

**ADMINISTRATION OF UT OF DAMAN & DIU  
OFFICE OF THE PRINCIPAL,  
GOVERNMENT ENGINEERING COLLEGE,  
VARKUND, NANI-DAMAN 396210.**

Notice No. 26.1/EQU/GEC/CIVIL/2019-20/44

DATED : 06/06/2019.

**E-TENDER**

The Principal, Government Engineering College, Daman on behalf of President of India, invites Tender for purchase of following items :

1. Supply of Equipment's for Civil Engineering through On-line bidding from the website of Gepnic.

* On-line downloading of Tender documents	10.06.2019 to 28.06.2019 -12:00 A.M.
* On-line submission of Tenders	Upto 28.06.2019 – 01:00 P.M. only
* On-line Opening of Price Bids (if possible)	On 29.06.2019 at 03:00 P.M. (Tentatively)

\* Bidders have to submit their PRICE bid in Electronic format only on <https://ddtenders.gov.in/nicgep/app> till the last date & time for submission. PRICE for Technical bid in Physical format shall not be accepted in any case.

**Only Tender fees & EMD to be submitted in physical form**, all other documents related to Technical Bid shall be uploaded only through e-tender website of NIC i.e. <https://ddtenders.gov.in/nicgep/app> . The Tender fees & EMD shall be done by RPAD / Speed post or by hand in Tender Box in Office of the Principal, Govt. Engineering College, Daman upto 28/06/2019 by 01:00 P.M. However Tender inviting authority will not be responsible in case of Postal delay.

The inviting authority reserves the rights to accept or reject any tender without assigning any reason. Tender opening can be postponed depending on the decision of the Tender committee.

In-case bidder needs clarification / training for participating in online tender, they can contact:  
National Informatics Centre, Daman  
GePNIC Portal, 24x7 Help Desk Nos. 0120-4200 462, 4001 005 and 6277 787  
Email: [support-gepnic-dd@nic.in](mailto:support-gepnic-dd@nic.in)

- Sd -

(Avinash R. Chaudhari)  
I/c. Principal,

Govt. Engineering College, Daman.

Copy to :

1. The NIC, Daman, with request to put-up on website of Administration of Daman & Diu.
2. The Field Publicity Officer, Daman with a request to publish in news papers specified in the office letter.

**TENDER FORM (TECHNICAL BID)**

**TENDER DOCUMENT FOR  
PURCHASE OF MECHANICAL MACHINERY / EQUIPMENTS  
AT GOVT. ENGINEERING COLLEGE, DAMAN.**

**Tender Notice No. 26.1/EQU/GEC/ELE/2019-20/44**

**DATED : 06/06/2019.**

**From:**

**Date:**

**To,  
The Principal,  
Government Engineering College,  
Varkund, Nani Daman.**

1.	Full name of the Company / Firm / Supplier (in block letters)	:	
2.	Full address of the Company / Firm / Supplier with telephone number, E-mail number, fax number	:	
3.	Year of incorporation	:	
4.	Name(s) of the Proprietors / Partners / Directors with their full address, Telephone Number, e-mail, fax etc.	:	
5.	Tender Fee Demand draft No. & Date	:	
6.	Details of EMD of Rs. 1,60,500/- in the form of F.D.R.	:	
7.	Name of two major clients with their Address etc.	:	
8.	Details of Registration, Trade License, Labour Licence, other license held / obtained from the various authorities	:	
9.	Copy of Last three years Income-tax return i.e. 2016-17, 2017-18 & 2018-19.	:	
10.	Company / Firm / Supplier Bank Details A. Bank Account No.- B. Bank Name & Branch location -	:	
11.	Copy of "TEST Certificate" from National Laboratories (ERDA/ETDC/ERTL etc.) for components mentioned TEST Certificate Necessary	:	
12.	Service tax / VAT / CST No.	:	
13.	PAN No.	:	

I / We certify that I / We read, understood and accept the contents of the broad terms and conditions incorporated in the Tender Form submit this Tender for consideration. I / We certify that the above statements are true.

(Signature of the Owner / Partner / Contractor with SEAL )

Full Name \_\_\_\_\_

Address \_\_\_\_\_

**U.T. ADMINISTRATION OF DAMAN AND DIU  
OFFICE OF THE PRINCIPAL,  
GOVERNMENT ENGINEERING COLLEGE,  
VARKUND, NANI DAMAN. 396210.**

Terms & conditions for Purchase of various Mechanical Machinery & Equipments  
etc. for Mechanical Laboratory at Govt. Engineering College, Daman.

Tender Notice No. 26.1/EQU/GEC/ELE/2019-20/44

DATED: **06/06/2019**.

General terms and condition :

1. Tender bids should be submitted duly signed and stamped on every page by the vendor's authorized signatory on or before 28/06/2019 by 1.00 pm. (TENDER Fee Rs. 1000/-) in the form of Demand Draft.
2. The EMD of Rs. 1,30,500/- in the form of F.D.R. in favour of "The Principal, Govt. Engineering College, Daman" should be submitted with the Technical Bid.
3. The EMD FDR must have a due date of atleast 06 months.
4. The rates quoted should be valid for 180 days from the date of submission of the Tenders.
5. The Vendor should be the authorized manufacturer / supplier / dealer of the required item.
6. The item should be complied with the specifications / configuration given in the Annexure – II.
7. Model, Make and standards of the item should be specified clearly.
8. Technical literature / brochure of item indicating the quoted make and model shall be enclosed.
9. The Committee or a respective member will visit the successful bidder for Demonstration, Inspection & Physical verification of the said items to be purchased.
10. A "Test Certificate" issued by the "National Laboratories" (ERDA / ETDC / ERTL etc.) should be produced for the major Mechanical components used in the Machineries & Equipments.
11. Supply, installation, testing, integration of the item shall be sole responsibility of the selected supplier.
12. The supply and installation of items should be done within 30 days from the date of receipt of supply order.
13. Minimum (01) one week onsite training shall be given to users on operational modules of the item or as required.
14. Head of Office reserves the right to cancel the order in the event of delay in supply and installation beyond 30 days from the date of Purchase Order resulting in forfeit of the EMD amount.
15. **Delivery: (30 Days from the receipt of Supply Order)**
  - (a) **The Equipment's / Items should be ready for inspection within 20 days from the date of supply order.**
  - (b) **The Inspection committee shall inspect respective items of supply, by way of selecting any random piece from the quantity ordered within 15<sup>th</sup> to 20<sup>th</sup> day of supply order (any extension for supply and inspection shall not exceed more than 45 days from the date of supply order).**
  - (c) **The expense / arrangement for inspection by the inspection committee of respective items at the factory / franchise site award of supply order, will be borne by the bidder.**
16. **Penalty: If the suppliers fails to deliver all or any of the Tendered items or perform the service within the specified date, penalty at the rate of 1% per week of the total order value subject to the maximum of 10% of total order value will be deducted, and also be liable to be blacklisted for future participation etc.**

17. Complete warranty for minimum (02) two years period for the Tendered items from the date of installation.
18. Any required Replacement in part or complete, required services / calibration, Transportation related to such occurrence etc. during the warranty period shall be fully borne by the vendor / supplier.
19. Price of the item should be quoted as per the sample price format given in the (Annexure – 2) in Electronic format only through GePNIC. Consolidated price amount should be mentioned both in figures and words.
20. Price of the item quoted in the tender shall be inclusive all charges like tax, freight, installation, activation, integration, documentation, training etc. (if any).
21. Item-wise lowest bids will be accepted for purchase of the respective Mechanical Machinery & equipment's and accordingly the tender awarded to the respective suppliers.
22. The lowest quoted item should be compatible with other purchased items. (Committee reserved the right to choose best compatible supporting equipments to the Primary item.
23. The prices as quoted would be considered as the final prices for evaluation. In any case, upward revision will not be allowed.
24. After the submission of bids, no change in the content of the bid would be allowed. However, the Institute at its discretion may request the vendor to provide additional inputs if required. In case of the vendor not being able to submit the additional input in writing on or before the date specified by the Institute, the bid received from the vendor would be rejected and no explanation would be offered to the vendor for the rejection.
25. The earnest money deposited (EMD) with the bid shall be returned along with the final payment in case of successful bidder. In case of other bidders it will be returned after finishing the codal formalities or after placing the supply order to the eligible bidder.
26. The bidder must be able to service / replace / repair the instruments within 03 to 04 days of the complaint.
27. Tenders will be opened in the presence of the committee member & the representatives of the firms who may like to be / will be present on the date and time of opening of the tenders.
28. The Selected vendor will be required to submit a Security Deposit in the form of FDR, in the favour of "The Principal, Govt. Engineering College, Daman" of 10% of total order value for a warranty period from the date of supply and installation within one week of receipt of the supply order. (the security deposit shall remain with the principal for the entire warranty period).
29. Payment will be made on submission of bill in duplicate after satisfactory completion of all the formalities of supply, installation, testing and integration of the products at Govt. Engineering College, Daman.
30. Decision of the Head of the institute will be final and binding in any matters relating to the tender.
31. In case the vendor requires any further information/clarification, they may contact the undersigned in writing on or before the due date & time of submission of tender.

