



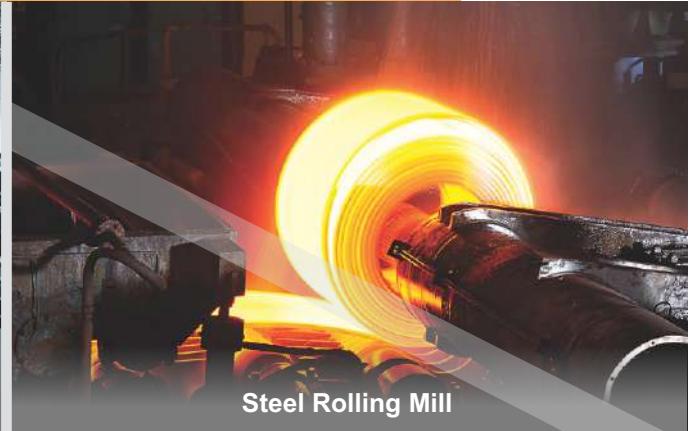
Over **70** years of consistent excellence

Universal Testing Machines

Accuracy Engineered for Industry



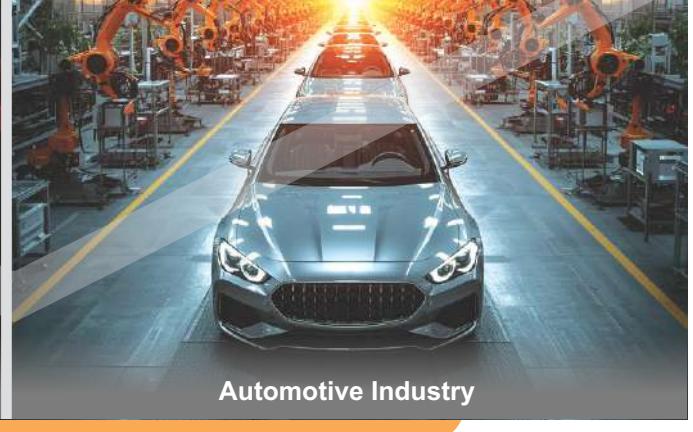
Educational Institute & Material Testing Lab



Steel Rolling Mill



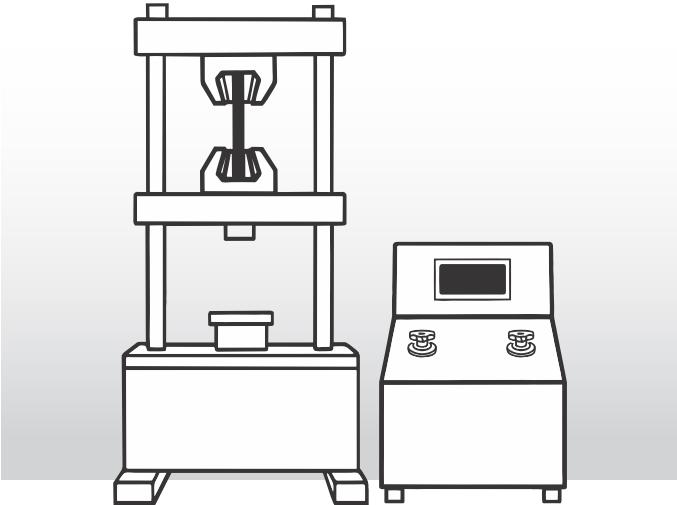
Metal Foundry



Automotive Industry



Stronger Standards, Smarter Solutions



Analogue UTM Machine – Model - UTN



Application:

'FIE' Universal Testing Machines are designed for testing Ferrous & Non-Ferrous materials under tension, compression, bending, transverse, and shear loads. Hardness tests on metals can also be conducted.

Principle of operation

The operation of the machine is by hydraulic transmission of load from the test specimen to a separately housed load indicator device, which could be analogue, digital, or in the form of computer software

The hydraulic system is ideal since it replaces transmission of load through levers and knife edges, which are prone to wear and damage due to shock on rupture of test pieces.

