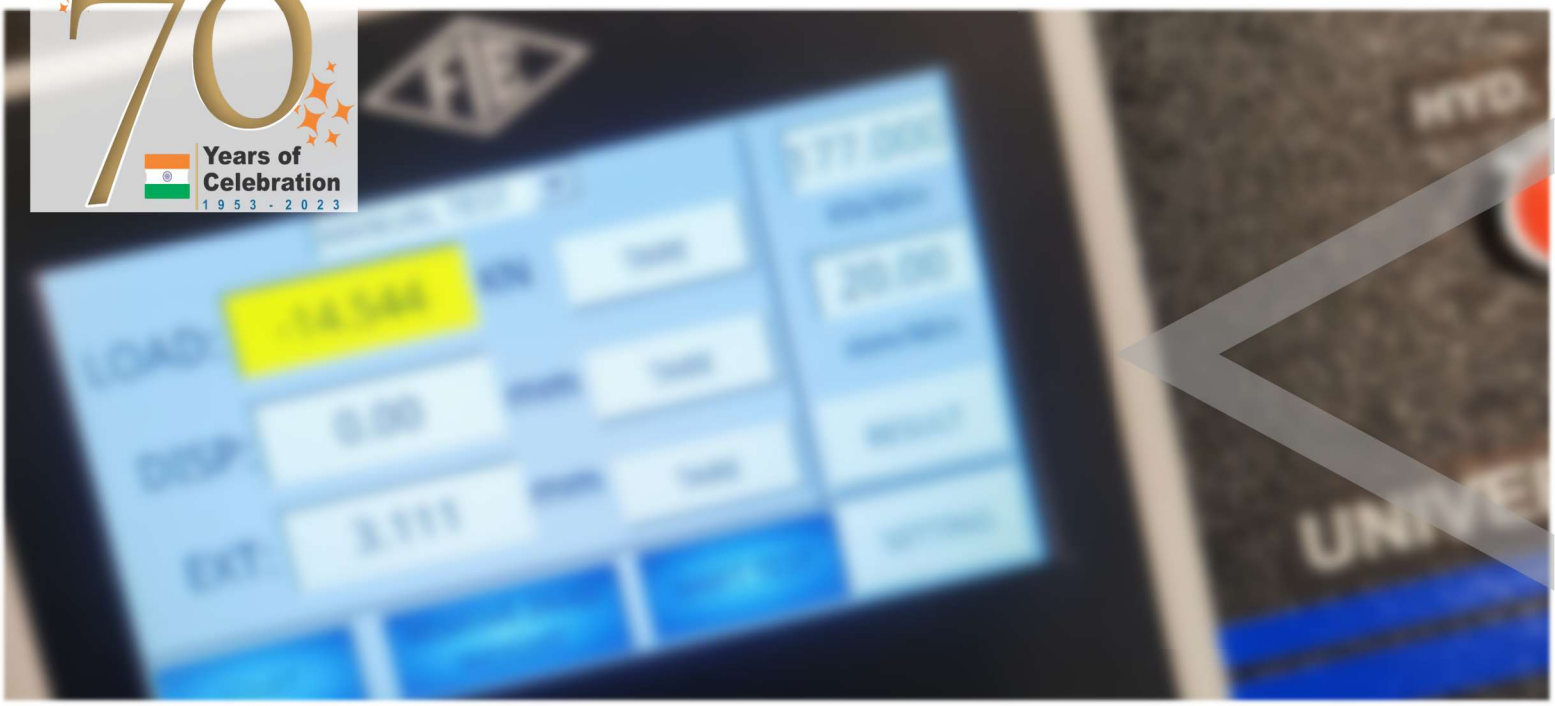
U-maX



Servo Controlled Hydraulic Grip 4-column Front Loading **Universal Testing Machine**

PLC Based Panel

Loading Accuracy as High as ±1%

Precision 4 column design for High rigidity

Best in class Analysis Software

Servo Controlled Hydraulic Grip 4-column Front Loading **Universal Testing Machine Model – U-MaX**

