

- High-quality Force Measurement Instruments
- High-precision Universal Test Machines
- Extensive range of grips, jigs, probes and fixtures
- Application expertise and customized solutions

MATERIALS
TESTING AND
FORCE GAUGES.

MEASURING UP TO **YOUR STANDARDS**
– EASY AND ACCURATE SOLUTIONS
TO THE CHALLENGES
YOU FACE EVERY DAY ■



About Us

AMETEK Test & Calibration Instruments is one of the world's leading manufacturers and developers of instruments for testing the tensile strength, compressibility, hardness, elasticity, peeling and adhesion ability of a wide range of materials. Our product portfolio spans from handheld Force Gauges up to 150 kN Universal Testing Machines and from Polymer Testers to Food Texture Analyzers.

Lloyd Instruments Universal Testing Machines are used to determine the physical and mechanical properties of raw materials and components, as well as for product testing of finished goods.

Chatillon is a leading manufacturer and global supplier of Force Measurement Instruments and Testers for use in production, quality and R&D in a host of applications and markets.

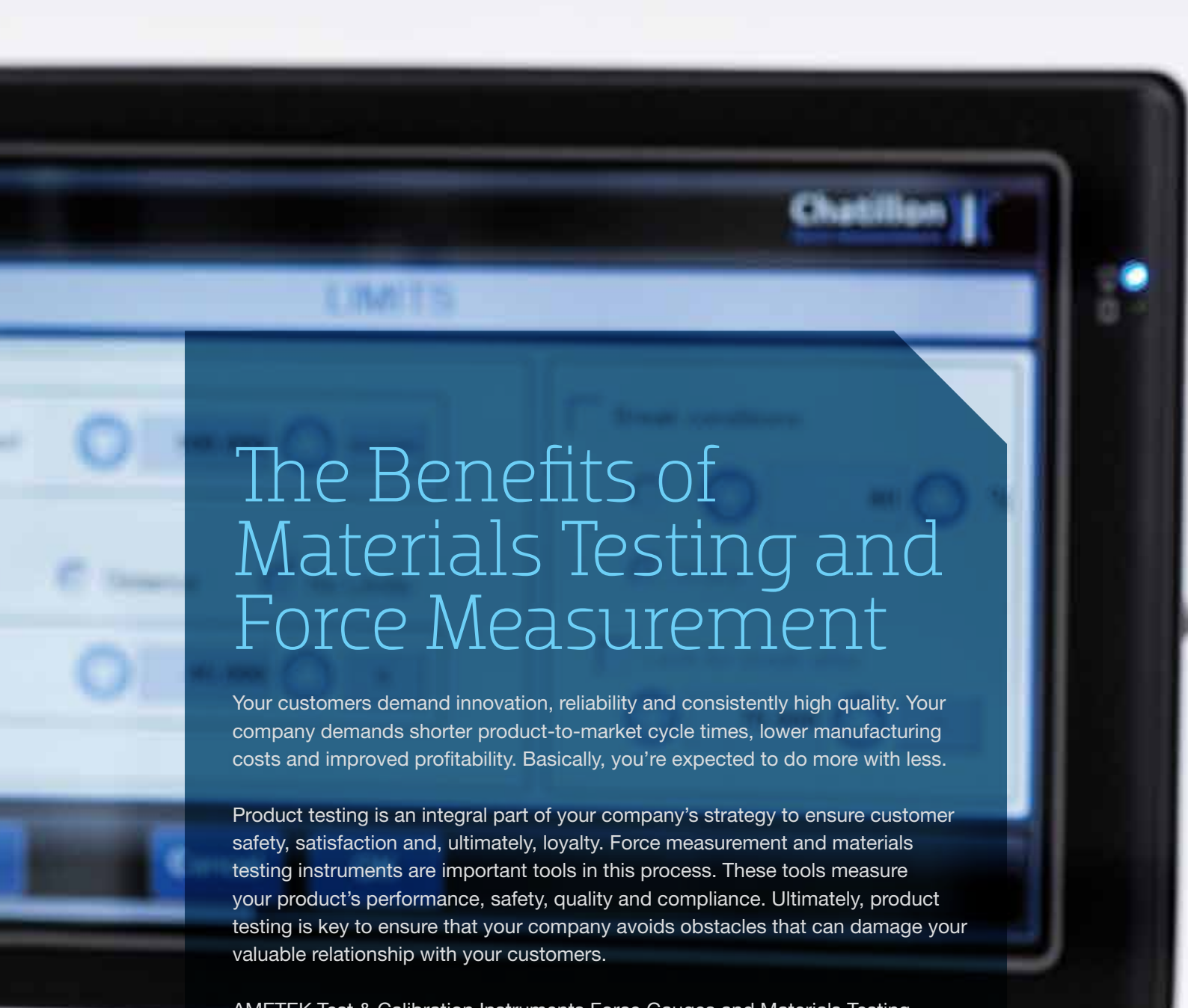
Davenport Polymer Testers are used in the polymer and plastics industry for quality conformity of incoming polymers and process control, as well as for testing and validating finished products.

