

### Ethanol in Gasoline and Water in Ethanol or Methanol

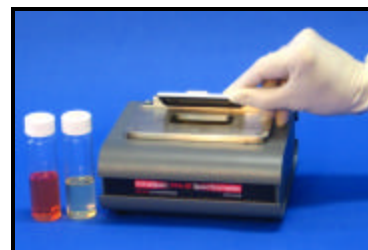
#### Introduction:

Wilks Enterprise, Inc. has two portable, easy-to use mid-infrared (IR) analyzers for ethanol in gasoline or water in ethanol or methanol measurements to be used by producers, distributors, fleet managers, or regulators. They are rugged, compact, portable and easy to use for non-technical personnel. They give a direct readout in percent ethanol or percent water allowing the user the capability to make measurements on site at a manufacturing facility, distribution center or service station in less than a minute. Each weighs less than 5 lbs. and can be operated from a battery pack or a cigarette lighter adapter cable.



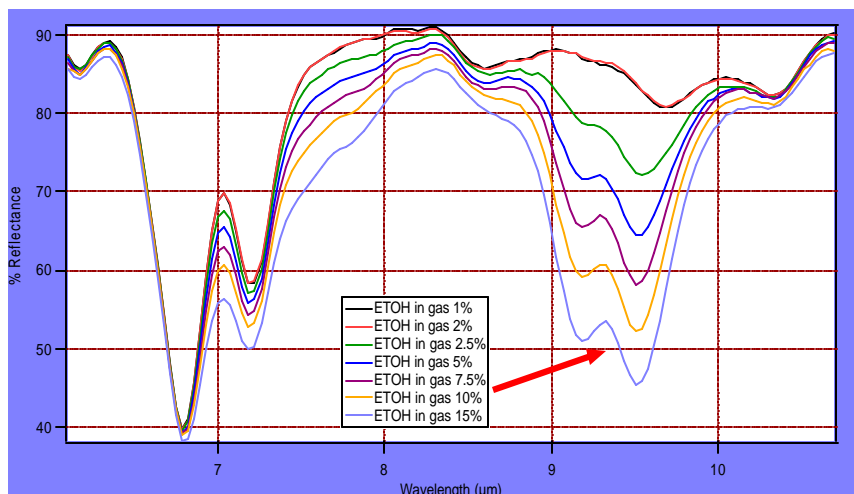
The **InfraCal Filtometer** is a low-cost analyzer preset for a specified wavelength suited for a particular measurement such as % ethanol in gasoline or water in ethanol/methanol. The InfraCal Filtometer is self contained with an internal calibration program and direct readout display. An RS 232 interface is available for data transmission to a PC. The InfraCal Filtometer is ideal where a single, repetitive analysis is needed.

The **InfraSpec VFA-IR Spectrometer** contains a linear variable filter and a 128 pixel detector array covering a wavelength range of 5.4-10.8  $\mu\text{m}$  ( $1850\text{-}925\text{ cm}^{-1}$ ). The capability to measure more than one wavelength allows for multiple analyses with one instrument, ie: ethanol in gasoline, water in ethanol/methanol as well as % biodiesel in diesel and total glycerides during the biodiesel reaction process. It is operated from a PC allowing for multiple calibrations, data storage and data transmission.



#### Analysis:

The InfraCal Filtometer and the InfraSpec VFA-IR Spectrometer are filter based mid infrared analyzers. Ethanol and water have characteristic absorbances in the mid infrared range. The increase and decrease of infrared absorbance correlates directly to the amount of water or ethanol present in the sample. Ethanol can be measured independently from gasoline at  $9.6\ \mu\text{m}$  ( $1042\text{ cm}^{-1}$ ) and water can be measured independently from ethanol or methanol at  $6.06\ \mu\text{m}$  ( $1650\text{ cm}^{-1}$ ). Measurement ranges and accuracies are listed below



## Measurement Ranges and Repeatability

	Range	InfraCal Filtometer	InfraSpec VFA - IR Spectrometer
Ethanol in Gasoline	0.5-20%	+/- 0.14	+/- 0.14
Ethanol in Gasoline	65-98%	+/- 0.7	+/- 0.7
Water in Ethanol	0.9-10%	N/A	+/- 0.15
Water in Methanol	0.5-10%	N/A	+/-0.15

## InfraCal Filtometer Specifications:

InfraCal Ethanol Filtometer	Model HATR-T2E, part number 405-2019
Dimensions	6.5 x 6.5 x 5 in. (165 x 165 x 225 mm)
Weight	4.5 lbs (2.0 kg)
Display	4 digit, 7 segment red LED, 5/8" character height
Power Requirements	12V DC, 7.5 watts max
Power Supply	Universal AC/DC converter type (supplied as standard), optional 12 volt battery
Operating Temperature Range	4°C - 45°C
Humidity	0 – 98% relative humidity (non-condensing)
Communications Port	RS 232
Analytical Wavelength	6.06 $\mu\text{m}$ (1650 $\text{cm}^{-1}$ ) or 9.57 $\mu\text{m}$ (1045 $\text{cm}^{-1}$ )
ATR Crystal Material	Zinc Selenide

## InfraSpec Spectrometer Specifications:

InfraSpec VFA - IR Spectrometer	Model E, part number 405-1021-1013
Dimensions	6.0" x 6.5" x 2.75", 15.2 x 16.5 x 7 cm
Weight	3.5 lbs., 1.5 kg
P.C. Interface	RS 232, USB
Power Requirements	12V DC, 2.0 amps
Power Supply	Universal AC/DC converter type (supplied as standard)
Suggested Temperature Operating Range	15°C - 60°C
Humidity	0 – 98% relative humidity (non-condensing)
Detector Array	128 Pixel linear pyroelectric array
Array Responsivity	5.4-10 <sup>5</sup> V/W
Standard Spectral Range	5.4-10.8 $\mu\text{m}$ (1850 – 925 $\text{cm}^{-1}$ )
<b>For InfraSpec VFA - IR Spectrometer ATR Sample Plate</b>	
ATR Crystal Material	Zinc Selenide
ATR Surface Size	50 x 16 mm
# of Reflections	12
Resolution	25 $\text{cm}^{-1}$

## Wilks Enterprise, Inc.

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