Benchtop Materials Testing Machines
The single column materials testing machines have frame capacities of 1 kN or 5 kN (200 lbf or 1,000 lbf) and include two model types — the S series and the T series. These machines are designed to test a wide range of materials, including, but not limited to: plastics, films, paper, packaging materials, filter material, adhesives, foils, food, toys, medical devices and components, in tension, compression, flexure, shear, and peel.

**S Series**
Using a combination of quality engineering and advanced technology, Tinius Olsen has produced a series of machines that are accurate and simple to use. All S series machines feature an easy-to-read backlit liquid crystal display that can be switched between a numerical and graphical display. All data shown on this display is obtained in real time, with the autoranging graphical display showing the test curve of the specimen under test. The control unit features dedicated keys for moving the crosshead up, down, stop, performing the test, as well as keys for load and extension tare and crosshead return. The control panel also features an alphanumeric keypad to allow the input of test conditions, test data and the formatting of the test report. The control unit can retain up to five separate test routines for easy and rapid recall. While powerful as stand-alone units, these machines can be enhanced by direct connection of a printer through which comprehensive test reports and high resolution graphs can be quickly obtained.

The S Series of testers are also designed for users all over the world — an optional language module can be plugged into the control panel and all data on the backlit LCD will be shown in the selected language: (for example English, etc.).

**T Series**
Building on the quality and technology of the popular and successful S series, Tinius Olsen has developed the T series of machines. The T series models have similar specifications, without the S series control panel. Instead, the T series machines communicate directly with a standard PC or network running one of our Windows based data analysis software packages, via high speed RS232 in both ASCII and super high speed binary modes.

**Common Features**
The S and T series use rapid change Z beam load cells that allow for simple and quick “sizing” of the machine to an appropriate capacity for the test. These load cells have an accuracy of +/- 0.5% of the applied load value, from 2% to 100% of the load cell capacity. The S and T series have a huge assortment of specimen grips and fixtures allowing the selection of an ideal configuration for your application.
Key Features

- PC control via high speed
- RS232 using ASCII mode and super high speed binary mode
- Machines are proof loaded to 200% of capacity
- Force accuracy of 0.5% of applied load across the load cell display range
- Built-in intelligent active force and displacement alarm system
- 32 bit precision motor controller
- Displacement resolution of 0.0001 mm (T series in binary mode)
- Speed resolution of 0.001 mm/min
- 150% mechanical overload capacity on each load cell
- 20% digital load tare while maintaining full load cell capacity
- Automatic motor drive alarms that monitor over/under voltage, current and temperature

Specifications:

- **Load measurement accuracy:** +/- 0.5% of applied load from 2% to 100% capacity; extended range down to 1% capacity with accuracy of 1% of applied load
- **Position measurement accuracy:** +/- 0.01% of reading or 0.001 mm, whichever is greater
- **Speed accuracy:** +/- 0.005% of set speed
- **Operating temperature range:** 32 to 100 degrees F (0 to 38 degrees C)
- **Storage temperature range:** 14 to 115 degrees F (-10 to 45 degrees C)
- **Humidity range:** 10% to 90% non-condensing, wet bulb method
- **Power:** standard optional voltages 220/240VAC, 50-60 Hz, 2000W; power must be free of spikes and surges exceeding 10% of the nominal voltage

Notes:

1. Load weighing system meets or exceeds the requirements of the following standards: ASTM E4, EN 10002-2, BS 1610, DIN 51221, ISO 7500-1. Tinius Olsen recommends that systems are verified at installation in accordance with ASTM E4 and ISO 75001. 2. Strain measurement system meets or exceeds the requirements of the following standards: ASTM E83, EN 10002-4, BS 3846 and ISO 9513. 3. These models conform to all relevant European CE Health and Safety Directives EN 50081-1, 580081-1, 73/23/EEC, EN 61010-1. 4. Specifications are subject to change without notice.

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**Fig 6.** Testing of rigid plastics and use of Model 100R multi gauge length extensometer

**Fig 7.** Model H5kT being used to determine the flexural strength of a printed circuit board

**Fig 8.** Model H1kS being used to find the tensile strength of a baby’s pacifier

**Fig 9.** A model H5kT and a model H5kS being used to determine the bonding strength of adhesive tape
COMMON APPLICATIONS

Fig 10. Testing the ripeness of apples using a set of Magnus Taylor probes

Fig 11. Testing the strength of coffee packaging using the quick release vice grips, HT55

Fig 12. Testing the strength of fishing line using single bollard grips, HT33

Fig 13. Testing the tensile and peeling forces of breakfast bar packaging

Fig 14. Testing the extraction force of a bullet from its cartridge using custom pneumatic grips

Fig 15. Testing the crushing strength of pills

Fig 16. Testing the compressive resistance of a polymer cement mixer

Fig 17. Checking the peeling strength of the outer layer of rubber hose, using a combination of standard and custom grips