The following documents among others must be submitted, without which tender will be summarily rejected:

1. Copy of EMD of Rs. 1,30,500/- in the form of F.D.R. valid upto 06 months from a nationalised bank.
2. Copy of Authorised Supplier / Dealer / Distributor of the said items.
3. Copy of Registration Certificate of the firm of a competent authority.
4. List of current two major clients.
5. Copy of "Test Certificate" issued by the "National Laboratories" (ERDA / ETDC / ERTL etc/) for the major Mechanical components used in the Machineries & Equipments.
6. Copy of VAT / CST and PAN Card.
7. Copy of Income Tax return for last three years 2016-17, 2017-18 & 2018-19.

8. Self certified certificate of assurance to service / repair / replace the complaint in reference of the instruments within one week of intimation.
9. Self certified certificate of not being a "Black listed company / supplier etc.

(Avinash R. Chaudhari)  
I/c. Principal,  
Govt. Engineering College, Daman.

## Schedule of Tender

Tender Notice No. 26.1/EQU/GEC/ELE/2019-20/44

DATED: 06/06/2019.

Sr. No.	Particulars	Details
1.	Name of the Work	Supply, installation and integration a various Electrical Machineries & Equipments etc. for Electrical Laboratory at Govt. Engineering College, Daman.
2.	Estimated Cost	Rs. 43,42,900/- lakh (approx.)
3.	Earnest Money Deposit	An EMD amounting to Rs. 1,30,500/- FD from any nationalized bank in favour of "The Principal, Govt. Engineering College, Daman.
4.	Address for issue of Tender Papers	Download from the website i.e. <a href="https://ddtenders.gov.in">https://ddtenders.gov.in</a>
5.	Last Date/ Time of Submission of Tender	Upto 28/06/2019 – 01:00 P.M. only
6.	Address at which tender to be submitted	Office of the Principal, Govt. Engineering College, Daman.
7.	Venue of Tender Opening	Office of the Principal, Govt. Engineering College, Daman.
8.	Date & Time of opening of Tender	On _____ at 04:00 P.M. (Tentatively)
NOTE	Tender to remain valid till 60 days from opening the tender. Supply & Installation shall be within 30 days of award of work.	

(Avinash R. Chaudhari)  
I/c. Principal,  
Govt. Engineering College, Daman.

ATTENDANCE REPORT

In reference to purchase of various Mechanical Machineries & Equipments etc.

Tender Notice No. 26.1/EQU/GEC/ELE/2019-20/44

DATED: **06/06/2019**.

Demonstration Venue : Govt. Engineering College, Daman.

Demonstration Date : \_\_\_\_\_ Time : 11:00 A.M.

Supplier Name	Name of Representative	Signature
1).		
2).		
3).		
4).		
5).		
6).		

Schedule of Supply, installation and integration a various Electrical Machineries & Equipment's etc. for Electrical Laboratory  
at Govt. Engineering College, Daman

Tender Notice No. 26.1/EQU/GEC/ELE/2019-20/44

DATED: 06/06/2019..

Table below must be filled as required and submit in Technical Bid Cover

Sr. No.	Item Particular	Configuration Required	Quantity	Configuration Offered with Brand / Make	Whether offer model compiles to configuration on given parameter? (Yes/ No.) with deviation.
<b>SURVEYING LABORATORY:</b>					
1	<b>ELECTRONIC TOTAL STATION</b>	<ul style="list-style-type: none"> <li>• 300m Reflector less Range Measuring range without prism :300m</li> <li>• Win-CE System Windows CE.Net is installed</li> <li>• Colourful Touch Screen Easy to use, operate by direct touch or press the keyboard according to your habit.</li> <li>• Convenient Data Communication The SD huge extended memory is incredibly flexibility and reliable safety, while USB interface help you build a close communication between TS and PC.</li> <li>• Dual Axis Compesation High automation in eliminating errors and compensation.</li> <li>• Display Dual sides with graph</li> <li>• Built-in Software With various outstanding surveying programs, Mapping Genius and Engineering Genius evolved your TS into a more powerful product.</li> </ul> <p><b>Specification:</b> Distance Measurement(20km visible normal condition) • Max.Range _ Reflectorless: 300m _</p>	<b>02</b>		



		<p>1 Prism: 5.0Km _ 3 Prism: 6.0K _ Mini Prism: 800m  • Digisplay: Max: 9999999.999 m Min: 0.1 mm</p> <p><b>Auto Compensator :</b></p> <ul style="list-style-type: none"> <li>• System: Dual axis Liquid-electric ,• Work Range: ±3'• Accuracy: 1" Vial</li> <li>• Plate Vial: 30"/2mm, • Circular Vial: 8'/2mm Optical Plummet</li> <li>• Precision _ With prism: 2 + 2ppm _ Without prism: 5 + 3ppm</li> <li>• Measure time: Fine: 2s, Quick measure: 1.2s, Track: 0.6s</li> <li>• Atmospheric Correction: Manual input, Auto correction</li> <li>• Reflection Prism Correction: Manual input, Auto correction Angle Measurement ,• Measuring Method: Absolute code • Raster Diameter: 79mm</li> <li>• Min Display Unit: 1"/ 5" Selectable • Accuracy: 2" • Detection Method _ Horizontal: Dual _ Vertical: Dual Telescope, • Image: Erect • Tube Length: 154mm , • Effective Aperture: 45mm (EDM: 50mm) • Magnification: 30x • Field of view: 1°30' • Minimum Focusing Distance: 1m • Resolving Power: 3"</li> <li>• Image: Erect • Magnification: 3x • Focusing Range: 0.5m <ul style="list-style-type: none"> <li>• Field of View: 5° Display • Type: LCD 3.5inch 320×240LCD TFT Computer Unit • On-Board: WindowsCE.NET English operation system • Processor: SAMSUNG S3C3410 32-bit risc microprocessor • Memory: RAM 64M ROM 64M On-board Battery • Power supply: Rechargeable Ni-H battery • Voltage: DC 7.2V • Continuous Operation Time: 8hours Size &amp; weight <ul style="list-style-type: none"> <li>• Dimension: 200×180×350mm • Weight: 6.0kg</li> </ul> </li> </ul> </li> </ul>			
2	<b>DIGITAL THEODOLITE</b>	<p>TELESCOPE Image Erect Magnification 30X  Effective aperture 45mm Resolving power 3" Field of view 1°30' Minimum focusing distance 1.4m  Stadia ratio 100 Stadia constant 0 Tube length 157mm</p>	02		

		<p>ANGLE MEASUREMENT Reading system Liquid electronic detection Diameter of circle 79mm Minimum reading 1"/5" selectable Accuracy 2" Horizontal angle Dual Vertical angle Dual DISPLAY Lcd display type 2 sides, two lines DATA OUTPUT Data I/O RS-232C</p> <p>LEVEL SENSITIVITY Plate level 3022/2mm Circular level 8'/2mm AUTO VERTICAL COMPENSATOR Working range 3' OPTICAL PLUMMET TELESCOPE Image Erect Magnification 3X Field of view 5°</p> <p>PHYSICAL CHARACTERISTICS Operating temperature -20°C 45°C Internal power supply Ni-Mh battery Voltage 6VDC Operating time 10 hours Dimension 145mm x 318mm x179 (LxHxW) Weight 5,2kg</p>			
3	<b>THEODOLIT ( 20" )</b>	<p>ANGLE MEASUREMENT Accuracy 20"</p> <p>175 mm telescopic Optical Plumnet , with steel stan, and box</p>	05		
4	<b>AUTOLEVEL</b>	<p><b>Features:</b> • Durable, Dependable, High Value Auto Levels • Rapid, Accurate, and Stable Automatic Compensation • Ultra-Short 20cm (7.9 in.) Focusing • All-Weather Dependability • Clampless, Endless Fine Horizontal Adjustments</p> <p>TELESCOPE Length 215mm (8.46 in.) Magnification 24X Objective Aperture 32mm (1.26 in.) Resolving Power 4 in. Field of View 1°25' (at 100m/328ft.) (2.5m/8.2 ft.) Min. Focus from end of telescope 0.2m (7.9 in.) Min. Focus from instrument center 0.3m (1 ft.) Image Erect, Stadia Constant 0 . Stadia Ratio 100 Focusing Knob 1-</p>	05		

