GOVERNMENT OF INDIA
MINISTRY OF ENVIRONMENT & FORESTS
NATIONAL CENTRE FOR SUSTAINABLE COASTAL MANAGEMENT
KOODAL BUILDING, ANNA UNIVERSITY CAMPUS
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AMENDMENT # 1 DT. 12.12.2013 to INVITATION FOR BIDS (IFB)
NATIONAL COMPETITIVE BIDDING

For **"Supply of Scientific & Technical Equipments and Related Services"**

Published on 22.11.2013 in All India Edition of "The Times of India" and "The Hindu"

Bid No.: NCB-NPMU/G-35

Changes have been made to the following Sections in the Bid Document:

Section I- Invitation for Bids (IFB)
Section II- Bidding Data Sheet (BDS)
Section VI- Schedule of Requirements: Technical Specifications

The dates as revised are given in the Table below –

Particulars	Provision as in the Bid Document published	Revised Provision after Amendment
Last Date of Sale of Bid Document	**23.12.2013 up to 5.00 P.M.**	**30.12.2013 up to 5.00 P.M.**
Date of Receipt of Bids	**24.12.2013 up to 10.00 A.M.**	**31.12.2013 up to 10.00 A.M.**
Date of Opening of Bids	**24.12.2013 at 10.30 A.M.**	**31.12.2013 at 10.30 A.M.**

The full text of bid document and the **Amendment # 1** to the bid document for the procurement of the packages of goods and detailed notice on Invitation for Bids are available for downloading from the Project website:

http://www.ncscm.org

All other terms and conditions remain unaltered.

Amendment to:

A.) Section I-Invitation for Bids (IFB)

Sl. No.	Provisions as in Invitation for Bids (IFB) of published bid document	Modification now made
1.	**Para 6 of IFB**	
	A complete set of bidding documents may be purchased from the office of The Director, National Centre for Sustainable Coastal Management, Koodal Building, Anna University, Chennai-600025, Tamilnadu from 22.11.2013 to 23.12.2013 for a non-refundable fee as indicated, in the form of cash or Demand Draft on any Scheduled Bank, payable at Chennai in favour of National Centre for Sustainable Coastal Management. Interested bidders may obtain further information at the same address. Bidding documents requested by mail will be dispatched by registered/speed post on payment of an extra amount of Rs.500. The National Project Director will not be held responsible for the postal delay if any, in the delivery of the documents or non-receipt of the same.	A complete set of bidding documents may be purchased from the office of The Director, National Centre for Sustainable Coastal Management, Koodal Building, Anna University, Chennai-600025, Tamilnadu from 22.11.2013 to 30.12.2013 for a non-refundable fee as indicated, in the form of cash or Demand Draft on any Scheduled Bank, payable at Chennai in favour of National Centre for Sustainable Coastal Management. Interested bidders may obtain further information at the same address. Bidding documents requested by mail will be dispatched by registered/speed post on payment of an extra amount of Rs.500. The National Project Director will not be held responsible for the postal delay if any, in the delivery of the documents or non-receipt of the same.
2	**Para 7 of IFB**	
	The notice and the bid document for the Goods can also be seen with option to download from NCSCM website **www.ncscm.org**.The down loaded bid document can be submitted along with non refundable fee of Rs. 2,100/- (Rupees Two Thousand One Hundred) only towards the cost of the bid document. The Director, National Centre for Sustainable Coastal Management, Chennai will not accept the same if any portion of the downloaded document differs from the approved bid document available in the above mentioned office. The download facility will be available from Dt. 22.11.2013 to 23.12.2013 up to 1700 Hrs. The Bidder should regularly access the same website for clarifications, amendments and pre-bid meeting minutes, if any, issued in respect of this tender: (a) Price of bidding document: Rs. 2,100.00 (including VAT) (non-refundable) (b) Postal charges, inland : Rs. 500.00 (c) Postal charges, overseas: Rs. 2000.00 (d) Date of commencement of sale of bidding document : 22.11.2013 (e) Last date for sale of Bidding document : 23.12.2013 (f) Last date and time for receipt of bids: 24.12.2013 (10 A.M.)	The notice and the bid document for the Goods can also be seen with option to download from NCSCM website **www.ncscm.org**.The down loaded bid document can be submitted along with non refundable fee of Rs. 2,100/- (Rupees Two Thousand One Hundred) only towards the cost of the bid document. The Director, National Centre for Sustainable Coastal Management, Chennai will not accept the same if any portion of the downloaded document differs from the approved bid document available in the above mentioned office. The download facility will be available from Dt. 22.11.2013 to 30.12.2013 up to 1700 Hrs. The Bidder should regularly access the same website for clarifications, amendments and pre-bid meeting minutes, if any, issued in respect of this tender: (a) Price of bidding document: Rs. 2,100.00 (including VAT) (non-refundable) (b) Postal charges, inland : Rs. 500.00 (c) Postal charges, overseas: Rs. 2000.00 (d) Date of commencement of sale of bidding document : 22.11.2013 (e) Last date for sale of Bidding document : 30.12.2013 (f) Last date and time for receipt of bids: 31.12.2013 (10 A.M.)

