

CEAST 9300 Series | Droptower Impact Systems



INSTRON®



CEAST 9300 Series

Droptower
Impact
Systems



Make An Impact

Impact resistance is one of the most important properties for component designers to consider, as well as the most difficult to quantify. Impact resistance is a critical measure of service life and more importantly these days, it involves the perplexing problem of product safety and liability. With the combined experience of Dynatup® and CEAST, Instron® has more than 80 years experience in designing impact testing systems to simulate real-life impact conditions.

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What are you testing?

CEAST 9300 droptower impact systems test a wide range of samples - from finished products to specimens made in accordance with specific standards.

p5

Which system is right for my test?

It's critical to evaluate mass, velocity, height, and energy requirements when choosing a CEAST 9300 Series impact system.

p11

What results do you need?

From basic pass-fail results to automated result calculation and visual curve displays, droptower impact systems are equipped with instrumentation to fit your application needs.

p12

What happens if you have new challenges?

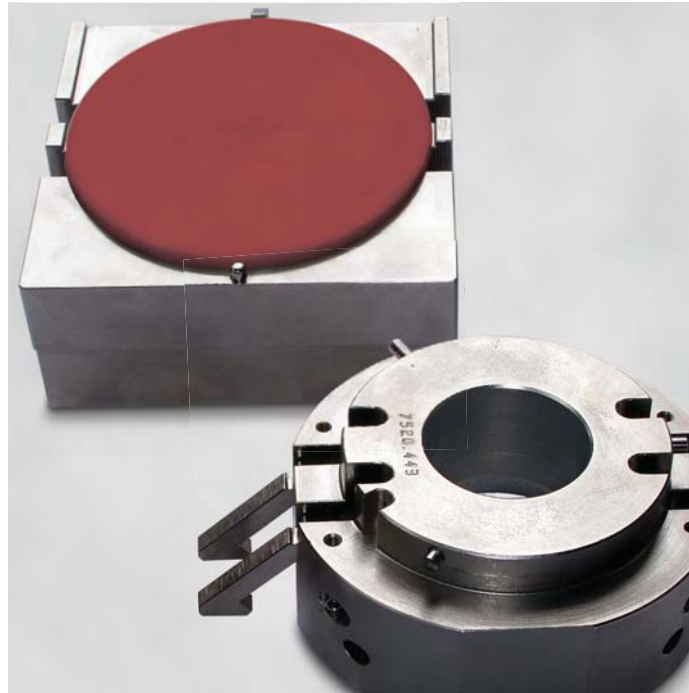
Many options and accessories, both custom and standard, can be created to meet your needs.

Solutions For Your Test

Whether you're testing components or testing to a standard, the CEAST 9300 Series can deliver an impact!



Tensile Impact Fixture



Puncture Fixture



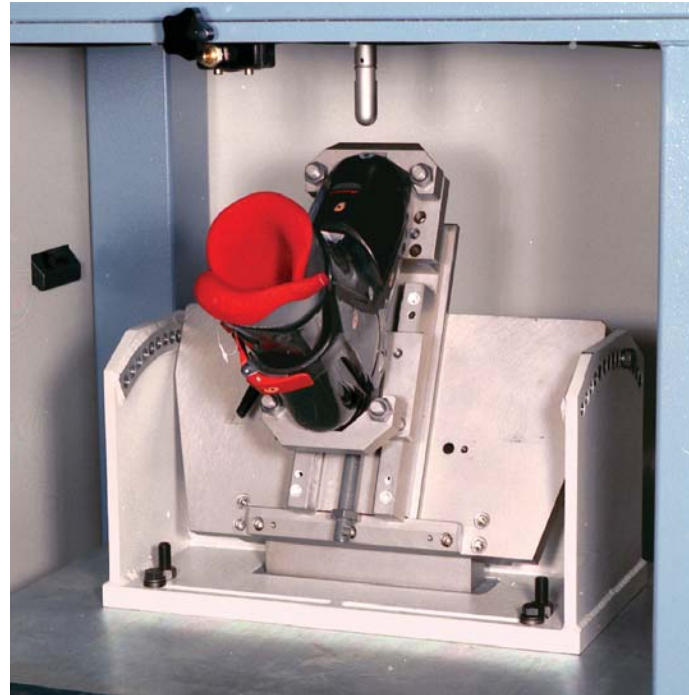
Wedge Peel Fixture

Standards

Impact testing was originally developed to determine the impact behavior of raw materials under high strain rates. Many standards organizations specify detailed testing requirements and test method procedures, and all have the same goal in mind - establishing the amount of energy required to fail a material. Droptower impact systems, fixtures, and tups are designed to meet a wide range of testing standards including: ISO, ASTM, ANSI, Airbus, Boeing, BSI, DIN, EN, FDA, Ford, GM, JIS, NASA, GOST, and more!



