

REFERENCE OF TENDER	DESCRIPTION OF TENDER	TIME PERIOD OF TENDER	DEPARTMENT/DIVISION/ UNIT REQUESTING TENDER	FEES	CLOSING DATE NOT LATER THAN 2.00PM	FOCAL PERSON
KK/333/2022/DSS	TO SUPPLY, DELIVER, INSTALL TEST AND COMMISSION ONE (1) UNIT ATOMIC ABSORPTION SPECTROPHOTOMETER WITH MERCURY VAPORIZER UNIT (AAS-MVU) FOR FOOD CHEMISTRY SECTION, DEPARTMENT OF SCIENTIFIC SERVICES, MINISTRY OF HEALTH	-	DEPARTMENT OF SCIENTIFIC SERVICES	\$30.00	10 th JANUARY 2023	Hjh Masayu Sa'adatul Amalina binti Haji Md Yussof Food Chemistry Section Department of Scientific Services Ministry of Health Negara Brunei Darussalam Contact No.: 2772616 e-mail: masayu.yusoff@moh.gov.bn

SECTION 2

SPECIFICATIONS AND REQUIREMENTS

TENDER REFERENCE NO: KK/333/2022/DSS

INVITATION TO TENDER

TO SUPPLY, DELIVER, INSTALL TEST AND COMMISSION **ONE (1) UNIT ATOMIC ABSORPTION SPECTROPHOTOMETER WITH MERCURY VAPORIZER UNIT (AAS-MVU) FOR FOOD CHEMISTRY SECTION, DEPARTMENT OF SCIENTIFIC SERVICES, MINISTRY OF HEALTH**

NAME OF ITEM	ATOMIC ABSORPTION SPECTROPHOTOMETER WITH MERCURY VAPORIZER UNIT (AAS-MVU)
NO.	ITEM DESCRIPTIONS AND SPECIFICATIONS
1	<u>GENERAL</u>
1.1	One (1) complete set of equipment for the analysis of Heavy Metals and Trace Elements in a variety of food and food products as follow: <ul style="list-style-type: none">• Atomic Absorption Spectrophotometer• Mercury Vaporizer Unit for high sensitivity mercury analysis by reduction and vaporization• Analytical standards and Chemicals with Certificate of Analysis• Data Management System• Operating Accessories
<u>2</u>	<u>MAIN UNIT</u>
2.1	Spectrophotometer must allow use of both coded high intensity Hollow Cathode Lamps and Electrode-less Discharge Lamps.
2.2	Photometer settings must be fully automatic (wavelength, slit width, etc.) assuring ease of operation and reproducibility with the use of the coded HCLs and EDLs
2.3	Include 2 units of Hollow Cathode Lamps for Mercury
2.4	Include 2 units of Hollow Cathode Lamps for Cadmium
2.5	Include 2 units of Hollow Cathode Lamps for Lead
2.6	Include 2 units of Hollow Cathode Lamps for Manganese
2.7	Include 2 units of Hollow Cathode Lamps for Copper
2.8	Include 2 units of Hollow Cathode Lamps for Zinc
2.9	Include 2 units of Hollow Cathode Lamps for Iron
2.10	Include 2 units of Hollow Cathode Lamps for Chromium
2.11	Include 2 units of Electrode-less Discharge Lamps for Arsenic

NO.	ITEM DESCRIPTIONS AND SPECIFICATIONS
2.12	Include 2 units of Electrode-less Discharge Lamps for Selenium
2.13	Include 2 units of Electrode-less Discharge Lamps for Antimony
2.14	Spectrophotometer must be true double-beam flame operation where the sample and reference beams are measured simultaneously for enhanced precision and detection limits
2.15	Flame and furnace operation must be integrated into a single instrument minimizing space requirements.
2.16	Changeover from flame to furnace operation must be fully automatic via software, eliminating the risk of damage or possible injury
2.17	Optimization of flame or furnace position must be automatic via software for convenience and repeatability of analysis
2.18	Autosampler must be supplied with the Atomic Absorption Spectrometer
2.19	Monochromator must be Czerny-Turner in design. Number of grating grooves should be at least 1800 lines/mm with focal length of 300mm
2.20	Wavelength range should be at least 185 to 900nm
2.21	Photomultiplier tube as the detector
2.22	The adjustment of the lamp in any one of the eight (8) position lamp turret for its optimal position must be fully automatic
2.23	The system to be supplied with one (1) spare unit of Deuterium lamp
3	<u>FLAME OPERATION</u>
3.1	Gas flow controllers must be computer-controlled with automatic gas sequencing and oxidant and fuel monitoring and control
3.2	High intensity deuterium arc background correction for non-graphite furnace techniques
3.3	Burner system must be fully automated computer-controlled including automatic burner position optimization
3.4	Burner position must be able to be stored by element and/or method for later recall and implementation yielding enhanced day-to-day reproducibility and ease of operation
3.5	Fuel and oxidant must be mixed within the burner system (not externally) for enhanced safety
3.6	Include burner chamber and burner head which is able to enhance safety and ensure maximum corrosion resistance
3.7	Safety interlocks against ignition must be provided for the following circumstances: <ul style="list-style-type: none"> • improper burner head installation or no burner head • insufficient gas pressure • improper and unsafe ratios of oxidant-fuel gases and • improper installation of nebulizer or end cap and drain system
3.8	Must be able to safely shutdown of flame upon power failure
3.9	Flame atomizer must be able to operate Air-C ₂ H ₂ , N ₂ O-C ₂ H ₂ flames with automatic changing between the two flame types