	(g) Date and Time of: 24.12.2013 (10.30 A.M.) opening of bids (h) Place of opening of bids: National Centre for Sustainable Coastal Management, Koodal Building, Anna University Campus, Chennai-600025 Tamilnadu, India Phone: +914422330108, 22200159, 22203408 Fax: 91 44 2220 0158 (i) Address for Communication: The Director National Centre for Sustainable Coastal Management, Koodal Building, Anna University Campus, Chennai-600025 Tamilnadu, India Phone: +91 44 22330108, 22200159, 22203408 Fax: 91 44 2220 0158 Web-Site: www.ncscm.org e-mail: procurement@ncscm.org All bids must be accompanied by a bid security as specified in the bid document and must be delivered to the above office at the date and time indicated above. The Bid Security should be valid for at least 45 days beyond the bid validity period i.e. **08.05.2014**. Electronic bidding will not be permitted. Late bids will be rejected.	(g) Date and Time of: 31.12.2013 (10.30 A.M.) opening of bids (h) Place of opening of bids: National Centre for Sustainable Coastal Management, Koodal Building, Anna University Campus, Chennai-600025 Tamilnadu, India Phone: +914422330108, 22200159, 22203408 Fax: 91 44 2220 0158 (i) Address for Communication: The Director National Centre for Sustainable Coastal Management, Koodal Building, Anna University Campus, Chennai-600025 Tamilnadu, India Phone: +91 44 22330108, 22200159, 22203408 Fax: 91 44 2220 0158 Web-Site: www.ncscm.org e-mail: procurement@ncscm.org All bids must be accompanied by a bid security as specified in the bid document and must be delivered to the above office at the date and time indicated above. The Bid Security should be valid for at least 45 days beyond the bid validity period i.e. **15.05.2014**. Electronic bidding will not be permitted. Late bids will be rejected.

B.) Section II- Bidding Data Sheet (BDS)

Sl. No.	Provisions as at Section II - Bidding Data Sheet of published bid document	Modification now made
1.	**ITB 24.1**	
	The deadline for the submission of bids is: **Date: 24.12.2013** **Time: 10:00 A.M.**	The deadline for the submission of bids is: **Date: 31.12.2013** **Time: 10:00 A.M.**
5	**ITB 27.1**	
	The bid opening shall take place on: **Date: 24.12.2013 Time: 10:30 A.M.**	The bid opening shall take place on: **Date: 31.12.2013 Time: 10:30 A.M.**

