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eraspec

PROFESSIONAL FTIR FUEL ANALYSIS

Full automation with autosampler option

Built-in high-precision D4052 density meter

NIR/PLS Module
Optional NIR/PLS extension for next level RON & MON testing

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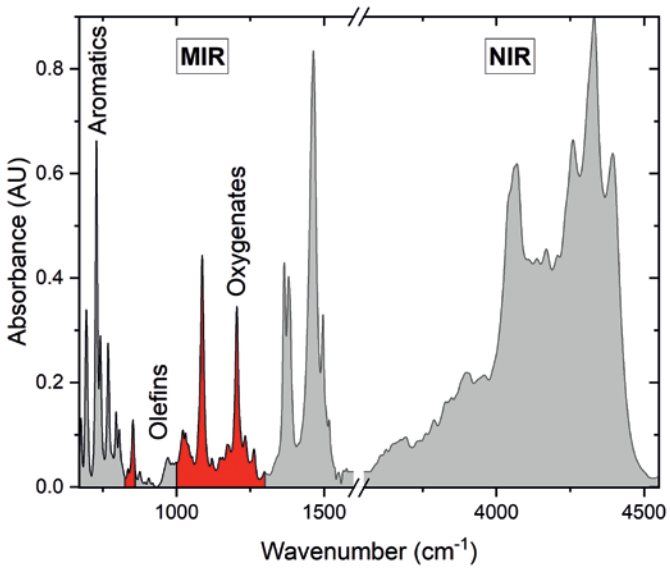
eraspec – High-end FTIR fuel analysis in seconds

Comprehensive Multi-Fuel FTIR Analysis in Seconds

era**spec** is your fuel analyzer of choice, independent of the fuel type analyzed. With its modular design the analysis of gasoline, diesel fuel or jet fuel becomes simple routine. Specialized modules cover benzene and FAME detection according to EN 238 and EN 14078. Advanced modules for measurement of fuel ethanol, fuel methanol and synthetic fuels are available.

era**spec** directly derives the concentrations of all relevant fuel components and immediately displays the results. They include oxygenates such as ethanol or MTBE according to ASTM D5845, aromatics such as benzene (ASTM D6277) or toluene, and FAME (ASTM D7806, EN 14078) in diesel fuel. Additionally, era**spec** uses chemometric models to evaluate the spectrum for significant parameters such as RON, MON, DVPE, cetane number, distillation and evaporation fractions without needing complex and time-consuming methods.



Unique Fourfold Cell Design

The measurement of different fuels implicates different requirements for the analyzer. era**spec** was launched with the leading-edge triple cell design which is now the standard for all era**spec** analyzers making future instrument upgrades extremely easy. This innovation uses a 20 µm cell to measure gasoline and a 100 µm cell to measure diesel and jet fuel. With the third cell era**spec** automatically performs a reagent free reference measurement whenever needed.

For special applications era**spec** is also available with **era**lytics unique fourfold cell design. Examples include high precision testing of FAME and cetane improvers as well as the up-grade of era**spec** with the innovative NIR/PLS module. This module extends the spectral range to the NIR range (4000-4500 cm^{-1}) by a measurement through a fourth 500 µm measuring cell. This allows for the exploitation of additional valuable information about the backbone of fuels leading to a factor of 2 better precision for octane numbers RON & MON.

NIR/PLS Module

This module extends the spectral range of era**spec** to the near infrared (NIR) range (4000–4500 cm^{-1}) by taking an additional measurement through a 500 µm measuring cell.
In this range, so-called combination bands show absorption, enabling the distribution of alkanes to be determined which significantly influence important fuel properties. Combining this NIR information with MIR data on aromatics, oxygenates and olefins within **era**lytics innovative PLS model improves the precision for RON and MON by a factor of 2.

Expandable SGS® Fuel Library

Each era**spec** comes with an international factory library using more than 1.000 fuel samples from 89 countries from the SGS® WORLDWIDE FUEL SURVEY. All fuel samples were analyzed at SGS® Germany based on primary measuring methods for fuel properties like Research Octane Number (RON) and Motor Octane Number (MON).
Based on several thousand era**spec** installations **era**lytics also offers customized libraries of international fuel calibration samples. New customer samples can easily be added to the library directly on the analyzer via its large touchscreen.

D4052 Density Measurement

era**spec** is available with two versions of **era**lytics' state-of-the-art temperature controlled U-tube density meter module (patented). The standard module DENS7777 measures according to ASTM D7777 (r = 0.0005 g/cm^3). The high end module DENS4052 offers measurements in full compliance with ASTM D4052 (r = 0.0001 g/cm^3).

