

**OS SYSTEMS - DIVING DRYSUITS  
USE & CARE MANUAL  
HDPro DRYSUIT  
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# INTRODUCTION

Congratulations on purchasing a Diving Drysuit from O.S. Systems, Incorporated (OS SYSTEMS). Your OS SYSTEMS Drysuit was manufactured in the USA, to exacting standards, using only the highest quality materials and supplies. Diving dry in an OS SYSTEMS Drysuit will significantly enhance your diving pleasure on each and every dive.

Because you will be diving dry, you will use less energy to stay warm, during, in between, and after dives. You will make more dives and have more energy than wetsuit divers. You will find that you do more diving, enjoy your diving more, and will never go back to wetsuit diving.

However, you must make sure that you are a Responsible Diver. You must read and understand all of the materials and instructions included in this OS SYSTEMS Diving Drysuit Manual, receive training about drysuit diving techniques from a properly certified and experienced instructor, and practice all of your drysuit skills until they are totally second nature.

Even if you are an experienced drysuit diver, you should read, absorb, understand and practice all of the same materials and skills before diving in your OS SYSTEMS Drysuit.

If any of the information in this OS SYSTEMS Drysuit Owner's Manual is unclear, or if you are unable to obtain satisfactory answers to any questions from your instructor, please contact OS SYSTEMS by e-mail at "Dive@ossystems.com".

Please make sure you read and thoroughly understand all of the Warnings, Important Safety Information, and Drysuit Guidelines, beginning on page 3 of this Owner's Manual.

## **ABOUT O.S. SYSTEMS, INCORPORATED (OS SYSTEMS)**

OS SYSTEMS is a manufacturing corporation located in Scappoose, Oregon, USA, employing between 30 and 45 people full time, year round. OS SYSTEMS has been in business since 1983, specializing in the manufacture of fabric drysuits, jackets and waders, for diving (recreational and commercial), search and rescue (diving and surface), Military, paddling, waterskiing, sailing, personal watercraft, marine biology, fishing, and any usage requested by the user. During this time OS SYSTEMS has manufactured over 90,000 drysuits.

# WARNING !!

Improper maintenance, use or misuse of this OS SYSTEMS Drysuit could cause loss of buoyancy control and exposure to thermal hazards, including uncontrolled descents, uncontrolled rapid ascents, and/or body overheating or overcooling, resulting in drowning, decompression sickness, air embolism, stroke or seizure.

## **DO NOT USE THIS OS SYSTEMS DRYSUIT UNTIL:**

1. You have received instruction in Drysuit diving and maintenance from a dive instructor who is certified to teach Drysuit diving by a nationally recognized instructional organization, and who is knowledgeable in the use and maintenance of Drysuits;
2. You have practiced and mastered practical Drysuit skills, including maintenance, check out, and emergency skills in a controlled environment under the supervision of this certified instructor, and
3. You have read, understood and followed all instructions and safety precautions in this OS SYSTEMS Diving Drysuit Manual.

Reading and understanding this OS SYSTEMS Diving Drysuit Manual is very important, but it is not a substitute for receiving the instruction and training from a properly certified and experienced instructor.

If your OS SYSTEMS Diving Drysuit Manual is lost or stolen, another copy can be obtained by downloading the Manual, in a PDF format, from "ossystems.com".

## **IMPORTANT ADDITIONAL SAFETY INFORMATION**

Your OS SYSTEMS Diving Drysuit is designed for use by certified SCUBA divers who have successfully completed a

course in Drysuit Diving from a properly certified instructor.

DO NOT USE THIS DRYsuit AS A LIFT BAG! If you use this OS SYSTEMS Drysuit as a lift bag and lose your grip on the object being lifted, you may become excessively buoyant, resulting in a rapid uncontrolled ascent.

DO NOT USE THIS DRYsuit FOR DIVING IN CONTAMINATED ENVIRONMENTS! Although some OS SYSTEMS Diving Drysuits can be adapted for use in some contaminated environments, this would require special training, equipment and procedures. Do not use your OS SYSTEMS Diving Drysuit in a contaminated environment unless you have been thoroughly trained and specially equipped.

Ice diving (diving in waters 40 degrees Fahrenheit or less) is extremely hazardous. Although some OS SYSTEMS Diving Drysuits can be adapted for use in some ice diving environments, this would require special training, equipment and procedures. Do not use your OS SYSTEMS Diving Drysuit in ice diving unless you have been thoroughly trained and specially equipped.

Keep this OS SYSTEMS Diving Drysuit Owner's Manual for future reference.

If you sell or loan your OS SYSTEMS Drysuit to someone, make sure that this OS SYSTEMS Diving Drysuit Owner's Manual accompanies this Drysuit, that the person reads, understands, and complies with all of the information and instructions contained in it, and that the person has had or does obtain the proper Drysuit Diving training.

Replacement or additional copies of this OS SYSTEMS Diving Drysuit Manual are available at OS SYSTEMS.com.

