

Requirement Specification Compliance Table

Supply, delivery, commissioning and provide training for a High-Performance Liquid Chromatography system equipped with diode-array detector or equivalent, and charged aerosol detector or equivalent.

S/N	Description and specifications	If “NO” please provide your comments in the remarks column"	
		Compliance	Remarks
1.1	Binary pump: • Biocompatible parallel dual-piston with independent piston drivers and variable stroke volume; • Binary pump system with 2X3 solvent channels; • Dynamic flow rate ranges from 0.001 to 8 mL/min with 1 µL/min increment; • Flow rate accuracy <0.5%; • Compatible with analytical and semi-preparative HPLC columns; • Maximum operation pressure 1,000 Bar; • High-pressure gradient proportioning; proportion accuracy <0.3%. • Built-in solvent degassing for 2 channels; • Biocompatible with pH range 2-12, buffer and chloride concentration up to 1 mol/L; • The pump must provide finger tight check valves for fast maintenance; • Includes safety features: leak sensor, active rear-seal wash system, excess pressure monitoring; • Fully automated solvent compressibility compensation; • Dwell volume is less than 250 µL; • Pulsation typically <0.1% or 0.2 MPa; • Compatible with Singapore power system: 220/240 V, 50 Hz;	YES / NO	

1.2	Autosampler • Injection method is based on split-loop principle; • The sample needs to be pre-pressurized prior to the injection for highest retention time stability and elongated column lifetime. • Sample capacity: minimum 200 of 2 mL vials; • Injection cycle time down to 8 sec; • Settable injection volume 0.01 µL to 100 µL with injection accuracy of $\pm 0.5\%$; • Maximum operation pressure 1000 bar; • With external needle wash, the carryover effect for caffeine should be $<0.0004\%$; • Needle wash from 1 solvent bottle; • Minimum sample injection volume from sample vial or plate should be as small as 2 µL; • Settable sample temperature ranging from 4 to 40 °C with error ± 1 °C; • The autosampler could recognize the sample racks by barcode reading.	YES / NO	
1.3	Column compartment • The column compartment must provide two thermostating modes-still air for highest efficiency at UHPLC conditions and forced air for easiest method transfer. • Settable column temperature ranges from 5 to 120 °C with stability ± 0.05 °C; • Heating rate: 20 to 50 °C in <15 min; • Able to accommodate simultaneously 2X30 cm column; • Equipped with pre-column solvent heater; • Equipped with gas, humidity and temperature sensor; • Provide finger tight fitting with zero dead volume for easy connection to column;	YES / NO	

1.4	Diode Array Detector or equivalent detector • 1024 element photodiode array; • Maximum data acquisition rate: 200 Hz; • Wavelength range: 190-680 nm; • The background noise signal should be $< \pm 3$ μAU at 230 nm; • Base line drift should be less than 0.5 mAU/hour at 230 nm; • At least 3 channels of single-wavelength data acquisition; • Support 3D spectrum; • Wavelength accuracy should be ± 1.0 nm and pixel resolution should be < 1.0 nm; • Light pipe flow cell 10 mm (max 60 bar pressure); • Biocompatible with pH range 2-12, tolerate with buffer or chloride concentration up to 1 mol/L; • Compatible with Singapore power system 220/240 V, 50 Hz; • Light source should be deuterium lamp; • A new deuterium lamp should be equipped.	YES / NO	
1.5	Charged Aerosol Detector or equivalent detector • Near universal detector by charge with nebulization by nitrogen gas; • Analyte response independent of chemical structure; • Compatible solvent flow rate 0.01-2.0 mL/min; • Max data acquisition frequency: 200 Hz; • Digital noise filtering; • Evaporation temperature: ambient+5 °C to ambient + 100 °C; • Dynamic detection range: 4 orders; • Equipped with air compressor and nitrogen generation as inlet gas source when in use; • The air compressor and nitrogen generator should have noise less than 60 dB and the foot print should be less than 0.6m X0.6m due to space restrain. Thus, the air compressor does not require specialized permit or license according to Ministry of Manpower.	YES / NO	

