INSTRON®



ACCESSORIES FOR MATERIALS TESTING

Seventh Edition



Accessories for Materials Testing

Seventh Edition

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CATALOG INTRODUCTION

Welcome to the Instron® materials testing catalog. Inside you will find hundreds of grips, fixtures, load cells, and other accessories designed to help you get the most from your materials testing system.

As you browse through, please keep in mind that we have extensive engineering design capabilities. If you cannot find exactly what you are looking for, then please contact us to discuss your requirements.

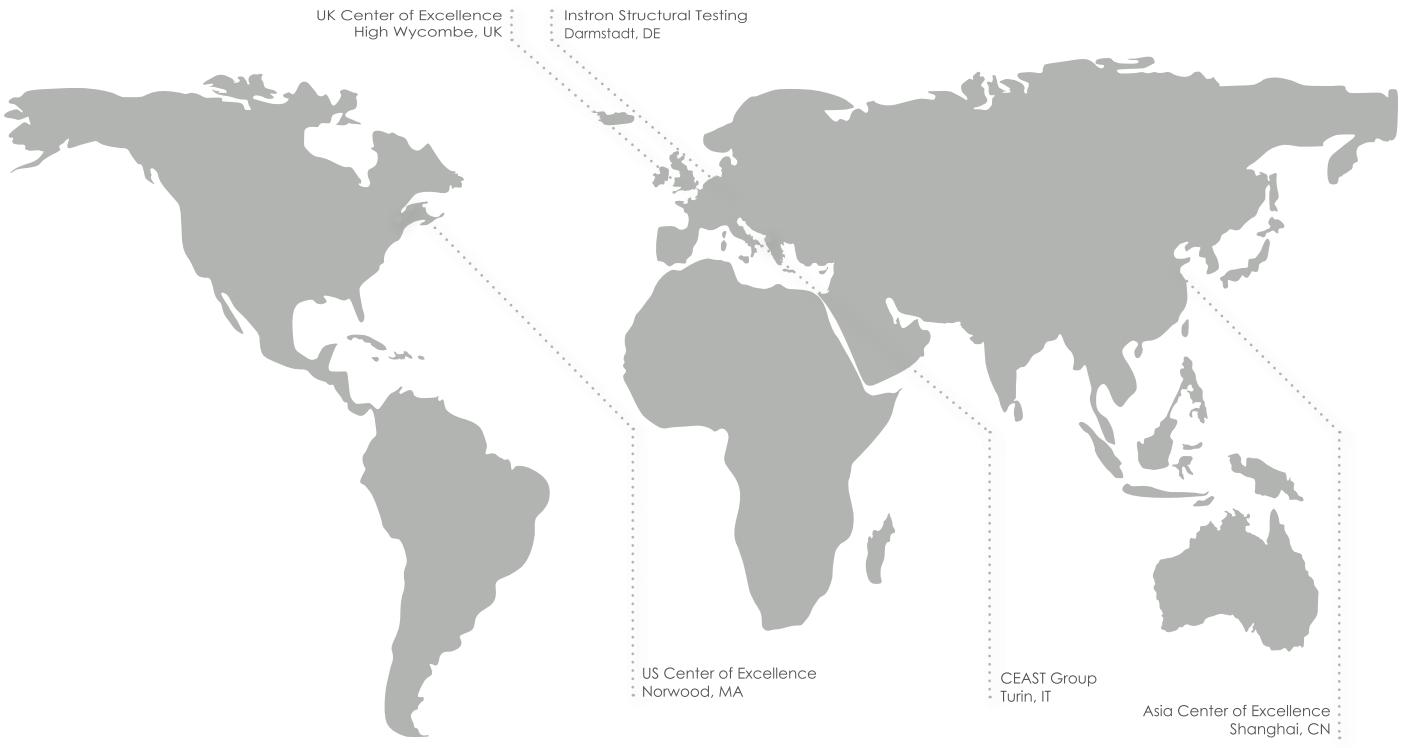
Although a specific product may be designed to fit particular Instron systems as standard, it is often possible to adapt a product to fit different models or equipment from other manufacturers. **Please contact us if there is an item of interest that you feel may not be directly compatible with your system.**

Compatibility with your testing system is an important consideration in ensuring that your accessory functions correctly. In most cases, compatibility is simply a case of confirming that the mechanical and/or electrical interfaces match, and you will find guidance in the reference section of this catalog. Individual products also have pertinent compatibility information listed to help you. If you are in any doubt, then please contact us for advice.

When contacting us with an inquiry about accessories please make sure you know the **model type and serial number** of your system so that we can provide you with the best possible assistance. In the reference section of this catalog you can record basic information that will help us deal most effectively with your inquiry. Details of where and how to obtain more information are included in the reference section as well.

We hope you enjoy looking through this catalog and would urge you to visit our website at www.instron.com to view our **online accessory catalog** where you can download additional information about many of the items shown here. You can also keep abreast of the latest developments in accessories and applications by **subscribing to our eNewsletters.** These provide information on the latest testing technology, applications stories, and special offers.

Contact details for our global sales and service offices are listed on page 437 of this catalog, or visit us at go.instron.com/locations.



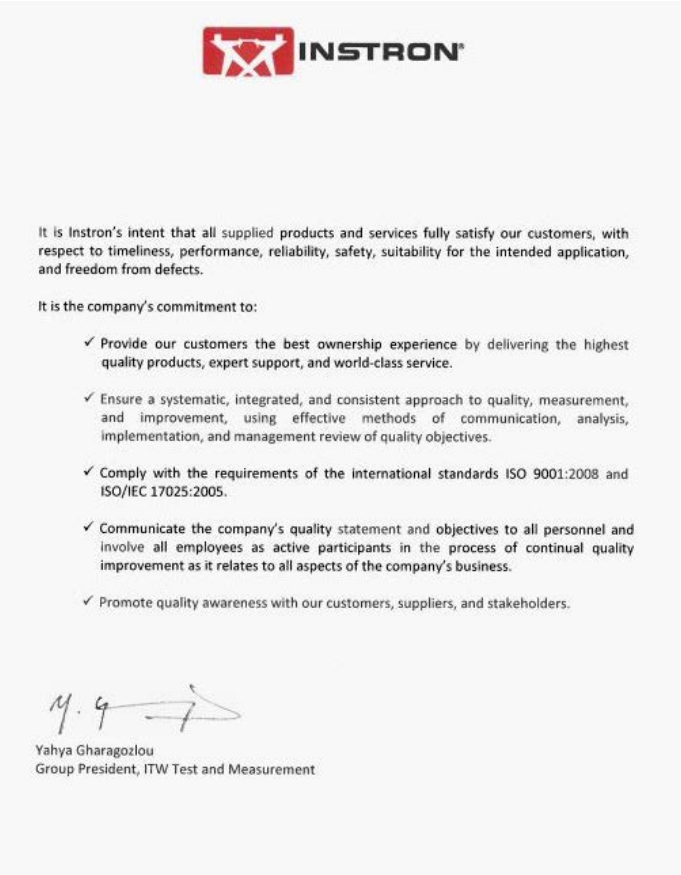
QUALITY STATEMENT

Instron® Quality Management Systems are Registered to ISO9001 at various global operations.

The Registrars are:

- Instron, Norwood, USA:
  SGS International Certification Services Inc.
  Certificate Number US95/0293
- Instron, A division of ITW Limited, High Wycombe, UK:
  SGS United Kingdom Limited.
  Certificate Number 92/1385
- Instron GmbH, Darmstadt, Germany:
  TÜV SÜD Management Service GmbH
  Certificate Number 12 100 11346 TMS
- Instron Singapore Pte Ltd., Singapore:
  SGS International Certification Services Inc.
  Certificate Number SG04/00094
- Instron, CEAST Italy:
  TÜV Management Services.
  Certificate Number: 50 100 3963

Instron's range of testing machines, load cells, transducers, and temperature chambers can be calibrated and supplied with a calibration certificate traceable to national standards on request.



INSTRON®

It is Instron's intent that all supplied products and services fully satisfy our customers, with respect to timeliness, performance, reliability, safety, suitability for the intended application, and freedom from defects.

It is the company's commitment to:

- ✓ Provide our customers the best ownership experience by delivering the highest quality products, expert support, and world-class service.
- ✓ Ensure a systematic, integrated, and consistent approach to quality, measurement, and improvement, using effective methods of communication, analysis, implementation, and management review of quality objectives.
- ✓ Comply with the requirements of the international standards ISO 9001:2008 and ISO/IEC 17025:2005.
- ✓ Communicate the company's quality statement and objectives to all personnel and involve all employees as active participants in the process of continual quality improvement as it relates to all aspects of the company's business.
- ✓ Promote quality awareness with our customers, suppliers, and stakeholders.

Yahya Gharagozlou
Group President, ITW Test and Measurement

SAFETY STATEMENT

Instron products, to the best of our knowledge, comply with various national and international safety standards in as far as they are applicable to materials testing. In particular, we certify that our products meet the relevant international safety standards referenced in the European Community's EMC Directive and Low Voltage Directive or Machinery Directive as applicable. Our products are CE marked and are provided with a Declaration of Conformity as required by the above mentioned directives.

Due to the large number of product variants, high level of customization and complexity, our products are not UL or CSA listed. However we can provide quotations for UL or CSA compliant products at special request. Please inquire if these certifications are needed.

Our instruments are used for destructive and non-destructive testing of a full range of products and materials including plastics, elastomers, food, composites, metals, ceramics, cloth, fibers, liquids and a variety of complete products, rigs and structures. Because of this wide range of applications with which our instruments are used, and over which we have no control, additional protection devices and operating procedures may be necessary. Instron strongly recommends that you perform your own risk analysis for your particular application and test process. At your request, we will gladly provide advice and quotations for additional safety devices such as additional warning signs, protective shielding and methods of restricting access to the equipment. Your best safety precautions are to gain a thorough understanding of the equipment by reading your instruction manuals and to always use good judgement.


2
INSTRON



ACCESSORIES FOR MATERIALS TESTING

Instron® has used its wealth of applications and engineering experience to produce a vast range of general purpose and application focused solutions to meet almost any materials testing requirement. If you cannot find what you are looking for, our engineered solutions group can provide tailored solutions to particular application requirements. Please do not hesitate to contact us.

The following pages describe a large number of Instron accessory products designed specifically for materials testing. Each one is manufactured to the highest quality to ensure long life and enduring performance.

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APPLICATION-SPECIFIC ACCESSORIES

2.1

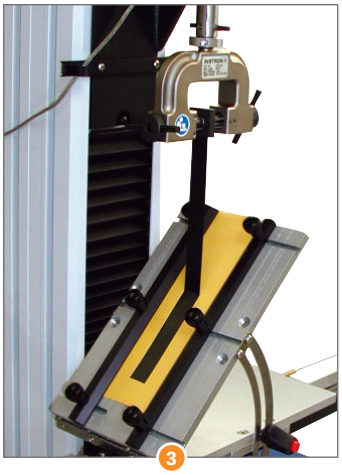
Sometimes an application, specimen or material requires a special gripping method. General purpose grips may not be adequate and can result in problems such as jaw breaks or premature failure of the specimen. The grips and fixtures in the following section have been specially engineered to provide solutions to the unique problems presented by some testing applications.

Instron® has great experience in producing engineered solutions for particularly difficult applications. Some examples of engineered solutions are shown in Section 3. Our worldwide staff of technical personnel is available to discuss your application in greater detail to help you determine the solution that's right for you.

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Adhesive peel tests may be performed with either variable angle, 90°, 180°, T-peel, or floating roller. The data analysis is basically the same. Peel test analysis requires the averaging of the load values over a defined range of peel length.

Principle of Operation

Peel fixtures are used to measure the bond strength between laminated surface coatings, films, packaging and their rigid backings, as well as other bonded structures. To initiate a test, the laminate is partially peeled from the backing medium. The medium is then inserted into the fixture and the free end of the sample is inserted into an appropriate upper grip. The upper grip that is connected to the crosshead is then driven in the tensile direction and the laminate is peeled from the backing. The force required to peel the laminate is monitored by the load weighing system, providing a direct measurement of bond strength.

Application Range

- Type of test: 90° and variable degree angle, T-peel and German wheel peel tests
- Type of materials: Films, tapes, laminated surface coatings, labels and decals

PEEL FIXTURES

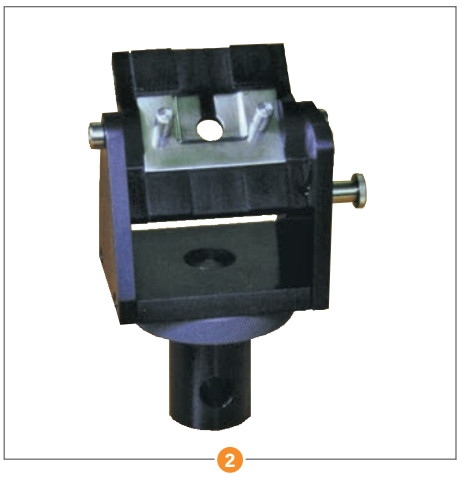
	Catalog Number	Description	Capacity			Specimen Height		Specimen Length		Upper Fitting	Lower Fitting	Accessory Height		Accessory Width		Testing Standards
			kN	kgf	lbf	mm	in	mm	in			mm	in	mm	in	
1	2820-026	German rotating wheel fixture	1	100	225	25	-	479	18.84	Use appropriate grip	0.5 in clevis pin (Type Dm)	194	7.63	28	1.12	ISO 6133 IPC-TM-650
2	2820-035	Constant 90° angle peel fixture	1	100	225	120	4.7	250	9.8	Use appropriate grip	0.5 in clevis pin (Type Dm)	95	3.7	150	4.9	ASTM B571 ASTM D2861 ASTM D6252 ASTM D5862
3	2820-036	Variable angle peel fixture	1	100	225	120	4.7	250	9.8	Use appropriate grip	0.5 in clevis pin (Type Dm)	285	11.2	150	4.9	ASTM B571 ASTM D2861
4	2820-102	Floating roller peel fixture	5	500	1,000	25	-	-	-	0.5 in clevis pin (Type Dm)	Use appropriate grip	143	5.6	40	1.6	ISO 4578 EN 1464
4	S1-11237	Floating roller peel fixture	5	500	1,000	-	1	-	-	0.5 in clevis pin (Type Dm)	Use appropriate grip	143	5.6	40	1.6	ASTM D3167

BIOMEDICAL/PHARMACEUTICAL

FIXTURES



1



2

With major breakthroughs in the medical industries, it is becoming ever more essential to provide accurate test data related to materials capabilities. With the combination of testing frames, software, grips, fixtures, and environmental conditioning provided by Instron®, required results are achieved with efficiency, accuracy, and repeatability.

Principle of Operation

Whether your application involves synthetic skin tissue, bones, ligaments, prosthetics, implants or sutures, Instron provides various products for testing to industry standards.

Needles and sutures need to be tested for penetration resistance and how many times they can be used before losing their sharpness. Even when tests are performed on tissues in ambient conditions, it is now required that they also be performed in near-actual conditions. Materials that will coexist internal to the human body must now be tested in saline solutions and at body temperature.

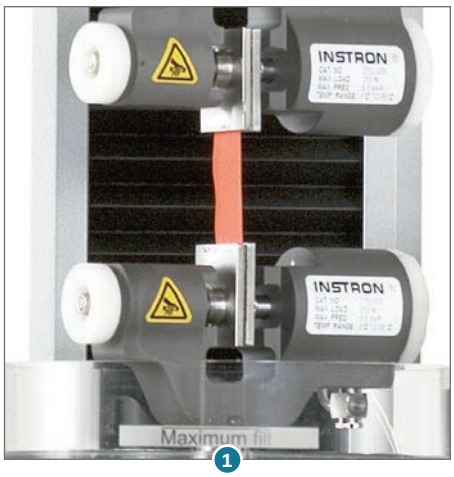
Application Range

- Type of tests: Tension, compression, peel, etc.
- Type of materials: Tissue, bones, ligaments, prosthetics, sutures

NEEDLE TESTING

	Catalog Number	Description	Capacity			Upper Fitting	Lower Fitting	Temperature Rating	
			kN	kgf	lbf			°C	°F
1	2810-502	Chuck, Single Straight Needle Fixture	0.1	10	20	6 mm Clevis Pin (Type Om)	-	+10 to +40	+50 to +100
2	S1-11862-3	Variable Angle Membrane Holder	0.1	10	20	-	½ inch Clevis Pin (Type Dm)	+10 to +40	+50 to +100





SUBMERSIBLE BATH

Catalog Number	Description	Temperature Range		Vertical Bath Travel		Bath Volume	Bath Inner Diameter		Heat-Up Time	
		°C	°F	mm	in	litres	mm	in	°C	°F
1 3130-100	Temperature-Controlled BioBath with Pneumatic Lifting and Lowering Mechanism	Ambient to +40	Ambient to +104	200	8	3.1	140	5.5	Approx. 30mins from +22 to +37 with water	Approx. 30mins from +72 to +99 with water

GRIPS FOR 3130-100 SUBMERSIBLE BATH

Catalog Number	Description	Capacity			Notes
		N	kgf	lbf	
1 2752-005	Submersible Pneumatic Side Action Grips	250	25	50	Specifically for use with 3130-100 BioBath
S1-16701	Submersible Pneumatic Cord and Yarn Grips	250	25	50	Specifically for use with 3130-100 BioBath

JAW FACES FOR 2752-005 SUBMERSIBLE GRIPS

Catalog Number	Description	Notes
2702-209	25 × 25 mm Serrated Faces. Minimum Grip Separation: 14 mm	For use with 2752-005 Submersible Grips Only
2702-208	25 × 25 mm SurfAlloy® Faces. Minimum Grip Separation: 14 mm	For use with 2752-005 Submersible Grips Only
2702-207	25 × 25 mm SurfAlloy Faces. Minimum Grip Separation: 0 mm	For use with 2752-005 Submersible Grips Only

COMPRESSION PLATENS FOR 3130-100 BIOPULS BATH

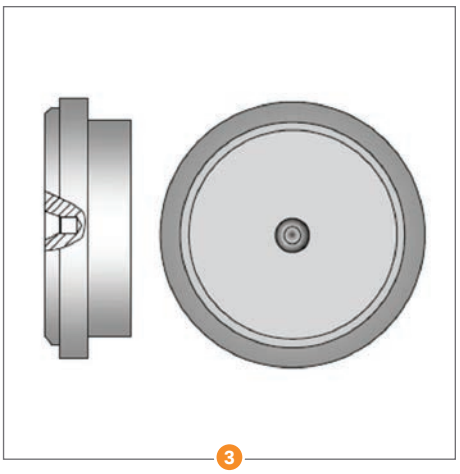
Catalog Number	Description	Diameter		Material	Force		Upper Mechanical Interface	Lower Mechanical Interface
		mm	in		kN	lbf		Upper
CP100918	Lightweight upper and lower compression platens for use in 3130-100 Biopuls Bath	50	2	Stainless Steel	0.250	56	M6 (male)	M6 (male)
S5636A	Upper and Lower Compression Platens for use in 3130-100 BioPuls Bath	50	2	Stainless Steel	5	1125	M6 (male)	M6 (male)

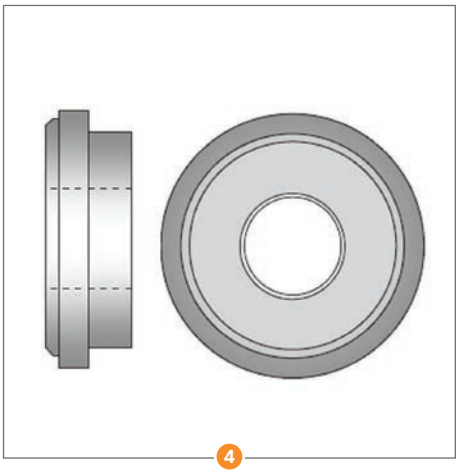
BIOMEDICAL/PHARMACEUTICAL

FIXTURES


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3


4

SYRINGE TESTING

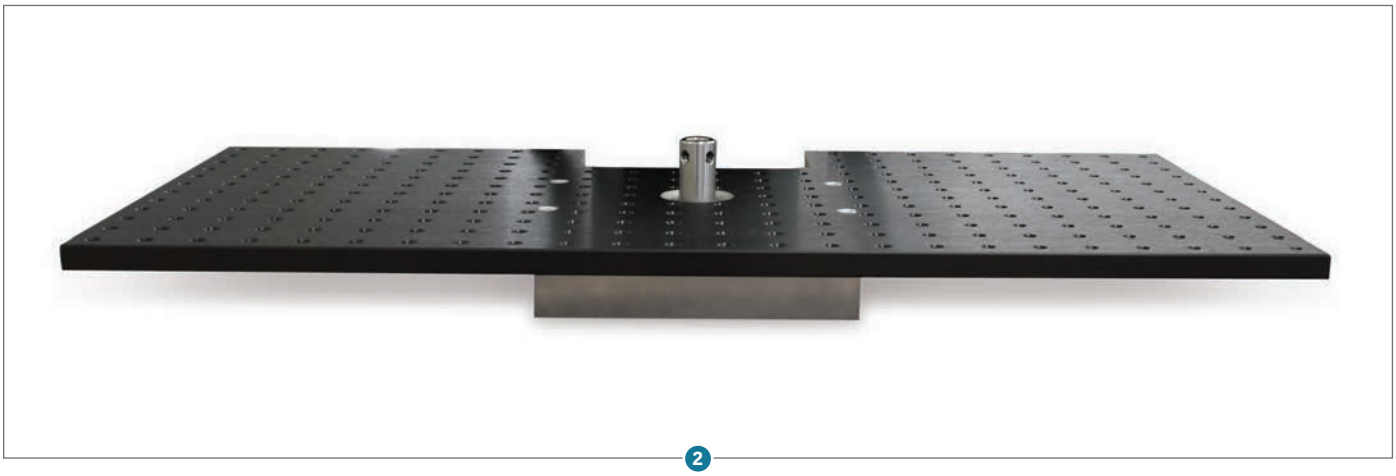
	Catalog Number	Description	Capacity			Upper Fitting	Temperature Range
			kN	kgf	lbf		
1	2870-001	Syringe Testing Fixture	0.5	50	112	6mm Clevis Pin (Type Om)	Ambient only
2	2870-003	Syringe Test Fixture per ISO 7886-1	0.5	50	112	6mm Clevis Pin (Type Om)	Ambient only
3	2870-002	Syringe Blank Adapters to be Drilled by Customer (Quantity: 4)	0.5	50	112	Used with 2870-001	Ambient only
4	CP101323	Custom Syringe Drilled Adapters (Quantity: 4)	0.5	50	112	Used with 2870-001	Ambient only



1



1



2

XY TEST STAGE

	Catalog Number	Description	Capacity			Upper Fitting	Temperature Range
			kN	kgf	lbf		
1	CP104480	X-Y Test Stage	133	13.6	30	½ inch Clevis Pin (Type Dm)	Ambient only

SYRINGE TESTING

	Catalog Number	Description	Capacity			Lower Fitting	Temperature Range	Dimensions
			kN	kgf	lbf			
	2910-106	Component Test Plate for 334X Single Column Systems	1	100	225	Direct to Base	Ambient only	M6 Threaded Holes, 25 mm Center-to-Center
1	CP104481	Component Test Plate for 444X/554X/584X Single Column Systems	1	100	225	Direct to Base	Ambient only	M6 Threaded Holes, 25 mm Center-to-Center
1	2910-105	Component Test Plate for 554XA/596X Single Column Systems	1	100	225	Direct to Base	Ambient only	M6 Threaded Holes, 25 mm Center-to-Center
2	2910-107	Component Test Plate for 446X/336X/556XA/596X Dual Column Systems	1	100	225	Direct to Base	Ambient only	M6 Threaded Holes, 25 mm Center-to-Center

BIOMEDICAL/PHARMACEUTICAL

FIXTURES



1



1

BIOCOAT

Catalog Number	Description	Notes
2910-103	BioCoat for Instron® 334X Systems	This liquid-resistant cover protects the frame's base from damage, e.g. messy biomedical specimens or spillage using the BioBath. The BioCoat is easy to install and has a flexible design that permits access to frame connectors and electronic controls. Designed for use up to 40°C, it is compatible with standard Instron fixtures, grips, baths, platens, and extensometers.
2910-102	BioCoat for Instron 594X Systems	

1

BIOBOX

Catalog Number	Description	Notes
1 CP110010	BioBox for 120V 334x Systems	This temperature-controlled box is placed around a single-column frame for full testing system capabilities of medical devices and bio-materials at and above body temperature (37 °C). • The spacious door allows for quick access to test space • Allows full test travel • Accommodates most standard test grips, fixtures and platens • Temperature range: ambient to +40 °C • Set temperature accuracy ±2 °C Note: Not compatible with AVE/SVE, 90° and Variable Angle Peel Fixture, COF fixture, and extra-long XL extensometers
CP110011	BioBox for 120V 554x Systems	
CP110012	BioBox for 120V 594x Systems	
CP110013	BioBox for 240V 334x Systems	
CP110014	BioBox for 240V 554x Systems	
CP110015	BioBox for 240V 594x Systems	



1

TEST FIXTURES

	Catalog Number	Description	Loading Angle	Testing Standards	Capacity	Machine Compatability	Temperature -Controlled Bath Compatibility
			°		kN		
1	2014-107	Variable Angle to ISO 14801	0 - 45	ISO 14801[1]	3 (Compression only)	E1000, E3000, E10000[2]	CP100543

Notes:
1. Can be used without bath to test the ambient, in-air sections of ISO 14801, or in combination with CP108107/CP100543 to test the complete standard.
2. Attachment kits 8000-127 are required for E1000 and E3000. 8000-141 required for use with E10000.

BIOMEDICAL/PHARMACEUTICAL

FIXTURES



1



DENTAL MATERIALS BEND FIXTURE

Catalog Number	Description	Testing Standards	Capacity	Roller Diameter	No. Rollers Included	Span	Bend Fixture Depth	Upper Connection	Machine Compatability	Bath Compatability
			kN	mm		mm	mm			
1 2810-600	3-Point Bend Fixture	ISO 9917, ISO 6827, ISO 4049, ISO 20795	3 (Compression Only)	2, 3, 4 or 5	Set of 3 (Choose Size)	15 - 80 (Lower Span)	15	M6 Male	E1000, E3000, E10000	CP100543
2810-605	4-Point Conversion Kit	ISO 9917, ISO 6827, ISO 4049, ISO 20795	3 (Compression Only)	2, 3, 4 or 5	Set of 2 (Choose Size)	5 - 40 (Upper Span)	15	M6 Male	E1000, E3000, E10000	CP100543

TEMPERATURE CONTROLLED BATHS

Catalog Number	Description	Inside Diameter (mm)	Max. Fill Depth	Volume (liter)	Empty Weight	Machine Compatibility
		°	mm	kN	kg	
CP100543	Large BioBath	190	180	5.1	25	E1000, E3000, E10000

FLUID RE-CIRCULATOR

Catalog Number	Description	Heating Rate	Temperature Range		Thermocouple Type	Voltage	Pump Type	WaveMatrix Connection	Bath Compatability	Fluid Compatability
		°C/l/min	°C	°F		V				
CP106108	Fluid Recirculator	1	+30 to +45	+86 to +113	K	115	Brushless Impeller	RS232	CP108107, CP100543	Mains Water, Saline, Distilled, NOT De-Ionised

BURST/PUNCTURE

FIXTURES


1


2


3

Burst or puncture fixtures are used to determine the resistance of a material to the penetration of a probe. The material is typically held by a set of clamping rings, and undergoes biaxial stresses representative of those encountered during actual use.

Principle of Operation

Fixtures are typically comprised of a lower frame with a clamping mechanism that attaches to the base of the testing system, while a probe attaches to the load cell on the moving crosshead. The probe is then moved onto the specimen at a low rate of travel until failure occurs. Common results from these tests are maximum force, force at break, penetration distance and energy to break.

Application Range

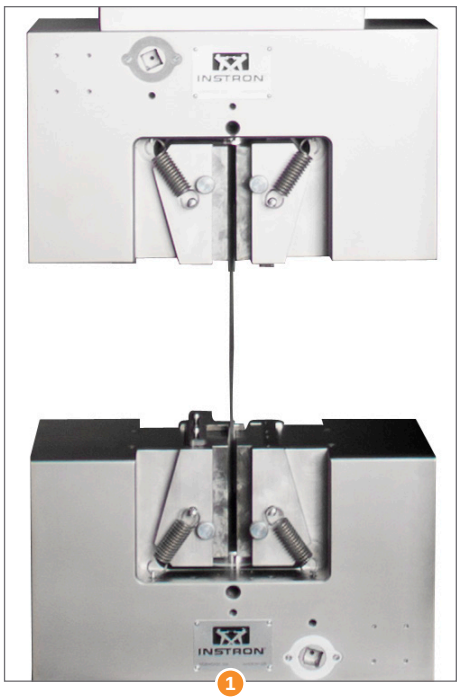
- Type of test: Puncture

BURST/PUNCTURE FIXTURES

	Catalog Number	Testing Standards	Capacity			Upper Fitting Length	Lower Fitting Length	Total Effective Length		Accessory Width		Temperature Rating	
			kN	kgf	lbf			mm	in	mm	in	°C	°F
1	2810-195	ASTM D3787, ASTM D6797, FED 191A	10	1,000	2,000	6 mm Clevis Pin (Type Om)	0.5 in Clevis Pin (Type Dm)	337	13.3	133	5.2	+10 to +40	+50 to +100
2	S1-11855	MIL-STD-3010	2.5	250	500	6 mm Clevis Pin (Type Om)	0.5 in Clevis Pin (Type Dm)	356	14	152	6	+10 to +40	+50 to +100
3	2810-501	ASTM D5748	4.4	440	1,000	6 mm Clevis Pin (Type Om)	0.5 in Clevis Pin (Type Dm)	356	14	125	5	+10 to +40	+50 to +100

COMPOSITE TEST

FIXTURES



1

A range of fixtures for testing composite materials is available and includes tension, compression, flexure, shear and peel. The unique nature of composite materials has resulted in the development of these fixtures to ensure optimum alignment, high resistance to buckling and precision specimen location.

Principle of Operation

Most of these fixtures are designed to meet specific materials testing standards. These standards have been developed over the years by leading manufacturers and research organizations, and then made their way into ASTM, ISO, DIN and other standards. Composites fixtures provide various ways of testing composite materials depending on how the material is manufactured and is intended to be used.

Application Range

- Type of test: Tension, compression, flexure, shear and peel tests to a variety of established standards

Safety Advice

Review safety note on page 236

TENSION

	Catalog Number	Testing Standards	Capacity			Upper Fitting	Lower Fitting	Accessory Height		Accessory Width		Accessory Weight		Temperature Rating	
			kN	kgf	lbf			mm	in	mm	in	kg	lb	°C	°F
	2716-028	ASTM D3039, D5083, D5766, EN 2561, EN 2597, prEN 6035, ISO 527-4, ISO 527-5, and AITM 1-0007	100	10,000	22,000	0.5 in Clevis Pin (Type Dm)	0.5 in Clevis (Type Dm) 4 × M16	314	12.36	249	9.80	47	104	-80 to +250	-112 to +482
1	2716-030	ASTM D3039, D5083, D5766, EN 2561, EN 2597, prEN 6035, ISO 527-4, ISO 527-5, and AITM 1-0007	250	25,000	56,000	M48 × 2 mLH (Type IImRH)	4 × M16	389	15.30	343	13.5	102	225	-80 to +250	-112 to +482

Notes:
1. 2716-028 and 2716-030 precision manual wedge grips grips are capable of meeting Nadcap AC7101 and AC7122 specifications when fitted to approved Instron® testing systems. Please contact Instron to discuss the suitability of your existing system if you require to meet Nadcap.

ITEMS FOR USE WITH 2716-028

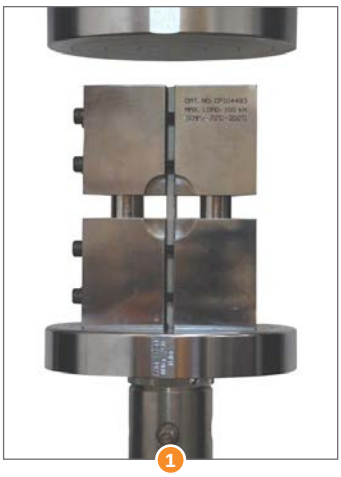
Catalog Number	Description
2701-231	Specimen Centering Stops
2703-366	Jaw faces for flats (fine carbide coated, 0 to 10 mm, 0 to 0.39 in)
2703-367	Jaw faces for flats (fine carbide coated, 5 mm to 15 mm, 0.2 in to 0.59 in)
2703-368	Jaw faces for flats (fine carbide coated, 15 mm to 25 mm, 0.59 in to 0.98 in)
2703-363	Jaw faces for flats (fine-serrated, 0 to 10 mm, 0 to 0.39 in)
2703-364	Jaw faces for flats (fine-serrated, 5 mm to 15 mm, 0.2 in to 0.59 in)
2703-365	Jaw faces for flats (fine-serrated, 15 mm to 25 mm, 0.59 in to 0.98 in)
2703-369	Jaw faces for rounds (fine V-serrated, 3 mm to 8 mm, 0.12 in to 0.31 in)
2703-370	Jaw faces for rounds (fine V-serrated, 8 mm to 15 mm, 0.31 in to 0.59 in)
2501-700	Adaptor Plate for “Piggy Back” Fixtures - ½” clevis pin (Type Df)
2501-702	Type IIf (M48LHf) Adaptor Plate for “Piggy Back” Fixtures
2501-704	Fixed Compression Platen for Lower Grip with LVDT Mountings
2501-705	Compression Platen with Lockable Spherical Seat and LVDT Mountings
2501-803	Lap Shear Fixture for 2716-028 Grips
2703-710	Replacement faces for 2501-803 Lap Shear Fixture

ITEMS FOR USE WITH 2716-030

Catalog Number	Description
2701-230	Specimen Centering Stops
2703-340	Jaw faces for flats (fine-serrated, 0 to 10 mm, 0 to 0.39 in)
2703-341	Jaw faces for flats (fine-serrated, 10 mm to 20 mm, 0.39 in to 0.79 in)
2703-342	Jaw faces for flats (fine-serrated, 20 mm to 30 mm, 0.79 in to 1.18 in)
2703-343	Jaw faces for flats (fine carbide coated, 0 to 10 mm, 0 to 0.39 in)
2703-344	Jaw faces for flats (fine carbide coated, 10 mm to 20 mm, 0.39 in to 0.79 in)
2703-345	Jaw faces for flats (fine carbide coated, 20 mm to 30 mm, 0.79 in to 1.18 in)
2703-346	Jaw faces for rounds (fine V-serrated, 5 mm to 10 mm, 0.2 in to 0.39 in)
2703-347	Jaw faces for rounds (fine V-serrated, 10 mm to 16 mm, 0.39 in to 0.62 in)
2703-348	Jaw faces for rounds (fine V-serrated, 16 mm to 22 mm, 0.62 in to 0.87 in)
2703-349	Jaw faces for rounds (fine V-serrated, 22 mm to 28 mm, 0.87 in to 1.10 in)
2703-350	Jaw faces for rounds (fine V-serrated, 28 mm to 34 mm, 1.10 in to 1.34 in)
2501-700	Type D Adaptor Plate for “Piggy Back” Fixtures
2501-702	Type IIf (M48LHf) Adaptor Plate for “Piggy Back” Fixtures
2501-704	Fixed Compression Platen for Lower Grip with LVDT Mountings
2501-705	Compression Platen with Lockable Spherical Seat and LVDT Mountings
2501-703	Lap Shear Fixture for 2716-030 Grips
2703-711	Replacement faces for 2501-703 Lap Shear Fixture
3119-317	250 kN Pull Rods for use with CP116244 Chamber and Extra-Height (E2) 598X Load Frame

COMPOSITE TEST

FIXTURES







COMPRESSION UNSUPPORTED GAUGE LENGTH FIXTURES

	Catalog Number	Testing Standards	Capacity			Upper Fitting	Lower Fitting	Accessory Height		Accessory Width		Accessory Weight		Temperature Rating	
			kN	kgf	lbf			mm	in	mm	in	kg	lb	°C	°F
1	CP104483	ASTM D6641	100	10,000	22,500	Requires Platen 100 mm or larger	Requires Platen 100 mm or larger	154	6	110	4	5.1	11.2	-70 to +200	-94 to +392
2	CP105787	Wyoming Modified Celanese	100	10,000	22,500	0.5 in Clevis Pin (Type Dm) or optional Platen 100 mm or larger	Requires Platen 100 mm or larger	142	5.6	75	3	5.3	11.7	-70 to +200	-94 to +392
3	S4690A	ASTM D3410	300	30,000	60,000	Requires Platen 100 mm or larger	Requires Platen 100 mm or larger	314	12.4	200	8	23	51	-70 to +200	-94 to +392



1



2



COMPRESSION ANTI-BUCKLING FIXTURES

	Catalog Number	Description	Testing Standards	Capacity			Upper Fitting	Lower Fitting	Temperature Rating	
				kN	kgf	lbf			°C	°F
	S4931A	Anti-Buckling Support Jig	ASTM D695-10, D3846-08	100	10,000	22,500	Requires compression platen diameter 100 mm (4 in) or larger[1]	Requires fixed compression platen diameter 100 mm (4 in) or larger. Compatible with CP114249 Base Support	-100 to +350	-148 to +662
1	CP108932	Anti-Buckling Support Jig with strain gauge cut out	ASTM D695-10, D3846-08	100	10,000	22,000	Requires compression platen diameter 100 mm (4 in) or larger[1]	Requires fixed compression platen diameter 100 mm (4 in) or larger. Compatible with CP114249 Base Support	-100 to +350	-148 to +662
	CP114221	Anti-Buckling Support and Cover Plates	SACMA SRM-1	100	10,000	22,000	Requires compression platen diameter 100 mm (4 in) or larger[1]	Requires fixed compression platen diameter 100 mm (4 in) or larger. Requires CP114249 Base Support	-100 to +350	-148 to +662
	CP114215	Anti-Buckling Support and Cover Plates with strain gauge cut out	SACMA SRM-1	100	10,000	22,000	Requires compression platen diameter 100 mm (4 in) or larger[1]	Requires fixed compression platen diameter 100 mm (4 in) or larger. Requires CP114249 Base Support	-100 to +350	-148 to +662
	CP115010	Anti-Buckling Plates	prEN2850 Annex C type B1, ISO 14126	100	10,000	22,000	Requires compression platen diameter 100 mm (4 in) or larger[1]	Requires fixed compression platen diameter 100 mm (4 in) or larger. Requires CP114249 Base Support	-100 to +350	-148 to +662
	CP115011	Anti-Buckling Plates with Strain gauge cut out	prEN2850 Annex C type B2, ISO 14126	100	10,000	22,000	Requires compression platen diameter 100 mm (4 in) or larger[1]	Requires fixed compression platen diameter 100 mm (4 in) or larger. Requires CP114249 Base Support	-100 to +350	-148 to +662
2	CP114249	Base Support for for Anti-Buckling Support Jigs/Plates	Boeing BSS 7260 (ASTM D 695 modified), SACMA SRM 1, prEN 2850	100	10,000	22,000	-	-	-100 to +350	-148 to +662

Notes:
1. Lockable spherical seat recommended to ensure parallelism
2. Image 2 Shows base support CP114249 with optional S4931A anti-buckling jig

CONFIGURATION TABLE

Category	Catalog Number	Test Standard					
		ASTM D695	ASTM D3846	Boeing BSS 7260	SACMA SRM-1	prEN 2850	ISO 14126
Anti-buckling jigs	S4931A or CP108932	●	●	●			
	CP114221 or CP114215				●		
	CP115010 or CP115011					●	●
Base Support	CP114249	●	●	●	●	●	●

● Optional
● Required

COMPOSITE TEST

FIXTURES



1



1

COMPRESSION AFTER IMPACT

	Catalog Number	Testing Standards	Capacity			Upper Fitting	Lower Fitting	Accessory Height		Accessory Width		Accessory Weight		Temperature Rating	
			kN	kgf	lbf			mm	in	mm	in	kg	lb	°C	°F
	CP105079	AITM 1-0010	150	15,000	33,750	Requires Platen 50 mm or larger	Requires Platen 100 mm or larger	200	8	220	8.4	15	32	-75 to +250	-103 to +482
	S5385A	ASTM D7137 and Boeing BSS 7260	150	15,000	33,750	Requires Platen 50 mm or larger	Requires Platen 100 mm or larger	203	8	256	14	15	32	-75 to +250	-103 to +482
1	CP103712	ASTM D7137M	150	15,000	33,750	Requires Platen 50 mm or larger	Requires Platen 100 mm or larger	203	8	356	14	15	32	-75 to +250	-103 to +482

FLEXURE/INTERLAMINAR SHEAR

	Catalog Number	Testing Standards	Capacity			Upper Fitting	Lower Fitting	Accessory Length		Accessory Width		Accessory Weight		Temperature Rating	
			kN	kgf	lbf			mm	in	mm	in	kg	lb	°C	°F
1	CP110860	Various. See optional anvils	10	1,000	2,200	0.5 in Clevis Pin (Type Dm)	Requires Platen 100 mm or larger	237 ± 20	9.33 ± 0.79	230	9.0	4	10	-70 to +250	-94 to +482

ITEMS FOR USE WITH CP110860

Catalog Number	Description
CP107574	Anvils to ASTM D2344 (ILSS)
CP106695	Anvils to ASTM D2344M (metric ILSS)
CP106948	Anvils to ASTM D790 & ISO 14125 (3pt Dia. 10mm)
CP107666	Anvils to EN 2562
CP111636	Anvils to EN 2563 (ILSS)
CP112749	Anvils to ISO 14125 & EN2746 (Flexural) and ISO 14130 & EN2377 (ILSS)
CP106702	3 and 4 Pt anvils Dia 6.5mm
CP108199	Micrometer option for ILSS anvils

COMPOSITE TEST

FIXTURES









SANDWICH CORE

	Catalog Number	Testing Standards	Capacity			Upper Fitting	Lower Fitting	Accessory Height		Accessory Width		Accessory Weight		Temperature Rating	
			kN	kgf	lbf			mm	in	mm	in	kg	lb	°C	°F
1	2505-013	ASTM C297	9	900	2,000	0.5 in Clevis Pin (Type Dm)	0.5 in Clevis Pin (Type Dm)	75	3	50.8	2	2.3	5	-150 to +315	-240 to +600
2	2505-015	ASTM C297	9	900	2,000	0.5 in Clevis Pin (Type Dm)	0.5 in Clevis Pin (Type Dm)	101	4	50.8	2	2.3	5	-150 to +315	-240 to +600
3	S4683A	ASTM C297	30	3,000	6,600	0.5 in Clevis Pin (Type Dm)	0.5 in Clevis Pin (Type Dm)	95	3.8	72	2.8	3.5	7	-70 to +250	-94 to +482
4	S4681A	ASTM C273 (Compression)	100	10,000	22,000	0.5 in Clevis Pin (Type Dm)	0.5 in Clevis Pin (Type Dm)	230	9	80	3.2	26	60	-70 to +250	-94 to +482
	S4682A	ASTM C273 (Tension)	100	10,000	22,000	0.5 in Clevis Pin (Type Dm)	0.5 in Clevis Pin (Type Dm)	230	9	80	3.2	26	60	-70 to +250	-94 to +482

ITEMS FOR USE WITH 2505-013

Catalog Number	Description
2506-131	Steel Bond Faces (2 in dia) for 2505-013

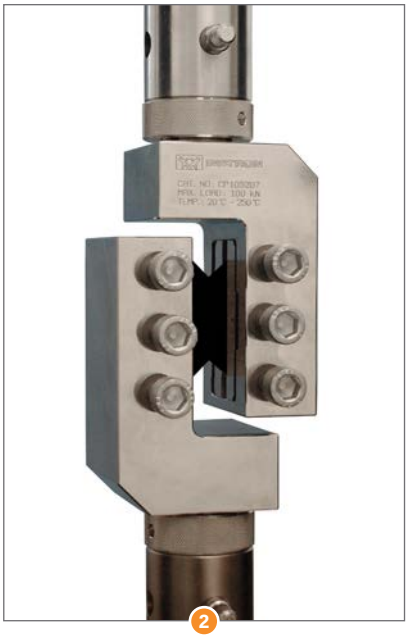
ITEMS FOR USE WITH 2505-013

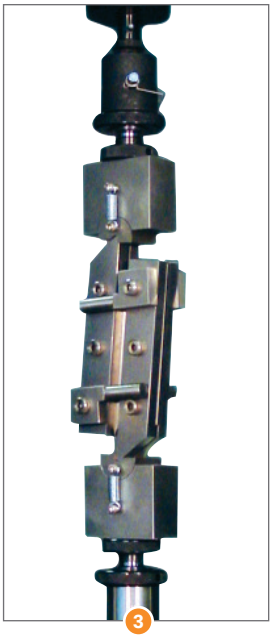
Catalog Number	Description
CP110900	Specimen Plates (Carbon steel, 5 sets) for S4681A Flatwise Shear (Compression) Fixture
CP108572	Specimen Plates (Carbon steel, 5 sets) for S4682A Flatwise Shear (Tension) Fixture

COMPOSITE TEST

FIXTURES









SHEAR

	Catalog Number	Testing Standards	Capacity			Upper Fitting	Lower Fitting	Accessory Length		Accessory Width		Accessory Weight		Temperature Rating	
			kN	kgf	lbf			mm	in	mm	in	kg	lb	°C	°F
1	S4685A	ASTM D5379	50	5,000	11,250	0.5 in Clevis Pin (Type Dm)	Requires Platen 150 mm or larger	181	7.1	178	7	7	15	-70 to +250	-94 to +482
2	CP105207	ASTM D7078	100	10,000	22,500	0.5 in Clevis Pin (Type Dm)	0.5 in Clevis Pin (Type Dm)	258	10.2	95.4	3.8	8	17.6	-75 to +250	-94 to +482
3	S4695A	ASTM D4255A	100	10,000	22,500	0.5 in Clevis Pin (Type Dm)	0.5 in Clevis Pin (Type Dm)	305	12	102	4	11.3	25	-70 to +250	-94 to +482
4	S4695B	ASTM D4255A	100	10,000	22,500	0.5 in Clevis Pin (Type Dm)	0.5 in Clevis Pin (Type Dm)	508	20	102	4	11.3	25	-70 to +250	-94 to +482

ITEMS FOR USE WITH S4685A

Catalog Number	Description
S4688A	Stainless steel wedge for 15 mm (0.625 in) wide specimens
S4687A	Stainless steel wedge for 19 mm (0.75 in) wide specimens
S4686A	Stainless steel wedge for 22 mm (0.875 in) wide specimens





CLIMBING DRUM PEEL

	Catalog Number	Testing Standards	Capacity			Upper Fitting	Lower Fitting	Effective Length		Accessory Width		Accessory Weight		Temperature Rating	
			kN	kgf	lbf			mm	in	mm	in	kg	lb	°C	°F
1	S4680A	ASTM D1781	3.2	320	700	0.5 in Clevis Pin (Type Dm)	0.5 in Clevis Pin (Type Dm)	240 Plus Specimen Length	9.5 Plus Specimen Length	134	5.3	3.5	7	-30 to +120	-22 to +248
	S4680C	ASTM D1781	3.2	320	700	0.5 in Clevis Pin (Type Dm)	0.5 in Clevis Pin (Type Dm)	240 Plus Specimen Length	9.5 Plus Specimen Length	134	5.3	3.5	7	-30 to +120	-22 to +248
	CP108963	EN 2243-3	3.2	320	700	0.5 in Clevis Pin (Type Dm)	0.5 in Clevis Pin (Type Dm)	240 Plus Specimen Length	9.5 Plus Specimen Length	134	5.3	3.5	7	-30 to +120	-22 to +248

Notes:
1. S4680A for flexible facing, S4680C and CP108963 for rigid facing

COMPOSITE TEST

FIXTURES



1

STRAIN GAUGE ADAPTOR

Catalog Number	Description
2210-891	Adapter for 120 ohm strain gauges. Connects to standard Instron strain channel (not included). Quarter bridge configuration. Provided with spring loaded terminals for attachment of strain gauge leads. Suitable for maximum strains of 5%.
1 2210-892	Adapter for 350 ohm strain gauges. Connects to standard Instron strain channel (not included). Quarter bridge configuration. Provided with spring loaded terminals for attachment of strain gauge leads. Suitable for maximum strains of 5%.

Notes:

1. Two adapters can be used with a 2210-857 cable to average the signal from two strain gauges.

ELASTICATED FABRIC

GRIPS



Fabric loop grips are used for tension and elongation testing of wide or narrow elastic fabrics. This test is performed with various types or combinations of materials, and tested at a constant rate of extension. Loop tension at specified elongation and elongation at specified loop tension are test procedures that require three cycles to bring the specimen under test to a specified point and returned to a zero value as described in ASTM D4964.

Principle of Operation

These grips have a U-shaped body style, and are also referred to as band clamps. One edge of the U is attached to a connector that mounts to the moving crosshead and to the base of the testing machine. The other edge of the U has a 6.5 mm (0.25 in) diameter that makes contact with the specimen. The specimen is wrapped onto itself and sewn at the end with two rows using a single needle stitch, forming a loop. This loop is then inserted around both the upper and lower grips and made ready for testing.

Application Range

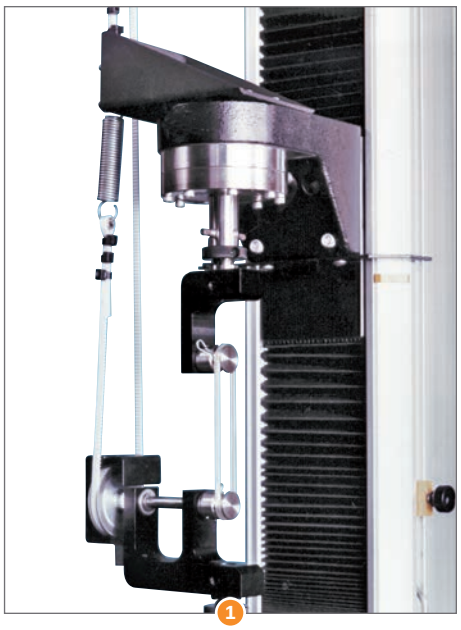
- Types of loading: Tension/tension testing
- Types of material: Elastomeric fabrics
- Specimen types: Looped fabric

ELASTICATED FABRIC GRIPS

	Catalog Number	Testing Standards	Capacity			Specimen Width		Upper Fitting	Lower Fitting	Upper Effective Length		Anvil Diameter		Accessory Width		Accessory Weight		Temperature Rating	
			kN	kgf	lbf	mm	in			mm	in	mm	in	mm	in	kg	lb	°C	°F
1	2717-080	ASTM D4964	2.5	250	560	76	3	6mm Clevis Pin (Type Om)	6mm Clevis Pin (Type Om)	97	3.8	6.4	0.25	108	4.3	0.5	1.1	+10 to +40	+50 to +100

ELASTOMERIC O-RING

FIXTURES



Elastomeric materials are frequently tested in the form of rings either because the finished product is an o-ring or because ring-shaped samples can be readily prepared. Tensile testing of ring specimens requires a special fixture.

Principle of Operation

Designed for testing elastomeric materials in the form of rings, these fixtures avoid local stress concentrations by using a lower spindle that is rotated by a toothed-belt driven from the moving crosshead. The upper spindle rotates freely and the rotation frequency of the lower spindle is easily selected by moving the toothed-belt from one pulley to another. The simple drive mechanism avoids the need for lubricants or separate electric motors.

Application Range

- Tensile testing of elastomeric rings to a variety of international standards

Safety Advice

Review safety note on page 236

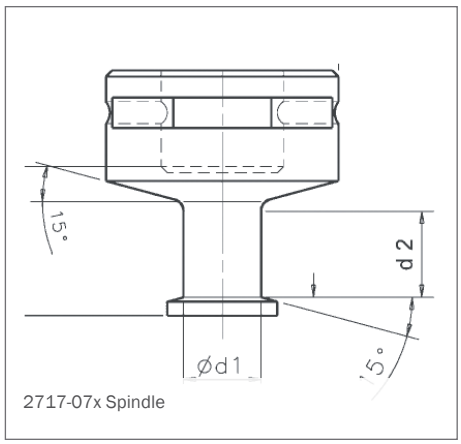
O-RING FIXTURES

	Catalog Number	Testing Standards	Capacity			Upper Fitting	Lower Fitting	Upper Effective Length		Lower Effective Length		Temperature Rating	
			kN	kgf	lbf			mm	in	mm	in	°C	°F
1	2717-068	Elastomeric o-ring Test Fixture, Single Column Systems	1	100	220	6mm Clevis Pin (Type Om)	6mm Clevis Pin (Type Om)	98	3.8	98	3.8	+10 to +40	+50 to +100
	2717-078	“O” Ring Test Fixture for 336X, 446X, 556X, and 596X Standard and Extra Height Table Top Test Systems	1	100	220	6mm Clevis Pin (Type Om)	0.5 in Clevis Pin (Type Dm)	98	3.8	98	3.8	+10 to +40	+50 to +100

ITEMS FOR USE WITH 2717-068, 2717-069, 2717-077, 2717-078, 2717-079

Catalog Number	Description
2717-070	Spindle set per ASTM D1414, and ASTM D412 Proc. B
2717-071	Spindle set per BS 3704
2717-072	Spindle set per DIN 53504 R1
2717-073	Spindle set per DIN 53504 R2
2717-074	Spindle set - ⅛ in
2717-075	Spindle set - ¼ in
2717-076	Spindle set - ½ in

Different o-ring diameters and thicknesses require different spindles in order to provide more accurate tests. The spindle is the component that hooks inside the o-ring and pulls on it during test. The spindles must be used in conjunction with a suitable o-ring test fixture.



2717-07x Spindle

Principle of Operation

The spindles come in different sizes specified by testing standards or by a specific need. The main fixture remains on the system, and the spindles can be easily interchanged to accommodate the specimen.

Application Range

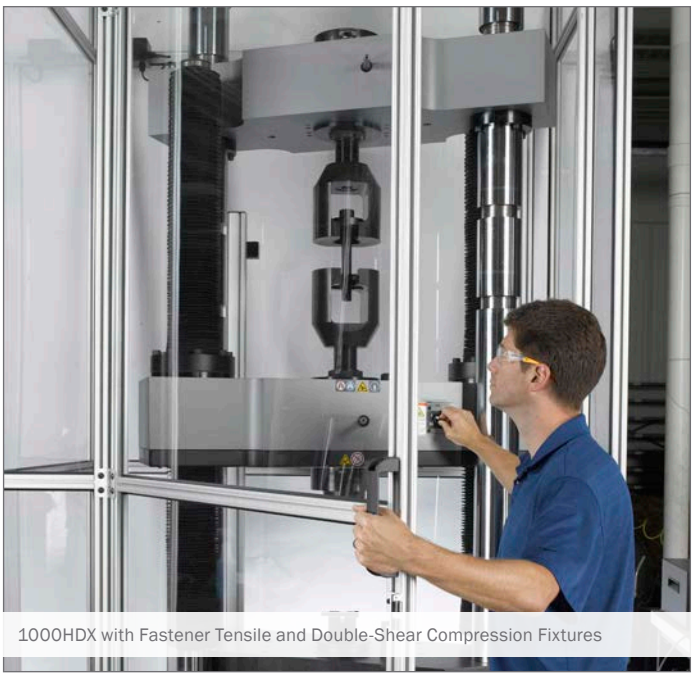
- Tensile testing of elastomeric rings to a variety of international standards

O-RING SPINDLES

Catalog Number	Testing Standards	Roller Diameter		Roller Width	
		mm	in	mm	in
2717-070	ASTM D1414, ASTM D412 Proc. B	4.75	0.19	7	0.28
2717-071	BS 3704	15	0.59	25	0.98
2717-072	DIN 53504 R1	22.3	0.88	7	0.28
2717-073	DIN 53504 R2	18.3	0.72	7	0.28
2717-074	-	3.175	0.125	7	0.28
2717-075	-	6.35	0.25	7	0.28
2717-076	-	12.7	0.5	7	0.28

FASTENER

HOLDERS



1000HDX with Fastener Tensile and Double-Shear Compression Fixtures



Basic Fastener Tensile Configuration includes Series B Bolt Holders

Fastener accessories allow for the performance of static tensile testing of external and internal threaded fasteners. Instron® fastener holders in combination with washers, short bolt adapters and nut proof loading assemblies carry out tests to include axial and wedge proof loading and tensile as well as nut proof load tests in accordance with ASTM F606.

Fastener holders sets are standardly available with capacities ranging from 100kN to 1500kN (22,500 lbf to 337,500 lbf). Each fastener holder has a key slot opening to facilitate quick specimen insertion. A circular recess in the holder ensures that the specimen is installed properly and aligned axially while also preventing it from shifting in the holder. These features work together to improve throughput and repeatability without compromising safety.

The fastener holders are typically attached to the load frame using spherically aligned tension rods, couplings and/or attachment kits that mate with the standard Instron attachment adapting interface noted in the product description.

Principle of Operation

The most common inserts used with fastener holders are washers. Washers provide the interface between the fastener being tested and the holder. For a typical test, the operator would fit an unthreaded washer under the head of a screw or bolt and a threaded washer onto the threaded section of the fastener (when testing studs, two threaded washers will be used, one on each threaded end portion). After fitting the specimen with both washers, the operator would place the fastener into the holder, apply a pre-load to ensure correct seating and adjust the alignment, and begin the test. Fasteners of a shorter length may require a short bolt adapter rather than a threaded washer.

Application Range

- Types of loading: Proof tests, axial and wedge tensile tests
- Specimen materials: Metal alloys
- Specimen types: Bolts, nuts, studs

Safety Advice

Review safety note on page 236



Series B Bolt Holders - Set of 2

FASTENER HOLDERS

Catalog Number	Testing Standards	Rated Capacity			Maximum Specimen Diameter**	Adapting Thread Size	Effective Length (each)		Weight (each)		Temperature Rating	
		kN	kgf	lbf	in		mm	in	lb	kg	°C	°F
W-5155-A	ASTM F606	150	15,000	33,750	M12 (0.5 in)	M36 (Type R4) Female	50.8	2	3.0	1.36	+0 to +100	+32 to +212
W-5155-B	ASTM F606	600	60,000	135,000	M24 (1.0 in)	M48 (Type II RH) Female	96.5	3.8	17.75	8.05	+0 to +100	+32 to +212
W-5155-C	ASTM F606	1,000	100,000	225,000	M36 (1.5 in)	M72 (Type IIA RH) Female	129.5	5.1	32.125	14.57	+0 to +100	+32 to +212
W-5155-D	ASTM F606	1,500	150,000	337,500	M48 (1.875 in)	M72 (Type IIA RH) Female	160	6.3	60.5	27.44	+0 to +100	+32 to +212

ADAPTER BUSHINGS FOR USE WITH SPHERICAL ALIGNMENT ADAPTERS

Catalog Number	Description
W-5551-D	M48mRH to M36fRH
W-5552-G	M72mRH to M48fRH
W-5553-B	Type Df to M48RHf

QUICK CHANGE PIGGYBACK ADAPTERS

Catalog Number	Description
W-5157-A	B Series to A Holders
W-5157-D	C Series to B Holders
W-5157-F	D Series to C Holders

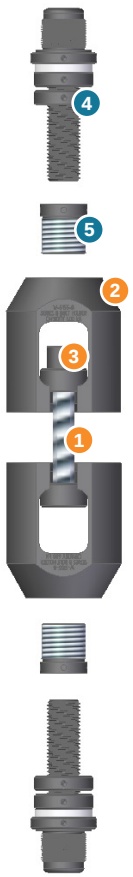
See Spherical Alignment Adapters in Section 2.12 for other recommentations on attachment kits

FASTENER

HOW TO ORDER HOLDERS

First, locate your machine model and serial number.
Now work through the following steps:

STANDARD CONFIGURATION - FASTENER TENSILE



1 FASTENER

Start by determining the **size** of the fastener(s) to be tested. This would include the **diameter**, **thread pitch** and **length** for each unique fastener to be tested.

* Consult Instron® when the fastener is high strength, and/or if dynamic testing will be performed

2 HOLDER

The holder is then selected by using the **smallest** and **largest fastener size**. If the range spans two or more Holder Series, then you will want to consider to **piggyback*** one holder to another. However, this is dependent on the available tensile test space.

* See page 30 for piggyback adapters

3 WASHER/SHORT BOLT ADAPTER

Now, select the washers* to **match the fasteners** with respect to the Holder Series that you selected in Step 2 and the test type shown in the section below. Standard Washers are ASTM F606 compliant; if ISO 898 compliance is required, note this at inquiry.

* See pages 31 - 34 for types of washers

4 SPHERICAL TENSION ADAPTER

A spherical tension adapter is recommended to provide compensation for minor misalignment, hence minimizing the stresses to the fastener that could result in premature failure.

If a Spherical Tension adapter is already **present**, please provide the **thread size** of the tension rod to determine if additional adapters may be required to install the fastener fixtures.

If a Spherical Tension adapter is **not available**, we will help you to determine the appropriate one for the specific machine model and serial number.

5 ADAPTER

Additional adapters may be required. This will be determined through the steps above.





1. Short Bolt Adapter
2. Wedge Washer
3. Nut Proof Washer

FIXTURE COMBINATIONS BY TEST TYPE

Select the appropriate fixtures for the type of static* test to be performed as determined by the fastener type to be tested. Bolt Holders are required for each of the configurations.

HEADED BOLT

- Tensile - One plain washer and one threaded washer*
- Wedge Tensile - One wedge washer (2), one plain washer and one threaded washer*

SCREW HEAD WITH TAPER

- Tensile - One countersunk washer and one threaded washer*

THREADED ROD

- Tensile - Two threaded washers*

NUT (3)

- Nut Proof Loading Mandrel fixture

Determine whether strain or extension measurement is required.

* When testing short fasteners, the threaded washer should be replaced with a short bolt adapter (1)

FASTENER

WASHERS FOR HOLDERS



Assorted Plain Washers for use with Bolt Holders to test Fasteners

Designed as an integral part of the fastener testing system, washers provide the interface between the specimen and the bolt holders. All washers are designed to conform to ASTM F606 standards in thickness, width and hardness. Each washer is engineered to fit a specific bolt holder, so it fits snug and secure in the recessed portion of the bolt holder. Numerous diameters and thread/pitch sizes are available, and washers can be engineered to meet customer specification for an exact fit.

Principle of Operation

There are several varieties of washers, each designed to fill different testing purposes: flat (for proof testing or axial tensile testing), wedge (used in conjunction with a threaded washer for wedge tensile testing), and countersunk (for testing fasteners with a vee shoulder head). For a typical test, the operator fits an unthreaded washer under the head of a screw or bolt, and a threaded washer onto the threaded section of the fastener. (When testing studs, two threaded washers are used, one on each threaded portion). After fitting the specimen with both washers, the operator places the fastener into the bolt holder, applies a pre-load to ensure correct seating and adjust the alignment, and begins the test.

Application Range

- Types of loading: Proof tests, axial and wedge tensile tests
- Specimen material: Metal alloys
- Specimen types: Bolts, studs
- All washers comply with ASTM F606, SAE J429 and ISO 898[1]

Notes:

1. Contact Instron® for specific fixtures to comply with ISO 898

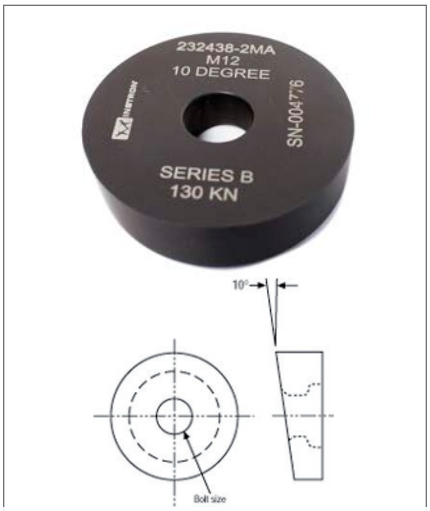


Plain Flat Washers

PLAIN FLAT WASHERS

Catalog Number	Specimen Diameter		Accessory Diameter		Testing Standards
	mm	in	mm	in	
W-5120-A	0 - 12	0 - 0.50	31.75	1.25	ASTM F606, SAE J429, ISO 898[2]
W-5120-B	0 - 24	0 - 1.00	50.80	2.00	ASTM F606, SAE J429, ISO 898[2]
W-5120-C	0 - 36	0 - 1.50	76.20	3.00	ASTM F606, SAE J429, ISO 898[2]
W-5120-D	0 - 48	0 - 1.875	101.60	4.00	ASTM F606, SAE J429, ISO 898[2]

Notes:
1. Specify diameter of specimen when ordering
2. Contact Instron® for specific fixtures to comply with ISO 898
3. Compatible with W-5117/M, W-5155/M holders

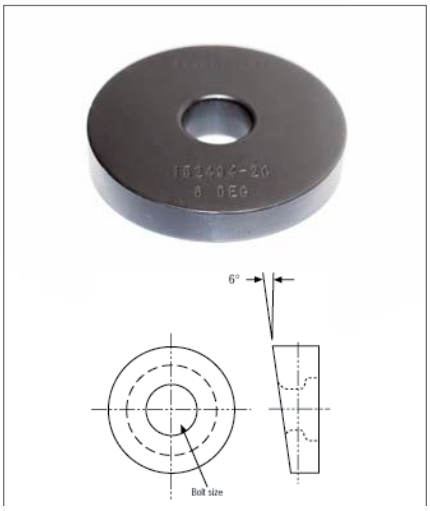


10° Plain Wedge Washers

10° PLAIN WEDGE WASHERS

Catalog Number	Specimen Diameter		Accessory Diameter		Testing Standards
	mm	in	mm	in	
W-5121-A	0 - 12	0 - 0.50	31.75	1.25	ASTM F606, SAE J429, ISO 898[2]
W-5121-C	0 - 36	0 - 1.50	76.20	3.00	ASTM F606, SAE J429, ISO 898[2]
W-5121-D	0 - 48	0 - 1.875	101.60	4.00	ASTM F606, SAE J429, ISO 898[2]
W-5121-B	6 - 24	0.25 - 1.0	50.80	2.00	ASTM F606, SAE J429, ISO 898[2]

Notes:
1. Specify diameter of specimen when ordering
2. Contact Instron for specific fixtures to comply with ISO 898
3. Compatible with W-5117/M, W-5155/M holders



6° Plain Wedge Washers

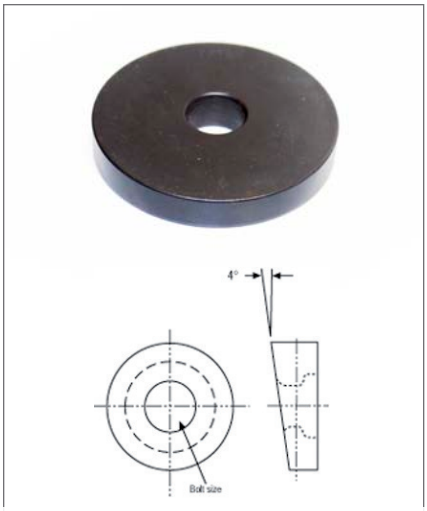
6° PLAIN WEDGE WASHERS

Catalog Number	Specimen Diameter		Accessory Diameter		Testing Standards
	mm	in	mm	in	
W-5122-A	0 - 12	0 - 0.50	31.75	1.25	ASTM F606, SAE J429, ISO 898[2]
W-5122-B	0 - 24	0 - 1.0	50.80	2.00	ASTM F606, SAE J429, ISO 898[2]
W-5122-C	0 - 36	0 - 1.50	76.20	3.00	ASTM F606, SAE J429, ISO 898[2]
W-5122-D	0 - 48	0 - 1.875	101.60	4.00	ASTM F606, SAE J429, ISO 898[2]

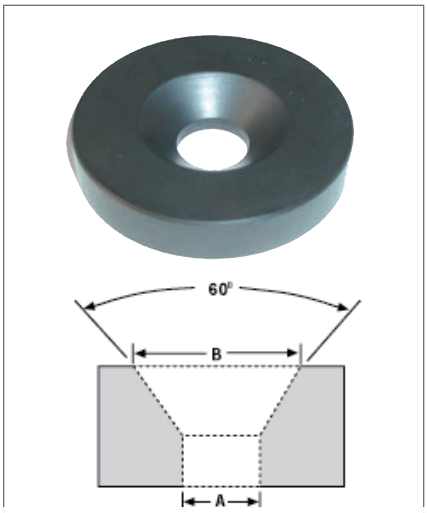
Notes:
1. Specify diameter of specimen when ordering
2. Contact Instron for specific fixtures to comply with ISO 898
3. Compatible with W-5117/M, W-5155/M holders

FASTENER

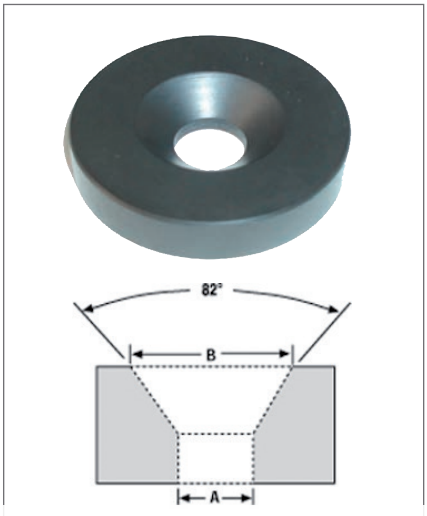
WASHERS FOR HOLDERS



4° Plain Wedge Washers



Countersunk Flat Washer to test 10°



Countersunk Flat Washer to test 82°

4° PLAIN WEDGE WASHERS

Catalog Number	Specimen Diameter		Accessory Diameter		Testing Standards
	mm	in	mm	in	
W-5123-A	0 - 12	0 - 0.50	31.75	1.25	ASTM F606, SAE J429, ISO 898[2]
W-5123-B	0 - 24	0 - 1.0	50.80	2.00	ASTM F606, SAE J429, ISO 898[2]
W-5123-C	0 - 36	0 - 1.50	76.20	3.00	ASTM F606, SAE J429, ISO 898[2]
W-5123-D	0 - 48	0 - 1.875	101.60	4.00	ASTM F606, SAE J429, ISO 898[2]

Notes:
1. Specify diameter of specimen when ordering
2. Contact Instron® for specific fixtures to comply with ISO 898
3. Compatible with W-5117/M, W-5155/M holders

COUNTERSUNK FLAT WASHER TO TEST 60°

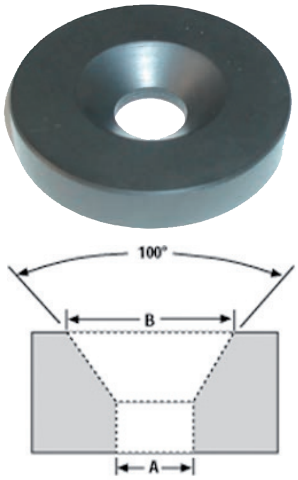
Catalog Number	Specimen Diameter		Accessory Diameter		Testing Standards
	mm	in	mm	in	
W-5139-A	0 - 12	0 - 0.50	31.75	1.25	ASTM F606, SAE J429, ISO 898[2]
W-5139-B	0 - 24	0 - 1.0	50.80	2.00	ASTM F606, SAE J429, ISO 898[2]
W-5139-C	0 - 36	0 - 1.50	76.20	3.00	ASTM F606, SAE J429, ISO 898[2]

Notes:
1. Specify diameter of specimen when ordering
2. Contact Instron for specific fixtures to comply with ISO 898
3. Compatible with W-5117/M, W-5155/M holders

COUNTERSUNK FLAT WASHER TO TEST 82°

Catalog Number	Specimen Diameter		Accessory Diameter		Testing Standards
	mm	in	mm	in	
W-5138-A	0 - 12	0 - 0.50	31.75	1.25	ASTM F606, SAE J429, ISO 898[2]
W-5138-B	0 - 24	0 - 1.0	50.80	2.00	ASTM F606, SAE J429, ISO 898[2]
W-5138-C	0 - 36	0 - 1.50	76.20	3.00	ASTM F606, SAE J429, ISO 898[2]

Notes:
1. Specify diameter of specimen when ordering
2. Contact Instron for specific fixtures to comply with ISO 898
3. Compatible with W-5117/M, W-5155/M holders



Countersunk Flat Washer to test 100°

COUNTERSUNK FLAT WASHER TO TEST 100°

Catalog Number	Specimen Diameter		Accessory Diameter		Testing Standards
	mm	in	mm	in	
W-5137-A	0 - 12	0 - 0.50	31.75	1.25	ASTM F606, SAE J429, ISO 898[2]
W-5137-B	0 - 24	0 - 1.0	50.80	2.00	ASTM F606, SAE J429, ISO 898[2]
W-5137-C	0 - 36	0 -1.50	76.20	3.00	ASTM F606, SAE J429, ISO 898[2]

Notes:
1. Specify diameter of specimen when ordering
2. Contact Instron® for specific fixtures to comply with ISO 898
3. Compatible with W-5117/M, W-5155/M holders



Threaded Flat Washers W-5144-A

THREADED FLAT WASHERS

Catalog Number	Specimen Diameter		Accessory Diameter		Testing Standards
	mm	in	mm	in	
W-5144-A	0 - 12	0 - 0.50	31.75	1.25	ASTM F606, SAE J429, ISO 898[2]
W-5144-B	0 - 24	0 - 1.0	50.80	2.00	ASTM F606, SAE J429, ISO 898[2]
W-5144-C	0 - 36	0 - 1.50	76.20	3.00	ASTM F606, SAE J429, ISO 898[2]
W-5144-D	0 - 48	0 -1.875	101.60	4.00	ASTM F606, SAE J429, ISO 898[2]

Notes:
1. Specify diameter of specimen when ordering
2. Contact Instron for specific fixtures to comply with ISO 898
3. Compatible with W-5117/M, W-5155/M holders



Threaded Flat Washers W-5144-B

FASTENER

SHORT BOLT ADAPTERS FOR HOLDERS



Short Bolt Adapters

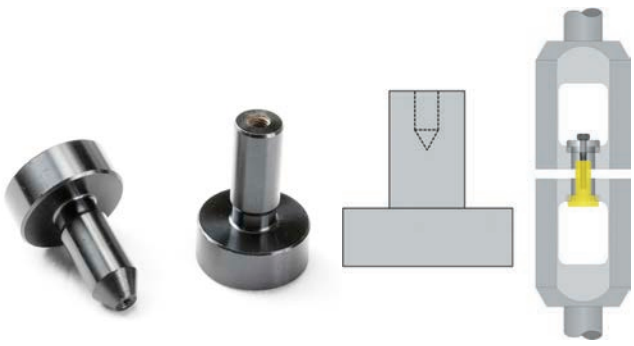
Short bolt adapters are used for bolts that are too short to be tested in bolt holders using conventional threaded washers. These adapters are available for all bolt holder series. There are two different types of short bolt adapters: top hat adapters for smaller diameter bolts, and dumbbell adapters for larger diameter bolts. The top hat adapters can generally be used on shorter bolts because a section of the adapter actually fits into the holder. If the bolt diameter requires a heavy duty adapter with thread attachment external to the bolt holders, a dumbbell adapter would be used.

Application Range

- Types of static loading: Proof tests, axial and wedge tensile tests
- Specimen material: Metal alloys
- Specimen types: Bolts, studs, nuts

Safety Advice

Review safety note on page 236



Tophat Style Adapters



Dumbbell Style Adapters

THREADED FLAT WASHERS

Catalog Number	Specimen Diameter		Accessory Diameter	
	mm	in	mm	in
W-5131-A	0 - 6	0 - 0.25	31.75	1.25
W-5131-B	0 - 12	0 - 0.50	50.80	2.00
W-5131-C	0 - 18	0 - 0.75	76.20	3.00
W-5131-D	0 - 24	0 - 1.0	101.60	4.00

Notes:
1. Test washers sold separately
2. Specify thread/pitch size and diameter when ordering
3. Designed for fastener strengths up to 1375MPa (200ksi). Max load rating stamped on part as supplied and may differ from the load rating of the matching bolt holder.

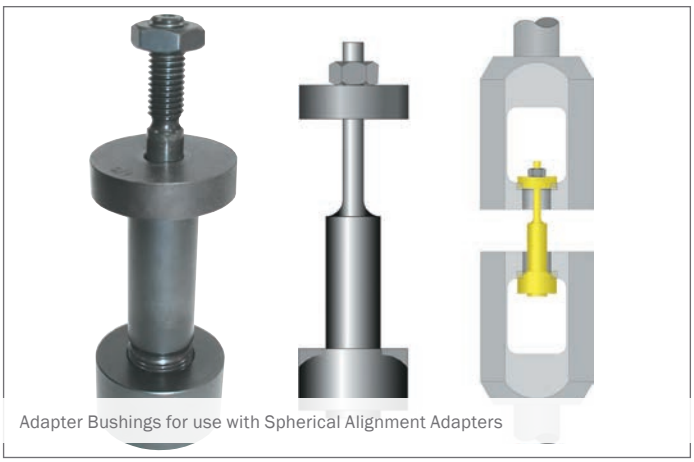
DUMBBELL STYLE

Catalog Number	Specimen Diameter		Accessory Diameter	
	mm	in	mm	in
W-5132-A	6 - 12	0.25 - 0.5	31.75	1.25
W-5132-B	12 - 24	0.50 - 1.0	50.80	2.00
W-5132-C	18 - 36	0.75 - 1.50	76.20	3.00
W-5132-D	24 - 48	1.0 - 1.875	101.60	4.00

Notes:
1. Test washers sold separately
2. Specify thread/pitch size and diameter when ordering

FASTENER

NUT-PROOF LOADING ASSEMBLY FOR HOLDERS



Adapter Bushings for use with Spherical Alignment Adapters

Nut-proof loading assemblies are designed for proof loading or cone stripping of threaded nuts. They are designed to be used in conjunction with fastener holders and are available for all of the fastener holders series. Nut-proof loading assemblies consist of a hardened proof loading mandrel and a proof loading plain flat washer. When used to perform cone stripping tests, an additional conically shaped plain washer must be used. Nut-proof loading assemblies are designed for a particular thread diameter and pitch. The mandrel stud is made of heat-treated tool steel and is built for extended use. The plain washer used for proof loading and the cone stripping conical washer used for cone proof loading are both hardened washers designed to ASTM guidelines.

Principle of Operation

Nut-proof mandrel studs are mounted in a matching fastener holder exactly like a fastener under test. The larger end of the mandrel is threaded, and a matching plain threaded flat washer is seated in the recess of the fastener holder to hold the stud. This allows the force applied to the fastener holder to be transferred to the stud. The other end of the mandrel is matched to the thread and pitch of the nut under test. A plain flat washer is slipped over the stud before threading on the nut. The plain flat washer's inner diameter is a close tolerance fit to the mandrel stud, and the outside diameter is the same as the recess in the fastener holder being used. Users can very easily switch from proof-loading bolts to proof-loading nuts without changing the fixturing, saving time and increasing operator productivity.

Application Range

- Types of loading: Static tension
- Specimen materials: Metal alloys
- Specimen types: Nuts

Safety Advice

Review safety note on page 236

ADAPTER BUSHINGS FOR USE WITH SPHERICAL ALIGNMENT ADAPTERS

Catalog Number	Description	Available Thread Size Range
W-5133-A	Nut "Proof Loading" Assembly for Series A Bolt Holders	#5 (M3) to 0.5 in (M12)
W-5133-B	Nut "Proof Loading" Assembly for Series B Bolt Holders	#5 (M3) to 1 in (M24)
W-5133-C	Nut "Proof Loading" Assembly for Series C Bolt Holders	#5 (M3) to 1.5 in (M36)
W-5133-D	Nut "Proof Loading" Assembly for Series D Bolt Holders	#5 (M3) to 1.875 in (M45)

Notes:
1. Specify thread size of nut to be tested



W-5133-A/B/C/D



1000HDX with Fastener Tensile and Double-Shear Compression Fixtures

The single and double shear test fixtures are designed to test the ability of a fastener to withstand load applied transversely to the axis of the fastener. ASTM F606 provides guidance for single shear testing of tower bolts, but refers to MIL-STD-1312 test 13 for double shear and test 20 for other single shear applications. The single shear fixture is made of a high strength, heat treated alloy steel for durability. It is a tension type fixture using a closed hole design to capture the fastener. This design requires a nut to be used on the bolt or stud being tested to prevent the fixture from separating. A separate fixture must be purchased for each size fastener being tested. The double shear fixture is made of a hardened tool steel to accommodate the high stress involved in a double shear test. It is a compression type fixture, consisting of a mandrel and an anvil, both with U-shaped cutouts. The anvil supports the fastener during the test, and the mandrel applies the compressive force. The mandrel and anvil of the fixture are precision machined as a matched set for a specific size fastener. A separate fixture must be purchased for each size fastener being tested.

Principle of Operation

The single shear fixture is designed for mounting to spherical tension rods. The fixture can be adapted to frames without tension rods, provided a spherical alignment device is utilized as part of the load train. The fastener is passed through both halves of the fixture, with the nut maintaining both halves of the fixture in contact with one another. Applying a tensile force to the fixture causes a shear force to be applied to the fastener. The double shear fixture is designed so that the lower half (anvil and base) rests on the machine table. The mandrel is mounted to the test frame adjustable crosshead with a mounting plate that is matched to the frame being used. The fastener is placed in the U-shaped cutouts of the anvil and base. The mandrel fits between the sides of the anvil with a very close tolerance, and has a corresponding U-shaped cutout. A compressive force is applied to the fixture, which induces a shear force at two different points on the fastener.

Application Range

- Types of loading: Shear tension, shear compression
- Specimen material: Metal alloys
- Specimen types: Bolts, studs

Safety Advice

Review safety note on page 236

FASTENER

SHEAR FIXTURES



1



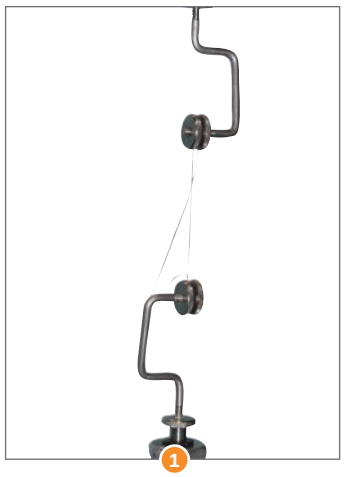
2



3

FASTENER SHEAR FIXTURES

	Catalog Number	Description	Pressure Rating		Testing Standards	Specimen Diameter	Upper Fitting	Lower Fitting
			MPa	psi				
1	W-5135	Double shear fixture for fasteners	1240	180,000	MIL-STD 1312-13, NASM1312-13	Specify	-	Table
2	W-5136	Mandrel mounting plate and adapter for double shear fixture	1240	180,000	MIL-STD 1312-13, NASM1312-13	-	Specify	-
3	W-5140	Single shear fixture for fasteners	-		ASTM F606	Specify	1.5 in - 6 fRH	1.5 in - 6fRH
	W-5141	Single shear fixture for fasteners	1380	200,000	ASTM F606	Specify	M36 × 4 fRH	M36 × 4 fRH







Fibers or filaments although all thin, still have a wide variety of thicknesses and tensile strengths, and require very specific gripping methods. These lever action grips provide the ideal means to hold single fiber specimens. The grips are simple, lightweight and symmetrical in design. The o-ring type of grip is designed to hold very small diameter fiber specimens during tension testing. The rubber V-groove provides a gradually increased frictional hold on the specimen, and helps reduce grip face pinching and subsequent specimen jaw breaks. Special consideration is built into the design, where the u-shaped bend provides sufficient area for specimen loading.

Principle of Operation

Lever action grips are generally used for the thicker range of specimens. These grips have an adjustable clamping force, self-aligning hard rubber-coated faces, and provide ease-of-operation similar to a clothes pin. Another approach used for much thinner fibers is the micro fiber grip, also know as the o-ring fiber grip. This grip utilizes two rubber o-rings sandwiched between two knurled wheels. These wheels thread on a stud and compress the o-rings to achieve desired gripping force on the specimen.

Application Range

- Type of loading: Tensile
- Specimen material: Fine wires, filaments
- Specimen shapes: Round, flat

FIBER GRIPS

	Catalog Number	Description	Capacity			Specimen Diameter		Upper Fitting	Lower Fitting	Upper Effective Length		Accessory Width		Accessory Weight	
			N	kgf	lbf	mm	in			mm	in	mm	in	kg	lb
1	2711-007	Fiber clamps, o-ring	0.75	0.075	0.165	1 um - 25 um	39 uin - 984 uin	6mm Clevis Pin (Type Om)	6mm Clevis Pin (Type Om)	70	2.8	21	0.83	0.025	0.05
2	2711-006	Fiber clamps, lever action	5	0.5	1.1	0 - 2.5	0 - 0.1	6mm Clevis Pin (Type Om)	6mm Clevis Pin (Type Om)	105	4	29	1.1	0.044	0.09

FOAM COMPRESSION

FIXTURES



Foam compression fixtures are designed for indentation and compression testing of expanded cellular materials. Standards that require this style of fixture include ASTM D3574, ASTM D5672, ISO 2439 and ISO 3386. The major components of the fixture include a perforated loading table and a circular indenter/anvil. The 203 mm diameter upper anvil incorporates a swivel joint. The base table is perforated with 6.5 mm holes spaced on 20 mm centers, and elevated from the mounting surface to allow for rapid air escape from the specimen.

Principle of Operation

The specimen is placed on the perforated table attached to the instrument base. The indenter is brought down in contact with the specimen to establish a reference height. This is followed by a series of pre-conditioning loading segments and a test loading sequence. Data is captured during the test loading sequence, which generally includes a dwell time. Results are then calculated which commonly include loads at defined percent indentations or deflections.

Application Range

- Indentation Force Deflection (IFD) and Compression Force Deflection (CFD) of expanded cellular materials
- Suitable for an entire product or cut specimen
- Suitable for specimens with or without skins

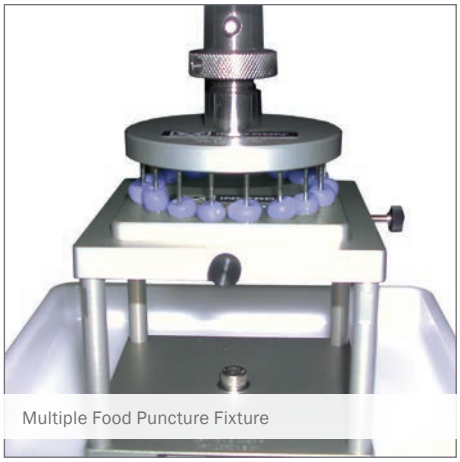
ELASTICATED FABRIC GRIPS

	Catalog Number	Testing Standards	Capacity			Upper Fitting	Lower Fitting	Upper Effective Length		Lower Effective Length		Accessory Width		Accessory Depth		Temperature Rating	
			kN	kgf	lbf			mm	in	mm	in	mm	in	kg	lb	°C	°F
1	2810-130	ASTM D3574, ASTM D5672, EN ISO 2439:2000, ISO 3386	10	1,000	2,250	6mm Clevis Pin (Type Om)	4 × M10 on 90 × 280 mm pattern	100	3.94	146	5.73	387	15.25	387	15.25	+10 to +40	+50 to +100

Notes:
1. Not compatible with 1011, 4411, 4300 or single column systems.


Ottawa Texture Test


Tortilla/Pastry Burst Fixture


Multiple Food Puncture Fixture

Instron® food fixtures cover a wide range of industry standard testing methods including compression, puncture, shear, and extrusion A variety of anvils, probes, shear, extrusion. and bending fixtures are available for R&D, quality assurance, and process control testing. Food fixtures provided by Instron are designed with materials that are corrosion-resistant and durable. All fixtures can be mounted in a drip tray to help keep the test area clean when evaluating the texture of wet, juicy or easily fractured foods.

Principle of Operation

As chewing occurs, food is compressed, sheared and torn, causing it to disintegrate in preparation for swallowing. Texture can be described as a set of characteristics that define how food disintegrates during this process. Instron's food fixtures are designed to provide a measure of these characteristics, providing test results that relate to texture.

Application Range

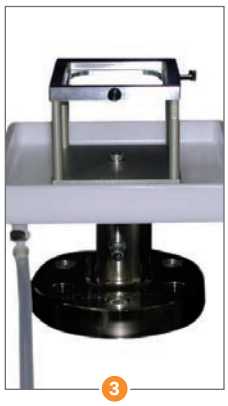
- Texture analysis of solid and semi-solid foods including cereal products, baked goods, processed and muscle meats, fruits and vegetables, dairy products, snack foods, pasta and noodles, confectionery, fish, seafood and more.

FOOD TESTING

FIXTURES







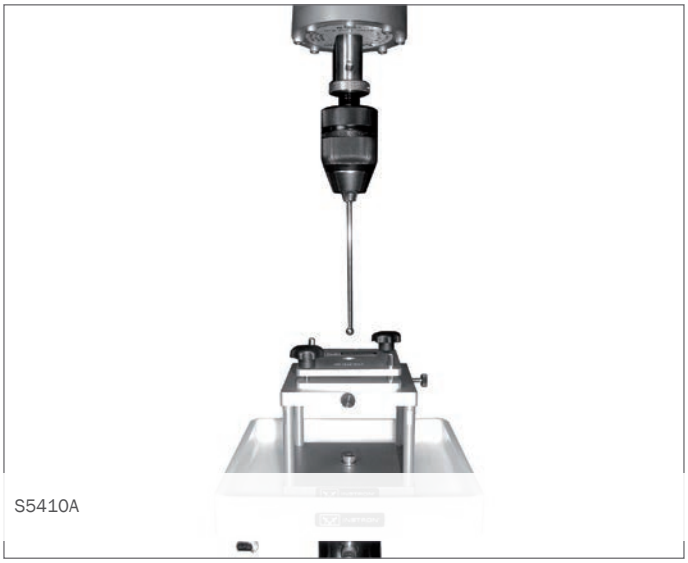




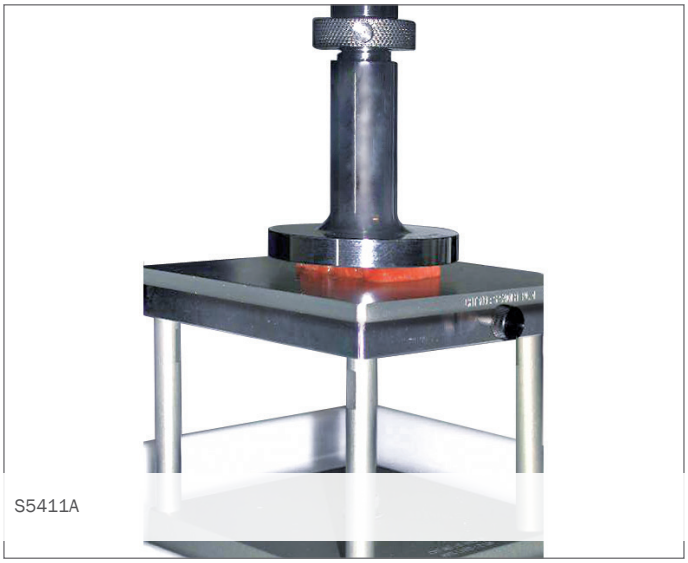


FOOD FIXTURES AND ACCESSORIES

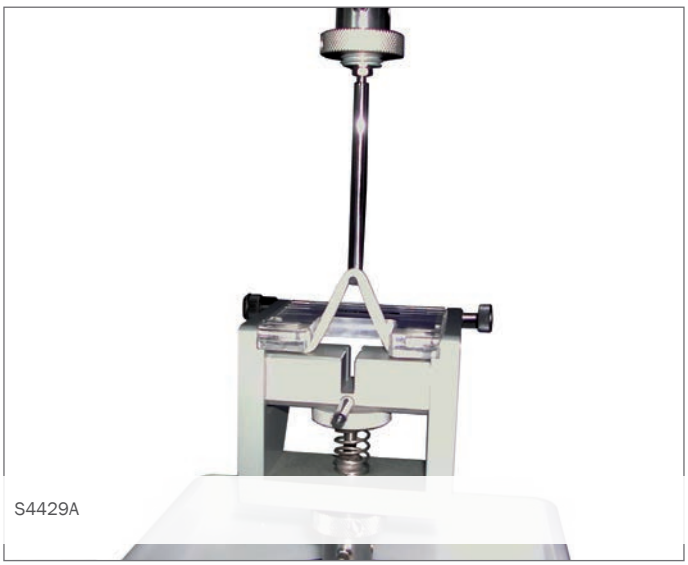
	Catalog Number	Description	Capacity			Notes
			N	kgf	lbf	
	S4429A	Dough Extensibility Fixture	0.01	1	2	6 mm clevis pin fitting (Type Om)
	S5407A	Cooked Noodle Tension Grips	0.05	5	10	6 mm clevis pin fitting (Type Om)
	S4430A	Pasta Buckling Fixture	0.1	10	20	6 mm clevis pin fitting (Type Om); requires Drip Tray S5400A with Support Frame S4427A
1	2830-036	3-Jaw Probe Chuck	0.1	50	100	6 mm clevis pin fitting (Type Om)
	S4428A	Tortilla/Pastry Burst Fixture	1	100	225	6 mm clevis pin fitting (Type Om); requires Drip Tray S5400A with Support Frame S4427A
	S4432A	Multiple Pea Puncture Fixture	1	100	225	6 mm clevis pin fitting (Type Om); requires Drip Tray S5400A with Support Frame S4427A
2	S4431A	Pasta Firmness/Stickiness Fixture	1	100	225	6 mm clevis pin fitting (Type Om); requires Drip Tray S5400A with Support Frame S4427A
	S5411A	Confectionary Holder	1	100	225	6 mm clevis pin fitting (Type Om); requires Drip Tray S5400A with Support Frame S4427A, and choice of probe set
	S5410A	Ball-end Probes, Set of 5	1	100	225	Used with 3-Jaw Chuck 2830-036; requires Drip Tray S5400A with Support Frame S4427A
	2830-005	Puncture Probe Set (Includes 9 probes)	1	100	225	Used with 3-Jaw Chuck 2830-036; requires Drip Tray S5400A with Support Frame S4427A
	2830-015	Magness-Taylor Probes, Set of 2	1	100	225	Used with 3-Jaw Chuck 2830-036; requires Drip Tray S5400A with Support Frame S4427A
	S5400A	Drip Tray	2	200	450	0.5 in clevis pin fitting (Type Dm)
3	S4427A	Support Frame	2	200	450	Requires Drip Tray S5400A
	S5401A	Sample Support Plates	2	200	450	Requires Drip Tray S5400A with Support Frame S4427A
	S5402A	Compression Anvil	2	200	450	6 mm clevis pin fitting (Type Om)
6	S5405A	Back Extrusion Cell	2	200	450	6 mm clevis pin fitting (Type Om); requires Drip Tray S5400A with Support Frame S4427A
4	S5406A	Warner Bratzler Shear Fixture	2	200	450	6 mm clevis pin fitting (Type Om); requires Drip Tray S5400A with Support Frame S4427A
5	S5403A	Kramer Shear Cell	2	200	450	6 mm clevis pin fitting (Type Om); requires Drip Tray S5400A with Support Frame S4427A
	S5404A	Ottawa Texture Cell	2	200	450	6 mm clevis pin fitting (Type Om); requires Drip Tray S5400A with Support Frame S4427A
	S5409A	Noodle Shear Fixture	2	200	450	6 mm clevis pin fitting (Type Om); requires Drip Tray S5400A, Support Frame S4427A and Warner Bratzler S5406A



S5410A



S5411A



S4429A



S5407A

FRICTION

FIXTURES



The 2810-005 coefficient of friction fixture measures the static and kinetic coefficient of friction of plastic film and sheets to ASTM D1894 and ISO 8295:2004. The major components of the fixture include a 200 g square metal sled wrapped with a 1/8 in (3.2 mm) thick foam pad and a rectangular metal table with a defined surface finish. A pulley located at one end of the table allows the sled, when attached to the crosshead via a nylon or metal tow line, to be pulled horizontally along the plate. Test material can be attached to either the sled, plate or both. The coefficient of friction fixture mounts in the testing system load frame using an Instron® standard Type D-base grip adapter. The tow line attaches directly to the load cell.

Principle of Operation

The coefficient of friction test fixture consists of a horizontal table and a moveable sled. Both the table and sled are covered with the test material. A tow line attaches to the sled and a low force load cell with a pulley guiding the tow line during the test. The fixture is mounted to the base of the instrument and, as the crosshead/load cell moves, the sled is pulled across the horizontal table. Data is recorded from the load cell during the test and analyzed to determine both static and kinetic friction. The static friction is derived from the first maximum peak (force) on the load curve and kinetic friction is derived from the average force between two pre-defined points. The coefficient of friction is defined as the recorded force divided by the weight of the sled.

Application Range

- Coefficient of friction determination on sheet, film and paper products. Testing in tensile mode only, no high rate applications.

FRICTION TEST FIXTURES

	Catalog Number	Testing Standards	Capacity			Upper Fitting	Lower Fitting	Accessory Width		Accessory Length	
			kN	kgf	lbf			mm	in	mm	in
1	2810-005	ASTM D1894, ISO 8295:2004	0.1	10	22	0.1875 in clevis pin (Type Bm) 0.25 in clevis pin (Type Cm) 6 mm clevis pin (Type Om)	0.5 in clevis pin (Type Dm)	152	6.0	514	20.25


1


1


2


3

Bend or flexure testing provides a convenient method for characterizing the strength of the miniature components and specimens typical of those found in microelectronics applications. Fixtures are available for both three and four-point loading.

Principle of Operation

The specimen is supported on two lower anvils at a defined distance. The support span can be adjusted according to specimen size. Force is applied to the specimen by an upper anvil located at the mid-span of the lower anvils. Some fixtures include an option for four-point loading.

Application Range

- Bend and flexure tests on a wide variety of miniature components and specimens

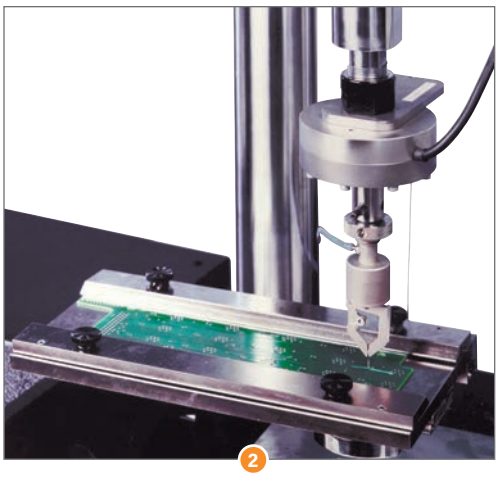
MICROELECTRONIC FLEXURE FIXTURES

	Catalog Number	Description	Capacity			Specimen Width		Support Span		Anvil Diameter		Upper Fitting	Lower Fitting
			kN	kgf	lbf	mm	in	mm	in				
	2810-410	Micro 3-point bend fixture	0.1	10	22	0 - 5	0 - 0.2	1	0.039	0.5 to 0.196 (Upper) 0.2 to 0.078 (Lower)		6 mm Clevis Pin (Type Om)	6 mm Clevis Pin (Type Om)
1	2810-411	Micro 3-point bend fixture	1	100	225	-		3 - 10	0.12 - 0.4	0.5	0.196	6 mm Clevis Pin (Type Om)	6 mm Clevis Pin (Type Om)
2	2810-412	Miniature 3-point bend fixture	2	200	450	-		10 - 100	0.4 - 3.9	5	0.196	6 mm Clevis Pin (Type Om)	6 mm Clevis Pin (Type Om)
3	2810-413	4-point anvil option for 2810-412	2	200	450	-		-		5	0.196	6 mm Clevis Pin (Type Om)	-

MICROELECTRONICS

PEEL FIXTURES





Peel fixtures are suitable for testing the peel strength of a wide range of laminated materials and components including copper runners on printed circuit boards, thin film coatings, adhesive tapes and other bonded structures.

Principle of Operation

The fixtures incorporate a moving table which is coupled to the crosshead or actuator of the materials testing machine through a cable and pulley. As the crosshead (or actuator) is driven in the tensile direction the cable pulls the table laterally to maintain the required peel angle throughout the test .This method prevents the exertion of outside forces on the sample. The force required to peel the specimen is measured by the machine load measurement system, providing a direct measure of bond strength. The substrate or base of the test sample is clamped to the moving table via a set of clamps.

Application Range

- Peel tests on copper runners, thin films and coatings, adhesive tapes and packaging

MICROELECTRONIC PEEL FIXTURES

	Catalog Number	Testing Standards	Capacity			Upper Fitting	Lower Fitting	Notes
			kN	kgf	lbf			
1	2820-033	Miniature variable angle peel fixture	1	100	225	Requires Upper Grip	6 mm Clevis Pin (Type Om)	Peel angles of 30°, 45°, 60°, 90°, 120°, 135° and 150°
2	2820-034	Miniature 90° Peel Fixture	1	100	225	Requires Upper Grip	6 mm Clevis Pin (Type Om)	-



2860-101 with 2860-200



1



2

Translation stages provide the ability to precisely position and align a test specimen below the actuator. The PCB clamping stage provides a rigid clamping base for the testing of microelectronic circuit boards and components. The clamping stage may be attached directly to the test machine base or to a translation stage.

Principle of Operation

Theta (rotary angle) and XY translation stages are available which are adjustable via digital micrometers. The translation stage axes are arranged with the angle stage at the base with the XY stage on top, allowing the test platform to be oriented with the XY axes referenced to the specimen.

Application Range

- Precise positioning and rigid clamping of microelectronic circuit boards and components within the test system

TRANSLATION AND CLAMPING STAGES

	Catalog Number	Testing Standards	Capacity			Lower Fitting	Temperature Rating	
			kN	kgf	lbf		°C	°F
1	2860-200	PCB clamping stage	0.5	50	112	6 mm Clevis Pin (Type Om)	+10 to +40	+50 to +100
	2860-100	XY manual translation stage	1	100	225	6 mm Clevis Pin (Type Om)	+10 to +40	+50 to +100
2	2860-101	XY-theta manual translation stage	1	100	225	6 mm Clevis Pin (Type Om)	+10 to +40	+50 to +100

MICROELECTRONICS

TENSILE GRIPS



1

A variety of tensile grips suitable for performing tensile tests on a wide range of microelectronic components and assemblies including leads, wires and irregularly shaped products.

Principle of Operation

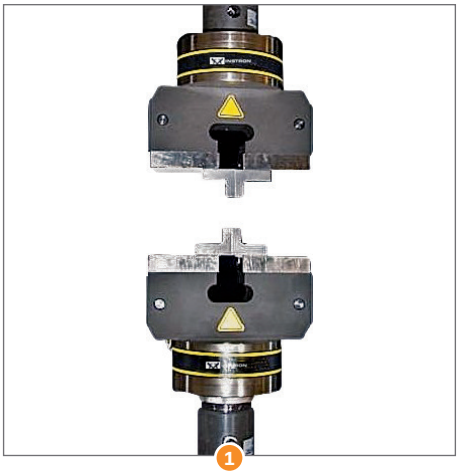
Pneumatically operated grips provide controllable and repeatable gripping for a variety of tensile gripping requirements. In addition, footswitch actuation means that the operator's hands are free for accurate specimen placemen. Mechanical stud pull grips incorporate two self-aligning couplings to ensure optimum alignment.

Application Range

- Tensile tests on microelectronic components and assemblies including leads, wires and irregularly shaped products

MICRO PNEUMATIC GRIP

	Catalog Number	Testing Standards	Capacity			Upper Fitting	Lower Fitting	Temperature Rating	
			kN	kgf	lbf			°C	°F
1	2712-101	Micro pneumatic grips, side action	0.01	1	2	6 mm Clevis Pin (Type Om)	6 mm Clevis Pin (Type Om)	-10 to +80	+14 to +176
	2732-101	Micro pneumatic grips, side action high temperature rated with integral pull rods	0.01	1	2	6 mm Clevis Pin (Type Om)	6 mm Clevis Pin (Type Om)	0 to +120	+32 to +248







VERSA GRIPS AND LEAD AND STUD PULL GRIPS

Catalog Number	Testing Standards	Capacity			Upper Fitting	Lower Fitting	Temperature Rating	
		kN	kgf	lbf			°C	°F
2712-202	Pneumatic versa grips, side action	0.5	50	112	6 mm Clevis Pin (Type Om)	6 mm Clevis Pin (Type Om)	0 to +60	+32 to +140
1 2712-203	Pneumatic versa grips, side action	1	100	225	6 mm Clevis Pin (Type Om)	6 mm Clevis Pin (Type Om)	0 to +60	+32 to +140
2712-204	Pneumatic versa grips, side action	2	200	450	6 mm Clevis Pin (Type Om)	6 mm Clevis Pin (Type Om)	0 to +60	+32 to +140
2712-212	Pneumatic lead pull grip	0.5	50	112	6 mm Clevis Pin (Type Om)	-	0 to +60	+32 to +140
2 2712-213	Pneumatic lead pull grip	1	100	225	6 mm Clevis Pin (Type Om)	-	0 to +60	+32 to +140
2712-214	Pneumatic lead pull grip	2	200	450	6 mm Clevis Pin (Type Om)	-	0 to +60	+32 to +140
3 2860-001	Wire pull hook fixture	0.01	1	2	6 mm Clevis Pin (Type Om)	-	0 to +60	+32 to +140
2860-300	Stud pull fixture	5	500	1,125	6 mm Clevis Pin (Type Om)	6 mm Clevis Pin (Type Om)	-20 to +70	-4 to +158

ITEMS FOR USE WITH 2712-202, 2712-203, 2712-204

Catalog Number	Description
S4834A	Jaw faces (interlocking)
S4835A	Jaw faces (serrated, needle nose)
S4836C	Jaw faces (serrated, 12.5 mm × 25.4 mm)
S4836B	Jaw faces (serrated, 25.4 mm × 25.4 mm)
S4836A	Jaw faces (serrated, 25.4 mm × 12.5 mm)
S4837A	Jaw faces (smooth, 25.4 mm × 12.5 mm)

ITEMS FOR USE WITH 2712-212, 2712-213, 2712-214

Catalog Number	Description
S4835A	Jaw faces (serrated, needle nose)

ITEMS FOR USE WITH 2860-001

Catalog Number	Description
2860-002	Pull hook (0.15 mm long)
2860-003	Pull hook (0.2 mm long)
2860-004	Pull hook (0.3 mm long)

ITEMS FOR USE WITH 2860-300

Catalog Number	Description
2860-301	Specimen preparation fixture for stud pull tests
2860-310	Stud set (7 mm × 7 mm)
2860-311	Stud set (10 mm × 10 mm)

MICROELECTRONICS

JAW FACES, HOLDERS AND OPTIONS



1



1

A range of interchangeable jaw faces, holders and options are available to fit tensile grips for microelectronics.

Principle of Operation

Jaw faces are available in a variety of surfaces to provide optimum gripping for the widest range of specimens Smooth, serrated and interlocking jaw faces can be used on the pneumatic versa grips. A range of studs is available for the stud pull fixture.

Application Range

- Tensile tests on microelectronic components and assemblies including leads, wires and irregularly shaped products

JAW FACES FOR LEAD PULL GRIP

Catalog Number	Surface	Notes
S4835A	Serrated	Needle Nose

JAW FACES FOR VERSAGRIP

Catalog Number	Surface	Accessory Width		Accessory Height	
		mm	in	mm	in
S4834A	Interlocking	-	-	-	-
S4836C	Serrated	12.5	0.5	25	1
S4836B	Serrated	25	1	25	1
S4836A	Serrated	25	1	12.5	0.5
S4837A	Smooth Ground	12.5	0.5	25	1

VICE CLAMP

Catalog Number	Notes
2860-210	For holding PCBs and assemblies

STUD PULL PREPARATION

Catalog Number	Notes
1 2860-301	For use with 2860-300 stud pull grips

PULL HOOKS

Catalog Number	Notes
2860-002	0.15 mm long with 50 µ foot diameter
2860-003	0.2 mm long with 80 µ foot diameter
2860-004	0.3 mm long with 150 µ foot diameter

STUD SETS

Catalog Number	Notes
2860-310	7 mm × 7 mm, set of five studs
1 2860-311	10 mm × 10 mm, set of five studs

SPRING TEST

FIXTURES



Coil Spring



Coil Spring Test Space

Spring test fixtures consist of compression plates, tension spring fixtures and special fixtures engineered for specific spring designs. These items can be added to specific frame models to increase the testing capabilities of the test frame.

Compression plates are the load-bearing surface when testing springs or other components in compression. Instron® spring testing compression plates are hardened and ground flat, and most can be adjusted to be parallel to the opposing plate. Parallel compression plates are an important factor in getting accurate and repeatable results for your spring tester. Most compression plates are also center drilled and tapped to allow attachment of other Instron or customer-designed fixtures.

Tension spring fixtures provide attachment pins to hold the eye of the tension spring during load testing. They consist of a main body and a spring bolt (pin) with varying sizes of hooks that can be changed to accommodate specific tension spring eye dimensions.

Special fixtures can be designed to accommodate most any spring design. Examples include load button for securing the spring in the test space and mandrels that pass through the spring to prevent buckling or ejection of the spring from the test space.

Principle of Operation

Spring testers are supplied with integrated compression plates that can be used for normal compression spring testing. Other fixtures, such as tension devices or other compression fixtures, can be mounted directly to the main compression plates. Appropriate adapters are available for various other fixtures and compression plates. Tension fixtures can normally be attached directly to the main compression plates with appropriate adapters. Spring bolts (pins) should be selected based on the tension spring eye dimensions. One end of the tension fixture will be free to rotate to accommodate various eye alignments.

Application Range

- Type of loading: Cyclic tension compression
- Specimen material: Metal alloys, finished products
- Specimen types: Compression, extension, disk, leaf and torsion springs: spring-type components

Safety Advice

Review safety note on page 236

SPRING TEST

FIXTURES

PARALLEL ADJUSTABLE COMPRESSION ANVILS

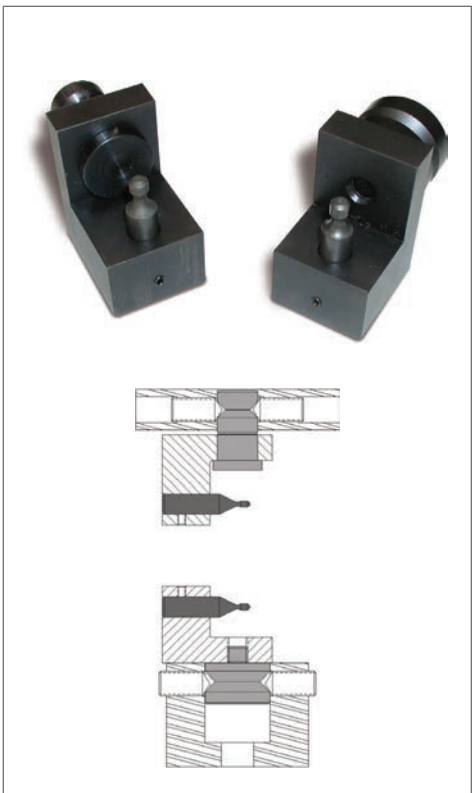
Catalog Number	Application	Capacity		Diameter		Connection
		kN	lbf	mm	in	
W-5537-A	2530 Load Cell	0.05	11	60	2.36	Type Om
W-5537-B	2530 Load Cell	10	2,250	60	2.36	Type Om
W-5537-C	W-5535 Load Cell	25	5,600	60	2.36	M16 × 2 mRH
W-5537-D	W-5535 Load Cell	25	5,600	100	3.94	M16 × 2 mRH

NON-PARALLEL ADJUSTABLE COMPRESSION ANVILS

Catalog Number	Application	Capacity		Diameter		Connection
		kN	lbf	mm	in	
2501-108	2530 Load Cell	0.05	11	57	2.25	Type Om
2501-121	2530 Load Cell	10	2,250	57	2.25	Type Om
W-5538-A	SF600 Series Top	5	1,125	60	2.36	20 mm Hitch
W-5538-B	SF600 Series Bottom	5	1,125	60	2.36	32 mm Button
W-5538-C	SF600 Series Bottom	5	1,125	100	3.94	32 mm Button
W-5538-D	SF1240 Series Top and Bottom	25	5,600	60	2.36	M16 × 2 mRH
W-5538-E	SF1240 Series Top and Bottom	25	5,600	100	3.94	M16 × 2 mRH

TENSION SPRING FIXTURES

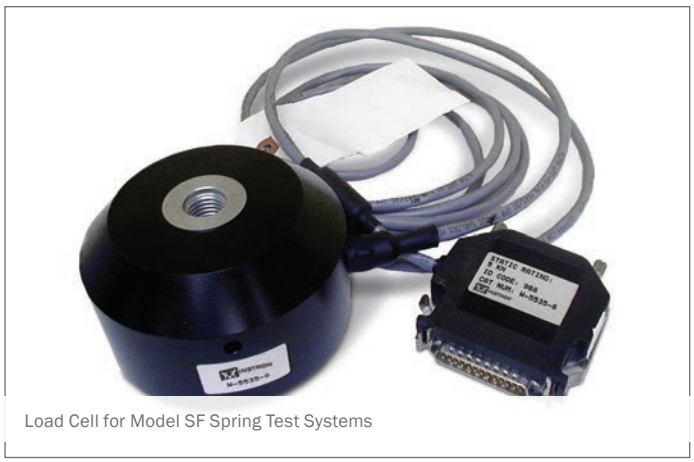
Catalog Number	Application	Capacity	
		kN	lbf
W-5540	Tension spring fixture for spring bolts to 5 mm (0.20 in), set of two	3.5	787
1 W-5540-A1	Mounting for SF600 series machine (20 mm hitch, 32 mm hitch)	-	-
W-5540-A2	Mounting for SF1240 series machine (M16 male)	-	-
W-5540-A3	Mounting for SF1390 series machine (M30 male)	-	-
W-5540-B1	Spring bolt 1 mm (0.04 in)	0.2	45
W-5540-B2	Spring bolt 2 mm (0.08 in)	0.7	157
W-5540-B3	Spring bolt 3 mm (0.12 in)	1.7	382
W-5540-B4	Spring bolt 4 mm (0.16 in)	2.5	562
W-5540-B5	Spring bolt 4.5 mm (0.18 in)	3.0	674
W-5540-B6	Spring bolt 5 mm (0.20 in)	3.5	787
W-5542	Tension spring fixture for spring bolts to 12 mm (0.47 in), set of two	10	2,250
W-5542-A2	Mounting for SF1240 series machine (M16 male)	-	-
W-5542-A3	Mounting for SF1390 series machine (M30 male)	-	-
W-5542-B1	Spring bolt 3 mm (0.12 in)	1.7	382
W-5542-B2	Spring bolt 4 mm (0.16 in)	2.5	562
W-5542-B3	Spring bolt 5 mm (0.20 in)	3.5	787
W-5542-B4	Spring bolt 6 mm (0.24 in)	6.5	1,461
W-5542-B5	Spring bolt 8 mm (0.31 in)	10	2,250
W-5542-B6	Spring bolt 10 mm (0.39 in)	10	2,250
W-5542-B7	Spring bolt 12 mm (0.47 in)	10	2,250



1

Compatible with SF600, SF1240, SF1390 and SFX1560 Series Test Systems.

Load cells for use with the Instron® SF Series Spring testing frames are available in several capacities. Lower capacity cells extend the range of the machine and increase the operating range of the SF Series testing frame. The load cells are built to withstand off-center loading throughout the test while still providing reliable measuring results. When used with the 5500, I-Series, 5800 and 5900 electronics, provision is made for both electrical and mechanical load limits. The lower capacity cells are usually attached to the main load cell using adapters that are purchased separately depending on frame model.



Load Cell for Model SF Spring Test Systems

Principle of Operation

All load cells convert the applied force to an electrical signal representative of the force applied to the specimen. When necessary to test smaller springs, low capacity cells can be added to increase the operating range of the machine.

Application Range

- Can increase resolution for testing small springs
- Extend the range of the testing frame
- Operate in tension, compression or alternating load stress
- All load cells comply with the highest applicable testing standards, including ASTM E4 and ISO 7500-1.

These load cells can be piggyback mounted into the test space on the SF600, SF1240, SF1390 and SFX1560 series Spring Test machines with the appropriate adapters and additional compression anvils. Machine model and existing load cell information is required.

SPRING LOAD CELLS

Catalog Number	Capacity			Upper Fitting	Lower Fitting
	kN	kgf	lbf		
2530-5N	0.005	0.5	1	Bolt On	Type 00 or Type 0
2530-10N	0.01	1	2	Bolt On	Type 00 or Type 0
2530-50N	0.05	5	11	Bolt On	Type 00 or Type 0
2530-100N	0.1	10	20	Bolt On	Type 00 or Type 0
CP117366	0.5	50	112	M16 × 2 fRH	M10 × 1.5 fRH
CP117367	1	100	225	M16 × 2 fRH	M10 × 1.5 fRH
CP117368	2	200	450	M16 × 2 fRH	M10 × 1.5 fRH
CP117634	5	500	1,100	M16 × 2 fRH	M16 × 2 fRH
CP119729	10	1,000	2,200	M16 × 2 fRH	M16 × 2 fRH
CP119730	25	2,500	5,600	M16 × 2 fRH	M16 × 2 fRH
CP118332	50	5,000	11,000	M33 × 2 fRH	M33 × 2 fRH
CP119732	100	10,000	22,000	M33 × 2 fRH	M33 × 2 fRH

TEXTILE CORD, YARN AND TIRE CORD

GRIPS



2714-005



2714-010



CP110730

Pneumatic cord and yarn grips provide a convenient method of clamping fiber, cord, yarns and fine braided wires to reduce the problem of jaw breaks associated with testing these materials. A specially designed horn with a smooth finish and a contoured surface with a graduated cam allows for easy loading and a stress-reduced clamping area on the specimen. The clamping mechanism can be activated either automatically or through a foot switch. This allows hands-free grip operation, enabling the specimen to be held with both hands for easy-loading. Pneumatic cord and yarn grips provide selectable clamping force to accommodate different materials and excellent follow-up action which compensates for decay of the holding force due to specimen creep.

Principle of Operation

Where the gripping area of mono-filaments, cord and yarn is small in relation to the strength, normal techniques using standard grip faces usually result in specimen failures adjacent to the jaw faces. The pneumatic cord and yarn grips have been designed specifically to overcome the problem of specimen failure by incorporating a capstan design that evenly distributes the gripping force over the surface of a curved half capstan through friction. In addition, the pneumatically cushioned gripping force applied to the ends of the specimen compensates for the decay of force due to specimen creep. The pneumatics activate a moveable face, which acts upon a contoured fixed gripping face. This serves as a capstan and provides support for the specimen, making the transition from the free-stressed length of specimen to the rigidly clamped portion gradual rather than abrupt, thus minimizing breakage of the specimen adjacent to the jaw face. The capstan also incorporates a polished guide horn, which assists in rapid specimen loading. The polished finish prevents damage to individual fibers during specimen insertion. The specimen is placed over the top of the horn and slides down to the proper gripping position on the contoured clamp. The grips may be closed or opened by a pneumatic footswitch for hands-free operation. An automatic air kit is also available for hands-free, automated, pre-tension testing via software or system default settings.

