Dive Lab, Inc.
1415 Moylan Road, Panama City Beach, FL 32407
Phone: 850-235-2715 Fax: 850-235-0858
e-mail: divelab@divelab.com

Dive Lab Umbilical Test Manifold

User Information Guide

Dive Lab Umbilical

Test Assembly

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Rev. 4/2019

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1.0 General Information:

This informational guide was written to provide information and support for users of the thermoplastic ¼" lightweight umbilical assemblies, used with the Dive Lab Extreme Lightweight Diving System (XLDS). Some of the information also applies to other types of umbilical assemblies, however the main intent of this guide, is to support the umbilicals used with the Dive Lab XLDS system. This information is intended to help guide users in proper maintenance, inspection and testing of umbilicals. The information herein has been derived from multiple sources.

The thermoplastic umbilicals, also referred to as "diving hoses", are used with the Dive Lab Extreme Lightweight Diving System (XLDS), have an indefinite life span. The breathing gas hose, communications and strength member, is manufactured by Umbilicals International® and should provide many years of service, if used and maintained properly. All XLDS umbilicals, as well as other surface supplied diving umbilicals, should be inspected on a regular basis to identify any damage, and to insure the umbilical is fully serviceable. Dive Lab recommends that the full length of the XLDS umbilicals be visually inspected at least once a month, when used under good conditions, and more often if used under harsh conditions, or where damage from sharp objects is possible. The inspection is intended to reveal physical damage, before it reaches the point of failure.

2.0 Umbilical Assembly Inspection:

Gas Supply Hose Pressure Testing: Pressure testing of the hose should be done at least once a year and anytime damage is suspected. In addition, the hose should be pressure tested anytime fittings have been replaced.

Fittings: Should be visually inspected daily, for any signs of damage in the form of fitting slippage, corrosion, cracking or damaged clamps, sleeve and fittings.

Communications / Strength Cable: Inspect on a regular basis for cuts, slices, missing chunks of the outer jacket, as well as damage around the connectors and corroded pins and sockets. The frequency of the inspection should be determined based on the hazards and environmental conditions.

Breathing Hose and Pneumofathometer: Should be inspected for of cuts, kinks, dents, wrinkles, bulges or any other deformities including fitting damage and corrosion.

D Ring / Shackles and Rigging: The umbilical strain relief whippings of the D-Ring and swivel shackle, as well as any other rigging hardware should be inspected for signs of damage, corrosion and wear.

Kinking: If the XLDS gas supply hose has been kinked, the hose will show an obvious dent and/or a wrinkle in the outer jacket, in a case where the hose has been kinked, contact Dive Lab and send pictures. Although

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XLDS gas supply hose is extremely tough and kink resistant, divers and tenders should always use extra care when taking a strain on the umbilical, in the event the umbilical is fouled or snagged.

The diver should always strive to maintain a clean umbilical path, and avoid ragged sharp surfaces. This can be difficult when diving around obstructions. Both the Diver and the Tender should work together, and develop a second sense, when it comes to umbilical management and be careful and not allow any tight bends or loops that could end in a kink or damage.

Figure 1 Umbilical Kink

Any umbilical that shows suspicious signs of possible damage, will need to be carefully inspected and tested. If the kink or damage is near either ends of the hose, the hose can be cut back and a new fitting installed. With the XLDS hose, if the hose has been severely kinked the outer jacket of hose will show signs in the form of wrinkling, which allows the hose to be easily folded over. Hoses that show these signs, should be pressure tested and flow tested, IAW the procedure within this guide.

3.0 Abrasion and other forms of damage: Cuts and scrapes in the black urethane outer jacket of the XLDS breathing supply hose, does necessarily pose a significant safety problem, providing the damage does not extend into the braided strength fabric (yarn looking material), that is in between the cover and main gas conduit core.

The main gas hose inner core of the XLDS gas supply hose is made of Hytrel®, an extremely strong flexible thermoplastic. The combination of the core, braided fabric, and outer cover gives the hose a 1500 psig working pressure. Minor cuts and slices in the outer jacket that do not extend into the fabric braid, can be repaired by simply wrapping the affected area with a high quality vinyl tape, extending at least one inch past the damaged area. Areas where the outer cover is gone, should be dried for at least 24 hours to remove any moisture from the polyester cords, then apply a thin coat of flexible urethane sealant such as Shoe Goo® or #3M 5200®, available at most hardware stores. The sealant is intended to bond and help water proof the fibers, before the vinyl tape is applied. The sealant should be allowed to dry for at least 8 hours, before wrapping the area with vinyl tape (see Figure 2 & 3). Repairs should be photographed and logged. The tape on the repaired areas should be removed for inspection, and re-

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taped at least once a year and /or whenever the tape shows signs of degrading. Note that the outer jacket is the skin, which encompasses and backs up the polyester cord, and surrounds the inner core.

