ANNEXURE – I (A)

TECHNICAL SPECIFICATIONS FOR INVERTED FLUORESCENCE RESEARCH MICROSCOPE AND CAMERA

DEPARTMENT OF BIOTECHNOLOGY, IIT MADRAS

Sr. No.	Technical Specifications
1.	**Microscope frame:** • Fully motorized active multi-port inverted fluorescence microscope with BF, DIC, Phase Contrast, and Fluorescence imaging capabilities • Motorized frame and motorized extra-fine/fine/coarse focus with minimum 10 nm z-step size • Equipped with side port adapters, side port caps, covers for blocking the stray light • Minimum light distribution: 100% side port, 100% eye port • Tool set necessary for manual adjustments and replacement of accessories • Water-proof and static-proof microscope cover • Water proof body with drainage facility to avoid any leakage into microscope body (preferable) • Digital controller for microscope system • All the motorised function of the microscope including XY stage and drift compensation device should be controlled by remote touch panel or tab or equivalent hardware for vibration free imaging
2.	**Eye Piece Unit:** • Eye piece tube with base unit • Focusable 10X eye piece with eye piece guard with minimum field of view 22 mm (2 nos.)
3.	**Motorized Stage:** • Motorized XY stage (preferably linear encoded) with frictionless, wear-free motor drives controlled by both touch panel & software • X-direction stroke: minimum 114 mm or higher; Y-direction stroke: minimum 73 mm or higher (sufficient travelling range available for well plates) • Speed: 20-25 mm/s • Magnetic sample holder (preferable/optional) • Controllable joystick for motorized stage with coarse, and fine movement. (Extra-fine movement is preferable) • Stage inserts for 35 mm/60 mm dish, glass slide, well plate (6 well- to 96 well-plate), T25 tissue culture flask
4.	**Transmitted Light Illumination System:** • Tiltable pillar with condenser holder • Condensor focusing mechanism • Minimum 2 filter holders • ND filter • Pre-centered LED white light for phase contrast, BF and DIC • Adjustable field iris diaphragm
5.	**Nosepiece:** • Motorized DIC-compatible sextuple revolving nosepiece • Nosepiece cap (2 nos.)

6.	**Condensor:** • Motorized condenser turret with lens unit • ND filter • Long working distance lens • Motorized aperture • Motorized/intelligent polarizer • Provision for shutter • Phase contrast module for 4X, 10X, 20X, 40X objectives • DIC cube and slider • Interference green contrast filter • DIC prism set for 40X, 60X and 100X objectives
7.	**Objectives for Fluorescence, DIC and Phase Contrast Applications:** • 4X phase objective with N.A. 0.10 or above • 10X phase objective with N.A. 0.30 or above • 20X phase objective with N.A. 0.40 or above, (LWD/ELWD) with coverglass correction • 40X phase objective with N.A. 0.60 or above, (LWD/ELWD) with coverglass correction • 60X/63X objective with N.A. 0.70 or above, with coverglass correction • 100X objective (Plan Apochromat) with N.A. 1.40 or above, with coverglass correction • Immersion oil and objective cleaning tissue paper set
8.	**Filter Turret Assembly:** • Motorized Epi Filter Turret with fast, smooth switching with six positions and built-in shutter • Field Stop • ND filter
9.	**Fluorescence Light Source:** • 130W mercury lamp or 120W metal halide lamp • Minimum working life 2000 hrs. • Controllable intensity adjustment • Additional backup lamp • Liquid light guide/fiber guide with adaptor
10.	**Fluorescence Filters:** • Pixel shift corrected fluorescence filter cubes sets for 1) DAPI, 2) FITC/GFP, 3) TRITC/RFP, 4) Texas Red/mCherry and 5) Cy5
11.	**Camera:** • sCMOS monochrome camera • Peltier cooling • Cooling temperature: -10°C below ambient temperature (20°C) • Quantum efficiency: minimum 80% • Effective number of pixels: 2048 (H) x 2048 (V) • Pixel size: 6.5 micron • Sensor size : 13.3mm x 13.3mm • Readout noise: 0.8 electrons median • Frame rate: 30 fps or above • Pixel binning: 2 x 2, 3 x 3, 4 x 4, 8 x 8, with 8,12, and 16 bit depth • Dynamic range: 37000:1 • Digital output: 16 bit support • Lens mount: C mount

