MTS
ALPHA INDUSTRIES
MATERIAL TESTING SOLUTIONS

Authorized Dealer: Sales and Service

NH Instruments
Testing and Metallography Solutions

NH INSTRUMENTS
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T. Dasarahalli, Bangalore 560057, Karnataka.
Email:nhinstruments24@gmail.com
Mobile:8660651375 , 8660942368

Hardware Specifications :

1. **Load Resolution** : 50,000 steps | 1,00,000 steps optional
2. **Displacement Resolution** : 0.01 mm / 0.001 mm optional
3. **Extensometer Resolution** : 0.001 mm (If extensometer Included in package)
4. **Jogging / Test Speed** : 0.05 mm/min to 600 mm/min (300 mm/min for 100 kN Onwards)
5. **Tests Covered** : Tensile Test, Compression Test, Bend Test , Shear Test
6. Control Panel to PC communication length upto 10 meters - RS485 Protocol
7. 64 Bit - Windows 7/8/10/11 Compatible PC Software
8. Software as per IS 1608 / ISO6982 / ASTM E8
9. Load, Displacement and Extension Accuracy : ± 1% of shown reading

Electromechanical SERVO additional features :

1. Load Rate accuracy control +- 3 % or +- 3 kN of set Load Rate within specified limits***
2. Displacement Rate accuracy of +- 1% or +- 1 mm/min of set Disp. Rate
3. Real time display of Load Rate*** and Displacement Rate
4. Working Auto Detect yield facility for changing from Load Rate to Displacement Rate
5. Hold Load up to 24 hours***

Note :

1. **Extensometer*** is used for calculating **0.1, 0.2 up to 1% Proof Stress** and proof load values and **Young's Modulus / Modulus of elasticity**

2. **Unitek Machines** will have the facility of conducting **Stress Rate Control*** / Load Rate Controlled*** / CH. Strain Control Tests** as per ASTM E8, **ISO 6892 and IS 1608** (Control Method A2 and Control Method B in ISO 6892 / IS 1608). **Achieved Stress Rate Control / Load Rate Controlled / CH. Strain Rate controlled Graphs can be printed on the test reports as per NABL requirement**

***Requirements of these features should be mentioned at the time of negotiation process. Quotation shall be generated as per the requirement

Software Specifications:

1. Load / Displacement / Extension display on Home Page.
2. Video Extensometer Integration
3. Sample type customization
4. Real time graph in selected units for Load and Stress.
5. Integration of multiple extensometers in one system
    a. Can save calibration for each one of the seperately.
6. Real Time Load Rate/ Disp Rate / Stress rate display in Servo Mode
7. Ability to Freeze real time graph
8. Prefect yield calculation as per customer demand
    a. Accurate calculation from graphical method
    b. ASTM method offset selection from 0.1 % to 1 %
    c. Yield calculation method can be change post test
9. Ability to select / unselect results displayed in printed reports.
10. Ability to change input parameters (Gauge length / CS. Area) post test.
11. Ability to add up to 10 extra Key-Value Pairs as input.

Customer can use these key value pairs as per his requirement

12. Ability to add up to 2 extra Key-Value Pairs in the report header.

Customer can use these key value pairs as per his requirement

13. Ability to export reports to excel with graphs.
14. Ability to print all Test Data Points of a selected test in selected units.
15. Graph Cursor - Zoom - Pan Facility
16. Unlimited Tests in one batch file.
17. **Proof stress calculation from 0.1 % to 1 % - (Extensometer Necessary)**
18. Report Customization as per customer demand.

Ability to print following graphs in test report (PDF).

- Load vs Time with Load Rate in Servo Test***
- Stress vs Time with achieved Stress Rate in Servo Test***
- Displacement vs Time with achieved Strain Rate in Servo Test
- CH. Strain vs Time with achieved Strain Rate in Servo Test

200 kN Unitek with Video Extensometer

ElectroMechanical Machines
Ball Screw Driven Servo Motor based Testing Machine

Extensometer Test - Stress vs Strain and Load vs Displacement

Date : 10/1/2023
Customer Name : Tata 4 mm sample Trial

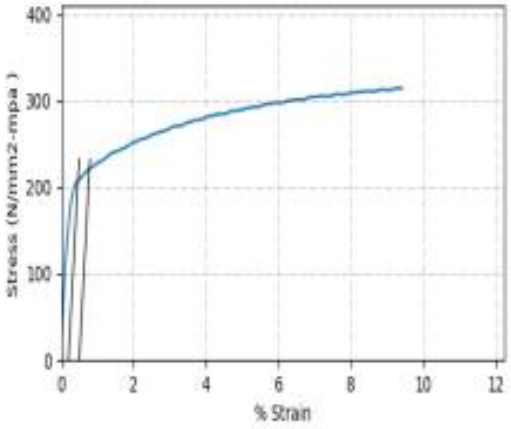
Test Type :	: Tensile Test - Stress Vs Strain
File Name	: rval_demo1_45deg
Sample Type	: Rectangular
Rate Disp.	: 5.0 (mm/min)

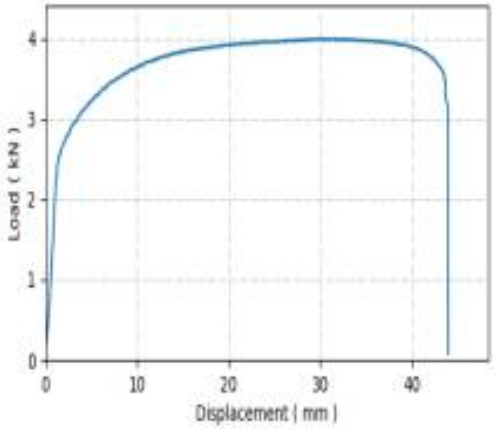
Gauge Length (mm)	: 80.0
Thickness (mm)	: 0.58
Width (mm)	: 21.0
Initial Area (mm2)	: 12.18

Sample Id : : Sample 1
:

