

- Application Expertise
- High Precision Test Machines
- Powerful Texture Analysis Software
- Comprehensive range of jigs, probes and fixtures

TEXTURE
ANALYSIS
INSTRUMENTS ■



LLOYD
MATERIALS TESTING
EXPERT SOLUTIONS
TO TEST PHYSICAL
AND MECHANICAL
PROPERTIES ■

About Us

Lloyd Materials Testing 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.

Materials testing machines from Lloyd guarantee the highest level of performance and capability for production testing, quality control, laboratory testing, research and education.

Lloyd Materials Testing manufactures and supplies universal testing machines (UTM) and tensile testers. As part of AMETEK, Inc. Lloyd Materials Testing has operations and technical distribution in over 80 countries.

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

- CHEWINESS
- ADHESIVENESS
- COHESIVENESS
- CRISPINESS
- EXTENSIBILITY
- TEXTURE ANALYSIS
- WORK TO CUT
- WORK TO SHEAR
- WORK TO PENETRATE

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Technical Specifications

Force capacity, external inputs and other specifications.



**QUALITY
IMPROVEMENT**
OPPORTUNITIES
THROUGHOUT THE
SUPPLY CHAIN ■

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 analysis test is the evaluation of the textural, mechanical and physical properties of raw ingredients and finished products primarily for the food industry. It has a relationship with data provided by sensory evaluation.

Lloyd Instruments Nexygen*Plus* texture analysis software captures force, distance and time during a test, which allows the calculation of parameters such as;

- GUMMINESS
- CHEWINESS
- SPRINGINESS
- FIRMNESS
- HARDNESS
- ADHESIVENESS
- WORK
- GEL STRENGTH
- COHESIVENESS
- ELASTICITY
- FRACTURE
- STICKINESS
- STRINGINESS
- TOUGHNESS
- TEXTURE PROFILE ANALYSIS (TPA)

Products

■ TEXTURE ANALYSIS INSTRUMENTS

» TA1 Texture Analyser

■ FOOD FIRMNESS INSTRUMENTS

» LTCM-100 Series Motorised Firmness Tester

» DFS II 025 Manual Digital Force Gauge

TA1

TEXTURE ANALYSER

1 kN / 225 lbf

Key Features

- 1 8 kHz data sampling rate to capture critical data points
- 2 Linear guide technology and preloaded ball screws
- 3 Plug'n'Play YLC load cells with anti-rotation collars - avoid load train twist and facilitating fast and easy axial alignment
- 4 Large work area - 180 mm throat depth - and a broad range of fixtures



USB



Traceability



TPA



8 kHz



File Sharing



Plug'n'Play



1 kN/225 lbf

Exceptional Load Accuracy
+/- 0.5% down to 1% of
load cell value

**Wide speed range for
high productivity**
0.01 to 2032 mm/min

**Optimal test
repeatability**

About the Solution

The TA1 is a cost effective, easy to use solution for performing rapid, detailed texture analysis tests on applications up to 1 kN (225 lbf). It is designed for use with the dedicated Texture Analysis functionality in our highly acclaimed NexygenPlus software.

Applications Expertise

Our in-house application experts are available to assist with texture analysis queries and discuss your requirements for special applications.

LTCM-100 SERIES FIRMNESS TESTER

MOTORISED
500 N / 110 lbf

Key Features

- 1 Mechanical force and mechanical deflection limits
- 2 Simple setup and operation
- 3 Portable and detachable force gauge
- 4 Full range of fixtures for firmness, puncture and compressive testing



500 N/110 lbf

WITH
DFS II 025:



USB



Plug'n'Play



10 kHz

Perfect for simple
compressive or tensile tests

Designed for a
production environment

High
repeatability

About the Solution

The LTCM-100 Series is a motorised tester ideal for firmness testing or associated puncture, compressive-extrusion, cutting-shear, tensile and compressive testing. A hand switch or optional foot switch to control tester speed and direction.

A digital force gauge determines the peak force to deduct the firmness characteristics. Force accuracy is achieved up to 0.1% of full scale. Ideal for a production environment, QA/QC laboratory or research environment. The LTCM series also offers the motorised LTCM-500 (2.5 kN / 550 lbf).