C.) <u>Section VI. Schedule of Requirements: Technical Specifications</u>

Specification as at Section VI - Schedule of Requirements- 3.Technical Specifications			Modification now made		
Package 2 - HPLC with Accessories					
Sl. No.	**Particulars**	**Specifications**	**Sl. No.**	**Particulars**	**Specifications**
1	**General**	Analysis of organic acids, flavanoids, phenolics, amino acids, large proteins, carbohydrate, anthocyanin, Phytopigments etc. Should offer smooth transition from standard HPLC to the Rapid Resolution Technology or equivalent. Must provide reliability and robustness for precision analysis. The system must be MS compatible & also should be able to do chromatography for variety of macro molecules.	**1**	**General**	Analysis of organic acids, flavanoids, phenolics, amino acids, large proteins, carbohydrate, anthocyanin, Phytopigments etc. Should offer smooth transition from standard HPLC to the Rapid Resolution Technology or equivalent. Must provide reliability and robustness for precision analysis. The system must be MS compatible & also should be able to do chromatography for variety of macro molecules.
2	**System specifications**	a) No. of Solvents: Up to four solvents. b) Gradient Formation: Low pressure mixing quaternary gradient c) Degasser: Five or more Channel Vacuum Degasser d) Gradient mixing accuracy ±0.5%, Operating temperature 4-35°C, e) Flow rate range: 0.001 Up to 2.000 mL/min. or better f) Pump Seal Wash: Automatic	**2**	**System specifications**	a) No. of Solvents: Up to four solvents. b) Gradient Formation: Low pressure mixing quaternary gradient c) Degasser: Five or more Channel Vacuum Degasser d) Gradient mixing accuracy ±0.5%, Operating temperature 4-35°C, e) Flow rate range: 0.001 Up to 2.000 mL/min. or better f) Pump Seal Wash: Automatic
2a		Flow rate precision < 0.06 % RSD or 0.02 min SD whichever is greater	**2a**		Flow rate precision < 0.06 % RSD or 0.02 min SD whichever is greater
2b		Maximum operating pressure: 14000 psi or better , Gradient type High-pressure mixing	**2b**		Maximum operating pressure: 14000 psi or better , Gradient type High-pressure mixing
2c		Composition accuracy ≤0.5% Composition, precision <0.25% SD at 1.0 ml/ min, Composition range 0-100%, pH range 2-11	**2c**		Composition accuracy ≤0.5% Composition, precision <0.25% SD at 1.0 ml/ min, Composition range 0-100%, pH range 2-11
2d		Micro-volume double plunger, plunging capacity 10 µL, Automated Plunger rinsing	**2d**		Micro-volume double plunger, plunging capacity 10 µL, Automated Plunger rinsing
2e		Mixing system: Electromagnetic valve open/close time control	**2e**		Mixing system: Electromagnetic valve open/close time control
2f		Automatic and continuous compressibility compensation without user intervention. On demand	**2f**		Automatic and continuous compressibility compensation without user intervention. On demand automatically