Material Test Results

Max. Load (kN)	: 4.000
Tensile Strength (N/mm2)	: 328.431
Disp. at Max. Load (mm)	: 30.08
Max. Displacement (mm)	: 43.96
Yield Load (kN)	: 2.887
Yield Stress (N/mm2)	: 237.062
Proof Stress 0.2 % Offset (N/mm2)	: 206.496
Proof Stress 0.5 % Offset (N/mm2)	: 221.163
Proof Load 0.2 % Offset (kN)	: 2.515
Proof Load 0.5 % Offset (kN)	: 2.694
Youngs Modulus (N/mm2)	: 62534.729
Max. Extension (mm)	: 4.7
Extension @ Fmax(mm)	: 4.68
% AGT	: 9.36
YS/UTS	: 0.63
UTS/YS	: 1.59





Servo Test Reports with Load vs Time (345 kN/min) and Displacement vs Time Graphs (12 mm/min)

345 kN/min pre yield speed and 12 mm/min Post Yield Speed

Date : 17/8/2021
Customer Name :

Input Data

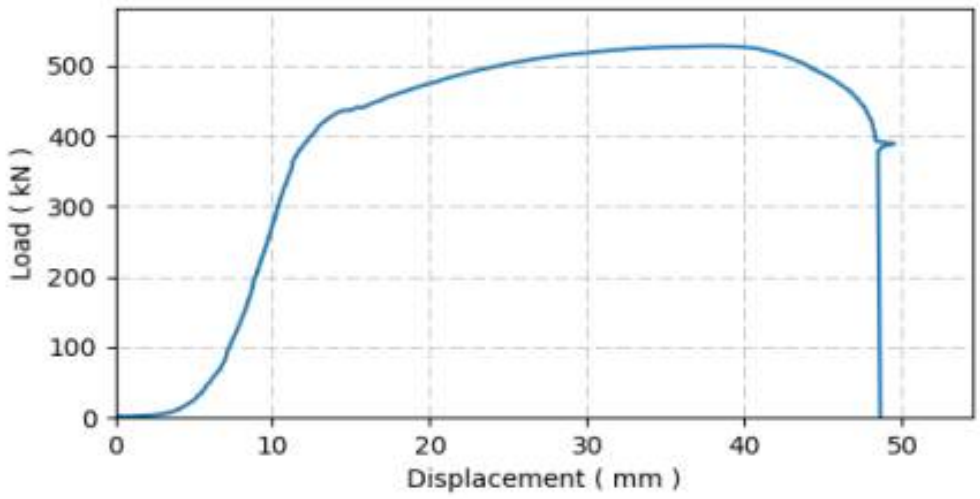
Test Type :	: Tensile Test
File Name	: demooo
Rate Load.	: 345.3 (kN/min)
Sample Type	: Tmt
Rate Disp.	: 12.0 (mm/min)

Density (gm/cc)	: 7.85
Gauge Length (mm)	: 160.0
Length (mm)	: 440.0
Weight (Kg)	: 2.84
Initial Area (mm2)	: 822.24
Weight (kg/meter)	: 6.455

Grade	: dddd
Make	: Jindal
Nominal Dia	: 25

Material Test Results

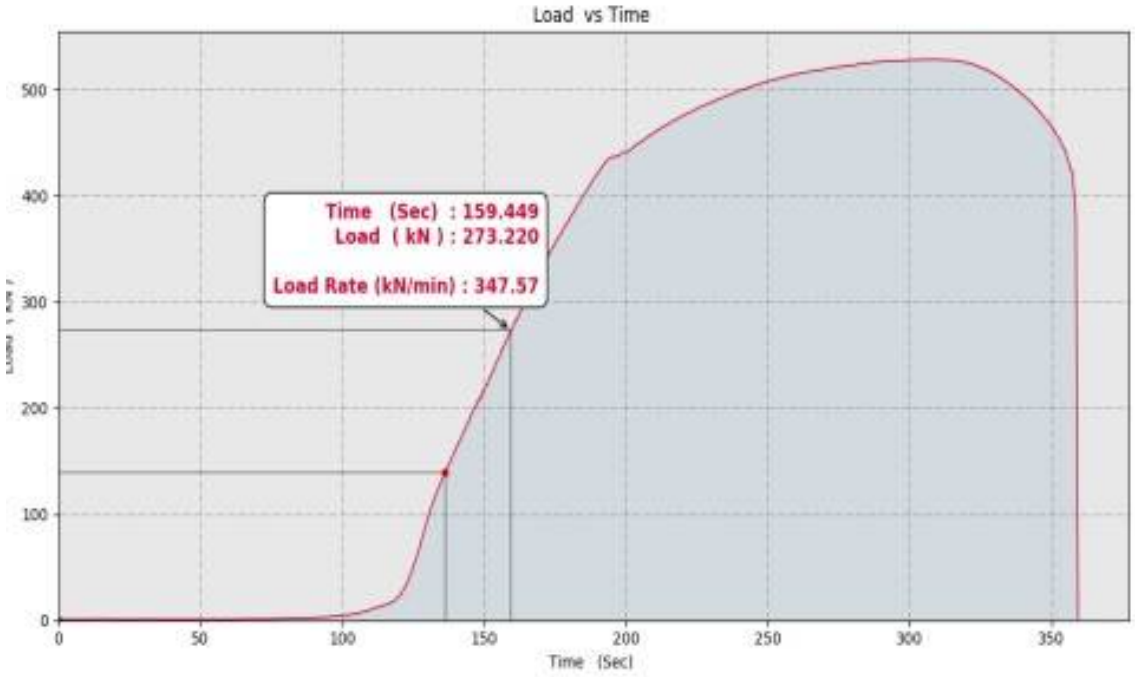
Max. Load (kN)	: 528.26
Ult. Stress (N/mm2)	: 642.464
Disp. at Max. Load (mm)	: 38.23
Max. Displacement (mm)	: 48.61
Yield Load (kN)	: 448.5
Yield Stress (N/mm2)	: 545.461
YS/UTS	: 0.849
UTS/YS	: 1.178
Elongation %	: 12.500
Final Gauge Length (mm)	: 180.0

