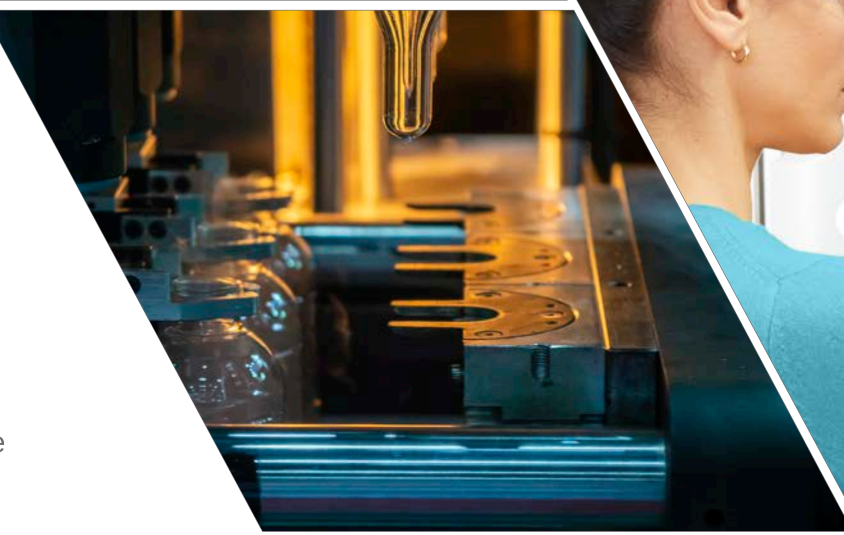
PLASTICS TESTING SOLUTIONS

Trusted by Scientists, Engineers, and Quality Managers Worldwide

INSTRON®



LEADER IN PLASTICS TESTING SOLUTIONS

As a global leader in mechanical testing, Instron® partners with most of the world's largest plastics manufacturers to implement and optimize their testing programs. Our applications experts are well-versed in current plastics standards while our global service organization is ready to provide support to your laboratories at the local level, no matter where they are in the world.

Tension and Compression

Melt Flow and Rheology

Fatigue and Fracture

Impact

OUR PRODUCTS

Our extensive suite of testing equipment enables you to perform all testing necessary to accurately produce and verify material data sheets, including melt flow and HDT / Vicat testers; drop weight impact testers, universal testing machines for tensile, compression, and flexural testing; dynamic testing systems for slow-speed and high-frequency fatigue testing; and pendulum systems for Charpy, Izod, and tensile impact testing.

PLASTICS TESTING SOLUTIONS

For Every Part of the Process

HDT AND VICAT TESTING

Instron's HDT and Vicat test systems are used to characterize the behavior of plastic materials at high temperatures, complying with a variety of ISO and ASTM standards. Available in multiple sizes to fit a range of throughput requirements, these systems are designed to increase productivity, offering oil degradation control, melt protection, and efficient cooling.

ASTM D1525 • ASTM D648 • ISO 306 • ISO 75

RHEOLOGY TESTING

Instron’s capillary rheometer systems are designed for both R&D and advanced quality control of thermoplastic materials, and accurately determine the rheological properties of polymer samples over a wide range of shear rates and testing conditions. This includes melt strength, die swell, and PVT behavior, allowing you to simulate processes such as injection molding, extrusion, blow molding, and film blowing.

ASTM D3835 • ISO 11443

MELT FLOW TESTING

Instron’s MFi Series melt flow index testers are specifically designed for easy and accurate measuring of melt flow rate (MFR) and melt volume rate (MVR) according to melt flow rate testing procedures determined by ASTM D1238 and ISO 1133 standards.

ASTM D1238 • ISO 1133 - 1 • ISO 1133 – 2

PLASTICS TESTING SOLUTIONS

For Every Part of the Process

TENSILE, COMPRESSION, FLEXURE TESTING

Instron's latest generation 3400 and 6800 Series universal testing machines are highly adaptable to perform tensile, compression, bend, peel, tear, shear, friction and puncture testing. These systems are compatible with hundreds of interchangeable accessories, such as grips, fixtures, extensometers, and environmental chambers for testing at non-ambient temperatures.