Application Range

- Type of loading: Tensile, static and tension cyclictests. Not suitable for high-cycle fatigue tests.
- Specimen material: Fine braided wires, cords, yarns, mono-filaments
- Specimen shapes: Round

Safety Advice

Review safety note on page 236

CORD CAPSTAN GRIPS

	Catalog Number	Description	Capacity			Specimen Diameter		Upper Fitting	Lower Fitting	Temperature Range	
			kN	kgf	lbf	mm	in			°C	°F
1	2715-001	Cord capstan grips	2.5	250	560	0 - 3.2	0 - 0.125	0.5 in Clevis Pin (Type Dm)	0.5 in Clevis Pin (Type Dm)	-70 to +315	-100 to +600
2	2715-002	Smooth faces for 2715-001		-			-	-	-	+10 to +40	+50 to +100

PNEUMATIC WIRE TIRE CORD GRIPS

Catalog Number	Capacity			Specimen Diameter		Upper Fitting	Lower Fitting	Effective Length		Accessory Width	
	kN	kgf	lbf	mm	in			mm	in	kg	lb
2714-010	5	500	1,125	2	0.07	0.5 in Clevis Pin (Type Dm)	0.5 in Clevis Pin (Type Dm)	Upper grip: 248 Lower grip: 248	Upper grip: 9.8 Lower grip: 9.8	245	9.6
CP108524	5	500	1,125	2	0.07	0.5 in Clevis Pin (Type Dm)	0.5 in Clevis Pin (Type Dm)	Upper grip: 248 Lower grip: 248	Upper grip: 9.8 Lower grip: 9.8	245	9.6
CP105953	5	500	1,125	2	0.07	0.5 in Clevis Pin (Type Dm)	0.5 in Clevis Pin (Type Dm)	Upper grip: 248 Lower grip: 248	Upper grip: 9.8 Lower grip: 9.8	245	9.6
CP110730	10	1,000	2,250	5	0.2	0.5 in Clevis Pin (Type Dm)	0.5 in Clevis Pin (Type Dm)	Upper grip: 230 Lower grip: 230	Upper grip: 9.1 Lower grip: 9.1	245	9.6

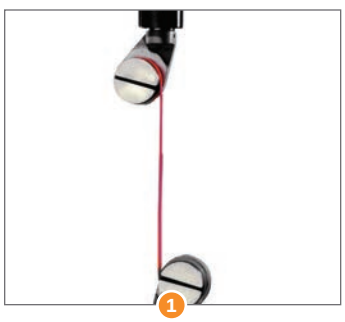
Notes:
1. 2714-010 has smooth moving clamp with flat stationary clamping surface
2. CP105953 has smooth moving clamp with grooved stationary clamping surface
3. CP108524 has Surfalloy coated moving clamp with flat stationary clamping surface

PNEUMATIC CORD AND YARN GRIPS

Catalog Number	Capacity			Specimen Diameter		Upper Fitting	Lower Fitting	Upper Effective Length		Accessory Weight		Temperature Range	
	kN	kgf	lbf	mm	in			mm	in	kg	lb	°C	°F
2714-031	0.05	5	11	0 - 2.3	0 - 0.09	6 mm Clevis Pin (Type Om)	6 mm Clevis Pin (Type Om)	90	3.54	0.179	0.4	-10 to +80	+14 to +175
2714-005	1	100	225	0 - 3.2	0 - 0.125	6 mm Clevis Pin (Type Om)	6 mm Clevis Pin (Type Om)	148	5.8	1.14	2.52	-10 to +80	+14 to +175
2734-007	1	100	225	0 - 3.2	0 - 0.125	Pneumatic Connection	Pneumatic Connection	154	6.1	2.8	6.2	-70 to +260	-94 to +500
2714-040	2	200	450	0 - 4.8	0 - 0.19	0.5 in Clevis Pin (Type Dm)	0.5 in Clevis Pin (Type Dm)	190	7.5	2.36	5.2	-10 to +80	+14 to +175

ITEMS FOR USE WITH 2714-040

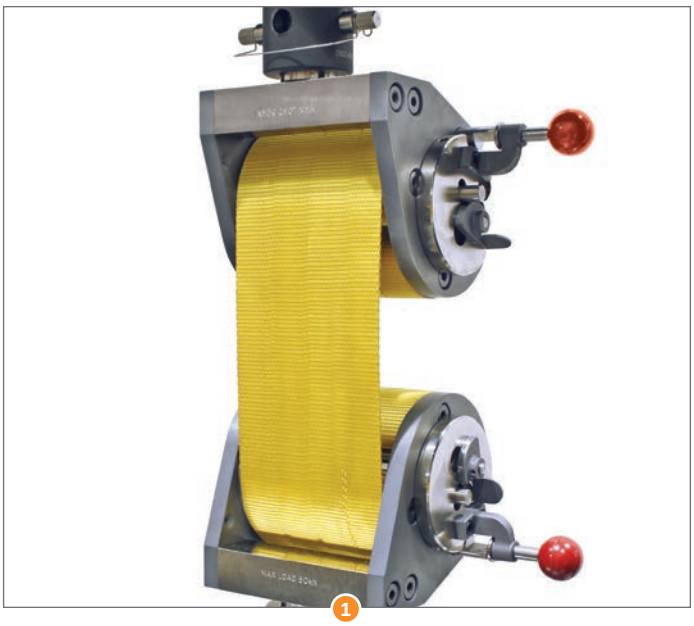
Catalog Number	Description
2714-042	Clamping blocks for general purpose cord and yarns
2714-043	Clamping blocks for Aramid type cord and yarns
2714-044	Clamping blocks for UHMWPE type cord and yarns
2714-045	Clamping blocks for Aramid (high denier) type cord and yarns


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WEBBING

GRIPS



Webbing is a high-strength textile material that cannot generally be gripped successfully with simple side-acting grips. Special grips based on the capstan principle minimize slippage and jaw breakage effects.

Principle of Operation

These webbing capstan grips incorporate an ingenious capstan design that provides fast, easy loading together with a gripping action that results in proper breaks in the full gauge length of the specimen. The specimen is loaded simply by inserting one end into the groove of the capstan and cranking it through 360°. Gripping efficiency is also greatly increased because the surfaces of both capstans are utilized.

Application Range

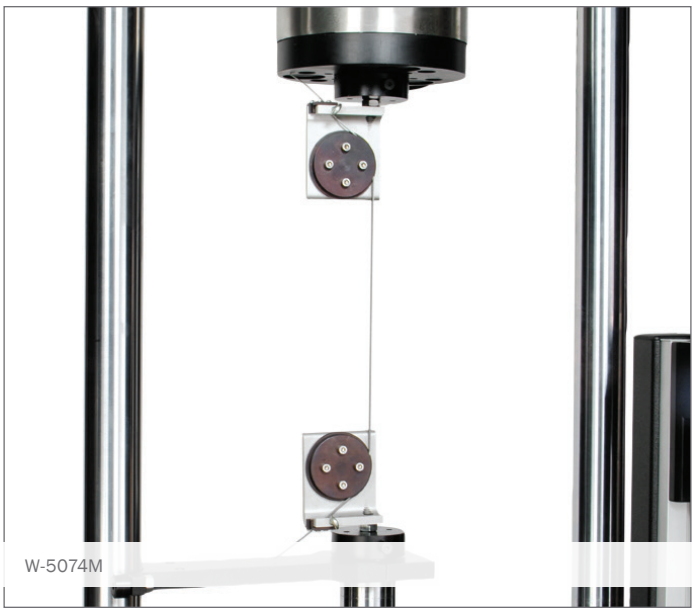
- Static tensile tests on webbing, belts and tapes

Safety Advice

Review safety note on page 236

WEBBING GRIPS

Catalog Number	Capacity			Specimen Length		Specimen Width		Specimen Thickness		Upper Fitting	Lower Fitting	Upper Effective Length		Accessory Width		Temperature Rating	
	kN	kgf	lbf	mm	in	mm	in	mm	in			mm	in	mm	in	°C	°F
2715-003	50	5,000	10,000	1,140	44.9	50	2	0.5 to 4.7	0.02 to 0.18	0.5 in Clevis Pin (Type Dm)	0.5 in Clevis Pin (Type Dm)	170	6.7	180	7.1	+10 to +40	+50 to +100
1 CP108121	50	5,000	10,000	1,140	44.9	100	4	0.5 to 4.7	0.02 to 0.18	0.5 in Clevis Pin (Type Dm)	0.5 in Clevis Pin (Type Dm)	170	6.7	230	9.1	+10 to +40	+50 to +100


W-5074M

Snubbing grips are typically supplied as a matched pair of grip bodies. Each body uses a spool to wrap the specimen around and a snubber (cam or clamp) to secure the free end of the specimen. Cable snubbing grips have a solid steel construction, while wire snubbing grips incorporate a hardened steel drum on an aluminum bracket. The grip body is designed so that the wire or cable specimen is pulled directly in line with the load cell. The snubbing mechanism is not designed to carry the full load applied to the specimen, rather the spool carries the load because the specimen is wrapped around it.

Principle of Operation

W-5074 wire snubbing grips are designed to test wire ranging from 0.125 mm to 1.5 mm (0.005 in to 0.06 in) in diameter. The grips consist of a hardened steel drum secured to an aluminum bracket. The grip is equipped with a screw operated clamp, which acts as the snubber. This clamp is screwed down hand-tight to the specimen end, which requires no modification. The specimen is then wrapped around the spool one and a half to two and a half times, depending on the strength of the wire.

W-5075 cable snubbing grips hold wire or cable specimens from 0.8 mm to 6.35 mm (0.0312 in to 0.25 in) in diameter. W-5074 cable snubbing grips hold wire or cable specimens from 0.125 mm to 1.5 mm (0.005 in to 0.6 in). Sockets or special end preparations of the specimen are not needed for these grips. The end of the specimen is placed between a cam lock and the spool, and secured by hand-tightening the cam lock. The design of wire and cable snubbing grips causes the majority of the tension force to be carried by the spool rather than the clamp or cam lock, reducing specimen slippage. It also ensures that tension reaches its peak in the free section of the specimen, between the grips. This maximizes the probability that the failure will occur in the free length of wire or cable, and produce valid test results. 2714 Series Pneumatic Tire Cord grips are specifically designed to test the steel reinforcing cords used in automotive tires. The special shape minimizes jaw breaks and the pneumatic action ensures quick loading with consistent and controllable gripping force.

Application Range

- Types of loading: Static tension
- Specimen material: Metallic materials
- Specimen types: Wire, cable

Safety Advice

Review safety note on page 236

WIRE AND CABLE SNUBBING

GRIPS





WIRE AND CABLE SNUBBING GRIPS

	Catalog Number	Capacity			Specimen Diameter		Upper Fitting	Lower Fitting	Capstan Diameter	
		kN	kgf	lbf	mm	in			mm	in
1	W-5074M	2.22	225	500	0.125 - 1.5	0.005 - 0.06	6 mm Clevis Pin (Type Om)	6 mm Clevis Pin (Type Om)	64	2.5
2	W-5075M	36	3,000	8,000	0.8 - 6.35	0.0312 - 0.25	0.5 in Clevis Pin (Type Dm)	0.5 in Clevis Pin (Type Dm)	117	4.6
	W-5143M	90	9000	20000	0.8 - 12.7	0.031 - 0.5	0.5 in Clevis Pin (Type Dm)	0.5 in Clevis Pin (Type Dm)	178	7
	CP114084	50	5000	11000	0.125 - 6	0.005 - 0.25	0.5 in Clevis Pin (Type Dm)	0.5 in Clevis Pin (Type Dm)	140	5.5



The strength of adhesive joints in timber is crucial in determining the performance of the completed structure. These fixtures are designed to provide an accurate and easy-to-use method for assessing adhesive strength using different types of timber and adhesives.

Principle of Operation

The test fixture consists of two steel specimen holders. The upper holder is attached to the load cell of the testingsystem via a flexible coupling to provide optimum alignment. The lower holder mounts directly to the testing machine base adapter. The prepared specimen is easily inserted from the front into the holders, which are designed to apply the test load to the specimen shoulders. The force required to break the adhesive bond is applied by moving the crosshead in the tensile direction.

Application Range

- Adhesive bond strength of wood according to ASTM D897

Safety Advice

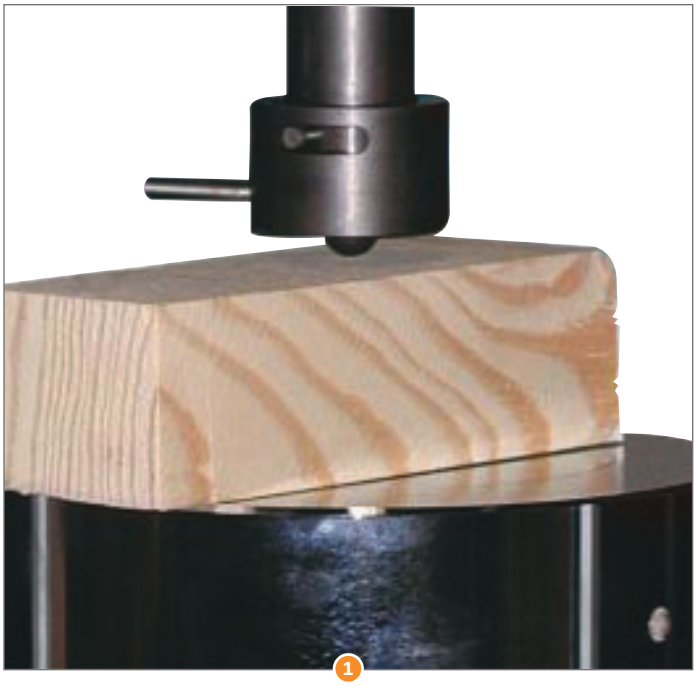
Review safety note on page 236

ADHESIVE BOND

	Catalog Number	Testing Standards	Specimen Diameter		Upper Fitting	Lower Fitting	Upper Effective Length		Accessory Weight		Accessory Width	
			mm	in			mm	in	kg	lb	mm	in
1	S1-11861	ASTM D897	48	1.875	0.5 in Clevis Pin (Type Dm)	0.5 in Clevis Pin (Type Dm)	100	4	0.75	1.65	70	2.8

WOOD COMPRESSION

FIXTURES



The compressive properties of wood can be determined using a range of specialized fixtures. Each device has been designed to meet a particular standard.

Principle of Operation

Compression test fixtures are designed to provide high stiffness, accurate deformation measurement and axial loading. The hardness test fixture uses a compressive ballpenetration technique to measure the force at a defined penetration depth.

Application Range

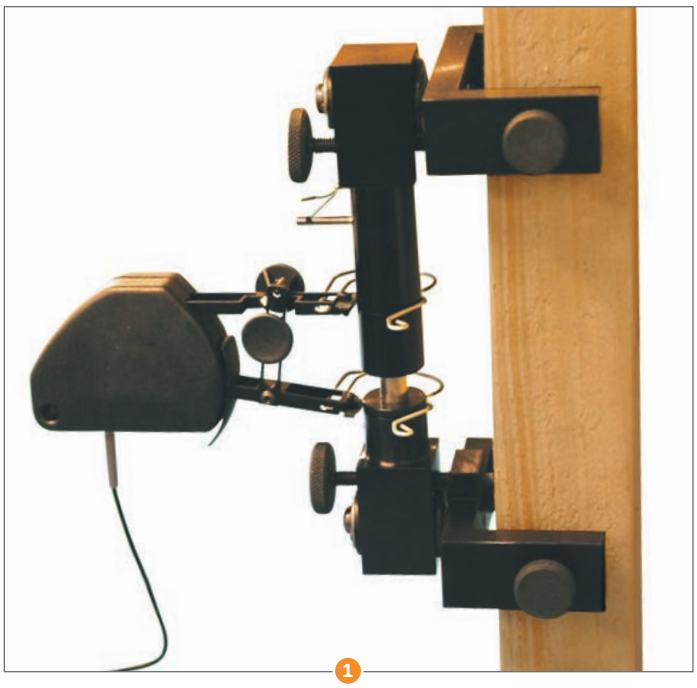
- Compressive and hardness properties of wood and timber products

HARDNESS

	Catalog Number	Testing Standards	Capacity			Specimen Length		Specimen Width		Specimen Thickness		Upper Fitting	Lower Fitting	Accessory Width	
			kN	kgf	lbf	mm	in	mm	in	mm	in			mm	in
1	S1-11892-2	BS 373, ASTM D143, ASTM D1037	100	10,000	22,500	150	6	50	2	50	2	0.5 in Clevis (Type Dm)	Requires suitable compression anvil	40	1.6

WOOD COMPRESSION

FIXTURES



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PARALLEL TO GRAIN

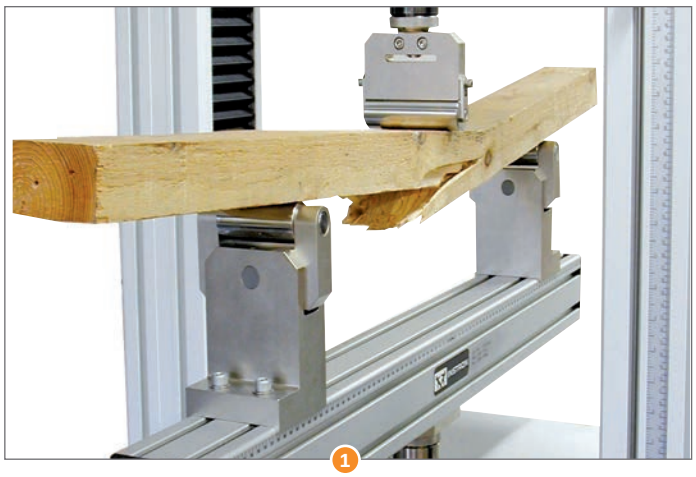
	Catalog Number	Testing Standards	Specimen Length		Specimen Width		Specimen Thickness		Upper Effective Length	
			mm	in	mm	in	mm	in	mm	in
1	S1-11858-1	BS 373, ASTM D143	200	8	50	2	50	2	150	6

PERPENDICULAR TO GRAIN

	Catalog Number	Testing Standards	Capacity			Specimen Length		Specimen Width		Specimen Thickness		Upper Fitting	Lower Fitting	Accessory Width	
			kN	kgf	lbf	mm	in	mm	in	mm	in			mm	in
1	S1-11683	BS 373, ASTM D143	25	2,500	6,625	150	6	50	2	50	2	16 mm Clevis Pin (Type 1m)	Direct To Base	204	8

WOOD FLEXURE

FIXTURES





2810-040 with 2820-057 Deflectometer

Bend tests provide a quick and simple way to determine the strength and deformation properties of wood and timber products. A range of fixtures is available to cater for various specimen sizes and strengths. All fixtures can be equipped with a range of optional support rollers, some of which feature articulation to cater for warped specimens. The range of fixtures is ideal for tests on MDF and fiberboard, as well as natural timber.

Principle of Operation

2820-04x Series bend fixtures are designed for static bend/flexure testing on a range of wood and timber products according to common International Standards. The beam attaches to the test instrument using simple mechanical interfaces that allows it to be removed when not in use. A range of optional support anvils and four-point conversion kits allow the fixtures to be configured to meet a wide range of standards. Specimens of the required size are supported by two anvils attached to a base beam. Force is applied either at the center (three-point bend) or at two points between the supporting rollers (four-point bend).

Application Range

- Static bending tests on a wide range of wood and timber specimens, including MDF and fiberboard at ambient temperatures
- Meets the following standards when used with appropriate optional anvil sets/4-point conversion kits and/or deflectometry: JIS A5905, JIS A5906, JIS A5908, JAS 112, JAS 601, BS 373, BS 5669, EN 310, EN 789, ISO 3133, ASTM D1037, ASTM D3037 and ASTM D143

Safety Advice

Review safety note on page 236

BASE BEAMS

Catalog Number	Description	Maximum Span		Lower Fitting	Weight		Testing Standards/Comments
		mm	in		kg	lb	
1 2820-040	10 kN Wood Bend Fixture Base Beam	800	31.5	0.5 in Clevis (Type Dm)	7.6	16.8	See Anvils for Compliance with Standards
2820-041	50 kN Wood Bend Fixture Base Beam	800	31.5	4 × M10 Bolts (90 × 280 mm)	36.6	80.1	See Anvils for Compliance with Standards
2820-042	50 kN Wood Bend Fixture Base Beam	1,200	47.2	4 × M10 Bolts (90 × 280 mm)	50.6	111.6	See Anvils for Compliance with Standards

4-POINT UPPER BEAMS

Catalog Number	Description	Maximum Span		Lower Fitting	Weight		Testing Standards/Comments
		mm	in		kg	lb	
2820-043	10 kN 4-Point Upper Beam	300	11.8	6 mm Clevis (Type Om) Swivel	3.4	7.5	See Anvils for Compliance with Standards
2820-044	50 kN 4-Point Upper Beam	610	24.0	0.5 in Clevis (Type Om) Swivel	15.2	33.5	See Anvils for Compliance with Standards

3-POINT ANVIL SETS FOR 2820-040/041/042

Catalog Number	Description	Maximum Specimen Width		Upper Fitting	Testing Standards/Comments
		mm	in		
2820-050	3-Point Articulating and Rolling Anvil set. Rigid wood block upper, 30 mm dia. lower	70	2.8	6 mm Clevis & 0.5 in (Type Om) (Type Dm)	BS 373 (2 in standard)
2820-051	3-Point Anvil set 60 mm dia. upper (Rigid), 30 mm dia. lower (Rolling and Articulating)	70	2.8	6 mm Clevis & 0.5 in (Type Om) (Type Dm)	BS 373 (2 cm standard)
2820-052	3-Point Anvil set 30 mm dia. upper (Rigid), 30 mm dia. lower (Rolling and Articulating)	70	2.8	6 mm Clevis & 0.5 in (Type Om) (Type Dm)	JAS 112
2820-056	3-Point Articulating and Rolling Anvil set Rigid wood block upper, bearing plate lower	80	3.1	6 mm Clevis & 0.5 in (Type Om) (Type Dm)	ASTM D3043, ASTM D143
2820-045	3-Point Rigid Anvil set 20 mm dia. upper, 20 mm dia. lower	100	4	6 mm Clevis & 0.5 in (Type Om) (Type Dm)	JIS A 5905, JIS A 5906, JIS A 5908, BS 5669
2820-046	3-Point Rigid Anvil set 30 mm dia. upper, 15 mm dia. lower	100	4	6 mm Clevis & 0.5 in (Type Om) (Type Dm)	BS EN 310
2820-047	3-Point Rigid Anvil set 76 mm dia. upper, 76 mm dia. lower	100	4	6 mm Clevis & 0.5 in (Type Om) (Type Dm)	ASTM D1037
2820-048	3-Point Rigid Anvil set 60 mm dia. upper, 60 mm dia. lower	100	4	6 mm Clevis & 0.5 in (Type Om) (Type Dm)	ISO 3133
2820-054	3-Point Anvil set 30 mm dia. upper (Rigid), 30 mm dia. lower (Rolling and Articulating)	300	11.8	6 mm Clevis & 0.5 in (Type Om) (Type Dm)	JAS 601, EN 789

4-POINT ANVIL SETS FOR 2820-043/044 UPPER BEAMS

Catalog Number	Description	Maximum Specimen Width		Testing Standards/Comments
		mm	in	
2820-053	4-Point Upper Anvil set 30 mm dia. upper (Rolling and Articulating)	70	2.8	JAS 112 (4-Point). Requires 2820-050/052 and 4-point upper beam
2820-049	4-Point Rigid Anvil set 60 mm dia. upper	100	4	ISO 3349 (4-Point). Requires 2810-048 and 4-point upper beam
2820-055	4-Point Upper Anvil set 30 mm dia. upper (Rolling and Articulating)	300	11.8	JAS 601, EN 789 (4-Point). Requires 2820-054 and 4-point upper beam

YOKE DEFLECTOMETER

Catalog Number	Description	Maximum Specimen Width		Testing Standards/Comments
		mm	in	
2820-057	Yoke Deflectometer for use with 2820-040, 041, and 042 bend fixtures	33	1.3	Requires 2630-113 Extensometer

WOOD FLEXURE

FIXTURES

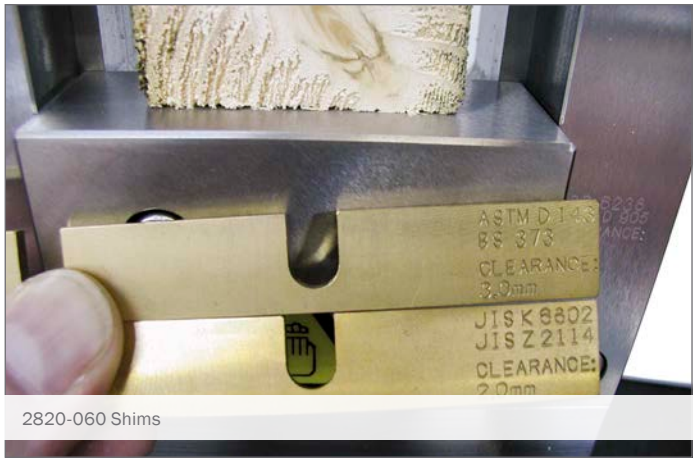
WOOD FLEXURE FIXTURE CONFIGURATION MATRIX

Catalog Number	3-Point Flexure Test														4-Point Flexure Test			
	JIS A 5905	JIS A 5906	JIS A 5908	BS 5669	BS EN 310	ASTM D 1037	ISO 3133	BS 373 (2 in standard)	BS 373 (2 cm standard)	JAS 112	JAS 601	EN 789	ASTM D 3043	ASTM D 143	ISO 3349	JAS 112	JAS 601	EN 789
2820-040	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
2820-041	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
2820-042	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
2820-043															●	●	●	●
2820-044															●	●	●	●
2820-045	●	●	●	●														
2820-046					●													
2820-047						●												
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2820-056													●	●				
2820-049															●			
2820-053																●		
2820-055																	●	●

- ● Required
- ● Select 1 based on requirements
- ● Select 1 based on maximum span and load

Note:
1. If multiple configurations are purchased, duplicates are not required.





2820-060 Shims

The fixture consists of a high-strength steel body with a sliding , self-aligning anvil that is used to apply compressive loading to the specimen in shear. The shear line can be set at 0.0 mm, 2.0 mm or 3.0 mm by using shims. The shims are clearly engraved with the applicable standard and are easy and quick to change. The fixture is attached to the testing system using simple clevis pin interfaces, which allow quick and easy fitting and removal.

Principle of Operation

The fixture consists of two main components. A sliding shear blade with a self-aligning anvil contacts the specimen that is supported in the body of the fixture. The shear blade moves downwards under compression and applies a shear force to the specimen. The self-aligning anvil ensures uniform lateral distribution of the applied load. A screw-action specimen clamp with self-aligning thrust pad holds the specimen securely during test.

Application Range

- Static shear tests on a wide range of wood and timber specimens and adhesive bonds at ambient temperatures.
- Meets the following standards: ASTM D143-94, ASTM D905-98, ISO 6238 2001, JIS K 6802-1973, JIS Z 2117-1977, BS 373: 1957 and JAS 601-1974

PARALLEL TO GRAIN

	Catalog Number	Testing Standards	Capacity			Specimen Length		Specimen Width		Specimen Thickness		Upper Fitting	Lower Fitting	Upper Effective Length		Accessory Width		Accessory Weight	
			kN	kgf	lbf	mm	in	mm	in	mm	in			mm	in	mm	in	kg	lb
1	2820-060	ASTM D143-94 ASTM D905-98 ISO 6238 2001 JIS K 6802-1973 JIS Z 2117-1977 BS 373: 1957 JAS 601-1974	50	5,000	11,250	63	2.5	50	2	50	2	0.5 in Clevis (Type Dm)	0.5 in Clevis (Type Dm)	350	13.8	130	5.1	11	24

WOOD TENSION

FIXTURES



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The tensile properties of wood, adhesives and fasteners can be determined using a range of specialized fixtures. Each device has been designed to meet a particular standard.

Principle of Operation

Tensile properties of wood can be determined using wedge action grips or special shoulderloading grips. Shoulderloading is also used to assess adhesive properties in tension using specially prepared specimens. The withdrawal force of screws and nails can be tested using specially designed tooling to grip the fastener.

Application Range

- Tensile tests on wood, adhesive bonds and fasteners in timber products.

Safety Advice

Review safety note on page 236

FIXTURE FOR CHIPBOARD, FIBERBOARD AND HARDBOARD

	Catalog Number	Testing Standards	Capacity			Specimen Width		Specimen Thickness	Upper Fitting	Lower Fitting	Upper Effective Length		Accessory Width		Accessory Weight	
			kN	kgf	lbf	mm	in				mm	in	mm	in	kg	lb
1	2820-061	ASTM D1037-99, BS 5669-1979, JIS A 5905-1994, JIS A 5906-1983, JIS A 5908-1994	10	1,000	2,250	50	2	As Required	6 mm Clevis (Type Om)	0.5 in Clevis (Type Dm)	57	2.2	66	2.6	0.65	1.4

ITEMS FOR USE WITH 2820-061

Catalog Number	Testing Standards	Specimen Length		Specimen Width		Quantity
		mm	in	mm	in	
2820-062	Specimen Blocks for use with 2820-061	50.4	1.98	50.4	1.98	20

PARALLEL TO GRAIN

	Catalog Number	Testing Standards	Capacity			Specimen Length		Specimen Width		Specimen Thickness		Upper Fitting	Lower Fitting	Upper Effective Length		Accessory Width		Accessory Weight	
			kN	kgf	lbf	mm	in	mm	in	mm	in			mm	in	mm	in	kg	lb
1	S1-11854	ASTM D143 Fig. 29	30	3,000	6,750	460	18	25	1	25	1	0.5 in Clevis (Type Dm)	0.5 in Clevis (Type Dm)	200	8	65	2.5	1.5	3.3

WOOD TENSION

FIXTURES



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PERPENDICULAR TO GRAIN

	Catalog Number	Testing Standards	Capacity			Specimen Length		Specimen Width		Specimen Thickness		Upper Fitting	Lower Fitting	Upper Effective Length		Accessory Width		Accessory Weight	
			kN	kgf	lbf	mm	in	mm	in	mm	in			mm	in	mm	in	kg	lb
1	S1-11856	ASTM D143 Fig. 31	10	1,000	2,250	50	2	62	2.5	50	2	0.5 in Clevis (Type Dm)	0.5 in Clevis (Type Dm)	95	3.75	114	4.5	2.5	5.5

CLEAVAGE TEST

	Catalog Number	Testing Standards	Capacity			Specimen Width		Specimen Thickness		Upper Fitting	Lower Fitting	Upper Effective Length		Accessory Width		Accessory Weight	
			kN	kgf	lbf	mm	in	mm	in			mm	in	mm	in	kg	lb
1	S1-11860	BS 373, ASTM D143	10	1,000	2,250	76	3	50	2	0.5 in Clevis (Type Dm)	0.5 in Clevis (Type Dm)	105	4.1	38	1.5	0.75	1.65

NAIL OR SCREW WITHDRAWAL

	Catalog Number	Testing Standards	Capacity			Specimen Length		Specimen Width		Specimen Thickness		Upper Fitting	Lower Fitting	Effective Length		Accessory Width		Accessory Weight	
			kN	kgf	lbf	mm	in	mm	in	mm	in			mm	in	mm	in	kg	lb
1	S1-14664	BS 373, ASTM D1037, ASTM D1761	25	2,500	5,625	150	6	50	2	50	2	0.5 in Clevis (Type Dm)	0.5 in Clevis (Type Dm)	245	9.65	195	7.7	4	8.8



DIGITAL CONTROLLER ACCESSORIES

2.2

Electronic or electrical devices that can be added to an existing controller include transducer conditioner channels for use with extensometry, analog outputs and firmware options. The type of controller you have determines the various features and capabilities that are available.

In most cases the model number of your load frame defines the type of control electronics incorporated in your testing system. For example, model 5585 uses a 5500 series controller.

If your system does not have any of the listed types of controller, please contact your local Instron® office to discuss your requirements. Refer to Advice for Users of Older Systems in Section 6.

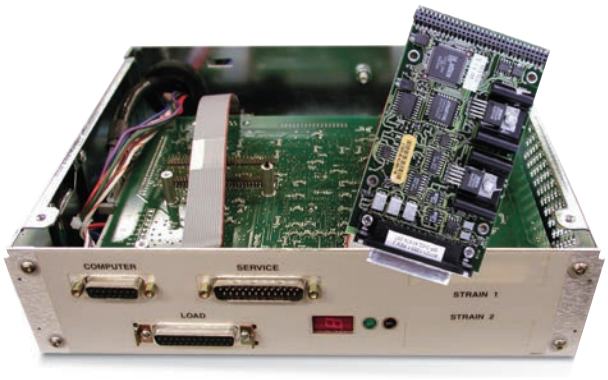
3300 Series Digital Controller Accessories 70

5500 and 5500A Series Digital Controller Accessories 71

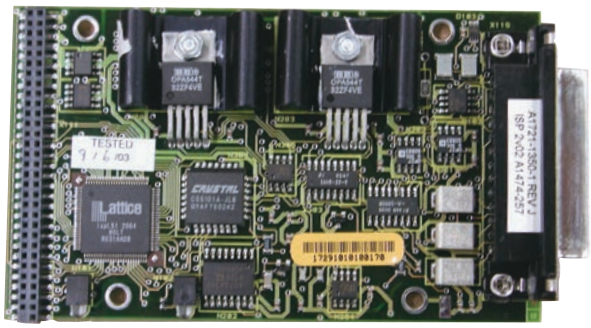
5900 Series Digital Controller Accessories 72

8800 Series Digital Controller Strain Conditioners 73

3300 SERIES DIGITAL CONTROLLER ACCESSORIES



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Today's testing laboratories and manufacturers have a wide variety of material and component testing needs ranging from simple standardization testing to advanced research. To meet these varying requirements, Instron® has different configurations of instruments to ensure the right solution to the testing application. Where an extensometer is required, Instron 3300 Series can be fitted with up to two optional strain channels.

Principle of Operation

Some applications may require direct strain measurement from the specimen. This optional sensor conditioning card is directly compatible with Instron strain-gauge extensometers and LVDTs. Devices with a ±10 VDC signal output may also be used. 3300 Series systems can take up to two sensor conditioning cards.

Application Range

- Required for strain input from optional strain measurement transducers

3300 OPTIONS

	Catalog Number	Description
1	2210-869	Sensor Conditioner Card for 3300 Series

5500 AND 5500A SERIES DIGITAL CONTROLLER ACCESSORIES


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Existing 5500 and 5500A Systems can be further enhanced by the addition of optional controller accessories. Options include strain channels for connecting extensometers and analog outputs for chart recorders, plotters, etc.

Principle of Operation

5500 and 5500A Systems can take up to two additional (optional) sensor conditioning cards. Some applications may require a direct strain measurement from the specimen or load/strain control. This optional sensor conditioning card is directly compatible with Instron® strain-gauge extensometers and LVDTs. Devices with a ±10 VDC signal output may also be used. A single conditioning card may also be used to provide a second load input. An analog output and digital I/O card is also available, allowing connection of analog chart recorders and plotters. Also, four logic output lines and four logic input lines are available to trigger input and output events.

Application Range

- For use where direct strain inputs from compatible transducers are required or where an analogue output to external devices is desired.

5500 OPTIONS

	Catalog Number	Description
1	2210-860	Sensor Conditioner Card for 5500 Series
2	2310-906	Analog output and digital input/output board

5500A OPTIONS

	Catalog Number	Description
1	2210-862	Sensor Conditioner for 5500A Series
2	2310-907	Analog output and digital input/output board for 5500A Series

5900 SERIES DIGITAL CONTROLLER ACCESSORIES



1



2



3

Electronic options include strain channels for connecting extensometers and other transducers, and analog outputs for chart recorders, plotters, data loggers etc. The Expansion Channel Module provides four or eight additional channels for data acquisition and control.

Principle of Operation

Some applications may require direct strain measurement from the specimen or load/strain control. Sensor conditioner cards may be added to the 5900 Series and these are directly compatible with Instron's strain gauge extensometers and LVDTs, as well as devices with +/- 10V DC output. The 5900 system can take up to two additional (optional) sensor conditioning cards as standard but this can be considerably increased by the addition of the Expansion Channel Module. This provides signal conditioning and calibration for either four or eight additional transducers which may be used for control as well as data acquisition. An Analog Output and Digital I/O card is also available, allowing connection of analog chart recorders, plotters or data loggers.

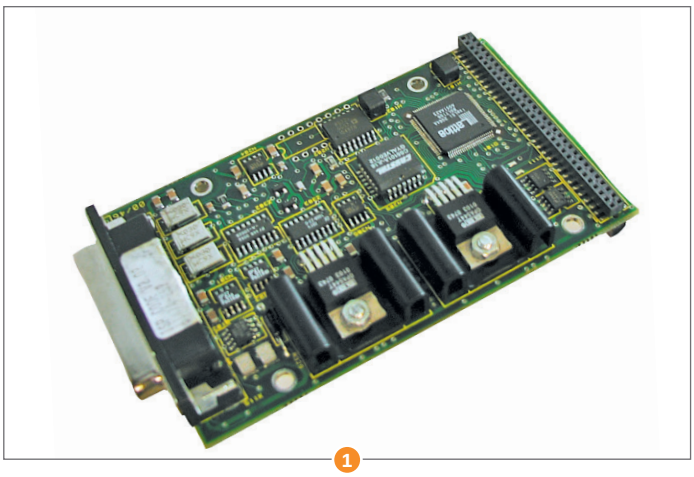
Application Range

- Required for strain input from optional strain measurement transducers and analog ouputs to chart recorders, plotters etc.

5900 OPTIONS

	Catalog Number	Description
1	2210-862	Sensor Conditioner Card for 5500A and 5900 Series
2	2210-920	Expansion Channel Module for 5900 Series
3	2310-907	Analog Output and Digital Input/ Output Board for 5500A and 5900
	W-5525	Sensor Conditioner Card for I-Series and 59-R7 / R8 Controllers (Static Hydraulic)

8800 SERIES DIGITAL CONTROLLER STRAIN CONDITIONERS



1

In order to input the signal from an optional extensometer or other strain transducer, it is necessary to have a strain channel fitted to the 8800 controller.

Principle of Operation

The strain channel provides excitation and signal conditioning for strain gauge and LVDT devices, and can also accept high level 0 to 10 V analog input signals Two versions are available, one for monitoring only and one for monitoring and control.

Application Range

- Required for strain input to 8800 controllers from optional strain measurement transducers

DIGITAL CONTROLLER STRAIN CONDITIONERS FOR ALL 8800 CONTROLLERS

Catalog Number	Description
8800-621	Strain conditioner for 8800 Tower (control and data acquisition)
8800-622	Strain conditioner for 8800 Tower (data acquisition only)

2

ENVIRONMENTAL CHAMBERS

2.3

Environmental chambers provide the capability to study the mechanical properties of materials and components over a wide range of temperatures. Our standard chamber range covers temperatures of -150 °C to +600 °C, with engineered solutions available to cater for height and width variants. Examples of special chambers can be seen in Section 3.

A complementary range of grips, pull rods and extensometry is available to provide the complete solution to your non-ambient testing requirements.

Environmental Chambers 76

Cooling Modules for Environmental Chambers 77

Mountings for Environmental Chambers 78



ENVIRONMENTAL CHAMBERS





The Instron® range of environmental chambers provides extensive temperature testing capabilities for evaluating material properties under non-ambient testing conditions. A full range of complementary grips and pull rods is available. We are also able to produce custom chambers to suit your application. Please contact us for more information.

Principle of Operation

The chambers use forced convection heating for optimum temperature distribution. Sophisticated controllers ensure minimum overshoot and excellent set-point stability. Features, such as internal lights, removable wedges and roller mounting options, ensure ease of use.

Application Range

- High and low temperature testing of materials and components in tension, compression, shear, flexure, fatigue, etc.

3119 SERIES ENVIRONMENTAL CHAMBERS

	Catalog Number	Temperature Rating		Internal Width		Internal Height		Internal Depth		Notes
		°C	°F	mm	in	mm	in	mm	in	
	3119-605	-100 to +350	-150 to +660	240	9.4	485	19.1	230	9.0	Requires cooling option for below ambient tests
1	3119-606	-100 to +350	-150 to +660	240	9.4	560	22.0	230	9.0	Requires cooling option for below ambient tests
	3119-609	-100 to +350	-150 to +660	240	9.4	660	25.6	230	9.0	Requires cooling option for below ambient tests
2	3119-607	-150 to +350	-240 to +660	400	15.7	560	22.0	400	15.7	Requires cooling option for below ambient tests
	3119-610	-150 to +350	-240 to +660	400	15.7	660	26.0	400	15.7	Requires cooling option for below ambient tests
2	3119-608	-150 to +600	-240 to +1110	400	15.7	560	22.0	400	15.7	Requires cooling option for below ambient tests
	3119-615[1]	-100 to+350	-150 to +660	240	9.4	860	33.9	230	9.0	Requires cooling option for below ambient tests
	3119-616[2]	-80 to +350	-112 to +660	400	15.7	900	35.4	400	15.7	Requires cooling option for below ambient tests
	3119-617[3]	-80 to +350	-112 to +660	400	15.7	760	29.9	400	15.7	Requires cooling option for below ambient tests
	3119-618[4]	-80 to +350	-112 to +660	400	15.7	1000	39.4	400	15.7	Requires cooling option for below ambient tests

Notes:
1. 3119-615 requires extra height load frame
2. 3119-616 designed for use with 2716-028/-030 precision wedge grips
3. 3119-617 designed for use with 312 kN extended hydraulic grips CP109120
4. 3119-618 designed for use with 312 kN extended hydraulic grips CP107291

COOLING MODULES FOR ENVIRONMENTAL CHAMBERS



3119-xxx Cooling Module

Cooling modules are optional devices that allow environmental chambers to be used below room temperature using CO2 or LN2 gases.

Principle of Operation

The cooling module is a solenoid valve that injects cooling gas into the chamber. It is activated automatically by the temperature controller of the chamber.

Application Range

- For use with environmental chambers when operation below room temperature is required

CO_2 COOLING MODULES

Catalog Number	Temperature Rating		Notes
	°C	°F	
3119-100	-70	-95	For use with 3119-400 Series chambers (except 3119-402/-403)
3119-115	-70	-95	For use with 3119-500 and 3119-600 Series chambers already installed

LN_2 COOLING MODULES

Catalog Number	Temperature Rating		Notes
	°C	°F	
3119-116	-70 to -100	-95 to -150	For use with 3119-500 and 3119-600 Series chambers already installed
3119-101	-70 to -150	-95 to -240	For use with 3119-400 Series chambers (except 3119-402/-403)

Note: Minimum temperature depends on model number

HOSES

Catalog Number	Description
3119-103	CO2 coolant inlet hose set (¼ in BSP female to ⅜ in BSP female at bottle end; includes adaptor Whitworth thread 0.86 in × 14 TPI female)
3119-105	CO2 coolant inlet hose set (CGA 295 female fitting 825 NGO - RH to 14 NGO - RH)
3119-104	LN2 coolant inlet hose (½ in BSP female on both ends)
3119-106	LN2 coolant inlet hose set (CGA 295 female fitting 0.75 UNF -2A RH to 16 UNF -2A RH)

MOUNTINGS FOR ENVIRONMENT CHAMBERS



Environmental chambers need to be firmly attached to the testing system during use. Both rigid and roller mountings are available.

Principle of Operation

Rigid mountings are simple, fixed brackets that bolt to the attachment holes in the testing system. Roller mountings allow the chamber to be pushed to the rear of the system when not in use.

Application Range

- For use with environmental chambers to attach them to the testing system

RIGID MOUNTING BRACKETS FOR 3119 SERIES ENVIRONMENTAL CHAMBERS

Catalog Number	Description	Notes
3119-204	Rigid mounting brackets for 3119-407/-408/-410/-607/-608/-610	For base mounting to 4204, 4206, 4208, 4210, 4400, 5500, 5900
3119-211	Rigid mounting brackets for 3119-407/-408/-410/-607/-608/-610	For base mounting on 1123, 1125, 1127, 1128 and noncorporate frames
3119-205	Rigid mounting brackets for 3119-407/-408/-410/-607/-608/-610	For base mounting to 8501, 8502, 8503, 8516, 8561, 8562, 8801, 8802, 8803, 8862
3119-201	Rigid mounting brackets for 3119-405/-406/-409 and 3119-500/-600 series	For base mounting on 3300, 4200, 4400, 5500, 5800, 5900
3119-202	Rigid mounting brackets for 3119-405/-406/-409 and 3119-500/-600 series	For base mounting to 4301, 4302, 4303 and 8511
3119-203	Rigid mounting brackets for 3119-405/-406/-409 and 3119-500/-600 series	For base mounting to 8501, 8502, 8503, 8516, 8561, 8562, 8801, 8802, 8803, 8862

ROLLER MOUNTING BRACKETS FOR 3119 SERIES ENVIRONMENTAL CHAMBERS

Catalog Number	Description
1 3119-230	Options available to suit different systems



EXTENSOMETERS

2.4

The precise measurement or control of specimen deformation is a fundamental requirement in many materials tests. The use of crosshead or actuator movement to derive specimen deformation is often employed, but accuracy is limited by external influences such as system compliance and specimen deformation outside the nominal gauge length (in the tab ends for example).

Extensometry provides a direct and accurate method for measuring and controlling specimen deformation by monitoring strain over a precisely defined gauge length.

The Instron® extensometry range includes many different types of extensometers to suit various specimens and applications. Each one is designed to provide the best possible accuracy. Instron has designed many custom extensometers and will discuss your extensometry requirements should you be unable to find a suitable device in the following pages.

Automatic Extensometers	80
Biaxial Automatic Extensometers	81
Averaging Axial Clip-on Extensometers	82-83
Dynamic Axial Clip-On Extensometer	84-85
Static Axial Clip-On Extensometers	86-88
LVDT Non-Separable Axial Clip-On Extensometers	89-91
Biaxial Clip-On Extensometers	92-93
Circumferential Extensometers	94
Connecting Cables for Extensometers	95
Crack Opening Displacement (COD) Gauges	96
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Knife Edges, Clips and Parts for Extensometers	112-113
Transverse Clip-On Extensometers	114

AUTOMATIC EXTENSOMETERS

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. By automating the tedious and time-consuming steps and eliminating inconsistencies in how a traditional clip-on extensometer is attached, lab operators can enjoy a simplified testing routine that improves the repeatability and reproducibility of results while improving throughput.


1

Principle of Operation

The extensometer is automatically controlled via the system software. The software provides an easy-to-use setup dialog box that facilitates opening and closing the arms, setting the reference arm position, and setting the gauge length. The measuring arms are motor driven and will automatically move to ensure that the vertical position and gauge length are always correct.

Prior to the start of a test, the motor will automatically disengage from the measuring arms, allowing the arms to freely travel with the specimen.

Additionally, the measuring arms are counterbalanced and operate on a nearly frictionless linear guidance system, making them virtually weightless and removing any influence on the material's properties.

Application Range

- Metals tensile testing
- Composite tensile testing
- Plastics and elastomers tensile testing
  (2665-750 can perform flexure tests with suitable fixturing)
- Specimen shapes: Strip, round, hexagonal, and flat

AUTOMATIC AXIAL EXTENSOMETERS

	Catalog Number	Gauge Length		Vertical Travel		Specimen Width		Specimen Thickness		Specimen Diameter		Resolution	Accuracy
		mm	in	mm	in	mm	in	mm	in	mm	in	µm	µm
1	2665-750	10 - 750	0.4 - 29.52	750	29.52	0 - 400	0 - 15.75	0 - 100	0 - 4	0 - 100	0 - 4	0.1	±1.5 or 0.5% of reading whichever is greater

Notes:
1. 2665-750 compatible with 3300, 5500, and 5900 electromechanical dual column systems, and LX, DX, HDX, and KPX static hydraulic testing systems running Bluehill® software (v 3.31 or above).

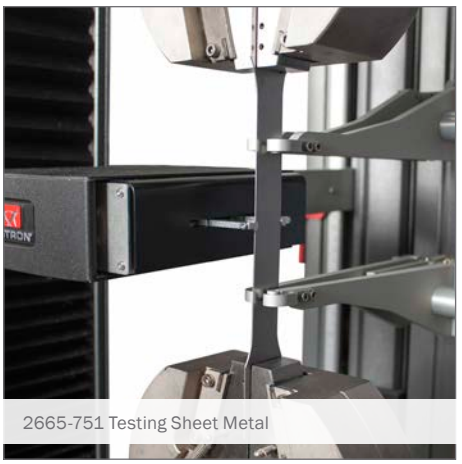
BIAXIAL AUTOMATIC EXTENSOMETER



2665-751 with 2716-020 Wedge Action Grips



2665-751 with 2810-400 Flexure Fixture


2665-751 Testing Sheet Metal

The AutoXBiax – built with the same high accuracy optical measurement system as the AutoX750 - is an automated, high precision measurement device that measures both axial and transverse strain simultaneously. The AutoXBiax is specifically designed to measure the plastic strain ratio (r-value) for steel and exceeds current standards, including ISO 10113, ASTM E517, and JIS Z 2254.

BIAXIAL AUTOMATIC EXTENSOMETERS (AXIAL SPECIFICATIONS)

Catalog Number	Gauge Length		Vertical Travel		Specimen Width		Specimen Thickness		Specimen Diameter		Resolution	Accuracy
	mm	in	mm	in	mm	in	mm	in	mm	in	µm	µm
2665-751	10 - 750	0.4 - 29.52	750	29.52	0 - 400	0 - 15.75	0 - 100	0 - 4	0 - 100	0 - 4	0.1	±1.5 or 0.5% of reading whichever is greater

BIAXIAL AUTOMATIC EXTENSOMETERS (TRANSVERSE SPECIFICATIONS)

Catalog Number	Gauge Width		Vertical Travel		Specimen Width		Specimen Thickness		Specimen Diameter		Resolution	Accuracy
	mm	in	mm	in	mm	in	mm	in	mm	in	µm	µm
2665-751	10 - 40	0.3 - 1.57	500	19.68	0 - 40	0 - 1.57	0 - 10	0 - 0.4	0 - 40	0 - 1.57	0.1	±1.5 or 0.5% of reading whichever is greater

Notes:
1. Maximum specimen thickness for 2665-750/-751 is based on a maximum width of 30 mm
2. Maximum specimen width for 2665-750/-751 is based on a maximum thickness of 30 mm

AVERAGING AXIAL CLIP-ON EXTENSOMETERS

These Averaging Axial clip-on extensometers use strain gauges for measurement and are constructed from high-strength aluminium, titanium, and stainless steel. All of the extensometers feature simple, single- handed operation.The extensometer incorporates automatic electrical calibration and transducer recognition including a unique digital serial number.



2650-560/-570 Averaging Axial Extensometer

Principle of Operation

All of the extensometers measure the axial strain on both sides of the specimen. Versions are available that provide either a single averaged axial strain output or two independent axial strain outputs. In all cases, the use of average axial strain corrects for any specimen bending due to mis-alignment for the consistent and accurate determination of modulus. The independent output versions allow simultaneous monitoring of both; the average axial and the bending strain.

Conical points are provided as standard with the extensometer and are recommended for most composite materials. A range of contact options are available: line contacts, which are recommended for use with soft materials, such as thermoplastics; and vee profiles, which are most suitable for thin section test pieces.

Application Range

- Suitable for a wide range of materials including composites, rigid plastics and metals

AVERAGING AXIAL CLIP-ON EXTENSOMETERS

Catalog Number	Gauge Length		Travel (Axial)		Strain (Axial)	Specimen Width		Specimen Thickness		Accessory Dimensions (L × W × H)		Temperature Range	
	mm	in	mm	in	%	mm	in	mm	in	mm	in	°C	°F
2650-560 2650-570	25	-	-0.5 to +1.25	-	-2 to +5	0.1 - 55	0.004 - 2.17	0 - 34	0 - 1.34	110 × 120 × 40	4.3 × 4.7 × 1.6	-200 to +200	-328 to +392
2650-562 2650-572	50	-	-0.5 to +1.25	-	-1 to +2.5	0.1 - 55	0.004 - 2.17	0 - 34	0 - 1.34	110 × 120 × 65	4.3 × 4.7 × 2.6	-200 to +200	-328 to +392
2650-564 2650-574	-	1	-	-0.02 to +0.05	-2 to +5	0.1 - 55	0.004 - 2.17	0 - 34	0 - 1.34	110 × 120 × 40	4.3 × 4.7 × 1.6	-200 to +200	-328 to +392
2650-566 2650-576	-	2	-	-0.02 to +0.05	-1 to +2.5	0.1 - 55	0.004 - 2.17	0 - 34	0 - 1.34	110 × 120 × 65	4.3 × 4.7 × 2.6	-200 to +200	-328 to +392

Notes:
1. 2650-56x features averaged axial output
2. 2650-57x features two independent axial outputs

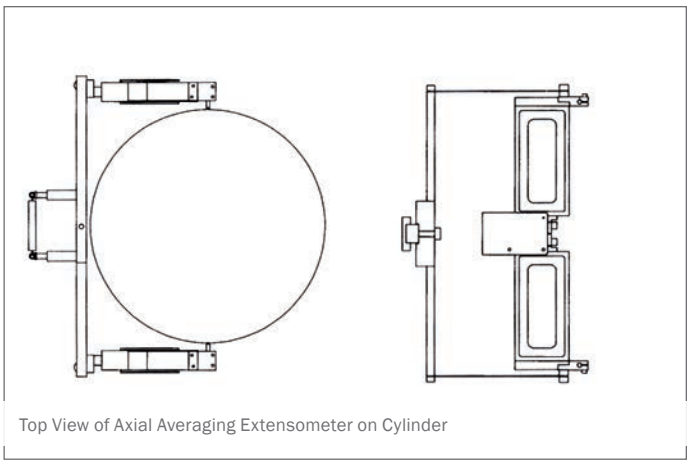
ITEMS FOR USE WITH 2650-56X AND -57X AVERAGING AND BIAXIAL EXTENSOMETERS

Catalog Number	Description
2601-111	Vee contacts for thin (<0.5 mm) test specimens
2601-112	Conical contacts for most composite laminates, rigid plastics and metals
2601-110	Line contacts for plastics

AVERAGING CLIP-ON EXTENSOMETERS



Axial Averaging Extensometer on Asphalt Cylinder



Top View of Axial Averaging Extensometer on Cylinder

3542RA E-SERIES AVERAGING CLIP-ON EXTENSOMETERS

Catalog Number	Gauge Length		Travel (Axial)		Specimen Diameter		Temperature Rating		Static or Fatigue Rated
	mm	in	mm	in	mm	in	°C	°F	
W-E406-8	-	6.00	-	±0.100	50 - 150	2 - 6	-40 to +100	0 to 2	Static
W-E406-10	-	8.000	-	±0.100	50 - 150	2 - 6	-40 to +100	0 to 1.18	Static
W-E406-100	100	-	±2.5	-	50 - 150	2 - 6	-40 to +100	-	Static
W-E406-150	150	-	±2.5	-	50 - 150	2 - 6	-40 to +100	-	Static

DYNAMIC AXIAL CLIP-ON EXTENSOMETERS



2620-60x

2620 Series dynamic strain gauge extensometers are accurate lightweight units used for accurate direct measurement and closed-loop control of strain in a variety of static and high frequency cyclic materials testing applications. Tensile, compressive, low and high cycle fatigue testing, creep and stress relaxation as well as straight line (ramp) testing may be performed with the 2620 series dynamic strain gauge extensometer to a extensive range of national and international standards. The extensometers are designed for use with metals, composites, plastics, wood and other materials exhibiting total strains up to ±50% of the original gauge length. Variations of gauge length and percentage strain levels may be achieved by the addition of gauge length extenders. Integrated mechanical stops limit the amount of overtravel in the extensometers, enabling them to survive specimen rupture without damage. 2620 Series extensometers are immersible in a range of fluids (acetone, mineral and silicone oils, alcohol and similar cooling/heating).

Principle of Operation

The 2620 extensometers are strain gauge units. The flexural element is a special alloy operating beam with fatigue certified foil gauges bonded to it. The gauges are arranged in a fully active four-arm Wheatstone bridge circuit. It is mounted in a lightweight frame and accurately follows the strain amplitudes applied to it.

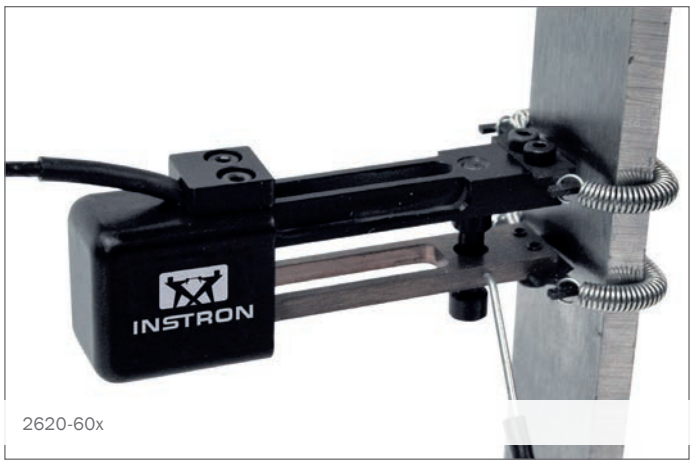
Application Range

- Dynamic fatigue and static and tests on a wide range of materials and specimens including metals, plastics and composites, prosthetics, sutures

DYNAMIC AXIAL CLIP-ON EXTENSOMETERS

Catalog Number	Gauge Length	Travel (Axial)	Travel (Axial)	Specimen Width		Specimen Thickness		Specimen Diameter		Temperature Rating		Accessory Width		Accessory Height		Static or Fatigue Rated
	mm	mm	%	mm	in	mm	in	mm	in	°C	°F	mm	in	mm	in	
2620-603	10, 25, 50	±1	10, 4, 2	0 - 25	0 - 1	3 - 12.5	0.12 - 0.5	3 - 25	0.12 - 1	-80 to +200	-112 to +392	21	0.83	59	2.32	Fatigue
2620-601	12.5, 25, 50	±5	40, 20, 10	0 - 25	0 - 1	3 - 12.5	0.12 - 0.5	3 - 25	0.12 - 1	-80 to +200	-112 to +392	21	0.83	63	2.48	Fatigue
2620-602	12.5, 25, 50	±2.5	20, 10, 5	0 - 25	0 - 1	3 - 12.5	0.12 - 0.5	3 - 25	0.12 - 1	-80 to +200	-112 to +392	21	0.83	56	2.21	Fatigue
2620-604	25, 50	±12.5 to -2.5	+50 to -10, +25 to -5	0 - 25	0 - 1	3 - 12.5	0.12 - 0.5	3 - 25	0.12 - 1	-80 to +200	-112 to +392	21	0.83	69	2.72	Fatigue

DYNAMIC AXIAL CLIP-ON EXTENSOMETERS



2620-60x

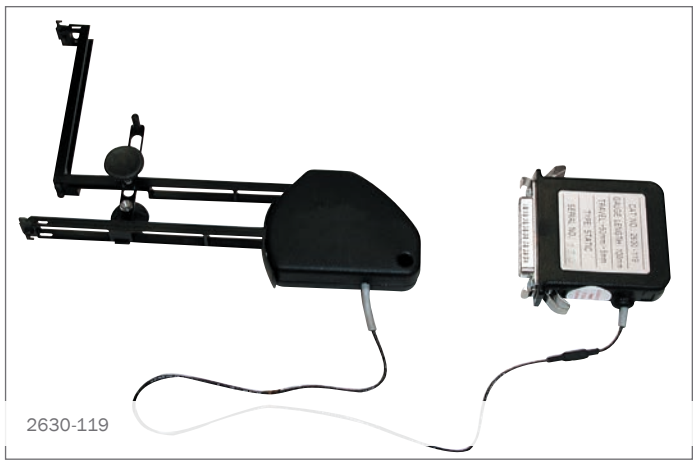
DYNAMIC AXIAL CLIP-ON EXTENSOMETERS

Catalog Number	Gauge Length	Travel (Axial)	Travel (Axial)	Specimen Width		Specimen Thickness		Specimen Diameter		Temperature Rating		Accessory Width		Accessory Height		Static or Fatigue Rated
	in	in	%	mm	in	mm	in	mm	in	°C	°F	mm	in	mm	in	
2620-829	0.5, 1, 2	±0.025	+50 to -10, +25 to -5	0 - 25	0 - 1	3 - 12.5	0.12 - 0.5	3 - 25	0.12 - 0.5	-80 to +200	-112 to +392	21	0.83	69	2.72	Fatigue
2620-828	0.5, 1, 2	±0.05	10, 5, 2.5	0 - 25	0 - 1	3 - 12.5	0.12 - 0.5	3 - 25	0.12 - 0.5	-80 to +200	-112 to +392	21	0.83	59	2.32	Fatigue
2620-824	0.5, 1, 2	±0.2	40, 20, 10	0 - 25	0 - 1	3 - 12.5	0.12 - 0.5	3 - 25	0.12 - 0.5	-80 to +200	-112 to +392	21	0.83	63	2.48	Fatigue
2620-826	0.5, 1, 2	±0.1	20, 10, 5	0 - 25	0 - 1	3 - 12.5	0.12 - 0.5	3 - 25	0.12 - 0.5	-80 to +200	-112 to +392	21	0.83	56	2.21	Fatigue
2620-831	1, 2	±0.5 to 0.1	+50 to -10, +25 to -5	0 - 25	0 - 1	3 - 12.5	0.12 - 0.5	3 - 25	0.12 - 0.5	-80 to +200	-112 to +392	21	0.83	69	2.72	Fatigue

STATIC AXIAL CLIP-ON EXTENSOMETERS



2630-10x


2630-119

The 2630 Series and W-6280 Series of extensometers offer speed of attachment and ease of use. The lightweight, 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.

The 2630 Series extensometers can be installed or set in place accurately and consistently, with the gauge length locking device automatically releasing itself after attachment, ensuring speed and reliability of operation. This unique cone latch mechanism also overcomes the problems associated with having to remove pins or clips prior to starting a test, or tests being conducted with the extensometer accidentally locked at gauge length. Because of their larger frame size, the W-6280 series extensometers require two-handed operation to attach the instrument to the specimen, so these extensometers still rely on a pin to set the gauge length.

All extensometers except the W-6235 provide the ability to measure both positive and negative strain, allowing compressive or flexural test measurements.

Principle of Operation

The extensometers include different gauge length and strain range options to suit a wide range of specimen characteristics. All extensometers comply with both the ASTM E83 and ISO 9513 standards. Gauge lengths are available in metric or U.S. customary units.

Calibration certificates are supplied, showing the individual performance of each unit at its factory calibration.

Application Range

- Static strain measurement on a wide range of materials and specimens including metals, plastics and composites

STATIC AXIAL CLIP-ON EXTENSOMETERS

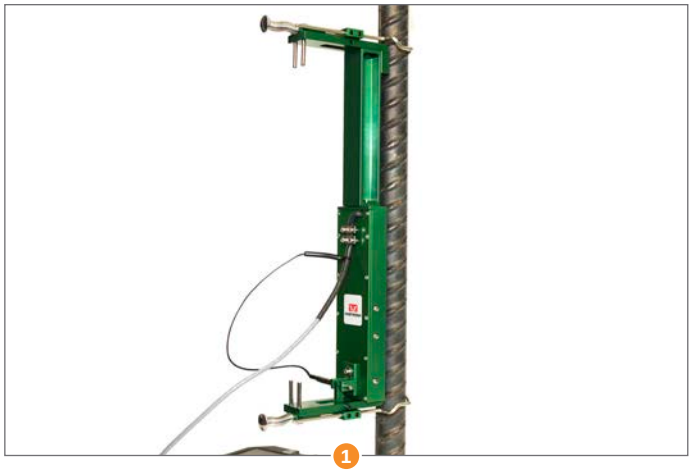
SI GAUGE LENGTHS | 2630 SERIES AXIAL CLIP-ON EXTENSOMETERS

Catalog Number	Gauge Length	Travel (Axial)	Travel (Axial)	Specimen Width		Specimen Thickness		Specimen Diameter		Temperature Rating		Accessory Width		Accessory Height		Accessory Weight	Static or Fatigue Rated
	in	in	%	mm	in	mm	in	mm	in	°C	°F	mm	in	mm	in	kg	
2630-120	8	±4	+50 to -50	0 - 40	0 - 1.6	0 - 12.5	0 - 0.5	20	0.8	-100 to +200	-148 to +392	39	1.5	25	1	0.027	Static
2630-101	10	±1	±10	0 - 40	0 - 1.6	0 - 12.5	0 - 0.5	20	0.8	-100 to +200	-148 to +392	39	1.5	25	1	0.027	Static
2630-102	10	±5	±50	0 - 40	0 - 1.6	0 - 12.5	0 - 0.5	20	0.8	-100 to +200	-148 to +392	39	1.5	25	1	0.027	Static
2630-105	25	±2.5	±10	0 - 40	0 - 1.6	0 - 12.5	0 - 0.5	20	0.8	-100 to +200	-148 to +392	39	1.5	52	2	0.056	Static
2630-106	25	+12.5 to -2.5	+50 to -10	0 - 40	0 - 1.6	0 - 12.5	0 - 0.5	20	0.8	-100 to +200	-148 to +392	39	1.5	58	2.3	0.058	Static
2630-107	25	+25 to -2.5	+100 to -10	0 - 40	0 - 1.6	0 - 12.5	0 - 0.5	20	0.8	-100 to +200	-148 to +392	39	1.5	69	2.7	0.060	Static
2630-111	50	+5 to -5	+10 to -10	0 - 40	0 - 1.6	0 - 12.5	0 - 0.5	20	0.8	-100 to +200	-148 to +392	39	1.5	72	2.8	0.060	Static
2630-112	50	+25 to -2.5	+50 to -5	0 - 40	0 - 1.6	0 - 12.5	0 - 0.5	20	0.8	-100 to +200	-148 to +392	39	1.5	72	2.8	0.060	Static
2630-113	50	+50 to -5	+100 to -10	0 - 40	0 - 1.6	0 - 12.5	0 - 0.5	20	0.8	-100 to +200	-148 to +392	39	1.5	72	2.8	0.066	Static
2630-123	75	7.5 to -0.75	+10 to -1	0 - 40	0 - 1.6	0 - 12.5	0 - 0.5	20	0.8	-100 to +200	-148 to +392	39	1.5	101	4	0.066	Static
2630-117	80	+8 to -0.8	+10 to 1	0 - 40	0 - 1.6	0 - 12.5	0 - 0.5	20	0.8	-100 to +200	-148 to +392	39	1.5	101	4	0.060	Static
2630-118	80	+40 to -0.4	+50 to -10	0 - 40	0 - 1.6	0 - 12.5	0 - 0.5	20	0.8	-100 to +200	-148 to +392	39	1.5	101	4	0.066	Static
2630-119	100	+50 to -5	+50 to -5	0 - 40	0 - 1.6	0 - 12.5	0 - 0.5	20	0.8	-100 to +200	-148 to +392	39	1.5	121	4.7	0.066	Static

US CUSTOMARY GAUGE LENGTHS | 2630 SERIES AXIAL CLIP-ON EXTENSOMETERS

Catalog Number	Gauge Length	Travel (Axial)	Travel (Axial)	Specimen Width		Specimen Thickness		Specimen Diameter		Temperature Rating		Accessory Width		Accessory Height		Accessory Weight	Static or Fatigue Rated
	in	in	%	mm	in	mm	in	mm	in	°C	°F	mm	in	mm	in	kg	
2630-121	0.3	±0.15	+50 to -50	0 - 40	0 - 1.6	0 - 12.5	0 - 0.5	20	0.8	-100 to +200	-148 to +392	39	1.5	25	1	0.027	Static
2630-103	0.5	±0.05	±10	0 - 40	0 - 1.6	0 - 12.5	0 - 0.5	20	0.8	-100 to +200	-148 to +392	39	1.5	25	1	0.027	Static
2630-104	0.5	±0.25	±50	0 - 40	0 - 1.6	0 - 12.5	0 - 0.5	20	0.8	-100 to +200	-148 to +392	39	1.5	25	1	0.027	Static
2630-108	1	±0.1	±10	0 - 40	0 - 1.6	0 - 12.5	0 - 0.5	20	0.8	-100 to +200	-148 to +392	39	1.5	52	2	0.056	Static
2630-109	1	+0.5 to -0.1	+50 to -10	0 - 40	0 - 1.6	0 - 12.5	0 - 0.5	20	0.8	-100 to +200	-148 to +392	39	1.5	58	2.3	0.058	Static
2630-110	1	+1 to -0.1	+100 to -10	0 - 40	0 - 1.6	0 - 12.5	0 - 0.5	20	0.8	-100 to +200	-148 to +392	39	1.5	69	2.7	0.060	Static
2630-114	2	+0.2 to -0.2	+10	0 - 40	0 - 1.6	0 - 12.5	0 - 0.5	20	0.8	-100 to +200	-148 to +392	39	1.5	72	2.8	0.060	Static
2630-115	2	+1 to -0.1	+50 to -5	0 - 40	0 - 1.6	0 - 12.5	0 - 0.5	20	0.8	-100 to +200	-148 to +392	39	1.5	72	2.8	0.060	Static
2630-116	2	+2 to -0.2	+100 to -10	0 - 40	0 - 1.6	0 - 12.5	0 - 0.5	20	0.8	-100 to +200	-148 to +392	39	1.5	72	2.8	0.066	Static

STATIC AXIAL CLIP-ON EXTENSOMETERS



1

ITEMS FOR USE WITH 2630 SERIES EXTENSOMETERS

Catalog Number	Description
2601-077	Knife-edges, standard straight profile, for 2630-100 Series Extensometers
2601-078	Knife-edges, three-point contact, for 2630-100 Series Extensometers
2601-079	Knife-edges, radiused, for 2630-100 Series Extensometers
2601-081	Specimen clips, adjustable and knife-edges for 2630-100 Series Extensometers (small)
2601-082	Specimen clips, adjustable and knife-edges for 2630-100 Series Extensometers (medium)
2601-083	Specimen clips, adjustable and knife-edges for 2630-100 Series Extensometers (large)

3543 E-SERIES AXIALCLIP-ON EXTENSOMETERS

	Catalog Number	Gauge Length		Travel (Axial)		Travel (Axial)	Temperature Rating		Specimen Diameter		Static or Fatigue Rated
		mm	in	mm	in	%	°C	°F	mm	in	
1	W-6280-8	-	8.00	-	1.000	12.5	-40 to +100	-40 to +212	0 - 25	0 - 1.0	Static
	W-6280-10	-	10.00	-	1.000	10	-40 to +100	-40 to +212	0 - 25	0 - 1.0	Static
	W-6280-200	200	-	25	-	12.5	-40 to +100	-40 to +212	0 - 25	0 - 1.0	Static
	W-6280-250	250	-	25	-	10	-40 to +100	-40 to +212	0 - 25	0 - 1.0	Static

AXIAL STRAIN GAGE BOLT EXTENSOMETER

Catalog Number	Gauge Length		Travel (Axial)		Travel (Axial)	Temperature Rating		Static or Fatigue Rated
	mm	in	mm	in	%	°C	°F	
W-E439	25 - 300	1.0 - 12.0	1.25	0.05	12.5	-40 to +100	-40 to +210	Static

LVDT NON-SEPARABLE AXIAL CLIP-ON EXTENSOMETERS



W-6193/4

Designed to measure specimen strain in a single element of the surface parallel to the axis of the specimen, snap-on extensometers utilize a clamp spring and squeeze plates to provide the user with easy one-handed operation. These extensometers should be removed before specimen fracture. Snap-on extensometers are engineered to conform to ASTM E83, and they use a Linear Variable Displacement Transformer (LVDT) to measure strain. Snap-on extensometers utilize a bell crank to translate deformation of the specimen to the LVDT. An electrical output is provided by the LVDT that is proportional to the mechanical travel.

Principle of Operation

When in place, the extensometer is in contact with the specimen at four points: the fixed knife-edge, the moveable knife-edge and the two clamping edges of the back support. When testing round specimens, the back support has clamping edges that are V-shaped, and when testing flat specimens, the back support has clamping edges that are rounded. For durability, knife-edges are hardened to at least HRC 58.

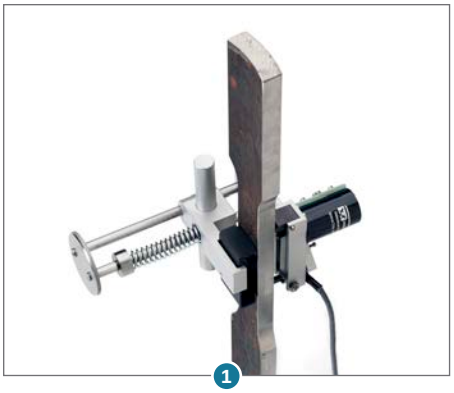
When tension is applied to the specimen, strain is registered by the moveable knife-edge. This knife-edge is fastened to the bell crank. As the moveable knife-edge travels with specimen elongation, it moves the bell crank and the LVDT core. The LVDT converts the mechanical motion of the core to a proportional electrical signal. This signal is then sent to the controller via the connector For the T1M, and T3M mill extensometer models, the moveable knife-edge can be interchanged between a straight knife-edge, which is typically used for round specimens, or a conical point, normally used for flat specimens. Extensometers are equipped with connectors that interface with current Instron® controllers. All connectors are equipped with auto-calibration, and most have an autoidentification feature that allows the controller to recognize the extensometer that is being used Instruments not equipped with the auto-identification feature can be setup with user codes for convenient use of the instrument. Extensometers can also be equipped with connections to interface with SATEC™ legacy controllers, such as MATS II, Apex, Vertex, Mark III and Mark IV.

Application Range

- Mechanical magnification of travel ensures extremely accurate measurements of small amounts of strain
- Utilizing interchangeable back supports, most extensometers can be used on both flat and round specimens, ensuring correct alignment of knife edges on specimen
- Static strain measurement on a wide range of materials and specimens including metals and composites

LVDT NON-SEPARABLE AXIAL CLIP-ON EXTENSOMETERS


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2

T1M SERIES LVDT EXTENSOMETERS

	Catalog Number	Gauge Length		Travel (Axial)		Travel (Axial)	Specimen Width	Specimen Thickness		Specimen Diameter	
		mm	in	mm	in	%	in	mm	in	mm	in
1	W-6193	-	2	-	0.4	2	0.5	-	0.005 - 0.050	-	0.005 - 0.050
1	W-6194	50	-	1	-	2	12.5	0.125 - 12.5	-	1.25 - 12.5	-

ITEMS FOR USE WITH W-6193

Catalog Number	Description
W-6002-1	Replacement knife edge kits for flats
W-6002-2	Replacement knife edge kits for rounds

T3M SERIES LVDT EXTENSOMETERS

	Catalog Number	Gauge Length		Travel (Axial)	Specimen Width		Specimen Thickness		Specimen Diameter	
		mm	in	%	mm	in	mm	in	mm	in
1	W-6200	-	2	2	-	2	-	0.06 - 2	-	0.5 - 2
	W-6204	-	2	2	-	0.5 - 2	-	0.6 - 2	-	0.5 - 2
	W-6205	-	2	2	-	-	-	-	-	0.5 - 3.5
2	W-6204-A	50	-	2	12.5 - 50	-	1.5 - 50	-	12.5 - 50	-
1	W-6201	50	-	2	50	-	1.5 - 50	-	12.5 - 50	-
2	W-6205-A	50	-	2	-	-	-	-	12.5 - 90	-

ITEMS FOR USE WITH W-6200, W-6204 AND W-6205

Catalog Number	Description
W-6003-1	Replacement knife edge kits for flats (W-6200)
W-6003-2	Replacement knife edge kits for rounds (W-6200)
W-6004-1	Replacement knife edge kits for flats (W-6204)
W-6004-2	Replacement knife edge kits for rounds (W-6204)
W-6005-2	Replacement knife edge kits for rounds (W-6205)

LVDT NON-SEPARABLE AXIAL CLIP-ON EXTENSOMETERS



B SERIES LVDT EXTENSOMETERS

Catalog Number	Gauge Length		Travel (Axial)		Travel (Axial)	Specimen Width		Specimen Thickness	Specimen Diameter
	mm	in	mm	in	%	mm	in	mm	mm
W-6101	-	1	-	0.02	2	-	0.5	-	-
1 W-6100	-	1.4	-	0.014	2	-	0.5	-	-
W-6101-A	25	2	0.5	-	2	12.7	-	0.125 to 12.5	1.25 to 12.5

ITEMS FOR USE WITH W-6100 AND W-6101

Catalog Number	Description
W-6000-1	Replacement knife edge kits for flats (W-6100)
W-6000-2	Replacement knife edge kits for rounds (W-6100)
W-6001-1	Replacement knife edge kits for flats (W-6101)
W-6001-2	Replacement knife edge kits for rounds (W-6101)

BIAXIAL CLIP-ON EXTENSOMETERS



2650-560/-570 Biaxial Extensometer

These Bi-axial clip-on extensometers use strain gauges for measurement and are constructed from high-strength aluminium, titanium, and stainless steel. All of the extensometers feature simple, single- handed operation. The extensometer incorporates automatic electrical calibration and transducer recognition including a unique digital serial number.

Principle of Operation

All of the extensometers measure the axial strain on both sides of the specimen. Versions are available that provide either a single averaged axial strain output or two independent axial strain outputs. In all cases, the use of average axial strain corrects for any specimen bending due to mis-alignment for the consistent and accurate determination of modulus. The independent output versions allow simultaneous monitoring of both; the average axial and the bending strain. Additionally, the biaxial versions measure transverse strain that allows for the determination of Poisson's Ratio and the in-plane shear modulus.

Conical points are provided as standard with the extensometer and are recommended for most composite materials. A range of contact options are available: line contacts, which are recommended for use with soft materials, such as thermoplastics; and vee profiles, which are most suitable for thin section test pieces.

Application Range

- Suitable for testing composites, rigid plastics and metals

BIAXIAL CLIP-ON EXTENSOMETERS



2650-56x/-57x Biaxial Extensometer

BIAXIAL CLIP-ON EXTENSOMETERS

Catalog Number	Gauge Length		Travel (Axial)		Strain (Axial)	Travel (Transverse)		Specimen Width		Specimen Thickness		Accessory Dimensions (L × W × H)		Temperature Range	
	mm	in	mm	in	%	mm	in	mm	in	mm	in	mm	in	°C	°F
2650-561 2650-571	25	-	-0.5 to +1.25	-	-2 to +5	±0.5	-	0.1 - 55	0.004 - 2.17	0 - 34	0 - 1.34	110 x 120 x 40	4.3 × 4.7 × 1.6	-200 to +200	-328 to +392
2650-563 2650-573	50	-	-0.5 to +1.25	-	-1 to +2.5	±0.5	-	0.1 - 55	0.004 - 2.17	0 - 34	0 - 1.34	110 x 120 x 65	4.3 × 4.7 × 2.6	-200 to +200	-328 to +392
2650-565 2650-575	-	1	-	-0.02 to +0.05	-2 to +5	-	±0.02	0.1 - 55	0.004 - 2.17	0 - 34	0 - 1.34	110 x 120 x 40	4.3 × 4.7 × 1.6	-200 to +200	-328 to +392
2650-567 2650-577	-	2	-	-0.02 to +0.05	-1 to +2.5	-	±0.02	0.1 - 55	0.004 - 2.17	0 - 34	0 - 1.34	110 x 120 x 65	4.3 × 4.7 × 2.6	-200 to +200	-328 to +392

Notes:
1. 2650-56x features averaged axial output
2. 2650-57x features two independent axial outputs

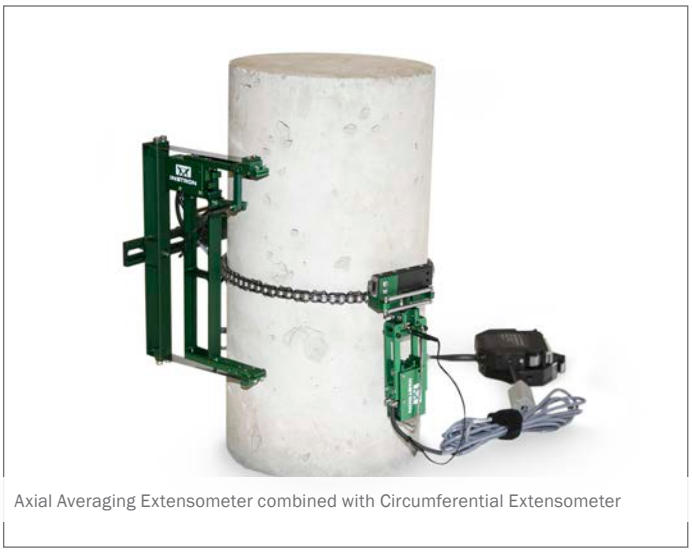
ITEMS FOR USE WITH 2650-56X AND -57X AVERAGING AND BIAXIAL EXTENSOMETERS

Catalog Number	Description
2601-111	Vee contacts for thin (<0.5 mm) test specimens
2601-112	Conical contacts for most composite laminates, rigid plastics and metals
2601-110	Line Chisel Point contacts

CIRCUMFERENTIAL EXTENSOMETERS



Circumferential Extensometer to measure Diametral Strain



Axial Averaging Extensometer combined with Circumferential Extensometer

Circumferential extensometers are used to determine the circumferential deformation of cylindrical specimens.

Principle of Operation

A strain gauge extensometer is attached around the circumference of the specimen using a chain assembly. As the specimen deforms under compression, the change in circumference is monitored by the extensometer.

Application Range

- Compressive strain properties on cylindrical specimens in materials, such as rock

Safety Advice

Review safety note on page 236

W-E406 E-SERIES CIRCUMFERENTIAL EXTENSOMETERS

Catalog Number	Gauge Length		Travel (Axial)		Specimen Diameter		Temperature Rating		Static or Fatigue Rated
	mm	in	mm	in	mm	in	°C	°F	
W-E406-200	200	-	6	-	30 - 200	-	-40 to +100	-40 to +212	Static
W-E406-6	-	6	-	0.25	-	1.25 - 6.0	-40 to +100	-40 to +212	Static

W-E406 E-SERIES AXIAL AVERAGING EXTENSOMETERS

Catalog Number	Gauge Length		Travel (Axial)		Specimen Diameter		Temperature Rating		Application
	mm	in	mm	in	mm	in	°C	°F	
W-E406-8	-	6	-	0.1	50 - 150	-	-40 to +100	-40 to +212	Concrete and Rock
W-E406-10	-	8	-	0.1	50 - 150	-	-40 to +100	-40 to +212	Concrete and Rock
W-E406-100	100	-	2.5	-	-	2 - 6	-40 to +100	-40 to +212	Concrete and Rock
W-E406-150	150	-	2.5	-	-	2 - 6	-40 to +100	-40 to +212	Concrete and Rock

CONNECTING CABLES FOR EXTENSOMETERS



1

A number of adapter cables and kits are available to convert and adapt extensometers to various models of testing machines, etc.

CONNECTING CABLES FOR EXTENSOMETERS

Catalog Number	Description
2210-857	Extensometer averaging cable
1 2210-877	Adapter cable, BNC sensor to 25-pin
8800-131	Extensometer cable and ID resistor kit for MTS® nine-pin strain gauge extensometer
8800-132	Extensometer cable and ID resistor kit for Instron® 2150/2160 style extensometers
8800-134	Instron strain plug, recognition code and cable for an MTS six-pin extensometer
W-N490-A[1]	Cable adapter to connect to a SATEC™ APEX, VERTEX or MARK III-T (EM machines) controller
W-N490-B[1]	Cable adapter to connect to a SATEC MATS II or MARK III Smart 'C' controller
W-N490-D[1]	Cable adapter to connect to a SATEC MARK III Smart (hydraulic machines) controller
W-N490-L[1]	Cable adapter to connect to an MTS controller

Notes:
1. Adapters do not provide support for automatic transducer recognition

CRACK-OPENING DISPLACEMENT (COD) GAUGES



2670 Series

COD gauges are designed for use with the range of fracture mechanics testing accessories developed by Instron® and suitable for use with all Instron systems. They provide for testing a wide range of specimens, including Compact Tension (CT) and bend specimens. The COD gauges can be used for both crack propagation and fracture toughness types of test.

Principle of Operation

The COD gauge gives a precise indication of the relative displacement of two accurately located knife-edges, which span the starter notch of the specimen. These lightweight gauges are self-supporting during testing, and self-release on specimen failure. The rugged casing provides protection from mechanical damage.

Application Range

- Fracture mechanics testing to a range of International standards

2670 SERIES COD GAUGES

Catalog Number	Gauge Length	Travel (Axial)	Temperature Rating		Accessory Width		Accessory Height		Accessory Weight	Static or Fatigue Rated
	mm	mm	°C	°F	mm	in	mm	in	kg	
2670-130	5	2	-200 to +200	-328 to -392	18	0.8	30	1.2	0.0095	Fatigue
2670-132	10	4	-200 to +200	-328 to +392	18	0.8	30	1.2	0.015	Fatigue

ITEMS FOR USE WITH 2670-130

Catalog Number	Description
2601-026	Bolt on knife-edge kit, 5 mm gauge length

ITEMS FOR USE WITH 2670-132

Catalog Number	Description
2601-020	Bolt on knife-edge kit, 10 mm gauge length

DEFLECTOMETERS



1

These general-purpose deflection measurement devices are based on LVDT transducers. A range of travel is available to suit a wide range of applications.

Principle of Operation

Each transducer has a fixed body with a moving core. The moving core is spring loaded and features a ball-tip or threaded rod. The body of the deflectometer is fixed to a stationary part of the test system, and the moving tip is located against the area of interest. Any movement of the area of interest is transferred to the moving tip and hence to the transducer, resulting in a signal that is proportional to the deflection.

Application Range

- General-purpose deflection measurement of components, structures, and devices

2601-04X SERIES DEFLECTOMETERS

Catalog Number	Travel (Axial)		Temperature Rating		Compatible Frame Models	Static or Fatigue Rated
	mm	in	°C	°F		
2601-041	±0.5	±0.2	-10 to +80	+14 to +176	42/4300,3300,5800,5900 and 8800	Static
2601-042	±2.5	±0.1	-10 to +80	+14 to +176	42/4300,3300,5800,5900 and 8800	Static
1 2601-043	±15	±0.6	-40 to +80	-40 to +212	42/4300,3300,5800,5900 and 8800	Static
2601-044	±50	±2	-40 to +80	-40 to +212	42/4300,3300,5800,5900 and 8800	Static
2601-045	±100	±4	-40 to +80	-40 to +212	42/4300,3300,5800,5900 and 8800	Static

ITEMS FOR USE WITH 2601-04X,2601-06X,2601-09X

Catalog Number	Description
2601-069	Magnetic base LVDT holder
2601-071	LVDT platen displacement fixture
2601-072	Precision micrometer, 0 to 50 mm (2 in) for manual calibration of LVDTs

Notes:
1. 2601-041/-042 feature ball end
2. 2601-043/44/45 feature threaded rod end
3. 2601-150 kit allows use with 5500 Series Systems



W-E401-x Deflectometer

3540 E-SERIES DEFLECTOMETERS

Catalog Number	Travel (Axial)		Temperature Rating		Static or Fatigue Rated
	mm	in	°C	°F	
W-E401-A	-	0.15	-40 to +100	-40 to +210	Static
W-E401-B	-	0.25	-40 to +100	-40 to +210	Static
W-E401-C	-	0.50	-40 to +100	-40 to +210	Static
W-E401-D	-	1.00	-40 to +100	-40 to +210	Static
W-E401-J	-	2.00	-40 to +100	-40 to +210	Static
W-E401-E	4.0	-	-40 to +100	-40 to +210	Static
W-E401-F	6.0	-	-40 to +100	-40 to +210	Static
W-E401-G	12.0	-	-40 to +100	-40 to +210	Static
W-E401-H	25.0	-	-40 to +100	-40 to +210	Static

DEFLECTOMETERS ACCESSORIES



2601-071

1

* Protective shield removed for clarity

A number of items are available to complement the range of deflectometers. These include a magnetic base and displacement fixtures for compression anvils.

Principle of Operation

The magnetic base provides a solid mounting for the deflectometer and allows the deflectometer to be positioned against components and structures. Deflectometers may also be used in conjunction with compression anvils using the displacement fixture.

Application Range

- To measure deflections in components, structures or between compression anvils
- For use with 2601 Series deflectometers

Safety Advice

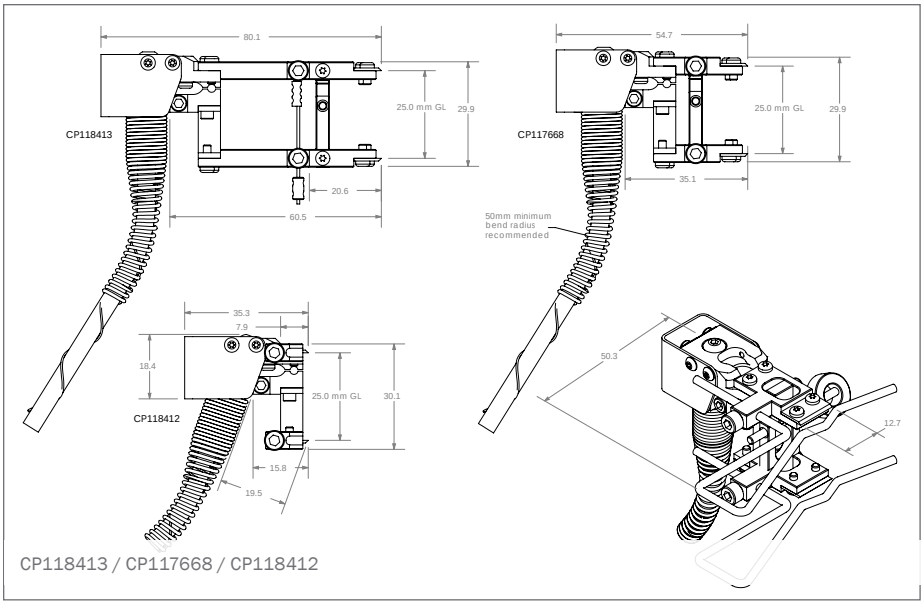
Review safety note on page 236

ITEMS FOR USE WITH 2601-04X, 2601-06X, 2601-09X

Catalog Number	Description	Notes
2601-069	Magnetic base LVDT holder	Cannot be used on non-magnetic surfaces
1 2601-071	LVDT platen displacement fixture	Mounts directly on the side of the platen and target is mounted on the side of the opposing platen
2601-072	Precision micrometer, 0 to 50 mm (2 in)	Allows manual calibration of 50 mm or smaller LVDTs in 0.01 mm gradations

HIGH-TEMPERATURE EXTENSOMETERS

(+600°C Capacitive)



CP118413 / CP117668 / CP118412



1



Sensor Conditioner Unit

The Instron® range of High-Temperature Extensometers are ideally suited for testing materials such as advanced composites, metals, and polymers at elevated temperatures. This series incorporates a capacitive sensor that does not require any cooling. The extensometers are supplied with a special sensor conditioner unit providing a 0-10 V output with exceptionally low noise.

These extensometers can be attached to round and flat specimens to perform tensile, compression, and cyclic tests.

Principle of Operation

The specimen displacement is measured using a capacitive sensor rather than strain gauges, providing the extensometer with the ability to withstand high temperatures without any active cooling. The dual-flexure design makes these units very durable and allows them to be left on the specimen through failure. The extensometers are easy to mount and feature integral springs that hold the unit on the test specimen.

The freestanding sensor conditioner produces a 0-10 V output that is connected to the strain channel of the testing system. The conditioner provides an electrical calibration signal so that the strain channel on the testing machine can be set up without the need for a mechanical calibrator.

Application Range

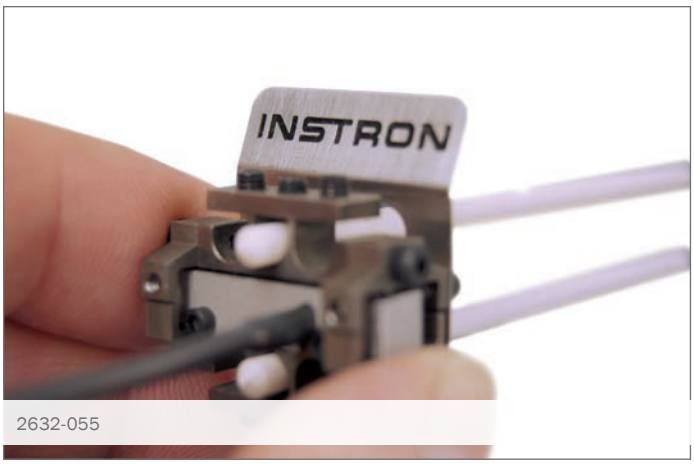
- Static and cyclic tests up to 100 Hz
- Suitable for tension, compression, and cyclic tests on composites, high-temperature polymers, and metals

HIGH TEMPERATURE EXTENSOMETERS

	Catalog Number	Gauge Length	Travel (Axial)
		mm	%
1	CP118412	25	-2 / +10
	CP117668	25	-6 / +30
	CP118413	25	-8 / +50

HIGH-TEMPERATURE EXTENSOMETERS

(>950 °C)



2632-055

There are many different types of high-temperature extensometers available. The type of instrument is dependent on the type of testing and the type of heating system.

The PSH8MS is typically used in hot tensile applications with tube type furnaces, and consists of a separate measuring unit and suspension arm assembly.

The 3448, 3548 and 2632 series of instruments are strain gauge instruments designed for high-temperature tension, compression and fatigue testing using a side entry port furnace.

Several models of creep extensometers are available, each using different materials, head designs and measuring units, though there are many similarities across the instruments. Most employ a replaceable insert system to not only match the specimen size, but also to allow user replacement of the specimen contacting portion of the instrument. Most instruments also employ a rod and tube design to contain the fixed and moveable portions of the instrument. Some instruments are only compatible with LVDTs to produce an electrical output proportional to the measured creep, while others are compatible with LVDTs, SLVCs, strain gauge extensometers or dial indicators for use as the measuring device.

Principle of Operation

The PSH8MS suspension arms transfer the elongation of the specimen to the measuring unit. They also determine the gauge length and maximum strain value of the unit.

The sideentry models employ heat shields, cooling fins, and optional air or water cooling to protect the strain gauges from excessive temperatures. The ceramic rods pass through the furnace wall. Sideentry types require a compatible furnace system that typically features a cutout and mounting surfaces for the cooling blocks.

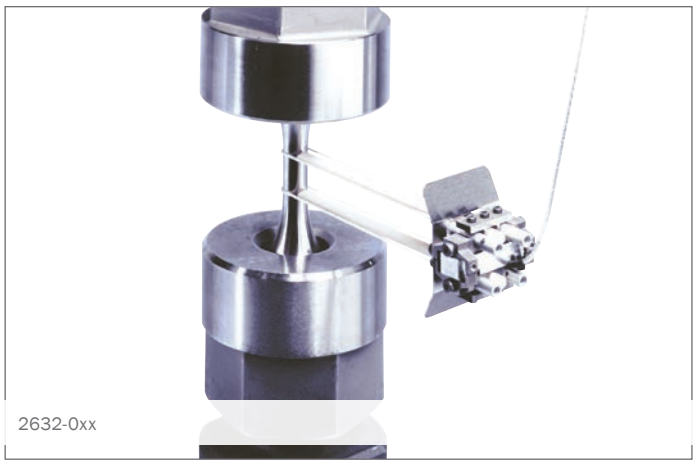
The double telescoping rod and tube design used on most of the creep extensometers allows the gauge length to be adjusted over a wide range, rather than being fixed at one point. The separately available measuring unit has a fixed amount of travel that is selected based on the material being tested and the maximum strain value required.

Application Range

- Various models to cover high-temperature tests on metallic and non-metallic materials in creep, tension, compression and fatigue

HIGH-TEMPERATURE EXTENSOMETERS

(>950 °C)



2632-0xx

2632 SERIES HIGH-TEMPERATURE EXTENSOMETERS

Catalog Number	Description	Gauge Length	Travel (Axial)	Travel (Axial)	Rod Type	Temperature Rating		Accessory Width		Accessory Height		Accessory Weight	Static or Fatigue Rated
		mm	mm	%		°C	°F	mm	in	mm	in	kg	
2632-054	+1000° C high temperature	12.5	+2.5 to -1.25	+20 to -10	Quartz, chisel-end	+10 to +1000	+50 to +1832	29	1.14	38	1.5	0.020 (1Hz max.)	Fatigue
2632-055	+1000° C high temperature	12.5	+2.5 to -1.25	+20 to -10	Alumina, chisel-end	+10 to +1000	+50 to +1832	29	1.14	38	1.5	0.020 (1Hz max.)	Fatigue
2632-056	+1000° C high temperature	25	+2.5 to -1.25	+10 to -5	Quartz, chisel-end	+10 to +1000	+50 to +1832	29	1.14	50	2	0.020 (1Hz max.)	Fatigue
2632-057	+1000° C high temperature	25	+2.5 to -1.25	+10 to -5	Alumina, chisel-end	+10 to +1000	+50 to +1832	29	1.14	50	2	0.020 (1Hz max.)	Fatigue

ITEMS FOR USE WITH 2630 SERIES HIGH-TEMPERATURE EXTENSOMETERS

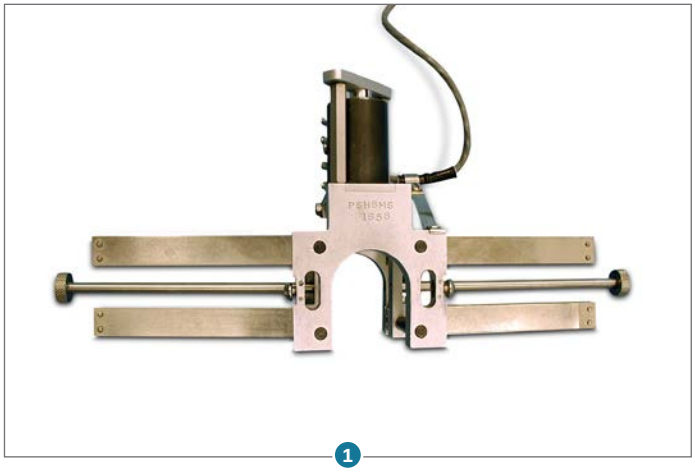
Catalog Number	Description
2632-059	Spare alumina rods for 2632-055 and 2632-057 extensometers; chisel point to suit flat specimens; two pairs
2632-062	Spare alumina rods for 2632-055 and 2632-057 extensometers; vee-chisel point to suit round specimens; two pairs
2632-060	Spare ceramic cord for 2632-054, 2632-055, 2632-056 and 2632-057; 500 meters; includes 10 pairs of spring assemblies
2632-058	Spare quartz rods for 2632-054 and 2632-056 extensometers; chisel point to suit flat specimens; two pairs
2632-061	Lead spring mounting for 2632-054, 2632-055, 2632-056 and 2536-057 extensometers

HIGH-TEMPERATURE EXTENSOMETERS

(>950 °C)



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STATIC EXTENSOMETERS FOR FURNACES

Catalog Number	Description	Gauge Length		Travel (Axial)		Travel (Axial)	Temperature Rating		Static or Fatigue Rated
		mm	in	mm	in	%	°C	°F	
CP113449	Slide-Mounted Side Entry Axial Extensometer	-	1.0	-	±0.2	±20	+1200	+2200	Static
CP113450	Slide-Mounted Side Entry Axial Extensometer	-	2.0	-	±0.4	±20	+1200	+2200	Static
CP113451	Slide-Mounted Side Entry Axial Extensometer	25	-	±5	-	±20	+1200	+2200	Static
CP113452	Slide-Mounted Side Entry Axial Extensometer	50	-	±10	-	±20	+1200	+2200	Static
W-E418-1	Self-Supporting Side Entry Axial Extensometer	-	1.0	-	±0.2	±20	+1200	+2200	Static
W-E418-2	Self-Supporting Side Entry Axial Extensometer	-	2.0	-	±0.4	±20	+1200	+2200	Static
W-E418-25	Self-Supporting Side Entry Axial Extensometer	25	-	±5	-	±20	+1200	+2200	Static
W-E418-50	Self-Supporting Side Entry Axial Extensometer	50	-	±10	-	±20	+1200	+2200	Static

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PSH8M SERIES HIGH-TEMPERATURE EXTENSOMETERS FOR FURNACES

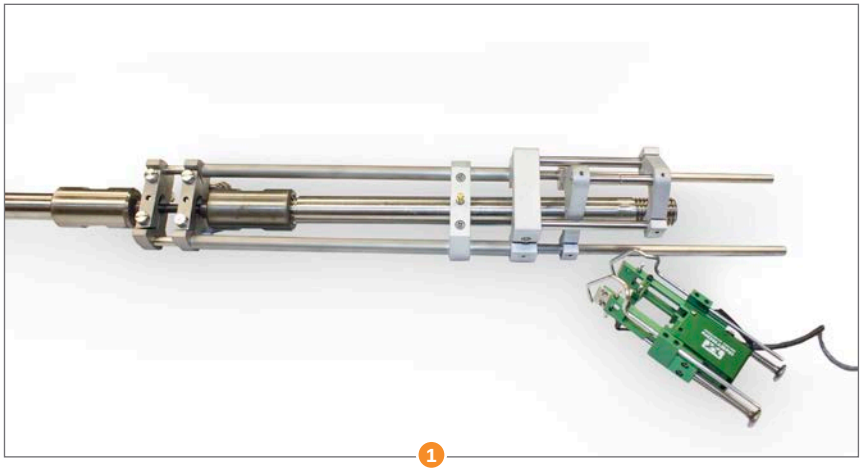
Catalog Number	Description	Gauge Length	Travel (Axial)	Temperature Rating		Static or Fatigue Rated
			in	°C	°F	
1 W-6183	PSH8MS extensometer	dependent on suspension arms	0.04	+982°	+1800°	Static

SUSPENSION ARMS

Catalog Number	Description
W-6185	PSH8MS high-temperature suspension arm assemblies for 0.505 inch diameter specimen, 11 to 13 in furnace
W-6189	PSH8MS high-temperature suspension arm assemblies for 0.252 inch diameter specimen, 11 to 13 in furnace
W-6190	PSH8MS high-temperature suspension arm assemblies for 0.25 inch diameter specimen, 18 in furnace
W-6192	PSH8MS high-temperature suspension arm assemblies for 0.10 to 0.250 inch thick × 0.50 inch wide, 18 in furnace

HIGH-TEMPERATURE EXTENSOMETERS

(>950 °C)



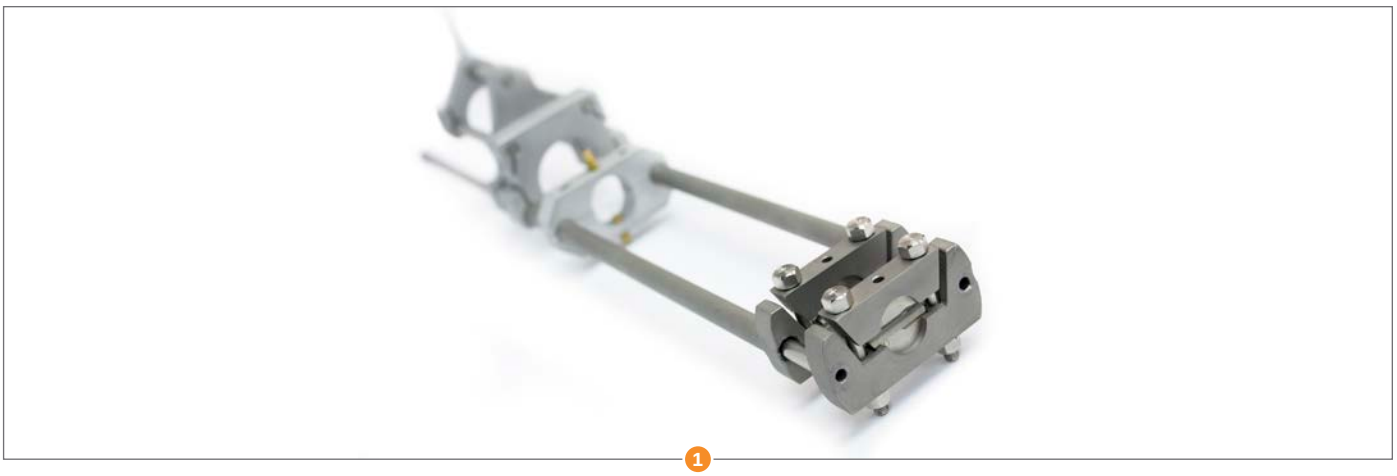
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ROD AND TUBE STYLE HIGH-TEMPERATURE EXTENSOMETERS FOR FURNACES

	Catalog Number	Description	Gauge Length		Travel (Axial)	Specimen Width		Specimen Thickness		Specimen Diameter		Temperature Rating		Static or Fatigue Rated
			mm	in		mm	in	mm	in	mm	in	°C	°F	
	W-C016-A	Model RT-214 LVDT	10 - 152	0.375 - 6.0	See LVDT or SLVC	16	0.625	1.6 - 12.7	0.0625 - 0.5	1.6 - 12.8	0.0625 - 0.505	+1090	+2000	Static
	W-C016-E	Model DR- 214 4 rod averaging extensometer	10 - 152	0.375 - 6.0	See LVDT or SLVC	16	0.625	1.6 - 12.7	0.0625 - 0.5	1.6 - 12.8	0.0625 - 0.505	+1100	+2150	Static
1	W-C016-F	Model RT-214 clip-on extensometer	25 - 50	1.0 - 2.0	See 2630 Type	16	0.625	1.6 - 12.7	0.0625 - 0.5	1.6 - 12.8	0.0625 - 0.505	+1090	+2000	Static
	W-C016-I	Model DA-214 dual channel extensometer	25 - 50	1.0 - 2.0	See LVDT or SLVC	16	0.625	1.6 - 12.7	0.0625 - 0.5	1.6 - 12.8	0.0625 - 0.505	+1090	+2000	Static

HIGH-TEMPERATURE EXTENSOMETERS

(>950 °C)



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INSERTS AND REPLACEMENT COMPONENTS FOR ROD AND TUBE STYLE EXTENSOMETERS

	Catalog Number	Description	Gauge Length		Specimen Width		Specimen Thickness		Specimen Diameter		Temperature Rating		Static or Fatigue Rated
			mm	in	mm	in	mm	in	mm	in	°C	°F	
1	W-C016-B	RT-214 replcaement rod, tube and head assembly	10 - 152	0.375 - 6.0	-	-	-	-	-	-	+1090	+2000	Static
1	W-C016-C[1]	High-temperature replaceable inserts	-	-	16	0.625	1.6 - 12.7	0.0625 - 0.5	1.6 - 12.8	0.0625 - 0.505	+1090	+2150	Static
2	W-C016-J1	High-temperature Type EG1 replaceable insert	-	-	16	0.625	2.54 - 6.35	0.0625 -0.5	2.54 - 6.35	0.2520 - 0.505	+1090	+2000	Static
3	W-C016-J2	High-temperature Type EG2 replaceable insert	-	-	16	0.625	6.35 - 12.7	0.25 - 0.5	6.4 - 12.8	0.2520 - 0.505	+1090	+2000	Static
4	W-C016-J3	High-temperature inserts for specimens with gauge length ridges	-	-	16	0.625	6.35 - 12.7	0.25 - 0.5	6.4 - 12.8	0.2520 - 0.505	+1090	+2000	Static
1	W-C016-D	High-temperature nut and bolt set for all replaceable insert extensometers	-	-	-	-	-	-	-	-	+1175	+2000	Static

Notes:
1 Specify exact specimen dimensions for W-C016-C at time of order

LVDT AND SLVC UNITS



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MEASURING UNITS FOR ROD AND TUBE STYLE EXTENSOMETERS

Catalog Number	Description	Travel (Axial)		Accessory Width		Specimen Thickness		Specimen Diameter		Static or Fatigue Rated
		mm	in	mm	in	mm	in	mm	in	
W-7811	9234-A LVDT	2.54	0.10	-	-	-	-	-	-	Static
W-7812	9234-K LVDT	6.35	0.25	-	-	-	-	-	-	Static

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LONG TRAVEL EXTENSOMETERS



2603-084 with Single Column Test System

The Instron® 2603 Series long-travel extensometer is a precise device for measuring strain in highly extensible materials such as elastomers, semi-rigid plastics, and films. Designed for use with electromechanical testing instruments, the long travel extensometer can be used to measure specimens elongations up to 250 mm (10 in). An optional version of 750 mm (30 in) travel is also available providing strain values of up to 7500% (10 mm gauge length).

Principle of Operation

The high-elongation extensometer is designed to clamp directly onto to a specimen quickly and easily. It will adjust to incremental gauge lengths ranging from 10 mm to 200 mm (0.5 in to 5 in). The XL will accommodate up to 10 in of clamp displacement, and is specifically designed to permit testing the sample through rupture without damaging the extensometer or otherwise disrupting the test routine. The XL extensometer is based on a pair of carefully counterbalanced clamp assemblies that drive a potentiometer through connecting cables. Both clamps move freely, but any increase in the separation or differential motion will advance the transducer. The upper and lower specimen clamps are separately counterbalanced and guided on a polished and ground shaft with linear bearings so that none of the extensometer's weight is applied to the specimen.

Application Range

- Elastomeric testing
- Plastics testing
- Testing of materials having high elongation properties
- Cellular materials

Safety Advice

Review safety note on page 236

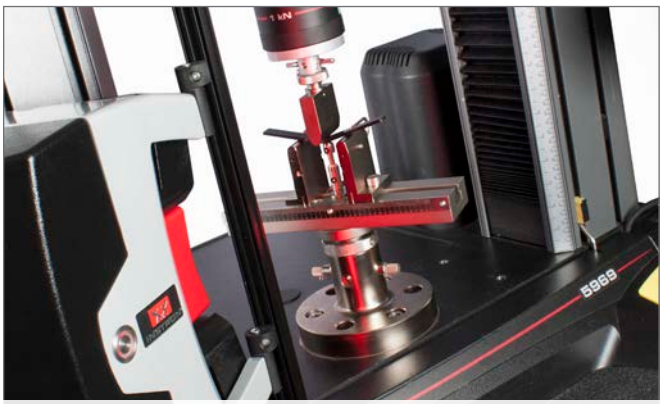
LONG TRAVEL EXTENSOMETERS

	Catalog Number	Gauge Length		Travel (Axial)		Specimen Width		Specimen Thickness		Temperature Rating Rated		Accessory Height		Notes
		mm	in	mm	in	mm	in	mm	in	°C	°F	mm	in	
1	2603-084	10, 20, 25, 50, 100, 200	0.5, 1, 2, 5	250	10	0 - 20	0 - 0.75	0 - 12.7	0.5	+10° to +40°	+50 to +100°	1125	44.3	For single column systems
	2603-080	10, 20, 25, 50, 100, 200	0.5, 1, 2, 5	250	10	0 - 20	0 - 0.75	0 - 12.7	0.5	+10° to +40°	+50 to +100°	1125	44.3	For twin column systems
	2603-086	10, 20, 25, 50, 100, 200	0.5, 1, 2, 5	750	30	0 - 20	0 - 0.75	0 - 12.7	0.5	+10° to +40°	+50 to +100°	1260	49.6	Compatible with 3300, 4400, 5500, 5800 and 5900 Single Column systems (except XX42)
	2603-085	10, 20, 25, 50, 100, 200	0.5, 1, 2, 5	750	30	0 - 20	0 - 0.75	0 - 12.7	0.5	+10° to +40°	+50 to +100°	1260	49.6	Compatible with 3300, 4400, 5500, 5800 and 5900 Dual Column systems (to 250kN)

NON-CONTACTING VIDEO EXTENSOMETERS

Measurement of strain during material testing is traditionally carried out using some form of contacting strain measurement device. While providing accurate measurement in many applications, contacting extensometers can have an adverse effect on test results. Non-contacting extensometry offers many benefits over traditional contacting devices including:

- No influence on the test specimen
- No problems with knife-edge slip
- No errors due to inertia of moving parts
- No moving parts eliminate errors due to wear
- No possibility of damage due to energy release at failure
- Can be used with environmental chambers over a wider temperature range



2663-901

Instron® introduced the first commercial video extensometer in 1991. This second generation of Instron Video Extensometers utilizes patented measurement technology in the fastest, most accurate non-contacting strain measurement devices commercially available.

Principle of Operation

A high-resolution digital camera and advanced real-time image processing are used to make precise strain measurements on material test samples. High performance is matched by an ergonomic design that allows easy set up, and provides very good operator access to the test area. Strain is measured by tracking contrasting gauge marks placed on the specimen. The gauge marks can be in the form of dots or lines and they can be applied to the specimen by a variety of methods. processed in real-time and the centers of the gauge marks located and tracked constantly during the test. Specimen strain is then calculated from the mark separation at the start of the test (gauge length) and the current mark separations. Tracking the center of the mark eliminates possible errors caused by stretching of the marks at high elongations. Gauge length is automatically measured before the beginning of each test and used for strain calculation, eliminating errors introduced by inaccurate specimen marking.

Two versions of the extensometer are available - Standard Video Extensometer SVE 2 and Advanced Video Extensometer AVE 2. The AVE offers greater accuracy for tests on rigid materials such as metals and composites and is also available with a transverse measurement option for r-value determination on sheet metals. The SVE 2 is ideally suited for everyday applications such as rubber, soft plastics, elastomers and other materials with high strain to failure. The AVE 2 offers greater accuracy and versatility for testing under multiple environmental conditions, and can be used for advanced strain measurement with Digital Image Correlation (DIC). The AVE 2 conforms to the most rigorous testing standards, such as ISO 527 and ASTM D638 and is available with transverse strain measurement as an option. Additionally, the AVE 2 can be used with DIC (Digital Image Correlation) software for full-field strain and displacement mapping.

Regardless of the machine currently in your lab, either unit can be integrated with any non-Instron or past-generation Instron system that uses a ±10v analog input.

Application Range

- Non-contacting strain measurement on a wide range of materials and specimen types including plastics, metals, textiles, paper, thin sheet, foil, wire
- Type of Loading: Tensile, compression, flexure static only. Not suitable for high-cycle dynamic fatigue tests
- Specimen shapes: Round and flat specimens with or without shoulder tab ends

Discover More with Non-Contacting Dynamic Strain Measurement

In addition to its excellent performance for static testing, the Instron AVE 2 is now available with an option for cyclic testing and high speed monotonic test measurement. Capable of tracking displacement at up to 500mm/s with cyclic test frequencies up to 20Hz, it offers the speed and flexibility scientists and engineers have been waiting for to study the dynamic behaviour of materials without contacting the specimen.

NON-CONTACTING VIDEO EXTENSOMETERS

NON-CONTACTING VIDEO EXTENSOMETERS

Catalog Number	Description	Optional Fields of View (FOV)/Resolution	Notes
2663-901	Advanced Video Extensometer AVE 2	60 mm/0.5 µm, 200 mm/1 µm, 500 mm/5 µm	Transverse option available for 'r' value on sheet metal, suitable for use with Instron® environmental chambers (with appropriate mounting kit)
2663-902	Standard Video Extensometer SVE 2	50 mm/3 µm, 100 mm/4 µm, 200 mm/5 µm, 350 mm/25 µm, 500 mm/50 µm	Axial only, no transverse option available; suitable for use with Instron environmental chambers (with appropriate mounting kit)

ITEMS FOR USE WITH 2663-901/-902

Catalog Number	Description
2663-910	Short Field of View Lens - 35 mm Focal Length
2663-911	Standard Field of View Lens - 16 mm Focal Length
2663-912	Long Field of View Lens - 9 mm Focal Length
2663-913	Extra Long Field of View Lens - 6 mm Focal Length
2663-841	White specimen marking pens
2663-842	Black specimen marking pens

ITEMS FOR USE WITH 2663-901

Catalog Number	Description
2663-914	Transverse Measurement Option for existing 2663-901 AVE 2 extensometers

DIGITAL IMAGE CORRELATION



2450-400 DIC System

Digital Image Correlation (DIC) is an optical technique that compares images of a tested specimen's surface to generate full-field strain and displacement maps. In other words, you can see an FEA-style picture to visualize strain and displacement over the full two-dimensional surface of the test specimen. This powerful capability unlocks the true story of the material behavior and allows materials testing professionals to analyze a number of advanced strain characteristics after the test.

The technique of DIC has been around for more than a decade. However until now, many users have struggled with a complex user interface and synchronization problems. In response, the Instron® DIC Replay package is streamlined for the materials testing community with an interface that is refreshingly simple and familiar. Additionally, Instron's DIC package features built-in synchronization of DIC images with test data collected, including load, position, and more. It is a DIC package that a capable materials testing professional can use easily. Instron DIC Replay Software is a self-contained 2D DIC package.

The software uses images and calibration data saved by Instron's Advanced Video Extensometer (AVE and AVE 2) and works in a post-processing mode. The user interface leverages the same tabbed style and graphical design of Bluehill® Software.

Full Field Strain and Displacement

Visualize strain and displacement over the full surface of a two dimensional object (2D analysis is appropriate when surface height deformation is negligible). Displays include Axial strain (ε_{yy}), Axial Displacement (d_y), Transverse Strain (ε_{xx}), Transverse Displacement (d_x), Shear Strain, Maximum Normal Strain, and Minimum Normal Strain.

Simple Display Options

Adjust display options using intuitive graphical icons. Options include:

- A variety of color palettes for contour maps
- Automatic or fixed scaling options
- Display gridlines to show data point locations
- A toggle to show or hide the raw sample images

Virtual Gauges

Snap on and resize strain gauges or extensometers to analyze strain behavior over a specific area of the test specimen or the average strain between two points.

Method Saving

Save strain/displacement and plot methods to recall and apply to other specimens.

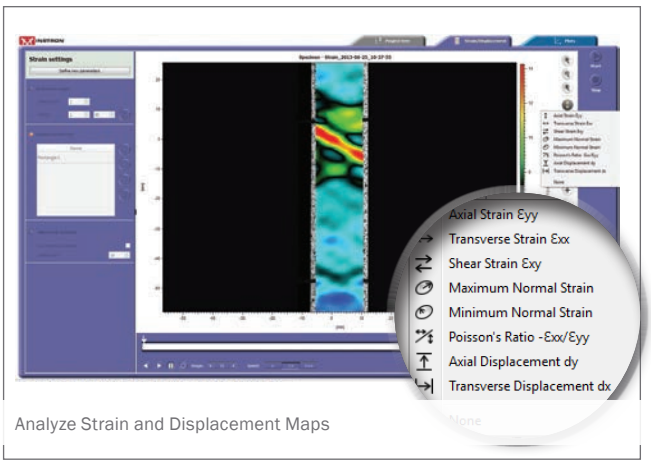
Integration with Materials Testing Software

View and plot results against the test data collected with Bluehill 3 Software — no additional synchronization hardware or cabling required.

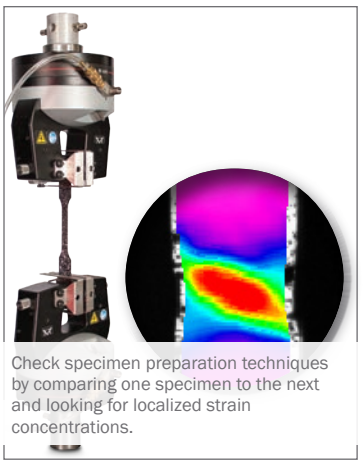
Flexible User License

Users can install the DIC Replay software on many PCs while ensuring secure access through a portable USB dongle. This dongle acts like a key to open the software and allows users to process data away from the testing machine (e.g. on an office laptop.) or without a network connection.

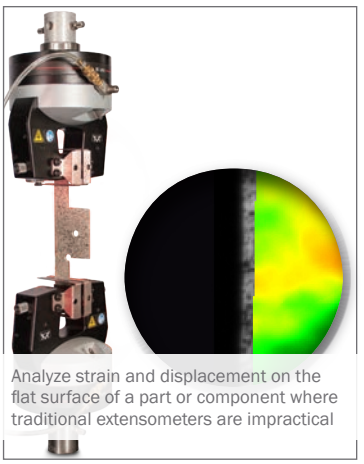
DIGITAL IMAGE CORRELATION



Analyze Strain and Displacement Maps



Check specimen preparation techniques by comparing one specimen to the next and looking for localized strain concentrations.



Analyze strain and displacement on the flat surface of a part or component where traditional extensometers are impractical

DIC REPLAY

Catalog Number	Description
2450-400	DIC Replay, 2D Digital Image Correlation Software for existing AVE/AVE 2 extensometers
2663-901R3	DIC Replay, 2D Digital Image Correlation Software option for new AVE 2 extensometers

Equipment compatibility:
1. Requires Instron® Advanced Video Extensometer, AVE or AVE 2 (2663-821 or 2663-901)
2. AVE requires Bluehill® Software version 3.42 or higher and AVE software version 3.24 or higher
3. AVE 2 requires Bluehill Software version 3.62 or higher

PC must have:
1. Microsoft® Windows 7 Professional (32 or 64 bit) or Windows 10 Professional (64 bit only)
2. Minimum of 2 GB RAM
3. Minimum of 2.67 GHz
4. Minimum of 250 GB hard drive space
5. Minimum of display resolution: 1280 × 720 pixels

KNIFE-EDGE, CLIPS AND PARTS FOR EXTENSOMETERS



Knife Edges and Clips

A range of optional and replacement parts are available for extensometers. Replacement knife-edges can be used when existing ones become worn or damaged. Optional clips allow different specimen sizes to be tested.

