



TENDER DOCUMENTS

CIVIL LAB EQUIPMENT

NUTECH/SCM/Civil Lab-2018/TD-011

NATIONAL UNIVERSITY OF TECHNOLOGY

TENDER NOTICE

NATIONAL UNIVERSITY OF TECHNOLOGY (NUTECH)

Tender No: NUTECH/SCM/Civil Lab-2018/TD-011

Sealed bids are invited from Government / FBR Registered Firms for the procurement of Civil laboratory equipment for NUTECH Technology Labs.

1. Tender documents containing terms & conditions and detailed specifications of items can be downloaded from NUTECH web "<https://nutech.edu.pk/scm/>" wef **15-12-2018**.
2. Quotations shall be submitted as per requirement of the tender documents.
3. Bidders will be required to submit bank draft/PO equal to 4% of quoted value as Bid Bond in favor of National University of Technology (NUTECH).
4. Sealed bids with detailed specification should reach on the following address latest by **1100 hours on 14-01-2019**. Late submission will not be entertained.
5. Bids will be opened at **1130 hours on 14-01-2019** at SCM Office.

Deputy Director (Supply Chain Management Office)
NATIONAL UNIVERSITY OF TECHNOLOGY (NUTECH)
UPROAD, SECI-12, ISLAMABAD
Tel: 0092-51-5476768, Ext :178



NATIONAL UNIVERSITY OF TECHNOLOGY
SUPPLY CHAIN MANAGEMENT OFFICE

INVITATION TO TENDER

Submission Date/Time 14-01-2019 at 11 00 hours

1. NUTECH desires to procure the list of item(s)/Store(s) as per **Annexure-A**. Interested bidders are requested to send their bids through courier or deliver at NUTECH under two separate sealed envelopes (placed together in third envelope), marked clearly, "Technical Offer" and "Commercial Offer", respectively to the undersigned, latest by or before above mentioned due date. If due to any unforeseen circumstances, NUTECH establishment remains closed, then the last date of submission will be extended to next working day.
2. Please also note that Technical Offer should contain Annexes-A & B duly filled in (supported with relevant technical literature /details/ catalogues etc). Commercial Offer will contain Annexure-C. Please ensure no space is left blank in the annexes.
3. Following must be noted for this IT (Invitation to Tender):-
 - a. Validity of offer will be 90 days
 - b. Delivery period will be 120 days
 - c. Tender(s) must be accompanied with a Bid Bond in agreement of faithful compliance of the conditions of Contract/Purchase Order. This amount will be equivalent to 4% of the total quoted value. In case of non-acceptance of any offer, the Bid Bond will be returned to the bidder by fastest possible means. The Bid Bond amount submitted by the successful bidder will however, be refunded on effective termination of Contract/ Purchase Order. (The Bid Bond will be forfeited in case of default by the bidder from his commitments made through his offer). Submission of Bid Bond is mandatory, otherwise your offer will be rejected.
 - d. 2 years warranty against 5% bank guarantee will be required from the successful bidders from the date of commissioning.
 - e. Rates should be quoted on free delivery basis at NUTECH Islamabad.
4. We reserve the rights to accept or reject any or all tenders as a whole or in part without assigning any reason whatsoever. The decision in this regard will be firm, final and binding on all bidders.

DD (Supply Chain Management)



NATIONAL UNIVERSITY OF TECHNOLOGY
SUPPLY CHAIN MANAGEMENT OFFICE

TECHNICAL OFFER

Annex A

User Reference No. Civil Eqpt Lab-001

Date 07-12-2018

Technical Specification

Ser	Nomen	Description	Country of Origin	A/U	Qty Req	Bidder Compliance			Tech Scurtinty to be done by user	
						Yes	No	Alternate Offer	Accepted	Rejected
									Reason of Rejection	
1.	Water bath	Le Chatelier 220-240V/50-60Hz/1ph	USA,Europe,Japan, South Korea	No	1					
2.	Length comparator digital version.	1. Digital gauge with output for PC Connection 2. Special cable required 3. Reference bar not included	USA,Europe,Japan, South Korea	No	1					
3.	Cement autoclave	1. High pressure. 230V, 50Hz, 1ph. 2. Conforming to ASTM C151 and C141,UNE 7207 3. Safety valve complete with official ISPELS 4. Verification certificate 5. Complete with rack for holding 10 specimens	USA,Europe,Japan, South Korea	No	1					