		<p>speed Sighting Aid Gun Sight ACCURACY (1km double run levelling) Without Micrometer 0.7mm (0.03 in.) With Micrometer 0.5mm (0.02 in.) COMPENSATOR Type Pendulum compensator with magnetic damping system Setting Accuracy 0.3 in. Working Range <math>\pm 15</math> ft. CIRCULAR LEVEL Sensitivity 10 ft./2mm HORIZONTAL CIRCLE ; Diameter 103mm (4.1 in.) Minimum Division <math>1^\circ/1\text{gon}</math></p> <p>GENERAL Water Resistance IPX6 (IEC 60529:2001) Operating Temperature <math>-4^\circ\text{F}</math> to <math>+122^\circ\text{F}</math> (<math>-20^\circ\text{C}</math> to <math>+50^\circ\text{C}</math>) Width 5.12 in. (130mm) Length 8.46 in. (215mm) Height 5.51 in. (140mm) Weight 4.1 lbs. (1.85kg)</p>			
5	<b>AUTOLEVEL Make</b>	<p>Standard deviation for 1km double run levelling 2.0mm Image Erect Magnification 24X Objective aperture 36mm Field of view <math>1^\circ 20'</math> Minimum focus 0.3m Multiplication constant 100 Additive constant 0 Compensator range <math>\pm 15'</math> Compensator setting accuracy <math>\pm 0.5''</math> Sensitivity of bubble <math>8' / 2\text{mm}</math> Horiz. circle reading <math>1^\circ</math> or 1gon Instrument weight 1.85kg Tripod M16 or 5/8" Technical Information: Typical deviation per 1km: 2.5mm Magnification: 20x , Lowest focusing distance: 1metre , Working range of the compensator: <math>\pm 15'</math>, Setting range of the compensator: 0.5" ,Temperature when operating: <math>-20^\circ\text{C}</math> up to <math>+40^\circ\text{C}</math> , Net weight: 1.5kg</p>	02		
6	<b>DUMPY LEVEL</b>	<p>Special Features : Internal Focusing fitted with horizontal circle, Sensitive bubble is mounted on the side of the telescope, Strong , Compact , Light in weight , Finest optical quality, Excellent folding mirror <input type="checkbox"/> Observer can read the bubble with ease, Designed For : Precision and reliable operation in all types of surveying locations</p> <p><b>Technical Data :</b></p> <p>Telescope Model Image Erect Length 228 mm</p>	05		

		Magnification 28 X Objective Aperture 38 mm Object Glass Diameter 40 mm Model DL - 9 38 mm 40 mm Model DL - 7 Erect 178 mm 28 X Short Focus 1.5 M ,Stadia Ratio1:100 ,Additive Constant 0,Accuracy $\pm$ 2-3 mm / Km Circle Diameter 95 mm Graduation 10 Minutes Plate Level Sensitivity 40" /2 mm			
7	<b>LEVELING STAFF</b>	LEVELING STAFF 4 meter 4 sections complete in full aluminium in best quality with water proof canvas cover.  LEVELING STAFF 4 meter 3 Section complete in full aluminium in best quality with water proof canvas cover.	12		
8	<b>TRIPOD</b>	WOODEN TRIPOD HEAVY DUTY made by good technology for total station with canvas cover.  LIGHT DUTY WOODEN TRIPOD made by good technology for electronic theodolite with canvas cover.  ALUMINUM TRIPOD HEAVY DUTY made by good technology.  ALUMINUM TRIPOD LIGHT DUTY made by good technology. ALUMINUM ORDINARY TRIPOD made by good quality. ALUMINUM WITH IRON PIPE ORDINARY TRIPOD made by good quality. Color : Yellow, orange, grey	05		
9	<b>RANGING ROD</b>	Sizes Available : (a) Size 2 meter single (b) Size 3 meter single (c) Size 2 meter 2 fold (d) Size 3 meter 3 fold	12		
10	<b>PLANE TABLE</b>	Board 750 x 600 mm, thick.22mm & 16mm Carrying Bag for Board Teak-wood Polished Stand rigid Brass Head & plate, Magnet Trough compass brass Spirit Level brass Sight van24" Plumbing Fork Plumb Bob.	05		
11	<b>Prismatic Compass With</b>	The compass can be threaded onto the lightweight surveyor's tripod with a ball and socket head using	12		

	<b>Aluminium Tripod</b>	standard 3/4 inch x 24 threads. The compass measures 4 3/8 inches (11.1 cm) in diameter, 1 1/2 inches (3.8 cm) thick, and weighs one pound, 3 ounces (539 grams). When mounted on its tripod, the height of the compass is adjustable from a minimum height of 12 1/2 inches (31.7 cm) tall is a maximum height of 21 inches (53.3 cm) tall. This compass is accurate with a resolution of about 1/2 a degree. Both the compass and tripod come with canvas cases.			
12	<b>SURVEY COMPASS</b>	Survey Compass 100 Mm Dia With Aluminium Tripod SC	12		
13	<b>SURVEY MEASURING</b>	CHAIN Survey Measuring Chain 30 metres long Survey Measuring Chain 20 metres long Arrows for Survey Chain Big Size Arrows for Survey Chain Small Size Canvas Cover for Measuring Chain	10		
14	<b>CROSS STAFF</b>	Cross Staff 4" aluminium with stand /Cross Staff 6" aluminium with stand  Cross Staff 4" Brass with stand / Cross Staff 6" Brass with stand	12		
<b>MATERIAL TESTING LABORATORY:</b>					
1	<b>DIGITAL UNIVERSAL TESTING MACHINE</b>	Loading accuracy: As high as + 1 % , Speeds: Straining at variable speeds to suit wide range of materials, Facilities for tests: Motor-driven threaded columns for quick and convenient adjustment of lower crosshead to facilitate rapid fixing of test specimen. Autographic recorder: Simultaneous roll autographic recorder supplied as standard to enable study of the behaviors of materials. Ideal Dia: High reading accuracy due to large size ideal design of dial. Large columns: Large effective clearance between columns enables testing of standard specimen as well as structures. Easy changeability: Easy change from	01		

		<p>plain to threaded and screwed specimens, Simple &amp; Safe: Simple to operate. Robust construction Chrome plated metal components Wide range of standard and special attachments accessories available.</p> <p><b>Max. Capacity 2000KN</b></p> <p>1st Measuring Range Resolution KN 0-2000 4.00</p> <p>2nd Measuring Range Resolution KN 0-50 0.10 0-1000 2.00</p> <p>3rd Measuring Range Resolution KN 0-500 1.00</p> <p>4th Measuring Range Resolution KN 0-200 0.40</p> <p>Max. Clearance for Tensile Test mm 50-900</p> <p>Max. Clearance for Compression Test mm0-900</p> <p>Clearance between Columns mm850</p> <p>R.A.M. Stroke mm300 / Straining/Piston Speed at no load mm 0-45</p> <p>Electric Supply kw 3.00 / <b>Standard Accessories</b> For Tension Test: Clamping Jaws for round specimen Mm 20-40 40-60 60-80 , Clamping Jaws for Flat specimen Mm 0-20 20-45 45-70, Width Mm 100 / For Compression Test: Pair of compression plate of diameter Mm 220</p>			
2	<b>DIGITAL COMPRESSION TESTING MACHINE</b>	<p>Capacity: 2000kN Optional: Digital Compression Testing Machine with Single Gauge also Available The Digital Compression Testing Machine has been designed to meet the need for a simple, economic and reliable means to test concrete for its compressive strength. The Digital Indicator incorporates a 4-Digits display calibrated in Kilo Newton (KN) and preset to maximum load capacity fitted with micro switches to switch-off the motor when the load</p>	01		

		<p>approaches the maximum capacity of the gauge, avoiding any over loading. Relays are incorporated so that the motor does not restart on its own after a power breakdown. The electrically operated pumping units are provided with a control knob to adjust the pace rate which can be effectively controlled by an experienced operator during the course of testing, by observing the progress of the Digital Indicator readings.</p>			
<b>3</b>	<b>FLEXURE TESTING MACHINE</b>	<p>Electrical The Flexure Strength Testing Machines are designed to provide maximum rigidity throughout their working range. The load is applied by the upward movement of a hydraulic ram. The jack can be raised or lowered for testing different size beams. The load is indicated on a calibrated Bourdon tube type Pressure Gauge of range: 0-100kN x 0.5kN (0-10,000 kgf x 50 Kgf). The load gauge is calibrated against NPL/ NCCBM certified proving ring.</p>	<b>01</b>		
<b>4</b>	<b>CUBE MOULD</b>	<p>Size: 50mm x 50mm x 50mm Non ISI 70.6mm x 70.6mm x 70.6mm Non ISI 100mm x 100mm x 100mm Non ISI 150mm x 150mm x 150mm Non ISI 150mm x 150mm x 150mm ISI Marked For concrete compressive strength testing we offer highly sophisticated testing machines duly made by our engineers and technicians keeping in mind the overall usages. Our concrete compressive strength testing machines includes concrete strength testing moulds like Cube Moulds, Beam Moulds, Cylindrical Moulds along with Flexural Strength Testing Machinethat are equipped with the latest designs and operating principle. Four standard sizes of cube moulds are offered and supplied complete with base plate</p>	<b>12</b>		
<b>5</b>	<b>BEAM MOULD</b>	<p>Size: 150mm x 150mm x 700mm 100mm x 100mm x 500mm Two standard sizes of Beam Moulds are offered for casting concrete specimens for flexural strength</p>	<b>02</b>		