Applications

era**spec**'s applications range from routine analysis at pipeline terminals, refineries and blending stations to high-tech fuel analysis at engine manufacturers. It is also frequently used by governmental bodies in mobile laboratories to test fuel quality right at the gas stations, fighting fuel adulteration fraud.

Fuel Modules

- **Gasoline module** (ASTM D5845, D6277)
- **EU Benzene module** (EN 238)
- **Diesel fuel module** (ASTM D7806)
- **EU FAME module** (EN 14078)
- **NIR/PLS module**
- **Jet fuel module**
- **Fuel ethanol module**
- **Fuel methanol module**
- **Synfuel module**
- **Automatic fuel recognition module**

Built-in Temperature Controlled Density Meter
Standard density module (ASTM D7777)
High precision density module (ASTM D4052)

Autosampler

Directly attached optional 10-position autosampler

Gasoline Module

PROPERTIES[1]	RANGE
Research Octane Number (RON)	70 – 110
Motor Octane Number (MON)	60 – 105
Anti Knock Index (AKI)	65 – 107
RVP & DVPE	35 – 105 kPa
Distillation Fractions	IBP, T10, T50, T90, FBP
Evaporation Fractions	E70, E100, E150 (°C) E200, E300 (°F)
Density (built-in U-tube cell)	0 – 3 g/cm^3
Driveability Index, VOC Emissions Calculator, Vapor Lock Index (VLI), User Definable Parameters	

AROMATICS[2]	RANGE
Benzene	0 – 10 Vol%
Toluene	0 – 20 Vol%
o-, m-, p-Xylene	0 – 20 Vol%
Ethylbenzene	0 – 20 Vol%
Propylbenzene	0 – 20 Vol%
2-Ethyltoluene	0 – 20 Vol%
3-Ethyltoluene	0 – 20 Vol%
4-Ethyltoluene	0 – 20 Vol%
Pseudocumene	0 – 20 Vol%
Hemellitol	0 – 20 Vol%
Mesitylene	0 – 20 Vol%
Iso-Durene	0 – 20 Vol%
Durene	0 – 20 Vol%
Naphthalene	0 – 10 Vol%

ANILINES[2]	RANGE
Aniline	0 – 15 Vol%
N-Methylaniline	0 – 15 Vol%
o-Methoxyaniline	0 – 20 Vol%
o-, m-, p-Toluidine	0 – 20 Vol%
N,N-Dimethylaniline	0 – 20 Vol%

SUM PARAMETERS	RANGE
Aromatics[1]	0 – 80 Vol%
Olefins[1]	0 – 80 Vol%
Di-Olefins[2]	0 – 20 Vol%
Oxygenates[2]	0 – 80 Vol%
Oxygen[2]	0 – 12 wt%
Anilines[2]	0 – 25 Vol%
Esters[2]	0 – 30 Vol%
Saturates	0 – 100 Vol%

OXYGENATES[2]	RANGE
MTBE	0 – 20 Vol%
ETBE	0 – 25 Vol%
TAME	0 – 25 Vol%
DIPE	0 – 20 Vol%
Dimethoxymethane (DMM)	0 – 20 Vol%
Methanol	0 – 15 Vol%
Ethanol	0 – 100 Vol%
Iso-Propanol	0 – 20 Vol%
1-Butanol	0 – 100 Vol%
2-Butanol	0 – 25 Vol%
Isobutanol	0 – 100 Vol%
tert-Butanol	0 – 25 Vol%
tert-Amylalcohol	0 – 20 Vol%
Dimethylcarbonate (DMC)	0 – 15 Vol%
Methylacetate	0 – 15 Vol%
Ethylacetate	0 – 15 Vol%
Isobutylacetate	0 – 15 Vol%
Sec-Butylacetate	0 – 15 Vol%

OTHER SUBSTANCES[2]	RANGE
MMT / CMT	0 – 10 000 mg/L
Manganese	0 – 2 500 mg/L
Dicyclopentadiene (DCPD)	0 – 15 Vol%
Cyclohexane	0 – 100 Vol%
Nitromethane	0 – 10 Vol%

Diesel Fuel Module

PROPERTIES[1]	RANGE
Cetane Number	20 – 80
Cetane Index	20 – 80
Distillation Fractions	IBP, T10, T50, T65, T85, T90, T95, FBP
Evaporation Fractions	E250, E350 (°C)
CFPP	-50 – +20 °C
Viscosity at 40 °C	0 – 10 mm^2/s
Density (built-in U-tube cell)	0 – 3 g/cm^3

PARAMETERS	RANGE
Total Aromatics[1]	0 – 80 Vol%
Polynuclear Aromatics (PNA)[1]	0 – 80 Vol%
Benzene[2]	0 – 5 Vol%
Cetane Improver (2-EHN, IPN)[2]	0 – 20 000 mg/L
Dimethoxymethane[2]	0 – 20 Vol%
FAME[2] / FAEE[2]	0 – 100 Vol%
Vegetable Oil[2]	0 – 65 Vol%