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CUSTOMIZED TEST SOLUTIONS
ARE OUR SPECIALTY
– NO MATTER YOUR TEST NEED,
WE'LL GIVE YOU
THE RIGHT **SOLUTION.**



The Benefits of Materials Testing and Force Measurement

Your customers demand innovation, reliability and consistently high quality. Your company demands shorter product-to-market cycle times, lower manufacturing costs and improved profitability. Basically, you're expected to do more with less.

Product testing is an integral part of your company's strategy to ensure customer safety, satisfaction and, ultimately, loyalty. Force measurement and materials testing instruments are important tools in this process. These tools measure your product's performance, safety, quality and compliance. Ultimately, product testing is key to ensure that your company avoids obstacles that can damage your valuable relationship with your customers.

AMETEK Test & Calibration Instruments Force Gauges and Materials Testing Instruments meet these demands - we help you deliver dependable, reliable and quality products that meet your internal requirements as well as international standards. We offer a comprehensive product line engineered to be easy to set up, easy to operate and even easier to maintain.

Markets

Our product range is very versatile and our universal test machines combined with dedicated grips and fixtures can be used to solve a variety of specific test applications.



Applications

- The following section details common applications and key international standards by industry sector.

Our application knowledge and expertise is immense.

If you don't see your application here, please contact us.

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Plastics

The testing of raw materials requires highly accurate and repeatable data to allow preparation of material data sheets. A wide range of grips is available, including pneumatic grips for reducing operator fatigue and constant pressure gripping. Our extensometers enable our customers to

accurately measure parameters such as modulus, yield strength and elongation to failure. For flexural and compression tests, our machines can compensate for load frame and fixture deflection ensuring highly accurate data acquisition.

Test Type	Standard / Application
Tensile strength, elongation to break, yield strength, modulus, Poisson's ratio	ASTM D638, ASTM D1708, ASTM D2990, ASTM D3291, ASTM D3807, ASTM D3846, ASTM D3914, ASTM D4321, ASTM D4475, ASTM D4476, ISO 527, BS 2782, DIN 53504
Compression	ASTM D695, ASTM D2412, ISO 604, BS 2782
Flexural	ASTM D790, ISO 178, BS 2782
Shear	ASTM D732
Friction	ASTM D1894



Products & Components

Testing of products and components often requires test methods that are not based on international standards.

NEXYGENPlus software can be configured for any multi-stage test method that is required. Configurable user access rights and audit trails benefit customers working in the

medical device or pharmaceutical industries.

Markets served include: Medical device, automotive, pipes, building materials, electronics, aerospace, packaging, defence and many more.

Packaging

The testing of packaging requires an extremely versatile materials testing system due to the varying requirements within industries such as pharmaceutical, cosmetics,

food and beverages. A single system from us will allow you to test in compliance with all standards shown below and many more.

Test Type	Standard / Application
Tensile strength, elongation, yield strength	ASTM D882, ISO 527
Static and kinetic coefficients of friction	ASTM D1894, ISO 8295
Tearing strength	ASTM D1004, ASTM D1938, ISO 6383
90° and 180° peeling of heat bonded seals	Seal Strength
Puncture resistance	ASTM D5748, EN 14477
Cardboard compression, flexural, ECT, BCT, FCT, SCT	ISO 5628, ISO 3037, ISO 12048, EN 23035, ISO 9895



Adhesive Tapes

Our LS Series can be configured to test in accordance with the FINAT methods.

