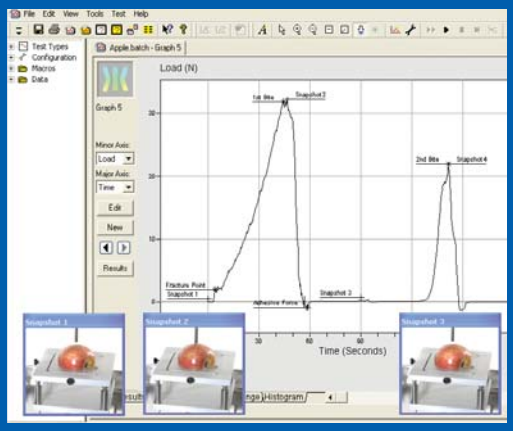

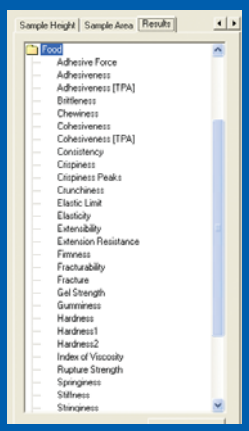

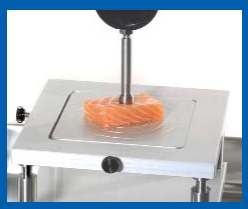

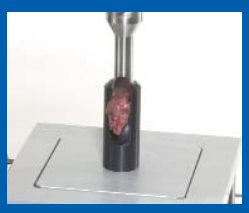

LLOYD INSTRUMENTS™

An AMETEK Company

Texture Analysis Instruments

AMETEK®
MEASUREMENT & CALIBRATION
TECHNOLOGIES

About Us

Lloyd Instruments is a world-leading manufacturer of innovative texture analysis, cosmetics and packaging test systems offering customers a wide choice of products suitable for testing the physical and mechanical properties of any food product, cosmetics or packaging material.

Lloyd Instruments is part of AMETEK Inc., a global manufacturer of electronic instruments and electromechanical devices with over 60 manufacturing plants around the world. AMETEK has been a NYSE listed company since 1930 (symbol: AME).

www.ametek.com

Lloyd Instruments offers expert test solutions for all types of applications. Our texture analysis instruments are designed to measure parameters such as:

Adhesiveness
Chewiness
Cohesiveness
Consistency
Crispiness
Crunchiness
Elasticity
Extensibility
Firmness
Fracturability
Gel Strength
Gumminess
Hardness
Rupture Strength
Springiness
Stiffness
Stringiness
Texture Profile Analysis
Toughness
Work to Cut
Work to Penetrate
Work to Shear

Contents

LLOYD INSTRUMENTS
An AMETEK Company

Texture Analysis Instruments

The Benefits of Texture Analysis

Texture analysis can highlight quality improvement opportunities throughout the supply chain and the production process.

At the research and development (R&D) stage, new or alternative ingredients can be compared with existing ingredients. In production, texture analysis is used for the measurement and control of process variations such as temperature, humidity and cooking time.

What is a Texture Analysis Test?

A texture profile analysis test replicates the effect of two bites on a sample. Lloyd Instruments NEXYGEN*Plus* texture analysis software captures force, distance and time during the test, allowing the calculation of parameters such as:

Adhesion Force	Firmness	Modulus
Adhesiveness	Fracturability	Resilience
Chewiness	Gumminess	Springiness
Cohesiveness	Hardness	Stringiness

TA*Plus* Texture Analyser
100 kg / 225 lbf

Lloyd Instruments fully software controlled TA*Plus* texture analyser is able to apply forces up to 100 kg / 225 lbf.

The advanced closed-loop drive system allows for precise machine control during a test. This enables accurate sample height measurement for testing samples to a percentage of their original size, with the ability to adjust test speed relative to sample dimensions.

External plug and play devices such as temperature and humidity probes may be connected to the machine to enable these parameters to be monitored during a test and reported in the NEXYGEN*Plus* software against force, distance and time. Test start and test stop conditions may also be controlled by these external devices.

In addition, long term creep and relaxation tests can be performed utilising the accurate load holding performance. The advanced load rate control gives complete flexibility, particularly when performing extrusion tests.

All TA*Plus* Systems Include:

- Base table
- 12.5 mm (0.5 in) cylinder probe
- Stainless steel drip tray

Base table

Cylinder probe

Drip tray

TAPlus
Texture Analyser

Key Features:

- Large working area - 179 mm (7 in) throat depth
- 8 kHz data sampling rate to capture all data points
- Wide speed range 0.00083 to 21.16 mm/s (0.002 to 50 in/min) at full load
- Multi-lingual and multi-unit display options
- Intelligent plug and play load cells and accessories
- Automatic diagnostics and load cell calibration check
- Frame stiffness compensation for extension accuracy to within 5 microns for many tests
- Fast delivery times

Applications Expertise

Our in-house application experts are available to assist with routine texture analysis queries and discuss your requirements for special applications. Through years of experience we have built an extensive range of jigs, probes and fixtures for food, cosmetics and packaging. We also offer a custom build service for test fixtures.

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Food Firmness Instruments

LTCM-100 Series Motorised Firmness Tester
50 kg / 110 lbf

The LTCM-100 Series is a manually controlled, motorised tester ideal for firmness testing or associated puncture, compressive-extrusion, cutting-shear, tensile and compressive testing.