Jet Fuel Module

PROPERTIES[1]	RANGE
Freezing Point	-80 – -20 °C
Flash Point	+25 – +100 °C
Smoke Point	0 – 1000 mm
Viscosity at 20 °C	1.2 – 2.1 mPas
Viscosity at -20 °C	0 – 10 mPas
Distillation Fractions	IBP, T10, T50, T65, T85, T90, T95, FBP
MSEP	50 – 100 Vol%
Density (built-in U-tube cell)	0 – 3 g/cm^3

PARAMETERS	RANGE
Total Aromatics[1]	0 – 80 Vol%
FAME Concentration[2]	0.1 – 6 Vol%
Polynuclear Aromatics (PNA)[1]	0 – 10 Vol%

Fuel Ethanol Module

PARAMETERS	RANGE
Ethanol	0 – 100 Vol%
Water	0 – 2 Vol%
Methanol	0 – 15 Vol%
Denaturant	0 – 100 Vol%
Density (built-in U-tube cell)	0 – 3 g/cm^3

Fuel Methanol Module

PARAMETERS	RANGE
Methanol	0 – 100 Vol%
Density (built-in U-tube cell)	0 – 3 g/cm^3

Auto Fuel Recognition

era**spec** automatically detects the fuel type of the sample and performs the corresponding analysis.

Easy addition of unlimited user-defined properties.

1 ... The range and repeatability for all correlated properties depend on the used database.

2 ... Lowest concentrations correspond to the limit of detection (LOD).

Technical Specifications of eraspec

Available Test Methods	ASTM D5845, D6277, D4052/D7777, D7806, D8321, D8340, E1655; EN 238, EN 14078; ISO 12185, ISO 15212; IP 365, IP 559;
Correlation to	ASTM D56, D86, D323, D445, D613, D976, D1319, D1322, D1840, D2386, D2699, D2700, D3828, D4814, D4815, D5191, D5769, D6371, D6379, D6378, D6890, D7153, D7371, D7668, D8183; EN 116, EN 13016; ISO 3104, ISO 3405, ISO 5163, ISO 5164, ISO 5165
Spectrometer Type	Patented mid-FTIR interferometer Laser and temperature controlled design
Measurement Cell	20 µm and/or 100 µm path length cell, reference cell Optimized triple position cell design incl. fully automated reference meaurement Optional fourfold cell for special applications (e.g. 500 µm)
Calibration	Factory calibrated with a matrix of several hundred international fuels
Spectral Libraries	Easy addition, expansion and exchange of individual fuel libraries On the fly recalculation of libraries without delaying any measurements
Density Meter (0-3 g/cm³) Temp. controlled oscillating U-tube	Standard density module (r = 0.0005 g/cm³; ASTM D7777) High precision density module (r = 0.0001 g/cm³; ASTM D4052)
Measurement Time	60 seconds, includes fully automated rinsing, filling and measurement (DENS7777) Warm-up time 30 seconds
Sample Introduction	Directly from the sample container by an integrated pump
Sample Volume	10-15 mL
Cleaning	Automatic rinsing with next sample or solvent Flow cell protection by an integrated filter
Display of Fuel Spectra	Direct comparison of spectra on the color touchscreen Overlay of fuel spectra with spectra of pure substances
Interfaces	Built-in PC with Ethernet, 5x USB-A, 1x USB-B, and RS232 interfaces; Wifi via USB dongle Direct LIMS connectivity via LAN and output to printer or PC Optional input by keyboard, mouse and barcode reader
Display	Industry proven multilingual color touchscreen
Remote Control	Remote service capability via Ethernet inferface
PC Software	era**soft RCS** – remote control Windows® software for multi-instrument remote control, convenient data transfer, viewing spectra and result analysis
Result Database	50 000+ detailed test reports and spectra storable in internal memory
Alarm Tracking	All alarm messages are stored in the database together with the results
Power Requirements	Auto-switching 85 – 264 V AC, 47 – 63 Hz, max. 150 W (multi-voltage power supply) Field application: 12 V DC (vehicle battery) adapter available
Dimensions / Weight (W x D x H)	29.1 x 32.9 x 34.8 cm (11.5 x 12.9 x 13.7 in) / 11.3 kg (24.9 lb)

Due to continuing product development, specifications are subject to change.
All **era**lytics products are manufactured under ISO 9001 regulations and are CE, ROHS and UL/CSA compliant. **www.eralytics.com/eraspec**

eralytics instruments are available worldwide.
An international network of over 50 authorized and well-trained distributors is ready to answer your inquiries and to offer local support and service.
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