#### **DRYSUIT GUIDELINES**

The following DRYsuit GUIDELINES have been adopted and endorsed by several manufacturers of drysuits, including OS SYSTEMS.

1. Complete a drysuit diving course from an instructor and stay current.
2. Use a buoyancy compensation device for surface flotation and back up.
3. Know your equipment and emergency procedures.
4. Practice your drysuit diving skills under controlled conditions until they become second nature.
5. Dive with a buddy who understands your drysuit system.
6. Use the correct amount of insulation or the water temperature you are diving in and for your exertion rate.
7. Do not weight yourself heavier than neutral buoyancy with an empty tank. Your weighting should allow you to make a safety stop at ten feet upon completion of your dive, with a tank containing 500 PSI or less.
8. Check your valves, zipper and seals before each dive.
9. Perform preventive maintenance and repairs on your drysuit and valves regularly, or have them serviced by a qualified individual.
10. Know your limitations and do not exceed them.

Diving where the water or air temperature is below 70 degrees Fahrenheit constitutes cold water diving.

Diving where the water or air temperature is below 40 degrees Fahrenheit constitutes ice diving. Ice diving is very dangerous and requires special equipment, training, preparation and procedures.

#### **A) GENERAL DRYSUIT SPECIFICATIONS -**

Drysuit shells are designed for many different applications, from sailing to waterskiing, to deep diving, etc. Different fabrics, design features, and components are used, depending on the specific application the Drysuit is designed to be used for.

All Drysuit shells are full body garments designed to prevent the intrusion of water into the shell when immersed in water. Proper insulation (Thermal Wear) worn under your OS SYSTEMS Diving Drysuit will keep you warm. The combination of OS SYSTEMS Diving Drysuit shell, Thermal Wear, and accessories is your Diving Drysuit System.

OS SYSTEMS designs and makes many different styles of Diving Drysuits. The references and the detailed descriptions in this OS SYSTEMS Diving Drysuit Manual shall be in regard to the HDPro Diving Drysuit.

## **B) BASICS OF THE OS SYSTEMS HDPRO DRYSUIT SHELL -**

### **1) Material of the Main Body -**

A number of different kinds of materials are used by many different manufacturers to make the main bodies of Diving Drysuits, including Polyurethane Coated Nylon (PCN), Butyl Rubber, Tri-laminate Butyl Rubber, Foam Neoprene, and Crushed Neoprene. Each type of fabric has advantages and disadvantages.

OS SYSTEMS has developed a unique fabric for its Diving Drysuit Shells, 210 denier High Count Nylon (210 HCHW), triple coated with polyurethane for total waterproofing and abrasion resistance. The 210 HC fabric was originally developed by the US military in order to combine the strength and durability of the 400 denier pack cloth fabrics, with the light weight and flexibility of the 200 denier oxford fabrics. The resulting 210 HC fabric has an extremely high strength to weight ratio. In fact a size large OS SYSTEMS Diving Drysuit, complete with Boots, valves and hose, may weigh as little as 8.0 pounds. Compare this to the weight of any other make of Diving Drysuit.

The seams of Diving Drysuits that are made from PCN are sewn using power sewing machines, and are sealed using industrial heat taping machines. This greatly reduces the amount of labor required to complete the basic drysuit shell. More time can be spent adding design feature like crotch gussets, arm gussets, pockets, reinforcing pads, custom sizing and colors, relief zippers, and many more individual design choices. Your individual drysuit can be to your own design, not a "take it or leave it, off the rack drysuit."

Repairs, when they are necessary, including seal replacement or holes in the shell fabric can be done easily and quickly, even on location in between dives. See the Repair Section below. OS SYSTEMS does recommend that zipper replacement be done exclusively at the factory.

### **2. Seals and Footwear -**

Each Diving Drysuit shell is equipped with LongLife Latex<sup>®</sup> rubber neck and wrist seals to prevent water intrusion. These seals have a minimum thickness specification of .026". They are more durable than the latex seals commonly used on other drysuits, and are easily replaced. Thicker Commercial seals are also available (.030"+). The seal replacement instructions are detailed the Repair Section below. Additional instructions are available at "[www.ossystems.com/repair/repr.htm](http://www.ossystems.com/repair/repr.htm)", and at "[www.ossystems.com/repair/seals.html](http://www.ossystems.com/repair/seals.html)".

Seal care and maintenance is detailed in the Maintenance section below.

The standard footwear on the HDPro drysuit is DV-Boots. DV-Boots are designed for diving, and have sturdy soles for walking, low profile toes and body for easy insertion into fins, reinforcing at wear areas, easy flex ankles for swimming, and fin keeper heels. DV-Boots can easily be installed and/or changed.

Other available footwear options include LongLife Latex socks or ankle seals.

### **3. Valves -**

OS SYSTEMS installs a manual, swivel, inflation valve (Inlet), and an automatic feature deflation valve (Exhaust) on your OS SYSTEMS Drysuit. A low pressure air hose is also included.