		automatically achieve desired pH and ionic strengths gradients from pure solvents and concentrated stock buffers.			achieve desired pH and ionic strengths gradients from pure solvents and concentrated stock buffers.
2g		**Fraction collector (Optional) :**Should have provision for collecting the detected compounds. Degasser Should be compatible with binary/quaternary pump	**2g**		**Fraction collector (Optional) :**Should have provision for collecting the detected compounds. Degasser Should be compatible with binary/quaternary pump
3	**Auto sampler**	Auto sampler with cooling system & manual option specifications, should withstand 14000 psi or more, volume of injection: 0.1 to 50 µL Injection Type: The mobile Phase should flow through needle at all the time except the time of injection in order to reduce the carry over. Also there should be a facility to wash the outer sheath of the needle. No. of Sample Vials: 90 vials of ~2 mL or more	**3**	**Auto sampler**	Auto sampler with cooling system & manual option specifications, should withstand 14000 psi or more, volume of injection: 0.1 to 50 µL Injection Type: The mobile Phase should flow through needle at all the time except the time of injection in order to reduce the carry over. Also there should be a facility to wash the outer sheath of the needle. **No. of sample vials: 4 ml vials of 40 to 50 numbers or 2 ml vials of 90 numbers or more**
		a) Sample delivery precision: < 1.0% RSD or better b) Sample Temp Control: 4ºC to 40ºC in 0.1ºC increments c) Sample Carryover: <0.004% d) Advanced Features: Auto Dilution			a) Sample delivery precision: < 1.0% RSD or better b) Sample Temp Control: 4ºC to 40ºC in 0.1ºC increments c) Sample Carryover: <0.004% d) Advanced Features: Auto Dilution
		High performance auto sampler includes liquid leakage sensor, pH range 2-11 or more, needle rinsing.			High performance auto sampler includes liquid leakage sensor, pH range 2-11 or more, needle rinsing.
4	Column Oven	a) Column Temp Control: ~20ºC to ~90ºC in 0.1ºC increments. b) Connector to connect with column chip for tracking and archive column usage history automatically.	**4**	Column Oven	a**) Column temperature control 20 degree to 80 degree C or more in 0.1ºC increment.** b) Connector to connect with column chip for tracking and archive column usage history automatically.
5	**Columns**	a) Columns with guard columns, rapid resolution high definition C-18 column 2nos. pH range 2-10, C18 column with less than 2micron particle size should be quoted. C-8 column 1 nos (acid and alkaline resistant) compatible with the HPLC	**5**	**Columns**	a) Columns with guard columns, rapid resolution high definition C-18 column 2nos. pH range 2-10, C18 column with less than 2micron particle size should be quoted. C-8 column 1 nos (acid and alkaline resistant) compatible with the HPLC
5a		Guard columns 6 nos., finger-tight, direct-connect units, capable of matrix removal and protect analytical columns.	5a		Guard columns 6 nos., finger-tight, direct-connect units, capable of matrix removal and protect analytical columns.
5b		Column oven Pelteir cooling and cooling for protein analysis, 10°C below ambient to at least 60 C. provision to upgrade with a column switching valve.	**5b**		Column oven Pelteir cooling and cooling for protein analysis, 10°C below ambient to at least 60 C. provision to upgrade with a column switching valve. Temp accuracy:

		Temp accuracy: ±0.1° C with calibration ±0.5 C. Connector to connect with column chip for tracking and archive column usage history automatically.			±0.1° C with calibration ±0.5 C. Connector to connect with column chip for tracking and archive column usage history automatically.
6	**Detectors**	**PDA Detector** The detector must have a dry noise specification of 10µAU, and a wet noise specification of 14µAU 1) The detector must have a wavelength accuracy of ± 1nm 2) The detector must have linearity of 5% at 2.0AU 3) The detector must have wavelength range from 190-600 nm or higher. **• Lamp** 1) The detector must have a high brightness lamp with a guaranteed life of 2000 Hours. 2) The detector must have only one/two lamp source/s and not require more than one Lamp for operation across the entire detector wavelength range. **Flow Cells** 1) The detector must have flow cells designed to optimize UHPLC fluidic Technology	**6**	**Detectors**	**PDA Detector must have wet noise specification of 14 µ AU or less.** 1) The detector must have a wavelength accuracy of ± 1nm 2) The detector must have linearity of 5% at 2.0AU 3) The detector must have wavelength range from 190-600 nm or higher. **• Lamp** 1) The detector must have a high brightness lamp with a guaranteed life of 2000 Hours. 2) **Detector must have one/two lamp source(s) for operation across the 190 to 600nm or higher detector wavelength range.** **Flow Cells** 1) The detector must have flow cells designed to optimize UHPLC fluidic Technology
6a		To be quoted separately with detailed specifications for wave length, slit width, diodes, software, path length etc.	**6a**		To be quoted separately with detailed specifications for wave length, slit width, diodes, software, path length etc.
6b		Fluorescence detector (optional) To be quoted separately with detailed specifications, 1) FLR Detector is a multi-channel, multi-wavelength fluorescence detector suitable for fast HPLC. 2) FLR detector' should have low-volume flow cell design, low-noise electronics and support for data rates up to 80 Hz. 3) FLR detector includes Leak Sensor assembly. 4) Detector wavelength range is 200-900nm. 5) Signal-to-noise ratio should be	**6b**		Fluorescence detector (optional) To be quoted separately with detailed specifications, 1) FLR Detector is a multi-channel, multi-wavelength fluorescence detector suitable for fast HPLC. 2) FLR detector' should have low-volume flow cell design, low-noise electronics and support for data rates up to 80 Hz. 3) FLR detector includes Leak Sensor assembly. 4) Detector wavelength range is 200-900nm. 5) Signal-to-noise ratio should be >1000 (Water