		testing. These beam moulds are made of cast iron and are supplied complete with a base plate.			
6	<b>CYLINDRICAL MOULD</b>	Size: 150mm x 150mm x 300mm 100mm x 100mm x 200mm Moulds for testing concrete cylinders for Compressive Strength Testing are offered in two different sizes. These cylindrical moulds are made of Cast Iron and split into two parts longitudinally. These are supplied complete with a base plate and top plate	03		
7	<b>BLAINE'S AIR PERMEABILITY APPARATUS</b>	: As Per IS 4031, 5516, 1727 & 4828, ASTM C-204 BS 4359-2 The apparatus is used for determining the fineness of cement in terms of specific surface expressed as total surface area in square centimetres per gram of cement. This is a variable flow type air permeability. Specification: The apparatus consists one each of permeability cell 12.5mm I.D. manometer 'U' type mounted on stand with a built in stop cock, perforated disc, plunger rubber stopper, rubber tube 30cm long. Packet of 12 filter paper disc and a bottle of 100ml dibutylphthalate liquid	01		
8	<b>VICAT NEEDLE APPARATUS</b>	As Per IS 4031, 2645, 2542 (PART-1), 1727, 5513 & 712 BS 12, 146, 915, 1370, 4027, 4246, 4248 AASHTO T 129, E 131. Specification: Same as Vicat Needle Apparatus but in addition is fitted with a dashpot which facilitates gentle lowering of the needles. Accessories: Mild steel base plate 5 inches x 5 inches. Fulcrum mould, brass, 70mm i.d. base dia. x 60mm i.d. top dia., 40 mm height. Note:1) Normally set of needles and mould which meet its requirements as per I.S. 5513 are supplied. While ordering please specify the specification code of the instrument required. 2) Vicat needle apparatus for determining consistency of hydraulic cement. Gypsum plaster, lime etc. As per ASTM C 187-58 C 472-62 C 110-58, IS 2542 (Part-1) can also be supplied.	05		



9	<b>FLOW TABLE</b>	Optional: Flow Table Motorized Also Available AS Per IS : 6932 ( PART VIII) ASTM C 230,BS 4551:1 This is used for determining the work ability of building limes. Specification: The flow table consists of a 30 cm dia. polish steel plate with 3 engraved annular circles 7, 11 and 19cm dia. The table top is arranged for a free fall of 12.5mm by a cam action. Supplied complete with one brass conical mould, 65mm i.d. at base and 40mm i.d. at top, height of the mould 90mm.	<b>01</b>		
10	<b>VEE BEE CONSISTOMETER</b>	As Per IS 1199 & BS EN 12350. The instrument is used for work ability as well as consistency of fresh concrete. A slump Cone and a graduated rod supplied with the instrument helps the operator to find out slump values and vibration table with container and acrylic disc is used to find out work ability of concrete expressed in Vee Bee degrees, which is defined as the time in seconds to complete required vibrating at which the fresh concrete flows out sufficiently to come in contact of the entire face of acrylic disc. Specification: The equipment consists of: A vibrating table size 380mm long and 260mm wide, resting upon elastic support at a height of about 305mm above the floor, complete with Start/Stop switch, cord and plug. A holder is fixed to the base in to which a swivel arm is telescoped with funnel and guide swivel arm is also detachable from the vibrating table. The divisions of scale on the rod record the slump of the concrete in millimetres. Supplied complete with a sheet metal container with lifting handles which can easily be fixed to the vibrating table. A slump cone open at both ends with lifting handles and a tamping rod of size 16mm dia and 600mm long rounded at both ends.	<b>01</b>		
11	<b>SLUMP TEST APPARATUS</b>	As Per IS 1199, IS 7320 Specification: The slump cone in these slump test apparatus is filled with freshly mixed concrete and tamped with a tamping rod in three or four	<b>04</b>		

		layers. The top of the concrete is levelled off with the top of the slump cone, the cone is lifted vertically up and the slump of the sample is immediately measured. The complete slump test apparatus set comprises of a Steel Octagon Base Plate (8 faces) with carrying handle, Graduated Tamping Rod 16mm dia. x 600mm long with one bullet end, slump cone having base 200mm, height 300mm fitted with handle.			
12	<b>COMPACTION FACTOR APPARATUS</b>	As Per IS 1199, 5515. & BS 1881-103 The apparatus is used for determining the work ability of fresh concrete, provided the maximum size of the aggregate does not exceed 38mm. The test is particularly useful for concrete mixes of very low work ability where true slump values are not reliable. Specifications: It consists of two rigid conical hoppers and a cylinder mounted on a rigid metal frame. The lower openings of the hoppers are fitted with hinged trapdoors having quick release catches. A circular metal plate is provided to cover the top of the cylinder. Supplied complete with one plasterer's trowel and one tamping rod, 16mm dia x 600 mm long, one end rounded.	01		
13	<b>LE CHATELIER MOULD</b>	As Per IS 269, 712, 5514, 1727, 2645, 6932 (PART IX) BS 6463 It is used for the determination of soundness by expansion method of ordinary and rapid hardening Portland cement, low heat Portland cement and class 'A' Limes. Specification: It consists of a small split cylinder forming a mould. On either side of the split cylinder. Two parallel indicating arms with pointed ends are attached. Supplied complete with two glass plates and a lead weight.	05		
14	<b>LE CHATELIER FLASK</b>	AS Per IS 4031 1968, ASTM C 188 Used for finding specific gravity of hydraulic cement. Made from Borosilicate glass. The flask is 243mm in total height, having a bulb of 90mm dia of 250ml approximate capacity. The long neck of the flask has at top a funnel of	05		

		50mm dia in that fits a ground glass stopper. The neck has over-all 11mm i.d. upper portion is graduated from 18ml to 24ml with 1 ml graduation. Just at the bottom of the neck 1 ml capacity is marked in between there is 17 ml capacity bulb.			
15	<b>LABORATORY CEMENT AUTOCLAVE</b>	As Per IS 4031-1968, IS 1624-1960 & ASTM C 151, C 141The autoclave is suitable for conducting accelerated soundness tests on cements or the autoclave expansion test requiring constant steam pressure with the correspondent constant pressure. It consists of a stainless steel cylinder with a welded heat insulated metal housing attractively finished. The attached control unit encloses a sensitive pressure regulator and pressure gauge. Power switches and pilot lights for controlling the electric heating units. Inside chamber dimensions 10.5 cm diameter x 40.5cm height suitable for operation on 230 V, 50 Hz Single Phase A. C. supply. Supplied complete with test bar holder, special rack to hold specimens above water level in the autoclave and in a vertical position to expose them in the same manner. A Digital PID Controller is fitted for controlling the desired temperature.	01		
16	<b>HEAT OF HYDRATION APPARATUS</b>	As Per IS 11262-1985, ASTM C 186 This equipment is required to determine the heat of hydration of cement as expressed in calories per gram. The equipment comprises of the following :1) A wide mounted double walled vacuum flask with a stop cock 38 mm &a insulating container for the flask 2) A Beckman thermometer (Range 5° C )held tightly by the cock stopper in such a way as to avoid accidental contact with the stirrer blade & the reading lens. To facilitate the easy removal the cock stopper is in two halves.3) A constant speed stirrer (double bladed propeller type) extended to within 38 mm from the bottom of the flask.4) A funnel (Gooch type)with a stem of 6 mm inner dia& a body approx. 25 mm long and 25	01		

		mm dia. is fitted to the cock stopper for introducing the sample All the above to combine to form the calorimeter for the determination of heat of hydration of cement. Suitable To Operate on 230 V A.C. 50 Hz			
17	<b>VIBRATING TABLE</b>	Size: 20" x 20" x 20", 24" x 24" x 24", 39" x 39" x 39" Specification: Proper compaction of cement and concrete while casting specimens for compressive or flexural strength testing essential to achieve a better and more consistent mixture. The cement and concrete vibrating table top has stops along its edges to prevent moulds from sliding off the table during operation. The maximum load capacity is 140 kg.	01		
18	<b>VIBRATING MACHINE</b>	Optional: Digital Machine also Available As Per IS 4031, IS 10080 Vibrating Machine is used for vibrating the mix in moulds at a frequency of 12,000 ± 400 cycles per minute. The vibrator is mounted over 4 coiled springs and the vibrations are developed by means of a revolving eccentric shaft. The center of gravity of the vibrator, including the cube mould, is either at the center of eccentric shaft or within 25mm below it. The simple design of the machine facilitates easy assembly and dismantling of the cube moulds	01		
19	<b>REBOUND HAMMER</b>	The concrete test hammer is an instrument which is easy to use, for quick and approximate measurement of the resistance to pressure of manufactured concrete products. The principles on which it works are based on the rebound impact of a hammer on a piston which rests against the surface of the concrete products. The Greater the resistance of the concrete, greater is the rebounded impact. By reading this rebound impact on a scale and relating it to curves on graphs supplied with the instrument, the resistance to compression in MPA or PSI can be found, with 20% of actual. Specifications : Consists of a barrel in	01		