The tester features a hand switch or optional foot switch to control tester speed and direction. A digital force gauge is used to determine the peak forces encountered in order to determine the firmness characteristics of the sample under test. Force accuracy is achieved up to 0.1% of full scale. Ideal for the production environment, QA/QC laboratory or research environment.

Key Features:

- Compact, bench top application
- Simple operation
- Standard hand switch operation
- Optional foot switch operation
- Mechanical, force and distance limits
- Large working area
- Adjustable speed from 0.08 to 8.3 mm/s (0.2 to 20 in/min)
- Portable force gauge

MT150 Series Manual Firmness Tester
66 kg / 150 lbf

The MT150 Series is an economical, manual, mechanical tester that is suitable for determining the firmness of fruit and vegetables.

The MT150 uses a portable mechanical or digital force gauge for the measurement instrument. The tester can be driven with either a lever or hand wheel. A digital indicator or ruler may be used to measure the puncture depth. A lever on the MT150 is used to position the sample in either tensile or compressive directions.

Key Features:

- Compact, bench top application
- Bench, horizontal or vertical wall mounting
- Simple operation
- Lever or hand wheel operation
- Optional ruler or digital indicator for penetration measurement
- Portable force gauge

NEXYGEN™ PLUS

Texture Analysis Software For the TA*Plus* Texture Analyser

NEXYGEN*Plus* multi-lingual texture analysis software is the hub of any Lloyd Instruments texture analysis system.

This extraordinarily easy to use and flexible software, allows the operator to control and monitor all aspects of the system from a single intuitive user interface. This ensures fast, reliable and powerful testing in addition to fingertip control of data analysis features.

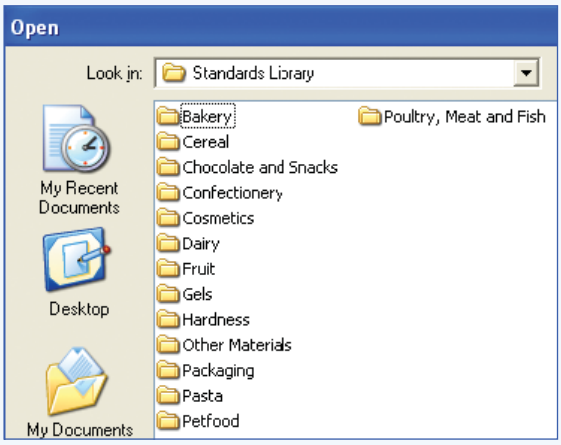
NEXYGEN*Plus* is supplied as a complete all-inclusive package with no additional modules required.

The package includes:

- Complete standards library for food, cosmetics and packaging testing
- Comprehensive multi-stage test wizard
- Video and still picture capture system
- Security and audit trail utility
- SPC trend and histogram charts
- User interface customisation facility
- Data export utility for connection to LIMS and SPC packages
- Seamless integration with Microsoft® Office

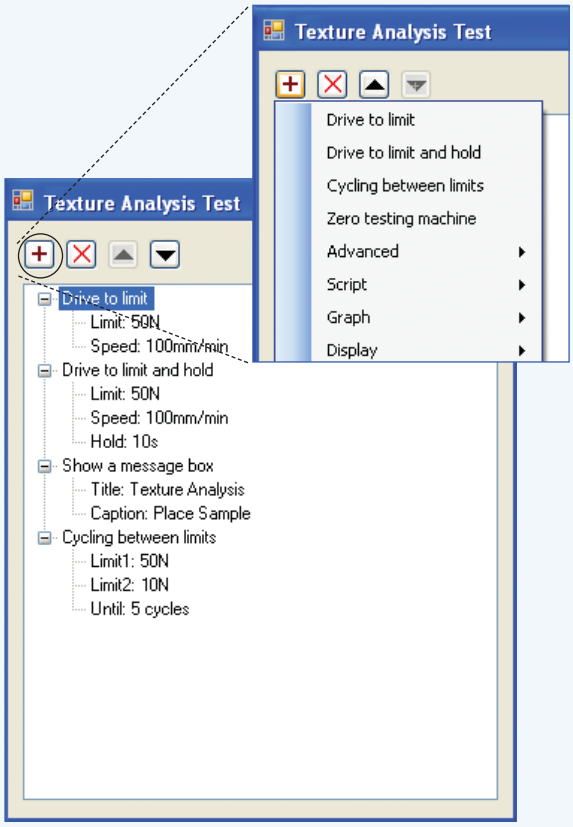
Test Library

Getting started with NEXYGEN*Plus* could not be simpler thanks to the extensive built-in library of test methods covering food, cosmetics and packaging tests to AACC, ASTM, DIN, EN, ISO and other standards. Unlike suppliers of similar systems, Lloyd Instruments offers a complete standards library to every customer, in addition to complete test wizards for tension, compression, tearing, peeling, friction and flexural tests.



Food test library

The standard user configurable test can be used to create specialist multi-stage tests and is particularly beneficial for texture profile analysis.