Custom Support Fixture for Glasses



Custom Support Fixture for Footwear



V-Block Support Fixture for Pipe Testing

Components

For many materials the act of processing them into a finished part directly affects their impact characteristics. In these cases, standard-based test methods provide little information about how the finished product or component will perform. Instead, R&D engineers must design a test that duplicates real-life applications - such as dropping a cell phone or a hand tool impacting a hard surface. With flexible configuration options, the CEAST 9300 Series enables engineers to simulate these scenarios and quantify impact performance for real-life product use.

Impact Testing Is All About Energy

How much energy does it take to fully break a specimen?
How little energy does it take to begin a failure mode in the specimen?
How much energy did the specimen absorb?

$$E = \frac{1}{2} mv^2$$

Energy equals half times mass times velocity squared

The greater the velocity or mass the higher the impact energy. The slower or lighter the mass the lower the impact energy. Our impact systems use masses ranging from 0.50 - 70.0 kg (1.10 - 154 lbs) and velocities ranging from 0.77 - 24.0 m/s (2.53 - 78.7 ft/s).

Regardless of your energy requirements, we have the system that meets your needs.



CEAST 9310

Energy Range
0.15 - 20.4 J
(0.11 - 15.1 ft-lb)

Impact Speed
0.77 - 3.71 m/s
(2.53 - 12.2 ft/s)

Drop Height
0.03 - 0.70 m
(1.18 - 27.6 in)

Drop Weight
0.50 - 3.00 kg
(1.10 - 6.61 lbs)



CEAST 9340

Energy Range
0.30 - 405 J
(0.22 - 299 ft-lb)

Impact Speed
0.77 - 4.65 m/s
(2.53 - 15.3 ft/s)

Drop Height
0.03 - 1.10 m
(1.18 - 43.3 in)

Drop Weight
1.00 - 37.5 kg
(2.20 - 82.7 lbs)



CEAST 9350 Standard Features

Energy Range
0.59 - 757 J
(0.44 - 558 ft-lb)

Impact Speed
0.77 - 4.65 m/s
(2.53 - 15.3 ft/s)

Drop Height
0.03 - 1.10 m
(1.18 - 43.3 in)

Drop Weight
2.00 - 70.0 kg
(4.41 - 154 lbs)



CEAST 9350 Optional Features

Energy Range
0.59 - 1800 J
(0.44 - 1330 ft-lb)

Impact Speed
0.77 - 24 m/s
(2.53 - 78.7 ft/s)

Drop Height (simulated)
0.03 - 29.4 m
(1.18 - 1160 in)

Drop Weight
2.00 - 70.0 kg
(4.41 - 154 lbs)

CEAST 9310

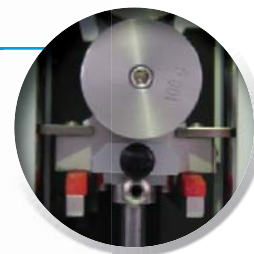
Interlocked transparent safety door allows safe operations (optional)

Two-handed release ensures operator safety

Changeable tups provide versatility for many applications

Various clamping sets enable users to test films, rigid sheets or plaques, to meet a range of test standards.

Threaded holes in the base allow for custom/component support mounting



Easily screw a mass to the front and back of the falling mass to either increase or decrease the potential energy of the system. Falling mass from 0.5 kg (1.1 lbs) to 3.0 kg (6.61 lbs) in increments of 50 g (0.11 lbs).

Easy-to-read scale allows for simple adjustment of the drop height

The pneumatically operated anti-rebound system (optional) allows for single impact or rebound tests



The CEAST 9310 is a tabletop system designed for low-energy impact testing from 0.15 - 20.4 J (0.11 - 15.1 ft-lb), 0.77 - 3.71 m/s (2.53 - 12.2 ft/s) and a drop height of 0.03 to 0.70 m (1.18 - 27.6 in). This compact model can be used to verify the quality of finished or semi-finished raw materials. The standard CEAST 9310 model is uninstrumented for the most basic drop weight tests, but can be fitted with instrumentation to investigate more complex technical problems.

