**Fourier Transform Infrared (FTIR) Spectrometer**

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| A white machine with a green handle  AI-generated content may be incorrect. | **Name of the equipment:** Fourier Transform Infrared Spectrometer**Make & Model:**Perkin Elmer Spectrum 2**I-Stem Registration ID-** …………………………**Category of Instrument**Analytical Chemistry**Types of Analysis / Testing*** Material Identification
* Functional Group Analysis
* Quantitative and Qualitative Chemical Characterisation

**Application:** * Pollutant Analysis
* Polymer Degradation Studies
* Soil and Water Quality Assessment
* Pharmaceutical and industrial Quality Control

**Description of Instrument**A Fourier Transform Infrared Spectrometer for rapid, non-destructive chemical analysis of solids, liquids, and gases. |

**Booking Details**

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| **Book through I-STEM:** <https://www.istem.gov.in/>**Slot Booking Link**[I-STEM Slot Booking link for External User](https://www.istem.gov.in) | **Booking available for**Internal and External Both**Requisition form for** [Internals](https://randc.nitc.ac.in/pdf/instruments/civil/CED-REQUISITION_FORM_Internal.pdf)[Externals](https://randc.nitc.ac.in/pdf/instruments/civil/CED-REQUISITION_FORM_Internal.pdf) |

**Contact Details**

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**Features, Working Principle and Specifications**

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| **Features of the equipment*** High-sensitivity DLATGS (deuterated L-Alanine doped triglycin Sulfate) detector for accurate spectral data
* Universal ATR (Attenuated Total Reflectance) accessory for solid/liquid samples
* Sealed and desiccated optics for moisture-sensitive measurements
 | **Unique features/Measurement capabilities, if any*** **Spectral range**: 4,000–400 cm-1
* **Resolution**: Up to 0.5 cm-1
* **Auto-alignment and real-time diagnostics** for consistent performance
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| **Instrument Technical Description and Major Specifications***(This Specifications Limited to Major 5)** **Spectral Range**: 4,000–400 cm-1
* **Resolution**: 0.5–4 cm-1 (adjustable)
* **Detector**: DLATGS (standard), optional liquid N2-cooled MCT for enhanced sensitivity
* **Beam Splitter**: KBr for mid-IR range
* **Supported File Formats**: .spa, .csv, .jcamp
 | **Measurement/Sample specifications:** * **Sample Type** Solid (powder/film), liquid, gel
* **Sample Quantity**Solids: 1-10mgLiquids: Thin Film (µL volume)
* **Pre Preparation**Solids: Dry Finely Ground (for KBr Pellets)Liquids: Free of Bubbles/Suspended Particles
* **Restrictions**No Corrosive or Highly Volatile solventsSamples must be IR transparent in measure range
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**Type of Sample Required for Analysis / Testing (Quantity, Pre-Preparation, State etc.)**

1. Liquids
	* Quantity: 5–20 µL (thin film for ATR) or 1–2 drops for liquid cells.
	* State: Homogeneous, free of bubbles/suspended particles.
	* Pre-Preparation:
		1. Volatile liquids: Use sealed cells to prevent evaporation.
		2. Viscous liquids: Apply directly to ATR crystal and ensure even coverage.
2. Solids
	* Quantity: 1–10 mg (for KBr pellets) or thin films for ATR.
	* State: Dry, finely ground powder (particle size <2 µm to reduce scattering).
	* Pre-Preparation:
		1. KBr Pellets: Mix 0.2–1% sample with anhydrous KBr; press at 8–10 tons.
		2. ATR: Flatten solid against crystal (e.g., with pressure clamp).
3. Gases
	* Quantity: 10–50 mL (sealed gas cell required).
	* State: Dry, non-corrosive.
4. Restrictions: Avoid samples containing water (interferes with IR bands) and corrosive substances (e.g., strong acids) that damage optics.

**Guidelines for Sample Submission – User Instructions**

1. General Instructions
	* Labelling: Clearly mark samples with Name/ID, Solvent used (if applicable), Expected functional groups (e.g., "suspected carbonyl peak").
	* Containers: Use clean glass vials or airtight containers for hygroscopic samples.
2. Liquid Samples
	* ATR Method:
		1. Place a drop on the ATR crystal.
		2. Lower the pressure arm evenly to form a thin film.
		3. Wipe crystal with methylene chloride → ethanol post-use.
	* Transmission Cells: Ensure spacer thickness matches solvent (e.g., 0.1 mm for organic solvents).
3. Solid Samples (KBr Pellets)
	* Grinding:
		1. Mix 1–2 mg sample + 100 mg dry KBr in a mortar.
		2. Grind briefly (over-grinding absorbs humidity).
	* Pressing:
		1. Load mixture into pellet die.
		2. Press at 8–10 tons for 1–2 minutes.
	* Storage: Keep pellets in a desiccator until analysis.
4. Cleaning Protocols
	* ATR Crystal: Wipe with solvent (acetone → ethanol) and polish if scratched.
	* KBr Plates: Clean with methylene chloride, then dry in the oven (100°C).
5. Turnaround & Limits
	* Max Samples/Batch: 10.
	* Analysis Time: 1–2 days (priority scheduling available).

**User Charges Rs. (GST Extra)**

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| **Internal** | **External Academic Institutes** | **National R&D Lab** | **Industry** |
| 300/- per sample | 600/- per sample | 600/- per sample | 1200/- per sample |