

Technical Specification of Universal Testing Machine

Features :

1. Loading accuracy required : $\pm 1\%$
2. Straining at variable speeds to suit a wide range of materials.
3. Printer & PC graphs enables to study the behavior of the material.
4. Motor driven threaded columns for quick effortless adjustment of lower cross-head-to facilitate rapid fixing of test specimen.
5. Simplicity in reading because of digital readouts.
6. Wide range of standard and special accessories, including load stabilizer
7. Easy change from plain to threaded and screwed specimens.
8. Large effective clearance between columns enables testing of standards specimens as well as structures.
9. Simple controls for ease of operation.
10. Robust straining frame of an extremely rigid construction.
11. Safe operation ensured by means of safety devices.
12. Fully enclosed and protected pressure transducer.
13. USB port to transfer data to computer for analysis/storage evaluation etc.
14. Manual control & release valve operation.
15. Max. Allowable Capacity for Tensile Strength: 80% of Machine Capacity
16. Max. Allowable Capacity for Compression Test: Full Capacity of the Machine.

Governing Standard:

IS 1828: Part1: 1991.

FIE Electronic Universal Testing Machine complies with Grade “A” of class 1 of IS-1828-Part1:1991.

Purpose/Application

'FIE' Electronic Universal Testing Machine is designed for testing Ferrous & Non-Ferrous materials under tension, compression bending, transverse and shear loads. Hardness test on metals can also conducted.

Design/Construction

Machine should consists of -

A) Straining unit :

- This consists of a cylinder motor with chain and sprocket drive and a table coupled with the ram of the hydraulic cylinder, mounted on to a robust base.
- The cylinder and the ram are individually lapped to eliminate friction. The upper cross-head is rigidly fixed to the table by two strengthened columns.
- The lower cross-head is connected to two screwed columns which are driven by a motor. Axial loading of the ram is ensured by relieving the cylinder and ram of any possible side loading by the provision of ball seating.
- A Rotary Encoder of minimum resolution 0.1mm is provided to measure the deformation of the specimen.
- Tension test is conducted by gripping the test specimen between the upper and lower cross-heads.
- Compression, transverse, bending, shear and hardness tests are conducted between the lower cross-head and the table.
- The lower cross-head can be raised or lowered rapidly by operating the screwed columns, thus facilitating ease of fixing of the test specimen.

B) Control Panel :

The Control Panel consists of a power pack complete with drive motor and an oil tank, control valves and electronic display unit.

Power Pack :

The power pack generates the maximum pressure of 200 kgf/cm². The hydraulic pump provides continuously non-pulsating oil flow. Hence the load application is very smooth

Hydraulic Controls :

Hand operated wheels are used to control the flow to and from the hydraulic cylinder. The regulation of the oil flow is infinitely variable. Incorporated in the hydraulic system is a regulating valve, which maintains a practically constant rate of piston movement. Control by this valve allows extensometer reading to be taken.

Software: Windows Based Software ,required for :

- a) Online graph on PC, Data analysis, Statistics, Point tracing, superimposing graphs to compare with standard, zooming graph etc.
- b) Report customization as per custom requirements.
- c) Proof stress calculation from 0.1% to 1%.
- d) Integration of custom sample.
- e) Facility to export data/results to PDF, EXCEL & CSV formats.

• **Technical Specification:-**

Requirement	Limit
Maximum Capacity	1000kN
Measuring range	0-1000KN
Load resolution (50000 counts full scale)	20N
Load range with accuracy of Measurement +/-1%	20 to 1000
Resolution of piston movement (Displacement)	0.1mm
Clearance for tensile test (At fully descended working piston)	50-850
Clearance for compression test (At fully descended working piston)	0-850mm
Clearance between columns	750mm
Ram Stroke	250mm
Straining/ Piston Speed (at no load)	0-80mm/min.
Power	4HP
V	400-440Volt
Φ	3Phase
FOR TENSION TEST	
Clamping jaws for round specimens of diameter	10-25mm
	25-45mm
Clamping jaws for flat specimens of thickness	0-22mm
	22-44mm
Width	70mm
Pair of Compression Plates of Dia.	160mm
Table with adjustable rollers	
Width of rollers	160mm
Diameter of Rollers	50mm
Maximum clearance between supports	800mm
Radius of punch tops	16 to 22mm

SPECIFICATION OF DIGITAL WEIGHING MACHINE

Technical specification of products/goods comprise of all utility and value standard and parameter as expected, it also includes drawing, design if applicable and available and the other terms and condition for specific products/goods.