NO.	ITEM DESCRIPTIONS AND SPECIFICATIONS
3.10	Include nebulizer capable of handling hydrofluoric acid containing samples
<u>4</u>	<u>FURNACE ATOMIZER</u>
4.1	Heating temperature range must be from ambient to 3,000°C
4.2	Must be provided with 2 gas inlets (1 for inert gas-Argon and 1 for oxidative gas-Air)
4.3	Heating control system should have digital temperature control using optical sensor
4.4	Inner gas flow rate range of 0 to 1.50 L/min with capability to perform automatic switching of 2 gas types in single method
4.5	Heating program must allow to set up to 20 stages with either ramp or step heating mode
4.6	Must include additional (on top of the standard consumbles given): <ul style="list-style-type: none"> • 5 sets of 10pcs graphite tube, normal • 5 sets of 10pcs graphite tube, pyrolytic
<u>5</u>	<u>AUTOSAMPLER</u>
5.1	Should be directly triggered from the AAS main unit having completely software controlled operation.
5.2	Autosampler must accommodate at least 60 vials position (≥15ml) for sample and 8 vials position (50ml) for standards.
5.3	Autosampler should permit access to any vial location of samples and standards
5.4	Rinse port with overflow wash mechanism to avoid any carryover or contamination from autosampler probe between two sample runs
5.5	Include 1000pcs of 15ml PP Autosampler Vials
5.6	Include 1000pcs of 50ml PP Autosampler Vials
5.7	Include 2 rinse bottle containers of more than 2L size
5.8	Include at least 500 pipette tips for dispensing
<u>6</u>	<u>FLOW INJECTION ACCESSORY</u>
6.1	The flow injection accessory must be automatic and fully controlled via software of the main computer-controlled AAS
6.2	It should comprises of 1 compact single unit capable of accomplishing the following tasks: Mercury Cold Vapor Technique and Hydride Generation Technique
6.3	The accessory should consist of 1 peristaltic pump and a switching valve
6.4	The speed of revolution is user-selectable revolution speed of 20 to 120rpm

NO.	ITEM DESCRIPTIONS AND SPECIFICATIONS
6.5	The switching valve must be made of chemical-resistant material
6.6	The carrier gas (Argon) for the mercury/hydride generation can be flow controlled from 40 to 250ml/min
6.7	Control of the gas flow should enable automatic switch-off after operation pauses for 10 minutes
<u>7</u>	<u>ABSORPTION CELL</u>
7.1	Absorption cell should consists of removable quartz windows for the mercury cold vapor/hydride generation to be electrically heated with temperature regulated continuously variable from 100°C to 1000°C or by an air-acetylene flame
<u>8</u>	<u>MERCURY VAPORIZER UNIT (1 UNIT)</u>
8.1	Measurement method is by circulation method with air flow rate to be at 6L/min
8.2	Optical path length of the flow cell must be up to 200mm
8.3	Volume of the sample can be carried up to 250mL
8.4	Should not require any external gas supply for operation
8.5	Include 150 reaction vessels which is made up of glass together with its rubber plugs and glass tubes for the reaction vessels
8.6	Include 6 sets of 10pcs magnetic stirrer
8.7	Include 5 bottles of Polyethylene Mercury Absorbing Bottle, together with its rubber plugs and glass tubes for the absorbing bottles
8.8	Include 5pcs of U-Shaped Tubes
8.9	Include 1 Vinyl Cover
<u>9</u>	<u>HYDRIDE VAPOR GENERATOR (1 UNIT)</u>
9.1	For use of highly accurate and fast quantitation of the elements which can be conducted up to the ppb level
9.2	Continuos flow system with sample consumption variable up to 0-8mL/min and reagent consumption up to 0-3mL/min
9.3	Include 30 absorption cell
9.4	Include 50 pump tubes for reagent
9.5	Include 40 pump tubes for samples
9.6	Include 3 reaction coils
9.7	Include 10 suction tubes for NaBh ₄ with joints