Designed and built to meet most common standards including:

- ISO 7765-2*
- ASTM D3763
- ASTM D5628 Method FD
- ASTM D7192

*For impact velocity up to 3.71 m/s

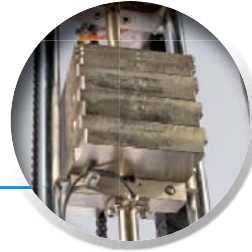
* See our CEAST Impact Accessories Brochure for a complete listing of tups, fixtures, and frame options

CEAST 9340

Motorized crosshead positioning system

Changeable tups and inserts provide versatility for many applications

Fully enclosed and interlocked test area contains the debris for operator safety. This test area can be equipped with an optional thermostatic chamber for testing in high or low temperatures.



Full set of weights deliver a range of impact energies

Optional anti-rebound system prevents secondary impacts



Various support fixtures enable users to test a wide range of specimens and components

The CEAST 9340 is a floor standing system designed to deliver 0.30 - 405 J (0.22 - 299 ft-lb) of energy. The standard model includes basic instrumentation and a conveniently mounted machine controller that enables the operator to run the tower and collect basic data. For more in-depth data, the CEAST impact software and data acquisition system can be added. The CEAST 9340 is suitable for a range of impact applications including tensile impact, penetration tests on plates and films, Izod, and Charpy tests.

Designed and built to meet the most common standards including:

ISO 3127	ASTM D3763
ISO 6603	ASTM D5628
ISO 7765	ASTM D7136
ISO 11343	ASTM D7192
ISO 8256	Boeing BSS 7260
PR EN6038	Airbus AITM 1.0010
DIN 53373	Airbus AITM 1-0057
ASTM D2444	SACMA SRM 2R-94

CEAST 9350

Standard Features

The CEAST 9350 is a floor standing system designed to deliver 0.59 - 757 J (0.44 - 558 ft-lb) of energy. As the premier model in the CEAST 9300 line, this model includes many time saving features and supports a large variety of options - from chambers to extra energy. The CEAST 9350 works with our impact software and data acquisition system to make analysis simple. This versatile instrument can be used to test anything from composites to finished products, and is suitable for a range of impact applications including tensile impact, puncture, Izod, and Charpy.

Designed and built to meet the most common standards including:

ISO 3127	ASTM D3763
ISO 6603	ASTM D5628
ISO 7765	ASTM D7136
ISO 11343	ASTM D7192
ISO 8256	Boeing BSS 7260
PR EN6038	Airbus AITM 1.0010
DIN 53373	Airbus AITM 1-0057
ASTM D2444	SACMA SRM 2R-94

Motorized crosshead positioning system

Changeable tups and inserts provide versatility for many applications

Versatile large test area to accommodate standard fixtures, components, a thermostatic chamber, and specimen feeding system

Wide range* of interchangeable falling masses available from 2.00 - 70.0 kg (4.41 - 154 lbs)



* See our CEAST Impact Accessories Brochure for a complete listing of tups, fixtures, and frame options

CEAST 9350

Optional Features



Weighing system measures the total weight of the falling mass and tup inserts.



The specimen feeding system performs tests in an automatic cycle within the environmental chamber. Designed to meet the demand for automation where intensive, high-volume testing is required, the feeder system can test 60 - 120 samples per hour.



Environmental chamber can cool specimens to -70°C (-94°F) or heat specimens to $+150^{\circ}\text{C}$ (302°F).



High-energy configuration increases the energy capacity from 757 - 1800 J (1330 ft-lb) and the velocity from 4.65 - 24.0 m/s (78.7 ft/s).



The automatic lubrication system eliminates friction effects between the tup insert and the test sample as recommended by ISO 6603.

