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UNIVERSAL T STING MACHINE

Over **60** years of consistent excellence

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# Analogue Universal Testing Machine

Model : UTN



High reading accuracy due to large size and design of dial

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Loading accuracy as high as  $\pm 1\%$ 



Motor driven threaded columns for quick & effortless adjustment of lower cross-head-to facilitate rapid fixing of test specimen



Over **60** years of consistent excellence

# Analogue Universal Testing Machine Model : UTN

### Features :

- Loading accuracy as high as <u>+</u> 1%
- Suitable at variable speeds to suit a wide range of materials.
- Continuous roll autographic recorder supplied as standard to enable study of the behavior 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.

#### **Application:**

'FIE' Analogue 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.

Machine Consists of -

#### Straining unit:

This consists of a hydraulic 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 lower 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.

An displacement scale, with a minimum graduation of 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 lower 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.

### **Control Panel:**

The Control Panel consists of a power pack complete with drive motor and an oil tank, control valves, load indicator system & autographic recorder.

#### **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.

### Attachments :



Attachment for Tension Test of -Shouldered & Threaded specimens upto M6 to M20 (Min. length 110 mm).



Attachment for Tension Test of - Wire Ropes (Min. Ø1 to Ø10mm)

### 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 mechanical extensometer reading to be taken.

## Principle of operation for-

# Model : UTN

Operation of machine is by hydraulic transmission of load from the test specimen to a separately housed load indicator.

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.

Load is applied by a hydraulically lubricated ram.

Main cylinder pressure is transmitted to the cylinder of the pendulum dynamometer system housed in the control panel.

The cylinder of the dynamometer is also of self-lubricating design.

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. The deflection of the pendulum represents the absolute load applied on the test specimen.

Return movement of the pendulum is effectively damped to absorb energy in the event of sudden breakage of a specimen.

#### Load indicator System :

This system consists of a large dial and a pointer.

A dummy pointer is provided to register the maximum load reached during the test.

Different measuring ranges can be selected by operating the range selection knob.

An overload trip switch is incorporated which, automatically cuts out the pump motor when the load range in use is exceeded.

#### **Displacement:**

An elongation scale, with a minimum graduation of 1mm, is provided to measure the deformation of the specimen.

### Pendulum Dynamometer :

This unit permits selection of favorable 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.



