DOVIDEQ medical

Leak test Procedure

Although it may not appear so at times, a flexible endoscope is a delicate instrument. A minor misstep can result in costly repairs. Unfortunately, there is plenty potential for internal and external harm during transportation to and from the procedure room, the treatment itself, and the cleaning process.

Five Steps for Leak Testing a Scope

Because fluid ingress is so damaging to your equipment, it's vital to leak-test your scopes after each treatment. The procedure for checking for leaks in a scope can be split down into five steps:

1 Connecting the water cap and pressure gauge correctly.

2 Putting the right amount of pressure on your testing scope

3 Only the bending section should be submerged at first

4 Taking on the entire scope

5 During the pressure test, the channels should be flushed

These methods, when combined with routine cleaning procedures, can help extend the life of an endoscope and keep it in your suite rather than in the repair lab.

1. Water Cap

It may seem insignificant, but connecting the water-resistant cap is the first and most critical step in properly leak testing an endoscope. To prevent fluid from entering the scope while it is being leak-tested and disinfected, place the cap over the electrical contacts immediately after a procedure.

The cap also features an ETO valve that may be used to pressure test a scope (i.e. check for leaks) as well as sterilize it with ETO gas. The water-resistant cap should be replaced every 12-18 months, according to scope makers (a lot of people are unaware of this advice and might use a water cap beyond its useful life). The cap might wear down over time, resulting in leaks and fluid invasion. Make sure you don't take your water-resistant cap for granted. It's an important step in the leak-prevention procedure. Ensure that it continues to function properly.

2. Pressurize the scope

During the leak test, the channels within the scope are opened to allow air to flow freely through the scope. There are 2 ways to do this.

The first is to use an automated pressurizer provided by the manufacturer. Properly connect the automated pressurizer to the scope via the ETO valve and then turn on the automated pressure tester to allow air to flow through the scope. Unfortunately, once the scope is pressurized using this method there is no way to gauge whether the scope has a leak until the scope is submerged only then can a loss of pressure be observed.

The second and preferred method is to use a hand-held pressure tester. The benefit associated with using a hand-held is that it allows the user to see if there is a leak in the scope **before it is submerged in the water**. The user pumps air through the scope, via the ETO valve, to hold a determined amount of pressure.

Once the determined amount of pressure is reached, you can observe the dial on the pressure tester to see if the scope is either holding or losing pressure. If the scope is losing pressure at a quick rate, it could be a good indicator that the scope has a hole in it. In this case, you should discontinue the leak test to avoid fluid invasion. If the scope loses pressure at a slow rate, continue the process to pinpoint the leak. Keep in mind that, as with any piece of equipment, the pressure tester can wear down over time and may need to be replaced (the pressure tester can leak as well, so be aware that it might falsely show leaks in scopes when performing the leak test).

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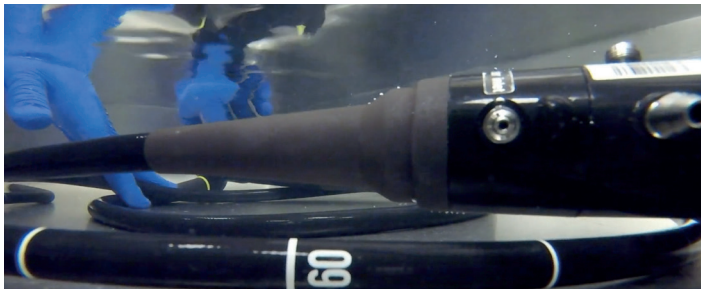
3. Test the Bending Section First

Since the bending section is the part of the scope most susceptible to fluid invasion, it's good practice to submerge it first as a separate event. The bending section consists of the bending rubber, the epoxy bands that hold the bending rubber in place, and the distal cap that covers the objective and light lenses as well as the biopsy channel(s).