12.	**Image Analysis Software:** • Standard research imaging software for fully automated acquisition, device control and experimental manager • Full four-dimensional image acquisition and analysis (XYZ, Time) • Capable of multi-channel, multi-well & multi-point imaging • Online & offline 2D deconvolution, online ratio measurement, co-localisation analysis, interactive measurement, 3D view, slice view, intensity measurement over time and over depth, kymograph, dynamic ROI, back ground subtraction, Z-projection over time and Z-intensity measurement • Advanced modules to perform complicated workflow of different permutations and combinations through Journals, Experimental manager or through jobs or equivalent modules • Software autofocus module for drift-free imaging (optional)
13.	**Image acquisition, processing, and analysis system:** • Windows 10 64-bit • Intel i7 Processor 10th generation • 16GB or more RAM • 2X 1TB HDD • 4GB Graphics Card • 32” or higher LED Monitor • UPS with minimum 1-hour backup power • Pricing on this system should be quoted separately
14.	**Warranty:** • 3 Year warranty and 2 years AMC included on all the above components
15.	**Optional:** • 3D blind deconvolution modules for wide-field, bright field, and confocal images • Hardware-based drift compensation and autofocus with cover glass bottom dishes, chamber slides and plastic & glass bottom multi well plates with automatic focus features for each well & position
16.	**System Integration:** • All the components including microscope, camera and software should be fully integrated
17.	**Vendor:** • Vendor should have a good track record of selling similar systems with at least 10 installations across India especially in institutes like IITs, IISERs, IISc, CSIR labs • Vendor should submit at least 3 performance certificates for similar systems • Vendor should have a local presence with good track record of after sales support in Chennai • Purchase committee reserves the right to reject bids based on adverse feedbacks received from past users.
18.	**Upgradability:** • System should be upgradable to live cell imaging applications and motorized TIRF in future • Nosepiece should be upgradeable for long-term live cell imaging with IR LED-based automated focus drift compensation

ANNEXURE – I (B)

COMPLIANCE SHEET FOR INVERTED FLUORESCENCE RESEARCH MICROSCOPE AND CAMERA

Sr. No.	Technical Specifications		Make & Model offered to Supply	OEM/ Autho-rised Dealer Certificate attached Yes/No	Comply Yes/No
1.	**Microscope frame**	Fully motorized active multi-port inverted fluorescence microscope with BF, DIC, Phase Contrast, and Fluorescence imaging capabilities			
		Motorized frame and motorized extra-fine/fine/coarse focus with minimum 10 nm z-step size			
		Side port adapters, side port caps, covers for blocking the stray light			
		Minimum light distribution: 100% side port, 100% eye port			
		Tool set necessary for manual adjustments and replacement of accessories			
		Water-proof and static-proof microscope cover			
		Water proof body with drainage facility to avoid any leakage into microscope body (preferable)			
		Digital controller for microscope system			
		All motorised function of the microscope including XY stage and drift compensation controlled by remote touch panel or tab or equivalent hardware for vibration free imaging			
2.	**Eye Piece Unit**	Eye piece tube with base unit			
		Focusable 10X eye piece with eye piece guard with minimum field of view 22 mm (2 nos.)			
3.	**Motorized Stage**	Motorized XY stage			

		(preferably linear encoded) with frictionless, wear-free motor drives controlled by both touch panel & software			
		X-direction stroke: minimum 114 mm or higher; Y-direction stroke: minimum 73 mm or higher (sufficient travelling range available for well plates)			
		Speed: 20-25 mm/s			
		Magnetic sample holder (preferable/optional)			
		Controllable joystick for motorized stage with coarse, and fine movement. (Additional extra-fine movement is preferable)			
		Stage inserts for 35 mm/60 mm dish, glass slide, well plate, T25 tissue culture flask			
4.	**Transmitted Light Illumination System**	Tiltable pillar with condenser holder			
		Condensor focusing mechanism			
		Minimum 2 filter holders			
		ND filter			
		Pre-centered LED white light for phase contrast, BF and DIC			
		Adjustable field iris diaphragm			
5.	**Nosepiece**	Motorized DIC-compatible sextuple revolving nosepiece			
		Nosepiece cap (2 nos.)			
		Upgradeable for long-term live cell imaging with IR LED-based automated focus drift compensation			
6.	**Condensor**	Motorized condenser turret with lens unit			
		ND filter			
		Long working distance lens			
		Motorized aperture			
		Motorized/intelligent polarizer			
		Provision for shutter			
		Phase contrast module for 4X, 10X, 20X, 40X			