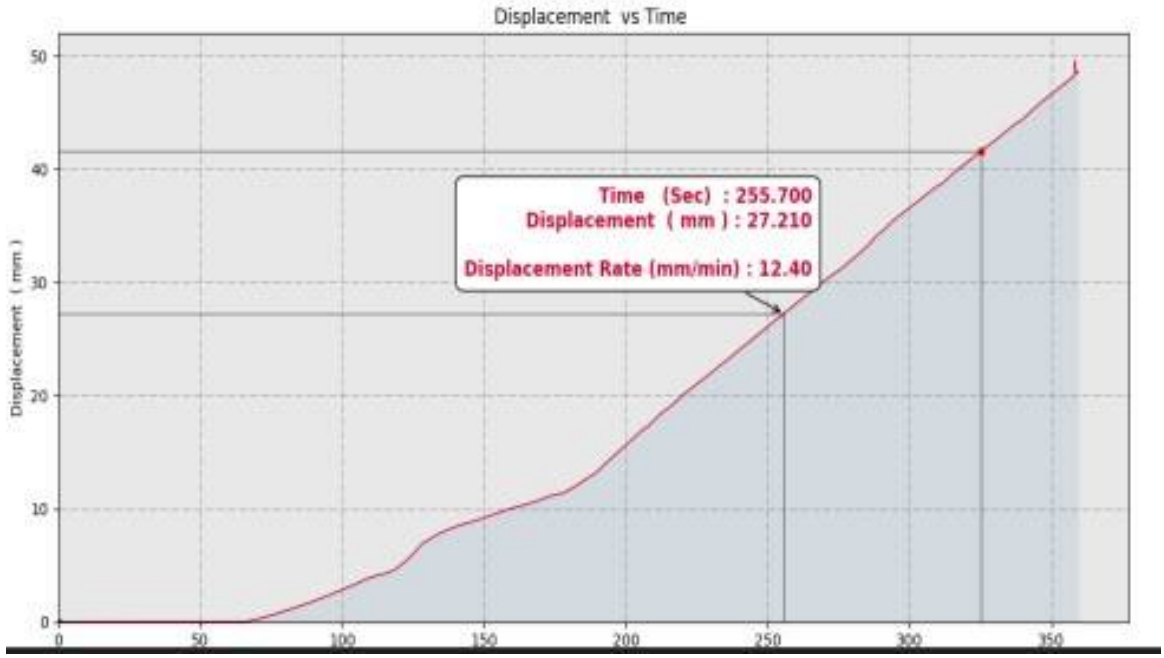


(345 kN/min) and (12 mm/min)

File Name : demooo

Load Rate : 347.57 (kN/min) from 139.84 kN [136.4 sec] To 273.22 kN [159.4 sec]
Displacement Rate : 12.4 (mm/min) from 41.58 mm [325.2 sec] To 27.21 mm [255.7 sec]





Servo Test Reports with Load vs Time (288 kN/min) and Displacement vs Time Graphs (12 mm/min)

TEST RESULT

288.9 kN/min Pre Yield and 12mm/min Post Yield Speed Control

Press Esc to exit full screen

Date : 17/8/2021

Customer Name :

Input Data

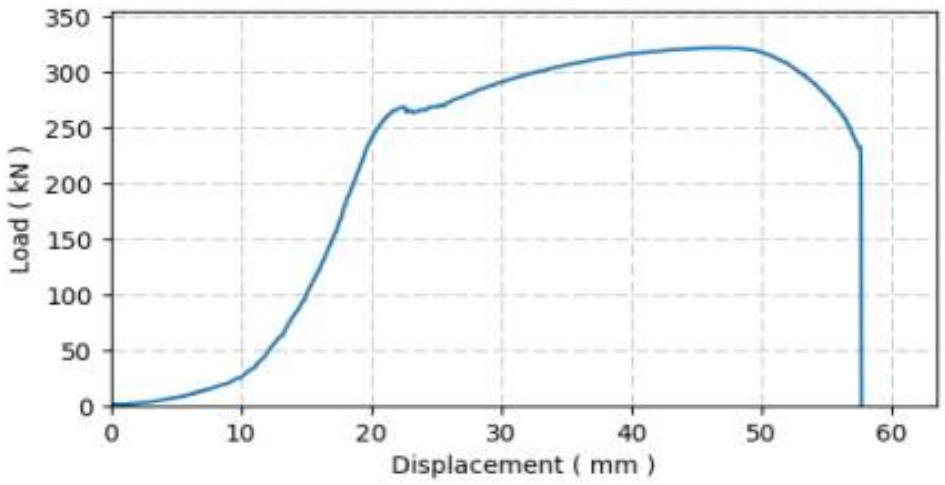
Test Type :	: Tensile Test
File Name	: demoo13
Rate Load.	: 288.9 (kN/min)
Sample Type	: Tmt
Rate Disp.	: 12.0 (mm/min)

Density (gm/cc)	: 7.85
Gauge Length (mm)	: 125.0
Length (mm)	: 400.0
Weight (Kg)	: 2.52
Initial Area (mm2)	: 802.55
Weight (kg/meter)	: 6.3