DFS II 025

DIGITAL FORCE GAUGE

MANUAL TEST
100 N / 25 lbf

Key Features

- 1 Normal & Peak Operating Modes
- 2 Integral Load Cell - better than 0.1% FS Accuracy
- 3 Wireless data transfer via integral Bluetooth®
- 4 Simple user interface



USB



Plug'n'Play



100 N/25 lbf



10 kHz

First to offer wireless data transfer and communication via integral Bluetooth

Compact, easy-to-use and designed for basic and complex applications

Ideal for handheld or test stand applications

About the Solution

The DFS II may be equipped with integral loadcells or smart remote sensors for load or torque measurement. A large, easy-to-read, high resolution, full color dot matrix LCD display supports a variety of standard gauge functions

including normal and peak readings, high/low limits, setpoints, pass/fail results, statistical results, load averaging, load comparisons, % and sharp break detection, loadcell actuation and direction.

The DFS II force gauges are available in ranges from 0.5 lbf (2.2 N) / to 500 lbf (2.5 kN).

Applications

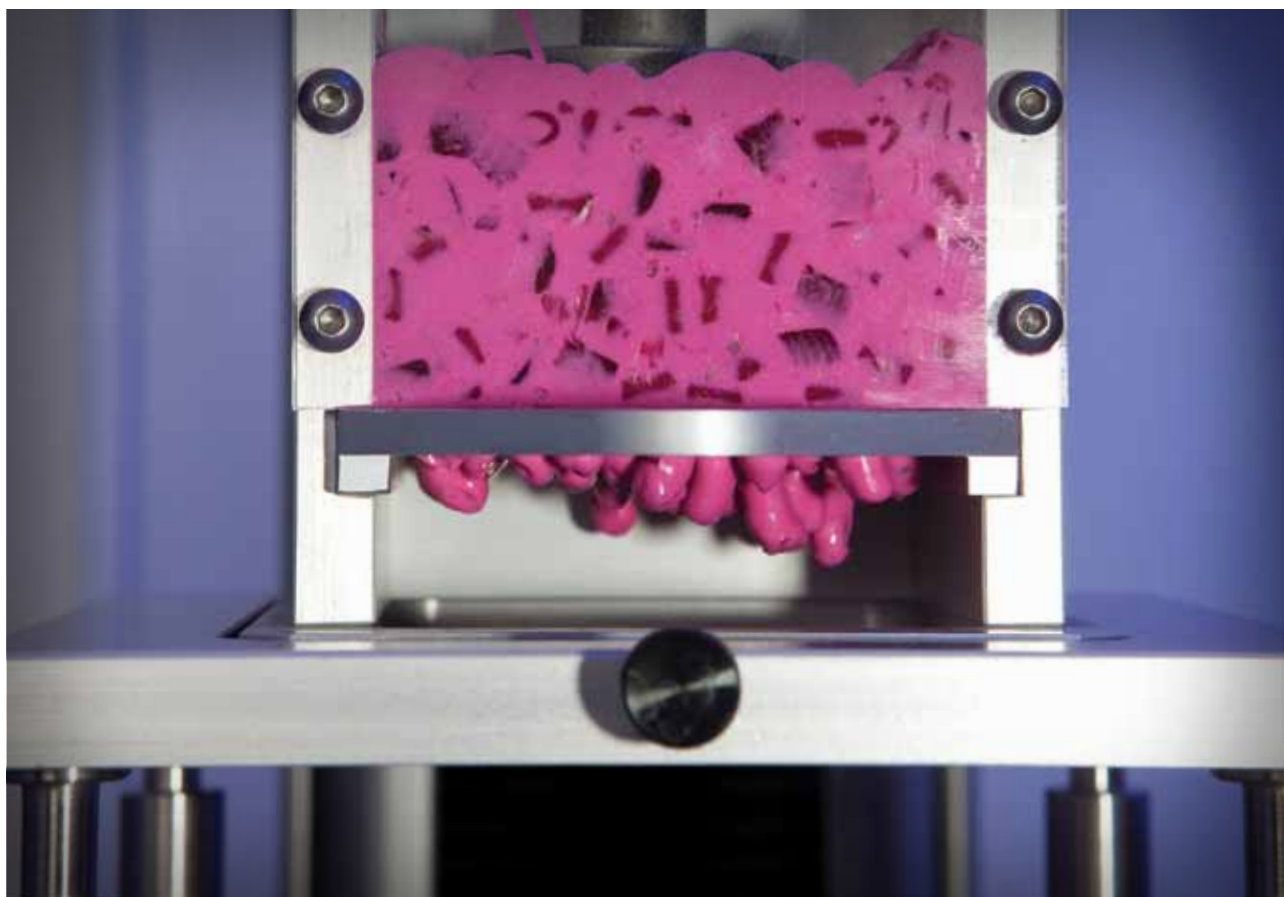
■ FOOD, COSMETICS AND PACKAGING APPLICATIONS