The Load is applied by a hydraulically lubricated ram. Main cylinder pressure is transmitted to the cylinder of the load-sensing system housed in the control panel.

In the case of analogue UTM, the load transmitted to the cylinder of the dynamometer is transferred through a lever system to a pendulum.

Displacement of the pendulum actuates the rack and pinion mechanism, which operates the load indicator pointer and the autographic recorder. In the case of Digital UTM, the load is transmitted to the pressure cell and converted into load on the display unit.

Displacement: In the case of analogue UTM, an elongation scale, with a minimum graduation of 1mm, is provided to measure the deformation of the specimen.

In the case of Digital and computerised machines, an encoder is connected to electronic panel for displacement reading.

Accuracy and Calibration :

FIE Electronic Universal testing machine is closely controlled for sensitivity, accuracy and calibration during every stage of manufacture.

Machine is calibrated over each of its measuring ranges In accordance with the procedure laid down in IS 1828: Part1.

FIE Electronic Universal Testing Machine complies with Grade "A" of class 1 of IS-1828-Part 1.

Features :

- Loading accuracy as high as $\pm 1\%$
- Suitable for variable speeds to suit a wide range of materials.
- Continuous roll autographic recorder supplied as standard to enable the study of the behaviour of materials.
- Motor driven threaded columns for quick effortless adjustment of lower cross-head-to facilitate rapid fixing of test specimen.
- High reading accuracy due to large size and design of dial.
- Wide range of standard and special accessories, including load stabilizer.
- Easy change from plain to threaded and screwed specimens.
- Large effective clearance between columns enables testing of standards specimens as well as structures.
- Simple controls for ease of operation.
- Robust straining frame of an extremely rigid construction.
- Safe operation ensured by means of safety devices.
- Fully enclosed and protected pendulum.
- Load Capacity : 100 kN, 200kN, 400kN, 600kN, 1000kN

Pendulum Dynamometer :

This unit permits selection of favourable hydraulic ratios producing relatively small frictional forces.

Pressurized oil in the loading cylinder pushes up the measuring piston proportionately and actuates the special dynamometer system.

The piston is constantly rotated to eliminate friction.

The dynamometer system is also provided with an integral damper and ensures high reliability of operation.

The load transmitted to the dynamometer is transferred through a pendulum to the load indicator.



Over 70 years of consistent excellence

Universal Testing Machine

Electronic UTM – Model - UTE



Servo Controlled Electronic UTM – Model - UTES



Features :

- Loading accuracy as high as $\pm 1\%$
- Straining at variable speeds to suit a wide range of materials.
- Printer & PC graphs enables to study the behaviour of the material.
- Motor driven threaded columns for quick effortless adjustment of lower cross-head-to facilitate rapid fixing of test specimen.
- Simplicity in reading because of digital readouts.
- Wide range of standard and special accessories, including load stabilizer
- Easy change from plain to threaded and screwed specimens.
- Large effective clearance between columns enables testing of standards specimens as well as structures.
- Simple controls for ease of operation.
- Robust straining frame of an extremely rigid construction.
- Safe operation ensured by means of safety devices.
- Fully enclosed and protected pressure transducer.
- USB port to transfer data to computer for analysis/storage evaluation etc.
- Manual control & release valve operation.
- Load Capacity : 100 kN, 200 kN, 400 kN, 600 kN, 1000 kN, 1200 kN, 1500 kN, and 2000 kN

Features :

