Chatillon force measurement

LLOYD materials testing

Top Load Testing

Your Guide to
Chatillon & Lloyd Instruments

AMETEK SENSORS, TEST & CALIBRATION

Principles & Definitions

What is Top Load Testing

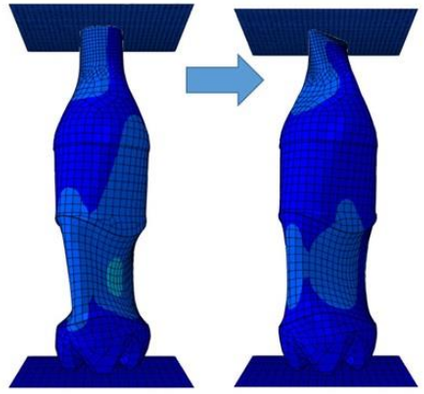
Top load, or crush resistance, is a critical parameter in determining the performance of a bottle in the bottling process, transport and storage. Environment considerations mean that the materials used are often recycled and the material thickness reduced to lower weight and therefore transport Co2 emissions. These factors are driving the need for rapid and accurate measurement of top load in R&D and quality control environments.

A top load test is a compression test on a product such as: drinks bottle, shampoo bottle, yogurt container, food tray, crate, etc.

The axial force causes deformation of the product. Typically the test measures the maximum force to reach the yield point or a specified deflection distance.

Common industry standard relating to this test are;

- **ASTM-D2659** – Standard Test Method for Column Crush Properties of Blown Thermoplastic Contain
- **ISBT-Rev. 1** – Voluntary standard test methods for PET bottles
- **ISO-8113** – Glass containers - Resistance to vertical load - Test method



Top Load Testing

Recommended Solutions

- TCM100 or 350 motorised test stand & DFE or DFS2 force gauge
- Chatillon CS2-225 digital force tester fitted with a CLC load cell
- LS1 universal testing machine fitted with a YLC load cell, NexygenPlus software

TCM Series & DF Series

CS2 Series

LS1 Series

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Top Load Testing – Motorized Test Stand & Force Gauge

Top load testing using a motorized test stand coupled with a force gauge offers you the following features:

Products Used

TCM100S-B motorised test stand & DFS2 force gauge (comes complete with the ForceTest software)

TCM-100 Motorised Test Stand
Capacity: 100 lbf / 500N
Speed: 5.08 to 1016mm/min
Accuracy: 0.1 of set speed value

DFE2 or DFS2* Series Digital Force Gauge
Capacity: 500N
Resolution: 0.005N
Accuracy: 0.1% PE
**All DFS gauges include ForceTest software*

ForceTest Software from the DF Series Force Gauge
The ForceTest software interfaces directly to your **digital force gauge** enabling you to automatically perform tests using a personal computer. Test results and a live graph can be monitored directly on the screen while the test is running. Learn more about the ForceTest software on the next page.

Please Note: Break load & Max load results only from the TCM solution.

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Top Load Testing – Motorized Test Stand & Force Gauge