Test Type	Standard / Application
180° peel	FTM1
90° peel	FTM2
Low speed release	FTM3
Loop tack	FTM9
Dynamic shear	FTM18



Rubber

Testing of rubber materials commonly requires machines capable of measuring very high strain in addition to testing at temperatures above and below ambient.

We offer extended column machines ideal for rubber applications that are compatible with long travel contacting and non-contacting extensometers.

Thermal chambers for testing between -70°C and +300°C are also available for the study of material properties at temperatures other than ambient.



Test Type	Standard / Application
Tensile	ISO 37, ASTM D412, ASTM D413, ASTM D429, ASTM D4482
Tear	ASTM D624

Metals

The key to accurate metals testing to international standards is the ability to measure the stress and strain to a very high degree of accuracy.

For metals testing, we offer a wide range of extensometers to measure such parameters as Young's modulus and proof stress.

Test Type	Standard / Application
Tensile	EN 10002, EN ISO 8496, ISO 6892, ASTM E8, ASTM A370
N value	ISO 10275
Bending	ASTM E290, ASTM E1012, EN 13523, EN ISO 7438, EN ISO 8491
Erichsen cupping test	DIN 50101

Furnaces for testing metals up to 1200°C are also available. Standard test methods within NEXYGENPlus software allow simple and fast test creation to international standards.



Textiles

The LS Series capability covers the testing of a wide range of textile products including:

Geo-textiles	Knitted products	Ropes
Fibre and yarn	Thermal insulation	Nets
Coated textiles	Non-wovens	Webbing

Test types include:

Seam slippage	Tensile strength
Compressive strength	Puncture resistance
Tear resistance	Trouser tear



Test Type	Standard / Application
Tensile textiles	ASTM D1682, EN ISO 13934, ASTM D1578, EN ISO 13935, EN 29073, EN ISO 2062
Tensile geo-textiles	ASTM D4884, ASTM D4632, ASTM D4595, EN ISO 10319, EN ISO 10321



Test Type	Standard / Application
Compression	I ASTM D3574, ISO 3386, BS 4098
Tensile	ASTM D3574

Foams

Several compression/relaxation tests can be performed on foam samples, measuring the forces at various percentages of compression to international standards.

Paper and Board

Tests such as Z direction fibre strength, bending, friction and compressibility can be easily performed using NEXYGENPlus software. Data from all tests can be combined into a single material properties data sheet.

Test Type	Standard / Application
Tensile wet & dry	EN 1607, EN 1608, ASTM C203
Flexural	EN 12089, ASTM C446, ASTM C203
Compression	EN 826, ASTM C165, EN 1605, EN 12089
Friction	TAPPI

Food

We also supply a dedicated food texture analyser featuring all the benefits of the LS Series and NEXYGENPlus.

Texture analysers are used to measure properties including:

TPA	Consistency	Gumminess
Adhesiveness	Crispness	Hardness
Chewiness	Firmness	Springiness
Cohensiveness	Gel strength	Stickiness



MECHANICAL FORCE GAUGES

LG & DG SERIES



up to 2.5 kN



Mountable



Mechanical



Economical tensile or compression testing

Ideal for a wide range of force testing applications. With their durable plastic housing and ergonomic shape, these gauges fit naturally in the hand for a comfortable and firm grip, even at maximum loads.

Accuracy better than $\pm 0.5\%$ F.S.

Available in lbf, kgf or N units and have a concentric dial that measures clockwise only and rotates 360-degrees for taring. A peak hold switch captures peak readings and can be easily and quickly returned to zero. A mechanical overload feature protects the gauge from damage.

For use in hazardous environments

HYDRAULIC GAUGES

ERICHSEN WUPPERTAL



Economical force measurement

Hydraulic Gauges are a low-cost method for obtaining general force measurements. With a wide range of styles and sizes, these gauges are popular in many industries and particularly popular for use in hazardous environments.