- Loading accuracy as high as $\pm 1\%$.
- VFD based Servo control incorporating of control modes - Standard manual control, Load rate control, Elongation rate control, Load hold mode, Auto start & Stress rate control.
- Straining at variable speeds to suit a wide range of materials. Printer & PC graphs enable study the behaviour of the material.
- Motor driven threaded columns for quick effortless adjustment of lower cross-head-to facilitate rapid fixing of test specimen.
- Simplicity in reading because of digital readouts.
- Wide range of standard and special accessories.
- Easy change from plain to threaded and screwed specimens.
- Large effective clearance between columns enables testing of standards specimens as well as structures.
- Simple controls for ease of operation.
- Robust straining frame of an extremely rigid construction.
- Safe operation ensured by means of safety devices.
- Manual control & release valve operation.
- Fully enclosed and protected pressure transducer.
- USB port for PC control of Machine.
- Load Capacity : 100 kN, 200 kN, 400 kN, 600 kN, 1000 kN, 1200 kN, 1500 kN & 2000 kN.



Electronic Control Panel, Series Unipro-21 :

Microcontroller-based panel with the following features -

- Front panel membrane-type keyboard for machine operation.
- LCD display.
- Data entry with membrane keyboard of test parameters, including rupture %, preload %, safe load etc.
- Panel communication with PC (RS 232 Protocol).



Electronic Control Panel Series UTES-2020 :

PLC based panel with following features -

- Industrial grade HMI for display.
- Data entry with Touch screen HMI of test parameters including rupture %, preload %, safe load etc.
- Panel communication with PC through MODBUS serial protocol.



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Universal Testing Machine

Hydraulic Grip Electronic UTM Model - UTE HGFL



Features :

- Open type cross head
- Hydraulic wedge action grips with separate power pack
- Long test stroke and dual test space
- Loading accuracy as high as $\pm 1\%$
- Straining at variable speeds to suit a wide range of materials.
- Printer & PC graphs enable study the behaviour of the material.
- Motor driven threaded columns for quick effortless adjustment of lower cross-head-to facilitate rapid fixing of test specimen.
- Simplicity in reading because of digital readouts.
- Wide range of standard and special accessories, including load stabilizer.
- Easy change from plain to threaded and screwed specimens.
- Large effective clearance between columns enables testing of standards specimens as well as structures.
- Simple controls for ease of operation.
- Robust straining frame of an extremely rigid construction.
- Safe operation ensured by means of safety devices.
- Fully enclosed and protected pressure transducer.
- RS 232 serial port to transfer data to computer for analysis/ storage evaluation etc.
- Manual control & release valve operation.
- Load Capacity : 100 kN, 200 kN, 400 kN, 600 kN, 1000 kN, 1200 kN, 1500 kN & 2000 kN.



Electronic Control Panel, Series Unipro-21 : Microcontroller-based panel with the following features -

- Front panel membrane-type keyboard for machine operation.
- LCD display.
- Data entry with membrane keyboard of test parameters, including rupture%, preload %, safe load etc.
- Panel communication with PC (RS 232 Protocol).

Servo Hydraulic Grip Electronic UTM Model - UTES HGFL



Features :

- Open type cross head
- Hydraulic wedge action grips with separate power pack
- Long test stroke and test space
- VFD based Servo control incorporating of control modes - Standard manual control, Load rate control, Elongation rate control, Load hold mode, Auto start & Stress rate control.
- Loading accuracy as high as $\pm 1\%$ Straining at variable speeds to suit a wide range of materials.
- Printer & PC graphs enable study the behaviour of the material.
- Motor driven threaded columns for quick effortless adjustment of lower cross-head-to facilitate rapid fixing of test specimen.
- Simplicity in reading because of digital readouts.
- Wide range of standard and special accessories. Including load stabilizer.
- Easy change from plain to threaded and screwed specimens.
- Large effective clearance between columns enables testing of standards specimens as well as structures.
- Simple controls for ease of operation.
- Robust straining frame of an extremely rigid construction.
- Safe operation ensured by means of safety devices.
- Fully enclosed and protected pressure transducer.
- USB control for data to computer for analysis / storage evaluation etc.
- Manual control & release valve operation.
- Load Capacity : 100 kN, 200 kN, 400 kN, 600 kN, 1000 kN, 1200 kN, 1500 kN & 2000 kN.