Shear Test (Min. Ø5 to Ø20mm) & (Min.Ø25 to Ø40mm

# Technical Specifications for - Analogue Universal Testing Machine **Model – UTN**

Maximum CapacitykN10020040060010001stMeasuring rangekN0-1000-2000-4000-6000-1000Minimum GraduationskN0.20.41122 nd Measuring rangekN0.00-2000-3000-500Minimum GraduationskN0.10.20.50.513 rd Measuring rangekN0.050.100.220.20.5Minimum GraduationskN0.050.100.200.400-600Minimum GraduationskN0.000.040.10.10.20Clearance for tensile test (At fully descended working piston)mm50-70050-70050-70050-80050-800Clearance for compression test (At fully descended working piston)mm150200200250250Straining/ Piston Speed (at no load)mm/min0-3000-1500-1000-8000-800Connect CED LOAD Qmm131.32.33333V	MODEL	UNIT	UTN 10	UTN 20	UTN 40	UTN60	UTN 100
Minimum Graduations         KN         0.2         0.4         1         1         2           2 nd Measuring range         KN         0-50         0-100         0-200         0-300         0-500           Minimum Graduations         KN         0.11         0.2         0.5         0.5         1           3 rd Measuring range         KN         0.05         0.1         0.25         0.2         0.5           4 th Measuring range         KN         0.05         0.1         0.25         0.2         0.5           4 th Measuring range         KN         0.05         0.1         0.25         0.2         0.5           4 th Measuring range         KN         0.05         0.1         0.25         0.2         0.5           4 th Measuring range         KN         0.02         0.04         0.1         0.1         0.2           Clearance for tensile test (At fully descended working piston)         mm         50-700         50-700         50-800         50-850           Clearance for compression test (At fully descended working piston)         mm         50         50         50         60         50           Clearance between columns         mm         50.0         0         0.50	Maximum Capacity	kN	100	200	400	600	1000
2 nd Measuring range         kN         0-50         0-100         0-200         0-300         0-500           Minimum Graduations         kN         0.1         0.2         0.5         0.5         1           3 rd Measuring range         kN         0.25         0.50         0.100         0.120         0.250           Minimum Graduations         kN         0.010         0.20         0.40         0.60         0.100           Minimum Graduations         kN         0.10         0.20         0.40         0.60         0.100           Minimum Graduations         kN         0.10         0.20         0.40         0.60         0.100           Minimum Graduations         kN         0.02         0.44         0.1         0.1         0.2           Clearance for tensile test (At fully descended working piston)         mm         50-700         50-700         50-700         60.0         750           Straining/ Piston Speed (at no load)         mm/min         0.700         0.700         0.700         0.800         0.800           CONNECTED LOAD         mm         10.3         1.3         2.3         2.5         3.5           V         400-440         400-440         400-440         4	1stMeasuring range	kN	0-100	0-200	0-400	0-600	0-1000
Minimum Graduations         KN         0.1         0.2         0.5         0.5         1           3 rd Measuring range         KN         0.25         0.50         0.100         0-120         0.250           Minimum Graduations         KN         0.05         0.11         0.25         0.2         0.5           4 th Measuring range         KN         0.02         0.40         0.40         0.40         0.40         0.41         0.2           4 th Measuring range         KN         0.02         0.04         0.11         0.1         0.2           Clearance for tensile test (At fully descended working piston)         mm         50-700         50-700         6-00         0-800         0-850           Clearance between columns         mm         500         500         600         750           Ram Stroke         mm         150         200         200         250         250           Straining Piston Speed (at no load)         mm/min         0-300         0-150         0-100         0-800         0-800           CONNECTED LOAD         m         1.3         1.3         2.3         3         3         3         3         3         3         3         3         3 <td>Minimum Graduations</td> <td>kN</td> <td>0.2</td> <td>0.4</td> <td>1</td> <td>1</td> <td>2</td>	Minimum Graduations	kN	0.2	0.4	1	1	2
3 rd Measuring range         KN         0-25         0-50         0-100         0-120         0-250           Minimum Graduations         KN         0.05         0.1         0.25         0.2         0.5           4 th Measuring range         KN         0.10         0.20         0.40         0.60         0.100           Minimum Graduations         KN         0.02         0.04         0.1         0.1         0.2           Clearance for tensile test (At fully descended working piston)         mm         50-700         50-700         50-800         50-800         50-800           Clearance for compression test (At fully descended working piston)         mm         60-700         6-700         6-800         750           Clearance between columns         mm         500         0.00         200         250         250           Straining Piston Speed (at no load)         mm/min         10-300         0-150         0-100         0-800           CONNECTED LOAD         mm         10         400-440         400-440         400-440         400-440         400-440         400-440         400-440         400-440         400-440         400-440         400-440         400-440         400-450         25-40         25-45         10-25<	2 nd Measuring range	kN	0-50	0-100	0-200	0-300	0-500