For use in hazardous environments

The hydraulic gauges can be used for occasional force checks, continuous loading, or permanent installation. Every model has a robust construction and most are suitable for use in rough operating conditions on machines and in production.

Range of styles to meet every need

ERGONOMIC GAUGES

MSE & DMG SERIES



up to 2.5 kN



Mountable



Mechanical



Accuracy better than $\pm 0.5\%$ F.S.

Ideal for functional capacity evaluations and basic muscle strength measurements where economy and ease-of-use are essential. Compact and easy-to-use, these gauges are designed for use in physical, occupational and sports medicine applications and general patient assessment in family, neurological and orthopedic practices.

For use in hazardous environments

Simplicity is a key design criterion for these gauges. A large, easy-to-read dial indicator displays peak strength and a variety of testing fixtures are optionally available. These mechanical force gauges are an excellent and economical solution for tensile or compression testing.

Application kits available

DIGITAL FORCE & TORQUE GAUGES

DF II SERIES



A new era in force measurement
– best price performance of any digital force gauge available



up to 2.5 kN



Traceability



Mountable



Digital



Analysis Software

■ **Accuracy**
up to $\pm 0.1\%$ F.S.

■ **Sample rate**
up to 10 KHz

■ **Advanced functions**

Impressive handheld gauges that meet the ever increasing industry demands for rapid data acquisition and shorter test cycles. These powerful, yet user-friendly gauges are designed for either handheld use or test stand mounting and provide accurate measurements that are required in quality testing to determine the strength or functionality of a part or product.

The DF II Series boasts a large, easy-to-read, high resolution LCD display, as well as a varying range of functions, including normal and peak readings. One of the models can be equipped with integral load cells or smart remote sensors for load measurement or torque measurement. Chatillon DF2 Wedge Communication Software is an option if advanced data analysis is needed.

MECHANICAL TEST STANDS

MT SERIES



up to 2.5 kN



Mountable



Mechanical



■ Tensile, compression, peel & flexural testing

■ For use with DF II Series Force Gauges

■ Extended column heights available

Easy-to-use solutions for force measurement applications. Features an innovative, compact and lightweight design that maximizes working space and simplifies operation and maintenance.

The single column design with a 150mm (6 in) throat is ideal for large specimens and the removable platen is designed to accommodate metric as well as imperial threaded fixtures. The test stand comes with a standard 6-inch stroke (longer strokes available as special order) and it can be bench mounted, wall mounted or even positioned horizontally.

MOTORIZED TEST STANDS

LTCM SERIES



up to 2.5 kN



■ Tensile, compression, peel & flexural testing

■ For use with DF II Series Force Gauges

■ Ideal for busy production environments

Economical, motorized testers optimized for production floor operation and when combined with a DF II Series digital force gauge, it provides users with an easy-to-use testing system. The series is ruggedly built and the control panel is designed to promote simple operation. The LTCM Series features a large working area and a 5 in (130mm) throat ideal for large sample sizes.

Crosshead travel is controlled from a simple console or using an optional footswitch controller. The series is very flexible with a crosshead speed of up to 20 in (500mm) per minute and a travel distance of up to 29 in (750mm). When combined with a Chatillon DFS II Series force gauge, you have a force measurement system with load accuracy of better than 0.1% Full Scale.

DIGITAL FORCE TESTERS

CS SERIES

Robust & reliable

– designed specifically for use in production environments



up to 5 kN



Traceability



Digital



Analysis Software



Ready for Use

■ **Accuracy**
up to $\pm 0.10\%$ F.S.

■ **Dust-protected & splash-proof touch screen**

■ **One click operation**

Revolutionary systems optimized for production testing applications, including medical devices, plastics, packaging, textiles, rubber and electronics to name a few. No personal computer is required, no proprietary software is required, and no knowledge of programming languages is required.

The Series provides you with an easy-to-use, intuitive and straight-forward method for tensile testing, compression testing, sheer testing, flexural testing, peel testing or advanced multi-stage testing that conform to ISO or ASTM testing procedures. With its one click operation on a robust and reliable touch screen, the CS Series is an excellent choice for simple testing applications.

MATERIAL TEST AND DATA ANALYSIS SOFTWARE



Analysis Software

NEXYGEN *PLUS*

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.