		>1000 (Water Raman band). 6) The detector incorporates four data channels, two wavelength pairs per channel, and supports both 2D and 3D scanning injection modes.			Raman band). 6) The detector incorporates four data channels, two wavelength pairs per channel, and supports both 2D and 3D scanning injection modes.
7	**Software**	a) Should have licensed software (window based) with 3D and peak purity. Compatible with all the detectors. Capacity to process signals and wavelengths. Compatible to import and export data. Flexible report publisher to make report in whatsoever format. The software should be quoted with a relational secured data base; it should support windows operating system or independent of operating system like SQL/Oracle and an interface for the software to the database for strong integrity and security of data. b) The raw data should be available for processing at any time after modification of 'n' number of times. c) All meta data are automatically managed, linked and versioned d) Apex integration & Gaussian skimming should be possible. e) Fast LC system software shall provide a calculator for scaling HPLC methods for transferring from HPLC to Fast LC.	**7**	**Software**	a) Should have licensed software (window based) with 3D and peak purity. Compatible with all the detectors. Capacity to process signals and wavelengths. Compatible to import and export data. Flexible report publisher to make report in whatsoever format. The software should be quoted with a relational secured data base; it should support windows operating system or independent of operating system like SQL/Oracle and an interface for the software to the database for strong integrity and security of data. b) The raw data should be available for processing at any time after modification of 'n' number of times. c) All meta data are automatically managed, linked and versioned d) Apex integration & Gaussian skimming should be possible. e) Fast LC system software shall provide a calculator for scaling HPLC methods for transferring from HPLC to Fast LC.
8	**Computer**	Suitable latest branded computer with 4GB RAM, i5 series processor or higher, min 1TB hard disk, Antivirus licensed copy min 3 year validity, with 21 inch LCD monitor, DVD writer, external portable hard disk for data storage (min 1TB), laser printer with back to back printing option should be quoted separately with the system. Offline work station with high end specifications.	**8**		Suitable latest branded computer with 4GB RAM, i5 series processor or higher, min 1TB hard disk, Antivirus licensed copy min 3 year validity, with 21 inch LCD monitor, DVD writer, external portable hard disk for data storage (min 1TB), laser printer with back to back printing option should be quoted separately with the system. Offline work station with high end specifications.
9	**Accessories**	Early maintenance feedback for continuous tracking of instrument usage in terms of seal wear and volume of pumped mobile phase. User settable limits. Electronic	**9**	**Accessories**	Early maintenance feedback for continuous tracking of instrument usage in terms of seal wear and volume of pumped mobile phase. User settable limits. Electronic

		records of maintenance of errors. UPS ≥5KVA UPS with 5 hours battery backup with latest model.			records of maintenance of errors. UPS ≥5KVA UPS with 5 hours battery backup with latest model.

Package 13 – Total Organic Carbon Analyzer with Accessories

The systems should include TOC Analyzer for liquid samples, with NDIR detector and Pt catalyst, with halide scrubber and moisture traps, auto sampling unit and the system should be upgradable to solid sample analyses. The instrument should simultaneously and/or stand alone measure TOC in seawater samples. PC controlled with software.			The systems should include TOC Analyzer for liquid samples, with NDIR detector and Pt catalyst, with halide scrubber and moisture traps, auto sampling unit and the system should be upgradable to solid sample analyses. The instrument should simultaneously and/or stand alone measure TOC in seawater samples. PC controlled with software.		
Sl. No.	**Instrument/ Accessory Component**	**Description**	**Sl. No.**	**Instrument/ Accessory Component**	**Description**
1	TOC Analyzer	NDIR detector based analyzer, PC controlled, High temperature oxidation, aqueous samples, Suitability for saline samples	**1**	TOC Analyzer	NDIR detector based analyzer, PC controlled, High temperature oxidation, aqueous samples, Suitability for saline samples
2	Measured parameters	TOC: Reproducibility:+ 1.5%. Measuring range 4ppb-3000 ppm. Detection limit:± 4 ppb.	**2**	Measured parameters	TOC: Reproducibility:+ 1.5%. **Measuring range 10 ppb-25000 ppm or above** . Detection limit:± 4 ppb.
3	Working temperature range	20-40 C	**3**	**Temperature range**	**Ambient room temperature for ideal functioning of the TOC analyser: 20-40˚ C**
4	Sample analyses	time < 5 mins	**4**	Sample analyses	time < 5 mins
5	Sample injection and maximum injection volume	Variable from 10 –2000 micro liters variable.	**5**	Sample injection and maximum injection volume	Variable from 10 –2000 micro liters variable.
6	Acidification	Automatic (including sparging)	**6**	Acidification for IC removal	Automatic (including sparging)