ASTM D1004 • ASTM D1621 • ASTM D1708 • ASTM D1894 • ASTM D3574 • ASTM D6272 • ASTM D638 • ASTM D695 • ASTM D790 • ASTM D882 • ASTM F1306
ISO 11897 • ISO 178 • ISO 527 • ISO 604 • ISO 6383-1 • ISO 8295

OPTIMIZE YOUR THROUGHPUT

Instron's automated testing systems empower labs to improve throughput, repeatability, and safety while freeing up skilled operators to focus on more complex and creative tasks. Available as either a complete turnkey solution or as modules fitted to existing Instron testing instruments, both options are tailored to your program's specific requirements. Instron automation solutions provide the broad control and handling capabilities needed to test a wide range of applications and comply with common plastics and film testing standards.

PLASTICS TESTING SOLUTIONS

For Every Part of the Process

PENDULUM IMPACT TESTING

The 9050 Series is capable of performing Charpy and Izod tests according to international standards. Instron pendulums are designed to meet the growing demand for accurate and repeatable impact testing on a wide range of materials and finished products for both QC and R&D.

ASTM D1822 • ASTM D256 • ASTM D6110 • ISO 179-1 • ISO 179-2
ISO 180 • ISO 8256 • ISO 9854-1

DROP WEIGHT IMPACT TESTING

Designed for R&D and advanced quality control, Instron's 9400 Series drop weight impact testing machines are used to determine the energy required to break or damage a material from a specific height and with a specific impact energy and velocity.

ASTM D2444 • ASTM D256 • ASTM D3763 • ASTM D5628 • ASTM D6110 • ASTM D7192
ISO 11343 • ISO 179-2 • ISO 180 • ISO 6603-2 • ISO 7765-2 • ISO 8256

DYNAMIC AND FATIGUE TESTING

Instron's ElectroPuls systems use patented linear motor technology to perform slow-speed static and high-frequency fatigue testing on a wide variety of materials and components. ElectroPuls systems are designed to test plastics at both ambient and non-ambient temperatures to all major national and international standards.

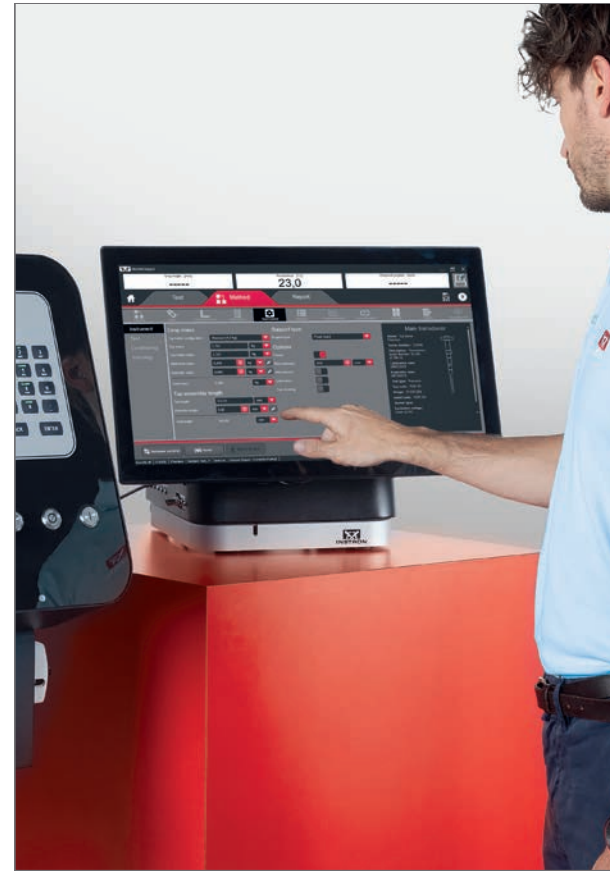
ASTM D623 • ASTM D7774 • ASTM D7791 • ISO 18489

THE BLUEHILL® ADVANTAGE

Intuitive Workflows Across All Your Testing Systems

Common Software Interface

Many of Instron's plastic testing systems are operated with Bluehill software – a built-for-touch architecture designed with large touchpoints, easy-to-understand icons, and intuitive workflows to make it easy to train new operators across a wide range of equipment