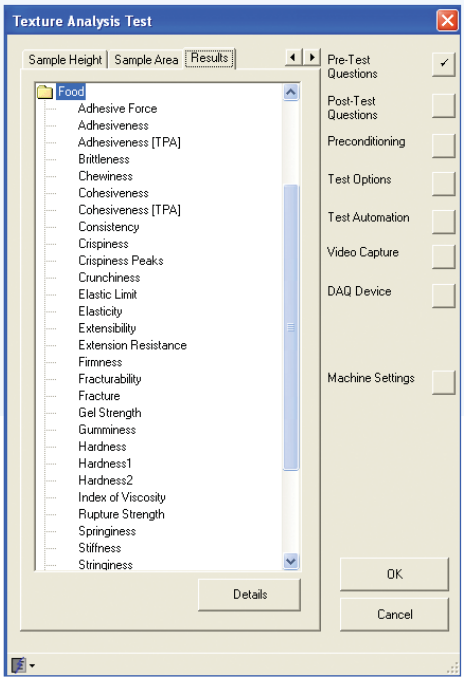


Create your own multi-stage tests with an unlimited number of stages

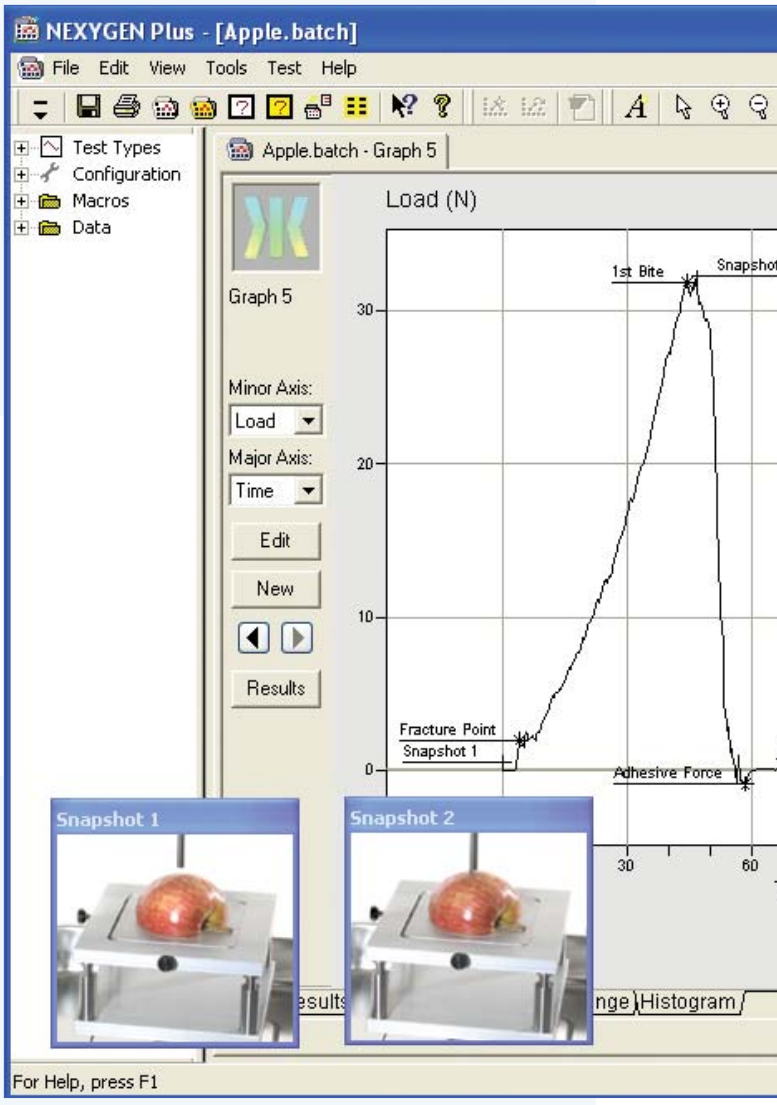
Test Results

The NEXYGEN*Plus* test creation wizard allows the operator to select results from the extensive built-in library or create their own.

Results can be added post-test for added flexibility. Result units can be freely converted to any S.I., imperial or user defined unit at the click of a button.



Test result library



Still picture capture system

Video capture is particularly useful for R&D applications

Video and Still Picture Capture

Whether for advanced texture analysis or presentation of tests results, video and stills capture is a feature unique to NEXYGEN*Plus* software.

Entire tests can be videoed and synchronised with the stress/strain data and replayed for detailed post-test analysis.

Alternatively, still images can be taken at specific points during the test. These still images are recorded on the graph for easy analysis.

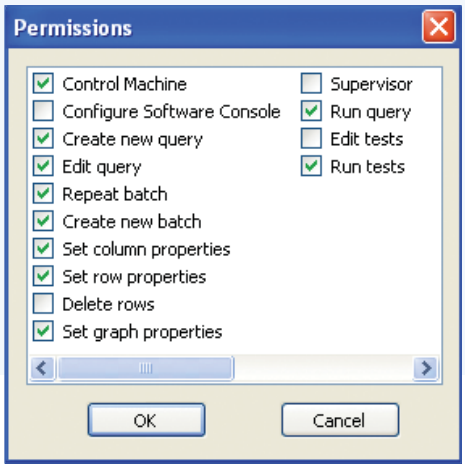
These powerful features can be utilised by simply connecting a webcam or analogue video camera to a PC.