It is expected that umbilicals will receive some minor cuts, scrapes, and bruises. A little umbilical first aid, can make the umbilical last many years, as long as the cord and the inner core are well protected. Any taped areas should be logged in the umbilical log and re-inspected at regular intervals.

Figure 2 Taping Abraision Damage

Figure 3 Finished Look of Taping

4.0 Communication and Strength Member:

The communication and strength member used with the XLDS umbilical, has a maximum safe design and working load of 1000 lbs. The strength member gets its strength from the Kevlar® braid. The communication wires consist of two pairs of shielded twisted 20 gage wire, for use with various diver intercom systems. Communication wires are wrapped in a metallic shield, and encased in a Polyester/Kevlar® braid, that is the main strength part of the assembly. The braid is covered in a tough red polyurethane jacket, which waterproofs, and protects the entire assembly.

Communication Strength members that show severe cuts or damage, compromising the polyester /Kevlar braid, will need to be replaced.

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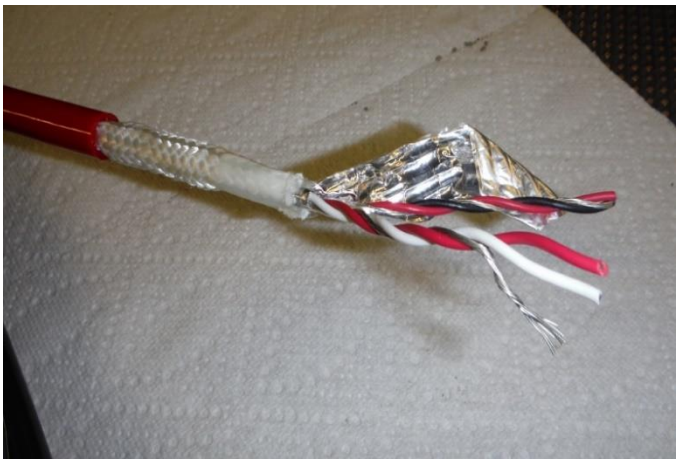

Figure 4 Strength and Communication Member

5.0 Umbilical Testing History/Rational:

Basic guidelines for inspecting and testing umbilicals, originates from maintenance procedures, developed by the US Navy for natural rubber air hose, used for deep sea diving helmets. Going back over 90 years, the original deep-sea diving hose was ½" I.D., and was made of natural rubber with steel wire for re-enforcement. The steel did not work well for diving hose. Salt water eventually got through the outer jacket, corroding and weakening the steel wire reinforcement, causing leakage and failures. As time went on, the steel wires were replaced with copper, then cotton fibers, and eventually polyester and synthetic blends, which provided for greater strength and longer life.

Today, we still see the basic rubber umbilicals being used in the commercial diving industry. However, it is not as common as the three-part twisted polyurethane/thermoplastic umbilicals.

From the very beginning of the US Navy, diving umbilicals were assembled, configured and tested at each diving command, by the divers that used them. Prior to 1990's, the only umbilicals used in the Navy, were made of fiber braid reinforced rubber hose, made by companies like Gates® and Good Year®. When hose was procured, it came with the manufactures batch number and a date of manufacture. Before making up umbilicals, the diving command would put together a short 3 - 6 foot sample from the new lot of hose, and pressurize it with water until it burst. In order for the sample batch to pass, the test piece had to burst at a pressure of, no less than four times the maximum rated working pressure of the hose, as stated by the manufacturer. Once the batch test piece had passed a burst test, all Navy Diving commands were notified that the umbilical of that batch number has passed the bust test, therefore no further burst testing was necessary with other commands procuring the same lot/batch of hose.

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Today the U.S. Navy uses only twisted polyurethane 3/8" I.D. umbilicals and no longer performs pull tests, instead they simply perform a 600 psig / 10 minute pressure test. Prior to testing, the umbilical end fittings are marked, to identify any slippage of the sleeve. The umbilical is then pressurized with water to 600 psig, and the pressure is held for ten minutes while inspecting the entire umbilical for any signs of damage in the form of bulges, cuts, abrasions and fitting slippage.

Fittings should be replaced if there is any slippage greater than 1/16".