NO.	ITEM DESCRIPTIONS AND SPECIFICATIONS
9.8	Include 10 suction tubes for HCl with joints
9.9	Include 3 suction tubes for samples with joints
9.10	Include 10 suction tubes for ASC with joints
9.11	Include 2 spare gas/liquid separator
9.12	Include 10 complete reagent bottles
9.13	Include 100pcs of 200ml Volumetric Flasks
10.0	<u>ATOMIC MUFFLER FURNACE FOR HVG (1 UNIT)</u>
10.1	Able to provide higher sensitivity for flame heating with availability of temperature controller to give an optimum control of the quartz glass cell temperature
11	<u>ANALYTICAL STANDARDS AND CHEMICALS</u>
11.1	Include the following analytical standards and chemicals required for the analysis together with its Certificate of Analysis
11.2	3 bottles of Arsenic Analytical Standard Solution (1000mg/L, 100ml)
11.3	3 bottles of Cadmium Analytical Standard Solution (1000mg/L, 100ml)
11.4	3 bottles of Copper Analytical Standard Solution (1000mg/L, 100ml)
11.5	3 bottles of Lead Analytical Standard Solution (1000mg/L, 100ml)
11.6	3 bottles of Mercury Analytical Standard Solution (1000mg/L, 100ml)
11.7	3 bottles of Manganese Analytical Standard Solution (1000mg/L, 100ml)
11.8	3 bottles of Palladium Analytical Standard Solution (1000mg/L, 100ml)
11.9	3 bottles of Zinc Analytical Standard Solution (1000mg/L, 100ml)
11.10	30 bottles of Concentrated Nitric Acid (65%, 2.5L)
11.11	30 bottles of Concentrated Hydrochloric Acid (37%, 2.5L)
11.12	20 bottles of Concentrated Sulphuric Acid (98%, 2.5L)

NO.	ITEM DESCRIPTIONS AND SPECIFICATIONS
11.13	20 bottles of Hydrogen Peroxide (30%, 2.5L)
11.14	5 bottles of Sodium Borohydride (500g)
11.15	5 bottles of Potassium Iodide (500g)
11.16	20 bottles of Tin (II) Chloride (500g)
11.17	20 bottles of Potassium Permanganate (500g)
11.18	20 bottles of Magnesium Perchlorate (500g)
<u>12</u>	<u>DATA MANAGEMENT SYSTEM</u>
12.1	<p>Desktop system with specifications following manufacturer's recommendations including the following:</p> <ul style="list-style-type: none"> • Genuine latest Microsoft Windows software compatible for use with the AAS-MVU software • Genuine latest Microsoft Office Software which should include Word, Excel and Powerpoint • Colour Laserjet printer • 3 toner cartridges for each colour (staggered delivery; upon request over the warranty period) • AAS-MVU software licence
12.2	Must be supplied with software designed for use with the instrument
12.3	<p>Software should permit:</p> <ul style="list-style-type: none"> • Controlled user access • Automatic check for proper functioning of lamp, detector and background corrector • Record of lamp time usage • Real time graphics • Compute statistical values • Multiple calibration formats • Reprocess all stored data
12.4	Two (2) latest and compatible tablet must also be supplied with the latest Windows operating system with standard accessories to be discussed and agreed with end user.
<u>13</u>	<u>OPERATING ACCESSORIES</u>
13.1	Include suitable power supply rating of UPS connected to the instrument system and workstation
13.2	Include suitable and recommended air compressor for use with the offered equipment system
13.3	Include suitable and recommended cooling water circulator for use with the offered equipment system
13.4	Any items or operating accessories not stated but required for safe and successful operation of the equipment system should be included
<u>14</u>	<u>SITE PREPARATION</u>
14.1	It is MANDATORY for the tenderer to do site visit prior to tender submission to discuss site requirements. A site visit form will be provided during the visit as evidence. Non-attendance

