

Testing Stent Quality with Prospector™

Application Note

Introduction

Stents are critical medical components that require extensive mechanical and functional testing before they can be approved for medical trials. New designs and materials are constantly being investigated for stent use, and stents were one of the first commercial scale applications of shape memory alloys.

Testing stents is challenging. Subtle changes can have a significant impact on the life of the stent, and the feature sizes in stents are very small. Most mechanical testing systems were originally designed to test large components and sheet material more likely to be found in railways and ships. However, Nordson's Material Test technology was developed from the outset to test micro electronic bond wires and soldered connections, making them very well suited to testing items the size of stents.

Micro Scale Visibility

A very common test for stents is a simple tensile test, to determine the maximum pulling load which it can survive, however this test is only simple when the component can be easily aligned and held for testing.

The Prospector system comes with a trinocular scope, giving the three-dimensional viewing required to align very small devices. An OmniScope trinocular mounting system allows the trinocular to be focused on a point anywhere in the test area, at any angle, with independent movement in the X, Y and Z axis. A video camera also records tests on a very small scale.

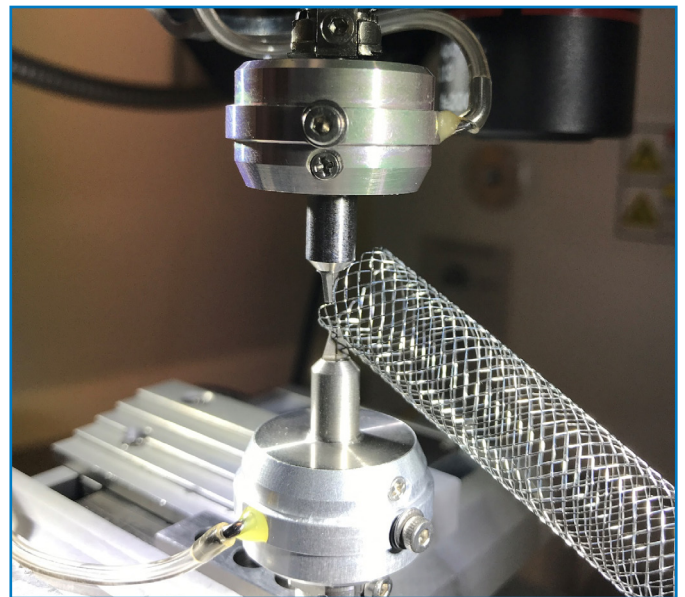


Figure 1. A stent being pulled with pneumatic jaws on a Prospector Micro Materials Tester.

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Fast Test Setup

Another advantage of the Prospector over conventional testing platforms is the interchangeable cartridge system. The system does not use fixed load cells, instead a load cell is incorporated into a cartridge that can feature different heads with tweezers, hooks or compression tips.

The tweezer cartridge can manipulate features as small as 50 µm in diameter for testing.

Alternatively, wires can be individually pulled using a hook that can be rotated underneath the test point. This presents a range of ways that the stents can be tested, depending on whether the wire strength itself is being tested, the welds, or how the stent behaves as a structure. The cartridges can be swapped in under a minute, making the machine rapidly versatile.

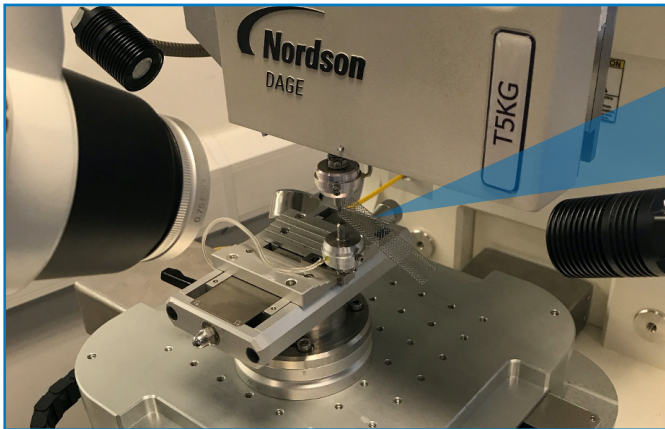


Figure 2. A video capture of a stent test, using the integrated trinocular camera.