Test Data Security and Audit Trails

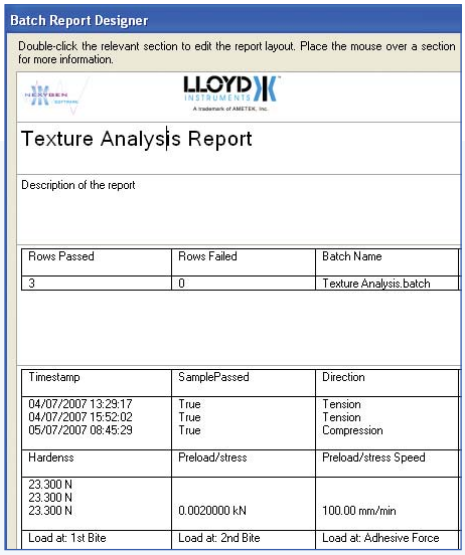
The NEXYGEN*Plus* security and audit trail module enables supervisors to manage user access and data traceability. The module can also be configured to assist manufacturers with FDA 21 CFR Part 11 compliance requirements.

Electronic signatures and the ability to restrict user access rights increase security and avoid costly errors.

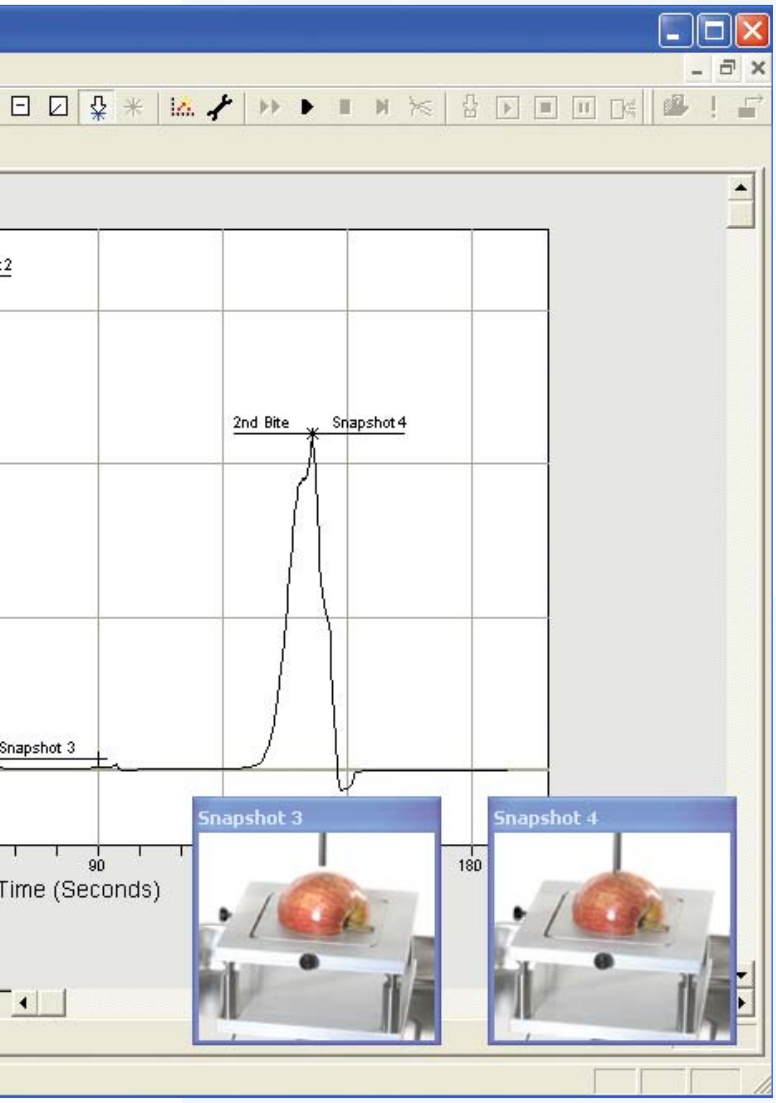
Integrated audit trails covering operator usage and test results guarantee that all changes to test procedures are recorded in a simple retrievable format.

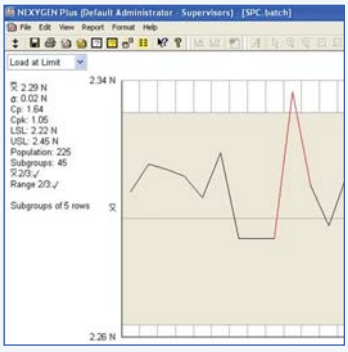


Configuration of user access rights



Report wizard





NEXYGENPlus SPC chart

Reporting and Exporting Data

NEXYGEN*Plus* software features a simple to use report designer linked to Microsoft Word. Layouts, fonts and images can all be manipulated using the full power of Microsoft Word.

Microsoft Office integration allows seamless transfer of data to familiar Windows® packages such as Word and Excel® for further analysis. Data can also be exported to your favourite LIMS, SPC or data management systems by using our versatile data export facility.

Probe and Fixture Selection

Specimen size depends on the homogeneity of the sample. A food with large voids will require a larger sample size than a food without voids to obtain similar repeatability.

The choice of fixtures depends on the sample. If the sample has a flat surface then generally compression platens that are larger then the sample, are used. Where the surface is uneven, such as with fruit and vegetables, small diameter probes are used.

Ask our applications experts for guidance on your specific application.

Bakery

The Lloyd Instruments TA*Plus* texture analyser is capable of testing bakery ingredients through to finished product.