NO.	ITEM DESCRIPTIONS AND SPECIFICATIONS
	will be considered as non-compliance.
14.2	<p>The following work if required should be included and listed:</p> <ul style="list-style-type: none"> - gas piping including outlets and regulators - electrical supply including wiring, outlets and isolators - fabrication and/or modification of work bench - any other deemed necessary to ensure successful and safe installation and operation of the system
14.3	The tenderer shall ensure that the site preparation for the placement of the system taking into the consideration on the safety of the end user during operation of the instrument
15	<u>DOCUMENTATION</u>
15.1	The tenderer must provide the mandatory operation, service and spare parts manual
15.2	On-site validation and commissioning report
16	<u>TRAINING</u>
16.1	On-site training for ALL staff members expected to handle the machine. Please ensure that adequate time is allocated such that training will take place in small groups to minimize staff shortage in the laboratory
16.2	Certificate of competence is to be issued to all trainees after completion of training
16.3	Provide hardcopy and softcopy of training notes
16.4	The successful tenderer needs to ensure the key users are updated on the current or relevant information related to the system used. They should provide ONE (1) off-site benchwork training for TWO (2) key users at ISO 17025 accredited laboratory for not less than 5 days . All expenses for attending the benchwork training shall be borne by the vendor; full registration, air ticket, daily allowance, insurance, accommodation, transport to and from the airport and place of training.
17	<u>WARRANTY</u>
17.1	A minimum of one (1) year warranty for manufacturer's defect on the hardware, software and all cost of repairs and/or replacements should be included
17.2	After-sales services must be provided for the product after one (1) year
17.3	<p>One-off preventive maintenance to be carried out just before or soon after the one-year warranty period. Scope of work to follow manufacturer's manual / recommendation specific for the equipment offered, which include:</p> <ul style="list-style-type: none"> • Supply, delivery and installation of preventive maintenance kits and/or consumables • Software update (to obtain prior authorization from user and BME) • Inspection • Cleaning • Alignment • Calibration • Any other related preventive maintenance works required
18	<u>DELIVERY</u>
18.1	<u>DELIVERY</u> Items offered MUST be delivered within _____ from date of approval. (Vendor to indicate the delivery period.)
19	<u>PRICE VALIDITY</u>
19.1	<u>PRICE VALIDITY</u> Price validity MUST NOT BE LESS THAN 90 days or three (3) months.

NO.	GENERAL SPECIFICATIONS
A	Total Price: B\$
B	Delivery Period:
C	Model & Brand:
D	Country of Origin:
E	Where marketed:
F	Year of Manufacture:
G	Warranty:
H	Power Requirement:
I	Battery Back-up:
J	International Safety Standard:
K	Technical Support:
L	Equipment Whole Life Support:
M	Dimensions (WxHxD) cm:
N	User Manuals:
O	Service Manuals:
P	Spare-parts & Consumables Listing:
Q	Technical Training On-Site:
R	Site Requirements:

*To all participating companies, please fill in the table above along with your other documents during submission of tender.

Bahagian/Unit	<i>FOOD CHEMISTRY SECTION</i>	
Bil. Rujukan Bahagian/Unit:	FORD / 2022 / 022	
Pegawai di rujuk	Nama :	Hajah Masayu Sa'adatul Amalina Bte Hj Md Yusoff
	E-mail :	masayu.yusoff@moh.gov.bn
	Tel. No.:	2772616
		Fax No. :

SECTION 3
TENDER FORM

TENDER REFERENCE NO: KK/333/2022/DSS

INVITATION TO TENDER
TO SUPPLY, DELIVER, INSTALL TEST AND COMMISSION ONE (1) UNIT ATOMIC ABSORPTION SPECTROPHOTOMETER WITH MERCURY VAPORIZER UNIT (AAS-MVU) FOR FOOD CHEMISTRY SECTION, DEPARTMENT OF SCIENTIFIC SERVICES, MINISTRY OF HEALTH

NAME OF ITEM	ATOMIC ABSORPTION SPECTROPHOTOMETER WITH MERCURY VAPORIZER UNIT (AAS-MVU)				
NO.	ITEM DESCRIPTIONS AND SPECIFICATIONS	VENDOR'S OFFER			
		COMPLY (Please tick <input type="checkbox"/>) (Provide evidence for compliance(s))		ITEM DESCRIPTIONS AND SPECIFICATIONS	PRICE (\$)
		YES	NO		
<u>1</u>	<u>GENERAL</u>				
<u>1.1</u>	One (1) complete set of equipment for the analysis of Heavy Metals and Trace Elements in a variety of food and food products as follow: <ul style="list-style-type: none"> • Atomic Absorption Spectrophotometer • Mercury Vaporizer Unit for high sensitivity mercury analysis by reduction and vaporization • Analytical standards and Chemicals with Certificate of Analysis • Data Management System • Operating Accessories 				
<u>2</u>	<u>MAIN UNIT</u>				