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
- + 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 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 international standards.

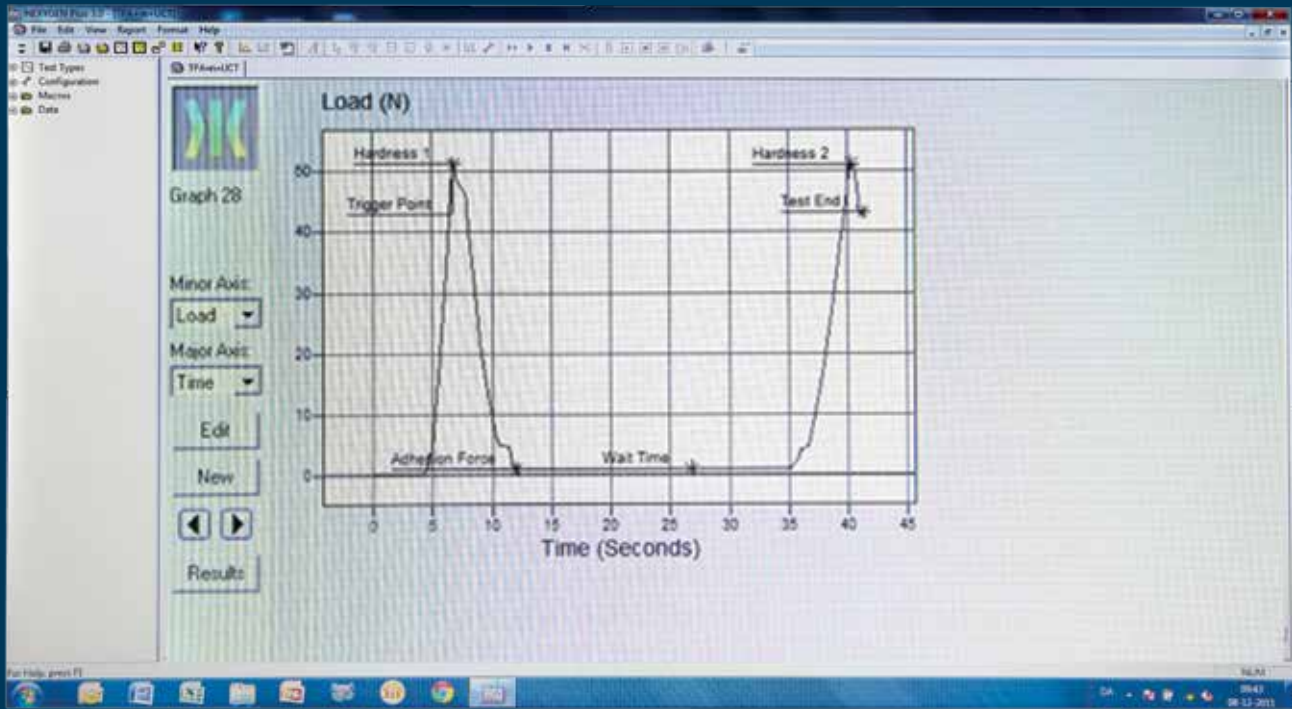
Our philosophy is to offer a complete standards library to every customer, in addition to complete test wizards for tension, compression, tearing, peeling, friction and flexural tests.

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

Video 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.

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.

APPLICATION-SPECIFIC TESTING MACHINES

Specific needs, unique solutions
– experts in designing test solutions that work for you



up to 1 kN



Traceability



Mountable



Digital



Analysis Software



Ready for Use

Friction Tester

The FT1 friction tester is a perfect choice to easily measure static and kinetic coefficients of friction.

It conforms to international standards for friction testing including ASTM D1894, ISO 8295 and TAPPI T549.

Texture Analyser

The TA1 texture analyser is a cost effective, easy to use solution for performing rapid, detailed texture analysis tests. An extensive range of jigs, probes and fixtures designed from years of experience is available. In addition, the machine can be fitted with multi-purpose grips for testing the strength and integrity of food packaging.