The effect of ingredients from different suppliers, baking times and recipes on the finished product can be rapidly measured and captured.

Dough extensibility

Dough stickiness

AACC (74-09)
Bread firmness

Test Type	Probe or Fixture
Dough extensibility	Gluten dough extensibility kit
Dough stickiness	Comparative dough stickiness jig
Creep / relaxation	Cylinder probes and compression platens
Firmness / hardness, fracturability, gumminess, springiness, stickiness	Cylinder probes or knife wedge
Bread firmness AACC (74-09)	FG/CY36 - 36 mm diameter probe rounded edge
Puncture of thin breads, pancakes and tortillas	Burst jig
Cutting resistance	Knife wedge
Hardness of bread crumbs	Ottawa cell
Tensile strength	TG34 vice action grips

Burst jig

Cereals

Greater repeatability can be obtained when testing cereals by using a Kramer-type shear cell to test the sample in bulk. This averages out variation in the product that would be measured by testing each individual piece of cereal.

The Ottawa forward extrusion cell is suitable for determining the softening time of cereals when immersed in milk.

Cereal bars can be tested to measure their resistance to bending using the 3 point bend jig. To compare the texture of cereal bars, the knife wedge is recommended.

NEXYGEN*Plus* measures parameters that indicate the crispiness and chewiness of a sample.

Kramer shear test

Cereal bar bending

Test Type	Probe or Fixture
Firmness / hardness, crispiness, chewiness	Kramer shear cell, Ottawa cell, cylinder probes, ball probes
Flexural strength	3 point bend jig
Shear	Knife wedge

Extensibility of chewing gum

Hardness of chocolate bars

Hardness of sweets

Crisp fracture test

Confectionery and Snacks

From the hardness of boiled sweets to the extensibility of chewing gum or the fracture strength of snack foods, the Lloyd Instruments TA*Plus* system is capable of testing all samples on the same machine.

Typically, penetration tests are performed to measure properties such as coating hardness, stickiness and hardness. 3 point bend tests measure the flexural strength and rigidity of chocolate bars.

Crispiness is a key characteristic of cooked potato crisps (chips) and other potato snacks and a departure from the expected texture is usually considered to be a quality defect.

Measurement of the crispiness and fracturability of crisps can be made using a ball probe with a TA*Plus* texture analyser equipped with a crisp fracture support jig.

Test Type	Probe or Fixture
Firmness / hardness, gumminess, fracturability, stickiness, springiness	Cylinder probes, ball probes, compression platens
Gel strength ISO 9665	12.5 mm (0.5 in) cylinder probe
Flexural strength	3 point bend jig
Tensile strength	TG34 vice action grip
Chocolate bar firmness	Knife wedge

Dairy

The development and quality control of dairy products are heavily reliant on texture analysis. During the development phase, texture analysis compares the texture of new formulations to existing proven products.

The TA*Plus* texture analyser is able to compare the spreadability of butter and spreads by measuring the force required to insert a 90° cone probe into a specially designed holder.

Extrusion cells allow the measurement of viscosity of yoghurts and sauces. Alternatively the TA*Plus* analyser can be fitted with a cone shaped probe for classic penetrometer tests.

Comparing the texture between full fat and low fat cheese is a critical part of the development process. A texture analyser fitted with a cylinder probe gives fast and accurate comparisons.

Butter cutting jig

Cheese wax coating puncture test

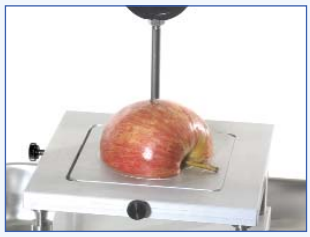
Penetrometer test using a cone probe

Test Type	Probe or Fixture
Consistency of yoghurt and cream based products	Forward extrusion cell, back extrusion cell
Firmness / hardness of cheese, butter, margarine	Cylinder probes, cone probes, ball probes, knife wedge
Gel strength ISO 9665	12.5 mm (0.5 in) cylinder probe
Spreadability of butter, margarine, spreads	Spreadability kit
Tensile strength / extensibility of cheeses	TG34 vice action grip
Viscosity of yoghurts and sauces	Forward extrusion cell, back extrusion cell
Creep / relaxation of butter and cheese	Cylinder probes, compression platens
Cutting resistance of butter, margarine and cheese to ISO 16305	Knife probes, butter cutting jig
Work softening of butter and margarine	Back extrusion cell
Ice cream firmness	Ice cream scoopability jig

Ottawa forward extrusion of soft fruit

Pea firmness test

Cucumber cutting force using Warner-Bratzler shear jig



Apple penetration test

Fruit and Vegetables

There are many factors that affect the texture of fruit and vegetables. The time of harvest and storage conditions have an effect on the rate of softening. Texture analysis can help determine the physical properties of fruit and vegetables, and how they change during ripening.

Mechanical data from compression tests using the Ottawa shear cell for soft fruit and wedge fracture tests have proved very successful in distinguishing between different attributes of fruit and vegetable texture.

The TA*Plus* can be used to correlate contrasting textural attributes in different varieties with differences in stiffness, hardness and toughness.

Ask our applications experts for guidance on your specific application.