	for IC removal				
7	Instrument background correction and check function	Analyzer has built in ultra pure (Carbon free) water generation system, which enables to perform back ground correction/check function.	**7**	Instrument background correction and check function	**It should be capable to perform back ground correction/check function**
8	Measurement features	• Automatic settings for optimal measurement conditions. • Automatic reanalysis of out of range samples. • Automatic selection of best calibration curve. • Automatic exclusion of anomalous values.	**8**	Measurement features	• Automatic settings for optimal measurement conditions. • Automatic reanalysis of out of range samples. • Automatic selection of best calibration curve. • Automatic exclusion of anomalous values.
9	Sample dilution and dilution accuracy	Automatic dilution range 2x to 50x (+ 5%)	**9**	Sample dilution and dilution accuracy	Automatic dilution range 2x to 50x (+ 5%)
10	Data processing	Linearization, peak detection, calibration, area calculation, SD and CV calculation, automatic reanalyses of samples depending upon dilution requirement	**10**	Data processing	Linearization, peak detection, calibration, area calculation, SD and CV calculation, automatic reanalyses of samples depending upon dilution requirement
11	Instrument Controls	Aspiration, measurement, injection, volume setting, Turning on/off of carrier gas, self diagnostics, warning for abnormalities, leakage check, timer for restarting from running conditions, Automatic blank checks and correction, Multipoint calibration, baseline	**11**	Instrument Controls	Aspiration, measurement, injection, volume setting, Turning on/off of carrier gas, self diagnostics, warning for abnormalities, leakage check, timer for restarting from running conditions, Automatic blank checks and correction, Multipoint calibration, baseline Auto correction, Automatic power shut down after furnace cooling

		Auto correction, Automatic power shut down after furnace cooling			
12	Additional essential features	High-salt sample combustion tube kit, Halogen scrubber, gas sample injection kit, POC measuring kit with sparger.	**12**	Additional essential features	**High-salt sample combustion tube kit, Halogen scrubber, gas sample injection kit.** **The Catalyst should be free of contamination**
13	Automatic Sample injection (ASI) unit	• Optional manual injection • Vial capacity :~25ml (External diameter ~25 x height ~85 mm); Vial septum • Magnetic stirrer • Acid addition and Sparging unit for NPOC analysis • Needle rince possible • 1000 Glass vials with septum	**13**	Automatic Sample injection (ASI) unit	• Optional manual injection • Vial capacity : :**25ml or less volume ; Vial septum** • Magnetic stirrer • Acid addition and Sparging unit for NPOC analysis • Needle rince possible • 1000 Glass vials with septum
14	Auto sampler	• Interchangebale manual injection and automatic injection module • Sample Containers: • ~25 mL vial rack at least~80 sample capacity • Sample pre-treatment: • Acid addition and sparging possible for NPOC analysis • Rinsing of the needle • Optional stirring	**14**	Auto sampler	• Interchangebale manual injection and automatic injection module • Sample Containers: • ~**25 ml or less sample capacity vial racks with positions between 40 and 80**. • Sample pre-treatment: • Acid addition and sparging possible for NPOC analysis • Rinsing of the needle • Optional stirring
15	Spares	• Combustion tubes • Halogen scrubber	**15**	Spares	• Combustion tubes • Halogen scrubber
16	Gas accessories	Universal gas regulators for carrier gas; Gas filters for air and oxygen, gas tubing with/without sleeves.	**16**	Gas accessories	Universal gas regulators for carrier gas; Gas filters for air and oxygen, gas tubing with/without sleeves.
17	PC, printer with software	• Complete control through software • Windows 7 compatibility	**17**	PC, printer with software	• Complete control through software • Windows 7 compatibility • Data export to ASCI or excel format

