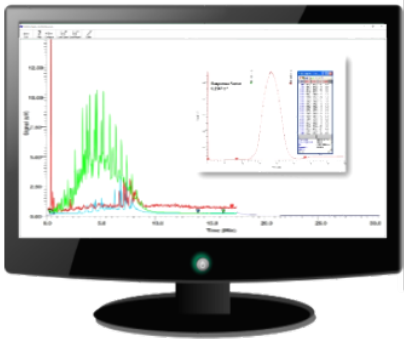
Separation Systems, Inc.
Experts in Gas Chromatography

Simulated Distillation

Analyzers, Software, Standards, Consumables, Training



www.separationsystems.com

Offering the Fullest Range of Optimized Solutions

Simulated distillation (SimDis) has been used to quickly and accurately determine the true boiling point distribution of crude oil and petroleum fractions by gas chromatography for over 40 years. From the very beginning, Separation Systems has been committed to working with ASTM and others to evolve, improve and advance the technique. And we remain committed to this important endeavor.

All of our simulated distillation analyzers are guaranteed to deliver accurate results that meet or exceed all the requirements of the current and proposed standard test methods from ASTM and other international standard organizations. All of our analyzers are 'comprehensive' in nature and include the following:

- **Agilent 7890B GC**
- **Automatic liquid sampler/injector**
- **Inlet appropriate for the designated test method(s) including our industry preferred SimDis® Inlet**
- **Column, flame ionization detector (FID) (and element and/or mass selective detector)**
- **Chromatography data acquisition system (if required)**
- **Industry leading SimDis® Expert software**
- **6 month supply of retention time standards, reference materials and consumable items (septa, inlet liners, ferrules)**
- **System configuration and testing at Separation Systems prior to shipment**
- **Installation & performance verification in the client's lab**
- **Training: GC hardware and GC data system, preventative maintenance procedures, how to recognize and fix problems, SimDis® Expert software and test method(s)**

When we leave your lab, your system is ready to go. Our extensive knowledge of simulated distillation analysis coupled with the highly responsive support we provide throughout the lifetime of the system is why so many people count on us for their simulated distillation needs. We never take any of our clients for granted. We'd be pleased to have the opportunity to do the same for you.

Simulated Distillation Test Methods Summary

Test Method	Max Carbon #	Sample Stream Type	Boiling Point Range (BP)	
			Initial (IBP)	Final (FBP)
ASTM D3710	Up to C15	Gasoline, Naphtha	~ -20 °C to 30 °C	< 260 °C/500 °F
ASTM D7096	C3 to C16	Gasoline, Naphtha	~ -20 °C to 30 °C	< 280 °C/536 °F
ASTM D2887 IP 406, ISO 3924 DIN 51435	C3 to C44	Jet Fuel, Diesel, Biodiesel Blends	~ 40 °C to 80 °C	< 538 °C/1000 °F
ASTM D5442	C17 to C44	Petroleum derived waxes		< 538 °C/1000 °F
ASTM D5307	C3 to C44	Crude Oil	-30 °C to 100 °C	< 538 °C/1138 °F
ASTM D7398	C8 to C70	Biodiesel, B100	> 100 °C/212 °F	<615 °C/1139 °F
ASTM D7213	C5 to C70	Lube Oil, Base Oil	> 100 °C/212 °F	< 615 °C/1139 °F
ASTM D6352	C5 to C90	Lube Oil, Base Oil	> 100 °C/212 °F	< 700 °C/1292 °F
IP 480, EN 15199-1	C10 to C120	Lube Oil, Base Oil	> 100 °C/212 °F	< 750 °C/1382 °F
ASTM D7169	C3 to C100	Residues, Crude oil	-30 °C to 100 °C	< 720 °C/1328 °F
IP 507, IP 545, EN 15199-2, EN 15199-3	Up to C120	Heavy Distillate Residues, Crude Oil	> 100 °C/212 °F	> 750 °C/1382 °F
ASTM D7500	C5 to C110	Lube Oil, Base Oil	> 100 °C/212 °F	< 735 °C/1355 °F
ASTM D7900, IP 601	C1 to C10	Stabilized Crude Oil	~ > -30 °C	Fraction < 170 °C
ASTM D6417	C5 to C22	Volatility of Lube Oils	IBP to 371°C /700 °F	< 700 °C/1292 °F

Separation Systems offers comprehensive GC analyzers for all of these standard test methods.

