

# FI-RXF100-R-T

## FI-RXF100-R-T Dual-Channel, Dual-Compartment FTIR Spectrometer

A research FTIR system with two independent, equivalent sample compartments and automatic channel switching. Transmission, ATR, diffuse and specular reflectance stay set up in any combination, with a liquid-nitrogen-cooled MCT and a room-temperature DLaTGS detector — for test laboratories and in-situ catalyst work.

**Best for:** Test laboratories handling solids, liquids and gases side by side, and in-situ catalyst characterisation with cells that stay connected.



**2**

Sample compartments, auto-switched

**$\leq 0.4 \text{ cm}^{-1}$**

Spectral resolution

**$8000\text{--}350 \text{ cm}^{-1}$**

Spectral range

**MCT + DLaTGS**

Detectors

### Overview

A compact, light and flexible research FTIR system. Any combination of transmission, ATR, diffuse reflectance and specular reflectance can be set up at once, so accessories need not be swapped: it serves test laboratories measuring solids, liquids and gases, and research institutes characterising catalysts in situ.

Two independent, equivalent sample compartments are built in without enlarging the instrument, and automatic switching between the two channels greatly improves measurement throughput. A high-sensitivity liquid-nitrogen-cooled MCT detector and a room-temperature DLaTGS detector let each application be measured under optimal conditions.

### Features

- Two channels and two sample compartments, independent and equivalent in use
- Channels switched by the software, quickly and conveniently
- Scan speed selected by the software: six speeds from 2.5K to 60K
- Automatic Kubelka-Munk (K-M) transformation for easy comparison of diffuse reflectance spectra
- Fully automatic and continuous acquisition modes for online analysis and in-situ measurement
- Save or load background spectra at any time; the software shows how long a background remains valid
- Spacious, open sample compartments that accept large infrared accessories
- Large accessories stay installed, which keeps the optical alignment
- Moisture-resistant ZnSe beamsplitter reduces maintenance
- Cryogenic and room-temperature detectors complement each other for optimised detection
- Suited to catalyst characterisation: the gas, water and electrical connections of in-situ reaction cells can stay permanently in place
- ATR and other measurement modes run side by side, greatly improving test efficiency

## Specifications

| Spectrometer              |                                                                                                                                                                                                                                         |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Channels and compartments | Two channels and two sample compartments, switched fully automatically                                                                                                                                                                  |
| Spectral range            | 8000–350 cm <sup>-1</sup> / 5000–500 cm <sup>-1</sup>                                                                                                                                                                                   |
| Spectral resolution       | ≤ 0.4 cm <sup>-1</sup>                                                                                                                                                                                                                  |
| Wavenumber accuracy       | ≤ 0.005 cm <sup>-1</sup>                                                                                                                                                                                                                |
| Interferometer            | High-stability cube-corner interferometer, permanently aligned, service life over 10 years                                                                                                                                              |
| Beamsplitter              | Moisture-resistant ZnSe for the mid-infrared; standard KBr also available                                                                                                                                                               |
| Detectors                 | 1. High-sensitivity liquid-nitrogen-cooled MCT with built-in ADC, liquid-nitrogen hold time up to 10 hours, front panel protected against freeze cracking as standard. 2. Moisture-resistant, high-sensitivity DLaTGS with built-in ADC |
| IR source                 | Long-life mid-infrared ceramic source, operating temperature 1550 K                                                                                                                                                                     |
| Dimensions                | 750 × 515 × 223 mm                                                                                                                                                                                                                      |

| Measurement and software |                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Measurement technique    | Dual-channel measurement. The independent, equivalent compartments take any combination of transmission, ATR, diffuse and specular reflectance without frequent accessory changes, for solids, liquids and gases and for in-situ characterisation                                                                                                                      |
| Software                 | Windows 10 processing software: infrared measurement, spectral pre-processing, fast spectral comparison, standard peak search, user-built reference libraries, quantitative analysis, automatic subtraction of diamond and CO <sub>2</sub> bands, intelligent peak identification with alarm, one-click measure-and-evaluate, automatic report generation and printing |
| Channel and scan control | Automatic channel switching; fast scan speeds of 20K, 40K and 60K; automatic K-M transformation for diffuse reflectance                                                                                                                                                                                                                                                |
| Acquisition              | Fully automatic and continuous acquisition for online analysis and in-situ measurement                                                                                                                                                                                                                                                                                 |
| Libraries                | Infrared spectral libraries configured to the application                                                                                                                                                                                                                                                                                                              |

## Applications

- In-situ characterisation of catalysts by diffuse reflectance and transmission
- Solids, liquids and gases in test laboratories
- Online analysis and in-situ measurement with fully automatic and continuous acquisition

## Catalyst characterisation

FTIR is increasingly valued in catalysis research. Characterising catalysts by infrared is simple and fast and uses practically no consumables apart from liquid nitrogen, and the methods are mature and widely accepted.

The two main infrared methods for catalysts are in-situ diffuse reflectance (DRIFTS) and in-situ transmission. Between them they provide:

- Reaction kinetics of the catalyst
- Online study of catalytic performance at high temperature, high pressure or high vacuum
- Reaction mechanisms and reaction pathways
- Adsorption sites and adsorption behaviour of the catalyst surface, from adsorption and desorption of probe gas molecules at different temperatures

- Acidity and basicity of the catalyst
- Experimental data for developing new catalysts
- Composition and structural analysis of catalyst samples

## Multi-task testing

Test laboratories receive all kinds of requests — solids, liquids and gases, transmission or ATR — and swapping sampling accessories between them is slow and error-prone. The FI-RXF100-R-T keeps the accessories you need permanently installed and switches the beam path automatically, accurately and efficiently. Set-ups include:

- Heatable in-situ transmission cell
- High-temperature / vacuum in-situ diffuse reflectance cell
- High-temperature / high-pressure in-situ diffuse reflectance cell
- Low-temperature / vacuum in-situ diffuse reflectance cell
- Absolute transmittance of materials (collimated incidence)
- Diffuse transmittance (integrating-sphere accessory)
- Reflectance at 10°, 30°, 45° and 80°, and variable-angle accessories
- ATR with diamond, ZnSe or Ge crystals
- Routine transmission of solids, liquids and gases

## Other hosts for in-situ catalysis

The FI-RXF100-R and the FI-RXF200 are also high-sensitivity hosts for in-situ catalyst characterisation.

## Figures



*In-situ diffuse reflectance and in-situ transmission on different catalysts at a research institute.*



*An FI-RXF100-R with an in-situ diffuse reflectance cell, cooling-water circulation and a high-precision temperature controller, in a university laboratory.*

### **Request a quotation**

Tell us what you measure and we will configure the FI-RXF100-R-T — sampling accessories, detector and libraries — for it.

**info@precisometer.com** · [www.precisometer.com/spectroscopy/ftir/fi-rxf100-r-t](http://www.precisometer.com/spectroscopy/ftir/fi-rxf100-r-t)