



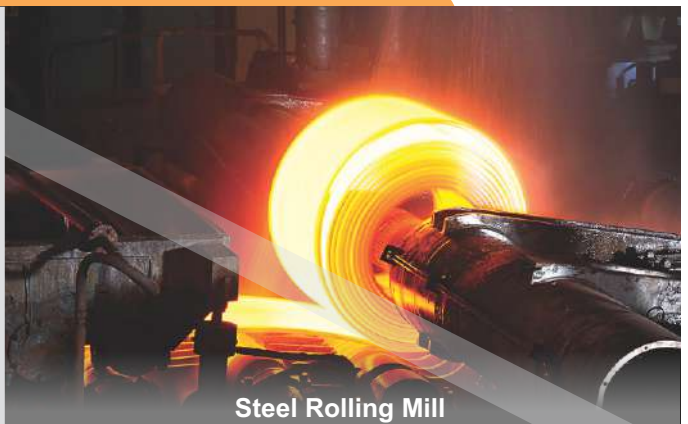
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Universal Testing Machines

Accuracy Engineered for Industry



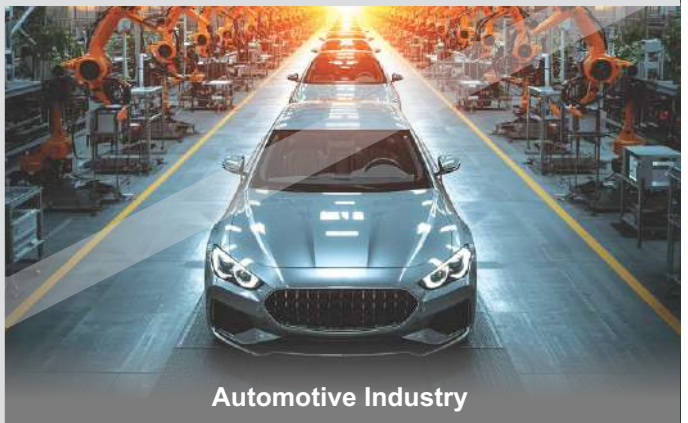
Educational Institute & Material Testing Lab



Steel Rolling Mill



Metal Foundry



Automotive Industry



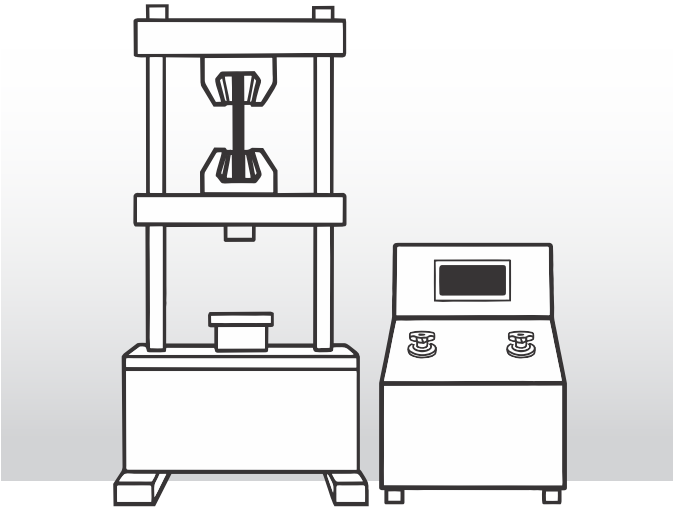
Stronger Standards, Smarter Solutions



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Universal Testing Machine

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.



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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



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).

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 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.