Minimum Graduations         kN         0.05         0.1         0.25         0.2         0.5           4 th Measuring range         kN         0.10         0-20         0.40         0-60         0-100           Minimum Graduations         kN         0.02         0.04         0.1         0.1         0.2           Clearance for tensile test (At fully descended working piston)         mm         50-700         50-700         50-800         60-850           Clearance between columns         mm         500         500         600         750           Ram Stroke         mm         150         200         200         250         250           Straining/ Piston Speed (at no load)         mm/min         0-700         0-700         0-700         0-700         0-800         0-800           CONNECTED LOAD         mm/min         0-00         0-150         0-100         0-800         0-800         0-700         0-700         0-700         0-700         0-700         0-700         0-700         0-700         0-700         0-700         0-800         0-800         0-700         0-700         0-700         0-700         0-700         0-700         0-700         0-700         0-700         0-700         0-700	Minimum Graduations	kN	0.1	0.2	0.5	0.5	1
4 th Measuring range         kN         0.10         0.20         0.40         0.60         0.100           Minimum Graduations         kN         0.02         0.04         0.1         0.1         0.2           Clearance for tensile test (At fully descended working piston)         mm         50-700         50-700         50-800         50-850           Clearance for compression test (At fully descended working piston)         mm         0-700         0-700         0-800         0-850           Clearance between columns         mm         500         500         500         600         750           Ram Stroke         mm         150         200         200         250         250           Straining/ Piston Speed (at no load)         mm/min         0-300         0-150         0-100         0-800           CONNECTED LOAD         mm         1.3         2.3         2.5         3.5           V         400-440         400-440         400-440         400-440         400-440         400-440         400-440         400-440         400-440         400-450         25-40         25-45         25-45         25-45         25-45         25-45         25-45         25-45         25-45         25-45         25-45         <	3 rd Measuring range	kN	0-25	0-50	0-100	0-120	0-250
Minimum Graduations         kN         0.02         0.04         0.1         0.1         0.2           Clearance for tensile test (At fully descended working piston)         mm         50-700         50-700         50-700         50-800         50-850           Clearance for compression test (At fully descended working piston)         mm         0-700         0-700         0-700         0-800         0-850           Clearance between columns         mm         500         500         600         750           Ram Stroke         mm         150         200         200         250         250           Straining/ Piston Speed (at no load)         mm/min         0-300         0-150         0-100         0-800           CONNECTED LOAD         m         400-440         400-440         400-440         400-440         400-440           φ         3         3         3         3         3         3         3           STANDARD ACCESSORIES         mm         20-30         20-30         25-40         25-45         25-45           Clamping jaws for flat specimens of diameter         0-10         0-10         0-15         0-15         0-22           for diameter         mm         10-20         10-20	Minimum Graduations	kN	0.05	0.1	0.25	0.2	0.5
Clearance for tensile test (At fully descended working piston)         mm         50-700         50-700         50-700         50-800         50-800           Clearance for compression test (At fully descended working piston)         mm         0-700         0-700         0-700         0-800         0-800           Clearance between columns         mm         500         500         500         600         750           Ram Stroke         mm         1500         200         250         250         250           Straining/ Piston Speed (at no load)         mm/min         0-700         0-150         0-100         0-800           CONNECTED LOAD         mm         1.3         1.3         2.3         2.5         3.5           V         400-440         400-440         400-440         400-440         400-440         400-440           \$\$0         3         3         3         3         3         3         3           STANDARD ACCESSORIES         mm         10-20         10-25         10-25         10-25         10-25           for ampling jaws for fround specimens         mm         20-30         25-40         25-40         25-40           Clamping jaws for flat specimens         mm         10-20	4 th Measuring range	kN	0-10	0-20	0-40	0-60	0-100
