

Application Note 8270390

High Temperature SimDist Analysis According to IP 507/07

Introduction

The IP 507/07 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: Bruker Simulated Distillation Analyzer for IP 507/07 based on the Bruker GC Gas Chromatograph
 Injector: COC Cold On-Column injector with full EFC control
 Column oven: With cryogenic (CO₂) cooling
 Detector: FID with EFC control
 Autosampler: CP-8400

Software:

GC control and data handling: CompassCDS Chromatography Software
 SimDist calculations: SimDist plug-in software fully integrated into CompassCDS

Materials

Column: BR-1HT column, 5 m x 0.53 mm x 0.1 µm
 Calibration mix for determination of TBP range
 Motor oil for 100% recovery determination

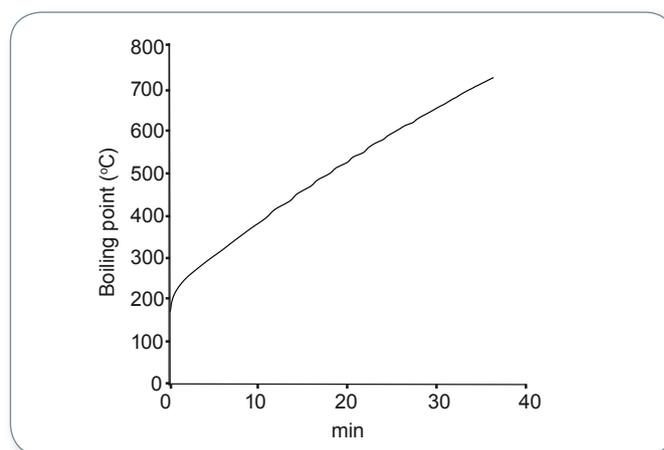


Figure 2: Typical calibration curve.

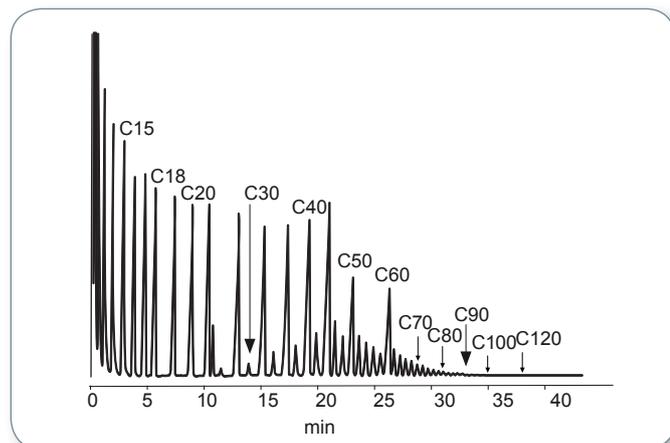


Figure 1: Typical chromatogram of a calibration mix.

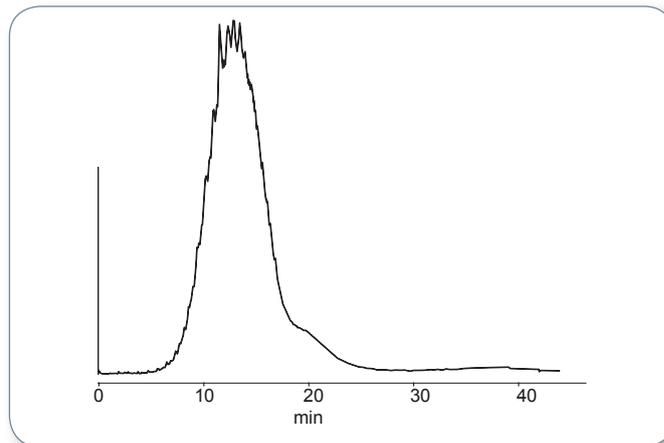


Figure 3: Chromatogram of a motor oil sample. Recovery is 100%.

Sample preparation

All samples and calibration mixtures are dissolved in CS₂ at 2%.

Conditions

Oven: 35°C, @ 10°C/min to 430°C

Injector : 100°C, @ 15°C/min to 430°C

Detector: 450 °C

Carrier gas: Helium, 19 mL/min

Sample size: 1 µL

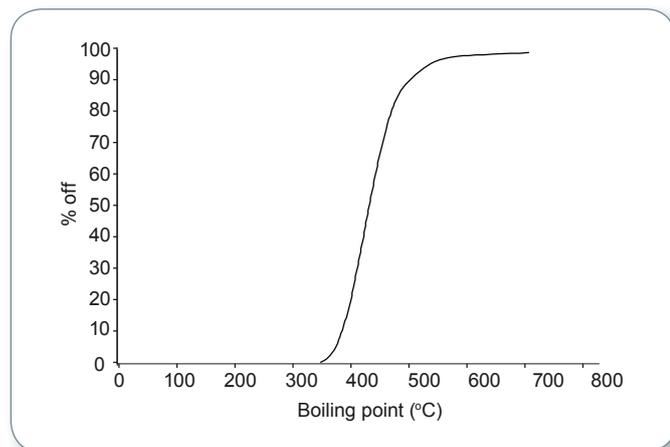


Figure 4: Result plot of the motor oil sample.

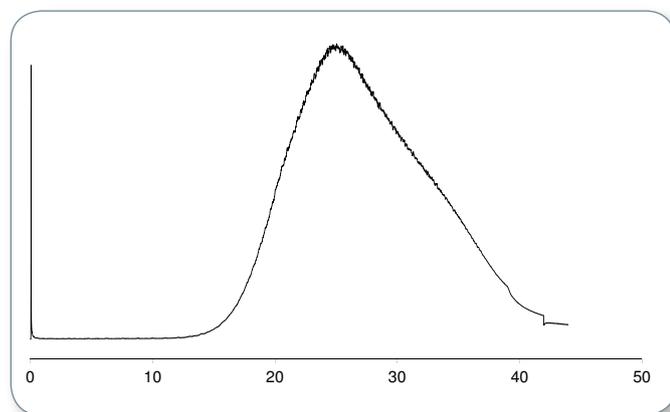


Figure 5: Chromatogram of a residue sample. Recovery is 88.7%.

Conclusion

The Bruker SimDist Analyzer and its CompassCDS based software provide the solution for high temperature simulated distillation applications as specified in SimDist method IP 507/07.

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	

Reference

IP 507/07.: Determination of boiling range distribution by gas chromatography method - Part 2: Heavy distillates and residual fuels. Energy Institute, London.

For research use only. Not for use in diagnostic procedures.

Keywords

IP 507/07

petroleum products

heavy distillate fuels

Instrumentation & Software

Bruker CP-8400

Bruker GC
Gas Chromatograph

CompassCDS Chromatography
Software

SimDist Analyzer

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