KNIFE-EDGES, CLIPS AND PARTS FOR EXTENSOMETERS

Catalog Number	Description
2601-079	Knife-edges, radiused, for 2630-100 series extensometers
2601-077	Knife-edges, standard straight profile, for 2630-100 series extensometers
2601-078	Knife-edges, three-point contact, for 2630-100 series extensometers
2601-112	Conical Point contacts for 2650-560/-570 Averaging Axial and Biaxial Extensometers (set of 4 contacts)
2601-110	Line Chisel Point contacts for 2650-560/-570 Averaging Axial and Biaxial Extensometers (set of 4 contacts)
2601-111	Vee Chisel Point contacts for 2650-560/-570 Averaging Axial and Biaxial Extensometers (set of 4 contacts)

KNIFE-EDGE, CLIPS AND PARTS FOR EXTENSOMETERS

KNIFE-EDGES, CLIPS AND PARTS FOR EXTENSOMETERS

Catalog Number	Description	Specimen Thickness	Specimen Diameter	Specimen Width
		mm	mm	mm
2601-026	Bolt on knife-edge kit, 5 mm gauge length for 2670 Series COD gauges	-	-	-
2601-081	Specimen clips, adjustable and knife-edges for 2630-100 Series extensometer	1 - 10	1 - 9	1 - 9
2601-082	Specimen clips, adjustable and knife-edges for 2630-100 Series extensometer	1 - 18	1 - 15	0 - 14
2601-083	Specimen clips, adjustable and knife-edges for 2630-100 Series extensometer	1 - 10	1 - 10	0 - 25
2632-059	Spare alumina rods for 2632-055 and 2632-057; chisel point to suit flat specimens; two pairs	-	-	-
2632-062	Spare alumina rods for 2632-055 and 2632-057; vee-chisel point to suit round specimens; two pairs	-	-	-
2632-060	Spare ceramic cord for 2632-054, 2632-055, 2632-056 and 2632-057, 500 metres; includes ten pairs of spring assemblies	-	-	-
2632-058	Spare quartz rods for 2632-054 and 2632-056; two pairs	-	-	-
2632-061	Leaf spring mounting for 2632-054, 055, 056 and 057 extensometers	-	-	-
2665-800	Knife edges for 2665-750/-751 AutoX Automatic extensometer, circular, suitable for flat, rectangular specimens	-	-	-
2665-801	Knife edges for 2665-750/-751 AutoX Automatic extensometer, flat, suitable for narrow specimens (e.g., nitinol wire, carbon fiber tow specimens, etc.) and delicate materials (latex, elastomers, etc).	-	-	-
2665-802	Shock-tolerant knife edges for 2665-750/-751 AutoX automatic extensometer, circular, suitable for flat, rectangular or round specimens. Recommended for thru-fracture testing applications that exceed 100kN or produce high energy release at failure. For 2665-750/-751 AutoX extensometers	-	-	-

TRANSVERSE CLIP-ON EXTENSOMETERS



2640-010



W-E404-x

Transverse Extensometers are designed for measuring displacements across the width or diameter of a test specimen. They are self-supporting on the test specimen and will work on any width or diameter specimen from 0 to 25 mm (1 in) They are commonly used for the measurement of Poisson's ratio and transverse strain on anisotropic materials such as composites. They are frequently used simultaneously with axial extensometers. These units easily clip on to the specimen and are held in place with an integral spring. The rounded contact edges help maintain the position on the specimen. A special version 2640-010 is available for determining "r" value of sheet metals (not suitable for Poisson's Ratio).

Principle of Operation

The specimen displacement is measured at a single point using a high-accuracy, dual flexure strain-gauge sensor designed for strength and improved performance. The special version for 'r' value measures the specimen displacement at two points using two individual high-accuracy, dual-flexure strain-gauge sensors. The output of each sensor is merged to produce a single averaged output The design makes these units very durable and they may be left on the specimen through specimen failure. The extensometers are easy to mount and feature integral springs that hold the unit on the test specimen. An adjustable specimen contact bar below the knife edges provides good mechanical stability for the extensometer body.

Application Range

- Static use only
- Suitable for transverse strain measurement on metals, rigid thermoplastics, thermosetting polymers and composites
- Suitable for round, rectangular or other regular shaped specimens
- Special version (2640-010) for r-value determination on sheet metals

TRANSVERSE CLIP-ON EXTENSOMETERS

Catalog Number	Travel (Transverse)		Specimen Width		Temperature Rating	
	mm	in	mm	in	°C	°F
W-E404-A	-	±0.02	0 - 25	0 - 1	-40 to +100	-40 to +212
W-E404-C	-	±0.1	0 - 25	0 - 1	-40 to +100	-40 to +212
W-E404-E	±0.5	-	0 - 25	0 - 1	-40 to +100	-40 to +212
W-E404-F	±2.5	-	0 - 25	0 - 1	-40 to +100	-40 to +212
2640-010[1]	±10	-	10 - 25	0.4 - 1	-80 to +200	-112 to +392

Notes: 1. 2640-010 designed for determining "r" value on sheet metal from 0.3 mm to 4 mm thickness. Requires a suitable axial extensometer.



FURNACES

2.5

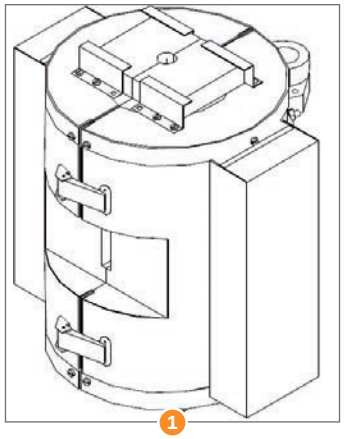
Very high-temperature properties of materials are a vital concern in many applications such as power generation, aerospace and automotive. Our standard range of furnaces covers temperatures up to +1600 °C in air, with engineered solutions available to cater for height and width variants.

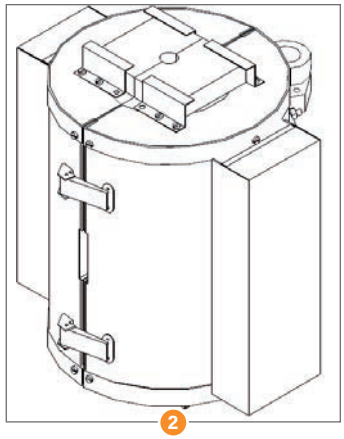
A wide range of grips, pull rods and extensometers is available to provide the complete solution to your high temperature testing requirements.

Special furnace equipment related to particular applications such as ceramics is also shown in Section 2, Application-Specific Accessories.

Furnaces	116-117
Grips for Furnaces	118-121
Mounting Brackets for SF-16 Furnaces	122
Pull Rods and Push Rods for Furnaces	123-124
Temperature Control for SF-16 Furnaces	125
Thermocouples for SF-16 Furnaces	126


1


1


2

These three zone resistance wire wound furnaces are of split construction to facilitate fast and easy loading of a pre-assembled specimen train. The case is constructed from stainless steel with aluminium and hardened insulation board end plates. The optional front cut-out allows the use of side entry high-temperature extensometry. Adjustable stainless steel latches keep the furnace halves locked together during use, but are then easily opened once testing is complete. The furnace is available with optional heavy duty brackets or mountings, which attach to a wide range of testing systems. An extensive range of standard controllers is available to suit most test regimes. Custom variants can be specified should the standard range not include a suitable unit.

Principle of Operation

The resistance wire is wound on to recrystallized alumina tube in three independent zones to form the furnace element. This three-zone format allows the user to tailor the furnace temperature gradient, creating a uniform central zone. High performance ceramic fiber insulation is used to reduce heat losses and provide fast heating rates. The specimen is heated through a combination of convection and radiation, dependent on the test temperature. The furnace bore has been optimized to suit a wide range of test fixturing without encouraging excessive thermal losses. Type K thermocouples are provided as standard, but any other configuration is available on request.

Application Range

- Types of loading: Creep, stress rupture, hot tensile, LCF, fracture mechanics
- Specimen material: High-temperature metal alloys
- Specimen types: Threaded or shoulder-end round and flat specimens
- Type of materials: Tissue, bones, ligaments, prosthetics, sutures

SF-16 STYLE HIGH-TEMPERATURE FURNACES

	Catalog Number	Description	Temperature Rating		Accessory Diameter		Accessory Length		ID	
			°C	°F	mm	in	mm	in	mm	in
1	W-8711-F	SF-16 Furnace with side-entry extensometer port	+1200	+2200	254	10.0	330	13.0	76.2	3
2	W-8711-B	SF-16 Furnace without extensometer port	+1200	+2200	254	10.0	330	13.0	76.2	3

ITEMS FOR USE WITH SF-16 FURNACE

Catalog Number	Description
W-7546-C	713C pull rod, 10.75 in (273.05 mm) long
W-7547-C	713C pull rod, 13 in (330.2 mm) long
W-7743	Type K Specimen Thermocouple

Catalog Number	Description
3119-960	Model TCS3203, TYPE K, Three-Zone Temperature Control System
3119-962	Model TCS3203, TYPE R/S, Three-Zone Temperature Control System

FURNACES



1

3117 SERIES HIGH-TEMPERATURE FURNACES

Catalog Number	Temperature Rating		Accessory Diameter		Accessory Length	
	°C	°F	mm	in	mm	in
1 3117-200	+1000	+1832	303	12	358	14

Note: 1. Temperature rating is maximum specimen temperature.

ITEMS FOR USE WITH 3117-200

Catalog Number	Description
3117-021	+1000°C tension-only pull rods
3117-031	+1000°C reverse stress pull rods

GRIPS FOR FURNACES



A range of high-temperature specimen grips and holders is available to suit the pull rods and push rods required.

Principle of Operation

A variety of grip and holder types is available including the commonly used screw-ended style.

Application Range

- For use with high-temperature pull rods and push rods and compatible furnace systems

TENSION-ONLY SPECIMEN ADAPTERS FOR 3117-021 PULL RODS

Catalog Number	Capacity			Specimen Thread Size	Temperature Rating		Static or Fatigue Rated	Notes
	kN	kgf	lbf		°C	°F		
3117-025	2 - 10	200 - 1,000	425 - 2,250	M8	+1000	+1832	Static	Force rating depends on temperature
3117-026	3 - 15	300 - 1,500	675 - 3,330	M10	+1000	+1832	Static	Force rating depends on temperature
3117-027	5 - 22.5	500 - 2,250	1,120 - 5,000	M12	+1000	+1832	Static	Force rating depends on temperature
3117-028	10 - 40	1,000 - 4,000	2,250 - 8,800	M16	+1000	+1832	Static	Force rating depends on temperature

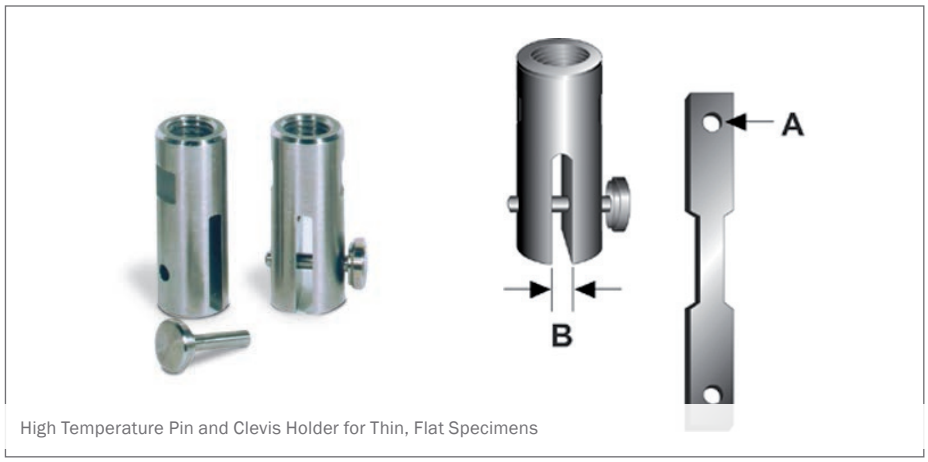
GRIPS FOR FURNACES



High Temperature Holders for Threaded-End Specimens

THREADED-END SPECIMEN HOLDERS FOR W-754X PULL RODS

Catalog Number	Specimen Thread Size	Upper Fitting	Lower Fitting	Temperature Rating		Material Type	Static or Fatigue Rated
	mm			°C	°F		
W-7551-C	Non-Standard D - Customer Specified	0.75 in - 10 fRH	0.75 in - 10 fRH	+1100	+2000	Inconel 713C	Static
W-7551-CM1	6 × 1.0	0.75 in - 10 fRH	0.75 in - 10 fRH	+1100	+2000	Inconel 713C	Static
W-7551-CM2	M8 × 1.0	0.75 in - 10 fRH	0.75 in - 10 fRH	+1100	+2000	Inconel 713C	Static
W-7551-CM3	M8 × 1.25	0.75 in - 10 fRH	0.75 in - 10 fRH	+1100	+2000	Inconel 713C	Static
W-7551-CM4	M10 × 1.5	0.75 in - 10 fRH	0.75 in - 10 fRH	+1100	+2000	Inconel 713C	Static
W-7551-CM5	M12 × 1.5	0.75 in - 10 fRH	0.75 in - 10 fRH	+1100	+2000	Inconel 713C	Static
W-7551-CM6	M12 × 1.75	0.75 in - 10 fRH	0.75 in - 10 fRH	+1100	+2000	Inconel 713C	Static
W-7551-CM7	M14 × 2.0	0.75 in - 10 fRH	0.75 in - 10 fRH	+1100	+2000	Inconel 713C	Static
W-7551-CM8	M16 × 1.5	0.75 in - 10 fRH	0.75 in - 10 fRH	+1100	+2000	Inconel 713C	Static
W-7551-CM9	M16 × 2.0	0.75 in - 10 fRH	0.75 in - 10 fRH	+1100	+2000	Inconel 713C	Static
W-7551-CM10	M18 × 2.5	0.75 in - 10 fRH	0.75 in - 10 fRH	+1100	+2000	Inconel 713C	Static
W-7551-CM11	M19 × 1.5	0.75 in - 10 fRH	0.75 in - 10 fRH	+1100	+2000	Inconel 713C	Static
W-7551-CU1	#10 - 24 fRH	0.75 in - 10 fRH	0.75 in - 10 fRH	+1100	+2000	Inconel 713C	Static
W-7551-CU2	#10 - 32 fRH	0.75 in - 10 fRH	0.75 in - 10 fRH	+1100	+2000	Inconel 713C	Static
W-7551-CU3	0.25 in - 20 fRH	0.75 in - 10 fRH	0.75 in - 10 fRH	+1100	+2000	Inconel 713C	Static
W-7551-CU4	0.25 in - 28 fRH	0.75 in - 10 fRH	0.75 in - 10 fRH	+1100	+2000	Inconel 713C	Static
W-7551-CU6	0.3125 in - 18 fRH	0.75 in - 10 fRH	0.75 in - 10 fRH	+1100	+2000	Inconel 713C	Static
W-7551-CU5	0.3125 in - 24 fRH	0.75 in - 10 fRH	0.75 in - 10 fRH	+1100	+2000	Inconel 713C	Static
W-7551-CU7	0.375 in - 16 fRH	0.75 in - 10 fRH	0.75 in - 10 fRH	+1100	+2000	Inconel 713C	Static
W-7551-CU8	0.375 in - 24 fRH	0.75 in - 10 fRH	0.75 in - 10 fRH	+1100	+2000	Inconel 713C	Static
W-7551-CU9	0.475 in - 16 fRH	0.75 in - 10 fRH	0.75 in - 10 fRH	+1100	+2000	Inconel 713C	Static
W-7551-CU10	0.5 in - 13 fRH	0.75 in - 10 fRH	0.75 in - 10 fRH	+1100	+2000	Inconel 713C	Static
W-7551-CU12	0.75 in - 10 fRH	0.75 in - 10 fRH	0.75 in - 10 fRH	+1100	+2000	Inconel 713C	Static
W-7551-CU11	0.875 in - 11 fRH	0.75 in - 10 fRH	0.75 in - 10 fRH	+1100	+2000	Inconel 713C	Static



High Temperature Pin and Clevis Holder for Thin, Flat Specimens

PIN AND CLEVIS SPECIMEN HOLDER FOR W-7546-C/W-7547-C PULL RODS

Catalog Number	Slot Thickness (B)	Pin Diameter (A)	Upper Fitting	Lower Fitting	Temperature Rating		Material Type	Static or Fatigue Rated
	mm	mm			°C	°F		
CP112249	1	3	0.75 in - 10 fRH	0.75 in - 10 fRH	+1100	+2000	Inconel 713C	Static
CP112250	1	3	0.75 in - 10 fRH	0.75 in - 10 fRH	+1100	+2000	Inconel 713C	Static
CP112251	1	4	0.75 in - 10 fRH	0.75 in - 10 fRH	+1100	+2000	Inconel 713C	Static
CP112252	1	4	0.75 in - 10 fRH	0.75 in - 10 fRH	+1100	+2000	Inconel 713C	Static
CP112253	1	6	0.75 in - 10 fRH	0.75 in - 10 fRH	+1100	+2000	Inconel 713C	Static
CP112254	1	8	0.75 in - 10 fRH	0.75 in - 10 fRH	+1100	+2000	Inconel 713C	Static
CP112255	1	10	0.75 in - 10 fRH	0.75 in - 10 fRH	+1100	+2000	Inconel 713C	Static

GRIPS FOR FURNACES



High Temperature Wedge Grips for Flat Specimens

WEDGE GRIPS FOR W-7546-C/W-7547-C PULL RODS

Catalog Number	Description	Capacity			Specimen Width (A)		Specimen Thickness (B)		Pin Diameter		Upper Fitting	Lower Fitting	Temperature Rating		Static or Fatigue Rated
		kN	kgf	lbf	mm	in	mm	in	mm	in			°C	°F	
W-7554	Hastelloy X high-temperature tension wedge grips	17.8	1,800	4,000	12.70 - 22.23	0.500 - 0.875	1.127 - 3.175	0.005 - 0.125	4.115	0.162	0.75 in - 10 fRH	0.75 in - 10 fRH	+982	+1800	Static
W-7554-A1	Hastelloy X wedge grip inserts	17.8	1,800	4,000	For use with W-7554		0.13 - 1.0	0.005 - 0.040	4.115	0.162	-	-	+982	+1800	Static
W-7554-A3	Hastelloy X wedge grip inserts	17.8	1,800	4,000	For use with W-7554		1.0 - 2.0	0.040 - 0.078	4.115	0.162	-	-	+982	+1800	Static
W-7554-A4	Hastelloy X wedge grip inserts	17.8	1,800	4,000	For use with W-7554		2.0 - 3.18	0.078 - 0.125	4.115	0.162	-	-	+982	+1800	Static

MOUNTING BRACKETS FOR SF-16 FURNACES

The standard SF-16 Furnace Mount provides a hinged mounting bracket to support the furnace during a test yet allowing it to be conveniently moved out of the test space when not in use.

Principle of Operation

Hinged arms allow adjustment in the horizontal plane while the furnace height is adjusted along a vertical column. The bracket is fully supported at its base and mounts either to the test machine or to another rigid bracket. Can also be floor-mounted.

Application Range

- Used to attach furnaces to the testing system.



MOUNTING BRACKETS FOR FURNACES

Catalog Number	Description
W-8523	Hinged furnace mounting bracket for SATEC™ Series hydraulic UTMs
1 W-8523-A	305 mm (12 in) Furnace mount extension
W-8523-B	Floor mount for standard SF-16 furnace mount
CP107143	Standard Hinged Furnace Mounting for W-8711 SF-16 furnace on EM Tabletop model 5967 E2, F2
CP119938	Standard SF-16 Furnace Mounting for use on E1 and E2 EM Floor frames. Compatible with 338x, 558x E1 AND E2, 598x E1 AND E2
CP107737	Advanced Mounting bracket for W-8711 SF-16 furnace on EM Floor model frames Compatible with 3382/84/85H, 5582/84/85 E1 and E2, 5982/84/85 E1 and E2 Frames.
CP103122	Advanced Mounting for W-8711 SF-16 furnace on EM Floor model frames, xx87/88/89 E1 and E2. Allows quick and simple fine adjustment of the vertical position of the furnace as well as parallelism to the load string

PULL RODS AND PUSH RODS FOR FURNACES



W-7546-C

A full range of pull rods and push rods is available to allow compatible grips to be used within our range of furnaces.

Principle of Operation

Pull rods and push rods are manufactured from high temperature materials for strength and resistance to corrosion and oxidation Specimen adapters and holders of various designs, water-cooled adapters and other complementary accessories are available.

Application Range

- For use with compatible grips when used in conjunction with furnaces

3117 SERIES +1000°C TENSION-ONLY PULL RODS

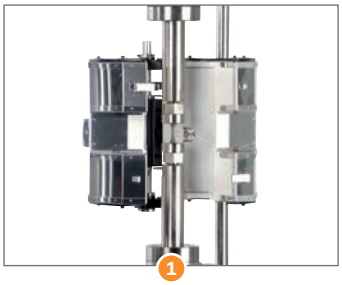
Catalog Number	Capacity		Temperature Rating		Accessory Length		Upper Fitting	Lower Fitting	Static or Fatigue Rated
	kN	kgf	°C	°F	mm	in			
3117-021	2 - 40	200 - 4,000	+1000	+1832	330	13	16 mm Clevis Pin (Type 1m)	16 mm Clevis Pin (Type 1m)	Static Tensile

Note: 1. Capacity depends on temperature.

ITEMS FOR USE WITH 3117-021

Catalog Number	Description
3117-025	Tension-only holders, M8 thread for 3117-020, 3117-021 pull rods
3117-026	Tension-only holders, M10 thread for 3117-020, 3117-021 pull rods
3117-027	Tension-only holders, M12 thread for 3117-020, 3117-021 pull rods
3117-028	Tension-only holders, M16 thread for 3117-020, 3117-021 pull rods

PULL RODS AND PUSH RODS FOR FURNACES



3117 SERIES +1000°C REVERSE STRESS PULL RODS

	Catalog Number	Capacity		Temperature Rating		Static or Fatigue Rated	Notes
		kN	kgf	°C	°F		
1	3117-501	±25 to ±100	±2550 to ±10200	1050	1922	Reverse stress LCF	Offers Class 5 Alignment to ASTM1012 when installed with Instron AlignPRO Optional threaded specimen adapters available (M20; M12; M8). Optional button headed specimen adapters available.

W-754X SERIES PULL RODS

	Catalog Number	Capacity			Temperature Rating		Accessory Length		Upper Fitting	Lower Fitting	Static or Fatigue Rated
		kN	kgf	lbf	°C	°F	mm	in			
	W-7546-C	90 - 26.7	9,000 - 2,720	20,000 - 6,000	+538 to +1100	+1000 to +2000	273	10.75	0.75 in - 10 mRH	0.75 in - 10 mRH	Static
1	W-7547-C	90 - 26.7	9,000 - 2,720	20,000 - 6,000	+538 to +1100	+1000 to +2000	330	13.0	0.75 in - 10 mRH	0.75 in - 10 mRH	Static

QUICK CHANGE ADAPTERS FOR W-754X SERIES PULL RODS

	Catalog Number	Capacity			Temperature Rating		Upper Fitting	Lower Fitting	Static or Fatigue Rated
		kN	kgf	lbf	°C	°F			
	W-7556M2	10	10,000	2,000	+93	+200	Type O m	0.75 in - 10 fRH	Static
1	W-7556	90	9,000	20,000	+93	+200	1.5 in - 6 fRH	0.75 in - 10 fRH	Static
	W-7556M	90	9,000	20,000	+93	+200	M48 × 2fRH and M36 × 4fRH	0.75 in - 10 fRH	Static
	W-7556M4	90	9,000	20,000	+93	+200	Type D m	0.75 in - 10 fRH	Static
	W-7556M6	90	9,000	20,000	+93	+200	Type 1 m	0.75 in - 10 fRH	Static
	W-7556M8	90	9,000	20,000	+93	+200	M48 × 2mLH	0.75 in - 10 fRH	Static

ITEMS FOR USE WITH 3117-031

Catalog Number	Description
CP112080	1 off pair of M8 × 1.25 reverse stress specimen adaptors. Suitable for use with 1000°C reverse stress pullrods (3117-031)
CP113229	1 off pair of M10 × 1.5 reverse stress specimen adaptors. Suitable for use with 1000°C reverse stress pullrods (3117-031)
3117-047	1 off pair of M12 × 1.75 reverse stress specimen adaptors. Suitable for use with 1000°C reverse stress pullrods (3117-031)
3117-048	1 off pair of M16 × 2 reverse stress specimen adaptors. Suitable for use with 1000°C reverse stress pullrods (3117-031)

TEMPERATURE CONTROL FOR SF-16 FURNACES



1

Temperature control systems are designed for controlling the heat output of furnaces, chambers and ovens, as well as controlling the cooling of chambers when connected to a liquid nitrogen source. The control systems are offered for use with new creep, stress rupture or hot tensile systems, or they can be added to an existing frame using an existing furnace or chamber (not intended for use with 3117 series furnaces or 3119 series environmental chambers). The control system can either be built into a panel that is part of the frame itself or provided in a standalone cabinet to house the controls, electronics and cabling connections. The systems may be configured for use with either a manual or automatic gradient adjustment. The control systems are compatible with all furnace systems offered as new equipment, and can be configured to operate nearly any furnace, chamber, or oven with any one of several different thermocouple types. Three-zone control systems are designed for heat-only furnaces with three separate zones of heating elements, and typically three different thermocouples to control those zones. Single-zone control systems are designed for heat-only furnaces with one zone of heating and one thermocouple. They can also be set up to control both a heating and cooling function for chambers that have both heating elements and a piped, solenoid controlled connection for liquid nitrogen using a single thermocouple.

Principle of Operation

Typical systems consist of either one or three model 2416 Eurotherm® controllers. Each controller independently controls the temperature of a furnace/ chamber zone. Automatically controlled systems allow the user to program a set-point or test temperature, and the controller controls a zero-cross fired SCR to control the current to each zone. Manual systems use a single 2416 controller for temperature indication and control, while allowing the operator to adjust the gradient to each zone through use of three powerpositioning potentiometers. Standard systems use Type-K thermocouples to monitor temperature either from the furnace wall or attached to the specimen. Other types of thermocouples can be substituted, if specified at the time of order. Zero-cross SCRs are used for stable high current control of power going to the furnace/ chamber heating elements. The electrical isolation and heat sink cooling design offers long life and stability, which is very important for long material testing applications.

Application Range

- Provides the ability to control single-zone and threezone furnaces of many different types
- Can be configured to control both heating and cooling functions of an environmental chamber

TEMPERATURE CONTROL SYSTEMS FOR MODEL SF-16 FURNACE

	Catalog Number	Description	Temperature Rating	
			°C	°F
1	3119-960	Model TCS3203, Type K, Three-Zone Temperature Control System (auto gradient adjust)	+1200	+2200
	3119-962	Model TCS3203, Type R, Three-Zone Temperature Control System (auto gradient adjust)	+1200	+2200

THERMOCOUPLES FOR SF-16 FURNACES



Specimen monitoring thermocouples are used to provide the most accurate indication of the specimen temperature They are also used as the control input for a furnace or chamber during the specimen loaded portion of the test. These thermocouples are intended for use with the TCS series of furnace and environmental chambers only. Furnace wall thermocouples are suitable for heating a furnace to the soak temperature or maintaining a furnace at temperature while switching load trains. Specimen thermocouples are typically required by most test specifications. The K-Type thermocouple is recommended for most general-purpose applications. It offers a wide temperature range, low standard error, and has good corrosion resistance. K-Type is sometimes called Chromel® Alumel®, which is the trade name of the Ni-Cr and Ni-Al wire alloys.

Principle of Operation

A thermocouple consists of two dissimilar metals, joined together at one end, which produce a small voltage at a given temperature. When the thermocouple is heated, the voltage produced is approximately linear with temperature. Specimen monitoring thermocouples are either welded to the specimen or tied to the specimen using wire of the same material as one of the two leads of the thermocouple. Most furnaces and chambers can be configured to be controlled by one, two or three specimen thermocouples depending on the control system used. Selection of the thermocouple type is also dependent on the thermocouple measuring circuit. Proper wire and connectors must be used to maintain the accuracy of the thermocouples themselves.

Application Range

- Ceramic bead insulators to prevent any undesired junctions
- Pre-attached male connectors to allow easy switching between furnace wall thermocouples and specimen thermocouples

THERMOCOUPLES FOR SF-16 FURNACES

	Catalog Number	Description	Accessory Length	
			mm	in
1	W-7743	Type K Thermocouple for monitoring/control of specimen temperature	1219	48

GENERAL PURPOSE COMPRESSION ACCESSORIES

2.6

Compression platens and anvils are available in a range of sizes and force capacities to suit applications from rigid foam to concrete. Optional self-aligning spherical seatings are available for most platens where precise parallelism is needed.

Some applications (for example, flexible foam and composites) require more specific compression solutions so please refer to the Application Specific Grips and Fixtures described in Section 2.1.

Compression Platens/Anvils 128-131

Self-Aligning/Spherical Seating 132-133

COMPRESSION PLATENS/ANVILS



W-2004-C and W-2005-C



W-2004-A/-B/-C/-D/-F

Designed to be centered on the loading axis of an electromechanical or hydraulic universal testing machine load frame, compression platens provide a hardened surface for complex compression tests in which uniform stress distribution is critical. Plane compression platens are available in a range of diameters. Designed to mount directly to the crosshead or table of the frame, plane compression platens are available with numerous types of adapters, making them compatible with a wide range of testing platforms.

Principle of Operation

With a variety of diameters, compression platens fill a wide range of testing needs. They can be used to test a variety of materials, including concrete, metals, composites and wood. The high Rockwell® scale hardness of the compression platens ensures lack of deformity at pressures up to their capacity. Inscribed concentric circles ensure proper, centered placement of the specimen, thereby increasing the validity of test results.

Needles and sutures need to be tested for penetration resistance and how many times they can be used before losing their sharpness. Even when tests are performed on tissues in ambient conditions, it is now required that they also be performed in near-actual conditions. Materials that will coexist internal to the human body must now be tested in saline solutions and at body temperature.

Application Range

- Type of loading: Static compression (unless otherwise stated)
- Specimen material: Concrete, metals, wood, composites or other materials
- Specimen types: Cylinders, cubes, fasteners (when used in conjunction with other fixtures) or components

Safety Advice

Review safety note on page 236

COMPRESSION PLATENS/ANVILS

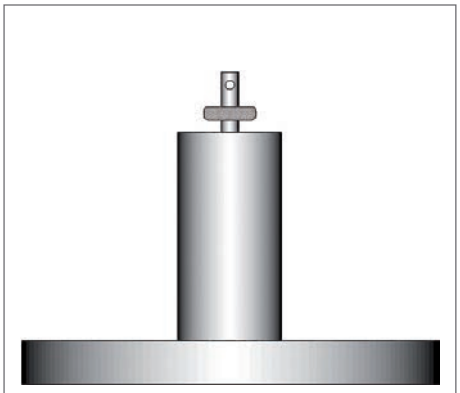
RIGID COMPRESSION PLATENS

Catalog Number	Capacity			Accessory Diameter		Mechanical Fitting	Effective Length	
	kN	kgf	lbf	mm	in		mm	in
2501-108	0.05	5	11	57	2.25	6 mm clevis pin (Type 00)	36.7	1.44
2501-114	0.1	10	22	25	1	6 mm clevis pin (Type 00)	21	0.8
S1-11585	0.1	10	22	150	6	2.5 mm clevis pin (Type 00)	113	4.4
2501-080	10	1,000	2,250	254	10	Square bolt pattern	25	1.0
2501-104	10	1,000	2,250	40.6	1.6	6 mm clevis pin (Type 00)	47.5	1.9
2501-083	10	1,000	2,250	50	2	6 mm clevis pin (Type Om)	49	1.9
2501-121	10	1,000	2,250	57	2.2	6 mm clevis pin (Type Om)	47.5	1.9
2501-106	10	1,000	2,250	127	5	6 mm clevis pin (Type 00)	47.5	1.9
2501-085	10	1,000	2,250	150	6	6 mm clevis pin (Type Om)	49	1.9
2501-185	30	3,000	6,750	300	12	Upper platen: 16 mm clevis pin (Type 1m) Lower platen: ½ in clevis pin (TypeDm)	75	3
2501-089	100	10,000	22,500	50	2	M30 × 2 mLH (Type Im)	50	2
2501-162	100	10,000	22,500	50	2	½ in clevis pin (Type Dm)	75	3
2501-082	100	10,000	22,500	50	2	16 mm clevis pin (Type 1m)	69	2.7
2501-071	100	10,000	22,500	150	6	M30 × 2 mLH (Type Im)	50	2
2501-163	100	10,000	22,500	150	6	½ in clevis pin (Type Dm)	75	3
2501-084	100	10,000	22,500	150	6	16 mm clevis pin (Type 1m)	69	2.7
2501-116	300	30,000	67,500	75	3	M48 × 2 mLH (Type IIm)	50	2
2501-117	300	30,000	67,500	150	6	M48 × 2 mLH (Type IIm)	50	2
S1-12093-1	600	60,000	135,000	127	5	M72 × 3 mLH (Type IIAm)	64	2.5
S1-12093-2	600	60,000	135,000	200	8	M72 × 3 mLH (Type IIAm)	64	2.5
2840-118	200 kN static, 100 kN dynamic			50	2	M30 × 2 fRH (Type If)	60	2.36
2840-119	500 kN static, 250 kN dynamic			150	5.9	M48 × 2 fRH (Type IIf)	75	3
2840-110	2,000 kN static, 1,000 kN dynamic			300	11.8	M48 × 2 fRH (Type IIf)	75	3
2840-111	2,000 kN static, 1,000 kN dynamic			500	19.7	M48 × 2 fRH (Type IIf)	100	4

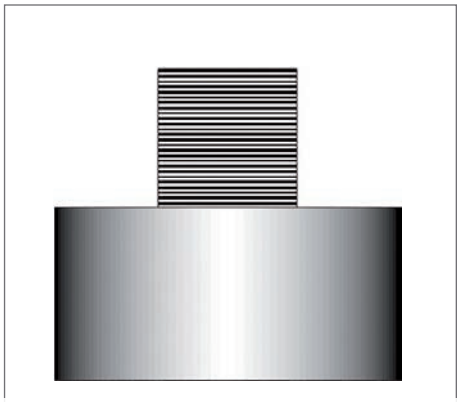
COMPRESSION PLATENS/ANVILS



2840-118/119



S1-11585



S1-12093-1/2

ITEMS FOR USE WITH PLATENS 2501-082, 083, 084, 085, 162, 163, 2840-110, 111, 118, 119

Catalog Number	Description
2601-071	LVDT platen displacement fixture
2601-041	LVDT deflection sensor, range ±0.5 mm (0.02 in)
2601-042	LVDT deflection sensor, range ±2.5 mm (0.1 in)
2601-043	LVDT deflection sensor, range ±15 mm (0.6 in)
2601-044	LVDT deflection sensor, range ±50 mm (2 in)
2601-045	LVDT deflection sensor, range ±100 mm (4 in)

SPHERICAL SEATINGS FOR USE WITH PLATENS

Catalog Number	Description
2501-096	Spherical seating, 100 kN
2501-118	Spherical seating, 300 kN
2840-112	Spherical seating, 500 kN/250 kN
2840-113	Spherical seating, 2,000 kN/1,000 kN

COMPRESSION PLATENS/ANVILS



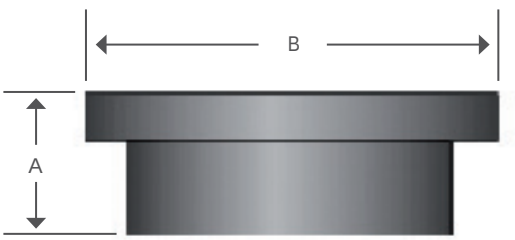
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COMPRESSION PLATENS FOR SATEC™ SERIES FRAMES

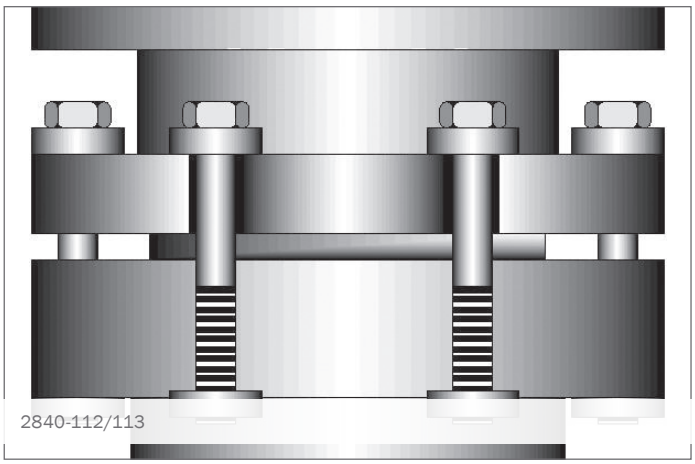
Catalog Number	Pressure Rating		Mechanical Fitting	Effective Height (A)		Accessory Diameter (B)		Accessory Weight		Compatible Frame Models
	kN	lbf		mm	in	mm	in	kg	lb	
W-2004-A	600	135,000	Type R1m (1.0 in) holding button	25.4	1.0	73.5	2.9	1	2	All Static Hydraulic
W-2004-B	2,000	450,000	Type R1m (1.0 in) holding button	25.4	1.0	114	4.5	2	4.4	All Static Hydraulic
1 W-2004-C	4,500	1,000,000	Type R1m (1.0 in) holding button	25.4	1.0	165	6.5	4	8.8	All Static Hydraulic
W-2004-D	4,500	1,000,000	Type R1m (1.0 in) holding button	38.1	1.5	228	9.0	11.5	25.3	All Static Hydraulic
W-2004-F	5,000	1,124,000	Type R1m (1.0 in) holding button	50.8	2.0	305	12	2.7	59.5	All Static Hydraulic
300LX-0001	690	100,000	M48 × 2 mLH (Type IIm)	32	1.25	162	6.375	11.3	2.5	300 LX
600LX-0001	690	100,000	M72 × 3 mLH (Type Am)	32	1.25	162	6.375	11.3	2.5	600 LX

Notes:
1. 150LX-0001, 300LX-0001 and 600LX-0001 are compression adapters and require the purchase of additional compression platens or fixtures for compression testing





SELF-ALIGNING/SPHERICAL SEATING



2840-112/113



W-2005-C

Designed to be centered on the loading axis of an electromechanical or hydraulic universal testing machine. Compression platens provide a hardened surface for complex compression tests in which uniform stress distribution is critical. Spherical seating is accomplished differently depending on the model purchased. For some models, the spherical seat is integral to the compression platen; for others the spherical seat is purchased separately to convert a compression platen to a spherically seated platen. Both types are available in a range of diameters.

These compression platens are designed to mount directly to the crosshead or table of the frame They are available with numerous types of adapters, making them compatible with a wide range of testing platforms.

Principle of Operation

With a variety of diameters, compression platens fill a wide range of testing needs. They can be used to test a variety of materials, including concrete, metals, composites and wood. The high Rockwell® scale hardness of the compression platens ensures lack of deformity at pressures up to their capacity. Their inscribed concentric circles ensure proper, centered placement of the specimen, thereby increasing the validity of test results. A level seating surface and even load distribution over the specimen is ensured due to the high tolerance in the flatness of the surface This aids the operator in attaining valid test results and true failure measurements.

The spherically-seated compression platens/seats are designed to accommodate angular displacement (up to 4°) of the top of the specimen with reference to the machine's loading axis. This is accomplished through the self-aligning action of the seat. Spherically-seated compression platens are typically used in conjunction with a plane (fixed) compression platen.

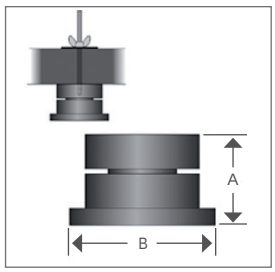
Application Range

- Type of loading: Static compression
- Specimen material: Concrete, metals, wood, composites or other materials
- Specimen types: Cylinders, cubes, fasteners (when used in conjunction with other fixtures) or components

Safety Advice

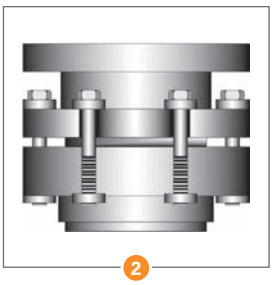
Review safety note on page 236

SELF-ALIGNING/SPHERICAL SEATING





1



2



1



1

SPHERICAL SEATS FOR RIGID COMPRESSION PLATENS

Catalog Number	Capacity Rating			Upper Fitting	Lower Fitting
	kN	kgf	lbf		
2501-096	100	10,000	22,500	6 × M10 on 100 mm BC	6 × M10 on 100mm BC
1 2501-118	300	30,000	67,500	M48 × 2 fRH (Type IIf)	6 × M10 on 100mm BC
2840-112	500 static, 250 dynamic	50,000 static, 25,000 dynamic	112,500 static, 56,250 dynamic	M48 × 2 fRH (Type IIf)	M48 × 2 LH (Type IIf)
2 2840-113	2,000 static, 1,000 dynamic	200,000 static, 100,000 dynamic	450,000 static, 225,000 dynamic	M48 × 2 fRH (Type IIf)	M48 × 2 LH (Type IIf)

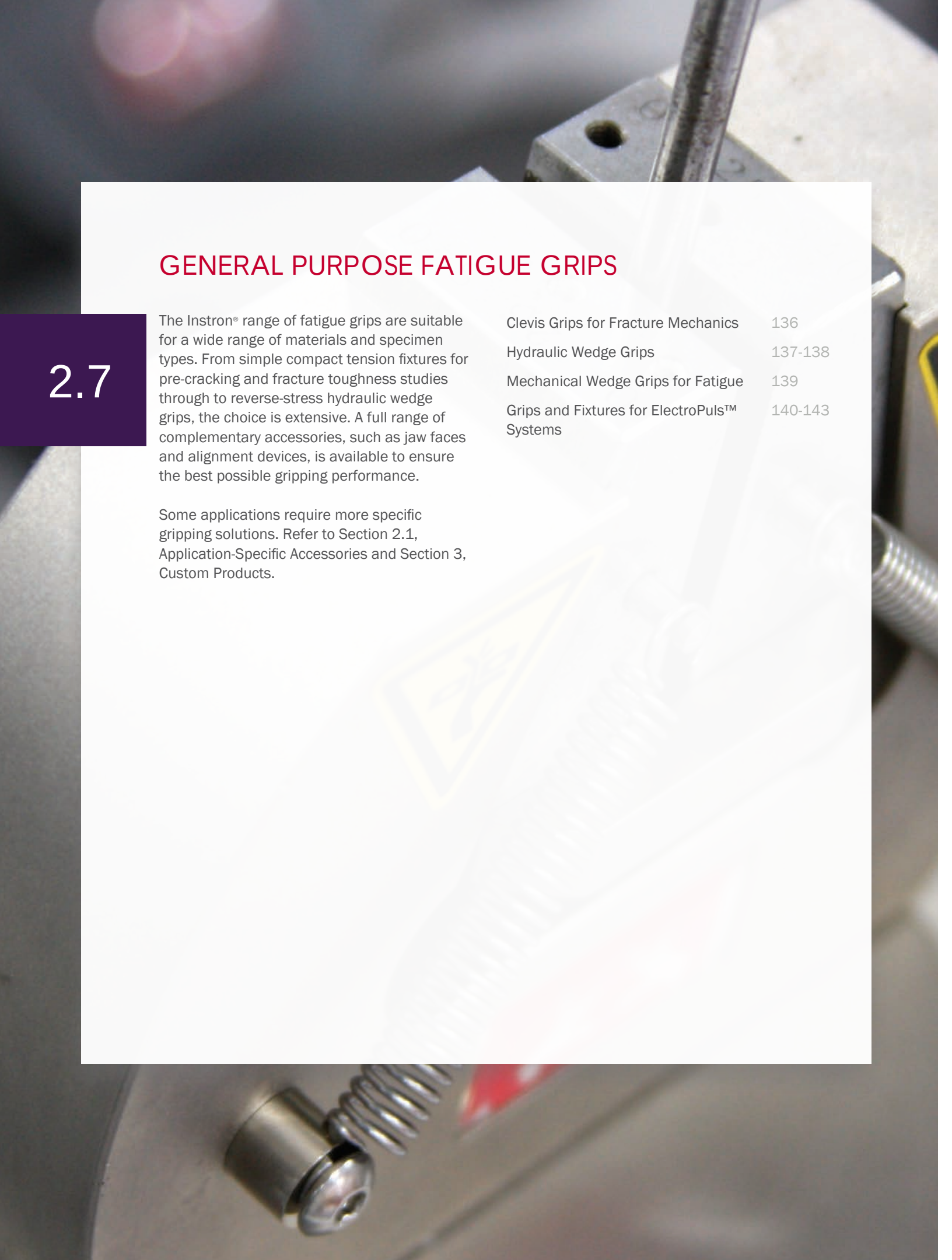
SPHERICALLY-SEATED COMPRESSION PLATENS FOR SATEC™ SERIES FRAMES

Catalog Number	Pressure Rating		Effective Height (A)		Accessory Diameter (B)		Accessory Weight		Upper Fitting	Compatible Frame Models
	kN	lbf	mm	in	mm	in	kg	lb		
W-2005-A	1,000	225,000	50.8	2.0	79	3.125	2.2	4.8	Type R1m (1.0 in) Holding Button	Static Hydraulic
W-2005-B	2,000	450,000	76.2	3.0	114	4.5	4	13.6	Type R1m (1.0 in) Holding Button	Static Hydraulic
1 W-2005-C	4,500	1,000,000	101.6	4.0	165	6.5	11.5	37.4	Type R1m (1.0 in) Holding Button	Static Hydraulic
W-2005-D	4,500	1,000,000	127	5.0	228	9.0	41.7	90	Type R1m (1.0 in) Holding Button	Static Hydraulic
W-2005-F	5,000	1,125,000	170	6.7	305	12.0	88	194	Type R2m (1.5 in) Holding Button	Static Hydraulic

SPHERICALLY SEATED COMPRESSION ANVILS FOR INSTRON EM SYSTEMS

Catalog Number	Capacity			Platen Diameter		Mechanical Interface	Weight		Effective Height		Operating Temperature	
	kN	kgf	lbf	mm	in		kg	lb	mm	in	°C	°F
S5722A[1]	10	100	2,250	50	2	6mm Clevis pin (Type Om)	0.9	2.0	85.5	3.8	-70 to +350	-94 to 662
S5724A	10	100	2,250	100	4	6mm Clevis pin (Type Om)	3.9	8.8	113.5	4.5	-70 to +350	-94 to 662
S5726A	10	100	2,250	150	6	6mm Clevis pin (Type Om)	5.8	12.8	113.5	4.5	-70 to +350	-94 to 662
S5728A	10	100	2,250	200	8	6mm Clevis pin (Type Om)	8.4	18.5	113.5	4.5	-70 to +350	-94 to 662
S5722B[1]	100	10,000	22,500	50	2	0.5in Clevis pin (Type Dm)	1.4	3.1	116.0	4.6	-70 to +350	-94 to 662
S5724B	100	10,000	22,500	100	4	0.5in Clevis pin (Type Dm)	4.6	10.1	128.5	5.1	-70 to +350	-94 to 662
1 S5726B	100	10,000	22,500	150	6	0.5in Clevis pin (Type Dm)	6.5	14.3	128.5	5.1	-70 to +350	-94 to 662
S5728B	100	10,000	22,500	200	8	0.5in Clevis pin (Type Dm)	9.1	20.1	128.5	5.1	-70 to +350	-94 to 662

Notes: 1. Spherical seat locking screws are not available on 50mm diameter spherically seated platens.
This feature is available only on spherically seated platens of diameter 100 mm and above.



GENERAL PURPOSE FATIGUE GRIPS

2.7

The Instron® range of fatigue grips are suitable for a wide range of materials and specimen types. From simple compact tension fixtures for pre-cracking and fracture toughness studies through to reverse-stress hydraulic wedge grips, the choice is extensive. A full range of complementary accessories, such as jaw faces and alignment devices, is available to ensure the best possible gripping performance.

Some applications require more specific gripping solutions. Refer to Section 2.1, Application-Specific Accessories and Section 3, Custom Products.

Clevis Grips for Fracture Mechanics	136
Hydraulic Wedge Grips	137-138
Mechanical Wedge Grips for Fatigue	139
Grips and Fixtures for ElectroPuls™ Systems	140-143

CLEVIS GRIPS FOR FRACTURE MECHANICS



2780 Series Compact Tension Fixture



2780 Series Compact Tension Fixture

Instron® fracture mechanics fixtures are suited to static and dynamic testing of compact tension specimens in accordance with the following standards: ASTM E399, ASTM E647, ASTM E1820.

Principle of Operation

The upper and lower grips are identical and attached to the specimen by means of clevis pins. The two grips are aligned during set up using supplied alignment fixture and secured with a pre-load in that alignment. Crack growth results are obtained using a COD gauge to measure displacement measuring the opening of the notch during loading. The retaining tab ensures that the clevis pins are safely inserted and remain in place during the test.

Application Range

- Types of loading - Static or fatigue
- Specimen geometries - Compact tension CT 6.5, 12.5 and 25 mm
- Fracture toughness, J-Integral, Crack Growth & R-Curve

COMPACT TENSION FIXTURES FOR FRACTURE MECHANICS

Catalog Number	Capacity	Specimen Thickness		Testing Standards	Notes
		mm	in		
2780-118	±10 kN dynamic, +20 kN static	6.5 and 12.5	-	ASTM E399, ASTM E647, ASTM E813, ASTM E1290, BS 7448	Attachment kits supplied, 8000-090 (x2) and 2501-132 (x1)
2780-119	±50 kN dynamic, +100 kN static	25	-	ASTM E399, ASTM E647, ASTM E813, ASTM E1290, BS 7448	Attachment kits supplied, 8000-090 (x2) and 2501-132 (x1)
2750-084	±55 kN dynamic, +110 kN static	12.7	0.5	-	Suitable for fatigue crack growth and JIC testing of 1T compact tension specimens
2750-083	±55 kN dynamic, +110 kN static	25.4	1.0	-	Suitable for 1T compact tension specimens
2750-088	±160 kN dynamic, +320 kN static	50.8	2.0	-	Suitable for 2T compact tension specimens
2780-120	±250 kN dynamic, +500 kN static	50	-	ASTM E399, ASTME 647, ASTME 813, ASTM E1290, BS 7448	For use with chamber - 1x piston rod extender T75HC-1001 - 1x attachment kit 8000-090

HYDRAULIC WEDGE GRIPS FOR FATIGUE TESTING









Instron® hydraulic wedge action grips may be used in static or dynamic materials testing applications. Interchangeable wedge shape grip faces accommodate either flat or round specimens. The grips maintain a constant gripping force on the specimen regardless of the test forces acting upon it, as long as there is hydraulic pressure to the grips.

Principle of Operation

Each grip functions independently of the other, with an external hydraulic supply providing pressure to both open and close the grips. When gripping pressure is applied, the relative vertical position of the specimen/ jaw faces remains unchanged to prevent specimen load generation during the gripping process. Once the grip faces contact the specimen, the hydraulic pressure produces a vertical force on the grip head. The grip force will remain constant as the design automatically compensates for specimen thickness changes.

Application Range

- Type of loading: Static or dynamic, reverse stress
- Specimen material: Metallics, plastics, composites
- Specimen geometries: Round section (not buttonhead) or flat specimens with or without shoulder tab

Safety Advice

Review safety note on page 236

HYDRAULIC WEDGE GRIPS

	Catalog Number	Capacity			Upper Fitting	Lower Fitting	Accessory Width		Accessory Height		Accessory Weight		Temperature Range		Static or Fatigue Rated
		kN	kgf	lbf			mm	in	mm	in	kg	lb	°C	°F	
1	2742-301	±30	±3,000	±6,800	M30 × 2 RH (Type If)	M30 × 2 RH (Type If)	125	4.92	187	7.36	9	20	+4 to +65	+39 to +150	Fatigue
2	2743-401	±100	±10,000	±22,000	M30 × 2 RH (Type If)	M30 × 2 RH (Type If)	200	7.87	219	8.62	31	68	+4 to +65	+39 to +150	Fatigue
3	2742-501	±250	±25,000	±56,000	M48 × 2 RH (Type IIf)	M48 × 2 RH (Type IIf)	320	12.6	311	12.25	100	220	+4 to +65	+39 to +150	Fatigue
4	2742-601	±500	±50,000	±110,000	M72 × 3 RH (Type IIIf)	M72 × 3 RH (Type IIIf)	400	15.75	360	14.17	255	561	+4 to +65	+39 to +150	Fatigue

HYDRAULIC WEDGE GRIPS FOR FATIGUE TESTING

ITEMS FOR USE WITH 2742-301

Catalog Number	Description
2703-801	Jaw faces for flats (serrated, 0 - 6.3 mm) 25 mm wide
2703-802	Jaw faces for flats (serrated, 6.3 - 12.7 mm) 25 mm wide
2703-803	Jaw faces for rounds (V-serrated, 3.0 -7.8 mm)
2703-804	Jaw faces for rounds (V-serrated, 7.1 - 12.7 mm)

ITEMS FOR USE WITH 2743-401

Catalog Number	Description
2704-521	Jaw faces for flats (flat-serrated, 0 - 7.8 mm) 50 mm wide
2704-522	Jaw faces for flats (flat-serrated, 7.1 - 15.7 mm) 50 mm wide
2704-527	Jaw faces for flats (flat-serrated, 16.5 - 25.2 mm) 50 mm wide. Quantity: 4 faces
2704-529	Jaw faces for flats (flat-serrated, 15 - 21 mm) 50 mm wide. Quantity: 4 faces
2704-525	Jaw faces for flats (carbide-coated, 0 - 7.8 mm) 50 mm wide
2704-526	Jaw faces for flats (carbide-coated, 7.1 - 15.7 mm) 50 mm wide
2704-523	Jaw faces for rounds (V-serrated, 6.1 - 11.9 mm) 50 mm wide
2704-524	Jaw faces for rounds (V-serrated, 9.9 - 16.0 mm)
2704-528	Jaw faces for rounds (V-serrated, 16.0 - 20.0 mm) Quantity: 4 faces
2704-530	Accessory mounting block to provide M30 × 2 RH female thread; set of 2 blocks

ITEMS FOR USE WITH 2742-501

Catalog Number	Description
2703-541	Jaw faces for flats (flat-serrated, 1 - 12 mm) 100 mm wide
2703-542	Jaw faces for flats (flat-serrated, 12 - 22 mm) 100 mm wide
2703-543	Jaw faces for flats (flat-serrated, 21 - 32 mm) 100 mm wide
2703-544	Jaw faces for flats (flat-serrated, 31 - 42 mm) 100 mm wide
2703-545	Jaw faces for rounds (V-serrated, 5 - 10 mm)
2703-546	Jaw faces for rounds (V-serrated, 10 - 16 mm)
2703-547	Jaw faces for rounds (V-serrated, 16 - 22 mm)
2703-548	Jaw faces for rounds (V-serrated, 22 - 28 mm)
2703-549	Jaw faces for rounds (V-serrated, 28 - 34 mm)
2703-572	Jaw faces for flats (carbide-coated, 1 - 12 mm) 100 mm wide
2703-573	Jaw faces for flats (carbide-coated, 11 - 22 mm) 100 mm wide
2703-574	Jaw faces for flats (carbide-coated, 21 - 32 mm) 100 mm wide
2703-575	Jaw faces for flats (carbide-coated, 31 - 42 mm) 100 mm wide

ITEMS FOR USE WITH 2742-601

Catalog Number	Description
2703-641	Jaw faces for flats (flat-serrated, 1 - 13 mm) 100 mm wide
2703-642	Jaw faces for flats (flat-serrated, 13 - 26 mm) 100 mm wide
2703-643	Jaw faces for flats (flat-serrated, 26 - 39 mm) 100 mm wide
2703-644	Jaw faces for flats (flat-serrated, 39 - 52 mm) 100 mm wide
2703-645	Jaw faces for rounds (V-serrated, 5 - 13 mm)
2703-646	Jaw faces for rounds (V-serrated, 13 - 26 mm)
2703-647	Jaw faces for rounds (V-serrated, 26 - 39 mm)
2703-648	Jaw faces for rounds (V-serrated, 39 - 52 mm)
2703-649	Jaw faces for rounds (V-serrated, 52 - 65 mm)
8000-123	Accessory mounting block for use with 250kN hydraulic wedge grips 2742-501. Provides central M48 × 2 RH female thread for mounting fixtures for static or dynamic testing applications. Set of 2 blocks. Requires fatigue rated adaptors
8000-125	Accessory mounting block

MECHANIC WEDGE GRIPS FOR FATIGUE TESTING



1

Instron® mechanical wedge action grips may be used in static or dynamic materials testing applications. Interchangeable wedge shape grip faces accommodate either flat or round specimens. The grip is designed to allow test specimens to be securely gripped without introducing axial pre-loading to the specimen. This is achieved by using jaw faces that move in a horizontal direction relative to the specimen.

Principle of Operation

Each grip is mechanically operated, with gripping force being applied via movement of the grip body relative to the wedge shaped jaw faces. This movement is induced by the tightening of four socket cap screws on the underside of the grip head. Each jaw face is located in the grip body by two extension springs, which allow the jaw faces to release the specimen after testing. The grip body wedge area is fitted with jaw guides, to ensure that the jaw faces remain square to each other and to the specimen.

Application Range

- Type of loading: Static or dynamic, reverse stress
- Specimen material: Metallics, plastics, composites
- Specimen geometries: Round section (not buttonhead) or flat specimens with or without shoulder tab

Safety Advice

Review safety note on page 236

MECHANICAL WEDGE GRIPS

	Catalog Number	Capacity			Upper Fitting	Lower Fitting	Upper Effective Length		Accessory Width		Accessory Height		Accessory Weight		Temperature Range		Static or Fatigue Rated
		kN	kgf	lbf			mm	in	mm	in	mm	in	kg	lb	°C	°F	
1	2743-402	±100	±10,000	±22,500	M30 × 2 RH (Type If)	M30 × 2 RH (Type If)	170	6.9	172	6.77	170	6.9	26	57.3	-70 to +300	-94 to +572	Fatigue

ITEMS FOR USE WITH 2743-402

Catalog Number	Description
2704-521	Jaw faces for flats (flat-serrated, 0 - 7.8 mm) 50 mm wide
2704-522	Jaw faces for flats (flat-serrated, 7.1 - 15.7 mm) 50 mm wide
2704-529	Jaw faces for flats (flat-serrated, 15.0 - 21.0 mm) 50 mm wide. Quantity: 4 faces
2704-527	Jaw faces for flats (flat-serrated, 16.5 - 25.2 mm) 50 mm wide. Quantity: 4 faces
2704-525	Jaw faces for flats (carbide-coated, 0 - 7.8 mm) 50 mm wide
2704-526	Jaw faces for flats (carbide-coated, 7.1 - 15.7 mm) 50 mm wide
2704-523	Jaw faces for rounds (V-serrated, 6.1 - 11.9 mm)
2704-524	Jaw faces for rounds (V-serrated, 9.9 - 16.0 mm)
2704-528	Jaw faces for rounds (V-serrated, 16.0 - 20.0 mm) 50 mm wide. Quantity: 4 faces
2704-530	Accessory mounting block to provide M30 × 2 RH female thread. Set of 2 blocks

GRIPS AND FIXTURES FOR ELECTROPULS™ SYSTEMS



1

Side-entry wedge grips for use with ElectroPuls systems have been designed to combine low mass with excellent gripping performance for a range of static and fatigue tests. Both manually and pneumatically operated wedge-grips are available and a range of jaw faces allows different specimen types and thicknesses to be tested. Pneumatically operated grips require a suitable air-kit and air supply.

Principle of Operation

The wedge action principle of these grips allows them to be tightened onto a specimen without altering the vertical position of the faces in relation to the specimen. This is accomplished by a design that moves the grip body to close the faces. This feature makes it possible to pre-select the exact point at which the specimen is held, with consistent gauge length and minimizing any compressive force which may cause specimen buckling. The jaw faces are preloaded during gripping to allow full reverse-stress dynamic tests to be performed.

Application Range

- Type of loading: Static or dynamic, reverse stress
- Specimen material: Metallics, plastics, composites
- Specimen geometries: Round section (not buttonhead) or flat specimens with or without shoulder tab

ELECTROPULS WEDGE GRIPS

	Catalog Number	Capacity			Type	Upper Fitting	Lower Fitting	Accessory Width		Accessory Height		Accessory Weight		Temperature Range		Static or Fatigue Rated
		kN	kgf	lbf				mm	in	mm	in	kg	lb	°C	°F	
1	2742-102	±1	±100	±225	Manual	M6 × 1 RHf	M6 × 1 RHf	56	2.2	106	4.2	0.26	0.57	-30 to +50	-22 to +212	Fatigue
	2742-103	±1	±100	±225	Pneumatic	M6 × 1 RHf	M6 × 1 RHf	73	2.9	135	5.3	0.7	1.54	+10 to +50	+50 to +122	Fatigue
	2742-205	±3	±300	±675	Pneumatic	3 × M6 or 3 × M8 on 75mm PCD	3 × M6 or 3 × M8 on 75mm PCD	120	4.7	200	7.9	1.9	4.2	+10 to +40	+50 to +104	Fatigue
	2742-206	± 3 kN ± 25 Nm	± 300 kgf ± 2.5 kgm	± 675 lbf ± 220 in-lb	Mechanical	3 × M6 or 3 × M8 on 75mm PCD	3 × M6 or 3 × M8 on 75mm PCD	124	4.9	158	6.2	3.5	7.72	-70 to +350	-112 to +662	Fatigue
	2742-306	± 10 kN ± 100 Nm	± 100 kgf ± 10 kgm	± 2250 lbf ± 880 in-lb	Mechanical	Flange Mount (6 × M8 on 75mm PCD)	Flange Mount (6 × M8 on 75mm PCD)	136	5.4	120	4.67	5	11.02	-70 to +350	-94 to +662	Fatigue
	2742-315	± 10 kN ± 100 Nm	± 100 kgf ± 10 kgm	± 2250 lbf ± 880 in-lb	Pneumatic	Flange Mount (6 × M8 on 75mm PCD)	Flange Mount (6 × M8 on 75mm PCD)	210	8.26	230	9.05	10.5	23.14	+10 to +50	+50 to +122	Fatigue

GRIPS AND FIXTURES FOR ELECTROPULS™ SYSTEMS



2742-103



2742-206



2742-306



2742-315

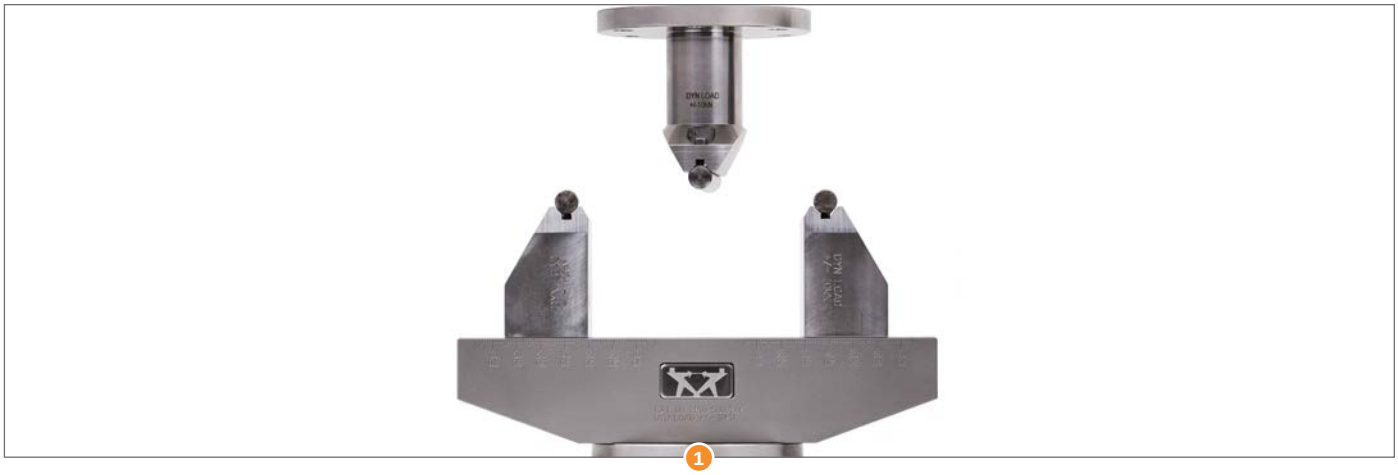
ITEMS FOR USE WITH 2742-102/-103

Catalog Number	Description
2703-901	Jaw faces for flats (serrated, 0 - 6.35mm)
2703-902	Jaw faces for rounds (V-serrated, 3.0 - 7.8 mm)
2718-013	Pneumatic Air Control Kit for E1000/E3000

ITEMS FOR USE WITH 2742-205/-206/-306/-315

Catalog Number	Description
2703-801	Jaw faces for flats (serrated, 0 - 6.3 mm)
2703-802	Jaw faces for flats (serrated, 6.3 - 12.7 mm)
2703-803	Jaw faces for rounds (V-serrated, 3.0 - 7.8 mm)
2703-804	Jaw faces for rounds (V-serrated, 7.1 - 12.7 mm)
2703-807	Jaw faces for rounds (V-serrated, 12.4 - 18.0 mm)
2718-013	High Pressure Pneumatic Air Control Kit for E10000

GRIPS AND FIXTURES FOR ELECTROPULS™ SYSTEMS



3 POINT BEND FIXTURE

Catalog Number	Capacity			Specimen Width		Anvil Diameter	Upper Fitting	Lower Fitting	Accessory Width		Accessory Height		Support Span		Temperature Range		Static or Fatigue Rated
	kN	kgf	lbf	mm	in	mm			mm	in	mm	in	mm	in	°C	°F	
1 2810-500	±10	±1000	±2248	50	2	10	3 × M6 or 3 × M8 on 75 PCD	3 × M6 or 3 × M8 on 75 PCD	234	9.2	224	8.84	10 - 194	0.4 - 7.6	-70 to +350	-112 to +662	Fatigue
2810-600	±3	±306	±675	20	0.78	2	M6 Male Thread	4 × M6	130	5.11	67	2.63	15-80	0.59 - 3.15	-70 to +350	-112 to +662	Fatigue

Notes:
1. Requires: fatigue rated adaptors

4-POINT CONVERSION KIT

Catalog Number	Description
2810-505	Converts 2810-500 from 3 point bend fixture to 4 point. Supplied with 10 mm diameter anvils.
2810-600	Converts 2810-600 from 3 point bend fixture to 4 point.

GRIPS AND FIXTURES FOR ELECTROPULS™ SYSTEMS

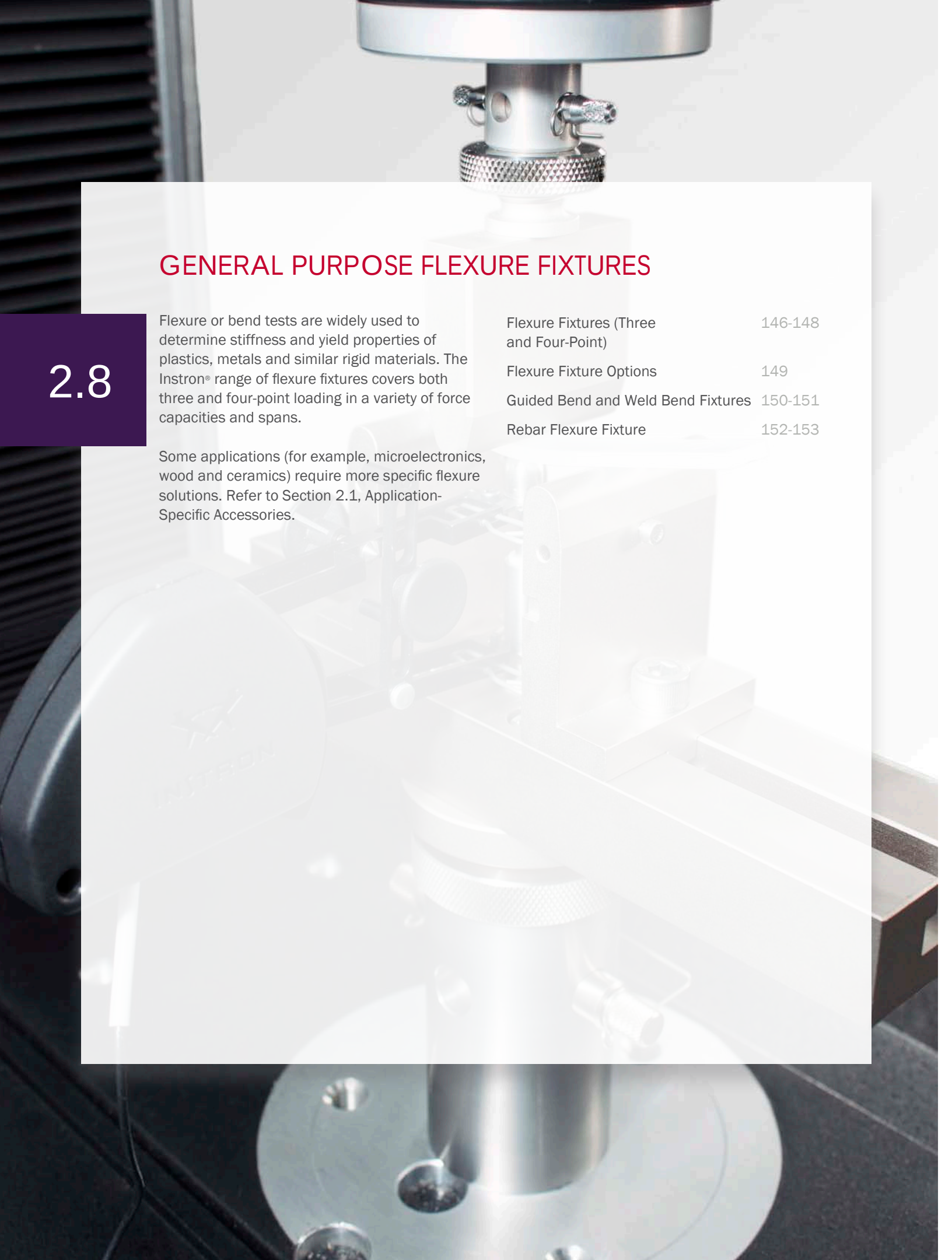


1

COMPRESSION PLATENS WITH LVDT MOUNT

	Catalog Number	Capacity			Mechanical Fitting	Effective Length		Accessory Diameter	
		kN	kgf	lbf		mm	in	mm	in
1	2840-030	±10	±1020	±2248	3 × M6 or 3 × M8 on 75 PCD	135	5.3	100	3.94
	2840-117	±3	±306	675	M6 × 1 RH Female	30.5	1.20	51	2

Notes:
1. 2840-030 Requires: LVDT mounting kit (2601-071) and LVDT



GENERAL PURPOSE FLEXURE FIXTURES

2.8

Flexure or bend tests are widely used to determine stiffness and yield properties of plastics, metals and similar rigid materials. The Instron® range of flexure fixtures covers both three and four-point loading in a variety of force capacities and spans.

Some applications (for example, microelectronics, wood and ceramics) require more specific flexure solutions. Refer to Section 2.1, Application-Specific Accessories.

Flexure Fixtures (Three and Four-Point)	146-148
Flexure Fixture Options	149
Guided Bend and Weld Bend Fixtures	150-151
Rebar Flexure Fixture	152-153

THREE AND FOUR POINT FLEXURE FIXTURES



2810-400

The flexure fixture allows a variety of flexural and fracture toughness bond tests to be performed, including determination of flexural modulus, flexural strength, and flexural yield strength. Easy to install, the three-point fixture can be modified with an optional conversion kit to provide a four-point bending conversion. Lower anvils are adjustable to accommodate specimens of different spans. Deflection of the specimen can be measured either through crosshead displacement, or for more precise measurement, using the mid-span direct measurement deflectometer plunger with a clip-on extensometer.

Principle of Operation

The specimen is supported on two precision machined (free to rotate or stationary) anvils of a defined radius. The force is applied either centrally (three-point) or at a defined distance either side of the center (four-point). The support beam is graduated lengthwise in metric units for accurate positioning of the anvils, equally spaced to the center line. This feature also applies to the four-point loading beam and anvils.

Application Range

- Type of loading: Static flexure, cyclic flexure tests
- Specimen material: Plastics, metals, alloys, composites, ceramics, and other materials
- Specimen shapes: Strip, bar, components

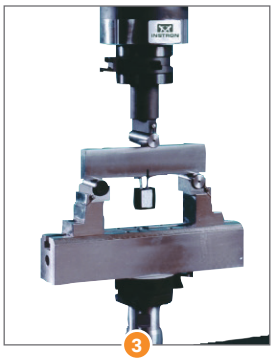
Safety Advice

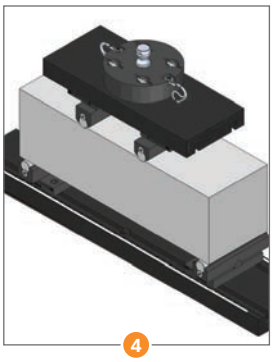
Review safety note on page 236

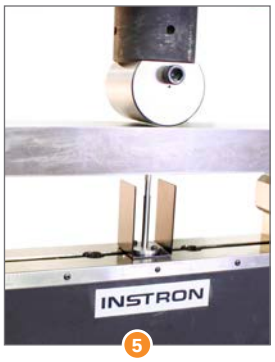
THREE AND FOUR POINT FLEXURE FIXTURES











FLEXURE FIXTURES

	Catalog Number	Capacity			Specimen Width		Support Span		Upper Fitting	Lower Fitting	Accessory Width		Accessory Height		Temperature Range		Anvil Diameter	Static or Fatigue Rated
		kN	kgf	lbf	mm	in	mm	in			mm	in	mm	in	°C	°F	mm	
1	2810-400	5	500	1,125	50	2	10 - 200	0.39 - 7.87	6 mm clevis pin (Type Om)	½ in clevis pin (Type Dm)	234	9.2	224	8.84	-100 to +350	-148 to +660	Loading: 10 mm Support: 4 or 10 mm	Static
2	2810-182	100	10,000	22,500	0 - 50	0 - 2	10 - 250	0.39 - 10	M30 × 2 RH (Type If)	M30 × 2 RH (Type If)	352	14	270	10.54	-100 to +350	-148 to +660	10	Static
3	2810-181	100	10,000	22,500	0 - 50	0 - 2	10 - 250	0.39 - 10	M30 × 2 RH (Type If)	M30 × 2 RH (Type If)	352	14	270	10.54	-100 to +350	-148 to +660	25	Fatigue
4	W-6814-A1	200	20,000	45,000	0 - 200	0 - 8	Upper: 76.2 - 420 Lower: 76.2 - 920	Upper: 3 - 16.6 Lower: 3 - 36.6	1.0 or 1.5 in holding button	Direct	200	7.89	1,500	56.09	+10 to +50	+50 to +122	76.2	Static
	W-6814-A2	200	20,000	45,000	0 - 300	0 - 12	Upper: 76.2 - 420 Lower: 76.2 - 920	Upper: 3 - 16.6 Lower: 3 - 36.6	1.0 or 1.5 in holding button	Direct	200	7.89	1,500	56.09	+10 to +50	+50 to +122	76.2	Static
	W-6814-A3	222	22,200	50,000	0 - 200	0 - 8	Upper: 50.8 - 445 Lower: 50.8 - 945	Upper: 2 - 17.6 Lower: 2 - 37.3	1.0 or 1.5 in holding button	Direct	200	7.88	1,500	56.09	+10 to +50	+50 to +122	31.8	Static
	W-6814-A4	222	22,200	50,000	0 - 300	0 - 12	Upper: 50.8 - 445 Lower: 50.8 - 945	Upper: 2 - 17.6 Lower: 2 - 37.3	1.0 or 1.5 in holding button	Direct	200	7.88	1,500	56.09	+10 to +50	+50 to +122	31.8	Static
5	2810-200	250	25,000	56,250	0 - 100	0 - 4	100 - 600	3.94 - 23.6	M48 × 2 RH (Type IIf)	M48 × 2 RH (Type IIf)	900	35.43	480	18.9	+10 to +40	+50 to +100	Loading: 100 mm Support: 50 mm	Fatigue
	2810-206	250	25,000	56,250	0 - 100	0 - 4	100 - 600	3.94 - 23.6	M48 × 2 RH (Type IIf)	M48 × 2 RH (Type IIf)	900	35.43	480	18.9	-100 to +350	-148 to +660	Loading: 100 mm Support: 50 mm	Static
	2810-250	500	50,000	112,500	0 - 150	0 - 6	100 - 1000	3.94 - 39.4	M72 × 3 RH (Type IIAf)	M72 × 3 RH (Type IIAf)	1300	51.18	700	27.56	+10 to +40	+50 to +100	Loading: 100 mm Support: 50 mm	Fatigue

THREE AND FOUR POINT FLEXURE FIXTURES

ITEMS FOR USE WITH 2810-181, 2810-182

Catalog Number	Description
2810-184	Three to four-point conversion kit for 2810-181, 2810-182
2810-187	Upper roller, 5 mm for 2810-181, 2810-182, 2810-183, 2810-184
2810-186	Upper roller, 10 mm for 2810-181, 2810-182, 2810-183, 2810-184
2810-185	Upper roller, 25 mm for 2810-181, 2810-182, 2810-183, 2810-184
2810-190	Lower roller and support set, 5 mm for 2810-181, 2810-182, 2810-183
2810-189	Lower roller and support set, 10 mm for 2810-181, 2810-182, 2810-183
2810-188	Lower roller and support set, 25 mm for 2810-181, 2810-182, 2810-183

ITEMS FOR USE WITH 2810-200, 2810-206

Catalog Number	Description
2810-201	Three to four-point conversion kit for 2810-206
2810-203	Upper roller anvil, 25 mm for 2810-206
2810-202	Upper roller anvil, 50 mm for 2810-206
2810-204	Lower roller anvil, 25 mm for 2810-206

ITEMS FOR USE WITH 2810-400

Catalog Number	Description
2810-401	Anvil set, 4 mm for 2810-400, 405
2810-402	Anvil set, 10 mm for 2810-400, 405
2810-403	Deflectometer for 2810-400
2810-405	Three to four-point conversion kit for 2810-400
2810-406	Adapters to attach 2665-750 AutoX750 extensometer arms to deflectometer 2810-403

ITEMS FOR USE WITH W-6814-A1,A2,A3, A4

Catalog Number	Description
W-6814	T-Slot Bases, Upper and Lower for Flexure Fixture Supports

FLEXURE FIXTURE OPTIONS



Optional Rollers for Flexure Fixtures

A range of different anvils and roller sizes are available to suit different testing requirements. Four-point conversion kits are available for most standard three-point fixtures.

FLEXURE FIXTURE OPTIONS

Catalog Number	Description	Accessory Diameter	
		mm	in
2810-401	Anvil set, 4 mm for 2810-400, 2810-405	4	-
2810-402	Anvil set, 10 mm for 2810-400, 2810-4 05	10	-
2810-187	Upper roller, 5 mm for 2810-181, 2810-182, 2810-183, 2810-184	5	-
2810-186	Upper roller, 10 mm for 2810-181, 2810-182, 2810-183, 2810-184	10	-
2810-185	Upper roller, 25 mm for 2810-181, 2810-182, 2810-183, 2810-184	25	-
2810-203	Upper roller anvil, 25 mm for 2810-206	25	-
2810-205	Upper roller anvil, 25 mm for 2810-206	25	-
2810-202	Upper roller anvil, 50 mm for 2810-206	50	-
2810-190	Lower roller and support set, 5 mm for 2810-181, 2810-182, 2810-183, 2810-184	5	-
2810-189	Lower roller and support set, 10 mm for 2810-181, 2810-182, 2810-183, 2810-184	10	-
2810-188	Lower roller and support set, 25 mm (0.97 in) diameter (includes two rollers)	25	-
2810-204	Lower roller anvil, 25 mm for 2810-206	25	-

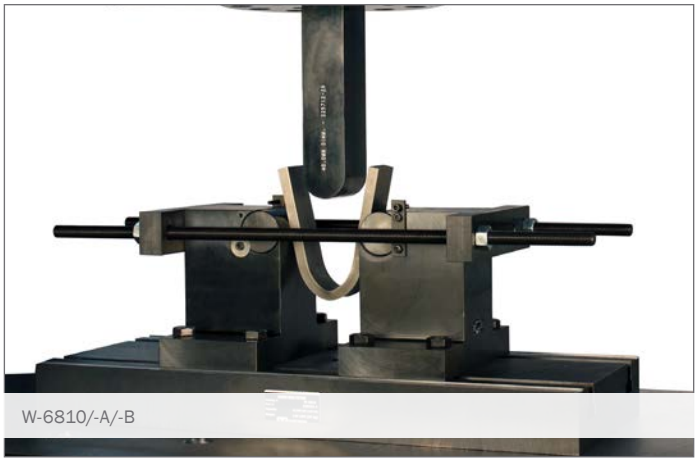
THREE TO FOUR-POINT CONVERSION KITS

Catalog Number	Description	Accessory Diameter		Notes
		mm	in	
2810-405	Three to four-point conversion kit for 2810-400	10	0.39	Span: 10 - 97 mm (0.39 - 3.82 in)
2810-184	Three to four-point conversion kit for 2810-181, 2810-182	25	-	Span: 25 - 90 mm (0.98 - 3.54 in)
2810-201	Three to four-point conversion kit for 2810-206	50	-	Span: 50 - 200 mm (1.97 - 7.9 in)

ITEMS FOR USE WITH W-9178-A

Catalog Number	Description	Accessory Diameter		Notes
		mm	in	
W-9178-C	Conversion parts for W-9178-A, four-point loading	12.7	0.5	Span: 2.67 in
W-9178-B	Conversion parts for W-9178-A, thicker specimens	25.4	1	Span: 4 - 8 in

GUIDED BEND AND WELD BEND FIXTURES



W-6810/-A/-B

Two types of bend fixtures are available for evaluating the ductility of plate specimens and welded ferrous and non-ferrous materials. The main difference between the two fixtures is in the base: the guided bend test fixture has a fixed span base, while the weld bend test fixture has an adjustable span base.

Both fixtures use plungers or loading struts with a fixed diameter nose for testing a particular specimen thickness. The plungers are attached to the adjustable crosshead using the grip bumper plate or a threaded adapter.

The base is equipped with a dowel hole in the center so that it can be doweled to the compression table and kept from sliding during a test. This also will maintain the alignment of the plunger in relation to the base so that the force is applied in the center of the span.

The hardened rollers in the base are captured, but free to rotate to allow the specimen to slide as the plunger moves between the rollers. The depth of the base will typically allow up to a full 180° bend in the specimen.

Principle of Operation

The bending force is applied as the specimen is forced against the plunger, either as the base is raised with the table or as the crosshead moves down depending on the frame being used. The plunger forces the specimen into a 180° bend against the rollers on the base.

On the weld bend test fixture, one half of the base can be adjusted to one of four different positions to allow for testing different thickness specimens. A separate plunger or strut is required for each thickness specimen. Several struts are available depending on the fixture.

Guided bend fixtures have a fixed span base and a single diameter loading strut or plunger to form a complete assembly. Specimen loading is performed the same as with the weld bend fixture, though a separate assembly must be purchased for each specimen thickness.

Application Range

- Type of loading: Compression bend
- Specimen material: Wrought or cast steel, non-ferrous materials
- Specimen types: Flat, flat welded

Safety Advice

Review safety note on page 236

GUIDED BEND AND WELD BEND FIXTURES



1



1



2

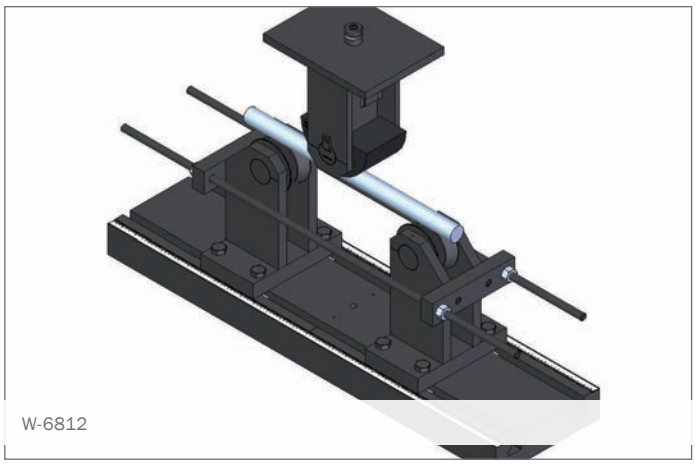
GUIDED BEND / WELD BEND TEST FIXTURE

	Catalog Number	Capacity			Support Span		Specimen Width		Standard Specimen Thickness		Anvil Diameter		Upper Fitting	Lower Fitting
		kN	kgf	lbf	mm	in	mm	in	mm	in	mm	in		
1	W-6810	100	10,000	22,500	254	10.0	76	3	Up to 12	Up to 42	38.1	1.5	1.0 in Holding Button (Type R1)	1.0 in Holding Button (Type R1)

ITEMS FOR USE WITH W-6810

	Catalog Number	Description
1	W-6810-A	4 loading noses for guided bend fixture (W-6180); 0.5, 1.0, 1.5 and 2.0 in diameter
2	W-6810-B	7 loading noses for guided bend fixture (W-6180); 12, 16, 20, 24, 32, 40 and 48 mm diameters

REBAR FLEXURE FIXTURES



W-6812

Cold Bend Testing Fixture for bend testing of steel reinforcement bars in general accordance with the following specifications: ASTM A615, A706, A996A and BS4449.

Principle of Operation

A heavy duty table mounted base fixture with an adjustable span is designed for performing the nominal 90/180° bend tests on #3 through #18 (M8-M50) rebar, when used with the appropriate loading pins. A loading strut, capable of accepting various diameter bending pins, is provided and must be adapted to the adjustable crosshead.

Application Range

- Type of loading: Compression cold bend
- Specimen material: Steel
- Specimen types: Round, rebar

Safety Advice

Review safety note on page 236

REBAR FLEXURE FIXTURES



FLEXURE FIXTURES FOR REINFORCEMENT BARS (REBAR)

	Catalog Number	Capacity[1]			Maximum Support Span (between rollers)		Specimen Width		Upper Fitting
		kN	kgf	lbf	mm	in	mm	in	
1	W-6812	200	20,000	45,000	480	19	76	3	Type R1 (1.0 in holding button)

Notes: 1. Rated capacity when installed fully supported

ITEMS FOR USE WITH W-6812 BENDING PINS

Catalog Number	Description	Specifications
W-6812-A1	Bending Pins, Set of 6 for #3, #4, #5, #6, #7, #8 Rebar	ASTM A615, A996
W-6812-A2	Bending Pins, Set of 3 for #9, #10, #11 Rebar	ASTM A615, A996
W-6812-A3	Bending Pin for #14 Rebar	ASTM A615, A996
W-6812-A4	Bending Pin for #18 Rebar	ASTM A615, A996
W-6812-B1	Bending Pins, Set of 6 for #3, #4, #5, #6, #7, #8 Rebar	ASTM A706
W-6812-B2	Bending Pins, Set of 3 for #9, #10, #11 Rebar	ASTM A706
W-6812-B3	Bending Pin for #14 Rebar	ASTM A706
W-6812-B4	Bending Pin for #18 Rebar	ASTM A706
W-6812-C1	Bending Pins, Set of 6 for 8 mm, 10 mm, 12 mm, 16 mm, 20 mm, 25 mm Rebar	BS 4449 Grade 250
W-6812-C3	Bending Pins, Set of 6 for 8 mm, 10 mm, 12 mm, 16 mm, 20 mm, 25 mm Rebar	BS 4449 Grade 250
W-6812-C2	Bending Pins, Set of 3 for 32 mm, 40 mm, 50 mm Rebar	BS 4449 Grade 250
W-6812-C4	Bending Pins, Set of 3 for 32 mm, 40 mm, 50 mm Rebar	BS 4449 Grade 250



GENERAL PURPOSE STATIC TENSION GRIPS

2.9

Instron® provides a variety of general-purpose static tension grips suitable for a wide range of materials and specimen types. From simple screw action grips through to hydraulic wedge grips, the choice is extensive. Many different types of jaw faces are available to provide reliable and consistent gripping.

Some applications require more specific gripping solutions. Refer to Section 2.1, Application-Specific Accessories and Section 3, Custom Products.

Hydraulic Side Action Grips	156-158
Mechanical Wedge Action Grips	159-162
Precision Mechanical Wedge Grips	163-164
Mechanical Wedge Action T Grips	165-166
Stand Alone Hydraulic Power Supply for Hydraulic Grips	167
Pneumatic Side Action Grips	168-170
Optional Accessories for 2712-04x and -05x	171
High Temperature Pneumatic Side Action Grips	172
Pneumatic Side Action Grip Accessories	173
Pneumatic Wedge Action Grips	174-175
Pneumatic Wedge Action Grips Accessories	176-177
Hydraulic Wedge Action Grips	178-179
Screw Action Grips	180-182
Self Tightening Thin Film	183-184
Threaded-end and Buttonhead Specimens	185-188



HYDRAULIC SIDE ACTION GRIPS



W-5450

Instron® hydraulic side-acting grips provide an innovative solution for high-capacity testing and deliver enhanced gripping performance, usability, and operator safety over traditional grip designs. These advanced grips maintain a constant clamping force on the specimen that acts perpendicular to the direction of testing and is independent of tensile loading.

Principle of Operation

Instron's dual side-acting grips incorporate our latest DuraSync™ technology. This self-centering mechanical synchronizer (patent pending) provides many improvements over hydraulic or mechanical rack and pinion designs commonly found in the marketplace.

- Side-load dampening reduces the risk of grip damage when testing slightly bent or irregularly shaped specimens such as rebar or wire rod
- Opposing jaw faces repeatedly self-center during specimen clamping reducing testing time and eliminating the need to resynchronize the grip faces between tests
- The synchronizer is located outside the gripping pocket preventing mechanical failure due to contamination

Application Range

- Tensile tests on a wide range of materials including: steel rod and plate, machined rounds and flats, reinforcement bar
- 3- and 7-wire strand, conveyor belt, and wood products
- Tension-tension cyclic tests
- Compression testing using optional secondary load string adapter
- Low-frequency, thru-zero cyclic testing with thru-zero support option

Notes:
1. For static electromechanical systems, a low-pressure, standalone pump is required.

Safety Advice

Review safety note on page 236

HYDRAULIC SIDE ACTION GRIPS



1

DURASYNC™ DUAL SIDE ACTING HYDRAULIC GRIPS

Catalog Number	Capacity			Specimen Parameters (Tension)						Upper and Lower Fittings for Static Hydraulic Systems	Upper and Lower Fittings for Static Electromechanical Systems		Weight (Per Grip)	
				Rounds		Flats		Cable						
	kN	kgf	lbf	mm	in	mm	in	mm	in				lb	kg
W-5450	250	25,000	56,200	3 - 60	0.12 - 2.36	0 - 60 × 80	2.36 × 3.15	-	-	Type IIA (M72 × 3P RHf)	Type II (M48 × 2 LH) Type I (M30 × 2 LH) Type D (1.25" connection with 1/2" clevis pin)	Standard	365	165
W-5420	600	60,000	135,000	3 - 60	0.12 - 0.36	0 - 100 × 110	3.94 × 4.33	5 - 25	0.19 - 1	Type IIA (M72 × 3P RHf) or Bolt Flange	-	Premium[1]	1020	476
W-5460	1,000	100,000	225,000	3 - 85	0.12 - 3.35	0 - 120 × 140	4.72 × 5.512	5 - 25	0.19 - 1	Bolt Flange	-	Premium[1]	1845	837
1 W-5430	1,500	150,000	337,000	3 - 85	0.12 - 3.35	0 - 120 × 140	4.72 × 5.512	5 - 25	0.19 - 1	Bolt Flange	-	Premium[1]	2850	1295
W-5440	2,000	200,000	450,000	3 - 100	0.12 - 3.94	0 - 120 × 182	4.72 × 7.17	5 - 25	0.19 - 1	Bolt Flange	-	Premium[1]	4380	1985

Notes:
1. Premium have option availabe for thru-zero and suitable for wire strand testing.

SINGLE SIDE ACTING HYDRAULIC GRIPS

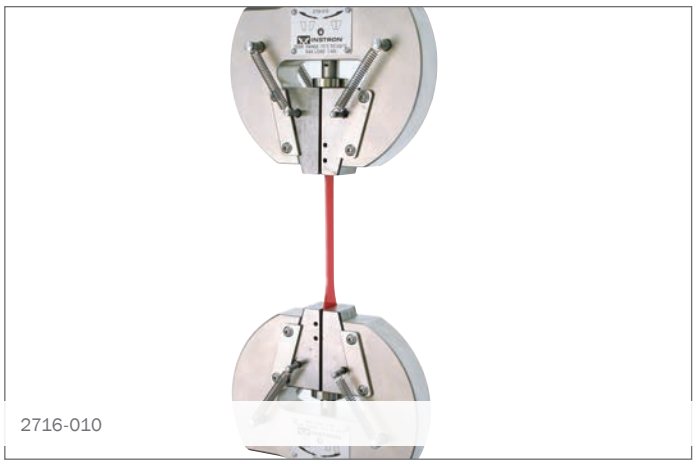
Catalog Number	Capacity			Specimen Parameters (Tension)						Upper and Lower Fittings for Static Hydraulic Systems	Upper and Lower Fittings for Static Electromechanical Systems		Weight (Per Grip)	
				Rounds		Flats		Cable						
	kN	kgf	lbf	mm	in	mm	in	mm	in				lb	kg
W-5400	600	60,000	135,000	3 - 57	0.12 - 2.24	0 - 75 × 127	2.95 × 5.0	5 - 15.7	0.19 - 0.63	Type IIAfRH (M72 × 3)	-	Standard	975	440

ITEMS FOR USE WITH W-54XX DURASYNC™ GRIPS

Catalog Number	Description
W-5403	Quick Change Wire Strand Insert Holders for 600 kN Hydraulic Single Side Acting Grips (W-5400)
W-5421	Quick Change Wire Strand Insert Holders for 600 kN Hydraulic Dual Side Acting Grips (W-5410 & W-5420)
W-5438	Quick Change Wire Strand Insert Holders for 1500 kN Hydraulic Dual Side Acting Grips (W-5430)
W-5448	Quick Change Wire Strand Insert Holders for 2000 kN Hydraulic Dual Side Acting Grips (W-5440)
W-5454	Specimen Alignment Kit for 250 kN Hydraulic Dual Side Acting Grips (W-5450)
W-5414	Specimen Alignment Kit for 600 kN Hydraulic Dual Side Acting Grips (W-5410 & W-5420)
W-5434	Specimen Alignment Kit for 1500 kN Hydraulic Dual Side Acting Grips (W-5430)
W-5444	Specimen Alignment Kit for 2000 kN Hydraulic Dual Side Acting Grips (W-5440)

Notes:
1. See page 212 for a full list of available jaw faces for W-54xx DuraSync grips

MECHANICAL WEDGE ACTION GRIPS



2716-010

The manual wedge action grip is designed for easy specimen loading, alignment and positioning. After initial face-to-specimen contact, gripping force will increase as the testing load increases. Virtually no pre-load is seen during specimen clamping due to the Instron® design of moving grip bodies. This makes them particularly suitable for testing high-strength materials, such as metals and composites, ensuring that specimen slippage is eliminated.

Principle of Operation

The wedge action principle of these grips allows them to be tightened onto a specimen without altering the vertical position of the faces in relation to the specimen. This is accomplished by a design that moves the grip body to close the faces. This feature makes it possible to pre-select the exact point at which the specimen will be held, with consistent gauge length and no compressive force applied which may cause specimen buckling.

A strong clamping force can be applied to materials that are difficult to hold through a high mechanical advantage achieved by the tightening mechanism. The grip faces are spring-loaded against a shoe that is in a fixed position in respect to the testing frame holding mechanism. Only a light initial gripping force needs to be applied to the specimen. As the grip is tightened, it's frame is drawn up, and the inclined sides push against the matching side of the faces which move laterally against the specimen. A shoe incorporated to the driving shaft prevents the faces from moving. The open front design of the grip frames allows faces to be easily interchanged as well as easy specimen loading.

Because the faces are held in a fixed position, there is no recoil or loosening when the specimen ruptures, and if an extensometer is attached, it will remain in place.

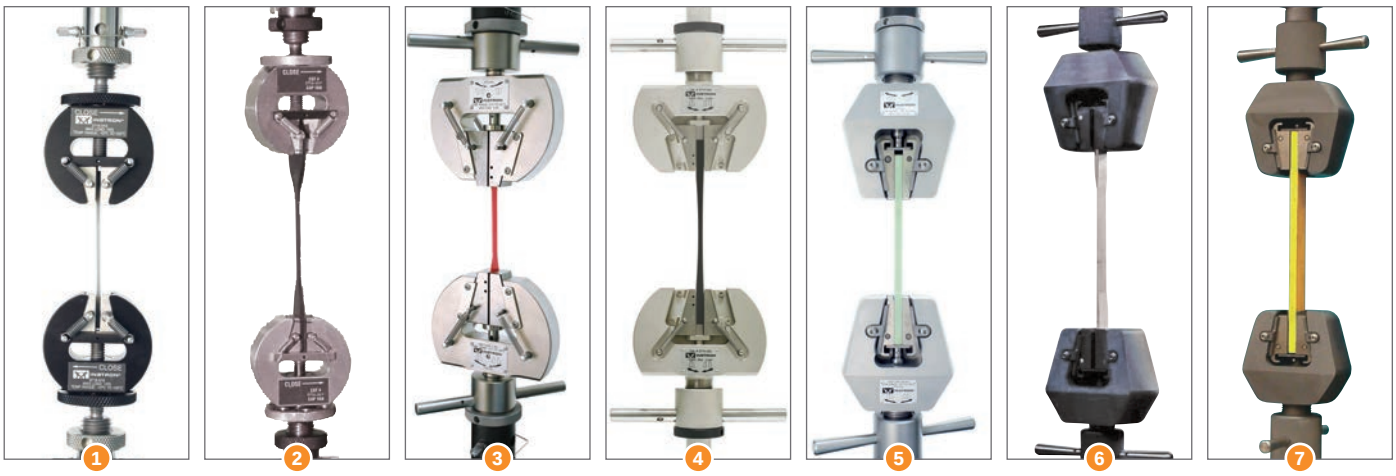
Application Range

- Type of loading: Tensile, static and tension cyclic tests. Not suitable for high-cycle fatigue test
- Specimen material: Wires, plastics, metals, elastomers
- Specimen types: Flat, round

Safety Advice

Review safety note on page 236

MECHANICAL WEDGE ACTION GRIPS



MECHANICAL WEDGE ACTION GRIPS

	Catalog Number	Capacity			Upper Fitting	Lower Fitting	Upper Effective Length		Accessory Weight		Temperature Range		Notes
		kN	kgf	lbf			mm	in	kg	lb	°C	°F	
1	2716-016	1	100	225	6 mm Clevis Pin (Type Om)	6 mm Clevis Pin (Type Om)	87	3.4	0.2	0.4	-10 to +100	+14 to +212	Uses 19 mm (0.75 in) wide faces
2	2716-017	2	200	450	6 mm Clevis Pin (Type Om)	6 mm Clevis Pin (Type Om)	87	3.4	0.365	0.8	-10 to +100	+14 to +212	Uses 19 mm (0.75 in) wide faces
3	2716-010	5	500	1,125	0.5 in Clevis Pin (Type Dm)	0.5 in Clevis Pin (Type Dm)	191	7.5	3.25	7	-150 to +250	-240 to +480	Uses 25 mm (1 in) wide faces
4	2716-015	30	3,000	6,750	0.5 in Clevis Pin (Type Dm)	0.5 in Clevis Pin (Type Dm)	203	8	5.25	12	73 to +250	-100 to +480	Uses 25 mm (1 in) wide faces
	2716-020	50	5,000	11,250	0.5 in Clevis Pin (Type Dm)	0.5 in Clevis Pin (Type Dm)	209	8.2	5.25	11.6	73 to +250	-100 to +480	Uses 25 mm (1 in) wide faces
5	2716-002	100	10,000	22,500	0.5 in Clevis Pin (Type Dm)	0.5 in Clevis Pin (Type Dm)	230	9	10	20	73 to +250	-100 to +480	Uses 25 mm (1 in) wide faces
6	2716-003	100	10,000	22,500	0.5 in Clevis Pin (Type Dm)	0.5 in Clevis Pin (Type Dm)	250	9.8	14	30	73 to +250	-100 to +480	Uses 50 mm (2 in) wide faces
7	2716-008	150	15,000	33,750	M48 × 2 mLH (Type IIm)	M48 × 2 mLH (Type IIm)	250	9.8	15.4	34	73 to +250	-100 to +480	Uses 50 mm (2 in) wide faces

MECHANICAL WEDGE ACTION GRIPS

ITEMS FOR USE WITH 2716-016, 2716-017

Catalog Number	Description
2703-171	Jaw faces for flats (fine-serrated, 0 - 6.4 mm)

ITEMS FOR USE WITH 2716-010, 2716-015, 2716-020

Catalog Number	Description
2716-011	Specimen centering device
2703-151	Jaw faces for flats (coarse-serrated, 0 - 6.4 mm)
2703-152	Jaw faces for flats (coarse-serrated, 6.4 - 12.6 mm)
2703-155	Jaw faces for flats (fine-serrated, 0 - 6.4 mm)
2703-156	Jaw faces for flats (fine-serrated, 6.4 - 12.6 mm)
2703-160	Jaw faces for flats (rubber-coated, 0 - 6.4 mm)
2703-157	Jaw faces for flats (SurfAlloy®-coated, 0 - 6.4 mm)
2703-158	Jaw faces for flats (SurfAlloy-coated, 6.4 - 12.6 mm)
2703-153	Jaw faces for rounds (fine V-serrated, 3.2 - 7.8 mm)
2703-154	Jaw faces for rounds (fine V-serrated, 7.1 - 12.5 mm)

ITEMS FOR USE WITH 2716-002

Catalog Number	Description
2703-001	Jaw faces for flats (coarse-serrated, 0 - 6.4 mm)
2703-002	Jaw faces for flats (coarse-serrated, 6.4 - 12.6 mm)
2703-006	Jaw faces for flats (fine-serrated, 0 - 6.4 mm)
2703-007	Jaw faces for flats (fine-serrated, 6.4 - 12.6 mm)
2703-070	Jaw faces for rounds (coarse-threaded, 12 - 16 mm)
2703-071	Jaw faces for rounds (coarse-threaded, 16 - 19 mm)
2703-004	Jaw faces for rounds (coarse V-serrated, 7 - 12.7 mm)
2703-008	Jaw faces for rounds (fine V-serrated, 3.5 - 8 mm)
2703-009	Jaw faces for rounds (fine V-serrated, 7 - 12.7 mm)
2703-010	Jaw faces for rounds (fine V-serrated, 12.7 - 19 mm)

ITEMS FOR USE WITH 2716-003, 2716-008

Catalog Number	Description
2703-011	Jaw faces for flats (coarse-serrated, 0 - 6.4 mm)
2703-012	Jaw faces for flats (coarse-serrated, 6.4 - 12.6 mm)
2703-072	Jaw faces for rounds (coarse-serrated, 12 - 16 mm)
2703-073	Jaw faces for rounds (coarse-serrated, 16 - 19 mm)
2703-013	Jaw faces for rounds (fine V-serrated, 3.5 - 8 mm)
2703-014	Jaw faces for rounds (fine V-serrated, 7 - 12.7 mm)
2703-015	Jaw faces for rounds (fine V-serrated, 12.7 - 19 mm)

MECHANICAL WEDGE ACTION GRIPS

MECHANICAL WEDGE ACTION, HIGH-TEMPERATURE

	Catalog Number	Capacity			Upper Fitting	Lower Fitting	Upper Effective Length		Accessory Weight		Temperature Range		Notes
		kN	kgf	lbf			mm	in	kg	lb	°C	°F	
1	2736-004	100	10000	22500	0.5 in Clevis Pin (Type Dm)	0.5 in Clevis Pin (Type Dm)	230	9	9	20	-73 to +315	-100 to +600	Uses 25mm (1in) wide faces
1	2736-005	100	10000	22500	0.5 in Clevis Pin (Type Dm)	0.5 in Clevis Pin (Type Dm)	230	9	13.6	30	-73 to +315	-100 to +600	Uses 50 mm (2 in) wide faces
2	2736-015	30	3,000	6,750	0.5 in Clevis Pin (Type Dm)	0.5 in Clevis Pin (Type Dm)	203 (Lower: 191)	8 (Lower: 7.5)	5.9	13	-73 to +350	-100 to +660	Requires faces

ITEMS FOR USE WITH 2736-002, 2736-004

Catalog Number	Description
2703-001	Jaw faces for flats (coarse-serrated, 0 - 6.4 mm)
2703-002	Jaw faces for flats (coarse-serrated, 6.4 - 12.6 mm)
2703-006	Jaw faces for flats (fine-serrated, 0 - 6.4 mm)
2703-007	Jaw faces for flats (fine-serrated, 6.4 - 12.6 mm)
2703-070	Jaw faces for rounds (coarse-threaded, 12 - 16 mm)
2703-071	Jaw faces for rounds (coarse-threaded, 16 - 19 mm)
2703-004	Jaw faces for rounds (coarse V-serrated, 7 - 12.7 mm)
2703-008	Jaw faces for rounds (fine V-serrated, 3.5 - 8 mm)
2703-009	Jaw faces for rounds (fine V-serrated, 7 - 12.7 mm)
2703-010	Jaw faces for rounds (fine V-serrated, 12.7 - 19 mm)

ITEMS FOR USE WITH 2736-003, 2736-005

Catalog Number	Description
2703-011	Jaw faces for flats (coarse-serrated, 0 - 6.4 mm)
2703-012	Jaw faces for flats (coarse-serrated, 6.4 - 12.6 mm)
2703-072	Jaw faces for rounds (coarse-serrated, 12 - 16 mm)
2703-073	Jaw faces for rounds (coarse-serrated, 16 - 19 mm)
2703-013	Jaw faces for rounds (fine V-serrated, 3.5 - 8 mm)
2703-014	Jaw faces for rounds (fine V-serrated, 7 - 12.7 mm)
2703-015	Jaw faces for rounds (fine V-serrated, 12.7 - 19 mm)

ITEMS FOR USE WITH 2716-010, 2716-015, 2716-020

Catalog Number	Description
2716-011	Specimen centering device
2703-151	Jaw faces for flats (coarse-serrated, 0 - 6.4 mm)
2703-152	Jaw faces for flats (coarse-serrated, 6.4 - 12.6 mm)
2703-155	Jaw faces for flats (fine-serrated, 0 - 6.4 mm)
2703-156	Jaw faces for flats (fine-serrated, 6.4 - 12.6 mm)
2703-160	Jaw faces for flats (rubber-coated, 0 - 6.4 mm)
2703-157	Jaw faces for flats (SurfAlloy®-coated, 0 - 6.4 mm)
2703-153	Jaw faces for rounds (fine V-serrated, 3.2 - 7.8 mm)
2703-154	Jaw faces for rounds (fine V-serrated, 7.1 - 12.5 mm)
2703-158	Jaw faces for flats (surfAlloy-coated, 6.4 - 12.6 mm)





PRECISION MECHANICAL WEDGE GRIPS



2716-030

Manual, moving body, wedge action self-centering grips offer an effective gripping solution for demanding tensile tests on composites, metals, and other rigid materials. The initial gripping force is applied manually and then, as the test proceeds, the wedge action allows the gripping force to increase in proportion to the applied load.

Principle of Operation

A worm gear drive in the moving grip body drives the grip body that closes the jaw faces together symmetrically, in a self-centering action, to clamp the specimen. This ensures accurate and repeatable specimen alignment, satisfying Nadcap AC7122-1 and AC7101-3 on suitable systems. The quick and easy operation of the grips improves productivity and usability compared to other gripping techniques.

The jaw faces can be changed in seconds without the use of special tools.

Using “piggy back” adaptors, fixtures for different test types (e.g. compression and flex) can be attached to the grips while the grips are left on the system.

Application Range

- Static tensile tests on a variety of materials including composites, metals, and plastics over a range of temperatures
- Type of loading: Tensile, static, and tension-tension cyclic tests; not suitable for high-cycle dynamic fatigue tests
- Specimen shapes: Flat and round
- Compatible with a range of composite test fixtures

Safety Advice

Review safety note on page 236

PRECISION MECHANICAL WEDGE GRIPS

TENSION

Catalog Number	Capacity			Upper Fitting	Lower Fitting	Accessory Height		Accessory Width		Accessory Weight		Temperature Range		Testing Standards
	kN	kgf	lbf			mm	in	mm	in	kg	lb	°C	°F	
2716-028	100	10,000	22,000	0.5 in Clevis Pin (Type Dm)	4 × M16 and 0.5 in Clevis Pin (Type Dm)	314	12.36	-	-	47	104	-80 to +250	-112 to +482	ASTM D3039, D5083, D5766, EN 2561, EN 2597, prEN 6035, ISO 527-4. ISO 527-5, and AITM 1-0007.
2716-030	250	25,000	56,000	M48 × 2 mLH (Type IIm)	4 × M16	389	15.30	343	13.5	102	225	-80 to +250	-112 to +482	ASTM D3039, D5083, D5766, EN 2561, EN 2597, prEN 6035, ISO 527-4. ISO 527-5, and AITM 1-0007.

ITEMS FOR USE WITH 2716-028

Catalog Number	Description
2701-231	Specimen Centering Stops
2703-366	Jaw faces for flats (fine carbide coated, 0 - 10 mm, 0 - 0.39 in)
2703-367	Jaw faces for flats (fine carbide coated, 5 - 15 mm, 0.2 - 0.59 in)
2703-368	Jaw faces for flats (fine carbide coated, 15 - 25 mm, 0.59 - 0.98 in)
2703-363	Jaw faces for flats (fine-serrated, 0 - 10 mm, 0 - 0.39 in)
2703-364	Jaw faces for flats (fine-serrated, 5 - 15 mm, 0.2 - 0.59 in)
2703-365	Jaw faces for flats (fine-serrated, 15 - 25 mm, 0.59 - 0.98 in)
2703-369	Jaw faces for rounds (fine V-serrated, 3 - 8 mm, 0.12 - 0.31 in)
2703-370	Jaw faces for rounds (fine V-serrated, 8 - 15 mm, 0.31 - 0.59 in)
2501-700	Adaptor Plate for “Piggy Back” Fixtures - ½” clevis pin (Type Df)
2501-702	Type 2 (M48) Adaptor Plate for “Piggy Back” Fixtures
2501-705	Compression Platen with Lockable Spherical Seat and LVDT Mountings
2501-704	Fixed Compression Platen for Lower Grip with LVDT Mountings
2501-803	Lap Shear Fixture for 2716-028 Grips
2703-710	Replacement faces for 2501-803 Lap Shear Fixture

ITEMS FOR USE WITH 2716-030

Catalog Number	Description
2701-230	Specimen Centering Stops
2703-343	Jaw faces for flats (fine carbide coated, 0 - 10 mm, 0 - 0.39 in)
2703-344	Jaw faces for flats (fine carbide coated, 10 - 20 mm, 0.39 - 0.79 in)
2703-345	Jaw faces for flats (fine carbide coated, 20 - 30 mm, 0.79 - 1.18 in)
2703-340	Jaw faces for flats (fine-serrated, 0 - 10 mm, 0 - 0.39 in)
2703-341	Jaw faces for flats (fine-serrated, 10 - 20 mm, 0.39 - 0.79 in)
2703-342	Jaw faces for flats (fine-serrated, 20 - 30 mm, 0.79 - 1.18 in)
2703-343	Jaw faces for flats (fine carbide coated, 0 - 10 mm, 0 - 0.39 in)
2703-346	Jaw faces for rounds (fine V-serrated, 5 - 10 mm, 0.2 - 0.39 in)
2703-347	Jaw faces for rounds (fine V-serrated, 10 - 16 mm, 0.39 - 0.62 in)
2703-348	Jaw faces for rounds (fine V-serrated, 16 - 22 mm, 0.62 - 0.87 in)
2703-349	Jaw faces for rounds (fine V-serrated, 22 - 28 mm, 0.87 - 1.10 in)
2703-350	Jaw faces for rounds (fine V-serrated, 28 - 34 mm, 1.10 - 1.34 in)
2501-700	Type D Adaptor Plate for “Piggy Back” Fixtures
2501-702	Type 2 (M48) Adaptor Plate for “Piggy Back” Fixtures
2501-705	Compression Platen with Lockable Spherical Seat and LVDT Mountings
2501-704	Fixed Compression Platen for Lower Grip with LVDT Mountings
2501-703	Lap Shear Fixture for 2716-030 Grips
2703-711	Replacement faces for 2501-703 Lap Shear Fixture
3119-317	250 kN Pull Rods for use with CP110128 Chamber and Extra-Height (E2) 598X Load Frame

MECHANICAL WEDGE ACTION T-GRIPS

(LEVER-OPERATED)



W-5151

These economical and versatile assemblies are designed for simplified specimen insertion and removal, a feature that saves time and reduces operator fatigue.

An assortment of interchangeable jaws will fit in the T-grip holders, which allows for acceptance of a range of sizes in both flat and round specimen. To increase ease of operation, the locking mechanism of the lower holder keeps the grip jaws open so that one-handed specimen insertion is possible.

The upper and lower grip bodies are structurally the same. Each grip body has a pocket that holds a pair of grip jaws and utilizes a wedge design. This wedge design causes the grips to further tighten as load on the specimen is applied, reducing slippage.

Principle of Operation

All capacities of T-grips are offered with lever/spring actuation, which uses a lever to raise and lower the jaws in the grip pocket, and a spring to provide the initial clamping force on the specimen. When loading a specimen, the operator locks the bottom jaw open, then opens the upper jaw and places the top half of the specimen inside. Once the specimen is clamped securely within the upper jaw, the operator positions the bottom half of the specimen into the lower grip jaws and unlocks the jaws, providing clamping force and securing the specimen so that the test may be conducted.

Application Range

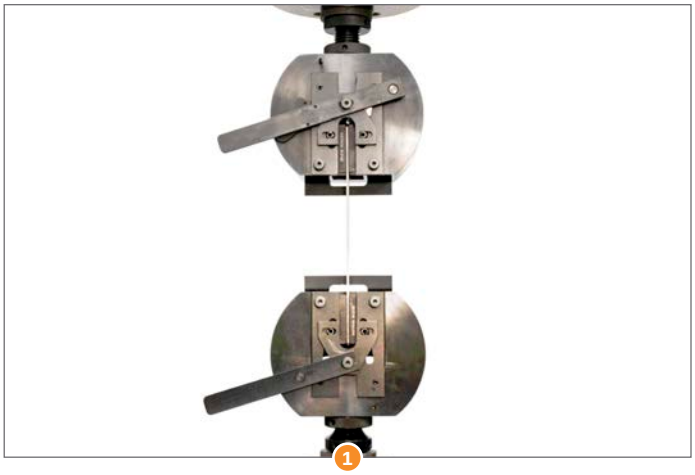
- Type of loading: Static tension
- Specimen material: Wires, plastics, metals, elastomers
- Specimen types: Flat or round specimens

Safety Advice

Review safety note on page 236

MECHANICAL WEDGE ACTION T-GRIPS

(LEVER-OPERATED)



T-GRIPS

	Catalog Number	Capacity			Upper Fitting	Lower Fitting	Specimen Width		Effective Length (A)		Accessory Width (B)		Accessory Height	
		kN	kgf	lbf			mm	in	mm	in	mm	in	mm	in
1	W-5151	150	15,000	33,750	M36 × 4 fRH	M36 × 4 fRH	50.8	2.000	114.3	4.5	279.4	11	13.6	30

ITEMS FOR USE WITH W-5151, W-5057M

Catalog Number	Description
W-2142	Jaw faces for flats (0 - 12.7 mm, 0 - 0.5 in)
W-2143	Jaw faces for flats (12.7 - 25.4 mm, 0.5 - 1.0 in)
W-2141-A	Jaw faces for rounds (9.6 - 15.9 mm, 0.375 - 0.625 in)
W-2141-B	Jaw faces for rounds (16 - 25.4 mm, 0.625 - 1.0 in)

STAND ALONE HYDRAULIC POWER SUPPLY FOR HYDRAULIC GRIPS



Hydraulic grips require high pressure hydraulic oil in order to operate them. This stand alone pump unit allows hydraulic grips to be used for static tests on machines without their own compatible hydraulic supply.

Principle of Operation

This self-contained unit provides opening and closing control of hydraulic grips with adjustable gripping pressure and handset controls. Dual action provides pressure to close as well as open the grips. Dual stage provides High flow/Low pressure and Low flow/High pressure clamping. Includes hoses for connection to the grips and casters for easy relocation. Optional replenish available to maintain gripping pressure (advisable for test durations over 24 minutes).

	Catalog Number	Operating Pressure		Dimensions (W × D × H)	
		psi	Bar	mm	in
1	2718-333	3000	207	360 × 560 × 1100	14 × 22 × 43

Notes:
1. Compatible with 2742-301, 501, 601, 2743-401, W-5450 and W-5410 for tension applications only.
2. For fatigue applications contact your nearest Instron office.

PNEUMATIC SIDE ACTION GRIPS



2712-04x Series

Pneumatic side action grips provide a versatile and effective solution for gripping a wide range of materials and specimen types. Fibres, wires, sheet, foils, film, textiles, plastics, elastomers and components can all be successfully tested. Repeatable gripping force and speed of operation make pneumatic grips the ideal choice for a wide range of testing applications.

Our 2712-04x and 2712-05x Series grips have a number of enhanced features to further improve ease of use, repeatability and operator safety including jaw face shields, super-quick jaw face changes and an optional specimen centering device.

A wide range of interchangeable jaw faces in various sizes and choice of surfaces is available including smooth ground, rubber coated and serrated. Line contact, wave profile and brake-lining faces are also available.

Principle of Operation

Pneumatic action grips clamp the specimen through a dual lever arm, actuated by an air cylinder built into the grip body. Gripping force can be controlled by adjusting the input air pressure and remains constant even if the specimen contracts in the gripped area providing the ultimate in ‘follow-up’ action. Pneumatic grips can be operated by a footswitch or by grip mounted air-valves (most models) making them quicker and simpler to operate than screw-action grips.

Application Range

- Type of loading: tensile, static, tension-tension cyclic tests. Not suitable for high cycle fatigue tests.
- Specimen material: thin sheets, films, foils, threads, plastic tapes, fine wires and soft materials.
- Specimen shapes: round (wires) and flat specimen with/without shoulder tab ends.

PNEUMATIC SIDE ACTION GRIPS



1



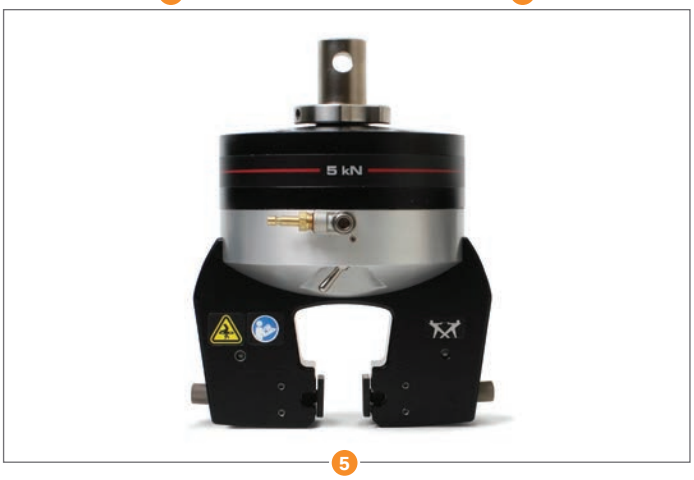
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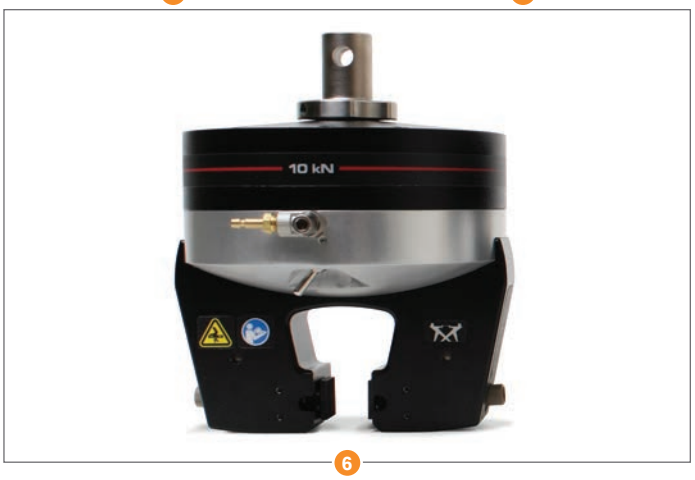
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PNEUMATIC SIDE ACTION GRIPS

	Catalog Number	Capacity			Upper Fitting	Lower Fitting	Upper Effective Length		Lower Effective Length		Accessory Width		Accessory Weight		Temperature Rating	
		kN	kgf	lbf			mm	in	mm	in	mm	in	kg	lb	°C	°F
1	2712-051	0.05	5	10	6 mm clevis pin (Type Om)	6 mm clevis pin (Type Om)	93.6	3.7	93.6	3.7	50.7	2.0	0.103	0.23	-20 to +100	-4 to +212
2	2712-052	0.25	25	50	6 mm clevis pin (Type Om)	6 mm clevis pin (Type Om)	122.4	4.8	122.4	4.8	68.8	2.7	0.344	0.76	-20 to +100	-4 to +212
3	2712-041	1	100	225	6 mm clevis pin (Type Om)	6 mm clevis pin (Type Om)	176	6.9	176	6.9	126	5.0	2.5	5.5	-20 to +100	-4 to +212
4	2712-042	2	200	450	6 mm clevis pin (Type Om)	6 mm clevis pin (Type Om)	186	7.3	186	7.3	152	6.0	4.1	9	-20 to +100	-4 to +212
5	2712-045	5	500	1,125	½ in clevis pin (Type Dm)	½ in clevis pin (Type Dm)	236	9.3	236	9.3	199	7.8	6.8	15	-20 to +100	-4 to +212
6	2712-046	10	1,000	2,250	½ in clevis pin (Type Dm)	½ in clevis pin (Type Dm)	239	9.4	239	9.4	208	8.2	9.7	21.3	-20 to +100	-4 to +212

Notes:
1. Maximum specimen thickness is affected by choice of jaw faces.