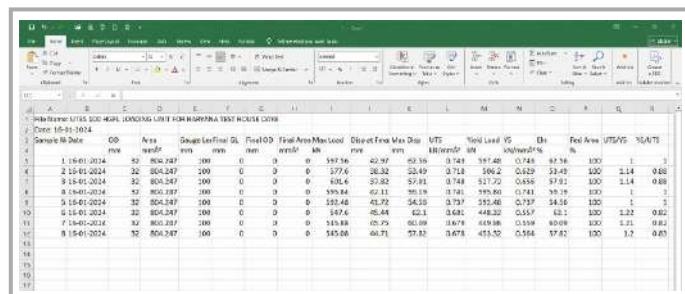
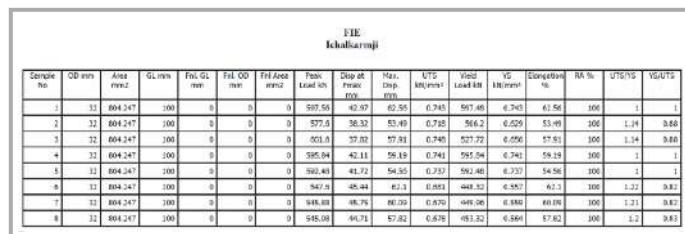
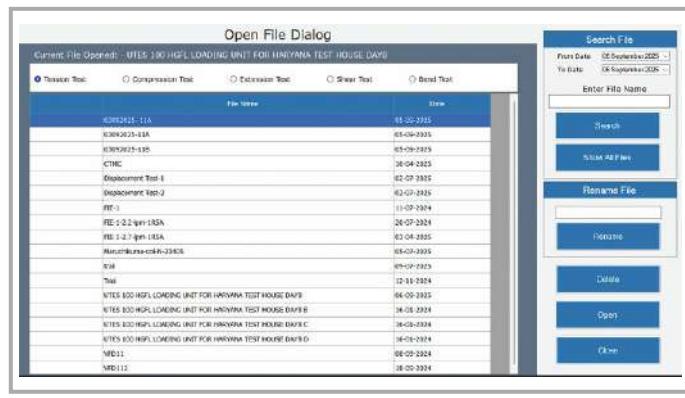
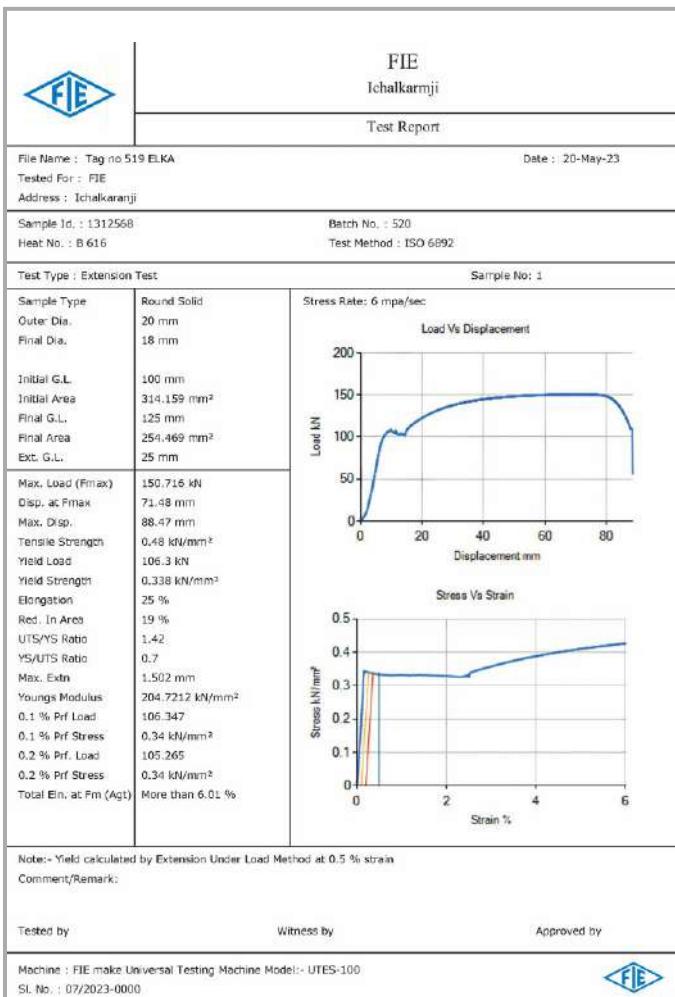
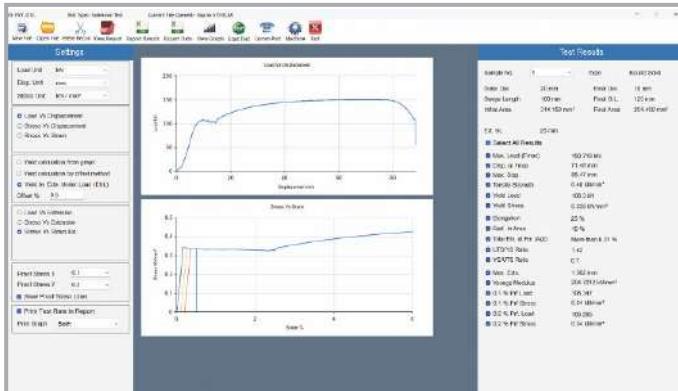
Electronic Control Panel Series UTES-2020 : PLC based panel with following features -

