

STRENGTH OF MATERIAL LAB

S. No.	Apparatus/Equipment required	Specifications	Qty.
1	Universal Testing Machine	<p>COMPUTERIZED UNIVERSAL TESTING MACHINE With Open Front Loading Hydraulic Jaws Supplied Complete With Laptop, Laser Printer & Software 1000 KN Capacity.</p> <p>Machines should be capable for conducting tests on various types of ferrous and non-ferrous materials like TMT bars, MS flats, Angles sections, Channels sections, T-sections, I-sections, Conduit pipes; MS pipes (Hollow & Solid), etc.</p> <ul style="list-style-type: none"> (i) Compression up to 500mmx500 size (ii) Tension for circular and flat section up to 50mm dia. or 100mm width resp. (iii) Transverse (iv) Bending (v) Shear (vi) Hardness and many others. <p>CAPACITY up to 1000KN.</p> <p>1.LOADING FRAME The machine should have six pillars in total for stability and rigidity. The Loading Frame consists of a central cross head whose position is adjustable through a geared motor depending on the size of the test specimen. The lower table is carried by the piston of the Hydraulic Ram of suitable capacity positioned in the cast iron base of the machine. The upper cross head is carried by four steel columns fixed to the lower table. Compression, Transverse, Bending, Shear and Hardness tests to be carried out between the central cross head and lower table, while the tension test is carried between the central and upper cross heads. Sensing of load is through a strain gauge based transducers, while the movement of the lower table (Ram Stroke) is measured by Rotary Encoder. Safety features like over travel limit for central cross head, over travel limit for Ram and over loading of the system are provided as standard with the machines. Hydraulically operated front loading grips will be supplied with the machine.</p> <p>2. HYDRAULIC PUMPING SYSTEM Hydraulic pumping system consists of multi plunger pump powered by a suitable motor operated on 415V, 3 Phase, 50Hz. This pump gives a continuous non pulsating oil flow to the Ram of the loading frame. Pressure switch is provided for additional safety against over load. Release valve and load control valve is placed at a convenient position for easy operation by the operator. It also have electrical control panel for the movement of the middle cross head and also for ON/OFF of the main pump. Additional switch is provided for fast lift of the</p>	01 unit





ram for initial filling of the gap.

3. LOAD PACING

The system is to be supplied with manual pacing arrangement with status of pace rate is indicated in the digital display unit. Pace rate is achieved manually by controlling the flow control knob and the system are released manually after the peak load is achieved.

4. MICROPROCESSOR BASED TOUCH PANEL DISPLAY & DATA ACQUISITION SYSTEM FOR UTM

The two-channel microprocessor based signal conditioning and touch panel display unit is suitable to measure load, Displacement and Extensometer (Optional) directly indicated in their respective engineering units. Load is indicated in terms kN and Extension/displacement in mm. The load is being measured by the Pressure Transducer and displacement is measured by Rotary encoder/ linear displacement transducer. The system receives the output signal of the both the channels as its input and amplify the same to be displayed on the Touch Panel display at the front panel. The data of both the channels of UTM can be transferred to computer through RS-232/ Ethernet and can be online monitored in the software.

SALIENT FEATURES OF SYSTEM

- Menu driven interface
- Facility to perform various operations such as TARE, PROGRAMMING, START, STOP etc. from Touch Panel display
- Programmable Rate of loading (Pace Rate) and sample parameters (Shape, Dimension etc. through Touch Panel display
- Standalone system to Start and stop of test
- Manual Pace Rate control at pre-set value with Pace Deviation Bar
- On-line display of Load, Peak Load and Displacement with recording of Peak load along other sample details
- Real time plotting of Load v/s Displacement, Load v/s Extensometer curve
- Storing of results in user defined file with sample parameter and other details
- Real time clock check to keep automatic track of the date, time and runs
- Test results can be stored in the electronic unit with unique record no. and can be retrieved and transferred to USB drive for printing
- Transmission of Data to computer through Ethernet/USB/RS232 port
- Speed precision +/-5% and accuracy +/-1%

5.Laptop

Intel Core, 5th generation processor, 8 GB RAM, 1TB HDD, DVD, 16"screen, HD Cam.

6.Laser Printer

With copier and scanner, Speed of 12 pages per minute for A4 and letter-size paper. First page out in as low as 10 seconds, 600 x 600 dpi with HP Resolution Enhancement technology (REt). 1200 dpi effective output quality (600 x 600 x 2 dpi) with Resolution Enhancement technology (REt)

7. Application Software

User friendly Software would be provided with the system to acquire and plot data online and then analyse the various result parameters.

Salient features of the software

- Windows based & user friendly
- Saving & Retrieving of Test Files
- On line display of Load, Displacement & Extensometer (Optional)
- Start & Stop operation for acquiring data
- Online Plot of Load v/s Displacement and Stress v/s Strain Graph
- Display of recorded Data on the Screen
- Storing of Data in Numeric form
- Plotting of following graphs-Load v/s Time, Displacement v/s Time, Load v/s Displacement, Stress v/s Strain

Calculation of various parameters such as load and elongation at yields, peak load and displacement at break, yield stress, Modulus of Elasticity, Ultimate tensile strength, compressive strength etc.

