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eraspec

# SPECTRAL FUEL ANALYSIS IN SECONDS

Standards
ASTM D5845, D6277, D7777, D7806,
EN 238, EN 14078, ISO 15212, IP 559

Fuel types
Gasoline, diesel fuel, jet fuel,
fuel ethanol, fuel methanol, ...


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# eraspec – portable high precision fuel analysis

## Comprehensive Multi Fuel FTIR Analysis

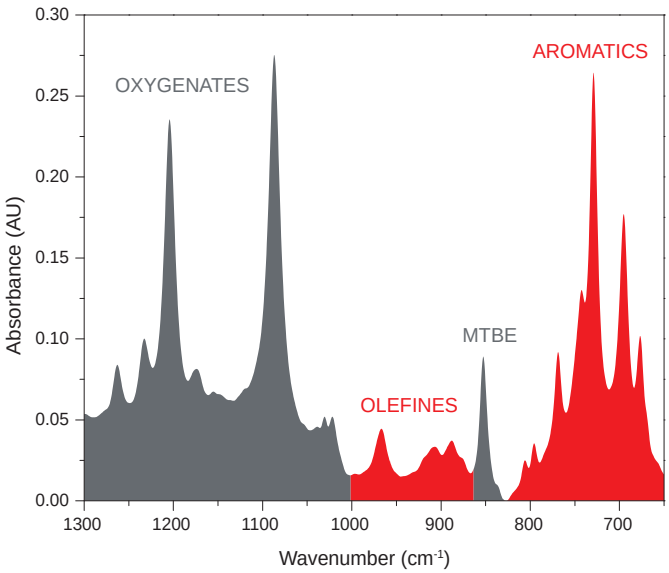
**ERASPEC** is your fuel analyzer of choice, independent of the fuel type analyzed. With its modular design the analysis of gasoline, diesel fuel or jet fuel become simple routine. Specialized modules cover benzene and FAME detection according to EN 238 and EN 14078. **ERASPEC** also measures ethanol, methanol and synthetic fuels. Product development keeps adding new modules for upcoming measurement needs and continuously enhances existing features.

## Laboratory-grade Portable Rugged Design

**ERASPEC** is a patented, rugged FTIR fuel analyzer. It is a stand-alone instrument that can be operated in the lab, in mobile laboratories and in the field. The patented interferometer and a spectral resolution tailored to the task lead to an exceptionally low noise level and deliver results known only from bench-top FTIR systems.

## Unique Triple-cell Design

The measurement of different fuels implicates different requirements for the analyzer. Therefore, eralytics launched **ERASPEC** in 2008 with a leading-edge triple-cell design. This innovation by eralytics uses a 20 µm cell to measure gasoline and a 100 µm cell to measure diesel and jet fuel. With the third cell **ERASPEC** automatically performs a reagent free reference measurement whenever needed. **ERASPEC** can also use both cells for a measurement if the specific application so requires. For example, **ERASPEC** can use the 100 µm cell to lower its detection limit for contaminants in gasoline such as acetates or anilines. Other path lengths for specialized fuel modules can be installed if needed.



# Fingerprint your Fuel in Seconds

**ERASPEC** measures a mid-infrared (mid-IR) spectrum of your fuel in less than one minute. It 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, octane boosters such as MMT or DCPD for gasoline measurements or FAME (ASTM D7806, EN 14078) in diesel fuel. Knowing the exact fuel composition makes calculating complex fuel parameters possible without needing complex and time consuming methods. **ERASPEC** uses chemometrical models to evaluate the spectrum for significant parameters such as RON, MON, DVPE, cetane number, distillation and evaporation fractions. The built-in U-tube density meter, measuring according to ASTM D7777 and ISO 15212, tops off **ERASPEC**'s measurement capabilities.

# Huge Expandable Database

With eralytics' experience and its customer base of several thousand **ERASPEC** installations around the world we can offer a huge database of international fuel calibration samples with known parameters. It is key to accurate, reliable results of calculated parameters such as RON and MON. **ERASPEC** learns new samples at the push of a button. In a simple process it is even possible to train **ERASPEC** completely new parameters. The added information is immediately available for the next measurement.

# Applications

**ERASPEC**'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)
  Contamination module
  MMT/CMT module
  Synfuel module
- **Diesel fuel module** (ASTM D7806)
  EU FAME module (EN 14078)
  2EHN module
- **Jet fuel module**
- **Fuel ethanol module**
- **Fuel methanol module**
- **Automatic fuel recognition module**