### **4. Zippers -**

All of the zippers on your OS SYSTEMS drysuit, entry and/or men's style relief if ordered, are #8, brass tooth, airtight, waterproof, diving quality zippers.

### **5. Entry Design -**

A number of different entry designs are used by different drysuit manufacturers, Back Shoulder Entry, Horizontal Front Entry, Diagonal Front Entry, Front Shoulder Entry, and a few other not often seen designs.

Do your best to avoid any damage to the entry zipper on your drysuit. Replacing it is the single most expensive repair you might incur. Please see the recommendations on storing your drysuit in the Usage Section below for a detailed explanation on how zippers can be damaged.

The HDPro is equipped with a Horizontal Front Entry design. This design provides for easy entry, minimizes the potential for zipper damage, reduces the amount of extra fabric length that needs to be added to the torso of your drysuit, streamlines the fabric of your drysuit shell, and helps reduce air migration in your drysuit.

An entry zipper placed horizontally at the waist is never subjected to being bent backwards and seldom receives any hard pressure or impact from BCDs, tank holders straps, etc.

You prepare for donning Horizontal Front Entry drysuit by opening the zipper vertically, much like a shark's mouth opens. Opening the zipper in this way makes it easier for you to put your head in

the drysuit and through the neck seal. Less fabric length in the torso is needed to pull the drysuit fabric over your head. You will have less unwanted torso length in your drysuit that needs to be pulled up and secured. You only need the suspenders that come installed in every HDPro.

After closing your entry zipper, wrap the zipper straps around your body, and lock them into the quick release buckles on the zipper cover. You do not need a crotch strap to hold the fabric in place.

### **C) THERMAL WEAR -**

Your HDPro Drysuit Shell keeps you dry. Your Thermal Wear, worn inside the drysuit, keeps you warm.

OS SYSTEMS makes a variety of synthetic fleece Thermal Wear. Choose the Thermal Wear that is right for you. Your choice will depend on your age, size, gender, anticipated activity level, length of anticipated dive, water temperatures, and anything that affects your metabolism level.

Thermal Wear made from synthetic fleece wicks moisture away from your skin. You will feel dry and comfortable even though moisture may condense on the inside of your HDPro shell fabric.

Your fleece Thermal Wear should fit closely, but still allow for unrestricted movement. This will minimize unwanted buoyancy from excess trapped air. The OS SYSTEMS 4-way stretch fleece jumpsuit is the perfect Thermal Wear first or second layer.

Close fitting Fleece Thermal Wear worn inside will also help reduce air movement inside your HDPro.

### **D) USING YOUR HDPRO -**

The Usage of your HDPro includes the following:

1. Sizing;
2. Donning (dressing);
3. Wearing;
4. Doffing (undressing); and
5. Storing.
  - (a) Q & A (Zipper Storage)

#### **1. Sizing -**

The first step in wearing an HDPro is to make sure that you have the correct size drysuit for you. Refer to the OS SYSTEMS Size Chart and select the correct size for you.

Height is the most important measurement to consider. The 210 HC fabric does not stretch. The HDPro Drysuit Shell that you select must have adequate room in the ease of the pattern to allow you to reach, bend over, squat, put fins on, climb ladders, and move around, without feeling any restrictions from the HDPro. Do not select an HDPro size that is designed for a person who is shorter than you are.

OS SYSTEMS offers a complete range of "shorts", "talls", "semi-customs" and "full custom" sizing options for all of its horizontal front entry diving drysuits, including the HDPro. See "Size Charts" at [www.ossystems.com](http://www.ossystems.com) for the Custom Measurement Sheet in PDF Format.

## **2. Donning -**

Dress in the combination of undergarments that you anticipate needing for your metabolic and activity level in the environment you anticipate encountering, and for the time you expect to spend.

Make sure that you have applied UV TECH to the inside and outside of your neck and wrist seals. Make sure you have Zipease recently applied to the teeth of the zipper so that the zipper slider will open and close easily. Check to make sure there is no sand or any other matter stuck in the Zipease lubricant on your zippers that might obstruct the zipper teeth when closing. Remove any watches, rings, earrings, or any item that might catch and tear the seals, including long or jagged fingernails.

Open the Zipper cover and fold it back so that the velcro on the cover will not catch on anything. Open the zipper to its maximum opening.

Begin donning by sitting on a chair and inserting one leg into that leg of the HDPro like you step into your trousers, with the zipper in front. Extend first one leg, and then the other, down into the shell and into the DV-Boot.

Grab the waist of your HDPro and pull the waistband of the HDPro up and set it into position so that the crotch area is snug yet comfortable (setting the crotch). Tension the suspenders to keep the crotch set properly.

Insert one hand/arm into the arm of your HDPro. Pull one shoulder of your HDPro fully over that shoulder, extending your arm down into the sleeve and your hand into the wrist seal. Hold your straightened fingers together so that they form one single unit pushing through the wrist seal. As your fingers emerge through the wrist seal, open your fingers and continue pushing and working your fingers, then your hand, and finally your wrist through the wrist

seal opening and into the proper position. The sealing area of the wrist seal should be at or just above your wrist bone. Make sure the wrist seal lays flat on your wrist.