Test Type	Probe or Fixture
Firmness of whole fruits / vegetables	Cylinder probes, ball probes, Warner-Bratzler shear jig
Firmness of peas, sweetcorn and beans	Pea jig
Extrusion properties of soft fruits, peas, beans, corn and processed fruit / vegetables	Forward extrusion cell, back extrusion cell

Gels

Gels are widely used in the food, cosmetics and pharmaceutical industries.

NEXYGEN*Plus* software features standard test methods for the measurement of Bloom strength in accordance with GME and GMIA approved methods.

Test Type	Probe or Fixture
Bloom strength AOAC	12.5 mm (0.5 in) cylinder probe
Bloom strength BS 757	12.5 mm (0.5 in) cylinder probe with 0.4 mm (0.0158 in) radius

Bloom strength is measured by inserting an AOAC probe a fixed distance into the gel and recording the maximum force.

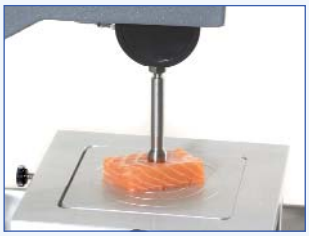
Additional methods are available that allow the operator to develop their own test procedures, based on specific point measurement.

Bloom strength measurement

Warner-Bratzler shear test on sausage

Volodkevich bite test

Minced meat firmness measurement using Kramer shear cell



Salmon firmness measurement

Meat, Poultry and Fish

Texture analysis is used to assist the investigation of meat quality predictors at the on-farm and processing stage of production.

A novel measure of meat tenderness recently developed is the rapid slice shear force test. This method has advantages over the traditional Warner-Bratzler shear test for steak as it can be done immediately post-cooking.

The Volodkevich bite set consists of a stainless steel probe shaped like an incisor and provides results that correlate well with meat toughness.

Canned and re-formed meats are easily tested using a Kramer shear cell. The texture analyser records the force required to shear the sample using ten or five shear blades supplied with the cell.

Test Type	Probe or Fixture
Toughness of cooked meat	Volodkevich bite set
Firmness	Kramer shear cell
Cutting strength	Warner-Bratzler shear jig
Rapid slice shear force	SSF shear blade

Pasta

The firmness, stickiness, elasticity and bending strength define the overall texture of cooked and uncooked pasta and noodles.

The breaking strength of uncooked spaghetti and lasagne sheets can be measured using the 3 point bend jig.

Test Type	Probe or Fixture
Pasta stickiness	Pasta stickiness jig
Pasta firmness	Cylinder probes
Spaghetti firmness	Spaghetti compression jig
Spaghetti / noodle extensibility	Spaghetti / noodle jig
Bending strength	3 point bend jig

Our unique spaghetti compression fixture measures the deflection of cooked spaghetti whilst under a fixed load for a specific time.

This method is very effective in defining the correct cooking time.

Ask our applications experts for guidance on your specific application.

Spaghetti and noodle tension jig

Pet Food

Lloyd Instruments texture analysers are routinely used for determining the hardness and consistency of various pet food products.

Test Type	Probe or Fixture
Biscuit hardness	Various probes
Canned food consistency	Various probes
Bending strength	3 point bend jig

Pet food firmness test

Bending test on bone-shaped dog chew

Cosmetics

The precise measurement of consistency, hardness, spreadability, bending strength and powder compaction is critical in the development and quality control of cosmetics.

Gel and cream consistency is measured using a back extrusion cell. The force required to extrude the sample is recorded in the NEXYGEN*Plus* software.

Lipstick bending test

Soap penetration test

Test Type	Probe or Fixture
Lipstick bending	Lipstick bend fixture
Lipstick cutting force	Knife blade set
Penetration test	Cone probes
Consistency	Back extrusion cell, various probes
Eye pencil bending	3 point bend jig

Packaging

Lloyd Instruments offers a wide range of packaging test equipment conforming to international standards such as ASTM, ISO, EN and other local standards authorities. Typical applications include:

Tensile strength
Peel strength
Puncture strength
Tear strength
Compression strength
Top loading
Falling dart impact resistance
Bottle opening force
Carton opening force
Carton erection force
Static coefficient of friction
Kinetic coefficient of friction

Actuation force measurement

Foil lid peel test

Test Type	Probe or Fixture
Tensile ASTM D412, peeling, tearing	TG34 vice action grip
Friction ASTM D1894	TG112 friction table
Puncture	TG73 puncture jig
Carton erection	Carton erection jig
Top loading	ST6/2 compression platens

The TA*Plus* can be easily configured as a dual texture analysis and packaging testing machine by changing fixtures.

Many food products are packaged in flexible packaging which can be tested for its tensile strength, puncture resistance, heat bond peel strength, tearing strength and coefficient of friction.

Our application knowledge and expertise is immense.
If you don't see your application here, please contact us.

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Probes, Fixtures and Grips

Probes

Description	Sizes
Cylinder probes	1 mm, 2 mm, 4 mm, 5 mm, 6 mm, 8 mm 10 mm, 20 mm, 25 mm, 30 mm, 35 mm, 40 mm, 45 mm, 50 mm, ¼ in, ½ in, ¾ in, 1 in, 1½ in, 2 in, 3 in, 4 in
Cone probes	15°, 30°, 40°, 45°, 60°, 90°
Ball probes	2 mm, 4 mm, 5 mm, 6 mm, 8 mm, 10 mm, 25 mm, ¼ in, ½ in, ¾ in, 1 in
AACC bread firmness probe	36 mm
Bloom strength kit	Includes 12.5 mm (0.5 in) flat end probe and 6 sample pots. BS probe also available.
Needle probe	2 mm outside diameter to needle point
Magness Taylor probe set	Magness Taylor puncture probe set consists of two sets of cylindrical probes of different sizes. Each pair has one flat end and one round end.
1 cm^2 area probe	1 cm^2 flat ended probe

Note: Probes are available in a wide range of materials to suit your application.