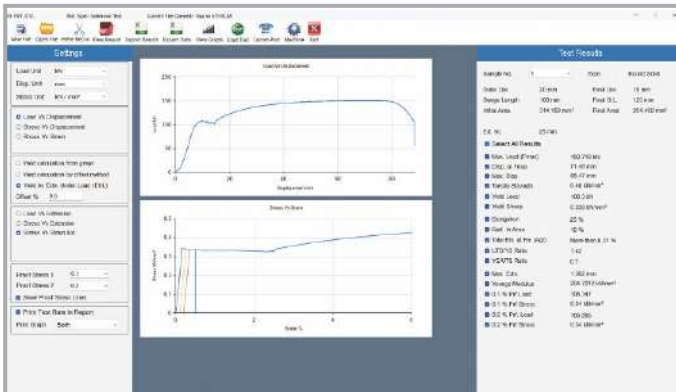
Electronic Control Panel Series UTES-2020 : PLC based panel with following features -

- Industrial grade HMI for display.
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- Panel communication with PC through MODBUS serial protocol.



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Universal Testing Machine



FIE Ichalkarmji	
Test Report	
File Name : Tag no 519 ELKA	Date : 20-May-23
Tested For : FIE	
Address : Ichalkaranji	
Sample Id. : 1312568	Batch No. : 520
Heat No. : B 616	Test Method : ISO 6892
Test Type : Extension Test	Sample No: 1
Sample Type Outer Dia. Final Dia. Initial G.L. Initial Area Final G.L. Final Area Ext. G.L. Max. Load (Fmax) Disp. at Fmax Max. Disp. Tensile Strength Yield Load Yield Strength Elongation Red. In Area UTS/YS Ratio YS/UTS Ratio Max. Extn Youngs Modulus 0.1 % Prf Load 0.1 % Prf Stress 0.2 % Prf Load 0.2 % Prf Stress Total Eln. at Fm (Ag1)	Round Solid 20 mm 18 mm 100 mm 314.159 mm² 125 mm 254.469 mm² 25 mm 150.716 kN 71.48 mm 88.47 mm 0.48 kN/mm² 106.3 kN 0.338 kN/mm² 25 % 19 % 1.42 0.7 1.502 mm 204.7212 kN/mm² 106.347 0.34 kN/mm² 105.265 0.34 kN/mm² More than 6.01 %
Stress Rate: 6 mpa/sec Load Vs Displacement 	
Stress Vs Strain 	
Note:- Yield calculated by Extension Under Load Method at 0.5 % strain Comment/Remark:	
Tested by	Witness by
Approved by	
Machine : FIE make Universal Testing Machine Model:- UTES-100	
SL No. : 07/2023-0000	

Open File Dialog																																																							
Current File Opened: UTES 100 HGPL LOADING UNIT FOR HANVANA TEST HOUSE DAVE																																																							
<input checked="" type="radio"/> Tension Test <input type="radio"/> Compression Test <input type="radio"/> Extension Test <input type="radio"/> Shear Test <input type="radio"/> Bored Test	Search File From Date: 02 September 2023 To Date: 04 September 2023 Enter File Name <input type="text"/> <input type="button" value="Search"/> <input type="button" value="Select All Files"/> <input type="button" value="Rename File"/> <input type="button" value="Findings"/> <input type="button" value="Delete"/> <input type="button" value="Open"/> <input type="button" value="Close"/>																																																						
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Sample No	OD mm	Area mm²	GL mm	Flt GL mm	Flt OD mm	Flt Area mm²	Peak Load kN	Disp at Peak mm	Max. Disp mm	UTS kN/mm²	Yield Load kN	YS kN/mm²	Elongation %	RA %	UTS/YS	YS/UTS
1	32	804.247	100	0	0	0	507.50	42.97	62.55	0.745	597.48	0.745	61.54	100	1	1
2	32	804.247	100	0	0	0	577.0	36.32	53.49	0.728	566.2	0.629	53.49	100	1.14	0.88
3	32	804.247	100	0	0	0	501.0	37.81	57.81	0.745	527.72	0.696	57.81	100	1.14	0.88
4	32	804.247	100	0	0	0	585.84	42.11	58.19	0.741	585.54	0.741	58.19	100	1	1
5	32	804.247	100	0	0	0	582.40	41.72	54.35	0.737	582.40	0.737	54.35	100	1	1
6	32	804.247	100	0	0	0	547.0	49.44	61.3	0.683	448.32	0.587	61.3	100	1.22	0.82
7	32	804.247	100	0	0	0	548.88	48.75	60.39	0.679	448.08	0.586	60.39	100	1.21	0.82
8	32	804.247	100	0	0	0	545.08	49.71	57.82	0.678	451.32	0.584	57.82	100	1.2	0.83