Any signs of bulging, cuts, abrasions or damage is absolutely unacceptable to US Navy. The actual burst and pull load strength of the umbilical, comes from the fibers that are bonded to the core tube, and covered with polyurethane. Without the fiber reinforcement, the umbilical could not withstand any significant internal pressure.

If the fittings show more than 1/16" of creep, the fittings must be replaced, and the hose retested. Current breathing supply umbilicals used for commercial and military surface supplied diving, have a maximum working pressure of 500 psig. The U.S. Navy pressure test at 600 psig for ten minutes, is a good and reasonable test, because this test does not unduly stress the umbilical, the way the pull test did.

200lb Pull Test: The old Navy test where the umbilical was pull tested at the same time as pressure testing, worked fine with rubber- based heavy hoses, due to the mass and flexibility, however it does not always work well for synthetic hoses, which often use a more rigid core inner material. Rigid inner core materials are not as compliant as rubber materials, and may take a set during a pull test, which sometimes results in a minor leakage around the fittings, due to elongation strain of the inner core between the hose barb and compression sleeve. After several years of testing, many umbilicals would leak at the fittings, requiring replacement of the hose.

6.0 Testing XLDS Umbilicals: XLDS umbilicals should be pressure tested as a routine test every year, when fittings have been replaced or whenever serviceability is in question.

Pull testing of the end fittings is not recommended, because pull testing can stretch and weaken the area under and around the crimp sleeve/hose barb. Also it could cause back flow leakage, through the umbilical laminates under the crimp fitting. Prior to testing XLDS ¼" I.D. and other types of umbilicals, make sure to mark the umbilical with a marker or tape where the hose enters the swaged sleeve, so that should any fitting slippage occur, it will be easily identified by the gap. If any fitting slippage is greater than 1/16" is present after testing, the fitting will need to be replaced and the hose retested. During the inspection, pay careful attention to signs of bulging, which indicates possible damage to fiber braid reinforcement. Carefully inspect the end fittings for cracks, wear and corrosion.

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Figure 5 Marking swage end for slippage check

The standard ¼" XLDS umbilicals assembly, with 3/8" interface whips are rated for a maximum working pressure of 1100 psig, and the RDC console has a maximum discharge working pressure of 390-400 psig due to relief settings. Dive Lab recommends using 2 times the maximum working pressure of the supply system, as the test pressure for testing the umbilicals. For the XLDS system, the test pressure to be used for XLDS umbilical assemblies (400 psig x 2 = 800 psig). This is for XLDS umbilicals only. Standard 3/8" and ½" umbilicals, should be tested as stated below.

Testing 3/8"- 1/2"Umbilicals:

For standard 3/8"umbilicals, we recommend 2 times the maximum working pressure of the system or 600 psig. Most surface supply HP consoles will deliver air or gas to a maximum pressures of between 225-300 psig, over the ambient pressure. Most LP compressor systems will never exceed 225 psig. To make things easy, you can simply perform the umbilical pressure test, at a pressure of 600 psig, plus or minus 10 psig and hold that pressure for ***ten minutes*****.** Before testing, mark the end of the fitting sleeve, so if there is any fitting slippage occurs, it will be easily identified by the gap. If there is any fitting slippage greater than 1/16" is evident, the fitting will need to be replaced and the hose retested. During inspection pay careful attention to signs of bulging, which indicates possible damage to fiber braid reinforcement. Carefully inspect the end fittings for cracks, wear and corrosion.

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Note: *The XLDS umbilicals are rated for a working pressure of 1500 psig, and the short 6" interface whips are rated for a working pressure of 1100 psig. The maximum operating pressure of the XLDS is 400 psig. Dive Lab feels there is more than enough safety factor built into the umbilical system, that a pressure test to 800 psig alone, is adequate. All standard 3/8" thermoplastic, umbilicals designed and intended for surface supplied diving, have a working pressure of at least 400 psig and most are 500 psig or greater.*

The Dive Lab Test manifold can also be used to test these, as well as other types of umbilicals and low-pressure hoses. The manifold can be used up to 1000 psig, however the relief valve will need to be re-set for the desired test pressure before testing. In addition, Dive Lab test manifolds manufactured after February 2015, also have straight thread ports that allow testing of SCUBA whips using ½-20 and 3/8-24 straight thread fittings.

Note: The test block has a one-way valve with a 250 psig spring. It requires at least 300 psig supply pressure before air can flow into the block. When testing low pressure SCUBA intermediate hoses, we recommend testing it to 2 times the working pressure of the system the hose is used with or 1.5 times the stated maximum working pressure of the hose.

