

CHRONECT[™] Hydrocarbon Index Workstation

Introduction

The determination of the hydrocarbon index is a method described in 2001 in the DIN EN ISO 9377-2 norm. It took over the former method of determination by infra-red.

In detail, the ISO norm demands a 900 mL water sample at pH 2 to which 80 g MgSO4 are added followed by 50 mL extracting agent.

The extracting agent (e.g., petrol ether, cyclohexane, or hexane) contains 0.2 mg/L n-decane and ntetracontane each as reference substances and retention time marker respectively.

The organic phase is separated, dried and purified over a chromatography column containing 2 g sodium sulfate and 2 g Florisil. Then, the sample is reduced to a volume of 1 mL and an aliquot is measured by GC-FID. The measured value for the hydro-carbon index in mg/L is the entire peak area of the chromatogram between the two reference substances C10 and C40.

The measurements of blind values and column bleeding are used to readjust and correct the peak area. An external calibration is performed by analyzing calibration solutions which are created from diesel oil and additive-free lubricant in relevant concentrations from 0.1 mg/L.

In the course of nowadays requirements for laboratories to reduce their sample preparation time (Turn-Around-Time) without loss in accuracy of analytical parameters such as sensitivity, precision and accuracy highly automated solutions for analytics are in demand.

The apparently time-consuming GC method to determine the hydrocarbon index offers high potential for automation. Relevant parts of the sample preparation can be significantly accelerated using an intelligent CHRONECT[™] robot RTC sampler with sub-sequent LC injection. Not only fitting the recent requirements, but this determination method is also simpler and cheaper.

Course of automation

- 15 mL water sample in a 20 mL vial, addition of 1.5 mL extracting agent by the autosampler
- Extraction within the vortex module
- Phase separation and stripping of the organic phase by the autosampler
- Transfer of the organic phase into a 1.5 mL vial containing Na₂SO₄
- Mixing in the vortex module
- Transfer of the extract into a 1.5 mL vial containing Florisil
- · Mixing in the shaker
- Stripping of 100 μL from the vial and rapid large volume injection into the GC

Control

The application system is controlled via the automation platform CHRONOS[™].

Figure 1 shows the sample preparation is performed in parallel to the gas chromatographic analysis to ensure the highest sample throughput possible.





Figure 1. CHRONOS[™] schedule of the Hydrocarbon Index automation.



Figure 2. Calibration standard at 6 mg/L.



Technical data of the application

- Limit of determination: 0,05 mg/L
- Duration of sample preparation: ~ 15 min
- Total duration of analytics per sample: 20 25 min, resulting in a capacity of 60 samples per day which can be analyzed by the system

Benefits of the application

- High sample throughput
- High degree of automation
- No risk of contamination
- · Excellent reproducibility
- Investment safety through well-established system components

Components

- GC with FID
- CHRONECT robot RTC sampler with a 120 cm axis
- ATAS GL Science OPTIC-4 (Figure 3)
- CHRONOS automation platform
- Data system with control and evaluation software
- · Accessories and consumables
- Factory acceptance test (at Trajan)
- Site acceptance test (in customer's laboratory)
- Commissioning
- Training and support

Information and support

Visit www.trajanscimed.com or contact techsupport@trajanscimed.com

Specifications are subject to change without notice.

CHRONECT™ Hydrocarbon Index Workstation is a development by Trajan.



Figure 3. ATAS GL Science OPTIC-4