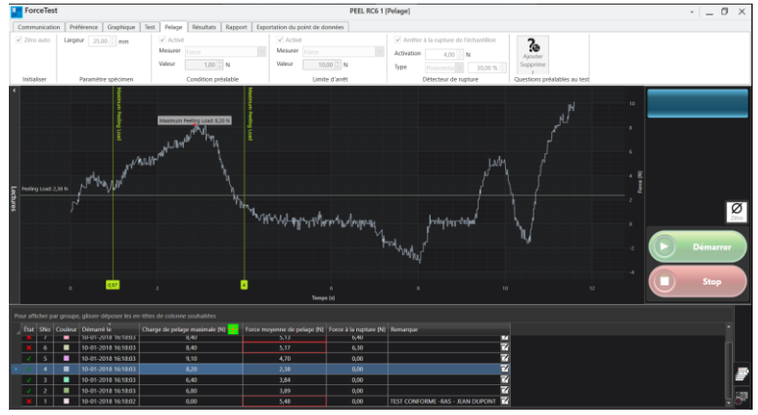
ForceTest Software

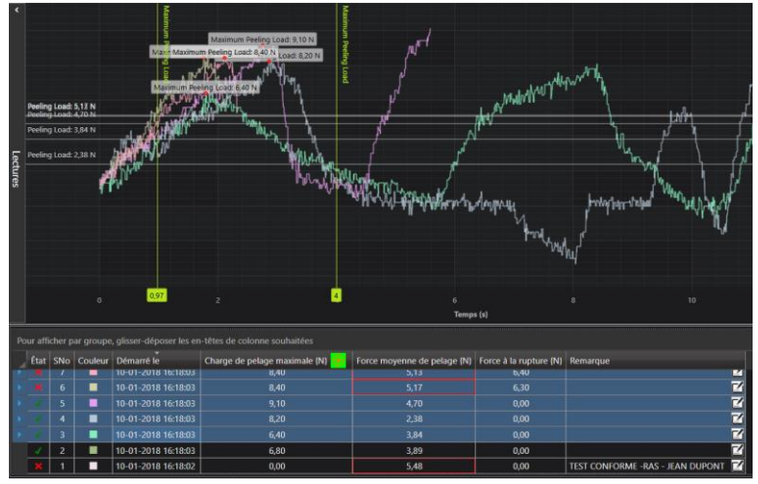
The Chatillon ForceTest Software is a Microsoft Windows™ based data analysis package for Chatillon DF II and DF III Series force gauges. This software is designed to enhance the capabilities of your force gauge by allowing you to record and analyze data on your computer.

ForceTest can be used to test, acquire data and analyse results for:

- Pull to Break testing
- Pull to Limit testing
- Compress to Rupture testing
- Compress to Limit testing
- Friction testing
- Peel testing
- Torque testing

Test results can be exported to a .csv format.
Graphs and test results can also be exported directly to PDF and Word formats.





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Top Load Testing – Digital Force Tester

Top load testing using a digital force tester offers you the following features:

Products Used

Chatillon CS2-225 digital force tester fitted with a CLC100 load cell

CS2 225 Digital Force Tester
Capacity: 225lbf / 1000N (1kN)
Cross Head Travel: 19.5in / 500mm
Throat Depth: 7.1in / 180mm
Max Return Speed: 50in/min – 1270mm/min
Speed Accuracy: 0.1 of set speed value

CLC Load Cell
Capacity 2.5N to 1000 N
Accuracy: 0.25% PE or 0.1% PE or 0.5% of the value read depending on the calibration chosen

CS2 Software from the CS2 Digital Force Tester

- Touch screen tablet allowing tests to be carried out according to many applications
- Automatic measurement of the bottle height
- Maximum force results; average strength result
- Automatic export of results to LIMS
- Reporting pdf
- Automatic export of results in .csv format
- Two levels of user access; supervisor and operator

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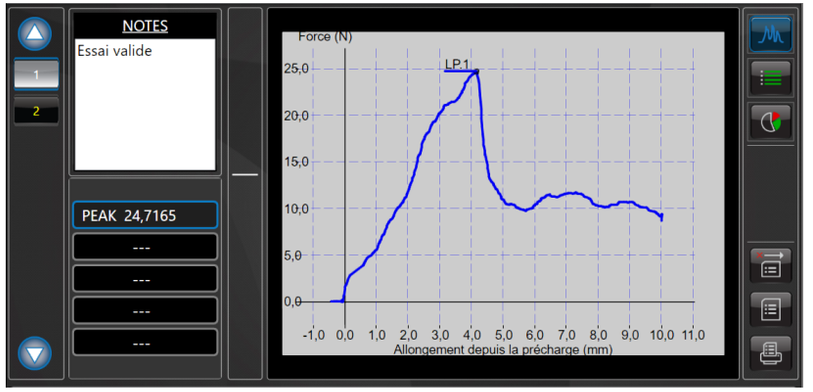
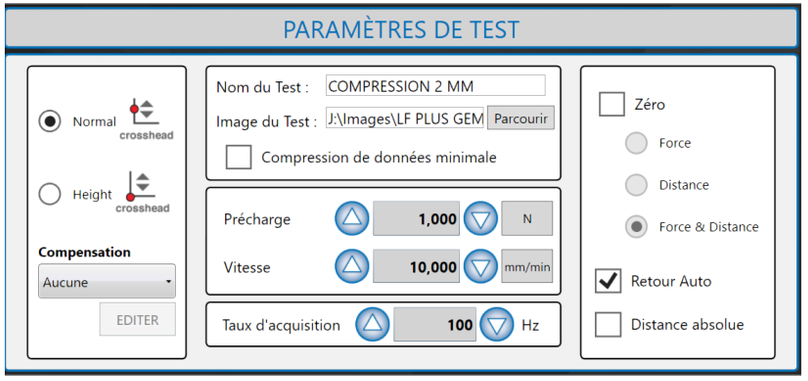
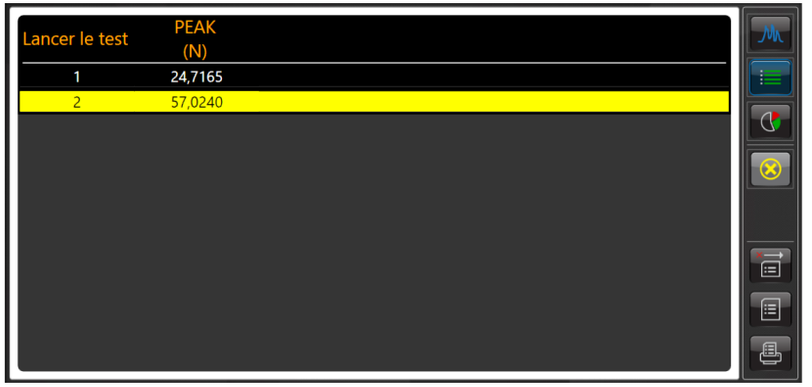
Top Load Testing – Digital Force Tester