As an example: *A SCUBA hose being used with first stage regulator, that has 140 psig, normal intermediate pressure, could be tested 2 X 140 = 280 or you could simply test the hose to 1.5 times its stated working pressure.*

Most intermediate SCUBA whips have a minimum working pressure of 250 psig. Never exceed 1.5 times the maximum working pressure of the hose being tested.

Caution: *Prior to pressure testing. Perform a visual inspection of the test manifold, and all components being used for pressure testing.*

Caution: *Never exceed 1.5 times the maximum stated working pressure of the hose being tested.*

Adjust the relief valve as necessary for the proper setting. Call or e-mail Dive Lab Inc if you have any questions.

Caution: *Always check the relief setting before starting any testing. To check the relief, simply cap the outlet of the manifold with the brass cap provided, and slowly pressuring with air to the required lift pressure and adjust the relief to lift at the desired lift pressure.*

Warning: *Always secure (Hog Tie) the umbilical by securely whipping / tying using a secure line so that should the umbilical fail it will not whip about.*

Warning: *When pressure testing with gas, never use any gas other than air or nitrogen as a pressure source. Using any gas containing oxygen greater than 21% by volume, could cause a detonation event that may result in bodily harm or death.*

Warning: *Always wear safety glasses and hearing protection when performing any pressure testing.*

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Warning: *Perform testing in a secure area, where all personnel can remain clear.*

Warning: *Always vent the umbilical very slowly, ensuring the open end is pointed in a safe direction and venting the system slowly.*

Warning: *Never substitute components of the test manifold, without first consulting Dive Lab Inc.*

The Dive Lab umbilical test manifold has been designed to allow fast, easy and safe pressure testing of the XLDS umbilicals. The test manifold allows pressurization using air only, or the combination of air and water. The advantage of using air only, is the hose stays dry. In addition, using air only may show very tiny bubbles, that may not show up if testing with water. With air only the umbilical can be wetted with soapy water. Filling the hoses with water and pressurizing with air, is the safest way in the event of a fitting failure or hose rupture. During testing the umbilical should be restrained, and eye and ear protection should be worn at all times. Care must be taken to insure the umbilical is securely restrained, by binding it with rope in a manner that will contain and restrain the entire assembly. The test manifold HP hose is equipped with a very small orifice, which limits how fast the high pressure air can enter the manifold, so the system cannot be pressurized faster than the relief and relive the pressure. For conventional diving umbilicals, the manifold relief valve is normally set to start relieving at 600 psig plus or minus 10 psig. The relief is capable of relieving pressure much faster than it can be pressurized. For the ¼" XLDS umbilicals, the relief is adjusted to lift at 800 psig, plus or minus 10 psig. The test pressure is 800 psig for 10 minutes, which is a pressure of twice the maximum supply system working pressure.

Caution: Never substitute or replace the umbilical manifold test hose or other components, without first checking with Dive Lab to insure compatibility.

Figure 6 Test Manifold ready to pressurize

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7.0 Testing Rational: The safest method of testing an umbilical is to pressurize the umbilical with water, because if a fitting was to fail, there would be little air in the umbilical, so the stored energy is very small. This being said, testing using ***air*** with this system is also very safe, providing the umbilical is properly secured and restrained. Testing with air is the easiest, simplest and fastest way to test, because the umbilical does not need to be dried after testing. Using air does have the potential danger in the event of a fitting or hose failure. If a fitting fails, it will result in a very loud noise, and umbilical whipping, if not properly secured. However, if properly secured and restrained, an umbilical failure during testing, will not pose a significant danger providing hearing and eye protection are used and the area is secured.

Warning: *A flailing, whipping umbilical can cause serious injury to persons standing close by.*

Regardless of the pressurization method, *always securely tie the ends of the hoses being tested and tie the entire assembly (See Figure 6).*

8.0 Conventional Hydraulic Testing: In order to use water as a test media, a hydraulic pump is normally needed. A typical hydro pump with the necessary gages, hoses and fittings can be very costly. Unless you have many different types of pressure testing to do on a regular basis, it might be difficult to justify the cost of a hydro pump system. If cost is not issue, the hydro pump system may be the best method, because it will allow a broad range of pressure tests to be conducted. If umbilicals and low pressure hoses are the only items that you need to test, then the test manifold is a safe, simple and inexpensive alternative to the hydro pump.

