

700 FTIR

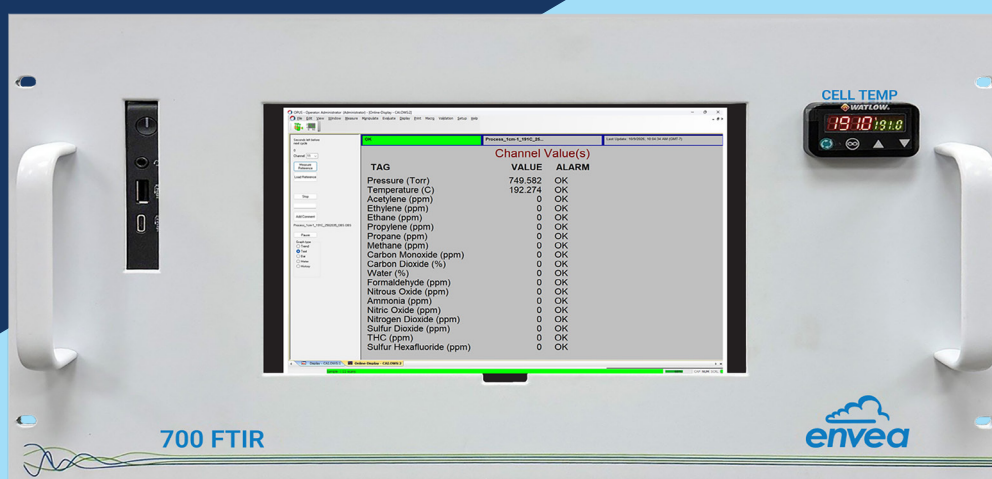
FOURIER TRANSFORM INFRARED ANALYZER



ENVEA offers a FTIR analyzer that delivers fast, accurate measurement of virtually any gas within an infrared absorption spectrum.

SPECIFIC FEATURES

- Fast and simultaneous measurements of up to 20 parameters
- Designed to measure wet and corrosive sample gases, including trace concentrations
- For hot/wet measurement of soluble gases such as HCl, HF, NH₃
- Excellent calibration stability
- Automatic correction of spectral interferences
- Unmatched accuracy and reliability
- Rugged & insensitive to vibrations
- Low maintenance required



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METHOD OF OPERATION

The 700 FTIR analyzer is based on Fourier Transform Infrared Spectroscopy. Non-symmetrical gas-phase molecules absorb IR light, causing the molecular bonds to stretch, bend or rotate. This absorption is used to measure and quantify several chemical components simultaneously.

An IR source emits radiation in the range of 7500 to 375 cm^{-1} . The IR radiation is split in a Michelson interferometer, where half of the light passes through to a fixed mirror and the other half is reflected toward a moving mirror. The two beams recombine and pass through a gas cell where the sample absorbs light at molecule specific frequencies. The remaining light is measured with a DTGS detector and Fourier transformed to convert from time domain to frequency domain. This transformation produces a single-beam spectrum ratioed with a baseline spectrum, and produces an absorbance spectrum. The absorbance spectrum is quantified with chemometrics to produce a concentration value.

CALIBRATION & SUPPORT

The 700 FTIR analyzer is custom-calibrated to meet each customer's specific application requirements. When they arrive at the customer site, they're ready for operation. All internal components are arranged for optimal performance and easy access for maintenance or service.

Our proprietary software program enables remote access by computer allowing immediate diagnosis and correction of any calibrations or other instrument performance issues.

APPLICATIONS

- Process control
- Stack gases (CEM/MACT)
- VOC abatement / scrubber efficiency
- Vehicle emissions
- Ammonia slip
- Gas purity
- Agricultural emissions
- Greenhouse gases
- Biomass / landfill gases
- Beverage CO_2 analysis
- Combustion efficiency monitoring
- DRE - Destruction/Reduction Efficiency performance monitoring
- Custom applications

SPECIFICATIONS

Analysis Method – Fourier Transform Infrared (FTIR)

Components – Multiple gases

Interferometer – Rocksolid™ permanent alignment, high stability with cube corner reflectors and non-wear bearing for long life

Detector Type – DTCS or MCT

Ranges – From ppb to percent

Response Time – From approximately 10 seconds to 5 minutes, depending upon sensitivity

Spectral Resolution – 0.8 cm^{-1} to 128 cm^{-1}

Spectral Range – 4300 - 750 cm^{-1}

Outputs Available – 4-20 mA, 0-10V, OPC, CSV

Control – PC, Windows 10 or higher

Sample Flow – Typically 0.2 to 5 lpm

Ambient Temperature – 5° to 40°C

Ambient Humidity – Less than 80% RH (non-condensing)