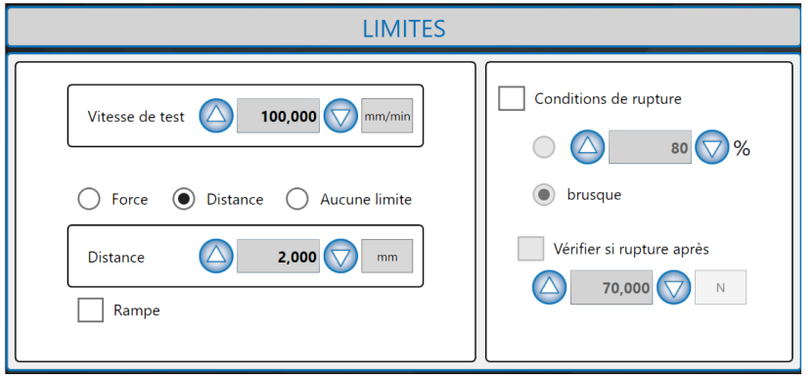
Example of test setup and results in the CS2 software

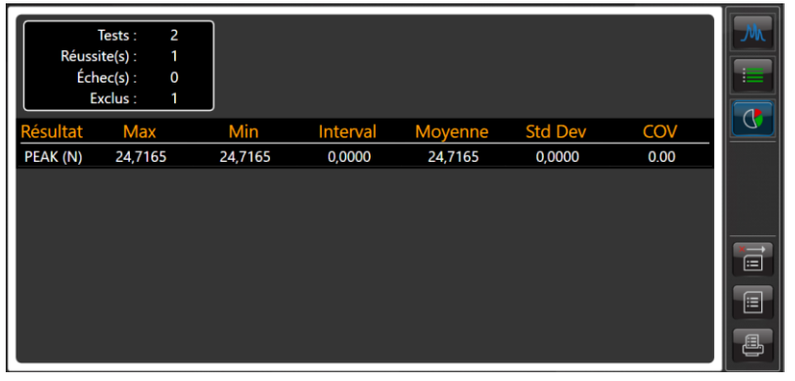
Note: Below example is in French. The software is available in several languages including English, German, French and Chinese.











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Top Load Testing – Universal Testing Machine

Top load testing using a universal testing machine offers you the following features:

Products Used

LS1 universal testing machine fitted with a YLC500N load cell, NexygenPlus software

LS1 Universal Testing Machine
Capacity: 225lbf / 1000N (1kN)
Cross Head Travel: 19.5in / 500mm
Throat Depth: 7.1in / 180mm
Max Return Speed: 50in/min – 1270mm/min
Speed Accuracy: 0.1 of set speed value

YLC 5N Load Cell
Capacity 5N to 1000N
Accuracy: +/- 0.5% from 1% to 100% of the stated load cell range

NexygenPlus Materials Testing Software
- Easy to use
- Complete standards library for food, cosmetics and packaging testing
- Comprehensive multi-stage test wizard
- Export data directly into your Excel and Word templates
- Full traceability of results