4.	Blaine apparatus	Blaine apparatus EN196/6 for concrete properties	USA, Europe, Japan, South Korea	No	1				
5.	Bulk density apparatus	Apparatus for measurement of bulk density of cement	USA, Europe, Japan, South Korea	No	1				
6.	Heat of hydration calorimeter	<ol style="list-style-type: none"> 1. With high resolution digital thermometer. 2. 230 V, 50-60 Hz, 1 ph. 3. For determining the heat of hydration of low heat Portland and hydraulic cement. 4. Conforming to EN 196-8 and ASTM C186. 5. Dewar flask housed in insulating box with constant speed electric stirrer and filler funnel. 6. High resolution battery operated electronic thermometer featuring: 7. PT 100 probe measuring range -40 +400° C, resolution 0.001°C 8. Memory for up to 10000 readings 9. PC software included for measurement data storage 10. Protection class IP65 	USA, Europe, Japan, South Korea	No	1				
7.	Special set of glassware	For water content determination including silica combustion tube and	USA, Europe, Japan	No	1				

		water absorption components, BS 4550, UNI 7208	n, South Korea						
8.	Vicat test	Vicat test set for EN method for measuring cement paste consistency	USA, Europe, Japan, South Korea	No	1				
9.	Air entrainment meter	Air entrainment meter for mortar 1 litre cap. for determining properties	USA, Europe, Japan, South Korea	No	1				
10.	Filling ring	Filling ring for determining mortar properties	USA, Europe, Japan, South Korea	No	1				
11.	Cement mixer complete Bowl	1. Capacity 5 litres. 230V, 50Hz, 1ph. 2. 220 - 50 Hz - 1Ph	USA, Europe, Japan, South Korea	No	1				
12.	Jolting apparatus.	Jolting apparatus. 230 V, 50 Hz, 1 ph.	USA, Europe, Japan, South Korea	No	1				
13.	Temperature Measurement	Air Entrainment Range 0 to 200°C	USA, Europe, Japan, South Korea	No	4				
14.	Vibrating table	1. 1250x625 mm with retaining edges. 2. Supplied complete with 2 vibrating units, clamping 3. device for the moulds and water proof CE pedal	USA, Europe, Japan, South Korea	No	1				

		4. Switch. 230V/50Hz/1Ph							
15.	Buoyancy Balance	1. 15kg x 1g 2. c/w frame, tank and cradle	USA, Europe, Japan, South Korea	No	1				
16.	MCC8 MULTITEST, stand alone closed loop automatic	1. Control console for up to 2 test frames, 2. Compression, flexure, indirect tensile tests and 3. Elastic modulus determination. Allows load, 4. Displacement and strain control. PC and printer 5. Not included. 230V/50Hz/1ph.	USA, Europe, Japan, South Korea	No	1				
17.	5000 kN cap. Compression & Flexural testing Machine	1. Cylinders up to 250 x 500 mm and cubes up to 300mm. 2. Conforming to EN 12390-4. 3. High-stiffness 4-welded-columns frame 4. Heavy duty spherical seat 5. Compression platens 305mm x 305mm 6. Daylights: horizontal 425mm, vertical 520mm 7. Piston travel 50mm 8. Limit switch preventing piston overtravel	USA, Europe, Japan, South Korea	No	1				

