

## **Technical Specifications for Universal Tensile Testing Machine for Geosynthetics**

### **Scope:**

To perform tensile, grab, tear, puncture tests on geosynthetics as per relevant ASTM and ISO standards.

### **Frame:**

- Maximum capacity – 100 kN
- Dual column, floor standing frame with single test zone
- Emergency stop mounted on the frame
- Interface: USB or Ethernet PC connectivity
- Frame stiffness: 200 kN/mm or higher
- Data processing rate: 150 MHz or higher with data acquisition 1 kHz or higher
- Control mode – position, strain, stress or load rate
- Vertical crosshead travel: 1100 mm or higher and horizontal opening: 600 mm or higher
- Test speed: 0.001 mm/min or less to 500 mm/min or higher.
- Position accuracy:  $\pm 10 \mu\text{m}$  or less
- Should return to zero function
- Power connection: As per Indian Standard

### **Load Measurement**

- Strain-gauge based load cell capacity of 100 kN or higher
- Load range: 0.2% to 100% of the capacity
- Accuracy:  $\pm 0.5\%$  or better
- Mechanical overload protection

### **Extension Measurement**

- Resolution:  $0.1 \mu\text{m}$  or better with accuracy:  $\pm 10 \mu\text{m}$  or better

### **Grips and Fixtures**

- Hydraulic operated grips with complete control for wide width tensile strength test as per ASTM D4595, ASTM D6637-15, EN29073-3:1992 and ISO 10319
- Set of heavy duty vice grips for testing as per ASTM D4632 and ASTM D4533, 20 kN or better, wave jaws for tensile, trapezoidal tear and grab tests on geosynthetic material

## **SOFTWARE**

### **Data Acquisition, Control input parameters**

- Material testing software with data acquisition, control and analysis tools and compatible with MS Windows 8 or 10
- Standard Operation Procedure with built-in library of test methods as per ASTM and ISO standards
- Curve and results regenerations functionality with pass/fail mode
- Real time display of Load v/s Time, Displacement v/s Time, Load v/s Displacement, - Load v/s Extensometer, Stress v/s Strain, curves, modulus values
- Load cell overload and crosshead over travel protection through software
- Multi-segment programmable tests, multiple end conditions, hold and slow cyclic tests

### **Data Analysis**

- Analysis of peak Load, Tensile Strength, Maximum deformation at peak load, Compressive Strength, Modulus of Elasticity, Flexural Strength.

### **Others:**

- Personal Computer, Air compressor (if required) for operation should be supplied along with machine
- Should have supplied minimum 3 nos. of this equipment in **India**. Customer service certificate copy should be attached
- Minimum 3 years comprehensive warranty and oversea suppliers should have an Indian representative.
- Installation, demonstration and training at CSIR-CBRI.
- 1 copy of the Operation manual
- Supplier should provide calibration certificate of all sensors in standard operating procedure and environment

### **Other Accessories**

#### Grips

- Set of roller grips for testing as per ASTM D6637, 100 kN or better
- Hydraulic geotextile sedam webbing grip
- CBR puncture attachment as per ASTM D6241 and ISO 12236
- Hydraulic static puncture attachment as per ASTM D6241, ASTM D4833

#### Fixtures

- Non-Contact extensometer