**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 |
| **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: 1-10mg Liquids: 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 solvents Samples must be IR transparent in measure range |

**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 |