		• Data export to ASCI or excel format • PC: I 3 second gen or higher, 4 GB RAM, 500 GB HDD, CD/DVD read-write combo, USB ports. • Printer: Black and White laser printer,			• PC: I 3 second gen or higher, 4 GB RAM, 500 GB HDD, CD/DVD read-write combo, USB ports. • Printer: Black and White laser printer,
18	Energy saving	Automatic power off after electric furnace cools down	**18**	Energy saving	Automatic power off after electric furnace cools down
	N.B.: Standard accessories required for equipment if any quote separately (provide list of standard accessories)			N.B.: Standard accessories required for equipment if any quote separately (provide list of standard accessories)	

Package 4 - Total Station with Accessories

Sl. No.	SPECIFICATIONS		Sl. No.	SPECIFICATIONS	
	Angle measurement			**Angle measurement**	
1.	Accuracy in vertical and horizontal angle	5”	**1.**	Accuracy in vertical and horizontal angle	5”
2.	Angle reading (least count)	0.1” in angle	**2.**	Angle reading (least count)	0.1” in angle
3.	Automatic level compensator	Dual-axis compensator +/- 4” or better	**3.**	Automatic level compensator	Dual-axis compensator +/- 4” or better
4.	Magnification	30x	**4.**	Magnification	30x
5.	Aperture	40mm	**5.**	Aperture	40mm
6.	Field of view at 100m	1° 30 Sec or better	**6.**	Field of view at 100m	1° 30 Sec or better
	Distance Measurement				
7.	Accuracy in Prism Mode	2+ 2ppm or better	**7.**	Accuracy in Prism Mode	2+ 2ppm or better
8.	Accuracy in Non	3+ 2ppm upto 400m or better	**8.**	Accuracy in Non	3+ 2ppm upto 400m or better

	Prism/Reflector-less			Prism/Reflector-less	
9.	Distance least count	0.1mm in distance	**9.**	Distance least count	0.1mm in distance
	Measurement range				
10.	Single circular prism:	3000 m in manual mode or better 800m in auto lock mode or better	**10.**	Single circular prism:	3000 m in manual mode or better 800m in auto lock mode or better
11.	360deg Prism	2000m in manual or better 600m in auto lock range or better	**11.**	360deg Prism	2000m in manual or better 600m in auto lock range or better
12.	Non Prism /Reflector-less	400m or better	**12.**	Non Prism /Reflector-less	400m or better
	Display, Memory & Communication				
13.	Keyboard	Full Alphanumeric keyboard with function keys back-lighted and identical on both faces to be effectively used in traversing application.	**13.**	Keyboard	**Full Alphanumeric keyboard with function keys back-lighted to be effectively used in traversing application**.
14.	Processor speed	500Mhz or better	**14.**	Processor speed	500Mhz or better
15.	Interface	RS232 and Integrated Blue tooth communication	**15.**	Interface	RS232 and Integrated Blue tooth communication
16.	Display	High resolution full VGA with 320x240 pixels or better. LED back-lighted and touch screen.	**16.**	Display	High resolution full VGA with 320x240 pixels or better. LED back-lighted and touch screen.
17.	Memory, Ports and communications	128 MB or more Internal memory, SD Card/USB etc.,	**17.**	Memory, Ports and communications	128 MB or more Internal memory, SD Card/USB etc.,
18.	Graphical Representation	Creation of points, Line, Polygon features should be available onboard and it should be seen as a map and to be downloaded to computer. Machine to have capability to take AutoCAD drawings as background Map	**18.**	Graphical Representation	Creation of points, Line, Polygon features should be available onboard and it should be seen as a map and to be downloaded to computer. Machine to have capability to take AutoCAD drawings as background Map