- » Bakery, Cereals
 - » Confectionery & Snacks, Meat,
Poultry & Fish
 - » Fruit & Vegetables
 - » Dairy
 - » Cosmetics,
Packaging
 - » Pasta, Gels,
Pet Food
-



PROBES, FIXTURES AND JIGS

FOR ALL APPLICATIONS



■ Extensive range of jigs, probes and fixtures designed from years of experience

■ Broad range of applications

■ Designed to meet international standards

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 than the sample, are used. If 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 TA1 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.

Test Type
▪ Dough extensibility
▪ Dough stickiness
▪ Creep / relaxation
▪ Firmness / hardness, fracturability, springiness
▪ Bread firmness AACC (74-09)
▪ Puncture of thin breads, pancakes and tortillas
▪ Cutting resistance
▪ Hardness of bread crumbs
▪ Tensile strength



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.

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.

The Ottawa forward extrusion cell is suitable for determining the softening time of cereals when immersed with milk. Cereal bars can be tested to measure their resistance to bending using the 3 point bend jig.

Test Type
▪ Firmness / hardness, crispiness, chewiness
▪ Flexural strength
▪ Shear



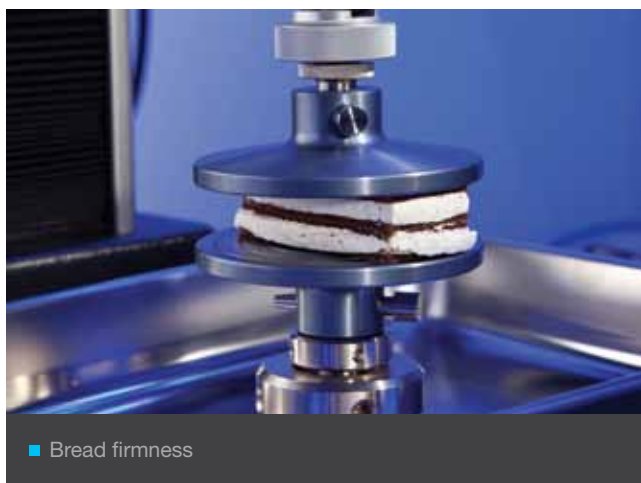
Confectionery and Snacks

From the hardness of boiled sweets to the extensibility of chewing gum or the fracture strength of snack foods, the TA1 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 TA1 equipped with a crisp fracture support jig.

Test Type

- Firmness / hardness, gumminess, fracturability, stickiness, springiness
- Flexural strength
- Tensile strength
- Chocolate bar firmness



■ Bread firmness

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

- Toughness of cooked meat
- Firmness
- Cutting strength
- Rapid slice shear force



■ Warner-Bratzler 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.

Test Type

- Firmness of whole fruits / vegetables
- Firmness of peas, sweetcorn and beans
- Extrusion properties of soft fruits, peas, beans, corn and processed fruit / vegetables

The TA1 can be used to correlate contrasting textural attributes in different varieties with differences in stiffness, hardness and toughness.



Controlling Temperature

Many products are temperature critical and need to be tested at a specific temperature to provide reproducible comparative results.

We offer solutions to suit these requirements such as Peltier systems and thermal chambers.