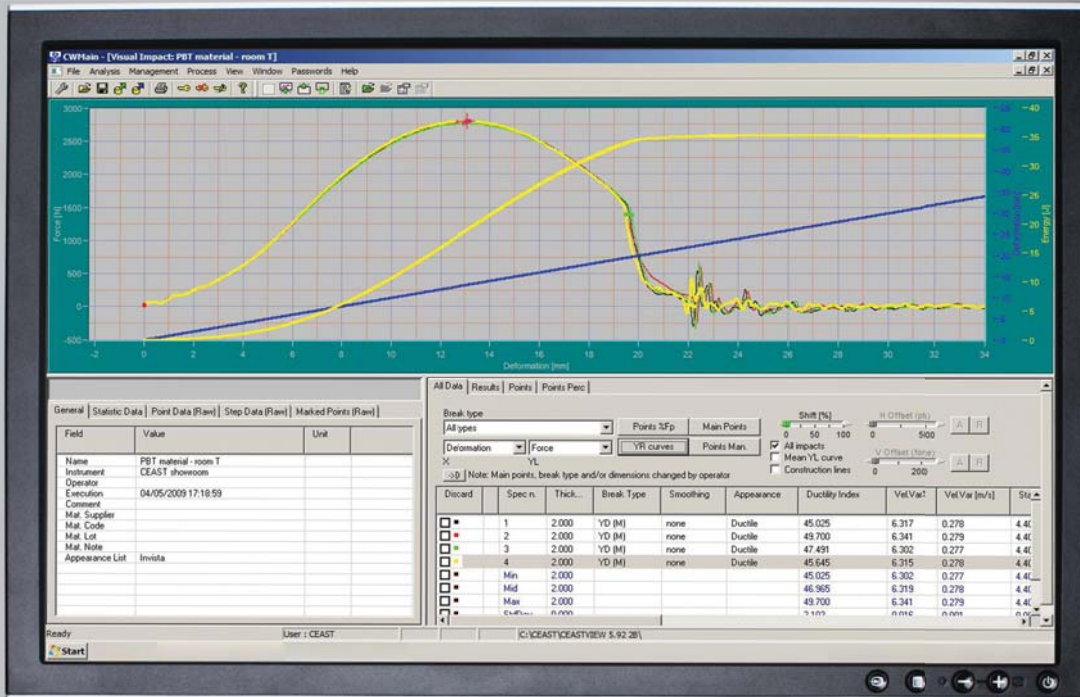


The anti-rebound system can catch the crosshead - preventing it from hitting the sample a second time.

The pivoting specimen loader tests up to 10 specimens in rapid sequence within the environmental chamber.

The Results Are In...

Do you need to know the energy required to break a specimen or do you need a more in-depth view of what happened during the test?



Instrumented Test Results

Uninstrumented

Uninstrumented impact testing is often referred to as “go” or “no go” testing. With a known drop height and weight, impact energy can be calculated. Since the falling weight either completely stops on the test specimen or destroys it completely in passing through, the only results that can be obtained are of a pass/fail nature. This data is recorded and establishes a material’s basic energy absorbed value. When used in an uninstrumented fashion, CEAST 9300 Series droptowers will provide more repeatable and consistent results than a Bruceton stair step test.

VS

Instrumented

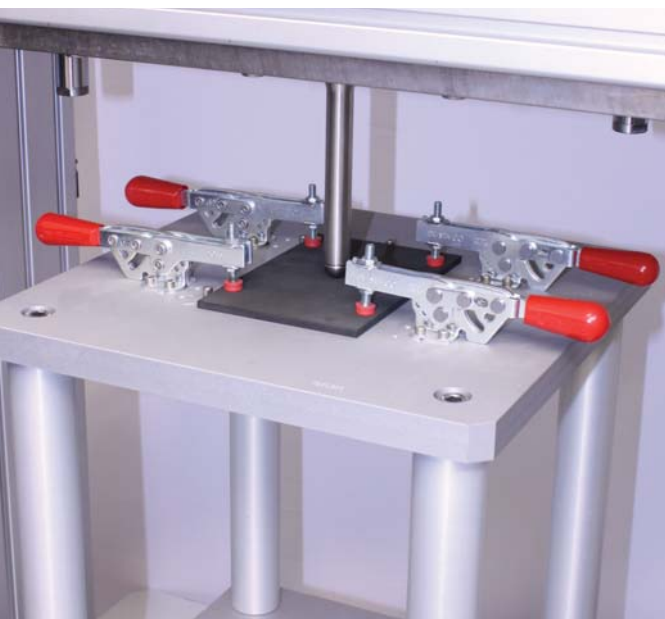
The addition of instrumentation to an impact system allows the engineer to “see” all types of information that was previously unknown, including incipient damage points and ductile-brittle transition zones. With instrumentation, the load on the specimen is continuously recorded as a function of time and/or specimen deflection prior to fracture. This gives a more complete representation of an impact than a single calculated value. Because failures originate at the weakest point and propagate from there, samples don’t have to shatter to be considered failures. Failure can be defined by deformation, crack initiation, or complete fracture, depending on the requirements.