Features:

- Open type crosshead
- Hydraulic wedge action grips
- Long test stroke and test space
- Servo control with control modes –
  - Standard manual control
  - Load rate control (Kn/min)
  - Displacement Rate (mm/min)
  - Stress Rate (mpa/sec)
  - Strain rate with encoder feedback(mm/min)
  - Load Hold Facility
- Motor-driven threaded columns for quick effortless adjustment of lower cross-head to facilitate rapid fixing of the test specimen.
- Easy change from plain to threaded specimens.
- Large effective clearance between columns enables testing of standard specimens.
- Simple controls for ease of operation.
- Robust straining frame of an extremely rigid construction.
- Safe operation ensured through safety devices.
- Fully enclosed and protected pressure transducer.
- Manual control & release valve operation.

Application:

'FIE' Electronic Universal Testing Machine is designed to test materials under tension, compression bending, transverse, and shear loads. Brinell Hardness tests on metals can also be conducted with optional accessories.

Machine Consists of -

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 onto 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 **four** 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 providing ball seating. A 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 the test specimen. The design includes open-type crossheads and hydraulic wedge action grips.

Control Panel :

The Control Panel consists of a power pack with a drive motor, oil tank, control valves, and electrical switchgear box.

Power Pack :

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

Hydraulic Controls :

The hand-operated release valve & motorized control valve are used to control the flow to and from the hydraulic cylinder. The regulation of the oil flow is infinitely variable. A regulating valve is incorporated into the hydraulic system, which maintains a practically constant rate of piston movement. Control by this valve allows extensometer readings to be taken.

Another Power pack is used to operate wedge action grips using a hydraulic cylinder by using solenoid valve operation For Hydraulic Wedge action grips, a separate control remote is provided with selector switches indicating clamp–declamp and null positions.

Principle of Operation for -
Model : U-MaX

UTM right control valve is Servo Controlled in close loop mode as per mode selection. There are multiple control modes available as explained in features.

The Load is applied by a hydrostatically lubricated ram. The main cylinder pressure is transmitted to the pressure transducer housed in the control panel. The transducer gives the signal to the electronic display unit, corresponding to the load exerted by the main ram. Simultaneously the encoder fitted on the straining unit gives the mechanical displacement.

Electronic Control Panel (Universal 2020) :

- PLC Based panel minimizes electronic hardware issues
- PLC and HMI minimize electronic hardware
- Load rate control ranges from 5% to 50% of machine capacity with an accuracy of ± 2%
- Displacement rate control 2 mm/ min to 20 mm/ min with an accuracy of ± 2%
- Touch screen Front panel and Graphical LCD.
- Data entry with touch input of test parameters including rupture %, peak, etc.
- Panel communication with PC up to 100 meters (RS 485 Protocol).

Accuracy and Calibration :

Our machines are closely controlled for Sensitivity, accuracy, and calibration during every stage of manufacturing. The machine is calibrated over each of its measuring ranges by the procedure laid down in IS 1828: Part 1. Our Universal Testing Machine complies with class 1 of IS-1828-1, ISO 7500, and ASTM E8

Servo Controlled Hydraulic Grip 4-column Front Loading **Universal Testing Machine Model – U-MaX**

Technical Specifications for -

Servo Controlled Hydraulic Grip Front Loading Universal Testing Machine, Series : U-MaX

● Maximum allowable capacity for Tensile & Compression test – 80% of the machine capacity for tensile test and full capacity for compression test.

