



Government of West Bengal
Office of the Administrator and Director, Forensic Science and laboratory,
Home and Hill Affairs Department, Police Establishment Branch
37/1/2 Belgachia Road, Kolkata-700037.

Memo No: 35/CON/A/FSL

Date: 18/11/24

Corrigendum

Please find the revised and amended specifications of instruments as per Annexure A, of e-Tender no SFSL/KOL/ET-06/2024-25, Tender ID no-2024_WBFSL_768258_1.

Sd/-
Administrator,
Forensic Science and laboratory,
West Bengal

PHYSICS DIVISION

Item No.1 Bench Top X-Ray Fluorescence Spectrometer

1. General Specifications

- The instrument should have analysis range of elements Sodium (Na) to Uranium (U).
- Sensitivity - 1 ppm to 100%
- X-ray tube Voltage & Current – 8 to 50 kV and up to 1 mA
- At least 03 types of Collimator
- At least 05 primary filters and optional filters with automatic exchange.
- High performance semi-conductor detector.
- Colour camera for chamber observation
- Radiation Shielding and warning indicator for X-Ray emission

2. Analysis Software Requirements

- Qualitative analysis (Automatic, KLM marker, Sum peak display, Spectrum search)
- Quantitative analysis (Bulk FP method, Calibration curve method)
- RoHS analysis solution (Cd, Pb, Cr, Br, Hg)
- Simplified analysis solution
- Report creation and daily check features.

3. Computer Accessories

Suitable software compliance with Indian IT Act and rules; Reputed Brand of PC with touch screen monitor and LaserJet Printer; and 5 KVA Online UPS having minimum 30 minutes battery backup of latest model should be supplied.

4. Training:

Training should be imparted for FSL West Bengal personnel on operation, maintenance and troubleshooting problems at the place of installation.

5. Warranty and AMC:

The warranty of the equipment should be for a period of at least 03 years from the date of installation. During the warranty period free upgrades of the software, if any, should be provided. The supplier should undertake to execute AMC (annual maintenance contract) for three years after warranty is over at the cost of not more than 10% of the cost of instrument which will be paid during the period of AMC.

6. Miscellaneous :

- The offered model should have international CE/ ISO certificates.
- Instrument should be compact bench top device for use in forensic lab and industrial environment.
- Instrument should work with stable power supply from 100 to 240 V AC, 50 to 60 Hz.
- Vendor should have proven track record and should provide at least 02 installation details in various Forensic Labs, Government Institutes in last five years along with institute name, customer details contact details as per requirement.
- Vendor should have a service engineer stationed in Kolkata/ eastern region or preferably have a branch office for attending to problems, if any during the warranty/ AMC period.

Item No.2 Hand Held X-Ray Fluorescence Spectrometer

1. General Specifications

- The instrument should have analysis range of elements Magnesium (Mg) to Uranium (U).
- Sensitivity - 1 ppm to 100%
- X-ray tube Voltage – 8 to 50 kV
- Collimator 3mm, 5mm and 8 mm
- At least 05 primary filters and optional filters with automatic exchange.
- High performance semi-conductor detector. Shield against possibility of puncture.
- Adjustable angle, robust construction, weighing ≤ 2.0 kg.
- Should be of dust, water and shock proof rugged construction with compliance to MIL 810 standards.
- Colour touch screen display.
- Radiation Shielding and warning indicator for X-Ray emission.

2. Analysis Software Requirements

- Qualitative analysis (Automatic, KLM marker, Sum peak display, Spectrum search)
- Quantitative analysis (Bulk FP method, Calibration curve method)
- RoHS analysis solution (Cd, Pb, Cr, Br, Hg)
- Simplified analysis solution
- Report creation and daily check features.

3. Computer and Accessories

- Suitable software compliance with IT Act and rules.
- The device should come with minimum 128 Mb internal memory.
- The software suite should allow the operator to set permissions, generate custom reports, print certificates of analysis, or remotely monitor and operate the instrument hands-free from a PC.
- Provision for integrated USB and Bluetooth communication for direct data transfer to a PC or networked storage device should be available.
- The battery life of the device should be minimum 10 hours continuous operation.