		<p>which is housed a hammer mass attached to an impact spring which slides on a guide bar. A plunger is attached to the guide bar which is pressed against the surface to be tested. As the piston is pressed against the surface to be tested, on reaching the compressive strength, the hammer mass is released and rebounds to a certain extent (according to the strength of the surface) which is indicated by a rider on a calibrated scale. A lock button fixed on the body of the hammer locks the rider in place and the rider can be reached to zero position by using the same button. The equivalent compressive strength can be computed from the chart supplied. Each hammer is calibrated against a standard test hammer, and is suitable for specimen of compressive strengths 100 - 700 kg/cm. The instrument, complete with a grinding stone for polishing the test surface, is supplied in a carrying case.</p>			
<b>20</b>	<b>TILE FLEXURE TESTING MACHINE</b>	<p>AS PER IS: 1237 and 654 The Tile Flexure Testing Machine is used to determine the flexural strength of clay roofing tiles and cement concrete flooring tiles. We are one of the leading manufacturers of Tile Flexure Testing Machines. Our machines are manufactured using best raw materials to ensure good functionality and durability. The Tile Flexure Testing Machine is a double lever loading machine where load is placed by a flow of lead metal that automatically stops as the sample breaks. The sample is mounted between rollers which are 40mm or 12mm in dia. Bearing rollers can be placed at center distances of 150, 200 or 270mm. The unit comes equipped with a 20 Kg lead metal.</p>	<b>01</b>		
<b>21</b>	<b>TILE ABRASION TESTING MACHINE AS</b>	<p>IS: 1237 &amp; 1706. This is used for determination of resistance to wear for cement concrete flooring tiles. Tiles specimen of size 7.06cm x 7.06cm is pressed trace-wise under specific load on a grinding path and abrasive powder is evenly spread on the rotating grinding path and</p>	<b>01</b>		

	<b>PER</b>	after specific number of revolutions of the grinding disc the second parallel side of the tile is subjected to wear for similar number of rotations. The wear of the tile is measured on a thickness gauge specifically made for the purpose. The machine consists of a disc rotating at a speed of 30 rpm in a circular tray. A bracket is provided to hold the specimen. A counter balance lever loads the specimen. Load applied is 30kgf. A funnel is fitted to evenly spread abrasive powder on the grinding path. A pre-set counter automatically stops the machine after 22 revolutions. This counter is re-adjustable. The machine works on 440 volts AC, three phase electrical supply.		
<b>GEO TECHNICAL LABORATORY:</b>				
<b>1</b>	<b>PLASTIC LIMIT TEST DEVICE</b>	As Per IS 2720 (PART-VII) ASTM D-42, BS 1377 AASHTO T 90. Moisture contents at which soil has smallest plasticity is called limit. For determination purpose plastic limit is defined as the water content at which a soil will just begin to crumble when rolled in to a thread of 3mm dia. Specification : The complete set consists of one each : I) Glass plate 20cm x 15cm having round ends, ii) Brass or stainless steel rod 3mm dia. x 150mm long, iii) Flexible spatula 15 cm, iv) Set of 6 moisture containers, v) Porcelain basin 150mm dia, vi) Plastic wash bottle 500ml.	<b>03</b>	
<b>2</b>	<b>SHRINKAGE LIMIT TEST DEVICE</b>	As Per IS 2720 (PART-VII) ASTM D 427, BS 1377, AASHTO T 92. Shrinkage limit is the maximum water content at which a reduction in water content does not cause an appreciable reduction in volume of the Soil Mass. At shrinkage limit, on further reduction in water, air enters in to the voids of soils and thus keeps the volume constant. The apparatus can be used to determine shrinkage limit and to calculate other shrinkage ratio, shrinkage index and volumetric shrinkage. Specification : Set consists of one	<b>03</b>	

		each :- I) Porcelain evaporating dish, ii) Shrinkage dish, iii) Glass cup, iv) Perspex plate with three metal prongs, v) Flexible spatula 100mm, vi) Glass cylinder, vii) 25ml x 1ml, supplied without mercury			
<b>3</b>	<b>LIQUID LIMIT DEVICE</b>	Motorized Liquid Limit also Available As Per IS 2720 (PART V), BS 1377-2 , ASTM D 4318 Casagrande method in mechanical form is known as liquid limit method and has been in use for soil mechanics for a number of decades. The liquid limit data of soils is useful to correlate mechanical properties of soil, such as compressibility and lower shear strength. Liquid limit is the water content at which soil passes from zero strength to an infinite strength, hence the true value of liquid limit cannot be determined. For determination purpose liquid limit is that water content at which a part of soil, cut by a groove of standard dimensions, will flow together for a distance of 1.25cm under an impact of 25 blows in a standard liquid limit apparatus. The soil at the water content has some strength which is about 0.17N/cm. sq. (17gms/sq.cm.). At this water content soil just passes from liquid state to plastic state. It consists on a brass cup held on an adjustable bracket. The cup can be adjusted for a fall of 1 cm and can be raised and dropped on a rubber base of standard hardness by cam action. Complete with one Casagrande grooving tool, one ASTM grooving tool and a height gauge block.	<b>03</b>		
<b>4</b>	<b>PROCTOR COMPACTION TEST</b>	As Per IS: 2720(P-VII) Specification :Soil compaction is of utmost requirement for constructing earth fill for dams, canal embankments, reservoirs, highways, runways and railways. The relationship between soil moisture content and compacted dry density largely determine the construction specifications and quality control of compacted earth fill. To check the strength of the soil the density of the soil is taken into account and hence the	<b>01</b>		

		quality control is checked otherwise.			
<b>5</b>	<b>UNIVERSAL AUTOMATIC COMPACTOR</b>	As Per ASTM D 558, BS 1377-4 It is a motor driven mechanical compactor useful for soil compaction into 100mm to 102 mm & 150mm to 152.4 mm diameter moulds. Two sets of Rammers are provided, one of 2.5 kg and arranged for 300 mm & 305 mm drop and other 4.5 kg and arranged for 450 mm & 457 mm drop. The rammer assembly is provided with a ratchet and pawl arrangement to lift it from the top of the soil layer. When the rammer reaches the required height the pawl release the rammer which falls freely on soil surface. The release mechanism is operated by an arm moving up and down which is connected to a reduction gear coupled to the motor through another arm. An automatic blow counter fitted to the compactor is used to set the number of blows. The base plate of the specimen mould is to be fitted to the rotating base plate of the instrument which marks 1/5” revolution per stroke. The equipment is suitable for operation on 230 V, 50 Cycles, Single Phase, A.C. supply moulds are to be ordered separately.	<b>01</b>		
<b>6</b>	<b>RAPID MOISTURE METER</b>	As Per IS 2720 (PART II) For quick determination of moisture content of materials in powder form viz. Soil, Sand, Coal pottery slip, cement etc. Calcium carbide when comes in contact with moisture acetylene gas is generated. This principle is used in Rapid moisture meter. A weighed quantity of samples is mixed with fixed quantity of calcium carbide reagent and the whole mixture is thoroughly shaken in a vessel to which a pressure gauge is fixed. The acetylene gas produced develops pressure. The instrument indicate moisture on Wet / weight basis . easily convertible to dry weight basis. The unit consists of a pressure vessel with clamp for sealing cap, rubber sealing gasket, pressure gauge calibrated in percentage moisture content 0 -25%, 50% on wet weight basis . A counte	<b>01</b>		



		poised balance for weighing sample, a scoop for measuring carbide reagent , one bottle of reagent approx. 450 gram, One cleaning brush and a steel balls for through mixing. Complete in wooden carrying box with handle.			
7	<b>SAND POURING CYLINDER</b>	As Per IS 2720 (P-XXVIII) BS 1377-9 Specification: The soil testing equipment is used for determination of the dry density of compact, fine, medium grained soils and for layers not exceeding 50cm thickness. A circular hole is dug into the ground, all the soil from within it collected, weighed and dried, and the hole back filled with a standard uniform sand or fine gravel, poured from a calibrated container for calculating the volume of hole. The complete apparatus consists of a Sand Pouring Cylinder fitted with Conical funnel and Shutter, Cylindrical Calibration Container, and a Metal tray with a central hole.	<b>02</b>		
8	<b>DOLLY CORE CUTTER HAMMER</b>	:As Per IS 2720 (PART XXIX) 1966 & BS 1377-9 This is used for determination of in situ dry density of natural or compacted fine grained soil, free from aggregates. A cylindrical cutter is used to extract a sample of the soil with the help of a dolly and rammer. From the weight, density and the moisture, and dry density of the soil is ready calculated. It consists one each of: cylindrical core cutter made of steel, 127.3mm. Long and 100mm internal diameter. Steel dolly, 25mm high with a lip to enable it to be located on top of the core cutter, rammer with detachable steel rod. SPARE, OPTIONAL EXTRA AND ACCESSORIES:- 1. Cylindrical core cutter 100mm i.d. x 175mm long 2. Dolly 3. Test form pad of 50.	<b>02</b>		
9	<b>PYCKNOMET ER</b>	As Per IS 2386 (P-III) Specification : Specific Gravity is the ratio of the weight in air of a given volume of a material at a standard temperature to the weight in air of an equal volume of distilled water at the same stated temperature. The Pycnometer Bottle can be used to test a	<b>06</b>		