9.0 Test Manifold: The umbilical test manifold was primarily designed and intended for testing the ¼" XLDS umbilicals, but can be used for testing conventional surface supply umbilicals, as well as other low and medium pressure hoses with the applicable adapters and test fittings. Testing with the umbilical test manifold can be done using air only, or with water and air, and should be limited to a maximum pressure of 1000 psig.

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Figure 7 Flow limiting device

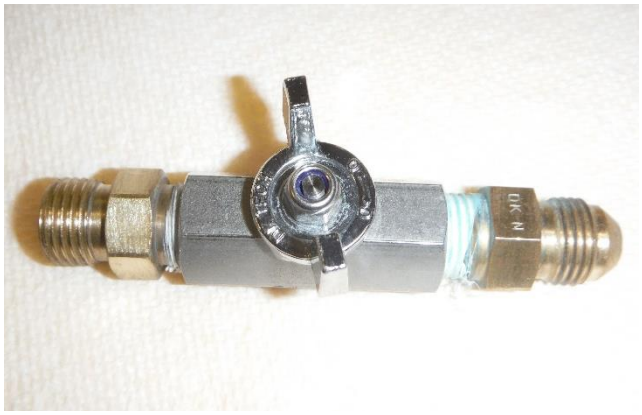

Figure 8 Vent isolation valve (max working pressure 1000 psig)

Figure 8 Water Hose QD adapter

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10.0 Tools and Materials Needed

- 5/8, 11/16, 7/8”open end wrench
- Garden hose and clean potable water supply (only if testing using water)
- Scuba cylinder charged with divers air to 1000 -1500 psig
- Safety glasses
- Hearing protection
- Line for securing the umbilical

11.0 Safety Precautions:

Caution: *Before testing the umbilical, the umbilical should be properly secured with a line, to prevent movement, as shown in* ***Figure 6****. In the event of a fitting or hose failure, the secured assembly will not be able to whip about.* ***A whipping umbilical could cause great bodily harm.***

Caution: *Always wear safety glasses and hearing protection during pressure testing (ear defenders), as a precaution when performing any pressure testing.*

Caution: *Keep all unnecessary persons away from items being tested.*

12.0 Checking / Adjusting the Relief Setting*:* It is best to always check the lifting pressure before testing umbilicals. If the manifold has not been used for a long period of time, or if you are unsure what the relief setting is, the relief can be easily checked by capping the outlet fitting on the gage manifold, and slowly pressurizing the assembly using a SCUBA cylinder, that has at least 1000 psig of air pressure.

Keep in mind, most relief valves seats will stick slightly. During the first lift check, the lift pressure may be up to 50 psig higher, then the normal setting. After lifting, the set pressure will usually return closer to the original setting. Even if the umbilical being tested is pressurized to 700 psig, before the relief lifts or pressurization can be halted, you will still be at a pressure under the standard 1.5 times the umbilical, or hoses working pressure well within what the umbilical can safely handle.

1. Cap the fitting at the discharge end of the manifold as shown in Figure 9.
2. Attach the yoke to a SCUBA cylinder with a charged pressure of at least 800 psig, but no more than 1500 psig.
3. Very slowly crack open the cylinder valve about 1/8 of a turn, for one to two seconds then shut. Repeat this procedure, while watching the gage on the test manifold, until the pressure reads 600 psig. Then slowly increase the pressure, until the relief starts venting.
   Note: If the relief has not started venting by the time the gage reads 650 psig, the relief will need to be adjusted. For adjustment proceed to 12.0.

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Adjusting the Relief:

1. After completing steps 1-3 above, to adjust the relief, loosen the adjustment lock nut on the relief using a 7/8” open end wrench.
2. Using a 5/16” Allen wrench, slowly rotate the adjustment hex clockwise to increase the setting, which will increase the pressure or counterclockwise to decrease pressure setting. Once the desired setting has been made, tighten the lock nut against the body. **Note:** After tightening the lock nut, check the lift setting one more time and readjust if necessary, then bleed down the yoke and whip assembly using the thumb bleed on the yoke, then vent off the block by loosening the cap on the outlet fitting using the 11/16 and 5/8” wrenches.