Grade	: fe-500
Make	: Jindal
Nominal Dia	: 25

Material Test Results

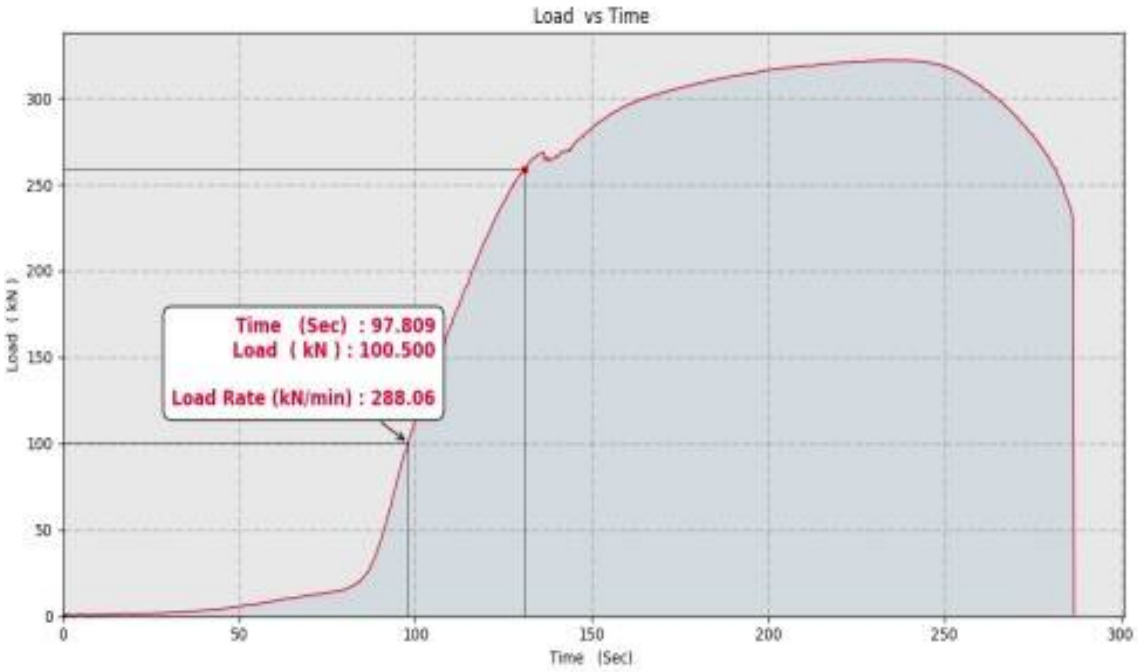
Max. Load (kN)	: 321.92
Ult. Stress (N/mm2)	: 401.121
Disp. at Max. Load (mm)	: 46.27
Max. Displacement (mm)	: 57.66
Yield Load (kN)	: 275.28
Yield Stress (N/mm2)	: 343.007
YS/UTS	: 0.855
UTS/YS	: 1.169
Elongation %	: 12.000
Final Gauge Length (mm)	: 140.0

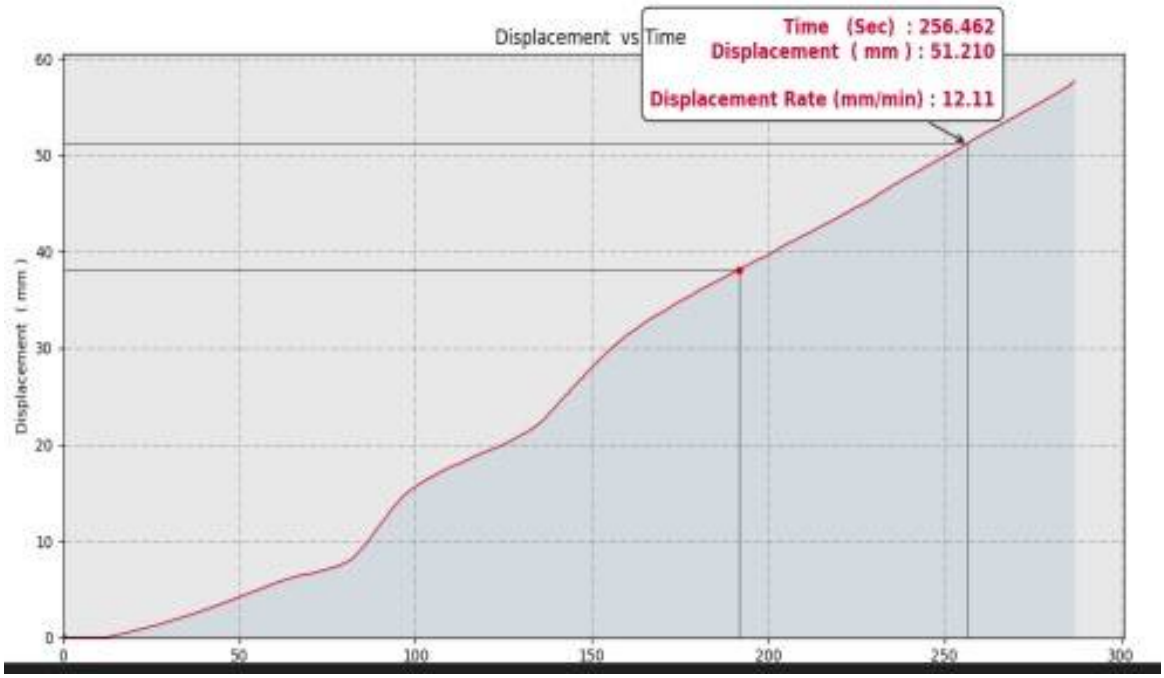


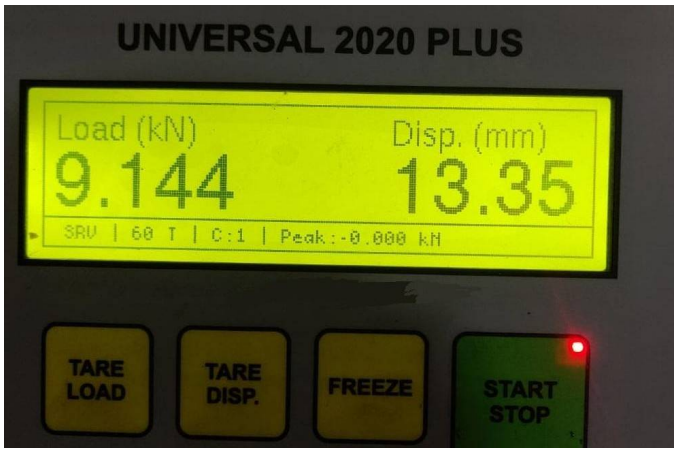
Tested By Checked By Approved By

File Name : demoo13

Load Rate : 288.06 (kN/min) from 259.08 kN [130.8 sec] To 100.5 kN [97.8 sec]
Displacement Rate : 12.11 (mm/min) from 38.16 mm [191.8 sec] To 51.21 mm [256.5 sec]