NO.	ITEM DESCRIPTIONS AND SPECIFICATIONS	VENDOR'S OFFER			
		COMPLY (Please tick <input type="checkbox"/>) (Provide evidence for compliance(s))		ITEM DESCRIPTIONS AND SPECIFICATIONS	PRICE (\$)
		YES	NO		
2.1	Spectrophotometer must allow use of both coded high intensity Hollow Cathode Lamps and Electrode-less Discharge Lamps.				
2.2	Photometer settings must be fully automatic (wavelength, slit width, etc.) assuring ease of operation and reproducibility with the use of the coded HCLs and EDLs				
2.3	Include 2 units of Hollow Cathode Lamps for Mercury				
2.4	Include 2 units of Hollow Cathode Lamps for Cadmium				
2.5	Include 2 units of Hollow Cathode Lamps for Lead				
2.6	Include 2 units of Hollow Cathode Lamps for Manganese				
2.7	Include 2 units of Hollow Cathode Lamps for Copper				
2.8	Include 2 units of Hollow Cathode Lamps for Zinc				
2.9	Include 2 units of Hollow Cathode Lamps for Iron				
2.10	Include 2 units of Hollow Cathode Lamps for Chromium				
2.11	Include 2 units of Electrode-less Discharge Lamps for Arsenic				

NO.	ITEM DESCRIPTIONS AND SPECIFICATIONS	VENDOR'S OFFER			
		COMPLY (Please tick <input checked="" type="checkbox"/>) (Provide evidence for compliance(s))		ITEM DESCRIPTIONS AND SPECIFICATIONS	PRICE (\$)
		YES	NO		
2.12	Include 2 units of Electrode-less Discharge Lamps for Selenium				
2.13	Include 2 units of Electrode-less Discharge Lamps for Antimony				
2.14	Spectrophotometer must be true double-beam flame operation where the sample and reference beams are measured simultaneously for enhanced precision and detection limits				
2.15	Flame and furnace operation must be integrated into a single instrument minimizing space requirements.				
2.16	Changeover from flame to furnace operation must be fully automatic via software, eliminating the risk of damage or possible injury				
2.17	Optimization of flame or furnace position must be automatic via software for convenience and repeatability of analysis				
2.18	Autosampler must be supplied with the Atomic Absorption Spectrometer				
2.19	Monochromator must be Czerny-Turner in design. Number of grating grooves should be at least 1800 lines/mm with focal length of 300mm				
2.20	Wavelength range should be at least 185 to 900nm				
2.21	Photomultiplier tube as the detector				
2.22	The adjustment of the lamp in any one of the eight (8) position lamp turret for its optimal position must be fully automatic				

NO.	ITEM DESCRIPTIONS AND SPECIFICATIONS	VENDOR'S OFFER			
		COMPLY (Please tick ✓) (Provide evidence for compliance(s))		ITEM DESCRIPTIONS AND SPECIFICATIONS	PRICE (\$)
		YES	NO		
2.23	The system to be supplied with one (1) spare unit of Deuterium lamp				
<u>3</u>	<u>FLAME OPERATION</u>				
3.1	Gas flow controllers must be computer-controlled with automatic gas sequencing and oxidant and fuel monitoring and control				
3.2	High intensity deuterium arc background correction for non-graphite furnace techniques				
3.3	Burner system must be fully automated computer-controlled including automatic burner position optimization				
3.4	Burner position must be able to be stored by element and/or method for later recall and implementation yielding enhanced day-to-day reproducibility and ease of operation				
3.5	Fuel and oxidant must be mixed within the burner system (not externally) for enhanced safety				
3.6	Include burner chamber and burner head which is able to enhance safety and ensure maximum corrosion resistance				
3.7	Safety interlocks against ignition must be provided for the following circumstances: <ul style="list-style-type: none"> • improper burner head installation or no burner head • insufficient gas pressure • improper and unsafe ratios of oxidant-fuel gases and improper installation of nebulizer or end cap and drain system 				

NO.	ITEM DESCRIPTIONS AND SPECIFICATIONS	VENDOR'S OFFER			
		COMPLY (Please tick <input type="checkbox"/>) (Provide evidence for compliance(s))		ITEM DESCRIPTIONS AND SPECIFICATIONS	PRICE (\$)
		YES	NO		
3.8	Must be able to safely shutdown of flame upon power failure				
3.9	Flame atomizer must be able to operate Air-C ₂ H ₂ , N ₂ O-C ₂ H ₂ flames with automatic changing between the two flame types				
3.10	Include nebulizer capable of handling hydrofluoric acid containing samples				
<u>4</u>	<u>FURNACE ATOMIZER</u>				
4.1	Heating temperature range must be from ambient to 3,000°C				
4.2	Must be provided with 2 gas inlets (1 for inert gas-Argon and 1 for oxidative gas-Air)				
4.3	Heating control system should have digital temperature control using optical sensor				
4.4	Inner gas flow rate range of 0 to 1.50 L/min with capability to perform automatic switching of 2 gas types in single method				
4.5	Heating program must allow to set up to 20 stages with either ramp or step heating mode				
4.6	Must include additional (on top of the standard consumables given): <ul style="list-style-type: none"> • 5 sets of 10pcs graphite tube, normal • 5 sets of 10pcs graphite tube, pyrolytic 				
<u>5</u>	<u>AUTOSAMPLER</u>				