- Industrial grade HMI for display.
- Data entry with Touch screen HMI of test parameters including rupture %, preload %, safe load etc.
- Panel communication with PC through MODBUS serial protocol.



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Universal Testing Machine



Windows based software feature :

- Online graph on PC, Data analysis, Statistics, Point tracing superimposing graphs to compare with standard, zooming graph etc.
- Report customization as per custom requirements.
- Video Extensometer compatible.
- R & N value extensometer compatible.

- Proof stress calculation from 0.1% to 1%.
- Integration of custom sample.
- Single point software calibration.
- Facility to export data to PDF, EXCEL & CSV formats.
- Unit selection for Real time Graph.
- Unlimited Test in single batch file.



| Specifications | | 10 | | | | | 20 | | | | | 40 | | | | | 60 | | | | | | | | | | | | |
|--|----------|------------------------|------|-----------|------------------------|-----------|-------------------|------------------------|------|----------|------------------------|-------------------|------|-----------|----------|-----------|-------------------|-------|------|----------|-----------|--|--|--|--|--|--|--|--|
| | | UTN | UTE | UTES | UTE HGFL | UTES HGFL | UTN | UTE | UTES | UTE HGFL | UTES HGFL | UTN | UTE | UTES | UTE HGFL | UTES HGFL | UTN | UTE | UTES | UTE HGFL | UTES HGFL | | | | | | | | |
| | UNIT | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Calibration Standards | | IS 1828 & ASTM E4 | | | | | IS 1828 & ASTM E4 | | | | | IS 1828 & ASTM E4 | | | | | IS 1828 & ASTM E4 | | | | | | | | | | | | |
| Maximum Capacity | kN | 100 | | 200 | | 400 | | 600 | | | | | | | | | | | | | | | | | | | | | |
| Load Resolution | N | As per measuring Range | 2 | | As per measuring Range | 4 | | As per measuring Range | 8 | | As per measuring Range | 12 | | | | | | | | | | | | | | | | | |
| Machine Accuracy Band | kN | 2 to 100 | | | | 4 to 200 | | | | 8 to 400 | | | | 12 to 600 | | | | | | | | | | | | | | | |
| Load Accuracy | % | ±1% | | | | ±1% | | | | ±1% | | | | ±1% | | | | | | | | | | | | | | | |
| Displacement Resolution | mm | NA | 0.01 | | NA | 0.01 | | NA | 0.01 | | NA | 0.01 | | NA | 0.01 | | NA | | | NA | | | | | | | | | |
| Clearance for Tensile Test (At Fully descended piston) | mm | 50 - 700 | | | | 50 - 700 | | | | 50 - 700 | | | | 50 - 800 | | | | | | | | | | | | | | | |
| Clearance for Compression Test (At Fully descended piston) | mm | 0 - 700 | | | | 0 - 700 | | | | 0 - 700 | | | | 0 - 800 | | | | | | | | | | | | | | | |
| Clearance between two columns | mm | 500 | | | | 500 | | | | 500 | | | | 600 | | | | | | | | | | | | | | | |
| Ram Stroke | mm | 150 | | | | 200 | | | | 200 | | | | 250 | | | | | | | | | | | | | | | |
| Straining / Piston speed at no load | mm / min | 1-150 | 1-75 | 1-150 | 1-75 | 1-150 | 1-75 | 1-150 | 1-60 | 1-150 | 1-60 | 1-100 | 1-50 | 1-100 | 1-50 | 1-100 | 1-50 | 1-100 | 1-50 | 1-100 | 1-50 | | | | | | | | |
| Sample Clamping Method | | Manual | | Hydraulic | | Manual | | Hydraulic | | Manual | | Hydraulic | | Manual | | Hydraulic | | | | | | | | | | | | | |