Jigs and Fixtures

Description	Details
Warner-Bratzler shear blade set	Supplied with one reversible blade with V-notch and 45° chisel point profiles Optional: Reversible blade with 12.5 mm square and 25 mm diameter semi-circular profiles
Burst jig	Sample clamp with 50 mm aperture and 25 mm ball probe
Crisp fracture jig	Supplied with 10 mm ball probe
Forward extrusion cell	50 mm diameter sample container. Set of discs with trapezoid extrusion holes 2 mm, 4 mm, 6 mm, 8 mm and 10 mm and a spill container.
Back extrusion cell	50 mm diameter pot with 4 discs: 49 mm, 45 mm, 40 mm and 35 mm
Ottawa forward extrusion cell	Supplied with spill container, 3 mm round bar, 2 mm and 5 mm flat blade, wire inset and 6 mm multi-hole
Kramer shear cell	10 bladed or 5 bladed Kramer shear cell
Spreadability kit	90° cone probe and 6 matching sample pots and one calibration pot
Butter / cheese cutting jig (wire)	Supplied with standard size wire
Butter / cheese cutting jig (blades)	Supplied with 3 blades 1 mm thickness and 3 blades 2 mm thickness
Knife blade set AACC 16-50 pasta firmness	Supplied with 2 Perspex blades, one 45° knife-edge and one flat 1 mm thickness
Spaghetti / noodle compression flex jig	Set of 2 holders to perform vertical flex on samples
Spaghetti / noodle tensile jig	Tensile testing of spaghetti and noodles
Spaghetti compression jig	Measures thickness after applying 500g to the sample
Pasta stickiness fixture	Sample holder and 50 mm x 25 mm compression platen
3 point bend jig	40 mm - 80 mm span, 6 mm support diameter
Comparative dough stickiness jig	Sample container and extruder
Dough preparation set	Supplied with container and plungers to aerate the sample prior to compression with supplied 6 mm probe
Gluten dough extensibility kit	Probe with side hook to pull dough upwards. Supplied with dough press for sample preparation.
Flat breads jig	Set of 2 spiked paddles for testing separation strength of flat breads
Volodkevich bite set	Single incisor shaped probe with lower sample holder
Ice cream scoopability jig	Jig for measuring ice cream firmness
Egg puncture	Egg puncture jig and egg holder
Knife wedge	Knife wedge
Burger jig	Base table insert with 27 mm aperture and a 25 mm trapezoid probe
Confectionery clamp	Two tier clamp set with 10 mm access aperture to hold irregular shaped samples
Thin film clamp	Clamping fixture with 6 mm and 1 mm aperture. Supplied with 5 mm and 10 mm ball probes.
Blade set	Blade holder and set of general-purpose knife-blades with HDPE table insert chopping board
Multi-probe	Probe fixture with multiple easy to change probes 150 mm x 5 mm. Ideal for uneven samples.
Pea test jig	For testing 18 samples using 18 x 2 mm diameter probes

Packaging and Cosmetics

Description	Details
Tensile film grip TG34	Rubber coated vice grip 25 mm wide, 500 N capacity
Peel jig for pots	Contact Lloyd Instruments for a fixture to suit your requirements
Friction jig TG112	Table and sleds to meet ASTM D1894, ISO 8295 and TAPPI T549
Carton erection jig	Contact Lloyd Instruments for a fixture to suit your requirements
Puncture jig TG73/50 and TG73/80	Puncture of thin films
Compression platens ST6/1 and ST6/2	50 mm and 100 mm diameter respectively
Needle extrusion	General-purpose needle extrusion fixture with spill container. Custom made needle profiles available.
Lipstick bending	Lipstick bend fixture
Lipstick cutting	Lipstick cutting fixture
Tube extruder	Adjustable tube extrusion fixture, suitable for continuous content extrusion. Includes spill container.
Tube extruder - single point	Single point extrusion of tubes

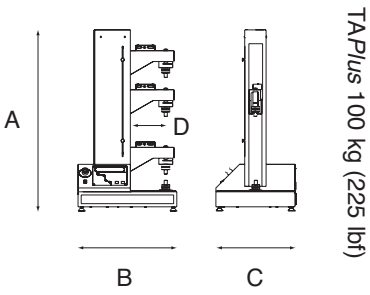
Custom Design Service

Our experienced application engineers will be pleased to assist with any special fixture requirements that you may have. Lloyd Instruments offers a complete design and manufacture solution.