PNEUMATIC SIDE ACTION GRIPS

ITEMS FOR USE WITH 2712-051, 2712-052

Catalog Number	Description
2701-215	Jaw face shields for faces 25 × 25mm for 2712-052 Pneumatic Grips
CP116858	Specimen alignment device for 2712-052 Pneumatic Grips
2702-360	Jaw faces (rubber coated, 10 × 10 mm, 0.39 × 0.39 in)
2702-361	Jaw faces (rubber coated, 12 × 25 mm, 0.5 × 1 in)
2702-362	Jaw faces (rubber coated, 25 × 25 mm, 1 × 1 in)
2702-363	Jaw faces (rubber coated, 50 × 25 mm, 2 × 1 in)
2702-364	Jaw faces (rubber coated, 100 × 25 mm, 4 × 1 in)
2702-365	Jaw faces (serrated, 10 × 10 mm, 0.39 × 0.39 in)
2702-366	Jaw faces (serrated, 12 × 25 mm, 0.5 × 1 in)
2702-367	Jaw faces (serrated, 25 × 25 mm, 1 × 1 in)
2702-368	Jaw faces (serrated, 50 × 25 mm, 2 × 1 in)
2702-369	Jaw faces (serrated, 100 × 25 mm, 4 × 1 in)
2702-370	Jaw faces (smooth, 10 × 10 mm, 0.39 × 0.39 in)
2702-371	Jaw faces (smooth, 12 × 25 mm, 0.5 × 1 in)
2702-372	Jaw faces (smooth, 25 × 25 mm, 1 × 1 in)
2702-373	Jaw faces (smooth, 50 × 25 mm, 2 × 1 in)
2702-374	Jaw faces (smooth, 100 × 25 mm, 4 × 1 in)
2702-375	Jaw faces (brake lining (HFC), 25 × 25 mm, 1 × 1 in)
2702-376	Jaw faces (brake lining (HFC), 50 × 25 mm, 2 × 1 in)
2702-377	Jaw faces (line contact smooth ground, 25 mm, 1 in)

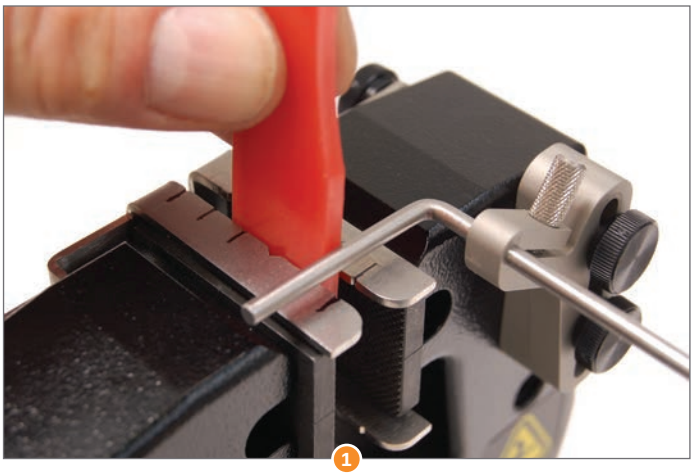
ITEMS FOR USE WITH 2712-04X

Catalog Number	Description
2701-201	Jaw face shields for faces 38 × 25 mm on 1kN and 2kN grips 2712-041/-042
2701-202	Jaw face shields for faces 50 × 38 mm on 1kN and 2kN grips 2712-041/-042
2701-203	Jaw face shields for faces 75 × 25 mm on 1kN and 2kN grips 2712-041/-042
2701-204	Jaw face shields for faces 50 × 25 mm on 5kN grip 2712-045
2701-205	Jaw face shields for faces 75 × 50 mm on 5kN grip 2712-045
2701-206	Jaw face shields for faces 75 × 25 mm on 5kN grip 2712-045
2701-207	Jaw face shields for faces 50 × 25 mm on 10kN grip 2712-046
2701-208	Jaw face shields for faces 75 × 50 mm on 10kN grip 2712-046
2701-209	Jaw face shields for faces 75 × 25 mm on 10kN grip 2712-046
2701-220	Specimen alignment device for 2712-04x Pneumatic Grips
2701-221	Specimen holders with integral specimen alignment device for 2712-041/-042 grips
2702-300	Jaw faces for flats (rubber coated, 25 × 25 mm)
2702-301	Jaw faces for flats (rubber coated, 25 × 38 mm)
2702-302	Jaw faces for flats (rubber coated, 25 × 50 mm)

ITEMS FOR USE WITH 2712-04X (CONTINUED)

Catalog Number	Description
2702-303	Jaw faces for flats (rubber coated, 38 × 12 mm)
2702-304	Jaw faces for flats (rubber coated, 38 × 25 mm)
2702-305	Jaw faces for flats (rubber coated, 38 × 50 mm)
2702-306	Jaw faces for flats (rubber coated, 50 × 25 mm)
2702-307	Jaw faces for flats (rubber coated, 50 × 38 mm)
2702-308	Jaw faces for flats (rubber coated, 50 × 50 mm)
2702-309	Jaw faces for flats (rubber coated, 75 × 25 mm)
2702-310	Jaw faces for flats (rubber coated, 75 × 50 mm)
2702-311	Jaw faces for flats (rubber coated, 150 × 50 mm)
2702-315	Jaw faces for flats (serrated, 25 × 25 mm)
2702-316	Jaw faces for flats (serrated, 25 × 38 mm)
2702-317	Jaw faces for flats (serrated, 25 × 50 mm)
2702-318	Jaw faces for flats (serrated, 38 × 12 mm)
2702-319	Jaw faces for flats (serrated, 38 × 25 mm)
2702-320	Jaw faces for flats (serrated, 38 × 50 mm)
2702-321	Jaw faces for flats (serrated, 50 × 25 mm)
2702-322	Jaw faces for flats (serrated, 50 × 38 mm)
2702-323	Jaw faces for flats (serrated, 50 × 50 mm)
2702-324	Jaw faces for flats (serrated, 75 × 25 mm)
2702-325	Jaw faces for flats (serrated, 75 × 50 mm)
2702-326	Jaw faces for flats (serrated, 150 × 50 mm)
2702-330	Jaw faces for flats (smooth, 25 × 25 mm)
2702-331	Jaw faces for flats (smooth, 25 × 38 mm)
2702-332	Jaw faces for flats (smooth, 25 × 50 mm)
2702-333	Jaw faces for flats (smooth, 38 × 12 mm)
2702-334	Jaw faces for flats (smooth, 38 × 25 mm)
2702-335	Jaw faces for flats (smooth, 38 × 50 mm)
2702-336	Jaw faces for flats (smooth, 50 × 25 mm)
2702-337	Jaw faces for flats (smooth, 50 × 38 mm)
2702-338	Jaw faces for flats (smooth, 50 × 50 mm)
2702-339	Jaw faces for flats (smooth, 75 × 25 mm)
2702-340	Jaw faces for flats (smooth, 75 × 50 mm)
2702-341	Jaw faces for flats (smooth, 150 × 50 mm)
2702-345	Jaw faces for flats (brake lining, 25 × 38 mm)
2702-346	Jaw faces for flats (brake lining, 38 × 25 mm)
2702-347	Jaw faces for flats (brake lining, 50 × 38 mm)
2702-350	Jaw faces for flats (line contact, 25 mm)
2702-351	Jaw faces for flats (line contact, 75 mm)
2702-352	Jaw faces for flats (waved profile, 50 × 50 mm)
2702-353	Jaw faces for flats (waved profile, 75 × 50 mm)
2702-354	Jaw faces for rounds (v-serrated, 3 - 6.5 mm dia. × 25 mm)
2702-355	Jaw faces for rounds (v-serrated, 6 - 18.5 mm dia. × 25 mm)

OPTIONAL ACCESSORIES FOR 2712-04X AND -05X GRIPS





2701-220 and CP116858 Specimen Alignment Device

Ensuring that each specimen is subjected to the same axial loading has an important influence on the repeatability of the testing system. The optional specimen alignment device ensures that the specimen is loaded vertically every time. It can be used with rigid and semi-rigid materials where the specimen can be pressed lightly against the backstop for rapid loading, or with flexible materials, such as tapes and foils, where the backstop provides a visual cue. It can be mounted above or below the jaw faces depending on the specimen design. Repeatable, quick, and simple to adjust.

2701-221 Combined Specimen Holder and Specimen Alignment Device

The 2701-221 combined specimen holder and specimen alignment device (patent pending) is an optional item for 2712-041 and 042 pneumatic side-action grips. The spring-loaded grippers hold the specimen while the operator closes the grips prior to starting the test. This avoids the pinch hazard associated with manually holding the specimen near the jaw faces during grip closure. The built-in adjustable specimen centering device ensures repeatable alignment and speedy operation.

	Catalog Number	Description	Comments
1	2701-220	Specimen Alignment Device for 2712-04x grips	Adjustable mechanical stops that ensure good axial alignment for reduced results scatter as well as providing fast and simple specimen insertion.
	CP116858	Specimen Alignment Device for 2712-052 grips	Adjustable mechanical stops that ensure good axial alignment for reduced results scatter as well as providing fast and simple specimen insertion.
2	2701-221	Specimen Holder	Specimen holders with integral specimen alignment device for 2712-041/-042 Pneumatic Grips.
	CP109362	Specimen Holder	Specimen holders with integral specimen alignment device for 2712-045/-046 Pneumatic Grips.

HIGH TEMPERATURE PNEUMATIC SIDE ACTION GRIPS

PNEUMATIC SIDE ACTION GRIPS, HIGH-TEMPERATURE

	Catalog Number	Capacity			Specimen Thickness		Upper Fitting	Lower Fitting	Upper Effective Length		Lower Effective Length		Accessory Width		Accessory Weight		Temperature Rating	
		kN	kgf	lbf	mm	in			mm	in	mm	in	mm	in	kg	lb	°C	°F
1	2732-006	0.1	10	22	0 - 3.5	0 - 0.125	3/16 in clevis pin (Type Bm)	Pneumatic Connection	560	22	134	5.3	136	5.3	0.4	0.9	-70 to +315	-100 to +600
	2732-008	1	100	225	0 - 6.3	0 - 0.25	Pneumatic Connection	Pneumatic Connection	194	7.6	194	7.6	145	5.7	4	8.8	-70 to +315	-100 to +600
2	2732-009	1	100	225	0 - 12.7	0 - 0.5	Pneumatic Connection	Pneumatic Connection	194	7.6	194	7.6	158	6.0	4	8.8	-70 to +315	-100 to +600

ITEMS FOR USE WITH 2732-003, 2732-004, 2732-008, 2732-009

Catalog Number	Description
2702-044	Jaw faces for flats (compound, 38 × 25 mm)
2702-045	Jaw faces for flats (compound, 50 × 38 mm)
2702-020	Jaw faces for flats (line contact, 25 mm)
CP109572	Jaw faces for flats (line contact, 75 mm)
2702-012	Jaw faces for flats (rubber-coated, 12 × 38 mm)
2702-032	Jaw faces for flats (rubber-coated, 25 × 25 mm)
2702-015	Jaw faces for flats (rubber-coated, 38 × 25 mm)
2702-018	Jaw faces for flats (rubber-coated, 50 × 38 mm)
2702-035	Jaw faces for flats (rubber-coated, 75 × 25 mm)
2702-013	Jaw faces for flats (serrated, 12 × 38 mm)
2702-033	Jaw faces for flats (serrated, 25 × 25 mm)
2702-016	Jaw faces for flats (serrated, 38 × 25 mm)
2702-019	Jaw faces for flats (serrated, 50 × 38 mm)
2702-059	Jaw faces for flats (serrated, 75 × 25 mm)
2702-011	Jaw faces for flats (smooth, 12 × 38 mm)
2702-031	Jaw faces for flats (smooth, 25 × 25 mm)
2702-014	Jaw faces for flats (smooth, 38 × 25 mm)
2702-017	Jaw faces for flats (smooth, 50 × 38 mm)
2702-034	Jaw faces for flats (smooth, 75 × 25 mm)

ITEMS FOR USE WITH 2732-006

Catalog Number	Description
2702-042	Jaw faces for flats (compound, 25 × 25 mm)
2702-043	Jaw faces for flats (compound, 50 × 25 mm)
2702-010	Jaw faces for flats (line contact, 25 mm)
2702-002	Jaw faces for flats (rubber-coated, 12 × 25 mm)
2702-362	Jaw faces for flats (rubber-coated, 25 × 25 mm)
S1-11613-1	Jaw faces for flats (rubber-coated, 100 × 25 mm)
2702-008	Jaw faces for flats (rubber-coated, 50 × 25 mm)
2702-003	Jaw faces for flats (serrated, 12 × 25 mm)
2702-367	Jaw faces for flats (serrated, 25 × 25 mm)
2702-009	Jaw faces for flats (serrated, 50 × 25 mm)
2702-001	Jaw faces for flats (smooth, 12 × 25 mm)
2702-372	Jaw faces for flats (smooth, 25 × 25 mm)
2702-007	Jaw faces for flats (smooth, 50 × 25 mm)
S1-11613-2	Jaw faces for flats (smooth, 100 × 25 mm)





PNEUMATIC SIDE ACTION GRIPS ACCESSORIES



1

Pneumatic action grips allow rapid, easy loading of specimens from delicate films to polymers and woven fabrics. This provides a very simple and efficient method for holding test specimens easily and quickly. Both jaw faces automatically adjust to different specimen thicknesses to ensure that the line of tensile force remains concentric with the grip body. Pneumatic grips require an air supply to be actuated and clamp specimens. Many facilities have air supplies built in, but if not, a portable air compressor may be purchased from Instron®. Some grips come equipped with a lever, which is actuated manually. However, if having both hands available to manage the specimen is necessary, a pneumatic or automatic footswitch may be added.

Principle of Operation

Having appropriate air available is key for grips to be dependable. An air regulator should always be used on the air supply. The pneumatic footswitch will allow the operator to have both hands free to manage the specimen while actuating the grips with the foot. This footswitch interfaces only with the grip and is expected to be directly compatible. For newer generation Instron equipment, an automatic air kit is available that can be actuated automatically through the software based on load detection parameters or actuated by foot through an electric switch.

PNEUMATIC SIDE ACTION GRIP ACCESSORIES

	Catalog Number	Description
	2701-004	Universal pneumatic footswitch (no pre-tension)
	2701-042	Universal air distribution kit (no pre-tension or footswitch)
1	2701-065	Automatic air control kit for all 3300, 4400, 5500, 5800 and 5900 series load frames, excluding model 4411 (pre-tension and footswitch)

PNEUMATIC WEDGE ACTION GRIPS



2716-111



2716-111

Pneumatic wedge action grips feature an open front design, which facilitates easy loading of large specimens. This series can accommodate round specimens up to 60 mm (2.36 in) in diameter and flat specimens up to 70 mm (2.75 in) thick. The compact design of these pneumatic wedge grips provides optimum use of the test area when installed on a Instron® floor model testing systems. Specially suited for industrial environments where dust and metal chips may be present, these grips have protective dust covers that fit easily over the faces to shield the moving surfaces. An optional piggyback adapter plate furnishes an efficient method for mounting secondary load strings for lower capacity testing without removing the larger grips. On the 2716-11x and 2716-12x grips, the V-faces used for round specimens by design have a reduced area at the center, which compromises their ability to absorb high energy breaks without fracture. This grip uses a split V-face configuration which allows the break energy to be dissipated without damaging the faces. On the W-5180 and W-5160 grips, the considerable increase in size allows the use of a one-piece design grip face.

Principle of Operation

These grips are operated with a control knob mounted on the grip or with an Instron standard pneumatic control kit. Powered by pneumatic control, the faces are moved by a pneumatic piston, which eliminates a costly hydraulic pump and its control. When under load, the wedge action provides additional clamping pressure to minimize specimen slippage. The 2716-11x and 2716-12x grips use a unique carrier/ face mounting system that allows for easy face insert changes. The carrier is placed on the grips and secured by springs from the grip body and against the driving piston. The faces sit on the carriers, held by a couple of thumb screws. The lubrication of the jaw face carriers is through a standard grease fitting, eliminating the need to remove either the faces or the carriers for greasing. Each face set can accommodate a wide range of specimen types, offering flexibility with a minimum number of face changes. W-5180 and W-5160 grips include a face mounting system with embedded magnets and jaw faces with circular centering disks. This design simplifies jaw face loading and holds the jaws in position when no load is applied.

Application Range

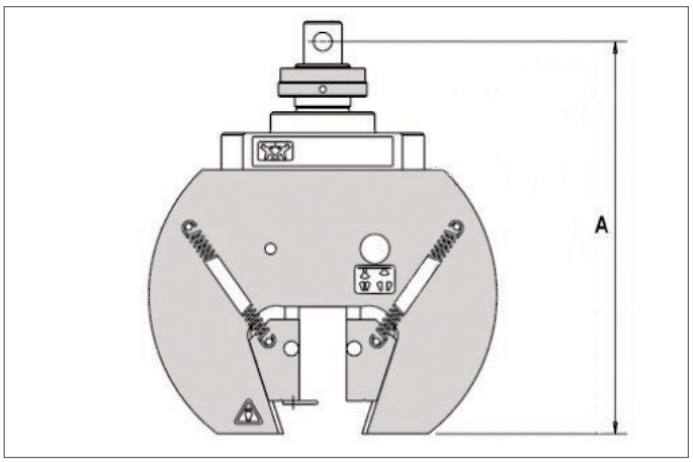
- Type of loading: Tension — not suitable for throughzero/ reverse stress or fatigue testing
- Specimen material: Wires, plastics, metals
- Specimen shapes: Flat, round

Safety Advice

Review safety note on page 236

PNEUMATIC WEDGE ACTION GRIPS





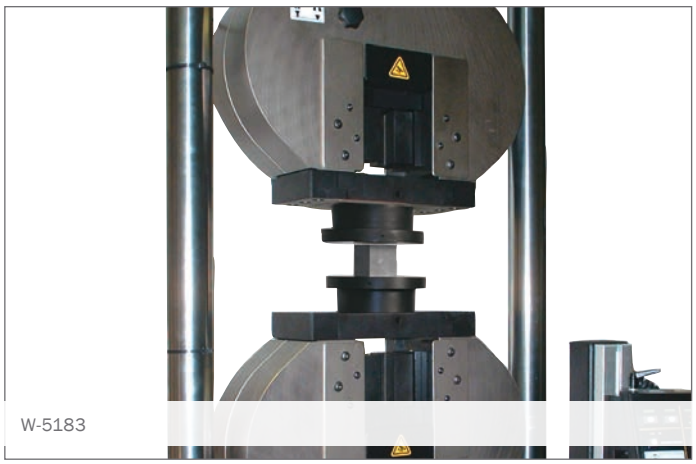
PNEUMATIC WEDGE ACTION GRIPS

	Catalog Number	Capacity			Upper Fitting	Lower Fitting	Effective Length (A)		Accessory Width (B)		Accessory Weight		Temperature Rating	
		kN	kgf	lbf			mm	in	mm	in	kg	lb	°C	°F
1	2716-111	100	10,000	22,500	0.5 in clevis pin (Type DM)	0.5 in clevis pin (Type DM)	Upper: 363	Upper: 12.7	300	11.8	52	114	+5 to +65	+40 to +150
	2716-121	200	20,000	45,000	M48 × 2 mLH (Type IImLH)	M48 × 2 mLH (Type IImLH)	Upper: 315	Upper: 12.4	300	11.8	52	114	+5 to +65	+40 to +150

ITEMS FOR USE WITH 2716-11X AND 2716-12X

Catalog Number	Description
2703-185	Jaw faces for flats (coarse serrated, 0 - 20 mm)
2703-186	Jaw faces for flats (coarse serrated, 20 - 40 mm)
2703-180	Jaw faces for flats (serrated, 0 - 20 mm)
2703-181	Jaw faces for flats (serrated, 20 - 40 mm)
2703-182	Jaw faces for rounds (V-serrated, 6 - 17.8 mm)
2703-183	Jaw faces for rounds (V-serrated, 16 - 34 mm)
2703-184	Jaw faces for rounds (V-serrated, 33 - 50.8 mm)
2501-194	Adapter 2716-11x and 2716-12x to M30 fLH/6 × M10 - 100 BC
2501-224	Grip spacer (2716-11x and 2716-12x grips)

PNEUMATIC WEDGE ACTION GRIPS ACCESSORIES



W-5183

Mounting hardware and adapters can be added to pneumatic wedge action grips. Mounting hardware provides the interface between the grips and the load frame, while adapters can be added to increase the range of testing functionality. By simply choosing the appropriate adapter, auxiliary fixtures can be mounted to the main grip body. This makes it possible to carry out other modes of testing without the need to remove large-capacity grips. This convenience allows all testing to be carried out in one test area at one working test height — saving set up time.

Principle of Operation

Mounting hardware includes two threaded studs and two self-locking taper washers. This hardware connects the pneumatic wedge grips to the load frame, and ensures that the grips won't rotate or move during a test. Piggyback adapters are easily mounted on all pneumatic wedge grips to allow lower force grips to be used. Positive mechanical location ensures secure mounting and ease-of-use. A tension/compression accessory kit can be added to W-5180 and W-5160 grips. Kit includes upper and lower adapter plates that are bolted to the grip body. The adaptor plates reproduce a corporate mounting pattern of a Type IIfLH (M48×2) for W-5186 and Type IIAfLH (M72×3) for W-5196 with 6 × M10-100 mm BC on center for attachment of tension or compression accessories and a receiver for compression accessories utilizing a 1.0 in (25.4 mm) holding button or fixtures with 0.5 in – 13 thread using included 1.0 in holding button adapter. Kit also includes centering washers, quick-release pins, and bolts for mounting plates to grip bodies.

Application Range

- Lower force tensile tests
- Bend/flexure tests
- Compression tests

Safety Advice

Review safety note on page 236

PNEUMATIC WEDGE ACTION GRIPS ACCESSORIES



1

ADAPTERS FOR 2716-11X AND 2716-12X GRIPS

Catalog Number	Description	Capacity			Accessory Height	
		kN	kgf	lbf	mm	in
2501-194	Adapter, 2716- 110, 2716-120 to M30 fLH/ 6 × M10 - 100 BC	100	10,000	22,500	25	1.0

ADAPTERS FOR W-5180 GRIPS

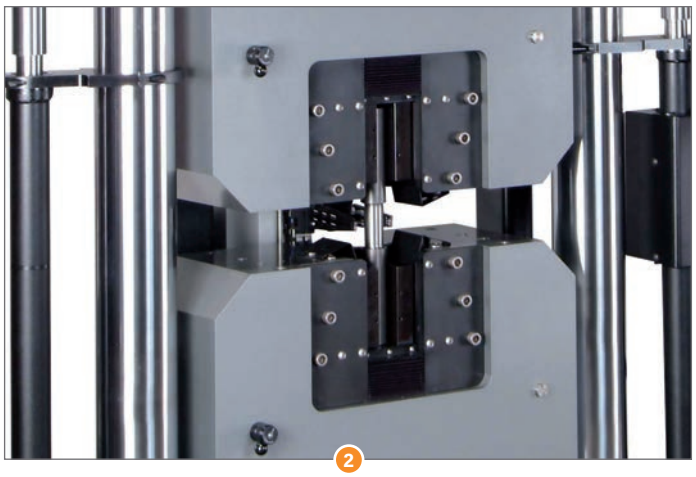
	Catalog Number	Description	Capacity			Accessory Height		Compatible Frame Models
			kN	kgf	lbf	mm	in	
1	W-5186	Compression/tension accessory kit	300	30,000	67,500	2.5	63.5	SATEC™ Series LX and KN models, electromechanical models (5587 and 5589)

ADAPTERS FOR W-5160 GRIPS

	Catalog Number	Description	Capacity			Accessory Height		Compatible Frame Models
			kN	kgf	lbf	mm	in	
1	W-5196	Compression/tension accessory kit	600	60,000	135,000	3.0	76.2	SATEC Series LX and KN models, electromechanical models (5587 and 5589)

HYDRAULIC WEDGE ACTION GRIPS







Hydraulic wedge action grips feature an open front design, which facilitates easy loading of large specimens. This series can accommodate round specimens up to 90 mm (3.54 in) in diameter and flat specimens up to 90 mm (3.54 in) thick with capacities ranging from 300kN (67,500 lbf) to 2000kN (450,000 lbf). Specially suited for industrial environments where dust and metal chips may be present, these grips have protective dust covers that fit easily over the faces to shield the moving surfaces. Optional adapter plates furnish an efficient method for mounting secondary load strings for lower capacity testing or other fixturing without removing the larger grip.

Principle of Operation

These grips are hydraulically operated and the grip body does not move during closing or openin. Hydraulic supply is typically from the main machine frame via a grip submanifold. Jaws are separable inserts held in a jaw carrier which are easy to install with no need to re-grease when changing jaw faces. Grip bodies have grease fittings to allow easy re-greasing of the carrier when needed.

Application Range

- Type of loading: Tension, *Not suitable for through-zero/ reverse stress or fatigue testing
- Specimen material: Metals
- Specimen shapes: Flat, round

Safety Advice

Review safety note on page 236

HYDRAULIC WEDGE ACTION GRIPS

	Catalog Number	Capacity			Upper Fitting	Lower Fitting	Effective Length (Excludes Mounting)		Accessory Width		Accessory Weight (Per Grip)		Temperature Rating	
		kN	kgf	lbf			mm	in	mm	in	kg	lb	°C	°F
1	W-5245	300	30,000	67,500	M48 × 2 (Type IIfRH)	M48 × 2 (Type IIfRH)	660	26.0	445	17.5	123	270	+10 to +38	+50 to +100
1	W-5360	600	60,000	135,000	M72 × 3p fRH (Type IIAfRH)	M72 × 3p fRH (Type IIAfRH)	660	26.0	546	21.5	327	720	+10 to +38	+50 to +100
2	W-5330	1500	150,000	337,500	Bolt Flange	Bolt Flange	1105	43.5	813	32	1140	2500	+10 to +38	+50 to +100
3	W-5320	2000	200,000	450,000	Bolt Flange	Bolt Flange	1486	58.5	813	32	1250	2750	+10 to +38	+50 to +100
	W-5340	1000	102,000	225,000	Bolt Flange	Bolt Flange	1105	43.5	660	26	680	1500	+10 to +38	+50 to +100

Notes: 1. Secondary load string adapting kits are available for mounting smaller tension grips and compression accessories in between these grips.The adapter kit for W-5245 is W-5186. The adapter kit for W-5360 is W-5196. The adapter kit for W-5330 is W-5325. The adapter kit for W-5320 is W-5324.

HYDRAULIC WEDGE ACTION GRIPS

GRIP FACES FOR USE WITH W-5245 300 KN HYDRAULIC WEDGE GRIPS

Catalog Number	Specimen Thickness		Surface	Pitch	Teeth Per Inch
	mm	in		mm	
W-5246-A	0 - 16	0 - 0.63	Flat-serrated	1.25	20
W-5246-B	16 - 32	0.63 - 1.25	Flat-serrated	1.25	20
W-5246-C	32 - 50	1.25 - 2.0	Flat-serrated	1.25	20
W-5247-A	3 - 10	0.118 - 0.39	V-serrated	1.25	20
W-5247-B	10 - 20	0.39 - 0.78	V-serrated	1.25	20
W-5247-C	20 - 30	0.78 - 1.18	V-serrated	2.5	10
W-5247-D	30 - 40	1.18 - 1.57	V-serrated	2.5	10

Notes: 1. Specimen Width for W-5246-A through W-5246-C accommodates specimen width up to 70 mm (2.75 in)

GRIP FACES FOR USE WITH W-5360 600 KN HYDRAULIC WEDGE GRIPS

Catalog Number	Specimen Thickness		Surface	Pitch	Teeth Per Inch
	mm	in		mm	
W-5197-A	0 - 30	0 - 1.18	Flat-serrated	1.25	20
W-5197-B	30 - 60	1.18 - 2.36	Flat-serrated	1.25	20
W-5198-A	3 - 10	0.12 - 0.39	V-serrated	1.25	20
W-5198-B	10 - 35	0.39 - 1.38	V-serrated	1.25	20
W-5198-C	35 - 57	1.38 - 2.25	V-serrated	2.5	10

Notes: 1. Specimen Width for W-5197-A through W-5197-B accommodates specimen width up to 100 mm (4 in)

GRIP FACES FOR USE WITH W-5330, W-5340, 1000 KN AND 1500 KN HYDRAULIC WEDGE GRIPS

Catalog Number	Specimen Thickness		Surface	Pitch	Teeth Per Inch
	mm	in		mm	
W-5331-A	0 - 35	0 - 1.4	Flat-serrated	3.2	8
W-5331-B	35 - 70	1.4 - 2.75	Flat-serrated	3.2	8
W-5332-C	3 - 12	0.12 - 0.47	V-serrated	1.25	20
W-5332-A	12 - 45	0.5 - 1.75	V-serrated	2.5	10
W-5332-B	45 - 70	1.75 - 2.75	V-serrated	2.5	10

Notes: 1. Specimen Width for W-5331-A through W-5331-B accommodates specimen width up to 100 mm (4 in)

GRIP FACES FOR USE WITH W-5320 2000 KN HYDRAULIC WEDGE GRIPS

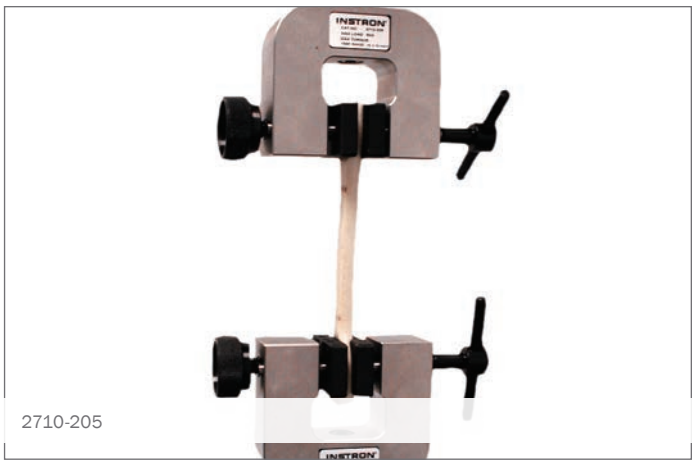
Catalog Number	Specimen Thickness		Surface	Pitch	Teeth Per Inch
	mm	in		mm	
W-5322-A	0 - 45	0 - 1.77	Flat-serrated	3.2	8
W-5322-B	45 - 90	1.77 - 3.54	Flat-serrated	3.2	8
W-5323-A	6 - 20	0.24 - 0.78	V-serrated	1.25	20
W-5323-B	20 - 57	0.79 - 2.24	V-serrated	2.5	10
W-5323-C	57 - 90	2.24 - 3.54	V-serrated	1.25	10

Notes: 1. Specimen Width for W-5322-A through W-5322-B accommodates specimen width up to 125 mm (5 in)

SCREW ACTION GRIPS



2710-113



2710-205

Screw action grips provide a very simple and efficient method for holding test specimens in a wide range of applications. The dual -acting design means that jaw faces can be adjusted to accommodate different specimen thicknesses, this ensures that the line of tensile force remains concentric with the grip body. They can be equipped with a selection of interchangeable grip jaw faces in various sizes and choice of surfaces including smooth ground, rubbercoated and serrated. Two models of screw grip are available. 2710-100 Series grips feature a unique snap-on jaw face attachment which makes changing faces extremely quick and simple, an optional specimen centering device as well as offering wide opening for thick specimens. 2710-200 Series grips are designed for basic tensile test requirements where a simple, cost-effective solution is desired.

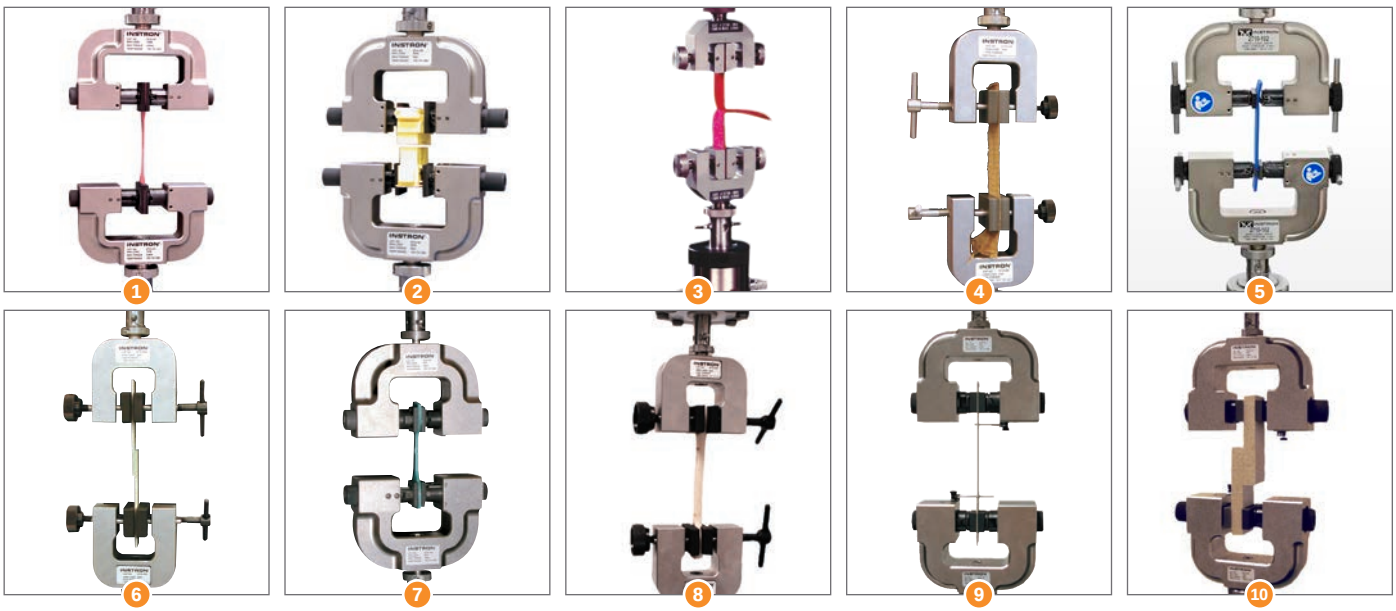
Principle of Operation

2710-100 Series screw action grips are designed for static tensile testing and include a number of features to optimize functionality and ease-of-use. The dual acting screw design accommodates specimens up to 30 mm (1.2 in) thick and can be offset for irregular or asymmetrical specimens such as lap-shear types. Screw knobs on either side are knurled to facilitate hand tightening and the higher capacities also feature Hex socket screw knobs that accommodate a hex key or torque wrench. Interchangeable jaw faces articulate about the vertical axis on one side and the horizontal on the other, thereby providing self-alignment of jaw faces that compensates for any irregularities in specimen thickness. Snap-on jaw faces greatly simplify the task of changing jaw faces. Once attached, the jaw faces are removed by simply retracting the carriage into the grip body, activating a mechanism that releases the jaw faces from their retention clip. Engraved scales on the carriages aid in centering the specimen along the planes of gripping. Further improvements in specimen alignment can be gained by using the optional specimen centering device. 2710-200 Series screw action grips are designed for basic tensile testing needs and are of dual acting design with nonarticulating jaw faces. One face is adjustable with a screw knob whilst the other features a T-handle for tightening. Serrated, smooth, rubber-coated and wave profile faces are available.

Application Range

- Static tensile tests on a wide range of materials and specimen types including plastics, metals, textiles, paper, thin sheet, foil, and wire.
- Type of Loading: Tensile, static and tension-tension cyclic tests. Not suitable for high cycle dynamic fatigue tests.
- Specimen shapes: Round (wires) and flat specimens with or without shoulder tab ends.

SCREW ACTION GRIPS



SCREW ACTION GRIPS

Catalog Number	Capacity			Specimen Thickness		Upper Fitting	Lower Fitting	Upper Effective Length		Lower Effective Length		Accessory Width		Accessory Weight		Temperature Rating	
	kN	kgf	lbf	mm	in			mm	in	mm	in	mm	in	kg	lb	°C	°F
1 2710-111	0.1	10	22	0- 30	0 - 1.2	6 mm clevis pin (Type Om)	6 mm clevis pin (Type Om)	94	3.7	94	3.7	173	6.8	0.45	0.99	-70 to +125	-94 to +257
2 2710-112	0.5	50	122	0-30	0 - 1.2	6 mm clevis pin (Type Om)	6 mm clevis pin (Type Om	98	3.9	98	3.9	173	6.8	0.55	1.21	-70 to +125	-94 to +257
3 2710-004	0.5	50	112	0 - 12	0 - 0.5	6 mm clevis pin (Type Om)	6 mm clevis pin (Type Om)	67	2.6	67	2.6	93	3.6	0.490	1	0 to +100	+32 to +212
4 2710-203	1	100	225	0 - 15	0 - 0.6	6 mm clevis pin (Type Om)	6 mm clevis pin (Type Om)	106	4.2	106	4.2	158	6.2	0.69	1.5	+10 to +40	+50 to +100
5 2710-113	1	100	225	0 - 36	0 - 1.4	6 mm clevis pin (Type Om)	6 mm clevis pin (Type Om)	117	4.6	117	4.6	196	4.6	1.2	2.6	-70 to +125	-94 to +257
6 2710-204	2	200	450	0 - 15	0 - 0.6	6 mm clevis pin (Type Om)	6 mm clevis pin (Type Om)	106	4.2	106	4.2	165	6.5	0.84	1.85	+10 to +40	+50 to +100
7 2710-114	2	200	450	0 - 36	0 - 1.4	6 mm clevis pin (Type Om)	6 mm clevis pin (Type Om)	117	4.6	117	4.6	196	4.6	1.2	2.6	-70 to +125	-94 to +257
8 2710-205	5	500	1,125	0 - 15	0 - 0.6	6 mm clevis pin (Type Om)	½ in clevis pin (Type Dm)	106	4.2	113	4.4	175	6.9	1.1	2.4	+10 to +40	+50 to +100
9 2710-115	5	500	1,125	0 - 46	0 - 1.8	6 mm clevis pin (Type Om)	½ in clevis pin (Type Dm)	137	5.4	156	6.1	225	8.9	2.7	5.9	-70 to +125	-94 to +257
10 2710-116	10	1,000	2,250	0 - 46	0 - 1.8	6 mm clevis pin (Type Om)	½ in clevis pin (Type Dm)	137	5.4	156	6.1	225	8.9	4.9	10.8	-70 to +200	-94 to +392

Notes: 1. Maximum specimen thickness will depend on jaw face selection. See jaw faces for required grip

ITEMS FOR USE WITH 2710-004

Catalog Number	Description
2702-133	Jaw faces for flats (line contact, 25 mm)
2702-132	Jaw faces for flats (rubber-coated, 25 × 25 mm)
2702-131	Jaw faces for flats (serrated, 25 × 25 mm)
2702-130	Jaw faces for flats (smooth, 25 × 25 mm)

2710 SERIES

Catalog Series	Description
2710-1XX	Advanced screw action grips feature self-aligning, quick-change jaw faces with a large selection of sizes and surfaces as well as an optional specimen centering device for rapid and repeatable specimen insertion. They are available in capacities up to 10kN and can cater for thicker specimens.
2710-2XX	Basic screw action grips utilise rigid jaw faces of fixed dimensions and a more limited range of surfaces and specimen thicknesses.

ITEMS FOR USE WITH 2710-111, 2710-112

Catalog Number	Description
2702-360	Jaw faces (rubber coated, 10 × 10 mm, 0.39 × 0.39 in)
2702-361	Jaw faces (rubber coated, 12 × 25 mm, 0.5 × 1 in)
2702-362	Jaw faces (rubber coated, 25 × 25 mm, 1 × 1 in)
2702-363	Jaw faces (rubber coated, 50 × 25 mm, 2 × 1 in)
2702-364	Jaw faces (rubber coated, 100 × 25 mm, 4 × 1 in)
2702-365	Jaw faces (serrated, 10 × 10 mm, 0.39 × 0.39 in)
2702-366	Jaw faces (serrated, 12 × 25 mm, 0.5 × 1 in)
2702-367	Jaw faces (serrated, 25 × 25 mm, 1 × 1 in)
2702-368	Jaw faces (serrated, 50 × 25 mm, 2 × 1 in)
2702-369	Jaw faces (serrated, 100 × 25 mm, 4 × 1 in)
2702-370	Jaw faces (smooth, 10 × 10 mm, 0.39 × 0.39 in)
2702-371	Jaw faces (smooth, 12 × 25 mm, 0.5 × 1 in)
2702-372	Jaw faces (smooth, 25 × 25 mm, 1 × 1 in)
2702-375	Jaw faces (brake lining (HFC), 25 × 25 mm, 1 × 1 in)
2702-376	Jaw faces (brake lining (HFC), 50 × 25 mm, 2 × 1 in)
2702-377	Jaw faces (line contact smooth ground, 25 mm, 1 in)

ITEMS FOR USE WITH 2710-113, -114,-115,-116

Catalog Number	Description
2702-300	Jaw faces for flats (rubber coated, 25 × 25 mm)
2702-301	Jaw faces for flats (rubber coated, 25 × 38 mm)
2702-302	Jaw faces for flats (rubber coated, 25 × 50 mm)
2702-301	Jaw faces for flats (rubber coated, 38 × 12 mm)
2702-304	Jaw faces for flats (rubber coated, 38 × 25 mm)
2702-305	Jaw faces for flats (rubber coated, 38 × 50 mm)
2702-306	Jaw faces for flats (rubber coated, 50 × 25 mm)
2702-307	Jaw faces for flats (rubber coated, 50 × 38 mm)
2702-308	Jaw faces for flats (rubber coated, 50 × 50 mm)
2702-309	Jaw faces for flats (rubber coated, 75 × 25 mm)
2702-310	Jaw faces for flats (rubber coated, 75 × 50 mm)
2702-311	Jaw faces for flats (rubber coated, 150 × 50 mm)
2702-315	Jaw faces for flats (serrated, 25 × 25 mm)
2702-316	Jaw faces for flats (serrated, 25 × 38 mm)
2702-317	Jaw faces for flats (serrated, 25 × 50 mm)
2702-318	Jaw faces for flats (serrated, 38 × 12 mm)
2702-319	Jaw faces for flats (serrated, 38 × 25 mm)
2702-320	Jaw faces for flats (serrated, 38 × 50 mm)
2702-321	Jaw faces for flats (serrated, 50 × 25 mm)
2702-322	Jaw faces for flats (serrated, 50 × 38 mm)

ITEMS FOR USE WITH 2710-113, -114,-115,-116 (CONTINUED)

Catalog Number	Description
2702-323	Jaw faces for flats (serrated, 50 × 50 mm)
2702-324	Jaw faces for flats (serrated, 75 × 25 mm)
2702-325	Jaw faces for flats (serrated, 75 × 50 mm)
2702-326	Jaw faces for flats (serrated, 150 × 50 mm)
2702-330	Jaw faces for flats (smooth, 25 × 25 mm)
2702-331	Jaw faces for flats (smooth, 25 × 38 mm)
2702-332	Jaw faces for flats (smooth, 25 × 50 mm)
2702-333	Jaw faces for flats (smooth, 38 × 12 mm)
2702-334	Jaw faces for flats (smooth, 38 × 25 mm)
2702-335	Jaw faces for flats (smooth, 38 × 50 mm)
2702-336	Jaw faces for flats (smooth, 50 × 25 mm)
2702-337	Jaw faces for flats (smooth, 50 × 38 mm)
2702-338	Jaw faces for flats (smooth, 50 × 50 mm)
2702-339	Jaw faces for flats (smooth, 75 × 25 mm)
2702-340	Jaw faces for flats (smooth, 75 × 50 mm)
2702-341	Jaw faces for flats (smooth, 150 × 50 mm)
2702-345	Jaw faces for flats (brake lining (HFC), 25 × 38 mm)
2702-346	Jaw faces for flats (brake lining (HFC), 38 × 25 mm)
2702-347	Jaw faces for flats (brake lining (HFC), 50 × 38 mm)
2702-350	Jaw faces for flats (line contact, 25 mm)
2702-351	Jaw faces for flats (line contact, 75 mm)
2702-352	Jaw faces for flats (waved profile, 50 × 50 mm)
2702-353	Jaw faces for flats (waved profile, 75 × 50 mm)
2702-354	Jaw faces for rounds (V-serrated, 3 to 6.5 mm dia. × 25 mm)
2702-355	Jaw faces for rounds (V-serrated, 6 to 18.5 mm dia. × 25 mm)

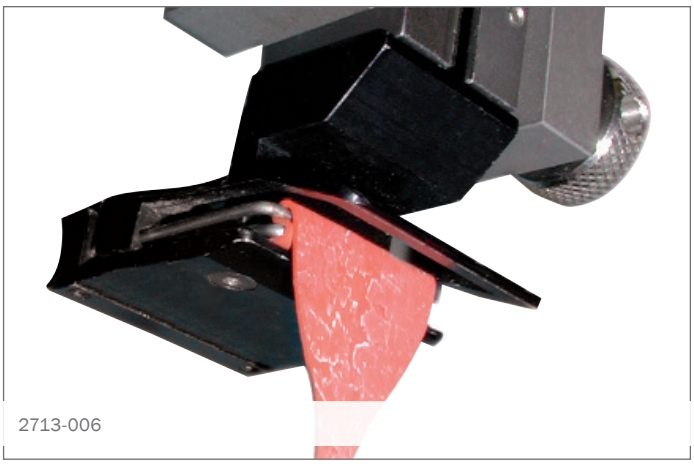
ITEMS FOR USE WITH 2710-203, 2710-204, 2710-205

Catalog Number	Description
2702-140	Jaw faces for flats (smooth, 50 × 30 mm)
2702-141	Jaw faces for flats (serrated, 50 × 30 mm)
2702-142	Jaw faces for flats (rubber-coated, 50 × 30 mm)
2702-143	Jaw faces for flats (waved profile, 50 × 30 mm)

ITEMS FOR USE WITH 2710-111, 2710-112, 2710-113, 2710-116, 2712-114, 2712-115

Catalog Number	Description
2710-109	Specimen centering device

SELF-TIGHTENING/THIN FILM GRIPS



2713-006

The self-tightening grips are primarily designed for precision testing of elastomeric and other flexible materials exhibiting a large reduction in cross-section area under load. They provide excellent testing accuracy, positive non-slip gripping action, and are quick and simple to use.

Principle of Operation

The self-tightening grip uses a serrated eccentric rollertype clamping action. The one lever, fast action reduces the time required to load specimens Specimen. insertion is extremely easy, and the spring pressures of the roller provides a positive non-slip action gripping force. This force is sufficient to hold the material until a load is applied. The follow-up action of the roller while under test prevents the specimen from creeping out of the grip as the load increases.

Special thin film grips use smooth and rubber coated wire capstans to provide a quick and highly efficient grip for testing thin film materials.

Application Range

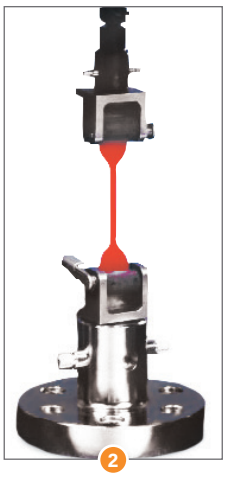
- Type of loading: Tensile, static, tension cyclic tests. Not suitable for high-cycle fatigue tests.
- Specimen material: Thin sheets, films, flexible plastic and elastomers.
- Specimen shapes: Flat specimen with or without shoulder tab ends.

Safety Advice

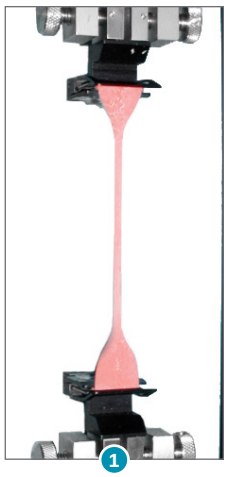
Review safety note on page 236

SELF-TIGHTENING/THIN FILM GRIPS











SELF-TIGHTENING ROLLER GRIPS

	Catalog Number	Capacity			Specimen Thickness		Upper Fitting	Lower Fitting	Effective Length		Temperature Rating	
		kN	kgf	lbf	mm	in			mm	in	°C	°F
1	2713-007	1	100	225	0 - 3	0 - 0.1	6 mm clevis pin (Type Om)	6 mm clevis pin (Type Dm)	102	4	-70 to +150	-94 to +300
2	2713-004	2	200	450	0 - 4	0 - 0.2	6 mm clevis pin (Type Om)	6 mm clevis pin (Type Om)	65	2.6	-70 to +315	-94 to +600
3	2713-002	5	500	1,125	0 - 8	0 - 0.3	½ in clevis pin (Type Dm)	½ in clevis pin (Type Dm)	102	4	-70 to +315	-94 to +600

THIN FILM GRIPS

	Catalog Number	Capacity			Specimen Thickness		Upper Fitting	Lower Fitting	Longer Effective Length		Temperature Rating	
		kN	kgf	lbf	mm	in			mm	in	°C	°F
1	2713-006	0.100	10	22	0 - 0.2	0 - 0.008	Tabbed End	Tabbed End	28	1.1	+10 to +40	+50 to +100

ITEMS FOR USE WITH 2713-006

	Catalog Number	Description
1	2501-351	Includes one ¼ in clevis pin (Type Cm), one ½ in clevis pin (Type Dm) and two 6 mm clevis pin (Type Om) connections

Notes:
1. Adapter set to allow thin film grips to be mounted directly to the testing machine rather than held in an existing grip

THREADED-END AND BUTTON-END GRIP BODIES



W-5158-1

Button-end holders are engineered to expedite production floor testing. The split-sleeve design eliminates the need for specimens to be threaded into the holder. The open front aspect also increases the ease in loading each specimen, as the operator has a full view of specimen position throughout the loading procedure. The contoured edge of each split-sleeve fits securely around the button head of shoulder-end specimens, and the external collar slides over the split sleeves and locks in place. This ensures quick, easy, secure and consistent specimen placement for each test.

The purely mechanical operation and solid steel construction of all parts ensure durability and require minimal maintenance. Additionally, the split sleeves are hardened, increasing ruggedness. The threadedend holders mount directly onto the threaded portion of spherically-seated tension rods. A threaded-end specimen is then fitted into each threaded-end holder. Once the specimen is positioned correctly in the two threaded-end holders, the operator may begin the test.

Principle of Operation

The button-end holder mounts directly onto the threaded portion of spherically-seated tension rods. After placing the specimen into the open split sleeve, the operator places the second split sleeve over the specimen and brings the external sleeve over the assembly. As the operator brings the external sleeve over the specimen and twists it, the mechanism locks the specimen into place. As the pre-test load force is applied to remove slack between the grip and specimen, the spherically-seated tension rods automatically straighten the specimen if it is placed off-center. This feature ensures the tension from the frame is applied to the whole of the specimen. Shoulder end holders are designed to comply with ASTM E8, ASTM A370, or ASTM A48, and other international standards, and can be made to customer specifications. The threaded-end holders mount directly onto the threaded portion of sphericallyseated tension rods. A threaded-end specimen is then fitted into each threaded end holder. Once the specimen is positioned correctly in the two threadedend holders, the operator may begin the test.

Application Range

- Type of loading: Static tension.
- Specimen material: Wide variety of metals, including, but not limited to: steel, cast iron, aluminum, titanium, and brass.
- Specimen types: Machined, shoulder-end specimens; machined, threaded-end specimens. Other diameters may be
- available upon customer request.

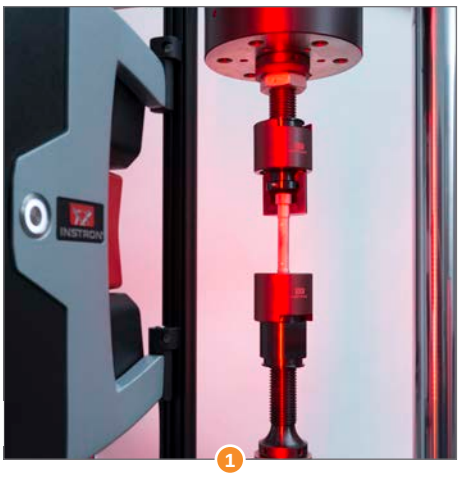
Safety Advice

Review safety note on page 236

THREADED-END AND BUTTON-END GRIP BODIES



W-5101



1



1

BUTTON-END SPECIMEN HOLDERS

	Catalog Number	Capacity			Upper Fitting	Lower Fitting	Accessory Diameter		Effective Length		Temperature Rating		Weight	
		kN	kgf	lbf			mm	in	mm	in	°C	°F	lb	kg
1	W-5158-1	300	30,000	67,500	M36 × 4 RHf	M36 × 4 RHf	78.2	3.3	83	3.3	0 - 38	32 to 100	4.1	1.86
	W-5158-2	300	30,000	67,500	1.5 in - 6 RHf	1.5 in - 6 RHf	78.2	3.3	83	3.3	0 - 38	32 - 100	4.1	1.86
	W-5158-3	300	30,000	67,500	1.5 in - 12 RHf	1.5 in - 12 RHf	78.2	3.3	83	3.3	0 - 38	32 - 100	4.1	1.86
	W-5159	600	60,000	135,000	M48 × 2p RHf	M48 × 2p RHf	114	4.5	127	5.0	0 - 38	32 - 100	13.58	6.16

Notes: 1. See items for use with specimen holders 2717-029.
2. All items are for Static use only.

INSERTS FOR USE WITH W-5158/W-5159 HOLDERS

	Catalog Number	Use With Holder	Specimen Diameter		Capacity	Specification	Weight	
			mm	in	kN		lb	kg
	W-5158-D	W-5158-x	-	0.16	50	ASTM E8, A370	1.81	0.82
	W-5158-C	W-5158-x	-	0.252	150	ASTM E8, A370	1.81	0.82
	W-5158-B	W-5158-x	-	0.357	200	ASTM E8, A370	1.81	0.82
1	W-5158-A	W-5158-x	-	0.505	300	ASTM E8, A370	1.81	0.82
	W-5159-A1	W-5159	-	0.5	400	ASTM A48	5.3	2.4
	W-5159-A2	W-5159	-	0.75	500	ASTM A48	5.3	2.4
	W-5159-A3	W-5159	-	1.25	600	ASTM A48	5.3	2.4
	W-5159-B9	W-5159	3	-	10	GOST 1497	5.3	2.4
	W-5159-B8	W-5159	4	-	25	GOST 1497	5.3	2.4
	W-5159-B7	W-5159	5	-	40	GOST 1497	5.3	2.4
	W-5159-B6	W-5159	6	-	50	GOST 1497	5.3	2.4
	W-5159-B5	W-5159	8	-	100	GOST 1497	5.3	2.4
	W-5159-B4	W-5159	10	-	150	GOST 1497	5.3	2.4
	W-5159-B3	W-5159	15	-	300	GOST 1497	5.3	2.4
	W-5159-B2	W-5159	20	-	600	GOST 1497	5.3	2.4
	W-5159-B1	W-5159	25	-	600	GOST 1497	5.3	2.4

THREADED-END AND BUTTON-END GRIP BODIES



2717 Series Threaded Specimen Holders

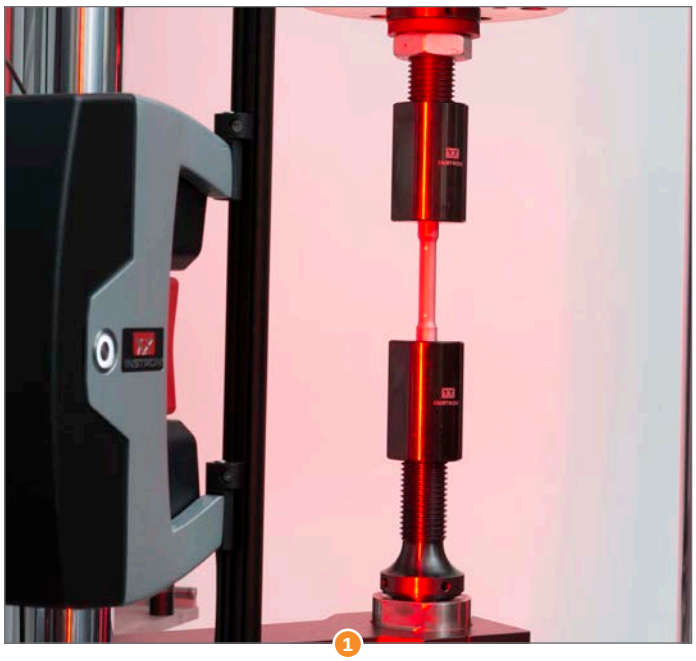
THREADED-END SPECIMEN HOLDERS

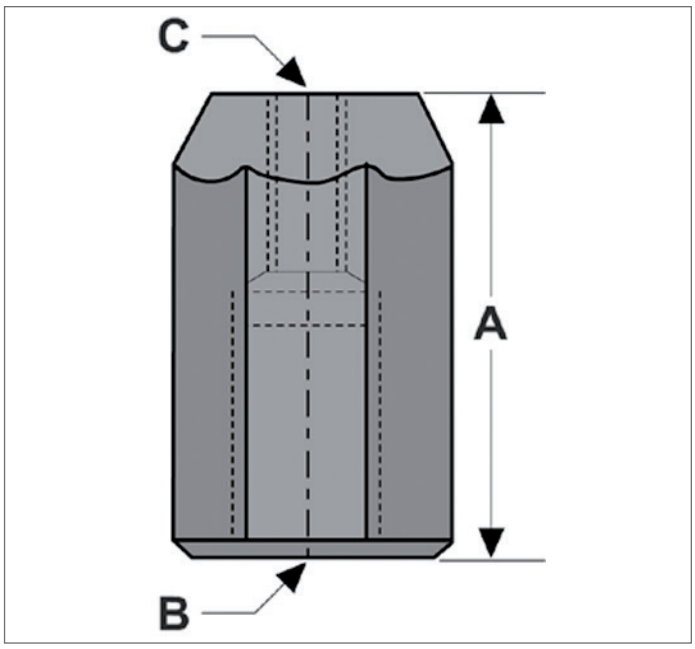
Catalog Number	Capacity			Upper Fitting	Lower Fitting	Accessory Diameter		Effective Length		Temperature Rating	
	kN	kgf	lbf			mm	in	mm	in	°C	°F
2717-029	100	10,000	20,000	½ in clevis pin (Type Dm)	½ in clevis pin (Type Dm)	50	2	82	3.2	0 to +150	+32 to +302

ITEMS FOR USE WITH 2717-028, CP109094, 2717-029

Catalog Number	Description
2717-021	Grip heads, M8 threaded
2717-022	Grip heads, M10 threaded
2717-023	Grip heads, M12 threaded
CP109870	Grip heads, M14 threaded
CP109287	Grip heads, M16 threaded
2717-024	Grip heads, M18 threaded
2717-025	Grip heads, M20 threaded
2717-026	Grip heads, M24 threaded
2717-027	Grip heads, blank, for threaded specimens

THREADED-END AND BUTTON-END GRIP BODIES

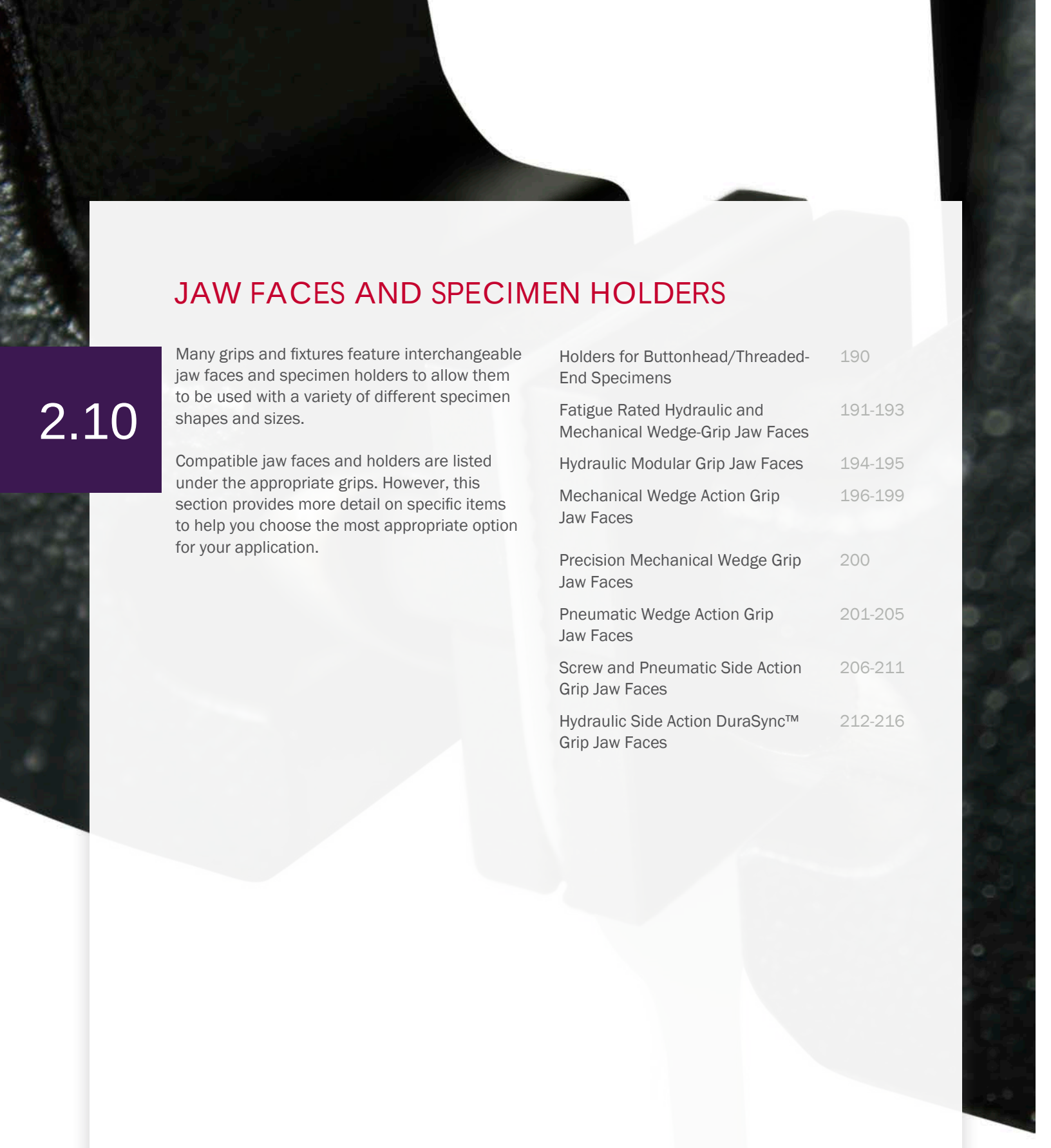




THREADED-END SPECIMEN HOLDERS

Catalog Number	Capacity			Specimen Diameter (C)		Specimen Thread Size	Upper Fitting (B)	Lower Fitting (B)	Accessory Length (A)		Temperature Rating		Static or Fatigue Rated
	kN	kgf	lbf	mm	in				mm	in	°C	°F	
1 W-5101	267	26,700	60,000	12.8	0.505	0.75 in - 10 NC	1.5 in - 6 fRH	1.5 in - 6 fRH	89	3.5	+5 to +40	+40 to +100	Static
W-5150	267	26,700	60,000	12.8	0.505	0.75 in - 10 NC	M36 x 4 fRH	M36 x 4 fRH	89	3.5	+5 to +40	+40 to +100	Static
W-5102	267	26,700	60,000	Specify up to 38	1.5	Specify up to 38 mm (1.5 in)	Specify up to 1.5 in	Specify up to 1.5 in	89	3.5	+5 to +40	+40 to +100	Static

Notes:
1. W-5102: Customer to specify diameter and thread pitch. Maximum diameter of threaded-end of specimen and of tension rod is 38 mm (1.5 in).



JAW FACES AND SPECIMEN HOLDERS

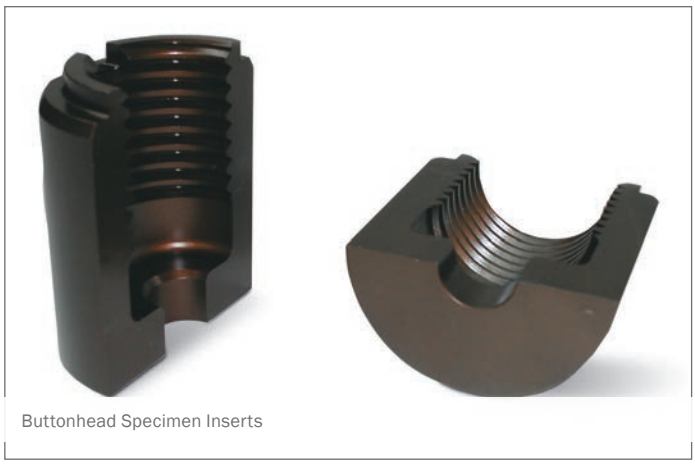
2.10

Many grips and fixtures feature interchangeable jaw faces and specimen holders to allow them to be used with a variety of different specimen shapes and sizes.

Compatible jaw faces and holders are listed under the appropriate grips. However, this section provides more detail on specific items to help you choose the most appropriate option for your application.

Holders for Buttonhead/Threaded-End Specimens	190
Fatigue Rated Hydraulic and Mechanical Wedge-Grip Jaw Faces	191-193
Hydraulic Modular Grip Jaw Faces	194-195
Mechanical Wedge Action Grip Jaw Faces	196-199
Precision Mechanical Wedge Grip Jaw Faces	200
Pneumatic Wedge Action Grip Jaw Faces	201-205
Screw and Pneumatic Side Action Grip Jaw Faces	206-211
Hydraulic Side Action DuraSync™ Grip Jaw Faces	212-216

HOLDERS FOR BUTTONHEAD/THREADED-END SPECIMENS



Buttonhead Specimen Inserts



W-5158-A

Holders are available to suit metallic threaded-end or buttonhead specimen styles in a range of different force capacities and sizes.

Principle of Operation

Threaded holders allow the specimen to be located directly by matching threads on the specimen. Buttonhead holders support the specimen under its shoulders.

Application Range

- Tests on threaded and buttonhead specimens made from metals and alloys

Safety Advice

Review safety note on page 236

GRIP HEADS FOR 2717-028 AND 2717-029 100 kN SELF-ALIGNING GRIPS

Catalog Number	Description
2717-021	Grip heads, M8 threaded
2717-022	Grip heads, M10 threaded
2717-023	Grip heads, M12 threaded
CP109870	Grip heads, M14 threaded
CP109287	Grip heads, M16 threaded
2717-024	Grip heads, M18 threaded
2717-025	Grip heads, M20 threaded
2717-026	Grip heads, M24 threaded
2717-027	Grip heads, blank, for threaded specimens

INSERTS FOR SHOULDER-END / BUTTON-HEAD SPECIMENS, 300 kN, FOR USE WITH W-5158

Catalog Number	Description
W-5158-A	0.505 inch shoulder-end specimen inserts
W-5158-B	0.357 inch shoulder-end specimen inserts
W-5158-C	0.252 inch shoulder-end specimen inserts
W-5158-D	0.160 inch shoulder-end specimen inserts
W-5158-X	Non-standard shoulder-end specimen inserts to customer drawing

FATIGUE-RATED HYDRAULIC AND MECHANICAL WEDGE GRIP JAW FACES



1

2703 and 2704 Series grip faces are designed to provide the best gripping for Instron® hydraulic and mechanical wedge grips. Flat and V-faces accommodate a wide range of specimen sizes in both flats and rounds. The faces are available in serrated steel for flats and rounds, and also carbide-coated for flats.

Principle of Operation

Grip faces feature serrated surfaces for optimum gripping. The serrations are designed to minimize damage to the specimen surface. Carbide-coated faces are also available for challenging materials.
*Note: Maximum Torque dependant on material

Application Range

- Static and fatigue tests on a wide variety of metallic and rigid non-metallic materials, including composites

JAW FACES FOR 2742-301: 30 kN HYDRAULIC WEDGE GRIPS

Catalog Number	Specimen Thickness		Specimen Diameter		Surface	Pitch	Accessory Width		Accessory Height	
	mm	in	mm	in		mm	mm	in	mm	in
2703-801	0 - 6.3	0 - 0.25	-	-	Serrated	0.6	25	1	38	1.5
2703-802	6.3 - 12.7	0.25 - 0.5	-	-	Serrated	0.6	25	1	38	1.5
2703-803	-	-	3.0 - 7.8	0.12 - 0.31	V-profile, Serrated (shark's tooth)	1	25	1	38	1.5
1 2703-804	-	-	7.1 - 12.7	0.28 - 0.5	V-profile, Serrated (shark's tooth)	1	25	1	38	1.5
2703-807	-	-	12.4 - 18	0.49 - 0.71	V-profile, Serrated (shark's tooth)	1	25	1	38	1.5

Notes: 1. 2703-807 rated to 10kN Axial force and 100Nm torsional capacity.

JAW FACES FOR 2742-102/-103 WEDGE GRIPS

Catalog Number	Specimen Thickness		Specimen Diameter		Surface	Pitch	Accessory Width		Accessory Height	
	mm	in	mm	in		mm	mm	in	mm	in
2703-901	0 - 6.3	0 - 0.25	-	-	Serrated	0.6	19	0.75	19	0.75
2703-902	-	-	3.0 - 7.8	0.12 - 0.31	V-profile (shark's tooth)	1	19	0.75	19	0.75

FATIGUE-RATED HYDRAULIC AND MECHANICAL WEDGE GRIP JAW FACES

JAW FACES FOR 2743-401/402: 100 kN HYDRAULIC AND MECHANICAL WEDGE GRIPS

Catalog Number	Specimen Thickness		Specimen Diameter		Surface	Pitch	Accessory Width		Accessory Height	
	mm	in	mm	in		mm	mm	in	mm	in
2704-521	0 - 7.8	0 - 0.31	-	-	Serrated	0.6	50	2	57	2.25
2704-525	0 - 7.8	0 - 0.31	-	-	Serrated	-	50	2	57	2.25
2704-526	7.1 - 15.7	0.28 - 0.62	-	-	Serrated	-	50	2	57	2.25
2704-522	7.1 - 15.7	0.28 - 0.62	-	-	Serrated	0.6	50	2	57	2.25
2704-529	15 - 21	0.59 - 0.82	-	-	Serrated	0.6	50	2	57	2.25
2704-527	16.5 - 25.2	0.65 - 0.99	-	-	Serrated	0.6	50	2	57	2.25
2704-523	-	-	6.1 - 11.9	0.24 - 0.47	V-profile, Serrated (shark's tooth)	1	50	2	57	2.25
2704-524	-	-	9.9 - 16	0.39 - 0.63	V-profile, Serrated (shark's tooth)	1	50	2	57	2.25
2704-528	-	-	16 - 20	0.63 - 0.78	Serrated	1	50	2	57	2.25

JAW FACES FOR 2742-501: 250 kN HYDRAULIC WEDGE GRIPS

Catalog Number	Specimen Thickness		Specimen Diameter		Surface	Pitch	Accessory Width		Accessory Height	
	mm	in	mm	in		mm	mm	in	mm	in
2703-541	1 - 12	0.04 - 0.47	-	-	Serrated	1	100	4	90	3.5
2703-542	11 - 22	0.43 - 0.87	-	-	Serrated	1	100	4	90	3.5
2703-543	21 - 32	0.83 - 1.26	-	-	Serrated	1	100	4	90	3.5
2703-544	31 - 42	1.22 - 1.65	-	-	Serrated	1	100	4	90	3.5
2703-545	-	-	5 - 10	0.2 - 0.4	V-profile, serrated (shark's tooth)	1.6	100	4	90	3.5
2703-546	-	-	10 - 16	0.4 - 0.63	V-profile, serrated (shark's tooth)	1.6	100	4	90	3.5
2703-547	-	-	16 - 22	0.63 - 0.87	V-profile, serrated (shark's tooth)	1.6	100	4	90	3.5
2703-548	-	-	22 - 28	0.97 - 1.10	V-profile, serrated (shark's tooth)	1.6	100	4	90	3.5
2703-549	-	-	28 - 34	1.10 - 1.34	V-profile, serrated (shark's tooth)	1.6	100	4	90	3.5
2703-572	1 - 12	0.04 - 0.47	-	-	Carbide-coated	-	100	4	90	3.5
2703-573	11 - 22	0.43 - 0.87	-	-	Carbide-coated	-	100	4	90	3.5
2703-574	21 - 32	0.83 - 1.26	-	-	Carbide-coated	-	100	4	90	3.5
2703-575	31 - 42	1.22 - 1.65	-	-	Carbide-coated	-	100	4	90	3.5

FATIGUE-RATED HYDRAULIC AND MECHANICAL WEDGE GRIP JAW FACES

JAW FACES FOR 2743-401/402: 100 kN HYDRAULIC AND MECHANICAL WEDGE GRIPS

Catalog Number	Specimen Thickness		Specimen Diameter		Surface	Pitch	Accessory Width		Accessory Height	
	mm	in	mm	in		mm	mm	in	mm	in
2703-641	1 - 13	0.04 - 0.51	-	-	Serrated	1	100	4	90	3.25
2703-642	13 - 26	0.51 - 1.02	-	-	Serrated	1	100	4	90	3.25
2703-643	26 - 39	1.0 - 1.54	-	-	Serrated	1	100	4	90	3.25
2703-644	39 - 52	1.54 - 2.05	-	-	Serrated	1	100	4	90	3.25
2703-645	-	-	5 - 13	0.2 - 0.51	V-profile, Serrated (shark's tooth)	1.6	100	4	90	3.25
2703-646	-	-	13 - 26	0.51 - 1.02	V-profile, Serrated (shark's tooth)	1.6	100	4	90	3.25
2703-647	-	-	26 - 39	1.0 - 1.54	V-profile, Serrated (shark's tooth)	1.6	100	4	90	3.25
2703-648	-	-	39 - 52	1.54 - 2.05	V-profile, Serrated (shark's tooth)	1.6	100	4	90	3.25
2703-649	-	-	52 - 65	2.05 - 2.56	V-profile, Serrated (shark's tooth)	1.6	100	4	90	3.25

HYDRAULIC MODULAR GRIP JAW FACES



2703-521

The 2703 Series grip faces are designed to provide the best possible gripping for Instron® 2742 Series hydraulic modular grips. 2703 Series flat and V-faces accommodate a wide range of specimen sizes in both flats and rounds. The faces are serrated for maximum gripping effectiveness.

Principle of Operation

2703 Series grip faces feature serrated surfaces for optimum gripping. The serrations are designed to minimize damage to the specimen surface.

Application Range

- Static and fatigue tests on a wide variety of metallic and rigid non-metallic materials including composites

HYDRAULIC MODULAR GRIP JAW FACES

JAW FACES FOR 2742-424: 100 kN MODULAR GRIPS

Catalog Number	Specimen Thickness		Specimen Diameter		Surface	Pitch	Accessory Width		Accessory Height	
	mm	in	mm	in		mm	mm	in	mm	in
2703-521	0 - 6.4	0 - 0.25	-	-	Serrated	0.6	50	2	57	2.25
2703-522	6.4 - 12.7	0.25 - 0.5	-	-	Serrated	0.6	50	2	57	2.25
2703-523	-	-	3.0 - 7.9	0.12 - 0.31	V-profile, serrated (shark's tooth)	1.0	50	2	57	2.25
2703-524	-	-	7.1 - 12.7	0.28 - 0.50	V-profile, serrated (shark's tooth)	1.0	50	2	57	2.25
2703-525	-	-	13.5 - 19.1	0.53 - 0.75	V-profile, serrated (shark's tooth)	1.0	50	2	57	2.25

JAW FACES FOR 2742-524: 250 kN MODULAR GRIPS

Catalog Number	Specimen Thickness		Specimen Diameter		Surface	Pitch	Accessory Width		Accessory Height	
	mm	in	mm	in		mm	mm	in	mm	in
2703-551	0 - 6.35	0 - 0.25	-	-	Serrated	0.6	100	4	76	3
2703-552	6.35 - 12.7	0.25 - 0.5	-	-	Serrated	0.6	100	4	76	3
2703-553	12.7 - 19.0	0.5 - 0.75	-	-	Serrated	0.6	100	4	76	3
2703-554	19 - 25.4	0.75 - 1.0	-	-	Serrated	0.6	100	4	76	3
2703-555	25.4 - 31.75	1.0 - 1.3	-	-	Serrated	0.6	100	4	76	3
2703-556	31.75 - 38.1	1.3 - 1.5	-	-	Serrated	0.6	100	4	76	3
2703-559	-	-	15.3 - 20.75	0.6 - 0.8	V-profile, Serrated (shark's tooth)	1.0	100	4	76	3
2703-558	-	-	20.75 - 26.25	0.8 - 1.03	V-profile, Serrated (shark's tooth)	1.0	100	4	76	3
2703-557	-	-	26.25 - 31.75	1.0 - 1.3	V-profile, Serrated (shark's tooth)	1.0	100	4	76	3

MECHANICAL WEDGE ACTION GRIP JAW FACES



Selection of 25 mm Wide Jaw Faces

2703 Series grip faces are designed to provide the best possible gripping for Instron® wedge action grips. Various surfaces are available to suit a wide range of specimen characteristics including flat serrated, v-serrated, threaded and Surfalloy coated.

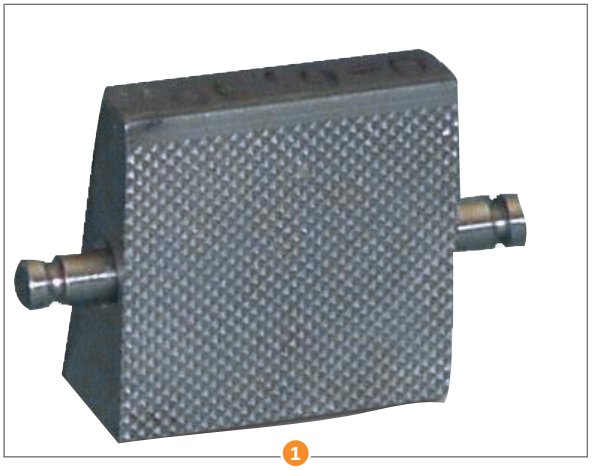
Principle of Operation

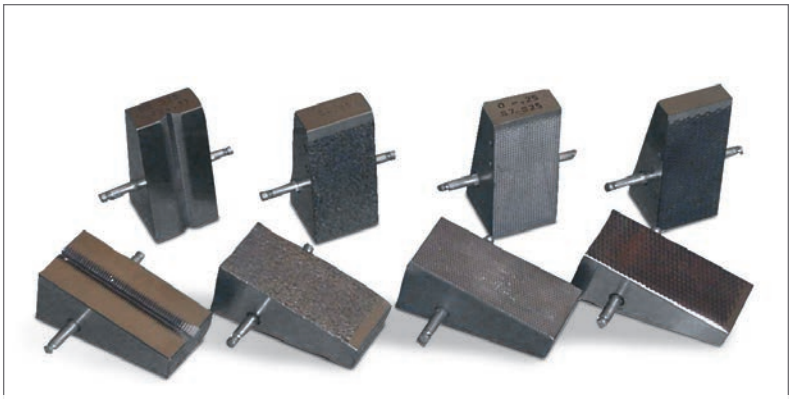
The faces are available in a range of sizes to accommodate most type of specimen sizes and material types. The 16 teeth per inch serrations are preferable for use with most metal, since they provide greater penetration into the specimen and have longer wear. The 25 teeth per inch serrations are ideal for small diameter, thin, very hard or penetration-sensitive materials. Some faces are also available with SurfAlloy™ coatings.

Application Range

- Tension applications for wires, plastics, metals, and other rigid materials
- Specimens may be round or flat

MECHANICAL WEDGE ACTION GRIP JAW FACES





Jaw Faces for 2716-010, 2716-015, 2716-020 and 2736-015 Grips

FLAT SPECIMEN JAW FACES FOR 2716-016 AND 2716-017 GRIPS

Catalog Number	Specimen Thickness		Surface	Pitch	Teeth Per Inch	Accessory Width		Accessory Height	
	mm	in		mm		mm	in	mm	in
1 2703-171	0 - 6.35	0 - 0.25	Flat-serrated	0.65	40	19	0.75	19	0.75

FLAT SPECIMEN JAW FACES FOR 2716-010, 2716-015, 2716-020 AND 2736-015 GRIPS

Catalog Number	Specimen Thickness		Surface	Pitch	Teeth Per Inch	Accessory Width		Accessory Height	
	mm	in		mm		mm	in	mm	in
2703-160	0 - 6.4	0 - 0.25	Rubber-coated	-	-	25	1	57	2.2
2703-155	0 - 6.4	0 - 0.25	Flat-serrated	1.0	25	25	1	57	2.2
2703-151	0 - 6.4	0 - 0.25	Flat-serrated	1.5	16	25	1	57	2.2
2703-156	6.4 - 12.6	0.25 - 0.5	Flat-serrated	1.0	25	25	1	57	2.2
2703-152	6.4 - 12.6	0.25 - 0.5	Flat-serrated	1.5	16	25	1	57	2.2
2703-157	0 - 6.4	0 - 0.25	SurfAlloy-coated	-	100 grit	25	1	57	2.2
2703-158	6.4 - 12.6	0.25 - 0.5	SurfAlloy-coated	-	100 grit	25	1	57	2.2

ROUND SPECIMEN JAW FACES FOR 2716-010, 2716-020 AND 2736-015 GRIPS

Catalog Number	Specimen Thickness		Surface	Pitch	Teeth Per Inch	Accessory Width		Accessory Height	
	mm	in		mm		mm	in	mm	in
2703-153	3.2 - 7.8	0.125 - 0.3	V-serrated	1.0	25	25	1	57	2.2
2703-154	7.1 - 12.5	0.25 - 0.5	V-serrated	1.0	25	25	1	57	2.2

MECHANICAL WEDGE ACTION GRIP JAW FACES



Jaw Faces for 2716-002 and 2736-002 Grips



Jaw Faces for 2716-003, 2716-008 and 2736-003 Grips

FLAT SPECIMEN JAW FACES FOR 2716-002 AND 2736-002 GRIPS

Catalog Number	Specimen Thickness		Surface	Pitch	Teeth Per Inch	Accessory Width		Accessory Height	
	mm	in		mm		mm	in	mm	in
2703-006	0 - 6.4	0 - 0.25	Flat-serrated	1.0	25	25	1	57	2.2
2703-001	0 - 6.4	0 - 0.25	Flat-serrated	1.5	16	25	1	57	2.2
2703-007	6.4 - 12.6	0.25 - 0.5	Flat-serrated	1.0	25	25	1	57	2.2
2703-002	6.4 - 12.6	0.25 - 0.5	Flat-serrated	1.5	16	25	1	57	2.2

ROUND SPECIMEN JAW FACES FOR 2716-002 AND 2736-002 GRIPS

Catalog Number	Specimen Thickness		Surface	Pitch	Teeth Per Inch	Accessory Width		Accessory Height	
	mm	in		mm		mm	in	mm	in
2703-070	12 - 16	0.25 - 0.63	Round-threaded	1.5	16	25	1	57	2.2
2703-071	16 - 19	0.63 - 0.75	Round-threaded	1.5	16	25	1	57	2.2

V-SERRATED JAW FACES FOR 2716-002 AND 2736-002 GRIPS

Catalog Number	Specimen Thickness		Surface	Pitch	Teeth Per Inch	Accessory Width		Accessory Height	
	mm	in		mm		mm	in	mm	in
2703-008	3.5 - 8	0.13 - 0.31	V-serrated	1.0	25	25	1	57	2.2
2703-009	7 - 12.7	0.28 - 0.5	V-serrated	1.0	25	25	1	57	2.2
2703-004	7 - 12.7	0.28 - 0.5	V-serrated	1.5	16	25	1	57	2.2
2703-010	12.7 - 19	0.5 - 0.75	V-serrated	1.0	25	25	1	57	2.2

FLAT SPECIMEN JAW FACES FOR 2716-003, 2716-008 AND 2736-003 GRIPS

Catalog Number	Specimen Thickness		Surface	Pitch	Teeth Per Inch	Accessory Width		Accessory Height	
	mm	in		mm		mm	in	mm	in
2703-011	0 - 6.4	0 - 0.25	Flat-serrated	1.5	16	50	2	57	2.2
2703-012	6.4 - 12.7	0.25 - 0.5	Flat-serrated	1.5	16	50	2	57	2.2

MECHANICAL WEDGE ACTION GRIP JAW FACES

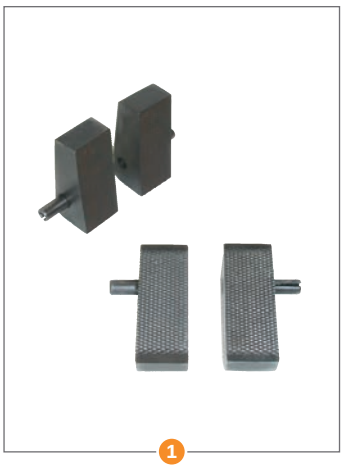
ROUND SPECIMEN JAW FACES FOR 2716-003, 2716-008 AND 2736-003 GRIPS

Catalog Number	Specimen Thickness		Surface	Pitch	Teeth Per Inch	Accessory Width		Accessory Height	
	mm	in		mm		mm	in	mm	in
2703-072	12 - 16	0.25 - 0.63	Round-threaded	1.5	16	50	2	57	2.2
2703-073	16 - 19	0.63 - 0.75	Round-threaded	1.5	16	50	2	57	2.2

V-GROOVED JAW FACES FOR 2716-003, 2716-008 AND 2736-003 GRIPS

Catalog Number	Specimen Thickness		Surface	Pitch	Teeth Per Inch	Accessory Width		Accessory Height	
	mm	in		mm		mm	in	mm	in
2703-013	3.5 - 8	0.13 - 0.31	V-serrated	1.0	25	50	1	57	2.2
2703-014	7 - 12.7	0.28 - 0.5	V-serrated	1.0	25	50	1	57	2.2
2703-015	12.7 - 19	0.5 - 19	V-serrated	1.0	25	50	1	57	2.2

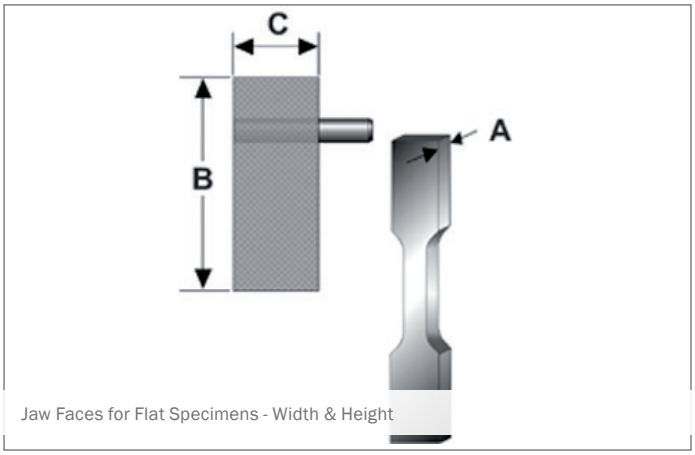
MECHANICAL WEDGE ACTION GRIP JAW FACES



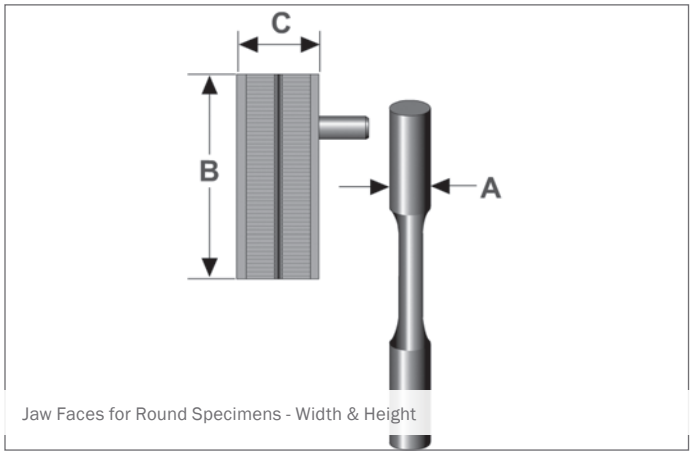








Jaw Faces for Flat Specimens - Width & Height



Jaw Faces for Round Specimens - Width & Height

FLAT SPECIMEN JAWS FOR W-5021, W-5021M, W-5005 AND W-5005M T-GRIPS

	Catalog Number	Specimen Thickness for W-5021 (A)		Specimen Thickness for W-5005 (A)		Surface	Teeth Per Inch	Accessory Width (C)		Accessory Height (B)	
		mm	in	mm	in			mm	in	mm	in
1	W-5012	0 - 12.7	0 - 0.5	3.8 - 8.9	0.15 - 0.35	Diamond 45°	16	24.9	0.98	63.5	2.50
	W-5012-A	0 - 12.7	0 - 0.5	3.8 - 8.9	0.15 - 0.35	Diamond 60°	16	24.9	0.98	63.5	2.50
2	W-5011	0 - 12.7	0 - 0.5	5 - 10	0.2 - 0.4	Horizontal	16	24.9	0.98	63.5	2.50
3	W-5011-A	0 - 12.7	0 - 0.5	5 - 10	0.2 - 0.4	Horizontal	20	24.9	0.98	63.5	2.50

ROUND SPECIMEN JAWS FOR W-5021, W-5021M AND W-5005M T-GRIPS

	Catalog Number	Specimen Thickness for W-5021 (A)		Specimen Thickness for W-5005 (A)		Teeth Per Inch	Accessory Width (C)		Accessory Height (B)	
		mm	in	mm	in		mm	in	mm	in
	W-5015	6.4 - 12.7	0.250 - 0.500	8.9 - 12.7	0.35 - 0.5	16	25.1	0.99	63.5	2.50
	W-5015-A	6.4 - 12.7	0.250 - 0.500	8.9 - 12.7	0.35 - 0.5	16	25.1	0.99	63.5	2.50
	W-5022	12.7 - 19.0	0.500 - 0.750	16.5 - 20.3	0.65 - 0.8	16	25.1	0.99	63.5	2.50
1	W-5023	19.0 - 25.4	0.750 - 1.000	22.9 - 26.6	0.9 -1.05	16	25.1	0.99	63.5	2.50

MECHANICAL WEDGE ACTION GRIP JAW FACES



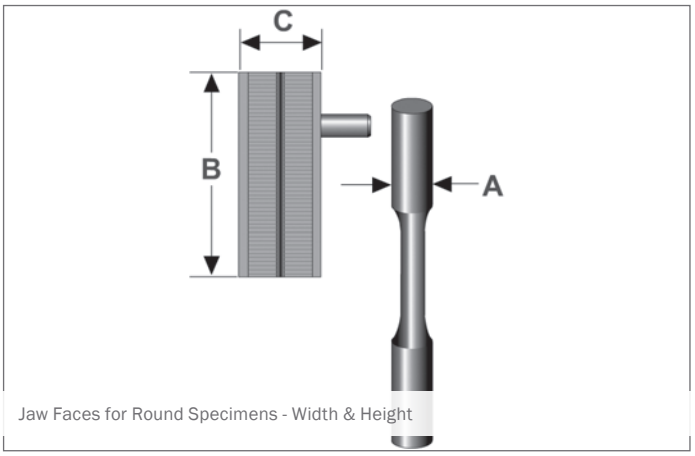
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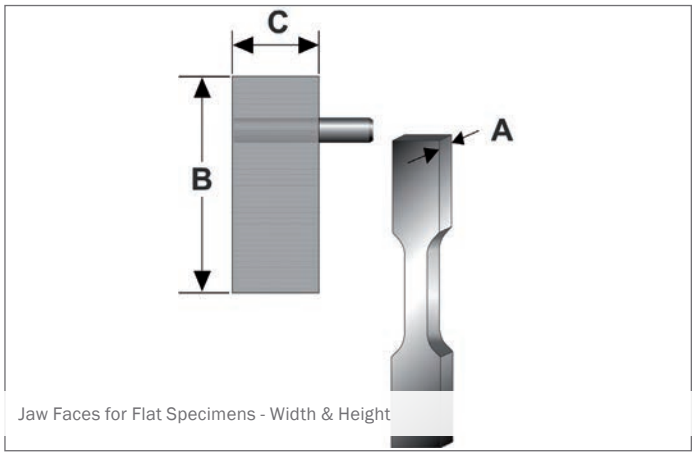
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Jaw Faces for Round Specimens - Width & Height



Jaw Faces for Flat Specimens - Width & Height

ROUND SPECIMEN JAWS FOR W-5057M AND W-5151 T-GRIPS

	Catalog Number	Specimen Thickness (A)		Surface	Teeth Per Inch	Accessory Width (C)		Accessory Height (B)	
		mm	in			mm	in	mm	in
1	W-2141-A	9.5 - 15.9	0.375 - 0.625	Horizontal	16	50.3	1.98	63.5	2.50
2	W-2141-B	15.9 - 25.4	0.625 - 1.000	Horizontal	16	50.3	1.98	63.5	2.50

FLAT SPECIMEN JAWS FOR W-5057M AND W-5151 T-GRIPS

	Catalog Number	Specimen Thickness (A)		Surface	Teeth Per Inch	Accessory Width (C)		Accessory Height (B)	
		mm	in			mm	in	mm	in
1	W-2142	0 - 12.7	0 - 0.5	Horizontal	16	50.3	1.98	63.5	2.50
1	W-2143	12.7 - 25.4	0.5 - 1.0	Horizontal	16	50.3	1.98	63.5	2.50

PRECISION MECHANICAL WEDGE GRIP JAW FACES



Jaw Faces for Precision Wedge Grips

JAW FACES FOR 2716-028 100 kN GRIPS

Catalog Number	Type	Specimen Thickness/ Diameter Range		Surface	Dimensions (W × H)	
		mm	in		mm	in
2703-363	Flat	0 - 10	0 - 0.39	Diamond Serrated 25 TPI	60 × 75	2.36 × 2.95
2703-366	Flat	0 - 10	0 - 0.39	Carbide Coated	60 × 75	2.36 × 2.95
2703-367	Flat	5 - 15	0.20 - 0.59	Carbide Coated	60 × 75	2.36 × 2.95
2703-364	Flat	5 - 15	0.20 - 0.59	Diamond Serrated 25 TPI	60 × 75	2.36 × 2.95
2703-365	Flat	15 - 25	0.59 - 0.98	Diamond Serrated 25 TPI	60 × 75	2.36 × 2.95
2703-368	Flat	15 - 25	0.59 - 0.98	Carbide Coated	60 × 75	2.36 × 2.95
2703-369	Vee (for Round)	3 - 8	0.12 - 0.31	V-Serrated 25 TPI	60 × 75	2.36 × 2.95
2703-370	Vee (for Round)	8 - 15	0.31 - 0.59	V-Serrated 25 TPI	60 × 75	2.36 × 2.95
2703-710	Flat (for Lap Shear)	-	-	Flat Serrated 25 TPI	60 × 75	2.38 × 2.95

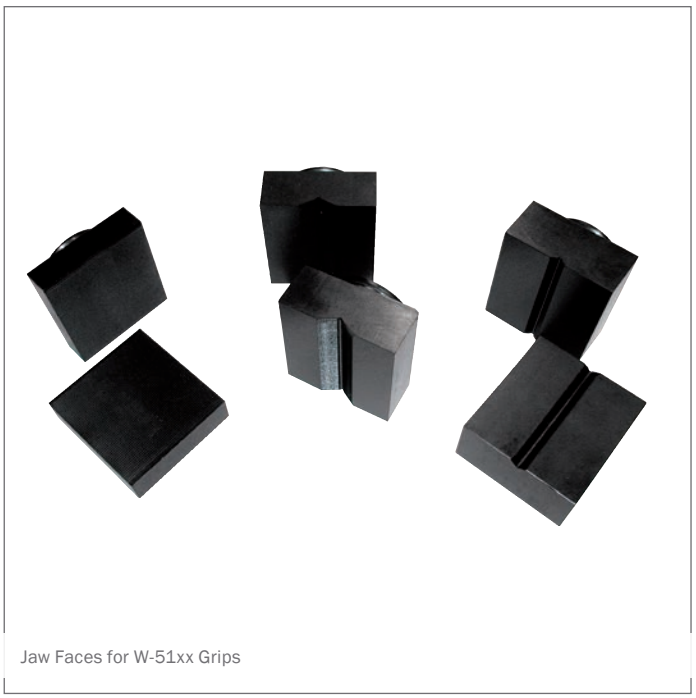
Notes:
1. 2703-710 requires 2501-803 Lap Shear fixture and standard flat serrated faces.
2. Specimen thickness for 2703-710 depends on standard face used.

VEE (FOR ROUND) JAW FACES FOR 2716-028 100 kN GRIPS

Catalog Number	Type	Thickness		Surface	Dimensions (W × H)	
		mm	in		mm	in
2703-340	Flat	0 - 10	0 - 0.39	Diamond Serrated 25 TPI	100 × 100	3.94 × 3.94
2703-343	Flat	0 - 10	0 - 0.39	Carbide Coated	100 × 100	3.94 × 3.94
2703-344	Flat	10 - 20	0.39 - 0.79	Carbide Coated	100 × 100	3.94 × 3.94
2703-341	Flat	10 - 20	0.39 - 0.79	Diamond Serrated 25 TPI	100 × 100	3.94 × 3.94
2703-342	Flat	20 - 30	0.79 - 1.18	Diamond Serrated 25 TPI	100 × 100	3.94 × 3.94
2703-345	Flat	20 - 30	0.79 - 1.18	Carbide Coated	100 × 100	3.94 × 3.94
2703-346	Vee (for round)	5 - 10	0.2 - 0.39	V-Serrated	100 × 100	3.94 × 3.94
2703-347	Vee (for round)	10 - 16	0.39 - 0.62	V-Serrated	100 × 100	3.94 × 3.94
2703-348	Vee (for round)	16 - 22	0.62 - 0.87	V-Serrated	100 × 100	3.94 × 3.94
2703-349	Vee (for round)	22 - 28	0.87 - 1.10	V-Serrated	100 × 100	3.94 × 3.94
2703-350	Vee (for round)	28 - 34	1.1 - 1.34	V-Serrated	100 × 100	3.94 × 3.94
2703-711	Flat (for Lap Shear)	-	-	Flat Serrated 25 TPI	100 × 100	3.94 × 3.94

Notes:
1. 2703-711 requires 2501-703 Lap Shear fixture and standard flat serrated faces.
2. Specimen thickness for 2703-710 depends on standard face used.

PNEUMATIC WEDGE ACTION GRIP JAW FACES



Jaw Faces for W-51xx Grips



Jaw Faces for 2716-1xx Grips

This series of grip faces is designed to provide the best possible gripping for the Instron® 2716 Series, W-5180 and W-5190 pneumatic wedge action grips. Not every face can be used to test every material. Variations of flat surfaces and grooved faces have been developed to accommodate a wider-range of requirements. The faces are designed with serrations of 20 or 25 teeth per inch for maximum gripping effectiveness.

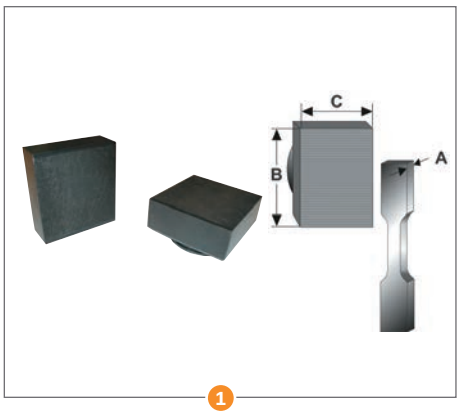
Principle of Operation

The faces are available with either flat or V-grooved surfaces, and in a range of sizes to accommodate most types of specimen sizes and material types. The 20 and 25 teeth per inch serrations are ideal for, thin, very hard or penetration sensitive materials. Additionally, both jaw faces work well for a wide range of specimen types.

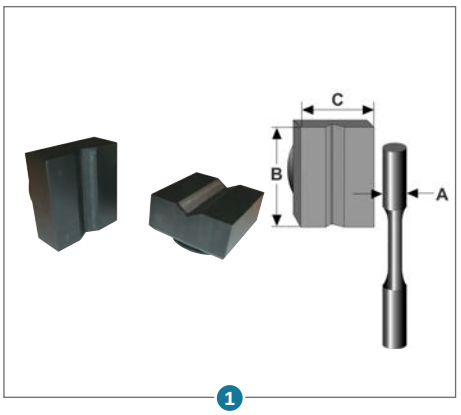
Application Range

- Types of loading: Static tension
- Application range: Wires, metals, rigid plastics
- Specimen types: Flat or round specimens

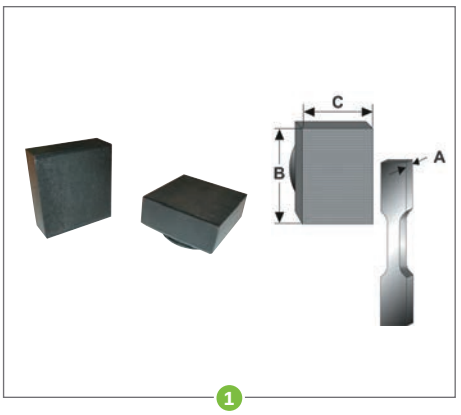
PNEUMATIC WEDGE ACTION GRIP JAW FACES



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FLAT JAW FACES FOR W-5180 PNEUMATIC WEDGE ACTION GRIPS

	Catalog Number	Specimen Thickness (A)		Surface	Pitch	Teeth Per Inch	Accessory Width (C)		Accessory Height (B)	
		mm	in		mm		mm	in	mm	in
1	W-5181-A	0 - 15	0 - 0.59	Flat-serrated	1.25	20	70	2.75	76	3
1	W-5181-B	15 - 30	0.59 - 1.18	Flat-serrated	1.25	20	70	2.75	76	3
1	W-5181-C	30 - 45	1.18 - 1.77	Flat-serrated	1.25	20	70	2.75	76	3
1	W-5181-D	45 - 60	1.77 - 2.36	Flat-serrated	1.25	20	70	2.75	76	3

ROUND JAW FACES FOR W-5180 PNEUMATIC WEDGE ACTION GRIPS

	Catalog Number	Specimen Thickness (A)		Surface	Pitch	Teeth Per Inch	Accessory Width (C)		Accessory Height (B)	
		mm	in		mm		mm	in	mm	in
1	W-5185-A	3 - 5	0.118 - 0.196	V-serrated	1.25	20	70	2.75	76	3
1	W-5185-B	5 - 15	0.196 - 0.590	V-serrated	1.25	20	70	2.75	76	3
1	W-5185-C	15 - 30	0.590 - 1.180	V-serrated	2.5	10	70	2.75	76	3
1	W-5185-D	30 - 45	1.180 - 1.770	V-serrated	2.5	10	70	2.75	76	3

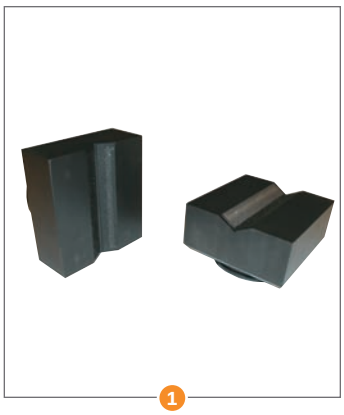
FLAT JAW FACES FOR W-5160 PNEUMATIC WEDGE ACTION GRIPS

Catalog Number	Specimen Thickness (A)		Surface	Pitch	Teeth Per Inch	Accessory Width (C)		Accessory Height (B)	
	mm	in		mm		mm	in	mm	in
W-5197-A	0 - 30	0 - 1.18	Serrated	1.25	20	100	4	100	4
W-5197-B	30 - 60	1.18 - 2.36	Serrated	1.25	20	100	4	100	4

FLAT JAW FACES FOR W-5190 PNEUMATIC WEDGE ACTION GRIPS

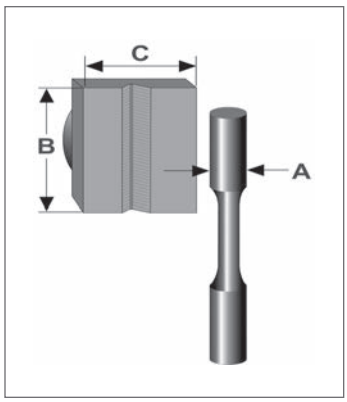
	Catalog Number	Specimen Thickness (A)		Surface	Pitch	Teeth Per Inch	Accessory Width (C)		Accessory Height (B)	
		mm	in		mm		mm	in	mm	in
1	W-5191-A	0 - 15	0 - 0.59	Flat-serrated	1.25	20	100	4	100	4
1	W-5191-B	15 - 30	0.59 - 1.18	Flat-serrated	1.25	20	100	4	100	4
1	W-5191-C	30 - 45	1.18 - 1.77	Flat-serrated	1.25	20	100	4	100	4
1	W-5191-D	45 - 60	1.77 - 2.36	Flat-serrated	1.25	20	100	4	100	4
	W-5191-E	60 - 70	2.36 - 2.75	Flat-serrated	1.25	20	100	4	100	4

PNEUMATIC WEDGE ACTION GRIP JAW FACES









ROUND JAW FACES FOR W-5160 PNEUMATIC WEDGE ACTION GRIPS

Catalog Number	Specimen Thickness (A)		Surface	Pitch	Teeth Per Inch	Accessory Width (C)		Accessory Height (B)	
	mm	in		mm		mm	in	mm	in
W-5198-A	3 - 10	0.12 - 0.39	Serrated	1.25	20	100	4	100	4
W-5198-B	10 - 35	0.39 – 1.38	Serrated	1.25	20	100	4	100	4
W-5198-C	35 - 57	1.38 to 2.24	Serrated	1.25	20	100	4	100	4

FLAT JAW FACES FOR W-5190 PNEUMATIC WEDGE ACTION GRIPS

Catalog Number	Specimen Thickness (A)		Surface	Pitch	Teeth Per Inch	Accessory Width (C)		Accessory Height (B)	
	mm	in		mm		mm	in	mm	in
1 W-5195-A	3 - 5	0.118 - 0.196	V-serrated	1.25	20	100	4	100	4
1 W-5195-B	5 - 15	0.196 - 0.590	V-serrated	1.25	20	100	4	100	4
1 W-5195-C	15 - 30	0.590 - 1.180	V-serrated	1.25	20	100	4	100	4
1 W-5195-D	30 - 45	1.180 - 1.770	V-serrated	1.25	20	100	4	100	4
1 W-5195-E	45 - 60	1.770 - 2.360	V-serrated	1.25	20	100	4	100	4

FLAT JAW FACES FOR 2716-110, 2716-111, 2716-120, 2716-121 PNEUMATIC WEDGE GRIPS

Catalog Number	Specimen Thickness (A)		Surface	Pitch	Teeth Per Inch	Accessory Width (C)		Accessory Height (B)	
	mm	in		mm		mm	in	mm	in
1 2703-180	0 - 20	0 - 0.79	Flat-serrated	1.0	25	76	3	63.5	2.5
2703-185	0 - 20	0 - 0.79	Flat-serrated	1.5	16	76	3	63.5	2.5
1 2703-181	20 - 40	0.79 - 1.57	Flat-serrated	1.0	25	76	3	63.5	2.5
2703-186	20 - 40	0.79 - 1.57	Flat-serrated	1.5	16	76	3	63.5	2.5

V-GROOVED JAW FACES FOR 2716-110, 2716-111, 2716-120, 2716-121PNEUMATIC WEDGE GRIPS

Catalog Number	Specimen Thickness (A)		Surface	Pitch	Teeth Per Inch	Accessory Width (C)		Accessory Height (B)	
	mm	in		mm		mm	in	mm	in
1 2703-182	6 - 17.8	0.24 - 0.70	V-serrated	1.0	25	76	2.5	63.5	3
1 2703-183	16 - 34	06.3 - 1.34	V-serrated	1.0	25	76	2.5	63.5	3
1 2703-184	33 - 50.8	1.30 - 2.00	V-serrated	1.0	25	76	2.5	63.5	3

SCREW AND PNEUMATIC SIDE ACTION GRIP JAW FACES



Smooth, Wave Profile, Serrated and Rubber-Coated Jaw Faces

2702 Series grip faces are designed to provide the best gripping for Instron® 2710/2712 Series and 2710-100/-200 Series side-action grips. Various surfaces are available to suit a wide range of specimen characteristics.

Principle of Operation

The faces are available in a range of sizes and surfaces to accommodate most specimen sizes and materials. The serrated faces have 25 teeth per inch for clamping plastics and soft materials. The smooth versions are used for thin sheets, films, foils, paper and tapes. Rubber-coated are used for threads, fabrics and plastic tapes. Line-contact, high friction compound and wave profile faces are also available for specialised applications.

Application Range

- Tension applications for wires, plastics, metals, elastomers and textiles

SCREW AND PNEUMATIC SIDE ACTION GRIP JAW FACES

JAW FACES FOR 2712-002, 2712-014, 2712-019, 2732-001, 2732-006, 2710-001, 2710-101 AND 2710-102 GRIPS

Catalog Number	Type	Dimensions (W × H)		Specimen Thickness		Pitch	Teeth
		mm	in	mm	in	mm	in
2702-003	Serrated	12 × 25	0.5 × 1	0 - 3.2	0 - 0.125	1	25
2702-367	Serrated	25 × 25	1 × 1	0 - 3.2	0 - 0.125	1	25
2702-009	Serrated	50 × 25	2 × 1	0 - 3.2	0 - 0.125	1	25
2702-002	Rubber-coated	12 × 25	0.5 × 1	0 - 3.2	0 - 0.125	-	-
2702-362	Rubber-coated	25 × 25	1 × 1	0 - 3.2	0 - 0.125	-	-
2702-008	Rubber-coated	50 × 25	2 × 1	0 - 3.2	0 - 0.125	-	-
S1-11613-1	Rubber-coated	100 × 25	4 × 1	0 - 3.2	0 - 0.125	-	-
2702-001	Smooth ground	12 × 25	0.5 × 1	0 - 3.2	0 - 0.125	-	-
2702-372	Smooth ground	25 × 25	1 × 1	0 - 3.2	0 - 0.125	-	-
2702-007	Smooth ground	50 × 25	2 × 1	0 - 3.2	0 - 0.125	-	-
S1-11613-2	Smooth ground	100 × 25	4 × 1	0 - 3.2	0 - 0.125	-	-
2702-010	Line contact	25 × 25	1 × 1	0 - 3.2	0 - 0.125	-	-
2702-042	High-friction compound	25 × 25	1 × 1	0 - 3.2	0 - 0.125	-	-
2702-043	High-friction compound	50 × 25	2 × 1	0 - 3.2	0 - 0.125	-	-

Notes:
1. 2702-362: Specimen thickness of 0-1.65mm for 2712-002, -014, -019, 2732-001 and -006.
2. Specimen thickness of 0-30mm for 2710-001, -101, and -102

JAW FACES FOR 2710-004 SCREW ACTION GRIPS

Catalog Number	Type	Dimensions (W × H)		Specimen Thickness		Pitch	Teeth
		mm	in	mm	in	mm	in
2702-130	Smooth ground	25 × 25	1 × 1	0 - 12	0 - 0.5	-	-
2702-131	Serrated	25 × 25	1 × 1	0 - 12	0 - 0.5	1	25
2702-132	Rubber-coated	25 × 25	1 × 1	0 - 12	0 - 0.5	-	-
2702-133	Line contact	25 × 25	1 × 1	0 - 12	0 - 0.5	-	-

SCREW AND PNEUMATIC SIDE ACTION GRIP JAW FACES

JAW FACES FOR 2712-003, 2712-004, 2712-015, 2712-016, 2712-018, 2712-020, 2732-003, 2732-004, 2732-008, 2732-009, 2710-002, 2710-103 AND 2710-104 GRIPS

Catalog Number	Type	Dimensions (W × H)		Specimen Thickness		Pitch	Teeth
		mm	in	mm	in	mm	in
2702-013	Serrated	12 × 38	0.5 × 1.5	0 - 12	0 - 0.78	1	25
2702-033	Serrated	25 × 25	1 × 1	0 - 12	0 - 0.78	1	25
2702-016	Serrated	25 × 38	1 × 1.5	0 - 12	0 - 0.06	1	25
2702-019	Serrated	50 × 38	2 × 1.5	0 - 12	0 - 0.06	1	25
2702-059	Serrated	76 × 25	3 × 1	0 - 12	0 - 0.6	1	25
2702-012	Rubber-coated	12 × 38	0.5 × 1	0 - 12	0 - 0.78	-	-
2702-032	Rubber-coated	25 × 25	1 × 1	0 - 12	0 - 0.78	-	-
2702-015	Rubber-coated	25 × 38	1 × 1.5	0 - 12	0 - 0.06	-	-
2702-018	Rubber-coated	50 × 38	2 × 1.5	0 - 12	0 - 0.06	-	-
2702-035	Rubber-coated	76 × 25	3 × 1	0 - 12	0 - 0.78	-	-
2702-011	Smooth ground	12 × 38	0.5 × 1.5	0 - 12	0 - 0.78	-	-
2702-031	Smooth ground	25 × 25	1 × 1	0 - 12	0 - 0.78	-	-
2702-014	Smooth ground	25 × 38	1 × 1.5	0 - 12	0 - 0.06	-	-
2702-017	Smooth ground	50 × 38	2 × 1.5	0 - 12	0 - 0.06	-	-
2702-034	Smooth ground	76 × 25	3 × 1	0 - 12	0 - 0.78	-	-
2702-020	Line contact	25 × 25	1 × 1	0 - 12	0 - 0.78	-	-
CP109572	Line contact	76 × 25	3 × 1	0 - 12	0 - 0.06	-	-
2702-044	High-friction compound	25 × 38	1 × 1.5	0 - 12	0 - 0.06	-	-
2702-045	High-friction compound	50 x 38	2 × 1.5	0 - 12	0 - 0.06	-	-
2702-125	V-serrated	25 × 25	1 × 1	3 - 6.5	0.12 - 0.25	1.5	16
2702-126	V-serrated	25 × 25	1 × 1	6.0 - 18.5	0.24 - 0.73	1.5	16

Notes:
1. Specimen thickness is reduced by 6 mm on grips 2712-003, 2712-015 and 2732-003
2. 2702-125 and 2702-126 V-serrated faces are only compatible with 2710-103 and 2710-104 screw side action grips

SCREW AND PNEUMATIC SIDE ACTION GRIP JAW FACES

JAW FACES FOR 2710-203, 2710-204 AND 2710-205 GRIPS

Catalog Number	Type	Dimensions (W × H)		Specimen Thickness		Pitch	Teeth
		mm	in	mm	in	mm	in
2702-141	Serrated	50 × 30	2 × 1.2	0 - 15	0 - 1.0	1	25
2702-142	Rubber-coated	50 × 30	2 × 1.2	0 - 15	0 - 1.0	-	-
2702-143	Waved profile	50 × 30	2 × 1.2	0 - 15	0 - 1.0	-	-
2702-140	Smooth ground	50 × 30	2 × 1.2	0 - 15	0 - 1.0	-	-

JAW FACES FOR 2710-113/-114/-115/-116 AND 2712-04X GRIPS

Catalog Number	Type	Dimensions (W × H)		Maximum Specimen Thickness (mm)				
		mm	in	2710-113/-114	2710-115/-116	2712-041	2712-042	2712-045/-046
2702-300	Rubber-coated	25 × 25	1 × 1	34	44	11	18	24
2702-301	Rubber-coated	25 × 38	1 × 1.5	34	44	11	18	24
2702-302	Rubber-coated	25 × 50	1 × 2	34	44	11	18	24
2702-303	Rubber-coated	38 × 12	1.5 × 0.5	34	44	11	18	24
2702-304	Rubber-coated	38 × 25	1.5 × 1	34	44	11	18	24
2702-305	Rubber-coated	38 × 50	1.5 × 2	34	44	11	18	24
2702-306	Rubber-coated	50 × 25	2 × 1	34	44	11	18	24
2702-307	Rubber-coated	50 × 38	2 × 1.5	34	44	11	18	24
2702-308	Rubber-coated	50 × 50	2 × 2	29	39	6	13	19
2702-309	Rubber-coated	75 × 25	3 × 1	34	44	11	18	24
2702-310	Rubber-coated	75 × 50	3 × 2	29	39	6	13	19
2702-311	Rubber-coated	150 × 50	6 × 2	29	39	6	13	19
2702-315	Serrated	25 × 25	1 × 1	36	46	13	20	26
2702-316	Serrated	25 × 38	1 × 1.5	36	46	13	20	26
2702-357	Serrated	25 × 50	1 × 2	31	41	9	16	22
2702-318	Serrated	38 × 12	1.5 × 0.5	36	46	13	20	26
2702-319	Serrated	38 × 25	1.5 × 1	36	46	13	20	26
2702-320	Serrated	38 × 50	1.5 × 2	36	46	13	20	26
2702-321	Serrated	50 × 25	2 × 1	36	46	13	20	26

SCREW AND PNEUMATIC SIDE ACTION GRIP JAW FACES

JAW FACES FOR 2710-113/-114/-115/-116 AND 2712-04X GRIPS

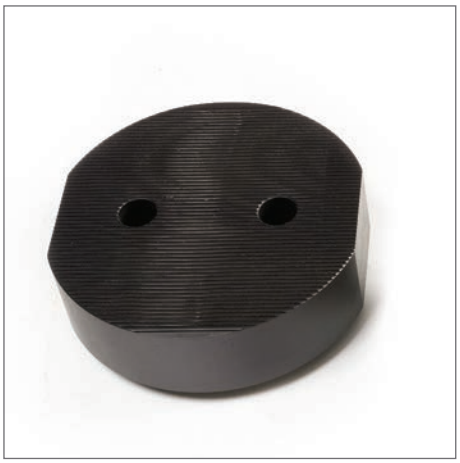
Catalog Number	Type	Dimensions (W × H)		Maximum Specimen Thickness (mm)				
		mm	in	2710-113/-114	2710-115/-116	2712-041	2712-042	2712-045/-046
2702-322	Serrated	50 × 38	2 × 1.5	36	46	13	20	26
2702-323	Serrated	50 × 50	2 × 2	31	41	8	15	21
2702-324	Serrated	75 × 25	3 × 1	36	46	13	20	26
2702-325	Serrated	75 × 50	3 × 2	31	41	8	15	21
2702-326	Serrated	150 × 50	6 × 2	31	41	8	15	21
2702-330	Smooth-ground	25 × 25	1 × 1	36	46	13	20	26
2702-331	Smooth-ground	25 × 38	1 × 1.5	36	46	13	20	26
2702-332	Smooth-ground	25 × 50	1 × 2	36	46	13	20	26
2702-333	Smooth-ground	38 × 12	1.5 × 0.5	36	46	13	20	26
2702-334	Smooth-ground	38 × 25	1.5 × 1	36	46	13	20	26
2702-335	Smooth-ground	38 × 50	1.5 × 2	36	46	13	20	26
2702-336	Smooth-ground	50 × 25	2 × 1	36	46	13	20	26
2702-337	Smooth-ground	50 × 38	2 × 1.5	36	46	13	20	26
2702-338	Smooth-ground	50 × 50	2 × 2	31	41	8	15	21
2702-339	Smooth-ground	75 × 25	3 × 1	36	46	13	20	26
2702-340	Smooth-ground	75 × 50	3 × 2	31	41	8	15	21
2702-341	Smooth-ground	150 × 50	6 × 2	31	41	8	15	21
2702-345	Brake-lining (HFC)	25 × 38	1 × 1.5	33	43	10	17	23
2702-346	Brake-lining (HFC)	38 × 25	1.5 × 1	33	43	10	17	23
2702-347	Brake-lining (HFC)	50 × 38	2 × 1.5	33	43	10	17	23
2702-350	Line-contact	25	1	36	46	13	20	26
2702-351	Line-contact	75	3	14	24	13	20	26
2702-352	Wave-profile	50 × 50	2 × 2	22.5	32.5	Not Compatible	6.5	12.5
2702-353	Wave-profile	75 × 50	3 × 2	-	5	Not Compatible	6.5	12.5
2702-354	Vee-serrated	3 - 6.5 × 25	0.1 - 0.25 × 1	6.5	6.5	6.5	6.5	6.5
2702-355	Vee-serrated	6 - 18.5 × 25	0.2 - 0.7 × 1	18.8	18.5	7	14	18.5

SCREW AND PNEUMATIC SIDE ACTION GRIP JAW FACES

JAW FACES FOR 2712-051/-052 AND 2710-111/-112 GRIPS

Catalog Number	Type	Dimensions (W × H)		Maximum Specimen Thickness (mm)			
		mm	in	2712-051	2712-052	2710-111	2710-112
2702-360	Rubber-Coated	10 × 10	0.4 × 0.4	5	4	34	34
2702-361	Rubber-Coated	12 × 25	0.5 × 1	5	4	34	34
2702-362	Rubber-Coated	25 × 25	1 × 1	5	4	34	34
2702-363	Rubber-Coated	50 × 25	2 × 1	5	4	34	34
2702-364	Rubber-Coated	100 × 25	4 × 1	5	4	34	34
2702-375	Brake-lining (HFC)	25 × 25	1 × 1	5	4	34	34
2702-376	Brake-lining (HFC)	50 × 25	2 × 1	5	4	34	34
2702-370	Smooth	10 × 10	0.4 × 0.4	7	6	35	35
2702-371	Smooth	12 × 25	0.5 × 1	7	6	35	35
2702-372	Smooth	25 × 25	1 × 1	7	6	35	35
2702-373	Smooth	50 × 25	2 × 1	7	6	35	35
2702-374	Smooth	100 × 25	4 × 1	7	6	35	35
2702-365	Serrated	10 × 10	0.4 × 0.4	7	6	35	35
2702-366	Serrated	12 × 25	0.5 × 1	7	6	35	35
2702-367	Serrated	25 × 25	1 × 1	7	6	35	35
2702-368	Serrated	50 × 25	2 × 1	7	6	35	35
2702-369	Serrated	100 × 25	4 × 1	7	6	35	35
2702-377	Line-Contact / Smooth	25 / 25 × 25	1 / 1 × 1	7	6	35	35

JAW FACES FOR HYDRAULIC SIDE-ACTING (DURASYNC™) GRIPS







Jaw faces for the DuraSync range of hydraulic side-acting grips are available in a variety of surface options to accommodate a wide range of requirements ranging from standard flat and round metallic materials to special faces for stranded wire.