	Compatible with Singapore power system (220/240 V, 50 Hz).		
1.6	Software - Latest version equipment operating software; - Allows diagnostic checks of LC modules; - allows automatic peak detection and area integration, with manual review if required; - Allows real time monitoring of UHPLC and detector parameters, even before sequence start; - Compatible with hardware to control hardware, run methods, collect data and for further extension to mass spectrum detector; 2 copies of software installation in 2 different computers: one connected with HPLC system for data acquisition and another for data analysis;	YES / NO	
1.7	Other accessories (Or Equivalent) - Computer equipped with Intel i7, Quad Core 3.1 GHz, 16 GB RAM and 1 TB for fast data processing and data storage; - The computer has minimum 24-inch LCD monitor, mouse & keyboard; - The computer has at least 2 USB ports for data transfer and DVD +/- RW; 3-year full warranty for computer;	YES / NO	
2	Installation - The vendor shall provide all necessary test equipment, instruments and labor for the delivery, installation, testing and commissioning of the proposed system. - Prior to system commissioning, the vendor shall be fully and solely responsible for every aspect of the successful implementation of the systems by the completion date as specified. - For awarded vendor, risk assessment must be conducted before installation.	YES / NO	

3	Commissioning - The vendor shall complete the testing and commissioning of the system within 2 weeks from the date of delivery. - Commissioning tests should be conducted by the vendor in the presence of representatives from NTU for the purpose of verifying the performance.	YES / NO	
4	Risk Assessment - Awarded vendor is to conduct Risk Assessment for installation, commissioning and all future preventive maintenance.	YES / NO	
5	Training - Provide full range training at vendors training center for 6 pax. - Provide on-site training at installation site.	YES / NO	
6	Warranty All items are covered by at least 12-month warranty for all parts and labor. (Service response, faulty parts change, engineer on-site within 2 working days, 1 PM job & PM kit annually).	YES / NO	
7	Preventive maintenance To provide 2-years preventive maintenance (1st year and 2nd year PM) after expiration of warranty for all parts and labor. (Service response, faulty parts change, engineer on-site within 2 working days, 1 preventive maintenance job and preventive maintenance kit annually.)	YES / NO	
8	Option to purchase - To provide 3rd, 4th, and 5th year preventive maintenance after expiration of warranty. - Refer to Annex B and to fill in the option to purchase in the PM cost schedule provided together in this tender.	YES / NO	
9	Delivery Delivery must be completed within 8 weeks from date of purchase order issuance.	YES / NO	

10	To attend <u>Mandatory</u> site briefing Site show date: 7th Feb to 13th Feb 2019 Site show time: 9:00 am to 5:30 pm Site show venue: N1-B3-a-04, central environmental laboratory, School of Civil and Environmental Engineering, Nanyang Technological University, 62 Nanyang Drive, Singapore, 637459 Tenderer to make a compulsory appointment with Dr. Pan Chaozhi (Tel: 92409678) or Dr. Poh Leong Soon (Tel: 92321192) for the site show visit. Tenderer who submit their bids without attending site briefing will not be considered for award of this tender.	YES / NO	
11	Track Record Tenderer to have a minimal 5-year experience with UHPLC products. To provide existing customers' list on the table 1 below. NTU-CEE-EBiG may contact existing customers for references.	YES / NO	
12	Acceptance Test Tenderer to comply with the Acceptance test of Annex A	YES / NO	

TABLE 1: TRACK RECORD OF THE SUPPLIER

This list will be used to determine the track record of the vendor. Please list down all past customers/ user who have purchased the equipment related to UHPLC products.

Name of the Company you have previous work with	Description of the purchase/ project	Date	Reference/ Contact Person	Contact No / Email