Repeat the sleeve entry process for the other sleeve.

Raise both arms high above your head pulling your HDPro up again to confirm that the crotch is still set.

Insert four fingers from each of your hands, spread widely apart, into the top of the circular opening of the neck seal. Stretch the neck seal carefully open and down over your head and onto your neck. The neck seal lays flat on the neck with its upper edge slightly below your Adam's Apple. Adjust the neck seal up or down for comfort and improved sealing. Work out any wrinkles or folds in the neck seal.

Neck seal adjustment is discussed in the Maintenance section of this OS SYSTEMS Diving Drysuit Manual.

Use your left hand to secure the HDPro fabric and entry zipper extended straight out. Slowly pull the zipper slider, with your right hand, along the line of the zipper, as parallel to the teeth as practical. After your zipper is closed, give the slider one final pull to make sure it is fully closed. Fold the zipper cover down over the zipper and attach the velcro to velcro to secure it.

You now are watertight, but your HDPro is probably full of air. You need to vent the excess air (Burping your HDPro). Stand straight up with one finger from each hand in the opening of the neck seal, pulling the neck seal slightly away from your neck. Squat slowly with your elbows pressing tightly against your sides. You will feel and hear the extra air rushing out through the neck seal opening.

When the air has stopped flowing out, remove your fingers from the neck seal, allowing the seal to return to its sealed position against your neck. Stand up. You are now burped and vacuum packed. You may remove additional air by repeating this process. If you feel a little too squeezed, you may add a little air back into your HDPro by slightly opening the neck seal. Find your own comfort level.

Wrap the zipper straps around your body and lock them into the side release buckles on the zipper cover. Adjust the tension for your comfort level.

Additional burping may be done when you enter the water. Submerge yourself up to the level of your armpits. Bring your arms in close against your body. With one hand, reach up and vent your neck seal until sufficient air has escaped. Do not lower the neck seal into

the water or water will flood into your HDPro! You may also push the Exhaust valve, allowing air to escape, but this is often much slower.

### **3. Wearing -**

Once you have donned your HDPro, double-check the size. Make sure that your crotch is set. If the crotch of your HDPro rides up too tightly, you will feel obvious pain. If your HDPro rides down too far, you will feel restrictions in moving your legs, much like a hobbled horse.

Stand up straight and reach high over your head. Reach down and touch your toes. Reach from side to side. Pick one foot up and step over some obstruction. Sit down and put your fins on. Duplicate any motions you anticipate needing to be able to do in the HDPro.

Refer to the Maintenance section of this OS SYSTEMS Diving Drysuit Manual for techniques to fit neck and wrist seals to make them more comfortable.

Rubber seals are very susceptible to punctures and tears. All drysuit fabrics must be kept unpunctured to be dry. The HDPro has reinforcing Knee/Butt Pads, and covers in critical areas to protect the 210 HC fabric. See the Repair Section of this OS SYSTEMS Diving Drysuit Manual for repair procedures.

### **4. Doffing -**

Remove your HDPro Drysuit by reversing the Donning procedures. Protect the rubber seals by removing any watches, etc. that might cut or tear the rubber. When grabbing, stretching or pulling seals, use several fingers to spread out the stress.

### **5. Storing -**

Clean the rubber seals, zippers, and fabric of your HDPro Drysuit as described in the maintenance section of this OS SYSTEMS Diving Drysuit Manual. Apply UV TECH and Zipease as indicated.

Make sure the zippers are left in the fully open position. Make sure your HDPro is dry before closing any pockets or rolling or folding your drysuit. The best way to dry your HDPro is to hang it, right side out, in a shaded area where there is a breeze, out of the sun and away from the heat. The inside of the 210 HC fabric can just be wiped down with any clean cloth or paper towel. Your HDPro should be dry in about 5 minutes.

Lay your HDPro Drysuit flat, zippers facing down, and, beginning with the toes of the DV-Boots, roll the HDPro along its back up all

the way to the neck seal. Fold the drysuit arms backward over the rolled up HDPro. Secure the rolled HDPro by crossing the zipper straps and wrapping them around the rolled drysuit and buckling them together. Place your HDPro in a storage bag.

Store your HDPro protected from exposure to heat, UV radiation, and ozone, as much as possible.

**(a) Q & A (Zipper storage) -**

OS SYSTEMS has been asked numerous times about storing drysuits with the zippers open or closed. We specifically instruct drysuit users to store their drysuit with the zipper open. In fact, we instruct the user to never close the zipper unless the drysuit is in actual use.

These diving drysuit zippers are usually described as #8 TZ zippers. This is a brass tooth, airtight and watertight zipper. YKK is the company that owns all of the companies that manufacture these zippers, whether labeled as YKK, BDM, DYNAT, or OEB.

