

MAXUM edition II Simulated Distillation



simdis

To ensure product quality and to support process control, Simulated Distillation is utilized to characterize the boiling point distribution of hydrocarbon mixtures up to a boiling point of 545°C in compliance with ASTM methods. The Simulated Distillation process gas chromatograph provides this information on-line and in a reliable manner using process suitable analytical procedures in the highly reliable Siemens MAXUM II platform, known for its superior hardware capabilities and unsurpassed networkability.

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Measuring the Boiling Point Distribution; On-line, Precise and Reproducible!

The Measuring Task

Providing on-line and automatic hydrocarbon boiling point characterization ensures fast and repeatable measurement using ASTM methods and provides a distinct advantage over laboratory analysis. The Siemens MAXUM edition II temperature programmable process gas chromatograph is configured to perform applications in

- Simulated Distillation,
- Boiling Point Determination and
- Motor Gasoline Characterization

The analytical system is designed to be installed in plants under process conditions and in electrical hazardous areas to perform the Simulated Distillation measurement. Also, its powerful software system, based on EZChrom and utilizing the MAXUM SimDis software modul produces the calculated outputs required from a simulated distillation analyzer.

Our Solution

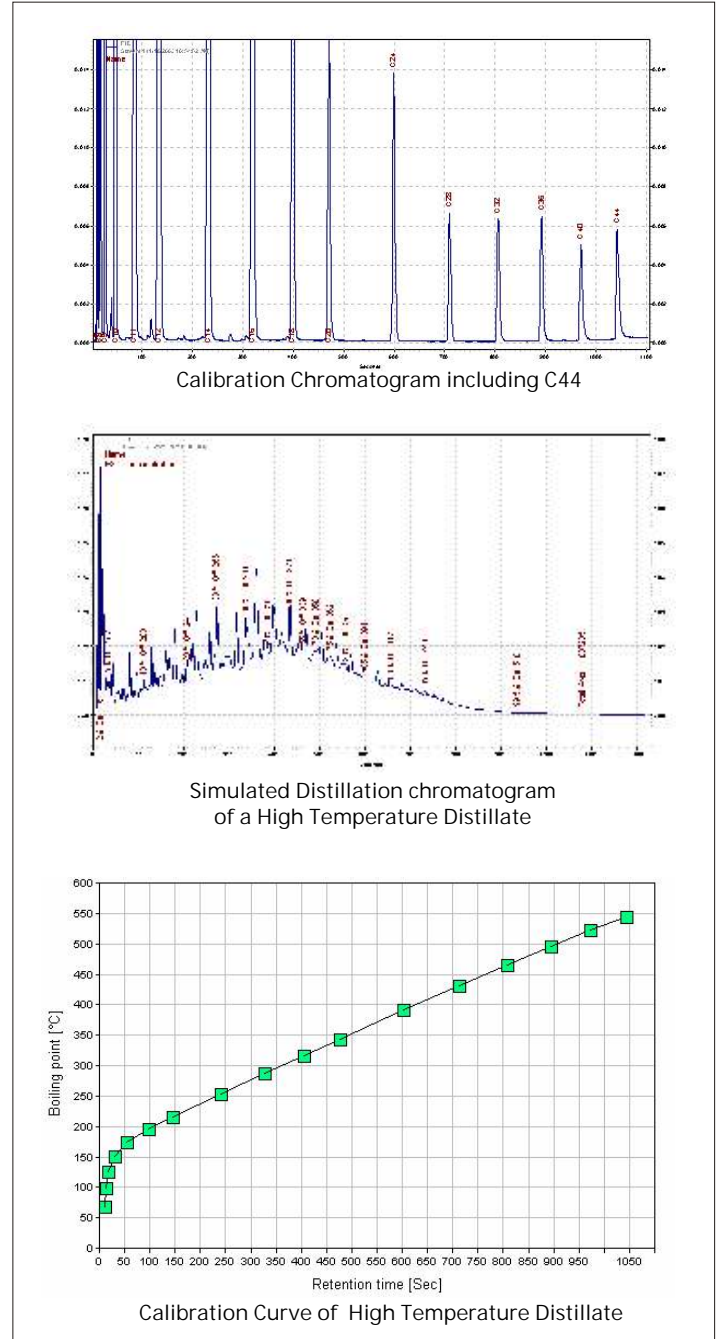
The on-line and automatic process gas chromatograph MAXUM edition II Simulated Distillation incorporates the analytical hardware inside a stainless steel lined isothermal air bath oven. The liquid injection valve injects a discrete splitless amount of sample into a metal capillary column that in turn is enclosed in an individual temperature programmable air bath enclosure located inside the isothermal oven enclosure. During the analysis the capillary column enclosure. The cool down of the capillary can be accelerated by a vortex cooler.