OUR APPLICATION EXPERTS CAN GUIDE YOU ON YOUR SPECIFIC NEEDS ■

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 TA1 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 TA1 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.

Test Type

- Consistency of yoghurt and cream based products
- Firmness / hardness of cheese, butter, margarine
- Gel strength ISO 9665
- Spreadability of butter, margarine, spreads
- Tensile strength / extensibility of cheeses
- Viscosity of yoghurts and sauces
- Creep / relaxation of butter and cheese
- Cutting resistance of butter, margarine, cheese ISO 16305
- Work softening of butter and margarine
- Ice cream firmness

Pasta & Rice

The firmness, stickiness, elasticity and bending strength define the overall texture of cooked and uncooked pasta, noodles and rice. The breaking strength of uncooked spaghetti and lasagne sheets can be measured using the 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.



Test Type	
▪ Pasta stickiness	▪ Spaghetti / noodle extensibility
▪ Pasta firmness	▪ Bending strength
▪ Spaghetti firmness	

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. 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.

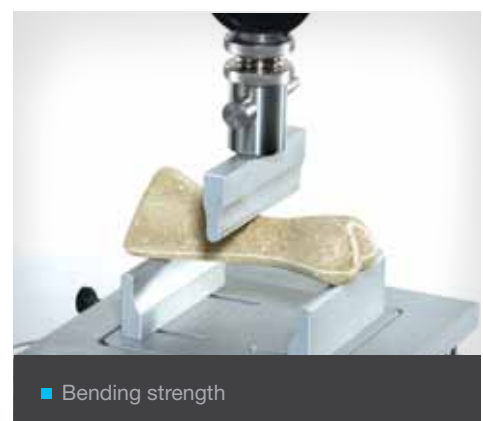


Test Type	
▪ Bloom strength AOAC	
▪ Bloom strength BS 757	

Pet Food

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

Test Type	
▪ Biscuit hardness	
▪ Canned food consistency	
▪ Bending strength	

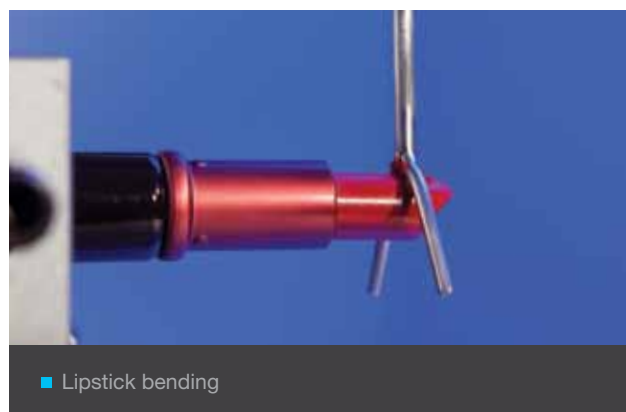


Cosmetics

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

Test Type
▪ Lipstick bending
▪ Lipstick cutting force
▪ Penetration test
▪ Consistency
▪ Eye pencil bending

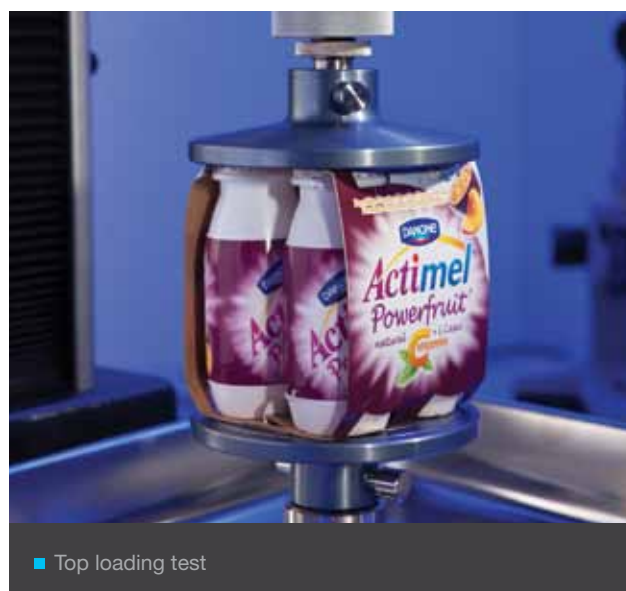
Gel and cream consistency is measured using a back extrusion cell. The force required to extrude the sample is recorded in the NEXYGEN*Plus* software.