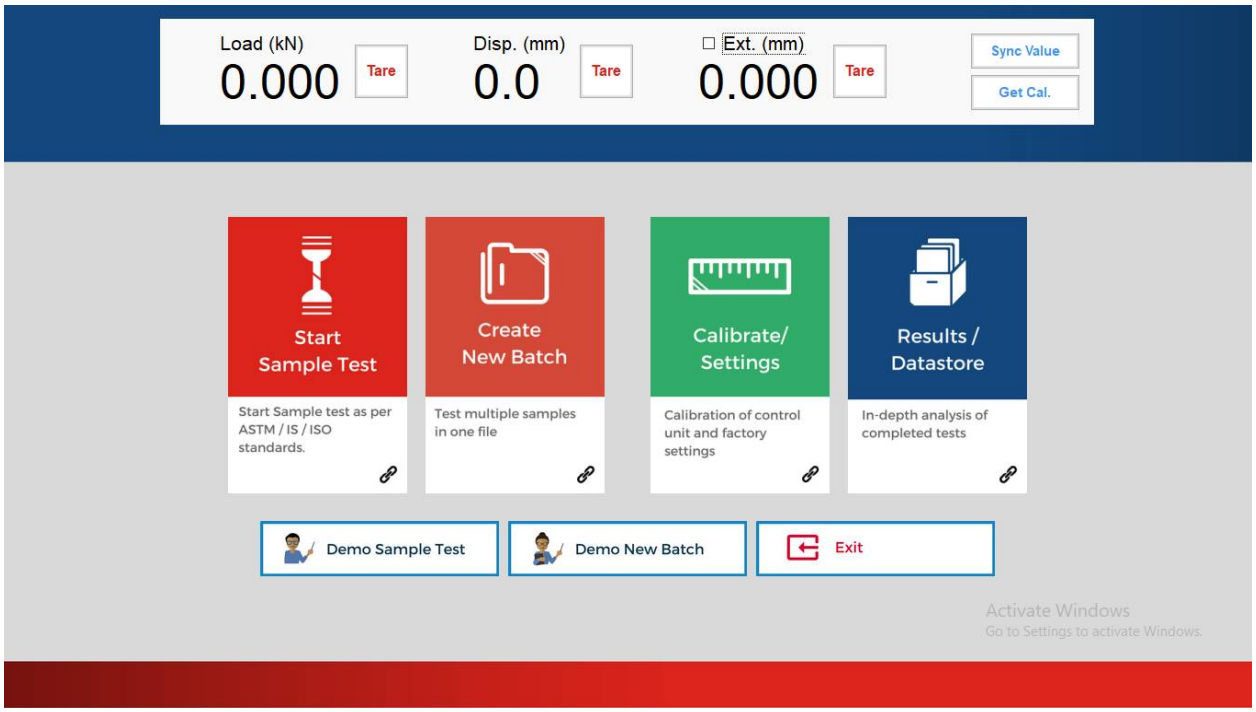






Control Panel - Graphic LCD Display

Software Screenshots



#1 : Select Graph Type

○ Load vs Displacement ◉ Stress vs Strain

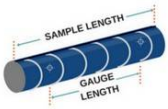
#2 : Select Extensometer Type

○ Clip On EE2 ○ Video Ext.

☐ Yield Str. % EUL 0.5 ☑ Proof Str. Offset 1 : % 0.2 ☑ Proof Str. Offset 2 : % 0.5

#3 : Select Sample Type

○ Round Solid ○ Rectangular ○ Round Hollow ◉ TMT ○ Strand ○ Other



Sample Length (mm) :

Weight (Kg) :

Density (gm/cc) :

Gauge Length (mm) :

Select output unit :

◉ Load ○ Stress

○ N ◉ kN ○ kGf ○ lbs

Discard Test | Start Test

Test Specifics

File Name : alpesh-ve-2-gate-inner

○ Test Type : Load vs Extension

○ Test Type : Stress vs Strain

Test Speed : 10.0 (mm/min)

Sample Type : Round Solid

Select Results to Print

☑ Max. Load (N) : 6835.351
☑ Ult. Stress (N/mm2) : 222.795
☑ Yield Load (N) : 5033.977
☑ Yield Stress (N/mm2) : 164.080
☑ Proof Stress 0.2 % Offset (N/mm2) : 154.983
☑ Proof Stress 0.5 % Offset (N/mm2) : 169.084
☑ Proof Load 0.2 % Offset (N) : 4754.878
☑ Proof Load 0.5 % Offset (N) : 5187.497
☑ Youngs Modulus (N/mm2) : 22884.809
☑ Total Elongation @ Rupture (mm) : 1.5
☑ % Total Uniform Elongation @ Fmax : 4.889
☑ Total Uniform Elongation @ Fmax (mm) : 1.47
☑ YS/UTS : 0.759
☑ UTS/YS : 1.318

Select output unit

◉ Load ○ Displacement ○ Stress

○ N ○ kN ○ kGf ○ lbs

Elongation and Area

☑ Final Gauge Length (mm) : 31.5
☑ Elongation % : 5.000

Input Fields

Gauge Length (mm) : 30.0
Outer Diameter (mm) : 6.25

Extra Fields

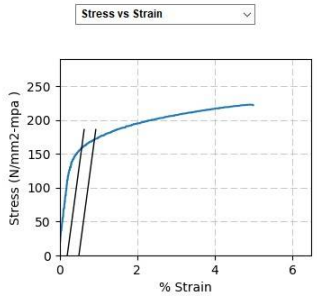
Key 2	:	Value 2
Key 1	:	Value 1
	:	
	:	
	:	
Sample Type	:	Gate Inner
Consignee Name	:	Trials

Edit Yield Load

New Yield : set

Edit Elongation

Final GL : set



Select a window of points

○ Start X : ○ Start Y : End X : End Y :

☑ Plot Offset Proof Lines

◉ Yield From Graph - First Drop

○ ASTM Method - Offset % 0.5

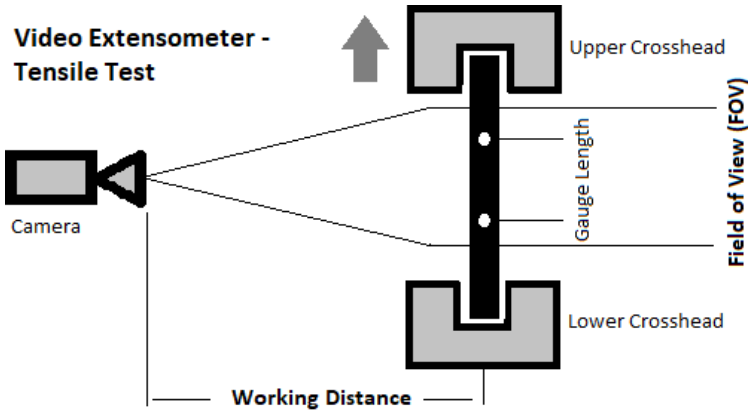
Apply ☐ Show Method in PDF

Refresh | Save Changes | Go Back

Video Extensometer Details

Video Extensometer is a non contact type of Extensometer. The Purpose of Video Extensometer is to optically measure the Strain on application of longitudinal tensile force on the test specimen. Markers, especially dots, lines or pre designed templates are used to track elongation in real time