		wide range of materials from clay to sand and gravel smaller than 10mm. It consists of 1kg Glass Jar with Brass Cone, Locking Ring and Rubber Seal.		
10	<b>PERMEABILITY TEST APPARATUS CONSTANT &amp; FALLING HEAD</b>	As Per IS 2720 (Part XBII)- 1966 BS 1377; EN DD ENV 1997-2; ASTM D2434;AASHTO T215 This equipment is used for testing the permeability of granular soils (sands and gravels).The specimen is formed in a permeability cell and water is passed through it from a constant level tank Take-off points located along the sides of the permeability cell are connected to three manometer tubes mounted on a panel complete with a meter scale. Water passing through the specimen is collected and measured, either for a specific quantity or over a period of time. The reduction of head is noted from the variation of water level in the manometer tubes. Comprising three glass tubes of constant bore, meter scale and connecting tubing for cell pressure take-off points, all mounted on a free-standing panel. Manufactured from transparent plastic with attachment for wall mounting. The inlet, outlet and overflow pipes are fitted to the base of the tank and can be adjusted for height within the tank. Supplied complete with connecting tubing. Clays and silts are tested using the ‘falling head’ technique. Flow of water through the specimen is observed by monitoring the rate of fall of water in the tube. It is essential that soils of very low permeability are sealed inside the cylinder to prevent seepage along the sides of the specimen. Before testing, the specimen must be completely saturated with water as the presence of air will restrict the flow of water Specification : The equipment comprises one each : - Gun metal mould - 100mm I.D. x 127.3mm high x 1000ml Volume. - Gun metal mould extension collar - 100mm dia x 60mm high for the above mould. - Gun metal drainage base plate with a recess for a porous stone, GI Tank	01	

11	<b>RELATIVE DENSITY TEST APPARATUS</b>	As Per IS 2720 (PART XIV), ASTM D 4253 & ASTM D 4254 The equipment is used for the determination of the relative density of cohesion less free draining soils and meets the essential requirements. Specification : The equipment consists one each of: Vibratory table, with a cushioned steel vibrating decks about 75cm x 75cm. It has a frequency of approximately 3600 vibratory table, minute under a 11.5kg load. Amplitude is variable in between 0.65mm in step of 0.05 to 0.25mm, 0.25 to 0.45 mm and 0.45 to 0.65mm. Suitable for operations on 415V, Three Phase supply. Cylindrical metal unit weight mould, 3000ml. Capacity.Guide sleeve with clamp assembly. Surcharges base plate for mould. Handle for surcharge base plate. Surcharge weight. The total weight together with surcharge base plate and handle is equipment to 140 kg. /sq. cm. For mould. Cylindrical metal unit weight mould 15000 ml. capacity. (Total weight together with the above mould & surcharge weight is equivalent to 140 kg./sq. cm) dial gauge 0.01mm x 50mm travel. Extension piece 25mm for dial gauge.	01		
12	<b>CONSOLIDATION TEST APPARATUS</b>	(Single Gang) Optional: Three Gang also available As Per IS 2720 (Part XV), IS 12287, BS 1377, ASTM D 2435 Consolidation test is un-dimensional test considered extremely important in soil mechanics. Sample taken from adjacent areas of a single site show differential settlement even when tested using same techniques. Soil of similar strength may show varying consolidation. Samples are very carefully prepared and vertical settlement of the specimen in saturated or drained conditions carefully recorded when known load is applied. SPECIFICATION: The standard outfit comprises of the following items. Loading unit, maximum capacity 20kg/cm.sq. Having a loading yoke connected to a lever arm with a counter balancing adjustment and having a lever ratio of 1:1 the whole assembly being mounted on a sturdy steel frame	01		

		<p>stand. The loading unit is so designed that it can be used for consolidation cells of different diameters as well as different dia. floating ring type consolidation cells. Fixed ring type Consolidometer (Odometer) cell assembly for testing 60mm dia. x 20mm thick specimen comprising: Fixed ring for specimens 60mm dia. x 20mm thick with guide ring. Top and bottom porous stones for 60mm dia. specimen. Perforated pressure pad, Channeled base with water inlet and gasket Flanged water jacket, water reservoir with plastic tube and pinch cock. Set of weights to give a pressure of 10kg/cm.sq. On 60mm dia. specimen, comprising: 7 nos. 0.05 kg/cm .sq., 5nos. 0.1 kg/sq.cm., 6nos. 0.5kg/sq. cm., and 5 nos. 1.0 kg/sq.cm. Supplied complete as above but without dial gauge. ACCESSORIES : Dial gauge 0.002 mm x 10mm. Extension piece, 40 mm long, consolidation test forms pad of 50 for one dimensional consolidation. OPTIONAL EXTRAS : Varying head stand pipe, 50cms. Long with mm. Scale. Fixed ring type of Consolidometer (Odometer) cell assembly for 50mm. dia. x 20mm thick specimens , complete with fixed ring guide ring. Pair of porous stones, perforated pressure pad, channeled base, gasket and flanged water jacket. Set of weights to give a pressure of 10kg/sq.cm. on 50cm. dia specimen. Fixed ring type of Consolidometer (Odometer) cell assembly for 70mm dia x 20mm thick specimens, complete with accessories as above. Set of weights to give a pressure of 10 kg/sq.cm. on 70mm dia. specimens. Fixed ring type of consolidometer (odometer) cell assembly for 100mm dia. x25mm thick specimens, complete with accessories as above. Set of weights to give a pressure of 10 kg/sq.cm. on 100mm. Dia. specimens.</p>			
13	<b>DIRECT SHEAR TEST</b>	Single Speed Motorized Also Available Three Speed Motorized Also Available Twelve Speed Motorized Also Available AS PER IS: 2720 (Part-VIII), ASTM D-3080	01		

	<b>APPARATUS</b>	<p>For determination of the direct shear strength of soils on specimen size 60 mm x 60 mm x 25 mm. Specification: The apparatus comprises of the following: Loading Unit: Supplied with load yoke with direct and lever system for applying load. Normal stress capacity 8kg/sq.cm. Load is applied either directly or through a counter balanced detachable lever. Provision is made for load to be applied either through a steel ball recessed in the loading pad or direct through a boss on the pre calibrated loading yoke. The loading unit is provided with V strips and roller strips for frictionless movement of shear box housing. Shear Box Assembly: Comprising Direct Shear box in two halves for a square specimen size 60 x 60 x 25 mm one pair of plain gripper plates, one pair of perforated gripper plates, one pair of porous stones, one top loading pad. Shear box housing: Accommodates the Direct Shear Box assembly. Complete with two ball roller strips. Specimen Cutter: For cutting 60 x 60 x 25 mm specimen from larger samples. Set of weights to give a normal stress of 3 kg/sq.cm. through lever as follows: To give kg/cm sq. Qty. 0.05 , 4 Nos. 0.1, 1No. 0.2, 1No. 0.5, 3 Nos. 1.,0 1No. Complete set as above but without proving ring. Nett weight 140Kg. Essential Accessories: High sensitivity compression ring cap 200 kg one consolidation dial gauge 0.01 mm x 25 mm and one strain dial gauge 0.01 mm x 25 mm and one strain dial gauge 0.01 mm x 25 mm. Optional extras: Additional set of weights to give a normal stress of 5 kg/cm<sup>2</sup> Soil Sampler for 60 mm x 60mm specimen and test from pad of 50. Spares: Porous stone for 60 mm x 60 mm size sample available in pairs.</p>			
14	<b>CBR TESTING MACHINE</b>	As Per IS : 9669, IS : 2720 (Part XVI) It is used in large road construction projects has increased considerably in recent years. This apparatus, mounted on a rolled steel joint cantilevered from the back of the truck or fitted to the underside of a mobile frame, can be used to determine the	01		