These #8 TZ zippers create a seal by causing the individual brass teeth on the zipper to interlock thus forcing the sealing lips of the neoprene, PVC, or polyurethane zipper tape to squeeze tight and seal out the water. These individual brass teeth must be correctly lined up so that they will mate up with all of the opposing brass teeth as the zipper is forced closed. This is accomplished by running a stabilizing polyester cord through a cavity inside each brass tooth.

If this cord is cut or broken, the individual teeth can be dislodged and move out of alignment. When this misaligned zipper is next closed these teeth can literally be skipped and hanging loose or similar. The zipper teeth can become stuck, whether open, closed or part way in between. The zipper can pop open when in use, or the user can become stuck inside the drysuit and have to cut his way out of the drysuit.

When the zipper is open, the line of teeth is fairly flexible. When the zipper is closed, these teeth are then locked in place and are very inflexible, especially if bent backwards. If the individual brass teeth are bent or twisted too much, the edges of the individual brass teeth will actually cut this stabilizing polyester cord and release the teeth to move a little.

The potential for breaking or cutting the stabilizing cord is much greater when the zipper is closed. Although this cord can be cut by radically bending the line of brass teeth when the zipper is open, the amount of bending required is much greater. The zipper is less likely to be damaged by storing it in the open position.

## **E) INSPECTING YOUR HDPRO -**

### **1. Inspect your HDPro (before & after) Each Use -**

#### **(a) Neck & Wrist Seals -**

Look at the outer edge of all latex seals. Look for a "V" notch starting that can lead to seal splitting. Look for cracking or checking in the latex material. Look for a soft/gummy feeling to the latex.

If you find **ANY** of these problems do not use the suit. Replace the seal.

If there are any areas where the latex is lifting slightly from the 210 HC fabric, apply a small touch of PB-300 to the area and press the seal back down to the fabric. Allow at least 30 minutes to dry.

#### **(b) Entry and Relief Zippers -**

With the zippers **FULLY** in the open position, inspect the brass rivets that line each side of the zipper opening. Drape each side of the zipper over your non-dominant hand (the edge of the zipper will form a U shape) pass all of the brass rivets over the top of your hand while you look for any that are broken or misaligned.

Look for excessive wax buildup and dirt in between the rivets. Clean with a toothbrush and mild soap if you find either. Reapply Zipease to the teeth of the zipper.

Inspect the small teeth on the inside edge of the zipper. These teeth interlock to hold the sealing area of the zipper together. Look for any missing or misaligned teeth. Look for wax or dirt (there should be none). Clean with a toothbrush and mild soap if you find wax or dirt.

Apply Zipease to the outer rivets **ONLY**. Open and close the zippers once before donning the suit.

#### **(c) 210 HC Fabric -**

Turn the suit inside out and look for any punctures. Patch as needed.

Look at the seams and the taping. If any tape is lifting, apply a touch of PB-300 and press the seam down.

Now turn the suit right side out and inspect for punctures. Patch as needed.

## **2. Establish an inspection timeline for your HDPro -**

Conduct the same inspection of your HDPro at the timeline intervals you select, even if you have not used it. Exposure to heat and the elements can cause deterioration that might require some repair. These timeline intervals should never be longer than 90 days apart.

## **F) MAINTENAINING YOUR HDPRO -**

### **1. Seals -**

#### **(a). The Composition of LongLife Latex Seals -**

OS SYSTEMS designs and owns all of the molds used to dip its LongLife Latex Seals. LongLife Latex Seals are dipped from only the best, high modulus, natural gum, latex rubber to maximize memory and longevity. The latex rubber is surgical grade, with the addition only of black dye, a minimum amount of ozone inhibitor and a long life sealant.

LongLife Latex Seals are not hypoallergenic; however, each seal does undergo a triple leeching process to minimize the protein content. Protein content is thought to be a contributing factor in some allergic reactions to rubber.

#### **(b). Why does rubber degrade?**

All rubber, as well as all synthetics, degrades over time. All of these materials, including natural gum rubber, contain special oils that are essential structural components called plasticizers. Over time these plasticizers migrate to the surface of the material and evaporate. This is called "outgassing". As these plasticizers are lost, the rubber degrades and becomes brittle, developing cracks and losing elasticity. These are signs that the useable life of the product is being shortened.

The degradation of rubber is accelerated by increased exposure to UV light from the sun, to ozone, to heat and to petrochemicals, but this degradation can be dramatically slowed. Examples of petrochemicals include gasoline, sun tan lotion, scented talcum powder, and the propellants in some spray cans.

#### **(c). The Care and Maintenance of LongLife Latex Seals -**

1. After every usage, wash the latex seal inside and out with a mild soap and warm water solution (if available) to remove all contamination that comes from body oils, pollution, lotions, etc.

2. Apply UV Tech? to the cleaned latex both on the inside and on the outside of the seal.

3. Store the suit rolled up in its bag to minimize the airflow around the seals. This allows the UV Tech to better protect the latex.