Specification for **ELECTRONIC WEIGHING MACHINE, ISI MARKED**

A. General Requirement :

No.	Detail
1.	Electronic Weighing System/machine platform type Class-3 shall be ISI marked (IS :9281:1981Part-3 with latest amendment).
2.	All type of Electronic Weighing machine shall be microprocessor based with software calibration and have LED or fluorescent digital/ display minimum 25 m.m. size bright character.
3.	These machines should work at $230 \pm 10\%$ A.C. supply.
4.	Electronic circuitry must with stand operating temperature between 0° to 50° centigrade
5.	Scale must have a set point, check weighing facility and memory of minimum 100 check transaction.
6.	ON/OFF switching should be available on Machine.
7.	Weighing scale digitizer should be mounted on separate stand and suitable length of load cell wire should be provided for easy movement of digitizer with covered PVC flexible pipe.
8.	Weighing machine lower platform/structure should be structural steel confirming to IS.
9.	Back grill should be adjustable type adjustment at 16" and 19" on platform for 50 kg. and above weightment.
10.	There shall be provision of connecting the printer directly with digitizer and RS 232 interfacing of PC.
11.	Weighing machine shall be stamped by weights and measurement department.
12.	The EWM must have 150% overload capacity and 200% ultimate load capacity and be equipped with press tare facility with a push button.
13.	Load cell used shall be made of stainless steel/Tool steel and the Electrical load cell used in electronic weighing system/machine scale shall meet the requirement specified in table 1 of IS:9281-1981 clause 3.1
14.	Marking: As per IS: 9281:1981 clause of 4.1 with following information: a) Model designation and serial number, b) Rated load, C) Non- linearity, D) Resolution, e) Manufacturer's name and trade mark, and f) Country of manufacture.

B. CAPACITY OF WEIGHING MACHINE :

Electronic Weighing System/Machine platform type shall be ISI Mark IS: 9281: 1981 part III, Class-3 with latest amendment.

No.	Detail	Requirement
	Make (Pl. Specify)	
	Model (Pl. Specify)	
	Weighing Capacity in KG	100
	Minimum Platform Size	400x400 mm
	Least Count	20 Gm
	Load cell details	1 No of minimum 300 kg Capacity.

Technical Specification of Weighing Machine (5Kg.)

1. Name of equipment	Weighing machine-5Kg
2. Resolution	1g
3. Operating Condition	0-50°C, RH 95%
4. Power Supply	Mains(1 Phase;230V and Battery Operated)
5. Battery back up	10Hours
6. Display	LED/LCD(Single type)
7. PAN Size	Min. 170X220mm
8. Governing Standard	IS 9281(with latest amendments)

Technical Specifications of Digital Vernier Caliper

Scope:

A digital caliper equipped with standard outside and inside jaws. Hardened stainless steel construction and equipped with the latest electromagnetic ABSOLUTE AOS System scale for error free, high-speed measurement.

Features:

- Range: 0 – 150mm
- Accuracy: $\pm 0.001\text{mm}$
- Resolution: 0.01mm
- Should have repeatability.
- Depth bar: Flat
- Thumb roller: Yes
- Data output: No
- Max. Permissible Error: $\pm 0.002''$
- Digital step: $0.0005''/0.01\text{ mm}$
- Max. response speed: Unlimited
- Display: LCD
- ORIGIN (ABS-Zero): Yes
- ON/OFF: : Yes
- Low voltage alarm: Yes
- Battery life: Approx. 3.5 years under normal use

Functions:

- **ABS (absolute) measurement function:** Enables absolute-mode measurement to be started without any zero-setting after switch-on. The absolute origin position can be set, or reset, with the ORIGIN switch at any time.
- **INC (incremental) measurement function:** Enables the display value to be set to zero, temporarily, at the current slider position to enable easy incremental-mode measurement

