

### Plastic Properties Tensile Testers

Tensile testing of plastic dogbone style samples is performed by selecting a tensile tester with adequate loading capacity and featuring speed control, software and tensile grips.

ASTM D638 (or ISO 527-1,-2) requires tensile test machines configured to perform tensile test properties on samples that can be as thick as 14 mm (0.55 inches).

Each universal tester is configured specially with fixtures and software. Any TestResources tensile tester can be equipped to perform a pull test or tensile test with wedge action grips, vise manual grips or pneumatic air grips.

Specimens are placed in the grips of the tensile testing machine and pulled to elongation at fracture, or failure. Test speed and grip separation are based on material properties.

The test requires measuring load and strain, or head travel of the tensile tester machine head. In the case where the sample elongates less than 20% and modulus is desired, a 50 mm gage length extensometer (contact us) is also required. Load and deflection data can be translated into a stress-strain curve, and tensile properties may be extracted as listed:

- Tensile Elongation at Break or Tensile Elongation at Rupture
- Tensile Elongation at Yield (where an increase in strain doesn't result in an increase in stress).
- Tensile Strength at Break – the stress (load/area) corresponding to rupture point
- Ultimate Tensile Strength - highest tensile stress or load a material can support.
- Tensile Modulus - The ratio of stress to strain in the elastic region of a stress-strain curve, also known as Young's Modulus, or Modulus of Elasticity.
- Secant modulus - slope of a line from zero strain to a specified strain point on the curve. This applies to materials that exhibit little or no linear behavior.

Elongation and tensile modulus can be calculated from crosshead displacement, or with an extensometer.

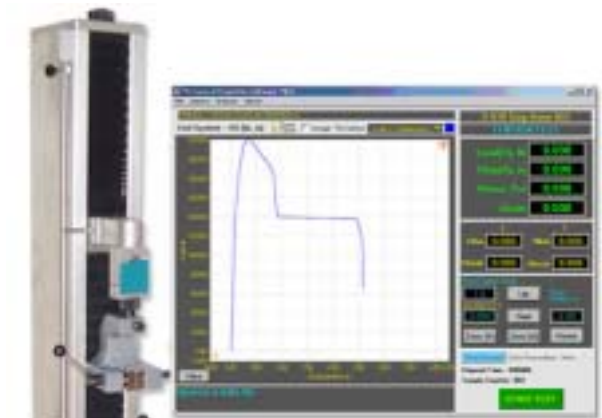
The test machine must be selected to match the highest load and travel expected. Common choices

- 10 kN or 2250 LB dual column tensile testers (2000M)
- 5 kN or 1125 LB single column tensile testers (1000M)
- 3 kN or 650 LB tensile testers (650M)
- 2 kN or 500 LB tensile testers (100P500)
- 2 kN or 500 LB tensile testers (100Q500)
- 1 kN or 225 LB tensile testers (100P250)
- 1 kN or 225 LB tensile testers (100Q250)

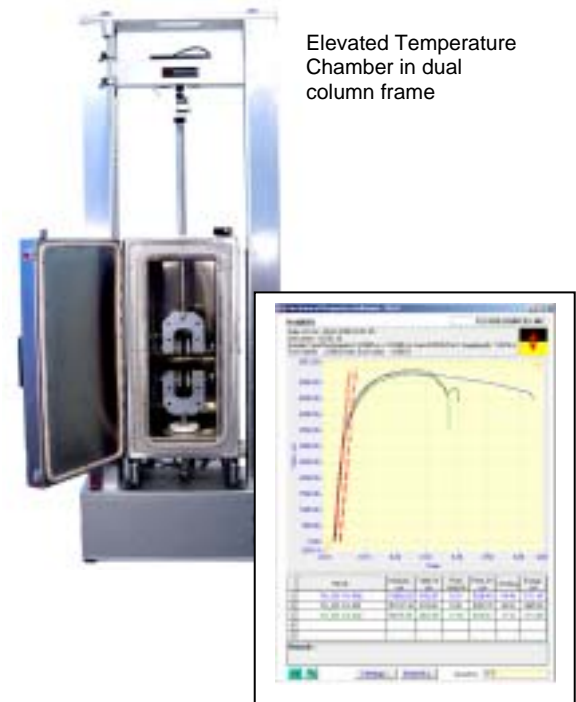
Modulus of elasticity calculations can be made using grip separation values or an extensometer, which produces more accurate data. ISO 527 allows for additional specimen configurations, different test speeds, and requires an extensometer.

TestResources tensile testers are known also as universal testers, or universal test machines. They all perform ASTM D638 and depending on the specific tensile properties (i.e. modulus and yield) they may require software additions to do the test. Users may employ a PC to setup and store test parameters such as tensile rate or speed and monitor live test results. Several choices of software are available including those that generate test reports and exports data to Excel for analysis.

Want Product information?  
<http://www.testresources.com/systems/systems.aspx?PDF>



1000M – rated 1125 LB



Elevated Temperature Chamber in dual column frame