4. Training:

Training should be imparted for FSL West Bengal personnel on operation, maintenance and troubleshooting problems at the time of supply.

5. Warranty and AMC:

The warranty of the equipment should be for a period of at least 03 years from the date of supply. During the warranty period free upgrades of the software, if any, should be provided. The supplier should undertake to execute AMC (annual maintenance contract) for three years after warranty is over at the cost of not more than 10% of the cost of instrument which will be paid during the period of AMC.

6. Miscellaneous :

- The offered model should have international CE/ ISO certificates.
- Instrument should be compact device for use in the field, forensic lab and industrial environment.

- Instrument should be chargeable with stable power supply from 100 to 240 V AC, 50 to 60 Hz.
- Vendor should have proven track record and should provide at least 02 installation details in various Forensic Labs, Government Institutes in last five years along with institute name, customer details contact details as per requirement.
- Vendor should have a service engineer stationed in Kolkata/ eastern region or preferably have a branch office for attending to problems, if any during the warranty/ AMC period.

Item No.3 Density Gradient Meter for Solid

1. General Specifications

The instrument should have the ability to test any type of solid such as rubber, plastic, cables, hard alloy, glass, metal, powder, ceramics, fireproofing materials, magnetic materials, mineral and rock, cement, jewelry, etc.

- The instrument should have the following basic specifications –
 - Capacity : 0.005-600 g
 - Density resolution : 0.001 g/cm³
 - Density range : 0.001 to 99.999 g/ cm³
 - Measuring time : ≤ 5s
 - Measuring principle : Archimedes principle
 - Measuring frame : Unibody injection frame
 - Measuring tank : Unibody injection forming transparent measuring tank
- Instrument should have features like automatic zero tracking, buzzer warning, and overload warning. It should be capable of using water or other kind of liquid as measurement medium.
- Provision for integrated USB and Bluetooth communication for direct data transfer to a PC or networked storage device should be available.

2. Training:

Training should be imparted for FSL West Bengal personnel on operation, maintenance and troubleshooting problems at the time of supply.

3. Warranty and AMC:

The warranty of the equipment should be for a period of at least 03 years from the date of supply. During the warranty period free upgrades of the software, if any, should be provided. The supplier should undertake to execute AMC (annual maintenance contract) for three years after warranty is over at the cost of not more than 10% of the cost of instrument which will be paid during the period of AMC.

4. Miscellaneous :

- The offered model should have international CE/ ISO certificates.
- Instrument should be compact bench top device for use in the forensic lab and industrial environment.
- Instrument should be useable with stable power supply from 100 to 240 V AC, 50 to 60 Hz.
- Vendor should have proven track record and should provide at least 05 installation details in various Forensic Labs, Government Institutes in last five years along with institute name, customer details contact details as per requirement.

- Vendor should have a service engineer stationed in Kolkata/ eastern region or preferably have a branch office for attending to problems, if any during the warranty/ AMC period.

Item No.4 ABBE 1.5 Refractometer

1. General Specifications

The instrument should have the ability to measure the refractive index of solid and liquid samples.

- The instrument should have the following basic specifications –
 - Measurement range Refractive index : nD 1.30000 to 1.70000
 - Measurement range dissolved solids : Brix 0-100%
 - Accuracy refractive index : nD \leq + 0.0002
 - Accuracy Dissolved Solids : Brix \leq +0.1%
 - Temperature Range : 0°C to 50°C
 - Temperature Resolution : 0.1°C
 - Correcting Range of Brix Vs. Temp. : 15°C to 45°C
- The instrument should have digital display on colour touch screen and provision for USB and Bluetooth communication for direct data transfer to a PC or networked storage device.
- The device should come with an internal memory of 16 GB.