Technical Specification

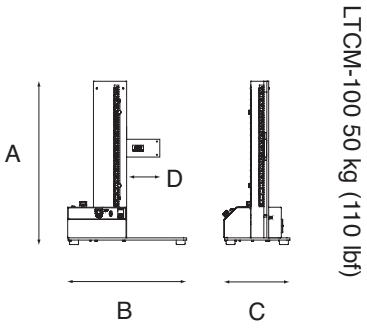
	Texture Analyser
Model	**TA*Plus***
Force Capacity	100 kg (225 lbf)
Maximum Crosshead Travel *(Between Eye Ends)*	500 mm (19.7 in)
Crosshead Speed Range	0.00083 to 21.16 mm/s (0.002 to 50 in/min) at full load
Maximum Return Speed	21.16 mm/s (50 in/min)
Speed Accuracy	< 0.2% at steady state
Minimum Load Resolution *(Load Cell Specific)*	0.0001 N
Load Cell Accuracy	< 0.5%
Extension Resolution	< 2 microns
Data Sampling Rate	8 kHz
External Inputs	Digital and Analogue
Load Measuring System	EN ISO 7500: 2004 Class 0.5 ASTM E4
A Machine Height	923 mm (36 in)
B Machine Width *(with Console)*	500 mm (19.7 in)
C Machine Depth	400 mm (15.7 in)
D Throat Depth	179 mm (7 in)
Weight	46 kg (102 lb)
Humidity	5 - 85% RH (Non-condensing)
Operating Temperature	5 to 35°C (41 to 95°F)
Storage Temperature	-20 to 55°C (-4 to 131°F)
Supply Voltage	230Vac ±10% 50-60 Hz Fuse T1AH250V 115Vac ±10% 50-60 Hz Fuse T2AH250V
Maximum Power Requirement	120VA max

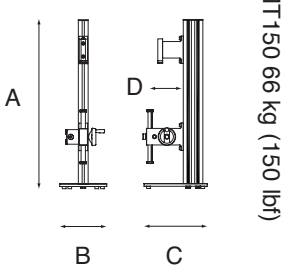
Texture Analyser



	Food Firmness Instruments	
	Motorised	**Mechanical**
Model	**LTCM-100**	**MT150**
Force Capacity	50 kg (110 lbf)	66 kg (150 lbf)
Maximum Crosshead Travel	394 mm (15.5 in)	150 mm (6 in)
Crosshead Speed Range	0.08 to 8.3 mm/s (0.2 to 20 in/min) at full load	NA
Maximum Return Speed	8.3 mm/s (20 in/min)	NA
Speed Accuracy	±3% Unloaded	NA
Minimum Load Resolution	0.0005 N (DFS gauge)	0.0005 N (DFS gauge)
Load Cell Accuracy	±0.1% full scale	±0.1% full scale
Extension Resolution	NA (Not measured)	NA
Data Sampling Rate	NA (Gauge dependent - DFS is 5000 Hz)	NA
External Inputs	NA (Gauge dependent - Digital and Analogue)	NA
Load Measuring System	Chatillon force gauge	Chatillon force gauge
A Machine Height	699 mm (27.5 in)	750 mm (29.5 in) Standard 1000 mm (39.4 in) Extended 1500 mm (60 in) Ultra
B Machine Width	508 mm (20 in)	216 mm (8.5 in)
C Machine Depth	279 mm (11 in)	290 mm (11.42 in)
D Throat Depth	130 mm (5.125 in)	152 mm (6 in)
Weight	18 kg (39 lb)	9 kg (20 lb)
Humidity	20 - 85% RH (Non-condensing)	NA
Operating Temperature	8 to 45°C (45 to 110°F)	NA
Storage Temperature	-17 to 54°C (0 to 130°F)	NA
Supply Voltage	230Vac ±10% 50-60 Hz Fuse 1VA max 115Vac ±10% 50-60 Hz Fuse 1VA max	NA
Maximum Power Requirement	120VA max	NA

Food Firmness Instruments





LLOYD INSTRUMENTS™

An AMETEK Company

Materials Testing Systems

As well as an important supplier of texture analysers to the food industry, Lloyd Instruments *Plus* Series of materials testing machines are the culmination of 40 years experience in materials testing. These high performance machines, available in a single and twin column design, enable you to make accurate force measurements in the range from 0.1 N - 300 kN (0.0225 lbf - 67443 lbf).

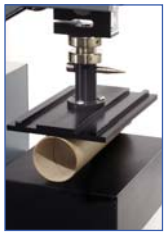
Designed to determine the physical and mechanical properties of raw materials, components and finished products our systems perform tests such as:

- Tensile
- Compression
- Flexural/bend
- Coefficient of friction
- Puncture
- Tear and peel

Our NEXYGEN*Plus* materials testing software is flexible and easy to use allowing the operator to control all aspects of the materials testing system to provide fast, reliable and powerful testing. Lloyd Instruments also offers a wide range of grips, fixtures and accessories.

Our systems are used in quality control, production, R&D and in education. The application range is extensive with the following markets commonly served:

- Automotive
- Pharmaceutical
- Paper and board
- Medical devices
- Building materials
- Plastics
- Metals
- Textiles
- Electronics
- Packaging



Plastics & Polymer Testing Instruments

To complement our range of materials testing systems, Lloyd Instruments also offers the complete solution for raw polymer and plastics testing applications.

Instruments in the Davenport range include:

- Melt flow indexers
- Melt viscometers for testing the intrinsic viscosity (IV) of PET
- HDT/VICAT measurement instruments
- Density measurement columns
- Falling dart impact testers for plastic film
- Inclined plane friction testers

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P-MT-6100-1107
November 2007