		<p>9. Complete with front door and rear transparent guard</p> <p>10. Load measurement accuracy (when connected to suitable control unit): class 1 to EN 12390-4 / class A to ASTM E74 starting from 10% of full scale. Special calibration from 1% of f.s. available on request</p> <p>11. Supplied complete with traceable calibration</p> <p>12. Certificate for load measurement accuracy and traceable test certificate for load transfer</p> <p>13. Verification (stability test), when purchased with control unit</p> <p>14. Complete with connection kit for separate control console (including pressure transducer)</p>							
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18.	Universal flexure frame complete	<ol style="list-style-type: none"> 1. 150 kN cap with pressure transducer for connection to control console. Less upper and lower rollers and/or bearers 2. For flexural tests on concrete beams, transverse 3. tests on kerbs and flagstones and other specimens using the suitable accessory <p><u>Specifications</u></p> <ol style="list-style-type: none"> 1. Rigid two-column welded frame, upper cross beam adjustable by hand winch and located in position by two pins 2. Piston travel 110 mm 3. Max. vertical clearance up to 510 mm with the accessory 50-C0013/10 4. Horizontal clearance 660 mm 5. Distance between lower rollers or bearers adjustable from 150 to 1200 mm 	USA, Europe, Japan, South Korea	No	1				
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19.	Double chamber hydraulic frame	<ol style="list-style-type: none"> 1. 600/15 kN cap. For testing cement, mortar, resin, hydraulically bound mixtures and other materials. 2. Conforming to EN 196-1, 1015-11, 12390-5, 12390-6, 1338, 13286-41, 993-5, ASTM C109, C348, C496, C293, C78 using the suitable accessories 3. Load measurement: pressure transducer on 600kN chamber, high accuracy load cell on 15kN chamber 4. Compression platens: dia. 216mm on 600kN chamber, dia.165mm on 15kN chamber 5. Daylights: vertical 315/205 mm; horizontal 265/-mm 6. Piston travel 50/30mm 7. Limit switch preventing pistons overtravel 8. Load measurement accuracy [when connected to suitable control unit]: class 1 to EN 12390-4 /class A to ASTM E74 starting from 10% of full scale for both chambers; special calibration from 6kN for 600kN 	USA, Europe, Japan, South Korea	No	1				
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		<p>chamber and from 0.75kN for 15kN chamber available on request</p> <p>9. Supplied complete with traceable calibration certificate for load measurement accuracy when purchased with control unit</p> <p>10. Complete with connection kit for separate control console</p>							
20.	Non Destructive Testing Concrete test hammer	<p>1. Type N. Aluminium body.</p> <p>2. Supplied with hard plastic carrying case.</p> <p>3. Conforming to EN 12504-2 and ASTM C805</p>	USA, Europe, Japan, South Korea	No	1				
21.	Calibration anvil	For concrete test hammer type	USA, Europe, Japan, South Korea	No	1				
22.	Crack microscope 40x	Crack microscope 40x for measuring crack length and width	USA, Europe, Japan, South Korea	No	1				
23.	Ultrasonic pulse velocity tester	Ultrasonic pulse velocity tester rechargeable battery operated	USA, Europe, Japan, South Korea	No	1				
24.	Electric Motorized Aggregate shaker	Electric Motorized Aggregate shaker c/w eight trays for Coarse	USA, Europe, Japan	No	1				

			n, South Korea						
25.	Aggregate crushing value apparatus	Standard aggregate crushing value apparatus for determining crushing values of aggregates	USA, Europe, Japan, South Korea	No	1				
26.	Laboratory oven	Forced convection laboratory oven with digital thermoregulator and 2 shelves. 250 l capacity. 220-240V/50-60Hz/1Ph	USA, Europe, Japan, South Korea	No	1				
27.	Specific gravity frame with plastic water tank	Specific gravity frame with plastic water tank for concrete properties	USA, Europe, Japan, South Korea	No	1				
28.	11 digital balance	1. 16000 g cap.x 0.1g resolution, under balance weighing facility, RS 232 serial, output, battery (rechargeable) and mains operated, complete with traceable calibration certificate. 2. 230V/50Hz/1ph.	USA, Europe, Japan, South Korea	No	1				
29.	Over-End shaker	230V/50Hz/1Ph	USA, Europe, Japan, South Korea	No	1				
30.	Standard aggregate crushing value apparatus	Standard aggregate crushing value apparatus for concrete properties	USA, Europe, Japan, South Korea	No	1				
31.	Impact testing machine	Impact testing machine for concrete properties	USA, Europe, Japan	No	1				

			n, South Korea						
32.	Los Angeles Abrasion Machine	<ol style="list-style-type: none"> 1. Los Angeles Abrasion Machine for concrete properties 2. c/w set of 12 abrasive charges for concrete properties 	USA, Europe, Japan, South Korea	No	1				
33.	Automatic Proctor/CBR digital	<ol style="list-style-type: none"> 1. Automatic Proctor/CBR digital compactor conforming to ASTM/AASHTO. 2. 230V, 50Hz, 1ph. 3. For automatic compaction of 100 to 102 mm, 150 to 152.4 mm, 4" and 6" dia. Moulds Including rammer 2495/4535 g with double interchangeable tip 50.8 mm circular face for 4" dia and sector face for 6" dia. moulds 4. Selectable rammer drop: 300, 305, 450, 457 mm 5. Blow rate: 30 blows/min 6. Power: 900W 7. Automatic control of compaction cycles conforming to ASTM/AASHTO 8. Protection guards for operator safety (CE) 	USA, Europe, Japan, South Korea	No	1				