Simulated Distillation Software without Compromise

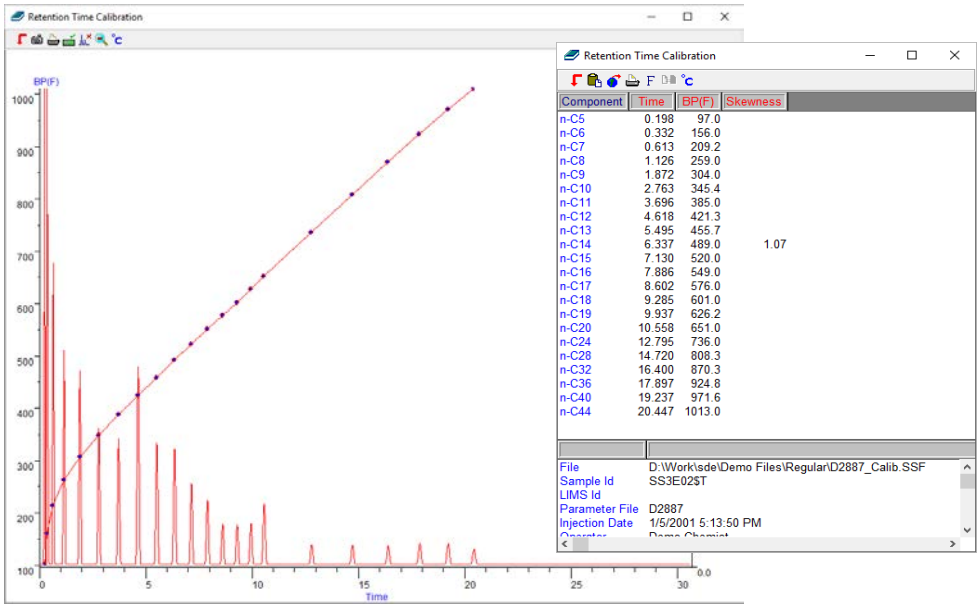
SimDis® Expert is the best simulated distillation data analysis software available today. And, with the release of Version 10, more powerful than ever. It meets or exceeds all of the requirements of existing and proposed standard test methods. Its intuitive design is broadly recognized as the gold standard for being the easiest to learn while offering all of the functionality and advanced capabilities required to make your 'data to decision' workflow simple and straightforward.

SimDis® Expert is compatible with all of today's chromatography data systems and can be tailored for your needs including support for selective detectors including FPD, PFPD, SCD, NCD and even MS. SimDis® Expert is available in client and network server versions.

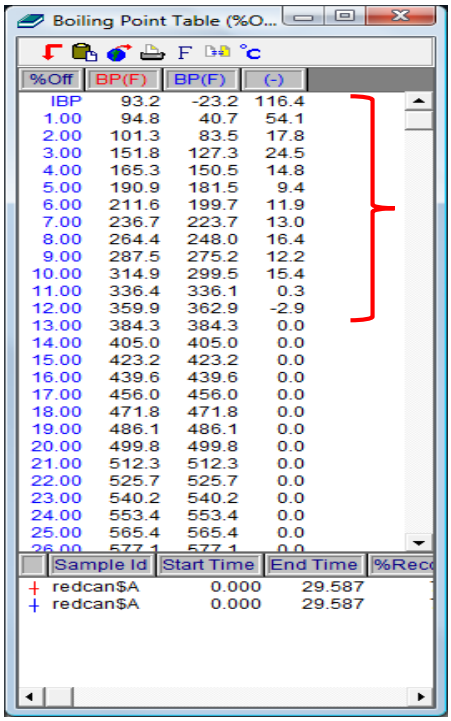
The software fully reflects Separation Systems' 40+ year dedication developing, testing and evolving simulated distillation test methods and contributions to advancing the state of the art.