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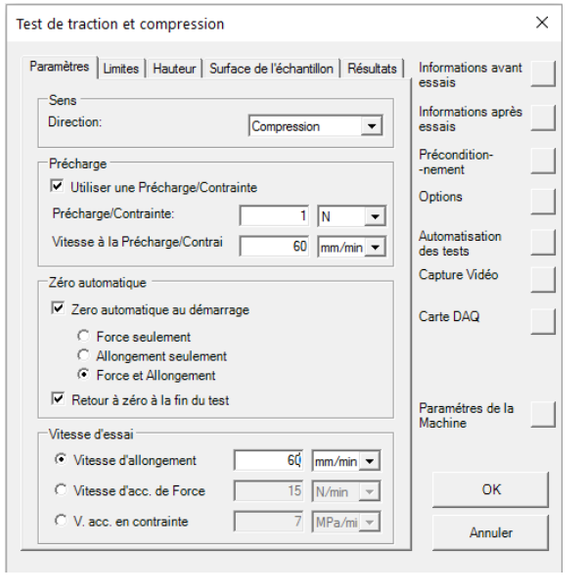
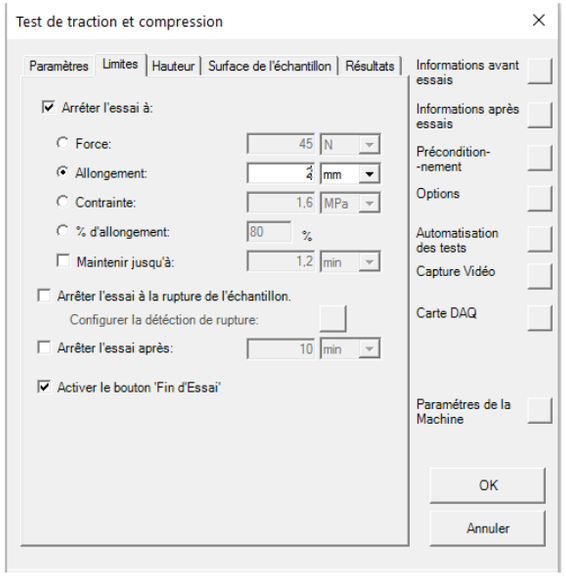
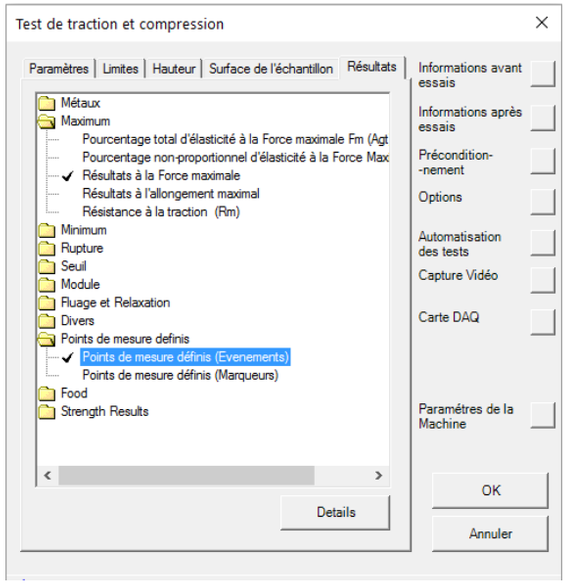
Top Load Testing – Universal Testing Machine

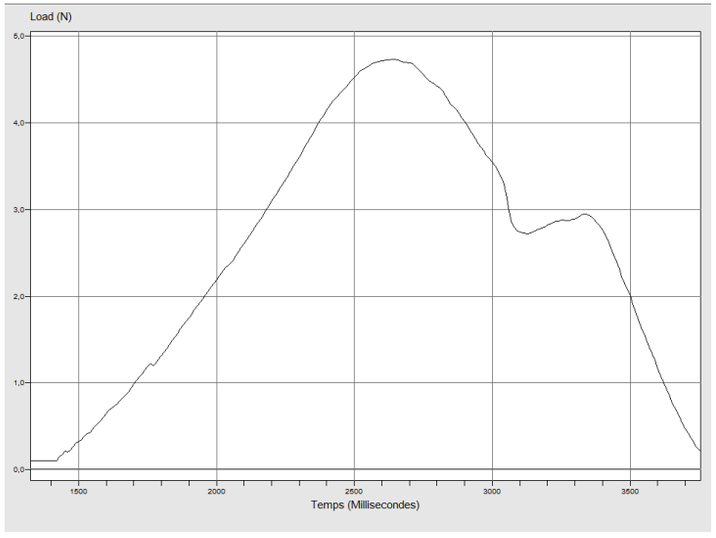
Example of test setup and results in the NexygenPlus software