		<ul style="list-style-type: none"> 9. Digital touch button console 10. Unique hammer lifting device to guarantee 11. Correct drop height 12. Modern and reliable design to ensure long working life 13. Noise reduction cabinet available (33-T8500/XUP) 							
34.	Bench compression testing machine	<ul style="list-style-type: none"> 1. Bench compression testing machine with motorized ram, two-column structure and adjustable crossbeam. 2. Loading capacity: 50kN 3. Clearance between columns: 270mm 4. Test speed: 1.27 mm/min 5. Ram travel: 120mm 6. Power rating: 300W 7. Complete with load ring 50kN capacity with 0.001 mm resolution dial gauge [strictly conforming to the Standards], CBR piston and penetration depth gauge. 230V, 50Hz, 1ph 	USA, Europe, Japan, South Korea	No	1				

35.	Direct Shear (Digishear) Test	<ol style="list-style-type: none"> 1. AUTOSHEAR - Direct/residual shear machine, digital control of speed and data acquisition via the Automax Control System. 110-240V, 50-60Hz, 1ph. 2. Microprocessor controlled drive 3. Large 240x120 pixel display 4. Test speed, travel and cycles programmable by the keyboard 5. Rapid approach and automatic positioning 6. Infinitely variable speed drive from 0.00001 to 11.00000 mm/min. 7. Possibility to set different speed and travel 8. (Forward & reverse) in the residual shear tests. 9. Three analogical channels: one for load cell and two for displacement transducers, 130000 point resolution 10. Different protocol of data downloading to PC through RS 232 serial port. Cycles: up 	USA, Europe, Japan, South Korea	No	1				
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		<p>to 9 (forward & reverse)</p> <p>11. Shearbox housing made of high resistance, technopolymeric material</p> <p>12. Maximum shear force: 5000 N</p> <p>13. Maximum vertical load: 500 N/ 5000 N using the</p> <p>14. 10:1 lever loading device supplied with the machine</p> <p>15. Horizontal displacement: adjustable via firmware up to 19 mm</p>								
		Accessories for Direct Shear Test Machine								
		1. 2000N load ring complete with adapters for shear machine		No	1					
		2. Dial gauge 10 mm x 0.002 mm		No	1					
		3. Dial gauge 30 mm x 0.01 mm		No	1					
		4. Shear box for square specimen 60x60mm		No	1					
		5. Sample cutter for 60mm square samples		No	1					
		6. Extrusion dolly for 60mm square samples		No	1					

		7. Set of slotted steelweights tot.37.5kg: 2x0.250kg; 2x0.500kg; 2x1kg; 3x2kg; 3x4kg; 2x8kg.		No	1				
36.	Oedometer (Consolidation Test)	1. Front loading oedometer to BS 1377, ASTM D2435 with lever arm ratios of 9:1 10:1 and 11:1	USA, Europe, Japan, South Korea	No	1				
		<u>Including</u>							
		1. Oedometer bench to accept up to three oedometers. Complete with locking nuts.		No	1				
		2. Fixed ring cell for 50.47mm diameter sample with upper and lower stones, cutter ring and cylinder wall. The cell is supplied with additional outlet suitable for permeability test.		No	1				
		3. Dial gauge 10 mm x 0.002 mm		No	1				
		4. Set of slotted steel weights total value 64kg: 2x0.25; 1x0.5; 1x1; 1x2; 1x4; 7x8kg		No	1				
37.	Strain Reading	1. GEODATALOG, 16 channels Data acquisition system.		No	1				

		2. Sensor output 2V suitable for strain gauges.		No	1				
		3. Requires a PC with RS232 serial port or RS232/USB, [110-240V/50-60Hz/1ph		No	1				

