INDIAN INSTITUTE OF TECHNOLOGY BOMBAY

MATERIALS MANAGEMENT DIVISION

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Specifications for Protein Purification System

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Sr no	**Tender Specifications**	**Compliance (Yes/No)**	**Additional Information**
1	Inert biocompatible system for all purification and development work from microgram to gram scale. The system should be capable of performing all the chromatography techniques: Size exclusion, Affinity, Ion exchange, Hydrophobic interaction, and Reverse phase.		
2	Two pump system with 4 pump heads of Hydrophobic material can be used with high salt concentration buffers of up to 8 M urea.		
3	Should have manual provision to individually purge each of the four pump heads.		
4	There should not be any siphoning effect due to gravity before the gradient formation		
5	At least 4 buffer inlets for equilibration buffer, sample loading, wash buffer and elution buffer.		
6	System should come along with a 2 mm flow cell (or the software should have the provision of normalizing the absorbance of 5 MM flow cell)		
7	The system should deliver flow rate of 0.001 mL/min to 25 mL/min or more without need for changing pump-heads for the entire flow range and pressure limit of minimum 20 Mpa or more		
8	The system must have Conductivity Monitor of range 0.01 mS/cm to 999.99 mS/cmwith an accuracy of ± 0.01 mS/cm. with built in temperature sensor to correct variation due to temperature. Conductivity monitor should be integrated with automated temperature and flow compensation system.		

9	System should have piston pumps for high performance and long life and should have an accuracy of ± 1.2%.		
10	System should be capable of delivering flow rate up to 50 mL/min during column packing		
11	System should have the capability of running with automatic pressure -flow modulation option. System should have the capability of running with automatic option enabling to modulate the flow rate upon reaching the set pressure and continue the run without pausing the system without dropping the flow rate. (tolerance ~ 20 % of applied flow rate)		
12	The system must have an in-line mixer equipped with magnetic stirrer to ensure accurate mixing of buffers. A mixer volume between 1.4 mL to 1.5 mL is mandatory		
13	The UV flow cell must have a cell volume of not more than 2 µL for maximum sensitivity).		
14	The UV lamp should not require any start-up time or warmup time and should not heat the sample/ protein.No warmup time must be there for the system detector to avoid sample degradation. Automatic switching off the lamp in stand-by mode. Capable of producing high signal to noise ratio		
15	The system must have fixed wavelength (280 nm) UV monitor.		
16	The UV lamp must have an operating life of more than 10000 hours.		
17	The UV module of the system must be able to read absorbance range from -6000 to +6000 mAU. , crucial for sharp peaks for samples in the negative spectra of the absorbance.		
18	A flow restrictor should be present in the flow path to generate a back pressure that prevents the formation of air bubbles in the UV flow cell.		
19	The system should be supplied with a round fraction collector having following properties: - Minimize spillage using Drop Sync technique. - Allows collection of up to 175 fractions. - Allows use of 3, 8, 15 and 50 mL tubes. - Fraction volume 0.1 to 50 mL. - Automatic peak recognition using control software. - Fraction collector should be capable of being used in time, volume or peak recognition mode. - Allows using flammable liquids/solvents.		
20	The system should have the option to be integrated with third party Detectors like Fluorescence detectors, RI and Auto samplers simultaneously for increased application flexibility at the time of purchase or post-purchase.		

21	The system should have upgradable modular capability of having 2 UV monitors installed at the same time for giving flexibility and increased application capability for using small and large flow cells simultaneously to detect low concentration and high concentration proteins for increased application flexibility post-purchase.		
22	All the accessories including PEEK Tubing, ferules and unions/connectors required to run the above should be supplied		
23	The system should supplied with column control valve which allows connection of one column and has an integrated bypass function, which enables washing of the system without removing the column and allows reverse flow for increased application flexibility.		
24	The system must be supplied with one outlet valve having 3 outlet option		
25	The system should have ph valve and ph electrode for in-line pH monitoring during the run. pH monitor should be easily calibrated by injection of calibration buffer directly into the valve with the pH electrode mounted.		
26	The system should be supplied with high resolution preparative scale gel filtration column having bed dimension of 16 x 600mm , bed volume of 120ml , Fractionation range (Mr) globular proteins 10 000 to 600 000 , Particle size of ~ 34 µm , Theoretical plates > 13000 m-1 , pH stability during cleaning-in-place (CIP) 1 to 14 , pH stability during operation3 to 12. Matrix should be Composite of cross-linked agarose and dextran.		
27	Should also be supplied with column of 1ml ,prepacked with affinity chromatography resin for purifying any recombinant protein that does not have an affinity binding partner.		
	System Control Software		
28	The system must be provided with software that works on a single software platform with full networking capabilities and has capability to be controlled through an independent desktop or laptop computer.		
29	The software must have both user programmable and p re - defined application protocols and method templates. In addition, the software should have capability to be upgradable to different modules for multivariate analysis such as design of experiments functionality for method development and optimization. License base software with 21 CFR COMPLIED		
30	Built in templates for all the existing columns with option to develop method for third party.		
31	Sharing of methods and results along with remote access capabilities to systems to save valuable time and resources		
32	Scouting of up to 99 runs with individual parameters in single method		
33	Method Queues for combining of different purification techniques.		

34	Software should perform real time control, data evaluation, watch commands, Scouting parameters, method queue, method wizard for easy programming, column library, with report generation option.		
35	Automatic data recovery after run is over should be possible.		
36	Include WATCH functions (in addition to the alarms) in the control software to ensure that various parameters like pH, conductivity, pressure, etc. are in the acceptable range upon execution of an action by the operator.		
37	The system should be capable of being installed with Design of Experiment (DOE) software integrated with the System control software as a tool for experimental design for generating precise data in fewer experiments for time and cost-efficient method development.		
38	The software must have a detailed evaluation segment for peak integration and evaluation, peak smoothening, peak offset adjustment, peak differentiation, peak addition and subtraction, peak overlay comparison of results and automated quantification of peak fractions.		
39	Instrument should have warranty for 1 year		