The Flame Ionization Detector base is heated independently of the oven temperature heated. Every temperature and temperature program is precisely controlled in order to provide reproducible chromatography and results.

The specifically designed sample conditioning system prepares the process sample for delivery to the sample inject valve. It employs high-speed bypass loop, flow meter, filter and other required hardware.

The complete analysis of distillate products is typically performed within 15-20 minutes but can take up to 30 minutes for very wide boiling point range samples. The MAXUM Simulated Distillation analyzer is capable of working with samples that have boiling points up to 545 °C (1013 F) that is



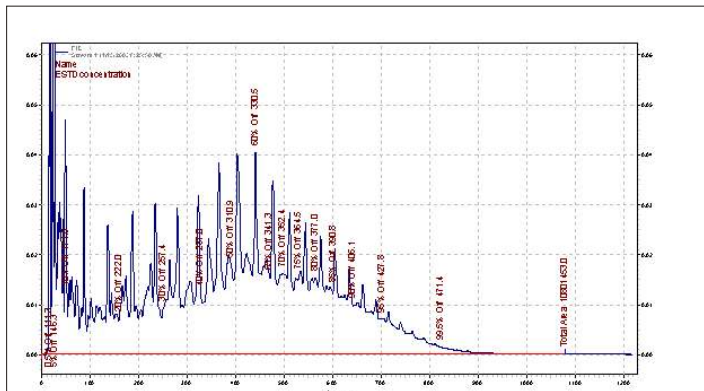
Chromatograms and results of high temperature distillate

the equivalent of $C_{44}H_{90}$. The chromatographic method applied is described in ASTM specification D-3710, D-5399 or D-2887.

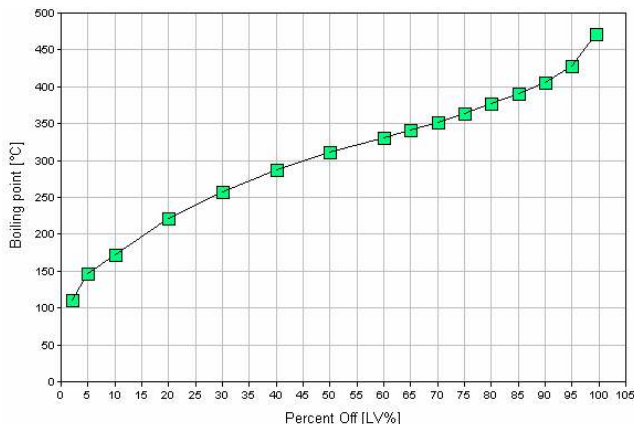
Software and Outputs

The standard and application specific software provided is an integral part of the MAXUM II Simulated Distillation system. The permanent application software Chromatogram and results for Gas Oil is customizable by the user and runs under

