈₂) compared with n-eicosane (C₂₀H₄₂) be at least 0,8.



AC Temperature Programmable Inlet (TPI)

The design of the AC TPI (temperature programmable inlet) leaves no room for inlet discrimination. The absence of vent and/or split flows eliminates this discrimination phenomenon. The sample is injected on the glass liner at a (relative) low temperature, then the inlet is ramped to higher temperatures, carefully evaporating the sample in the inlet and releasing it to the column.

REPORTING

A custom report template is included with the application and generates a report conforming to the standard test method. The system can be configured so it goes in standby-mode after a sequence of analysis, lowering gas consumption and keeping the system conditioned. The included oven exhaust deflector deflects the oven hot-air exhaust up and away from the instrument, improving oven cooling during and after the analysis

CONCLUSION

The combination of the configured GC system (see configuration above), selected capillary GC column, proprietary injection port and liner, appropriate chemical standards as well as application installation and support by certified AC Service, provide a complete solution for the measurement of the hydrocarbon oil Index that optionally can be extended to include lighter fractions of the oil, and/or exclude peak areas of the aromatic hydrocarbons toluene, ethyl benzene and the three isomers of xylene.

AC Analytical Controls® by PAC has been the recognized leader in chromatography analyzers for gas, naphtha and gasoline streams in crude oil refining since 1981. AC also provides technology for residuals analysis for the hydrocarbon processing industry. Applications cover the entire spectrum of petroleum, petrochemical and refinery, gas and natural gas analysis; ACs turn-key application solutions include the AC Reformulyzer®, SIMDIS, HiSpeed RGA and customized instruments.