



INDIAN INSTITUTE OF TECHNOLOGY BOMBAY
MATERIALS MANAGEMENT DIVISION
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Ref. PR No. 1000057899

Rfx. No. 6100003134

Technical Specification for Inverted Fluorescence based Cell Imaging System

Sr. No	Item Description	Detailed Technical Specification	Technical Compliance (Yes / No)	Additional Information (if any)
1.	Inverted Fluorescence based Cell Imaging System			
1.1.	Main Microscope Stand	i. Type: Fully automated inverted research microscope stand, OR an integrated automated digital live-cell imaging station, suitable for multi-channel fluorescence and long-term time-lapse imaging. ii. Motorization: Motorized Z-drive, step resolution $\leq 0.15 \mu\text{m}$ (150 nm) or better. A high-speed turret, fast filter wheel, or rapid solid-state channel-switching mechanism able to complete multi-channel acquisitions across high-density multi-well formats without mechanical lag. Automated fluorescence turret or light-cube chamber, minimum 5 positions. iii. Stage: Motorized high-precision XY scanning stage (OEM or third-party, seamlessly software-integrated) with universal holders for 35 mm dishes, multi-well plates and slides; fully automated, multi-position time-lapse capable. iv. Upgradability: An upgrade path for future expansion — including, where offered, compatibility with a laser-scanning and/or spinning-disk confocal imaging system at a later date, without requiring replacement of the base stand. A hardware-based continuous focus-drift compensation system (IR LED/laser reference) or a software autofocus algorithm, maintaining focus over multi-day unattended time-lapse acquisition.		

1.2.	Illumination Systems	i. Fluorescence illumination: Solid-state LED light engine or LED light-cube system, minimum 20,000-hour operational lifetime per source, with independent channels covering UV, Blue, Green and Red/Far-Red ranges and rapid electronic switching between channels. ii. Transmitted illumination: LED-based transmitted light suitable for Brightfield and Phase Contrast imaging.		
1.3.	Fluorescence Filters & High-Throughput Acquisition Speed	i. High-speed multi-channel switching (minimum 4 channels: 3 fluorescence + 1 transmitted) must support at least 60 stage positions acquired within a 15-minute interval without timing drift. ii. DAPI channel: Ex $\approx$354 nm / Em $\approx$456 nm, or equivalent standard UV/DAPI filter set. iii. CFP channel: Ex $\approx$434/456 nm / Em $\approx$477/480 nm. iv. GFP channel: Covering mAG/Azami-Green (Ex $\approx$492 nm, Em $\approx$505 nm) and mVenus (Ex = 515 nm, Em $\approx$527 nm). v. RFP channel: Covering mKO2/Kusabira-Orange 2 (Ex $\approx$551 nm, Em $\approx$565 nm) and mCherry (Ex $\approx$587 nm, Em $\approx$610 nm). vi. Documentation requirement: the bidder must submit, with the technical bid, excitation/dichroic/emission spectra for the offered CFP, GFP and RFP filter sets and a written statement, supported by that spectral data, that there is no significant bleed-through/cross-talk between the CFP, GFP and RFP channels specifically. Bids without this documentation will be treated as non-compliant on this item.		
1.4.	Objective Lenses	i. 10X: Plan Apochromat or Plan Fluorite, NA $\geq$0.30, long working distance, suitable for plastic multi-well plates and glass-bottom vessels, phase-contrast compatible. ii. 20X: Plan Apochromat or Plan Fluorite, NA $\geq$0.40, long working distance, compatible with plastic multi-well plates, dishes and glass; high fluorescence transmission.		
1.5.	Stage-Top Live-Cell Incubation System	i. Chamber: Stage-top incubator mountable on the motorized XY stage, or an integrated environmental enclosure native to the imaging		

		system. ii. Temperature control: Ambient +3°C up to at least 40°C. iii. Humidity: Active or highly regulated passive humidity control to prevent sample evaporation over multi-day time-lapse. iv. CO2 control: Digital gas mixer for active CO2 control, 0-10%.		
1.6.	Scientific Camera	i. Type: Monochrome scientific CMOS (sCMOS) or monochrome CMOS camera, optimized for low-light live-cell fluorescence imaging. ii. Resolution: Minimum 3.0 Megapixels. iii. Sensitivity: Quantum efficiency ≥80% at @ 550 nm. iv. Frame rate: ≥30 fps in any camera-supported acquisition mode suitable for live-cell time-lapse imaging (including pixel-binned or reduced-field-of-view modes).		
1.7.	Software	i. Imaging software: Comprehensive, fully licensed manufacturer software controlling all components, with multi-dimensional experiment scheduling (≥60 positions, 4 channels, 15-minute intervals), automated background correction, and lossless streaming to a high-speed NVMe drive.		
1.8.	Workstation	i. Computer workstation: A workstation meeting, at minimum, 64 GB RAM, a dedicated GPU (≥6 GB VRAM), and a ≥32-inch Full HD monitor — OR, for an integrated all-in-one imaging station, a built-in computing/display system of equivalent capability. The workstation (or its integrated equivalent) must be included within the single all-inclusive bid price quoted in response to this tender, and will not be treated as a separately negotiable item after award. ii. Storage sizing: Fast (NVMe or equivalent) acquisition storage and archival storage, sized by the bidder to support lossless, uninterrupted acquisition — without manual intervention or storage-related interruption — of the following experimental design for its full unattended duration: up to 60 simultaneous stage positions; 4 channels per timepoint (3 fluorescence + 1 transmitted); acquisition interval as frequent as 15 minutes; continuous		

		unattended run duration of at least 7 days. The bidder must state, with the technical bid, the raw data volume their offered camera and acquisition settings would generate for this exact experimental design over a continuous 7-day run, and show how the proposed fast-storage capacity — together with any automated/scheduled background offload to archival storage during a running experiment — accommodates this volume without the fast drive reaching capacity mid-run. A minimum of 2 TB NVMe (or equivalent) fast storage and 8 TB archival storage is the floor; where the bidder's own data-volume calculation for this experimental design exceeds that floor, the offered storage must be sized above it accordingly.		
1.9.	Supporting Accessories	i. Online UPS: Heavy-duty online UPS, 30-45 minutes minimum battery backup. ii. Anti-vibration table: High-quality active or passive anti-vibration table for the microscope system.		
1.10.	Track Record & User Performance Verification	i. Proven track record: The proposed system model (or its direct functional predecessor from the same manufacturer line) must have been installed and operational for at least 3 years in a minimum of 5 (five or more) installations in Government research institutes or universities. ii. Verification reports: Verifiable installation references (Contact details) from Principal Investigators or facility in-charges of those user institutes must accompany the technical bid.		
1.11.	Warranty, Maintenance (CMC) and Technical Support SLA	i. Warranty: 3-years warranty including replacement of all parts & labour charges. ii. Support SLA: Acknowledgment and formal response to any technical support request within 48 hours by a certified service engineer. iii. Loaner part support: A functional replacement loaner part within 48-72 hours of any hardware failure, remaining active until the certified replacement is installed. iv. Spares availability: Replacement parts are guaranteed to be available for at least 8 years post-installation.		