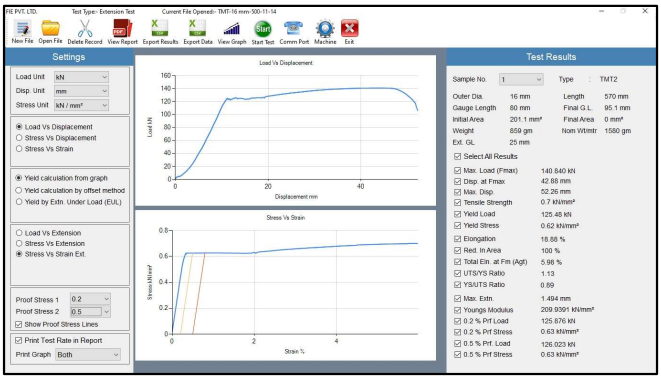
Model	Unit	U-MaX 100	U-MaX 120
Maximum Capacity	kN	1000	1200
Measuring range	kN	0-1000	0-1200
Load resolution (100000 units full scale)	N	10	12
Load range with accuracy of measurement +/-1%	kN	20 – 1000	24 - 1200
Resolution of piston movement (Displacement)	mm	0.01	0.01
Clearance for tensile test(at fully descended working piston)	mm	1000	1000
Clearance for compression test(at fully descended working piston)	mm	900	900
Clearance between columns	mm	550	550
Ram stroke	mm	250	250
Straining/piston speed at no load	mm/min	0-20	0-20
CONNECTED LOAD			
Power	HP	6	6
Voltage	V	400-440	400-440
Ø Phase		3	3
STANDARD ACCESSORIES			
FOR TENSILE TEST			
Clamping jaw for round specimens of diameter	mm	Ø10 - Ø25, Ø25 – Ø45	Ø10 - Ø25, Ø25 – Ø45
Clamping jaw for flat specimens of thickness	mm	0 - 22, 22 - 44	0 - 22, 22 - 44
Width	mm	70	70
FOR COMPRESSION TEST			
Pair of compression plates of diameter	mm	Ø160	Ø160
FOR TRASVERSE TEST			
Table with adjustable rollers			
Width of the rollers	mm	160	160
Diameter of the rollers	mm	50	50
Maximum clearance between supports	mm	300	300
Radius of punch tops	mm	R16, R22	R16, R22

Servo Controlled Hydraulic Grip 4-column Front Loading **Universal Testing Machine Model – U-MaX**

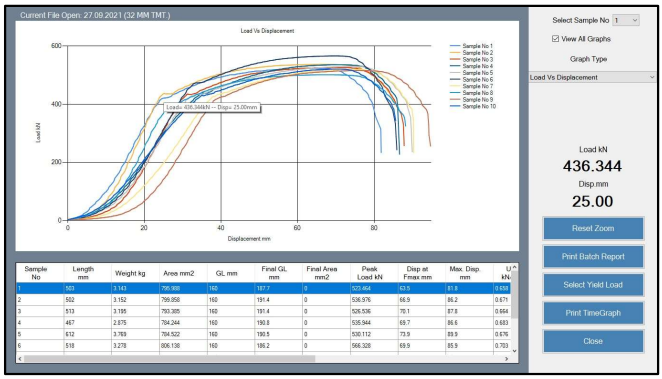
Software Features:

- Windows-based Software with a graphical UI interface.
- Runs on the latest Windows OS.
- Realtime graph of Load vs Displacement, Load vs Extension, Load vs Time, Displacement vs Time plotting facility.
- User entry for selection of various types of samples with dimension entry.
- All types of test results like UTS, YS, elongation, Proof stress, and Young's Modulus calculation automatically after the test.
- Graph zoom, graph trace facility with batch testing, multiple graph plotting facility
- PDF Report single as well as batch report generation.
- Result can be exported in CSV format
- Multiple unit selection facility for load displacement & stress
- CSV Results can be shared to a network server.

