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# High Temperature SimDist Analysis According to IP507/07

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## Introduction

The IP507/07 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 materials with initial boiling points (IBP) above 100 °C and final boiling points (FBP) above 750 °C, for example, heavy distillate fuels and residuals. The method is not applicable to bituminous samples.

## Instrumentation

GC: Varian 450-GC/Simulated Distillation Analyzer
Injector: Temperature controlled with Varian SPI injector for capillary column with full EFC control
Column oven: With cryogenic ($CO_2$) cooling
Detector: FID with EFC control
Autosampler: CP-8400 or CP-8410

## Software

GC control and data handling: Galaxie™ GC Workstation
SimDist calculations: SimDist software plug-in fully integrated into Galaxie

## Materials

Column: Varian CP-SimDist column, 5 m x 0.53 mm x 0.1 μm Ultimetal (pn: CP7569)
Calibration mix for determination of TBP range
Motor oil for 100% recovery determination

## Sample Preparation

All samples and calibration mixtures are dissolved in $CS_2$ at 2%.

## Conditions

Oven temp/program: 35 °C/10 °C per min to 430 °C
Injector temp/program: 100 °C/15 °C per min to 430 °C
Detector temp: 450 °C
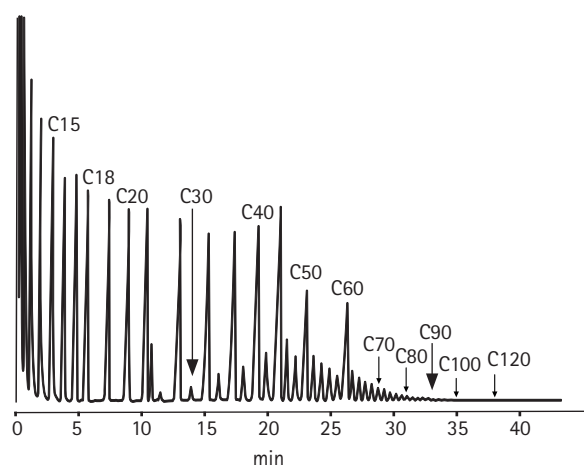Carrier gas/flow rate: Helium, 19 mL/min
Sample size: 1 μL

## Results



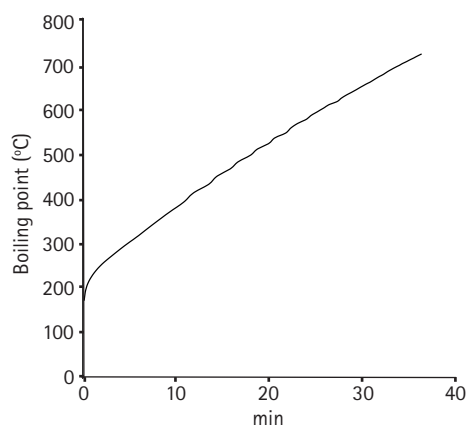**Figure 1.** Typical chromatogram of a calibration mix.
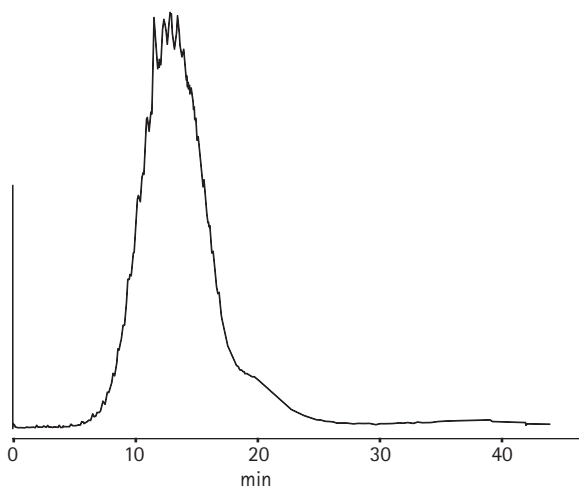


**Figure 2.** Typical calibration curve.

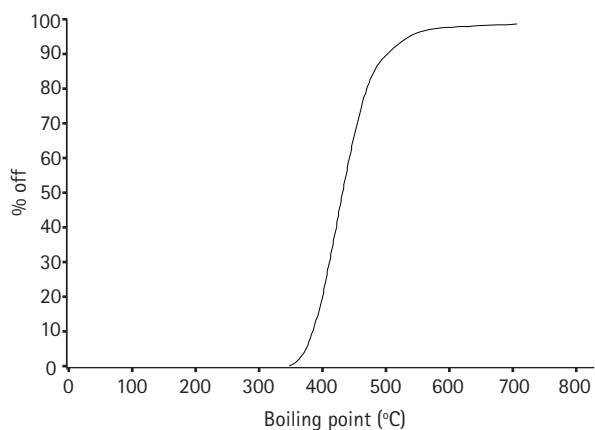**Figure 3.** Chromatogram of a motor oil sample. Recovery is 100%.



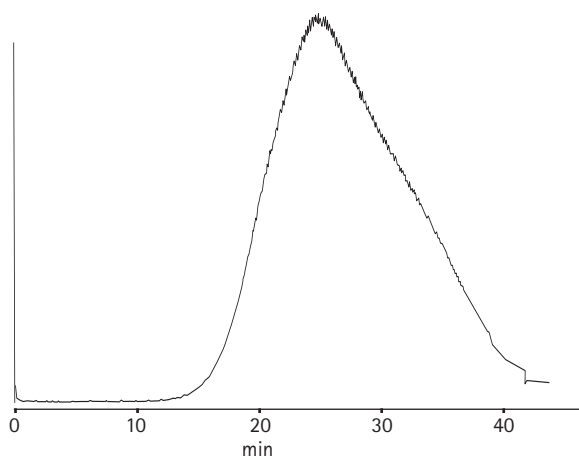**Figure 4.** Result plot of the motor oil sample.



**Figure 5.** Chromatogram of a residue sample. Recovery is 88.7%.

**Table 1.** Results from the residue sample.

| % off | °C | D86 |
|---|---|---|
| IBP | 476.7 | 504.8 |
| 1 | 487.8 | |
| 5 | 520.6 | 528.8 |
| 10 | 539.3 | 548.9 |
| 15 | 553.9 | |
| 20 | 566.9 | 572.6 |
| 25 | 578.1 | |
| 30 | 587.5 | 587.5 |
| 35 | 596.0 | |
| 40 | 605.8 | |
| 45 | 615.4 | |
| 50 | 626.1 | 613.3 |
| 55 | 637.5 | |
| 60 | 649.7 | |
| 65 | 662.4 | |
| 70 | 676.3 | 652.9 |
| 75 | 692.0 | |
| 80 | 709.1 | 537.6 |
| 85 | 728.8 | |
| 88 | 745.0 | |

## Conclusion
The Varian SimDist Analyzer and its Galaxie™ based software provide the solution for high temperature simulated distillation applications as specified in SimDist method IP507/07.

## Reference
IP 507: Determination of boiling range distribution by gas chromatography method – Part 2: Heavy distillates and residual fuels. Energy Institute, London.

*These data represent typical results.*
*For further information, contact your local Varian Sales Office.*

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