- ➔ **Resolution - As Low as 0.5 µ**
- ➔ **Accuracy - As High as ±0.5 %**
- ➔ **ASTM E83 Class B2 Compliance**

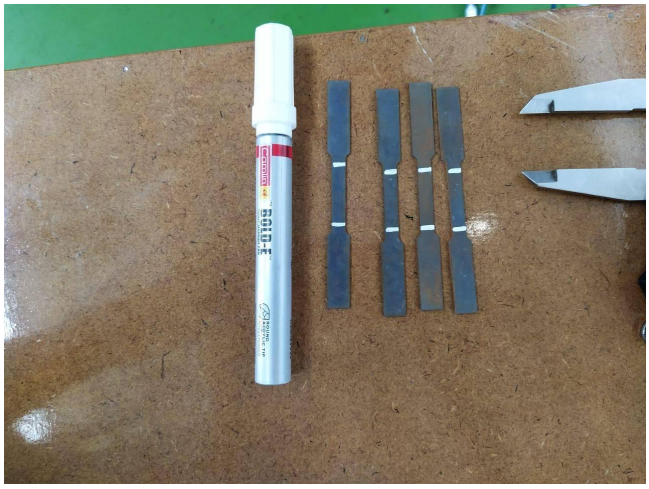


Specifications - Subject to change due to constant Research and Development. Can be changed as per customer requirement.

Field Of View (mm)	**100**	**150**	**250**	**400**	**500**
Gauge Length (mm)	**40**	**60**	**100**	**160**	**200**
Max. Extension (mm)	**32**	**48**	**80**	**128**	**160**
Resolution (Aprox) (µ)	0.5	1	1	3	5
Extension Error (%)	±0.5 %	±0.5 %	±0.5 %	±0.5 %	±0.5 %
Strain Error (mm/mm or %) *Whichever Greater	**±0.0002 or ±0.5 %**	**±0.0002 or ±0.5 %**	**±0.0002 or ±0.5 %**	**±0.0002 or ±0.5 %**	**±0.0002 or ±0.5 %**
ASTM - E83 Class	**Class B2**	**Class B2**	**Class B2**	**Class B2**	**Class B2**

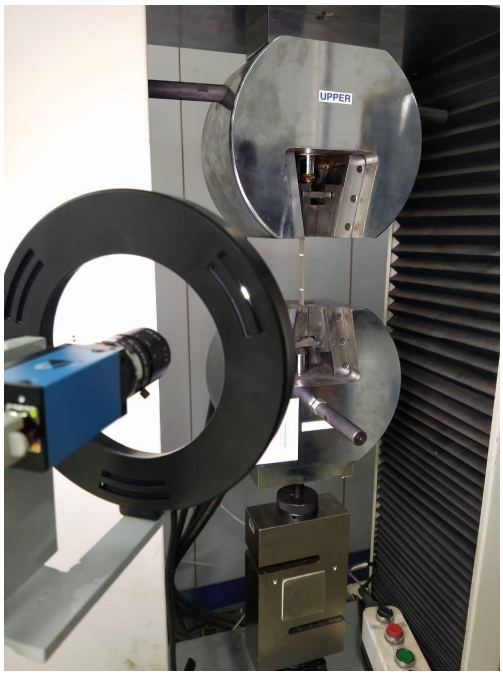
Advantages over contact type Extensometer:

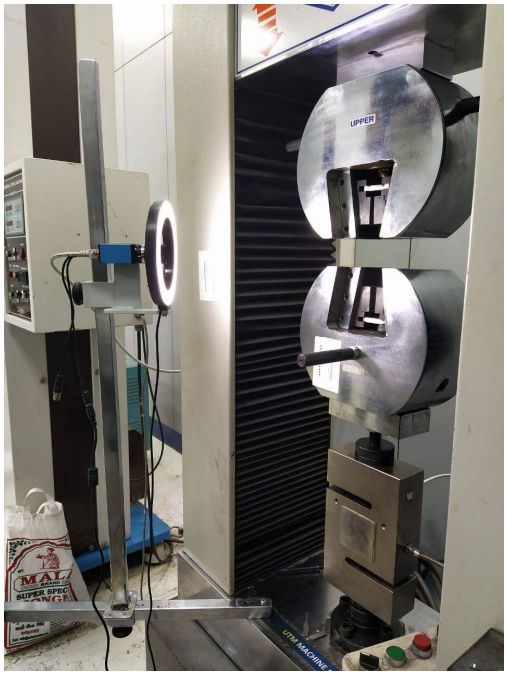
1. **More accurate results** as there is no mechanical influence on the specimen during the test due to the non-contacting camera system.
2. Knife edge **Slippage errors are omitted**.
3. Knife edge **damage errors are omitted**.
4. Auto Gauge Length Detection - **Consistent results** as the human error is eliminated while marking the Gauge length
5. No moving parts - hence, extremely **low maintenance costs**.
6. **No possibility of damage** due to rupture shocks and jerks - hence, **no wear and tear of the Video Extensometer**
7. Gives you Elongation **results upto the sample rupture**
8. **Extremely easy to use for untrained operators.**