**Built in density meter** (ASTM D7777, ISO 15212)

## 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 – 100 kPa |
| Distillation Fractions | IBP, T10, T50, T90, FBP |
| Evaporation Fractions | E70, E100, E150 (°C)<br>E200, E300 (°F) |
| Density (built-in U-tube cell) | 0 – 3 $gcm^{-3}$ |
| Driveability Index, VOC Emissions Calculator, Vapor Lock Index (VLI) | |

| SUM PARAMETERS | RANGE |
|---|---|
| Aromatics[1] | 0 – 60 Vol% |
| Olefins[1] | 0 – 80 Vol% |
| Di-Olefins[2] | 0 – 15 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% |

| 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% |

| 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 – 25 Vol% |
| Iso-Propanol | 0 – 20 Vol% |
| 2-Butanol | 0 – 25 Vol% |
| tert-Butanol | 0 – 25 Vol% |
| Dimethylcarbonate (DMC) | 0 – 15 Vol% |
| Methylacetate | 0 – 15 Vol% |
| Ethylacetate | 0 – 15 Vol% |
| Isobutylacetate | 0 – 15 Vol% |
| Sec-Butylacetate | 0 – 15 Vol% |

| OCTANE BOOSTERS[2] | RANGE |
|---|---|
| MMT | 0 – 10 000 mg/L |
| CMT | 0 – 10 000 mg/L |
| Manganese | 0 – 2 500 mg/L |
| Dicyclopentadiene (DCPD) | 0 – 15 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 $gcm^{-3}$ |

| PARAMETERS | RANGE |
|---|---|
| Total Aromatics[1] | 0 – 60 Vol% |
| Polynuclear Aromatics (PNA)[1] | 0 – 50 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 – -25 °C |
| Flash Point | +25 – +65 °C |
| Smoke Point | 19 – 29 mm |
| Viscosity at 20 °C | 1.2 – 2.1 mPas |
| Viscosity at -20 °C | 2.4 – 4.5 mPas |
| Distillation Fractions | IBP, T10, T50, T65, T85, T90, T95, FBP |
| Density (built-in U-tube cell) | 0 – 3 $gcm^{-3}$ |

| PARAMETERS | RANGE |
|---|---|
| Total Aromatics[1] | 0 – 60 Vol% |
| FAME Concentration[2] | 0 – 6 Vol% |
| Polynuclear Aromatics (PNA)[1] | 0 – 10 Vol% |

## Fuel Ethanol Module

| PARAMETERS[2] | RANGE |
|---|---|
| Ethanol | 0 – 100 Vol% |
| Water | 0 – 2 Vol% |
| Methanol | 0 – 15 Vol% |
| Denaturant | 0 – 75 Vol% |
| Density (built-in U-tube cell) | 0 – 3 $gcm^{-3}$ |

## Fuel Methanol Module

| PARAMETERS[2] | RANGE |
|---|---|
| Methanol | 0 – 100 Vol% |
| Density (built-in U-tube cell) | 0 – 3 $gcm^{-3}$ |

## Auto Fuel Recognition

**ERASPEC** 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), all concentrations in Vol% and Mass%.

# Technical Specifications of eraspec

| | |
|---|---|
| Available Test Methods | ASTM D5845, D6277, D7777, D7806; EN 238, EN 14078; ISO 15212; IP 559 |
| Correlation to | ASTM D56, D86, D323, D445, D613, D976, D1319, D1322, D1840, D2386, D2699, D2700, D3828, D4814, D5191, D6371, D6379, D6378, D7153; EN116, EN 13016;<br>ISO 3104, 3405, ISO 5163, ISO 5164, ISO 5165 |
| Spectrometer Type | Patented mid-FTIR interferometer<br>Laser and temperature controlled design |
| Measurement Cell | 20 µm and/or 100 µm path length cell, reference cell<br>Optimized dual or triple position cell design for gasoline, diesel and jet fuel measurements |
| Calibration | Factory calibrated with a matrix of several hundred international fuels |
| Spectral Libraries | Easy addition, expansion and exchange of individual fuel libraries<br>On the fly recalculation of libraries without delaying any measurements |
| Density Meter | 0 – 3 $gcm^{-3}$ (r = 0.0005 $gcm^{-3}$)<br>Oscillating U-tube cell |
| Measurement Time | 60 seconds, includes sample introduction, measurement and calculations<br>Warm-up time 30 seconds |
| Sample Introduction | Directly from the sample container by an integrated pump |
| Sample Volume | 10 mL |
| Cleaning | Automatic rinsing with next sample or solvent<br>Flow cell protection by an integrated filter |
| Display of Fuel Spectra | Direct comparison of spectra on the color touchscreen<br>Overlay of fuel spectra with spectra of pure substances |
| Display | Industry proven 7" color touchscreen |
| Interfaces | Built-in PC with Ethernet, USB, and RS232 interfaces<br>Direct LIMS connectivity via LAN and output to printer or PC<br>Optional input by external keyboard, mouse, and barcode reader |
| Remote Control | Remote service capability via Ethernet inferface |
| PC Software | ERASOFT 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)<br>Field application: 12 V DC (vehicle battery) adapter available |
| Dimensions / Weight | 29 x 35 x 34 cm (11.4 x 13.8 x 13.4 in) / 9.7 kg (21.4 lb) |

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

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