Figure 9 Adjusting the manifold relief

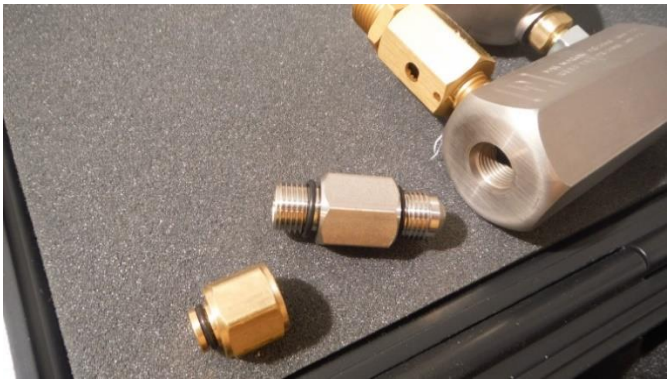

Figure 10 Umbilical Adapter (Standard 9/16 oxygen one side and -8 on the other side)

Note: The cap is intended for oxygen end only

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13.0 Testing Using Air Only:

To perform pressure testing with air only, attach one end of the umbilical or hose to the outlet end of the test manifold, and the other end of the umbilical vent / isolation valve. Using air has some advantages over using water, but keep in mind if a fitting were to come loose, there would be a lot of energy being released. Using air instead of water will identify very tiny leaks, which may not be present, when water is used as a test media. The pressurized umbilical can be immersed in water or sprayed with a solution of soapy water to help identify any leaks.

Note: *A hand pump spray container, containing a solution of mild dish detergent and water, which can be sprayed on the fittings and hose to aid in identifying any leaks. In addition the entire umbilical can be immersed in water to identify any leaks.*

Testing:

1. Securely make up and tie the umbilical and end components as shown in *Figure 6.*

2. Attach the test manifold to the umbilical as shown in *Figure 6.*

3. Attach the vent / isolation valve *(see Figure 8)* at the end of the umbilical then open the valve.

4. Attach a SCUBA cylinder that has diver breathing air only. Do not use any other gas, except divers breathing air at a pressure of between 800-1500 psig, to the DIN / Yoke adapter and shut the bleed valve on the Din / Yoke assembly. Lay the cylinder down on its side and attach the male QD plug, to the female QD socket.

Note: *The hose has a built in flow restrictor at the yoke end, which allows for slow pressurization of the manifold and umbilical. In addition, the relief is normally set to relieve at between 600* +/- 10 *psig and is capable of venting pressure faster than the scuba cylinder can deliver.*

5. Slowly open the cylinder valve approximately ¼ to ½ turn, allowing air to slowly pressurize the manifold and umbilical assembly, until the manifold gage reads 600 +/- 10 psig and then shut the valve.

6. Allow the pressure to stabilize for a minute or two then re-pressurize as necessary, to get a final reading of 600 +/- 10 psig. Once the system pressure has stabilized, shut the cylinder valve, then open the bleed valve located on the yoke din assembly and vent the DIN / Yoke and hose assembly.

Disconnect the whip if desired. Note and record the test start time, and pressure on the record sheet, then allow the system to sit for ten (10) minutes, then record the stop time and stop pressure. If there has been any loss of pressure, the cause of the loss must be identified and rectified, then the test should be repeated, until the pressure test is successful with zero pressure loss.

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14.0 Testing Using Water:

To perform the 600 psig pressure test with water and air, first the umbilical needs to be filled with clean fresh water, using the garden hose adapter as shown in *Figure 8*.

1. Securely make up and tie the umbilical and end components as shown in *Figure 6*.

2. Attach the outlet of the test manifold to the umbilical as shown in *Figure 6*.

3. Attach the vent / isolation valve (*see Figure 8*) at the end of the umbilical then open the valve.

3. Using a bucket or other suitable container, place the end of the umbilical with the vent / isolation valve in the bucket, to avoid getting water everywhere.

4. Open the water supply and allow water to flow out the vent valve for at least 10 to 15 seconds, to eliminate as much air as possible. Then shut the vent valve, secure the water supply and remove the garden hose QD adapter.

5. Attach a SCUBA cylinder that has diver breathing air at a pressure of between 1000-3000 psig to the DIN / Yoke adapter, then shut the bleed valve on the Din/ Yoke assembly. Lay the cylinder down on its side.

Note: *The hose has a built in flow restrictor at the yoke end, which allows for slow pressurization of the manifold and umbilical. In addition, the relief is set to relieve at 625 and is capable of venting pressure faster than the scuba cylinder can deliver.*

7. Slowly open the cylinder valve approximately ¼ - ½ turn, allowing air to slowly pressurize the manifold and umbilical assembly, until the manifold gauge reads 600 +/- 10 psig and then shut the valve.

8. Allow the pressure to stabilize for a minute or two then re-adjust the pressure as necessary to get a final reading of 600 +/- 10 psig. ***Note:*** Stabilization of the umbilical pressure usually takes 2-3 minutes because the umbilical stretches slightly.