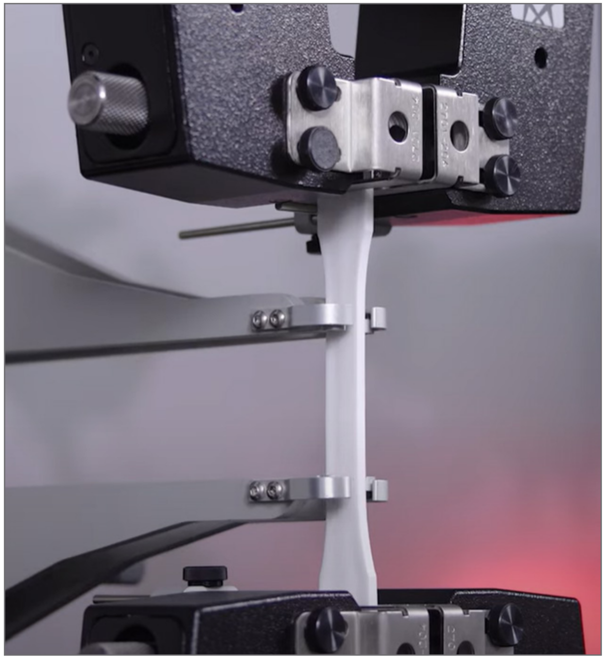


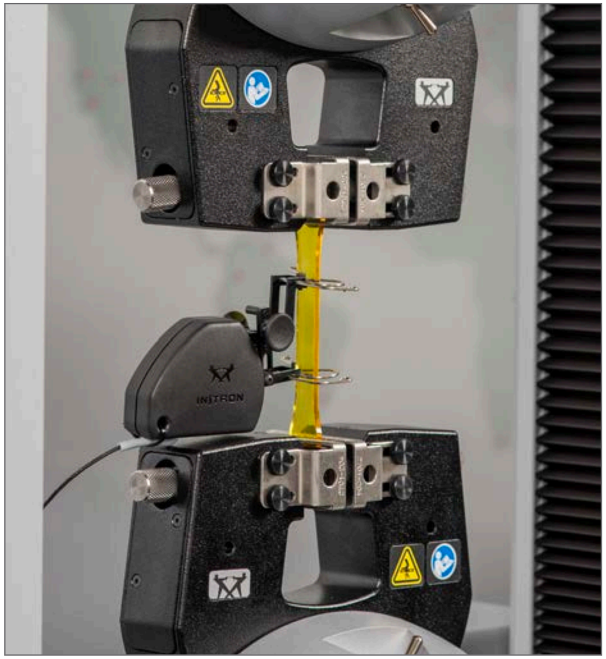
The Power of Bluehill

Bluehill is designed for simplicity, but it’s packed with powerful features – such as pre-configured test methods for some of the most commonly used ASTM and ISO standards, including ASTM D638 for tensile testing, ISO 179 for Charpy impact, and ISO 1133 for melt flow. You can also set up step-by-step instructions in your methods for greater repeatability, customize your workspace, configure permissions with Bluehill security, customize your export settings, and so much more.

STRAIN MEASUREMENT

Extensometers for Plastics Testing





Non-Contacting Video

The AVE 2 non-contacting video extensometer measures deformation optically by tracking the movement of two marks on the specimen. Meeting the requirements of many of the most rigorous plastics testing standards, including ASTM D638 and ISO 527-2, the AVE 2 can be used on all types of materials ranging from rigid plastics to high-elongation polymers, and can be used with environmental chambers and digital image correlation software.

Automatic Contacting

The need for increased specimen throughput has created a demand for faster, more reliable, and more accurate materials testing routines. Automatic contacting extensometers provide this capability by enhancing the productivity of testing laboratories that can take advantage of the automatic gauge length positioning feature, as well as the automatic attachment to the test specimen. The AutoX750 conforms to the most rigorous plastics testing standards, including ISO 527-2 and ASTM D638.

Clip-On

Clip-on extensometers for static testing offer speed of attachment and ease of use. Their light-weight, rugged cross brace design eliminates errors caused by physical distortion, while built-in protection ensures that damage is not caused by over-extension. The low operating-force arms of the extensometer reduce the possibility of knife-edge slippage when testing hard or smooth surfaced materials. Instron clip-on extensometers conform to the most rigorous plastics testing standards, including ISO 527-2 and ASTM D638.

NON-AMBIENT TESTING

Instron's 3119-600 Series environmental chambers provide extensive temperature testing capabilities for evaluating material properties under non-ambient conditions.