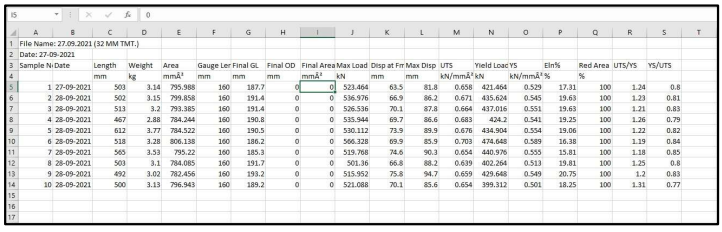
Home Screen



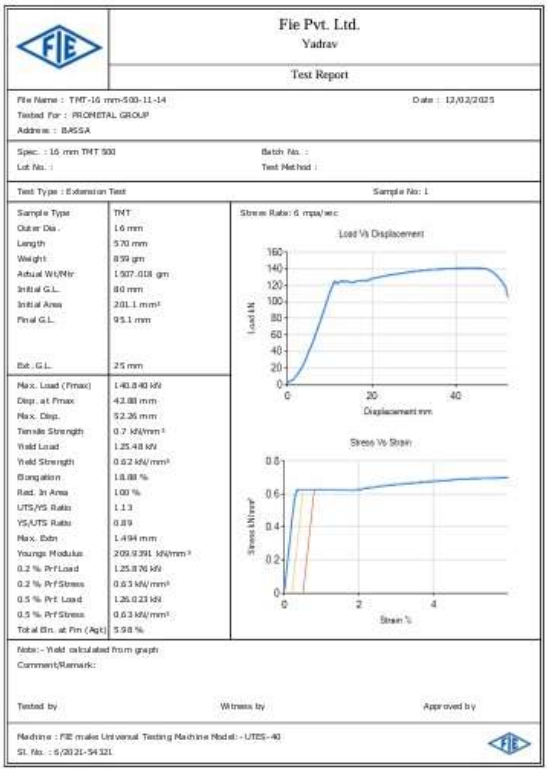
Graph Superimpose and Comparison



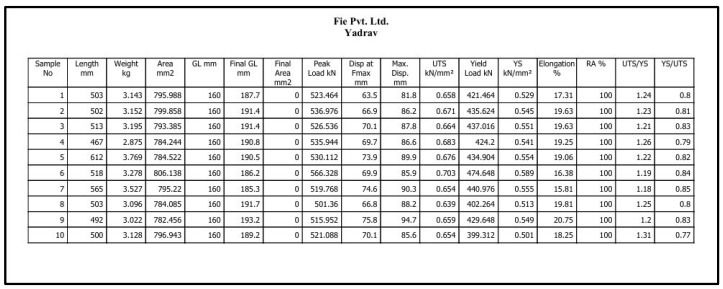
CSV Export



Report Screen



Batch Report



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Sample No	Length mm	Weight kg	Area mm2	GL mm	Final GL mm	Final Area mm2	Peak Load kN	Disp at Fmax mm	Max. Disp. mm	UTS kN/mm²	Yield Load kN	YS kN/mm²	Elongation %	RA %	UTS/YS	YS/UTS
1	503	3.143	795.988	160	187.7	0	523.464	63.5	81.8	0.658	421.464	0.529	17.31	100	1.24	0.8
2	502	3.152	799.858	160	191.4	0	536.976	66.9	86.2	0.671	435.624	0.545	19.63	100	1.23	0.81
3	513	3.195	793.385	160	191.4	0	526.536	70.1	87.8	0.664	437.016	0.551	19.63	100	1.21	0.83
4	467	2.875	784.244	160	190.8	0	535.944	69.7	86.6	0.683	424.2	0.541	19.25	100	1.26	0.79
5	612	3.769	784.522	160	190.5	0	530.112	73.9	89.9	0.676	434.904	0.554	19.06	100	1.22	0.82
6	518	3.278	806.138	160	186.2	0	566.328	69.9	85.9	0.703	474.648	0.589	16.38	100	1.19	0.84
7	565	3.527	795.22	160	185.3	0	519.768	74.6	90.3	0.654	440.976	0.555	15.81	100	1.18	0.85
8	503	3.096	784.085	160	191.7	0	501.36	66.8	88.2	0.639	402.264	0.513	19.81	100	1.25	0.8
9	492	3.022	782.456	160	193.2	0	515.952	75.8	94.7	0.659	429.648	0.549	20.75	100	1.2	0.83
10	500	3.128	796.943	160	189.2	0	521.088	70.1	85.6	0.654	399.312	0.501	18.25	100	1.31	0.77

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