Special Instructions

Description	Bidder			Tech Scrutiny to be done by User		
	Yes	No	Alternate Offer	Accepted	Rejected	Reasons of Rejection
Environment Conditions (a) Temperature range: -05°C to +60°C (b) Relative humidity: 0-90% non-condensing						
Warranty period Two years from the date of commissioning. A warranty sticker is to be pasted on each item by the Supplier / OEM highlighting Name of Firm, Contract No and date, Description of Store and Warranty validity						
Training Notes Supplier will provide a set of handouts for training on operation and maintenance of the equipment						
Publications Supplier is to provide hard and soft copies (CD) of following manuals. (a) Operational / Maintenance manual: - Qty 01 with Equipment and additional Qty 02 for record purposes and should consist of following sections:- (1) Equipment Description /Operation:- (a)Specifications (b)Description (c)Operation (2) Servicing:- (a)Maintenance Schedule (b)Adjustment / test (c)Removal / Installation procedure (d)Tools Used (3) Trouble shooting guide (4) Cleaning requirements (5) Shipping and receiving (6) Storage requirements (b) IPB (Illustrated Parts Breakdown Manual) should have full parts description along with detailed diagrams (exploded view). (c) Experimental manuals which must contain the list and procedure of the experiments that equipment can perform.						

<p>Spares / Technical Support</p> <p>(a) Supplier to have in-country spares / technical support and ensure spares and technical support / assistance for next 10 years</p> <p>(b) Comprehensive list of spares required for scheduled maintenance of Equipment is to be provided</p> <p>(c) Any software provided must have its license</p> <p>(d) Software upgrade support must be provided free of cost for ten years with renewed license at every upgrade</p> <p>(e) Supplier must also provide calibration service for at least five years after commissioning</p>					
<p>Additional Spare / Replaceable parts.</p> <p>(a) Replaceable spare / parts during scheduled inspections are to be identified and provided as per requirement along with equipment sufficient to cater five years consumption.</p> <p>(b) All specialized / standard tools required for inspection / repair / servicing must be supplied along with equipment.</p>					
<p>Physical Inspection Criteria: 100% physical inspection of store will be carried out before commissioning of the equipment for following details:-</p> <p>(a) For physical damage, scratches and deformity.</p> <p>(b) Accessories /components as per contractual specifications.</p> <p>(c) Technical Manuals (Operation manual, user guide, IPBs).</p> <p>(d) Quality certificate and calibration certificate by the OEM</p> <p>(e) OEM certificate and verifiable documents by the supplier that store has been procured from certified source and is factory new and from latest production.</p> <p>(f) Brand name and country of origin.</p>					

<p>Commissioning</p> <p>(a) Commissioning of the equipment will be carried out by OEM rep at his own cost and risk at designated place at NUTECH.</p> <p>(b) Any special requirement for installation, operation and commissioning must be specified in the offer by the supplier.</p>					
<p>Training</p> <p>01 week OEM operational/ maintaince training at NUTECH</p>					
<p>Improvement and Safety Measures</p> <p>Any improvement and safety measures suggested by NUTECH during commissioning are to be resolved by the supplier / manufacturer at no extra cost.</p>					
<p>Liability of Supplier</p> <p>(a) OEM certificate of authorized dealership Supplier is to provide original OEM certificate of subject equipment bought directly from the manufacturer and being an authorized dealer.</p> <p>(b) In case the equipment supplied is not compatible with specifications, the supplier will be obliged to call his representatives at his own cost for consultation and corrective action</p>					
<p>Special Notes</p> <p>(a) Additional requirements for the maintenance of equipment (if any) must be intimated by the supplier in technical offer.</p> <p>(b) Supplier must provide the list of organizations using same equipment in Pakistan (if any).</p> <p>(c) Equipment must be a standard product of OEM available at web address of OEM.</p> <p>(d) In case of premature failure of the equipment, OEM has to replace / rectify the item free of cost. Required transportation charges would be borne by the supplier.</p>					

Firm Name_____
Signature_____
Name/Designation_____
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NATIONAL UNIVERSITY OF TECHNOLOGY
SUPPLY CHAIN MANAGEMENT OFFICE

TECHNICAL OFFER

Annex B

User Reference No: **Civil Eqpt Lab-001**

Date: **07-12-2018**

Please fill in the following essential parameters:

1. Validity of Offer: _____ Days (Should not be less than 90 days)
2. Delivery Period: _____ Days (After Placement of order)
3. Country of Origin: _____
4. Warranty/Guarantee: _____ Months from the date of final acceptance of the stores.