Technical Specifications of Digital Micrometer

Description:

This Standard Digimatic Micrometer is an affordable device that should offers the following benefits:

- Cost-effective with simplified functionality for standard applications.
- Extraordinary battery life.
- Constant measuring force

Features:

- Range: 0 - 25 mm
- Digital step: 0.001 mm
- Should have Repeatability.
- Maximum Permissible Error J MPE: $\pm 2 \mu\text{m}$
- IP Rating: IP65
- Display: LCD, character height 7.5 mm
- Measuring face: Carbide-tipped, micro-lap finish
- Measuring spindle: $\varnothing 6.35 \text{ mm}$, spindle pitch 0.5 mm
- Scale: Thimble and sleeve satin chrome finish, $\varnothing 18 \text{ mm}$
- Power supply: 1 battery SR-44, 1.5V
- Digital/Analog: Digital
- Inch-Metric: Metric

Specification of Tool Kit Set

1. Material: Steel
2. Quality: Industrial Heavy Duty Tools.
3. It should be a very handy tool kit, used by electricians, plumbers, carpenters, mechanics and many more professionals
4. Toolkit Should be made by reputed make for professional use.
5. The tool kit set shall contain:
1. Adjustable Wrench(Small & Medium)
2. Allen key Set
3. C-Clamp
4. Continuity Tester
5. Crimping Tools: Hand Operated 400Sq.mm
6. Crimping Tools : Small/Multipurpose
7. Electrician's knife
8. File: Set
9. Gloves: Cotton
10. Gloves:33kV
11. Goggles
12. Hacksaw Frame with Blade: Mini
13. Hammer: Electrician & Mechanical
14. Measuring Tape: 10Mtr.
15. Nut Driver Set
16. Phase Sequence Indicator
17. Plier: Bent Nose, Long Nose, Side Cutting, Combination etc
18. Punch
19. Screw Driver: Philips, Stubby, Torx
20. Screw driver Set
21. Soldering iron
22. Spanner: Double Ended Set
23. Spanner: Ring Set
24. Torch
25. Viewing mirror
26. Voltage Detector
27. Wire Stripper etc.
28. Carry Bag/Box

Hot Air Oven

- Should have Chamber capacity of 90-250 ltrs.
- It should have interior & exterior construction of SS 304
- Should be provided with air ventilation and air circulating fan.
- It should have option for auto cut off when door opens during operation.
- It should have fitted with stainless steel vertical channels for height adjustment of trays.
- It should have Digital PID temperature controller with PT100 sensor for precise monitoring & control
- Controller should be Equipped with timer (timer bypass option should be available), auto tuning and alarms.
- Controller should have LED/LCD display.
- Oven Temperature range: ambient +10°C to 250°C
- Control accuracy $\pm 1.0^{\circ}\text{C}$
- It should have independent over temperature safety protection and should be user settable.
- It should have over current protection.
- Oven should be CE or equivalent Indian standard certified.
- Supply Voltage: 230 V AC, 50 HZ, Single phase.
- Local Service Setup for prompt and efficient post sales support.

Hot Air oven should also have RS232 port/USB Port /Bluetooth for PC interface and also have the data storage facility

Technical Specifications of Insulating Mat

Insulation Mat should have following Technical specification:

- Insulation mat should be ISI marked at every meter.
- Insulation mat would be tested by CPRI/ERDA for IS: 15652:2006 having 2" wide safety glow bands on both side mentioned in the test report.
- Insulation mat would be 100% shock proof under leakage current of 10ma.
- Insulation mat would be fire retardant, water and moisture proof.
- Insulation mat would have no adverse effect of acids, alkalies and transformer oil and would have mechanical properties to withstand load and movement of breaker trolley.
- Insulation mat would be manufactured without any metallic derivations.
- Insulation mat would be suitable for both ac & dc electrical installations.
- Insulation mat would have high tensile strength to withstand trolley moment.
- Mechanical puncture resistance test, slip resistance test
- Insulation mat will be marked with class, ISI, lot no, roll no., manufacturer identity.
- The insulation mat should have Inherent inbuilt glow bands on the borders for extra safety and visibility in the dark.