9. Once the system pressure has stabilized, shut the cylinder valve then open the bleed valve located on the yoke din assembly, and vent the supply then disconnect the whip.

10. On the test record sheet, note and record the test start time and pressure, and allow the system to sit for ten (10) minutes, while observing the fittings and hose for any signs of damage and abnormalities. After the ten minute test time, record the stop time and stop pressure.

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If there has been any loss of pressure the cause of the loss must be identified and rectified, then the test should be repeated, until the pressure test is successful with zero pressure loss.

Warning: When depressurizing the umbilical, always point the discharge end in a safe direction and open the valve very slowly, and allow the pressure to vent slowly.

After successful completion of testing, the umbilical and manifold should be dried. The simplest way to dry the umbilical is to use diver's air. It usually requires at least one 80 C.F. to dry a 300ft long XLDS umbilical, and about 2 full 80 C.F. SCUBA tanks to dry a 600 ' long 3/8" umbilical. For the XLDS, attach the umbilical to the console and adjust the outlet pressure to 50 psig. Insure the discharge end of the umbilical is tied and secure, to keep it from whipping about. For other console supplies or LP compressor, allow a moderate flow for at least 5 minutes, then check for moisture by holding a cooled mirror or class in the flow path at the end of the umbilical. With the air reduced flow if any significant moisture is present, it will show as condensation on the mirror or glass which means additional air flow will be needed to complete drying. **Note:** When drying a 3/8" umbilical, it may require up to two SCUBA cylinders to completely dry the 3/8" umbilical.

15.0 Test Manifold Care and Maintenance: After using, if the manifold was used with water as a test media, the test manifold should be dried before storage. Normally this will be accomplished by running air through for at least 2 minutes.

16.0 Gage Comparison: The gauge should be compared to a gauge of known accuracy at least once a year. The gage is a straight thread O-ring seal and can be easily removed for comparison or it can be compared in place.

For any questions on use, care and maintenance of the Umbilical Test System please call or e-mail Dive Lab visit our website at www.divelab.com or call us at 850-235-2715.

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CERTIFICATION SHEET

Umbilical Pressure Leak Test

Umbilical Serial #	System Component Part Description /Identification

Purpose of Tests (check test box)
☐ Conventional Umbilical Routine Pressure Test, as well as visual inspection of umbilical for cuts, slices, bulges, fitting slippage, excessive wear, signs of kinking, and any other signs of damage or deformity, 600 psig for 10 min.
☐ XLDS Umbilicals Routine Pressure Test, as well as visual inspection of umbilical for cuts, slices, bulges, fitting slippage, excessive wear, signs of kinking, and any other signs of damage or deformity, 800 psig for 10 min.

Maximum System Design Pressure	Maximum Umbilical Rated Working Pressure
psig	psig

Test Pressure Used	Test time Used	Test Media Used
psig		☐ Water ☐ Divers Air ☐ N2 ☐ Other

Test 1
Start Time_____ Start Pressure_____ Stop Time _____ Stop Pressure_____ ☐ Pass ☐ Fail

Remarks (if any)