Sample No	OD mm	Area mm²	GL mm	Flt GL mm	Flt OD mm	Flt Area mm²	Peak Load kN	Disp at Peak mm	Max. Disp mm	UTS kN/mm²	Yield Load kN	YS kN/mm²	Elongation %	RA %	UTS/YS	YS/UTS
1	32	804.247	100	0	0	0	507.50	42.97	62.55	0.745	597.48	0.745	61.54	100	1	1
2	32	804.247	100	0	0	0	577.0	36.32	53.49	0.728	566.2	0.629	53.49	100	1.14	0.88
3	32	804.247	100	0	0	0	501.0	37.81	57.81	0.745	527.72	0.696	57.81	100	1.14	0.88
4	32	804.247	100	0	0	0	585.84	42.11	58.19	0.741	585.54	0.741	58.19	100	1	1
5	32	804.247	100	0	0	0	582.40	41.72	54.35	0.737	582.40	0.737	54.35	100	1	1
6	32	804.247	100	0	0	0	547.0	49.44	61.3	0.683	448.32	0.587	61.3	100	1.22	0.82
7	32	804.247	100	0	0	0	548.88	48.75	60.39	0.679	448.08	0.586	60.39	100	1.21	0.82
8	32	804.247	100	0	0	0	545.08	49.71	57.82	0.678	451.32	0.584	57.82	100	1.2	0.83

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.



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Specifications

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 meas-uring Range	2				As per meas-uring Range	4				As per meas-uring Range	8				As per meas-uring 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								
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	1-75	1-150	1-60	1-150	1-60	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						
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						
STANDARD ACCESSORIES FOR TENSILE TEST																										
Round Jaw	mm	10-20 20-30					10-20 20-30					10-25 25-40					10-25 25-35									
Flat Jaw	mm	0-10 10-20					0-10 10-20					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									
STANDARD ACCESSORIES FOR TRANSRVERS TEST																										
Width of Roller	mm	160					160					160					160									
Dia of Roller	mm	30					30					30					50									
Max Clearance between Support	mm	500					500					500					600									
Radius of Punch	mm	6, 12					6, 12					12, 16					16, 22									
Machine Height	mm	2000			2500		2000			2500		2100			2700		2500			3000						
Machine Length	Inch	96					96					96					100									
Machine Width	Inch	40					40					40					40									
Machine Weight	Kg	1350					1350					1500					1800					2850			3300	
Loading Unit Packing Size	L W H	Inch	40 40 84	36 36 90	40 40 102	40 40 84	36 36 90	102 40 40	40 40 90	36 40 36 90	108 40 40	36 40 40	108 43 43	108 43 43	126 43 43											
Control Unit Packing Size	L W H	Inch	36 40 72	48 36 51	36 54 54	36 40 72	48 36 51	36 54 54	36 40 72	48 36 51	36 54 54	36 54 54	36 54 54	36 40 72	36 54 54											