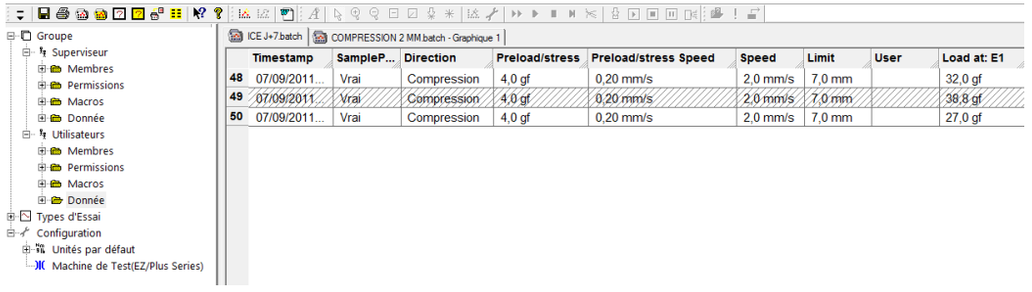
Note: Below example is in French. The software is available in several languages including English, German, French and Chinese.











	Timestamp	SampleP...	Direction	Preload/stress	Preload/stress Speed	Speed	Limit	User	Load at: E1
48	07/09/2011...	Vrai	Compression	4,0 gf	0,20 mm/s	2,0 mm/s	7,0 mm		32,0 gf
49	07/09/2011...	Vrai	Compression	4,0 gf	0,20 mm/s	2,0 mm/s	7,0 mm		39,8 gf
50	07/09/2011...	Vrai	Compression	4,0 gf	0,20 mm/s	2,0 mm/s	7,0 mm		27,0 gf

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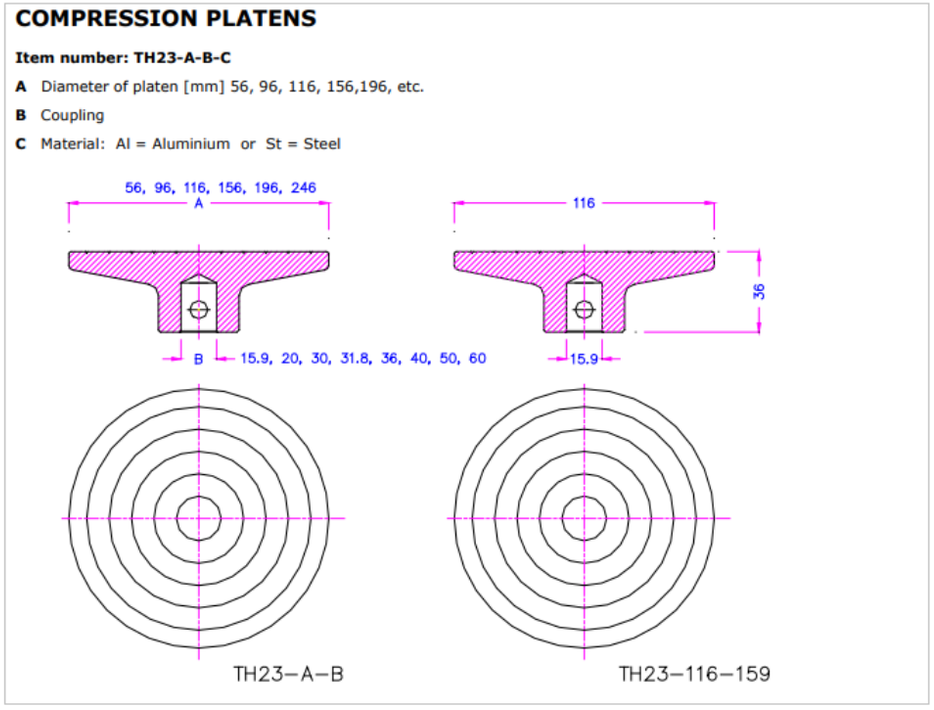
Top Load Testing – Fixtures

Example of Fixtures That Can Be Used for Top Load Tests

Compression plates are available in aluminium for testing soft samples such as cardboard, plastics, rubber, foams, lightweight springs, bottles and cartons. They are also available in hardened steel for testing rubber, plastics, heavy duty springs, building products, composites and ceramics.

Circular slotted Compression plates are ideal for this test. Cross slotted vents allow air to escape from the container during the compression stage of the test.



Contact

Chatillon and Lloyd Instruments has specialists around the world who are all able to offer expert advice for all of your material testing requirements. Contact us today, or visit www.ametektest.com for more information.

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