

Annex I

Automatic Rock Uniaxial and Triaxial testing system

Reason for requisition- To test stress and strain characteristics of rocks under different loading conditions which are capable of obtaining the complete stress-strain curve of rock specimens until reaching its post-failure

No	Description	Requirement	Supplier's Response		Remarks
			Yes	No	
1	Uniaxial and Triaxial unit	Stand alone closed loop automatic control console for up to 4 test frames to perform compression, flexure, indirect tensile tests under load, displacement and strain control with PC, printer and software. Microprocessor control system featuring fully automatic test cycle with closed loop digital feedback			
	Test Standards	Test execution conforming to Standard - ASTM D7012, ASTM D5407, ASTM D2664, ASTM D2938, ASTM D3148			
	Control System	Servohydraulic Control System			
	Software package	Data acquisition software. Should be able to perform Compression (Uniaxial and triaxial) with strain measurements, flexure, indirect tensile strength (Should include software packages) Software package should be included for Elastic modulus and Poisson ratio determination allowing: - free unlimited programmable load/stress cycles fulfilling any test procedure - real time monitoring of test data, stress/time, stress/axial strain, stress/lateral strain graphs - automatic verification of sample centering and sensors functionality as per Standards' requirement			
	Power supply	230 V, 50 Hz, 1 ph			
	Calibration tools	Calibration of load digital readout unit			
	Compression frame capacity	3000 kN cap. compression frame for testing cylinders up to 160 x 320 mm and cubes up to 200mm. with High-stiffness 4-welded-columns frame - Heavy duty spherical seat			
	Specimen diameter and height	Diameter upto 160 mm and height twice the diameter			
		Explosion proof test kit			

No	Description	Requirement	Supplier's Response		Remarks
			Yes	No	
	Confining Pressure Unit	Maximum pressure 70 Mpa, servohydraulic control console for lateral pressure to perform triaxial rock testing. 230V, 50 Hz, 1ph. pressure Programmable test cycles up to 100 different ramps			
	Hoek Cells and Accessories	Hoek triaxial cell NX 54.7 mm and other required accessories			
	Strain Reading and Control	Compensation device for up to 4 Wheatstone bridges with 1/4 or 1/2 bridge setup, Strain gauge application kit, Connecting terminals, Strain gauges			
	Uniaxial Component -	Compression device for rock core specimens with dia. from 54.7 mm [NX] to 63.5 mm [HQ] conforming to ASTM D7012: - upper spherical seat and compression platens dia. 80 mm with hardness 58 HRC - stroke: 66 mm - vertical clearance: 167 mm - overall high: 333 mm. - supplied with distance pieces to reduce the vertical clearance: 2 x 30 mm high and 1 x 22 mm height - max. load capacity: 1200 kN			
	Language	English with user manual			
	Accessories	Tools and accessories required for proper functioning of the instrument and calibration tools.			
	Wetted Parts	Stainless steel			
	Warranty/ After sales service	Atleast 3 years comprehensive warranty including minimum 3 free services per year during the warranty period			
	Annual service	Rates for annual services after completion of warranty period			(Rates only)

Annex II

Specification for GNSS RTK Receiver (Base and Rover)

* Bidders are required to mark (✓) if the requirement complies, otherwise mark (×).

* If kept blank, "Yes" is assumed.

No.	Description	Minimum Specification	Supplier's Response		Offered
			Yes	No	
	Brand	<i>Please specify</i>			
	Model	<i>Please specify</i>			
	Country of Origin	<i>Please specify</i>			
	Country of Manufacture	<i>Please specify</i>			
	Detailed Specification	Must be attached			
1.	Channels	700 or more			
2.	Satellite Signals	GPS, GLONASS, Galileo, BeiDou, QZSS, L-Band, IRNSS, SBAS			
3.	Positioning	Static Survey 2.5 mm + 0.1 ppm RMS (Horizontal) 3.5 mm + 0.4 ppm RMS (Vertical) RTK (< 30 Km) 5 mm + 0.5 ppm RMS (Horizontal) 10 mm + 0.5 ppm RMS (Vertical) Code Differential: 0.40 m RMS SBAS Accuracy: 0.60 m			
4.	Transmission Power	2-5 watts			
5.	Maximum Range	> 10 km			
6.	Level Sensor	Integrates E-Bubble sensor			
7.	IMU System	For tilted measurements			
8.	Connections	4G, UHF, WIFI, Bluetooth, Web UI			
9.	Waterproof/Dustproof	IP67			
10.	Vibration	Vibration Resistant			
11.	Battery	Rechargeable			
12.	Working Time	Up to 10 hours			