Highest Boiling Point.... Reliable and Unattended



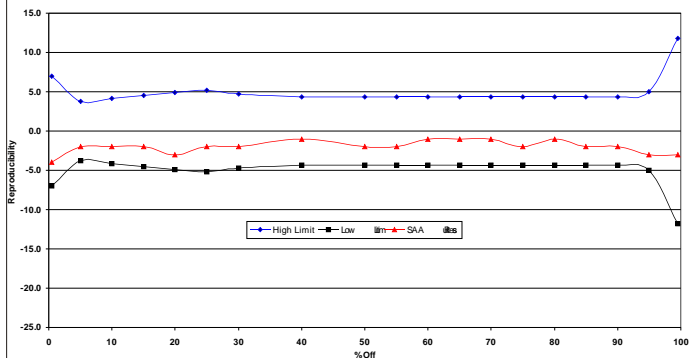
ASTM Reference Gas Oil



Distillation Curve of Gas Oil

	ASTM D-2887 Reference Gas Oil	Siemens MAXUM II Analysis °C	Repro - ducibility °C	Deviation °C
IBP 0.5%	115	119	7.0	-4
5%	151	153	3.8	-2
10%	176	178	4.2	-2
15%	201	203	4.5	-2
20%	224	227	4.9	-3
25%	243	245	5.2	-2
30%	259	261	4.7	-2
35%	275	276	NA	-1
40%	289	290	4.3	-1
45%	302	303	NA	-1
50%	312	314	4.3	-2
55%	321	323	4.3	-2
60%	332	333	4.3	-1
65%	343	344	4.3	-1
70%	354	355	4.3	-1
75%	365	367	4.3	-2
80%	378	379	4.3	-1
85%	391	393	4.3	-2
90%	407	409	4.3	-2
95%	428	431	5.0	-3
FBP 99.5%	475	478	11.8	-3

Reproducibility of
ASTM Reference
Gas Oil



D-2887 Reproducibility oC

Chromatograms and results for Gas Oil

control of the EZChrom application. The Siemens Simulated Distillation application package implements all control and timing functions required by ASTM D-3710, D-2887 or D5399.

The software also provides for execution of the ASTM STP-577 correlation from D-3710 or D-2887 to D-86.

The application software requires minimal user interaction and incorporates analyzer control such as for oven and detector temperature and detector signal acquisition, automatic integration, calculations, data outputs and communication.



Typical calibration setup screen

Component Concentrations - Calculate and Correlate

The software provides user programmable concentration outputs for any component or group of components, among them for C3, i-C4, n-C4, i-C5 and n-C5 (Typical for gasoline analysis. Other fuels and some other gasoline samples may contain interfering components).

D-3710 or D-2887

Outputs are provided for the calculated temperatures at percent off levels of 0.5 (IBP), 10, 20, 30, 50, 70, 80, 90, 95 and 99.5 (FBP). User programmable outputs for any temperature increment can be selected.

STP-577

Correlated outputs are provided for the D-86 temperatures at percent off levels of 0.5 (IBP), 10, 20, 30, 50, 70, 80, 90 and 99.5 (FBP) or the percent off levels at temperatures 55, 60, 70, 100, 135, 150, and 180 °C.

Other Correlated Outputs

Individual outputs are provided for Reid Vapor Pressure, Vapor to Liquid Ratio, Standard or Alternate Methods. Correlation performance can be optimized by the user to compensate for variations in blend, process conditions and other factors.

Your Advantages

- Proven technique from the world market leader in Process Gas Chromatography
 - Highest boiling end point including n-C₄₄H₉₀
 - Follows ASTM D-3710, D-2887 or D-5399
 - Software permits correlation to D-86 according STP-577
 - Certified for hazardous area installations
 - Available for multiple sample streams
 - Standard Siemens Process Gas Chromatography communication and networkability
 - Minimum Maintenance
 - Worldwide service and support

Technical Data:

Measurement:	Simulated Distillation
Application:	Gasoline, Diesel, Kerosene, Naphtha, Gasoil, Jet Fuel, Lube Oil, and Solvents
Max. Boiling End Point	about 545 °C / 1013 F (n-C ₄₄ H ₉₀)
Cycle Time:	typically 15-20 minutes
Repeatability:	better than +/- 1.5 °C (+/- 3F) (ASTM D3710)
Installation:	NEC Class I, Div.1 or 2, Group B,C,D, T1 or T2 (depending on BP end point), (CSA), and Zone 1 or 2, Group B,C,D, T1 or T2 (depending on BP end point) (CENELEC)

Auxiliary Gases

Carrier Gas	Hydrogen, Nitrogen or Helium	>99.999%	approx.20 cc/min
Fid Fuel	Hydrogen	>99.999%	approx.30 cc/min
Combustion Air	Air	Hydrocarbon Free	approx.500 cc/min
Airbath Oven Air	Instrument Air	approx. 210 l/min	approx. 575 l/min (with Vortex Cooler)

More detailed technical data, installation, communication and networking information for the Simulated Distillation analyzer as well as other analytical solution from Siemens are available:

MAXUM edition II on-line Process Gas Chromatograph,

MAXUM edition II Total Sulfur Analyzer

Applications Notes

Presentations

For More Information Contact

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