Range of tup inserts



Component Testing Solution



Compression After Impact (CAI) testing

We Have Solutions That Meet Your Needs

Standard Solutions

There are a range of standard solutions designed to meet most common applications conducted on the CEAST 9300 Series droptowers. These include various tups (load sensors), tup inserts that make contact with the specimen, and fixtures to hold the material being tested.

Frame Options

The “upgrade” concept is a main feature of the CEAST 9300 Series droptowers. The instruments are pre-wired for easy connection of most options* at a later date. For the CEAST 9350, this includes the environmental chamber, the pivoting and automatic specimen loaders, the tup lubrication, additional energy system, and the anti-rebound system.

Custom Solutions

If the standard CEAST 9300 Series does not meet your requirements, we can offer customized solutions. Whether you are looking for a special tup insert (striking head) or a tailored drop tower, we have an experienced team of skilled engineers that will work with you to design and produce a system for your specific needs.

Our experience in the specification and manufacture of custom solutions means we can help you solve problems faster and easier than trying to do the job yourself or sub-contracting it to someone with less knowledge. You'll also have the security of dealing with an ISO 9001 accredited company that offers full warranty and after-sales support for your investment.

* See our CEAST Impact Accessories Brochure for a complete listing of tups, fixtures, and frame options



Support For The Life Of Your Equipment



When You Need Us, We're There

Operating with 25 offices in 18 countries and more than 1,200 employees, Instron® has a global infrastructure that is local to you. When you need service and support for your CEAST 9300 Series equipment, we'll be there. We remain committed to advancing materials and components testing techniques.



Maximize Uptime

The Instron world-class service organization is committed to delivering high-quality installation, calibration, training, maintenance, and technical support throughout the life of your CEAST droptower impact system. We help to ensure that your impact system is working when you need it.



Quality Standards You Can Trust

Operating under ISO 9001 quality standards and with an extensive list of accreditations, Instron employs a product design philosophy where our customers' data integrity, safety, and protection of investment are paramount. We strive to ensure that our customer satisfaction is second to none.

CEAST 9300 Series Specifications



		CEAST 9310 Standard Model with anti-rebound system	CEAST 9340	CEAST 9350	CEAST 9350 with High-Energy System
Energy Range*	J	0.15 - 20.4	0.30 - 405	0.59 - 757	0.59 - 1800
	ft-lb	0.11 - 15.1	0.22 - 299	0.44 - 558	0.44 - 1330
Impact Velocity	m/s	0.77 - 3.71	0.77 - 4.65	0.77 - 4.65	0.77 - 24.0
	ft/s	2.53 - 12.2	2.53 - 15.3	2.53 - 15.3	2.53 - 78.7
Drop Height	m	0.03 - 0.70	0.03 - 1.10	0.03 - 1.10	0.03 - 29.4 (simulated)
	in	1.18 - 27.6	1.18 - 43.3	1.18 - 43.3	1.18 - 1160 (simulated)
Mass Range*	kg	0.50 - 3.00	1.00 - 37.5	2.00 - 70.0	2.00 - 70.0
	lbs	1.10 - 6.61	2.20 - 82.7	4.41 - 154	4.41 - 154
Mass Increments	kg	0.05	0.5	0.5	0.5
	lbs	0.11	1.1	1.1	1.1
Test Area Dimensions (w × d × h)	mm	250 × 150 × 145	490 × 450 × 565	700 × 720 × 550	700 × 720 × 550
	in	9.8 × 5.9 × 5.7	19.3 × 17.7 × 22.2	27.5 × 28.3 × 21.6	27.5 × 28.3 × 21.6
Electrical Supply	-	115/230 V 50/60 Hz	220-240 V 50/60 Hz 100-120 V 50/60 Hz	220-240 V 50/60 Hz 100-120 V 50/60 Hz	220-240 V 50/60 Hz 100-120 V 50/60 Hz
Compressed Air Supply	bar	5.0	5.0	5.0	5.0
	psi	72.5	72.5	72.5	72.5
Machine Dimensions (w × d × h)	mm	425 × 340 × 1315	985 × 610 × 2620	1015 × 866 × 2700	1015 × 866 × 3160
	in	16.7 × 13.4 × 51.8	38.7 × 24 × 103	40 × 34 × 106	40 × 34 × 124
Machine Weight	kg	38	340	550	775
	lbs	83.7	749	1212	1708