Principle of Operation

Jaw faces are easily installed from the front side of the grips to allow a wide variety of materials and specimens to be tested. No routine maintenance is required beyond simple cleaning of the jaw face surfaces in contact with the specimen.

Application Range

- Tensile tests on a wide range of materials including: steel rod and plate, machined rounds and flats, reinforcement bar, 3- and 7-wire strand, conveyor belt, and wood products

JAW FACES FOR HYDRAULIC SIDE-ACTING (DURASYNC™) GRIPS

FOR USE WITH W-5450 250KN HYDRAULIC DUAL SIDE ACTING GRIPS

Catalog Number	Specimen Thickness		Surface	Pitch	Teeth Per Inch	Accessory Width		Accessory Height	
	mm	in		mm		mm	in	mm	in
W-5451-A	0 - 60	0 - 2.362	Tungsten Carbide Coat	-	-	86	3.375	80	3.150
W-5451-B	0 - 60	0 - 2.362	Concentric Grooves	1	-	86	3.375	80	3.150
W-5451-C	0 - 60	0 - 2.362	Concentric Grooves	2	-	86	3.375	80	3.150
W-5452-A	3 - 10	0 - 0.39	V-serrated	1.27	20	86	3.375	80	3.150
W-5452-B	10 - 35	0.39 - 1.38	V-serrated	1.6	16	86	3.375	80	3.150
W-5452-C	35 - 60	1.38 - 2.36	V-serrated	2.54	10	86	3.375	80	3.150

FOR USE WITH W-5410 (BASIC) & W-5420 (PREMIUM) 600KN HYDRAULIC DUAL SIDE ACTING GRIPS

Catalog Number	Specimen Thickness		Surface	Pitch	Teeth Per Inch	Accessory Width		Accessory Height	
	mm	in		mm		mm	in	mm	in
W-5411-A	0 - 55	0 - 2.17	Flat-serrated	1.25	20	110	4.33	120	4.72
W-5411-B	50 - 100	1.97 - 3.94	Flat-serrated	1.25	20	110	4.33	120	4.72
W-5412-A	3 - 10	0.12 - 0.39	V-serrated	1.25	20	110	4.33	120	4.72
W-5412-B	10 - 35	0.39 - 1.38	V-serrated	1.25	20	110	4.33	120	4.72
W-5412-C	35 - 60	1.38 - 2.36	V-serrated	2.54	10	110	4.33	120	4.72

FOR USE WITH W-5430 1500KN HYDRAULIC DUAL SIDE ACTING GRIPS

Catalog Number	Specimen Thickness		Surface	Pitch	Teeth Per Inch	Accessory Width		Accessory Height	
	mm	in		mm		mm	in	mm	in
W-5431-A	0 - 60	0 - 2.362	Flat-serrated	2.54	10	150	5.91	160	6.30
W-5431-B	60 - 120	2.36 - 4.72	Flat-serrated	3.18	8	150	5.91	150	5.91
W-5432-A	3 - 17	0.12 - 0.67	V-serrated	1.25	20	150	5.91	150	5.91
W-5432-B	17 - 65	0.67 - 2.56	V-serrated	2.54	10	150	5.91	150	5.91
W-5432-C	35 - 85	1.38 - 3.35	V-serrated	2.54	10	150	5.91	150	5.91

JAW FACES FOR HYDRAULIC SIDE-ACTING (DURASYNC™) GRIPS

FOR USE WITH W-5440 2000KN HYDRAULIC DUAL SIDE ACTING GRIPS

Catalog Number	Specimen Thickness		Surface	Pitch	Teeth Per Inch	Accessory Width		Accessory Height	
	mm	in		mm		mm	in	mm	in
W-5441-A	0 - 60	0 - 2.362	Flat-horizontal	65	10	182	7.17	190	7
W-5441-B	60 - 120	2.362 - 4.72	Flat-horizontal	65	8	182	7.17	190	7
W-5442-A	3 - 17	0.12 - 0.67	V-horizontal	65	20	182	7.17	190	7
W-5442-B	17 - 65	0.67 - 2.56	V-horizontal	65	10	182	7.17	190	7
W-5442-C	35 - 85	1.38 - 3.35	V-horizontal	65	10	182	7.17	190	7
W-5442-D	50 - 100	1.97 - 3.94	V-horizontal	65	8	182	7.17	190	7

FOR USE WITH W-5400 600KN HYDRAULIC SINGLE SIDE ACTING GRIPS

Catalog Number	Specimen Thickness		Surface	Pitch	Teeth Per Inch	Accessory Width		Accessory Height	
	mm	in		mm		mm	in	mm	in
W-5401-A	0 - 57	0 - 2.24	Flat-serrated	1.25	20	127	5.0	120	5.0
W-5401-B	25 - 75	0.98 - 2.95	Flat-serrated	1.25	20	127	5.0	120	5.0
W-5402-A	3 - 10	0.12 - 0.39	V-serrated	1.25	20	127	5.0	120	5.0
W-5402-B	10 - 35	0.39 - 1.38	V-serrated	1.25	20	127	5.0	120	5.0
W-5402-C	35 - 57	1.38 - 2.24	V-serrated	1.25	20	127	5.0	127	5.0

JAW FACES FOR HYDRAULIC SIDE-ACTING (DURASYNC™) GRIPS

WIRE STRAND INSERT STYLE GRIPS FOR 600KN, 1500KN AND 2000KN HYDRAULIC SIDE ACTING GRIPS (REQUIRES QUICK CHANGE INSERT HOLDERS)

Catalog Number	Cable Size		Specimen Diameter Tolerance	
	mm	in	mm	in
W-5404-A	4.8	0.1875	0.25	0.010
W-5404-B	5.6	0.2188	0.25	0.010
W-5404-C	6.4	0.25	0.25	0.010
W-5404-D	7.1	0.2813	0.25	0.010
W-5404-E	7.9	0.3125	0.25	0.010
W-5404-F	9.5	0.375	0.25	0.010
W-5404-G	11.1	0.4375	0.25	0.010
W-5404-H	12.7	0.50	0.25	0.010
W-5404-J	14.3	0.5625	0.25	0.010
W-5404-K	15.2	0.5938	0.25	0.010
W-5404-L	15.7	0.625	0.25	0.010
W-5404-M	19.1	0.75	0.25	0.010
W-5404-N	22.2	0.875	0.25	0.010
W-5404-P	25.4	1.00	0.25	0.010

JAW FACES FOR HYDRAULIC SIDE-ACTING (DURASYNC™) GRIPS

FOR USE WITH W-5440 2000KN HYDRAULIC DUAL SIDE ACTING GRIPS (THRU ZERO)

Catalog Number	Specimen Thickness		Surface	Pitch	Teeth Per Inch	Accessory Width		Accessory Height	
	mm	in		°		mm	in	mm	in
W-5445	Required Thru Zero Wedge Support Kit		-	-	-	-	-	-	-
W-5446-A	0 - 60	0 - 2.362	Flat-horizontal	45	20	175	6.88	225	8.88
W-5446-B	25 - 85	0 - 2.362	Flat-horizontal	45	10	175	6.88	225	8.88
W-5447-A	3 - 17	0 - 2.362	V-horizontal	45	20	175	6.88	225	8.88
W-5447-B	17 - 65	0 - 0.39	V-horizontal	45	20	175	6.88	225	8.88
W-5447-C	35 - 85	0.39 - 1.38	V-horizontal	45	10	175	6.88	225	8.88

FOR USE WITH W-5420 (PREMIUM) 600KN HYDRAULIC DUAL SIDE ACTING GRIPS (THRU ZERO)

Catalog Number	Specimen Thickness		Surface	Pitch	Teeth Per Inch	Accessory Width		Accessory Height	
	mm	in		mm		mm	in	mm	in
W-5422	Required Thru Zero Wedge Support Kit		-	-	-	-	-	-	-
W-5423-A	0 - 55	0 - 2.17	Flat-serrated	1.25	20	110	4.33	120	4.72
W-5423-B	50 - 100	1.97 - 3.94	Flat-serrated	1.25	20	110	4.33	120	4.72
W-5424-A	3 - 10	0.12 - 0.39	V-serrated	1.25	20	110	4.33	120	4.72
W-5424-B	10 - 35	0.39 - 1.38	V-serrated	1.25	20	110	4.33	120	4.72
W-5424-C	35 - 60	1.38 - 2.36	V-serrated	2.54	10	110	4.33	120	4.72

FOR USE WITH W-5420 (PREMIUM) 600KN HYDRAULIC DUAL SIDE ACTING GRIPS (THRU ZERO)

Catalog Number	Specimen Thickness		Surface	Pitch	Teeth Per Inch	Accessory Width		Accessory Height	
	mm	in		mm		mm	in	mm	in
W-5422	Required Thru Zero Wedge Support Kit		-	-	-	-	-	-	-
W-5423-A	0 - 60	0 - 2.36	Flat-serrated	1.25	20	143	5.63	187	7.38
W-5424-A	3 - 17	0.12 - 0.67	V-serrated	1.25	20	143	5.63	187	7.38
W-5424-B	17 - 65	0.67 - 2.56	V-serrated	2.54	20	143	5.63	187	7.38
W-5424-C	35 - 85	1.38 - 3.35	V-serrated	2.54	10	143	5.63	187	7.38

LOAD CELLS

2.11

Load cells convert the force experienced by the specimen into an electrical signal that is used by the electronic controller to precisely monitor, report or control the force.

Materials testing is unlike an application such as weighing because not only are forces changing dynamically, but they are often not applied in a truly axial fashion. In order to minimize the force measurement errors that can result from these effects, Instron® supplies a range of different load cells, each designed specifically for materials testing.

For example, the patented Dynacell™ range of fatigue-rated load cells features a built-in accelerometer that corrects for the inertial loading error due to grip mass in fatigue tests.

Whatever your test application, you can be assured that Instron load cells will provide accuracy and longevity through advanced applications technology and quality manufacturing.

Load Cells for Fatigue Testing	218-220
Load Cells for Static Applications	221-224
SATEC™ Series Load Cells	225
Load Cells for Torsion Testing	226-227
Load Cell Adapter Cables	228

2527 SERIES DYNACELL™ LOAD CELLS



2527-xxx

During tests carried out on servohydraulic machines, elements of the system are subject to acceleration. As a result, in addition to the force applied to the specimen, the load cell also reads forces resulting from its own movement and the mass of the grips and fixtures attached to it.

Dynacell is the world's first truly dynamic load cell, designed from the outset for measuring dynamic loads. Dynacell introduces the following advantages:

- Reduces dynamic load errors, which can be a significant percentage of readings.
- Increases productivity by allowing higher frequency operation while maintaining test validity. Improvements such as doubling the frequency are common.

Principle of Operation

Dynacell utilizes an accelerometer at the heart of the load cell, directly on the load axis. This removes the risk of errors in the acceleration reading resulting from off center loading. Advantages include:

- The accelerometer is on the load line, eliminating both amplitude and phase errors.
- Automatic set up takes less than one minute.
- Set up is consistent and reliable between operators.

The conditioning of the acceleration signal from the Dynacell is handled as standard in the 8800MT electronics, and is set up automatically when the system is auto-tuned. This saves time and reduces operator errors.

For users who wish to do this themselves, they have the option of switching this feature on or off and setting the correction factor manually. The resulting signal is subtracted from the load cell signal to produce the true force on the specimen.

Application Range

- All Instron® 2527 Series Dynacell dynamic load cells, when used with the 8800 Series, meet the requirements of ISO 75001/1 Class 0.5, ASTM E4, EN10002 Part 2, JIS B7721, B7733 and ISO 10002 Part 2

2527 SERIES DYNACELL™ LOAD CELLS

2527 SERIES DYNACELLS

Catalog Number	Capacity			Machine Fitting	Accessory Fitting	Accessory Diameter		Accessory Height		Accessory Weight		Static or Fatigue Rated
	kN	kgf	lbf			mm	in	mm	in	kg	lb	
2527-131	±0.25	±25	±56	3 × M6 and M6 RH	M6 × 1 RH female	75	2.95	40	1.6	1	2.2	Fatigue
2527-130	±1	±100	±225	3 × M6 and M6 RH	M6 × 1 RH female	75	2.95	40	1.6	1	2.2	Fatigue
2527-129	±2	±200	±450	3 × M6 and M6 RH	M6 × 1 RH female	75	2.95	40	1.6	1	2.2	Fatigue
2527-153	±5	±500	±1,125	6 × M6 and M20 RH	M20 RH	107	4.2	71	2.8	4	8.8	Fatigue
2527-102	±10	±1,000	±2,250	6 × M6 and M20 RH	M20 RH	107	4.2	71	2.8	4	8.8	Fatigue
2527-101	±25	±2,500	±5,620	6 × M6 and M20 RH	M20 RH	107	4.2	71	2.8	4	8.8	Fatigue
2527-100	±50	±5,000	±11,250	6 × M10 and M30 RH	M30 RH	154	6.06	99	3.9	10	22	Fatigue
2527-111	±100	±10,000	±22,500	6 × M10 and M30 RH	M30 RH	154	6.06	99	3.9	10	22	Fatigue
2527-113	±250	±25,000	±56,250	6 × M20 and M48 RH	M48 RH	203	8.0	131	5.2	25.5	56	Fatigue
2527-125	±500	±50,000	±110,000	M72 RH	M72 RH, 6 × M30 on 225 PCD and 6 × M20 on 150 PCD 95	305	12.0	232	9.1	95	209	Fatigue
2527-120	±1,000	±100,000	±220,000	M100 RH	M100 RH, 12 × M30 on 225 PCD and 6 × M20 on 150 PCD	305	12.0	360	14.2	140	308	Fatigue
2527-140	±2,500	±25,000	±550,000	M150 RH	M150 RH	405	15.95	450	17.7	322	708	Fatigue

2527 SERIES BIAXIAL DYNACELLS

Catalog Number	Capacity			Torque Capacity		Machine Fitting	Accessory Fitting	Accessory Diameter		Accessory Height		Accessory Weight		Static or Fatigue Rated
	kN	kgf	lbf	Nm	in - lb			mm	in	mm	in	kg	lb	
2527-302	±1	±100	±225	±25	±220	3 × M6 on 75 PCD	3 × M6 on 57 PCD 3 × M6 on 75 PCD	94	3.7	68	2.68	1.3	2.87	Fatigue
2527-303	±5	±500	±1,124	±25	±220	3 × M6 on 75 PCD	3 × M6 on 57 PCD 3 × M6 on 75 PCD	94	3.7	68	2.68	2	4.41	Fatigue
2527-202	±10	±1,000	±2,250	±100	±800	6 × M8	6 × M8	94	3.7	86	3.38	2.5	5.5	Fatigue
2527-201	±25	±2,500	±5,620	±100	±800	6 × M8	6 × M8	94	3.7	86	3.38	2.5	5.5	Fatigue

2518 SERIES SANDWICH LOAD CELLS



2518-1xx

Load cells are an integral part of the force measurement system of a testing machine. Their interchangeability along with transducer recognition and single-point electrical calibration makes them easy to use. They maintain high alignment and are resistant to offset loading throughout the test, even with large specimens. Instron® controls the design, manufacture and quality of all load cells, with customer applications in mind. They are certified in accordance with international standards for use in material testing machines only. 2518-100 Series load cells are fatigue-rated for use on Instron servohydraulic testing systems where high side-load resistance is desirable.

Principle of Operation

2518 Series load cells are precision force transducers containing a full bridge of strain gauges bonded to internal load bearing structures. When mechanically stressed, the electrical resistance of the gauges changes, thus changing the output signal. This signal is then conditioned for display readouts in accordance with international standards. The shear element design of the 2518-100 Series provides exceptional resistance to offset loads.

Application Range

- Instron load cells have been tested for accuracy and repeatability on calibration apparatus traceable to international standards, with an uncertainty of measurement not exceeding one third of the permissible error of the load cell. Their accuracy is equal to or better than 0.025% of the cell rated output or 0.25% of the indicated load, whichever is greater.

2518 SERIES SANDWICH LOAD CELLS

Catalog Number	Capacity			Upper Fitting	Lower Fitting	Accessory Diameter		Accessory Height		Accessory Weight		Static or Fatigue Rated
	kN	kgf	lbf			mm	in	mm	in	kg	lb	
2518-103	±5	±500	±1,125	6 × M10 and M30 RH (Type If)	6 × M10 and M30 LH (Type If)	140	5.5	96	3.8	8.5	18.7	Fatigue
2518-102	±10	±1,000	±2,250	6 × M10 and M30 RH (Type If)	6 × M10 and M30 LH (Type If)	140	5.5	96	3.8	8.5	18.7	Fatigue
2518-107	±15	±1,500	±3,375	6 × M10 and M30 RH (Type If)	6 × M10 and M30 LH (Type If)	140	5.5	99	3.8	8.5	18.7	Fatigue
2518-101	±25	±2,500	±5,620	6 × M10 and M30 RH (Type If)	6 × M10 and M30 LH (Type If)	140	5.5	96	3.8	8.5	18.7	Fatigue
2518-100	±50	±5,000	±11,250	6 × M10 and M30 RH (Type If)	6 × M10 and M30 LH (Type If)	140	5.5	96	3.8	8.5	18.7	Fatigue
2518-111	±200	±20,000	±40,000	M48 RH (Type IIf)	6 × M10 and M30 LH (Type If)	210	8.3	170	6.7	20	44	Fatigue

LOAD CELLS FOR STATIC APPLICATIONS



2580 Series Static Load Cells

Instron® static load cells are an integral part of the force measurement system, and are designed and manufactured especially for use in materials testing machines. They maintain excellent alignment and are resistant to offset loading throughout the test, even with large specimens. The cells can withstand up to 150% of rated capacity without zero shift. Interchangeability, along with transducer recognition and electrical calibration makes the load cells easy to use.

A number of designs are available suitable for specific test instruments or applications.

Principle of Operation

Instron load cells are precision force transducers featuring a full bridge of strain gauges bonded to a high stiffness elastic element. When subjected to a force, the electrical resistance of the gauges changes in proportion to the applied force, thus changing the output signal. This signal is then conditioned by the system electronics for display and data acquisition in accordance with international standards. The high axial stiffness reduces stored energy that can transfer to the specimen at yield or at break, giving false values.

Increased lateral stiffness reduces measurement errors from off-axis loading, commonly found when performing compression tests or where specimens fail by tearing.

Our range of load cells is designed to perform static tests in tension, compression and reverse stress modes, reducing the need to change cells frequently and providing the widest possible applications coverage.

Application Range

- All load cells comply with the highest applicable testing standards, including ISO 7500-1 and ASTM E4.

LOAD CELLS FOR STATIC APPLICATIONS



2519


2525-800

2519 SERIES S-BEAM LOAD CELLS

Catalog Number	Capacity			Mechanical Fitting	Effective Length		Static or Fatigue Rated
	kN	kgf	lbf		mm	in	
2519-10N	0.01	1	2	2.5 mm and 6 mm clevis pin (Type 00f and 0f)	78	3.07	Static
2519-50N	0.05	5	10	2.5 mm and 6 mm clevis pin (Type 00f and 0f)	78	3.07	Static
2519-100N	0.1	10	20	2.5 mm and 6 mm clevis pin (Type 00f and 0f)	78	3.07	Static
2519-500N	0.5	50	112	6 mm clevis pin (Type 0f)	88	3.46	Static
2519-1KN	1	100	225	6 mm clevis pin (Type 0f)	88	3.46	Static
2519-2KN	2	200	450	6 mm clevis pin (Type 0f)	101	3.98	Static
2519-5KN	5	500	1,125	0.5 in clevis pin (Type Df)	114	4.48	Static

2525 SERIES DROP-THROUGH LOAD CELLS

Catalog Number	Capacity			Mechanical Fitting	Accessory Diameter		Effective Length		Static or Fatigue Rated
	kN	kgf	lbf		mm	in	mm	in	
2525-815	0.0025	0.25	0.5	2.5 mm clevis pin (Type 00f)	80	3.1	135	5.3	Static
2525-808	0.01	1	2	2.5 mm clevis pin (Type 00f)	80	3.1	135	5.3	Static
2525-817	0.05	5	10	2.5 mm clevis pin (Type 00f)	80	3.1	135	5.3	Static
2525-807	0.1	10	22	2.5 mm clevis pin (Type 00f)	80	3.1	135	5.3	Static
2525-816	0.5	50	112	6 mm clevis pin (Type 0f)	80	3.1	133	5.2	Static
2525-806	1	100	225	6 mm clevis pin (Type 0f)	80	3.1	133	5.2	Static
2525-818	2	200	450	6 mm clevis pin (Type 0f)	80	3.1	133	5.2	Static
2525-805	5	500	1,125	6 mm clevis pin (Type 0f)	80	3.1	133	5.2	Static
2525-804	10	1,000	2,250	6 mm clevis pin (Type 0f)	80	3.1	133	5.2	Static
2525-810	30	3,000	6,750	16 mm clevis pin (Type 1f)	80	3.1	142	5.6	Static
2525-802	50	5,000	11,250	16 mm clevis pin (Type 1f)	80	3.1	142	5.6	Static
2525-801	100	10,000	22,500	16 mm clevis pin (Type 1f)	80	3.1	142	5.6	Static

LOAD CELLS FOR STATIC APPLICATIONS



2530 SERIES STATIC LOAD CELLS

Catalog Number	Capacity			Mechanical Fitting	Accessory Diameter		Effective Length		Static or Fatigue Rated
	kN	kgf	lbf		mm	in	mm	in	
2530-5N	0.005	0.5	1	2.5 mm clevis pin (Type 00f)	85	3.3	48	1.9	Static
2530-10N	0.01	1	2	2.5 mm clevis pin (Type 00f)	85	3.3	48	1.9	Static
2530-50N	0.05	5	11	2.5 mm clevis pin (Type 00f)	85	3.3	48	1.9	Static
2530-100N	0.1	10	22	2.5 mm clevis pin (Type 00f)	85	3.3	48	1.9	Static
2530-500N	0.5	50	112	6 mm clevis pin (Type 0f)	85	3.3	91	3.6	Static
2530-1KN	1	100	225	6 mm clevis pin (Type 0f)	85	3.3	91	3.6	Static
2530-2KN	2	200	450	6 mm clevis pin (Type 0f)	85	3.3	91	3.6	Static
2530-5KN	5	500	1,125	0.5 in clevis pin (Type Df)	85	3.3	101	3.98	Static
2530-10KN	10	1,000	2,250	0.5 in clevis pin (Type Df)	107	4.2	122	4.8	Static
2530-30KN	30	3,000	6,750	0.5 in clevis pin (Type Df)	107	4.2	122	4.8	Static
2530-50KN	50	5,000	11,250	0.5 in clevis pin (Type Df)	107	4.2	122	4.8	Static
2530-100KN	100	10,000	22,500	0.5 in clevis pin (Type Df)	113	4.4	110	4.3	Static

LOAD CELLS FOR STATIC APPLICATIONS



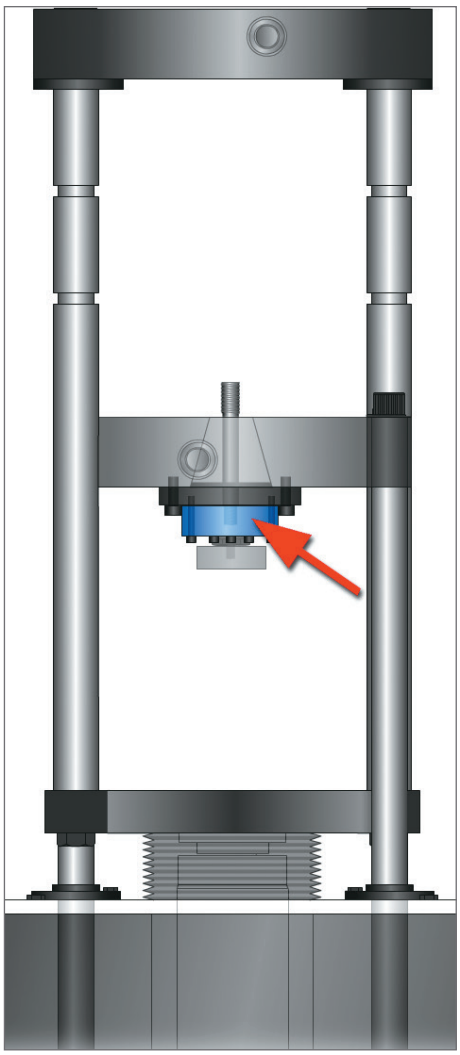


2580 SERIES STATIC LOAD CELLS

Catalog Number	Capacity			Frame Fitting	Mechanical Fitting	Accessory Diameter		Effective Length		Weight	
	kN	kgf	lbf		mm or in	mm	in	mm	in	kg	lb
2580-500N	±0.5	50	112	M10 × 1.5RH Central Thread	6 mm clevis pin (Type Of)	76	3	91	3.6	0.6	1.3
2580-1KN	±1	100	225	M10 × 1.5RH Central Thread	6 mm clevis pin (Type Of)	76	3	91	3.6	0.6	1.3
2580-2KN	±2	200	450	M10 × 1.5RH Central Thread	6 mm clevis pin (Type Of)	76	3	91	3.6	0.6	1.3
2580-5KN	±5	500	1,125	M10 × 1.5RH Central Thread	0.5 in clevis pin (Type Df)	76	3	101	4.0	0.8	1.8
2580-10KN	±10	1,000	2,250	M16 × 2RH Central Thread 6 off M8 on 75 mm PCD	0.5 in clevis pin (Type Df)	107	4.2	122	4.8	4.2	9.2
2580-30KN	±30	3,000	6,750	M16 × 2RH Central Thread 6 off M8 on 75 mm PCD	0.5 in clevis pin (Type Df)	107	4.2	122	4.8	4.2	9.2
2580-50KN	±50	5,000	11,250	M16 × 2RH Central Thread 6 off M8 on 75 mm PCD	0.5 in clevis pin (Type Df)	107	4.2	122	4.8	4.2	9.2
2580-100KN	±100	10,000	22,500	M30 × 2RH Central Thread 6 off M10 on 100 mm PCD	0.5 in clevis pin (Type Df)	113	4.4	152	6.0	11	24.2
2580-150KN	±150	15,000	33,750	M48 × 2RH Central Thread 6 off M20 on 150 mm PCD	M48 × 2LH (Type IIf) 6 off M20 on 150 mm PCD 6 off M10 on 100 mm PCD (100 kN max)	218	8.6	170	6.7	35	77.0
2580-250KN	±250	25,000	56,200	M48 × 2RH Central Thread 6 off M20 on 150 mm PCD	M48 × 2LH (Type IIf) 6 off M20 on 150 mm PCD 6 off M10 on 100 mm PCD (100 kN max)	218	8.6	170	6.7	35	77.0
2580-400KN	±400	40,000	88,000	M48 × 2RH Central Thread 6 off M20 on 150 mm PCD	M48 × 2LH (Type IIf) 6 off M20 on 150 mm PCD 6 off M10 on 100 mm PCD (100 kN max)	218	8.6	170	6.7	35	77.0
2580-600KN	±600	60,000	135,000	M72 × 3RH Central Thread	M72 × 3LH (Type IIaf) 6 off M10 on 100 mm PCD (100 kN max)	230	9.1	211	8.3	45	99.0

Notes:
1. System accuracy when used with Instron 5900 Series, 0.5% of reading down to 1/1,000th of load cell capacity. Requires compatible sensor conditioner card and Bluehill® 3 or Bluehill Universal Advanced Performance Module.

SATEC™ SERIES LOAD CELLS



Compatible with Static Dual- and Single-Test Space Hydraulic Test Systems, and SATEC Classic EM Test Systems (T Series, EMF Series and UD Series)

Available in several capacities, lower capacity load cells extend the calibrated range of the test frame. Regardless of whether the frame is manufactured by Instron®, SATEC, United, Tinius-Olsen, or another other manufacturer, adaptation can be supplied for the load cell. In most cases, the load cell can be adapted and configured for use in both tension and compression, though some instances and mounting locations will limit the cell to single direction use.

When ordered for use with Instron controllers that have self-identification/self-calibration features (such as the 5500, I-Series, 5800, 8800 and 5900 controller series), it is necessary to either purchase field service for on-site calibration.

Principle of Operation

Load cells convert the applied force to an electrical signal that is representative of the force applied to the specimen. When testing smaller specimens or a variety of materials requiring varying forces, low capacity cells can be added to increase the operating range of the machine. Adding a low range cell will increase the available resolution of the force measuring transducer allowing for a lower calibrated reading.

The upper mounting for the load cell depends on the frame, but can be supplied to use the cell as the 1) main load cell, or as a 2) secondary low range cell that piggybacks to the main cell. *The type of mounting must be specified at the time of order.*

The standard series low profile cells are applicable for use on static hydraulic frames as well as static screw driven frames. The mounting supplied allows mounting the load cell on the underside of the adjustable crosshead. When mounting on a static dual-test space hydraulic frame, a stud is supplied the passes through the crosshead into both the tension and compression spaces. This allows accessories to be attached to the cell so it can be used both in compression and tension. For single direction use, the load cell will be mounted in the appropriate test area.

Application Range

- Extend the range of universal testing machines by improving the lowest calibrated point
- Variety of attachment methods available*
- Can be used as the main cell or as a secondary low range cell
- Operate in static tension and/or static compression*
- All load cells comply with the highest applicable testing standards, including ASTM E4 and ISO 7500-1

* Dependent on the machine model

LOAD CELLS FOR USE WITH TORSION MT SERIES



MT1 Torsion System



MT2 Torsion System

Compatible with Model MT1, MT2 Torsion Test Systems

Torsion cells for use with the MT Series torsion frames are available in several capacities depending on the frame model. Lower capacity cells extend the range of the machine and increase the functionality of the MT Series testing frame.

For the MT1, the torsion cells are miniature reaction torque transducers. These cells are very small, with excellent linearity and repeatability. All cells use the same mounting pattern, so interchanging fixtures is no problem. Due to the capacity and sensitivity, it is important to be mindful of the weight of any fixtures used with the 2 in-lb cell. These cells are provided with integrated mounting and overload protection plates that are used to mount the main cell on the MT1 frames. This not only provides protection for the cell, but also allows for extremely fast changeovers from the main cell to a low range cell.

For the larger MT2 through MT50 frames, the cells are flanged reaction torque transducers. This provides a higher resistance to bending moments. The cell has a high torsional stiffness and low end sensitivity, and provides excellent linearity and repeatability. All cells for a particular frame use a standard circular mounting pattern so the cells mount to the frame with the same hardware as the main cell. NO additional adapters are required, as all existing fixtures mount to the lower capacity cells in the same manner as for the main cell.

Principle of Operation

All torsion cells convert rotational motion to an electrical signal that is representative of the torque induced. When necessary to test smaller specimens, low capacity cells can be added to increase the operating range of the machine. If the maximum applied torque to the specimen under test is well below the capacity of the frame, adding a low range cell will increase the resolution of the torque measuring transducer. *Adding a low capacity cell to the MT2 thru MT20 torsion frames will require a load cell protection device.*

Installing the torque cells on the MT1 and MT2 frames requires only the use of allen wrenches, so changeover is easy. This reduces downtime and increases productivity. For the larger MT5 thru MT50, a torque wrench with allen sockets is required when changing cells.

Application Range

- Low deflection
- Integrated overload protection device (<200 in - lb capacity only)
- Swap from full capacity to low capacity in less than a minute (<200 in - lb capacity only)
- All load cells comply with the highest applicable testing standards, including ASTM E2624

LOAD CELLS FOR USE WITH TORSION MT SERIES



1



2

TORSION CELLS FOR USE WITH MT SYSTEMS

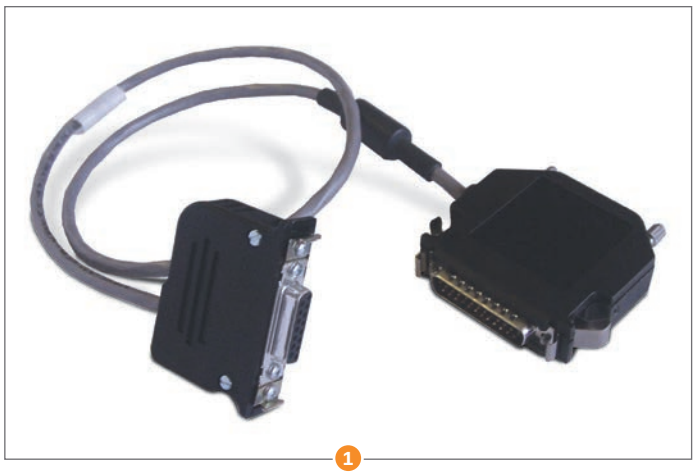
	Catalog Number	Torque Capacity		Upper Fitting	Lower Fitting	Accessory Diameter		Accessory Height		Static or Fatigue Rated
		mm	in			mm	in			
1	W-5510-T4*	0.225	2	M6 × 1 mRH	Center: M12 × 1.75 fRH Pattern: (4) M5 on 25 mm bolt circle	54	2.125	79.4	3.125	Static
2	W-5510-T3*	2.25	20	M6 × 1 mRH	Center: M12 × 1.75 fRH Pattern: (4) M5 on 25 mm bolt circle	54	2.125	79.4	3.125	Static
2	W-5510-T2*	22.5	200	M6 × 1 mRH	Center: M12 × 1.75 fRH Pattern: (4) M5 on 25 mm bolt circle	54	2.125	79.4	3.125	Static
	W-5510-T1	225	2,000	3.25 in bolt circle	3.25 in bolt circle	101.6	4	76.2	3	Static

Notes: * Requires IP-MT2-G1 on all MT2 models.

ITEMS FOR USE WITH LOW CAPACITY TORSION TRANSDUCERS (W-5510-T2, T3, T4)

Catalog Number	Description
IP-MT2-G1	Torque Cell protection device for low range torque transducers

LOAD CELL ADAPTER CABLES



1

A variety of adapter cables are available to allow current Instron® load cells to be used with older systems or those not manufactured by Instron. It is also usually possible to adapt existing load cells to EXTEND™ electronic retrofits.

ADAPTER CABLES FOR LOAD CELLS

Catalog Number	Description
2503-045	2511 load cell to 4500/4300 electrical adapter
1 2525-001	Sensor conditioner adapter cable, 15-pin sensor to 25-pin conditioner card
2525-002	Sensor conditioner adapter cable, 25-pin sensor to 15-pin conditioner card
8800-126	Load cell cable, connector, ID resistor kit, and third party connectors
S1-12349-2	Adapter, electrical, provides electrical calibration for 2518-8XX or 2525-8XX load cells on TT-B, TT-C, TT-D, 1130, 1122, 1123 and 1125 systems

LOAD FRAME ACCESSORIES

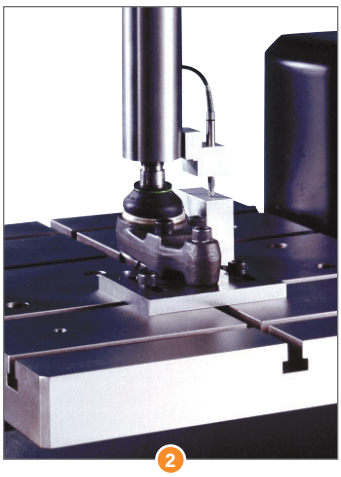
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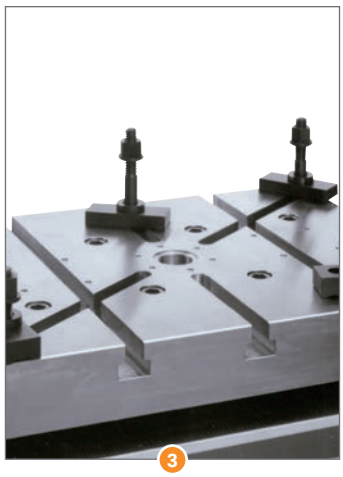
Load frame accessories include items designed to fit a specific model of testing frame, such as support tables, protective shields, T-slot tables, in-head wedge grips, in-head tension rods, and similar items.

T-Slot Table for 3300/4400/5500/ 5800/5900 Series	230
PIP Marker for 4400/5500/ 5800/5900 Series	231
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Static Hydraulic Testing Machines Tension Rods and Alignment Couplings	240-241
Satec Series Compression Bridges	242
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Satec Series Grip Hangers and Filler Plates	245–247
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T-SLOT TABLE FOR 3300, 4400, 5500/5500A, 5800 AND 5900 SERIES









The T-slot table provides an extended work area primarily intended for clamping components or structures for performing tensile, compression or flexural tests.

The T-slot table is mounted directly on the base platen of the machine and is equipped with T-slots running from front to back and side to side. Components/structures can then be secured in position on the table using the various clamping tools supplied. When installed, the T-slot table can be used for conventional testing by attaching a machine base adapter in the center of the table for the mounting of standard Instron® grips, test fixtures, and other major accessories.

Principle of Operation

Simple mechanical T-slot attachment.

Application Range

- Type of loading: Tensile, compression, flexure, and cyclic, static tests. Not suitable for high-cycle fatigue.
- Specimen type: Components and structures.

T-SLOT TABLE FOR 3300, 4400, 5500/5500A, 5800 AND 5900 SERIES

	Catalog Number	Capacity			Accessory Width		Accessory Height		Accessory Depth		Accessory Weight	
		kN	kgf	lbf	mm	in	mm	in	mm	in	kg	lb
1	CP103964	5	500	1,125	200	8	28	1.1	160	6.3	1.7	3.75
	2850-205[1]	50	5,000	11,250	400	15.7	50	2	500	19.7	77	170
2	2850-206[2]	50	5,000	11,250	400	15.7	50	2	500	19.7	77	170
3	2850-201	300	30,000	67,500	650	25.6	85	3.34	500	19.7	184	405
3	2850-202	600	60,000	135,000	640	25.2	90	3.54	640	25.2	245	540
4	2850-203	250	25,000	56,250	550	19.7	85	3.34	500	19.7	166	366

Notes:
1. 2850-205 for use with 4400, 5500, 5800 and 5900 Series Dual Column Table models.
2. 2850-206 for use with 3300 Series Dual Column Table models.

PIP MARKER FOR 4400, 5500/5500A, 5800 AND 5900 SERIES



PIP Jack Socket


1

A manual switch with cable and connecting plug that is compatible with Instron® testing systems featuring a PIP marker facility.

Principle of Operation

Manually depressing the switch allows the capture of specimen data at the moment the switch closes. Systems equipped with Bluehill® or Merlin™ software have access to these data points via the calculations and results table. Older systems with chart recorders produce a momentary peak on the chart to indicate when the switch closed.

Application Range

- Capturing of user-defined data points as determined by a manual switch closure

PIP MARKER FOR 4400, 5500/5500A, 5800 AND 5900 SERIES

	Catalog Number	Notes
1	2310-516	Remote PIP marker cable and switch

HYDRAULIC GRIP CONTROLS FOR 8800 SERIES



Hydraulic grip controls provide opening and closing control for hydraulic grips fitted to servohydraulic systems without the need for a free-standing pump. The configuration includes a handset, manifold with adjustable gripping pressure, and hoses for connecting the grips to the system's hydraulic supply.

Principle of Operation

The handset allows the upper and lower grips to be opened and closed. Gripping pressure is set from a regulator on the hydraulic manifold.

Application Range

- Hydraulic grips requiring operating pressures of up to 207-bar (3,000 psi)
- Compatible with model 8801, 8802, 8803, 8804, 8871, 8872, 8874, 8511, 8516 and 8502, 8503, 8504, 8505, 8506 servohydraulic systems

HYDRAULIC GRIP CONTROLS FOR 8800 SERIES

	Catalog Number	Notes	
1	2718-111	Hydraulic grip controls for servohydraulic systems 207-bar (3,000 psi)	8801, 8802, 8803, 8804, 8871, 8872, 8874, 8511, 8516 and 8502, 8503, 8504, 8505, 8605

AIR KITS FOR PNEUMATIC GRIPS



1



2

Pneumatic air kits, foot-switches or distribution kits are for ease-of-grip closure and productivity. In particular, the foot- switch capability allows both hands to be free to handle the specimen while the foot actuates the grip closure. Depending on the model type, an automatic electrical foot-switch can also provide pre-tension grip control for applications, such as textile testing.

Principle of Operation

The automatic air kit is one of the most useful options available for Instron®'s current product. It can be operated by simply stepping on a switch to close the grips, or settings can be arranged in the controller to automatically close on a pre-defined load reading (pre-tension) and open based on specimen break. The pneumatic foot-switch channels the air to either close or open the grip on demand. The air distribution kit is available to provide air to the grips which have an integrated air valve, with one hand required to operate the grips.

AIR KITS FOR PNEUMATIC GRIPS

	Catalog Number	Description
1	2701-004	Universal pneumatic foot-switch (no pre-tension)
2	2701-042	Universal air distribution kit (no pre-tension or foot-switch)
	2701-065	Automatic air control kit for all 3300, 4400, 5500/5500A and 5900 Series load frames, excluding model 4411 (pre-tension and foot-switch)
	2701-042	Only suitable for grips with integral air control valves

ALIGNMENT FIXTURES



Some applications require very precise specimen alignment. This is achieved using special fixtures designed to allow specimen alignment to be optimized.

Principle of Operation

A variety of fixtures can be used to control both concentricity and angularity. The specially designed AlignPro™ system consists of a fixture that is mounted between the load cell and the load frame that allows easy adjustment of both concentricity and angularity. The fixture has been designed for use with a strain-gauged specimen mounted in the grips. The output from the gauges indicates the degree of misalignment, and these can be input to AlignPro software that provides a numerical and pictorial view of the degree of bending in the specimen. Adjustments can be made in real time, and the effect on bending seen immediately. This greatly simplifies and speeds the process of achieving optimum alignment.

Application Range

- Static, fatigue and through-zero tests on materials where optimum alignment is critical

ALIGNMENT FIXTURES

	Catalog Number	Description	Dynamic Capacity			Notes
			kN	kgf	lbf	
1	8000-082	AlignPro alignment fixture	250	20,000	56,000	Compatible with 1321, 1322, 1323, 1324, 1331, 1332, 1333, 1334, 1350, 8501, 8502, 8503, 8504, 8516, 8561, 8562, 8801, 8802, 8803, 8804, 8861 and 8862 systems
1	8000-083	AlignPro alignment fixture	500	50,000	100,000	Compatible with 8503, 8504, 8803 and 8804 systems
2	8000-170	AlignPro software and electronics	-	-	-	-
	2910-130	AlignPro alignment fixture	100	10,000	22,500	For 5982 systems with 2580 series 100 kN load cell
	2910-132	AlignPro alignment fixture	250	25,000	56,200	For 5984 fitted with a 2580-302 load cell and 5985 fitted with a 2580 series 250 kN load cell.
	8000-171	Strain-gauged alignment cell, 8 gauges, 8 mm diameter	-	-	-	For use with 8000-170 AlignPro Software and electronics package. Comprises specimen with 8 mm diameter GL and 15 mm gripped diameter.
	8000-172	Strain-gauged alignment cell, 8 gauges, 10 mm diameter	-	-	-	For use with 8000-170 AlignPro Software and electronics package. Comprises specimen with 10 mm dia in GL and ends compatible with 3117-031 high-temperature reverse stress pullrods.
	8000-173	Strain-gauged alignment cell, 8 gauges, flat 12 × 6 mm	-	-	-	For use with 8000-170 AlignPro Software and electronics package. Comprises flat specimen 5 × 3 mm in GL and 15 × 3 mm gripped tab dimensions.
	8000-174	Strain-gauged alignment cell, 8 gauges, thin flat 15 × 2 mm	-	-	-	For use with 8000-170 AlignPro Software and electronics package. Comprises thin flat specimen 15 × 1 mm
	8000-179	Strain-gauged alignment cell adaptor cable	-	-	-	For use with older style strain-gauged alignment cells with current AlignPro system

LOAD FRAME SUPPORT TABLES/BASES



1

In order to provide an ergonomic height for testing frames, tables or bases can be purchased as an option. Floor model systems feature an optional support base with an integral storage drawer. Table models are smaller and may be placed on an industrial table. Instron® provides both light and heavy duty tables depending on the weight of the testing system.

LOAD FRAME SUPPORT TABLES/BASES

Catalog Number	Compatible Frame Models	Accessory Width		Accessory Height		Accessory Depth	
		mm	in	mm	in	mm	in
9529C	Models 8871, 8872 and 8874	1000	39.4	495 - 550	19.5 - 21.65	800	31.5
7789C	Models 8871, 8872, and 8874	1000	39.4	695	25.36	750	29.53
1300-151[1]	ElectroPuls™ E1000	-	-	-	-	-	-
1300-311	ElectroPuls E1000 and E3000	1000	39.4	785	30.91	750	29.53
1 2910-064	Base extension for floor models 4481, 4482, 4484, 4485, 5881, 5882, 5884, 5885, 5885H, 5982, 5984, 5985 load frames	1130	44.5	300	12	757	29.8
2910-056	Table for extra width, extra height and dual test space table model systems	1524	60	813	32	762	30

Notes:
1. 1300-151 ElectroPuls E1000 Horizontal Mounting Kit includes brackets and rocker feet to enable the E1000 test instrument to be mounted horizontally. Dimensions depend on the parts that are adapted to the frame.

PROTECTIVE SHIELDS



Safety Note

For certain applications, test space enclosures or other safety devices, such as protective shielding, warning signs and methods of restricting access to the equipment, are recommended. A range of protective shields is available in this section. Instron will be glad to provide advice and quotations for additional safety methods.

Test space enclosures or protective shields are sometimes a necessary accessory depending on the type of specimen being tested. Violent failures of specimens are common when testing rebar, cable, composites, rock, or any other material that shatters or creates projectiles upon failure. The enclosures/shields are constructed of a vibration-proof extruded aluminum frame with clear Lexan® panels. Clear panels allow an unobstructed view of the specimen during the test, while providing protection for the operator and surrounding area. The panels are held in the aluminum frame with rubber panel gaskets to ensure a tight, rattlefree shield. Access door(s) are integrated into the enclosure to allow operator access to the load train or removal of extensometry. Most enclosures/shields are available with door interlocks to prevent operation of the machine unless the doors are closed.

Principle of Operation

Depending on the frame model, the enclosure/shield is either bolted directly to the frame or is a free-standing enclosure that completely surrounds the test frame. Some frames require a separate front and back enclosure to completely enclose the test space, though sometimes a rear enclosure is not necessary. When supplied without interlocks, the enclosure does not interrupt operation or interface with the control system. When dictated by procedure or directive, door interlocks can be integrated into the enclosure/shield door. This will require that the door(s) be closed prior to starting a test and will interrupt the test in the event that a door is opened during a test. When used with Instron® testing software that allows a test to be paused, access is allowed to the test space at specific points during the test to allow removal of extensometry without halting the test.

Application Range

- Clear anodized extruded aluminum frame for superior strength and looks while minimizing weight
- Clear Lexan panels for observation during the test
- Access doors to allow operator access
- Available with or without door safety interlocks

FOR 3300, 4400, 5500/5500A, 5800 AND 5900 SERIES

Catalog Number	Accessory Width		Accessory Height		Compatible Frame Models
	mm	in	mm	in	
2910-074	546	21.5	1000	39.4	Model 336X (dual T-slot column cover style only),446X, 556X, 586X and 596X dual column table top, standard width load frames only.
2910-062	749	29.5	915	36	Models 4481, 5581, 5881, 3382, 4482, 5582, 5882, 5982, 3384, 4484, 5584, 5884, 5984, 4485, 5585, 5885, 5985, 3385H, 5585H and 5885H load frames

PROTECTIVE SHIELDS

FOR ELECTROPULS™ TEST INSTRUMENTS

Catalog Number	Accessory Width		Accessory Height		Compatible Frame Models
	mm	in	mm	in	
1 1300-301	835	32.9	876	34.5	ElectroPuls E1000
1300-303	1048	41.3	1924	75.8	ElectroPuls E10000[1]
1300-304	1056	41.6	1185	46.6	ElectroPuls E3000

Notes:
1. Height shown is from floor. Shield door height is 1180mm (46.5 in)
2. For 8800MT Controllers only. For 8800 Tower Controllers, please consult the factory

FOR SATEC SERIES MODELS

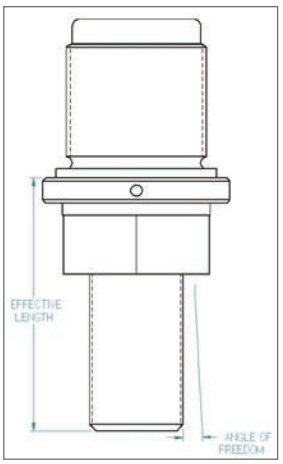
Catalog Number	Compatible Frame Models	Maximum Enclosure Height		Dimensions
		mm	in	
W-5231-A	Floor-standing interlocked enclosure for use with LX/DX Models. Compatible with: 150LX-J*A, 150LX-J8B, 300LX-J*A, 300LX-J*B, 600LX-J*A All DX models configured with -G1A, -G1E, -G6A, -G8, -G8A)	2366	93.1[1]	762 mm (30 in) wide front and rear access door. Enclousre is 1400 mm (55.1 in) wide. Depth is adjustable to 914 mm (36 in), 1067 mm (42 in) or 1219 mm (48 in).
W-5231-B	Floor-standing interlocked enclosure for use with LX/DX Models. Compatible with: 150LX-J*C, 300LX-J*C, 600LX-J*B All DX models configured with -G1B, -G6B, -G7A	2670	105.1[1]	762 mm (30 in) wide front and rear access door. Enclousre is 1400 mm (55.1 in) wide. Depth is adjustable to 914 mm (36 in), 1067 mm (42 in) or 1219 mm (48 in).
W-5231-C	Floor-standing interlocked enclosure for use with LX/DX Models. Compatible with: 150LX-J*D, 300LX-J*D, 600LX-J*C All DX models configured with -G1C, -G1F, -G6C, -G7B, -G7F	2976	117.1[1]	762 mm (30 in) wide front and rear access door. Enclousre is 1400 mm (55.1 in) wide. Depth is adjustable to 914 mm (36 in), 1067 mm (42 in) or 1219 mm (48 in).
W-5231-D	Floor-standing interlocked enclosure for use with LX/DX Models.Compatible with: 600LX-J*D All DX models configured with -G1D, -G6D, -G7C, -G7D, -G7G	3357	132.1[1]	762 mm (30 in) wide front and rear access door Enclousre is 1400 mm (55.1 in) wide. Depth is adjustable to 914 mm (36 in), 1067 mm (42 in) or 1219 mm (48 in).
W-5232-A	Floor-standing interlocked enclosure for use with HDX or 2 column KN Models. Compatible with 1000HDX, 300KN, 600KN	3277	129	991 L × 1626 W × 3277 H mm (39 × 64 × 129 in)
W-5232-B	Floor-standing interlocked enclosure for use with 2 column KN Models. Compatible with 1200KN, 1500KN	3886	153	1473 L × 1981 W × 3866 H mm (58 × 78 × 153 in)
W-5233-A	Floor-standing interlocked enclosure for use with 400HVL-G1A, 400HVL-G2A, 600HVL-G2A	-	-	1474 L × 1982 W × 2693 H mm (58 × 78 × 106 in)
W-5233-B	Floor-standing interlocked enclosure for use with 400HVL-G1D, 400HVL-G2D, 400WHVL-G1A, 400WHVL-G2A, 600HVL-G2D	-	-	1474 L × 1982 W × 3531 H mm (58 × 78 × 139 in)
W-5233-C	Floor-standing interlocked enclosure for use with 600XWHVL-G2A	-	-	1524 L × 2286 W × 3658 H mm (60 × 90 × 144 in)
W-5235-A	Machine Shield with Roller Base Two Dimensional machine shield allows a transparent panel to be moved in front of test area to interfere with specimen debris in one direction only. Does not cover sides or rear of machine, or most angular directions. Includes one height-adjustable panel mounted on roller base	-	-	1511 L × 937 W × 3658 mm (59.5 × 36.9 in) H. No guarantee of user protection is made.
W-5235-B	Additional Machine Shield Panel Optional panel that can be added to W-5235-A to increase height and effective shield area. Includes hardware for attaching panel.	-	-	-

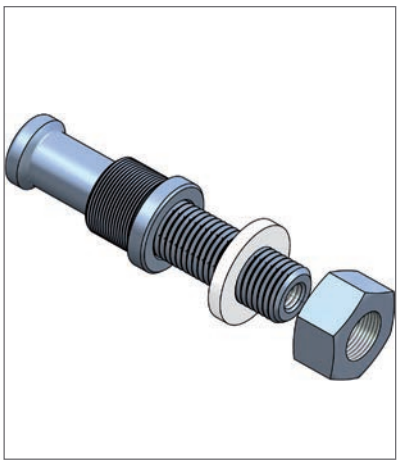
Notes:
1. Height can be reduced by 80 mm (3.1 in) by removing extension andles to accommodate limited ceiling height.

UNIVERSAL SPHERICAL TENSION ADAPTER (USTA)









The USTA is a versatile device that connects a wide number of tension accessories to an Instron test machine, provides a smooth spherical seat, and requires few or no additional adapters. The USTA threads into a standard machine interface from the direction of the test space, connects to the machine thread on one end and directly to the accessory on the other, all in one compact device.

The USTA consists of a sleeve component that is threaded for the test machine and a shank component that is threaded for tension accessories. The two components mate on matching spherical surfaces that allow flexibility during alignment and sustain the load during a test. A nut holds the assembly together and a polymer washer allows flexibility without looseness.

UNIVERSAL SPHERICAL TENSION ADAPTERS

Catalog Number	Description	Capacity		Upper/Lower Effective Length		Angle of Freedom	Accessory Interface
		kN	lbf	mm	in		
1 W-5551-A	Single-1 Spherical Coupling/1 Rigid Coupling Type IIm (M48 × 2 LH)	300	67,500	140	5.5	2	Type R4 Male (M36 × 4pRH) Type R3 Female (0.75 in × 10 RH)
2 W-5551-B	Dual-2 Spherical Couplings Type IIm (M48 × 2 LH)	300	67,500	140	5.5	2	Type R4 Male (M36 × 4pRH) Type R3 Female (0.75 in × 10 RH)
W-5551-G	Single-1 Spherical Coupling/1 Rigid Coupling Type IIm (M48 × 2 LH)	300	67,500	101.6	4.0	2	Type R4 Male (M36 × 4pRH) Type R3 Female (0.75 in × 10 RH)
W-5551-H	Single-1 Spherical Coupling/1 Rigid Coupling Type Dm (M48 × 2 LH)	300	67,500	172.7	6.8	2	Type R4 Male (M36 × 4pRH) Type R3 Female (0.75 in × 10 RH)
W-5552-A	Single-1 Spherical Coupling/1 Rigid Coupling Type IIAm (M72 × 3 LH)	600	135,000	129	5.06	3	Type II Male (M48 × 2pRH) Type R3 Female (0.75 in × 10 RH)
W-5552-B	Dual-2 Spherical Couplings Type IIAm (M72 × 3 LH)	600	135,000	129	5.06	3	Type II Male (M48 × 2pRH) Type R3 Female (0.75 in × 10 RH)
W-5552-E	Single-1 Spherical Coupling /1 Rigid Coupling Type IIm (M48 × 2 LH)	400	90,000	98.5	3.88	2	Type RIIm (M48 × 2 RH) Type R3f (0.75 – 10 inch RH)
W-5552-F	Dual-2 Spherical Couplings Type IIm (M48 × 2 LH)	400	90,000	98.5	3.88	2	Type RIIm (M48 × 2 RH) Type R3f (0.75 – 10 inch RH)
W-5554-A	Dual-2 Spherical Couplings, 1-Adapter Flange, Hardware M100 × 4p LH	1,500	337,500	191	7.5	3	Type IIA Male (M72 × 3pRH) Type R4 Female (M36 × 4pRH)

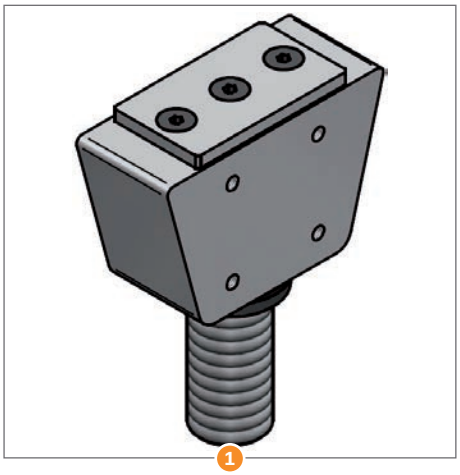
UNIVERSAL SPHERICAL TENSION ADAPTER (USTA)

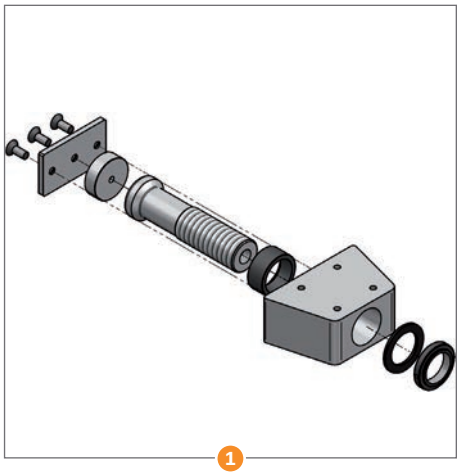
ADAPTER AND EXTENSION KITS FOR USTA AND OTHER TENSION RODS

Catalog Number	Description	Capacity		Effective Length		Accessory Interface
		kN	lbf	mm	in	
W-5551-D	Bushing Kit	300	67,500	18	0.7	Includes two Type R4 (M36 × 4pRH) to Type II RH (M48 × 2pRH) bushings
W-5553-B	EM Accessory Adapter Kit	100	22,500	101	4	Includes two Type II RH (M48 × 2pRH) Female to Type D Female Clevis adapters, two Type R4 (M36 × 4pRH) to Type II RH (M48 × 2pRH) bushings and two 1.5 - 6 to Type II RH (M48 × 2pRH) bushings
W-5551-C	Extension Rod	300	67,500	203	8	Includes one rigid adapter with Type R4 (M36 × 4pRH) female thread in one end for attachment to tension rod. Other end threaded Type R4 (M36 × 4pRH) male and TypeR3 (0.75 - 10RH) female for test accessories
W-5552-C	Extension Rod	600	135,000	203	8	2 Includes two rigid adapters with Type IIRH (M48 × 2pRH) female thread in one end for attachment to tension rod. Other end threaded Type IIRH (M48 × 2pRH) male and Type R3 (0.75 - 10RH) female for test accessories
W-5554-E	Extension Rod	1500	337,500	254	10	Includes one rigid adapter with Type IIA RH (M72 × 3pRH) female thread in one end for attachment to tension rod. Other end threaded Type IIA RH (M72 × 3pRH) male and Type R3 (0.75 - 10RH) female for test accessories
W-5553-A	Legacy Accessory Tension Rod Kit	534	120,000	203	8	Includes two rigid adapters with Type II RH (M48 × 2pRH) female thread for tension rods on one end. Other end threaded 1.5 - 6 UNC for SATEC legacy accessories and Type R4 (0.75 - 10RH) for additional accessories. Also includes two Type II RH (M48 × 2pRH) male to Type R4 (M36 × 4pRH) female reducer bushings for use on 300 kN tension rods
W-5554-D	Reducing Rod Kit	300	67,500	146	5.75	Includes two 203 mm (8 in) Type R4 (M36 × 4pRH) threaded rods with type R3 (0.75-10RH) female thread in one end. Threads directly into female thread of USTA or WGTA, with approximatley 146 mm (5.75 in) of thread remaining for tension test accessories
W-5552-D	Reducing Rod Kit	300	67,500	203	8	Includes one rigid adapter with Type IIRH (M48 × 2pRH) female thread in one end for attachment to tension rod. Other end threaded Type R4 (M36 × 4pRH) male and Type R3 (0.75 - 10RH) female for test accessories. Each adapter extends 203 mm (8 in) into test space
W-5554-C	Reducing Rod Kit	600	135,000	203	8	Includes two rigid adapters with Type IIA RH (M72 × 3pRH) female thread in one end for attachment to tension rod. Other end threaded Type II RH (M48 × 3pRH) male and Type R3 (0.75 - 10RH) female for test accessories. Each adapter extends 203 mm (8 in) into test space

SPHERICAL TENSION RODS AND ALIGNMENT COUPLINGS FOR STATIC HYDRAULIC TESTING MACHINES


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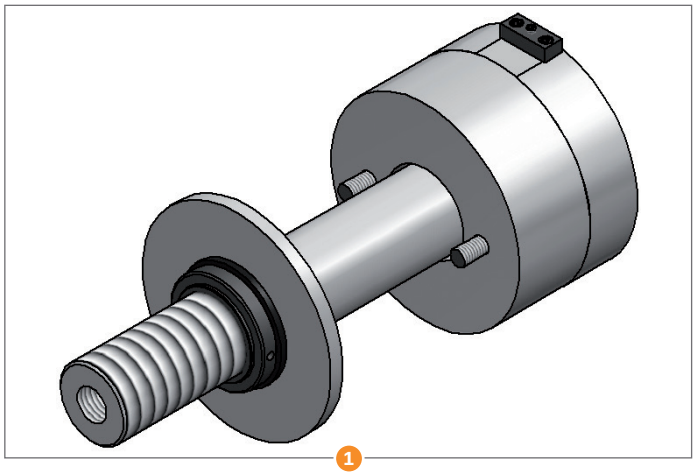

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The WGTA provides a spherical tension rod to Instron IPG test machines between 1000 kN and 1500 kN capacity that feature open front grips. It provides the same test accessory connection as the USTA, but instead of the spherical seat being incorporated into the threaded sleeve, it is contained inside a wedge block. This device replaces the jaw carriers and is retained inside the grip body using the same jaw cover plates. Unlike a device gripped in the jaws that could fall out when grip pressure is removed, the WGTA will remain in the grip body with or without grip presure until deliberately removed.

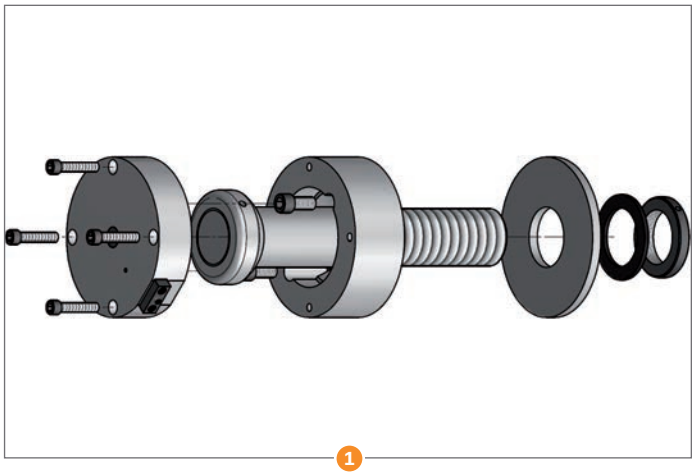
WGTA

Catalog Number	Description	Capacity		Effective Length		Angle of Freedom	Accessory Interface
		kN	lbf	mm	in	Degrees	
1 W-5554-B	Dual-2 Wedge Block Mounted Spherical Tension Rods Machine Wedge Pocket	1500	337,500	165	6.5	3	Type IIA Male (M72 × 3pRH) Type R4 Female (M36 × 4pRH)

SPHERICAL TENSION RODS AND ALIGNMENT COUPLINGS FOR STATIC HYDRAULIC TESTING MACHINES



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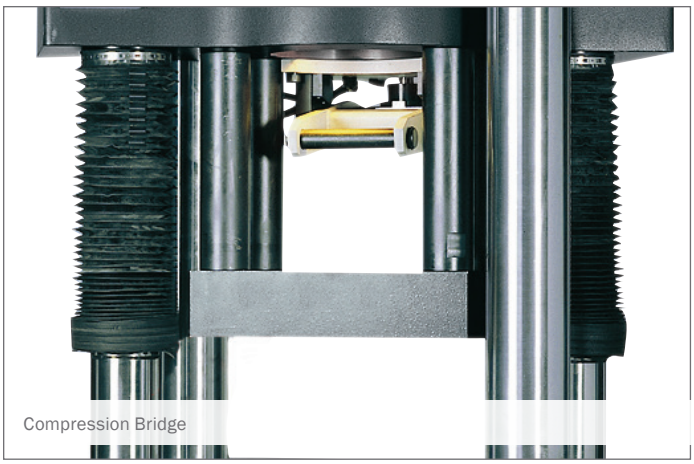
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The THTA (Through-Head Tension Adapter) connects a wide number of tension accessories to manual crank and pinion (G1) systems. It provides a smooth spherical seat and requires few or no additional adapters. The spherical tension rod also provides adaptation of compression accessories without the need to add a spacer such that compression and tension accessories can be in place at the same time.

THROUGH-HEAD TENSION ADAPTER

Catalog Number	Description	Capacity		Effective Length		Angle of Freedom	Accessory Interface
		kN	lbf	mm	in	Degrees	
1 W-5163-A	Dual-2 Spherical Tension Rods, Rod to be inserted through crosshead (1000HDX-G1)	300	67,500	117	4.6	2	Type R4 Male (M36 × 4pRH) Type R3 Fe male (0.75 in × 10 RH)
W-5163-B	Dual-2 Spherical Tension Rods, Rod to be inserted through crosshead (1500HDX-G1)	300	67,500	112	4.4	2	Type R4 Male (M36 × 4pRH) Type R3 Female (0.75 in × 10 RH)
W-5163-C	Dual-2 Spherical Tension Rods, Rod to be inserted through crosshead (150DX-G1 or 300DX-G1)	300	67,500	139.7	5.5	2	Type R4 Male (M36 × 4pRH) Type R3 Female (0.75 in × 10 RH)
W-5163-D	Dual-2 Spherical Tension Rods, Rod to be inserted through crosshead (600DX-G1 or G6)	300	67,500	139.7	5.5	2	Type R4 Male (M36 × 4pRH) Type R3 Female (0.75 in × 10 RH)
W-5164-A	Dual-2 Spherical Tension Rods, Rod to be inserted through crosshead (1000HDX-G1)	600	135,000	142	5.6	2	Type II Male (M48 × 2pRH) Type R3 Female (0.75 in × 10 RH)
W-5164-B	Dual-2 Spherical Tension Rods, Rod to be inserted through crosshead (1500HDX-G1)	600	135,000	137	5.4	2	Type II Male (M48 × 2pRH) Type R3 Female (0.75 in × 10 RH)
W-5164-C	Dual-2 Spherical Tension Rods, Rod to be inserted through crosshead (600DX-G1 or G6)	600	135,000	130.3	5.13	2	Type II Male (M48 × 2pRH) Type R3 Female (0.75 in × 10 RH)
W-5165-A	Dual-2 Spherical Tension Rods, Rod to be inserted through crosshead (1000HDX-G1)	1000	225,000	168	6.6	2	Type IIA Male (M72 × 3pRH) Type R4 Female (M36 × 4pRH)
W-5165-B	Dual-2 Spherical Tension Rods, Rod to be inserted through crosshead (1500HDX-G1)	1500	337,500	163	6.4	2	Type IIA Male (M72 × 3pRH) Type R4 Female (M36 × 4pRH)

SATEC™ SERIES COMPRESSION BRIDGES



Compression Bridge

Hydraulic grip compression bridges are available for the entire line of SATEC Series HVL Model static hydraulic testing machines. Each bridge is designed to fit a specific capacity frame, and is permanently mounted to the underside of the adjustable crosshead. The bridge spans the hydraulic grip lever arms and allows for attachment of compression fixtures to the underside of the bridge. The bridge allows for full use of the tension space without removing fixturing and allows the compression fixturing to remain on the frame when performing tension tests. The compression bridge does take up significantly more compression test space than a spacer assembly. Depending on the compression fixturing used, it may be necessary to increase the tension and compression space of the test frame to accommodate the bridge with fixturing. The bridge is rated to the full capacity of the frame on which it is used Installation requires modification to the adjustable crosshead and to the position limit switch when installed on existing machines.

Principle of Operation

Hydraulic grip actuators greatly increase the gripping force of in-head grip jaws, but their design interferes with the compression test space In order to perform compression tests, the lower hydraulic grip lever arm must be removed from the adjustable crosshead. The use of a hydraulic grip compression bridge allows compression tests to be performed without removing the lever arm or any other tension fixturing. The bridge is bolted to four columns that are in turn threaded to the underside of the adjustable crosshead. The bridge has a center hole that allows compression fixturing to be bolted to the bridge.

Application Range

- Permits the installation of compression fixturing without the need to remove the tensile grips and fixtures
- Rated to the full capacity of the frame on which it is used
- Designed for static compression loading

Safety Advice

Review safety note on page 236

COMPRESSION BRIDGES

Catalog Number	Pressure Rating		Accessory Height (A)		Accessory Width (B)		Accessory Depth (C)		Upper Fitting	Compatible Frame Models
	MPa	psi	mm	in	mm	in	mm	in		
W-2590-E	690	100,000	527	20.75	533	21	279	11	0.53 in through hole	5596, 400HVL

SATEC™ SERIES COMPRESSION SPACERS



Hydraulic Grip Compression Spacers

Hydraulic grip compression spacers are available for the entire line of SATEC Series HVL Model static hydraulic testing machines. Each spacer is designed to fit a specific capacity frame and is provided with mounting hardware to allow mounting on the underside of the adjustable crosshead. The spacer takes up less compression test space than does a compression bridge. However, the spacer must be removed from the frame to do tension testing, and the tension grip jaws with hangers and lever arm mounting pin must be removed to allow use of the spacer. The spacer is rated to the full capacity of the frame on which it is used.

Principle of Operation

Hydraulic grip actuators greatly increase the gripping force of in-head grip jaws, but their design interferes with the compression test space. In order to perform compression tests, the lower hydraulic grip lever arm must be removed from the adjustable crosshead.

The use of a hydraulic grip spacer allows compression tests to be performed without removing the lever arm. The lower grip jaws with attached hangers and mounting pin are removed from the lower lever arm, and the spacer is attached to the adjustable crosshead between the lever arm side plates.

The spacer sits in a recess in the crosshead or uses a centering washer to maintain alignment with the center of the crosshead, and thus the center of the compression table. A threaded rod passes through the lower grip pocket, and a plate and wingnut are used to attach the spacer securely to the crosshead. The bottom of the spacer has a threaded hole that allows the attachment of compression plates or other compression fixturing.

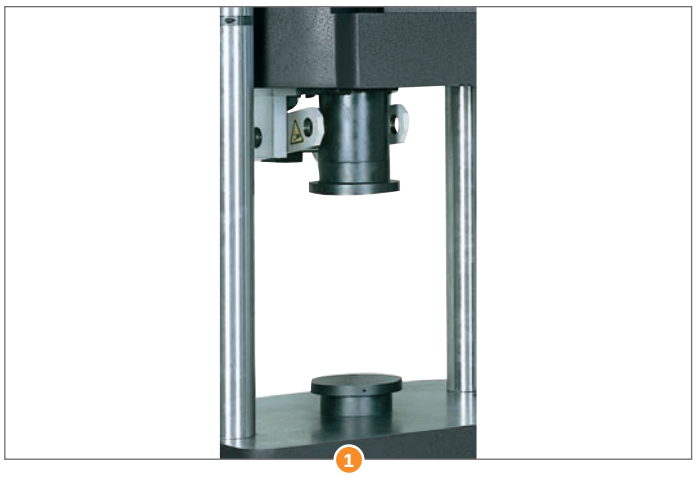
Application Range

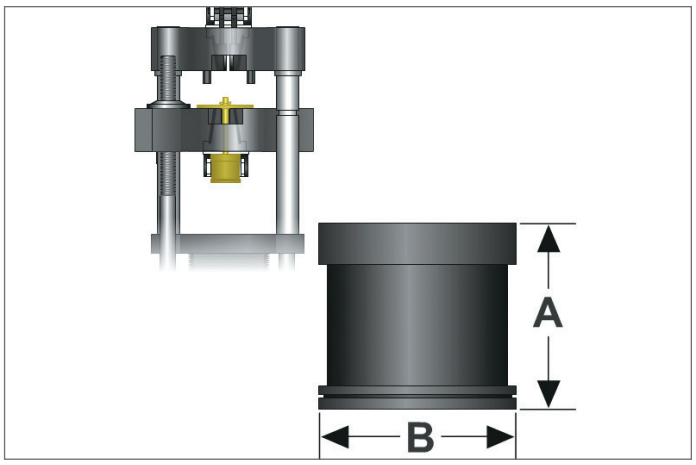
- Permits installation of compression fixturing without the need to remove the hydraulic grip lever arms
- Rated to the full capacity of the frame on which it is used
- Operates in static compression only

Safety Advice

Review safety note on page 236

SATEC™ SERIES COMPRESSION SPACERS





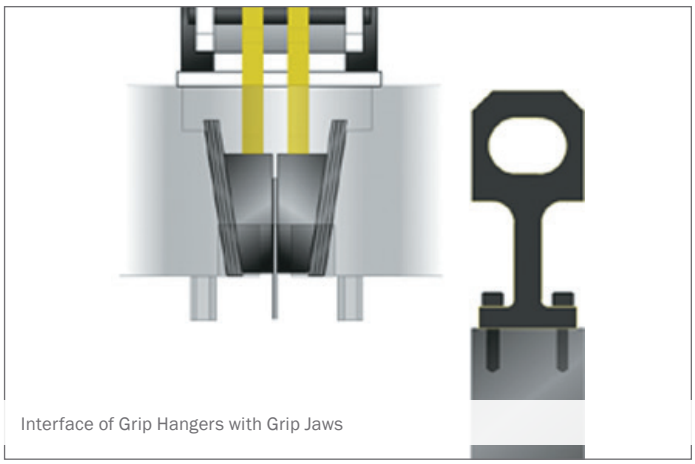
COMPRESSION BRIDGES

	Catalog Number	Pressure Rating		Accessory Diameter (B)		Lower Fitting	Effective Length		Compatible Frame Models
		MPa	psi	mm	in				
1	W-0119-E	690	100,000	178	7	0.5 in - 13 mRH	178	7	400HVL

SATEC™ SERIES GRIP HANGERS AND FILLER PLATES



Grip Hangers



Interface of Grip Hangers with Grip Jaws

All SATEC universal testing machines with in-head grip pockets, whether they use pinion grip actuators or hydraulic lever arm actuators, will require replacement gripping components to maintain optimum gripping performance. Common components that wear over time include grip jaws, filler plates, pinions and grip jaw hangers.

Filler plates allow the grip jaw opening to be adjusted to a range of specimen thicknesses and maximize the full use of the grip jaw range. These components are essential to prevent the grip jaws from protruding out of the grip pocket which may result in damage to the machine.

Pinions are used only with systems that are configured with manual, crank and pinion style gripping. The pinions extend through the machine crosshead, front to back, and engages with the rack teeth of the wedge grip jaws inserted in the grip pocket to open or close the grip jaws to clamp or unclamp the test specimen.

Principle of Operation

An equal quantity and thickness of filler plate(s) is inserted behind each of the four wedge grip jaws and rest on the top side of each crosshead. Various thicknesses of filler plates are available and are dependent on the machine model and capacity. Filler plates are easily replaced and minimize wear of the grip pocket.

One pinion is installed through each of the machine's crosshead and secured. The gear teeth of the pinion are exposed in the grip pocket and when the wedge grip jaws are inserted their rack teeth will engage with one another. A crank handle is then secured to the pinion shaft. The handle is the mechanism to turn to close or open the wedge grip jaws to grip or release the test specimen.

Grip jaw hangers are bolted to the top of each of the four wedge grip jaws. Each grip and hanger assembly is then fitted to the upper or lower hydraulic lever arm grip actuator. The hanger than transmits the pivoting motion of the lever arm into the a linear motion of the grip jaw, and provides clearance so that the pivot bar of the actuator assembly does not interfere with the self-tightening action of the wedge grip pocket and jaws as load increases on the tensile specimen.

Application Range

- Filler plates allow adjustment of grip jaw opening to maintain in-head grips inside the pocket
- Additional hangers allow quicker changeover of grip jaws when using hydraulic grip actuators

SATEC™ SERIES GRIP HANGERS AND FILLER PLATES

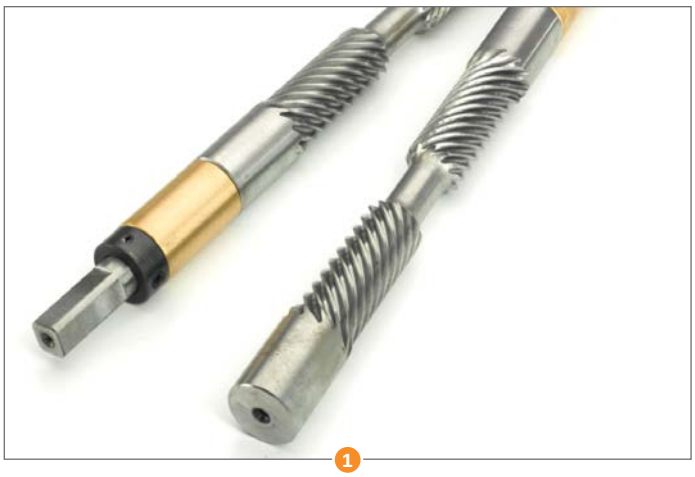


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FILLER PLATES

Catalog Number	Description	Compatible Frame Model
IP-9000-A	1/8 in thick Filler Plates, Set of 4	60BTE, 60WHVL
IP-9000-C	1/8 in thick Filler Plates, Set of 4	60HVL, 5590, 150DX-G1, 300DX-G1
IP-9001-A	1/4 in thick Filler Plates, Set of 4	120BTE
IP-9001-B	3/8 in thick Filler Plates, Set of 4	120BTE
IP-9001-C	1/2 in thick Filler Plates, Set of 4	120BTE, 120HVL
1 IP-9001-E	3/16 in thick Filler Plates, Set of 4	120HVL, 120WHVL, 5592, 600DX-G1
IP-9001-D	1/4 in thick Filler Plates, Set of 4	120HVL, 120WHVL, 5592, 600DX-G1
IP-9000-B	3/16 in thick Filler Plates, Set of 4	150DX-G1, 300DX-G1
IP-9002-A	1/8 in thick Filler Plates, Set of 4	200BTE, 200HVL, 200WHVL, 5594, 1000HDX-G1B
IP-9002-B	1/4 in thick Filler Plates, Set of 4	200BTE, 200HVL, 200WHVL, 5594, 1000HDX-G1B
IP-9002-C	1/2 in thick Filler Plates, Set of 4	200BTE, 200HVL, 200WHVL, 5594, 1000HDX-G1B
IP-9003-A	1/8 in thick Filler Plates, Set of 4	300HVL, 300WHVL, 5595, 150HDX-G1B
IP-9003-B	1/4 in thick Filler Plates, Set of 4	300HVL, 300WHVL, 5595, 150HDX-G1B
IP-9003-C	1/2 in thick Filler Plates, Set of 4	300HVL, 300WHVL, 5595, 150HDX-G1B
IP-9004-A	1/4 in thick Filler Plates, Set of 4	400BTE, 500BTE, 400HVL, 400WHVL, 5596
IP-9004-B	3/8 in thick Filler Plates, Set of 4	400BTE, 500BTE, 400HVL, 400WHVL, 5596
IP-9004-C	1/2 in thick Filler Plates, Set of 4	400BTE, 500BTE, 400HVL, 400WHVL, 5596

SATEC™ SERIES GRIP HANGERS AND FILLER PLATES



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PINIONS

Catalog Number	Description	Compatible Frame Model
IP-9010-A	1/8 in thick Filler Plates, Set of 4	60BTE, 60WHVL
IP-9011-A	1/8 in thick Filler Plates, Set of 4	60HVL, 5590, 150DX-G1, 300DX-G1
IP-9011-B	1/4 in thick Filler Plates, Set of 4	120BTE
IP-9011-C	3/8 in thick Filler Plates, Set of 4	120BTE
IP-9011-D	1/2 in thick Filler Plates, Set of 4	120BTE, 120HVL
1 IP-9012-B	3/16 in thick Filler Plates, Set of 4	120HVL, 120WHVL, 5592, 600DX-G1
IP-9012-A	1/4 in thick Filler Plates, Set of 4	120HVL, 120WHVL, 5592, 600DX-G1
IP-9010-B	3/16 in thick Filler Plates, Set of 4	150DX-G1, 300DX-G1
IP-9013-A	1/8 in thick Filler Plates, Set of 4	200BTE, 200HVL, 200WHVL, 5594, 1000HDX-G1B
IP-9014-A	1/4 in thick Filler Plates, Set of 4	200BTE, 200HVL, 200WHVL, 5594, 1000HDX-G1B
IP-9014-B	1/2 in thick Filler Plates, Set of 4	200BTE, 200HVL, 200WHVL, 5594, 1000HDX-G1B

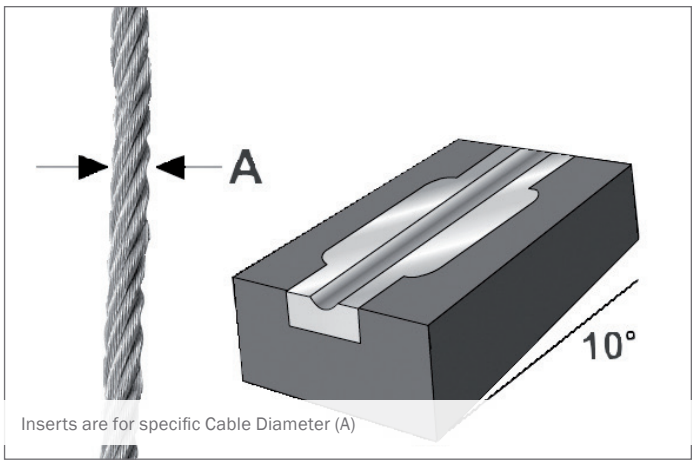
GRIP HANGERS

Catalog Number	Capacity			Compatible Frame Models
	kN	kgf	lbf	
1 W-0110-E	2,000	200,000	450,000	400HVL

SATEC™ SERIES IN-HEAD GRIPS FOR CABLE



W-1538/W-1538-A



Inserts are for specific Cable Diameter (A)

Designed as an integral part of the testing platform, cable wedge grip jaws fit directly into the crosshead pocket of the frame. Cable grip jaws are only available for load frames with a capacity of 600 kN (135,000 lb) or more. These jaws are rugged heat-treated steel, and ideal for testing stranded cable specimens. The wedge design causes the gripping force to increase as tension force is applied. This ensures a secure gripping action with minimal slippage throughout the range of the test.

Cable grip jaws consist of a wedge shaped body and an insert. The insert is sized for the diameter of the cable being tested.

Principle of Operation

A pair of wedge grip jaws is used in each crosshead pocket to grip the upper and lower end of the specimen. When using cable grip jaws, jaw actuation must be accomplished hydraulically, regardless of actuation method (i.e. hydraulically operated pinions or hydraulic lever arm).

Once the specimen has been inserted between the jaws, the operator applies an initial clamping force to the specimen with the pinion or lever actuators (depending on frame options). When the test is begun, the wedge design of the grip jaws and pocket translates some of the tension force applied by the load frame into a gripping force on the specimen. As the tension force increases so does the gripping force, reducing instances of specimen slippage.

Application Range

- Jaws are rated to full machine capacity — up to 3,000 kN (600,000 lbf, 300,000 kgf)
- Designed for testing specimens in compliance with ASTM E8 standards
- Wedge design causes gripping force to increase as more tension force is applied

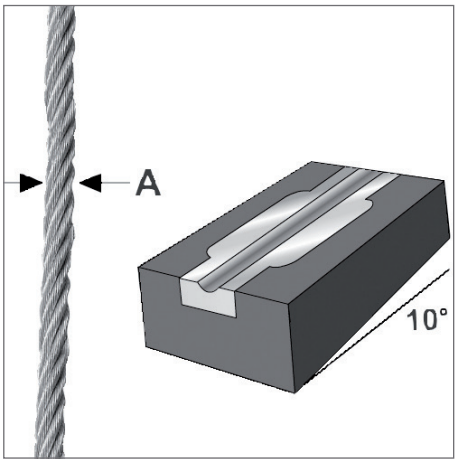
SATEC™ SERIES IN-HEAD GRIPS FOR CABLE



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IN-HEAD WEDGE GRIPS FOR CABLE SPECIMENS

	Catalog Number	Description	Capacity			Specimen Diameter (A)		Accessory Width		Accessory Length		Surface	Compatible Frame Models
			kN	kgf	lbf	mm	in	mm	in	mm	in		
1	W-1538	Grip Bodies	2,000	200,000	450,000	-	-	114	4.49	196.9	7.75	-	5596, 400HVL
2	W-1538-A	Cable inserts	2,000	200,000	450,000	9.53	0.375	50.8	2	196.9	7.75	Textured abrasive	5596, 400HVL
	W-1538-B	Cable inserts	2,000	200,000	450,000	11.11	0.4375	50.8	2	196.9	7.75	Textured abrasive	5596, 400HVL
	W-1538-C	Cable inserts	2,000	200,000	450,000	12.7	0.5	50.8	2	196.9	7.75	Textured abrasive	5596, 400HVL
	W-1538-D	Cable inserts	2,000	200,000	450,000	15.88	0.625	50.8	2	196.9	7.75	Textured abrasive	5596, 400HVL
	W-1538-E	Cable inserts	2,000	200,000	450,000	19.05	0.75	50.8	2	196.9	7.75	Textured abrasive	5596, 400HVL
	W-1538-F	Cable inserts	2,000	200,000	450,000	12.9	0.51	50.8	2	196.9	7.75	Textured abrasive	5596, 400HVL
	W-1538-G	Cable inserts	2,000	200,000	450,000	13.2	0.52	50.8	2	196.9	7.75	Textured abrasive	5596, 400HVL
	W-1538-H	Cable inserts	2,000	200,000	450,000	15.24	0.6	50.8	2	196.9	7.75	Textured abrasive	5596, 400HVL

ITEMS FOR USE WITH W-1538

Catalog Number	Description
W-0110-E	Grip hangers for hydraulic grips

SATEC™ SERIES IN-HEAD GRIPS FOR FLAT SPECIMENS



GripJaws for Current Model Dx-G1, HVL, 5590- Flat Jaws



W-5246

Designed as an integral part of the testing platform, flat wedge jaws fit directly into the crosshead pocket of the frame and provide a grip that is adaptable to a variety of testing applications. These jaws are rugged heat-treated steel designed for minimum maintenance and high-durability. They are ideal for testing a variety of hard, flat specimens. The teeth of the jaws are also hardened, and different tooth options increase the application range. A coarse tooth pattern is best for softer materials and higher loads, whereas a finer tooth pattern is best for harder materials. The wedge design causes the gripping force to increase as tension force is applied. This ensures a secure gripping action with minimal slippage throughout the range of the test.

Principle of Operation

A pair of wedge grip jaws is used in each crosshead pocket to grip the upper and lower end of the specimen. The grip jaw pairs are actuated (opened and closed) by one of two basic methods: pinion or lever arm. When pinion actuation is used, the back surface of each grip jaw is equipped with rack teeth to facilitate actuation of the jaws in the crosshead pocket. A pinion meshes with these rack teeth and, as the pinion is actuated by the operator, either manually or hydraulically, the jaws are raised or lowered in the crosshead pocket. When lever arm actuation is used, a grip hanger is attached to each grip jaw.

Once the jaws are installed in the grip pocket, the grip hangers will pivot about a lever arm. As the operator actuates the lever arm, the jaws are raised or lowered in the crosshead pocket. Once the specimen has been inserted between the jaws, the operator applies an initial clamping force to the specimen with the pinion or lever actuators (depending on frame options). When the test is begun, the wedge design of the grip jaws and pocket translates some of the tension force applied by the load frame into a gripping force on the specimen. As the tension force increases so does the gripping force, reducing instances of specimen slippage.

Application Range

- Jaws are rated to full machine capacity — up to 3,000 kN (600,000 lbf, 300,000 kgf)
- Designed for testing specimens in compliance with ASTM E8 standards
- Wedge design causes gripping force to increase as more tension force is applied

SATEC™ SERIES IN-HEAD GRIPS FOR FLAT SPECIMENS

IN-HEAD WEDGE GRIPS FOR FLAT SPECIMENS

	Catalog Number	Capacity			Specimen Width (A)		Specimen Thickness (B)		Teeth Per Inch	Surface	Accessory Weight		Accessory Width		Accessory Length		Compatible Frame Models
		kN	kgf	lbf	mm	in	mm	in			kg	lb	mm	in	mm	in	
1	W-1214	300	30,000	67,500	50	2	25	1	16	Horizontal	1.4	3	56.8	2.24	76.2	3	150DX-G1, 150DX-G6, 300DX-G1, 300DX-G6, 5590, 12-60HVL
	W-1408	600	60,000	135,000	70	2.75	45	1.75	8	Horizontal	3.2	7	75.9	2.99	127	5	600DX-G1, 600DX-G6, 5592, 5593, 120HVL, 120WHVL, 120BTE
	W-1408-A	600	60,000	135,000	70	2.75	45	1.75	8	Diamond	3.2	7	75.9	2.99	127	5	600DX-G1, 600DX-G6, 5592, 5593, 120HVL, 120WHVL, 120BTE
	W-1409	600	60,000	135,000	70	2.75	45	1.75	16	Horizontal	3.2	7	75.9	2.99	127	5	600DX-G1, 600DX-G6, 5592, 5593, 120HVL, 120WHVL, 120BTE
	W-1409-A	600	60,000	135,000	70	2.75	45	1.75	16	Diamond	3.2	7	75.9	2.99	127	5	600DX-G1, 600DX-G6, 5592, 5593, 120HVL, 120WHVL, 120BTE
	W-1559	1,000	100,000	225,000	82	3.25	50	2	8	Diamond	5.9	13	88.6	3.49	152.4	6	1000HDX-G1, 5594, 200HVL, 200WHVL, 200BTE
	W-1560	1,000	100,000	225,000	82	3.25	50	2	16	Diamond	5.9	13	88.6	3.49	152.4	6	1000HDX-G1, 5594, 200HVL, 200WHVL, 200BTE
	W-1660	1,500	150,000	337,500	90	3.5	76	3	8	Diamond	8.2	18	101.3	3.99	171.5	6.75	1500HDX-G1, 5595, 300HVL, 300WHVL, 300BTE
2	W-1761	2,000	200,000	450,000	100	4.25	76	3	8	Diamond	12.2	27	114	4.49	196.9	7.75	5596, 400HVL, 400WHVL, 400BTE
3	W-1911	3,000	300,000	675,000	150	6	105	4	8	Diamond	29.5	65	171.1	6.74	254	10	600HVL, 600XWHVL, 5597, 5598

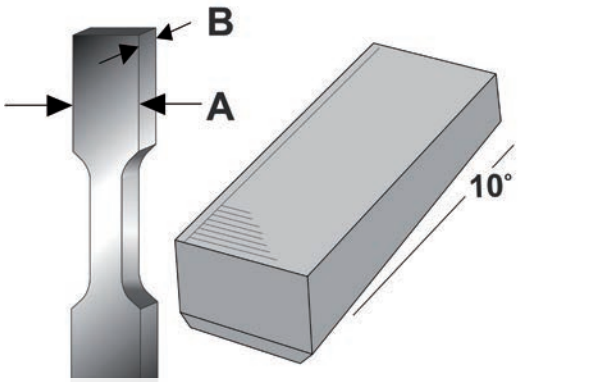
ITEMS FOR USE WITH W-1761

Catalog Number	Description
W-0110-E	Grip hangers for hydraulic grips

ITEMS FOR USE WITH W-1761

Catalog Number	Description
W-0110-G	Grip hangers for hydraulic grips

SATEC™ SERIES IN-HEAD GRIPS FOR FLAT SPECIMENS



Open-Front Jaw Faces for Flat Specimens - Width & Height

OPEN-FRONT JAWS FOR FLAT SPECIMENS

Catalog Number	Capacity			Specimen Width (A)		Specimen Thickness (B)		Teeth Per Inch	Surface	Accessory Length		Compatible Frame Models
	kN	kgf	lbf	mm	in	mm	in			mm	in	
W-5246-A	300	30,000	67,500	70	1.75	0 - 16	0 - 0.63	20	Horizontal	76.2	3	300DX-G7, W-5244, W-5245 Wedge Grips
W-5246-B	300	30,000	67,500	70	1.75	16 - 32	0.63 - 1.25	20	Horizontal	76.2	3	300DX-G7, W-5244, W-5245 Wedge Grips
W-5246-C	300	30,000	67,500	70	1.75	32 - 50	1.25 - 2.0	20	Horizontal	76.2	3	300DX-G7, W-5244, W-5245 Wedge Grips
W-5197-A	600	30,000	67,500	100	4	0 - 30	0 - 1.18	20	Horizontal	101.6	4	600DX-G7, W-5160, W-5360 Wedge Grips
W-5197-B	600	60,000	135,000	100	4	0 - 35	0 - 1.4	20	Horizontal	101.6	4	600DX-G7, W-5160, W-5360 Wedge Grips
W-5331-A	1000, 1500	60,000	135,000	100	4	0 - 35	0 - 1.4	8	Horizontal	152.4	6	1000HDX-G7, 1500HDX-G7, W-5330, W-5340 Wedge Grips
W-5331-B	1000, 1500	60,000	135,000	100	4	35 - 70	1.4 - 2.75	8	Horizontal	152.4	6	1000HDX-G7, 1500HDX-G7, W-5330, W-5340 Wedge Grips
W-5322-A	2000	60,000	135,000	125	5	0 - 45	0 - 1.77	8	Horizontal	188.9	7.438	W-5320 Wedge Grips
W-5322-B	2000	60,000	135,000	125	5	45 - 90	1.77 - 3.54	8	Horizontal	188.9	7.438	W-5320 Wedge Grips

SATEC™ SERIES IN-HEAD GRIPS FOR ROUND SPECIMENS



Grip Jaws Current Model DX-G1, HVL, 5590 and Machines Vee Grip Jaws



W-5247

Designed as an integral part of the testing platform, V-wedge jaws fit directly into the crosshead pocket of the frame and provide a grip adaptable to a variety of testing applications. These jaws are rugged heat-treated steel, and ideal for testing a variety of round specimens. Most of the offered V-wedge jaws can also be produced using through-hardened tool steel, which is suitable for rebar applications. The teeth of the jaws are also hardened, and different tooth options increase the application range. A coarse tooth pattern is best for softer materials and higher loads, whereas a finer tooth pattern is best for harder materials. The wedge design causes the gripping force to increase as tension force is applied. This ensures a secure gripping action, which decreases occurrences of slippage throughout the range of the test.

Filler plates are provided with the purchase of testing frames, and allow a variety of specimen thicknesses to be tested. The variety of available jaws also allows variability in the range of specimen diameters. This versatility is due to the different depths and angles of the V-notch in the jaws available, depending on the specific dimensions of the specimen being tested.

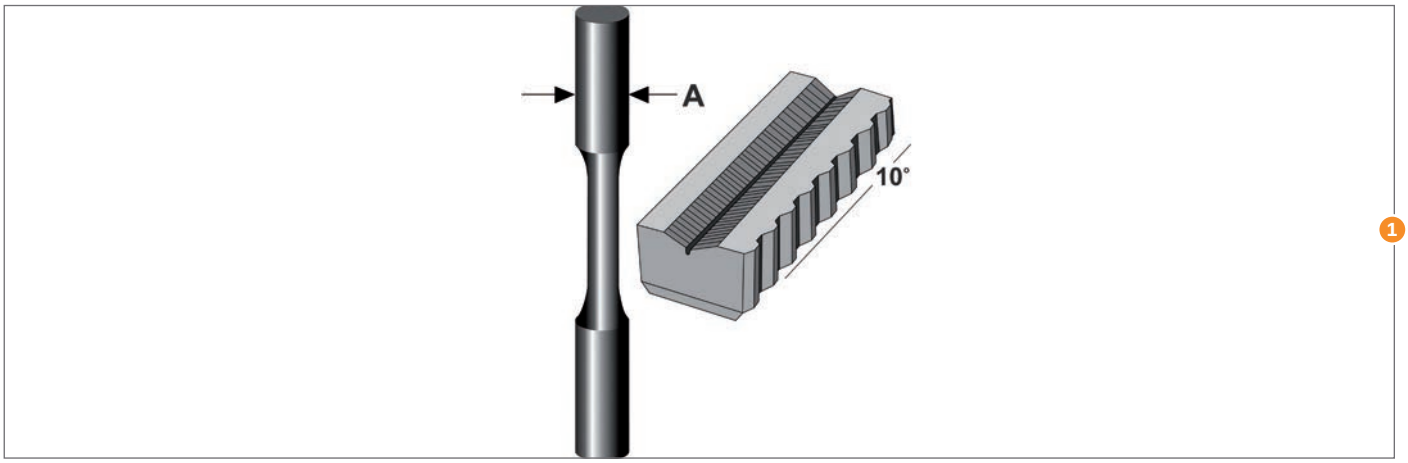
Principle of Operation

A pair of wedge grip jaws is used in each crosshead pocket to grip the upper and lower end of the specimen. The grip jaw pairs are actuated (opened and closed) by one of two basic methods: pinion or lever arm. When pinion actuation is used, the back surface of each grip jaw is equipped with rack teeth to facilitate actuation of the jaws in the crosshead pocket. A pinion meshes with these rack teeth and, as the pinion is actuated by the operator, either manually or hydraulically, the jaws are raised or lowered in the crosshead pocket. When lever arm actuation is used, a grip hanger is attached to each grip jaw. Once the jaws are installed in the grip pocket, the grip hangers will pivot about a lever arm. As the operator actuates the lever arm, the jaws are raised or lowered in the crosshead pocket. Once the specimen has been inserted between the jaws, the operator applies an initial clamping force to the specimen. When the test is begun, the wedge design of the grip jaws and pocket translates some of the tension force applied by the load frame into a gripping force on the specimen. As the tension force increases so does the gripping force, reducing instances of specimen slippage.

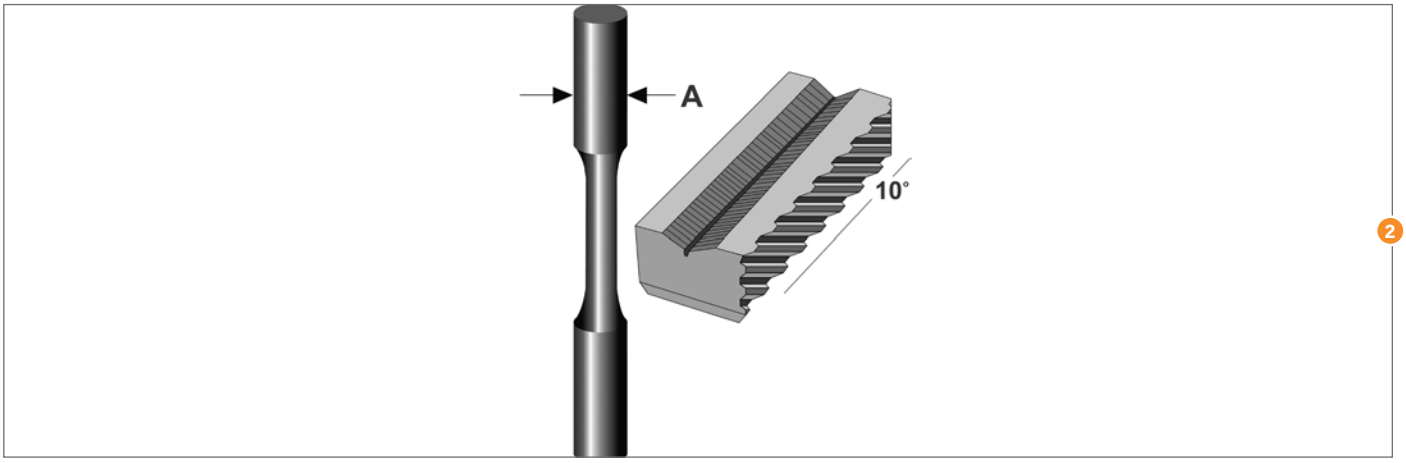
Application Range

- Jaws are rated to full machine capacity — up to 3,000 kN (600,000 lbf; 300,000 kgf)
- Suitable for use with a variety of round specimens (including pipe, bar, tube and rebar) made of a variety of materials (including steel, wrought iron, copper, bronze, brass, aluminum, and composites)

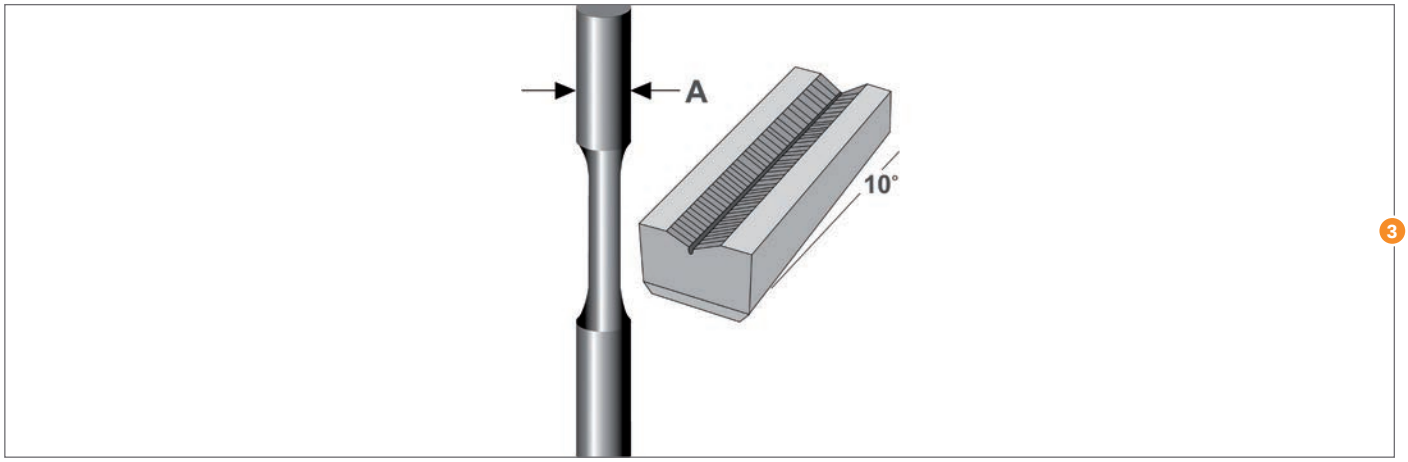
SATEC™ SERIES IN-HEAD GRIPS FOR ROUND SPECIMENS



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SATEC™ SERIES IN-HEAD GRIPS FOR ROUND SPECIMENS

IN-HEAD WEDGE GRIPS FOR ROUND SPECIMENS

Catalog Number	Capacity			Specimen Width (A)		Teeth Per Inch	Surface	Accessory Weight		Accessory Width		Accessory Length		Compatible Frame Models
	kN	kgf	lbf	mm	in			kg	lb	mm	in	mm	in	
1 W-1215	300	30,000	67,500	12 - 32	0.5 - 1.25	16	Horizontal	1.4	3	56.8	2.238	76.2	3	150DX-G1, 150DX-G6, 300DX-G1, 300DX-G6, 5590, 12-60HVL
W-1215-A	300	30,000	67,500	5 - 13	0.2 - 0.5	16	Horizontal	1.4	3	56.8	2.238	76.2	3	150DX-G1, 150DX-G6, 300DX-G1, 300DX-G6, 5590, 12-60HVL
2 W-1410	300	30,000	67,500	12.7 - 40	0.5 - 2.25	10	Horizontal	3.2	7	75.9	2.988	127	5	600DX-G1, 600DX-G6, 5592, 5593, 120HVL, 120WHVL, 120BTE
W-1410-A	600	60,000	135,000	7 - 25	0.25 - 1	16	Horizontal	3.2	7	75.9	2.988	127	5	600DX-G1, 600DX-G6, 5592, 5593, 120HVL, 120WHVL, 120BTE
W-1411	600	60,000	135,000	12.7 - 57	0.5 - 2.25	16	Horizontal	3.2	7	75.9	2.988	127	5	600DX-G1, 600DX-G6, 5592, 5593, 120HVL, 120WHVL, 120BTE
W-1561	1,000	100,000	225,000	12.7 - 57	0.5 - 2.25	10	Horizontal	5.9	13	88.6	3.488	152.4	6	1000HDX-G1, 5594, 200HVL, 200WHVL, 200BTE
W-1562	1,000	100,000	225,000	45 - 85	1.75 - 3.25	10	Horizontal	5.9	13	88.6	3.488	152.4	6	1000HDX-G1, 5594, 200HVL, 200WHVL, 200BTE
3 W-1563	1,000	100,000	225,000	12.7 - 57	0.5 - 2.25	16	Horizontal	5.9	13	88.6	3.488	152.4	6	1000HDX-G1, 5594, 200HVL, 200WHVL, 200BTE
W-1563-A	1,000	100,000	225,000	6 - 12.7	0.25 - 0.5	16	Horizontal	5.9	13	88.6	3.488	152.4	6	1000HDX-G1, 5594, 200HVL, 200WHVL, 200BTE
W-1662	1,500	100,000	337,500	12.7 - 82	0.5 - 3.25	10	Horizontal	8.2	18	101.3	3.988	171.5	6.75	1500HDX-G1, 5595 300HVL, 300WHVL 300BTE
W-1669-A	1,500	150,000	337,500	10 - 63	0.375 - 2.5	8	Horizontal	8.2	18	101.3	3.988	171.5	6.75	1500HDX-G1, 5595, 300HVL, 300WHVL, 300BTE
W-1669-B	2,000	200,000	450,000	10 - 63	0.375 - 2.5	8	Horizontal	12.2	27	114	4.488	196.9	7.75	5596, 400HVL, 400WHVL, 400XWHVL, 400BTE
W-1763	2,000	200,000	450,000	32 - 95	1.25 - 3.75	10	Horizontal	12.2	27	114	4.488	196.9	7.75	5596, 400HVL, 400WHVL, 400XWHVL, 400BTE
W-1912	3,000	300,000	675,000	35 - 125	1.375 - 5	10	Horizontal	29.5	65	171.1	6.737	254	10	New 600HVL, 600XWHVL, 5597, 5598
W-1916	3,000	300,000	675,000	10 - 63	0.375 - 2.5	10	INSRT: horizontal GRP: diamond	INSRT: 6.8 GRP: 22.7	INSRT: 15 GRP: 50	145.7	5.737	INSRT: 279.4 GRP: 254	INSRT: 11 GRP: 10	600HVL, 600XWHVL, 5597, 5598

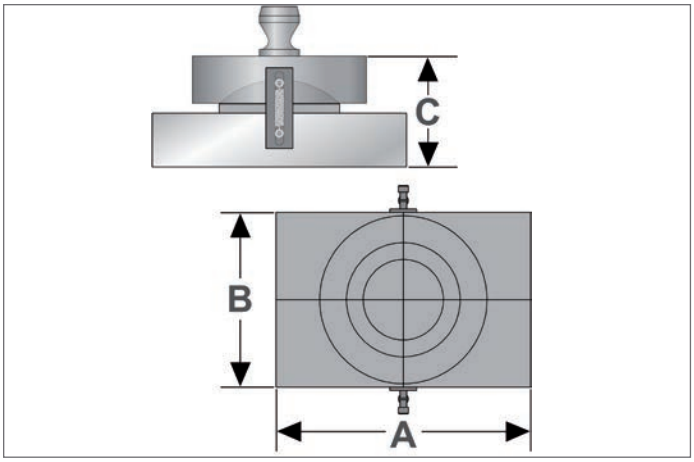
ITEMS FOR USE WITH W-1669-B, W-1763

Catalog Number	Description
W-0110-E	Grip hangers for hydraulic grips

ITEMS FOR USE WITH W-1912, W-1916

Catalog Number	Description
W-0110-G	Grip hangers for hydraulic grips

RD AND QC SERIES BRICK AND BLOCK FIXTURES



These are specialty fixtures used for testing full-size formed concrete, clay, and rock materials. The fixtures are spherically-seated compression platens sized for testing either bricks or concrete blocks. The platens provide a hardened surface (Rockwell® HRC 58/60) for complex compression tests in which uniform stress distribution is critical. The block test fixtures are designed to accommodate one full concrete block. The platen for both the upper and lower surfaces is large enough to prevent any part of the specimen from overhanging the plate. This assures even loading across the entire specimen.

The brick test compression fixtures are designed to accommodate either full size or half size specimens, and are used to determine the compressive strength of the specimen. The fixtures consist of two lower supports that can be adjusted to three different spans to accommodate different length specimens. The lower supports are free to pivot in the longitudinal and transverse directions to prevent exertion of any force on the specimen in these directions. The upper loading surface is a flat loading nose that can pivot longitudinally with the specimen. Additional spacers are typically required to achieve the correct test space opening.

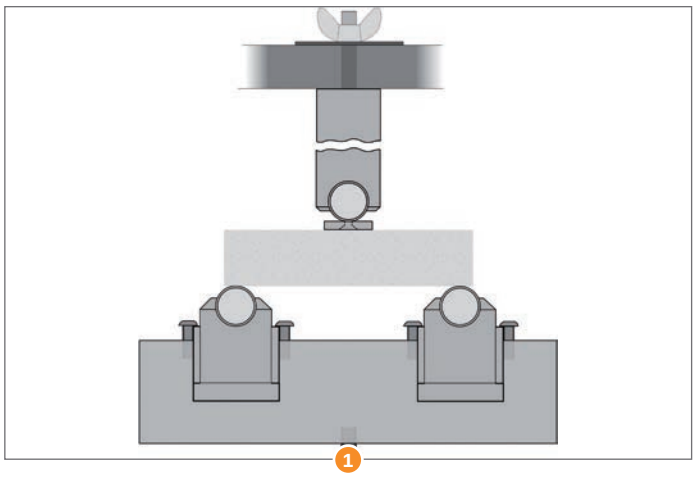
Principle of Operation

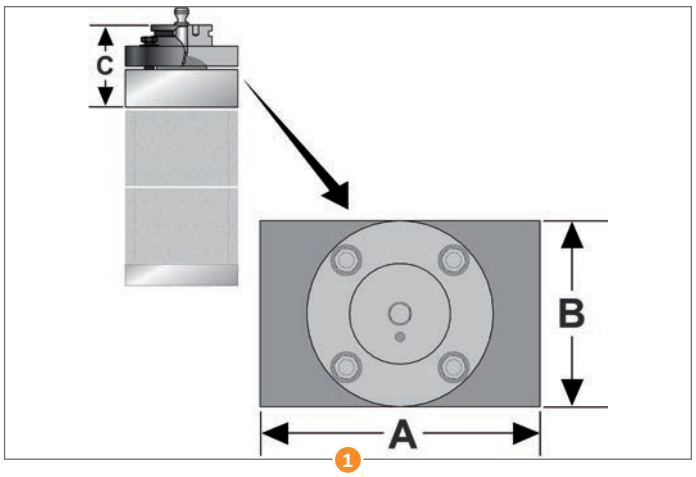
The high Rockwell scale hardness of the compression platens ensures lack of deformity at pressures up to their capacity. Their inscribed concentric circles along with a crosshair axis ensure proper, centered placement of the specimen, thereby increasing the validity of test results. A level seating surface and even load distribution over the specimen is ensured due to the high tolerance in the flatness of the surface. This aids the operator in attaining valid test results and true failure measurements. Both types of fixtures utilize a spherical seat designed to accommodate angular displacement (up to 4°) of the top of the specimen with reference to the machine's loading axis. This is accomplished through the spherical seating of the platen and the metal springs connecting the platen and the base.

Application Range

- Conform to ASTM C67 and C140, depending on the fixture
- All fixtures mount in Prism frames using a holding stem and set screw assembly
- Operate in static compression only

RD AND QC SERIES BRICK AND BLOCK FIXTURES





BRICK AND BLOCK FIXTURES

Catalog Number	Pressure Rating		Specimen Length		Specimen Width		Specimen Thickness		Support Span		Upper Fitting	Lower Fitting	Accessory Width (B)		Accessory Height (C)		Accessory Length (A)		Testing Standards
	MPa	psi	mm	in	mm	in	mm	in	mm	in			mm	in	mm	in	mm	in	
W-1380	690	100,000	-	-	-	-	-	-	-	-	Ball hitch	-	165	6.5	105	4.14	241	9.5	ASTM C67
1 W-1189-G	690	100,000	406	16	305	12	203	8	-	-	Ball hitch	-	305	12	222	8.75	470	18.5	ASTM C140

RD AND QC SERIES COMPRESSION FIXTURES



W-1184-G

Designed to be centered on the loading axis of a RD or QC test machine load frame, compression platens provide a hardened surface for complex compression tests in which uniform stress distribution is critical. Plane and spherically seated compression platens are available in a range of diameters. Designed to mount directly to the table or upper head of the frame, compression platens are available with numerous types of adapters, making them compatible with a wide range of testing platforms. Cube and cylinder fixtures typically consist of an upper spherical compression platen that is used in conjunction with existing machine spacers and lower platens. In the case of cube fixtures used on large capacity frames, an additional lower sub-platen may be included. Splitting tensile fixtures are used for splitting cylinders along the length of the cylinder to determine their splitting tensile strength. Applying a compressive load with this fixture induces tensile stresses on the plane containing the applied load.

Principle of Operation

The high Rockwell® scale hardness of the compression platens ensures lack of deformity at pressures up to their capacity. Their inscribed concentric circles ensure proper, centered placement of the specimen, thereby increasing the validity of test results. A level seating surface and even load distribution over the specimen is ensured due to the high tolerance in the flatness of the surface. This aids the operator in attaining valid test results and true failure measurements. The spherically seated compression platen is designed to accommodate angular displacement (up to 4°) of the top of the specimen with reference to the machine's loading axis. This is accomplished through the spherical seating of the platen and the metal springs connecting the platen and the base.

When compression platens are used for testing concrete cylinders, it may be necessary to use customer supplied sulfur or pad endcaps if the specimen loading surface is uneven. The splitting tensile fixture applies a force along the longitudinal surface of a cylinder, usually against the machine lower table.Thin strips of plywood are used on the top and bottom sides of the cylinder to evenly distribute the force against the cylinder.

Application Range

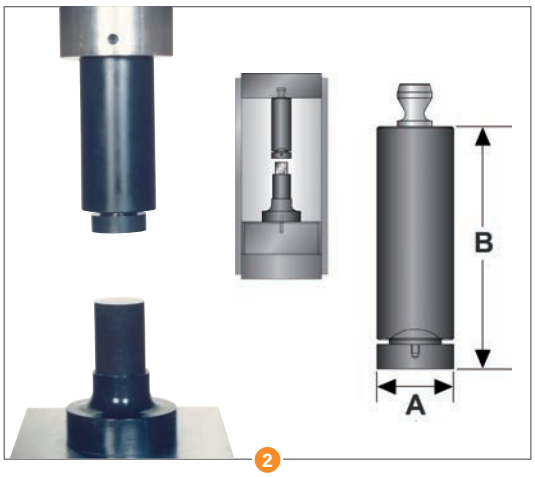
- Types of loading: Static compression
- Specimen material: Concrete, metals, wood, composites, or other materials
- Specimen types: Cylinders, cubes, fasteners (when used in conjunction with other fixtures), or components

Safety Advice

Review safety note on page 236

RD AND QC SERIES COMPRESSION FIXTURES







CUBE AND CYLINDER FIXTURES

	Catalog Number	Pressure Rating		Upper Fitting	Lower Fitting	Accessory Diameter (A)		Accessory Height (B)		Accessory Width		Accessory Length		Compatible Frame Models	Testing Standards
		MPa	psi			mm	in	mm	in	mm	in	mm	in		
1	W-1108	690	100,000	Adapter plate	Direct	79.4	3.125	266.7	10.50	-	-	-	-	CTL	-
	W-1186-G	690	100,000	Ball hitch	Direct	79.4	3.125	179.3	7.06	-	-	438	17.25	400RD	ASTM C109, ASTM C39, AASHTO T 97, AASHTO T 22
2	W-1186-H	690	100,000	Ball hitch	Direct	79.4	3.125	220.7	8.69	-	-	-	-	600RD, 600QC	ASTM C109, ASTM C39, AASHTO T 97, AASHTO T 22
	W-1186-I	690	100,000	Ball hitch	Direct	79.4	3.125	220.7	8.69	-	-	-	-	1000RD	ASTM C109, ASTM C39, AASHTO T 97, AASHTO T 22
	W-1379	690	100,000	Ball hitch	-	-	-	247.7	9.75	254.0	10.00	254.0	10.00	RD, QC	BS 1881 Part 4

FIXTURES FOR 6-IN SULFUR CAP CYLINDERS

	Catalog Number	Pressure Rating		Upper Fitting	Accessory Diameter (A)		Accessory Height (B)		Compatible Frame Models	Testing Standards
		MPa	psi		mm	in	mm	in		
	W-1183-H	690	100,000	Ball hitch	165.1	6.500	228.6	9.00	600RD, 600QC	ASTM C39, AASHTO T 22
	W-1183-I	690	100,000	Ball hitch	165.1	6.500	228.6	9.00	1000RD	ASTM C39, AASHTO T 22
1	W-1184-G	690	100,000	Ball hitch	215.9	8.500	120.7	4.75	400RD	ASTM C39, AASHTO T 22

RD AND QC SERIES COMPRESSION FIXTURES


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SPLITTING TENSILE FIXTURES

Catalog Number	Pressure Rating		Upper Fitting	Lower Fitting	Accessory Height (B)		Accessory Width		Accessory Length		Compatible Frame Models	Testing Standards
	MPa	psi			mm	in	mm	in	mm	in		
W-1187-G	690	100,000	Ball hitch	Table rest	323.9	12.75	304.8	12.00	50.8	2.00	400RD	ASTM C 496
W-1187-H	690	100,000	Ball hitch	Table rest	374.7	14.75	304.8	12.00	50.8	2.00	600RD, 600QC	ASTM C 496
W-1187-I	690	100,000	Ball hitch	Table rest	374.7	14.75	304.8	12.00	50.8	2.00	1000R	ASTM C 496

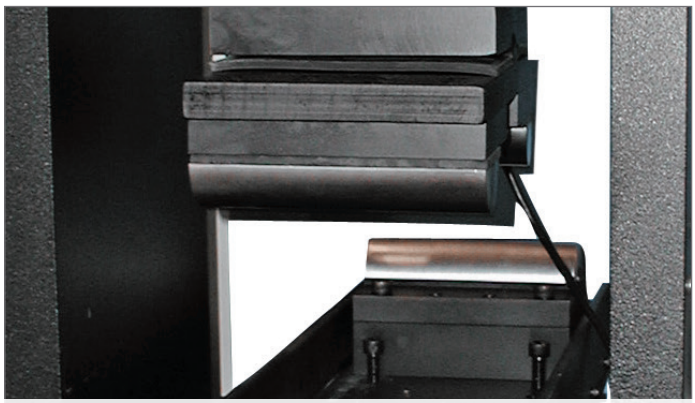
PLANE COMPRESSION PLATENS

Catalog Number	Pressure Rating		Lower Fitting	Accessory Diameter		Accessory Height		Compatible Frame Models	Testing Standards
	MPa	psi		mm	in	mm	in		
W-1190-A	690	100,000	0.5 in - 13 mRH	165	6.500	25.4	1.00	RD, QC	ASTM C 39, AASHTO T 22
W-1190-B	690	100,000	0.5 in - 13 mRH	165	6.500	50.8	2.00	RD, QC	ASTM C 39, AASHTO T 22

SPACERS

	Catalog Number	Pressure Rating		Upper Fitting	Accessory Diameter		Accessory Height		Compatible Fitting Frame Models
		MPa	psi		mm	in	mm	in	
1	W-1376-A	690	100,000	Ball hitch	165	6.500	101.6	4.00	RD, QC
2	W-1376-B	690	100,000	Ball hitch	165	6.500	152.4	6.00	RD, QC
3	W-1376-C	690	100,000	Ball hitch	165	6.500	203.2	8.00	RD, QC
4	W-1377-A	690	100,000	Ball hitch	229	9.000	101.6	4.00	RD, QC
5	W-1377-B	690	100,000	Ball hitch	229	9.000	152.4	6.00	RD, QC
6	W-1377-C	690	100,000	Ball hitch	229	9.000	203.2	8.00	RD, QC

RD AND QC SERIES COMPRESSION FIXTURES



W-1188-x

Flexure fixtures are designed for center and third-point loading of concrete beams. A lower support channel rests on the machine's lower platen. The channel has a series of locating holes to permit adjustment of the span of the support blocks in 3-inch increments. A flexible upper bearing block is used to apply the vertical force using either a single loading nose for center-point loading, or dual loading noses for three-point loading. The upper bearing block allows adjustment of the loading noses in 1-inch increments.