No.	Description	Minimum Specification	Supplier's Response		Offered
13.	Operating System	Linux			
Controller Unit Specifications					
14.	Display Size	5-inch display or more			
15.	Pole	Carbon Fiber Pole, 2.45m length			
16.	Field Software	Support to Survey, Sketch and Photos, Stakeouts, GIS, Total Station applications etc.			

(Please use separate sheets for optional offers.)

Annex III

Specification for Multispectral RTK Drone

* Bidders are required to mark (✓) if the requirement complies, otherwise mark (×).

* If kept blank, "Yes" is assumed.

No.	Description	Minimum Specification	Supplier's Response		Offered
			Yes	No	
	Brand	<i>Please specify</i>			
	Model	<i>Please specify</i>			
	Country of Origin	<i>Please specify</i>			
	Country of Manufacture	<i>Please specify</i>			
	Detailed Specification	Must be attached			
1.	Takeoff Weight	1400 g or more			
2.	Max Flight Time	Approx. 25 minutes or more			
3.	Max Ascent Speed	6 m/s (automatic flight); 5 m/s (manual control)			
4.	Max Descent Speed	3 m/s			
5.	Max Speed	31 mph (50 kph) (P-mode); 36 mph (58 kph) (A-mode)			
6.	Operating Temperature	0° to 40° C (32° to 104° F)			
7.	Operating Frequency	2.4000 GHz-2.4835 GHz			
8.	EIRP	< 20 dBm			
9.	Hover Accuracy Range	RTK enabled and functioning properly: Vertical: ± 0.1 m; Horizontal: ± 0.1 m RTK disabled: Vertical: ± 0.1 m (with vision positioning); ± 0.5 m (with GNSS positioning) Horizontal: ± 0.3 m (with vision positioning); ± 1.5 m (with GNSS positioning)			
10.	Single-Frequency High-Sensitivity GNSS	GPS + BeiDou + GLONASS + Galileo			
11.	Multi-Frequency Multi-System High-Precision RTK GNSS	Frequency Used GPS: L1/L2; GLONASS: L1/L2; BeiDou: B1/B2; Galileo[2]: E1/E5 First-Fixed Time: < 50 s Positioning Accuracy: Vertical 1.5 cm + 1 ppm (RMS); Horizontal 1 cm + 1 ppm (RMS). 1 ppm indicates error with a			

No.	Description	Minimum Specification	Supplier's Response	Offered
		1 mm increase over 1 km of movement. Velocity Accuracy: 0.03 m/s		
12.	Gimble Controllable Range	Tilt: -90° to +30°		
13.	Velocity Range	≤ 31 mph (50 kph) at 6.6 ft (2 m) above ground with adequate lighting		
14.	Altitude Range	0 - 33 ft (0 - 10 m)		
15.	Operating Range	0 - 33 ft (0 - 10 m)		
16.	Obstacle Sensory Range	2 - 98 ft (0.7 - 30 m)		
17.	Operating Environment	Surfaces with clear patterns and adequate lighting (> 15 lux)		
18.	Sensors	Six 1/2.9" CMOS, including one RGB sensor for visible light imaging and five monochrome sensors for multispectral imaging. Each Sensor: Effective pixels 2.00 MP or more		
19.	Filters	Blue (B): 450 nm ± 16 nm; Green (G): 560 nm ± 16 nm; Red (R): 650 nm ± 16 nm; Red edge (RE): 730 nm ± 16 nm; Near-infrared (NIR): 840 nm ± 26 nm		
20.	Lenses	FOV (Field of View): 62.7° Focal Length: 5.74 mm (35 mm format equivalent: 40 mm), autofocus set at ∞ Aperture: f/2.2		
21.	RGB Sensor ISO Range	200 - 800		
22.	Monochrome Sensor Gain	1 - 8x		
23.	1. Electronic Global Shutter	1/100 - 1/20000 s (visible light imaging); 1/100 - 1/10000 s (multispectral imaging)		
24.	Max Image Size	1600 × 1300 (4:3.25) or more		
25.	2. Photo Format	JPEG (visible light imaging) + TIFF (multispectral imaging)		
26.	Supported SD Cards	Max Capacity: 128 GB.		