2. Training:

Training should be imparted for FSL West Bengal personnel on operation, maintenance and troubleshooting problems at the time of supply.

3. Warranty and AMC:

The warranty of the equipment should be for a period of at least 03 years from the date of supply. During the warranty period free upgrades of the software, if any, should be provided. The supplier should undertake to execute AMC (annual maintenance contract) for three years after warranty is over at the cost of not more than 10% of the cost of instrument which will be paid during the period of AMC.

4. Miscellaneous :

- The offered model should have international CE/ ISO certificates.
- Instrument should be compact bench top device for use in the forensic lab and industrial environment.
- Instrument should be useable with stable power supply from 100 to 240 V AC, 50 to 60 Hz.
- Vendor should have proven track record and should provide at least 03 installation details in various Forensic Labs, Government Institutes in last five years along with institute name, customer details contact details as per requirement.
- Vendor should have a service engineer stationed in Kolkata/ eastern region or preferably have a branch office for attending to problems, if any during the warranty/ AMC period.

Item No.5 Forensic Video authentication and Video Enhancement Software with Accessories

1. General

The video analysis and authentication software should be able to analyse various formats of videos along with audio and be able to authenticate the originality of the recording. Should be able to accept all input media devices like CD/DVD/USB/Media Cards/Network etc. and be able to support export to all such output devices.

2. Basic Functionalities

The software should have the following basic functionalities –

- a) Support video and audio formats: avi, mp4, m4v, mov, wmv, asf, mkv, mpg, mpeg, mts, dav, bmp, jpg, dvd and such other formats;
- b) Frame by frame video playback in forward and reverse direction;
- c) Video playback and audio synchronized playback;
- d) Frame image zoom with interpolation;
- e) Image normalization using brightness, contrast and color adjustments;
- f) De-Interlacing using the first or second half-frame;
- g) Image or image sequence export.

3. Search for Traces of Inter-frame Editing/ Manipulation

Video Continuity

- a) Brightness graph analysis:
 - Graph of brightness of a selected area (including all frame);
 - Dynamic spectrogram of brightness graph (frame size and type);
 - Narrowband harmonics detection;
 - Energy and phase plots of selected harmonic continuity analysis (frame size, step, initial phase);
 - Copy/Paste search in brightness graph (autocorrelation analysis using decision making threshold);
 - Display of copy/paste fragments in two video display windows for detailed comparison;
- b) Date/Time stamp automatic recognition:
 - Different date/time stamp shapes recognition algorithms;
 - Automatic recognition of date/time stamp values;
 - Numbers with/without stroke;
 - Numbers with/without stroke;
 - Indicating digit area;
 - Marking frames with date/time stamp value changing;
 - Output of date/time stamp recognition results in table form;
 - Plotting of date/time stamp recognition results:
 - Frame PTS on frame number;
 - Date/Time stamp on frame number;
 - Time difference between frames on PTS of a frame;
 - Number of frames with matching values

Video Frame Integrity

- a) Coding errors of digital image (ELA) detection;

- Calculation and visualization of two dimensional graph of quantization errors for video frames and images;
 - Detection of degree of compression of JPEG algorithm to calculate the quantization error graph;
 - Zoom and navigate in the plane of the quantization errors graph;
 - Synchronization of quantization errors graph and the original image in two video display windows.
- b) Pixel brightness dispersion analysis (detection of insertions):
- Calculation and visualization of a two dimensional graph of brightness dispersion;
 - Histogram of the two dimensional graph of brightness dispersion;
 - Contrasting of brightness dispersion using histogram;
 - Zoom and navigate in the plane of brightness dispersion;
 - Synchronization of brightness dispersion graph and the original image in two video display windows
- c) Image color gradient analysis (detection of insertions):
- Calculation and visualization of a two dimensional graph of color gradients;
 - Color gradient graph calculation:
 - Using Scharr operator;
 - Using Sobel operator;
 - Contrasting of color gradient using a relay filter;
 - Zoom and navigate in the plane of color gradient;
 - Synchronization of color gradient graph and the original image in two video display windows.
- d) The software should be able to display of frame difference in video frames sequence.