Packaging

The TA1 can be 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. We offer a wide range of packaging test equipment conforming to international standards such as ASTM, ISO, EN and other local standards authorities.

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



Test Type	
▪ Tensile ASTM D412, peeling, tearing	▪ Carton erection
▪ Friction ASTM D1894	▪ Top loading
▪ Puncture	

Nexygen^{Plus}

Multi-lingual texture analysis software

is the hub of any Lloyd Materials Testing texture analysis system.

NEXYGENPLUS

TEXTURE ANALYSIS SOFTWARE

The 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.

NEXYGENPlus is supplied as a complete all-inclusive package with no additional modules required.

THE PACKAGE INCLUDES:

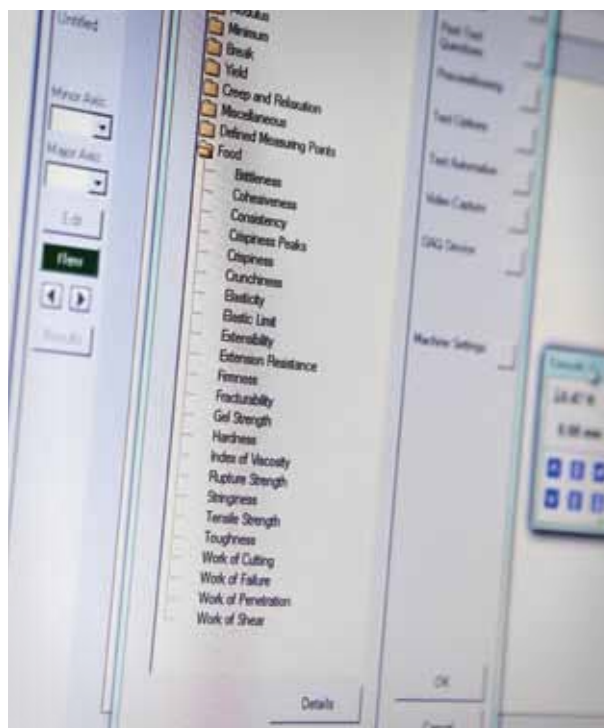
- + Complete standards library for food, cosmetics and packaging testing
- + Comprehensive multi-stage test wizard
- + Security and audit trail utility
- + SPC trend and histogram charts
- + Video and still picture capture system
- + Compatible with Windows 7 or XP
- + Data export utility for connection to LIMS and SPC packages
- + Seamless integration with Microsoft® Office