	Servo/Motorisation, Automatic Target aiming and Search			**Servo/Motorisation, Automatic Target aiming and Search**	
19.	Shortest search distance	1.5m or better	**19.**	Shortest search distance	1.5m or better
20.	Search time	Less than 10 Sec	**20.**	Search time	Less than 10 Sec
21.	Rotation speed	45°/Sec or better	**21.**	Rotation speed	45°/Sec or better
22.	Prism Search Window	Definable by the user requirement	**22.**	Prism Search Window	Definable by the user requirement
	Power Management			**Power Management**	
23.	Battery & Operating time	Li-ion battery with 5Hrs or better on continuous operation	**23.**	Battery & Operating time	Li-ion battery with 5Hrs or better on continuous operation
	Environmental Specifications			**Environmental Specifications**	
24.	Operating temperature	0 to + 50º C or better	**24.**	Operating temperature	0 to + 50º C or better
25.	Storage Temperature	0 to + 60° C or better	**25.**	Storage Temperature	0 to + 60° C or better
26.	Dust and water proofing	IP55 or better	**26.**	Dust and water proofing	IP55 or better
	Onboard Applications			**Onboard Applications**	
27.	Applications	Standard applications like Surveying, Setting out, setting up of the station and orientation, Coordinate Geometry calculations etc., should be available.	**27.**	Applications	Standard applications like Surveying, Setting out, setting up of the station and orientation, Coordinate Geometry calculations etc., should be available.
28.	Additional Applications Required	➢ Onboard Traverse Application ➢ Horizontal Plane Scanning ➢ Vertical Plane, Scanning ➢ Cross Sectional survey	**28.**	Additional Applications Required	➢ Onboard Traverse Application ➢ Horizontal Plane Scanning ➢ Vertical Plane, Scanning ➢ Cross Sectional survey
	Single user downloading and post processing software in desktop/Laptop			**Single user downloading and post processing software in desktop/Laptop**	
29.	File management, Printing and plotting, editing, merging, extracting files, Configuring the units, code table XML export, Fit, zoom, window,		**29.**	File management, Printing and plotting, editing, merging, extracting files, Configuring the units, code table XML export, Fit, zoom, window, pan,	

	pan, redraw, Real-time Zoom with mouse, CAD output, and compatibility to AutoCAD, DWG and DXF, DGN etc with legend settings. Create points, line Arc, circle, spiral, spline, combined curve, radiation, alignment, polygon, intersection points, line segments, Line conversions, Area, Validating data, Generation of Contour, 3D view and volume calculations. Should support industry standard GIS and data produced should be able to merge with data by total stations of other make. Compatible to run in windows 7 with Hardware lock protected.			redraw, Real-time Zoom with mouse, CAD output, and compatibility to AutoCAD, DWG and DXF, DGNetc with legend settings. Create points, line Arc, circle, spiral, spline, combined curve, radiation, alignment, polygon, intersection points, line segments, Line conversions, Area, Validating data, Generation of Contour, 3D view and volume calculations. Should support industry standard GIS and data produced should be able to merge with data by total stations of other make. Compatible to run in windows 7 with Hardware lock protected.	
	Standard OEM (Original Equipments Manufacturer) Accessories to be supplied			**Standard OEM (Original Equipments Manufacturer) Accessories to be supplied**	
30.	Accessories required per total station	➢ Wooden Tripod – 1 No. ➢ Circular Prism with Holder and Target plate– 1 No. ➢ Pole with Bipod – 1 No. ➢ 360 degree Prism – 1 No. ➢ Battery – 2 Nos. ➢ Battery Charger – 1 No.	**30.**	Accessories required per total station	➢ Wooden Tripod – 1 No. ➢ Circular Prism with Holder and Target plate– 1 No. ➢ Pole with Bipod – 1 No. ➢ 360 degree Prism – 1 No. ➢ Battery – 2 Nos. ➢ Battery Charger – 1 No.