Fig 18. Testing the strength of plastic building blocks with a custom attachment

Fig 19. Testing the adhesive peeling forces of foil packaging

Fig 20. Testing the puncture and bursting strength of packaging material

Fig 21. Determining the force to remove the lid from a plastic package
Fig 22. Testing strength of crimped connections using HT20 grips

Fig 23. Dumbbell sample of sheet metal being tested with HW21 grips

Fig 24. A 3 point bend test being performed with model HF72 flexural jig on plastic sample

Fig 25. Reinforced plastic dumbbell samples

Fig 26. Model H10kS shown with an environmental chamber for testing at elevated or reduced temperatures; note the use of a laser extensometer that can be used with the chamber to determine the elongation of the sample

Fig 27. Compression test on crash helmet

Fig 28. Testing webbing material using S453 grips

Fig 29. Tinius Olsen high travel extensometer, model 100RC

Fig 30. Testing the puncture resistance of work gloves

Fig 31. Testing the extraction forces of new material for wine bottle corks

Fig 32. Tear test on rubber specimens
The dual column materials testing machines have frame capacities of 10kN, 25kN and 50kN (2000 lbf, 5000 lbf and 10,000 lbf) and include two model types — the S series and the T series. These machines are designed to test a wide range of materials, including, but not limited to: rigid plastics, films, paper, packaging materials, filter material, thin sheet metal, adhesives, foils, food, toys, medical devices and components, in compression, flexure, shear, and peel.

**S Series**

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**T Series**

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**Common Features**

The S and T series use rapid change Z beam load cells that allow for simple and quick “sizing” of the machine to an appropriate capacity for the test. These load cells have an accuracy of ±/− 0.5% of the applied load value, from 2% to 100% of the load cell capacity.

The S and T series have a huge assortment of different grips and fixtures available allowing the selection of an ideal configuration for your application.
Key Features

- PC control via high speed RS232 using ASCII and super high speed binary modes
- Force accuracy of 0.5% of applied load across the load cell display range
- 32 bit precision motor controller
- Displacement resolution of 0.0001 mm (T series in binary mode)
- Speed resolution of 0.001 mm/min
- 150% mechanical overload on load cells
- 20% digital load tare while maintaining full load cell capacity
- Automatic motor alarms monitor over/under voltage, current and temperature
- Built-in intelligent active force and displacement alarm system

Technical Specifications

<table>
<thead>
<tr>
<th>MODEL</th>
<th>H10K</th>
<th>H25K</th>
<th>H50K</th>
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<tr>
<td>LOAD CELLS</td>
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<tr>
<td>Rapid change, low profile Z type load cells with digital encoding for automatic recognition and scaling available – 10kN, 5kN, 2.5kN, 1kN, 500N, 250N, 100N, 50N, 10N, 5N</td>
<td>Rapid change, low profile Z type load cells with digital encoding for automatic recognition and scaling available – 25kN, 10kN, 5kN, 2.5kN, 1kN, 500N, 250N, 100N, 50N, 10N, 5N</td>
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<td>Measurement direct from ballscrew – fully auto scaling of single measurement range</td>
<td>Measurement direct from ballscrew – fully auto scaling of single measurement range</td>
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Specifications:

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Storage temperature range: 14 to 115 °F (-10 to 45 °C)

Humidity range: 10% to 90% non-condensing, wet bulb method

Power: standard optional voltages 220/240VAC, 50-60 Hz, 2000W; power must be free of spikes and surges exceeding 10% of the nominal voltage

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4. Specifications are subject to change without notice.
Tinius Olsen has built upon its long history of providing solutions to an enormous variety of testing problems to develop Horizon, a comprehensive software program that makes testing simple, precise, and efficient. Whether the test sample is metal, paper, composite, polymer, rubber, textile, or a micro component, Tinius Olsen’s Horizon software goes far beyond data collection and presentation. It will help you automate your operations, from R&D to the charting and analysis of QC testing. Horizon provides a library of standard, specific, and application-focused test routines that have been developed in close cooperation with our customers around the world and to the standards they are using.

Among the many valuable features offered by Horizon are: a test routine library; simultaneous multiple machine control; test, output, method, and result editors; and multilayered security. This software is designed for data acquisition, data analysis, and closed loop control of nearly all Tinius Olsen testing machines.

Horizon also includes the following:
- Generation of user customized reports
- Standard SPC programs for X-bar, R, and frequency distributions/histograms
- Ability to recall, replot and rescale test curves
- Recall of data that spans different test modules
- User-configurable machine parameter and control settings
- Multilingual capabilities

Horizon is rich with capabilities that improve productivity and enable you to build, access, and use a modern, powerful materials testing database. It employs the latest Windows environments to create an intuitive user experience. Built-in tutorials, on-line help, and help desk access provide additional user support.