SINGLE COLUMN TESTING MACHINES

LS SERIES

Extraordinary versatility
– the right solution for a multitude of industries and applications



up to 5 kN



Traceability



Mountable



Digital



Analysis Software



Ready for Use

■ Accuracy +/- 0.5% down to 1% of load cell

■ For quality control, education and R&D

■ Modern linear guide technology

High-precision solutions that, when combined with our extensive range of grips, fixtures, extensometers and software, create a powerful materials testing system. Suitable for a wide range of applications and test types, including medical devices, plastics, packaging, textiles, rubber and electronics to name a few.

The series features an integral control console with a multi-function keypad and an easy-to-read backlit LCD to display load and extension information. The control console displays prompts and menus, which guide you through machine operations. It can work as a standalone system but when used in collaboration with NEXYGEN*Plus* software it allows the operator to control and monitor all aspects of the system from a single front end.

TWIN COLUMN BENCH MOUNTED

Extraordinary versatility
– the right solution for a
multitude of industries and
applications



up to 100 kN



Traceability



Mountable



Digital



Analysis Software



Ready for Use

■ Data sampling rate
1000Hz

■ For simple to complex
multi-stage tests

■ Extended models
available

Designed to measure medium or high force ranges and excellent for tension and compression testing where high precision is required. The series can carry out tensile, compression, flexural, friction, insertion/extraction, peeling, tearing or cyclic tests on a wide variety of materials or components.

Combines high performance and flexibility with exceptional ease of use. Equally designed for routine quality control testing and for performing complex multi-stage tests. A comprehensive range of grips and fixtures is available to accommodate specific test specimens. The series can work as a standalone system but when used in collaboration with NEXYGEN*Plus* software, the operator can control and monitor all aspects of the system from a single front end.

TWIN COLUMN FLOOR STANDING



From routine to complex
– flexibility and high performance testing on the largest samples



up to 150 kN



Traceability



Mountable



Digital



Analysis Software



Ready for Use

■ Data sampling rate
1000Hz

■ Extended models
available

■ High accuracy
load measurement

Incorporates an extensive range of features making these units ideal for performing complex, as well as routine, testing applications on very large materials. The LR Series machines are floor standing models and they feature a twin-column design with a crosshead travel range of 1150 mm (45.3 in).

The high stiffness frame incorporates a crosshead guidance system to prevent side loading of the sample under test. The twin-column floor-standing machines can work as a standalone system but when used in collaboration with NEXYGEN*Plus* software, the operator can control and monitor all aspects of the system from a single front end.



GRIPS, JIGS, FIXTURES & PROBES

Throughout our years in business, we have designed many solutions to meet our customers' specific needs.

We supply an extensive variety of accessories for our entire product range, including **adapters** used for tensile and compression testing, **cables** and force gauge **adapter kits** designed to ensure proper centerline alignment. We also feature a large selection of **grips**, **fixtures**, **jigs** and **probes**.

If we don't have it, we can probably make it, so you are welcome to ask our applications experts for guidance on your specific application.



EXTENSOMETERS

We provide a wide variety of general purpose **Contacting Extensometers**, in just the size you need. These extensometers are designed for accurate strain and extension measurement of a wide range of materials such as semi-rigid plastics, rubbers, wire, cable, textiles and more, up to a maximum sample thickness of 25 mm. These contacting extensometers are also available as **Long Travel Extensometers**, ideal for use when testing high-elongation materials.

A wide range of **Deflection Gauge Extensometers**, which measure deformation in three and four point bend tests and in compression testing applications, is also available.

The non-contacting **Video Extensometer** is suitable for both the measurement of material constants as well as "long travel" applications. The equipment is mounted on an adjustable frame which is attached to the tensile testing machine. It is thus possible to adjust the video extensometer to the optimal position within the chosen work area. The video extensometer is available with eight different lenses to ensure optimal focus.



POGOS & SPLINTER SHIELDS

POGO Test Frames are unique to AMETEK TCI. By fitting the POGO frame below the machine base it becomes possible to test very large samples – up to 2 x 2 m (78.7 x 78.7 in) in size.

There is also an added benefit of optional elevated and low temperature testing capability. POGO test frames are available for all single-column and twin-column bench-mounted test machines.