(At fully descended working piston)         mm         50-700         50-700         50-700         50-800         50-800           Clearance for compression test (At fully descended working piston)         mm         0-700         0-700         0-700         0-800         0-850           Clearance between columns         mm         500         500         600         750           Ram Stroke         mm         150         200         200         250         250           Straining/ Piston Speed (at no load)         mm/min         0-300         0-150         0-100         0-800           CONNECTED LOAD         mm/min         0-300         0-130         2.3         2.5         3.5           V         MM         400-440         400-440         400-440         400-440         400-440           Q         3         3         3         3         3         3           STANDARD ACCESSORIES         mm         20-30         20-30         25-40         25-40         25-40           Clamping jaws for flat specimens of flat specimens of thickness         mm         10-20         10-20         10-25         10-25           OTH COMPRESSION TEST         mm         10-20         10-20         15-30	Minimum Graduations	kN	0.02	0.04	0.1	0.1	0.2
(At fully descended working piston)         mm         0-700		mm	50-700	50-700	50-700	50-800	50-850
Ram Stroke         mm         150         200         250         250           Straining/ Piston Speed (at no load)         mm/min         0-300         0-150         0-160         0-000           CONNECTED LOAD         m         1         1.3         2.3         2.5         3.5           Power for UTN         HP         1.3         1.3         2.3         2.5         3.5           V         400-440         400-440         400-440         400-440         400-440         400-440           φ         3         3         3         3         3         3         3           STANDARD ACCESSORIES          10-20         10-20         10-25         10-25         10-25           Clamping jaws for round specimens of diameter         10         0-10         0-15         0.15         0.22           of diameter         mm         10-20         10-20         15.30         15.30         22.44           Vidth         mm         50         50         65         70         70           FOR COMPRESSION TEST         mm         120         120         160         160         160           FOR COMPRESSION TEST         mm         120		mm	0-700	0-700	0-700	0-800	0-850
Straining/ Piston Speed (at no load)         mm/min         0-300         0-150         0-150         0-100         0-80           CONNECTED LOAD         HP         1.3         1.3         2.3         2.5         3.5           V         400-440         400-440         400-440         400-440         400-440         400-440 $\phi$ 3         3         3         3         3         3         3           STANDARD ACCESSORIES         FOR TENSION TEST UTN         In-20         10-20         10-25         10-25         10-25           Clamping jaws for round specimens of diameter         Imm         20-30         25-40         25-40         25-45           Clamping jaws for flat specimens of thickness         Imm         10-20         10-25         10-25         10-25           Of thickness         Imm         10-20         10-15         0-15         0-22         0           Of thickness         Imm         10-20         10-20         15-30         15-30         22-44           Vidth         Imm         50         50         65         70         70           Pair of Compression Plates of diameter.         Imm         120         120         120         160 <td>Clearance between columns</td> <td>mm</td> <td>500</td> <td>500</td> <td>500</td> <td>600</td> <td>750</td>	Clearance between columns	mm	500	500	500	600	750
CONNECTED LOADImage: formed to the state of	Ram Stroke	mm	150	200	200	250	250
Power for UTNHP1.31.32.32.53.5V400-400400-440400-440400-440400-440400-440 $\phi$ 333333STANDARD ACCESSORIESFOR TENSION TEST UTNClamping jaws for round specimens of diameter10-2010-2010-2510-2510-25Clamping jaws for flat specimens of thickness10-100-150.150.22Clamping jaws for flat specimens of thickness10-100.150.150.22Clamping jaws for flat specimens of thickness10.100.100.150.150.22Clamping jaws for flat specimens of thickness10.100.100.150.150.22Pair of Compression Plates of diameter.mm10.2010.2015.3015.3016.0FOR TRANSVERSE TEST Table with adjustable rollersmm160160160160Diameter of Rollersmm3030305050Maximum clearance between supportsmm500500600800	Straining/ Piston Speed (at no load)	mm/min	0-300	0-150	0-150	0-100	0-80
V 0400-440400-440400-440400-440400-440\$\phi\$33333STANDARD ACCESSORIESFOR TENSION TEST UTNClamping jaws for round specimens of diameter10-2010-2010-2510-2510-25Clamping jaws for flat specimens of thickness10-2010-2025-4025-4025-45Clamping jaws for flat specimens of thickness0-100-100-150-150-22Clamping jaws for flat specimens of thicknessmm10-2010-2015-3015-3022-44Widthmm505065707070FOR COMPRESSION TESTPair of Compression Plates of diameter.mm120120120120160FOR TRANSVERSE TESTvidth of rollersmm160160160160Diameter of Rollersmm3030305050Maximum clearance between supportsmm500500600800	CONNECTED LOAD						
Φ33333STANDARD ACCESSORIESFOR TENSION TEST UTNClamping jaws for round specimens of diameter10-2010-2010-2510-2510-25Clamping jaws for flat specimens of thicknessmm20-3020-3025-4025-4025-45Clamping jaws for flat specimens of thickness0-100-100-150-150-22Mm10-2010-2015-3015-3022-44Widthmm5050657070FOR COMPRESSION TESTmm120120120120160FOR TRANSVERSE TESTmm160160160160160Vidth of rollersmm3030305050Maximum clearance between supportsmm500500600800	Power for UTN	HP	1.3	1.3	2.3	2.5	3.5