4. Apply UV Tech to all seals again prior to using the suit.

**NOTE:** Applying UV Tech to a contaminated seal will only trap contaminants and accelerate the deterioration.

#### **(d). UV Tech -**

UV Tech is an environmentally friendly, water based, industrial quality protectant and replasticizer that helps preserve natural gum rubber. UV Tech actually replaces lost plasticizers and helps seal in existing plasticizers, maintaining the integrity, suppleness and elasticity of rubber. UV Tech penetrates rapidly, delivering rejuvenating plasticizers deep into the material and protecting existing plasticizers. UV TECH does not just remain on the surface after application, simply making it shiny. UV Tech leaves surfaces dry and non-glossy, and will not attract dirt.

UV Tech contains UV blocking sunscreen that bonds to surfaces, providing durable protection from UV, ozone, rain-borne soils and contaminants. A single coat of UV Tech will help considerably, but for best results use UV Tech once after every usage, before storage, and again before the next usage. Spray UV Tech liberally over the inside and outside surfaces of the rubber, or spray on rag and apply with wiping motion. When stored away from sunlight, a product will not need to be treated as often. The protection provided by UV Tech will survive several washings and/or usages.

#### **(e). Fitting New Seals -**

New neck, wrist or ankle seals may feel tight or restrictive at first but will relax a little with use. Seals will feel tighter in a warm indoor area than they will feel in the cold water environment.

You can pre-stretch your seals by pulling the wrist seals over a small bottle and pulling the neck seal over a larger bottle. These seals should be only slightly stretched, about 20% from their resting circumference. Leave the seals in a stretched position for only 6 hours at a time. Test fit the seals after the first 6 hours and repeat the 6-hour sessions as needed until the seals are comfortable. Make sure that you have applied UV Tech to the latex prior to stretching.

OS SYSTEMS manufactures 4 sizes of neck seals and 3 sizes of wrist seals. Make sure that you have the correct size seal installed on your drysuit BEFORE you start any stretching of the seals.

#### **(f) Trimming New Seals -**

Do not trim OS SYSTEMS wrist or ankle seals.

Each size of OS SYSTEMS neck seal may be trimmed to improve fit. First pre-stretch the seal. If this is inadequate, turn the seal inside out. This will expose the guide rings on the inside of the neck seal. Using very sharp scissors, trim the neck seal in between these guide rings. Trauma scissors used by emergency personnel are easily available in emergency supply stores. Do not leave any jagged edges on the trim. Leaving jagged edges will focus all of the stress generated by stretching the seal over your head directly at the jagged point, and cause the latex to rip.

**WARNING!!** Never use a seal that is so tight that blood flow is restricted to the head or hands. **Too tight of a neck seal can lead to a life-threatening situation once in the water.**

#### **2. Zipper -**

When opening or closing your zipper, pull the zipper head directly along the line of the zipper, but at a slight angle up from the fabric of the drysuit. This will keep the zipper head from diving into the teeth of the zipper.

**Store the zipper only in the OPEN POSITION.** Close the zipper only when the drysuit is being used. If you bend the zipper backward or forward at a sharp angle, especially when the zipper is zipped closed, you can break the stabilizer cord that holds the teeth in place. The zipper teeth will then become dislodged and you will have to replace the zipper, at a great expense to you.

Periodically clean the zipper teeth with a toothbrush using a mild soap and water solution. Be sure to remove all sand and any other foreign particles at every opportunity. After cleaning, lubricate the zipper teeth with Zipease beeswax lubricant.

**NOTICE:** This zipper is not warranted by the zipper manufacturer. Take care of your zipper and it will work well for you for years.

#### **3. 210 HC Fabric -**

After each use, gently wash the inside and outside of the 210 HC fabric with a mild solution of hand washing or dishwashing soap. Then spray or rinse the inside and outside of the fabric with clean

water. Wipe the inside of the 210 HC fabric dry, and hang dry the outside of the 210 HC fabric, out of the sun and away from heat.

#### **4. Valves -**

After each use, gently run a mild soapy water solution through your Exhaust valve. Rinse with clean water and allow it to dry. Lubricate lightly with a pure silicone lubricant, like Seal Saver.

Repeat this process with your Inlet valve, although you will not be able to run the soap and water completely through the valve.

Inspect both valves to confirm that there is no sand, grease, or oil remaining to interfere with valve performance.

### **G) REPAIRING YOUR HDPRO -**

#### **1. Testing the HDPro -**

To test an HDPro Drysuit, first fully close the relief zipper, if any. Then turn the HDPro inside out and close the front entry zipper. Reach through the neck to fully close the entry zipper.

There are two basic methods of closing off the wrist and neck seals, plug and secure, or fold and clamp. To plug and secure, insert two small cans, or sand filled bottles (cups filled with sand and sealed with duct tape work well) into the wrist seals. One of these plugs should have an air connection so that it will allow air from a compressor or HP air cylinder to inflate the suit. One large can will likewise fill the neck seal. Secure these plugs with stretch velcro, strong rubber bands/tubes such as surgical tubing, etc. to keep air from escaping from around the seals.