		<p>bearing capacity of soils quickly and efficiency. This method of testing in-situ, using piston penetration, is useful for determining the load carrying capacity in the field, when the in -place density and water contents are such that the degree of saturation is 80% or greater. When the material is coarse grained and cohesionless so that it is not affected b changes in the water content and when the material has been in- place. Similar to above but supplied with bench mounting type 5000kgf. Capacity load frame motorized, in place of load frame hand operated. The lead screw of the load frame has a single constant rate of travel of 1.25mm/minute. Dial Gauge 2 in. travel &amp; 0.001 in division for CBR penetration measurement, having provision for increasing the dial gauge- plunger length .Proving ring , 50 kN (5,000kgf) capacity x 0.5. kN/Div sensitivity/ readability, one with 25 kN capacity x 0.04 kN / div sensitivity / readability and one with 10 kN capacity x 0.01 kN / div sensitivity / readability. Note: Proving Rings of other capacities are also required</p>			
15	<b>UNCONFINED COMPRESSION TESTING MACHINE</b>	<p>As Per IS 2720 (PART X) ASTM T 208 This is similar to above with the added advantage of a motorized drive permitting constant rates of stain. Specification : Comprises a screw operated load frame, cap.5000kg with a gear box and motor drive giving 1.25 mm/min. Rates of strain, a pair of cone seating, adaptor for proving ring, and stain dial gauge bracket. Supplied with one pair of male/female coning tools for 38mm dia. samples but without ring and dial gauge. Suitable for operation on 230 V, Single Phase A.C. Supply. Accessories : Coning tools in pairs (Male &amp; Female) for samples having diameter 38mm, 50mm, 75mm &amp; 100mm.</p>	01		
16	<b>TRIAXIAL TEST</b>	<p>As Per IS 2720 (PART XII) The cell is useful for testing 38mm dia x 76mm high soil specimen. Transparent Perspex chamber with anvil and loading plunger, the cell</p>	01		

	<p><b>APPARATUS</b></p>	<p>is easily opened by releasing four nuts of the tie rods. It is leak proof up to 10kg/cm.sq. Fluid pressure. An oil plug which can also be used as an air vent is provided for introducing a thin layer of oil over water. This provides effective sealing at the plunger for long duration tests. The cell is fitted with four sleeve packed valves of no volume change type on the base. These valves are used for cell pressure, pore water pressure, drainage or back pressure. The loading plunger of the cell has dial gauge rest. Loading pad made of Perspex for 38mm dia specimens. Pair of plain discs made of Perspex 38mm dia 6mm thick. Pair of porous stones 38mm dia specimen. Split sand former for 38mm dia specimen. Sheath stretcher for 38mm dia specimen. One dozen rubber sheaths for 38mm dia samples. For synthetic rubber 'o' rings for 38mm dia specimen. One plastic drainage tube One load frame 5000 Kgf motorized , consists one rate of strain type, giving the following rates of strain. 1.25mm/min . Load frame is supplied with a dial gauge bracket. Universal triaxial cell (stationary bushing) 10kg/cm.sq. One lateral pressure assembly 0-10 kg/cm.sq. One lateral pressure assembly 0-10kg/cm.sq. complete with foot pump and rubber hose. One high sensitivity proving ring capacity 1000kg. One strain dial gauge 0.01 x 25mm. Suitable for operation on 230 V A.C. It is designed for application of cell pressure upto 10kg/cm on a triaxial specimen in the triaxial cell. The unit is mostly used in routine tests which last for about 10 to 15 minutes wherein the variations of cell pressure can be tolerated. The apparatus consists of a pressure chamber which has a flanged top 2 cap fitted with a 10 kg/cm . Pressure gauge and a valve for pumping in air. Water inlet and drain cock are fitted to the chamber. 2 The foot pump supplied easily develops a pressure of 10 kg/cm<sup>2</sup> Complete with connecting pressure hose.</p>			
17	<b>LABORATOR</b>	As Per IS 2720 (XXX)-1968 BS 1377. Consists of a	<b>02</b>		

	<b>Y VANE SHEAR TEST APPARATUS</b>	torque head adjustable in height by means of a lead screw rotated by a drive wheel to enable the vane to be lowered into the specimen. Rotation of the vane is by means of a hand wheel which operates a worm gear arrangement turning the upper end of a calibration torsion spring, vane dia, rod dia, vane size & vane height are as per IS specifications. The vane shaft is attached through the hollow upper shaft to a resettable pointer, which indicates the angle indicates the angle of torque on a dial graduated in degree the dial reading multiplied by spring factor gives the torque a container for soil sample is also supplied & a sampling tube of 38mm. i.d.& 150mm long can also be used as container Supplied with set of four springs, one each of approx. 2 kgs/cm sq., 4kgs/cm sq., 6 kgs/cm sq. & 8kgs/cm sq. complete as above in a wooden carrying case			
<b>18</b>	<b>MOTORIZED SIEVE SHAKER</b>	Carries upto 7 sieves of 200mm or 300m, 450mm diameter. The shaker is driven by a ¼ H.P. Motor through a reduction gear immersed in oil. The sieve table does not rotate but is inclined from the vertical axis and the direction on inclination charges progressively in clockwise direction. If the stop pin below the table is removed, the shaker can have a rotary motion. In addition to this gyratory motion of the table, there is an upward and downward movement ensuring that each square cm of the sieve is utilized. A pair of rods and a holder are supplied. The holder can be fixed on the top of the upper most sieve, and thus the sieve set in firmly held. Suitable for operation form 230 V, 50 Hz Single Phase A.C. Supply.	<b>02</b>		
<b>19</b>	<b>PLATE LOAD TEST APPARATUS</b>	As Per IS 1888 1962, ASTM D 1194, BS 13779 This is for estimating the bearing capacity of shallow foundations in situ and for the design of flexible pavement. In the test procedure a steel plate is subjected to gradually increasing load and settlements of the plates recorded. Specification : The out fit consists of 50 tons hydraulic jack with separate	<b>01</b>		



		<p>pumping unit fixed to it a 0 - 500KN x 0.5KN, Pressure gauge and flexible metal pipe 5 mtr. long, Special ball and socket arrangement between the jack and the bearing plate, Extension rod 12mm dia. x 25 cm long for taking dial gauge readings, Magnetic base with female thread on top for holding extension rod, Top end plate, 50mm, dia with male thread for fitting onto the extension rods and positioning the dial gauge plunger 4 Nos. Column 15cm dia x 25cm long with flanges complete with four bolts and nut, Column 15cm dia x 50cm long with flanges complete with four bolts and nuts, Bridge support of welded steel angle construction , 5 mtr. Span and stands approximately 30 cm. High. Fitted with two quick release clamps a for positioning and holding the dial bracket, Plane M.S. plate 60cms x 60cm . Square x 60 cms. Square x 25mm thick. Plane M.S. plate 45cm x 45cm x square x 25mm thick. Plane M.S. plate 30 cms x 30 cms x 25mm thick. Dial Gauge 0.01mm x 25mm. Accessories: Plane M.S. 75mm x 25mm thick. Plane M.S. 50cm x 25mm thick. Grooved M.S. plate 60cms x 60cms x 25mm thick. Grooved M.S. plate 45cms x 45cms x 25mm thick. Grooved M.S. plate 30cms x 30cms x 25mm thick. Grooved M.S. plate 75cms x 75cms x 25mm thick.</p>			
<p><b>20</b></p>	<p><b>STANDARD TEST SIEVES</b></p>	<p>As Per IS:460 (Par t-I, II) 1978 Test Sieves is a common laboratory requirement. Sieves are used for sieving of chemical powders, medical powders, aggregate, sand soil and cement etc. These sieves are manufactured as per various standards like IS, BS, ASTM, DIN etc. In Civil Engineering it is a common practice to use sieves for gradation and particle size determination. Manufacturers brass frame and G.I. Frames Sieves of dia. 200mm, 300mm and 450mm. Normally brass sieves are manufactured in 200cm dia. and frame is spun brass,The Sieve cloth used is standard SS or prosper bronze wire mush. The G.I. Frames sieves manufactured normally n</p>	<p><b>02</b></p>		

		sizes 300mm dia. or 450mm dia. have a steel perforated sheet having accurately punched square holes. Brass Frame 200mm Dia.: SIZES AVAILABLE: 4.75 mm, 4mm, 3.35mm, 2.80mm, 2.36mm, 2mm, 1.70mm, 1.40mm, 1.18mm, 1mm, 850micron, 600micron, 500micron, 425micron, 355micron, 300micron, 250micron, 212 micron, 180micron, 150micron, 125 micron, 106 micron, 90 micron, 75 micron, 63 micron, 53 micron, 45 micron, 38 micron, 25 micron. G.I. Frame Sieves 300mm Dia and 450mm Dia: SIZES AVAILABLE : 125mm, 106mm, 100mm, 90mm, 80mm, 75mm, 63mm, 53mm, 50mm, 45mm, 40mm, 37.5mm, 31.5mm, 26.5mm, 25mm, 22.4mm, 20mm, 19mm, 16mm,14mm, 13.2mm, 12.5mm, 11.2mm, 10mm, 9.5mm, 8mm, 6.7mm, 6.3mm, 5.6mm, 4.75mm, 4.0mm, 3.35mm, 2.36mm, 1.18mm, 1.00mm. Lid & receiver in G.I. frame for 300mm dia& 450mm dia sieves .			
21	<b>LABORATORY OVEN</b>	18"X18"X18" Laboratory with Digital Temperature Controller Hot Air Oven Temperature Range 50 <sup>0</sup> C to 250 <sup>0</sup> C, Stain les Steel , 03 Shelves	03		
22	<b>Digital Weighing Scale</b>	Digital Weighing Scale, 120 Kg, Front & Back Red LED Double Display, MS Platform	02		
<b>FLUID MECHANICS LABORATORY:</b>					
1	<b>TILTING FLUME</b>	Specifications: A hydraulic flume of c/s 200 x 300 mm & 4000 mm length with transparent window on either sides of 1000 mm length. Sliding gates one at upstream and other at the downstream side. Screw jack for change of the slope of the flume. A Sump tank of sufficient capacity. Supply tank with waves damping arrangement. A1 Hp centrifugal monoblock pump. A Orifice meter with manometer to measure the discharge. Inlet/throat dimensions: 50/25 mm respectively. Trolley with point	01		