NO.	ITEM DESCRIPTIONS AND SPECIFICATIONS	VENDOR'S OFFER			
		COMPLY (Please tick <input checked="" type="checkbox"/>) (Provide evidence for compliance(s))		ITEM DESCRIPTIONS AND SPECIFICATIONS	PRICE (\$)
		YES	NO		
5.1	Should be directly triggered from the AAS main unit having completely software controlled operation.				
5.2	Autosampler must accommodate at least 60 vials position ($\geq 15\text{ml}$) for sample and 8 vials position (50ml) for standards.				
5.3	Autosampler should permit access to any vial location of samples and standards				
5.4	Rinse port with overflow wash mechanism to avoid any carryover or contamination from autosampler probe between two sample runs				
5.5	Include 1000pcs of 15ml PP Autosampler Vials				
5.6	Include 1000pcs of 50ml PP Autosampler Vials				
5.7	Include 2 rinse bottle containers of more than 2L size				
5.8	Include at least 500 pipette tips for dispensing				
6	<u>FLOW INJECTION ACCESSORY</u>				
6.1	The flow injection accessory must be automatic and fully controlled via software of the main computer-controlled AAS				
6.2	It should comprise of 1 compact single unit capable of accomplishing the following tasks: Mercury Cold Vapor Technique and Hydride Generation Technique				

NO.	ITEM DESCRIPTIONS AND SPECIFICATIONS	VENDOR'S OFFER			
		COMPLY (Please tick <input type="checkbox"/>) (Provide evidence for compliance(s))		ITEM DESCRIPTIONS AND SPECIFICATIONS	PRICE (\$)
		YES	NO		
6.3	The accessory should consist of 1 peristaltic pump and a switching valve				
6.4	The speed of revolution is user-selectable revolution speed of 20 to 120rpm				
6.5	The switching valve must be made of chemical-resistant material				
6.6	The carrier gas (Argon) for the mercury/hydride generation can be flow controlled from 40 to 250ml/min				
6.7	Control of the gas flow should enable automatic switch-off after operation pauses for 10 minutes				
<u>7</u>	<u>ABSORPTION CELL</u>				
7.1	Absorption cell should consists of removable quartz windows for the mercury cold vapor/hydride generation to be electrically heated with temperature regulated continuously variable from 100°C to 1000°C or by an air-acetylene flame				
<u>8</u>	<u>MERCURY VAPORIZER UNIT (1 UNIT)</u>				
8.1	Measurement method is by circulation method with air flow rate to be at 6L/min				
8.2	Optical path length of the flow cell must be up to 200mm				
8.3	Volume of the sample can be carried up to 250mL				

NO.	ITEM DESCRIPTIONS AND SPECIFICATIONS	VENDOR'S OFFER			
		COMPLY (Please tick \checkmark) (Provide evidence for compliance(s))		ITEM DESCRIPTIONS AND SPECIFICATIONS	PRICE (\$)
		YES	NO		
8.4	Should not require any external gas supply for operation				
8.5	Include 150 reaction vessels which is made up of glass together with its rubber plugs and glass tubes for the reaction vessels				
8.6	Include 6 sets of 10pcs magnetic stirrer				
8.7	Include 5 bottles of Polyethylene Mercury Absorbing Bottle, together with its rubber plugs and glass tubes for the absorbing bottles				
8.8	Include 5pcs of U-Shaped Tubes				
8.9	Include 1 Vinyl Cover				
9	<u>HYDRIDE VAPOR GENERATOR (1 UNIT)</u>				
9.1	For use of highly accurate and fast quantitation of the elements which can be conducted up to the ppb level				
9.2	Continuos flow system with sample consumption variable up to 0-8mL/min and reagent consumption up to 0-3mL/min				
9.3	Include 30 absorption cell				
9.4	Include 50 pump tubes for reagent				