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Specifications

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
Sample Clamping Method		Manual			Hydraulic		Manual		Hydraulic		Manual		Hydraulic		Manual		Hydraulic		
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				400-440				
Phase	V	3					3				3				3				
Power Consumption at peak load	kW	3			4.5		3		4.5		4.5		7.5		7.5		7.5		
STANDARD ACCESSORIES FOR TENSILE TEST																			
Round Jaw	mm	10 - 25 25 - 45					10 - 25 25 - 45				10 - 25 25 - 45		10 - 20 20 - 30 30 - 40 40 - 50		10 - 25 25 - 45		10 - 20 20 - 30 30 - 40 40 - 50 50 - 60		
Flat Jaw	mm	0 - 22 22 - 44					0 - 22 22 - 44				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		120		70		120		
STANDARD ACCESSORIES FOR COMPRESSION TEST																			
Compression Plate Dia	mm	160					160				160				160				
STANDARD ACCESSORIES FOR TRANSVERS TEST																			
Width of Roller	mm	160					160				160				200				
Dia of Roller	mm	50					50				50				50				
Max Clearance between Support	mm	800					800				800				800				
Radius of Punch	mm	16, 22					16, 22				16, 22				16, 22				
Machine Height	mm	2800			3400		2800		3400		4700		4700		4700		4700		
Machine Length	Inch	108					108							
Machine Width	Inch	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		175 54 54		175 54 54		175 54 54		
Control Unit Packing Size	L W H	36 40 72	36 54 54				36 54 54				54 56 54				54 56 54				



Over **70** years of consistent excellence

Optional Accessories



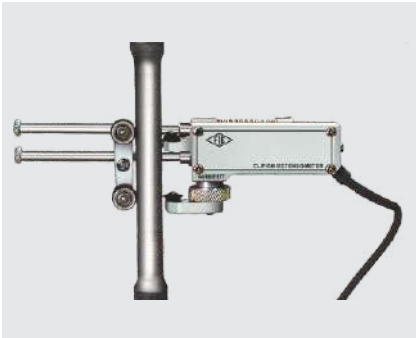
Analogue Cum Digital UTM machine
Available for UTN series models



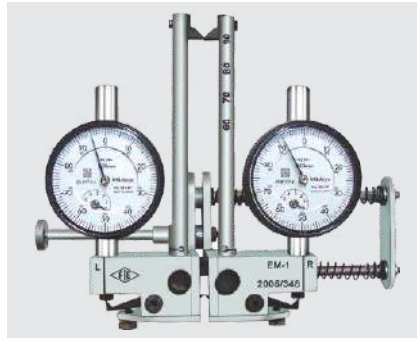
Panel with Touch screen Industrial PC
Applicable for all models



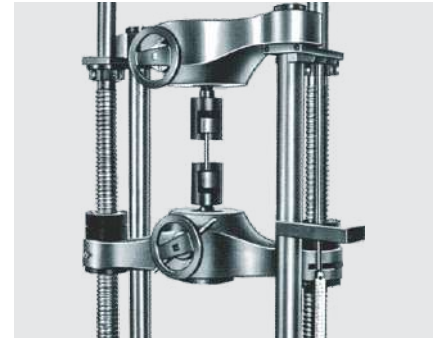
Strand wire grips
Applicable for HGFL Models



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



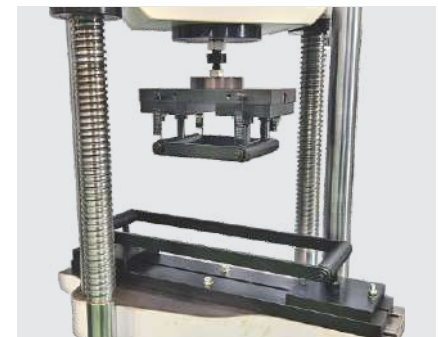
Video Extensometer
Applicable for all models



Shear Test attachment
Applicable for all models



180° Bend Test attachment & mandrels
Applicable for all models



Flexural Test attachment
Applicable for all models



Fuel Instruments & Engineers Pvt. Ltd.

Plot No. 68 & 89, Parvati Co-op Industrial Estate, YADRAV-416 145 (Ichalkaranji),
Tal : Shirol, Dist : Kolhapur, Maharashtra State, INDIA.

Cell : +91 93090 72719, 95790 55146

• E-mail : response@fietest.com • Web : www.fietest.com