4. Video Recording Device Identification:

- a) File structure analysis (correct parsing and format check);
- Information detailing for every header field;
 - HEX and ANSI data representation;
 - Frame allocation mapping;
 - Software traces detection;
 - All metadata extraction (XML, GPS, etc.)
- b) Date/Time stamp overlay image analysis;
- c) PRNU analysis (unevenness of video matrix elements);
- Calculation and visualization of a two dimensional graph of unevenness of photosensitive elements of the matrix;
 - Contrasting of the graph of unevenness of photosensitive elements of the matrix using histogram;
 - Zoom and navigate in the plane of unevenness of photosensitive elements of the matrix;
 - Synchronization of unevenness of photosensitive elements of the matrix graph and the original image in two video display windows;
 - Automatic detection of maximum and minimum values of unevenness of photosensitive elements of the matrix graph;
 - Automatic comparison of unevenness of photosensitive elements of the matrix graphs for different video recorders.

5. Video Image Enhancement and Analysis

- The software should be able to capture compressed / uncompressed audio data from a variety of video source including CCTV.
- The system should have editing features such as crop, flip rotate, resize de-interlace.
- The system should have the capability to –
 - Extract and compare the frames.
 - Pre-processing of the video signal and image clarification
 - Video de-multiplexing and stabilization
 - Process digital (DVR) or analogue video evidence
 - DVR security, video decode, digital video (DVR) files from proprietary security system into the uncompressed video
 - Enhance dark video and poor-quality video, security and surveillance video
 - De-interlace field recorded forensic video to avoid blurry stills printed from video frame averaging
 - Facility for enhancement of image / video by Laplacian filtering, Gaussian, Bilateral, Wiener, de-blocking filters or other suitable filters for forensic applications
 - Support for enhancement / noise suppression (Signal SNR up to 4dB)
 - Playback Speed Adjustment
 - Variable slow motion speed adjustment to compensate for time lapsed video.
- The system should be compatible with digital and the analogue video, still image and should be scalable with different modules.
- The system should have the facility to analyse with photogrammetric tools and measurement tools.
- It should export & import all kinds of encrypted file formats.
- Auto-detection to identify the manufacturer, format, codec and version.
- Maintain a clean and reliable operating system which cleans up after each player to prevent corruption and conflicts.
- Should have image processing like Histogram Equalization, Advanced Filters, Image Alignment, Colour Correction, Colour channel conversion to greyscale etc.
- Should have image masking and tracking facilities with Highlight, Pixelate, Blur or Mask with immediate preview (without Rendering). Should be able to stabilise a sequence of video based on object tracking.
- The system should have the facility to integrate recorded consecutive and non-consecutive images within a sequence.
- Should be able to create reports and documents with embedded images.
- Should keep audit trail recording all user actions and processes.

6. Software, Hardware and other Accessories

- Software should come with a perpetual licence. During the warranty and AMC period free upgrades of the software, if any, should be provided.
- Reputed Brand of PC Workstation of latest model with latest OS, HD quality Monitor and colour laser Printer with 5 KVA Online UPS with 30 minutes battery backup should be supplied.
- Two (02) Studio Quality headphones
- Keyboard and Mouse

7. Training:

Training should be imparted for FSL West Bengal personnel on operation, maintenance and troubleshooting problems at the place of installation.

8. Warranty and AMC:

The warranty of the equipment should be for a period of at least 03 years from the date of installation. The supplier should undertake to execute AMC (annual maintenance contract) for three years after warranty is over at the cost of not more than 10% of the cost of instrument which will be paid during the period of AMC.