Splinter Shields are available to protect the user when testing brittle samples which are liable to fragment.

These shields help prevent sample splinters from leaving the test area when performing a test. Sliding shields are lowered onto the test area once the sample is mounted. Hinged shields can be easily opened, allowing full access to the test area from the front or back of the machine. Splinter Shields are available for single-column and twin-column (both bench and floor models) test machines.



FURNACES & THERMAL CABINETS

Our high temperature vertical split **Furnace** with a temperature range from 50 to 950°C can be used with all of our twin-column test machines.

The electrical heating elements are wound in three zones, which may be independently balanced to linearize the temperature over the full length of the unit. The Furnace is controlled by a sophisticated temperature control unit that is housed in a separate control console.

Designed for testing samples under predefined temperature conditions, we offer a range of **Thermal Cabinets**, providing a temperature range from -70 to 300°C within a large general purpose test area.

The cabinets have a glass observation panel in the front door that allows the specimen to be inspected during test. The cabinets are mounted on wheels on an independent base unit. Normal ambient tests are possible, when the cabinet is moved in rear position, clear of the test machine crosshead.

Thermal cabinets can be used with all of our twin-column test machines (both bench and floor models).

POLYMER TESTER

PETPLUS

**The preferred
IV measurement method**
– Save costs, save time,
focus on safety



■ Ideal for QC and R&D

■ Simple set-up

■ Small footprint

A unique test instrument designed for fast and safe solvent-free intrinsic viscosity (IV) measurement of moisture-sensitive polyethylene terephthalate (PET). Existing solvent methods for determining IV involve the need to handle and dispose of toxic solvents.

The PETPlus method is both kinder to the environment and saves on the high costs of purchase and disposal of solvents.

Unlike other IV measurement instruments, the PETPlus can test polymers at virtually all stages of the process: from incoming resin, powder, dry granules, molten polymer, preforms, PET bottles, films and even re-ground material, thereby eliminating scrap.

POLYMER TESTER

MFI SERIES



■ **Test according to international standards**

Used to determine the melt flow rate of a polymer by extruding it in a molten state through a calibrated die using a reference weight.

The MFI-9 is a competitively-priced product, which achieves high accuracy, repeatability and reproducibility of results. The MFI-9 Indexer is ideal for low volume users who require high quality.

■ **Manual or fully automatic testing**

The MFI-10 is an intelligent, modular system, which offers flexibility of testing and increased automation. The main base unit can be configured for either manual or fully automatic testing.

■ **Extended column heights available**

POLYMER TESTER

DENSITY COLUMN



■ **Simple set-up, operation and maintenance**

Davenport Density Measuring Columns are designed to measure the density of solid materials, notably plastics, according to the most commonly used international standards.

■ **Complies with international standards**

It can also be used to make a quick comparative test, ideal for discerning density differences between similar materials.

■ **Accepts mains water**

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 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.

Chatillon Force Measurement

Chatillon has been a hallmark in the industry since 1835. The handheld 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.

Crystal Pressure

Digital pressure gauges and calibrators that are accurate, easy-to-use and reliable. Designed for use in the harshest environments; most products carry an IS, IP67 and DNV rating.

M&G Calibration

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

AMETEK[®] TEST & CALIBRATION INSTRUMENTS

United Kingdom

Tel +44 (0) 1243 833 370
Mail uk-far.general@ametek.co.uk

France

Tel +33 (0)1 30 68 89 40
Mail general.lloyd-instruments@ametek.fr

Germany

Tel +49 (0) 2159 9136 510
Mail info.mct-de@ametek.de

Denmark

Tel +45 4816 8000
Mail ametekdk@ametek.com

USA

Tel +1 (727) 536 7831
Mail chatillon.fl-lar@ametek.com

India

Tel +91 22 2836 4750
Mail ametekdk@ametek.com

Singapore

Tel +65 6484 2388
Mail uk-far.general@ametek.co.uk

China

Beijing
Tel +86 10 8526 2111
Mail lloyd@ametek.com.cn

Shanghai

Tel +86 21 5868 5111
Mail lloyd@ametek.com.cn

Guangzhou

Tel +86 20 8363 4768
Mail lloyd@ametek.com.cn