NO.	ITEM DESCRIPTIONS AND SPECIFICATIONS	VENDOR'S OFFER			
		COMPLY (Please tick ✓) (Provide evidence for compliance(s))		ITEM DESCRIPTIONS AND SPECIFICATIONS	PRICE (\$)
		YES	NO		
9.5	Include 40 pump tubes for samples				
9.6	Include 3 reaction coils				
9.7	Include 10 suction tubes for NaBH ₄ with joints				
9.8	Include 10 suction tubes for HCl with joints				
9.9	Include 3 suction tubes for samples with joints				
9.10	Include 10 suction tubes for ASC with joints				
9.11	Include 2 spare gas/liquid separator				
9.12	Include 10 complete reagent bottles				
9.13	Include 100pcs of 200ml Volumetric Flasks				
10.0	ATOMIC MUFFLER FURNACE FOR HVG (1 UNIT)				
10.1	Able to provide higher sensitivity for flame heating with availability of temperature controller to give an optimum control of the quartz glass cell temperature				

NO.	ITEM DESCRIPTIONS AND SPECIFICATIONS	VENDOR'S OFFER			
		COMPLY (Please tick <input type="checkbox"/>) (Provide evidence for compliance(s))		ITEM DESCRIPTIONS AND SPECIFICATIONS	PRICE (\$)
		YES	NO		
11	<u>ANALYTICAL STANDARDS AND CHEMICALS</u>				
11.1	Include the following analytical standards and chemicals required for the analysis together with its Certificate of Analysis				
11.2	3 bottles of Arsenic Analytical Standard Solution (1000mg/L, 100ml)				
11.3	3 bottles of Cadmium Analytical Standard Solution (1000mg/L, 100ml)				
11.4	3 bottles of Copper Analytical Standard Solution (1000mg/L, 100ml)				
11.5	3 bottles of Lead Analytical Standard Solution (1000mg/L, 100ml)				
11.6	3 bottles of Mercury Analytical Standard Solution (1000mg/L, 100ml)				
11.7	3 bottles of Manganese Analytical Standard Solution (1000mg/L, 100ml)				
11.8	3 bottles of Palladium Analytical Standard Solution (1000mg/L, 100ml)				
11.9	3 bottles of Zinc Analytical Standard Solution (1000mg/L, 100ml)				
11.10	30 bottles of Concentrated Nitric Acid (65%, 2.5L)				

NO.	ITEM DESCRIPTIONS AND SPECIFICATIONS	VENDOR'S OFFER			
		COMPLY (Please tick ✓) (Provide evidence for compliance(s))		ITEM DESCRIPTIONS AND SPECIFICATIONS	PRICE (\$)
		YES	NO		
11.11	30 bottles of Concentrated Hydrochloric Acid (37%, 2.5L)				
11.12	20 bottles of Concentrated Sulphuric Acid (98%, 2.5L)				
11.13	20 bottles of Hydrogen Peroxide (30%, 2.5L)				
11.14	5 bottles of Sodium Borohydride (500g)				
11.15	5 bottles of Potassium Iodide (500g)				
11.16	20 bottles of Tin (II) Chloride (500g)				
11.17	20 bottles of Potassium Permanganate (500g)				
11.18	20 bottles of Magnesium Perchlorate (500g)				
12	<u>DATA MANAGEMENT SYSTEM</u>				
12.1	Desktop system with specifications following manufacturer's recommendations including the following: <ul style="list-style-type: none"> • Genuine latest Microsoft Windows software compatible for use with the AAS-MVU software • Genuine latest Microsoft Office Software which should include Word, Excel and Powerpoint 				

NO.	ITEM DESCRIPTIONS AND SPECIFICATIONS	VENDOR'S OFFER			
		COMPLY (Please tick ✓) (Provide evidence for compliance(s))		ITEM DESCRIPTIONS AND SPECIFICATIONS	PRICE (\$)
		YES	NO		
	<ul style="list-style-type: none"> • Colour Laserjet printer • 3 toner cartridges for each colour (staggered delivery; upon request over the warranty period) AAS-MVU software licence				
12.2	Must be supplied with software designed for use with the instrument				
12.3	Software should permit: <ul style="list-style-type: none"> • Controlled user access • Automatic check for proper functioning of lamp, detector and background corrector • Record of lamp time usage • Real time graphics • Compute statistical values • Multiple calibration formats • Reprocess all stored data 				
12.4	Two (2) latest and compatible tablet must also be supplied with the latest Windows operating system with standard accessories to be discussed and agreed with end user.				
13	<u>OPERATING ACCESSORIES</u>				
13.1	Include suitable power supply rating of UPS connected to the instrument system and workstation				
13.2	Include suitable and recommended air compressor for use with the offered equipment system				