STANDARD ACCESSORIESFOR TENSION TEST UTNClamping jaws for round specimens of diameter10-2010-2010-2510-2510-25Clamping jaws for flat specimens of thickness10-100-100-150.150.22Clamping jaws for flat specimens of thickness0000-150.150.22Mm10-2010-2015-3015-3022-44Widthmm5050657070FOR COMPRESSION TESTPair of Compression Plates of diameter.mm120120120120160FOR TRANSVERSE TESTTable with adjustable rollersmm160160160160Diameter of Rollersmm3030305050Maximum clearance between supportsmm500500600800	V		400-440	400-440	400-440	400-440	400-440
FOR TENSION TEST UTN         Image: Section of the section of diameter         Image: Section of the section of diameter         Image: Image: Section of the section	Φ		3	3	3	3	3
Clamping jaws for round specimens of diameter         10         10-20         10-25 <td>STANDARD ACCESSORIES</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	STANDARD ACCESSORIES						
Clamping jaws for flot specimens of diameter         mm         20-30         25-40         25-40         25-40         25-45           Clamping jaws for flat specimens of thickness         Mm         0-10         0-10         0-15         0-15         0-22           Clamping jaws for flat specimens of thickness         mm         10-20         10-20         15-30         15-30         22-44           Width         mm         50         50         65         70         70           FOR COMPRESSION TEST         mm         120         120         120         160           FOR TRANSVERSE TEST         mm         120         120         120         160           FOR TRANSVERSE TEST         mm         160         160         160         160           for follers         mm         30         30         50         50         50           width of rollers         mm         30         30         50	FOR TENSION TEST UTN						
of diameter         mm         20-30         25-40 <th20< th=""> <th20< th=""> <th20< t<="" td=""><td rowspan="2"></td><td></td><td>10-20</td><td>10-20</td><td>10-25</td><td>10-25</td><td>10-25</td></th20<></th20<></th20<>			10-20	10-20	10-25	10-25	10-25
of thickness         mm         10-20         10-20         15-30         15-30         22-44           Width         mm         50         50         65         70         70           FOR COMPRESSION TEST         mm         120         120         120         120         160           FOR TRANSVERSE TEST         mm         120         120         120         160         160           FOR TRANSVERSE TEST         mm         160         160         160         160         160           Width of rollers         mm         160		mm	20-30	20-30	25-40	25-40	25-45
of thickness         mm         10-20         10-20         15-30         15-30         22-44           Width         mm         50         50         65         70         70           FOR COMPRESSION TEST         mm         120         120         120         120         160           FOR TRANSVERSE TEST         mm         120         120         120         160           FOR TRANSVERSE TEST         mm         160         160         160         160           FOR TRANSVERSE TEST         mm         160         160         160         160           width of rollers         mm         160         160         160         160         160           Diameter of Rollers         mm         30         30         30         50         50           Maximum clearance between supports         mm         500         500         600         800	Clamping jaws for flat specimens		0-10	0-10	0-15	0-15	0-22
FOR COMPRESSION TESTPair of Compression Plates of diameter.mm120120120120160FOR TRANSVERSE TEST Table with adjustable rollersmm160160160160160width of rollersmm160160160160160160Diameter of Rollersmm3030305050Maximum clearance between supportsmm500500600800		mm	10-20	10-20	15-30	15-30	22-44
Pair of Compression Plates of diameter.mm120120120120160FOR TRANSVERSE TESTTable with adjustable rollerswidth of rollersmm160160160160160Diameter of Rollersmm3030305050Maximum clearance between supportsmm500500600800	Width	mm	50	50	65	70	70
FOR TRANSVERSE TEST         Table with adjustable rollers         width of rollers       mm       160 <td< td=""><td>FOR COMPRESSION TEST</td><td></td><td></td><td></td><td></td><td></td><td></td></td<>	FOR COMPRESSION TEST						
Table with adjustable rollerswidth of rollersmm160160160160Diameter of Rollersmm30303050500Maximum clearance between supportsmm500500500600800	Pair of Compression Plates of diameter.	mm	120	120	120	120	160
width of rollersmm160160160160160Diameter of Rollersmm3030305050Maximum clearance between supportsmm500500500600800	FOR TRANSVERSE TEST						
Diameter of Rollers     mm     30     30     30     50       Maximum clearance between supports     mm     500     500     600     800	Table with adjustable rollers						
Maximum clearance between supports mm 500 500 500 600 800	width of rollers	mm	160	160	160	160	160
	Diameter of Rollers	mm	30	30	30	50	50
Radius of punch tops         mm         6,12         6,12         12,16         16,22         16,22	Maximum clearance between supports	mm	500	500	500	600	800
	Radius of punch tops	mm	6,12	6,12	12,16	16,22	16,22

• Due to constant R& D specifications & features are subject to change without notice.

• Colour scheme subject to confirm at the time of order.

# Analogue Universal Hardness Testing Machine

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entranten tradenta antenden de series

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Series : UTN



Over **60** years of consistent excellence

Manufactured By : Fuel Instruments & Engineers Pvt. Ltd.

Sold and Serviced by : SUZUKI INSTRUMENTS

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Web-Site : simaterialtestingservices.com