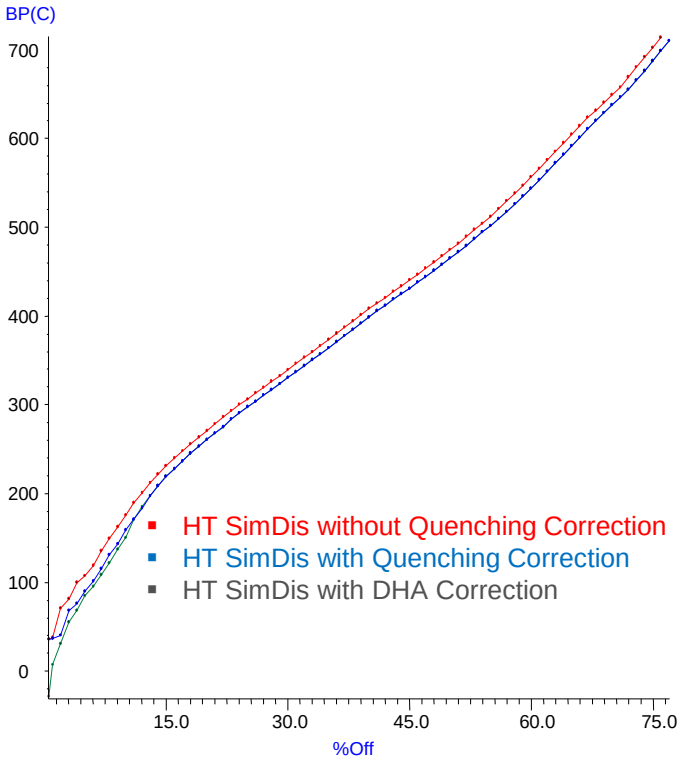
Key Software Highlights

- All current and proposed standard test methods are supported
- Utilizes a graphical user interface and straightforward analysis workflow
- D86 and D1160 correlations
- Full range of standard calculations: MOV, NOACK, Reid Vapor Pressure (RVP), CETANE index, sample average molecular weight
- Cut points can be calculated as average molecular weight
- Built in peak integrator with expanded integration parameters simplifies data reprocessing
- Full range of standard reports as well as the ability to create your own custom reports
- Fully customizable cut points
- Supports the use of selective detectors including MS
- Peak skew and column resolution determination based on multiple peaks
- User access levels can be assigned for security
- Single 'universal' software driver to support all chromatography data systems
- Results can be exported as ASCII/CSV, to Microsoft Excel or OpenOffice
- Screen views can be exported to the Windows 'clipboard' or as Windows Enhanced Metafiles (WMF)
- Built in Merge Expert™ for DHA 'front end' correction of crude oil samples
- 'Intelligent' adjustment of the peak/elution detection algorithm; it 'learns' based on user defined elution marks
- Sample blending simulation model including aromatics and saturates analysis (ASA)
- Method configuration now includes detailed information about the scope of the method, chromatographic conditions and recommended standards and consumables
- **AND SO MUCH MORE……**



D2887 retention time calibration chromatogram, BP curve, and BP table including peak automatic skewness fit



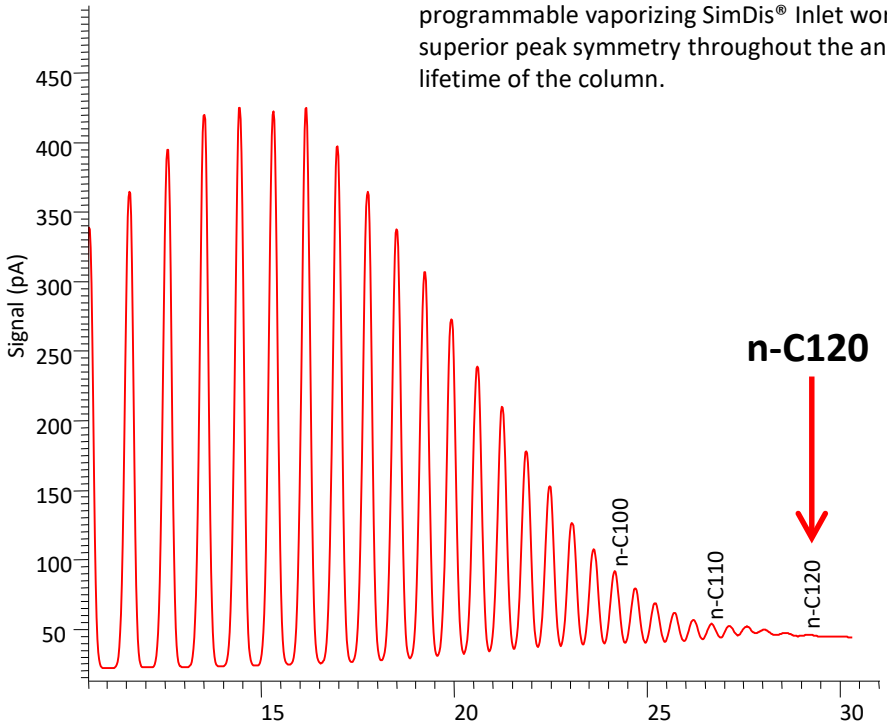


The boiling point curve for crude oil produced by high temperature simulated distillation can be 'corrected' through the use of the included Merge Expert™ software to process boiling point data produced by a GC running a detailed hydrocarbon analysis (DHA) test method (ex. ASTM D6729, D6730, D7900)

Meeting the Challenge of High Temperature Simulated Distillation

SimDis® Inlet

The design geometry and glass liner of our patented temperature programmable vaporizing SimDis® Inlet work together to provide superior peak symmetry throughout the analysis and extend the lifetime of the column.



