Testing Plastics

CONTENTS

2 Introduction and key benefits
4 Different types of testing
6 Horizon Software
8 Different types of testing
10 Testing equipment and solutions
Using Tinius Olsen plastics testing equipment you will benefit from improvements in .... PRODUCTIVITY REPEATABILITY TRACEABILITY
Tinius Olsen offers solutions for testing the strength and performance of plastics through tensile, flexural, compression, folding endurance, impact, heat distortion, vicat, melt flow, tear and puncture tests. Our versatile benchtop polymer-testing machines can perform tests in accordance with ASTM, ISO and other international standards from test configuration through to reporting and generating results immediately for your processes.
Different types of testing

**TENSILE**
Pulling the material or component at a constant speed, strain, or stress rate until it breaks, shears, or peels apart as your need and the standard requires.

- ISO 527-1, 527-2, ISO 6259-1
- ASTM D 638
- GB/T 1040.1, 8804.1

**FLEXURE**
Bending the material or component with it supported at two precise points of contact while applying a force at one or two contact points from above.

- ISO 178
- ASTM D 790
- GB/T 9341

**IMPACT**
The process of hitting a material and instantaneously determining the energy it can absorb.

- ISO 179, 180
- ASTM D 6110-18, D256
- GB/T 1043, 1843
VICAT/HDT

Testing for the bending and/or Vicat penetration of plastic at given temperatures over time.

ISO 75, 306
ASTM D648, 1525
GB/T 1633

MELT FLOW

Measuring the flow rate and associated properties of the polymer as it is extruded through a precision orifice

ISO 1133
ASTM D 1238
GB/T 3682

HORIZON SOFTWARE

Tinius Olsen’s testing, analysis and reporting software. Used when testing raw material such as rigid, reinforced or high impact plastics, or structures and components such as films, enclosures and devices.

Whether materials are moulded, extruded or 3D printed, Tinius Olsen’s Horizon plastics testing software provides the platform to ensure the testing is accurate, to standard and efficient. - see page 6
Horizon Software

Horizon is the link between the material or component under test and the process where the test results are required. It manages multiple operators and those viewing the results, it defines the test methods for the international standard used, and captures data at high speed showing live real-time results throughout the test. When the test is over, it instantly compares the results with the pre-defined pass/fail limits, then alerts and reports to those needing to know.

Horizon is a fully network-capable platform using an SQL database able to meet even the most rigorous compliance and traceability needs in the medical, aerospace, automobile and consumer product industries.

It is future proofed through Tinius Olsen’s status as a formal software developer and includes built-in diagnostics and support tools.
**Productivity** – Horizon’s user interface simply allows the operator to click and test, click and test, report.

**Repeatability** – Achieved by Horizon minimising the operations a user needs to make and, depending on the volume of testing, either semi automating or fully automating the test.

**Traceability** – Horizon works from its very core with compliance; Test methods, when, how and who is using them, through to recording, storing and reporting.

Horizon can work with a single testing machine, for example an MFI and a single PC as a standard work station, or with multiple testing machines and PC work stations, across multiple labs, operators and stakeholders.
UTMs

The Tinius Olsen benchtop range of ST models feature both single and dual column frames with optimized footprint sizes. The single column models have frame capacities of 1kN (100kgf/220lbf) and 5kN (500kgf/1,100lbf), while dual column models are available in capacities of 10kN (1,000kgf/2,200lbf), 25kN (2,500kgf/5,500lbf) and 50kN (5,000kgf/11,000lbf), and are designed to test a wide range of materials and finished products for strength properties in tension, compression, flexure, shear, tear and peel.

Melt Flow

The Tinius Olsen MP1200 model is configurable from a standard procedure A format through procedure B and on with automatic motorized weight application capability, post test polymer purge and cleaning.

Extensometers

100S

The Tinius Olsen model 100S is designed as a dual purpose extensometer to measure E modulus and offset yield stress (proof stress) on relatively high modulus materials while also providing the ability to measure high elongations up to break.

VEM Series

The Tinius Olsen VEM Series of video extensometers are fully integrated with our testing machines and results-reporting software, supporting multiple gauge length click and drag placements, strain rate control and real time results during and throughout the test. The 100 series is designed to measure higher levels of strain (>10%) in tensile, compression, shear and flexural modes. The 200 series is designed to measure low levels of strain from 0.01% in tensile, compression, shear and flexural modes. The flexible 300 series has a choice of 70 lenses and various camera staging options available including a unit that allows for fine X, Y and Z camera positioning and adjustment for optimum measuring performance.

UTM Accessories

Available from Tinius Olsen, configured and integrated to meet the test need and deliver the results required:

- Extensometers contacting and non-contacting, technologies, low and high strain as required.
- Specimen grips, holders, probes and tooling to hold test specimens in the precise way as defined by the test standard and effect the application of force. All capable of coping with the specimen break again and again.
- Temperature Chambers providing a test environment at elevated hot or cold temperatures.
- Test specimen measurement calipers and stations.
- Bar code reading
- Video capture in sync with the test and the resultant curve
Impact
The Tinius Olsen IT impact range can be configured for Charpy and/or Izod tests, for manual or automated specimen feed, from 0.5J to 50J.

Impact Accessories
Available from Tinius Olsen; Test specimen notcher and notch verification stations.

Model IT504 – In this configuration, the machine has been equipped with cold box (top cover removed). Liquid nitrogen is the typical medium used to cool the specimen.

Model IT503 – the model complies with CE requirements and cannot operate if the interlocked doors are open.

HDT/Vicat
Tinius Olsen’s Heat Distortion and Vicat testers are available in 3 or 6 test station formats configured as HDT or Vicat across the stations as required. These testers support safe placement and retrieval of test specimens, rapid cooling post test and easy implementation of fume extraction.

Environmental Chamber
Suitable for most twin screw materials testing machines, the Tinius Olsen Environmental Chamber provides a means for performing physical tests within a temperature range of -70 to 300°C (-95 to 570°F). An internal radial fan provides efficient air circulation that minimizes temperature gradients throughout the chamber. A digital controller ensures accurate temperature control. Optional sub-zero temperature testing is available via a self-pressurising liquid nitrogen Dewar. The chamber door is fitted with a triple glazed window for viewing the test area and also scanning the sample for strain measurements when using the Tinius Olsen 500L laser extensometer. When liquid nitrogen is used, a demisting facility is fitted.

Contact us
If you have any questions or require further information and help, please contact us at:
www.tiniusolsen.com
info@tiniusolsen.com

Tinius Olsen
USA
Horsham, PA
UK
Redhill, Surrey
India
Noida, UP
China
Shanghai
Notes Section