No.	Description	Minimum Specification	Supplier's Response	Offered
	Capacity			
27.	Operating Temperature	0° to 40° C (32° to 104° F)		
28.	Operating Frequency	2.4000 GHz-2.4835 GHz		
29.	Effective Transmission Distance (Unobstructed, free of interference)	4.5 km or more		
30.	EIRP	< 20 dBm		
31.	Mobile Device Holder	Tablets and smartphones		
32.	Operating Temperature	0° to 40° C (32° to 104° F)		
33.	GNSS Frequency	Simultaneously receive : GPS: L1 C/A, L2, L5 BEIDOU: B1, B2, B3 GLONASS: F1, F2 Galileo: E1, E5A, E5B		
34.	Positioning Accuracy	Single Point Horizontal : 1.5 m(RMS) Vertical : 3.0 m(RMS) RTK Horizontal : 1 cm+ 1 ppm(RMS) Vertical : 2 cm+ 1 ppm(RMS)		
35.	Positioning Update Rate	1 Hz, 2 Hz, 5 Hz, 10 Hz and 20 Hz		
36.	Differential Data Format	RTCM 2.X/3.X		
37.	Data Link	OcuSync, Wi-Fi, LAN, 4G		
38.	Memory Capacity	16 GB		
39.	IP Rating	IP65		

(Please use separate sheets for optional offers.)

Specification for Photogrammetric Software

* Bidders are required to mark (✓) if the requirement complies, otherwise mark (×).

* If kept blank, "Yes" is assumed.

No.	Description	Minimum Specification	Supplier's Response		Offered
			Yes	No	
1.	Inputs	Aerial —nadir & oblique— and terrestrial			
		Video (mp4 or avi format) Automatically extracts still frames from videos to create a project			
		Any camera (compact, DSLR, thermal, multispectral, fisheye, 360°, large-frame, etc.), images in .jpg or .tiff			
		Multi-camera support in the same project Create a project using images from different cameras and process them together			
		RTK/PPK + IMU data support			
		Camera rig support Process images using known rig relatives from multiple synchronized cameras			
		Ground control point edit and import Import and edit ground control points to improve the absolute accuracy of your project			
		Known or custom reference coordinate system support in imperial or metric units Select EPSG code from known coordinate systems or define your own local system			
		Camera exterior orientation support Optimize camera exterior orientation parameters starting from GPS and IMU input parameters			
		External point cloud import Import point clouds from different sources, such as LiDAR, to generate DSMs & orthomosaics			
2.		Processing templates Automate processing and			

No.	Description	Minimum Specification	Supplier's Response		Offered
	Processing	generation of outputs by using standard or customized templates			
		Rapid Check with Quality Report Rapid processing template for a quick dataset-check while still on site			
		Camera self-calibration Optimize internal camera parameters, such as focal length, principal point of autocollimation and lens distortions			
		Rolling shutter effect correction Correct the warp of images taken with rolling shutter cameras (like GoPro, DJI Phantoms, etc.) to maintain accuracy even when flying fast and low			
		Automatic Aerial Triangulation (AAT) and Bundle Block Adjustment (BBA) Process automatically with or without known camera exterior orientations: (x, y, z, w, f, k)			
		Automatic point cloud densification Produce a dense and detailed 3D point cloud, which can be used as a basis for DSM and 3D mesh			
		Automatic point cloud filtering & smoothing Use presets for point cloud filtering and smoothing options			
		Machine-learning point cloud classification Automatically classify the RGB dense point cloud into five groups: ground road surfaces, high vegetation, buildings and human-made objects			
		Automatic DTM/DEM extraction Remove above-ground objects from DSM and create bare-Earth			