The other method for closing off the seals is to fold the ends of the seals over and clamp them off with some form of clamps that are strong enough to hold the pressure, but soft enough to not puncture the seals themselves. Again, you must have a method of inflating air into the HDPro.

Lay the suit (front zipper up) on a large worktable. Fill the suit just to the point where the neck seal starts to bulge out (the air pressure in the HDPro will cause the suit to feel somewhat rigid).

With a sponge, or a spray bottle, drip soapy water on the entire suit while working on an area no larger than 12 inches by 12 inches. DO NOT become distracted while looking for leaks!!!! Mark any holes or punctures.

#### **2. Patching Punctures in the 210 HC Fabric -**

You will probably never have to patch the 210 HC fabric. However, since 210 HC is not totally impervious to punctures, we will discuss the repair procedure.

All 210 HC punctures are patched from the inside of the 210 HC fabric. Cut a patch of appropriate size from the 210 HC fabric that was supplied with your HDPro. The patch should be round or oval shaped, NO CORNERS THAT CAN CATCH AND PULL UP!

**Install the patch, smooth polyurethane to smooth polyurethane.**

Use Methyl Ethyl Keytone (MEK), which is available from paint stores, to clean the area that will be patched. Apply 3 thin coats of PB-300 to the patch and to the area of the suit where that patch will be applied (go ¼ of an inch beyond the edges of your patch). Allow 3 minutes drying time between applications of the PB-300 adhesive. After the 3<sup>rd</sup> application of the PB-300 adhesive has dried for about 2 minutes, and is still tacky, place the patch over the hole or puncture and apply firm pressure to affect a good bond between the two pieces. Run a small bead around the edges of the patch. Your HDPro is ready for use in 30 minutes.

For larger punctures and tears, make your patch a sandwich patch, one on the inside and one on the outside. For the outside patch glue the Polyurethane side of the patch fabric to the face of drysuit fabric.

**3. Patching punctures in the latex seals -**

Usually holes in seals are not patched. The seals are just replaced. However, you can patch these holes by using any of commercially available rubber inner tube Patch Kits that are available at most automotive or tire stores. When using those Patch Kits, follow the instructions provided in that Patch Kit.

**4. Replacing Wrist Seals -**

You can easily replace the seals on your own HDPro. Detailed seal replacement instructions are provided with each can of OS SYSTEMS PB-300 Drysuit Glue, and are set out below.

Remove the old wrist seal with an infrared heat lamp. Leave the residue of the old glue in place

Insert the squeeze style stainless steel OS SYSTEMS Wrist Repair Mold, smaller end first, through the sleeve and into the wrist opening. Leave about 1.5 inches of metal mold showing out the end of the sleeve.

You will want to keep the sleeve secure and stationary while you are working on it. Cut off a length of duck tape 1.5 inches long.

Cut that piece lengthwise so that you will have two pieces approximately 1.0 x 1.5 inches. Roll each piece length wise to create a small tube that has adhesive all around. You will want at least three of these duct tape tubes to place on the mold, and under the sleeve fabric, at even points near the furthest edge of the sleeve. Leave some of each of the tubes sticking out past the sleeve, so that you can use these protruding edges to secure the new wrist seal that you will be installing on the sleeve.

Install the new wrist seal over the stainless steel Wrist Mold. Pull the edge of the new wrist seal all the way over the residual glue remaining on the sleeve. Press the new latex seal against the protruding pieces of duck tape. Roll the edge of the new wrist seal up until all of the residual band of glue on the sleeve is fully visible.

What you now have is the surface of the new wrist seal where you will be applying glue, and the residual glue area, exposed and touching each other. This procedure reduces glue slop and helps line up the two surfaces that will be glued together.

Lightly wipe the residual band of glue and the exposed new seal with Methyl Ethyl Ketone (MEK).

Apply one coat of PB-300 adhesive to both exposed surfaces and wait 3 minutes. Apply a second coat PB-300 to both surfaces and wait about 2 minutes, until the PB-300 is tacky but not runny. Insert the flat wooden applicator into the folded area of the new seal and gently break the bond of any adhesive that overlapped when you were applying the PB-300. If you want, you can apply some masking tape under the rolled up edge of the new wrist seal to catch any slop over glue.

Now "walk" the new seal over the original seal area so that it exactly overlays the still glued band on the sleeve. Press the new seal firmly using your fingers. Allow the PB-300 glue to set up and cure for at least 2 hours, longer is better.

Turn the sleeve inside out and run a small bead of PB-300 on the fabric side edge of the seal. This is just a little extra insurance against leaks.

## **5. Replacing the Neck Seal -**

Remove the old neck seal with an infrared heat lamp.

If possible, attach the OS SYSTEMS Repair Neck Plate on some clean box or bucket, like a 5 gallon pickle bucket, to raise it up and let the HDPro fall gently down, better exposing the neck area for working.

Place your HDPro over this Repair Neck Plate and bucket, letting the fabric hang down. Center the neck hole of the HDPro on the Repair Neck Plate and pull the material tight. Attach clamps to hold the drysuit fabric against the plate.