ELECTRICAL

| | | | | | | | | | | | | | | |
|--------------------------------|-------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|--|--|--|
| Power | HP/KW | 1.5 / 1.1 | 2.5 / 1.9 | 1.5 / 1.1 | 2.5 / 1.9 | 2.5 / 1.9 | 3.5 / 2.6 | 2.5 / 1.9 | 3.5 / 2.6 | 2.5 / 1.9 | 3.5 / 2.6 | | | |
| Voltage | V | 400-440 | | | 400-440 | | | 400-440 | | | 400-440 | | | |
| Phase | V | 3 | | | 3 | | | 3 | | | 3 | | | |
| Power Consumption at peak load | kW | 1.1 | 1.9 | 1.1 | 1.9 | 1.9 | 2.6 | 1.9 | 2.6 | 1.9 | 2.6 | | | |

STANDARD ACCESSORIES FOR TENSILE TEST

| | | | | | | | |
|-----------|----|----------------|----------------|----------------|----------------|----------------|----------------|
| Round Jaw | mm | 10-20 20-30 | 10-20 20-30 | 10-25 25-40 | 10-25 25-35 | 10-25 25-45 | 10-25 25-35 |
| Flat Jaw | mm | 0-10 10-20 | 0-10 10-20 | 0-15 15-30 | 0-15 15-25 | 0-15 15-30 | 0-15 15-25 |
| Jaw Width | mm | 50 | 50 | 65 | 70 | | |

STANDARD ACCESSORIES FOR COMPRESSION TEST

| | | | | | | | |
|-----------------------|----|-----|-----|-----|-----|-----|-----|
| Compression Plate Dia | mm | 120 | 120 | 120 | 120 | 120 | 120 |
|-----------------------|----|-----|-----|-----|-----|-----|-----|

STANDARD ACCESSORIES FOR TRANSRVERS TEST

| | | | | | | | |
|-------------------------------|-------------|----------------|----------------|----------------|----------------|-----------------|-----------------|
| Width of Roller | mm | 160 | 160 | 160 | 160 | 160 | 160 |
| Dia of Roller | mm | 30 | 30 | 30 | 30 | 30 | 30 |
| Max Clearance between Support | mm | 500 | 500 | 500 | 500 | 500 | 600 |
| Radius of Punch | mm | 6, 12 | 6, 12 | 12, 16 | 12, 16 | 16, 22 | |
| Machine Height | mm | 2000 | 2500 | 2000 | 2500 | 2100 | 2700 |
| Machine Length | Inch | 96 | 96 | 96 | 96 | 96 | 100 |
| Machine Width | Inch | 40 | 40 | 40 | 40 | 40 | 40 |
| Machine Weight | Kg | 1350 | 1350 | 1500 | 1800 | 2850 | 3300 |
| Loading Unit Packing Size | L W H | 40 40 84 | 36 36 90 | 40 40 84 | 36 36 90 | 102 40 40 | 108 40 40 |
| Control Unit Packing Size | L W H | 36 40 72 | 48 36 51 | 36 40 72 | 48 36 51 | 36 54 54 | 36 54 54 |