No.	Description	Minimum Specification	Supplier's Response		Offered
		model			
		Automatic brightness and color correction			
		Quality Report Assess the accuracy and quality of projects			
		Project merging and splitting			
		Project area definition			
		Custom number of keypoints			
		Multiprocessor CPU + GPU support			
		Radiometric processing and calibration			
3.	Raycloud Editor	Assess quality of optimized camera positions, 3D point cloud and mesh			
		View 3D point cloud and mesh in standard, trackball or first person viewing modes			
		Accurately scale projects with no or imprecise geolocation by defining one/multiple distances			
		Orientate objects with no or imprecise geolocation by defining directions of one/multiple axes			
		Annotate and edit 2D and 3D GCPs, check points, and MTPs with the highest accuracy, using both original images and 3D information at the same time			
		Visually assess the size of the error of the computed position of a GCP or MTP			
		Reoptimize camera positions and/or rematch images based on GCPs & MTPs to improve reconstruction			
		Image masking			
		Point cloud editing			

No.	Description	Minimum Specification	Supplier's Response	Offered
		Define a plane to generate a DSM and orthomosaic from building facades, bridge piles, etc		
		Polyline and surface object creation		
		3D mesh and DSM editing		
		Visual outlier detection		
		Create a virtual camera trajectory, play the animation in real-time and export it		
4.	Volume Manager	Volume object creation		
		Volume object management		
		Adjust the reference base to fit different terrain and obtain accurate measurement		
5.	Mosaic Editor	Create and edit regions on the orthomosaic, choose the best content from multiple underlying images and projection type to remove moving objects or artifacts		
		Edit only the desired portion of the orthomosaic, blend it in real-time and get the improved orthomosaic within minutes		
		Select planar or ortho projection for each created region to remove artifacts		
6.	Index Calculator	Make the vegetation indices more reliable and accurate by applying radiometric corrections		
		Generate an accurate Reflectance map and the preferred resolution as a basis of index maps		
		Improve your analysis by managing and visualizing index values per region		
		Generate singleband and NDVI maps based on pre-defined formulas without user intervention		
		Create and save your own		

No.	Description	Minimum Specification	Supplier's Response		Offered
		formulas choosing among each input band and generate custom index maps			
		Create a basis of your annotated vector map by segmenting the data into classes using statistical algorithms			
		Match on-site scouts and observations by assigning annotations based on your decisions			
		Put your data into action and export the prescription map in .shp format			
7.	Output Results	<p>2D output results:</p> <ul style="list-style-type: none"> • Nadir orthomosaics in GeoTIFF output format • Orthomosaics from user-defined orthoplane in GeoTIFF output format • Google tiles export in .kml and .html output formats • Index maps (Thermal, DVI, NDVI, SAVI, etc.) in GeoTIFF and GeoJPG format <p>Prescription maps in .shp format</p> <p>2.5D output results:</p> <ul style="list-style-type: none"> • Nadir DSMs and DTMs in GeoTIFF format • DSMs from user-defined orthoplane in GeoTIFF output format <p>3D output results:</p> <ul style="list-style-type: none"> • 3D PDF for easy sharing of 3D mesh • Full 3D textured mesh in .obj, .ply, .dxf, and .lxb format • Tiled Level-of-detail (LoD) mesh in osgb and slpk (Esri) format • Point cloud in .las, .laz, .xyz and .ply output format • Contour lines in .shp, .dxf, .pdf format • Classified point cloud in 			

No.	Description	Minimum Specification	Supplier's Response	Offered
		.las and .csv format • Contour lines in .shp, .dxf, .pdf format • User-defined vector objects in .dxf, .shp, .dgn, and kml format		
		Fly-through animation and flight paths Export the animation in .mp4 and .avi formats and the fly-through waypoints and path in .csv format		
		Optimized camera position, external orientation and internal parameters, Export Aerial Triangulation results into third-party software (e.g. INPHO, DAT/EM Summit Evolution)		
		Undistorted images If the original images were acquired using a perspective lens an undistorted copy of the calibrated images will be generated		
8.	Technical support and After sales service	Yes		
9.	Warranty	01 year updates, bug fixes for free.		
10.	License Type	Must be permanent floating license and use on up to 2 devices simultaneously		

(Please use separate sheets for optional offers.)