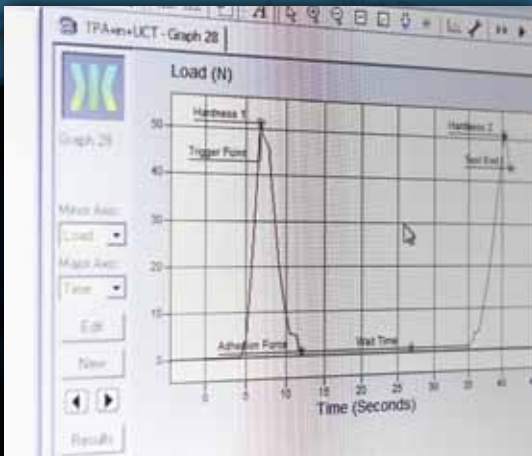
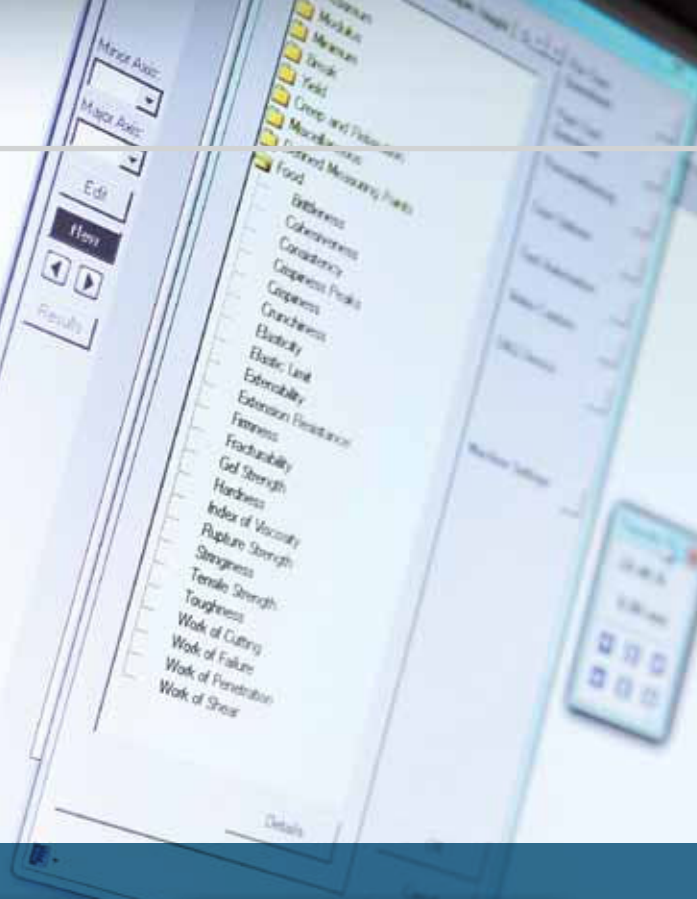
Test Library

Getting started with NEXYGENPlus 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 international standards.

Our philosophy is to offer a complete standards library to every customer, in addition to complete test wizards for tension, compression, tearing, peeling, friction and flexural tests.

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





Video capture is particularly useful for R&D applications ■

Test Results

The 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.

Video and Still Picture Capture

Whether for advanced texture analysis or presentation of tests results, video and stills capture is a unique convincing feature. 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 security and audit trail feature 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.

Test 2	Direction	Preload/Speed	Hardness	Adhesion Force	Adhesiveness	Cohesiveness	Springiness	Cohesiveness	Gumminess	Resilience
1	Compress	0.9010000 kN 20.800 mm/min	0.0003792	0.065763 N	0.83994 N	-0.0019234 mm	16.216	-0.104 N		
4	Compress	0.9010000 kN 20.800 mm/min	0.0009515	-0.011479 N	0.91544 N	0.00021273 mm	192.86	-0.020261 mm	-1.4345	-1.3755 N
5	Compress	0.9010000 kN 20.800 mm/min	0.00095729	-0.36579 N	0.91045 N	-0.0030049 mm	177.80	-0.0042984 mm	-1.3619	-1.3482 N
9	Compress	0.9000010000 kN 20.800 mm/min	0.00034304	-0.076957 N	0.34317 N	0.00020495 mm	0.61629	0.001548 mm	-20.684	-7.6954 N
10	Compress	0.9000010000 kN 20.800 mm/min	0.00037284	0.051953 N	0.35396 N	0.00059603 mm	0.55736	0.79855 mm	-2.4187	-1.2773 N
17	Compress	0.9000010000 kN 20.800 mm/min	0.00041179	-0.076294 N	0.024711 N	-0.00054612 mm	-7.3911	0.97589 mm	-16.407	-0.43465 N
18	Compress	0.9000010000 kN 20.800 mm/min	0.0000057	-0.0057220 N	-0.0097286	-0.000074448 mm	2.5506	0.74613 mm		
19	Compress	0.9000050000 kN 60.800 mm/min	0.0042643 kN	0.0057033 N	4.1678 N	0.00020331 mm	0.87787	2.5426 mm	2.7837	11.703 N
20	Compress	0.9000050000 kN 100.00 mm/min	0.0013293 kN	0.016376 N	1.1304 N	0.00061134 mm	0.05439	2.2297 mm		
21	Compress	0.9000050000 kN 100.00 mm/min	0.0052612 kN	-0.0019056 N	0.0020 N	0.000002751 mm	0.83095	1.5109 mm	2.4577	-12.931 N
24	Compress	0.910000 kN 100.00 mm/min	0.010736 kN	0.84822 N	10.736 N	-0.00051813 mm	36.406	331.12 mm		
25	Compress	0.910000 kN 100.00 mm/min	0.010667 kN	0.83413 N	11.022 N	0.0037626 mm				
26	Compress	0.915000 kN 100.00 mm/min	0.016553 kN	1.8790 N	10.540 N	0.0053565 mm	57.400	221.37 mm		
27	Compress	0.920000 kN 100.00 mm/min	0.020904 kN	1.1337 N	21.215 N	0.0044708 mm	84.069	318.88 mm		
28	Compress	0.950000 kN 100.00 mm/min	0.051226 kN	1.8397 N	51.642 N	0.0081818 mm	599.1	626.58 mm		