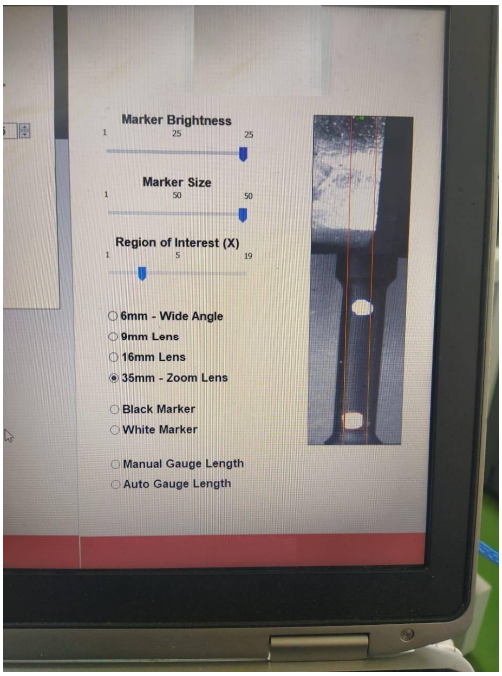


Markers Used for Marking Gauge Length

Setup on Motorised Universal Testing Machines







Video Extensometer Reports on Motorised Machines

TEST CERTIFICATE

UNITEK VIDEO EXTENSOMETER

Date : 19/7/2020
Customer Name :

Input Data

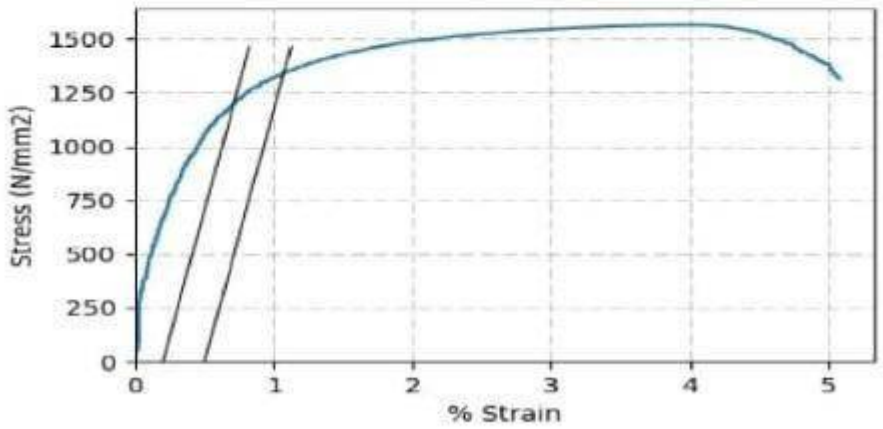
File Name	: unitek-video-3
Load Cell	: 50000 (N)
Sample Type	: Rectangular
Test Speed	: 10.0 (mm/min)
Test Type	: Tensile Test - Stress Vs Strain

Gauge Length (mm)	: 25.0
Thickness (mm)	: 1.0
Width (mm)	: 6.0
Initial Area	: 6.0

Sample Id : : sample-4

Material Test Results

Max. Load (N)	: 9398.412
Ult. Stress (N/mm2)	: 1566.402
Yield Load (N)	: 9281.705
Yield Stress (N/mm2)	: 1546.951
YS/UTS	: 0.848
UTS/YS	: 1.179
Proof Stress 0.2 % Offset (N/mm2)	: 1176.875
Proof Stress 0.5 % Offset (N/mm2)	: 1328.788
Proof Load 0.2 % Offset (N)	: 7061.250
Proof Load 0.5 % Offset (N)	: 7972.728
Total Elongation @ Rupture (mm)	: 1.27
% Total Uniform Elongation @ Fmax	: 3.986
Total Uniform Elongation @ Fmax (mm)	: 1.0
Final Gauge Length (mm)	: 26.27
Elongation %	: 5.080



TESTED BY **APPROVED / REVIEWED BY** **WITNESSED BY**

TEST CERTIFICATE

UNITEK VIDEO EXTENSOMETER

Date : 19/7/2020
Customer Name :

Input Data

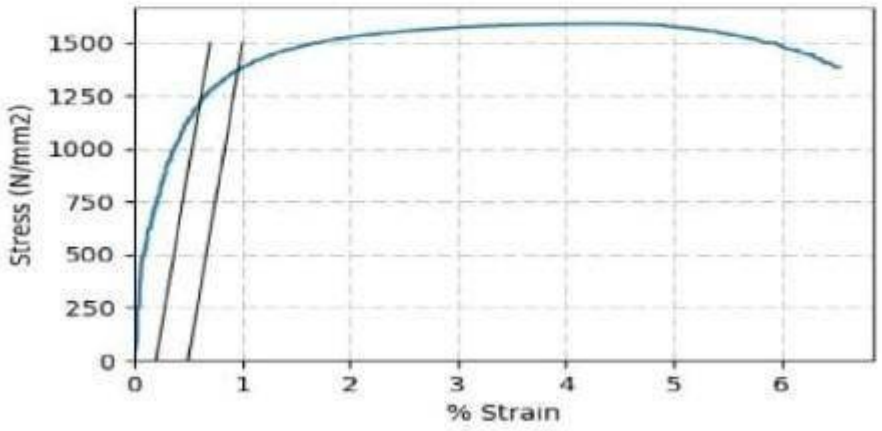
File Name	: unitek-ve-2
Load Cel	: 50000 (N)
Sample Type	: Rectangular
Test Speed	: 10.0 (mm/min)
Test Type	: Tensile Test - Stress Vs Strain

Gauge Length (mm)	: 25.0
Thickness (mm)	: 1.0
Width (mm)	: 6.0
Initial Area	: 6.0

Sample Id : : sample-4
:

Material Test Results

Max. Load (N)	: 9544.884
Ult. Stress (N/mm2)	: 1590.814
Yield Load (N)	: 9238.864
Yield Stress (N/mm2)	: 1539.811
YS/UTS	: 0.857
UTS/YS	: 1.167
Proof Stress 0.2 % Offset (N/mm2)	: 1193.693
Proof Stress 0.5 % Offset (N/mm2)	: 1363.295
Proof Load 0.2 % Offset (N)	: 7162.158
Proof Load 0.5 % Offset (N)	: 8179.770
Youngs Modulus (N/mm2)	: 112131.807
Total Elongation @ Rupture (mm)	: 1.65
% Total Uniform Elongation @ Fmax	: 4.386
Total Uniform Elongation @ Fmax (mm)	: 1.1
Final Gauge Length (mm)	: 26.65
Elongation %	: 6.600



TESTED BY **APPROVED / REVIEWED BY** **WITNESSED BY**

Video Extensometer Setup on Hydraulic UTM :