Turn the replacement neck seal inside out, wipe the base of the new neck seal, and the residual glue band on the drysuit, with MEK.

Apply one coat of PB-300 adhesive to the areas of the new neck seal, and the residual glue around the neck hole, where new seal will be attached. Wait for 3 minutes, and apply a 2<sup>nd</sup> coat of PB-300 adhesive to the same two parts. Let sit for about 2 minutes, or until the PB-300 is tacky but not runny. If the PB-300 dries a little too much, simply apply an additional light coat and then install.

Install the new seal where the original seal was glued using the residual glue for alignment. Press the new seal firmly using your fingers. Allow the PB-300 glue to set up and cure for at least two hours. Longer is better.

**THANK YOU -**

This Drysuit Use and Care Manual describes, in great detail, many procedures you can do to maintain your HDPro and greatly extend its useful life, and your enjoyment.

You will be able to make field and base repairs. If you are unable to do all of the recommended maintenance, and do all of the repairs, OS SYSTEMS is available to assist you. We maintain complete drysuit repair and rehabilitation facilities.

Thank you for purchasing an OS SYSTEMS HDPro. We appreciate your business.

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**DRYSUIT & SEAL SIZING PAGE**

**A) DRYSUIT SIZING CHART -**

SIZE	CHEST	WAIST	HIPS	WEIGHT	HEIGHT
<b>XS</b>	33-35	26-28	34-36	90-115	4'11"-5'2"
<b>SM</b>	35-38	28-30	36-38	115-135	5'3"-5'6"
<b>MED</b>	38-40	30-34	38-42	135-160	5'7"-5'11"
<b>LGE</b>	42-44	34-38	42-44	165-200	5'10"-6'1"
<b>XLG</b>	46-48	38-42	44-48	200-230	6'1"-6'3"
<b>XXL</b>	50-52	44-48	48-52	230-260	6'2"-6'4"

Custom sized SPIRIT Drysuits are available. The Custom Measurement Sheet is available on the OS SYSTEMS website, [www.ossystems.com](http://www.ossystems.com).

**B) SEAL SIZING CHART --**

**Wrist Seals (DLS-2/DLSC-2)**

SUIT Size	SEAL Size	WRIST Circumference
XXS	XS	4" - 5½"
XS	XS	4" - 5½"
S	S/M	5½"- 6½"
M	S/M	5½"- 6½"
L	L/XL	6 5/8" +
XL	L/XL	6 5/8" +
XXL	L/XL	6 5/8" +

**Neck Seals (DLS-1/DLSC-1)**

SUIT Size	SEAL Size	NECK Circumference
XS	XS/S	12"-14"
S	XS/S	12"-14"
M	M/L	14"-16"
	M/L	14"-16"
XL	XL/XXL	16"-19"
XXL	XL/XXL	16"-19"

**C) DV-Boot - Size choice - Whole sizes - Men's USA - 4-14**

The DV-Boot is a diving boot that is attached to the HDPro shell just like a rubber seal, and can be replaced just as easily. It is made by dipping the fabric liner in a specialized rubber compound. The walking sole is vulcanized to the boot. The DV-Boot has a slim profile toe for easy insertion into and use with swim fins. The ankle is soft and flexible for non-tiring swimming. Reinforcing pads are vulcanized at wear spots. A finkeeper ridge is at the back of the heel.

# OS SYSTEMS WARRANTIES

1. All **HDPro, ULPro, VULCAN, SARR, NAUTILUS, MANTA, STREAM COUNT, STEALTH MAS, COAST GUARD EXPOSURE, STEALTH WADER, TRAVEL WADER, BREEZE, SPIRIT, PADDLING** drysuits, jackets, and waders, are warranted against defects in workmanship and sewn seam construction for a period of two years.
2. All **DOLPHIN** drysuits are warranted against defects in workmanship and sewn seam construction for a period of one year.
3. All diving drysuit inlet and exhaust valves, in drysuit of original installation, are warranted against defects in materials and workmanship for a period of three years.
4. All **STEALTH WADERS** and **TRAVEL WADERS** are additionally replacement warranted against any and all sewn seam leaks for a period of one year. If your OS Wader develops a sewn seam leak in the first year, OS SYSTEMS will replace it.

## **Additional terms and conditions of all OS SYSTEMS Warranties:**

All warranties are to the original purchaser only, and commence on the date of purchase from an authorized OS dealer. Proof of purchase is required for all warranty repairs. OS SYSTEMS reserves the right, at its own discretion, to repair the defect at its factory in Oregon, or to replace the product. All freight charges are to be paid by the purchaser. This special limited warranty is void if the product has been abused, misused, or not cared for properly. OS SYSTEMS does not warrant, or extend any warranties provided by the original manufacturers on the waterproof zippers. Undergarments and Longlife Latex seals are warranted for 60 days.

**THE FOREGOING WARRANTIES ARE IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTIES OF MERCHANTABILITY, OR FITNESS FOR A PARTICULAR PURPOSE.**



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