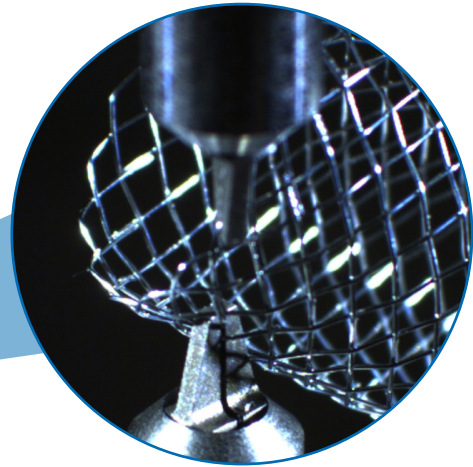


Figure 3. The laser welded joints within a stent require a high magnification scope to identify the correct wire to pull.

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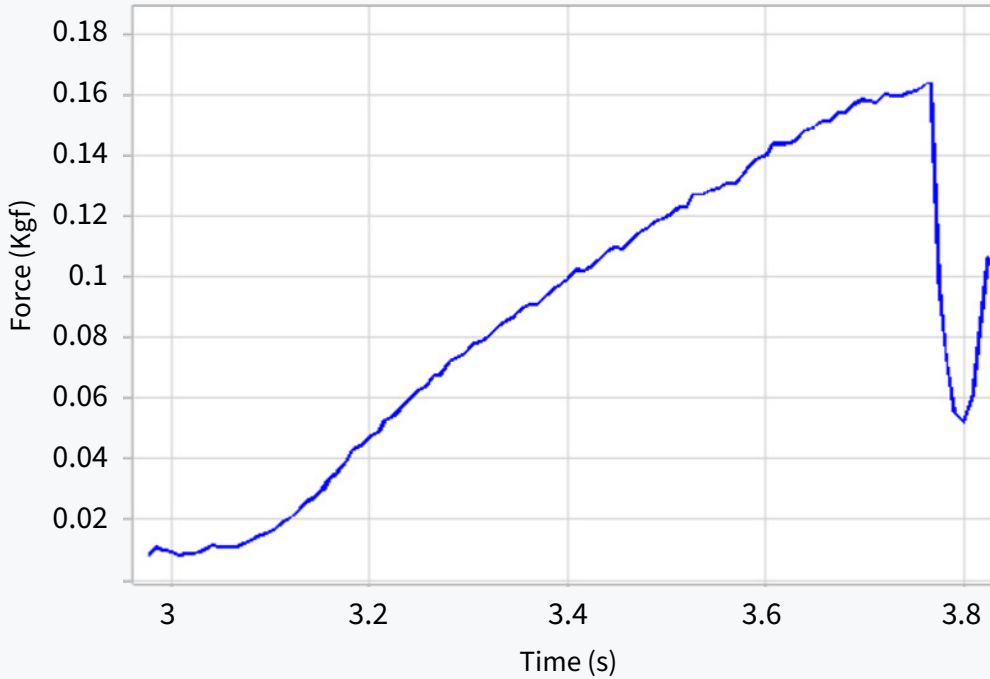


Figure 4. Force vs. Test Time Measurement.

Conclusion

Prospector provides the ideal combination of optics and mechanical testing required to test the performance of different stent designs, as well as a wide range of medical device scale items.

If you are struggling to grip or even see the critical features on your device, our test and inspection products are here to help you.

For more information, speak with your Nordson representative or contact your Nordson regional office

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Prospector Micro Materials Tester.



Quadra X-ray Inspection provides high magnification 2D and 3D images of medical devices, non-destructively.