Extensive library of standard results and test set ups ■

Create your own custom test via a unique user interface ■

Built in statistical analysis and SPC functions ■

Reporting and Exporting Data

NEXYGEN Plus 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.

PROBES, FIXTURES & GRIPS

	Description	Sizes
Probes	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, 1/4 in, 1/2 in, 3/4 in, 1 in, 1 1/2 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, in, in, 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

	Description	Details
Jigs & Fixtures	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	

	Description	Details
Cosmetics & Packaging	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 jigTG112	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. We provide a complete solution to meet your need.

TECHNICAL SPECIFICATIONS

	TA1	LTCM Series	DFS II Series
Force Capacity	100 kg (225 lbf)	50 kg (110 lbf) to 250 kg (550 lbf)	10 kg (25 lbf) to 200 kg (500 lbf)
Maximum Crosshead travel (Between Eye Ends)	500 mm (19.7 in)	394 mm (15.5 in) to 750 mm (29 in)	-
Load Cell Accuracy	+/- 0.5% from 1% to 100% of load cell value	±0.1 % full scale	±0.1 % full scale
Throat Depth	180 mm (7.1 in)	130 mm (5.125 in)	-
External Inputs	Digital & Analogue	NA, gauge dependent	Digital
Crosshead Speed Range (at full load)	0.01 - 2032 mm/min (0.0004 - 80 in/min)	0.08 to 8.3 mm/s (0.2 to 20 in/min)	-
Maximum Return Speed	2032 mm/min (80 in/min)	8.3 mm/s (20 in/min)	-



ALL TA1 SYSTEMS INCLUDE
 BASE TABLE, 12.5 MM
 (0.5 IN) CYLINDER PROBE
 AND STAINLESS STEEL
 DRIP TRAY ■

ABOUT AMETEK

AMETEK Test & Calibration Instruments

A business unit of AMETEK Measurement & Calibration Technologies offering the following industry leading brands for test and calibration instrumentation.

LLOYD Materials Testing

Materials Testing Solutions

Materials testing machines and software from Lloyd Instruments guarantee the highest level of performance and capability for production testing, quality control, laboratory testing, research and education to provide expert materials testing solutions.

Davenport Polymer Test Equipment

Allows critical polymer parameters to be determined, including melt flow index and melt flow rate, intrinsic viscosity (IV) measurement of moisture-sensitive PET polymers and polymer density measurement.

Texture Analysers

The comprehensive program provides the platform to perform rapid, general food testing and detailed texture analysis on a diverse range of foods.

Chatillon Force Measurement

Chatillon has been a hallmark in the industry since 1835. The hand held gauges and motorized testers have earned their reputation for quality, reliability and accuracy and they represent the de facto standard for force measurement.

Newage Hardness Testing

Newage offers a comprehensive range of hardness testers, durometers, optical systems and software for measurement, data acquisition and analysis.

JOFRA Calibration

The inventor of the portable high precision dry-block temperature calibrators. The calibration instruments program also covers precision thermometers and temperature baths, temperature sensors handheld instruments for pressure calibration and process signal calibrators for easy control loop calibration, measurements and simulation.

M&G Calibration

Pneumatic floating-ball or hydraulic piston dead weight testers with accuracies to 0.015% of reading.

AMETEK[®] TEST & CALIBRATION INSTRUMENTS

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