Facility to print the data and all the graphs

Max. Capacity (kN) : 1000

1st Measuring range (kN) : 0-200

Least Count (N) : 100

2nd Measuring range (kN) : 200-1000

Least Count (N) : 1000

Clearance for Tension test (mm) : 50-850

Clearance for compression test (mm) : 0-850

Ram Stroke (mm) : 250

Piston speed at no load (mm/min) : 0-80

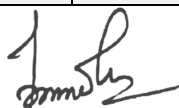
Clearance between columns (mm) : 750

: 3.5

Connected Load (K.W.)

Standard Accessories supplied with the machine

		<p>For Tension Clamping jaws for round specimens (mm) : 08-16mm, 20-40mm, 40-60mm Clamping jaws for flat specimens (mm) : 0-20, 20-50 Width (mm) of specimen : 75 Hydraulically Operated front loading grips will be supplied with the machine</p> <p>For Compression Diameter of platens (mm) : 250 For Transverse Diameter of rollers (mm) : 50 Length of Rollers (mm) : 170 Max. Span between the rollers (Adjustable) (mm) : 800</p> <p>For Compression Diameter of platens (mm) For Transverse Diameter of rollers (mm) : 50 Length of Rollers (mm) : 170 Max. Span between the rollers (Adjustable) (mm) : 800</p> <p>1. Specifications of Items</p> <table><tr><th>Sr. No.</th><th>Specifications of Items</th><th>Size</th></tr><tr><td>1.</td><td>Square Hollow Section</td><td>100 x 100 x 10 mm</td></tr><tr><td>2.</td><td>Rectangular Hollow Section</td><td>120 x 100 x 10 mm</td></tr><tr><td>3.</td><td>I-Section</td><td>200 x 100 x 10 mm</td></tr><tr><td>4.</td><td>Channel Section</td><td>200 x 100 x 10 mm</td></tr><tr><td>5.</td><td>Angle Section</td><td>100 x 100 x 10 mm</td></tr><tr><td>6.</td><td>Chequered Plate</td><td>Up to 12 mm thickness</td></tr><tr><td>7.</td><td>Shear Test Attachment</td><td>Up to 40 mm Sizes</td></tr><tr><td>8.</td><td>Extensometer</td><td>Gauge length 50 mm</td></tr><tr><td>9.</td><td>Flexural Test Attachment</td><td>-----</td></tr><tr><td>10.</td><td>Bending Test Attachment</td><td>180⁰</td></tr><tr><td>11.</td><td>MS Conduit Pipes</td><td>50 mm internal Diameter</td></tr></table> <p>Note: 2 Year warranty of various parts and 5 years AMC</p>	Sr. No.	Specifications of Items	Size	1.	Square Hollow Section	100 x 100 x 10 mm	2.	Rectangular Hollow Section	120 x 100 x 10 mm	3.	I-Section	200 x 100 x 10 mm	4.	Channel Section	200 x 100 x 10 mm	5.	Angle Section	100 x 100 x 10 mm	6.	Chequered Plate	Up to 12 mm thickness	7.	Shear Test Attachment	Up to 40 mm Sizes	8.	Extensometer	Gauge length 50 mm	9.	Flexural Test Attachment	-----	10.	Bending Test Attachment	180 ⁰	11.	MS Conduit Pipes	50 mm internal Diameter	
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2	Beam deflection Apparatus	Features Rigid base and supports Choice of end conditions	01 unit																																				





		a) knife edge b) built-in Beams or cantilevers Deflection and slope measurable	
3	Rosette strain gauge indicator box	Strain gauge based experimental setup for structural stress analysis Strain gauges: Units: 10 with one measuring grid, 10 units with 2 orthogonal measuring grids. Type: suitable for working with Aluminium alloy and MS, 1-D measurement Suitable accessories including adhesive, surface cleaning kit, connecting wires Data acquisition system and strain gauge amplifiers: Capability of full-bridge, half-bridge and quarter bridge configuration, 8 sensors input (minimum) Individual channel data rate 20 KS/s (minimum), low pass filter, 14-bit Analog-digital convertor per channel or better Suitable data acquisition and processing software. Accessories: Required suitable accessories including, but not limited to, power cables and adapters, data cables, operating manuals etc. Note: 2 Year warranty of various parts and 5 years AMC	01 unit
4	Heat treatment Furnace	Specifications Inner Chamber size : 22cmX22cmX22cm Maximum temperature: 1400°C Working Temperature: 1300°C Heating Elements: Silicon carbide with end connections easily replaceable Temperature Accuracy: +/- 1°C must be available Programmable temperature controller: Eurotherm controller No of steps 30 steps Insulation: Ultra high purity alumina low thermal mass insulation Body and Construction: Made of mild steel duly powder coated/Triple walled Safety: High speed semi-conductor fuse/over current short circuit Protection High temperature alarm Note: 2 Year warranty of various parts and 5 years AMC	01unit
5	Johmany End Quench Apparatus	Specifications: Quenching fixtures designed as per ASTM : A 255 – 02 ; IS 3848 – 1966 Standard test piece dimensions : Dia 25± 0.5 x Length 100 ± 0.5mm Sample Size: φ25 * 100	01 unit
6	Steel Rule	1 meter	04 unit
7	Vernier Calliper	12 inches/ least count(0.02mm)	04 unit

8	Micrometre	Standard/ least count(0.01mm)	04 unit
9	Ellen key Set	Standard	04 unit
10	Plier	Standard	04 unit
11	Electrical drilling machine	Mini bench drilling machine, Pillar drill 16mm chuck,500 watt motor, max rpm 2350,Bench top mounted Press	01 unit

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