Annex IV

Specification for Hand Held GPS

* Bidders are required to mark (✓) if the requirement complies, otherwise mark (×).

* If kept blank, "Yes" is assumed.

No.	Description	Minimum Specification	Supplier's Response		Offered
			Yes	No	
	Brand	<i>Please specify</i>			
	Model	<i>Please specify</i>			
	Country of Origin	<i>Please specify</i>			
	Country of Manufacture	<i>Please specify</i>			
	Detailed Specification	Must be attached			
1.	Unit dimensions	7 x 8 x 4cm or less			
2.	Display size	2.8"			
3.	Display resolution	240x320 pixels QVGA			
4.	Display type	Transflective TFT 65K colors			
5.	Touch screen	Yes			
6.	Weight	250g (with Lithium battery) or less			
7.	Battery life	up to 15 hours or more			
8.	Water rating	IPX7			
9.	Interface	USB and NMEA 0183 compatible			
10.	Base map	Preload Worldwide base map			
11.	Ability to add maps	Yes			
12.	Built-in memory	16GB or more			
13.	Accepts data cards	Yes (microSD™ card 64G)			
14.	Waypoints/favorites/locations	>3000			
15.	Routes	>200			
16.	GPS accuracy	3-7m (GPS/GLONASS) 1-3m (GPS with SBAS)			

No.	Description	Minimum Specification	Supplier's Response	Offered
17.	Electronic compass	Yes		
18.	Barometric altimeter	Yes		
19.	Thermometer	Yes		
20.	Buzzer	Yes		
21.	Timer	Yes		
22.	Camera	Yes		
23.	Picture view	Yes		
24.	Flash light	Yes		
25.	Bluetooth 4.0	Yes (share the location information)		
26.	Sun and moon information	Yes		
27.	Area calculation	Area and Perimeter Calculation		
28.	Custom POIs	Yes		
29.	Google data compatible	Yes		
30.	AVG	Yes		
31.	Calculator	Yes		
32.	Military grid reference system coordinates	Support		

(Please use separate sheets for optional offers.)

Annex V

General Specification for Analytical Balance

* Bidders are required to mark (√) if the requirement complies, otherwise mark (×).

No.	Description	Requirement	*Supplier's Response		Remarks
			Yes	No	
	Brand	<i>Please specify</i>			
	Model	<i>Please specify</i>			
	Country of Origin	<i>Please specify</i>			
	Detailed Specification	<i>Must be attached</i>			
1.	Capacity (g)	120/220			
2.	Readability (g)	0.0001			
3.	Repeatability (STDEV) (g)	0.0001			
4.	Linearity (g)	± 0.0002			
5.	Stabilization Time (s)	4			
6.	Units	Milligram, Gram, Kilogram, Ounce, Pound, Carat, Pennyweight, Ounce Troy, Grain, Newton, Hong Kong Tael, Singapore Tael, Taiwan Tael, Momme, Tical (MM), Mesghal, Tola (India)			
7.	Display	Backlit LCD Display			
8.	Pan Size (Ø)	3.54 in. / 90 mm			
9.	Draftshield Size	6.8 × 5.2 × 8.1 in. / 172 × 131 × 205 mm			
10.	Ports	RS 232/USB			
11.	Warranty	3-year comprehensive warranty • (note: Copy of the warranty terms and conditions of the Bidder must be submitted with the Bid document)			

(Please use separate sheets for optional offers.)

Annex VI

Annex 'A'

General Specification for ICI Pilling Box Tester

* Bidders are required to mark (✓) if the requirement complies, otherwise mark (×).