9. Miscellaneous :

- The offered model should have international CE/ ISO certificates.
- The system must be factory tested and a certificate should be provided.
- Instrument should be compact bench top device for use in forensic lab and industrial environment.
- Instrument should work with stable power supply from 100 to 240 VAC, 50 to 60 Hz.
- Vendor should have proven track record and should provide at least 03 installation details in various Forensic Labs, Government Institutes in last five years along with institute name, customer details contact details as per requirement.
- Vendor should have a service engineer stationed in Kolkata/ eastern region or preferably have a branch office for attending to problems, if any during the warranty/ AMC period.

Item No.6 Geiger Mullar Counter

1. General Specifications

It should be able to detect all kinds of ionizing radiation such as alpha particles, beta particles, and gamma rays. It should be safe to handle.

- Working Principle - using the ionization effect produced in a Geiger-Müller tube.
- Hand-held instrument with swivel display and robust construction.
- Should be of dust, water and shock proof rugged construction with compliance to IP-68 & MIL 810 standards.
- Large display screen with adjustable backlight and contrast for easy viewing.
- Suitable OS for connectivity and data visualization on any paired device/ phone
- Text mode displays detailed information like CPM, date, time, elapsed time, dose rate ($\mu\text{Sv/h}$, mR/h), etc.
- Open protocol for data export.
- Provision for USB and Bluetooth communication for direct data transfer to a PC or networked storage device.
- Audio data port and internal speaker.
- The device should work on AA batteries and come with an internal flash memory of at least 1 MB and slot for memory stick.
- Internal data logger and real-time clock.

2. Training:

Training should be imparted for FSL West Bengal personnel on operation, maintenance and troubleshooting problems at the time of supply.

3. Warranty:

The warranty of the equipment should be for a period of at least 03 years from the date of supply. During the warranty period free upgrades of the software, if any, should be provided.

4. Miscellaneous :

- The offered model should have international CE/ ISO certificates.
- Instrument should be compact device for use in the field, forensic lab and industrial environment.
- Vendor should have proven track record and should provide at least 05 supply details in various Forensic Labs, Government Institutes in last five years along with institute name, customer details contact details as per requirement.
- Vendor should have a service engineer stationed in Kolkata/ eastern region or preferably have a branch office for attending to problems, if any during the warranty/ AMC period.

Item No.7 Mirror less Digital SLR Camera

1. General Specifications

The mirror less digital single lens reflex camera should be compact, rugged and easy to handle. It should meet the following requirements –

- Form factor – Mirror less
- Lens – Interchangeable, 18-135 mm with zoom lens
- Optical zoom – 3 X
- Aspect ratio – 1.35 : 1
- Max. shutter speed – 1/8000 second
- Min. shutter speed – 30 seconds
- Video resolution – Full HD 4000p
- Optical sensor resolution – 45 mp
- Shooting speed – 10 fps
- Battery – Rechargeable lithium-ion battery
- The camera should have LCD display on 180° tiltable colour touch screen.
- Camera should come with an internal flash memory of at least 1 MB and slot for memory stick.
- Provision for USB, Bluetooth and wi-fi communication for direct data transfer to a PC or networked storage device.

2. Training:

Training should be imparted for FSL West Bengal personnel on operation, maintenance and troubleshooting problems at the time of supply.

3. Warranty:

The warranty of the equipment should be for a period of at least 03 years from the date of supply. During the warranty period free upgrades of the software, if any, should be provided.

4. Miscellaneous :

- The offered model should have international CE/ ISO certificates.
- Instrument should be compact device for use in the field, forensic lab and industrial environment.
- Vendor should have proven track record and should provide at least 05 supply details in various Forensic Labs, Government Institutes in last five years along with institute name, customer details contact details as per requirement.
- Vendor should have a service engineer stationed in Kolkata/ eastern region or preferably have a branch office for attending to problems, if any during the warranty/ AMC period.