Print Name	Signature	Date

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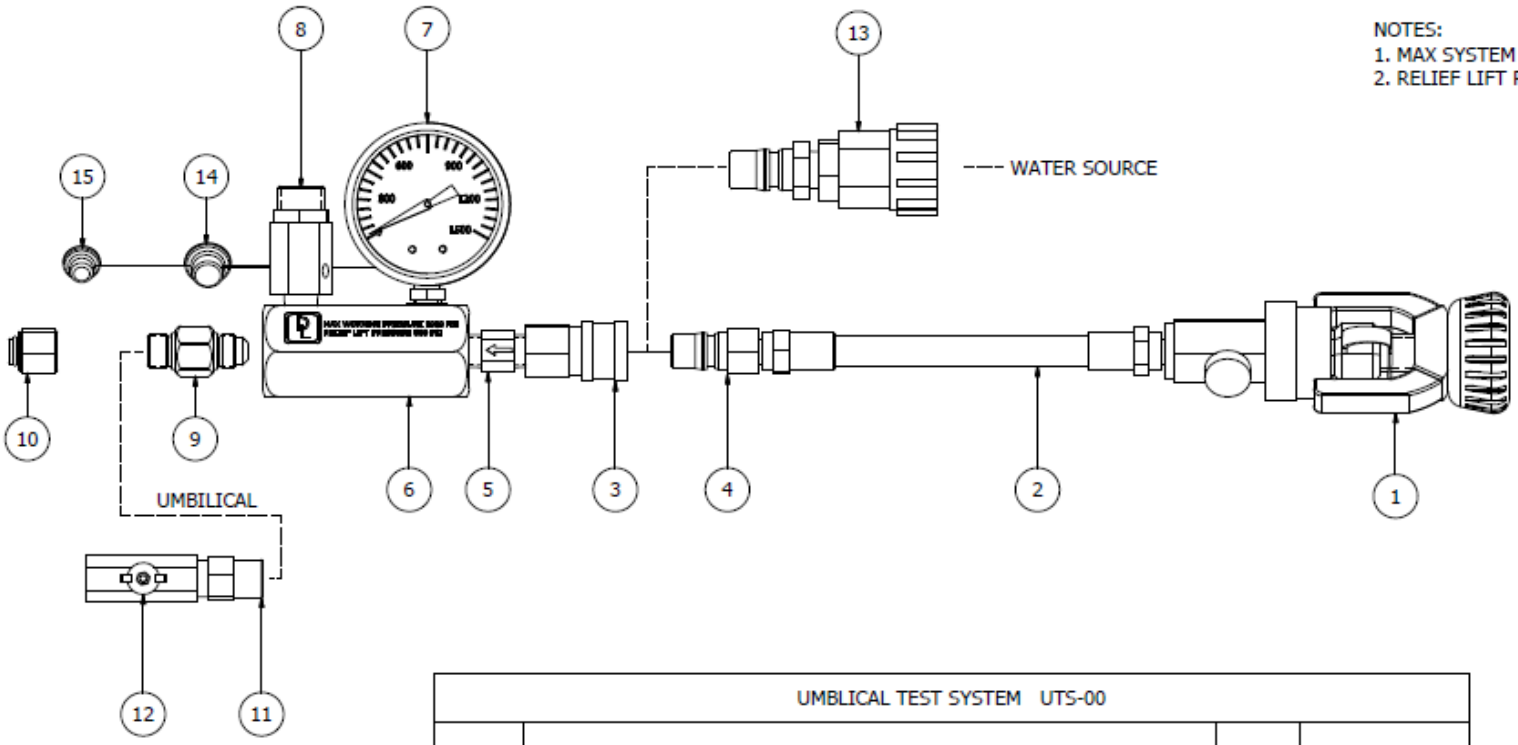

NOTES:
1. MAX SYSTEM WORKING PRESSURE 1000 PSI
2. RELIEF LIFT PRESSURE 600 PSI

UMBLICAL TEST SYSTEM UTS-00			
ITEM	DESCRIPTION	QTY	PART NUMBER
1	DIN/YOKE COMBO	1	UTS-01
2	HOSE, HIGH PRESSURE 1/4 MNPT	1	UTS-02
3	QUICK DISCONNECT SOCKET 1/4 FNPT	1	UTS-03
4	QUICK DISCONNECT PLUG 1/4 FNPT	1	UTS-04
5	CHECK VALVE 1/4 MNPT	1	UTS-05
6	MANIFOLD	1	UTS-06
7	GAUGE, 7/16-20 ST- 0-1500	1	UTS-07
8	RELIEF, 1/4 MNPT 6000PSI	1	UTS-08
9	ADAPTER, 9/16 O2 x -6 JIC O-RINGS -014	1	UTS-09
10	DUST CAP ASSEMBLY	1	UTS-10
11	FITTING 9/16-O2 x 1/4MNPT	1	UTS-11
12	BALL VALVE, SHUTOFF	1	UTS-12
13	HOSE ADAPER	1	TUS-13
14	PLUG 1/2-20 UNF O-RING -013	1	UTS-14
15	PLUG 3/8-24 UNF O-RING -011	1	UTS-15

Dive Lab Part Number : UTS-00

MATERIAL

DIVE LAB INC. 1415 MOYLAN ROAD, PANAMA CITY BEACH, FL 32407
VOICE: 850-235-2715 FAX: 850-235-0858

.X+- .032 .XX +- .01 .XXX +- .005 √63 UNSPECIFIED SURFACES

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EMAIL: DIVELAB@DIVELAB.COM

DRAWN	M.WARD	10/28/2013
CHECKED		
QA		
MFG		
APPROVED		

Dive Lab Inc.

TITLE: UMBILICAL TEST SYSTEM UTS-00

SIZE	DWG NO	REV
C	0015	A

SCALE

SHEET 1 OF 1