General

GST No: _____ (Please enclose copy)

NTN/CNIC: _____ (if exempted, please provide valid exemption certificate)

Payment Terms: (Mandatory to mention) (Please tick/ mention the desired payment term/ mode).

1. 50 % Advance payment (Against valid bank Guarantee)
2. 50 % Payment after delivery, Installation/commissioning, user satisfaction certificate
3. Others

Details of Payment Recipient

(1) Name/Title: _____

(2) Address: _____

Signature: _____

Official Seal: _____

Name/Designation: _____



NATIONAL UNIVERSITY OF TECHNOLOGY
SUPPLY CHAIN MANAGEMENT OFFICE

FINANCIAL OFFER

Annex C

User Reference No : **Civil Eqpt Lab-001**

Date **07-12-2018**

Ser	Nomen	Description	Qty Req	A/U	Unit Price Rs (excluding GST)	GST (If applicable)	Total Rs Amount
1.	Water bath	Le Chatelier 220-240V/50-60Hz/1ph	1	No			
2.	Length comparator digital version.	1. Digital gauge with output for PC Connection 2. Special cable required 3. Reference bar not included	1	No			
3.	Cement autoclave	1. High pressure. 230V, 50Hz, 1ph. 2. Conforming to ASTM C151 and C141, UNE 7207 3. Safety valve complete with official ISPELS 4. Verification certificate 5. Complete with rack for holding 10 specimens	1	No			
4.	Blaine apparatus	Blaine apparatus EN196/6 for concrete properties	1	No			
5.	Bulk density apparatus	Apparatus for measurement of bulk density of cement	1	No			
6.	Heat of hydration calorimeter	1. With high resolution digital thermometer. 2. 230 V, 50-60 Hz, 1 ph. 3. For determining the heat of hydration of low heat Portland and hydraulic cement.	1	No			

		<p>4. Conforming to EN 196-8 and ASTM C186.</p> <p>5. Dewar flask housed in insulating box with constant speed electric stirrer and filler funnel.</p> <p>6. High resolution battery operated electronic thermometer featuring:</p> <p>7. PT 100 probe measuring range -40 +400° C, resolution 0.001°C</p> <p>8. Memory for up to 10000 readings</p> <p>9. PC software included for measurement data storage</p> <p>10. Protection class IP65</p>					
7.	Special set of glassware	For water content determination including silica combustion tube and water absorption components, BS 4550, UNI 7208	1	No			
8.	Vicat test	Vicat test set for EN method for measuring cement paste consistency	1	No			
9.	Air entrainment meter	Air entrainment meter for mortar 1 litre cap. for determining properties	1	No			
10.	Filling ring	Filling ring for determining mortar properties	1	No			
11.	Cement mixer complete Bowl	<p>1. Capacity 5 litres. 230V, 50Hz, 1ph.</p> <p>2. 220 - 50 Hz - 1Ph</p>	1	No			
12.	Jolting apparatus.	Jolting apparatus. 230 V, 50 Hz, 1 ph.	1	No			
13.	Temperature Measurement	Air Entrainment Range 0 to 200°C	4	No			
14.	Vibrating table	<p>1. 1250x625 mm with retaining edges.</p> <p>2. Supplied complete with 2 vibrating units, clamping</p> <p>3. device for the moulds and water proof CE pedal</p> <p>4. Switch. 230V/50Hz/1Ph</p>	1	No			

15.	Buoyancy Balance	<ol style="list-style-type: none"> 1. 15kg x 1g 2. c/w frame, tank and cradle 	1	No			
16.	MCC8 MULTITEST, stand alone closed loop automatic	<ol style="list-style-type: none"> 1. Control console for up to 2 test frames, 2. Compression, flexure, indirect tensile tests and 3. Elastic modulus determination. Allows load, 4. Displacement and strain control. PC and printer 5. Not included. 230V/50Hz/1ph. 	1	No			
17.	5000 kN cap. Compression & Flexural testing Machine	<ol style="list-style-type: none"> 1. Cylinders up to 250 x 500 mm and cubes up to 300mm. 2. Conforming to EN 12390-4. 3. High-stiffness 4-welded-columns frame 4. Heavy duty spherical seat 5. Compression platens 305mm x 305mm 6. Daylights: horizontal 425mm, vertical 520mm 7. Piston travel 50mm 8. Limit switch preventing piston overtravel 9. Complete with front door and rear transparent guard 10. Load measurement accuracy (when connected to suitable control unit): class 1 to EN 12390-4 / class A to ASTM E74 starting from 10% of full scale. Special calibration from 1% of f.s. available on request 11. Supplied complete with traceable calibration 	1	No			