Item No.8 Fourier-Transform Infrared (FTIR) Spectrometer

1. General Specifications

FTIR spectrometer should be able to determine functional groups of different samples solid, liquid or gas including narcotic drugs, explosives, organic and inorganic chemicals, pesticides, additives, surfactants etc. The spectrometer should meet the following requirements –

- Spectral Range – 350 to 7000 cm^{-1}
- Spectral Resolution – Better than 1.0 cm^{-1}
- Infra-red source – Air-cooled, high intensity IR source
- Beam splitter – Moisture resistant coating
- Wave number precision – repeatability 0.001 cm^{-1}
- Wave number accuracy – less than 0.1 cm^{-1}
- Detector – Temperature-controlled, high sensitivity detector
- Signal to Noise Ratio – 35,000 :1 or better for one minute measurement
- Interferometer should have highest stability, insensitive to mirror tilt, mechanical vibration or temperature variations.
- System should not require inert gas purging.

2. Software, Hardware and other Accessories

The FTIR Spectrometer should be software based fully PC controlled with USB/Ethernet based interface. Software will be used for data measurement, manipulation, and evaluation with a step-by-step assistance. During the warranty and AMC period free upgrades of the software, if any, should be provided. The following hardware/ accessories should also be supplied:-

- Reputed Brand of PC Workstation of latest model with latest OS, Monitor and colour laser Printer with 5 KVA Online UPS with minimum 30 minutes battery backup.
- Keyboard and Mouse.
- Software should include IR library containing minimum 10,000 spectra and possibility to create user's own library.
- Transmission Unit.
- Universal ATR with pure monolithic Diamond Crystal (non-glued) for direct analysis of solid, liquid, paste, and powder and gel samples without sample preparation.
- 15-ton Hydraulic Press, KBr Powder, KBr Die Set, Agate Mortar Pastel, Pellet Holder, Liquid demountable cell with KBr window, Nujol (25ml).
- Additional Desiccant Pack from manufacturer - 05 Nos.

3. Training:

Training should be imparted for FSL West Bengal personnel on operation, maintenance and troubleshooting problems at the place of installation.

4. Warranty and AMC:

The warranty of the equipment should be for a period of **at least 04 years** from the date of installation. The supplier should undertake to execute AMC (annual maintenance contract) for three years after warranty is over at the cost of not more than 10% of the cost of instrument which will be paid during the period of AMC. **Ten (10) years warranty shall be available for laser, IR source, interferometer and UATR.**

5. Miscellaneous :

- The offered model should have international CE/ ISO certificates.
- The system must be factory tested and a certificate should be provided.
- Instrument should be compact bench top device for use in forensic lab and industrial environment.
- Instrument should work with stable power supply from 100 to 240 VAC, 50 to 60 Hz.
- Vendor should have proven track record and should provide at least 03 installation details in various Forensic Labs, Government Institutes in last five years along with institute name, customer details contact details as per requirement.
- Vendor should have a service engineer stationed in Kolkata/ eastern region or preferably have a branch office for attending to problems, if any during the warranty/ AMC period.

Item No.9 Multi Spectral Imaging System (Video Spectral Comparator)

1. General Specifications

- High-Resolution CCD/ digital FireWire
- Color Camera of 1.3 megapixel and above
- Camera Spectral Response range 74 approx. 350 – 1100 nm
- Hyper Spectrometer

2. Optics

- 30" flat screen monitor
- Magnification up to x170
- Field of view 74 approx. 200 x 150 nm

3. Illumination

- Long Wave incident UV at 365 nm
- Medium Wave incident UV at 312 / 313 nm
- Short Wave incident UV at 254 nm
- Long Wave transmitted UV at 365nm
- Visible & IR Incident High-Intensity Light
- Visible / Infrared Transmitted Flood Light
- IR illumination for Anti-Stokes features detection
- IR Luminescence

4. Image Comparison & Transformation

- Superimposition of Live and stored image with the adjustable mix, 0 to 100%
- Variable Speed Image storable between a live and a stored image

- Left to right image reversal (Horizontal image reversal)
- Top to bottom image reversal (Vertical image reversal)
- Grey level reversal (Positive to negative)
- Image rotation through any angle
- Contract / Stretch
- Image processing, Image quality enhancement filters, Multi-layer imaging,
- IPI decoder, OVI viewer, MRZ decoder