Both types of fixtures are suitable for determining the flexural strength of concrete beams. The capacity of the fixture is dependent on the portion of the lower channel that is supported by the machine table.

Principle of Operation

Two lower hardened bearing blocks support a centered specimen. The bearing surfaces are half cylinders that pivot on rollers. The lower support blocks are adjustable within the lower channel to provide several different spans in fixed increments. The entire assembly is held in place using pins that bear against the front and back of the machine table.

The upper bearing block is similar in construction in that the same pivoting half-cylinder bearing surfaces are used. However, the upper assembly includes an additional pivot on the mounting block. This pivoting action enables the entire upper block to move in order to maintain contact with the specimen during failure. The upper assembly can be used as either a three-point bend fixture or a four-point bend fixture.

Application Range

- Conform to ASTM C78, C293, and AASHTO T 97
- All fixtures mount in Prism frames using a holding stem and set-screw assembly

Safety Advice

Review safety note on page 236

UNIVERSAL FLEXURE ATTACHMENTS

Catalog Number	Pressure Rating			Specimen Length		Specimen Width		Specimen Thickness		Support Span		Loading Span		Accessory Height		Accessory Length		Compatible Frame Models	Testing Standards
	kN	kgf	lbf	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in		
W-1188-G	200	20,000	45,000	305 - 914	12 - 36	203	8	102 - 203	4 - 8	305 - 914	12 - 36	102 - 254	4 - 10	285	11.2	991	39	400 RD	ASTM C78, ASTM C293, AASHTO 197
W-1188-H	200	20,000	45,000	305 - 914	12 - 36	203	8	102 - 254	4 - 10	305 - 914	12 - 36	102 - 254	4 - 10	285	11.2	991	39	600 RD, 600 QC	ASTM C78, ASTM C293, AASHTO 197
W-1188-I	200	20,000	45,000	305 - 914	12 - 36	203	8	102 - 254	4 - 10	305 - 914	12 - 36	102 - 254	4 - 10	285	11.2	991	39	600 RD, 600 QC	ASTM C78, ASTM C293, AASHTO 197

Notes:
1. Upper fitting: ball hitch; lower fitting: locating pins

SATEC™ SERIES TENSION RODS



Spherical Tension Rods for SATEC Dual Test Space Static Hydraulic HVL, 5590 and BTE Machines

Spherically-seated tension rods are used with universal testing machines in order to mount external tensile accessories to the load frame. Typically, spherically-seated tension rods are used as a matched pair of assemblies. Assemblies for semi-open or closed crosshead designs consist of a stud, an adapter plate, a hex nut, a cover plate, a recoil washer, and a jam nut.

Principle of Operation

Spherically-seated tension rods are engineered to provide an ideal mounting platform for external tensile fixtures. They allow for easy changing of accessories, and also provide simple and precise alignment through an adapter plate that is bolted into the crosshead. This adapter plate holds a spherical bearing to seat the threaded alignment rod.

The assemblies are engineered to be compatible with a wide range of frames, and can also be used with a variety of accessories, including T-grip jaw holders, threaded-end specimen holders, shoulder-end specimen holders and fastener testing bolt holders. These accessories are mounted onto the threaded portion of the spherically-seated tension rods, and provide the interface between the machine and the specimen.

Because the threaded alignment rod is engineered to seat into the spherical bearing of the adapter plate, alignment of the specimen load train is automatically achieved when tension is applied. This design feature ensures axial loading of the specimen.

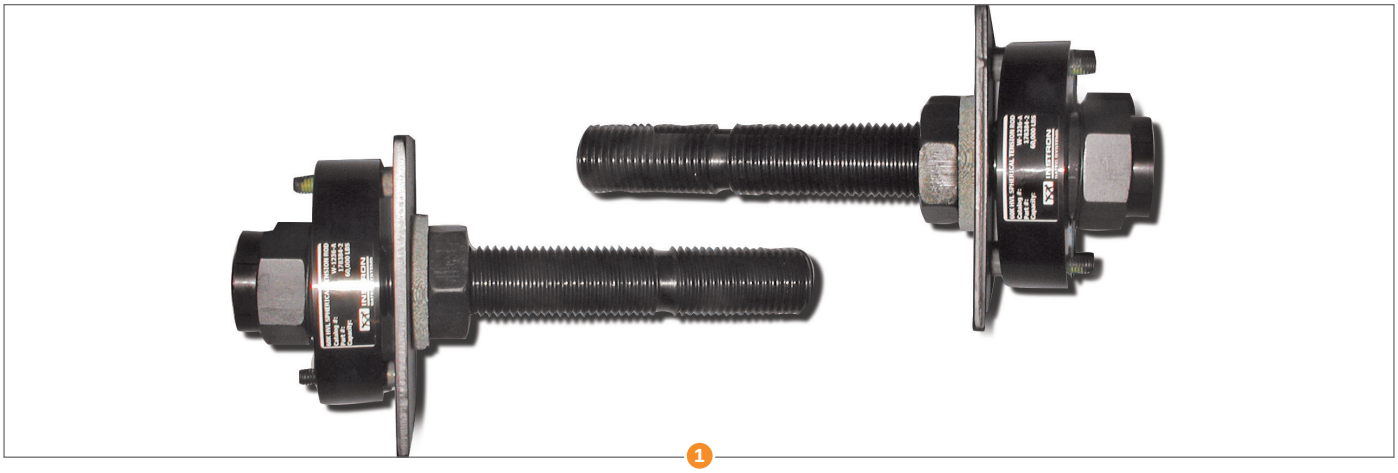
Application Range

- Spherical bearing provides simple and precise alignment of load train
- Design allows for quick and easy changing of accessories
- Operate in static tension only

Safety Advice

Review safety note on page 236

SATEC™ SERIES TENSION RODS

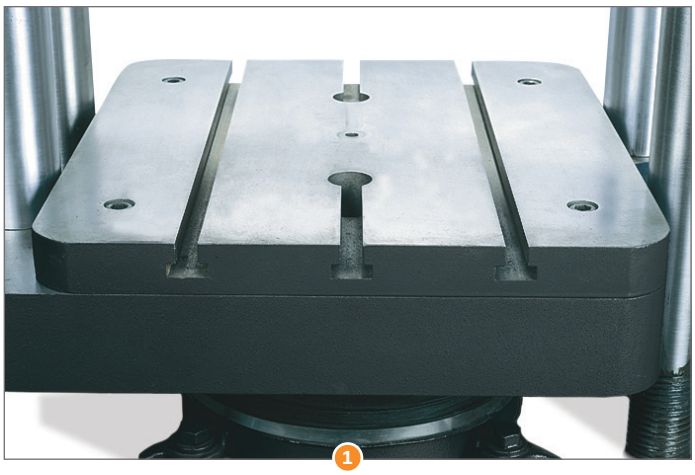


1

TENSION RODS FOR 5590-HVL MODELS

	Catalog Number	Capacity			Compatible Frame Models	External Thread	Internal Thread
		kN	kgf	lbf			
1	W-5163-C	300	33750	67500	5590, 30-60HVL	M36 × 4 mRH	0.75 in - 10 fRH
	W-5163-D	300	33750	61500	5592, 120HVL, 135HVL	M36 × 4 mRH	0.75 in - 10 fRH
	W-5164-C	600	67500	135000	5592, 120HVL, 135HVL	1.5 in - 6 mRH	0.75 in - 10 fRH
	W-5163-A	300	33750	67500	2294, 200HVL	M36 × 4 mRH	0.75 in - 10 fRH
	W-5163-B	300	33750	67500	5595, 300HVL	M36 × 4 mRH	0.75 in - 10 fRH
	W-5165-A	1000	112500	225000	5594, 200HVL	M72 × 3 mRH	M36 × 4 mRH
	W-5164-A	600	67500	135000	5594, 200 HVL	M48 ×2 mRH	0.75 in - 10 fRH

SATEC™ SERIES T-SLOT TABLES



T-slot tables are available for SATEC Series HVL, DX and KN Models. The T-slot table provides an extremely versatile method of securing fixtures in the compression space of a frame. The table is bolted to the machine frame loading table and is typically manufactured to cover the full width and depth of the loading table. Depending on the frame model, the table will reduce the usable compression space 50 mm to 75 mm (2 in to 3 in). The frame loading table must be drilled and tapped to accept the T-slot table.

Principle of Operation

T-slot tables allow the attachment of fixtures to test odd size specimens in the compression space of universal testing machines. Commercially available T-slot nuts are slid into the inverted T-slot of the table. Bolts, studs or threaded rods can then be threaded into the nuts. The T-slot table can be used to secure specimens that might otherwise be ejected from the test space under load. It can also be used to position specimens in the same location for repeated tests or batch testing. Guides, slides or stops can be positioned on the table and bolted into position to allow precise placement of the specimens for every test. With the fixturing removed from the test space, the T-slot table is capable of supporting a compressive load to full frame capacity, the same as the loading table.

Application Range

- Allow the attachment of fixtures to test odd-size specimens in the compression space of universal testing machines (UTMs)
- Operate in static compression only

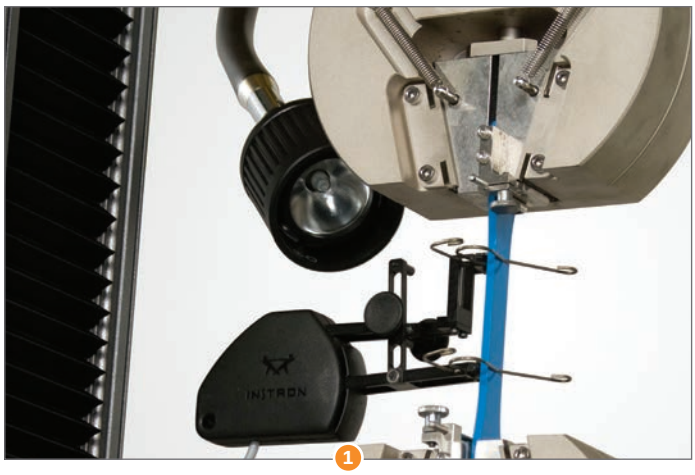
Safety Advice

Review safety note on page 236

T-SLOT TABLE ATTACHMENT FOR DX AND KN MODELS

	Catalog Number	Accessory Width		Accessory Depth		Accessory Height		Compatible Frame Models
		mm	in	mm	in	mm	in	
1	300DX-0005	355	14	355	14	38	1.5	300DX

TEST AREA LIGHTING



1

Test area lighting is used to apply direct light on a specimen. Laboratory lighting conditions are unpredictable and can cast shadows on specimens when a clear view is required. The light will shine directly on the specimen and has a flexible extension for convenient positioning. The test area lighting accessory operates from a 12 V supply directly from the test instrument and features a 20 W halogen lamp.

TEST AREA LIGHTING

	Catalog Number	Description
1	2910-063	Test area lighting for use with 3300, 4400, 5500, 5800 and 5900 series systems except the 5587, 5887, 5589 and 5889

COMPUTER HARDWARE AND DIGITAL INTERFACES

2.13

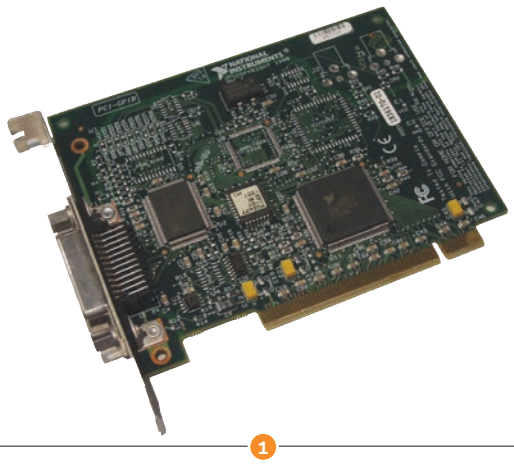
Software has become an integral part of many modern materials testing systems. When the time comes to take that first step in computerizing your system or to update your existing PC hardware we recommend that you contact us to discuss the best route forward. There are software and hardware compatibility issues that need careful consideration to ensure successful installation.

All PC systems supplied by Instron® come with a full Instron warranty and have been thoroughly checked for software and hardware compatibility. When ordered with the PC, interface cards are also installed and checked.

Computer hardware develops so quickly that it is not possible to include technical details of available PC platforms since they rapidly become inaccurate. Please contact your nearest Instron office to find out about the latest PC offerings available from Instron.

PC Interfaces 268

PC INTERFACES



1



2

Electronic interfaces are required in the PC to allow communication with the testing system. The interface type required depends on the type of controller fitted to your system.

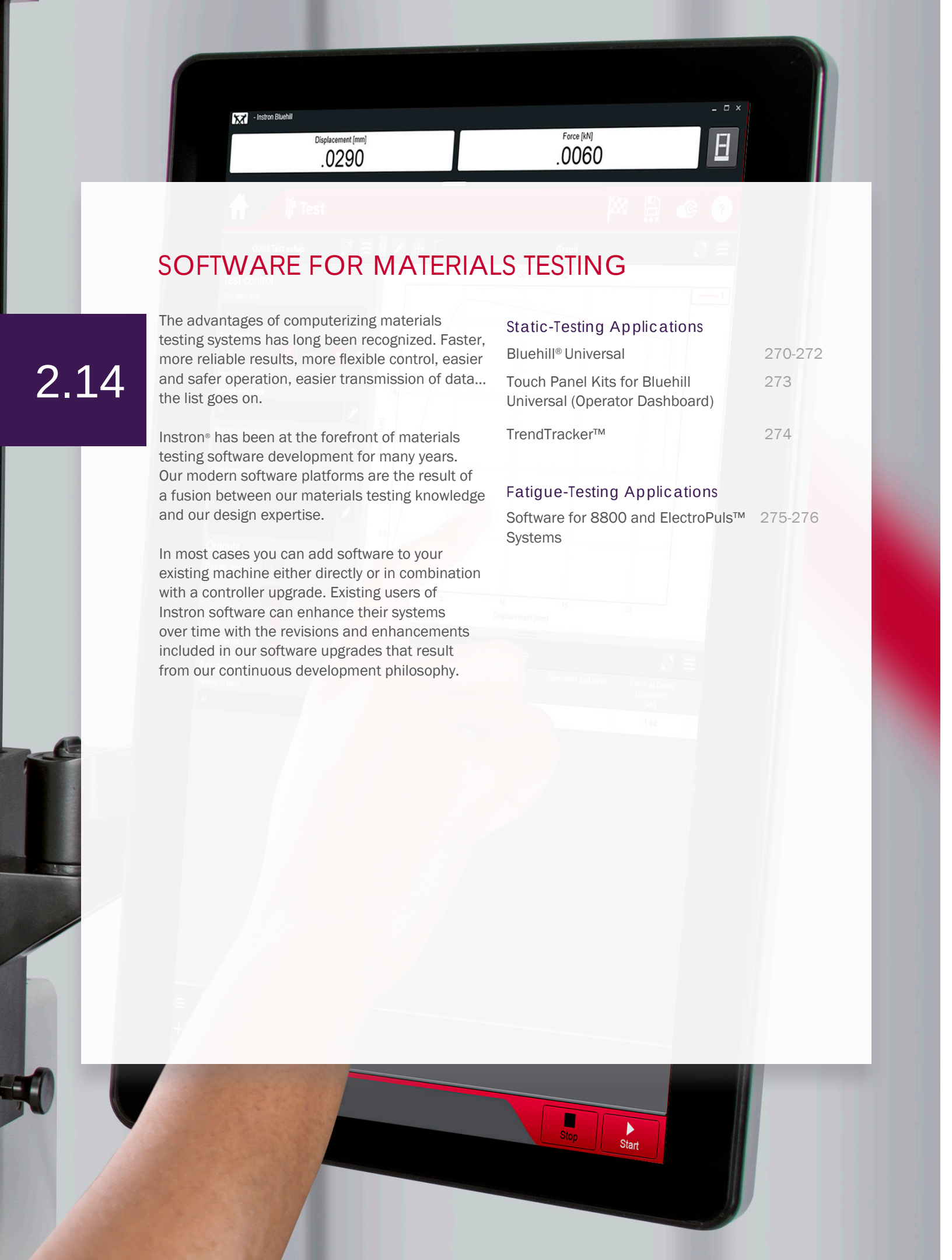
Principle of Operation

Dedicated high-speed interfaces provide the best possible communications for the complex process of controlling a testing system and transmitting data. The interface card is installed in the PC and provides the link to the testing instrument via a suitable cable.

PC INTERFACES

	Catalog Number	Testing Standards	Lower Fitting
1	2490-949	National Instruments PCIe-GPIB board (with 4 m GPIB cable)	For use with systems using IEEE communications protocol
2	2424-500	Ethernet Frame Interface for 3300 and 5500 Series systems	For use with upgrading the PC on older 3300 and 5500 Series systems
	W-5522	Ethernet Frame Interface for I Series, 5500 Series Static Hydraulic Systems	For use with upgrading the PC on older I Series and 5500 Series Static Hydraulic Systems

Notes:
1. An interface is also required in the test instrument. Some models feature built-in interfaces but others are optional. Refer to your system documentation or call us for confirmation.
2. 2490-949 is not required with 8800MT electronics.



SOFTWARE FOR MATERIALS TESTING

2.14

The advantages of computerizing materials testing systems has long been recognized. Faster, more reliable results, more flexible control, easier and safer operation, easier transmission of data... the list goes on.

Instron® has been at the forefront of materials testing software development for many years. Our modern software platforms are the result of a fusion between our materials testing knowledge and our design expertise.

In most cases you can add software to your existing machine either directly or in combination with a controller upgrade. Existing users of Instron software can enhance their systems over time with the revisions and enhancements included in our software upgrades that result from our continuous development philosophy.

Static-Testing Applications

Bluehill® Universal 270-272

Touch Panel Kits for Bluehill Universal (Operator Dashboard) 273

TrendTracker™ 274

Fatigue-Testing Applications

Software for 8800 and ElectroPuls™ Systems 275-276

BLUEHILL® UNIVERSAL



Bluehill Universal was built from the ground-up for touch interaction. The new portrait layout, with its meticulously crafted visual design, gives the most comprehensive view of the test workspace on the Operator Dashboard, a stunning large-format touch monitor with an integrated controller.

Bluehill Universal's large touchpoints and intuitive gestures make the user experience simpler and smarter. Easy-to-understand icons and workflows make it easy to train new or experienced users, simplifying operator training, and allowing you to start testing even faster.

Bluehill Universal is available for the following Instron testing systems:
- New 5900 and 3300 systems, as well as existing 5900, 3300, 5500, 59R and IS02 static testing systems.
- ElectroPuls™ and 8800 dynamic systems when running static tests.



Effortless Workflows

An easy-to-use touch interface, built from the ground up with ergonomics in mind, optimizes your testing workflow.



Increased Efficiency

Console functions and numerical keypads are conveniently located and accessible, making your testing faster and easier.



Advanced Capability

Powerful Bluehill architecture gives you complete control over how you set up test methods, allowing you to achieve optimal results.

BLUEHILL® UNIVERSAL

KEEPING IT SIMPLE







QuickTest

QuickTest, a new standard feature of Bluehill Universal, allows users to start tests quickly as it only takes a few seconds to enter your parameters. QuickTest is ideal for users looking to run very simple peak-force type tests, or for userswho need to quickly run a test with a single ramp. It is particularly useful for users who are not familiar with Bluehill method building.

Pre-Loaded Templates

Bluehill Universal includes an extensive library of pre-configured methods for some of the most commonly used ASTM, ISO, and EN standards. The methods are packaged in modules that are specific to your testing application.

Prompted Tests

Users can be guided through the entire testing process with step-by-step instructions, ensuring that your tests remain repeatable, simple, and error-free. The prompts are customizable with your own text and images.



Exporting Tools

Whether you need a polished PDF report, or a customized file to integrate with your lab information management system, Bluehill Universal's exporting tools have the flexibility to output results, user inputs, raw data, graphs, and more in a wide variety of formats.



TestProfiler

TestProfiler allows for easy set up of tests that require step-by-step loading patterns that fall outside of a standard single or two-ramp test which are beneficial for mimicking the functional use of a product or component. TestProfiler also offers the ability to control and respond to transducers such as chambers and other digital sensors.



Analysis

Replay, reanalyze, or make modifications to previously-tested specimens without having to re-run tests.



Expression Builder

Build your own user-defined functions using a list of variables from the method. Users can write functions for detecting test events, defining new calculations, making measurements, or setting domains for calculations



Test Cam

Connect a USB webcam to experience point-by-point video playback, allowing you re-analyze the test even after it has finished.



Application Programming Interface

Bluehill Universal's Application Programming Interface (API) allows system administrators to program their own custom interfaces for controlling pre- and post-test actions within Bluehill.

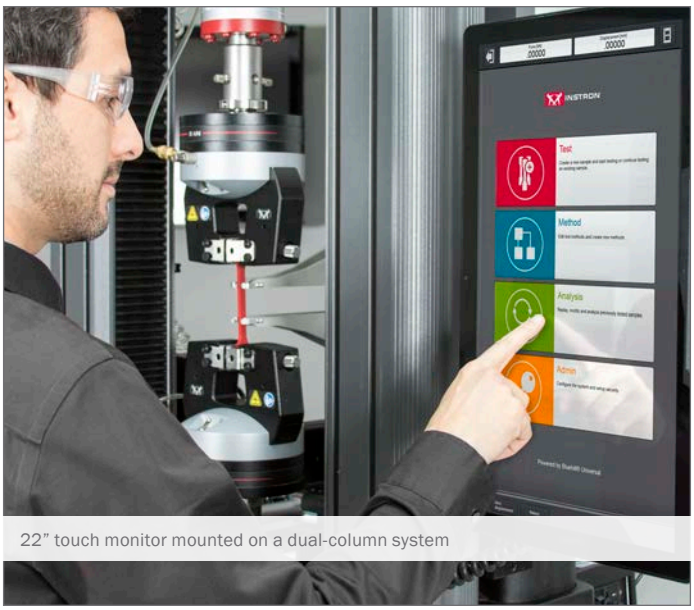


Instron® Connect

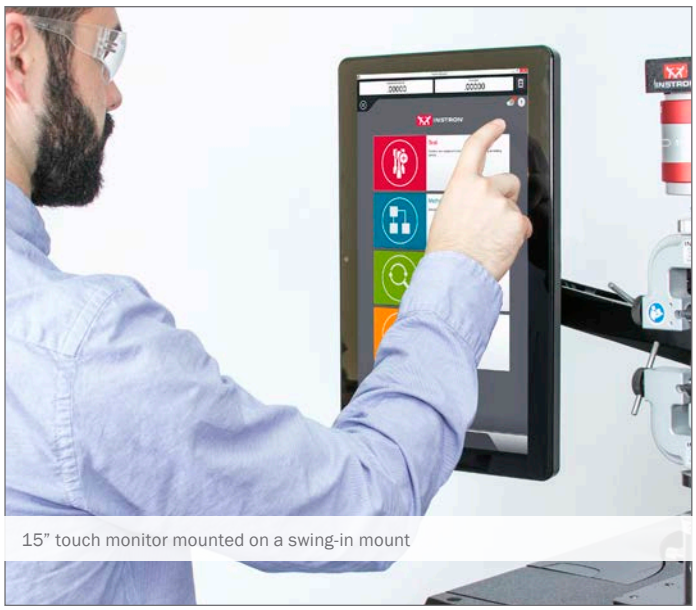
Instron's unrivaled application expertise and best-in-class service establishes us as the leader in customer satisfaction with the best ownership experience. Instron Connect introduces a powerful communication platform that brings our support engineers even closer to your organization.

- Secure screen-sharing and submit service requests directly through the system. Easily send test methods and test sample data files for review.
- Maintain your lab's certification with calibration reminders and easy scheduling to avoid unnecessary downtime.
- Automatic software update notifications provide confidence that your Instron system is running in optimal condition.

OPERATOR DASHBOARD



22” touch monitor mounted on a dual-column system



15” touch monitor mounted on a swing-in mount

The Operator Dashboard

Bluehill Universal can be installed on an Operator Dashboard, which includes either a 15” or 22” touch monitor with optional integrated controller, and mounting brackets for new or existing testing systems. The Operator Dashboard’s optional swing-in touchscreen mounting sits close to the test system, minimizing repetitive movement of the operator, and improving the overall ergonomics of testing.

Save Time

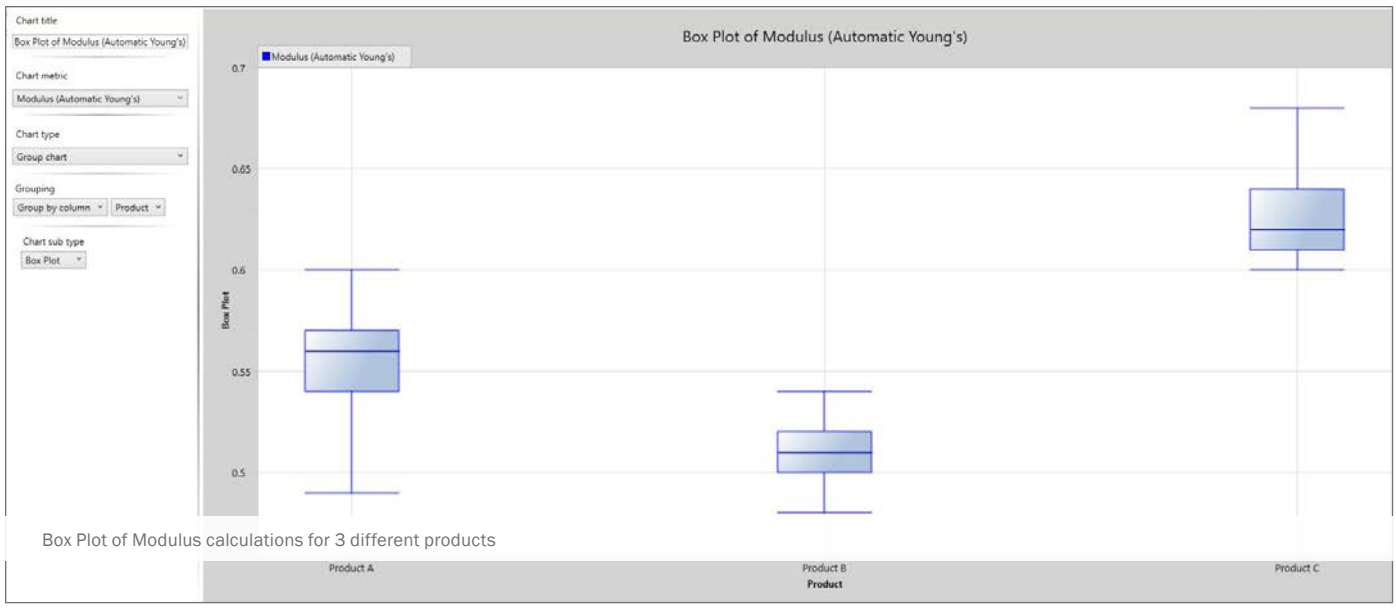
Improved touchpoints and gestures of Bluehill Universal help you cut time from a number of testing tasks. Starting new tests, manually entering specimen data, and running batches of material is faster and easier, allowing operators to spend time on more value-added tasks. Building methods and analyzing results is more efficient with new menus and results export options.

Improve Ergonomics

The optional swing-in touchscreen monitor is easy to adjust, and sits close to the testing system, minimizing repetitive motion of the operator. No more reaching for a mouse to perform just a single click! Not only does this provide a more ergonomic work setup, but saves the operator time from needing to go back and forth between a computer and the testing system.

Enhance Capability

Built on the trusted foundation of Instron’s existing Bluehill Software, Bluehill Universal’s architecture gives you complete control of your test setup, with powerful features you need for running advanced tests. Run simple cyclic waveforms, leverage user-defined calculations and expressions, or replay any existing data with new test routines. All the while, Bluehill Universal’s streamlined functionality keeps the workflow simple, uncluttered, and ideal for the new or infrequent user.



Box Plot of Modulus calculations for 3 different products

TrendTracker Software

TrendTracker is an add-on database package for Bluehill® 3 and Universal that allows users to gain extra insight into their Instron test results. The TrendTracker integrated database is built on either a SQL Server Express or an existing SQL Server. All test results, test parameters, or relevant testing information is sent to the database and visible with the TrendTracker Viewer, an easy-to-use querying and visualization tool.

What Does TrendTracker Do For You?

The TrendTracker Viewer can search Bluehill test specimens based on specimen property, test parameter, or calculation results. This means no more file searching and copy-paste to pull all of your test results together!

- Quickly Narrow down to the right dataset using multiple criteria in seconds
- Save your search definition and viewer settings for future use

Visualization Tools

Visualization tools allow you to organize the data into subgroups and apply meaningful statistics and charts. Create control charts such as Xbar-R or Xbar-S charts to see how the production quality measures up against your specification limits. Monitor results with individual run charts to analyze performance of a material or product over time.

SOFTWARE FOR 8800 SERIES AND ELECTROPULS™





The Software suite consists of a number of application programs designed to address common fatigue and static testing requirements on 8800 Series and ElectroPuls systems.

The suite includes general purpose fatigue, complex cyclic and fracture toughness applications, as well as static and LabVIEW® user-programmability options.

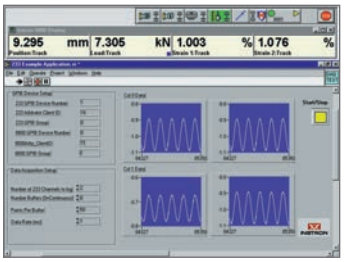
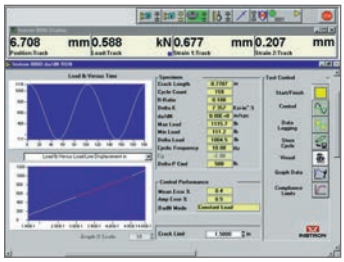
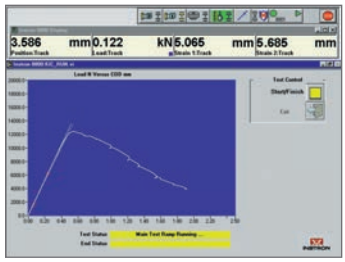
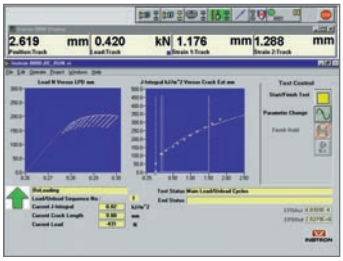
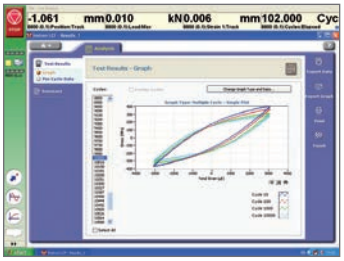
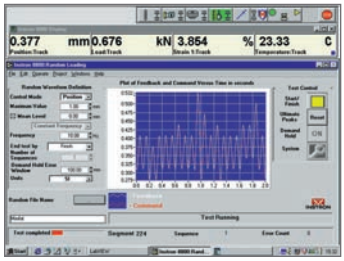
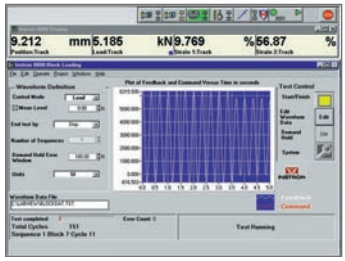
Principle of Operation

Each program in the suite is designed to offer depth of functionality while retaining ease of use. Programs run under console software or with the optional operator panel Easy-to-follow windows simplify the set up and running of the test.

Application Range

- WaveMatrix
- General-purpose, advanced and multi-axis fatigue
- LabView drivers for user-programmability
- da/dN
- Fracture toughness
- J-integral
- Low Cycle Fatigue (LCF)
- Random
- Bluehill® for static testing

SOFTWARE FOR 8800 SERIES AND ELECTROPULS™



SPECIMEN MEASURING AND PREPARATION TOOLS

2.15

Instron® supplies specimen marking devices of various types, as well as a range of specimen measurement units that can be connected directly to compatible systems to allow downloading of specimen dimensions without typing, saving time and preventing errors.

Specimen Marking Punches 278

Specimen Measurement Devices 279-280

SPECIMEN GAUGE MARKING PUNCHES



Punch marking a metallic specimen



1



2

Gauge-point punches are used to punch mark a metallic specimen with a set gauge length before testing so that specimen elongation can be measured either during or after the test. Punches are available for a range of common gauge lengths in both manual and automatic styles.

Principle of Operation

Manual gauge-point punches require a strike with a hammer to punch mark the specimen. Standard punches consist of either a single set of punch points or a combination of two different sets of punch points. The punches are checked at the factory to provide punch marks at a predetermined, fixed gauge length.

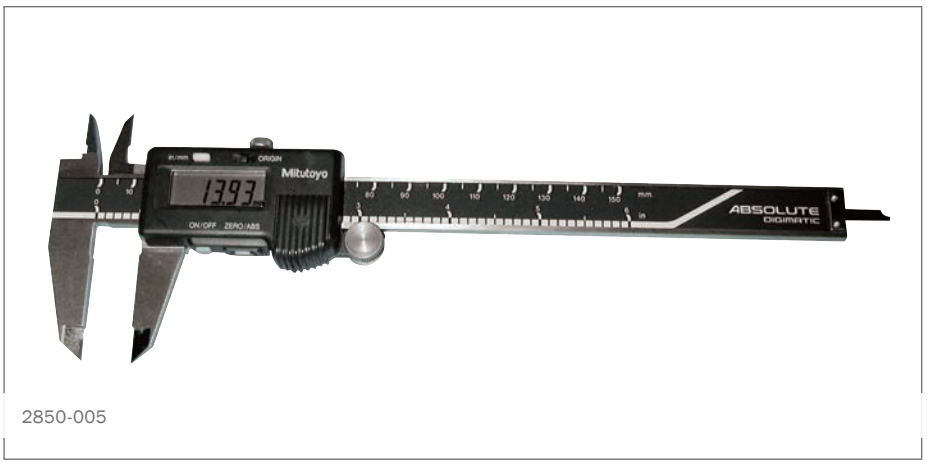
MANUAL GAUGE POINT PUNCH

	Catalog Number	Description	Gauge Length	
			mm	in
	W-6714	Manual gauge point punch	-	8
	W-6718	Manual gauge point punch	-	0.5
1	W-6719	Manual gauge point punch	-	1.4
	W-6771	Manual gauge point punch, combination gauge length	-	1 / 2
2	W-6771-B	Manual gauge point punch	25 / 50	-
	W-6709	Extra punch points, set of two	50.8	2
	W-6704	Extra punch points, set of two	100 - 200	4 - 8
	W-6703	Certification of gauge length	-	-

SPECIMEN MEASUREMENT DEVICES



2850-003



2850-005

A variety of specimen measurement devices are available to provide digital measurement, digital measurement with automatic data entry or manual measurement.

Specimen measuring with digital instruments, such as calipers and micrometers, provide accurate measurement. Devices can be purchased in a variety of measuring ranges. When purchased with the automatic data entry interface, the instrument will send the digital measurement directly to the controlling software used to run the test. No manual entry is needed. These instruments are compatible with Bluehill® and Partner™ advanced materials testing software.

Various manual measurement devices are available for post-test determination of specimen elongation or reduction of area. Percent elongation scales (both standard and telescoping are available) measure the elongation of flat specimens. A reduction of area gauge measures the reduction of area of a round specimen.

Principle of Operation

Digital transfer of data from the measuring instrument to the software is accomplished with an automatic data entry interface. This interface translates and routes data from the instrument with an RS-232 output and connecting cables to the controlling software. The reduction of area and percent elongation devices operate similar to a ruler or sliding scale ruler.

Application Range

- Accurate specimen measurement with hands-free data entry

CALIPERS

Catalog Number	Description	Travel (Axial)	
		mm	in
W-3275-N	Caliper, standard jaw with data cable	0 - 150	0 - 6
W-3275-Q	Caliper, standard jaw with data cable	0 - 150	0 - 6
W-3275-O	Caliper, standard jaw with data cable	0 - 300	0 - 12

SPECIMEN MEASUREMENT DEVICES







AUTOMATIC DATA ENTRY OPTIONS

	Catalog Number	Description	Travel (Axial)	
			mm	in
1	2850-003	Vertically mounted probe automatic measurement system for use with Bluehill®, Merlin™ or Series IX™ version 8 software	0 - 25	0 - 1
	2850-007	Micrometer Measurement System with stand, foot switch, USB interface, and connecting cables. Suitable for Bluehill 2 or 3 only	0 - 25	0 - 1
2	2850-005	Handheld automatic caliper measurement system with carbide tips, for use with Bluehill, Merlin or Series IX version 8 software	0 - 150	0 - 60
	2850-015	Interface box to connect two Instron or Mitutoyo digital gauges simultaneously	-	-
3	W-3276-B	Automatic data entry interface for use with Partner™	-	-

MICROMETERS

Catalog Number	Description	Travel (Axial)	
		mm	in
W-3275-A	Micrometer, outside with data cable	0 - 25	0 - 1
W-3275-B	Micrometer, outside with data cable	25 - 50	1- 2

TORSIONAL AND AXIAL TORSIONAL GRIPS

2.16

Torsion grips are designed to transmit torsional forces to the specimen and usually employ either a collet or socket-style gripping arrangement. Specific types of testing systems are required to apply torsional loading, so please check that your system includes torsional capability. Typical applications include medical devices, packaging, and fasteners.

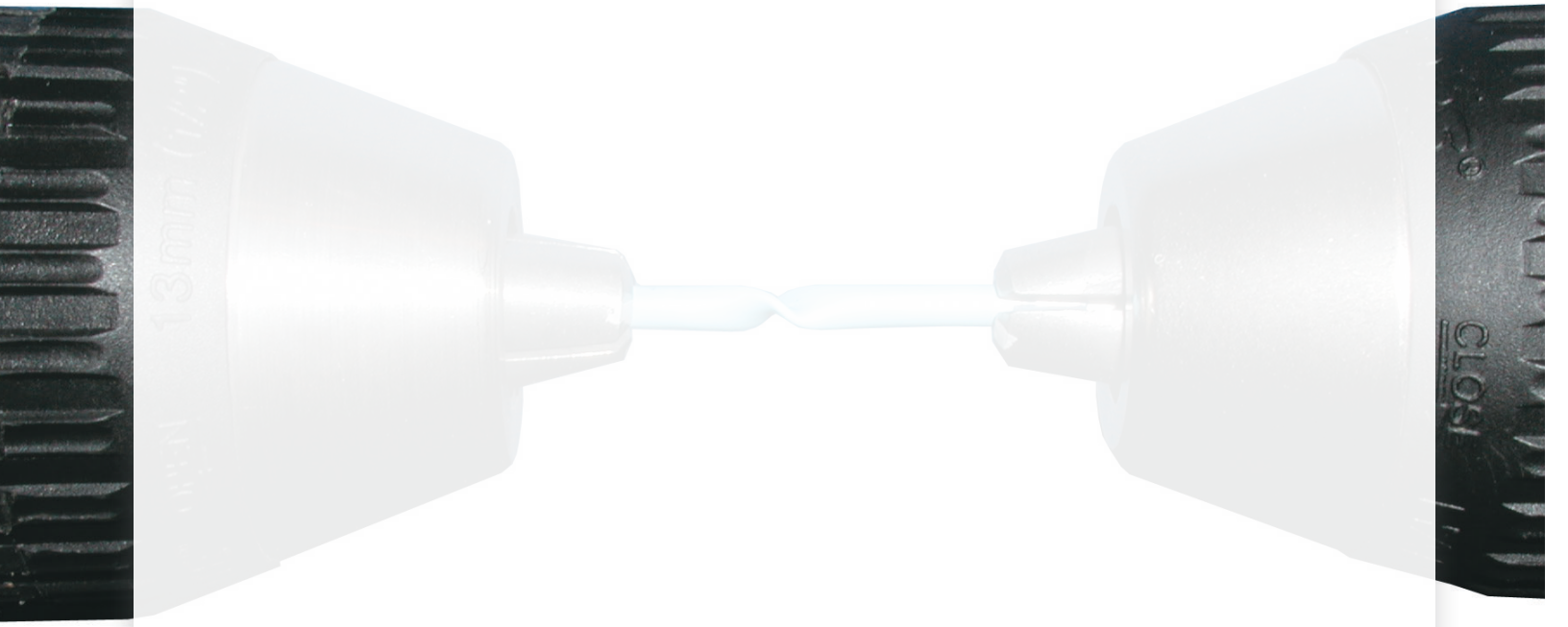
Axial torsional grips are used in conjunction with systems able to apply both torsional and axial loads to a specimen simultaneously. Applications include biomedical testing of prostheses.

Axial/Torsional Wedge Grips 282

Chuck Style Grips 283

Collet Style Grips 284

Socket Style Grips 285



AXIAL TORSION WEDGE GRIPS



The application of both axial and torsional forces simultaneously under fatigue conditions requires special grip design. These grips utilize a wedge action gripping technique that makes them suitable for flat specimens as well as cylindrical.

Principle of Operation

Major grip components are the grip driver, wedge grip head, grip attachment flange, and jaw faces. The grip driver applies the clamping force to the grip head by moving it relative to the jaw faces, which causes the the jaw faces to clamp the specimen. The grip drive also incorporates three sets of anti-rotation sliders that transfer any applied torque from the actuator to the grip and specimen. The jaw faces are either serrated or V-grooved to accommodate flat or cylindrical specimens.

Application Range

- Axial torsion tests on flat or cylindrical specimens

AXIAL/TORSION HYDRAULIC WEDGE GRIPS

	Catalog Number	Axial Capacity			Torque Capacity		Temperature Rating		Upper Fitting	Lower Fitting	Notes
		kN	kgf	lbf	mm	in	°C	°F			
1	8260C	25	2,500	5,500	100	885	+10 to +40	+50 to +100	Direct to actuator/ load cell	Direct to actuator/ load cell	Suitable for model 8874; requires: 207-bar (3,000 psi) hydraulic power supply

ITEMS FOR USE WITH 8260C

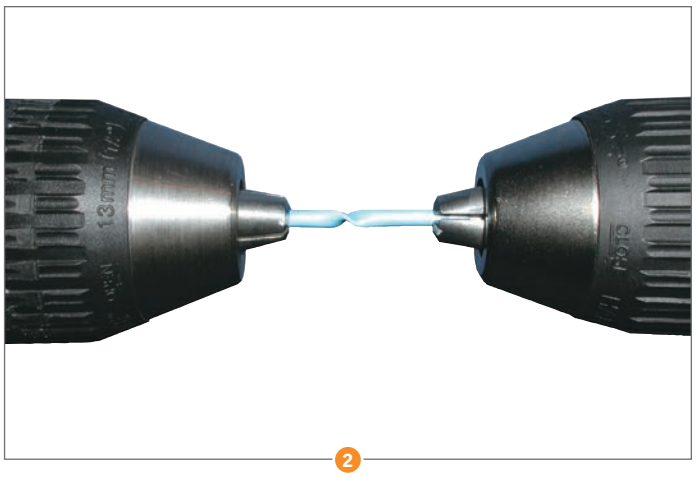
Catalog Number	Description
2703-801	Jaw faces for flats (serrated, 0 to 6.3 mm)
2703-802	Jaw faces for flats (serrated, 6.3 mm to 12.7 mm)
2703-803	Jaw faces for rounds (V-serrated, 3.0 mm to 7.8 mm)
2703-804	Jaw faces for rounds (V-serrated, 7.1 mm to 12.7 mm)
2703-807	Jaw faces for rounds (V-serrated, 12.4mm to 18.0 mm)

Notes: 1. 2703-807 rated to 10kN Axial force and 100Nm torsional capacity.

CHUCK STYLE TORSION GRIPS



1



2

These universal drill-type chuck grips can be used to hold round, hex or triangular specimens. The standard sets are available in both a keyless and keyed style that can hold a range of specimen sizes. Keyless operation lets you rapidly grip and release specimens. A comfortable, sure grip sleeve allows you to hand-tighten the chucks. Keyed operation provides fast, easy tightening, as well as quick, non-stick release.

Principle of Operation

Chuck-style grips are threaded into or bolted to the output shaft and/or torque cell of MT Series frames. The chuck grips spin closed to clamp specimens during torsion testing. The jaws of these grips extend well beyond the chuck nose to accept a broad range of wires, cables and cylindrical specimens. Both keyed and keyless chucks are available for gripping a variety of specimen diameters and include adapters for mounting to an MT Series frame.

Application Range

- Types of loading: Torsion
- Specimen material: Various
- Specimen types: round, Hex, Triangular

CHUCK-STYLE TORSION FIXTURES FOR MT

	Catalog Number	Torque Capacity		Specimen Diameter		Upper Fitting	Lower Fitting	Upper Effective Length	
		Nm	in - lb	mm	in			mm	in
2	W-MT01-B	8	70	0.05 - 9.5	0.02 - 0.374	M12 × 1.75 mRH	M12-1.75 × 1/2-20	75	2.95
1	W-MT01	8	70	1.6 - 12.7	0.063 - 0.5	M12 × 1.75 mRH	M12-1.75 × 1/2-20	89	3.5

Notes:
1. W-MT01 is a keyless chuck
2. W-MT01-B is a keyed chuck

COLLET STYLE TORSION GRIPS



1


2

Two standard sets of collet style grips are available: a small collet grip set for smaller specimens and a large collet grip set for larger specimens. Both sets are double-angle style.

Principle of Operation

The collet-style grips are threaded into or bolted to the output shaft and/or torque cell of MT Series frames. The collet grips use a split collet design that, when manually tightened, provides nearly uniform clamping pressure on the specimen. Collet style grips accept a smaller range of specimen diameters than chuck-style grips (W-MT01 series), but can withstand higher torsional forces. Both small and large collet grip assemblies are available for gripping a range of specimens. Adapters are included to attach collet grips to the MT Series frames.

Application Range

- Types of loading: torsion
- Specimen material: various
- Specimen types: round

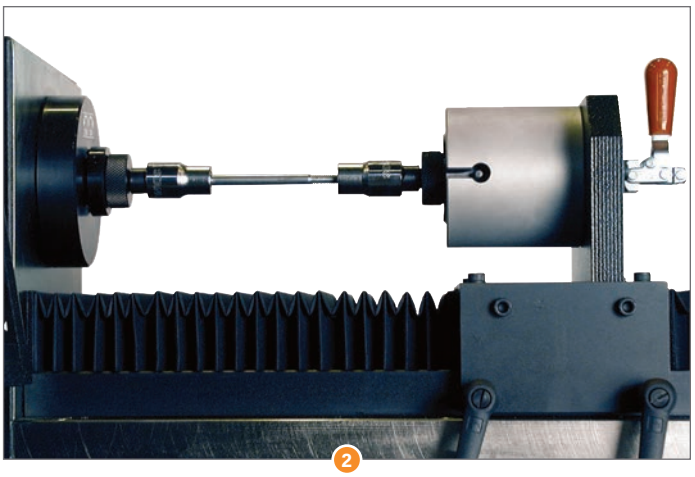
COLLET-STYLE TORSION FIXTURES FOR MT

	Catalog Number	Torque Capacity		Specimen Diameter		Increments		Fitting	Effective Length	
		Nm	in - lb	mm	in	mm	in		mm	in
1	W-MT02	225	2,000	1.19 - 6.3	0.046 - 0.25	0.4	0.0156	M12 × 1.75 M	83	3.27
2	W-MT02-B	225	2,000	6.3 - 14.25	0.25 - 0.5625	0.8	0.312	M12 × 1.75 M	83	3.27

Notes:
1. Gripping capacity of the collets may be affected by specimen properties such as surface finish and diameter

SOCKET STYLE TORSION GRIPS


1


2

These socket-style adapters allow connection of any 0.5-inch drive socket or accessory directly to the torque cell and/or output shaft on the MT Series frames. Smaller drive sockets can be connected through use of reducing adapters. English and Metric sockets sets are available in a wide range of sizes that allow testing of fasteners or finished products that have a hex-type connection. These adapters are useful for testing the running torque of locking and non-locking fasteners, proof testing fasteners with torsional loading, or checking torsional resistance of ratchets, torque wrenches or other types of tools.

Principle of Operation

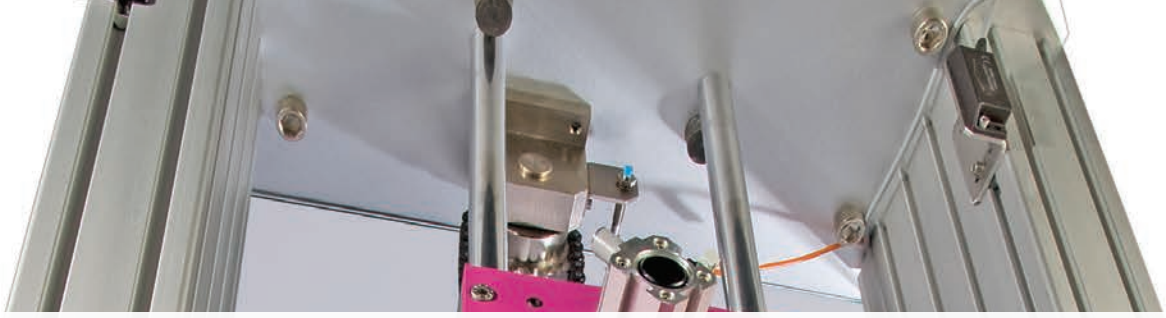
The socket-style grip adapters are threaded into or bolted to the output shaft and/or torque cell on the MT Series frames. A jam-nut is used to fix the threaded adapter in place and maintain it tight for bi-directional testing. The socket is then pressed onto the adapter and retained by a spring-loaded ball like any commercial ratchet. Two sockets can be used for testing bolt and nut specimens, or one socket for tightening or loosening fasteners in parts that must be held in a custom fixture.

Application Range

- Types of loading: torsion
- Specimen material: various
- Specimen types: round, finished products

SOCKET-STYLE TORSION GRIPS FOR MT

	Catalog Number	Description
1	W-MT03	MT1 Socket drive. Provides 1/2” drive with adapters for motor and torque cell mounting. Includes two complete 6 point US Customary socket sets with 11 pieces each ranging from 3/8” to 1” in 1/16” increments.
2	W-MT03-M	MT1 Socket drive. Provides 1/2” drive with adapters for motor and torque cell mounting. Includes two complete 12 point metric socket sets with 15 pieces each ranging from 10 mm to 24 mm in 1 mm increments.
	W-MT04	MT2 Socket drive. Provides 1/2” drive with adapters for motor and torque cell mountings. Includes two complete 6 point US Customary socket sets with 11 pieces each ranging from 3/8” to 1” in 1/16’ increments.
	W-MT04-M	MT2 Socket drive. Provides 1/2” drive with adapters for motor and torque cell mountings. Includes two complete 12 point metric socket sets with 15 pieces each ranging from 10 mm to 24 mm in 1 mm increments.



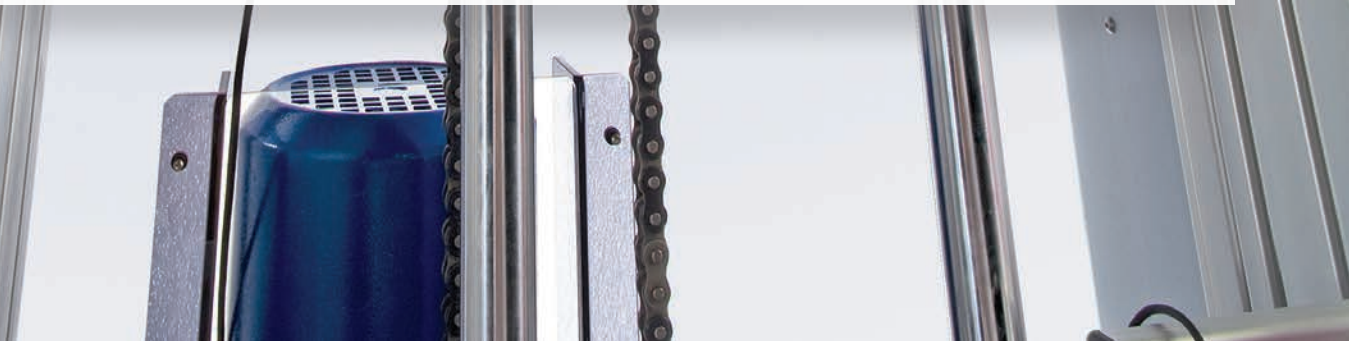
ACCESSORIES FOR IMPACT SYSTEMS

2.17

Sometimes an application, specimen or material requires a special gripping method. General purpose grips may not be adequate and can result in problems such as jaw breaks or premature failure of the specimen. The grips and fixtures in the following section have been specially engineered to provide solutions to the unique problems presented by some testing applications.

Instron® has great experience in producing engineered solutions for particularly difficult applications. Some examples of engineered solutions are shown in Section 3. Our worldwide staff of technical personnel is available to discuss your application in greater detail to help you determine the solution that's right for you.

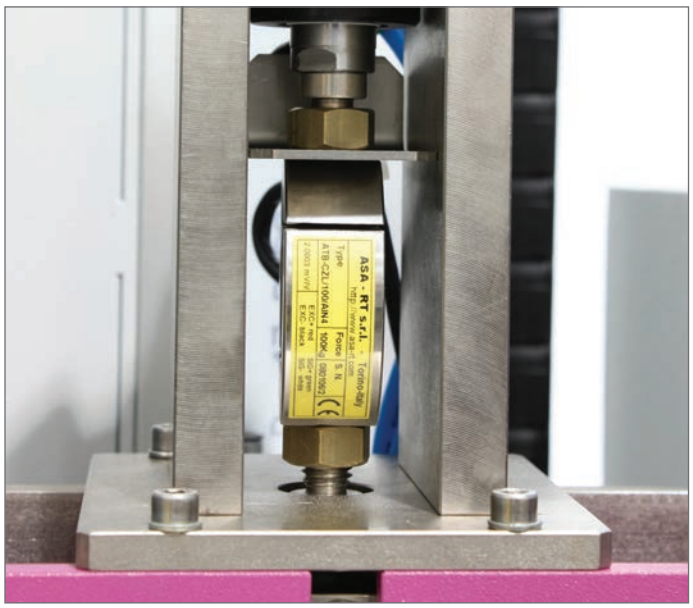
Drop Tower Accessories	288-303
Pendulum Accessories	304-313
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Specimen Preparation	317-320



DROP TOWER ACCESSORIES

Sometimes an application, specimen or material requires a special gripping method. General purpose grips may not be adequate and can result in problems such as jaw breaks or premature failure of the specimen. The grips and fixtures in the following section have been specially engineered to provide solutions to the unique problems presented by some testing applications.

Instron® has great experience in producing engineered solutions for particularly difficult applications. Some examples of engineered solutions are shown in Section 3. Our worldwide staff of technical personnel is available to discuss your application in greater detail to help you determine the solution that's right for you.





Drop Tower Accessories

Optional Frame Features	289-290
Tup Holders	291
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Puncture Testing	296
CAI Testing	297
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Wedge Peel Testing	300
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OPTIONAL FRAME FEATURE

Anti-Rebound System

The absorbed kinetic energy of the falling crosshead can cause a rebound during drop events. The anti-rebound system prevents secondary impacts on the sample and can catch even the heaviest crosshead.

Environmental Chamber

Many components and materials are subjected to conditions above or below ambient temperatures. To simulate impact performance under these environmental conditions, the CEAST 9300 Series can be fitted with an environmental chamber, which cools specimens to -70°C (-94°F) or heats them up to 150°C (302°F). Air is circulated throughout the chamber, providing uniform temperature distribution to eliminate hot or cool spots.

Additional Height

We offer a steel base that lifts the drop tower by 300 mm (12 in). This extra height allows easier access to the test space.

Additional Energy System

Spring-assisted velocity system accelerates the crosshead to increase the maximum impact energy with speeds up to 24 m/s (78.7 ft/s) with a 2 kg (4.4 lb) mass and 7 m/s (23 ft/s) with a 70 kg (154 lb) mass.

Pivoting Specimen Loader

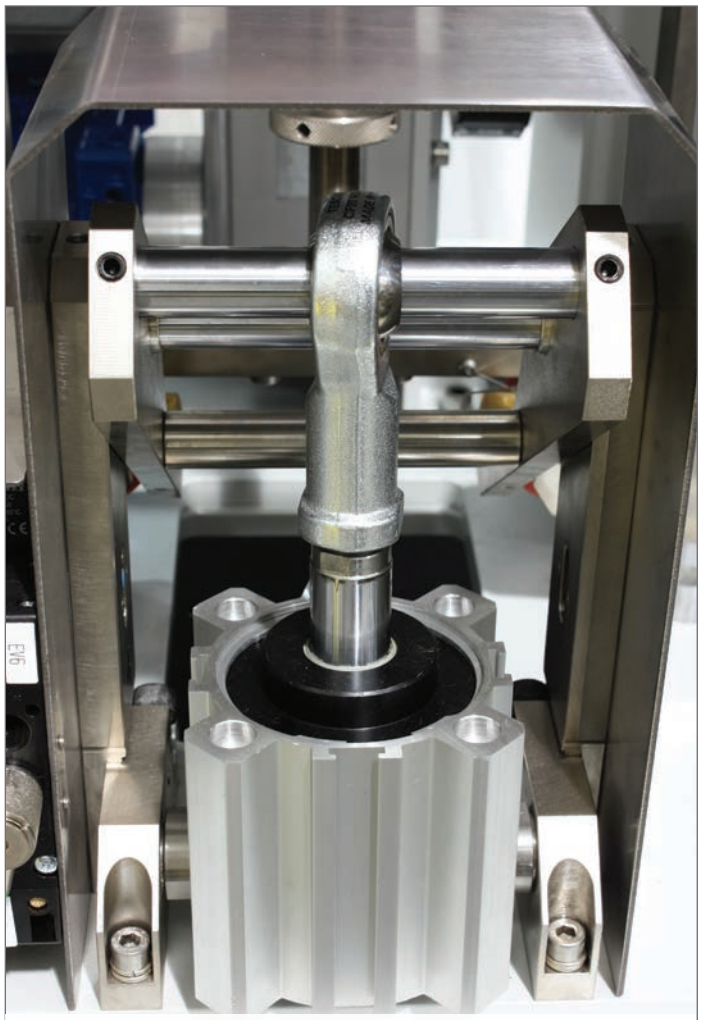
The pivoting specimen loader can test up to 10 specimens in rapid sequence within the environmental chamber.

Automatic Specimen Feeding System*

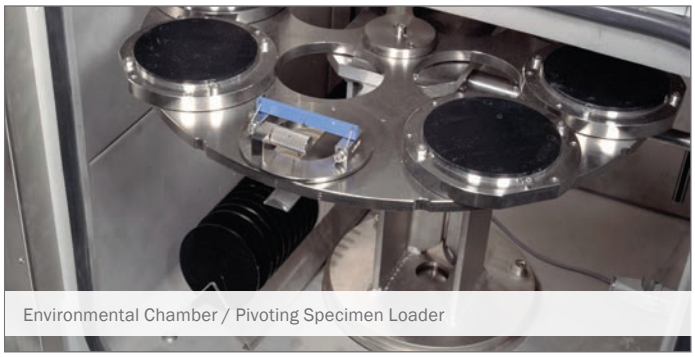
The specimen feeding system performs tests in an automatic cycle within the environmental chamber and tests up to 60 samples per hour. This system is designed to meet the demand for automation where intensive, high-volume testing is required.

*Must be added with initial purchase. It cannot be added in the field.

OPTIONAL FRAME FEATURES



Anti-Rebound System



Environmental Chamber / Pivoting Specimen Loader



Environmental Chamber / Automatic Specimen Feeding System



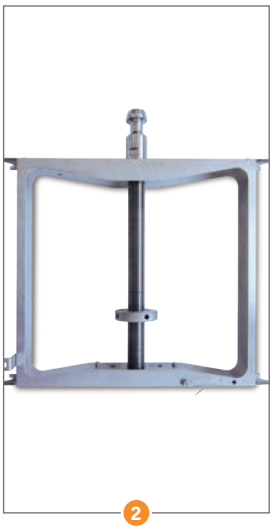
Additional Energy System

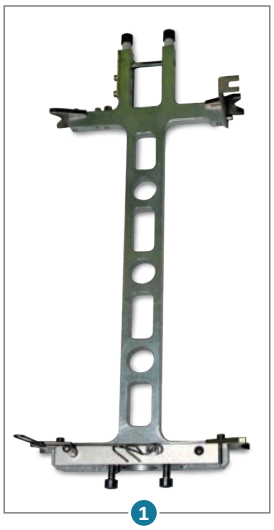
ADHESIVE BOND

Description	9310	9340	9350
Anti-Rebound System	•	•	•
Environmental Chamber		•	•
Additional Height		•	•
Additional Energy System			•
Pivoting Specimen Loader			•
Automatic Specimen Feeding System			•

TUP HOLDERS


1


2


1


2


1

CEAST 9350

	Catalog Number	Description	Weight Range		Energy Range		Maximum Energy[2]		Velocity Range[3]	
			kg	lbs	J	ft-lbs	J	ft-lbs	m/s	ft/s
1	C-7520-022	Lightweight Tup Holder	2.0 - 5.0	4.4 - 11.0	0.59 - 54.0	0.44 - 39.8	903	666	0.77 - 24	2.53 -78.7
2	C-7520-021	Standard Weight Tup Holder	5.0 - 30.0	11.0 - 66.0	1.47 - 329	1.08 - 243	1354	999	0.77 - 19	2.53 - 62.3
	C-7520-935	Reinforced Tup Holder for 222 kN (50,000 lb) Tup	6.0 - 31.0	13.0 - 68.0	1.77 - 334	1.30 - 246	1363	1005	0.77 - 9.4	2.53 - 30.8
	C-7520-026	Additional Weight Set for Standard and Reinforced Tup Holders	Up to 70.0	154	Up to 757	558	1800	1330	0.77 - 7.2	2.53 - 23.6

Notes:
1. The weight range includes an average tup and insert weight of 0.7 kg (1.54 lbs)
2. With High-Energy System
3. With High-Energy System. If this option is not present the maximum velocity is equal to 4.65 m/s with all tup holders and masses.

CEAST 9340

	Catalog Number	Description	Weight Range		Energy Range		Velocity Range	
			kg	lbs	J	ft-lbs	m/s	ft/s
1	C-7510-021	Lightweight Tup Holder	1.0 - 3.5	2.20 - 7.72	0.30 - 37.8	0.21 - 27.9	0.77 - 4.65	2.53 - 15.3
2	C-7510-021	Standard Weight Tup Holder	3.0 - 22.5	6.61 - 49.6	0.88 - 243	0.65 - 179	0.77 - 4.65	2.53 - 15.3
	C-7510-026	Additional Weight Set for Standard Weight Tup Holder	37.5	82.7	405	299	0.77 - 4.65	2.53 - 15.3

Notes:
1. The weight range includes an average tup and insert weight of 0.5 kg (1.10 lbs)

CEAST 9310

	Catalog Number	Description	Weight Range		Energy Range		Velocity Range	
			kg	lbs	J	ft-lbs	m/s	ft/s
1	n/a	Standard Tup Holder	0.5 - 3.00	1.10 - 6.83	0.15 - 21	0.11 - 15.49	0.77 - 3.7	2.53 - 12.14

Notes:
1. The weight range includes an average tup and insert weight of 0.5 kg (1.10 lbs)



Instrumented Tup

The tup is the heart of the drop tower; it's the piece that impacts the sample or component. This mechanical component comes in diverse shapes, sizes, and weights. Most tups can be purchased with sensors to perform instrumented impact tests, as well as interchangeable inserts (the head of the tup). The required capacity is dependent on the application and based on the expected maximum load, not the machine's energy capacity.

Instrumented Tups

Instrumented tups are designed with either a strain gauge or piezoelectric sensor embedded in the tup insert. These devices capture the impact and transform it into an electric signal, which is collected by a data acquisition system so the user can see a picture of the impact. Instrumented tups are available in a range of shapes and sensors to comply with various testing standards.

Un-Instrumented Tups

Un-instrumented tups are used for tests where "break" or "no break" type results are required. These devices have a geometrical shape that is defined by a test standard. In cases where un-instrumented tups are designed to work with tensile-impact and adhesive-impact fixtures, the force sensor is installed in the application-specific fixture.

Strain Gauge Sensor

As the more robust tup inserts, strain gauge sensors are recommended for impact testing of materials that are made from composites, fail in a ductile mode, and are anticipated to have load values more than 5 kN (1124 lbs).

Piezoelectric Sensor

These higher-frequency tup inserts are ideal when testing fairly brittle or light-load materials, such as thin films.

STRAIN GAUGE TUPS AND INSERTS

CEAST 9350 STRAIN GAUGE (TYPE 1) TUPS

Catalog Number	Capacity		Minimum Insert Diameter (For Puncturing Test)	
	kN	lbs	mm	in
C-7529-301	22	5,000	10	0.394
C-7529-302	45	10,000	20	0.787
C-7529-303	90	20,000	20	0.787
C-7529-304	222	50,000	20	0.787

CEAST 9340 STRAIN GAUGE (TYPE 1) TUPS

Catalog Number	Capacity		Minimum Insert Diameter (For Puncturing Test)	
	kN	lbs	mm	in
C-7519-301	22	5,000	10	0.394
C-7519-302	45	10,000	20	0.787
C-7519-303	90	20,000	20	0.787

TUP INSERTS FOR STRAIN GAUGE (TYPE 1) TUPS

Catalog Number	Description	Testing Standards	Tup Compatability
C-7519-310	10 mm (0.394 in) Ø Hemispherical	ISO 6603-1,-2, ISO 7765-1,-2	C-7519-301
C-7529-310	10 mm (0.394 in) Ø Hemispherical	ISO 6603-1,-2, ISO 7765-1,-2	C-7529-301
C-7519-311	12.7 mm (1/2 in) Ø Hemispherical	ASTM D3763, ASTM D7192, ASTM D5628 Method FD	C-7519-301
C-7529-311	12.7 mm (1/2 in) Ø Hemispherical	ASTM D3763, ASTM D7192, ASTM D5628 Method FD	C-7529-301
C-7529-313	20 mm (0.787 in) Ø Hemispherical	ISO 6603-1,-2, ISO 7765-1,-2, ASTM D5628 Method FE	All Strain Gauge (Type 1) Tups
C-7529-324	25.4 mm (1 in) Ø Hemispherical	-	All Strain Gauge (Type 1) Tups
C-7529-325	38.1 mm (1 1/2 in) Ø Hemispherical	ASTM D5628 Method FC	All Strain Gauge (Type 1) Tups
C-7529-320	10 mm (0.394 in) Ø Hemispherical (For Non-Puncturing Test)	ISO 6603-1,-2, ISO 7765-1,-2	All Strain Gauge (Type 1) Tups
C-7529-321	12.7 mm (1/2 in) Ø Hemispherical (For Non-Puncturing Test)	ASTM D3763, ASTM D7192, ASTM D5628 Method FD	All Strain Gauge (Type 1) Tups
C-7529-322	16 mm (5/8 in) Ø Hemispherical (For Non-Puncturing Test)	ASTM D7136/7136M, Airbus AITM 1.0010, prEN 6038, ISO 18352, Boeing BSS 7260, SACMA 2R-94	All Strain Gauge (Type 1) Tups
C-7529-329	6.35 mm (1/4 in) Radius Conical, 25.4 mm Ø (1 in) Base	ASTM D5628 Method FB	All Strain Gauge (Type 1) Tups
C-7529-362	6.35 mm (1/4 in) Radius Conical, 50.8 mm Ø (2 in) Base	ASTM D2444 - Type C	All Strain Gauge (Type 1) Tups
C-7529-360	12.7 mm (1/2 in) Radius Conical, 50.8 mm Ø (2 in) Base	ASTM D2444 - Type A	All Strain Gauge (Type 1) Tups
C-7529-361	50.8 mm (2 in) Radius Conical, 50.8 mm Ø (2 in) Base	ASTM D2444 - Type B	All Strain Gauge (Type 1) Tups
C-7529-350	50 mm Ø Flat Faced	-	All Strain Gauge (Type 1) Tups
C-7529-335	Metals Charpy Insert, 8 mm Tip Radius	ASTM E23, ISO 148	All Strain Gauge (Type 1) Tups
C-7529-336	Metals Charpy Insert, 2 mm Tip Radius	ISO 148, DIN 50115, EN 10045	All Strain Gauge (Type 1) Tups
C-7529-340	Metals DWTT Insert	ASTM E208	All Strain Gauge (Type 1) Tups
C-7529-337	Metals IZOD Insert	ASTM E23	All Strain Gauge (Type 1) Tups
C-7529-330	Plastics Charpy Insert	ISO 179-2	All Strain Gauge (Type 1) Tups
C-7529-331	Plastics Charpy Insert	ASTM D6110	All Strain Gauge (Type 1) Tups
C-7529-332	Plastics IZOD Insert	ISO 180, ASTM D256	All Strain Gauge (Type 1) Tups

PIEZO TUPS AND INSERTS

CEAST 9350 PIEZO (TYPE 2) TUPS

Catalog Number	Capacity		Minimum Insert Diameter (For Puncturing Test)	
	kN	lbs	mm	in
C-7529-601	0.45	100	20	0.787
C-7529-694	4.5	1,000	12.7	0.50
C-7529-604	4.5	1,000	20	0.787
C-7529-696	22	5,000	12.7	0.50
C-7529-606	22	5,000	20	0.787

CEAST 9340 PIEZO (TYPE 2) TUPS

Catalog Number	Capacity		Minimum Insert Diameter (For Puncturing Test)	
	kN	lbs	mm	in
C-7519-601	0.45	100	20	0.787
C-7519-694	4.5	1,000	12.7	0.50
C-7519-604	4.5	1,000	20	0.787
C-7519-696	22	5,000	12.7	0.50
C-7519-606	22	5,000	20	0.787

TUP INSERTS FOR PIEZO (TYPE 2) TUPS

Catalog Number	Tup Adapter	Description	Testing Standards	Tup Compatability
C-7529-801	-	12.7 mm (1/2 in) Ø Hemispherical	ASTM D3763, ASTM D7192, ASTM D5628 Method FD	C-7529-694, C-7519-694
C-7529-802	-	12.7 mm (1/2 in) Ø Hemispherical	ASTM D3763, ASTM D7192, ASTM D5628 Method FD	C-7529-696, C-7519-696
C-7529-803	-	15.875 mm (5/8 in) Ø Hemispherical	ASTM D5628 Method FA	C-7529-694 ,C-7519-694, C-7529-696, C-7519-696
C-7529-825	-	16 mm (5/8 in) Ø Hemispherical	ASTM D7136/7136M, Airbus AITM 1.0010, prEN 6038, ISO 18352, Boeing BSS 7260, SACMA 2R-94	C-7529-694 ,C-7519-694, C-7529-696, C-7519-696
C-7529-804	C-7529-894	20 mm (0.787 in) Ø Hemispherical	ISO 6603-1,-2, ISO 7765-1,-2, ASTM D5628 Method FE	All Piezo (Type 2) Tups
C-7529-806	C-7529-896	25.4 mm (1 in) Ø Hemispherical	-	All Piezo (Type 2) Tups
C-7529-807	C-7529-897	38.1 mm (1 ½ in) Ø Hemispherical	ASTM D5628 Method FC	All Piezo (Type 2) Tups
C-7529-826	C-7529-894	16 mm (5/8 in) Ø Hemispherical (For Non-Puncturing Test)	ASTM D7136/7136M, Airbus AITM 1.0010, prEN 6038, ISO 18352, Boeing BSS 7260, SACMA 2R-94	All Piezo (Type 2) Tups
C-7529-840	C-7529-896	6.35 mm (¼ in) Radius Conical, 25.4 mm (1 in) Ø Base	ASTM D5628 Method FB	All Piezo (Type 2) Tups
C-7529-830	C-7529-894	50mm Ø Flat Faced	-	All Piezo (Type 2) Tups
C-7529-812	C-7529-897	Plastics Charpy Insert	ISO 179-2	All Piezo (Type 2) Tups
C-7529-811	C-7529-894	Plastics Charpy Insert	ASTM D6110	All Piezo (Type 2) Tups
C-7529-810	C-7529-894	Plastics IZOD Insert	ISO 180, ASTM D256	All Piezo (Type 2) Tups

TEST FIXTURES



C-7520-031



C-7520-035

Test fixtures, a key component of the CEAST 9300 Series Drop Towers, are designed to test to a wide range of standards, components, and products. The fixture set includes a stand, where the specimen rests, and clamping mechanisms that push the specimen against the stand and hold it securely in place during an impact test.

Fixed-Height Stand - C-7520-031

The fixed-height stand positions each sample so that a tup strikes it during an impact test. The design accommodates specimens with a thickness up to 25 mm (1 in), making it an ideal solution for testing films and plates. It can also be used for Charpy and Izod tests.

Adjustable Height Stand - C-7520-035

This stand is equipped with a flexible base that can travel 100 mm (3.9 in) through simple, screw-action adjustments. This adjustable design accommodates specimens with a thickness up to 195 mm (7.67 in), making it an ideal solution for films, plates, tubes, and components. It can also be used for both Charpy and Izod tests. For specimens less than 110mm high, adapter C-7520-039 is required.

PUNCTURE TESTING



Clamping plates for the CEAST 9350 and CEAST 9340 use a pneumatic system to push the sample against the test stand, holding it securely in place during the impact test. For the CEAST 9310, clamps are manually operated. Customized plates are available upon request.

CLAMPING PLATES FOR RIGID PLASTICS ON CEAST 9350 AND CEAST 9340

Catalog Number	Clamping Diameter		Testing Standards	Compatible Stands
	mm	in		
C-7520-056	31.75	1.25	Montell Method MA 17238	C-7520-031 or C-7520-035 and C-7520-039
C-7520-041	38.10	1.50	ASTM D5628 Geometry FB	C-7520-031 or C-7520-035 and C-7520-039
1 C-7520-042	40.00	1.57	ISO 6603-1, ISO 6603-2 and ASTM D5628 Geometry FE	C-7520-031 or C-7520-035 and C-7520-039
C-7520-043	76.00	3.00	ASTM D3763, ASTM D5628 Geometry FA and FD	C-7520-031 or C-7520-035 and C-7520-039
C-7520-044	100.00	3.94	ISO 6603-1 and ISO 6603-2	C-7520-031 or C-7520-035 and C-7520-039
C-7520-046	127.00	5.00	ASTM D5628 Geometry FC	C-7520-031 or C-7520-035 and C-7520-039

CLAMPING PLATES FOR FILMS ON CEAST 9350 AND CEAST 9340

Catalog Number	Clamping Diameter		Testing Standards	Compatible Stands	Clamping Surface
	mm	in			
C-7520-050	40.00	1.57	ISO 7765-2	C-7520-031 or C-7520-035 and C-7520-039	Undulated
C-7520-054	40.00	1.57	ISO 7765-2	C-7520-031 or C-7520-035 and C-7520-039	Rubber
C-7520-051	76.00	3.00	ASTM D3763	C-7520-031 or C-7520-035 and C-7520-039	Rubber
C-7520-055	100.00	3.94	-	C-7520-031 or C-7520-035 and C-7520-039	Rubber
C-7520-052	125.00	4.92	ISO 7765-1	C-7520-031 or C-7520-035 and C-7520-039	Rubber
C-7520-053	127.00	5.00	ASTM D1709	C-7520-031 or C-7520-035 and C-7520-039	Rubber

CLAMPING PLATES FOR RIGID PLASTICS AND FILM ON CEAST 9310

Catalog Number	Clamping Diameter		Testing Standards
	mm	in	
C-6887-050	40.00	1.57	ISO 7765-2
C-6887-051	76.00	3.00	ASTM D3763
C-6887-052	127.00	5.00	ASTM D1709

CAI TESTING

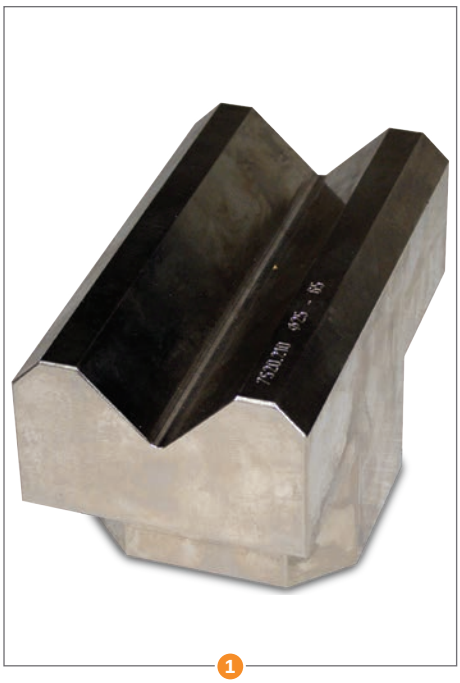


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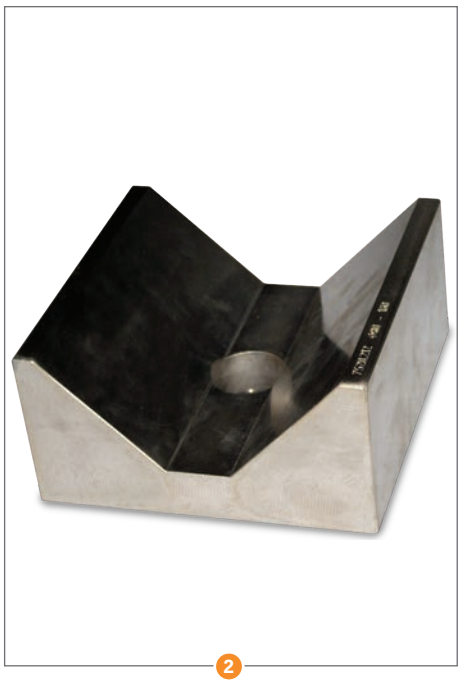
Compression After Impact (CAI) testing is common for composite materials and standards including Boeing BMS-7260, SACMA 2R-94, ASTM D7136/M, and Airbus AITM 1.0010. The fixture and insert varies for each test, and the crosshead weight is very important. The anti-rebound system is required for all standards, while a tup and insert are required to complete the configuration and must be chosen based on the expected maximum load.

CAI TESTING FIXTURES FOR CEAST 9350 AND CEAST 9340

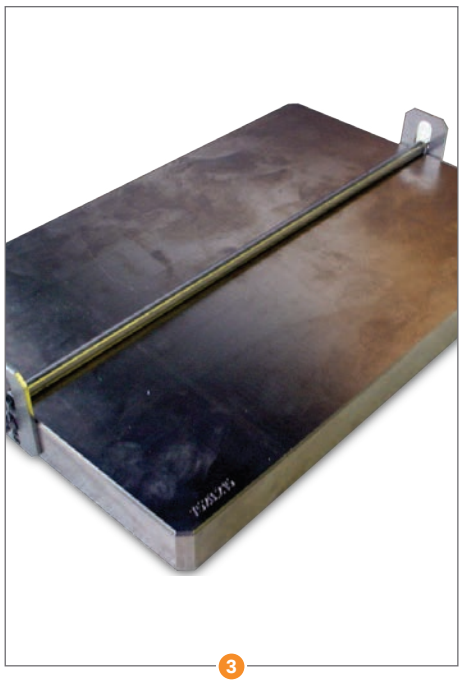
	Catalog Number	Description	Window Size		Specimen Size		Testing Standards
			mm	in	mm	in	
1	C-7520-350	CAI Impact Fixture, Metric (Aluminum Top Plate)	75.0 × 125.0	2.95 × 4.92	100.0 × 150.0	3.94 × 5.91	ASTM D7136M
	C-7520-352	CAI Impact Fixture, Metric (Steel Top Plate)	75.0 × 125.0	2.95 × 4.92	100.0 × 150.0	3.94 × 5.91	ASTM D7136M, Airbus AITM 1.0010, prEN 6038, ISO 18352
	C-7520-351	CAI Impact Fixture, Imperial (Aluminum Top Plate)	76.2 × 127.0	3.00 × 5.00	101.6 × 152.4	4.00 × 6.00	ASTM D7136, SACMA 2R-94
	C-7520-353	CAI Impact Fixture, Imperial (Steel Top Plate)	76.2 × 127.0	3.00 × 5.00	101.6 × 152.4	4.00 × 6.00	ASTM D7136, Boeing BSS 7260 Class II



1



2



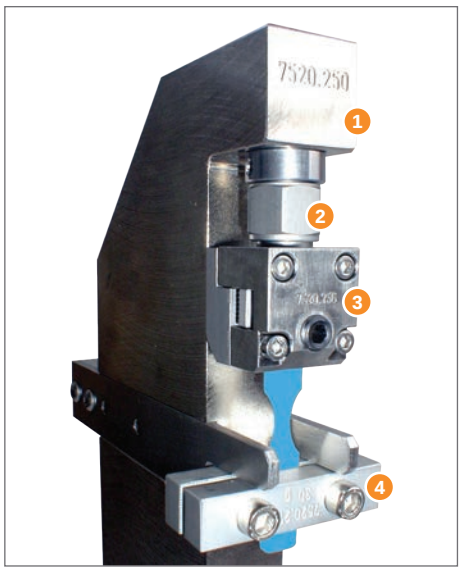
3

Our pipe testing fixtures, which comply with ASTM D2444, feature a V-grooved design to hold cylindrical specimens up to 160 mm (6.30 in). A tup and insert are required to complete the configuration and must be chosen based on the expected maximum load.

CAI TESTING FIXTURES FOR CEAST 9350 AND CEAST 9340

	Catalog Number	Specimen Size		Testing Standards	Compatible Standards
		mm	in		
1	C-7520-210	25.0 - 65.0	0.98 - 2.56	ASTM D2444	C-7520-035
2	C-7520-212	80.0 - 160.0	3.15 - 6.30	ASTM D2444	C-7520-035
3	C-7520-215	Small Pipes and Fittings	Small Pipes and Fittings	ASTM D2444 Type B	C-7520-035 and C-7520-039

TENSILE IMPACT TESTING





This instrumented vice is designed to meet ISO 8256 A for tensile impact tests. The fixture is suitable for specimen types 1-2-3-4-5 and equivalents, and includes fixed-height vice supports. The complete fixture requires the selection of a piezoelectric force sensor, a clamping device, and a vice.

TENSILE IMPACT ACCESSORIES FOR CEAST 9350 AND CEAST 9340

	Catalog Number	Description	Testing Standards
1	C-7520-250	Instrumented Vice for ISO 8256 A Tensile Impact Tests	ISO 8256 A
2	C-7520-251	Piezoelectric Force Sensor 2.2 kN	ISO 8256 A
2	C-7520-252	Piezoelectric Force Sensor 0.45 kN	ISO 8256 A
	C-7520-255	Clamping for Rigid and Film Specimens Types 1 and 3	ISO 8256 A
3	C-7520-256	Clamping for Rigid and Film Specimens Types 2 and 4	ISO 8256 A
	C-7520-257	Clamping for Rigid Specimens Type 5	ISO 8256 A
	C-7520-260	Striker for ISO 8256 A Tensile Impact Test (CEAST 9350)	ISO 8256 A
5	C-7510-260	Striker for ISO 8256 A Tensile Impact Test (CEAST 9340)	ISO 8256 A
	C-7520-281	Tensile Grips - 30 g for Film Specimens Type 1, 2, 3, and 4	ISO 8256 A
	C-7520-282	Tensile Grips - 60 g for Film Specimens Type 1, 2, 3, and 4	ISO 8256 A
	C-7520-283	Tensile Grips - 120 g for Film Specimens Type 1, 2, 3, and 4	ISO 8256 A
4	C-7520-271	Tensile Grips - 30 g for Rigid Specimen Types 1, 2, 3, and 4	ISO 8256 A
	C-7520-272	Tensile Grips - 60 g for Rigid Specimen Types 1, 2, 3, and 4	ISO 8256 A
	C-7520-273	Tensile Grips - 120 g for Rigid Specimen Types 1, 2, 3, and 4	ISO 8256 A
	C-7520-276	Tensile Grips - 30 g for Rigid Specimen Type 5	ISO 8256 A
	C-7520-277	Tensile Grips - 60 g for Rigid Specimen Type 5	ISO 8256 A
	C-7520-278	Tensile Grips - 120 g for Rigid Specimen Type 5	ISO 8256 A

WEDGE PEEL TESTING



1



2



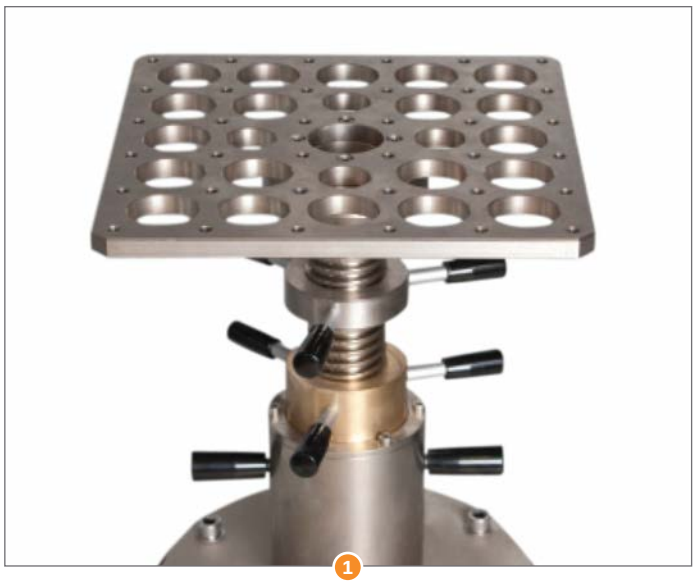
3

The impact wedge peel test is an ISO test method used to measure the resistance of structural adhesives to cleavage fracture at various temperatures and test speeds of 2 and 3 m/s. This common test is used in both the development of new adhesives and the quality control of product batches.

TENSILE IMPACT ACCESSORIES FOR CEAST 9350 AND CEAST 9340

	Catalog Number	Description	Testing Standards
1	C-7520-306	Asymmetric Wedge	ISO 11343
	C-7520-305	Symmetric Wedge	ISO 11343
	C-7520-310	Striker for ISO 11343 Testing (CEAST 9350)	ISO 11343
2	C-7510-310	Striker for ISO 11343 Testing (CEAST 9340)	ISO 11343
3	C-7520-304	Support Stand, Clamp and 15 kN Strain Gauge Sensor for ISO 11343	ISO 11343

COMPONENT TESTING



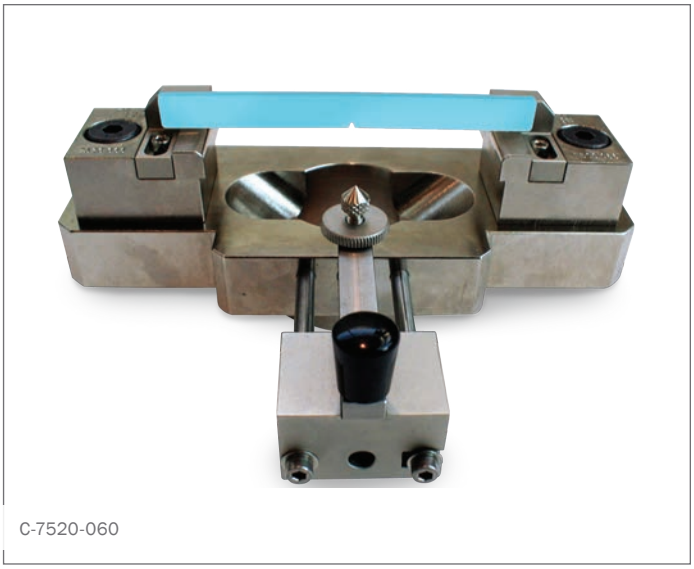


Fixtures can be custom designed to test a wide variety of uniquely sized parts and components. Please ask about options for your application if a standard product is not available.

COMPONENT TESTING FIXTURES FOR CEAST 9340 AND CEAST 9350

	Catalog Number	Description	Size		Compatible Standards
			mm	in	
1	C-7520-037	General Purpose Plate Stand Mounted	275 × 275	10.83 × 10.83	C-7520-035
	C-7520-020	General Purpose T-Slot Plate Stand Mounted[1]	370 × 450	14.57 × 17.72	C-7520-035
2	C-7520-040	General Purpose T-Slot Plate Base Mounted[1]	370 × 450	14.57 × 17.72	Mounted on Base

Notes:
1. These items cannot be used with CEAST 9340 equipped with thermostatic chamber. There is a dedicated CP number to cover this application.



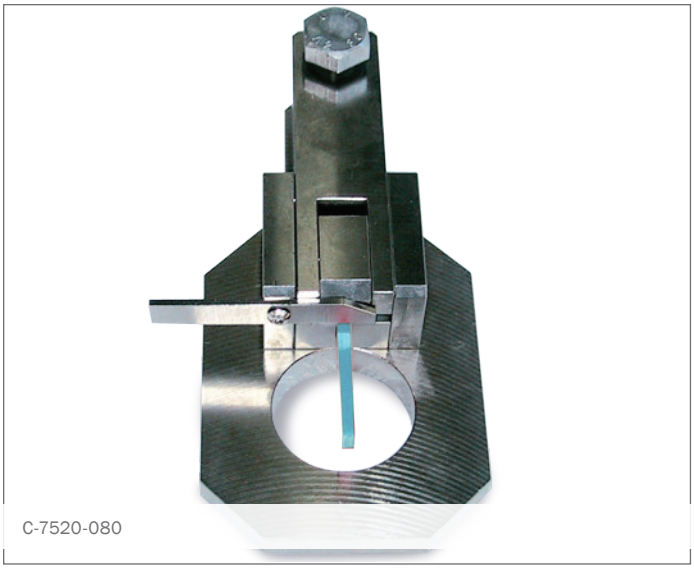
C-7520-060

Fixtures are available for testing to ASTM D6110 (formerly ASTM D256), ISO 179, and ASTM E23 Charpy standards. The tup chosen is based on the maximum load expected and is not related to the energy absorbed by the sample.

CHARPY TESTING ACCESSORIES FOR CEAST 9350 AND CEAST 9340

Testing Standard	Specimen Size		Span		Vice	Shoulders	Stands
	mm	in	mm	in			
ISO 179	4 × 10 × 80	1.57	62	2.44	C-7520-060	C-7520-063 (Flatwise)	C-7520-031 or C-7520-035 and C-7520-039
ISO 179	4 × 10 × 80	1.57	62	2.44	C-7520-060	C-7520-064 (Edgewise)	C-7520-031 or C-7520-035 and C-7520-039
ASTM D6110	3.17 × 12.7 × 127	0.125 × 0.50 × 5.00	101.6	4.00	C-7520-060	C-7520-066	C-7520-031 or C-7520-035 and C-7520-039
ASTM D6110	6.35 × 12.7 × 127	0.25 × 0.50 × 5.00	101.6	4.00	C-7520-060	C-7520-066	C-7520-031 or C-7520-035 and C-7520-039
ASTM D6110	12.7 × 12.7 × 127	0.50 × 0.50 × 5.00	101.6	4.00	C-7520-060	C-7520-066	C-7520-031 or C-7520-035 and C-7520-039
ASTM E23	10 × 10 × 55	0.39 × 0.39 × 2.17	40	1.57	C-7520-060	C-7520-069	C-7520-031 or C-7520-035 and C-7520-039

IZOD TESTING



C-7520-080

Fixtures are available for testing plastics to ASTM D256 and ISO 180 IZOD standards.

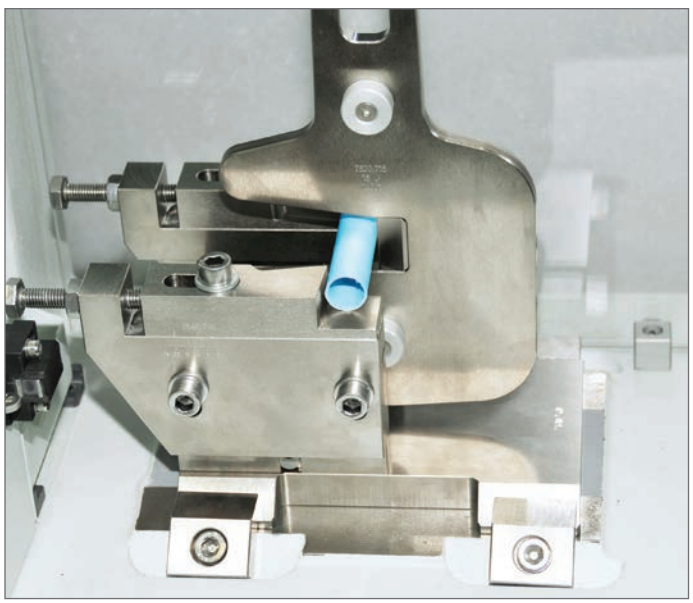
IZOD TESTING ACCESSORIES FOR CEAST 9350 AND CEAST 9340

Testing Standard	Specimen Size		Vice	Shoulders	Stands
	mm	in			
ISO 180	4 × 10 × 80	0.16 × 0.39 × 3.15	C-7520-080	C-6545-250	C-7520-031 or C-7520-035 and C-7520-039
ASTM D256	3.17 × 12.7 × 127	0.125 × 0.50 × 5.00	C-7520-080	C-6545-251	C-7520-031 or C-7520-035 and C-7520-039
ASTM D256	6.35 × 12.7 × 127	0.25 × 0.50 × 5.00	C-7520-080	C-6545-050	C-7520-031 or C-7520-035 and C-7520-039
ASTM D256	12.7 × 12.7 × 127	0.50 × 0.50 × 5.00	C-7520-080	C-6545-124	C-7520-031 or C-7520-035 and C-7520-039
ASTM E23	10 × 10 × 55	0.39 × 0.39 × 2.17	C-7520-081	C-7520-089	C-7520-031 or C-7520-035 and C-7520-039

PENDULUM ACCESSORIES

The CEAST 9300 Series Pendulum Impact Systems are designed to test a wide range of samples, from bars/dumbbell to pipes, in accordance with specific standards. The CEAST 9050 is the advanced model of the series. It can be fitted with accessories for Charpy, IZOD, Pipe, and Tensile Impact Testing. Each test requires a specific vice/fixture, specimen adapters, and hammers, and most tests can be conducted either with an un-instrumented or instrumented hammer.





Pendulum Accessories

Charpy Testing - Polymers (ISO, BS, and DIN)	305-306
Charpy Testing - Polymers (ASTM)	307
Charpy Testing - Metals	308
IZOD Testing	309-310
Pipe Testing - Polymers	311
Tensile Impact Testing	312-313

CHARPY TESTING - POLYMERS (ISO, BS, AND DIN)



1

Accessories are available for ISO 179, BS 2782-359, DIN 53453, and DIN 53753. Since the hammer energy determines the velocity of test, the vice required and the shoulders should be chosen based on the specimen size. Samples are aligned on the fixture either by a notch alignment device or side alignment device for un-notched specimens. Instrumented hammers are available and, when combined with a DAS and Visual Impact software, will provide load-displacement data for the test.

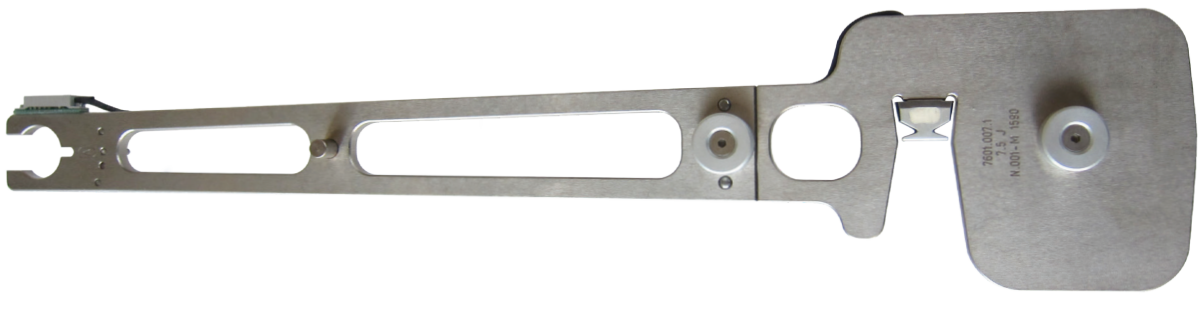
CHARPY VICES POLYMERS (ISO, BS, AND DIN)

	Catalog Number	Impact Velocity		Alignment Device	Wooden Case	Testing Standards
		m/s	ft/s			
1	C-7610-101	2.9	9.5	C-7610-112 (Notch), C-7610-121 (Unnotched, 33-80 mm), C-7610-122 (Unnotched. 80-127 mm), C-7610-115 for Cryobox	C-7610-107	ISO 179-1, ISO 179-2, BS 2782-359, DIN 53453, and DIN 53753
	C-7610-103	2.9 and 3.8	9.5 and 12.5	C-7610-112 (Notch), C-7610-121 (Unnotched, 33-80 mm), C-7610-122 (Unnotched. 80-127 mm), C-7610-115 for Cryobox	C-7610-107	ISO 179-1, ISO 179-2, BS 2782-359, DIN 53453, and DIN 53753
	C-7610-102	3.8	12.5	C-7610-112 (Notch), C-7610-121 (Unnotched, 33-80 mm), C-7610-122 (Unnotched. 80-127 mm), C-7610-115 for Cryobox	C-7610-108	ISO 179-1, ISO 179-2, BS 2782-359, DIN 53453, and DIN 53753

CHARPY SHOULDERS POLYMERS (ISO, BS, AND DIN)

Catalog Number	Specimen Size		Span		Test Direction	Testing Standards
	mm	in	mm	in		
C-7610-145	3 × 10 × 33-39-75	0.12 × 0.59 × 1.30-1.54-2.95	18-24-60 (Adjustable)	0.71-0.94-2.36 (Adjustable)	Edgewise	ISO 179-1, ISO 179-2, and BS 2782-359
C-7610-155	3 × 10 × 33-39-75	0.12 × 0.59 × 1.30-1.54-2.95	18-24-60 (Adjustable)	0.71-0.94-2.36 (Adjustable)	Flatwise	ISO 179-1, ISO 179-2, and BS 2782-359
C-7610-140	3 × 15 × 33-39-75	0.12 × 0.59 × 1.30-1.54-2.95	18-24-60 (Adjustable)	0.71-0.94-2.36 (Adjustable)	Edgewise	ISO 179-1, ISO 179-2, and BS 2782-359
C-7610-150	3 × 15 × 33-39-75	0.12 × 0.59 × 1.30-1.54-2.95	18-24-60 (Adjustable)	0.71-0.94-2.36 (Adjustable)	Flatwise	ISO 179-1, ISO 179-2, and BS 2782-359
C-7610-180	4 × 6 × 50	0.16 × 0.24 × 1.97	42	1.65	Flatwise	DIN 53453 and DIN 53753
C-7610-130	4 × 10 × 80	0.16 × 0.39 × 3.15	62	2.44	Flatwise	ISO 179-1, ISO 179-2, and BS 2782-359
C-7610-131	4 × 10 × 80	0.16 × 0.39 × 3.15	62	2.44	Edgewise	ISO 179-1, ISO 179-2, and BS 2782-359
C-7610-181	10 × 15 × 120	0.39 × 0.59 × 4.72	72	2.83	Flatwise	DIN 53453
C-7610-182	10 × 15 × 120	0.39 × 0.59 × 4.72	72	2.83	Edgewise	DIN 53453

CHARPY TESTING - POLYMERS (ISO, BS, AND DIN)



C-7601-007-1 (C)

1

UN-INSTRUMENTED CHARPY HAMMERS POLYMERS (ISO, BS, AND DIN)

Catalog Number	Potential Hammer Energy		Impact Velocity		Testing Standards
	J	ft lb	m/s	ft/s	
C-7600-065	0.5	0.37	2.9	9.5	ISO 179-1, DIN 53453, DIN 53753, and BS 2782-359
C-7600-001	1.0	0.74	2.9	9.5	ISO 179-1, DIN 53453, DIN 53753, and BS 2782-359
C-7600-002	2.0	1.48	2.9	9.5	ISO 179-1, DIN 53453, DIN 53753, and BS 2782-359
C-7600-004	4.0	2.95	2.9	9.5	ISO 179-1, DIN 53453, DIN 53753, and BS 2782-359
C-7600-005	5.0	3.69	2.9	9.5	ISO 179-1, DIN 53453, DIN 53753, and BS 2782-359
C-7600-007	7.5	5.53	3.8	12.5	ISO 179-1, DIN 53453, DIN 53753, and BS 2782-359
C-7600-015	15.0	11.06	3.8	12.5	ISO 179-1, DIN 53453, DIN 53753, and BS 2782-359
C-7600-025	25.0	18.44	3.8	12.5	ISO 179-1, DIN 53453, DIN 53753, and BS 2782-359
C-7600-050	50.0	36.89	3.8	12.5	ISO 179-1, DIN 53453, DIN 53753, and BS 2782-359

INSTRUMENTED CHARPY HAMMERS POLYMERS (ISO, BS, AND DIN)

Catalog Number	Potential Hammer Energy		Load Capacity		Impact Velocity		Connection Type	Testing Standards
	J	ft lb	kN	lbs	m/s	ft/s		
C-7601-005-1	5.0	3.69	2	450	2.9	9.5	Slip Ring	ISO 179-2
1 C-7601-007-1	7.5	5.53	2	450	3.8	15.5	Slip Ring	ISO 179-2
C-7601-015-1	15.0	11.06	2	450	3.8	12.5	Slip Ring	ISO 179-2
C-7601-025-2	25.0	18.44	4	900	3.8	12.5	Slip Ring	ISO 179-2
C-7601-050-2	50.0	36.89	4	900	3.8	12.5	Slip Ring	ISO 179-2

CHARPY TESTING - POLYMERS (ASTM)

The vice, shoulders, and hammers listed here are designed to meet ASTM D6110. The test is conducted at 3.46 m/s (11.45 ft/s) and various hammer energies and specimen shoulders are available.

CHARPY VICE POLYMERS (ASTM)

Catalog Number	Impact Velocity		Alignment Device	Wooden Case	Testing Standards
	m/s	ft/s			
C-7610-105	3.46	11.35	C-7610-111 (Notch), C-7610-122 (Unnotched, 80-127 mm), C-7610-115 for Cryobox	C-7610-108	ASTM D6110

CHARPY SHOULDERS POLYMERS (ASTM)

Catalog Number	Specimen Dimensions		Span		Test Direction	Testing Standards
	mm	in	mm	in		
C-7610-160	3.17 × 12.7 × 127	0.125 × 0.5 × 5.0	101.6	4.0	Flatwise	ASTM D6110
C-7610-161	6.35 × 12.7 × 127	0.25 × 0.5 × 5.0	101.6	4.0	Edgewise	ASTM D6110
C-7610-162	12.7 × 12.7 × 127	0.50 × 0.5 × 5.0	101.6	4.0	Edgewise	ASTM D6110

UN-INSTRUMENTED CHARPY HAMMERS - POLYMERS (ASTM)

Catalog Number	Potential Hammer Energy		Impact Velocity		Testing Standards
	mm	in	mm	in	
C-7600-165	0.5	50.0	3.46	11.35	ASTM D6110
C-7600-101	1.0	0.74	3.46	11.35	ASTM D6110
C-7600-102	2.7	2.0	3.46	11.35	ASTM D6110
C-7600-105	5.4	4.0	3.46	11.35	ASTM D6110
C-7600-110	10.8	8.0	3.46	11.35	ASTM D6110
C-7600-121	21.6	16.0	3.46	11.35	ASTM D6110
C-7600-150	50.0	36.9	3.46	11.35	ASTM D6110

INSTRUMENTED CHARPY HAMMERS - POLYMERS (ASTM)

Catalog Number	Potential Hammer Energy		Load Capacity		Impact Velocity		Connection Type	Testing Standards
	J	ft lb	kN	lbs	m/s	ft/s		
C-7601-005-1 (C)	5.4	4.0	2	450	3.46	11.35	Slip Ring (Cable)	ASTM D6110
C-7601-007-1 (C)	10.8	8.0	2	450	3.46	11.35	Slip Ring (Cable)	ASTM D6110
C-7601-015-1 (C)	21.6	16.0	4	900	3.46	11.35	Slip Ring (Cable)	ASTM D6110
C-7601-025-2 (C)	50.0	36.9	4	900	3.46	11.35	Slip Ring (Cable)	ASTM D6110

CHARPY TESTING - METALS

Accessories are available for metals Charpy Testing. Tests can be conducted with accessory designed according to ASTM E23, and DIN 50115 with hammer energies up to 50 J. The 9050 is an ideal system for instructional or comparative testing (i.e. in academic settings or to meet internal standards).

The 9050 is not suitable for customers running ASTM E23 for production or quality purposes. Per the standard, those customers are required to perform an indirect verification using NIST specimens. NIST performs these verification tests on floor model pendulum systems. Floor models impact the specimen at a higher velocity due to their longer hammer arm and generate lower absorbed energy numbers.

CHARPY VICE METALS

Catalog Number	Impact Velocity		Alignment Device	Wooden Case	Testing Standards
	m/s	ft/s			
C-7610-102	3.8	12.5	C-7610-112 (Notch), C-7610-121 (Unnotched, 33-80 mm)	C-7610-108	ASTM E23 and DIN 50115

Notes:
1. For indirect verification to metals standards, only low-energy specimens may be used.

CHARPY SHOULDERS METALS

Catalog Number	Specimen Dimensions		Span		Test Direction	Testing Standards
	mm	in	mm	in		
C-7610-195	4 × 3 × 27	0.157 × 0.118 × 1.06	24	0.945	Edgewise	DIN 50115
C-7610-194	5 × 5 × 55	0.197 × 0.197 × 2.17	42	1.65	Edgewise	ASTM E23 and DIN 50115
C-7610-196	6 × 6 × 44	0.236 × 0.236 × 1.73	32	1.26	Edgewise	DIN 50115
C-7610-193	10 × 2.5 × 55	0.394 × 0.098 × 2.17	42	1.65	Edgewise	ASTM E23 and DIN 50115
C-7610-192	10 × 5 × 55	0.394 × 0.197 × 2.17	42	1.65	Edgewise	ASTM E23 and DIN 50115
C-7610-191	10 × 7.5 × 55	0.394 × 0.295 × 2.17	42	1.65	Edgewise	ASTM E23 and DIN 50115
C-7610-197	10 × 10 × 55	0.394 × 0.394 × 2.17	42	1.65	Edgewise	ASTM E23 and DIN 50115

UN-INSTRUMENTED CHARPY HAMMERS - METALS

Catalog Number	Potential Hammer Energy		Striker Radius		Impact Velocity		Testing Standards
	J	ft lb	mm	in	m/s	ft/s	
C-7600-651	50.0	36.9	2	0.079	3.8	12.5	DIN 50115
C-7600-650	50.0	36.9	8	0.314	3.8	12.5	ASTM E23

INSTRUMENTED CHARPY HAMMERS - METALS

Catalog Number	Potential Hammer Energy		Load Capacity		Striker Radius		Impact Velocity		Connection Type	Testing Standards
	J	ft lb	kN	lbs	mm	in	m/s	ft/s		
C-7601-650-1	50.0	36.9	8	1800	8	0.314	3.8	12.5	Slip Ring	ISO 148 and ASTM E23
C-7601-651-1	50.0	36.9	8	1800	2	0.079	3.8	12.5	Slip Ring	ISO 148 and DIN 50115

IZOD TESTING - POLYMERS



An IZOD test consists of impacting a specimen in a cantilever bending mode while the fixed end is clamped in a vice. This method gives a higher stress than a Charpy test, but may require a controlled clamping force for good repeatability. The manual vice can be tightened using the optional torque wrench (C-7610-204), while the clamping force can be adjusted using the lever or pneumatically-operated vices. Instrumented hammers are available and, when combined with a DAS and Visual Impact Software, will provide load-displacement data for the test.

IZOD VICES POLYMERS

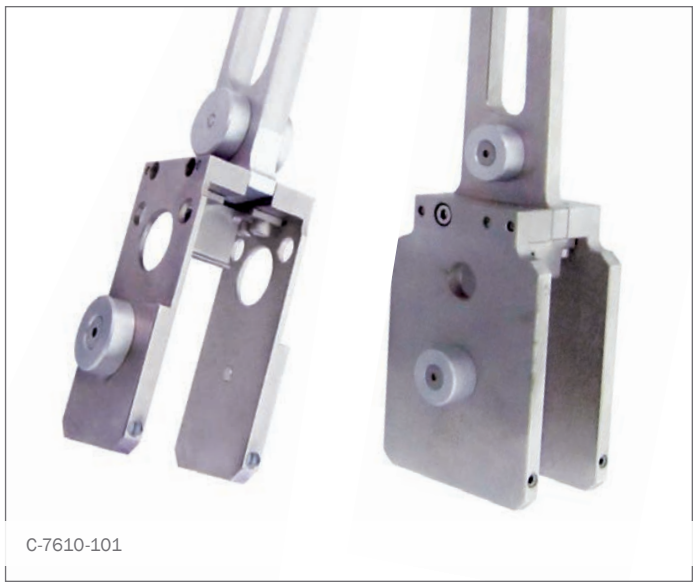
	Catalog Number	Impact Velocity		Clamping Type	Alignment Device	Wooden Case	Testing Standards
		m/s	ft/s				
1	C-7610-201	3.46	11.35	Manual or Torque Wrench	Notched (Included), Unnotched ISO 180 (C-7610-206), Unnotched ASTM D256 (C-7610-205)	C-7610-108	ISO 180, ASTM D256, and ASTM D4812
	C-7610-210	3.46	11.35	Lever Operated	Notched (Included), Unnotched ISO 180 (C-7610-206), Unnotched ASTM D256 (C-7610-205)	-	ISO 180, ASTM D256, and ASTM D4812
	C-7610-220[1]	3.46	11.35	Pneumatic	Notched (Included), Unnotched ISO 180 (C-7610-206), Unnotched ASTM D256 (C-7610-205)	-	ISO 180, ASTM D256, and ASTM D4812

Notes:
1. Not compatible with cryobox option

IZOD SPECIMEN ADAPTERS - POLYMERS

	Catalog Number	Specimen Dimensions		Testing Standards
		mm	in	
	C-6545-409	3 × 10 × 80	0.12 × 0.39 × 3.15	ISO 180
	C-6545-051	3.17 × 12.7 × 63.5	0.125 × 0.50 × 2.50	ASTM D256 and ASTM D4812
1	C-6545-250	4 × 10 × 80	0.16 × 0.39 × 3.15	ISO 180
	C-6545-050	6.35 × 12.7 × 63.5	0.25 × 0.50 × 2.50	ASTM D256 and ASTM D4812
	C-6545-124	12.7 × 12.7 × 63.5	0.50 × 0.50 × 2.50	ASTM D256 and ASTM D4812

IZOD TESTING - POLYMERS



C-7610-101

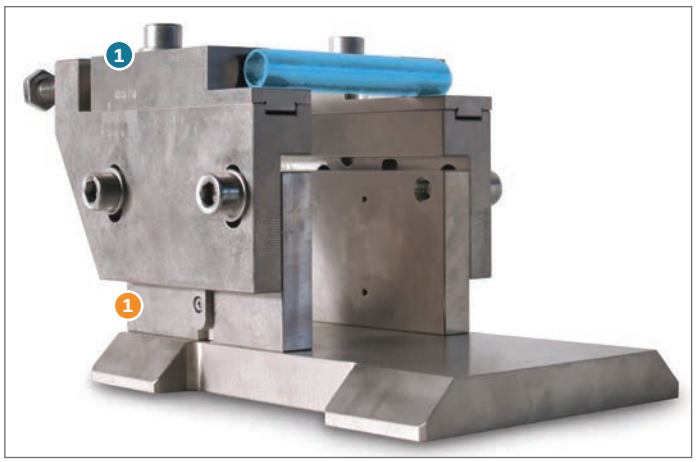
UN-INSTRUMENTED IZOD HAMMERS - POLYMERS

Catalog Number	Potential Hammer Energy		Impact Velocity		Testing Standards
	mm	in	mm	in	
C-7600-265	0.5	0.37	3.46	11.35	ISO 180, ASTM D256 and ASTM D4812
C-7600-201	1.0	0.74	3.46	11.35	ISO 180, ASTM D256 and ASTM D4812
C-7600-202	2.75	2.0	3.46	11.35	ISO 180, ASTM D256 and ASTM D4812
C-7600-205	5.5	4.0	3.46	11.35	ISO 180, ASTM D256 and ASTM D4812
C-7600-211	11.0	8.1	3.46	11.35	ISO 180, ASTM D256 and ASTM D4812
C-7600-222	22.0	16.0	3.46	11.35	ISO 180, ASTM D256 and ASTM D4812
C-7600-250	50.0	36.89	3.46	11.35	ISO 180, ASTM D256 and ASTM D4812

INSTRUMENTED IZOD HAMMERS - POLYMERS

Catalog Number	Load Capacity		Potential Hammer Energy		Impact Velocity		Connection Type	Testing Standards
	kN	lbs	J	ft lb	m/s	ft/s		
C-7601-205-1	2	450	5.0	3.69	3.46	11.35	Slip Ring	ISO 180, ASTM D256 and ASTM D4812
C-7601-211-1	2	450	11.0	8.1	3.46	11.35	Slip Ring	ISO 180, ASTM D256 and ASTM D4812
C-7601-222-1	2	450	22.0	16.0	3.46	11.35	Slip Ring	ISO 180, ASTM D256 and ASTM D4812
C-7601-250-1	2	450	50.0	36.89	3.46	11.35	Slip Ring	ISO 180, ASTM D256 and ASTM D4812

PIPE TESTING - POLYMERS



According to ISO 7628 and ISO 9854, either complete segments or small sections of pipes are ideal for testing on a pendulum in a 3-point bend configuration similar to the Charpy tests. Sample diameter dimensions up to 25 mm (0.98 in) can be tested with hammer energies of 7.5 - 15 J (5.6 - 11.1 ft-lbs) or 50 J (36.9 ft-lbs), as defined in the ISO standards.

UN-INSTRUMENTED PIPE TESTING HAMMERS

Catalog Number	Potential Hammer Energy		Impact Velocity		Testing Standards
	J	ft lb	m/s	ft/s	
C-7600-715	15.0	11.06	3.8	12.5	ISO 9854-1
C-7600-750	50.0	36.89	3.8	12.5	ISO 9854-1

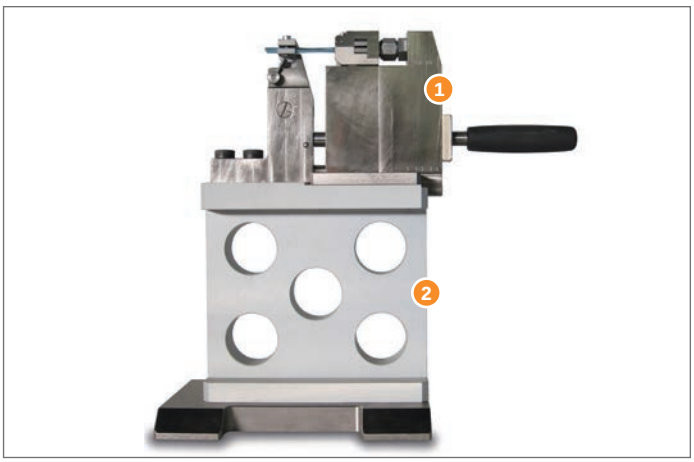
PIPE TESTING VICE

Catalog Number	Impact Velocity		Wooden Case	Testing Standards
	m/s	ft/s		
1 C-7610-740	3.8	12.5	C-7610-110	ISO 9854-1

PIPE TESTING ADAPTERS

Catalog Number	Specimen Dimensions		Span		Specimen Type	Testing Standards
	mm	in	mm	in		
C-6546-747	50 × 6, Diameter >25	1.97 × 0.24, Diameter >0.98	40	1.57	Fig. 2, Shape 2	ISO 9854-1
C-6546-749	50 × 6, Diameter >75	1.97 × 0.24, Diameter >2.95	40	1.57	Fig. 3, Shape 2	ISO 9854-1
C-6546-748	120 × 15, Diameter >75	4.72 × 0.59, Diameter >2.95	70	2.76	Fig. 3, Shape 3	ISO 9854-1
1 C-6546-746	Complete Diameter <25 120 × 15 Diameter >25	Complete Diameter <0.98 4.72 × 0.59 Diameter >0.98	70	2.76	Fig. 1, Shape 1 and 3	ISO 9854-1

TENSILE IMPACT TESTING - POLYMERS



Hammer geometry, impact energy, specimen shapes, and dimensions are defined in test standards, such as ISO 8256 Method A and Method B. The specimen is either held in the stationary anvil (ISO 8256 Method A) or attached directly to the pendulum hammer (ISO 8256 Method B). Hammer energies are available from 0.5 - 50 J (0.37 - 36.9 ft-lbs) depending on the type of the test. The Tensile Impact Vice can be fitted in the crosshead with an optional device to ensure specimen alignment.