		<p>12. Certificate for load measurement accuracy and traceable test certificate for load transfer</p> <p>13. Verification (stability test), when purchased with control unit</p> <p>14. Complete with connection kit for separate control console (including pressure transducer)</p>					
18.	Universal flexure frame complete	<p>1. 150 kN cap with pressure transducer for connection to control console. Less upper and lower rollers and/or bearers</p> <p>2. For flexural tests on concrete beams, transverse</p> <p>3. tests on kerbs and flagstones and other specimens using the suitable accessory</p> <p>Specifications</p> <p>1. Rigid two-column welded frame, upper cross beam adjustable by hand winch and located in position by two pins</p> <p>2. Piston travel 110 mm</p> <p>3. Max. vertical clearance up to 510 mm with the accessory 50-C0013/10</p> <p>4. Horizontal clearance 660 mm</p> <p>5. Distance between lower rollers or bearers adjustable from 150 to 1200 mm</p>	1	No			

19.	Double chamber hydraulic frame	<ol style="list-style-type: none"> 1. 600/15 kN cap. For testing cement, mortar, resin, hydraulically bound mixtures and other materials. 2. Conforming to EN 196-1, 1015-11, 12390-5, 12390-6, 1338, 13286-41, 993-5, ASTM C109, C348, C496, C293, C78 using the suitable accessories 3. Load measurement: pressure transducer on 600kN chamber, high accuracy load cell on 15kN chamber 4. Compression platens: dia. 216mm on 600kN chamber, dia.165mm on 15kN chamber 5. Daylights: vertical 315/205 mm; horizontal 265/-mm 6. Piston travel 50/30mm 7. Limit switch preventing pistons overtravel 8. Load measurement accuracy [when connected to suitable control unit]: class 1 to EN 12390-4 /class A to ASTM E74 starting from 10% of full scale for both chambers; special calibration from 6kN for 600kN chamber and from 0.75kN for 15kN chamber available on request 9. Supplied complete with traceable calibration certificate for load measurement accuracy when purchased with control unit 10. Complete with connection kit for separate control console 	1	No			
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20.	Non Destructive Testing Concrete test hammer	1. Type N. Aluminium body. 2. Supplied with hard plastic carrying case. 3. Conforming to EN 12504-2 and ASTM C805	1	No			
21.	Calibration anvil	For concrete test hammer type	1	No			
22.	Crack microscope 40x	Crack microscope 40x for measuring crack length and width	1	No			
23.	Ultrasonic pulse velocity tester	Ultrasonic pulse velocity tester rechargeable battery operated	1	No			
24.	Electric Motorized Aggregate shaker	Electric Motorized Aggregate shaker c/w eight trays for Coarse	1	No			
25.	Aggregate crushing value apparatus	Standard aggregate crushing value apparatus for determining crushing values of aggregates	1	No			
26.	laboratory oven	Forced convection laboratory oven with digital thermoregulator and 2 shelves. 250 l capacity. 220-240V/50-60Hz/1Ph	1	No			
27.	Specific gravity frame with plastic water tank	Specific gravity frame with plastic water tank for concrete properties	1	No			
28.	11 digital balance	1. 16000 g cap.x 0.1g resolution, under balance weighing facility, RS 232 serial, output, battery (rechargeable) and mains operated, complete with traceable calibration certificate. 2. 230V/50Hz/1ph.	1	No			
29.	Over-End shaker	230V/50Hz/1Ph	1	No			
30.	Standard aggregate crushing value apparatus	Standard aggregate crushing value apparatus for concrete properties	1	No			
31.	Impact testing machine	Impact testing machine for concrete properties	1	No			