Test materials at temperatures ranging from **-100 °C** to **600 °C**

FLEXIBILITY BY DESIGN

Application-Based Testing Solutions

Instron universal systems are compatible with hundreds of grips and fixtures found in Instron's expansive accessories catalog, with specific configurations designed to perform many of the most popular ASTM and ISO tests.

01 Pneumatic Side Action Grips

02 Mechanical Wedge Action Grips

03 3-Point Bend Fixture

04 Compression Platens

05 Variable Angle Peel Fixture

06 Self-Tightening Roller Grips

07 Fatigue-Rated Wedge Action Grips

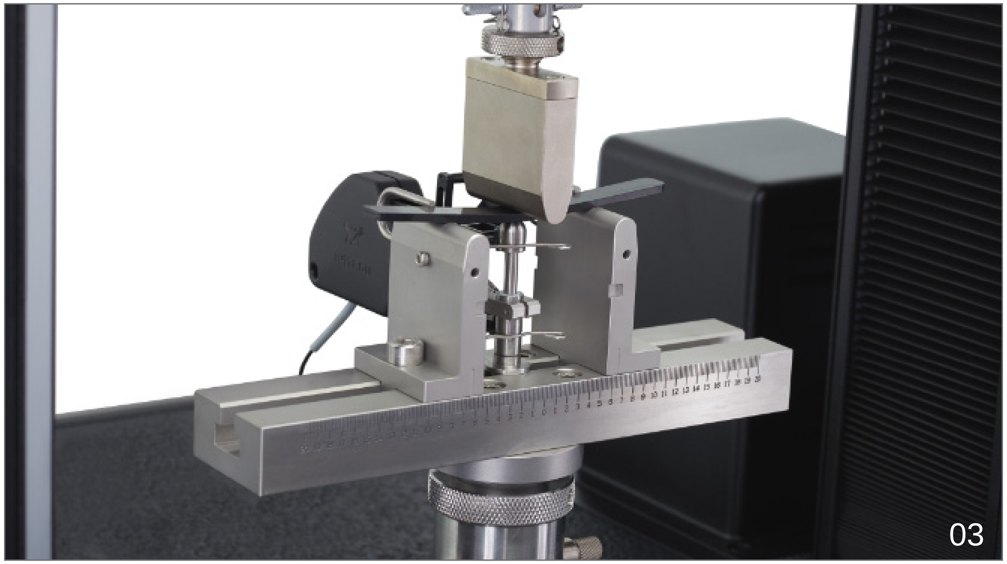
08 Coefficient of Friction Fixture

09 Long Travel Extensometer

10 Puncture Burst Fixture

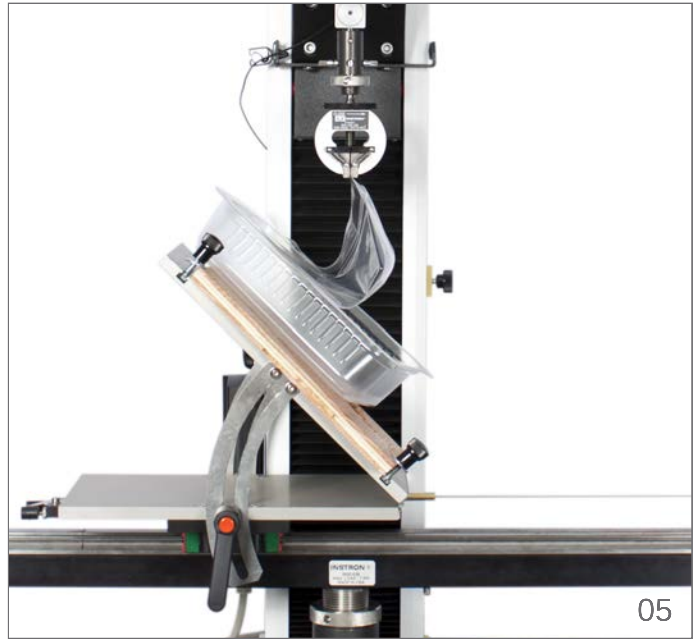
01

02



03


04


05


09


06

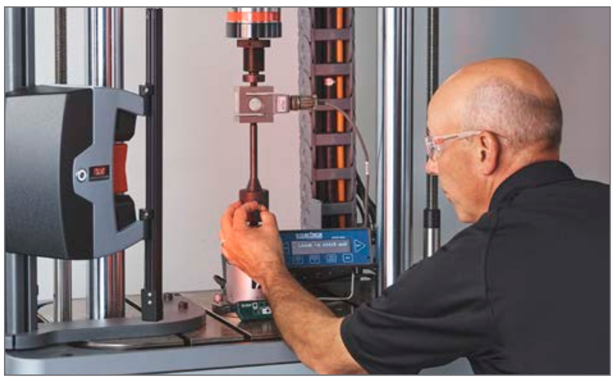

07


08


10

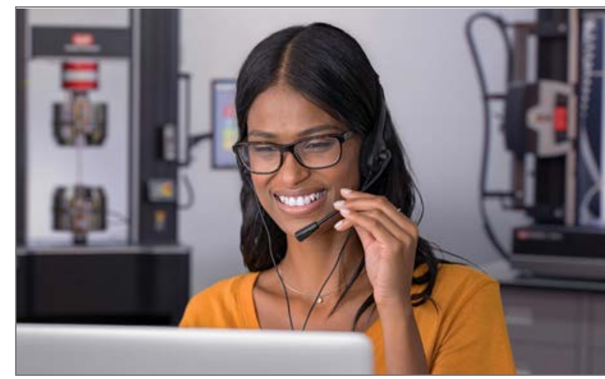
OUR PROMISE: WITH YOU EVERY STEP OF THE WAY

With over 300 field service engineers spread across every major market, Instron has all the tools, services, and staff needed to offer you exceptional personalized support. Our global team is on hand to help you achieve your objectives, from regular preventative maintenance and calibration of testing instruments to application support and training. Partnering with Instron will extend the life of your investment, minimize downtime, and reduce the cost of equipment ownership while streamlining your testing processes and helping to future-proof your testing.



CALIBRATION

PREVENTATIVE MAINTENANCE



TECH SUPPORT AND TRAINING

CONNECTED SERVICES

REPAIR AND REFURBISHMENT

SYSTEM UPGRADES AND RETROFITS

GLOBAL COVERAGE, LOCAL EXPERTISE

We are regionally close to our customers with **1,500+ worldwide employees**

We speak **40+ languages** with documentation in 20+ languages