No.	Description	Requirement	Supplier's Response		Remarks
			Yes	No	
	Brand	<i>Please specify</i>			
	Model	<i>Please specify</i>			
	Country of Origin	<i>Please specify</i>			
	Detailed Specification	Must be attached			
1	Standards	Compatible with BS 5811, EN ISO 12945-1			
2	No. of Stations	04			
3	Pill Boxes	Cubic, with internal dimensions before lining : (235 x 235 x 235) mm Should be lined with cork jointing material 3.2 mm thickness			
4	Mounting Jig	Should available to mount specimens on tubes			
5	Cork liners inside the box	06 nos. per box, Should be detachable for easy replacement			
6	Polyurethane sample tube	Length 140±1mm, Outer diameter 31.5±1mm, wall thickness 3.2±0.5mm, mass 52.25±1g, 4pcs for a box			
7	Rotation Speed	60 ±2 rpm			
8	Counter	1-99999 cycles			
9	Control Method	Touch Screen Control with preloaded test standards			
10	Power requirement	230 ± 10V, 50 Hz			
11	Warranty	At least one year warranty and one year priority technical support after sale should be provided by the supplier.			
12		Equipment to have warranty given by the original machine manufacturer			
13		ISO calibration certificate should be presented with the equipment			
14		All the units to be manufactured by reputed testing equipment manufacturers established at least 5 years in the business of supplying such equipment			
15		Equipment installation, commissioning and training should be carried out by the supplier and training should be carried out by the supplier			

Annex VII

Annex 'A'

General Specification for Crimp Tester

* Bidders are required to mark (✓) if the requirement complies, otherwise mark (×).

No.	Description	Requirement	*Supplier's Response		Remarks
			Yes	No	
	Brand	<i>Please specify</i>			
	Model	<i>Please specify</i>			
	Country of Origin	<i>Please specify</i>			
	Detailed Specification	Must be attached			
1	Standard	Compatible with ISO 7211, BS 2863, BS 2865			
2	Straightening Tension ranges	Two tension ranges 0-35gf (cN), 0-175 gf (cN)			
3	Scale Length	At least 120 cm			
4	Length accuracy	1 mm			
5	Testing mode	Manual simple operation			
6	Warranty	At least one year warranty and one year priority technical support after sale should be provided by the supplier.			
7		Equipment to have warranty given by the original machine manufacturer			
8		ISO calibration certificate should be presented with the equipment			
9		All the units to be manufactured by reputed testing equipment manufacturers established at least 5 years in the business of supplying such equipment			
10		Equipment installation, commissioning and training should be carried out by the supplier			

Annex VIII

Minimum Requirements For Microscope Camera		Yes / No	Comments if any deviation
Model	Please specify		
Brand	Please specify		
Country of Origin	Please specify		
Country of Manufacture	Please specify		
System should supply 5 mega pixel CMOS scientific color camera (basic resolution 2560 x 1920) and the camera adapter from the microscope manufacturer (same Brand) for proper compatibility.			
Exposure Time not be higher than 2 s & Sensor Size not be less than 5.70 mm x 4.28 mm. Also the Pixel Size not be higher than 2.2 μ m x 2.2 μ m.			
The camera operating software should be supplied from the microscope manufacturer and should have live image display capability through software.			
Software should be capable of Interactive measurement: length, contour-based measurement data (area, box, perimeter, gray values), angle and should also be able to do the text annotations in the captured image.			
Software should have facility to acquire images, edit CZI files and export into various formats.			
Supportive laptop should be provided with the system.			
warranty			
Manufacture product catalogs with requested informations should be supplied			
Manufacture authorization for the bidder to represent the given brand			
User reference list should be attached			
Bidder should have good aftersales facility with trained technicians and parts available locally to carry out any service/ repair immediately			

Annex IX

Annex 'A'

General Specification for ASTM Photographic Spun Yarn Appearance Standards

* Bidders are required to mark (✓) if the requirement complies, otherwise mark (×).