Power Requirements – 115/230 VAC (+/- 10%); 50/60 Hz

Pressure – Realtime pressure compensation

Gas Cell

Construction – 316 Stainless Steel (50°C or 191°C)

Mirrors (700 FTIR and 7000 FTIR) – Gold-plated SS 316

Windows – ZnSe standard, others available

O-rings – Parafluor

Inlet/Outlet Connections – $\frac{3}{8}$ ", $\frac{1}{4}$ ", (cell dependent)

Purge Fittings – $\frac{1}{4}$ " Swagelok® compression

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TECHNICAL SPECIFICATIONS

Feature	700 FTIR
Path Length	10.2m
Volume	550 cm ³
Dimensions (in.)	19W x 11H x 28D
Maximum Resolution	0.8 cm ⁻¹
Gas Cell Temperature	50°C or 191°C
Flow Rate Range	1 - 10+ lpm
Recommended Flow Range	3.5 lpm
Options	None
Best Fit	PPB to low % levels
Repeatability	Generally within 1% at 100 times LOD
Zero drift	± 1% of F.S.
Span drift	± 1% of F.S.
Linearity	10000 times LOD or better
Lower detectable limit	Low to mid level ppb
Response time	10 seconds
Interferometer resolution	0.8 cm ⁻¹
Measurement cell	316 SS
Power supply	115/230VAC, 50-60 Hz
Digital output	Modbus TCP/IP, 0-10 VDC, 4-20 mA
Weight	100 lbs. (46 Kg) approximate
Operating temperature	50°C or 191°C
Reference Laser	Diode
Source	Silicon Carbide