TENSILE IMPACT CLAMPING SYSTEMS

Catalog Number	Description	Testing Standards
C-7610-040	Crosshead Clamping Jig	ISO 8256 - Method A
C-7610-341	Tensile Impact Template, Specimen Type 1	ISO 8256 - Method A
C-7610-342	Tensile Impact Template, Specimen Type 2	ISO 8256 - Method A
C-7610-343	Tensile Impact Template, Specimen Type 3	ISO 8256 - Method A
C-7610-344	Tensile Impact Template, Specimen Type 4	ISO 8256 - Method A

TENSILE IMPACT HAMMERS

Catalog Number	Potential Hammer Energy		Impact Velocity		Testing Standards
	J	ft lb	m/s	ft/s	
C-7600-365	0.5	0.37	2.9	9.5	ISO 8256 - Method A
C-7600-301	1.0	0.74	2.9	9.5	ISO 8256 - Method A
C-7600-302	2.0	1.48	2.9	9.5	ISO 8256 - Method A
C-7600-304	4.0	2.95	2.9	9.5	ISO 8256 - Method A
C-7600-307	7.5	5.53	3.8	12.5	ISO 8256 - Method A
C-7600-315	15.0	11.06	3.8	12.5	ISO 8256 - Method A
C-7600-325	25.0	18.44	3.8	12.5	ISO 8256 - Method A
C-7600-350	50.0	36.89	3.8	12.5	ISO 8256 - Method A

TENSILE IMPACT VICE

Catalog Number	Potential Hammer Energy		Impact Velocity		Wood Case	Testing Standards
	m/s	ft/s	J	ft lb		
1 C-7610-304 Plus	-	-	-	-	C-7610-109	ISO 8256 - Method A
2 C-7610-301	2.9	9.5	Up to 5	Up to 3.69	C-7610-109	ISO 8256 - Method A
C-7610-300	3.8	12.5	>5	>3.69	C-7610-109	ISO 8256 - Method A

TENSILE IMPACT TESTING - POLYMERS

UN-INSTRUMENTED TENSILE IMPACT CLAMPS

Catalog Number	Specimen Types	Specimen Thickness		Testing Standards
		mm	in	
C-7610-357	1, 2, 3, and 4	0.01 - 0.5	0.00039 - 0.02	ISO 8256 - Method A
C-7610-355	1, 2, 3, and 4	0.5 - 4.2	0.020 - 0.17	ISO 8256 - Method A
C-7610-356	5	3.0 - 4.2	0.12 - 0.17	ISO 8256 - Method A

INSTRUMENTED TENSILE IMPACT CLAMPS

Catalog Number	Specimen Types	Specimen Thickness		Load Capacity	Testing Standards
		mm	in		
C-7610-307	1, 2, 3, and 4	0.01 - 0.5	0.00039 - 0.02	Dependant on Selected Force Sensor	ISO 8256 - Method A
C-7610-305	1, 2, 3, and 4	0.5 - 4.2	0.020 - 0.17	Dependant on Selected Force Sensor	ISO 8256 - Method A
C-7610-306	5	3.0 - 4.2	0.12 - 0.17	Dependant on Selected Force Sensor	ISO 8256 - Method A

FORCE SENSORS TENSILE IMPACT

Catalog Number	Specimen Types	Specimen Thickness	Load Capacity		Testing Standards
			kN	lbs	
C-7610-310	All	All	0.5 - 4.2	0.020 - 0.17	ISO 8256 - Method A
C-7610-311	All	All	3.0 - 4.2	0.12 - 0.17	ISO 8256 - Method A

TENSILE IMPACT CROSSHEADS

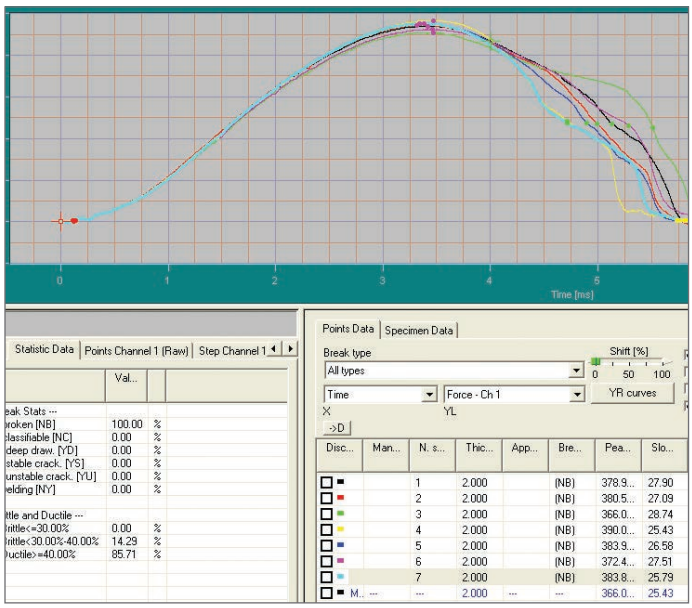
Catalog Number	Specimen Types	Specimen Types	Specimen Thickness		Testing Standards
			mm	in	
C-7610-391	1, 2, 3, and 4	15 g Crosshead	0.01 - 0.5	0.020 - 0.17	ISO 8256 - Method A
C-7610-371	1, 2, 3, and 4	15 g Crosshead	0.5 - 4.2	0.020 - 0.17	ISO 8256 - Method A
C-7610-392	1, 2, 3, and 4	30 g Crosshead	0.01 - 0.5	0.020 - 0.17	ISO 8256 - Method A
C-7610-372	1, 2, 3, and 4	30 g Crosshead	0.5 - 4.2	0.020 - 0.17	ISO 8256 - Method A
C-7610-373	1, 2, 3, and 4	60 g Crosshead	0.5 - 4.2	0.020 - 0.17	ISO 8256 - Method A
C-7610-374	1, 2, 3, and 4	120 g Crosshead	0.5 - 4.2	0.020 - 0.17	ISO 8256 - Method A
C-7610-381	5	15 g Crosshead	3.0 - 4.2	0.020 - 0.17	ISO 8256 - Method A
C-7610-382	5	30 g Crosshead	3.0 - 4.2	0.020 - 0.17	ISO 8256 - Method A
C-7610-383	5	60 g Crosshead	3.0 - 4.2	0.020 - 0.17	ISO 8256 - Method A
C-7610-384	5	120 g Crosshead	3.0 - 4.2	0.020 - 0.17	ISO 8256 - Method A

DYNSTAT VICE AND HAMMERS

Catalog Number	Potential Hammer Energy		Impact Velocity		Testing Standards
	J	ft lb	m/s	ft/s	
C-7610-801	-	-	2.2	7.22	DIN 51230 and DIN 53435
C-7600-865	0.5	0.37	2.2	7.22	DIN 51230 and DIN 53435
C-7600-801	1	0.74	2.2	7.22	DIN 51230 and DIN 53435
C-7600-802	2	1.48	2.2	7.22	DIN 51230 and DIN 53435

INSTRUMENTATION AND SOFTWARE

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. Depending on the requirements, failure can be defined by deformation, crack initiation, or complete fracture.





Instrumentation and Software

Data Aquisition 315

Visual IMPACT Software 316

DATA ACQUISITION SYSTEM

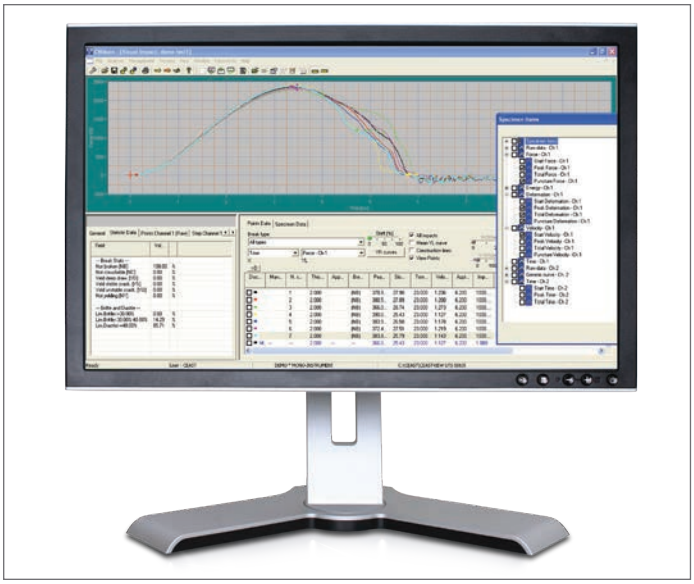


1

The CEAST DAS 64K is a state-of-the-art Data Acquisition System designed for impact testing instruments. Compatible with the full range of CEAST Impact Testing Systems, the CEAST 9000 Series Pendulum Machines and the CEAST 9300 Series Drop Towers, it's the key for instrumented impact testing. The DAS 64K also enables the data collection from instrumented tups or hammers on older models and non-CEAST impact machines. The DAS 64K is the result of a complete re-design that enhances its versatility and testing efficiency. This significant step forward is also accomplished by the simultaneous evolution of Visual IMPACT, the dedicated software for instrument handling and data processing.

	Catalog Number	Description	Additional Information	Testing Standards
1	C-7190-000	CEAST DAS 64K - High-Speed Data Acquisition Unit	Up to 4 Channels	CEAST 9050, CEAST 9310, CEAST 9340, CEAST 9350
	C-7191-000	CEAST DAS 64k-SC – High-Speed Data Acquisition Unit	Single Channel	CEAST 9050, CEAST 9310, CEAST 9340, CEAST 9350
	C-7190-011	Strain Gauge Channel for DAS 64k	14 Bit Resolution, Up to 4 MHz Sampling Frequency, and 65,536 Points per Channel	CEAST 9050, CEAST 9310, CEAST 9340, CEAST 9350
	C-7190-021	Piezo Channel for DAS 64k	14 Bit Resolution, Up to 4 MHz Sampling Frequency, and 65,536 Points per Channel	CEAST 9050, CEAST 9310, CEAST 9340, CEAST 9350
	C-7190-031	Voltage Channel for DAS 64k, 0 to +10V	14 Bit Resolution, Up to 4 MHz Sampling Frequency, and 65,536 Points per Channel	CEAST 9050, CEAST 9310, CEAST 9340, CEAST 9350
	C-7190-041	Voltage Channel for DAS 64k, -10 to +10	14 Bit Resolution, Up to 4 MHz Sampling Frequency, and 65,536 Points per Channel	CEAST 9050, CEAST 9310, CEAST 9340, CEAST 9350
	C-7190-051	4 to 20mA Channel for DAS 64k	14 Bit Resolution, Up to 4 MHz Sampling Frequency, and 65,536 Points per Channel	CEAST 9050, CEAST 9310, CEAST 9340, CEAST 9350

VISUAL IMPACT SOFTWARE

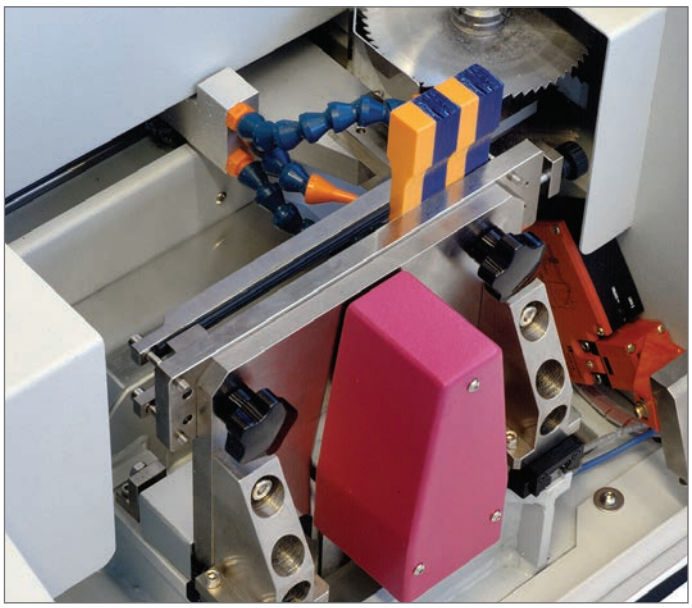


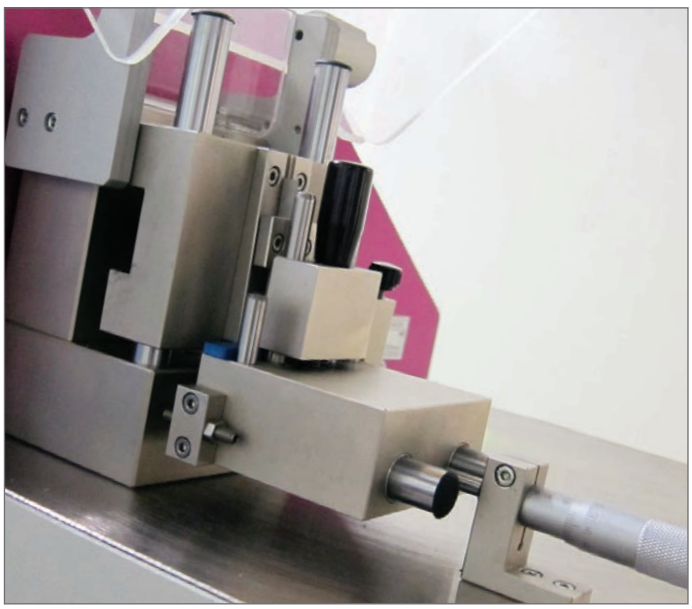
Visual IMPACT v.6 is a powerful software suite designed for impact testing. Developed within the CeastVIEW software platform, it brings together the CEAST and Instron® experience of impact testing, providing a complete interface between the instruments and the end user. Developed for data processing, organization, and reporting, it is configured into common application areas with a full set of new features for customization.

Catalog Number	Description	Additional Information	Compatible Machines
C-0710-690-1	Visual IMPACT v.6 Un-Instrumented Pendulums	For Analysis of Pendulum Tests Conducted with Un-Instrumented Hammers	CEAST 9050
C-0710-690-2	Visual IMPACT v.6 Instrumented Pendulums	For Analysis of Pendulum Tests Conducted with Instrumented Hammers	CEAST 9050
C-0710-690-3	Visual IMPACT v.6 Instrumented Drop Towers	For Analysis of Tests Conducted with Instrumented Tups on Drop Towers	CEAST 9350, CEAST 9340, CEAST 9310 Dynatup 8000 series, Dynatup MiniTower
C-0710-690-1U	Upgrade to Visual IMPACT v. 6 Un-Instrumented Pendulums	Suitability of upgraded version has to be checked in advance	Resil Impactor, Resil 5.5, CEAST 9010, CEAST 9050
C-0710-690-2U	Upgrade to Visual IMPACT v. 6 Instrumented Pendulums	Suitability of upgraded version has to be checked in advance, in particular the DAS model.	Resil Impactor, Resil 5.5, CEAST 9010 CEAST 9050
C-0710-690-3U	Upgrade to Visual IMPACT v. 6 Instrumented Drop Towers	Suitability of upgraded version has to be checked in advance, in particular the DAS model.	Fractovis Plus, Hobbit, CEAST 9350, CEAST 9340, CEAST 9310, Dynatup 8000 series, Dynatup MiniTower

SPECIMEN PREPARATION

Proper preparation of the specimen is a critical process for accurate material characterization. An appropriate preparation of the specimen, as well as an adequate notching procedure, effect the final test results that generate reliable outcomes in the finished product performances. This is accomplished by several specimen preparation techniques, making them particularly suitable to select the most appropriate material and failure results analysis. According to the requirements of the main international standards, Instron® offers an extensive range of notching, milling, and punching machines designed to prepare specimens from thin to thick samples, as well as from soft to hard samples and reinforced plastic materials.





Specimen Preparation

Punching Machines 318
Notching Machines 319-320

PUNCHING MACHINES



Pneumatic Hollow Die Punch

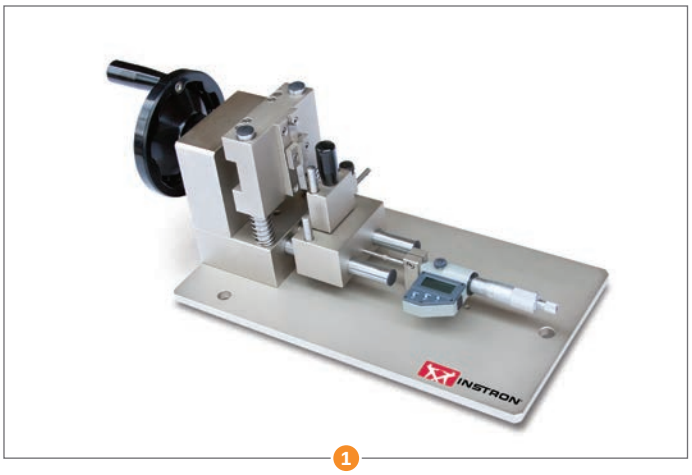


Manual Hollow Die Punch

These machines are developed to obtain specimens by punching, using hollow dies of different sizes and contours. Several hundreds of dies can be created by interchangeable socket punches with different profiles and sizes according to the standards and to the customer needs. Dies are made of steel with hand-finished cutting edges and can be provided with the ejector for easily removing the specimen after punching.

These machines can be used to punch films, flexible materials (rubbers, foams and similar) or thin sheets of semi-rigid plastic materials having thickness up to 2 mm (actual maximum thickness varies depending on the material).

NOTCHING MACHINES



1



2

Notching Machines are designed to notch specimens for impact resilience determinations according to Izod, Charpy, and Tensile Impact methods. These instruments use a linear knife cutting technique to avoid overheating and consequent stresses during the specimens notching operations. Therefore, they are able to guarantee an accurate notch preparation. Manual, motorized, and fully-automatic models are available to cover the different testing needs.

Manual and Motorized Models

The manual and motorized Notching Machines are designed to notch thermoplastic material specimens. A notch, with dimension according to the requirement of the main international standards, is obtained by means of a constant profile knife with an alternating linear movement. For high precision, a micro-metric head with digital display can be supplied to ensure a constant monitoring of the specimen notch.

MANUAL AND MOTORIZED NOTCHVIS

	Catalog Number	Testing Standards
1	C-6897-000	CEAST Manual Notching Machine - Manually-Operated Notching Machine with Linear Movement of Cutting Knife
2	C-6898-000	CEAST Motorized Notching Machine - Notching Machine with Motorized Linear Movement of Cutting Knife

KNIVES FOR THE MANUAL AND MOTORIZED NOTCHVIS

Catalog Number	Notch Radius	Testing Standards	Material
C-6530-063	0.1 ± 0.02 mm	ISO 179 C	Tungsten Carbide
C-6530-045	0.25 ± 0.05 mm	ISO 179 A, ISO 180 A, ASTM D6110, ASTM D256, BS 2782-359 A	Tungsten Carbide
C-6530-061	0.5 ± 0.05 mm	ASTM D256 D	Tungsten Carbide
C-6530-064	0.8 ± 0.1 mm	BS 2782-359 C, DIN 53453 2	Tungsten Carbide
C-6530-053	1 ± 0.02 mm	ISO 179 B, ISO 180 B, ISO 8256 1, ASTM D256 D, BS 2782-359 B	Tungsten Carbide
C-6530-049	2 ± 0.2 mm	BS 2782-359 C, DIN 53453 C	Tungsten Carbide



1

Automatic Model CEAST AN50

The CEAST AN50 is designed for laboratories that need to perform a large number of impact tests. Up to 50 specimens can be notched in a single cycle with the key parameters stored for later use. The optional knife cooling system, double notch loader, and an adjustable cutting speed allow for consistent time savings and accurate notching operations at the same time.

Specimen Loaders

Loaders are used to hold specimens before notching and can be used for holding dumbbell specimens that can be cut to the correct length when the optional slicing device is used.

CEAST AN50 AND OPTIONS

	Catalog Number	Description
1	C-6899-000	CEAST AN50 - Microprocessor Controlled Unit to Notch a Set of Specimens and Optionally to Slice Their Ends
	C-6899-000C1	Basic Configuration - Without Cooling or Slicing Devices
	C-6899-000C2	Option for Knife Cooling Device - Based on an Adjustable Jet of Compressed Air
	C-6899-000C4	Option for Knife Cooling and Slicing Devices at 60 Hz - Knife Cooling Based on an Adjustable Jet of Compressed Air - Equipped with Two Circular Saws to Automatically Cut Both Ends of the Specimen to 80, 63.5 or 57 mm
	C-6899-000C5	Option for Knife Cooling and Slicing Devices at 60 Hz - Knife Cooling Based on an Adjustable Jet of Compressed Air - Equipped with Two Circular Saws to Automatically Cut Both Ends of the Specimen to 80, 63.5 or 57 mm

LOADERS FOR THE CEAST AN50

Catalog Number	Description
C-6867-006	Specimen Loader for both Rectangular and “Dumbbell” Specimens
C-6867-005	Loader for Double Notching of Rectangular Specimens According to ISO 179-1, ISO 8256, and Equivalent Standards (size 4 × 10 × 80 mm)
C-6867-007	Loader for Double Notching of Rectangular Specimens According to BS 2782-359 and Equivalent Standards (size 50 × 6 mm)

KNIVES FOR THE CEAST AN50

Catalog Number	Notch Radius	Testing Standards	Material
C-6819-097	0.1 ± 0.02 mm	ISO 179 C	Tungsten Carbide
C-6819-100	0.25 ± 0.05 mm	ISO 179 A, ISO 180 A, ASTM D6110, ASTM D256, BS 2782-359 A	Tungsten Carbide
C-6819-313	0.5 ± 0.05 mm	ASTM D256 D	Tungsten Carbide
C-6819-096	1 ± 0.02 mm	ISO 179 B, ISO 180 B, ISO 8256 1, ASTM D256 D, BS 2782-359 B	Tungsten Carbide
C-6819-094	2 ± 0.02 mm	BS 2782-359 C, DIN 53453 C	Tungsten Carbide

IPG/SATEC™ PENDULUM IMPACT ACCESSORIES

2.18

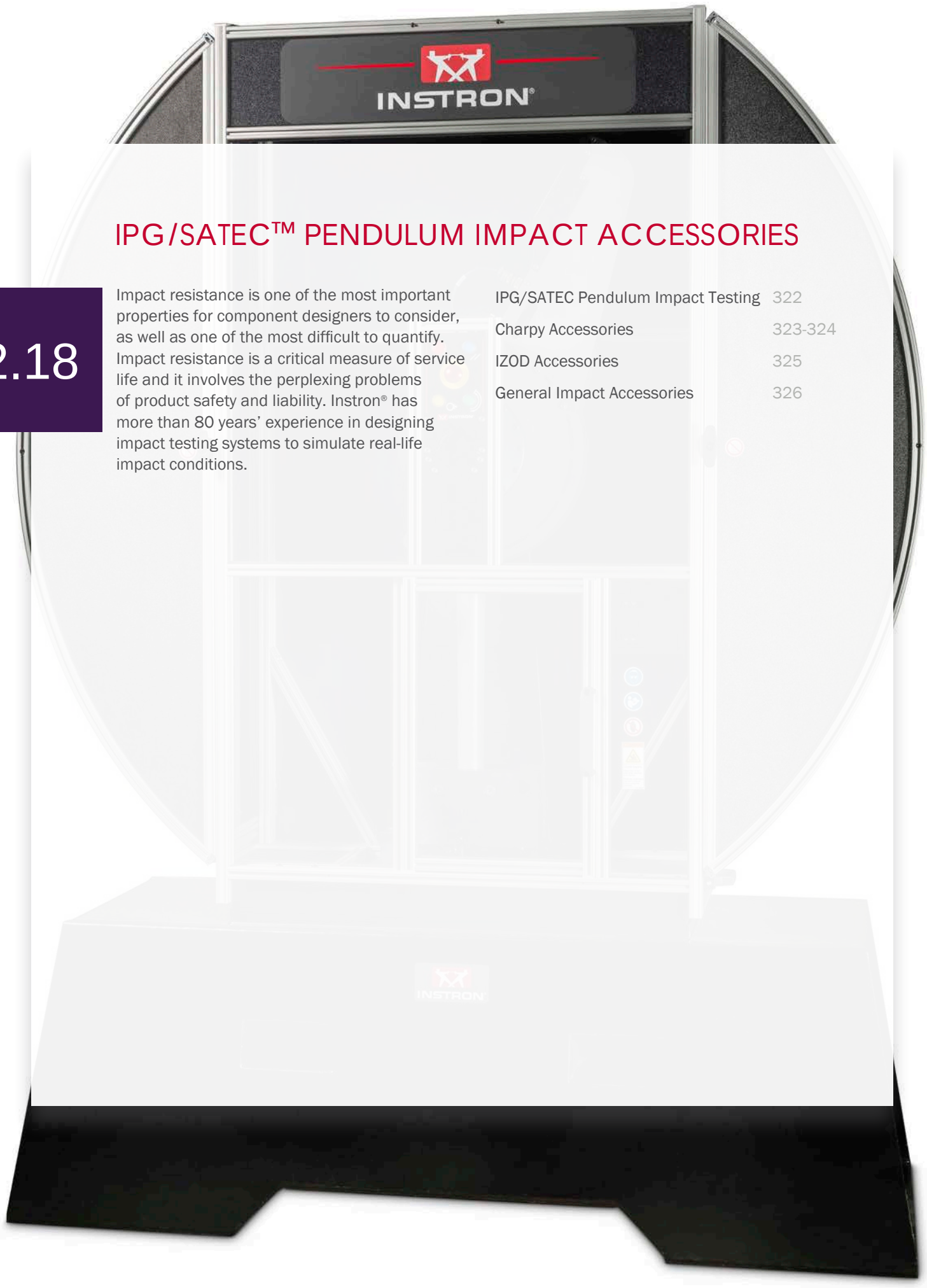
Impact resistance is one of the most important properties for component designers to consider, as well as one of the most difficult to quantify. Impact resistance is a critical measure of service life and it involves the perplexing problems of product safety and liability. Instron® has more than 80 years'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

IPG/SATEC Pendulum Impact Testing 322

Charpy Accessories 323-324

IZOD Accessories 325

General Impact Accessories 326



IPG/SATEC™ PENDULUM IMPACT TESTING



Motorized Pendulum Impact Testing System (MPX)

Instron® floor model pendulums are designed to meet the growing demand for accurate and repeatable impact testing on metals. Used to determine the mechanical and physical properties of metals and finished products for both research and development (R & D) and quality control (QC), the MPX and SI Floor model pendulums are capable of performing Charpy and Izod tests according to international standards. As non-instrumented systems, they provide the absorbed energy value. By fully instrumenting the pendulum, a more complete study of how the material reacts to impact can be gathered. This information is useful when evaluating the type of failure or the dynamic response of the material.

MPX Motorized Pendulum Impact Testing

- Available in capacities from 300 to 900 Joules
- Integrated guard and safety control system that meets CE and ISO 13849
- Automatic test start at door closure ensures adherence to test standards for non-ambient specimen testing
- Meet a wide range of international standards, including ASTM E23, ASTM A370, ISO 148, EN 10045, GOST 9454, AS 1544, JIS Z2242 and JIS B7722

CHARPY ACCESSORIES


Charpy Striker Kit, 8mm


1

Accessories are available for metals Charpy Testing including Charpy test kits – strikers, anvils and shrouds - and specimen supports for standard and sub-size specimens. These common replacement parts are fully inspected and in full compliance with ASTM E23 and ISO 148.

Easy-to-replace Charpy and Izod pendulum impact components wear over time and require replacement such as strikers, anvils and specimen supports are available. These items are suitable for the Instron® MPX, SI-1M, and SI Series Pendulum Impact Testing Systems.

NON-INSTRUMENTED CHARPY IMPACT TESTING

Catalog Number	Description	Testing Standards	Capacity		Compatible Model	Temperature Range	
			J	ft - lb		°C	°F
W-3599-C	Charpy Striker, 2 mm Radius	ISO 148-2:2009, GOST 9454:1978	Up to 900	663.8	MPX, SI-1M, and SI Series	+0 to +100, 10% to 90% Humidity	+32 to +212, 10% to 90% Humidity
W-3599-A	Charpy Striker, 2 mm Radius, LH & RH Anvil with Bolts and Shrouds	ISO 148-2:2009, GOST 9454:1978	Up to 900	663.8	MPX, SI-1M, and SI Series	+0 to +100, 10% to 90% Humidity	+32 to +212, 10% to 90% Humidity
W-3599-D	Charpy Striker, 8 mm Radius	ISO 148-2:2009, ASTM E23:2016b	Up to 900	663.8	MPX, SI-1M, and SI Series	+0 to +100, 10% to 90% Humidity	+32 to +212, 10% to 90% Humidity
W-3599-B	Charpy Striker, 8 mm Radius, LH & RH Anvil with Bolts and Shrouds	ISO 148-2:2009, ASTM E23:2016b	Up to 900	663.8	MPX, SI-1M, and SI Series	+0 to +100, 10% to 90% Humidity	+32 to +212, 10% to 90% Humidity

INSTRUMENTED CHARPY IMPACT TESTING

Catalog Number	Description	Testing Standards	Capacity		Compatible Model	Temperature Range	
			J	ft - lb		°C	°F
W-3567-E	Charpy Striker, 2 mm Radius	ISO 148-1:2006, ISO 148-2:2008, ISO 148-3:2008, EN 10045-1:1990, AS 1544-2:2003, GOST 9454:197	89	20,000	MPX, SI-1M Series, and SI-Retrofit Systems	+10 to +38	+50 to +100
W-3567-H	Charpy Striker, 8 mm Radius	ASTM E23:2007. ISO 148-1:2006, ISO 148-2:2008, ISO 148-3:2008	13.3	3,000	Models SI-1A, SI-1B, SI-1D3, Light Pendulums	+10 to +38	+50 to +100
1 W-3567-F	Charpy Striker, 8 mm Radius	ASTM E23:2007. ISO 148-1:2006, ISO 148-2:2008, ISO 148-3:2008	89	20,000	MPX, SI-1M Series, and SI-Retrofit Systems	+10 to +38	+50 to +100

Notes:
1. W-3567-E, W-3567-H, W-3567-F require Impulse Software for Pendulum Impact

CHARPY ACCESSORIES



1

SPECIMEN SUPPORT SETS

	Catalog Number	Description	Accessory Width	Accessory Depth	Testing Standards	Compatible Model	Temperature Range	
			mm	mm			°C	°F
	W-3594	Charpy Subsize Specimen Support	2.5	10	ASTM E23:2007, ISO 148-1:2006, ISO 148-2:2008	MPX, SI-1M, and SI Series	+10 to +38	+50 to +100
	W-3595	Charpy Subsize Specimen Support	5	10	ASTM E23:2007, ISO 148-1:2006, ISO 148-2:2008	MPX, SI-1M, and SI Series	+10 to +38	+50 to +100
	W-3596	Charpy Subsize Specimen Support	7.5	10	ASTM E23:2007, ISO 148-1:2006, ISO 148-2:2008	MPX, SI-1M, and SI Series	+10 to +38	+50 to +100
1	W-3585	Charpy Standard Specimen Support	10	10	ASTM E23:2007, ISO 148-1:2006, ISO 148-2:2008, ISO 148-3:2008	MPX, SI-1M, and SI Series	+10 to +38	+50 to +100

IZOD ACCESSORIES



1



2

Accessories are available to convert the MPX or SI machines to perform Izod tests in addition to Charpy with a simple Izod conversion kit and Izod Striker.

TENSION IMPACT

Catalog Number	Description	Capacity		Compatible Model
		J	ft - lb	
W-3555-B	Adapter Set to Test Threaded Specimen, 9/16 - 12NC Specimen	406.7	300	SI-1 Series Only
W-3555-C	Adapter Set to Test Threaded Specimen, M14 x 2 Specimen	406.7	300	SI-1 Series Only

NON-INSTRUMENTED IZOD IMPACT TESTING

	Catalog Number	Description	Testing Standards	Capacity		Compatible Model	Temperature Range	
				J	ft - lb		°C	°F
1	W-3587-A	Izod Striker	ASTM E23:2016b	162.7	120	Model SI-1A/1B/1D3, Light Pendulums	+0 to +100, 10% to 90% Humidity	+32 to +212, 10% to 90% Humidity
2	W-3587-C	Charpy to Izod Conversion Kit	ASTM E23:2016b	162.7	120	Model SI-1A/1B/1D3, Light Pendulums	+0 to +100, 10% to 90% Humidity	+32 to +212, 10% to 90% Humidity
	W-3587-D	Specimen Tongs	ASTM E23:2016b	NA	NA	NA	+0 to +100, 10% to 90% Humidity	+32 to +212, 10% to 90% Humidity

GENERAL IMPACT ACCESSORIES



1



1



2



3

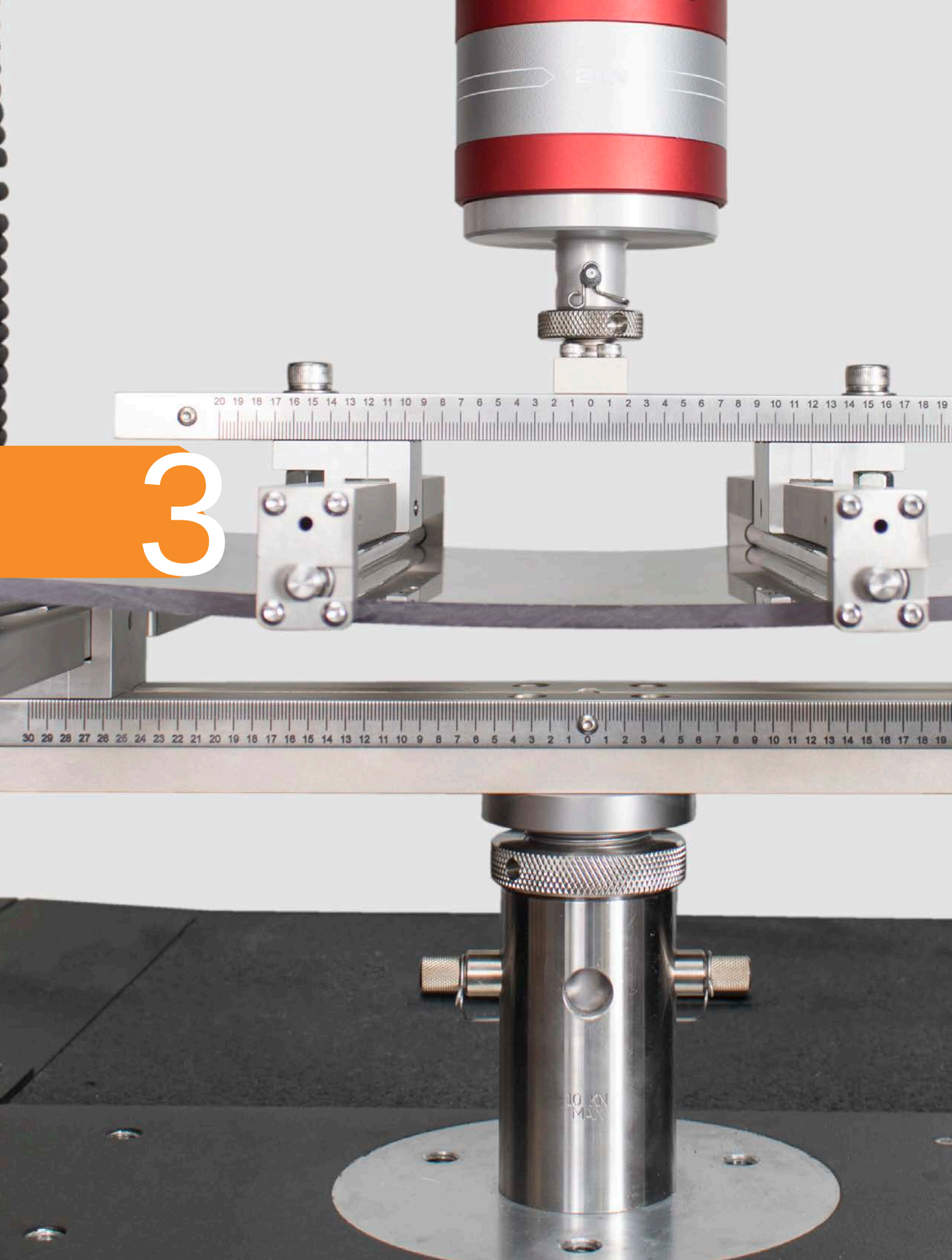
Instron® offers general impact testing accessories that assist with specimen preparation, handling and measurement. Additionally, foundation preparation templates and machine frame anchors for use when installing or relocating a floor model pendulum impact system.

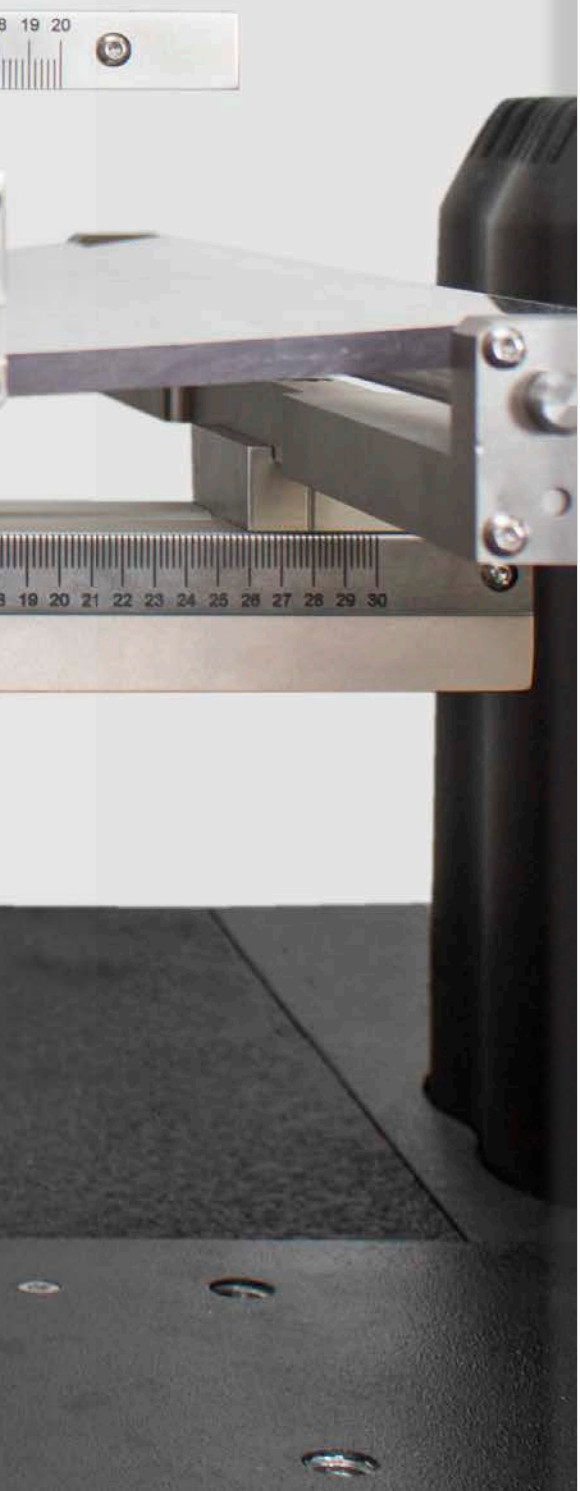
SPECIMEN HANDLING/CENTERING DEVICES

	Catalog Number	Description	Standards	Compatible Model
1	W-3550	Tongs to Insert Charpy Specimen at Low and Room Temperature	ASTM E23:2016b	MPX, SI-1M, and SI Series
	W-3587-D	Tongs to Insert Izod Specimen	-	MPX, SI-1M, and SI Series
	W-3558	Center Gauge to Position Charpy Anvil and Pendulum	-	MPX, SI-1M, and SI Series

GENERAL ACCESSORIES

	Catalog Number	Description	Standards	Capacity		Compatible Model
				J	ft - lb	
	W-3561	Lateral Expansion Gage	ASTM A370	-	-	Any Charpy Impact Tester
1	W-3551	V-Notch Carbide-Tipped Milling Cutter, 1-Inch Bore	ASTM E23:2016b	-	-	Any Charpy Impact Tester
2	W-3577	Hammer Hoist Kit to lift Hammer safely	-	-	-	MPX-V2
	W-3572-D	Foundation Template	-	-	-	MPX-V2
	W-3572-B	Set of (4) J-Bolts	-	-	-	MPX-V2, (2) J-Bolts required for >= 600 J
3	W-3573	Set of (4) J-Bolts	-	-	-	SI
	W-3598-A	Room Temperature Charpy Specimen Loader	-	-	-	MPX-V2
	W-3576-A	300 J Hammer Weights	-	Up to 300	221.27	MPX-V2
	W-3576-B	450 J Hammer Weights	-	Up to 450	331.9	MPX-V2
	W-3576-C	600 J Hammer Weights	-	Up to 600	442.54	MPX-V2
	W-3576-D	750 J Hammer Weights	-	Up to 750	553.17	MPX-V2


3



ENGINEERED SOLUTIONS

The huge variety of materials and testing applications means that we are frequently required to design special solutions to meet unique testing needs.

If our standard products do not meet your requirements, a team of highly-skilled and experienced engineers is available to design and produce solutions to your specific problems. Whether you need a special jaw face or a furnace system for high temperatures, you will find that we have the experience and resources to do the job to your requirements and expectations.

Our experience in the specification and manufacture of engineered solutions means we can help you solve problems quicker and easier than trying to do the job yourself or sub-contracting it to someone with less knowledge. You will have the security of dealing with an ISO 9001:2000 accredited company that offers full warranty and after sales support for your investment.

In the following section you will see just some of the hundreds of engineered solutions we have developed for our customers worldwide, combining advanced engineering with more than 60 years of materials testing experience.

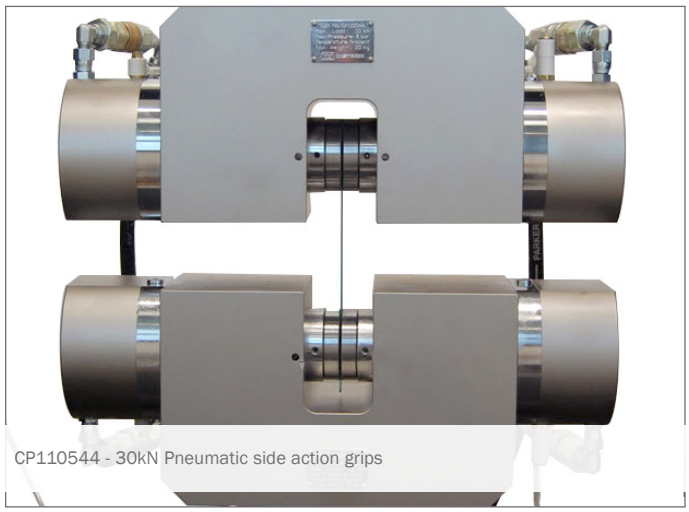
3.1	Grips and Fixtures	329-333
3.2	Environmental Chambers and Furnaces	334
3.3	Systems for Special Applications	335-336

GRIPS AND FIXTURES

The infinite variety of materials, specimens and applications together with the continual advance of materials science puts an even greater demand on grips and fixtures. If our current range of standard products does not meet your needs, you can rely on our specialists to provide a solution.



Cup Peel Fixture and grip



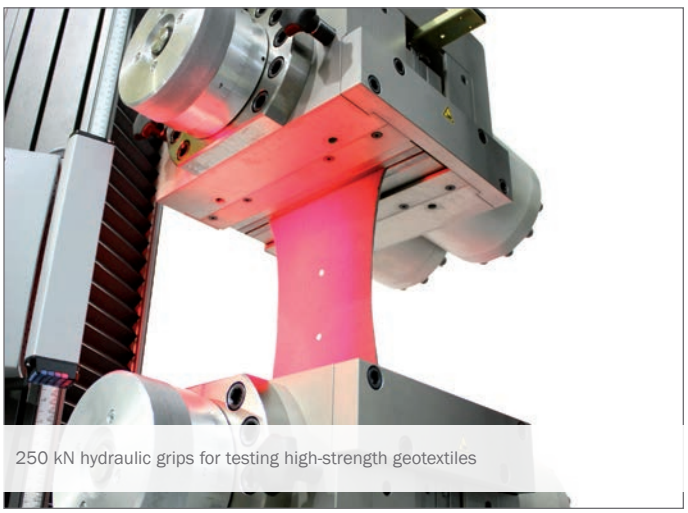
CP110544 - 30kN Pneumatic side action grips



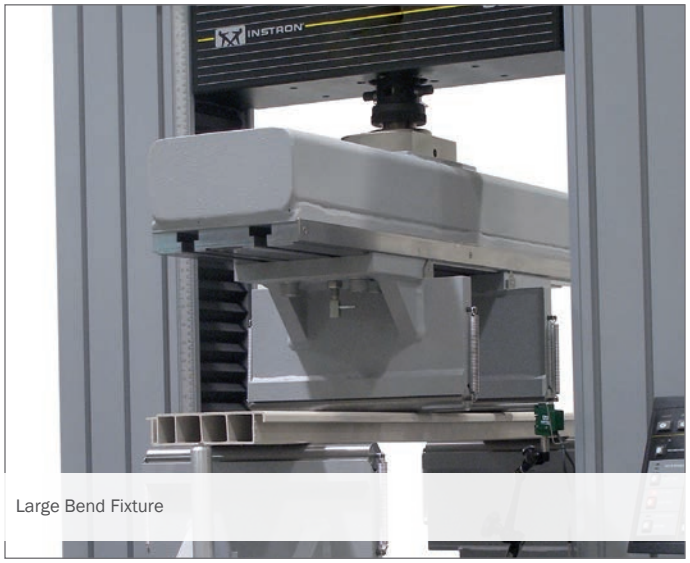
Extended Temperature 1kN Mini Wedge Grips



High Temp O-ring Fixture for tensile test of o-rings



250 kN hydraulic grips for testing high-strength geotextiles



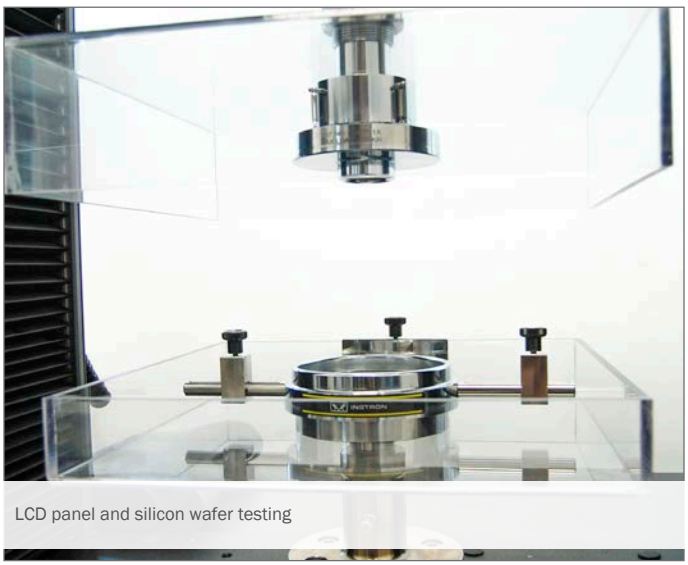
Large Bend Fixture



CP101960 - Comb fixture used for evaluating haircare products



Hydraulic clamping fixture for static puncture and cone drop testing of geotextiles



LCD panel and silicon wafer testing

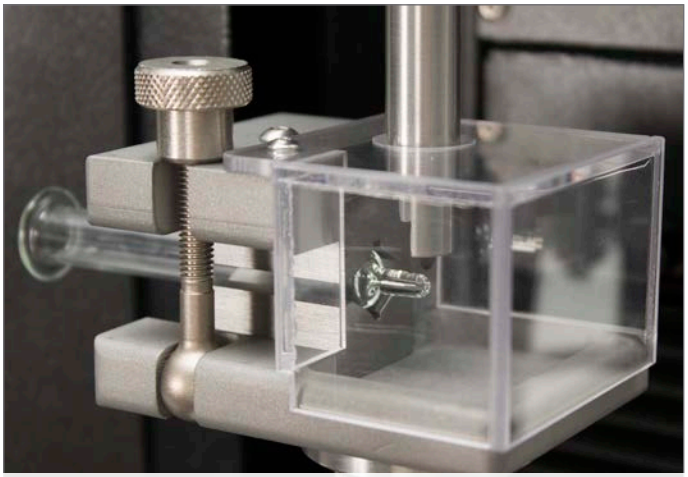


CP122566 - Component Test Plate and Crosshead Extension for single column frames.

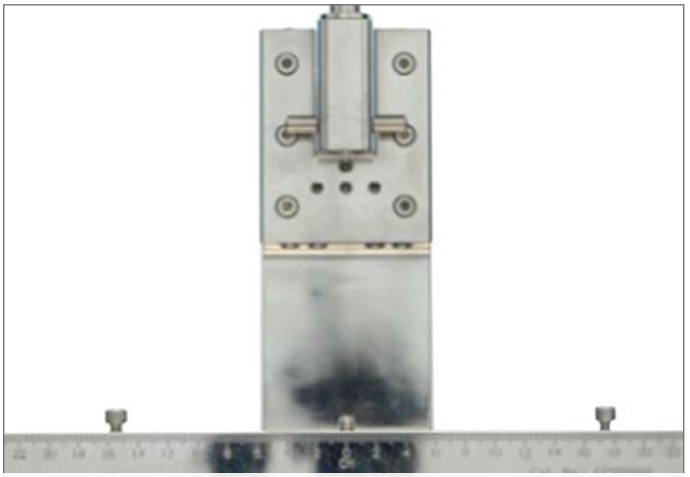


Hydraulic side action grips for tests on large diameter seven-strand wire rope

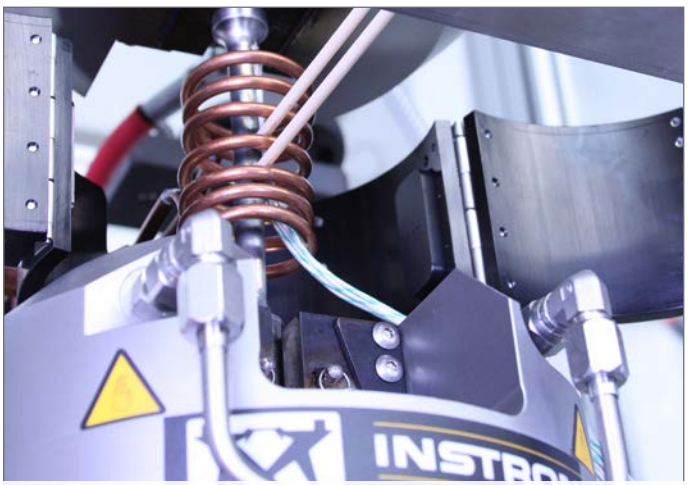
GRIPS AND FIXTURES



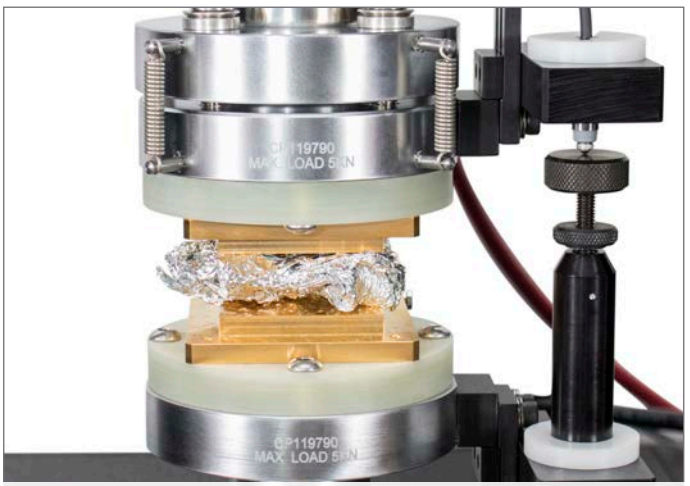
ISO 11040-4 glass syringe fixture



Flexural & Interlaminar Shear (ILSS) Fixture for composites testing



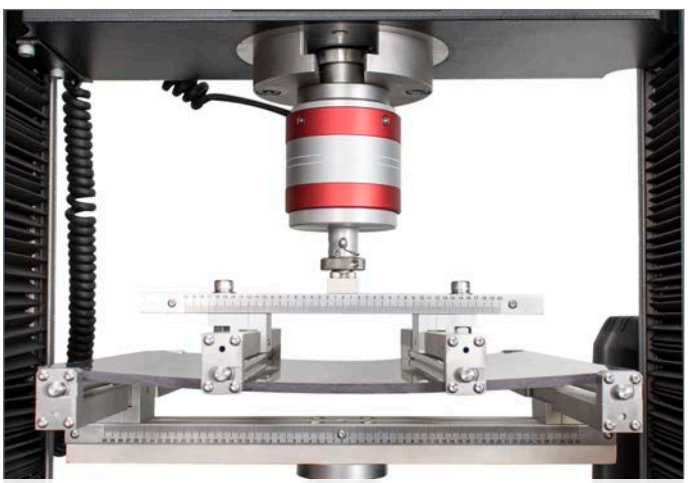
Thermo-Mechanical Fatigue (TMF) grips with induction heater and extensometer



CP119790 - Platens with Integrated Resistance Measurement



2000kN Single Side-Acting grips

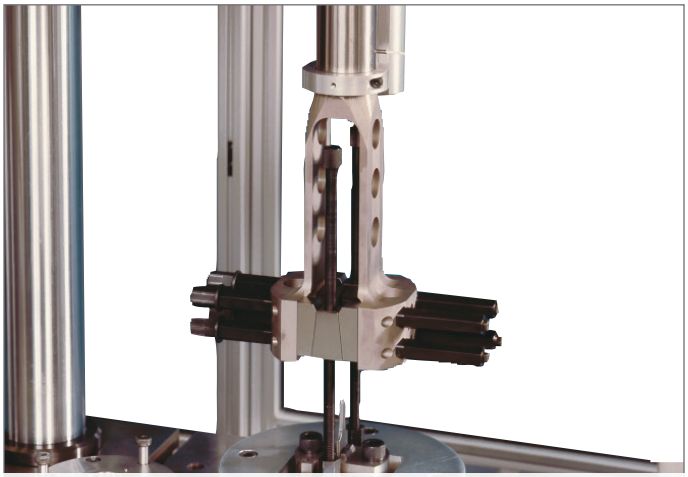


CP117856 - 4 point bend fixture for glass testing

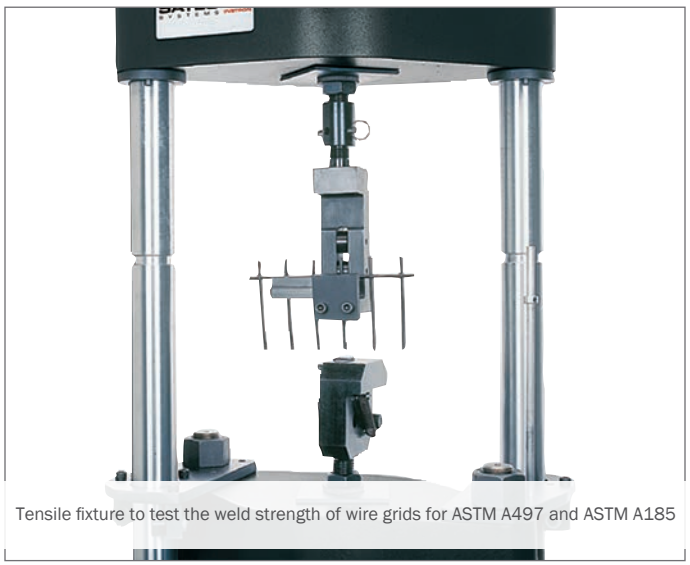
GRIPS AND FIXTURES



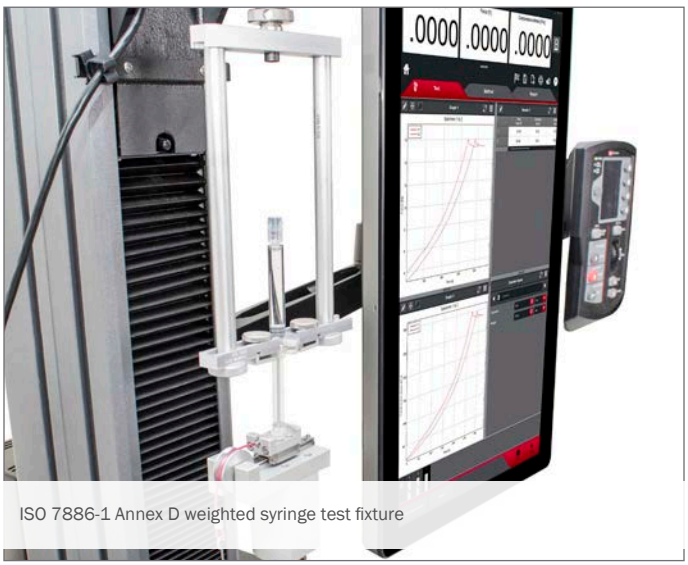
Extended hydraulic wedge grips extending into an Environmental Chamber



Fast jaw grips, puncture probe and Charpy fixture for use with high-rate testing systems



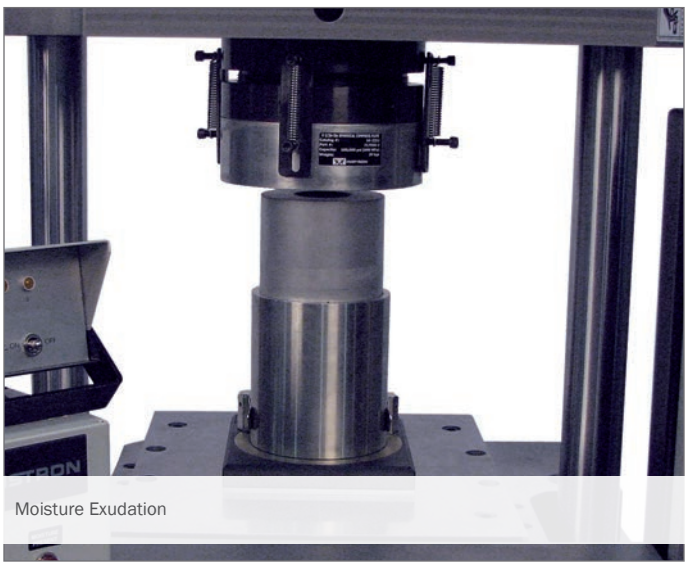
Tensile fixture to test the weld strength of wire grids for ASTM A497 and ASTM A185



ISO 7886-1 Annex D weighted syringe test fixture



ISO 11040-4 needle penetration puncture fixture

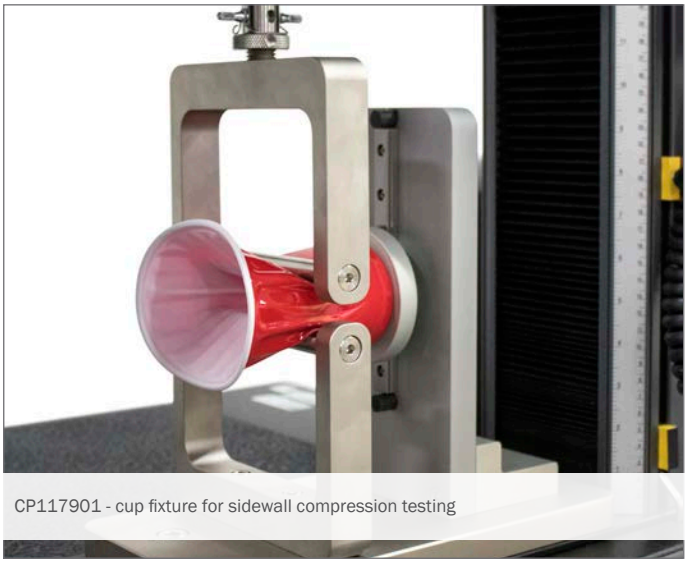


Moisture Exudation

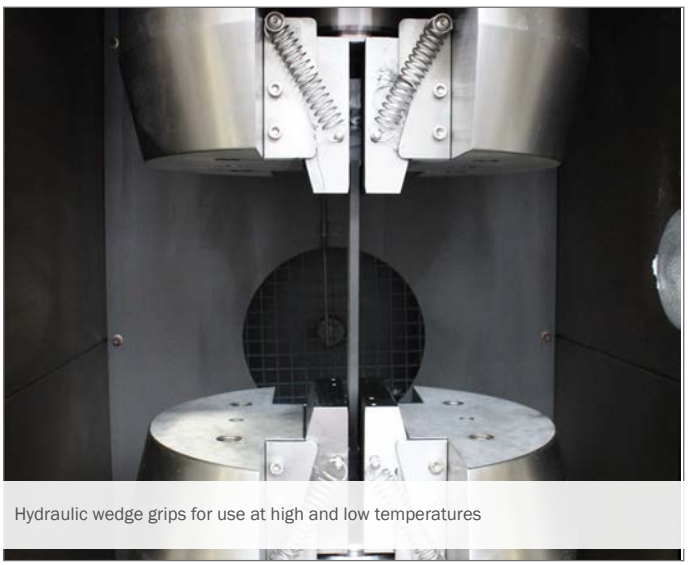
GRIPS AND FIXTURES



Large fastener holders used for fatigue testing of aerospace fasteners



CP117901 - cup fixture for sidewall compression testing



Hydraulic wedge grips for use at high and low temperatures



CP119733 - Integrated wedge for pneumatic grip belt and woven material testing



CP122690 Terminal Strength Shear Fixture



CP120173 - O-ring flexibility fixture

ENVIRONMENTAL CHAMBERS AND FURNACES

Instron® has been at the forefront of environmental testing for many years. Our engineering team ensures that grips, pull rods, and extensometers are available to provide a complete solution to your environmental testing needs.



Short environmental chamber



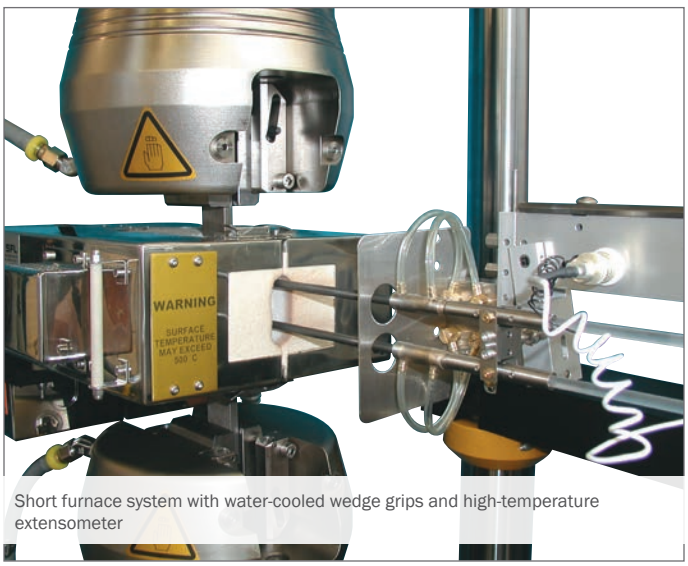
Induction heating furnace system



CP118099 - Refrigerated BioBox for single column frames



Three-zone furnace for general purpose materials testing



Short furnace system with water-cooled wedge grips and high-temperature extensometer

SYSTEMS FOR SPECIAL APPLICATIONS

Sometimes an application is so unique that even the testing machine itself is specially designed. With our depth of knowledge and application experience, Instron® is perfectly positioned to take on these demanding projects.



Standalone Dual Axis Specimen Measurement Device for width and thickness measurement into Bluehill Software



Extra-height, extra-wide static testing system with large table for tests on components



CP1942K- Multi-load string static testing system with temperature chamber

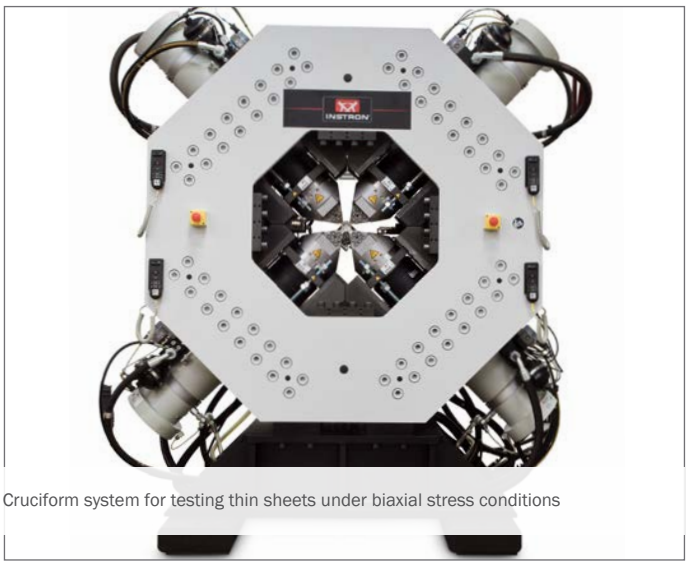


Large sheet specimen tensile testing system

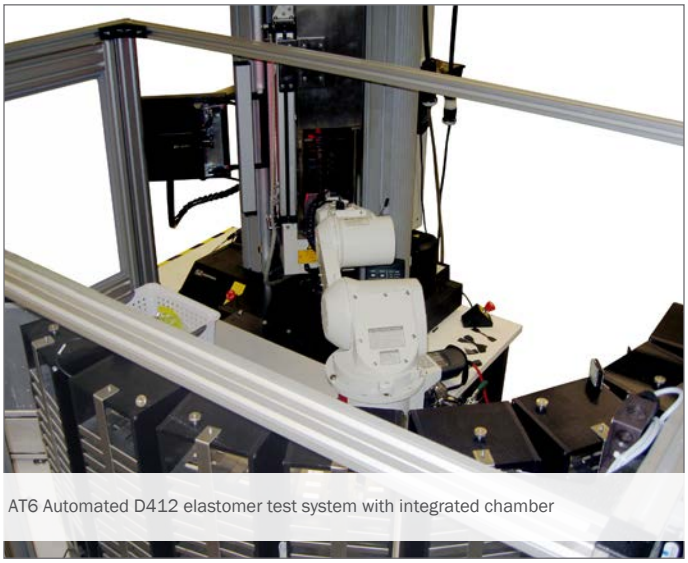


CP111021 - Extended height BioBath for ElectroMechanical frame for testing biological tissues

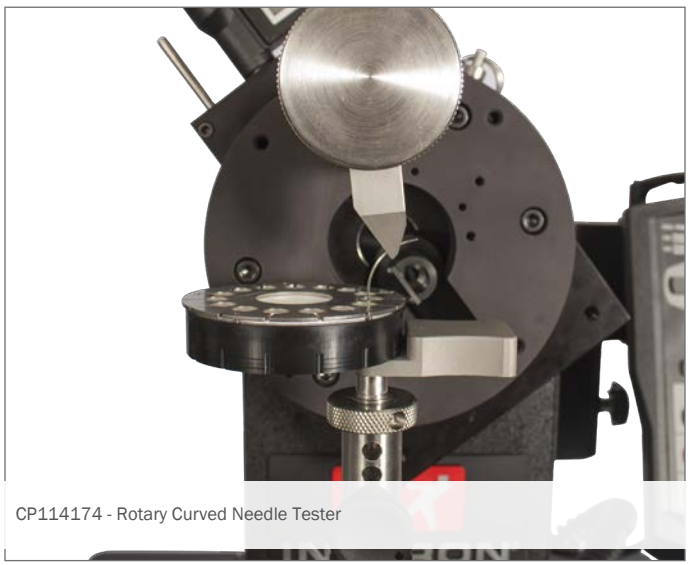
SYSTEMS FOR SPECIAL APPLICATIONS



Cruciform system for testing thin sheets under biaxial stress conditions



AT6 Automated D412 elastomer test system with integrated chamber



CP114174 - Rotary Curved Needle Tester



CP120718 - Metal Safety Enclosure for containment of material after high strength break



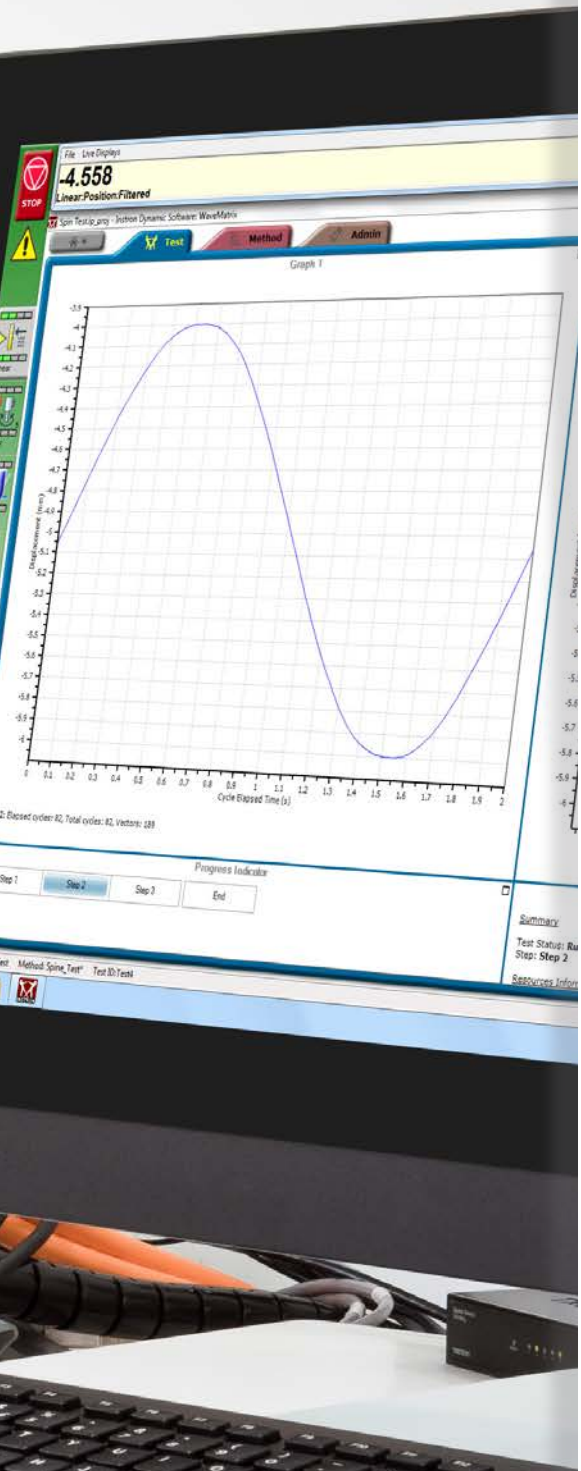
Fretting Fatigue Test System



MT10 - Torsion Tester



4



APPLICATION OVERVIEWS

This section provides information about some common applications, along with suggestions about which accessories are most appropriate. With such a huge variety of applications, we are not able to cover everything, so please contact us with specific questions if you cannot find the answer in this section of the catalog.

For more up-to-date information on your specific application, visit Testing Solutions at www.instron.com.

4.1	Plastics	339-340
4.2	Elastomers	341-342
4.3	Textiles	343-344
4.4	Composites	345-347
4.5	Adhesives	348-349
4.6	Metals	350-352
4.7	Biomedical	353-355
4.8	Electronics	356-358

PLASTICS



Polymers are utilized in virtually every facet of human activity and industry - from packaging to automotive, electronics to healthcare, and construction to aerospace. The list is endless. Replacement of traditional materials such as metals with polymers is largely due to the cost-effectiveness and many superior attributes of plastic. The electrical insulation, color, strength, and high-speed molding qualities have made plastics well-suited for electrical appliances ranging from handheld mixers and hair dryers to power tools and automotive components. The aircraft and aerospace industries have made wide use of engineering plastics in structural parts and components in windows, panels and other applications.

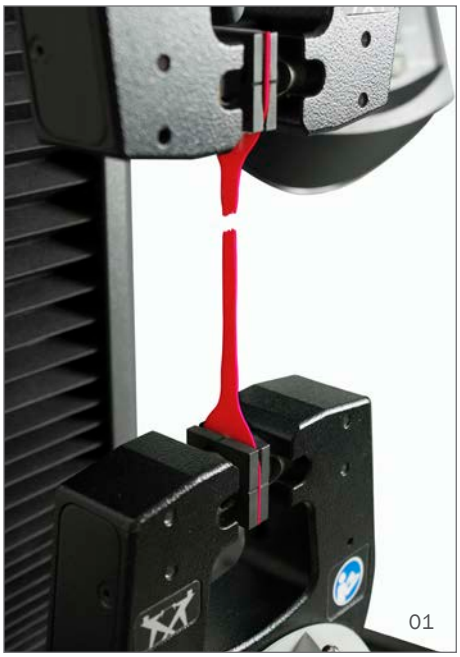
Mechanical characterization of the properties of plastics and polymers is critical in the development of materials and manufacturing processes, as well as for quality control. Since the properties of polymers are greatly affected by temperature, testing must be done at high and low temperatures to simulate end-use conditions. Tensile, bend/flexure, compression, fatigue, puncture, shear, and impact/high-rate tests are commonly used.

Instron® provides a range of grips, fixtures, accessories and environmental chambers suitable for rigid, semi-rigid and flexible thermoplastics, thermosetting plastics, films, laminates, foams, and finished components.

01 2712-041 pneumatic side-action grips

02 2630-100 Series clip-on extensometer with 2716-010 mechanical wedge-action grips

03 Bluehill® Universal static testing software







Grips and Fixtures

Tension testing can be accomplished with 2710 Series screw action, 2712 Series pneumatic action or 2716 Series wedge action tensile grips. For most rigid plastics, serrated jaw faces work effectively. For softer materials, we recommend rubber-coated jaw faces. Plastic film may also be tested using line contact jaw faces or the specially developed 2713-006 thin film grips.

Bend and flexure tests may be performed using 2810 Series flexure fixtures. Three or four-point configurations are available. For accurate center point deflection measurement, we suggest using the optional deflectometers.

Compression anvils and platens are available in a range of sizes and designs including optional spherical seatings for optimum alignment. Deflectometers can also be used in conjunction with compression anvils to provide accurate strain measurement.

Extensometry

Extensometers are frequently used in tensile testing of plastics. Rigid or semi-rigid materials can use 2630 or 2620 Series clip-on extensometers and our 2630-123 extensometer features a 75mm gauge length in accordance with ISO 527-2. Materials showing elongations over 100% can use the 2603 Series long travel extensometer, AutoX750, AVE 2, or SVE2. The 2665-750 Automatic extensometer is an ideal solution for meeting the requirements of ISO 527 and ISO 178 for rigid, semi-rigid and high elongation polymers. In non-contact strain measurement applications, where the specimen is too fragile for contacting methods or is in an environmental chamber, the Advanced Video Extensometer 2 (AVE 2) or Standard Video Extensometer 2 (SVE 2) are an ideal choice.

Environmental

Testing at non-ambient temperatures is readily achieved using 3119 Series environmental chambers. Pull rods, push rods and a range of suitable high/low temperature grips, such as 2732 Series pneumatic and 2736 Series wedge tensile grips, are available.

Software

Software for static testing of plastics is provided by Bluehill Universal or Bluehill LE. Fatigue tests can be performed using dynamic software programs, such as WaveMatrix™.

ELASTOMERS



Elastomers are used in varying applications from automotive in the form of tires, to household applications, gloves for example. However, there are many others, including hoses, drive belts, seals, building products, anti-vibration mountings, medical products and leisure goods. They range from natural latex rubber to highly-engineered synthetic materials for critical engineering applications.

Elastomers typically show characteristics of high elongation, energy absorption, and can experience violent failures. Mechanical characterization of the properties of elastomers is critical in the development of materials and manufacturing processes, as well as for quality control. Since the properties of elastomers are greatly affected by temperature, testing must be done at high and low temperatures to simulate end-use conditions.

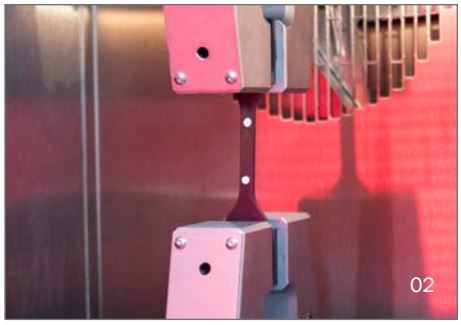
Common tests include tensile, compression, tear, peel, rheology and adhesion. Instron® provides a range of grips, fixtures, accessories and environmental chambers suitable for tests on suitable for all varying types of applications.

01 Long travel extensometer with 2713-002 self-tightening roller grips

02 High-temperature pneumatic grips in a chamber using AVE2 video extensometer

03 AVE2 video extensometer for non-contacting strain measurement in a chamber







Grips and Fixtures

When performing a tensile test on elastomers, maintaining clamping force is important to prevent slippage during the test to accommodate the materials thickness shrinkage during elongation. Instron's 2712 Series pneumatic grips maintain a constant gripping force and accommodate any reduction in specimen thickness during testing. The gripping force itself can be selected by regulating the pneumatic pressure. 2713 Series self-tightening or 2713-006 thin film grips are also an excellent choice for elastomers, including very thin materials such as latex. Special fixtures are available for testing elastomeric o-rings. The 2717 Series o-ring test fixture rotates the specimen to avoid local stress concentrations while tension is applied. Elastomeric foams can be tested in tension using 2710 screw action or 2712 Series pneumatic grips or in compression with 2501 Series compression accessories. The 2810-130 foam compression fixture is specially designed to test elastomeric foams and features a self-aligning upper compression plate and perforated lower plate to allow air to be dissipated during testing.

Extensometry

Strain measurement is often accomplished with crosshead travel, but this is less accurate due to elongation in the specimen tab ends as well as machine compliance. A more accurate method is to use a 2603 Series long travel extensometer, which provides direct strain measurement. For delicate specimens, the 2663 Series AVE 2 and SVE 2 video extensometers provide non-contacting strain measurement over a wide range of strains and are ideal for use at high or low temperatures in conjunction with 3119 Series environmental chambers.

Environmental

3119 series environmental chambers testing at non-ambient temperatures and can be coupled with a wide range of accessories. Pull rods, push rods and a range of suitable high and low temperature grips, such as 2732 Series pneumatic grips, are available.

Software

Software for static testing of elastomeric materials is provided by Bluehill® Universal or Bluehill LE Software.

TEXTILES



The textile industry manufactures fabrics, cords, yarns and individual fibers, all of which may be either natural or synthetic materials. Testing of textile properties is widely used to determine tenacity, elongation, tensile strength, and many other parameters. Many test specifications relate to the end use, including the testing of tire cord for strength and adhesion, grab tests, fabric seam slippage, tear, and puncture tests.

Standardization of test methods is well established in the textile industry, with specifications requiring control of parameters including temperature and humidity. Some standards cover a range of parameters including breaking load, elongation, single strand strength, knot breaking strength, loop breaking strength, and tenacity.

A wide range of forces can be experienced in testing textiles, from small single fibers measuring only a few grams to high strength webbing and geotextiles made from industrial fibers. The sensitivity of many textiles to gripping techniques has resulted in a large variety of grips and fixtures designed specifically for tensile testing certain types of textiles. New high-strength industrial fibers such as aramids present particular challenges in achieving consistent gripping without slippage or inducing jaw breaks. Incorporation of elastomeric fibers into clothing has resulted in the need to test the relaxation properties of these materials on a routine basis for both development and quality control.

Although a seemingly simple material, applications for advanced textiles continue to expand. Automotive, civil engineering, and biomedical industries have all benefited from new textile technologies such as airbags, geotextiles, sutures, and wound dressings.

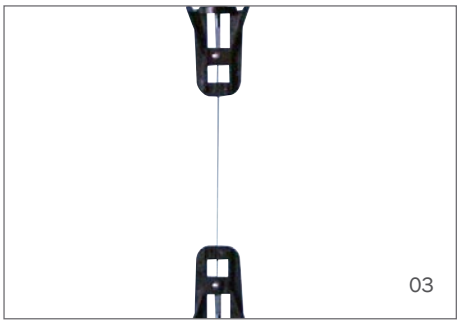
01 CP108121 webbing capstan grips

02 2714-040 Cord and yarn grips

03 2711 Series lever-action fiber grips


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Grips and Fixtures

Woven textiles are commonly tensile tested using 2710 series screw-action grips or 2712 series pneumatic side action tensile grips. Rubber-coated jaw faces are usually suitable for all types of textiles testing. Higher strength textiles such as coated geotextiles may require wave profile faces to prevent slippage. Elasticated fabrics like those containing elastanes can be tensile tested with 2712 series pneumatic tensile grips (often using line contact jaw faces) or with special fabric loop grips to ASTM D4964 and D8775. Fibers can be tested using 2712-05X series pneumatic action tensile grips, which are designed for small specimens. Also available for longer fibers are the 2711 series o-ring fiber clamps.

Cords and yarns generally cannot be tested with simple side action pneumatic grips because of their sensitivity to local clamping forces. Specially designed 2714 series pneumatic cord and yarn tensile grips provide a gradual increase in gripping force over a polished and specially contoured surface and are ideal for textile cords and yarns. Aramid yarns can be problematic because of their high tensile strength and slippery coating. 2714-032 aramid yarn tensile grips and 2714-040 grips with 2712-043 aramid clamping blocks have a different contour and surface finish to minimize jaw breaks when testing aramids and similar high strength textiles.

Cords, thicker yarns, and webbing can be tested using 2715 Series capstan tensile grips. These are available in various force capacities and capstan forms according to the application. Burst tests are sometimes used to evaluate coated or knitted fabrics, and the 2810-195 compression ball burst fixture has been designed to meet ASTM D378 and ASTM D6797.

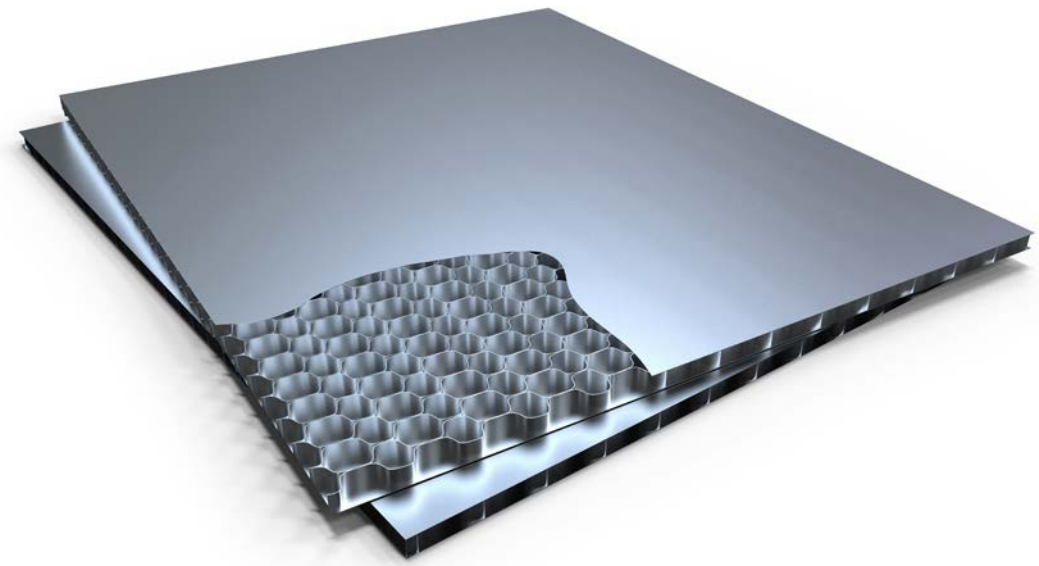
Extensometry

Extensometry is not generally used in textiles applications. However, the 2663 Series AVE 2 and SVE 2 offer non-contact measurement possibilities for yarns, fibers, and wovens where traditional contact extensometers fail. Video extensometry has also been used with success in evaluating geotextiles.

Software

Software for static textiles testing is accomplished with Bluehill® Universal or Bluehill LE, and fatigue tests can be performed using dynamic software programs such as WaveMatrix™.

COMPOSITES



Composite materials are composed of two or more distinct phases, usually a reinforcing fiber within a binder or matrix. The concept of increasing strength and toughness by adding fibers to binders is very old; mud bricks containing straw or animal hair are among the first examples. However, it is only relatively recent that composites as we currently recognize them have become widely used. Today, fiber-reinforced composites are at the heart of the materials revolution.

Composites have advantages of design flexibility, high stiffness and strength, low weight and cost savings. One unique attribute of these materials is that the properties can be selected by the design engineer to suit the component and application. For example, some proportion of the fibers can be oriented in the direction of principle load on the component, while others can be configured to carry shear and off-axis loads. Cost and weight savings can often be achieved by replacing several parts made from conventional materials with a single composite component.

Testing composites requires the greatest possible attention to test conditions, grips, fixtures and specimen preparation if meaningful results are to be obtained. Despite being a relatively new technology, the level of standardization is high, and a number of specialized tests are used to determine parameters such as inter-laminar shear strength, compressive strength after impact, and peel strength.

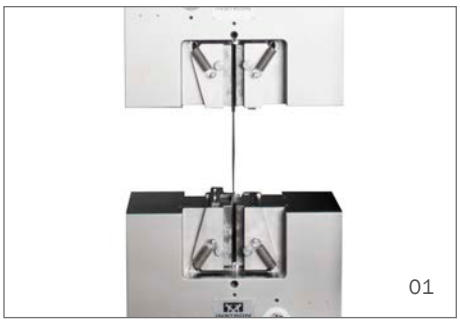
Although the most common composites are based on polymer matrices, the use of fiber-reinforcement in metals and ceramics is being actively developed for a host of applications in the aerospace, power generation and biomedical industries.

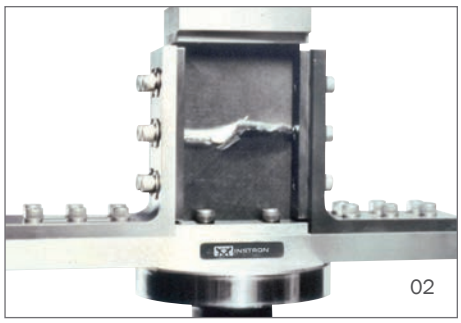
01 2716-030 Precision manual wedge grips

02 CP103712 Compression after impact fixture

03 2650-561 Biaxial clip-on extensometer

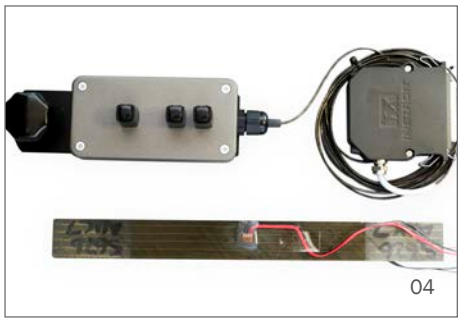
04 2210-892 Strain gauge adaptor


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Grips and Fixtures

Composites specimens are extremely susceptible to misalignment in the load string as well as improper gripping, both potentially causing a reduction in material properties. Considerable care should be taken in specimen preparation and the load string should be optimized to produce repeatable results. Tensile tests require proper loadstring alignment to avoid bending, and 2716 028/-030 Precision Manual Wedge Grips or 2742/2743 Series Hydraulic Wedge Grips are recommended as they are approved for meeting Nadcap standards. Composite materials often require special fixturing and a full range of composite test fixtures are shown in Section 2.1 which includes devices for tension, compression, shear, flex, and peel according to all the major standards.

Alignment

Alignment is critical when testing composites. Instron® testing machines use precision guidance columns along with adjustable AlignPRO™ alignment fixtures to meet and maintain the highest levels of alignment demanded by the aerospace industry. The Instron alignment system improves the accuracy of test data by ensuring that the load string is correctly aligned under load and consists of the AlignPRO fixture, a strain gauged alignment specimen (fitted with 8 or 12 gauges), and dedicated AlignPRO software. The fixture allows the load cell and grip assembly to be aligned quickly and precisely while allowing both concentric and angular misalignment to be adjusted. The software monitors the output from the strain gauges mounted on either flat or round alignments cells and identifies which adjustments are required; displaying in real time the effect of the adjustments, enabling accurate machine setup in minutes.

Extensometry

Extensometry is used extensively used for composites due to their need for precise strain measurement. Historically, composite specimens are tested using applied strain gages, and strain gauge adapter boxes allow for the seamless strain measurement in Bluehill® Software from a standard gage. 2620 and 2630 Series Clip-On Extensometers can be used for measuring modulus before failure. 2650 Series Averaging Extensometers are designed to minimize bending errors on thin laminates. The determination of Poisson's Ratio requires the simultaneous monitoring of axial and transverse strain. The very small deformations require very high accuracy devices. 2650-500 Series Bi-axial extensometers measure both axial and transverse directions on both sides of the specimen and automatically average each side to offset any bending errors. Non-contacting solutions such as the AVE are especially effective at measuring strain until failure on specimens which exhibit high energy breaks. The monitoring of multiple strain gauges on a specimen or structure can be achieved via special multi-channel data acquisition units, such as the 2210-920 Expansion Channel Module for 5900 Series systems.

COMPOSITES



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01 3119-610 environmental chamber with CP104947 100 kN extended hydraulic grips

02 Bluehill® Universal

Environmental

Testing under conditions of high or low temperatures is a common requirement in evaluating composite materials. The 3119 Series Environmental Chambers offer a range of sizes and temperature ranges to suit a wide variety of requirements.

Software

Static tests on composites are performed by Bluehill Universal or Bluehill LE software. Bluehill Universal and Bluehill LE are available with a number of pre-configured test methods for composites testing, including:Airbus AITM 1-0005 (Issue 2 June 1994), AITM 1-0007 (Issue 3 Dec 2004), AITM 1-0010 (Issue 3 October 2005), ASTM C365-05, ASTM C1358-05, ASTM D2344-00, ASTM D3039-08, ASTM D3846-08, ASTM D4018-99, ASTM D5766-07, ASTM D7137-07, EN 2563 (1997), ISO 527-4 (1997) & ISO 527-5 (1997), ISO 14125:1998, ISO 14129:1997, ISO 14130:1997 Fatigue tests can be performed using dynamic software programs, such as WaveMatrix™.

ADHESIVES

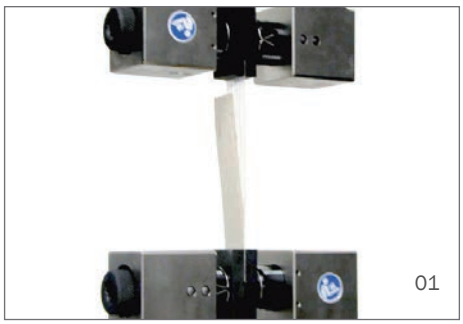


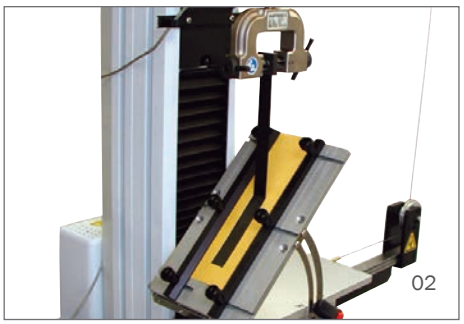


Adhesives play an increasingly important role in modern life and are frequently found as replacements for more traditional methods of joining materials such as riveting, crimping and welding. Adhesive joints offer improved performance in a multitude of applications including automotive, aerospace, packaging and biomedical. From pressure-sensitive tapes to high-strength resin systems, the performance of adhesives is constantly being evaluated using materials testing systems. Apart from tensile and shear tests such as tack and lap-shear, the peel strength properties of adhesives are of great importance. Tape manufacturers, for example, use 90°, 180°and rotating wheel peel tests. Specialized peel tests, such as the climbing drum method, are used to characterize the honeycomb paneling used in aerospace applications. The peel test produces a rapidly alternating force as ligaments of adhesive are stretched and then fail. The capture and interpretation of such characteristics requires great care in the design of the test instrument and analysis software in order to ensure meaningful data. Stiff and responsive load cells, high bandwidth electronics and high data acquisition rates are all important factors in peel testing adhesives.

As adhesives find their way into ever more arduous applications, the need to understand their fatigue behavior increases as does the need to understand their short and long-term response to differing environmental conditions.

ADHESIVES


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01 Peel test on tape using 2710 Series screw action grips

02 2820-036 Variable angle peel fixture with screw-action grip (upper)

03 3119-600 Series environmental chamber

04 Bluehill® Universal static testing software

Grips and Fixtures

The strength properties of adhesives are important and a variety of techniques are employed to test them. From seals that are intended to fail predictably and repeatably such as in packaging, to ultra high strength bonded structures in automotive and aerospace applications, Instron® has a range of grips and fixtures to assess the strength and peel resistance of adhesives.

Tensile tests on lap-shear specimens are commonly performed using 2710 Series screw action grips as the dual-acting design allows for an adjustable offset.

Adhesive properties are often determined using a variety of peel fixtures such as 90°, variable angle and rotating wheel. These are ideal for testing adhesive tapes of various types. The adhesion of printed circuit board foils can be determined using the 2820-101/-102 floating roller fixture, which are ideal for peeling flexible laminates from a rigid substrate.

Special fixtures for testing adhesives in wood, composites and microelectronics applications are also available. Wood test fixtures include devices for measuring the shear strength of adhesives used for timber. The climbing drum peel fixture for composites is available for both flexible and rigid substrates. Miniature peel fixtures are designed for very small specimens and low forces.

Fatigue tests on adhesive joints can usually be performed using grips from our standard range of general purpose fatigue grips.

Environmental

Adhesives are often tested under various environmental conditions. The Instron range of environmental chambers covers a wide range of conditions including high and low temperatures.

Software

Peel tests require analysis of the complex force displacement curve. Bluehill Universal or Bluehill LE software programs contain a large number of control and analysis options relating specifically to peel test. Fatigue tests can be performed using dynamic software programs, such as WaveMatrix™.

METALS



Common tests for metals and metallic alloys are tensile, shear, bend, impact, torsion, fatigue, as well as fracture properties. Metals testing is one of the most commonly testing materials for both electromechanical and servohydraulic systems, with materials as diverse as fine gold wire for microelectronics to steel reinforcing bar for the construction industry. Tensile tests are performed on a huge variety of metallic materials including wire, foil, sheet, plate, bar, tube, and fasteners.

Typical tensile properties that need to be determined include modulus, yield strength, elastic and plastic strain, tensile strength, and break elongation. The strain-hardening behavior of metal sheet is of major importance to manufacturers of material used for deep drawing or pressing components, such as car bodies, where strain hardening exponent (n-value) are an indicator to materials performance in these end applications. Similarly the plastic strain ratio (r-value) is an important indicator for how much reduction in the materials area when subjected to a tensile load, which requires axial and transverse extensometers.

To make metal production cost effective, it is optimal during high production, which in turn requires a large volume of testing to be performed in order to ship material. Efficiency of completing the required tests is therefore paramount for metals producers. Instron®'s advanced software, as well as automated accessories can help to provide significant throughput gains. Alternatively to fully optimize testing lab output, Instron offers fully robotic testing systems which can allow unattended operation over extended periods.

The crucial importance of fatigue and fracture behavior in applications, such as rotating shafts, axles and aircraft components, has resulted in the widespread use of dynamic tests in which forces are cycled many times to evaluate the performance of materials and components over long periods. High cycle fatigue, fracture toughness, Low Cycle Fatigue (LCF) and specialist tests, such as Thermo-Mechanical Fatigue (TMF), are frequently performed. In many cases these tests are also required to be under non-ambient temperatures with furnaces, environmental chambers and cryostats integrated into the testing system.

Instron metals testing solutions comply with the requirements for all major testing standards (ASTM, ISO, GB, JIS, BS, etc.). In addition, Instron actively participate in standards committees and are continually trying to improve the development of those standards.

METALS


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01 DuraSync Side-Acting Grips for Curved Specimens

02 AutoX Biax Extensometer Testing Sheet Metal for “r” and “n”

03 AutoX Automatic Extensometer for Rebar Testing

04 Clip on Transverse Extensometer

Grips and Fixtures

Wedge grips are the most commonly used grip type for metals testing. These can vary in how they perform, the industrial series DX/HDX testing systems can feature manual or hydraulic wedge grips built into the crosshead. Alternatively manual, pneumatic and hydraulic wedge grips are available in a range of capacities up to 2000 kN.

For some applications it may be beneficial to use hydraulic side acting grips, Instron® DuraSync™ grips provide reliable clamping with repeatable alignment with a patented mechanical linkage that protects the grips from damage experienced from side load due to bent, bowed or curve specimens.

Thin wires and foils can often be successfully tested using 2712 Series pneumatic and 2710 screw action tensile grips with smooth faces. Special grips are available for braided wires including 2714-010 wire tire cord grips, 2715 Series wire capstan grips, single and double side-acting grips with wire strand inserts and the SG series of wire and cable snubbing grips. For threaded or buttonhead specimens, 2717 Series, W-5158/ W5159 shoulder end holders and W-5102 threaded end holders can be used.

Fatigue tests on metals can be performed using a variety of pre-loaded mechanical and hydraulic grips:

- 2742-301 30 kN hydraulic wedge grips are ideal fatigue tests on smaller specimens as well as for r&n tests on sheet metals
- 2742 and 2743 Series mechanical and hydraulic wedge grips provide full reverse-loading capability with a wide range of jaw face types and sizes including carbide-coated

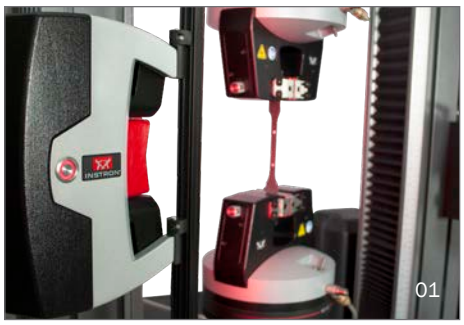
Fracture mechanics tests on CT specimens are readily performed with 2750 Series clevis grips. 2810 Series bend fixtures are ideal for fracture mechanics testing on bend specimens.

01 Sheet Metal Test with Pneumatic Grips and AVE Extensometer

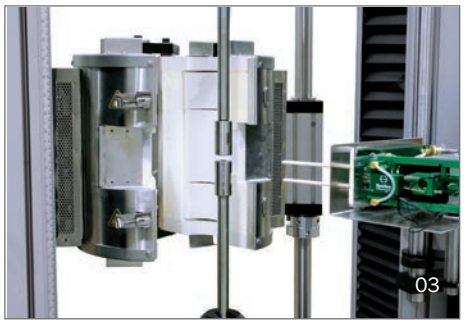
02 Hydraulic Wedge Grip and AutoX Extensometer used to Test Rebar

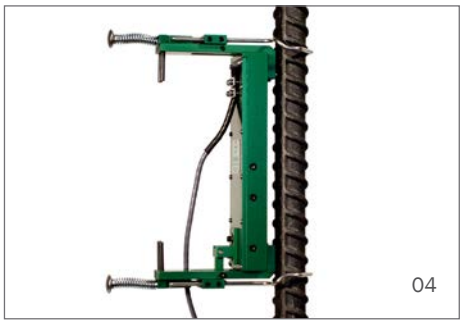
03 Split Furnance and Side Entry Extensometer to perform non-ambient testing

04 Long Travel Clip-on Extensometer for Rebar Testing


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Extensometry

Strain measurement is critical when testing metals as the compliance of the load string will influence the extension measured from the crosshead movement. There are varying gauge lengths required for different standards, and different elongations required depending on the material type. Instron® T1M, T3M and 2630 Series clip-on extensometers are ideal for metals testing providing accurate and stable strain data.

2663 AVE video extensometers provide a non-contacting solution for static metals testing including the ablilty to measure transverse strain for plastic strain ratio (r-value) determination.

Automatic contacting extensometers such as the 2665-750 AutoX750 provide fully automatic strain measurement as well as direct control of strain rate in accordance with ISO 6892-1 Method A1 on suitable systems. Repeatability, productivity, flexibility and ease of use are also improved compared to traditional clip-on devices. 2665-751 AutoXBiaxial extensometer can also provide the ability to measure transverse strain for plastic strain ratio (r-value) determination.

Fatigue tests require extensometers with excellent dynamic performance. 2620 Series clip-on extensometers are light, compact and have high resonant frequencies, making them the best choice for fatigue tests including those run in strain control. 2670 Series Crack-Opening Displacement (COD) gauges are suited for fracture mechanics tests and are available in a range of travels, gauge lengths and temperature ranges.

Environmental

Elevated temperature testing of metals can be accomplished using Instron's furnace systems with associated pull rods and high temperature extensometry.

Software

Software for metals testing includes Bluehil® Universal for static tests. Dynamic tests on metals can be performed using WaveMatrix™ general purpose fatigue testing software as well as fracture mechanics packages aimed at fracture toughness, crack growth and J-Integral applications.

BIOMEDICAL



Longer life expectancy, an increasingly active population, and scientific advances are fuelling a tremendous demand for new and improved biomedical devices and materials. As technology evolves, researchers and manufacturers face the enduring task of delivering biomaterials and products that combine high quality with life-long performance.

Biomedical testing allows the performance and compatibility of new materials and medical devices to be proven in vitro, without putting patients at risk, and for the evaluation of critical and complex issues in a controlled and repeatable manner. In addition to helping new products meet essential regulations, such as Food and Drug Administration (FDA) compliance, biomedical testing allows the quality of medical products to be verified in a production line, and the development of new and innovative solutions in the laboratory.

Applications for materials testing equipment within the Biomedical industry are many and varied. Sectors, such as Orthopaedics, Biomaterials, Dental, Medical Consumables & Equipment, Implantable Devices, and Pharmaceuticals, all demand the highest accuracy and repeatability from testing equipment. Specialist fixturing is often required to perform successful tests and many require the simulation of “in vivo” conditions, such as temperature or fluids.

Instron® has been closely associated with the Biomedical field for many years and brings a wealth of applications knowledge to play in the design of testing equipment for this important and growing industry.

The following pages provide an insight into the accessories and systems available from Instron to perform tests on a diverse range of products and materials from medical packaging to orthopaedic implants. Our extensive custom engineering facilities allow us to tailor solutions to meet your exact requirements, so please talk to us about your application if you can’t find exactly what you are looking for in this catalog.

Please also refer to www.instron.com for the latest information on Biomedical testing equipment.

01 Peel test on medical packaging using 2712-051 50N pneumatic grips

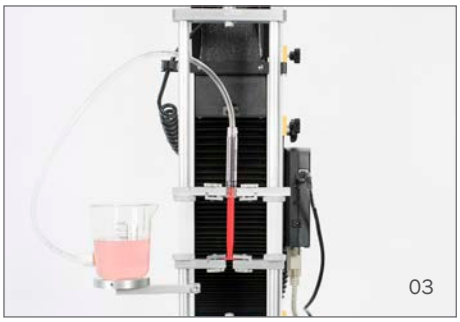
02 Dental implant test to ISO 14801 using 2014-107 fixture and CP108107 temperature controlled bath

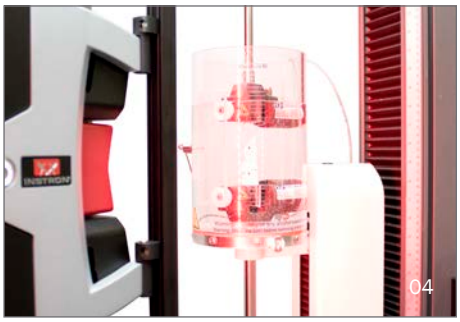
03 Syringe tests to ISO 7886-1 using 2870-003 fixture

04 Tensile tests on biomaterials using 3130-100 BioBath and AVE2 video extensometer









Grips and Fixtures

The huge variety of materials and components tested means that both standard and custom grips and fixtures are used in Biomedical testing.

Biological specimens can often be successfully tested with 2712 Series Pneumatic Grips with custom submersible versions being used in conjunction with our BioBath for tests in saline and other liquids at body temperatures. Sutures, packaging, and adhesives can often be tested with our standard grip ranges. Nitinol wire can be successfully tested using pneumatic cord and yarn clamps.

Our range of compression anvils and flexure/bend fixtures can be used to measure the compressive and flexural strength of materials, components, and biological specimens.

Specialist fixturing is available for tests on dental materials, implants, needles, and medical devices. A range of component test plates for selected models allow the user to create their own custom solution for clamping components and medical devices.

Please refer to the dedicated section on Biomedical/ Pharmaceutical Fixtures for more details of suitable grips and fixtures.

Extensometry

Measurement of specimen strain can be very challenging in this application. Instron® Non-Contacting Video Extensometers can be used for testing delicate soft-tissue specimens even in a saline bath providing contrasting marks can be applied to the specimen. Standard contacting devices can be used on rigid, semi rigid, and highly-extensible materials, such as elastomers.

BIOMEDICAL







01 CP110010 BioBox for testing materials at a constant temperature from ambient to +40 °C

02 CP113023 Instron's spinal implant designed to meet ASTM F1717

03 2810-410 Micro-bend test fixture testing a stent

Environmental

Where tests at body temperatures are required, our BioBox environmental chamber envelops the entire testing machine to provide a constant, stable temperature for conducting tests. Our liquid bath options allow tests at controlled temperatures in a variety of aqueous solutions including saline. A range of submersible grips and fixtures are available for use with these baths.

The BioCoat splash guard provides a waterproof cover for selected models giving protection for the machine and ensuring an easy-to-clean, hygienic surface when testing biological specimens. For tests at higher and lower temperatures, our range of isothermal environmental chambers can be used.

Software

Static tests can be performed using Bluehill® Software that can be configured to test a huge range of biomedical and pharmaceutical specimens. Bluehill features compliance correction, which can be used to more accurately determine specimen strain where an extensometer cannot be used. Bluehill 3 is available with a number of pre-configured Biomedical test methods, ASTM F88, ASTM F2256, ASTM F2458, ASTM F2516, ASTM F2606, DIN EN 455-2, ISO 7886-1 Annex G.

WaveMatrix™ Software for Dynamic, Hydraulic, and ElectroPuls™ machines ensures accurate and highly-controlled fatigue and endurance tests to be performed on a wide variety of materials and devices including stents, implants, and prosthetics.

ELECTRONICS



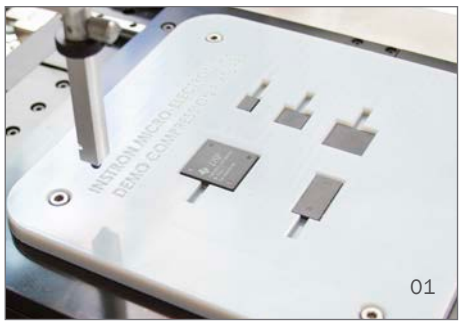
The electronics industry is ever-changing, with smartphones, tablets, and wearable devices showing exponential growth, innovation, and non-stop evolution of design. Consumer-driven markets yield a necessary demand for critical testing of electronic products and their components. Reliability within the specified product life cycle, prevention of failure, and evaluation of quality are imperative in maintaining the brand name reputations of OEMs.

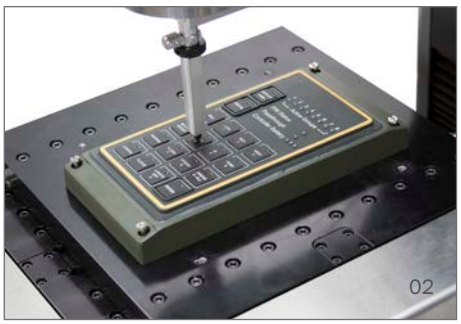
Looking a step deeper, component testing in the microelectronics and semiconductor industry, has prevailed over traditional methods of materials testing. Strain measurement of samples including thin-film materials and copper clad laminates (CCL) tested under tensile mode, yield a demand for highly specific testing accessories. High temperature tensile and flex testing ensure that evolving materials within the industry are held to the standard of quality consumers expect.

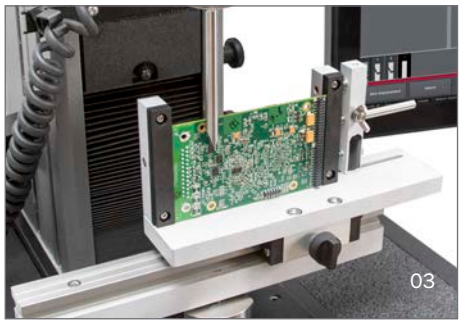
Testing of hand-held devices and microelectronic components demand testing that mimics real-life conditions. For buttons or switches, integral parts of electronic devices, mechanical testing is vital to ensure the steady reliability of these components. Fully automated solutions for testing button tactility provides comprehensive load and displacement measurements that are essential when characterizing functionality.

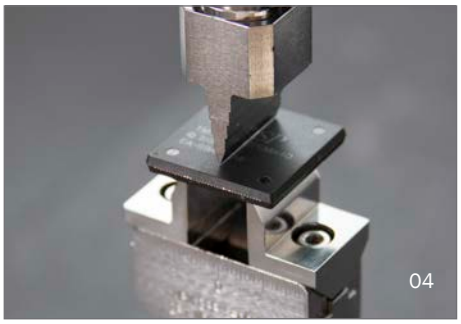
The electronics industry, driven by a consumer-market, has constantly shown growth and initiative in developing new solutions for hardware and components. Instron® strives to provide innovative testing solutions for this ever-expanding market.

ELECTRONICS









01 XY Stage for Point Compression of Electronic Packages

02 XY Stage for Button Testing of Electrical Panels

03 Die Shear Fixture

04 Three Point Micro Bend Fixture

Grips and Fixtures

Consumer electronic device and microelectronics testing is focused on the component level when compared to traditional materials testing on raw material specimens. Instron offers a wide range of accessories that are suited for component level testing.

The 7200-103 (XY stage accessory with all motion controller kit) is offered as an automated solution to test microelectronic components and hand-held devices in compression mode. Interfacing directly with Bluehill® Software, this solution offers the capability to create user friendly methods and automate multi-point compression testing in a single run. Alternatively, the AT2 XY stage solution is offered as well, which interfaces with Bluehill and TestMaster™ to run the stage. This solution is significantly slower than the 7200-103 automated solution. The 2860 series fixtures are offered as a manual XY stage solution with clamping systems to hold substrates and samples.

The 2712 series pneumatic and micro-pneumatic grips are able to perform tension testing of components such as lead pull, fine wire pull testing, and more. The 2810 series micro-bend fixtures are capable of performing three and four point bend testing on small scale components.

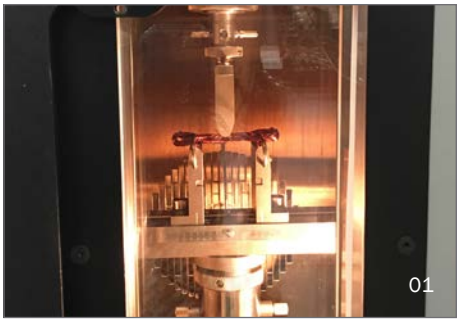
Please refer to the dedicated Microelectronics section in Applications specific accessories for details and specifications of various fixtures. Also, more details can be found in the Electronics Testing Solutions page on www.instron.com.

01 High Temperature Bend Testing of Epoxy Mold Compounds

02 AVE 2 Video Extensometer

03 Three Point Bend with LVDT for Electronic Devices

04 Bluehill® Universal









Extensometry

Strain measurement is an important aspect of component testing in the microelectronics and semiconductor industries. Instron®'s clip-on extensometers are used to measure strain on samples such as CCL when performing a tensile test. Further, non-contact extensometers, such as the AVE 2, are widely used to perform strain measurements of thin-film materials as well as CCL.

Environmental

Instron's environmental chambers provide a non-ambient test environment for tensile and flex testing. Heat chambers are essential to measuring the tensile strength of insulating materials such as CCL, which are later compared against tensile strengths at ambient conditions. This is important to characterize insulating materials, which are used as a layer in printed circuit board materials and other components to prevent warping due to thermal stress. Flex testing is also conducted at low temperatures (-40 °C) and high temperatures to characterize materials used in various electronic packages (IC chips, BGAs, Package-on-package (PoP), etc.).

Software

Bluehill Universal software is designed to create test methods for performing a multitude of testing types. Various routines such as initialization and compliance correction can be implemented from the software which are critical for measuring deflections in microns. Further, using the graphical analysis tool, various critical results can be presented such as voltage measurements and the corresponding force applied. Results from Bluehill Universal can be exported to various file formats for data analysis. TrendTracker™ can be used with the software to conduct data mining and statistical analysis of results.

Wavematrix™ software for Dynamic, Servohydraulic, and ElectroPuls™ machines ensures accurate and highly-controlled fatigue and endurance tests can be performed on a wide variety of components, samples, and devices.



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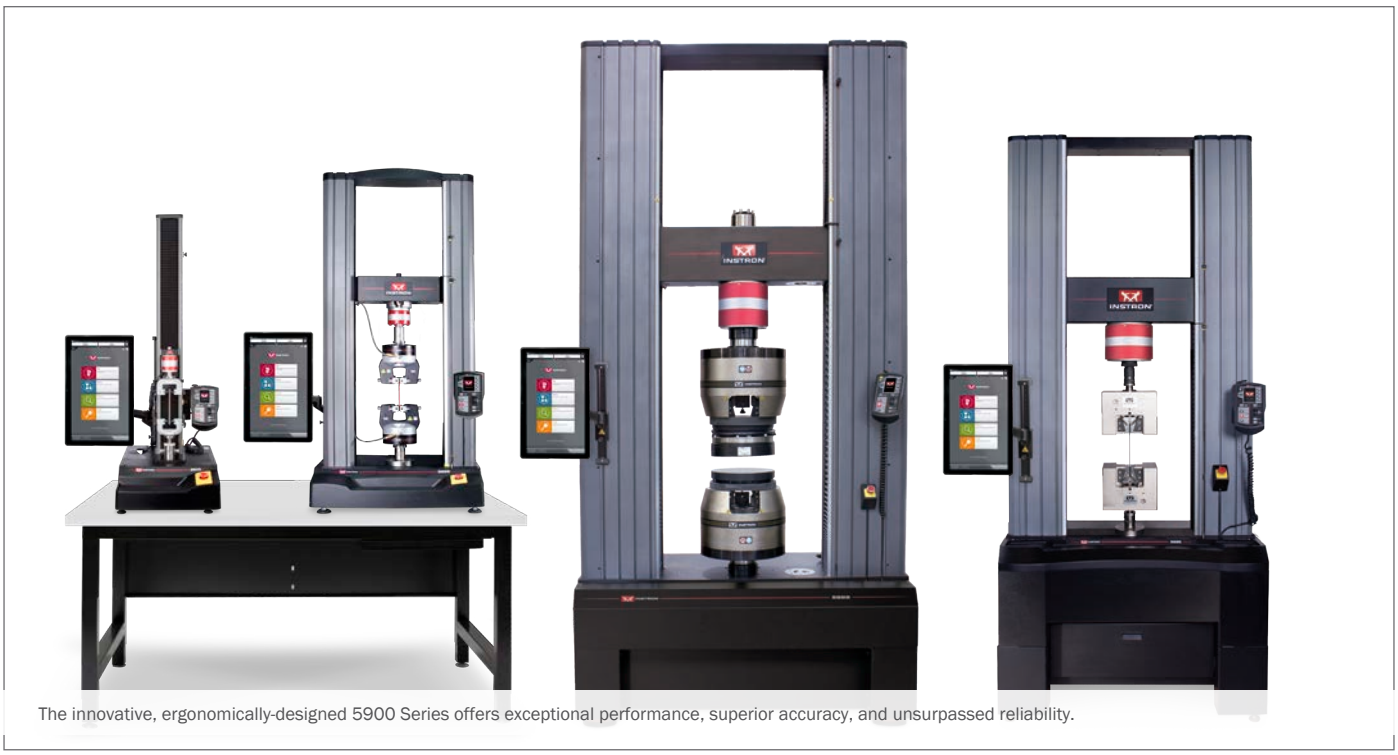


PRODUCTS AND SERVICES

Science and technology have pushed material performance boundaries far beyond what was thought possible when Instron® was founded more than 60 years ago. In the face of constant change, the company has continued to be a pioneer and leader in materials and structural testing. It offers more capabilities to provide materials scientists with more of the information, services, support and tools they needed to advance engineering and manufacturing boundaries. Instron has greatly enhanced its abilities to serve its markets with a strategy of synergistic integration. It has implemented this strategy with steps that have included the acquisition of companies, product lines and technologies, joint ventures and other types of cooperative initiatives and licensing agreements.

5.1	Electromechanical Testing Systems	361-364
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ELECTROMECHANICAL TESTING SYSTEMS



The innovative, ergonomically-designed 5900 Series offers exceptional performance, superior accuracy, and unsurpassed reliability.

Instron® electromechanical universal testing machines perform tensile, compression, bend, peel, tear, and other mechanical tests on materials and products to ASTM, ISO, and other industry standards. These systems are available in a range of sizes and maximum force capacities. From small, low-force systems to test microelectronics, biomaterials, and films in the biomedical and electronics industries to large, high-force systems to test metals and composites in the automotive and aerospace industries, Instron has systems suitable for all applications. With over 50,000 systems installed worldwide, businesses and universities involved in quality control and research & development have relied on Instron systems to perform groundbreaking research, develop innovative new materials, and ensure best-in-class manufacturing processes.

The 5900 Series Universal Testing Instruments offer exceptional performance and are designed with enhancements that deliver unparalleled accuracy and reliability, improved ergonomics, and an enhanced overall experience for the operator. New industry leading features include load measurement accuracy to +/-0.5% of reading down to 1/1000 of load cell capacity and fast, synchronized data acquisition rates up to 2,500 points per second. The most common uses of these mechanical testing systems are for tensile, compression, bend, peel, shear, tear and cyclic tests. Configured systems are fully capable of meeting test requirements per ASTM, ISO, DIN, TAPPI, GB, JIS, ANSI, NAS, etc.

Frame types include the 5940 single column tabletop for low-force testing up to 2 kN; the 5960 dual column tabletop systems for mid-range testing up to 50 kN; and the 5980 floor model systems for heavy- duty, robust testing up to 600 kN. The control panel is an integral component of the testing system, decreasing set up time and increasing testing efficiency through the use of programmable live displays and soft keys. Tests can be set up and run directly from the control panel.

ELECTROMECHANICAL TESTING SYSTEMS



The Affordably Priced 3300 Series is the Ideal Choice for Quality Control and Production Environments

The 3300 Series of mechanical testing systems provide the simplicity, performance, and affordability needed for quality control and production testing. The 3300 Series is ideal for routine, standardized QC tests to general purpose mechanical testing.

Three model types are available: single column, table top dual column, and a floor model. Capacities range from .5 kN to 100 kN. The 3340 Series Single Column Systems are ideal for tension and/or compression applications where tests are less than 5 kN (1,100 lbf), lab space is limited, and where free access to the test area is desirable. Dual column table tops are available in load force capacities of 5, 10, 30, and 50 kN for routine and every day testing; and a 100 kN floor model is available for more robust applications.

ELECTROMECHANICAL TESTING SYSTEMS



Simple multi-axis testing is often necessary to test the performance of medical devices, consumer products, and components, such as Luer locks, wires, child-proof medicine bottles, tubing, packaging, and automotive components. The Instron® Torsion Add-On for Electromechanical Universal Testing Systems is designed for simple, simultaneous axial and torsional testing of devices and/or components, but can be used for purely uni-axial or torsional testing. The Torsion Add-On easily mounts to any new Instron 594X or 596X or can be retrofitted in the field on existing 594X or 596X frames. The torsion drive is mounted above the machine's crosshead and all required electronics are mounted to the system's column, thus maintaining the frame's footprint.



