Simulated Distillation of a Heavy Gasoil and FCC Feed according to IP 480
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Introduction
The IP480 standard specifies a method for the determination of the boiling range distribution of petroleum products by capillary gas chromatography using flame ionization detection. The standard is applicable to materials having a vapor pressure low enough to permit sampling at ambient temperature and a boiling range of at least 100 °C. The standard is applicable to distillates with initial boiling points (IBP) above 100 °C and final boiling points (FBP) below 750 °C, for example, middle distillates and lubricating base stocks.

Instrumentation
Technique: Varian 450-GC Gas Chromatograph Simulated Distillation Analyzer
Injector: Temperature controlled on-column (1093) with full EFC control
Detection: High temperature FID with full EFC control
Autosampler: Varian CP-8410 AutoSampler (or Varian CP-8400 AutoInjector)

Software
GC Control and Data Handling: Galaxie™ Software
Simulated Distillation Calculations: SimDist plug-in software fully integrated into Galaxie Workstations

Materials and Reagents
Sample: Crude oil
Column: Varian CP-SimDist UltiMetal™, 5 m x 0.53 mm x 0.09 μm (pn: CP7569)
Calibration: Mixture of n-paraffins (approx 1 %) dissolved in carbon disulfide
Internal Standard: ASTM D 5307 Crude Oil Int. St.

Sample Preparation
The calibration mix was prepared by dissolving 0.1 g polywax 1000 in 7 mL CS₂ and adding 10 μL of an equal volume mixture of n-alkanes, all according to the method. The samples were obtained by making a 2 to 3 % (m/v) solution in CS₂.

Conditions
Sample Size: 1 μL
Carrier Gas: Helium, 19 mL/min
Oven Program: 35 °C @ 10 °C/min to 430 °C
Injector Program: 100 °C @ 15 °C/min to 430 °C
Detection: 450 °C

Results and Discussion
The software calculates the IBP and FBP of the samples using the retention times of n-alkanes in the calibration mix.

![Figure 1. Polywax 1000 spiked with n-alkanes, calibration mix.](image1)

The same conditions were used to analyze the samples. A CS₂ blank was used for baseline subtraction. It is important to note that in spite of the fact that a temperature stable, ultra low bleed, UltiMetal column was used, some low level column bleed will always be present and will influence analysis results if no baseline subtraction is employed.

![Figure 2. Heavy gasoil and CS₂ blank.](image2)
A FCC feed can be analyzed in the same way. In this case, a CS<sub>2</sub> blank is used for baseline subtraction.

**Conclusion**

The chromatograms from the calibration mix for both heavy gasoil and FCC feed provide firm evidence of the solid performance of the Varian Simulated Distillation Analyzer. The reproducibility values shown are consistent with those prescribed in the IP 480 method.

**Reference**