		gauge for level measurement. Models Supplied. Weirs:Sharp crested weir (crest length 200 mm) Broad crested weir Ogee weir or spillway.			
2	<b>FLOW OVER NOTCH &amp; WEIR</b>	Recirculating-Type The unit consists of flow channel of proper length & width. The notch or weir is fitted, water supply is given at one end of channel. Water flow over notch or weir. Arrangement are made to measure the still level to determine the head. Features:Interchangeable Brass/Aluminum notches & weir. Measurement of head by scale.Range Of Experiments: To determine coefficient of discharge through. 60° 'V' notch. Rectangular notch.Specifications:Water storage tank.Notches 60 included angle 'V' notch.Rectangular notch.Notch interchanges arrangement. Measuring tank & collecting tank & stop watch. Service Required: Water supply. Suitable floor space of 2 m. x 2 m.	01		
3	<b>MOUTHPIECE &amp; ORIFICE INSTRUMENT</b>	The unit consists of supply tank along with orifice and mouth piece fixed to the tank. A pointer is provided at the discharge of orifice to demonstrate & to determine X, Y co-ordinate of jet.  Features: An arrangement to obtain a steady or quiescent flow. An arrangement to vary the head by changing the position of over flow pipe. Piezometer tube to measure head. An arrangement to measure co-ordinate of jet.Range Of Experiments:Determination of coefficient of discharged (CD) & coefficient of velocity (CV) & coefficient of contraction (CC) for orifice. Specifications: Main supply tank with orifice & mouthpiece fitting arrangement. Diameter of Orifice-8.5 mm, Diameter of mouthpiece-8.5 mm, Nozzle25 mm & 50 mm length. Tracer pointer with scale. Measuring tank. Stop watch.Service Required: Suitable Water supply. Suitable floor space of 1.5 m. x 1.5 m.	01		

4	<b>BERNOULLI'S THEOREM APPARATUS</b>	<p>The unit consists of a rectangular transparent flow section through which water is to be flown the velocity of water is changes as cross sectional area of channel changes. The changes of head can be measured with manometric tube connected at various sockets, along with the length of channel. Thus the Bernoulli's theorem can be verified by calculating the energy &amp; head of water at different section.</p> <p>Features: Steady flow arrangement. Transparent flow section. Independent measurement of pressure head. Variable flow rate arrangement. Self sufficient unit. Range Of Experiment: Bernoulli's theorem can be verified.</p> <p>Specifications: Flow channel 750 mm long, transparent acrylic. Supply with flow control valve. Manometric tubes fixed over the flow channel. Measuring tank = 400 x 300 mm Sump tank = 900 x 400 x 400 mm 1/2 Hp pump. Supply tank is fitted on heavy pipe frame. Stop watch. Service Required: Suitable Water supply. Suitable floor space 2 m. x 2 m.</p>	01		
5	<b>VENTURI METER FLOW MEASUREMENT</b>	<p>The unit consist of two pipe emerging out from common manifold along with a Venturi Meter &amp; orifice meter, tapping are provided to measure pressure differences which are connected to differential manometer. A flow regulating valve is provided at the down speed stream of pipe. A measuring tank is provided to collect the flow. The actual flow rate can be measure are both meters calibrated.</p> <p>Features: Two pipes emerging out from a common manifold with a orifice meter. Each line is provided with flow control valve for setting of differential flow rates. Pressure of different pipe lines are connected Flow control valve at the end of each line assures for full running of pipe. Range Of Experiments: Calibration of Venturi Meter. Calibration of orifice meter. Specifications: Measuring tank &amp; stop watch. Basic piping-1" Orifice meter &amp; Venturi Meter inlet &amp; throat diameter 32 &amp; 15 mm resp. Differential manometer. Flow control valve.</p>	01		

		Services Required: Suitable Water supply.Suitable floor space of 1.5 m.x 2 m.			
6	<b>PIPE FITTING APPARATUS</b>	The unit provide study of loose pipe in various pipe fitting. A differential manometer supply to measure the loss of head in these fitting. A flow control valve is provided. An experiment can be carried out at various flow rates. Features:Testing of pipe circuit consisting of sudden contraction, sudden enlargement bends etc.Measurement of head loss at each section for various flow Range Of Experiments: To determine loss of head due to sudden contraction. To determine loss of head due to sudden enlargement. To determine loss of head in an elbow.To determine loss of head in a bend. Specifications: Basic piping. Pipe fitting. Pipe elbow.Pipe bends. Sudden expansion-1/2”to 1” Sudden contraction-1” to 1/2”Differential manometer. Flow control valve. Stop watch. Service Required:Suitable Water supply. Suitable floor space of 2 m. x 2 m.230 V. A. C. single phase supply with earthing connection.	01		
7	<b>METACENTRIC HEIGHT APPARATUS</b>	The unit consists of a small tank. Water is poured in it, so that a small ship model can float over it. The ship model is provided with a horizontal guide bar over which a small weight can be slid. Displacement of weight is measured with a scale. A pointer is attached at the centre of ship. When the weight is slide the ship tilts. The angle of tilt is measured by displacement of pointer & from then the metacentric height of ship can be studied. Specifications:Water tank 700 mm. x 700 mm. x 300 mm. heights with fibre lining inside.Ship model 300 mm. x 150 mm. with a horizontal guide bar for sliding weight & pointer hung from a hook. Scales for measuring displacement of sliding weight & pointer. Services	01		

		Required: Bench area of about 1 m. x 1 m. at working height.			
8	<b>REYNOLDS APPARATUS</b>	<p>The unit consists of a Acrylic tube connected to a tank. At entrance of tube a bell mouth section is provided and at the other end a valve is provide to control the rate of flow. A capillary tube is introduced centrally to the bell mouth to inject die. By varying the rate of flow the reynolds number changes. This also changes type of flow. Visual observation of die (thread) will indicate the type of flow which can be confirmed from the Reynolds number computed. Features: Steady flow arrangement Very clear flow visualization Fine control of die thread.Accurate flow measurement &amp; control. Range Of Experiment:To determine the Reynolds number &amp; hence the type of flow either laminar or turbulent. To determine upper &amp; lower Reynolds number &amp; velocities. Specifications: Acrylic tube (transparent) 25 mm OD of suitable length.Sump tank of 400 X 400 X 700 mm. Supply tank of 300 x 300 mm size &amp; die tank with die needle.Flow control valve.Measuring Flask &amp; stop watch for flow measurement. Crompton Greaves motor for recirculating type unit. Service Required:Suitable floor space of 2 m. x 2 m. x 2 m. for the instrument. Water supply.</p>			
9	<b>PRESSURE MEASUREME NT APPARATUS</b>	<p>This is a board mounted model which demonstrates various types of pressure measurement devices used in common practice. The devices incorporated are: Single well Manometer Differential Manometer Sensitive Manometer Pressure Gauge Vacuum Gauge</p> <p>These devices are coupled to suction and discharge piping of Hydraulic Bench Pump and a close circulation systems is established, with this set up, the working and operating principle of the pressure measuring devices can be studied.</p> <p>Service Required: Bench Area of about 2.5 m x 1 m at</p>	01		

		working height. Glycerine 500 ml for each experimental trial.			
<b>10</b>	<b>PITOT TUBE APPARATUS</b>	Screw type arrangement to raise or lower this pitot tube. The open end connected to a sensitive manometer.	<b>01</b>		
<b>11</b>	<b>VISCOMETER</b>	Minimum Sample Volume      100 µL Viscosity Range                1-3500 cSt Operating Range                18 - 40 °C Output Range      20 - 100 °C Humidity Range                0 ~ 90%, Non-condensing Accuracy                ~+/- 2% Reading Repeatability                ~+/- 0.5% Reading Typical Test Time                <1 min Standards                Correlates to ASTM D445	<b>01</b>		