Consumables for Simulated Distillation Analysis

All of the consumable products we offer are designed or selected to ensure your ability to achieve superior simulated distillation results is as simple and straightforward as possible. All of the calibration standards we offer are produced and tested by us in house.

Calibration and Response Factor Standards, Reference Materials

Test Method	Description	Part Number
D3710/D7096	Retention time standard; 6 X 1 mL ampoules	SD-008
D3710/D7096	Response factor standard; 6 X 1 mL ampoules	SD-007
D2887	Retention time standard; 0.1 - 1% C5-C44 in carbon disulfide; 6 X 1 mL ampoules	SD-SS3E-01
D2887	Retention time & response factor standard; 0.01 – 0.1% C5-C44 in carbon disulfide; 6 X 1 mL ampoules	SD-SS3E-02
D2887	Retention time standard; 0.02-0.2% C5-C44 as well as trace n-C3, n-C4, and i-C4 in carbon disulfide; 6 X 1 mL ampoules	SD-SS3E-02-2X-WG
D7213	Retention time standard; C5-C72 with C12 and C40 markers; Polywax 500 6 X 1 mL	SD-SS3E-03
D7169, D6352	Retention time standard; C5-C26 Polywax 655; 10:1 carbon disulfide; 6 X 1 mL ampoules	SD-SS3E-05
D7169, D6352	Response factor standard; C10 - C50; 6 X 1 mL ampoules	SD-SS3E-05Q
D6352	Retention time standard for D6352; C10-26 Polywax 655; 6 X 1 mL ampoules	SD-SS3E-06
D2887	Reference gas oil Lot #2; 25 mL bottle	SD-016-02
D2887	Reference gas oil Lot #2; 5 mL bottle	SD-016-05
D7169, D6352	Reference material 5010; 25 mL bottle	SD-020-01C
D7169, D6352	Reference material 5010; 5 mL bottle	SD-020-02

Columns, Septa, Inlet Liners, Ferrules, Gas Filters

Test Method	Description	Part Number
D3710, D2887	Column; packed (Procedure A)	SD-001
D7096	Column; wide bore capillary	SD-003
D2887	Column; wide bore capillary for ASTM D2887 (Procedure A); 10M	SD-002-2
D2887	Column; wide bore capillary for ASTM D2887 (Procedure B); 5M	SD-002-5M
D7169, D6352	Column; metal clad wide bore capillary for ASTM D7169, D7213; 5M X 0.53 X 0.1µ	SD-002HTE2
All except D3710, D7096	Septa; for use with SimDis® Inlet with D7169, D6352; 25 pieces/package	SS-031-00
All except D3710, D7096	Septa; for use with SimDis® Inlet with D2887; 25 pieces/package	SS-031-00CONV
All except D3710, D7096	Ferrules; SimDis® Inlet; 10 pieces/package	SS-030-20
All except D3710, D7096	Ferrules; for high temperature methods (D7169, D6352) detector side; 10 pieces/package	SS-030-20D
All except D3710, D7096	Inlet liners; SimDis® Inlet; 5 pieces/package	SS-035-00
All except D3710, D7096	Inlet liners; SimDis® Inlet for fast analysis; 5 pieces/package	SD-035-00.1
All	Gas filter; hydrocarbon trap for carrier gas	SS-350-001
All	Gas filter; oxygen indicating moisture trap	SS-350-005

Please call 1-800-340-4402 for pricing, availability or to order.

Your **One Source** for
Simulated Distillation

www.separationsystems.com

About Us

We are a minority owned business located in Gulf Breeze, Florida. We offer GC and GC-MS based analysis systems, application software, consumables, support and training for petroleum refining, bio-fuels and petrochemical applications. Our systems are comprehensive in nature and include a GC or GC-MS, our own specialized hardware and software, reference & calibration standards, consumables, training and support.

While the majority of our systems are designed to meet the international standard testing method requirements (ex. ASTM, EN, ISO), we also design systems for special requirements including custom software.

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