| Specifications | | 100 | | | | | 120 | | | | 150 | | | | 200 | | | | | |
|--|----------|------------------------|------|------|----------|-----------|-------------------|------|----------|-----------|------|-------------------|----------|-----------|------|------|-------------------|-----------|------|--|
| | | UTN | UTE | UTES | UTE HGFL | UTES HGFL | UTE | UTES | UTE HGFL | UTES HGFL | UTE | UTES | UTE HGFL | UTES HGFL | UTE | UTES | UTE HGFL | UTES HGFL | | |
| | UNIT | | | | | | | | | | | | | | | | | | | |
| Calibration Standards | | IS 1828 & ASTM E4 | | | | | IS 1828 & ASTM E4 | | | | | IS 1828 & ASTM E4 | | | | | IS 1828 & ASTM E4 | | | |
| Maximum Capacity | kN | 1000 | | | | | 1200 | | | | | 1500 | | | | | 2000 | | | |
| Load Resolution | N | As per measuring Range | 20 | | | | | 24 | | | | | 30 | | | | | 40 | | |
| Machine Accuracy Band | kN | 20 to 1000 | | | | | 24 to 1200 | | | | | 30 to 1500 | | | | | 40 to 2000 | | | |
| Load Accuracy | % | ±1% | | | | | ±1% | | | | | ±1% | | | | | ±1% | | | |
| Displacement Resolution | mm | NA | 0.01 | | | | | 0.01 | | | | | 0.01 | | | | | 0.01 | | |
| Clearance for Tensile Test (At Fully descended piston) | mm | 50 - 850 | | | | | 50 - 850 | | | | | 50 - 850 | | | | | 50 - 850 | | | |
| Clearance for Compression Test (At Fully descended piston) | mm | 0 - 850 | | | | | 0 - 850 | | | | | 0 - 850 | | | | | 0 - 850 | | | |
| Clearance between two columns | mm | 750 | | | | | 750 | | | | | 750 | | | | | 750 | | | |
| Ram Stroke | mm | 250 | | | | | 250 | | | | | 250 | | | | | 250 | | | |
| Straining / Piston speed at no load | mm / min | 1-80 | 1-25 | 1-80 | 1-25 | 1-65 | 1-25 | 1-65 | 1-25 | 1-50 | 1-20 | 1-50 | 1-20 | 1-45 | 1-20 | 1-45 | 1-20 | 1-45 | 1-20 | |
| Sample Clamping Method | | Manual | | | | | Hydraulic | | | | | Manual | | | | | Manual | | | |

ELECTRICAL

| | | | | | | | | | | |
|--------------------------------|-------|---------|---------|-------|---------|---------|----------|---------|----------|-----|
| Power | HP/KW | 4 / 3 | 6 / 4.5 | 4 / 3 | 6 / 4.5 | 6 / 4.5 | 10 / 7.5 | 6 / 4.5 | 10 / 7.5 | |
| Voltage | V | 400-440 | | | 400-440 | | | 400-440 | | |
| Phase | V | 3 | | | 3 | | | 3 | | |
| Power Consumption at peak load | kW | 3 | 4.5 | 3 | 4.5 | 4.5 | 7.5 | 7.5 | 7.5 | 7.5 |