Low torque testing of syringe caps



Mascara cap removal test

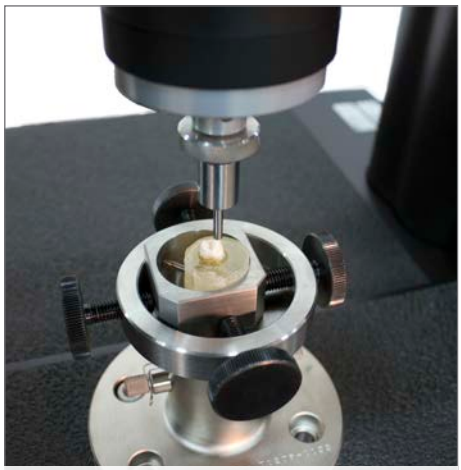


Key insertion and rotation test

ELECTROMECHANICAL TESTING SYSTEMS



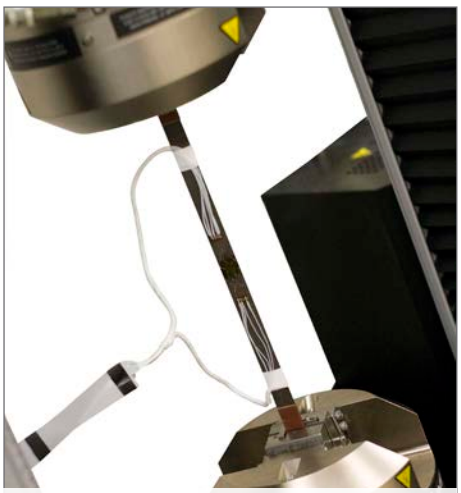
Flexure Test of Semi-Rigid Plastics Specimen Using the AutoX 750 Automatic Contacting Extensometer Meets ISO 178



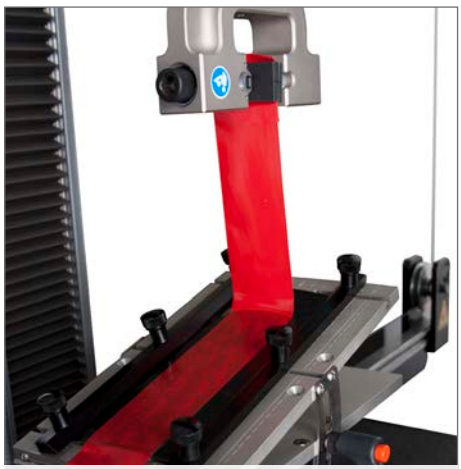
5940 Electromechanical Testing System Configured with Dental Fixture for Research & Development Purposes



Precision Manual Wedge Grips Installed in an Environmental Chamber for High-Temperature Testing of a Metal Specimen



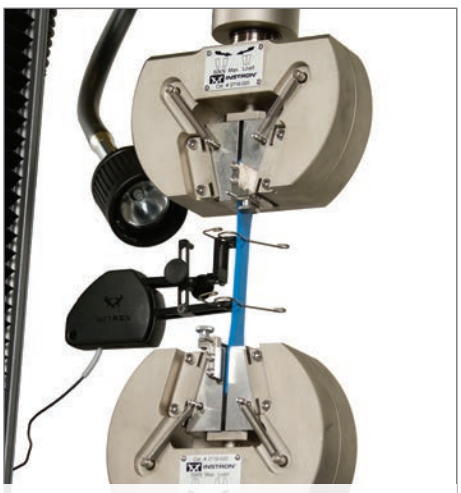
Testing a Composite Laminate using Hydraulic Wedge Grips on a 5980 Floor Model System



5940 Electromechanical Testing System Configured with Dental Fixture for Research & Development Purposes



250 kN DuraSync™ Grips and AutoX Automatic Contacting Extensometer Measuring Strain of a Metal Specimen



Wedge-Action Grips with Clip-On Extensometer for Plastics Tensile Testing



Deflection of a Rubber Component while Under a Compressive Load is Measured Using a Deflectometer



Shear Strength Test of Bonded Adhesive Using 2712-045 Pneumatic-Action Grips

DYNAMIC TESTING SYSTEMS



ElectroPuls All-Electric Dynamic Test Instruments up to 10 kN force capacity

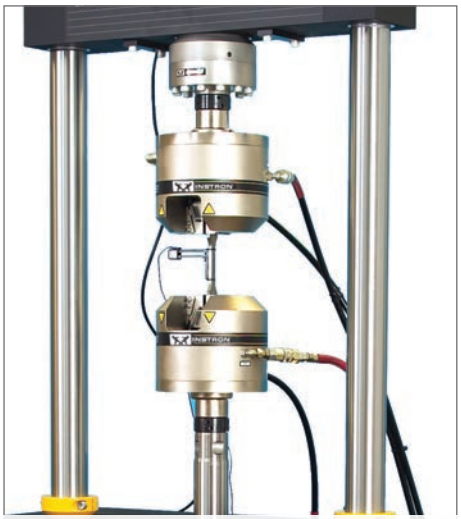
Dynamic testing systems are generally used to test materials and components in cyclic fatigue to either characterize materials or to simulate long-term operation. For these machine, test loads range from 10 N up to 2500 kN.

The ElectroPuls™ test instruments are state-of-the-art, Electrodynamic testing systems featuring linear motor technology for lower force dynamic and static tests on materials and components. Test loads typically range from sub-Newton up to 10,000 N. They are all-electric and do not require any additional air, hydraulics, water or special utilities.

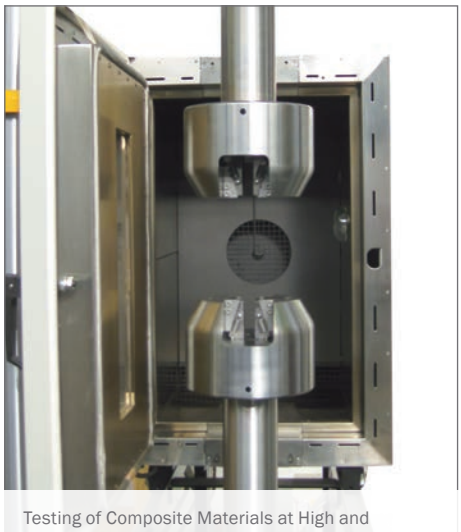
Applications for Dynamic Systems range from biomechanical simulation of orthopaedic implants to aircraft engine turbine blades being tested under simultaneous thermal and mechanical loads. Many real life loading conditions on materials and components involve impact or high levels of loading and strain rates. The Instron® VHS systems are designed to perform tests under constant strain rate conditions up to velocities of 25 m/s.

Instron's product range and applications experience for dynamic and fatigue testing is second to none. Our systems include advanced digital control electronics, load sensors with built-in inertia compensation to automatically remove error signals and the latest application software WaveMatrix™.

DYNAMIC TESTING SYSTEMS



High Cycle Fatigue



Testing of Composite Materials at High and Low Temperatures



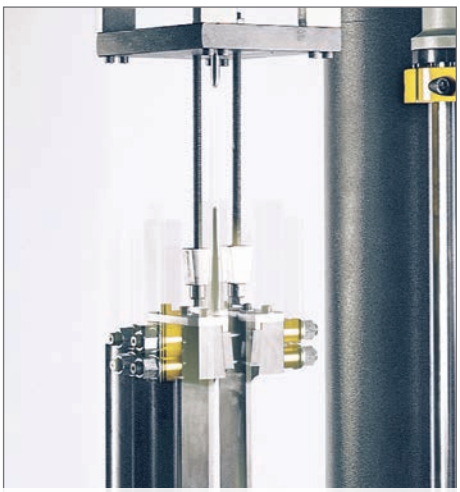
Low Cycle and Thermomechanical Fatigue



Multi-Axial Testing of Materials with Planar Biaxial Cruciform Systems



Combined Axial-Torsional Tests on Materials and Components



High-Strain Rate Testing of Materials (speeds up to 25 m/s)



Servohydraulic testing systems from 10 kN up to 2500 kN Capacity

IMPACT SYSTEMS



CEAST 9350



CEAST 9340



CEAST 9000



MPX Series

Impact Systems

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, 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.

CEAST 9300 Series Droptowers

The CEAST 9300 Series is built to test a wide range of materials from specimens to finished products. These droptower impact systems are equipped with instrumentation to fit your application needs from a basic pass-fail result to an automated calculation and visual curve display. The 9300 Series is designed to deliver an energy range of 1J - 1800J with velocities up to 24 m/s.

CEAST 9000 Series Pendulums

The CEAST 9000 Series is designed to perform your Charpy, Izod, Tensile Impact, and Dynstat tests in accordance with specific standards on a wide range of samples including bars, dumbbells, and pipes. Our pendulum systems use hammer energies ranging from 0.5J - 50J and velocities from 1 - 3.80 m/s.

MPX Series Motorized Pendulum

MPX Series Motorized Pendulum Impact Testing Systems were developed for metals testing to Charpy and Izod impact standards. Available in capacities from 300 to 900 Joules, each system includes an integrated guard, safety control system, and Fracta™ Software for simple data acquisition and reporting of absorbed energy. The system features automatic test start at door closure for efficient testing and adherence to standards for non-ambient impact testing.



Motorized Notching Machine



CEAST AN50



Manual Hollow Die Punch



Pneumatic Hollow Die Punch

Specimen Preparation

In accordance with international standards, Instron® offers an extensive range of machines designed to cut out specimens from thin and soft plastic materials. The Manual and Motorized Notching Machines are linear notching machines, designed to quickly and accurately prepare, notched specimens for impact tests according to Izod, Charpy and Tensile Impact methods. The CEAST AN50 is designed for laboratories performing impact tests in high quantities. In a single cycle the system can notch 50 specimens each 4 mm thick, storing the key parameters for later use. Die punch systems are built to punch specimens by using hollow dies of different contour and size. Commonly used for rubber, elastomer, plastic, leather, cloth, plasticized cloth, paper, cellular materials, and films.

RHEOLOGY AND MELT FLOW SYSTEMS



Capillary Rheometers



Melt Flow Testers

From Melt Flow Testers to Capillary Rheometers, CEAST Rheology systems are designed to determine the flow properties of thermoplastic materials according to ISO and ASTM international standards.

Melt Flow Testers

The Melt Flow Tester Series is ideal for routine Melt Mass-Flow Rate (MFR) and Melt Volume-Flow Rate (MVR) measurements. These testers accurately perform test procedures ranging from the simple manual determination of MFR to semi-automated MVR measurements involving multiple test weights.

Capillary Rheometers

The CEAST SmartRHEO Series accurately investigates the rheological properties of polymers and composite thermoplastic materials for R&D, Advanced QC, and process optimization (injection molding, extrusion, and blow molding). A broad range of options simulate specific material applications, including Die Swell, and PVT measurements.

THERMO-MECHANICAL TESTERS



HDT and Vicat Manual Model HV3S



HDT and Vicat Automatic Model HV6X

Thermo-Mechanical Systems

From very simple units for QC labs to more advanced and automated systems, the Instron® Thermo-mechanical systems are designed to determine the behavior of plastic materials at high temperatures, measuring the Heat Deflection Temperature (HDT) and the Vicat Softening Temperature (VST) according to ISO and ASTM international standards.

HDT and Vicat Testers

HDT and Vicat testers offer two different bath dimensions and can host from 2 up to 6 testing stations, both for manual and automated test cycles. The HV500 Thermal Tester performs HDT and Vicat tests, at temperatures up to 500 °C, by using an innovative heating system with Aluminum Oxide micrometer-sized powder.

UNIVERSAL HYDRAULIC TESTING SYSTEMS



Bend/Flex Testing

The Industrial Series of universal hydraulic testing systems includes some of the most rugged and durable machines ever made. Developed for high-capacity testing, frames are powered by a hydraulic pumping system that moves a piston assembly to provide the forces necessary for static tension, compression, bend, and flexure testing. They are commonly used to test metal samples, concrete, rebar, tube and pipe, stranded wire, steel bar, steel plate, fasteners, wood, and high-strength composites.



Fastener Testing



Rebar Testing



300DX Dual Test Space System



3000X Single Test Space System

UNIVERSAL HYDRAULIC TESTING SYSTEMS



1500HDX performing Tension Test on Rebar Specimen



1500KPX performing Tension Test on Pipe Specimen

AUTOMATED SYSTEMS



Automated systems are available as either a complete turnkey solution or fitted to existing Instron testing instruments.

TestMaster™ 2 Automated Systems

Instron® TestMaster 2 automated systems enable a new dimension of testing productivity. Systems are available as complete turnkey solutions or can be fitted to existing Instron testing instruments. Either option is tailored to your testing operations and throughput requirements. The unique modular design of the testmaster 2 automated systems provide the broad control and handling capability needed to fulfill a wide range of applications. Standardized systems are available for the following application areas:

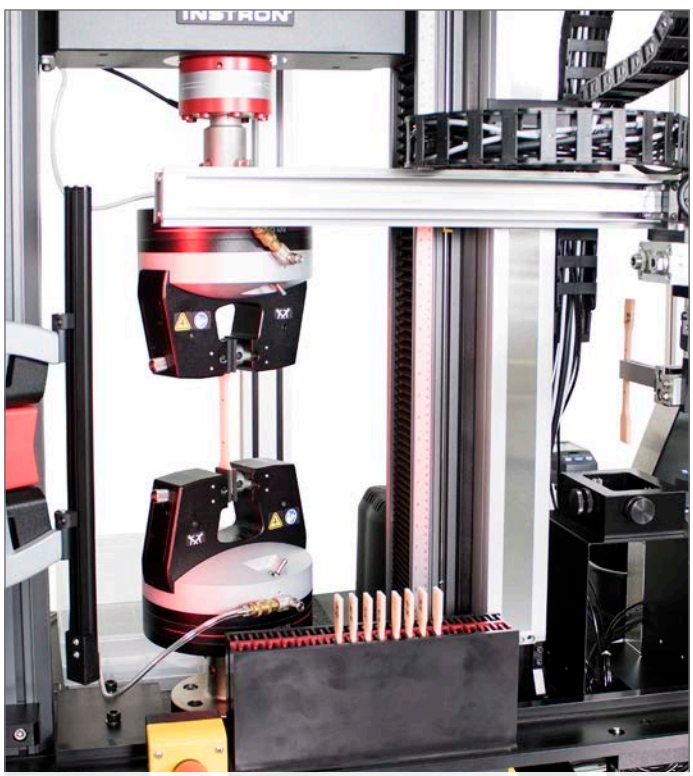
- Rubber tensile and tear
- Plastic tensile and flex
- Thin films tensile
- Simple metals tensile
- Advanced metals tensile
- Component testing



Automated XY Stage Testing System for automated compression testing of devices and/or components with multiple test points



Automated metals testing systems are available for testing specimens ranging from thin sheet to thick plate



Instron® AT3, non-robotic, automation systems offer automatic: identification via barcodes; dimension measurement, testing and disposal based on pass/fail criteria, for up to 80 specimens in a test run.

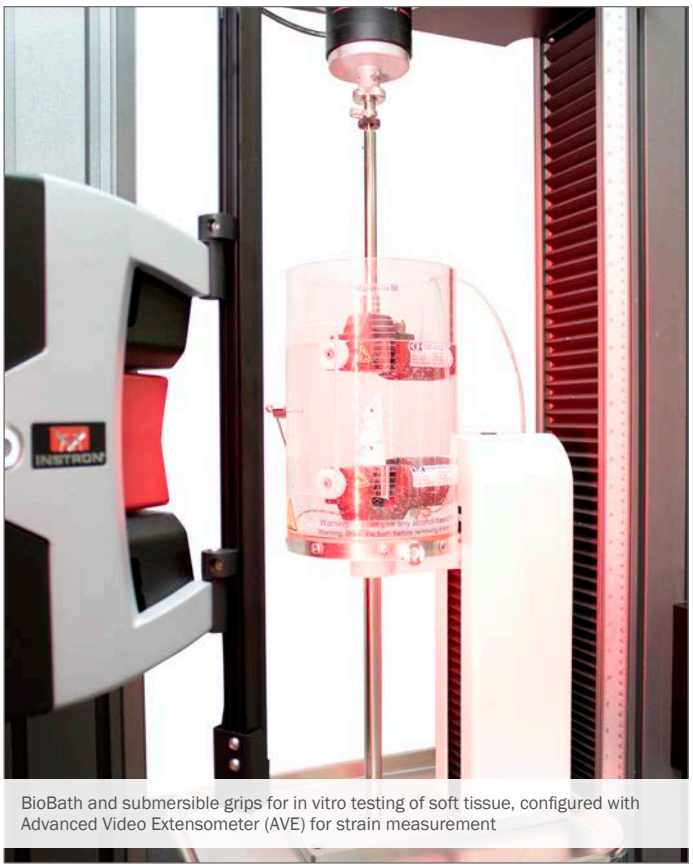


Automatic identification, dimension measurement, testing and disposal

APPLICATION SPECIFIC PRODUCTS



Needle Tensile Test using 2712-041 Pneumatic Grips



BioBath and submersible grips for in vitro testing of soft tissue, configured with Advanced Video Extensometer (AVE) for strain measurement

Biomedical Testing

Biomedical testing allows the performance and compatibility of new materials and medical devices to be proven in vitro, without putting patients at risk, and for the evaluation of critical and complex issues in a controlled and repeatable manner. In addition to helping new products meet essential regulations, such as Food and Drug Administration (FDA) compliance, biomedical testing allows the quality of medical products to be verified in a production line, and the development of new and innovative solutions in the laboratory.

Instron® has engineered an extensive range of application-centric products to be the most advanced solutions for biomedical testing challenges. By meeting demands as diverse as low-force testing on native tissues to complex multi-axial simulation of spinal segments; or materials for medical device applications, such as nitinol wire, stents, dental wire, and tubing we have ensured that our products best fit the needs of individual customers and provide many years of superior performance.



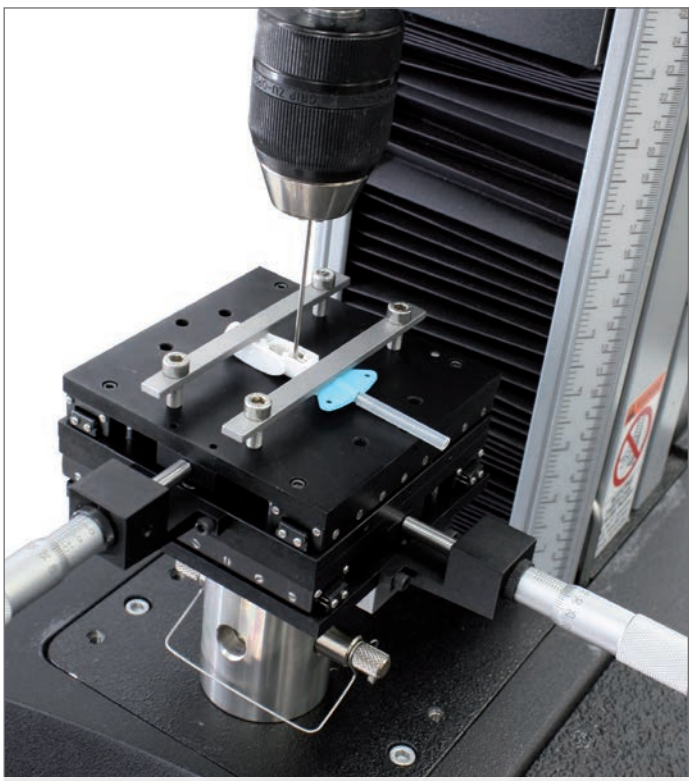
Dynamic Fatigue Testing of Straight Endosseous Dental Implants (ISO 14801)



Auto-injector testing to ISO 11608-5



Nitinol wire testing to ASTM F2516



An XY-Stage is used to Finely Position a Catheter During Multiple Push Tests on the Individual Components

APPLICATION SPECIFIC PRODUCTS



Compression Texture Test on Tofu



Torsion Tester

Food Testing

Instron® food testing systems are used for texture analysis of solid and semi-solid foods including cereal products, baked goods, processed and muscle meats, fruits and vegetables, dairy products, snack foods, pasta and noodles, confectionery, fish, seafood and more. A variety of anvils, probes, shear, extrusion and bending fixtures are available for R&D, quality assurance and process control testing. Instron food fixtures meet the requirements of a wide range of testing methods including compression, puncture, shear and extrusion and are designed with materials that are corrosion-resistant and durable. All fixtures can be mounted in a drip tray to help keep the test area clean when evaluating the texture of wet, juicy or easily fractured foods.

Torsion Testing

Instron's torsion product line includes electromechanical solutions for applications that require multiple turns. Coupled with Instron's standard machine controllers, data acquisition hardware and software, these products provide precise machine control, unsurpassed accuracy and superior flexibility.



400HVL EXTEND Upgrade with I-Series Electronics, User Control Panel and a new V-Series Hydraulic Power Supply.



5900 EXTEND Upgrade on Instron Model 4505

At Instron®, we are experts in upgrading material testing systems. We upgrade Instron and non-Instron load frames with the latest digital electronics and application software. The result is a superior system at a fraction of the cost of a new machine.

Instron has upgraded more testing equipment than anyone in the industry – more than 5,000 systems and still counting. An Instron upgrade ensures your testing system will be outfitted with the industry's most advanced software and electronics. Furthermore, your investment will be supported by Instron's worldwide network of experienced service engineers. The list of ways in which your system's capabilities will be extended is extensive:

- Maximize performance through higher precision measurement and control
- Streamline operations with advanced data reporting and automatic test results
- Increase productivity with Instron's intuitive user interface, simple set up and efficient testing workflow
- You can continue to add functionality as the need arises

INSTRON® PROFESSIONAL SERVICES AND SUPPORT



Training at Instron facility

Calibration and Verification Services

Instron offers an extensive range of calibration and verification services for material testing instruments and related accessories. Our services and service delivery processes are designed to comply with the requirements of ISO and ASTM. Instron factory-based calibration labs maintain a broad range of primary and secondary standards, all traceable to national and international standards. Our global services calibration laboratory is ISO 17025 accredited to verify your equipment at your site. Our labs are accredited around the globe by accrediting bodies such as NVLAP (Lab code 200301-0) and UKAS accredited (calibration laboratory No.0019). Instron calibration services are accepted internationally through ILAC, IAF, EA, ASLAC, IAAF. Equipped to calibrate most types and brands of materials testing machines, Instron's typical verification services include:

- Force
- Impact
- Temperature
- Alignment
- Speed
- Strain
- Torque
- Creep
- Hardness
- Displacement

Training and Consultancy

Training and consultancy has a very important role in educating you about meeting safety requirements, testing standards and reducing costs from bad practices. By receiving consultancy and training from our Instron Test Experts, you will benefit from learning about: how to avoid mistakes with testing; how to get reliable results; how to minimise cost with safe testing practices and; how to understand test standards. Training is delivered online, at your laboratory, or at regional training sites.

Contact your local Instron Service Department to arrange training at your site or one of our facilities in North America & Europe.

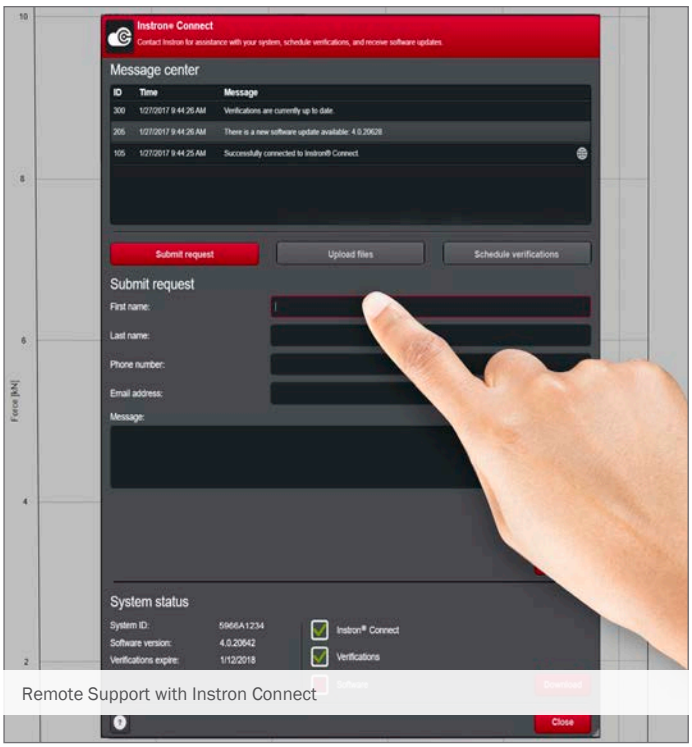
Life-Cycle Management

Once you have bought a test machine, you want to prolong its working life for as long as it's economically viable. Parts, software and other elements become obsolete over time but upgrades are always available to keep your products up to date. By communicating these changes to products in advance to you, it enables you to better prepare for changes, minimising your downtime and saving cost in the long run by having up-to-date testing equipment. However, if it is no longer economically viable to maintain your current system then we will work with you to assess your upgrade options and help implement them.

INSTRON® PROFESSIONAL SERVICES AND SUPPORT



Telephone Support



Remote Support with Instron Connect

Technical Support

Instron provides a wide variety of technical support needs to insure that you are up and running and gathering important data when it's required. There are several avenues of technical support that can be accessed and used depending on your specific needs. These service cover hardware as well as software support requests.

On-Site Support

Services are typically for required maintenance and verifications, emergency and standard repair support, reconditioning, parts repair/exchange, and upgrade/accessory installation services. Maintenance and scheduled verification are typically managed and scheduled via annual services agreements.

Online Support

Services can provide faster responses through either our Instron Connect platform or our standard web delivery processes. Instron Connect includes secure screen sharing with audio, file uploads, verification reminder scheduling, messaging and automatic software updates all through the operator dashboard as part of Bluehill Universal® (BHU). Standard web support platforms can provide you with access to online help desk services, software update downloads, remote diagnostics, application assistance, and secure access to your systems verification certificates. Web services availability may vary by Instron system family and global region location.

Telephone Support

Services are structured to provide efficient responses to your requests for assistance. Global Instron support center teams provide technical consultation which may also include remote hardware and software support diagnosis. Working closely with local on-site service delivery teams our telephone support centers can rapidly brief and dispatch resources to your site when necessary.

Agreements and Contracts

Instron provides service agreements and contracts that can span basic time and material service products all the way up to full comprehensive coverages. Agreements can include preventative maintenance services, calibrations, training, software support, technical support, consultancy and other custom services. These agreements and contracts can vary depending on the global region of service.

ITW TEST AND MEASUREMENT

MAGNAFLUX



Magnetic particle inspection with UV light to find small defects in a critical part



Nondestructive testing is used to inspect critical parts or materials without damage so the part or material can still be used after testing



Invisible stress defects are made visible through fluorescent nondestructive testing

For over 85 years, Magnaflux has partnered with manufacturers, test labs and field inspectors to make the world a safer place through nondestructive testing solutions.

- Penetrant Testing chemical products and equipment
- Magnetic Particle Inspection consumables, magnetizing equipment and accessories
- UV lamps and light sources for fluorescent Non-Destructive Testing.

Our customers trust us to help them ensure the very best quality control for their most critical components with products and equipment for penetrant testing and mag particle inspection. Our uncompromising stance on safety and performance is what sets us apart, and why generations of NDT professionals continue to rely on us.

MAGNAFLUX®

TO LEARN MORE, VISIT:
www.magnaflux.com



The GF40 Digital Mass Flow Controller (MFC)



The 0254 Secondary Electronics Controller

Equip your lab with the best instruments and accessories to deliver precision results and move your research forward.

The GF40 digital mass flow controller (MFC) provides maximum process flexibility using our exclusive MultiFlo™ technology - new gas calibrations and full-scale ranges can be changed on the same device via software without removing the MFC from the gas line. The device is also LabVIEW™ compatible allowing direct communication between the MFC system and LabVIEW™ without requiring LabVIEW™ I/O cards.

The 0254 secondary electronics controller may be used to provide power, set point, and local display.

BROOKS®
INSTRUMENT
Beyond Measure

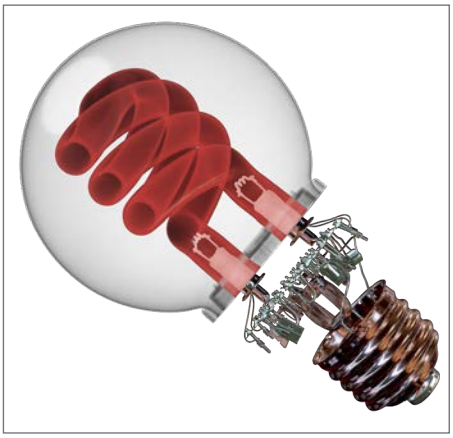
TO LEARN MORE, VISIT:
www.brooksinstrument.com

ITW TEST AND MEASUREMENT

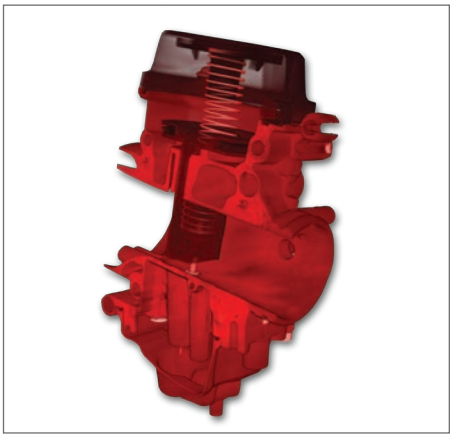
NORTH STAR IMAGING



NSI offers eight (8) standard X-ray and CT/micro CT systems including the just released X3000 which has a small footprint but has the capabilities of larger X-ray systems.







NSI manufactures digital industrial X-ray and 3D computed tomography (CT) systems and software solutions for non-destructive testing; and evaluating products and materials for quality inspection.

Added services include as-needed Inspection Service; Technical Service & Support, and basic & advanced digital radiography (DR) and CT Technical Training courses throughout the year.

Visit www.4nsi.com to learn more about NSI's products and services or contact our global sales team to schedule a demonstration at sales@4nsi.com.

NORTH STAR IMAGING
NSI
AN ITW COMPANY

TO LEARN MORE, VISIT:
www.4nsi.com

ITW TEST AND MEASUREMENT

BUEHLER®





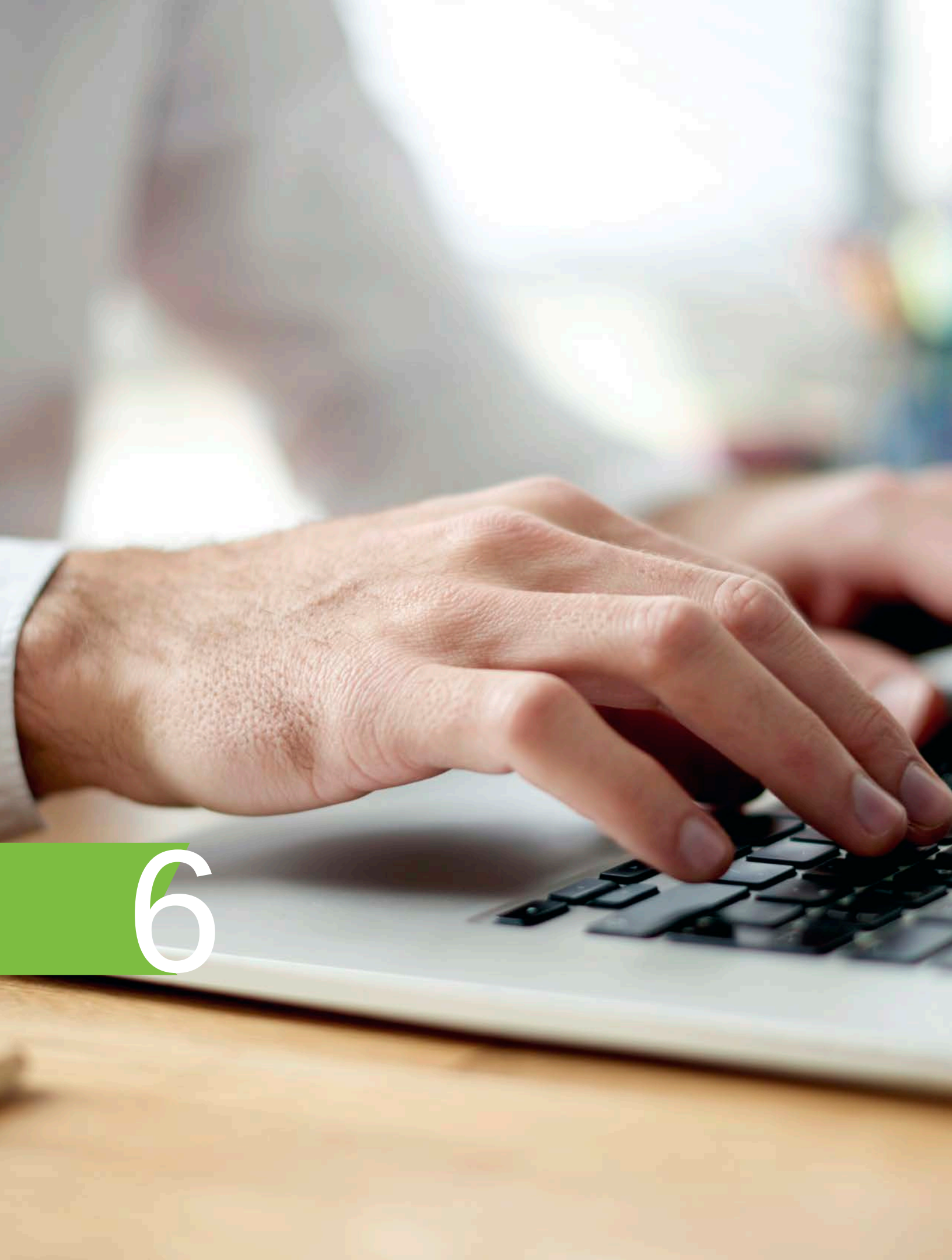




Buehler is a premier manufacturer of scientific testing and material preparation equipment and consumables for use in materials analysis with offices in nine countries, sales distribution in over 100 countries, and over 45 Buehler Solutions Centers. Buehler employees and operations are committed to delivering quality and environmentally responsible products guided by ISO 9001 Quality Management Principles and ISO 14001 Environmental Managements Systems. Buehler innovates solutions and offers expert service and support throughout the materials preparation and analysis market.

BUEHLER®

TO LEARN MORE, VISIT:
www.buehler.com



6



REFERENCE

This section contains information that allows you to check the compatibility of grips and fixtures, give you tips on testing and cross-reference indexes so you can find what you are looking for quickly. There is also a telephone list of worldwide sales and service offices and their locations at go.instron.com/locations

For up-to-date information on our products and services, and to browse our comprehensive online glossary of materials testing terms, visit us at www.instron.com.

6.1	Compatibility Details	387-396
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COMPATIBILITY DETAILS

In many cases the products offered in this catalog will require couplings to fit your specific testing machine. A range of standard couplings and adapters is available to cater for the majority of situations. It is very important to supply the basic details of your system when requesting a quotation so we can ensure that the items will be compatible.

Mechanical Compatibility

The mechanical interfaces used on Instron® grips and fixtures have remained largely the same. For electromechanical systems these generally conform to a clevis pin style of attachment with different sizes of clevis pin used according to the force capacit. Hydraulic systems (including both dynamic and static-hydraulic) generally use threaded connections with wedge washers or rings of bolts.

During the 1980's a drive toward metrication resulted in both US Customary (inches) and metric (millimeters) sizes being used for load cells and some grips/fixtures. As a consequence, care needs to be taken to ensure that the correct couplings and adapters are specified. While this catalog contains lists of couplings, adapters and attachment kits, we strongly advise that you let us check compatibility by supplying your system details before we provide a quotation.

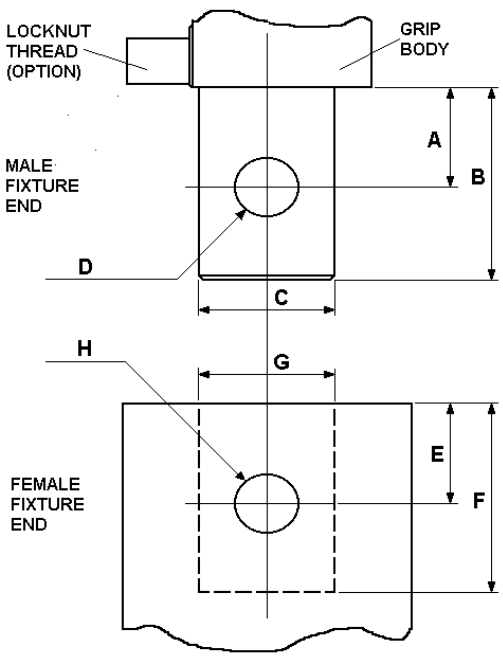
Compatibility Details 387-395

6.1

Clevis Interface

The simple clevis attachment used in the majority of electromechanical systems consists of a male spigot on the grip or fixture, which fits into a corresponding female connection in the load cell (or coupling) and into the base or crosshead adapter. The various sizes of clevis attachments are defined by the diameter of the clevis pin such that a grip with a 1/2-inch male (m) clevis will always fit a load cell or adapter with a 1/2-inch female (f) clevis attachment.

The following diagrams show the various types of clevis interfaces commonly found on electromechanical systems.



Type: 2.5 mm Clevis Pin

Male Fixture End

A 7.00 mm

B 13.00 mm

C Maximum 5.95 mm diameter
Minimum 5.935 mm diameter

D Maximum 2.63 mm diameter
Minimum 2.60 mm diameter

Female Fixture End

E 5.00 mm

F 13.00 mm

G Maximum 6.022 mm diameter
Minimum 6.00 mm diameter

H Maximum 2.63 mm diameter
Minimum 2.60 mm diameter

COMPATIBILITY DETAILS

Type: 6 mm Clevis Pin

Male Fixture End

A 12.00 mm

B 20.00 mm

C Maximum 11.95 mm diameter
Minimum 11.90 mm diameter

D Maximum 6.029 mm diameter
Minimum 6.022 mm diameter

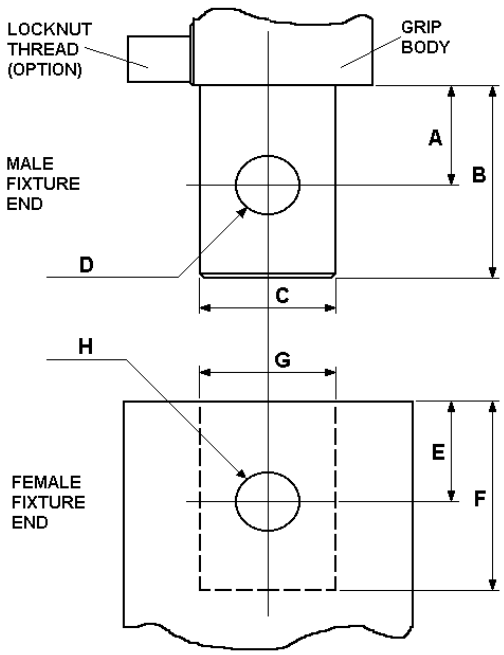
Female Fixture End

E 9.00 mm

F 20.00 mm

G Maximum 12.027 mm diameter
Minimum 12.00 mm diameter

H Maximum 6.012 mm diameter
Minimum 6.00 mm diameter



Type: 16 mm Clevis Pin

Male Fixture End

A 22.00 mm

B 38.00 mm

C Maximum 33.95 mm diameter
Minimum 33.90 mm diameter

D Maximum 16.035 mm diameter
Minimum 16.028 mm diameter

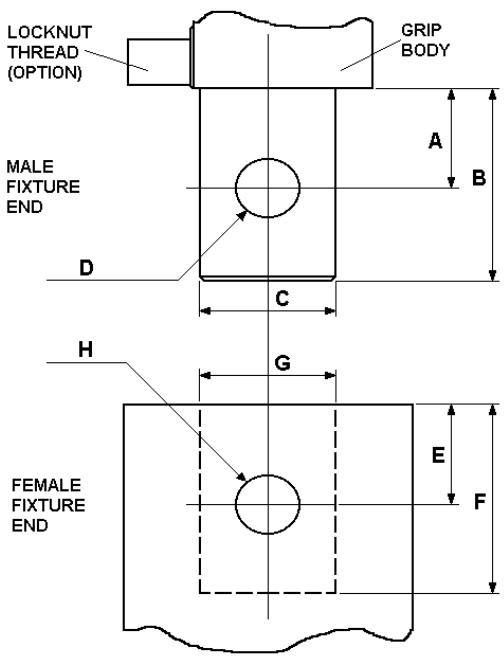
Female Fixture End

E 18.00 mm

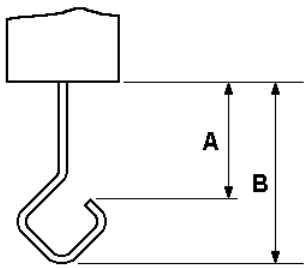
F 38.00 mm

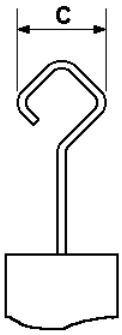
G Maximum 34.05 mm diameter
Minimum 34.00 mm diameter

H Maximum 16.043 mm diameter
Minimum 16.00 mm diameter



COMPATIBILITY DETAILS





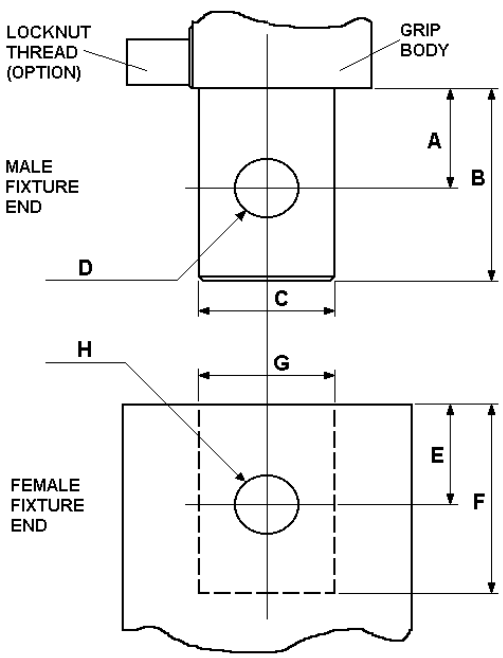
Type: Hook

Fixture End

A 4.98 mm

B 15.88 mm

C 6.28 mm



Type: 3/16-inch Clevis Pin

Male Fixture End

A 10.00 mm

B 17.00 mm

C Maximum 12.68 mm diameter
Minimum 12.65 mm diameter

D Maximum 5.00 mm diameter
Minimum 4.88 mm diameter

Female Fixture End

E 8.00 mm

F 19.00 mm

G Maximum 12.78 mm diameter
Minimum 12.75 mm diameter

H Maximum 4.82 mm diameter
Minimum 4.78 mm diameter

COMPATIBILITY DETAILS

Type: 1/4-inch Clevis Pin

Male Fixture End

A 13.50 mm

B 21.00 mm

C Maximum 15.85 mm diameter
Minimum 15.82 mm diameter

D Maximum 6.55 mm diameter
Minimum 6.48 mm diameter

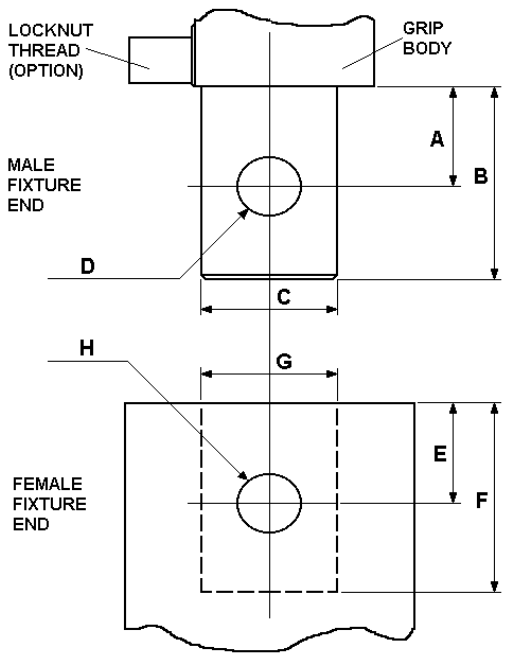
Female Fixture End

E 12.00 mm

F 26.00 mm

G Maximum 15.93 mm diameter
Minimum 15.90 mm diameter

H Maximum 6.38 mm diameter
Minimum 6.35 mm diameter



Type: 1/2-inch Clevis Pin

Male Fixture End

A 27.50 mm

B 43.00 mm

C Maximum 31.73 mm diameter
Minimum 31.70 mm diameter

D Maximum 12.90 mm diameter
Minimum 12.83 mm diameter

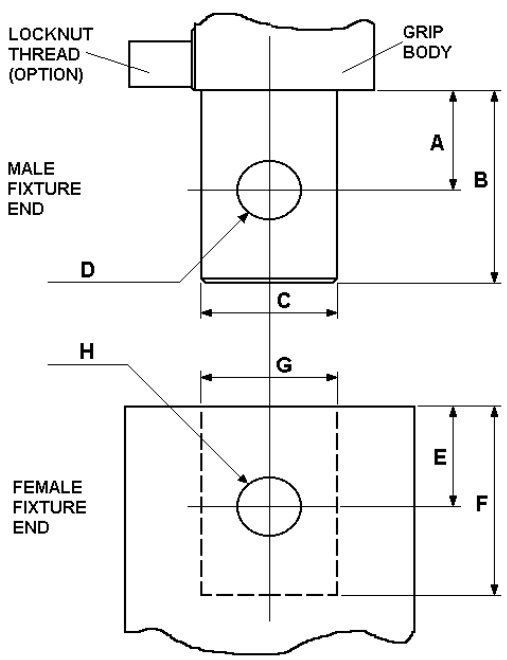
Female Fixture End

E 26.00 mm

F 46.00 mm

G Maximum 31.85 mm diameter
Minimum 31.80 mm diameter

H Maximum 12.80 mm diameter
Minimum 12.75 mm diameter

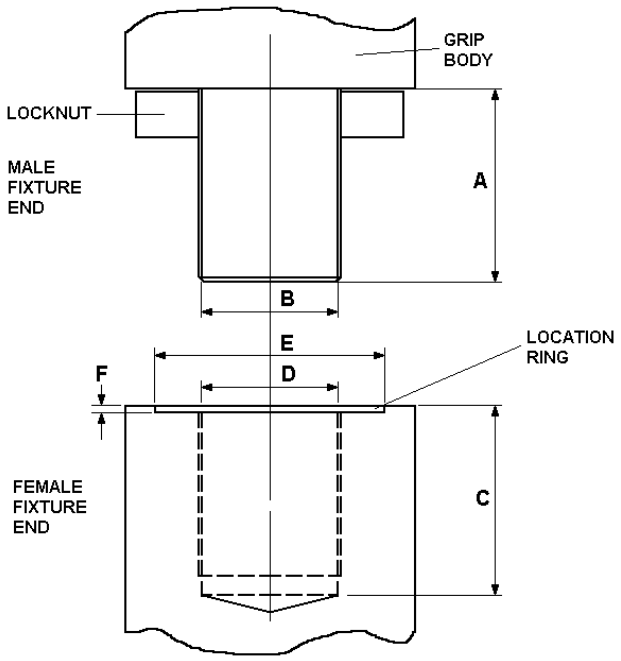


Threaded Interface

Threaded connections are most frequently found in hydraulic systems where grips and fixtures are larger and far less frequently removed. Threaded connections are also used on Instron® electromechanical systems above 100 kN (22,500 lbf). Threaded connections on hydraulic systems also feature wedge washers, which ensure that a pre-loaded connection does not loosen when used in fatigue applications. Threaded connections are defined by the diameter (in a similar way to clevis connections) and by the thread form. The thread form can be US Customary (inches) or metric (millimeters) and Left-Handed (LH) or Right-Handed (RH).

Many systems using threaded connectors feature female threads in the load cell and crosshead/actuator. Grips and fixtures generally feature female RH threads, although there are examples where male LH threads are used, especially on accessories designed for electromechanical systems.

As with the clevis design, it is simply a case of matching male and female versions of the same size and thread form to ensure compatibility.



Type: M30, Type I

Male Fixture End

A 28.72 mm

B M30×2 mm LH thread

Female Fixture End

C 40.00 mm

D M30×2 mm LH thread

E 40.02 mm diameter

F 3.06 mm

Notes: 1. RH threads were adopted on 8800 Series Dynamic systems from serial number 2000

COMPATIBILITY DETAILS

Type: M30, Type I

Male Fixture End

A 36.00 mm

B M48×2 mm LH thread

Female Fixture End

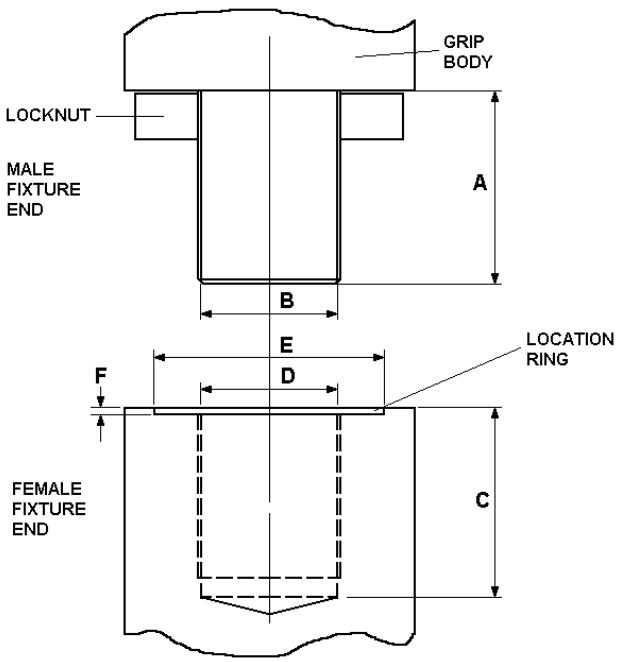
C 45.00 mm

D M48×2 mm LH thread

E 60.020 mm diameter

F 3.060 mm

Notes: 1. RH threads were adopted on 8800 Series Dynamic systems from serial number 2000



Type: M72, Type IIA

Male Fixture End

A 50.00 mm

B M72×3 mm LH thread

Female Fixture End

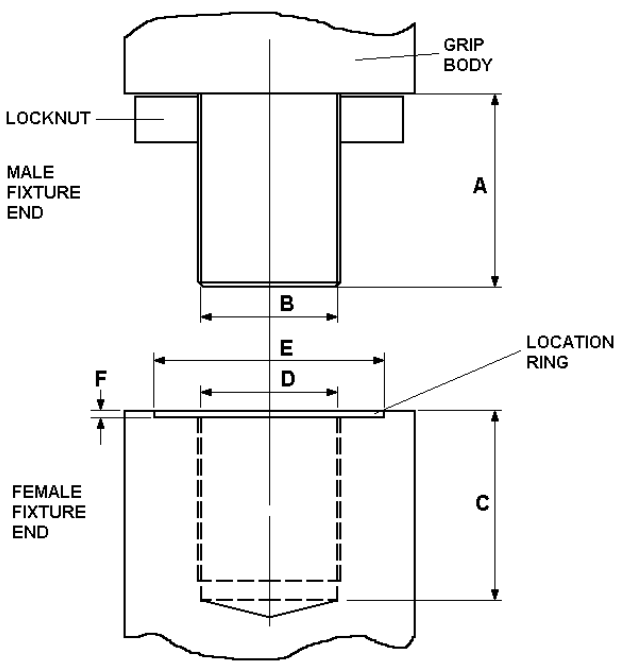
C 80.00 mm

D M72×3 mm LH thread

E 82.550 mm diameter

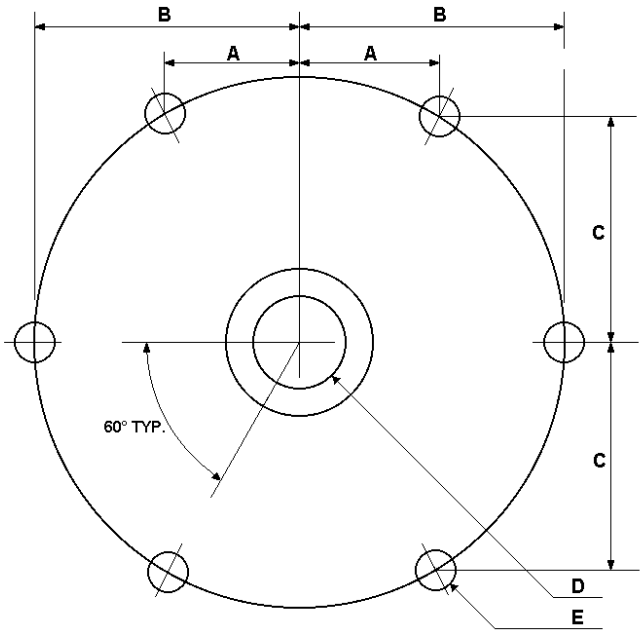
F 5.000 mm

Notes: 1. RH threads were adopted on 8800 Series Dynamic systems from serial number 2000



Bolt Interface

Most systems include a variety of bolt patterns for attaching adapters or grips and fixtures. The sizes and thread forms used depend on the age and size of the load frame. During the early 1980's, metric thread sizes began being used on many new load frame designs. An example of a typical bolt pattern for more recent models is shown. Always refer to your system documentation to confirm the actual mechanical interface details.



Type: Center Bolt Circle

Machine End

A 25.00 mm

B 50.00 mm

C 43.30 mm

D M30×2 mm LH thread

E M10×25 mm RH thread (six places)

Interface Codes

Sometimes attachments are referred to by a letter or number rather than the actual engineering description as shown below:

Type A Hook

Type OO 2.5 mm clevis pin

Type O 6 mm clevis pin

Type B 3/16 in clevis pin

Type C 1/4 in clevis pin

Type D 1/2 in clevis pin

Type 1 16 mm clevis pin

Type I M30×2 LH unless otherwise noted

Type II M48×2 LH unless otherwise noted

Type IIA M72×3 LH unless otherwise noted

COMPATIBILITY DETAILS

Accessory Mounting Holes

Some accessories, such as environmental chambers, furnaces and certain larger extensometers are designed to be mounted to the machine base. The majority of Instron® systems have 4 × M10 threaded mounting holes placed centrally at a spacing of 90 mm × 280 mm for attaching such accessories. Some earlier systems used a 1/2-inch thread rather than M10 for the bolt holes. Please check your system documentation.

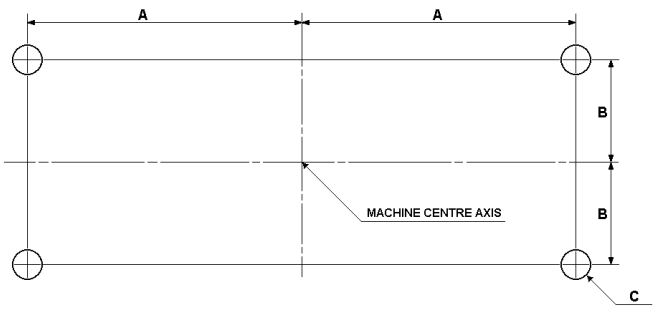
Type: Accessory Mounting Holes (not load rated)

Machine End

A 140.00 mm

B 45.00 mm

C M10×25 mm RH thread (four places)



Electrical, Electronic and Software Compatibility

The majority of accessories that interface to electronic controllers or electrical systems of the load frame are designed for specific models. Compatibility will be clearly shown in the catalog or any supplementary datasheet. In some cases it is necessary to ensure that the system has a certain revision of firmware — an upgrade may be required. Unless you are absolutely clear about the compatibility of the item you require, please contact us for guidance.

COUPLINGS, ADAPTERS AND ATTACHMENT KITS

INTERFACE CODES

Sometimes attachments are referred to by a letter or number rather than the actual engineering description as shown:

Type A Hook
Type 00 2.5 mm clevis pin
Type 0 6 mm clevis pin
Type B 3/16 in clevis pin
Type C 1/4 in clevis pin
Type D 1/2 in clevis pin
Type 1 16 mm clevis pin
Type I M30 × 2 LH unless otherwise noted
Type II M48 × 2 LH unless otherwise noted
Type IIA M72 × 3 LH unless otherwise noted

The following pages list the majority of current standard couplings, adapters and attachment kits available for Instron® testing systems. In addition to these, we have created many others that allow our accessories to be used on systems from other manufacturers. If you would like to use an accessory on a non-Instron system, please contact us - we would be happy to advise on adaptation.

Optional Frame Features 398-402



COUPLINGS, ADAPTERS AND ATTACHMENT KITS

RIGID COUPLINGS

Catalog Number	Description
2501-350	Rated capacity: 100 N, 2.5 mm - 6 mm accessory clevis-end fitting
S1-13807	Rated capacity: 100 N, 2.5 mm - 1/4 in accessory clevis-end fitting
2501-134	Rated capacity: 100 N, 6 mm - 3/16 in accessory clevis-end fitting
2501-160	Rated capacity: 5 kN, weigh beam to 6 mm accessory clevis-end fitting
2501-133	Rated capacity: 2 kN, 6 mm - 1/4 in accessory clevis-end fitting
2501-093	Rated capacity: 10kN, 6 mm - 1/2 in accessory clevis-end fitting
2501-120	Rated capacity: 2 kN, 1/2 in - 1/4 in accessory clevis-end fitting
2501-173	Rated capacity: 100 kN, 1/2 in - M30 × 2 RH accessory threaded-end fitting
2501-172	Rated capacity: 100 kN, 1/2 in - M48 × 2 RH accessory threaded-end fitting
2501-092	Rated capacity: 100 kN, 16 mm - ½ in accessory clevis-end fitting
2501-073	Rated capacity: 100 kN, 16 mm - M30 × 2 RH accessory threaded-end fitting
2501-171	Rated capacity: 100 kN, 16 mm - M48 × 2 RH accessory threaded-end fitting
8005-062	Rated capacity: 100 kN, M48 × 2 LH - 1/2 in accessory clevis-end fitting

TENSION COUPLINGS (FLEXIBLE)

Catalog Number	Description
2501-126	Rated capacity: 100 N, hook to a 3/16 in accessory clevis-end fitting
2501-115	Rated capacity: 100 N, 2.5 mm to 3/16 in accessory clevis-end fitting
2501-157	Rated capacity: 100 N, 2.5 mm to 1/4 in accessory clevis-end fitting
2501-109	Rated capacity: 100 N, 6 mm to 3/16 in accessory clevis-end fitting
2501-348	Rated capacity: 2 kN, 6 mm to 6 mm accessory clevis-end fitting
2501-094	Rated capacity: 2 kN, 6 mm to 1/4 in accessory clevis-end fitting
2501-091	Rated capacity: 10 kN, 6 mm to 1/2 in accessory clevis-end fitting
2501-090	Rated capacity: 100kN, 16 mm to 1/2 in accessory clevis-end fitting

ATTACHMENT KITS

Catalog Number	Description
8005-041	Attachment kit, rated capacity: 100 kN M30 × 2 LH - M30 × 2 RH accessory threaded-end fitting; includes wedge washers
8005-045	Attachment kit, rated capacity: 100 kN M30 × 2 LH - M48 × 2 RH accessory threaded-end fitting; includes wedge washers
8005-046	Attachment kit, rated capacity: 100 kN M48 × 2 LH - M30 × 2 RH accessory threaded-end fitting; includes wedge washers
8005-042	Attachment kit, rated capacity: 300 kN M48 × 2 LH - M48 × 2 RH accessory threaded-end fitting; includes wedge washers
8005-043	Attachment kit, Type 11Am LH (M72 × 3) to 11Am RH (M72 × 3) accessory threaded-end fitting; rated capacity: 600 kN static, 500 kN dynamic; includes wedge washers

COUPLINGS, ADAPTERS AND ATTACHMENT KITS

BASE/LOAD CELL ADAPTORS

Catalog Number	Description
2501-113	Crosshead/base adapter, rated capacity: 100 kN 6 × M10 on 100PC to 1/2 in accessory clevis-end fitting
2501-148	Crosshead/base adapter, rated capacity: 100 kN 6 × M10 on 100PC to M48x2 LH accessory threaded-end fitting
2501-086	Crosshead/base adapter, rated capacity: 100 kN 6 × M10 on 100PC to M30x2 LH accessory threaded-end fitting
2501-119	Adapter, rated capacity: 100 N, 1/2 in to 3/16 in accessory clevis-end fitting
2501-346	Adapter, rated capacity: 10 kN, 1/2 in to 6 mm accessory clevis-end fitting
2501-159	Adapter, rated capacity: 10 kN, 16 mm to 6 mm accessory clevis-end fitting
2501-338	Adapter, rated capacity: 100 kN, 1/2 in to 16 mm accessory clevis-end fitting
8000-025	M30LHm to 1/2” clevis pin (Type Df)

GRIP ADAPTERS

Catalog Number	Description
2501-194	Piggyback Adapter, rated capacity: 100 kN, converts pneumatic wedge grips 2716-110, 2716-120 to M30×2 LH with 6 x M10 on 100 PCD)
2501-208	Piggyback Load Cell Adapter for use with Type D load cell clevis. Allows the high capacity cell to remain bolted to the crosshead while a more sensitive, low capacity cell is installed. Bolts to load cell and provides a Type D f (1/2” clevis) attachment. For mounting 2580 Series load cells. Compatible with 500 N, 1kN, 1kN & 5kN capacities only.
2501-209	Piggyback Load Cell Adapter for use with Type D load cell clevis. Allows the high capacity cell to remain bolted to the crosshead while a more sensitive, low capacity cell is installed. Bolts to load cell and provides a Type D f (1/2” clevis) attachment. For mounting 2580 Series load cells. Compatible with 10kN, 30kN & 50kN capacities only.
2501-210	Piggyback Load Cell Adapter for use with Type D load cell clevis. Allows the high capacity cell to remain bolted to the crosshead while a more sensitive, low capacity cell is installed. Bolts to load cell and provides a Type D f (1/2” clevis) attachment. For mounting 2530 Series load cells. Compatible with 5 N, 10 N, 50 N, 100 N, 500 N, 1kN, 2kN & 5kN capacities only.
2501-235	Adapter for mounting 2530, 2525 or 2518 load cells on 338X floor model systems. The lower capacity load cell can be either connected to the 338X load cell or the 338X load cell can be removed and the lower capacity load cell can then be connected directly to the crosshead.

COUPLINGS, ADAPTERS AND ATTACHMENT KITS

8800 SERIES SYSTEMS WITH SERIAL NUMBER ABOVE H2000

Catalog Number	Description
8000-050	Mounting flange for 8870 base providing central M20 × 1.5 RH female thread
8000-049	Base mounting kit for 8871/214 load cell. Suitable for mounting Dynacell™'s 100 N, 250 N, 1 kN, 5 kN, 10 kN and 25 kN to the base of 8870 machines
8000-087	M20 × 1.5 to M20 × 1.5 attachment kit
8000-044	M20 × 1.5 to M30 × 2 attachment kit; this kit is for attaching M30 accessories to M20 load cell or actuator
8000-091	M30 to M30 × 1.5 attachment kit; this kit is for attaching M30 accessories to M30 load cell or actuator
8000-045	M20 × 1.5 to ½ in clevis pin
8000-046	M20 × 1.5 to 16 mm clevis pin
3555K	M20 × 1.5 to 6 mm clevis pin
8000-120	Attachment kit for low-force Dynacell 2527-130, 2527-131 or 2527-132 to M20 RH female thread
8000-121	Attachment kit for low-force Dynacell 2527-130, 2527-131 or 2527-132 to M30 RH female thread
8000-122	Attachment kit for low-force Dynacell 2527-130, 2527-131 or 2527-132 to M30 LH female thread
8000-101	Attachment kit to provide M20 × 1.5 female thread on 8874 actuator/load cell. Converts 6 × M8 on 75 PCM bolt pattern to M20 × 1.5 central female thread. For attaching single-axis grips and fixtures to 8874 machine.

Notes:
1. All machines after 8800 H2000 have metric RH threads in actuator, load cell, grips and fixtures
2. Load cells and actuators in the range 5 kN to 25 kN normally have an M20 × 1.5 RH thread

ATTACHMENT KITS FOR LOAD CELLS AND ACTUATORS FROM 50 KN TO 100 KN

Catalog Number	Description
8000-090	M30 × 2 to M30 × 2 attachment kit
8000-091	M30 × 2 to M20 × 1.5 attachment kit; this kit is for attaching M20 accessories to M30 load cell or actuator
8000-108	M30 × 2 to ½ in clevis pin
8000-026	Adapter, clevis pin (16 mm) to M30 × 2 RH female thread

Notes:
1. Load cells and actuators of 50 kN and 100 kN normally have an M30 × 2 RH thread

ATTACHMENT KITS FOR LOAD CELLS AND ACTUATORS FROM 50 KN TO 100 KN

Catalog Number	Description
8000-092	M48 × 2 to M48 × 2 attachment kit
8000-093	M48 × 2 to M30 × 2 attachment kit
8000-094	M48 × 2 to M20 × 1.5 attachment kit

Notes:
1. Load cells and actuators of 250 kN normally have an M48 × 2 RH thread

ATTACHMENT KITS FOR LOAD CELLS AND ACTUATORS OF 500 KN

Catalog Number	Description
8000-095	M72 × 3 to M72 × 3 attachment kit
8000-096	M72 × 3 to M48 × 2 attachment kit
8000-097	M72 × 3 to M30 × 2 attachment kit

Notes:
1. Load cells and actuators of 500 kN normally have an M72 × 3 RH thread

ATTACHMENT KITS FOR LOAD CELLS AND ACTUATORS OF 1 MN

Catalog Number	Description
8000-092	M100 × 4 to M100 × 4 attachment kit
8000-099	M100 × 4 to M72 × 3 attachment kit
8000-100	M100 × 4 to M48 × 2 attachment kit

Notes:
1. Load cells and actuators of 1 M normally have an M100×4 RH thread

ATTACHMENT KITS FOR LOAD CELLS AND ACTUATORS OF 2.5 MN

Catalog Number	Description
8000-092	M150 × 4 to M150 × 4 attachment kit
8000-093	M150 × 4 to M100 × 4.5 attachment kit

Notes:
1. Load cells and actuators of 2.5 MN normally have an M150 × 4 RH thread

COUPLINGS, ADAPTERS AND ATTACHMENT KITS

ATTACHMENT KITS FOR 8800 SYSTEMS BEFORE SERIAL NUMBER H2000

Catalog Number	Description
8000-037	M30mRH to M30mLH (Type I) attachment kit with screw locks and adapters
7325C	Allows attachment of M20 RH accessories to M30 LH actuator/load cell; requires suitable attachment kit for accessories (not included)
8005-041	Attachment kit; rated capacity: 100 kN, M30x2 LH - M30 × 2 RH accessory threaded end fitting; includes wedge washers
8005-046	Attachment kit; rated capacity: 100 kN, M48x2 LH - M30 × 2 RH accessory threaded end fitting; includes wedge washers
8000-031	Load cell/actuator Type II to Type I and II
8000-032	Load cell/actuator Type IIA to Type IIA and II
8000-033	Load cell/actuator Type III to Type II and IIA
8000-030	Load cell/actuator Type I to Type I and II
8000-025	Adapter clevis ½ in pin to M30 × 2 (male)

Notes:
1. Machines before 8800 H2000 had the following convention:
2. Actuator or load cell
   - M30 × 2 LH thread, Type I
   - M48 × 2 LH thread, Type II
   - M72 × 3 LH thread, Type IIA
   - M100 × 4 LH thread, Type III
   - M150 × 4 LH thread grips and fixtures, Type IV
   - M30 × 2 RH thread, Type I
   - M48 × 2 RH thread, Type II
   - M72 × 3 RH thread, Type IIA
   - M100 × 4 RH thread, Type III
   - M150 × 4 RH thread, Type IV
3. 8511 machines had the following convention:
   - ±18 kN dynamic system - M16 LH thread
   - ±47 kN dynamic system - M24 LH thread

ATTACHMENT KITS FOR MODEL 8511

Catalog Number	Description
8000-070	Load Cell/actuator Type I
8000-071	Load cell/actuator Type II to Type I and II
8000-078	Load cell/actuator Type IIA to Type IIA and II
8000-076	Load cell/actuator Type III to Type II and IIA
8000-077	Load cell/actuator Type I to Type I and II
8000-079	Adapter clevis ½ in pin to M30 × 2 (male)

Notes:
1. Connection types for Legacy Dynamic Systems:
   - 1 ¼ in - 12 RH, Type A
   - 1 in - 14 RH, Type B
   - 2 in - 12 RH, Type C
   - 2 ½ in - 12 RH, Type D

COUPLINGS, ADAPTERS AND ATTACHMENT KITS

ADAPTERS, ATTACHMENT KITS AND RIGID COUPLINGS FOR INSTRON® SATEC™ SYSTEMS

Catalog Number	Description
W-5172-C	0.5 in - 13 mRH to Dm



SELECTING THE RIGHT GRIPS AND JAW FACES

Selecting the best gripping solution has a number of aspects to it. In particular, the specimen must be held in a way that prevents slippage and jaw breaks, and ensures axiality of the applied force. However, there are other considerations, such as productivity and ease of use, that may make one design better suited to your needs. In the case of some test types, the gripping requirements are very specific and a purpose-designed grip or fixture may be available. Such grips and fixtures are often designed to meet a particular testing standard, making selection very straightforward.

For a great many tests however, you can use general purpose accessories. General purpose grips and fixtures have the advantage of being able to grip a wide variety of specimen types and materials using a range of options such as different jaw faces, alignment fixtures, etc. Choosing the correct grip and options available for your application is more involved because of the variety available. The application suitability of Instron® accessories is covered in the introduction page of each accessory section in this catalog, and also in the various datasheets and brochures relating to specific products. The following pages summarize the advantages of different types of general-purpose grips and fixtures so you can identify the most appropriate type for your application. Please refer to specific product sections and datasheets for more detailed information concerning specific grip types. If you need expert advice on selecting the best gripping solution, please contact us.

Selecting the Right Grips and Jaw Faces 404-408

6.3

SELECTING THE RIGHT GRIPS AND JAW FACES



Screw Action Grips

Screw action grips provide a very simple and efficient method for holding flat test specimens in applications where you must easily insert the specimen and quickly apply a clamping force. Jaw faces can be adjusted to accommodate different specimen thicknesses. This ensures that the line of tensile force remains concentric with the grip body. Grips can be equipped with a selection of interchangeable grip jaw faces in various sizes and choice of surfaces including smooth ground, rubber-coated and serrate. Line contact and special-coated faces are also available.

- Type of loading: Tensile, static and tension-tension cyclic tests (not suitable for high-cycle fatigue tests)
- Specimen material: Thin sheets, films, foils, threads, plastic tapes, fine wires, fabric and soft materials
- Specimen shapes: Round (wires) and flat specimen with or without shoulder tab ends



Manual Wedge Action Grips

The manual wedge-action grip is designed for easy specimen loading, alignment and positioning. After initial face-to-specimen contact, gripping force will increase as the testing load increases. Virtually no pre-load is seen during specimen clamping due to the Instron® design of moving grip bodies. This makes them particularly suitable for testing high-strength materials, such as metals and composites, ensuring that specimen slippage is eliminated. A strong clamping force can be applied to materials that are difficult to hold through a high mechanical advantage achieved by the tightening mechanism. The grip faces are spring-loaded against a shoe, which is in a fixed position in respect to the test frame holding mechanism. Only a light initial gripping force needs to be applied to the specimen. Where very good alignment is required, Precision Mechanical Wedge grips offer exceptional stiffness and superior alignment for critical tests on composites and aerospace materials.

- Type of loading: Tensile, static and tension cyclic tests (not suitable for high-cycle fatigue test)
- Specimen material: Wires, plastics, metals, composites
- Specimen types: Flat, round



Mechanical Lever Action Wedge Grips

T-grip holders are available with two types of actuation: lever/spring or screw type. All capacities of T-grips are offered with lever/spring actuation, which uses a lever to raise and lower the jaws in the grip pocket and a spring to provide the initial clamping force on the specimen. When loading a specimen, the operator locks open the bottom jaw, opens the upper jaw and places the top half of the specimen inside. Once the specimen is clamped securely within the upper jaw, the operator positions the bottom half of the specimen into the lower grip jaws and unlocks the jaws. This provides clamping force and secures the specimen so that the test may be conducted.

- Type of loading: Static tension
- Specimen material: Wires, plastics, metals
- Specimen types: Flat or round specimens

SELECTING THE RIGHT GRIPS AND JAW FACES

Pneumatic Wedge Action Grips



The grips are operated with a control knob mounted on the grip or with an Instron® standard pneumatic control kit. Powered by pneumatic control, the faces are moved by a pneumatic piston, which eliminates a costly hydraulic pump and its control. When under load, the wedge action provides additional clamping pressure to minimize specimen slippage. A unique carrier/ face mounting system allows for easy face insert changes. The carrier is placed on the grips and held on by springs from the grip body and against the driving piston. The faces sit on the carrier held by a couple of thumb screws (or by a magnet). The lubrication of the jaw face carrier is through a standard grease fitting. This eliminates the need to remove either the faces or the carriers for greasing. Each face set can accommodate a wide range of specimen types offering flexibility with a minimum number of face changes.

- Type of loading: tension (not suitable for through-zero/reverse stress or fatigue testing)
- Specimen material: wires, rigid plastics and metals
- Specimen shapes: flat, round

Pneumatic Side Action Grips



Pneumatic action grips clamp the specimen through a dual lever arm, actuated by air cylinders built into the grip body. The gripping force can be increased with air pressure to accommodate materials that are often difficult to hold. This constant gripping force is maintained on the specimen and provides the ultimate in “follow-up” action to compensate for any decay in the gripping force. The grips are closed or opened by a pneumatic footswitch for hands-free operation. An automatic air kit is also available for both hands-free and automated testing via software or system default settings. The interchangeable jaw faces are mounted in such a manner that one face is free to swivel on a horizontal axis and the other on a vertical axis. This action allows for alignment to compensate for variations in sample thickness.

- Type of loading: Tensile, static, tension-tension cyclic tests (not suitable for high-cycle fatigue tests)
- Specimen material: Thin sheets, films, foils, threads, plastic tapes, fine wires and soft materials such as elastomers
- Specimen shapes: Round (wires) and flat specimen with or without shoulder tab ends

Hydraulic Side Action Grips



Hydraulic grips are used where high tensile forces are required during testing. The grips are suitable for testing a wide range of metallic and high strength non-metallic materials. Ideally suited for testing flat, hexagonal and round sections. The grips are designed so that the specimen can be entered from the front for fast accurate loading. Quick clamping and release of the test specimen is made possible through the use of a hydraulic power pack controller unit. The dual sided grips close symmetrically about the tensile axis.

- Type of loading: Tensile, static and tension cyclic tests (not suitable for high-cycle fatigue tests)
- Specimen material: Wires, reinforcing bar, metals and alloys
- Specimen shape: Round, hexagonal and flat specimens

SELECTING THE RIGHT GRIPS AND JAW FACES



Shoulder and Threaded End Specimen Grips

These grips are designed specifically for specimens that feature threaded or shoulder ends. They are very simple in design as well as compact and easy to use. The purely mechanical operation and solid steel construction of all parts ensure durability while requiring minimal maintenance.

- Type of loading: Static, tension
- Specimen material: Wide variety of metals, including, but not limited to steel, cast iron, aluminum, titanium, and brass
- Specimen types: Machined, shoulder end specimens and machined, threaded end specimens



Lever Action Grips

The lever action grips provide the ideal means to hold single fiber specimens and very fine wire. The grips are simple, lightweight and symmetrical in design. The rubber-coated grip faces are mounted on steel pins so that one face is free to swivel on a horizontal axis and the other on a vertical axis. This action allows self-alignment that compensates for variations in specimen thickness. The grip is designed to minimize the incidence of jaw breakage through clamping adjustment and free pivoting of the faces. Also, the lower grip can be mounted horizontally with an offset mounting bracket, to allow a pre-tension weight to hang on the specimen.

- Type of loading: Tensile, cyclic, static, tension-tension tests. (not suitable for high-cycle fatigue tests)
- Specimen material: Fine wires and filaments
- Specimen shapes: Round and flat specimens with or without shoulder tab ends



Self-Tightening Grips

Self-tightening grips are primarily designed for the testing of elastomeric and other flexible materials exhibiting a large reduction in cross section area under load. They provide excellent testing accuracy, positive non-slip gripping action, and are quick and simple to use.

- Type of loading: Tensile, static, tension cyclic tests (not suitable for high-cycle fatigue tests)
- Specimen material: Thin sheets, films, flexible plastic and elastomers
- Specimen shapes: Flat specimen with or without shoulder tab ends

SELECTING THE RIGHT GRIPS AND JAW FACES

Hydraulic Wedge Grips for Fatigue



Each grip functions independently of the other. An external hydraulic supply provides pressure to both open and close the grips. When gripping pressure is applied, the relative vertical position of the specimen/jaw faces remains unchanged to prevent generation of specimen load during the gripping process. Once the grip faces contact the specimen, the hydraulic pressure produces a vertical force on the grip head. The grip force will remain constant as the design automatically compensates for specimen thickness changes.

- Type of loading: static or dynamic, reverse stress
- Specimen material: metallics, plastics, composites
- Specimen geometries: round section (not buttonhead) or flat specimens with or without shoulder tab

Mechanical Wedge Grips for Fatigue



Each grip is mechanically operated. Gripping force is applied via movement of the grip body relative to the wedge shaped jaw faces. This movement is induced by the tightening of four socket cap screws on the underside of the grip head. Each jaw face is located in the grip body by two extension springs, which allow the jaw faces to release the specimen after testing. The grip body wedge area is fitted with jaw guides to ensure that the jaw faces remain square to each other and to the specimen.

- Type of loading: static or dynamic, reverse stress
- Specimen material: metallics, plastics, composites
- Specimen geometries: round section (not buttonhead) or flat specimens with or without shoulder tab

SELECTING THE RIGHT GRIPS AND JAW FACES



Jaw Faces for Manual Wedge Action Grips

2703 Series jaw faces are for Instron® 2716 and 2736 Series wedge action grips. Variations of flat surfaces and V-grooved faces have been developed to accommodate a wide range of requirements. The faces are made of vanadium steel and are serrated for maximum gripping effectiveness. Serrations of 16 and 25-teeth per inch are available.

- Suitable for: Tension applications for wires, plastics, metals, and other rigid and semi-rigid materials
- Specimens may be round or flat



Jaw Faces for Screw Action and Pneumatic Action Grips

2702 Series jaw faces are for Instron 2710 and 2712 Series side action grips. Not every face can be used to test every material. A variety of flat surfaces have been developed to accommodate a wider range of requirements. The faces are provided with serrations, smooth, rubber-coated, high-friction compound and wave profile for maximum gripping effectiveness.

- Suitable for: Tension applications for wires, plastics, metals, elastomers, and textiles



Jaw Faces for Fatigue-rated Hydraulic Wedge Grips

2703 and 2704 Series flat and V-faces accommodate a wide range of specimen sizes in both flats and rounds, and feature serrated or carbide surfaces for optimim gripping.

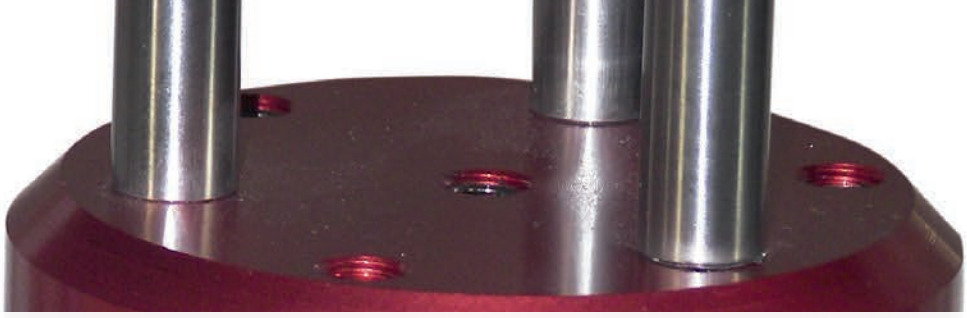
- Suitable for: Static and fatigue tests on a wide variety of metallic and rigid non-metallic materials including composites



Buttonhead and Threaded Specimen Holders

Holders are available to suit metallic threaded end or buttonhead specimen styles in a range of different force capacities and sizes. Threaded holders allow the specimen to be located directly by matching threads on the specimen. Buttonhead holders support the specimen under its shoulders.

- Suitable for: Tests on threaded and buttonhead specimens made from metals and alloys



MATERIALS TESTING HINTS AND TIPS

Materials Testing Systems are Potentially Hazardous

Materials testing systems are potentially hazardous. Materials testing involves inherent hazards from high forces, rapid motions and stored energy. You must be aware of all moving and operating components that are potentially hazardous, particularly the actuator in a servohydraulic testing system or the moving crosshead in an electromechanical testing system. Whenever you consider that safety is compromised, press the Emergency Stop button to stop the test and isolate the testing system from hydraulic or electrical power.

Carefully read all relevant manuals and observe all Warnings and Cautions.

Ensure that the test set up and the actual test you will be using on materials, assemblies or structures constitute no hazard to yourself or others. Make full use of all mechanical and electronic limits features. These are supplied to enable you to prevent movement of the actuator piston or the moving crosshead beyond desired regions of operation. Your best safety precautions are to gain a thorough understanding of the equipment by reading your instruction manuals and to always use good judgment. You will find more specific warnings and cautions in the manuals whenever a potential hazard exists.

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SPECIMEN GRIPPING SOLUTIONS

Two of the most common problems operators face are specimen slippage and failure of the specimen in the gripped portion (“jaw break”)

Slippage occurs most frequently when using mechanical or screw action grips with flat faces. Faces come in various combinations of sizes and coatings. When selecting faces, the surface area should be large enough to cover the tab (if it’s a dumbbell sample) or, for a parallel sample, as much of the surface area as possible.

With any grip, ensure that the specimen end is gripped by at least 75% of the available jaw face length, otherwise gripping efficiency will reduce and in some cases the jaw face can be damaged.

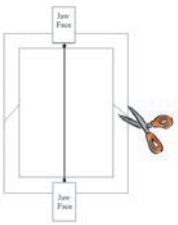
The important thing to bear in mind when running into gripping problems is not to hesitate to experiment. How you arrive at the end result (i.e. no slippage and no jaw breaks) is incidental.

Specimen Slippage - Several Approaches:

- Use larger faces to provide a greater contact area.
- Cover the face with masking tape, crocus cloth or
- various grades of emery cloth.
- Using pneumatic grips will allow you to control
- and duplicate the clamping forces on a specimen
- (all pneumatic grips should have a pressure adjusting
- valve plus a filter in the supply line).
- When running tests at elevated temperatures, use faces coated with brake lining material rather than rubber.

Jaw breaks usually occur when the sample inside the grips is damaged by too much clamping force or by serrated faces biting too deep:

- Screw action grips: The operator may be using too much force when tightening onto the sample. Use a torque wrench or pneumatic grips.
- Pneumatic grips: Drop the pressure, but not to the point where you get slippage.
- Serrated faces: Change to faces that have more serrations per inch (less bite).
- Serrated faces: Cover with masking tape or comparable material. This will soften the bite and prevent damage to the sample.



Testing Monofilaments and Single Fibers

A single fiber or monofilament may be affixed to an aperture card. The gauge length of the specimen is the height of the aperture. The card is cut on the slant on either side of the specimen after it has been mounted in the testing instrument.



Using Line Contact Grip Faces

Paper and other sheet materials are best gripped in line contact grip faces, where the gauge length is between the center of the two line contacts.



Using Plain and Serrated Grip Faces

Plain ground grip faces can be used to grip film, foil and other sheet materials. Sheet metal specimens should be gripped with serrated faces, where the diamond serrations will bite into the specimen to prevent slippage.

LOOKING AFTER YOUR GRIPS



Any successful gripping solution can be adversely affected by poor maintenance. Many common gripping techniques rely on friction or local surface deformation of the specimen to function. If the gripping surfaces become worn or contaminated, a loss in gripping efficiency occurs. Ultimately this causes slippage of the specimen and an invalid test.

The first response to slippage is often to increase the gripping force by over-tightening mechanical grips or to increase the pressure of pneumatic or hydraulic grips. Although this may temporarily solve the slippage, it can also bring new problems:

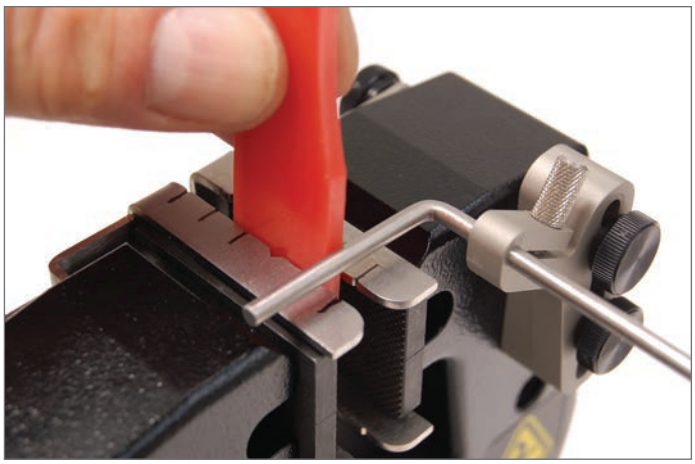
- Simple screw action grips are often tightened with a spanner or wrench. It is very easy to exert very high torque loadings to the load cell unless care is taken. Excessive tightening can easily damage low force load cells. Taken to extremes, it is possible to damage the grips themselves. Use a small torque wrench to achieve consistent gripping force.
- Increasing the pressure applied to the specimen by the gripping system also increases the chance of influencing the mechanical properties. This is especially true of materials that are weaker in compression than in tension (aramid fibers are an example). Increases in jaw breaks often accompany increases in gripping force.

Poor maintenance can result in uneven or inconsistent gripping. High frictional losses in screw grips reduce the clamping force on the specimen for a given tightening force. Friction effects in wedge grips can induce bending if the faces move unevenly.

Golden Rules for Reliable Gripping

- Regularly clean and lubricate moving parts with the correct grades of lubricant as advised by the manufacturer. This is especially important for wedge action grips, which rely on the smooth sliding of the jaw faces along an inclined plane for their correct function.
- Periodically inspect the grips for defects, such as cracks or leaks in hoses.
- Periodically verify that pressure gauges are accurately registering air or oil pressure to the gripping system.
- Replace jaw faces when the surfaces become worn, damaged or contaminated. Some jaw face surfaces, such as rubber-coated types, can degrade over time simply due to exposure to air and light. This degradation can accelerate if jaw faces are used under non-ambient conditions in an environmental chamber.
- Do not use more gripping force than necessary to provide reliable, slip-free gripping.
- Old grips don't necessarily work with new materials or specimens. You may find that special grips or different jaw face surfaces are needed. You can try a variety of things to modify existing gripping methods including emery cloth, sticky tape, etc.

OPTIMIZING SPECIMEN ALIGNMENT





As a general rule, care should always be taken to ensure that the axis of force application runs through the centerline of the specimen. Off-axis loading of the specimen can lead to various problems:

- Specimen bending, which results in poor modulus values when using single-sided extensometers
- Specimen buckling in compression and through-zero tests
- Offset loading of the load cell, leading to errors in output or in extreme cases load cell damage
- Non-uniform stress conditions within the material, making it behave differently
- Edge effects caused by high local stress at the specimen edges
- Scatter in test results if the misalignment is random

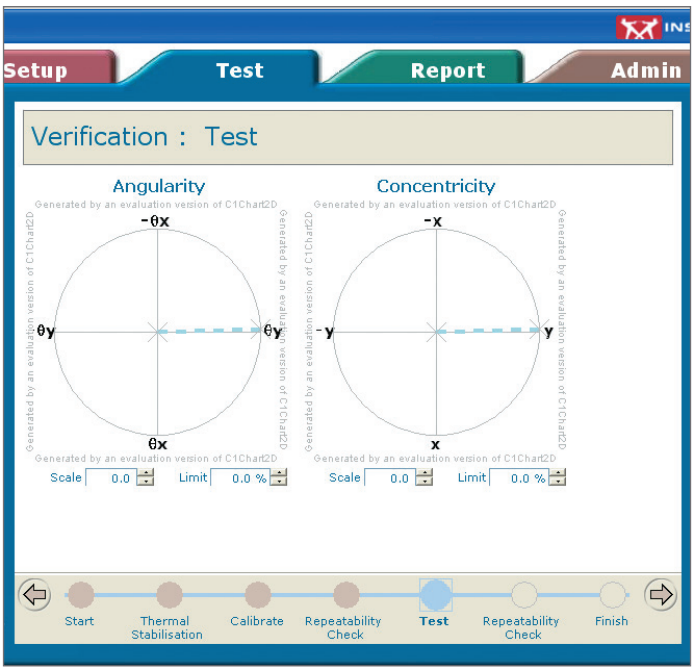
There are several ways to improve the alignment of the specimen. Some applications require the use of additional fixturing to obtain the best possible alignment, where others may simply require more attention by the operator to ensure the specimen is loaded accurately and consistently.

Flexible or universal couplings can be employed to allow the grip to align itself with a slightly bent specimen. Some types of grips employ two universal couplings, one at the top and one at the bottom.

Some grips and fixtures feature specimen stops that allow the specimen to be accurately and repeatably located.

OPTIMIZING SPECIMEN ALIGNMENT



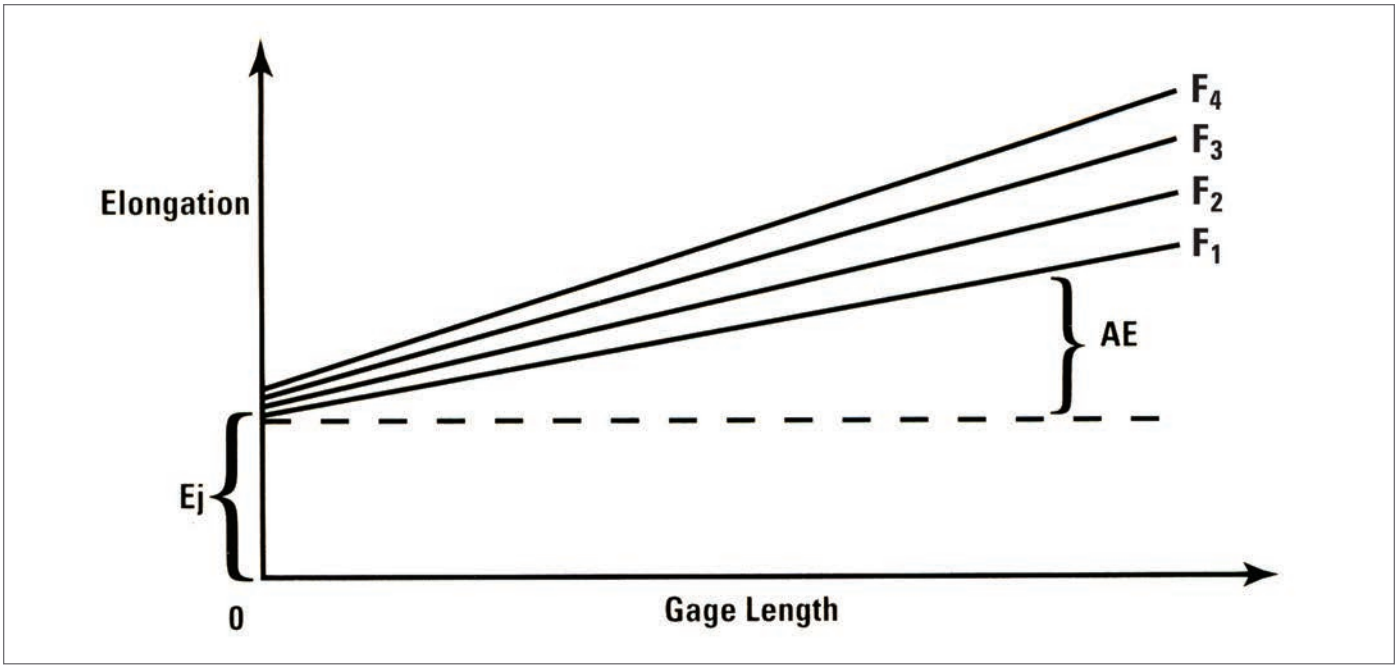


Applications, such as Low Cycle Fatigue (LCF), where alignment is critical are best handled using fully-rigid load strings with special adjustable alignment fixtures. Typically these allow adjustment of both concentricity and angularity. The Instron® AlignPro™ system allows the user to monitor the output from a strain gauged specimen while making alignment adjustments.

Apart from special equipment designed to improve alignment, there are some simple guidelines you can follow to help improve or maintain good specimen alignment:

- Check basic alignment using a stiff, straight specimen, such as a piece of steel. Small adjustments can often be made by slackening and retightening the load cell and base adapter mounting bolts.
- Make sure that any universal couplings or jaw faces designed to pivot are free from wear and well lubricated. If in doubt, replace them.
- Check grips periodically for any accidental damage that might cause misalignment.
- Some grips (e.g. screw action grips) have independently adjustable jaw faces. Ensure that they are adjusted to grip the specimen down the centerline of the applied force. If the specimen thickness changes significantly, remember to adjust both faces to maintain good axial alignment.
- Ensure that your specimen preparation is good. A bent or badly prepared specimen can make all your other efforts worthless.
- Make sure that you pre-load the load string if your grips feature lock or check nuts. Load the system to the maximum grip capacity and hand-tighten the lock nuts before releasing the load. This also increases the stiffness of the load string and eliminates backlash and play (often seen as non-linear effects at the beginning of the test).
- Ensure that the load cell is bolted firmly to the load frame using the correct number of bolts and the correct torque.
- Ensure that all connecting pins and adapters are in good condition. DO NOT use bolts or undersize pins to substitute for the correct Instron parts. Consider buying spare pins to replace worn or lost items.
- Ensure your grips and fixtures are clean and lubricated with the recommended lubricants. Jaw faces designed to slide in the grip body, such as in wedge grips, will not function correctly without lubrication and can induce bending if one face slides and the other does not. Specimen slippage can also occur.
- Make sure that system users understand that care taken in loading the specimen will minimize scatter in test results.
- Flexible or universal couplings can be employed to allow the grip to align itself with a slightly bent specimen. Some types of grips employ two universal couplings, one at the top and one at the bottom.

GRIP PENETRATION EFFECTS



Determining Effective Gauge Length

If grip pressure on the clamped specimen is not uniform throughout the clamped length, a certain amount of specimen extension may take place within the grips. When this happens, if the elongation is measured from the test curve and a calculation of percentage elongation is based on the separation between the grip at the start of the test, the resulting figure will be in error.

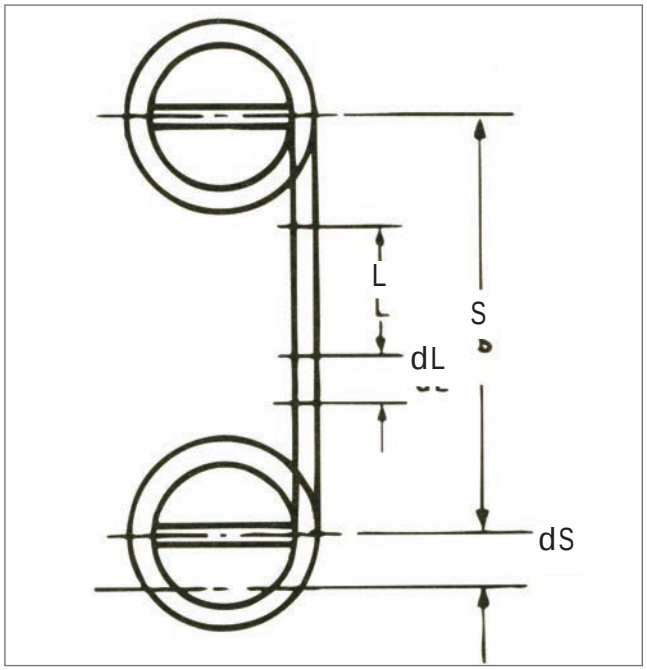
Extension of the specimen within the grips is referred to as grip penetration. It may not be apparent from examining the load elongation curve whether grip penetration has occurred since it will not produce a stick-slip effect, but it is proportional to the applied load. As grip penetration is proportional to load, the load elongation curve will remain smooth and apparently normal.

A method for determining the presence and magnitude of possible grip penetration is to plot elongation against gauge length for a given applied force (Fx). If the resulting line, when extrapolated to zero gauge length, does not pass through the origin, but gives a positive displacement on the elongation axis, then this is the result of grip penetration. It is essential when performing these tests to always test the specimen at the same strain-rate since certain materials are strain-rate sensitive. For example, the longer the gauge length, the faster the required crosshead speed, and the ratio between gauge length and crosshead speed will be constant.

Calculating Effective Gauge Length

The intercept gives a value Ej representing elongation within the grip at a specified load. The quantity AE represents the true elongation for a corresponding gauge length or grip separation. When calculating elongation from a load verses strain graph, the value Ej should be subtracted from the total elongation before dividing this value by the gauge length or grip separation figure.

CALCULATING STRAIN AT FAILURE FOR YARNS AND TEXTILES USING THE EFFECTIVE GAUGE LENGTH METHOD



The stress/strain curve is reasonably linear from 90% of the failure load up to failure for most highly-twisted yarns and tightly-woven textiles. This characteristic can be used to extrapolate a known strain at 90% to obtain the real strain at failure. The strain calculated using the initial grip separation at gauge length is in error due to grip penetration. The Effective Gauge Length (EGL) is a value by which the increase in grip separation must be divided to obtain the real strain of the specimen. The EGL can be determined by conducting a calibration test where two marks have been placed on the specimen at a known separation, L. The initial grip separation, S is noted. The test is now performed but stopped at 90% of the failure load. At this point the changes in separation dL and dS are noted. Then:

$$\frac{dL}{L} = \text{true strain}$$

$$\text{also: } \frac{dL}{L} = \frac{dS}{EGL}$$

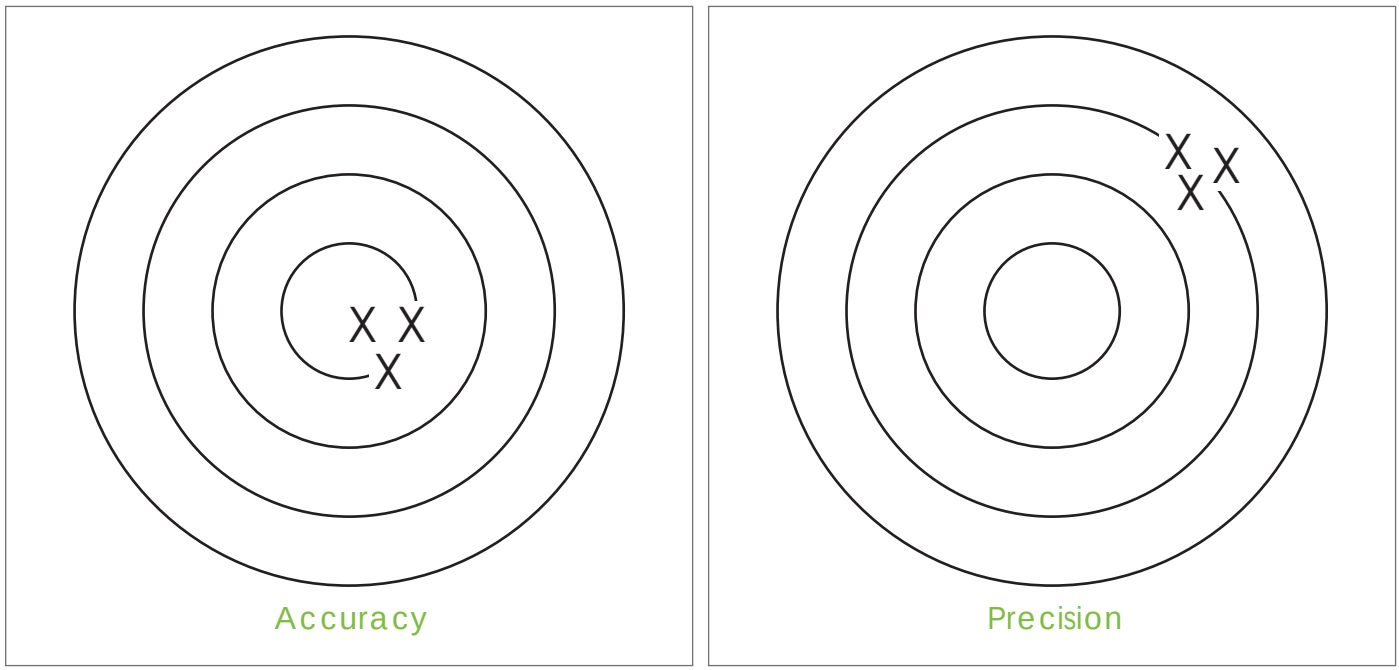
$$\text{therefore: } EGL = \frac{dS.L}{dL}$$

So for subsequent tests, with an initial separation, S:

$$\text{Strain at failure} = \frac{dS\ (\text{failure})}{EGL}$$

This technique can only be used for calculating strain at failure, because of the varying degrees of grip penetration as the specimen properties change during a test.

ACCURACY AND PRECISION: UNDERSTANDING THE DIFFERENCE



Precision, accuracy and resolution are all terms that we encounter frequently in daily life and certainly in the specification of testing equipment. The illustration below shows the interrelationships between these terms.

Accuracy is precision with calibration. This means that you not only repeat time and again, but also hit what you are aiming for within prescribed error limits.

Precision means that you can hit the same point time and again within certain limits. But, as the target illustrates, you can be precise without 'hitting the bullseye'.

Accuracy, precision and calibration are similar terms but with very dissimilar meanings.

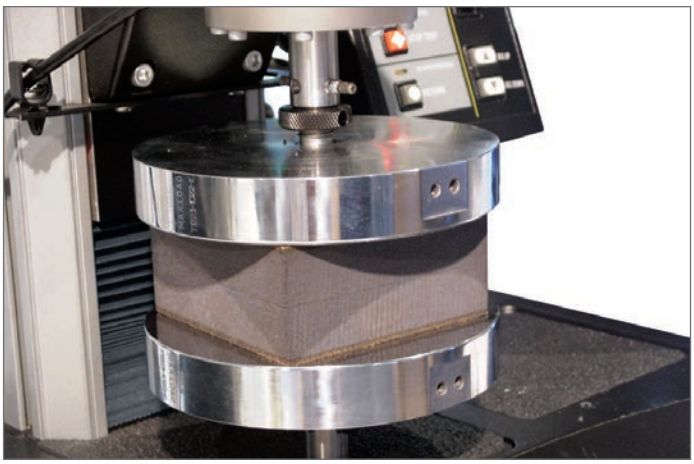
Accuracy is difficult without good precision. Precision, however, does not ensure accuracy. Precision with calibration results in accuracy.

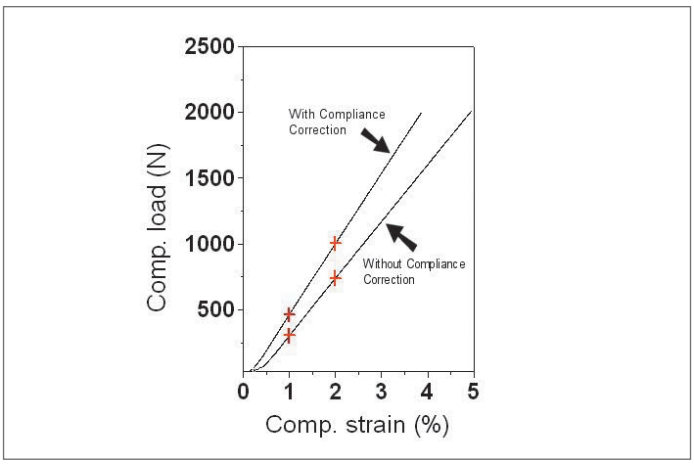
Resolution is the ability of a system to detect small changes but does NOT mean that the value of the changes is accurately reported. When you look at the specification of measurement devices, remember that the only meaningful measure is accuracy.

However, it is also possible to be misled by an accuracy specification. What really matters is the system accuracy. For example, a load cell may have a particular accuracy specification but that does not mean that you will get that accuracy once you have connected it to your test system. The overall system accuracy is also affected by the load cell conditioning electronics and the readout resolution.

Instron® prides itself on specifying system accuracies very precisely and unambiguously so that you do not doubt what accuracy you will achieve. This includes a clear statement of the range over which the accuracy holds for particular systems.

COMPLIANCE CORRECTION





What is Compliance?

Any mechanical system subjected to a force will deform, however slightly. This applies equally to material testing systems. The load frame, load cell and grips of your system are not infinitely stiff and will deform slightly as force is applied to the specimen. This deformation is called compliance and can lead to significant errors in the results of certain types of test.

Most material testing systems measure crosshead or actuator displacement, and this is often used as a measure of specimen deformation. However, the displacement output recorded by the system is actually the sum of the system's compliance and the specimen deformation.

In many applications (such as tensile testing of plastics and elastomers), the system compliance is often very small when compared to the specimen deformation and the error can be ignored.

Where very precise measurements of specimen deformation are required, the use of extensometers avoids system compliance errors completely.

But what can you do if the use of extensometers in your application is inconvenient or very difficult due to the test fixturing requirements or test environment? For these cases it is possible to make use of a feature available in Bluehill®, Merlin™, Series IX™ or Partner™ software called Compliance Correction.

Compliance Correction

The Compliance Correction feature allows system compliance to be subtracted from the load displacement data generated by the testing system, leaving behind the deformation attributable to the specimen. This more accurate, corrected data can then be used for generating results.

Different compliance files can be stored for different test configurations, allowing great flexibility in applying the correction according to your application.

Using this technique, it is possible to get significantly more accurate results from test runs without the aid of extensometers or other direct strain measurement methods.

It is especially useful for compressive tests on products and components such as gaskets, springs, and assemblies. If you are an existing user of Bluehill, Merlin, Series IX or Partner, you can check to see if the version you have supports this feature. If not, then you can upgrade your system to use the latest software products. Contact your local office for details.

TESTING AT NON-AMBIENT TEMPERATURES







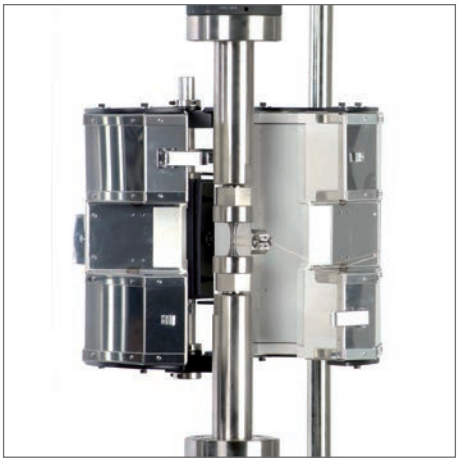
The properties of materials at high and low temperatures are of major interest to engineers. In most cases you can add an environmental chamber or furnace to your testing system, which allows you to perform the required tests. The following section offers some guidance on the selection and use of high and low temperature equipment.

Environmental chambers cover a typical temperature range of -150°C to +600°C and provide a large volume suitable for a wide range of tests. Instron® chambers use forced convection heating/cooling in which a fan is used to circulate hot or cold air within the chamber. The specimen is located near the center of the chamber using suitable grips. The grips are attached to the testing system using pull rods or push rods that extend through ports in the chamber top and bottom. A hinged door containing a window allows access to the load string .The chamber can be rigidly-mounted or use a roller mounting, which allows the chamber to be moved back from the test space when not in use. Removable wedges in the front of the chamber allow the chamber to be moved backwards without the need to remove the load string first and are a major convenience, especially for users with a large variety of tests to perform. Wedges may be standard or optional depending on the model.

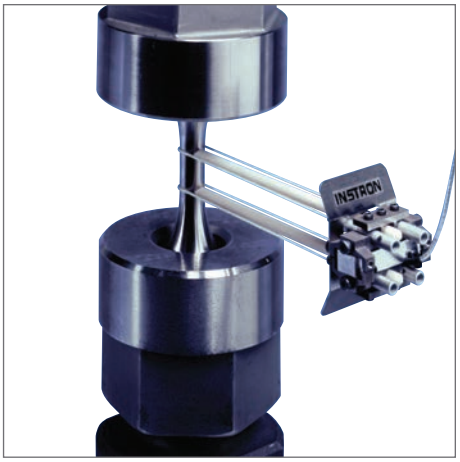
Testing below ambient temperatures requires the use of a refrigerant gas such as liquid nitrogen (LN2) or carbon dioxide (CO2), or mechanical cooling using a specially constructed chamber. LN2 allows lower temperatures to be achieved and is the most common choice of cooling method. The cooling gas is injected into the chamber via a solenoid valve controlled by the chamber temperature controller.

A range of grips compatible with high and low temperatures are available including wedge action and pneumatic side action type. Pull rods and push rods to suit your combination of model number, chamber, grip and load cell are available. The vast range of combinations makes it best for us to configure the pull rods and push rods needed for a particular system as part of any quotation.

TESTING AT NON-AMBIENT TEMPERATURES







Furnaces are used to apply temperatures much higher than those achievable with environmental chambers, up to +1600°C in air and higher than +2000°C in vacuum. However, since the heat transfer mechanism in furnaces is predominantly radiation, they are not very efficient at temperatures below about +300°C. The heated volume in a furnace tends to be a lot smaller than in an environmental chamber in order to achieve high temperatures at a reasonable power requirement and cost. Grips and specimens are generally much more specific in design, utilizing specialized materials to withstand high temperatures and atmospheric degradation.

High-temperature extensometers are available for direct strain measurement at very high temperatures. Furnace design itself has developed in recent years, with traditional tube and clam shell designs being augmented by short furnaces with external gripping.

The best technical choice of a furnace system is determined by the details of your application. Apart from the obvious need to achieve a particular temperature, it is important to consider heat-up rates, set-point stability, temperature gradient, and atmospheric requirements. The specimen material may also affect the best choice of grip design and material. The nature of the results you want from your test will also influence the choice of extensometers and software for use with the furnace syste. The more details we have about your application, the better able we are to advise on the best choice.

TIPS ON USING ENVIRONMENTAL CHAMBERS AND FURNACES





If your system incorporates 'specimen protect' or 'load protect' (Instron® 5500/5500A,5800,5900,8500 and 8800 Series electronics), you can use this feature to compensate for load string and specimen expansion/contraction while your furnace or chamber reaches set-point temperature.

Having inserted the specimen into the grips, set the desired load threshold value and enable the feature before switching on the furnace or chamber. As the load string expands or contracts, the crosshead or actuator will move to keep the force on the specimen below the threshold value.

- To prevent loss of heat around pull rods and push rods always use any convection shields provided, or lightly pack the space between the pull rod and the furnace or chamber port with a suitable refractory fiber.
- Make sure you use the recommended anti-seize compounds and lubricants on your grips to help aid specimen removal.
- Use the smallest grips possible in order to reduce heat-up times and maximize the available travel in an environmental chamber.
- After you have finished testing at below ambient temperatures, you can remove any condensation from the grips and pull rods by warming them in the chamber and allowing them to cool naturally.
- Remember to allow sufficient time for the specimen to reach the test temperature after inserting it into the grips. Consider putting a number of specimens in the chamber to reach the test temperature provided the different thermal history that results is not significant. This will also help to improve testing productivity.
- Ensure that ALL load string components are rated for use at the required test temperature. Certain items such as rubber-coated jaw faces have reduced temperature ranges compared to the rest of the load string. The chamber may be capable of exceeding the temperature rating of the load string so ensure that temperature limits and alarms are set accordingly.
- For optimum window clarity during low temperature testing always switch on the window heaters (if fitted) for 40 minutes prior to running your tests. This is especially important when using non-contacting extensometry to ensure reliable target tracking.

ADVICE FOR USERS OF OLDER SYSTEMS





Instron® material testing systems are designed and manufactured to provide long life and enduring performance. It is not unusual for systems to remain in regular use more than 30 years after the initial installation. During such a long lifetime, many of the technologies used in the construction of your system will develop and change dramatically. This is especially true of electronics and software.

It is also a fact that components used in the construction of your system can eventually become obsolete or very difficult to find. This can limit our ability to maintain or repair very old systems.

Our systems are so long-lived that it is important for you to be able to take advantage of new electronic and software developments. In many cases this can be done without having to purchase a new system. Our EXTEND™ Series of electronic upgrades and retrofits can be fitted to most older systems, including those from other manufacturers, to further extend the life of your system and allow you to take advantage of new software and electronics.

More details about EXTEND upgrades can be obtained from visiting our website at: go.instron.com/upgrade or by contacting your local Instron sales office at: go.instron.com/locations.

Maximize Performance
- Improved accuracy and resolution
- Improved testing tolerances
- Ability to meet new testing standards
- Greater range on load transducers

Add Functionality
- Advanced data reporting
- Modular testing applications
- Automatic transducer recognition and calibration

Increase Value
- Common user interface
- Reduced test set up and run times

CONVERSION TABLE

The following table may be useful to you in converting any specifications you see into alternative systems of units.

CONVERSION TABLE

Acceleration	1 m/s^2 = 3.2803 ft/s^2	1 ft/s^2 = 0.3048 m/s^2
Area	1 in^2 = 6.4516 cm^2 1 ft^2 = 9.2903 x 102 m^2	1 yd^2 = 0.83613 m^2 1 ft^2 = 0.11111 yd^2
Energy and Specific Energy	1 J = 1 N*m = 0.73756 ft*lbf 1 kJ = 737.56 ft*lbf 1 kJ = 0.9478 BTU 1 kJ/kg = 0.42992 BTU/lb	1 ft*lbf = 1.35582 J 1 BTU = 778.17 ft*lbf 1 BTU = 1.0551 kJ 1 BTU/lb = 2.326 kJ/kg
Energy Transfer Rate	1 W = 1 J/s = 3.413 BTU/h 1 kW = 1.341 hp 1 BTU/h = 0.293 W	1 hp = 2545 BTU/h 1 hp = 550 ft*lbf/s 1 hp = 0.7457 kW
Flow	1 gal/min = 3.7854 L/min 1 gal/min = 6.309 x 10-5 M3/sec	1 in^3/sec = 16.387 cm^3/sec
Force	1 N = 1 kg*m/s^2 1 N = 0.22481 lbf	1 lbf = 32.174 lb*ft/s^2 1 lbf = 4.4482 N
Length	1 cm = 0.3937 ft 1 m = 3.2808 ft	1 in = 2.54 cm 1 ft = 0.3048 m
Mass/Density	1 kg = 2.2046 lb 1 g/cm3 = 103 kg/m^3 1 g/cm3 = 62.428 lb/ft^3	1 lb = 0.4536 kg 1 lb/ft3 = 0.016018 g/cm^3 1 lb/ft3 = 16.018 kg/m^3
Pressure/Stress	1 Pa = 1 N/m2 = 1.45x10-4 lb/in^2 1 bar = 105 N/m^2 1 atm = 1.01325 bar	1 atm = 14.696 lbf/in^2 1 lbf/in^2 = 6894.8 Pa 1 lbf/ft^2 = 144 lbf/in^2
Specific Heat	1 kJ/kg*K = 0.238846 BTU/lb*°R 1 BTU/lb*°R = 4.1868 kJ/kg*K	-
Temperature	T(°F) = T(°C)*(9/5) + 32°F T(°C) = [T(°F) - 32°F]*(5/9)	T(°C) = T(K) - 273.15 T(°F) = T(°R) - 459.67 T(°R) = 1.8 T(K)
Torque	1 in*lb = 0.11298 N*m 1 ft*lb = 1.3558 N*m	-
Velocity	1 km/h = 0.62137 mile/h 1 ft/min = 1.1364 x 10-2 mi/hr 1 mi/hr = 1.6093 km/hr 1 mi/hr = 0.44704 m/sec	1 mile/h = 1.6093 km/h 1 ft/sec = 0.3048 m/sec 1 RPM = 0.10472 Rad/sec 1 Rev/sec = 6.2832 Rad/sec
Volume	1 cm3 = 0.061024 in^3 1 m3 = 35.315 ft^3 1 L = 10-3m^3 1 L = 0.0353 ft^3 1 U.S. gal. = 3.7854 L	1 U.S. gallon = 0.13368 ft^3 1 U.S. gallon = 3.7854 x 10-3 m^3 1 U.S. gallon = 231 in^3 1 in3 = 16.378 cm^3 1 ft3 = 0.028317 m^3 1 U.K. gallon = 1.20095 U.S. gallons

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Many standards can be met with what we call 'general purpose' accessories. These can often be used to meet multiple standards and it is not practical to list all the standards that can be used. If you don't find the standard you are looking for then refer to the other General Purpose Accessories in Section 2.

Our website contains many more examples of solutions to meet International Standards so please visit www.instron.com and click on "Testing Solutions" if you do not find what you are looking for here.

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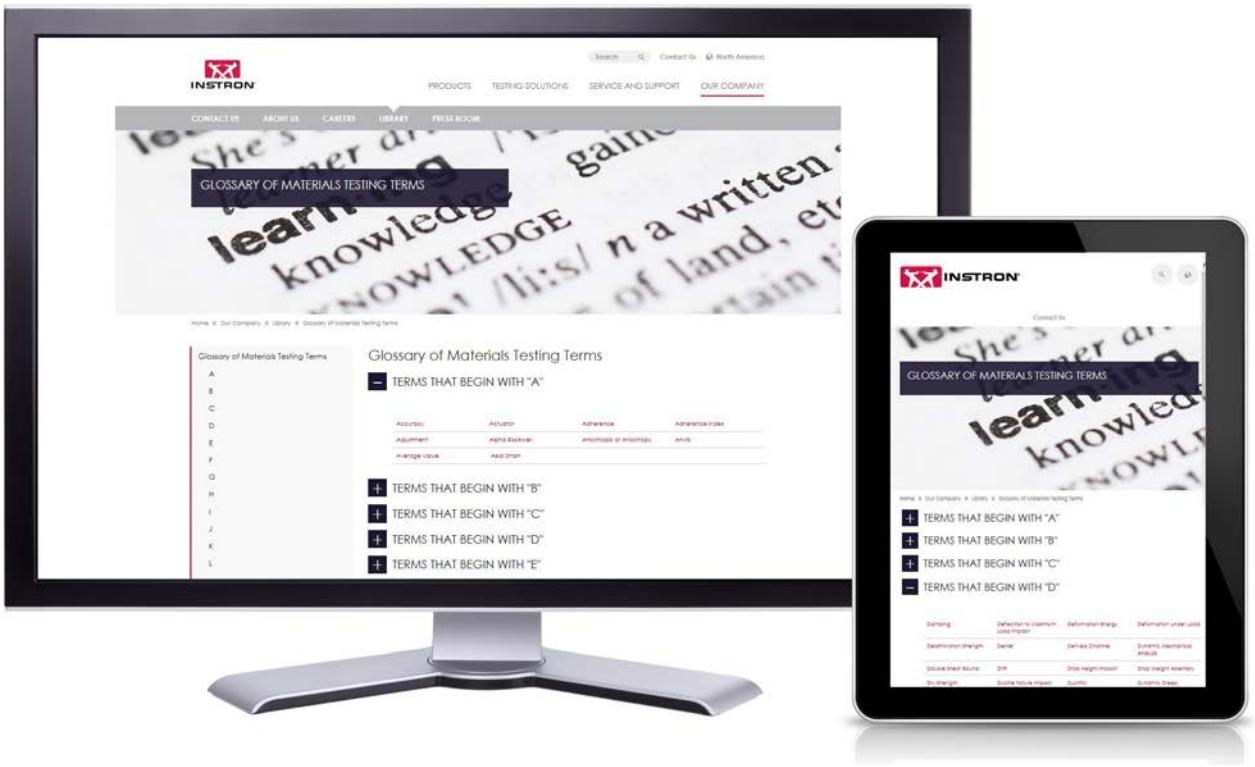
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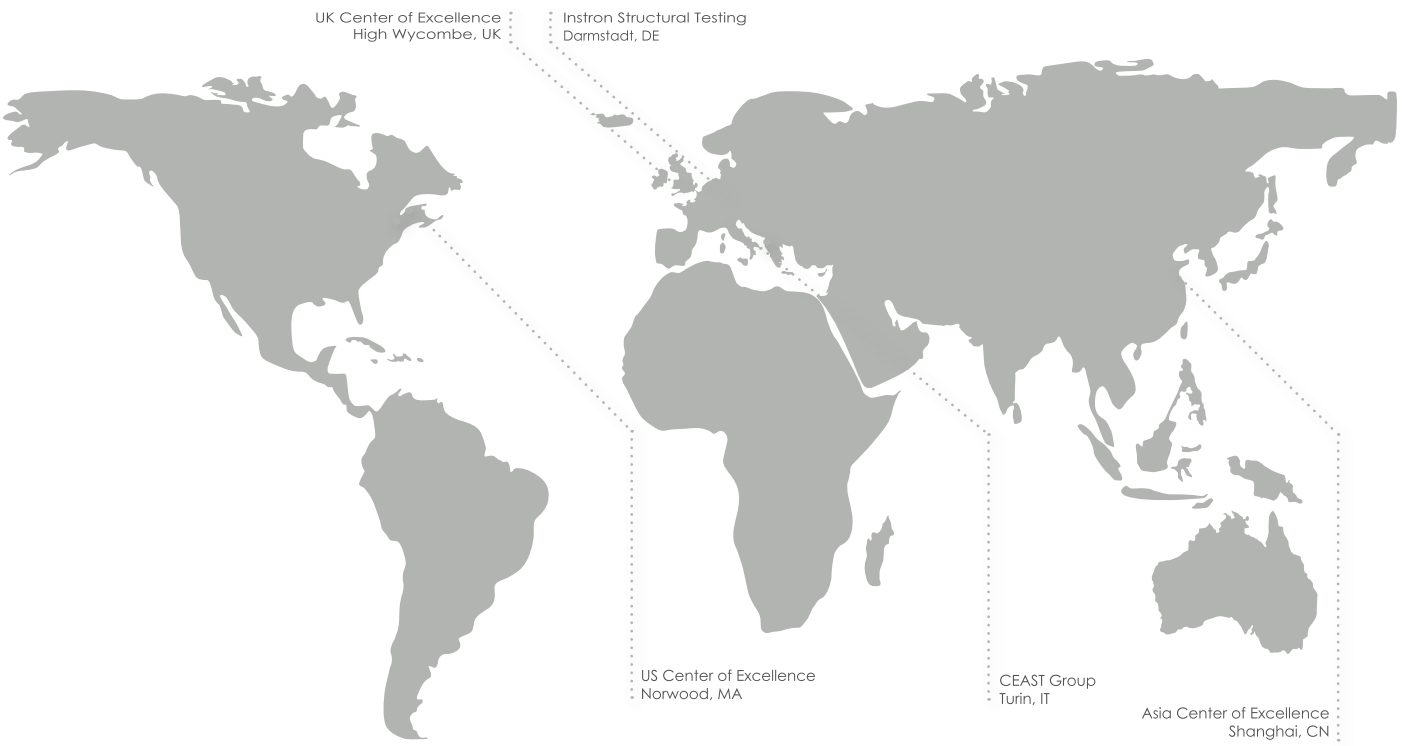
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