NO.	ITEM DESCRIPTIONS AND SPECIFICATIONS	VENDOR'S OFFER			
		COMPLY (Please tick ✓) (Provide evidence for compliance(s))		ITEM DESCRIPTIONS AND SPECIFICATIONS	PRICE (\$)
		YES	NO		
13.3	Include suitable and recommended cooling water circulator for use with the offered equipment system				
13.4	Any items or operating accessories not stated but required for safe and successful operation of the equipment system should be included				
14	<u>SITE PREPARATION</u>				
14.1	It is MANDATORY for the tenderer to do site visit prior to tender submission to discuss site requirements. A site visit form will be provided during the visit as evidence. Non-attendance will be considered as non-compliance.				
14.2	The following work if required should be included and listed: - gas piping including outlets and regulators - electrical supply including wiring, outlets and isolators - fabrication and/or modification of work bench any other deemed necessary to ensure successful and safe installation and operation of the system				
14.3	The tenderer shall ensure that the site preparation for the placement of the system taking into the consideration on the safety of the end user during operation of the instrument				
15	<u>DOCUMENTATION</u>				
15.1	The tenderer must provide the mandatory operation, service and spare parts manual				
15.2	On-site validation and commissioning report				

NO.	ITEM DESCRIPTIONS AND SPECIFICATIONS	VENDOR'S OFFER			
		COMPLY (Please tick ✓) (Provide evidence for compliance(s))		ITEM DESCRIPTIONS AND SPECIFICATIONS	PRICE (\$)
		YES	NO		
16	<u>TRAINING</u>				
16.1	On-site training for ALL staff members expected to handle the machine. Please ensure that adequate time is allocated such that training will take place in small groups to minimize staff shortage in the laboratory				
16.2	Certificate of competence is to be issued to all trainees after completion of training				
16.3	Provide hardcopy and softcopy of training notes				
16.4	The successful tenderer needs to ensure the key users are updated on the current or relevant information related to the system used. They should provide ONE (1) off-site benchwork training for TWO (2) key users at ISO 17025 accredited laboratory for not less than 5 days . All expenses for attending the benchwork training shall be borne by the vendor; full registration, air ticket, daily allowance, insurance, accommodation, transport to and from the airport and place of training.				
17	<u>WARRANTY</u>				
17.1	A minimum of one (1) year warranty for manufacturer's defect on the hardware, software and all cost of repairs and/or replacements should be included				
17.2	After-sales services must be provided for the product after one (1) year				

NO.	ITEM DESCRIPTIONS AND SPECIFICATIONS	VENDOR'S OFFER			
		COMPLY (Please tick ✓) (Provide evidence for compliance(s))		ITEM DESCRIPTIONS AND SPECIFICATIONS	PRICE (\$)
		YES	NO		
17.3	<p>One-off preventive maintenance to be carried out just before or soon after the one-year warranty period. Scope of work to follow manufacturer's manual / recommendation specific for the equipment offered, which include:</p> <ul style="list-style-type: none"> • Supply, delivery and installation of preventive maintenance kits and/or consumables • Software update (to obtain prior authorization from user and BME) • Inspection • Cleaning • Alignment • Calibration • Any other related preventive maintenance works required 				
18	<u>DELIVERY</u>				
18.1	<p><u>DELIVERY</u> Items offered MUST be delivered within _____ from date of approval. (Vendor to indicate the delivery period.)</p>				
19	<u>PRICE VALIDITY</u>				
19.1	<p><u>PRICE VALIDITY</u> Price validity MUST NOT BE LESS THAN 90 days or three (3) months.</p>				
TOTAL PRICE (B\$)					

NO.	GENERAL SPECIFICATIONS	VENDOR'S OFFER
A	Total Price: B\$	
B	Delivery Period:	
C	Model & Brand:	
D	Country of Origin:	
E	Where marketed:	
F	Year of Manufacture:	
G	Warranty:	
H	Power Requirement:	
I	Battery Back-up:	
J	International Safety Standard:	
K	Technical Support:	
L	Equipment Whole Life Support:	
M	Dimensions (WxHxD) cm:	
N	User Manuals:	
O	Service Manuals:	
P	Spare-parts & Consumables Listing:	
Q	Technical Training On-Site:	
R	Site Requirements:	

*To all participating companies, please fill in the table above along with your other documents during submission of tender.

1. We offer and undertake on your acceptance of our Tender to provide the above mentioned services in accordance with your Invitation To Tender.
2. Our Tender is fully consistent with and does no contradict or derogate from anything in your Invitation To Tender. We have not qualified or changed any of the provisions of your Invitation To Tender.
3. OUR OFFER IS VALID FOR **TWELVE (12)** CALENDAR MONTHS FROM THE TENDER CLOSING DATE.
4. When requested by you, we shall extend the validity of this offer.
5. We further undertake to give you any further information which you may require.

Dated this _____ day of _____, _____.

[Signature of authorised officer of Tenderer]
Name:
Designation:

Tenderer's official stamp