Dimensions with Optional Chamber Added

Test Area Dimensions with Chamber	mm	n/a	370 × 300 × 495	550 × 550 × 500	550 × 550 × 500
	in	n/a	14.6 × 11.8 × 19.5	21.6 × 21.6 × 19.7	21.6 × 21.6 × 19.7
Machine Dimensions with Chamber	mm	n/a	985 × 695 × 2620	1015 × 1154 × 2650	1015 × 1154 × 3160
	in	n/a	38.7 × 27.3 × 103	40 × 45.4 × 104	40 × 45.4 × 124.4
Machine Weight with Chamber	kg	n/a	400	700	925
	lbs	n/a	881	1543	2039

*Includes an average striker weight of 0.2 kg (0.66 lbs) for the CEAST 9310, 0.5 kg (1.10 lbs) for the CEAST 9340 and 0.7 kg (1.54 lbs) for the CEAST 9350

Americas

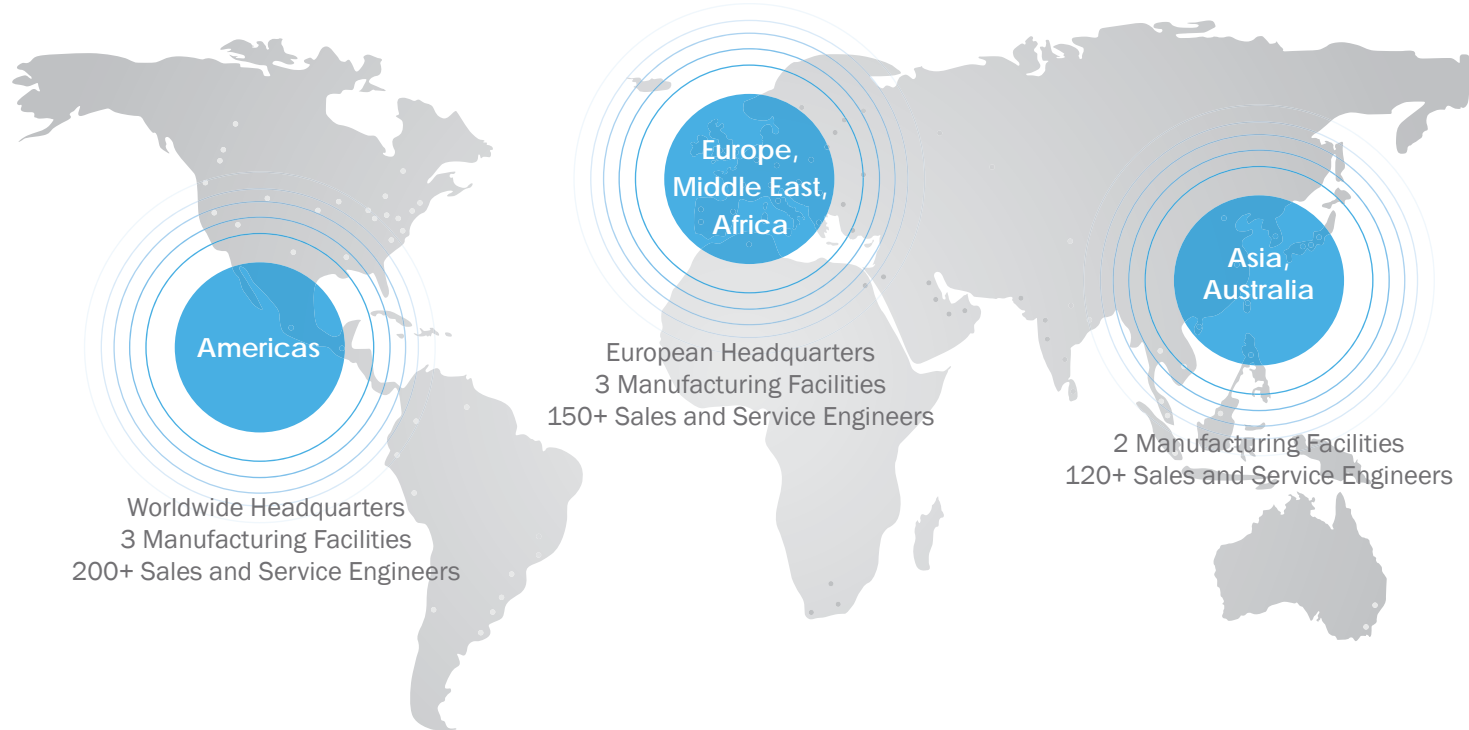
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Global Support that is Local to You

Instron® has a global infrastructure that is local to you and remains committed to being the leader in mechanical testing instrumentation.

For more information on CEAST products visit www.ceast.com

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