Sales in **120** countries with **250+ field service engineers** globally

○ Manufacturing + Sales & Service Office ● Operations + Sales & Service ■ Office Sales & Service Office

FIELD SERVICE ENGINEERS AROUND THE WORLD

193 AMERICAS

161 EUROPE & UK

105 ASIA

SUPPORTED PLASTICS TESTING STANDARDS

For Every Part of the Process

The many standards referenced within this brochure are not intended to be a complete and comprehensive worldwide list of standards; but a list of the most prominent and widely-used in the materials testing industry. Many of the testing solutions discussed are closely related to standards defined by other national, international, and industry-specific standards organizations. For further information, support, or application expertise, please contact your local Instron® office.

HDT AND VICAT TESTING

ASTM D1525	Standard Test Method for Vicat Softening Temperature of Plastics
ASTM D648	Standard Test Method for Deflection Temperature of Plastics Under Flexural Load in the Edgewise Position
ISO 306	Thermoplastic Materials — Determination of Vicat Softening Temperature (VST)
ISO 75	Determination of Temperature of Deflection Under Load

RHEOLOGY TESTING

ASTM D3835	Standard Test Method for Determination of Properties of Polymeric Materials by Means of a Capillary Rheometer
ISO 11443	Plastics - Determination of the Fluidity of Plastics Using Capillary and Slit-Die Rheometers

MELT FLOW TESTING

ASTM D1238	Standard Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer
ISO 1133 - 1	Determination of the Melt Mass-Flow Rate (MFR) and Melt Volume-Flow Rate (MVR) of Thermoplastics - Part 1: Standard Method
ISO 1133 - 2	Determination of the Melt Mass-Flow Rate (MFR) and Melt Volume-Flow Rate (MVR) of Thermoplastics - Part 2: Method for Materials Sensitive to Time-Temperature History and/or Moisture