The bending section is prone to damage for a number of reasons. By design, the bending rubber is the thinnest part of the scope, therefore it is more susceptible to tears and pinholes. It is also angulated and manipulated the most during a procedure, so it will experience a considerable amount of "normal" wear and tear during the scope's lifetime.

So, before you submerge the entire scope, just insert the bending section into the water and let it sit for a minute or two (preferably two). Carefully check for any leaks while this section is in its straight position. If a leak is found at this point, remove the bending section from the water do not continue to process the scope.

If there are no visible leaks in the bending section in the straight position, proceed to angulate the scope while keeping the bending section completely submerged. This practice can expose any pinholes or tears that may have been concealed while the scope was in the straight position.



4. Submerge the Entire Scope

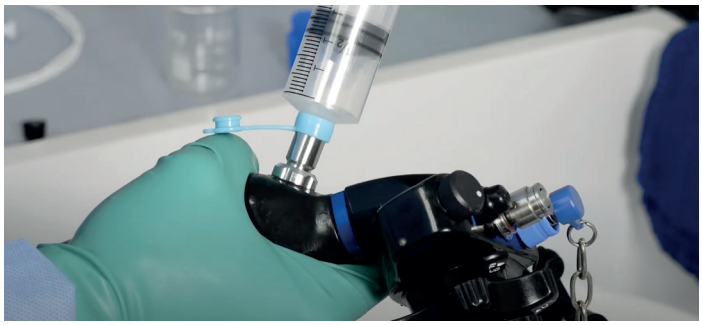
Once you've checked that the bending section is free of leaks, the entire scope can be submerged. It is very important to fully submerge the scope so that a proper leak test can take place; make sure that every area of the scope is completely covered with water.

When submerged, there will be surface bubbles on the scope. These bubbles occur naturally due to the change in pressure when the scope is first submerged. Clear off any surface bubbles and make a thorough visual inspection of the surface of the scope. Check any area that may develop leaks, especially any part of the scope that can be manipulated (e.g. buttons and angulation dials) or around parts that protrude from the scope (e.g. the light post, suction "tree," biopsy port, etc.). The visual inspection of the surface of the scope is very important in preventing fluid invasion.

5. Flushing the Channels

Finally, with the entire scope still fully submerged, the internal channels can be checked for leaks. This is a very important step in leak testing, especially on scopes that have both suction and biopsy channels. Internal channels can develop holes through normal wear and tear or by physical trauma. When this occurs, the damaged channels can allow fluid invasion of the scope. The internal channels are the toughest area to find a leak because it isn't always easy to see. By properly flushing these channels, the incidence of fluid invasion can be diminished.

The best way to ensure that a scope's channels do not have any leaks is to use a syringe filled with water. Each channel in the scope should be flushed through the ports (suction, biopsy) at least three or four times with the syringe, keeping the scope fully submerged while flushing. If the port being used to flush the channel is removed from the water, air can flow back into the channel and give the user the impression that a leak may be present.



After the first flush, you'll see bubbles exiting the scope. These bubbles were trapped inside the scope when it was first submerged in the water. This is normal. As the scope is flushed out the second time, there should be considerably fewer bubbles. After flushing the channel for a third and fourth time using the syringe and water, there should be no more bubbles escaping from the scope. If bubbles continue to exit the scope after the third and fourth flush, there is a good possibility that the scope has a hole in the channel being flushed.

If after the fourth flushing there is no evidence of bubbles and the entire scope has passed the leak test, then the user can remove the scope from the water, detach the pressure tester (leaving the water cap on), re-submerge the scope back into the water, and continue the pre-cleaning process.

And there you have it: a 5-step process to help you better leak-test your scopes. Incorporate these techniques with the rest of your standard procedures and you should be able to improve the longevity of your scopes. The process takes a few minutes to accomplish, but the extra time needed to thoroughly examine a scope for leaks can prove to be worth the effort. Fluid invasion can cause significant damage to a scope and drastically reduce its useful life. By keeping in mind these 5 steps, you can save lots of money on repairs and reduce your scopes' downtime.