		objective			
		DIC cube and slider			
		Interference green contrast filter			
		DIC prism set for 40X, 60X and 100X objectives			
7.	**Objectives for Fluorescence, DIC and Phase Contrast Applications**	4X phase objective with N.A. 0.10 or above			
		10X phase objective with N.A. 0.30 or above			
		20X phase objective with N.A. 0.40 or above, (LWD/ELWD) with coverglass correction			
		40X phase objective with N.A. 0.60 or above, (LWD/ELWD) with coverglass correction			
		60X/63X objective with N.A. 0.70 or above, with coverglass correction			
		100X objective (Plan Apochromat) with N.A. 1.40 or above, with coverglass correction			
		Immersion oil and objective cleaning tissue paper set			
8.	**Filter Turret Assembly**	Motorized Epi Filter Turret with fast, smooth switching with six positions and built-in shutter			
		Field Stop			
		ND filter			
9.	**Fluorescence Light Source**	130W mercury lamp or 120W metal halide lamp			
		Minimum working life 2000 hrs.			
		Controllable intensity adjustment			
		Additional backup lamp			
		Liquid light guide/fiber guide with adaptor			
10.	**Fluorescence Filters**	Pixel shift corrected fluorescence filter cubes sets for 1) DAPI, 2) FITC/GFP, 3) TRITC/RFP, 4) Texas Red/mCherry & 5) Cy5			
11.	**Camera**	sCMOS monochrome camera			
		Peltier cooling			
		Cooling temperature: -10°C below ambient temperature (20°C)			

		Quantum efficiency: minimum 80%			
		Effective number of pixels: 2048 (H) x 2048 (V)			
		Pixel size: 6.5 micron			
		Sensor size: 13.3mm x 13.3mm			
		Readout noise: 0.8 electrons median			
		Frame rate: 30 fps or above			
		Pixel binning: 2 x 2, 3 x 3, 4 x 4, 8 x 8, with 8,12, and 16 bit depth			
		Dynamic range: 37000:1			
		Digital output: 16 bit support			
		Lens mount: C mount			
12.	**Image Analysis Software**	Standard research imaging software for fully automated acquisition, device control and experimental manager			
		Full four-dimensional image acquisition and analysis (XYZ, Time)			
		Capable of multi-channel, multi-well & multi-point imaging			
		Online & offline 2D deconvolution, online ratio measurement, co-localisation analysis, interactive measurement, 3D view, slice view, intensity measurement over time and over depth, kymograph, dynamic ROI, back ground subtraction, Z-projection over time and Z-intensity measurement			
		Advanced modules to perform complicated workflow of different permutations and combinations			
		Software autofocus module for drift-free imaging (optional)			

13.	**Image acquisition, processing, and analysis system**	Windows 10 64-bit			
		Intel i7 Processor 10th generation			
		16GB or more RAM			
		2X 1TB HDD			
		4GB Graphics Card			
		32” or higher LED Monitor			
		UPS for the workstation with minimum 1 hour backup power			
14.	**Warranty**	3 Year warranty and 2 years AMC included on all the above components			
15.	**Optional**	3D blind deconvolution modules for wide-field, bright field, and confocal images			
		Hardware-based drift compensation and autofocus			
16.	**System Integration**	All components including microscope, camera and software fully integrated			
17.	**Vendor**	Vendor should have a good track record of selling similar systems with at least 10 installations across India especially in institutes like IITs, IISERs, IISc, CSIR labs			
		Vendor should submit at least 3 performance certificates for similar systems			
		Vendor should have a local presence with good track record of after sales support in Chennai			
18.	**Upgradability**	System should be upgradable to live cell imaging applications and motorized TIRF in future			
		Nosepiece should be upgradeable for long-term live cell imaging with IR LED-based automated focus drift compensation			