5. Image Measurements

- Distance between two points
- The area within a user-defined box
- The radius of a circular feature from three peripheral points
- The angle between two lines
- Area of user-defined shape
- Area of selected features i.e. An alphanumeric character or logo

6. Software, Data Base and Computer Hardware

- ICAO data reader
- Hidden Image Decoder
- Histogram Stretching
- Case Work
- Side By Side Comparison Of Live & Stored Image
- Color Measurement to measure color Coordinates
- Comparison of spectrum for whole UV, visible & NIR region
- Split Screen for simultaneous ink analysis on two separate documents
- Calibration procedure including measuring statistics, image analysis, Processing and reporting P.C operating system Windows
- X-Y translator Stage, Polari safe viewer for UV
- Passport database
- Bank Note database
- Compatible Computer hardware for the high-resolution spectral comparator of the latest version is to be quoted.
- It should have a range of application focused workspaces providing tools and functions specific to the document being examined.
- Display diagnostic reports on-screen or output as PDF format.
- During the warranty and AMC period free upgrades of the software, if any, should be provided.
- The following hardware/ accessories should also be supplied:-
 - Reputed Brand of PC Workstation of latest model with latest OS, Monitor and colour laser Printer with 5 KVA Online UPS with 30 minutes battery backup.
 - Keyboard and Mouse.
 - The supply should include a Calibration Tool automatic calibration of filters and light sources, automated diagnostics to check the status of motors, light sources and filters along with lamp life monitoring and lamp failure detection features.

7. Training:

Training should be imparted for FSL West Bengal personnel on operation, maintenance and troubleshooting problems at the place of installation.

8. Warranty and AMC:

The warranty of the equipment should be for a period of at least 03 years from the date of installation. During the warranty period free upgrades of the software, if any, should be provided. The supplier should undertake to execute AMC (annual maintenance contract) for three years after warranty is over at the cost of

not more than 10% of the cost of instrument which will be paid during the period of AMC.

9. Miscellaneous :

- The offered model should have international CE/ ISO certificates.
- The system must be factory tested and a certificate should be provided.
- Instrument should be compact bench top device for use in forensic lab and industrial environment.
- Instrument should work with stable power supply from 100 to 240 VAC, 50 to 60 Hz.
- Vendor should have proven track record and should provide at least 03 installation details in various Forensic Labs, Government Institutes in last five years along with institute name, customer details contact details as per requirement.
- Vendor should have a service engineer stationed in Kolkata/ eastern region or preferably have a branch office for attending to problems, if any during the warranty/ AMC period.

Item No.10 Full Spectrum UV/ IR Camera Forensic Kit

1. General Specifications

The UV/ IR camera should have the following specifications –

- 24 MP CMOS Sensor
- DIGIC 8 Image Processor or equivalent
- 4024p Video Full HD or better
- Dual Pixel CMOS /AF 30 mm or better
- 6.5 fps Electronic Shutter or better
- Touch Screen Display
- Wi-Fi and Bluetooth with SD Card Slot
- AF- F 12-52 mm f/1.8 - 6.0 Lens

2. Accessories

The Camera forensic kit should also include the following –

- FTZ Adapter or motorized housing
- 12mm F Macro Focus Lens Adapter or in-built lens & filters
- 52mm UV Bandpass Lens Filter
- 52mm Color-Correcting UV/IR-Cut Lens Filter
- 52mm 720nm Infrared Lens Filter
- 52mm 850nm Infrared Lens Filter
- EN-EL 15C Battery or equivalent
- Charger
- Neck Strap
- Multispectral IR/UV Flash or equivalent
- Rail-Mounted IR Focus Assist Flashlight or equivalent
- Rail-Mounted UV Focus Assist Flashlight or equivalent
- Set of Focus Assist Flashlight Batteries or equivalent
- Off-Camera Flash Stand or tripod
- Flash Storage Pouch
- Adjustment Tool
- Custom Hard Case

3. Training:

Training should be imparted for FSL West Bengal personnel on operation, maintenance and troubleshooting problems at the place of installation.