No.	Description	Requirement	*Supplier's Response		Remarks
			Yes	No	
	Brand	<i>Please specify</i>			
	Model	<i>Please specify</i>			
	Country of Origin	<i>Please specify</i>			
	Detailed Specification	Must be attached			
1	Standard	Compatible with ASTM D 2255			
2	Photograph size	6 inches x 10 inches			
3	Photographs in each series	04 nos. representing Grade A to D			
4	Mounted Board	Each series mounted on a extra heavy board			
5	Specified series	Standards 1-12, 12-24, 24-36, 36-50, 50-75 English Cotton count (05 Nos.)			
6	Warranty	At least one year warranty			
7		All the units to be manufactured by reputed testing equipment manufacturers established at least 5 years in the business of supplying such equipment			

Annex X

Annex 'A'

General Specification for Portable Thickness Gauge

* Bidders are required to mark (√) if the requirement complies, otherwise mark (×).

No.	Description	Requirement	*Supplier's Response		Remarks
			Yes	No	
	Brand	<i>Please specify</i>			
	Model	<i>Please specify</i>			
	Country of Origin	<i>Please specify</i>			
	Detailed Specification	Must be attached			
1	Measuring Range	10mm x 0.01mm			
2	Throat depth	50 mm			
3	Diameter of the flat anvil	30 mm			
4	Material	Stainless steel/ Aluminium			
5	Warranty	At least one year warranty and one year priority technical support after sale should be provided by the supplier.			
6		Equipment to have warranty given by the original machine manufacturer			
7		All the units to be manufactured by reputed testing equipment manufacturers established at least 5 years in the business of supplying such equipment			
8		Equipment installation, commissioning and training should be carried out by the supplier			

Annex XI

Basic Specification for Laser Cutting Machine

Description	Requirement	Supplier's Response Yes / No	Remarks
Country	Specify		
Brand / Model	Specify		
Warranty	yes / Specify		
Working area	600X900mm		
Power	80W RECI		
Laser tube type	8000-10000 hours working life time		
Control mode	** USB interface		
Mechanical orbits	high precision and long life time.		
Motor and driver type	Step motors and step drivers		
Cooling type	water pump		
Table type	(engraving and cutting) strip type table.		
360 degree slope engrave	Support		
Main accessories included	1) 1*Air pump (blowing dust during work) 2) 1*Exhaust fan with Tube clips (heat radiation and smoke extraction) 3) 1*water pump (used for small power tube to cool the laser tube) or chiller (used for bigger power tube cooling) 4) 1*USB Cable (connecting PC and machine) 5) 1*CD or electronic documents (including software, user manual, guiding videos etc) 6) 2*Power cables 7) 1*Tool box (for routine maintenance)		
Voltage	220 to 240V		
Accessories all included	Yes		
Industrial heavy Duty	Yes		

Annex XII

MINIMUM SPECIFICATION FOR UP/DOWN/CROSS CONVERTER

		Bidder Response yes /No
Make & Model		
Country of Origin		
Conversion	VGA/HDMI/SDI to HDMI/SDI Multi-format Up/Down/Cross	
Video Inputs	1x VGA, 1x HDMI, 1x 3G/HD/SD-SDI (support Level A and Level B)	
Loop Through	Yes	
Video Outputs	2x 3G/HD/SD-SDI with embedded Audio (support Level A and Level B) 1x HDMI	
Audio Inputs	2x RCA (Stereo Pair), 2x SDI/HDMI Audio embedded	
Audio Outputs	SDI embedded audio up to 8CH, 48KHz, PCM audio HDMI embedded audio up to 8CH, 48KHz, PCM audio	
Audio Format Selection	2x RCA (Stereo Pair), 2x SDI/HDMI Audio embedded	
Supported Video Input Formats	1080p(23.98/24/25/29.97/30/50/59.94/60 Hz), 1080psf(23.98/24/25/29.97/30Hz), 1080i (50/59.94/60Hz), 720p (50/59.94/60Hz), 625i, 576p, 576i, 525i, 480p, 480i, 1920x1080(60Hz), 1280x720(60Hz), 1600x1200(60Hz), 1400x1050(60Hz), 1366x768(60Hz), 1280x1024(60Hz), 1024x768(60Hz), 800x600 (60Hz)	
Output Resolutions	1080p(23.98/24/25/29.97/30/50/59.94/60 Hz), 1080i (50/59.94/60Hz), 720p (50/59.94/60Hz), 625i, 525i	
Updates and Configuration	Mini USB x 1	
Warranty	One Year Warranty	