

Issue 19

## Welcome to the Instron® Materials Testing Accessories Newsletter

### In This Issue: Biomedical Applications – Part 2 of 2

#### Accessories for Biomedical Applications

Instron's global team of biomedical applications specialists and professional engineers deliver turnkey solutions for orthopaedics, biomechanics, biomaterials, medical devices, and dental testing. We work closely with scientists and manufacturers worldwide to develop innovative and specialized [BioPuls™](#) solutions – the most advanced biomedical solutions for the challenges presented by our customers.

With diverse testing demands, from native tissues such as collagen or shape-memory alloys (like Nitinol), to the most complex multi-axial simulation of spinal segments, we ensure that our systems and products are best fit for the needs of individual customers and provide many years of superior life-long performance.

Our BioBath and submersible grips are used in many biomedical applications. [View our short product video](#) to see them in action!

Below are examples of biomedical applications. Please follow the links for



further details of the applications and/or product details.

#### [BioPuls Sutures with SVE](#)

Sutures are used in a variety of surgical procedures to allow for wound closure and to aid in tissue healing. They are manufactured from various absorbable and non-absorbable materials, and may be single filament or braided with or without a coating. The challenges found when testing sutures include loading the specimen, as some sutures are delicate and only a low amount of force can cause them to fracture. Also, some sutures are used inside wounds and are constantly in a hydrated environment.

#### [Non-contact extensometers](#)

#### Contact Us

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#### Related Links

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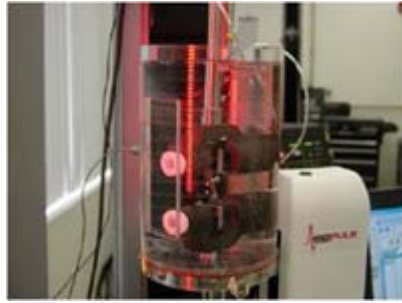
- Missed previous issues of the Accessories Newsletter? Catch up at the Instron [Library](#). Follow the link and select "Newsletter" as the Document Type.



3rd Edition of the [Accessory Catalog](#) is now available!

#### Future Events

For a list of upcoming shows that Instron will be attending, please visit the [Events](#) page of our website.



### [BioPuls Adhesives](#)

Medical adhesives are widely used for applications, such as bandages, secondary dressings, and wound closure. The adhesive strength of these products must be clearly defined before put to use in a clinical setting. If the adhesive is not strong enough, the product may lead to infection or poor healing. If the adhesive is too strong, the underlying tissue may become damaged upon removal. One challenge in conducting a peel test to evaluate different adhesives is simulating the environment in which the product will be used. The angle of peel and the type of substrate used must be carefully selected in order to accurately understand the adhesion properties during normal use. [View](#) our additional resources on medical adhesive testing.

### [Peel Fixtures](#)



### [BioPuls Contact Lenses](#)

Millions of people use contact lenses on a daily basis, making them one of the most widely used medical devices in the world. Preferred over eyeglasses, they are used for a variety of eye correction prescriptions and are manufactured in an array of forms, ranging from hard to soft lenses. When testing lenses, loading the specimen into the grips can pose many problems, since the soft lens material is slippery and delicate and fractures at very low forces. Additionally, the test specimens are extremely small, providing a limited amount of gripping surface. Contact lenses must be tested in an environment that best simulates physiological conditions; ambient testing results in the drying out and cracking of the material.

### [BioPuls Hydrogels](#)

Hydrogels are widely used in the biomedical industry for applications including coatings for catheters, contact lenses, scaffold, and wound dressings – these materials have the ability to absorb fluids and swell up to 2000 times their original size. Hydrogels are often implanted into the body to provide medical benefits and need to be tested in a simulated environment.

There are many challenges in testing hydrogels. Loading the specimen can cause many problems, as the material is slippery and delicate, so it can easily fracture. Additionally, many grips apply too much pressure to the specimen and jaw faces tend to be too rough, causing the specimen to fail before

testing can even begin. Lastly, because these specimens fail at such low forces, highly accurate load and extension measurements are required. Hydrogels also necessitate the use of a temperature controlled bath at 37°C to maintain physiological conditions throughout the mechanical evaluation. Testing under ambient conditions results in the hydrogels drying out, which consequently significantly changes the mechanical properties.

#### [Testing Syringe Force Required To Discharge Various Fluids](#)

Syringes are commonly used for administering medicines that are stored in the barrel of the syringe and discharged through the needle. Medicine is usually injected subcutaneously where there is little blood flow, so the medication can absorb at a lower rate than intramuscular or intravenous injections. Syringes are most commonly manufactured out of polypropylene, a non-toxic plastic. Additionally, they can be made from a variety of materials, including glass and tungsten. It is important that the material and design of both the syringe and the needle be tested to evaluate the compressive force necessary to discharge the medicine from the needle. The challenge in testing these tubular specimens is to create a platform in which the syringe can be placed and remain stable while a compressive force is administered on the plunger from above to mimic normal use of the device.

#### [Hip Femoral Fatigue Fixture](#)

The hip femoral fatigue fixture was specifically designed to meet the enhanced requirements of ISO 7206-4. The fixture simulates the fatigue loading of a hip stem during a gait cycle.

#### [BioPuls Dual-Station ISO Hip Simulator](#)

Based on the Gravimetric method for wear determination, the BioPuls dual station ISO hip simulator for use on the [8870 testing systems](#) offers an accurate, yet cost-effective solution to laboratories whose research and testing needs are varied and demanding.

#### [BioPuls Dual-Station ASTM Hip Simulator](#)

Based on the Gravimetric method according to ASTM F1714, the BioPuls hip wear simulator accessory for use on the [8874 axial torsional testing system](#) offers an accurate, yet cost effective solution to laboratories whose research and testing needs are varied and demanding.

#### [BioPuls Dual-Station ISO Knee Simulator](#)

The BioPuls Dual-Station knee simulator provides both force and displacement control, and has been designed to test around current ISO 14243 (2002) requirements. It offers an accurate and cost effective solution to laboratories whose research and testing needs are varied and demanding. The system applies physiologically accurate load and motion profiles, including flexion-extension, anterior-posterior shear, interior-exterior torque, and axial loads on a test specimen while it is soaked in a serum bath maintained at 37°C.

#### [BioPuls Spine](#)

The BioPuls multi-axial spine testing system has been designed with true six-axis capability to allow a comprehensive study of complex loading on the spine. Testing in combined modes is now possible to provide more physiologically relevant results.

**For more information about biomedical applications and suggested solutions, please visit the [Biomedical Testing Solutions](#) section of our website.**

For more information on Accessories, visit us [on the web](#), submit an [online request](#), or call us at +1 800 473 7838 (US only) or +44 1494 456815 (Europe only)

Are you testing something a little different? Do you think more people should know about it? Would you like to submit an article for possible publication in the Instron accessories newsletter? If so, please [submit your story](#).

## [What do you think? Tell us!](#)



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