TENSILE, COMPRESSION, FLEXURE TESTING

ASTM D1004	Tear Resistance (Graves Tear) of Plastic Film and Sheeting
ASTM D1621	Compressive Properties of Rigid Cellular Plastics
ASTM D1708	Tensile Properties of Plastics by Use of Microtensile Specimens
ASTM D1894	Static and Kinetic Coefficients of Friction of Plastic Film and Sheeting
ASTM D3574	Standard Test Methods for Flexible Cellular Materials - Slab, Bonded, and Molded Urethane Foams
ASTM D6272	Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials by Four-Point Bending
ASTM D638	Tensile Properties of Plastics
ASTM D695	Compressive Properties of Rigid Plastics
ASTM D790	Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
ASTM D882	Tensile Properties of Thin Plastic Sheeting
ASTM F1306	Slow Rate Penetration Resistance of Flexible Barrier Films and Laminates
ISO 11897	Packaging - Sacks Made From Thermoplastic Flexible Film - Tear Propagation on Edge Folds
ISO 178	Determination of Flexural Properties
ISO 527 - 2	Determination of Tensile Properties - Part 2: Test Conditions for Moulding and Extrusion Plastics
ISO 527 - 3	Determination of Tensile Properties - Part 3: Test Conditions for Films and Sheets
ISO 604	Determination of Compressive Properties of Plastics
ISO 6383 - 1	Film and Sheeting - Determination of Tear Resistance - Part 1: Trouser Tear Method
ISO 8295	Film and Sheeting - Determination of the Coefficients of Friction

PENDULUM IMPACT TESTING

ASTM D1822	Standard Test Method for Determining the Tensile-Impact Resistance of Plastics
ASTM D256	Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics
ASTM D6110	Standard Test Method for Determining the Charpy Impact Resistance of Notched Specimens of Plastics
ISO 179 - 1	Determination of Charpy Impact Properties - Part 1: Non-Instrumented Impact Test
ISO 179 - 2	Determination of Charpy Impact Properties - Part 2: Instrumented Impact Test
ISO 180	Determination of Izod Impact Strength
ISO 8256	Plastics - Determination of Tensile-Impact Strength (Method A)
ISO 9854 - 1	Thermoplastics Pipes for the Transport of Fluids - Determination of Charpy Impact Properties - Part 1: General Test Method

DROP WEIGHT IMPACT TESTING

ASTM D2444	(Type A, B, and C) Determination of the Impact Resistance of Thermoplastic Pipe and Fittings
ASTM D256	Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics
ASTM D3763	High Speed Puncture Properties of Plastics Using Load and Displacement Sensors
ASTM D5628	(Method FA, FB, FC, FD, FE) Standard Test Method for Impact Resistance of Flat, Rigid Plastic Specimens
ASTM D6110	Standard Test Method for Determining the Charpy Impact Resistance of Notched Specimens of Plastics
ASTM D7192	Standard Test Method for High Speed Puncture Properties of Plastic Films
ISO 11343	Determination of Dynamic Resistance To Cleavage of High-Strength Adhesive Bonds Under Impact
ISO 179 - 2	Plastics - Determination of Charpy Impact Properties - Part 2: Instrumented Impact Test
ISO 180	Plastics - Determination of Izod Impact Strength
ISO 6603 - 2	Plastics - Determination of Puncture Impact Behavior of Rigid - Part 2: Instrumented Impact Testing
ISO 7765 - 2	Plastics Film and Sheeting - Determination of Impact Resistance by the Free-Falling Dart Method
ISO 8256	Determination of Tensile-Impact Strength

DYNAMIC AND FATIGUE TESTING

ASTM D623	Compressive Fatigue Characteristics and Rate of Heat Generation of Vulcanized Rubbers
ASTM D7774	Flexural Fatigue Properties of Plastics
ASTM D7791	Uniaxial Fatigue Properties of Plastics
ISO 18489	Determination of the Resistance Against Slow Crack Growth Under Cyclic Loading - Cracked Round Bar Test Method

Scan the QR Code to visit our **PLASTICS TESTING HUB** and learn more

THE WORLD STANDARD

We stake our reputation on the integrity of data. From the measurement of primary test data to result generation, we design and manufacture the full data integrity chain (e.g. load cells, sensor conditioning, and software). Additionally, we calibrate more than 90,000 of these sensors annually with the lowest accumulated uncertainty.

30,000+

We service and calibrate more than 30,000 Instron systems in active use worldwide every year.

96%

96% of the Fortune 100 list of the world's largest manufacturing companies use Instron test systems.

18,000+

Instron systems have been cited in more than 18,000 patents since 1975.

www.instron.com