4. Warranty and AMC:

The warranty of the equipment should be for a period of at least 03 years from the date of installation. During the warranty period free upgrades of the software, if any, should be provided. The supplier should undertake to execute AMC (annual maintenance contract) for three years after warranty is over at the cost of not more than 10% of the cost of instrument which will be paid during the period of AMC.

5. Miscellaneous :

- The offered model should have international CE/ ISO certificates.
- The system must be factory tested and a certificate should be provided.
- Instrument should be a compact device for use in forensic lab and industrial environment.
- Instrument should work with the battery supplied along with the kit and batteries should be chargeable with power supply from 100 to 240 VAC, 50 to 60 Hz.
- Vendor should have proven track record and should provide at least 03 installation details in various Forensic Labs, Government Institutes in last five years along with institute name, customer details contact details as per requirement.
- Vendor should have a service engineer stationed in Kolkata/ eastern region or preferably have a branch office for attending to problems, if any during the warranty/ AMC period.

Item No.11 Muzzle Velocity Measuring System

1. General Specifications

The system should work on the principle of optical gates movable to any place. The system should have LED Diode IR based Sensor, having long life and measure velocity at a point.

It should comply with the following –

- Measuring base – 1000 mm base length between optical gates
- Calibre range – 4.0 mm to 40.0 mm
- Velocity range – 25 to 2000 m/s
- Resolution for velocity – 0.1 m/s.
- Velocity Accuracy – 0.1 %
- Rate of Fire range – 2 to 10,000 rpm
- Effective Sensor area – 750 x 750 mm (HxW)
- Safe passage area – 800 x 800 mm (HxW)

Projectile Yaw Measurement System

- Two (02) pieces of high speed detectors (X and Y)
- Velocity – up to 2000 m/s
- Maximal caliber – 30 mm
- Accuracy ± 0.5 degree
- Signal Acquisition Unit
- Connection with triggering device

2. Software, Hardware and other Accessories

- Software should be able to record all measured values and consequently calculate the statistics value of measured group of rounds. The result should display on PC with BMS software (Ballistic Measurement Software) instantly without using any additional software mode and result should be display on software window only.
- Software should show graph of bullet passage thru gates.
- Report generation from Ballistic Measurement software directly. Ethernet / Wi-Fi.
- Laptop with 16GB Ram, Hard disk 500 GB SSD, 14" Display, latest Windows OS and ink tank colour Printer with Scanner.
- Calibration equipment should be supplied for Velocity.

3. Training:

Training should be imparted for FSL West Bengal personnel on operation, maintenance and troubleshooting problems at the place of installation.

4. Warranty and AMC:

The warranty of the equipment should be for a period of at least 03 years from the date of installation. During the warranty period free upgrades of the software, if any, should be provided. The supplier should undertake to execute AMC (annual maintenance contract) for three years after warranty is over at the cost of not more than 10% of the cost of instrument which will be paid during the period of AMC.

5. Miscellaneous :

- The offered model should have international CE/ ISO certificates.
- The system must be factory tested and a certificate should be provided.
- Supplier must ensure that supplied equipment is tested at their firing range for quality parameter checking along with OEM having ballistic quality standard certificate as a manufacturer of Ballistic Equipment license holder.
- Instrument should be a compact device for use in forensic lab and industrial environment.
- Instrument should work with power supply from 100 to 240 VAC, 50 to 60 Hz.
- Vendor should have proven track record and should provide at least 02 installation details in various Forensic Labs, Government Institutes in last five years along with institute name, customer details contact details as per requirement.
- Vendor should have a service engineer stationed in Kolkata/ eastern region or preferably have a branch office for attending to problems, if any during the warranty/ AMC period.