700 FTIR Temperature Controller Accessory provides up to 4 circuits for external heated lines and/or heated-jacket



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700 FTIR Symbol	191°C Name	Range	LOD (ppm)	700 FTIR Symbol	50°C Name	Range	LOD (ppm)
C ₂ H ₄ O	Acetaldehyde	1000ppm	0.4	C ₃ H ₈ O	2-Propanol	10ppm	0.04
CH ₃ COOH	Acetic Acid	100ppm	0.1	C ₂ H ₄ O	Acetaldehyde	100ppm	0.2
C ₂ H ₂	Acetylene	1000ppm	0.6	C ₃ H ₆ O	Acetone	100ppm	0.4
C ₃ H ₄ O	Acrolein	200ppm	0.7	C ₂ H ₂	Acetylene	10ppm	0.1
NH ₃	Ammonia	1000ppm	0.6	AMP	AminoMethylPropanol	10ppm	0.4
C ₄ H ₁₀	Butane	100ppm	1.6	NH ₃	Ammonia	500ppm	0.1
CO ₂	Carbon Dioxide	100%	0.3%	C ₆ H ₆	Benzene	10ppm	0.1
CO	Carbon Monoxide	2.5%	1%	C ₄ H ₆	Butadiene	15ppm	0.1
CHCl ₃	Chloroform	100ppm	0.1	CO ₂	Carbon Dioxide	100%	0.1%
C ₂ H ₆	Ethane	500ppm	1.1	CO	Carbon Monoxide	1000ppm	0.3
EtOH	Ethane	500ppm	1.1	CF ₄	Carbon Tetrafluoride	500ppm	0.2
C ₃ H ₆ O ₂	Ethyl Formate	500ppm	0.6	DCM	Dichloromethane	20ppm	0.1
C ₂ H ₄	Ethylene	100ppm	0.3	C ₂ H ₆	Ethane	500ppm	0.4
HCHO	Formaldehyde	100ppm	0.2	C ₂ H ₄	Ethylene	100ppm	0.2
CH ₂ O ₂	Formic Acid	100ppm	0.4	HCHO	Formaldehyde	10ppm	0.03
C ₆ H ₁₄	Hexane	100ppm	0.6	CH ₂ O ₂	Formic Acid	200ppm	0.1
HCl	Hydrogen Chloride	1000ppm	0.5	CCl ₃ F	Freon 11	10ppm	0.1
HCN	Hydrogen Cyanide	100ppm	0.5	CClF ₂ CCl ₂ F	Freon 113	10ppm	0.1
HF	Hydrogen Fluoride	30ppm	0.5	Blend	Freon 1120	10ppm	0.1
H ₂ S	Hydrogen Sulfide	5000ppm	10.0	CCl ₂ F ₂	Freon 12	10ppm	0.05
IPA	Isopropyl Alcohol	100ppm	0.4	C ₂ H ₂ F ₄	Freon 134a	15ppm	0.01
CH ₄	Methane	5000ppm	0.3	CF ₄	Freon 14	15ppm	0.01
CH ₃ OH	Methanol	50ppm	0.6	Blend	Freon 140a	10ppm	0.1
MEK	Methyl Ethyl Ketone	400ppm	3.4	Blend	Freon 141b	10ppm	0.1
C ₄ H ₁₀	n-Butane	100ppm	0.4	C ₃ F ₈	Freon 218	12ppm	0.02
C ₆ H ₁₄	n-Hexane	100ppm	0.4	CHClF ₂	Freon 22	10ppm	0.05
NO	Nitric Oxide	5000ppm	1.5	Blend	Freon 225	10ppm	0.1
NO ₂	Nitrogen Dioxide	1000ppm	1.0	CClF ₃	Freon-13	10ppm	0.04
N ₂ O	Nitrous Oxide	1000ppm	1.6	HCl	Hydrogen Chloride	10ppm	0.1
C ₅ H ₁₂	Pentane	100ppm	1.3	HCN	Hydrogen Cyanide	100ppm	0.2
C ₃ H ₈	Propane	1000ppm	1.3	HF	Hydrogen Fluoride	10ppm	0.1
C ₃ H ₆	Propylene	100ppm	0.6	CH ₄	Methane	300ppm	0.4
Styrene	Styrene	100ppm	0.5	CH ₃ OH	Methanol	100ppm	0.2
				MEK	Methyl Ethyl Ketone	10ppm	0.1
				CH ₂ Cl ₂	Methylene Chloride	25ppm	0.1
				MDEA	m-Methyldiethanolamine	2.5ppm	0.03
				MEA	Monoethanolamine	20ppm	0.2
				NO	Nitric Oxide	500ppm	0.3
				NO ₂	Nitrogen Dioxide	1000ppm	0.3
				NF ₃	Nitrogen Trifluoride	9ppm	0.01
				N ₂ O	Nitrous Oxide	50ppm	0.04
				PFBI	PFBI	10ppm	0.1
				PZ	Piperazine	5ppm	0.1
				C ₃ H ₈	Propane	10ppm	0.04
				C ₃ H ₆	Propene	10ppm	0.1
				C ₃ H ₆	Propylene	10ppm	0.1
				SO ₂	Sulfur Dioxide	1000ppm	0.2
				SF ₆	Sulfur Hexafluoride	10ppm	0.01
				C ₇ H ₈	Toluene	100ppm	0.4
				C ₂ H ₃ Cl	Vinyl Chloride	25ppm	0.05
				H ₂ O	Water	5%	0.01%
				C ₈ H ₁₀	Xylene	10ppm	0.1

Expressed in ppm or % when indicated. Other ranges available upon request.



700 FTIR HEATED SAMPLER



- Specifically designed for maintaining optimal sample handling on 700 FTIR analyzers
- Temperature control for oven, pump, internal heated sample line (up to 6 ft. between sampler and analyzer) and heated jacket
- Critical components heated to 191°C
- Single heated-head pump (5.0 lpm)
- T-handle heated filter on front panel for easy access and replacement
- Heavy-duty, high-temperature-resistant flow meter
- Calibration solenoid valves for zero, span and bias calibrations
- Remote / local calibration control
- Electrically actuated ball valve for switching between sampling and calibration modes
- Stainless steel tubing and ¼-inch SS bulkhead connections
- Digital I/O including temperature alarm outputs
- Optional remote control via Modbus TCP or external software
- 19-inch rack-mount, fan-cooled enclosure (17"W x 22"D x 8.5"H)

700 MULTI-POINT SAMPLER



- 4, 8, 12 or 16 sample points are available through solenoid valve switching
- 7" TFT LCD touch screen
- LCD displays active sample point with time-remaining countdown
- Selectable sample time and sample stream identification
- Remote control via digital inputs, Modbus TCP or CAI data logger

700 I/O MODULE



- Converts the digital signal from OPUS Software to either voltage (0 - 10 V) or current (4-20 mA)
- Adds Modbus TCP capability
- 16 analog outputs, 8 digital inputs, 8 digital outputs or 24 analog outputs

700 FTIR TEMPERATURE CONTROLLER



- Provides temperature control circuits for external heated sample line and filter