STANDARD ACCESSORIES FOR TENSILE TEST

| | | | | | | | | |
|-----------|----|--------------------|--------------------|--------------------|--------------------|---|--------------------|---|
| Round Jaw | mm | 10 - 25 25 - 45 | 10 - 20 20 - 30 30 - 40 40 - 50 50 - 60 | 10 - 25 25 - 45 | 10 - 20 20 - 30 30 - 40 40 - 50 50 - 60 |
| Flat Jaw | mm | 0 - 22 22 - 44 | 0 - 10 10 - 20 20 - 30 30 - 40 | 0 - 22 22 - 44 | 0 - 10 10 - 20 20 - 30 30 - 40 40 - 50 50 - 60 |
| Jaw Width | mm | 70 | 70 | 70 | 70 | 120 | 70 | 120 |

STANDARD ACCESSORIES FOR COMPRESSION TEST

| | | | | | | |
|-----------------------|----|-----|-----|-----|-----|-----|
| Compression Plate Dia | mm | 160 | 160 | 160 | 160 | 160 |
|-----------------------|----|-----|-----|-----|-----|-----|

STANDARD ACCESSORIES FOR TRANSRVERS TEST

| | | | | | | |
|-------------------------------|-------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Width of Roller | mm | 160 | 160 | 160 | 160 | 200 |
| Dia of Roller | mm | 50 | 50 | 50 | 50 | 50 |
| Max Clearance between Support | mm | 800 | 800 | 800 | 800 | 800 |
| Radius of Punch | mm | 16, 22 | 16, 22 | 16, 22 | 16, 22 | 16, 22 |
| Machine Height | mm | 2800 | 3400 | 2800 | 3400 | 4700 |
| Machine Length | Inch | 108 | 108 | 108 | 108 | 108 |
| Machine Width | Inch | 56 | 56 | 56 | 56 | 56 |
| Machine Weight | Kg | 4500 | 5500 | 4500 | 5500 | 6000 |
| Loading Unit Packing Size | L W H | 126 52 52 | 144 52 52 | 126 52 52 | 144 52 52 | 139 54 54 |
| Control Unit Packing Size | L W H | 36 40 72 | 36 54 54 | 36 54 54 | 54 56 54 | 175 54 54 |



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Optional Accessories



Analogue Cum Digital UTM machine
Available for UTN series models



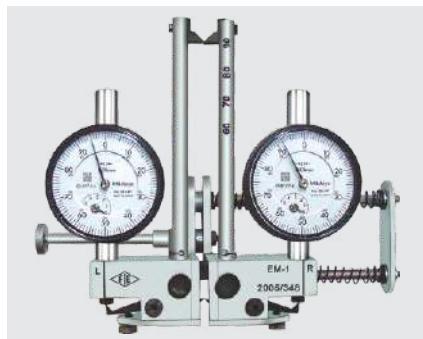
Panel with Touch screen Industrial PC
Applicable for all models



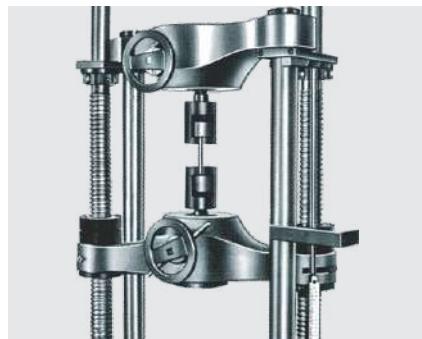
Strand wire grips
Applicable for HGFL Models



Electronic Extensometers
Applicable for all models



Mechanical Extensometers
Applicable for all models



Attachment for Shouldered &
Threaded Specimens
M6 to M28 Applicable for all models



Brinell Hardness Test attachment
Applicable for all models



Adjustable Gauge length
Electronic Extensometer



Video Extensometer
Applicable for all models



Shear Test attachment
Applicable for all models



180° Bend Test attachment & mandrels
Applicable for all models



Flexural Test attachment
Applicable for all models



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