32.	Los Angeles Abrasion Machine	<ol style="list-style-type: none"> 1. Los Angeles Abrasion Machine for concrete properties 2. c/w set of 12 abrasive charges for concrete properties 	1	No			
33.	Automatic Proctor/CBR digital	<ol style="list-style-type: none"> 1. Automatic Proctor/CBR digital compactor conforming to ASTM/AASHTO. 2. 230V, 50Hz, 1ph. 3. For automatic compaction of 100 to 102 mm, 150 to 152.4 mm, 4" and 6" dia. Moulds Including rammer 2495/4535 g with double inter changeable tip 50.8 mm circular face for 4" dia and sector face for 6" dia. moulds 4. Selectable rammer drop: 300, 305, 450, 457 mm 5. Blow rate: 30 blows/min 6. Power: 900W 7. Automatic control of compaction cycles conforming to ASTM/AASHTO 8. Protection guards for operator safety (CE) 9. Digital touch button console 10. Unique hammer lifting device to guarantee 11. Correct drop height 12. Modern and reliable design to ensure long working life 13. Noise reduction cabinet available (33-T8500/XUP) 	1	No			

34.	Bench compression testing machine	<ol style="list-style-type: none"> 1. Bench compression testing machine with motorized ram, two-column structure and adjustable crossbeam. 2. Loading capacity: 50kN 3. Clearance between columns: 270mm 4. Test speed: 1.27 mm/min 5. Ram travel: 120mm 6. Power rating: 300W 7. Complete with load ring 50kN capacity with 0.001 mm resolution dial gauge [strictly conforming to the Standards], CBR piston and penetration depth gauge. 230V, 50Hz, 1ph 	1	No			
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35.	Direct Shear (Digishear) Test	<ol style="list-style-type: none"> 1. AUTOSHEAR - Direct/residual shear machine, digital control of speed and data acquisition via the Automax Control System. 110-240V, 50-60Hz, 1ph. 2. Microprocessor controlled drive 3. Large 240x120 pixel display 4. Test speed, travel and cycles programmable by the keyboard 5. Rapid approach and automatic positioning 6. Infinitely variable speed drive from 0.00001 to 11.00000 mm/min. 7. Possibility to set different speed and travel 8. (Forward & reverse) in the residual shear tests. 9. Three analogical channels: one for load cell and two for displacement transducers, 130000 point resolution 10. Different protocol of data downloading to PC through RS 232 serial port. Cycles: up to 9 (forward & reverse) 11. Shearbox housing made of high resistance, techno-polymeric material 12. Maximum shear force: 5000 N 13. Maximum vertical load: 500 N/ 5000 N using the 14. 10:1 lever loading device supplied with the machine 15. Horizontal displacement: adjustable via firmware up to 19 mm 	1	No			
Accessories for Direct Shear Test Machine							

		1. 2000N load ring complete with adapters for shear machine	1	No			
		2. Dial gauge 10 mm x 0.002 mm	1	No			
		3. Dial gauge 30 mm x 0.01 mm	1	No			
		4. Shear box for square specimen 60x60mm	1	No			
		5. Sample cutter for 60mm square samples	1	No			
		6. Extrusion dolly for 60mm square samples	1	No			
		7. Set of slotted steelweights tot.37.5kg: 2x0.250kg; 2x0.500kg; 2x1kg; 3x2kg; 3x4kg; 2x8kg.	1	No			
36.	Oedometer (Consolidation Test)	1. Front loading oedometer to BS 1377, ASTM D2435 with lever arm ratios of 9:1 10:1 and 11:1	1	No			
		<u>Including</u>					
		1. Oedometer bench to accept up to three oedometers. Complete with locking nuts.	1	No			
		2. Fixed ring cell for 50.47mm diameter sample with upper and lower stones, cutter ring and cylinder wall. The cell is supplied with additional outlet suitable for permeability test.	1	No			
		3. Dial gauge 10 mm x 0.002 mm	1	No			
		4. Set of slotted steel weights total value 64kg: 2x0.25; 1x0.5; 1x1; 1x2;1x4;7x8kg	1	No			
37.	Strain Reading	1. GEODATALOG, 16 channels Data acquisition system.	1	No			
		2. Sensor output 2V suitable for strain gauges	1	No			

		3. Requires a PC with RS232 serial port or RS232/USB, [110-240V/50-60Hz/1ph	1	No			
TOTAL							

Total Value_____

GST _____

Gross Total Value_____

Bid Bond Ref_____

Firm Name_____
Signature_____
Name_____
Designation_____