Video Extensometer Results of Hard Drawn Steel Wire on Hydraulic UTM

TEST CERTIFICATE

HGFL UTM - VIDEO EXTENSOMETER

Date : 8/2/2019
Customer Name : customer name

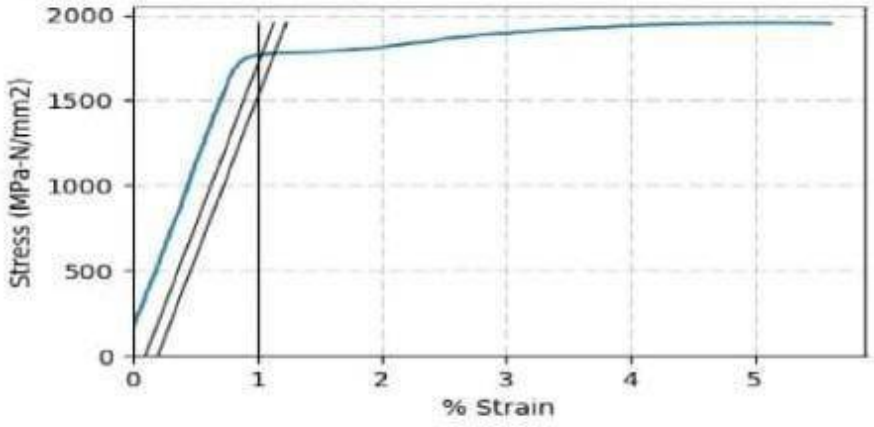
Input Data

File Name	: final-tata-3
Sample Type	: Round Solid
Test Type	: Tensile Test - Stress Vs Strain
Gauge Length (mm)	: 175.0
Outer Diameter (mm)	: 4.0
Initial Area	: 12.57
Sample Id :	: sample-4
Key 2	: Extra long
Key 3	: Value 3
Key 4	: Value 4
Key 5	: value 5

Material Test Results

Max Load (kN)	: 24.565
Ut Stress (MPa-N/mm2)	: 1954.24
Total Uniform Elongation @ Fmax (mm)	: 8.96
Total Elongation @ Rupture (mm)	: 9.82
Yield Load (kN)	: 22.349
Yield Stress (MPa-N/mm2)	: 1777.997
% Total Uniform Elongation @ Fmax	: 5.122
Proof Stress Offset 0.1 % (MPa-N/mm2)	: 1767.026
Proof Stress Offset 0.2 % (MPa-N/mm2)	: 1777.025
Proof Stress EUL 1.0 % (MPa-N/mm2)	: 1764.422
YS/UTS	: 0.909
UTS/YS	: 1.1
Youngs Modulus (MPa-N/mm2)	: 203731.879
Proof Load Offset 0.1 % (kN)	: 22.212
Proof Load Offset 0.2 % (kN)	: 22.337
Proof Load EUL 1.0 % (kN)	: 22.179
Elongation %	: 5.611
Final CS. Area (mm2)	: 7.07
Final Gauge Length (mm)	: 184.82
Reduction in Area %	: 43.755

* Yield Determined from Load vs Displacement Graph



TESTED BY **APPROVED BY** **WITNESSED BY**

TEST CERTIFICATE

HGFL UTM - VIDEO EXTENSOMETER

Date : 8/2/2019
Customer Name : customer name

Input Data

File Name	: final-tata-5
Sample Type	: Round Solid
Test Type	: Tensile Test - Stress Vs Strain

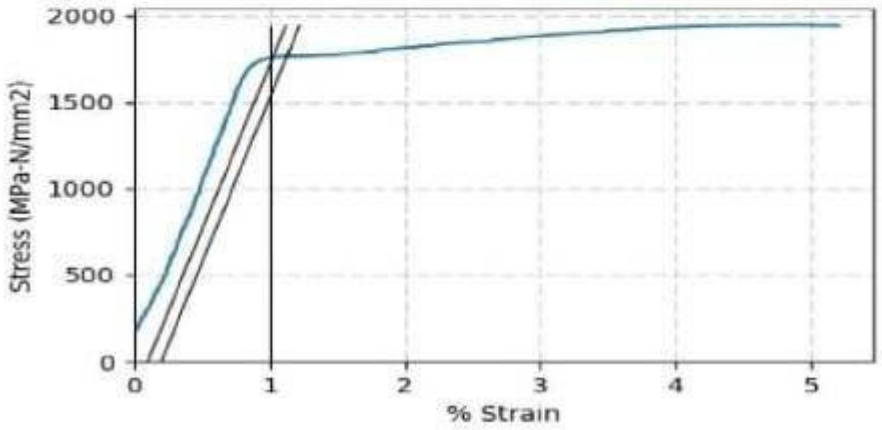
Gauge Length (mm)	: 175.0
Outer Diameter (mm)	: 4.0
Initial Area	: 12.57

Sample Id :	: sample-4
Key 2	: Extra long
Key 3	: Value 3
Key 4	: Value 4
Key 5	: value 5

Material Test Results

Max Load (kN)	: 24.495
Ut Stress (MPa-N/mm2)	: 1948.65
Total Uniform Elongation @ Fmax (mm)	: 8.6
Total Elongation @ Rupture (mm)	: 9.46
Yield Load (kN)	: 22.208
Yield Stress (MPa-N/mm2)	: 1766.783
% Total Uniform Elongation @ Fmax	: 4.915
Proof Stress Offset 0.1 % (MPa-N/mm2)	: 1759.006
Proof Stress Offset 0.2 % (MPa-N/mm2)	: 1765.568
Proof Stress EUL 1.0 % (MPa-N/mm2)	: 1756.437
YS/UTS	: 0.906
UTS/YS	: 1.104
Youngs Modulus (MPa-N/mm2)	: 208351.894
Proof Load Offset 0.1 % (kN)	: 22.111
Proof Load Offset 0.2 % (kN)	: 22.193
Proof Load EUL 1.0 % (kN)	: 22.078
Elongation %	: 5.406
Final CS. Area (mm2)	: 7.07
Final Gauge Length (mm)	: 184.46
Reduction in Area %	: 43.755

* Yield Determined from Load vs Displacement Graph



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