

UK CA CE

APPROVED
BS EN 14225-2:2017
PPE Regulation (EU)
2016/425

Owners Manual *Drysuits*

Custom 90° NINETY PORT 10 Ri2-100 MSF500

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About this manual

“Remember, diving should be enjoyed, not endured”

The statement above is printed into every dry suit that we make.



Mike Smeaton: A diver for 45yrs - Chile



Paul Rose: BBC Oceans - Antarctic

We do not take for granted the investment you have made in your new **O’Three** dry suit. You have not just bought another dry suit, you have bought into a company that has a customer care philosophy that is at the heart of everything we do.

From start to finish and beyond your purchase, everyone here at **O’Three** is committed to making sure you will be able to enjoy your diving to the full.

Diving has changed and is no longer the domain of just an intrepid few. Dry suits have had a major role in that evolution. This manual is produced to help increase your understanding and knowledge of the dry suit you have bought.



Portland Bill - Portland, Dorset UK
Image by Ben Pipe



Portland Bill, Dorset UK
Image by Dave Fowler

Warning

Stop!
Take Care

Before you use this dry suit, you must have completed and passed an industry recognized dry suit training programme, by an instructor who specialises and has a proven history in SCUBA (Self Contained Underwater Breathing Apparatus) drysuit diving.

It is of the utmost importance that you read and fully understand all of the instructions and safety precautions in the owner manual, including those for the valves and other accessories that might be attached to this suit before you start your training.

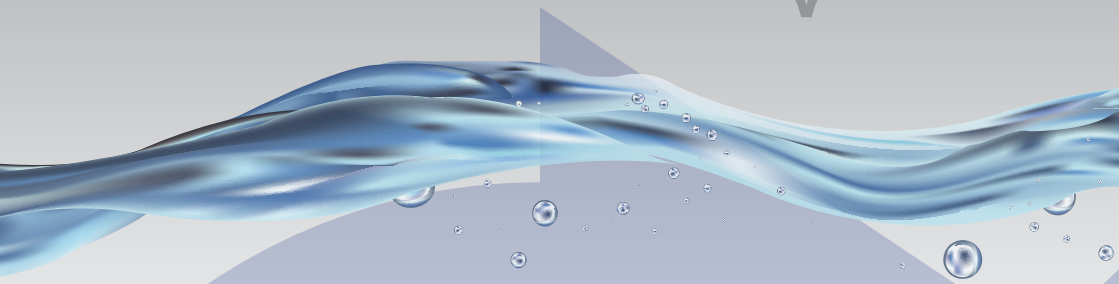
Careful maintenance not carried out in accordance with the owner manuals, or misuse of this dry suit and its accessories could result in loss of buoyancy control and or thermal protection, resulting in extreme health hazards such as drowning, decompression sickness, air embolism, stroke and seizure…., which could result in death.

Please be aware, there is also the risk of hyperthermia (heat exhaustion).

On very rare occasions an allergic reaction to neoprene or latex may occur.
If a rash should appear, please stop using and seek expert advice.

If any part of this manual is either lost or damaged, or you have any other questions, please contact **O'Three**.

Living Document



This manual is not a substitute for a dedicated training course delivered by an experienced and qualified instructor. Experience gained slowly and methodically and then practiced will enable you to become aware of what you can and cannot do in a dry suit.

This manual is a living document and has been designed in such a way that if an amendment needs to be made the whole manual does not need to be replaced.

This manual contains 62 pages, all of which have been individually numbered. If any pages become damaged or go missing, please get in touch immediately and we will replace those missing pages free of charge.

Stop!
Take Care

Whether you are new to dry suit diving or an old hand, it is in **your interest** and above all **your safety** that you read this manual from start to finish.



Tooni Mahto: BBC Oceans. Antartic. - Image by Ian Kellet

About O'Three

As a company with an international reputation for quality and **customer care**, that we are told is second to none, we fully understand our obligation to you, our customer.

Each suit is manufactured to an established procedure that we have developed and evolved over the years.

With our experienced dedicated team, **O'Three** has grown into a respected Dry Suit and Wet Suit manufacturer and is an "established market leader", putting quality neoprene innovation and service at the very core of everything we do.

From the very beginning, it was our strong belief that **O'Three** would be about exceptional quality and customer care. Simple really, and still our main aim.

To build a solid business you cannot have one without the other. This approach takes time, but with stubborn conviction those two core values have become inextricably linked and are at the bedrock of **O'Three's** success.



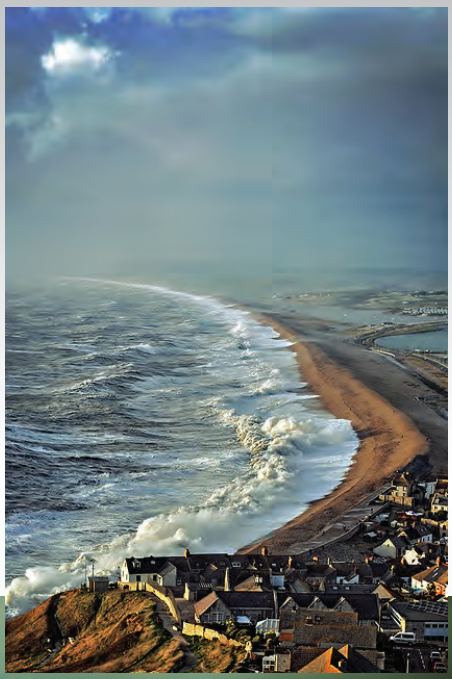
Our Environment

Portland is a limestone tied island on the Dorset coast in the United Kingdom and is the home of **O'Three** Ltd.

We are surrounded by water and the Jurassic Coast.

There are not many places that have a more diverse geology above and below the water.

It is this harsh environment that has shaped Portland and has had a major influence on the way we design and build our suits.





50.5500° N
2.4400° W

Warranty

O'Three has gained a unique reputation for producing high quality, individually customised dry suits and delivering customer care that is at the very core of everything we do. Within the company we are lucky enough to have a wealth of knowledge that has been made possible through a superb record of staff retention. What this means to you as the end user, is that you are not just buying a dry suit, you are buying into a philosophy that runs deep throughout the whole company. That philosophy is not just a part of our DNA, *it is our DNA*.

In Plain Terms:
In this day and age of lawsuits and litigation, **O'Three** prides itself on its "no nonsense, no hassle" after sales service – which we are told is second to none. We pride ourselves on this side of our business. It is testament to the quality of our products and to the mutual trust between **O'Three** and its customers. Accidents happen and if your suit becomes damaged for whatever reason outside of our standard warranty terms, **O'Three** will do it's very best to get you back in the water as quickly and as reasonably priced as possible.

In legal terms:
Recreational / non-professional:
Every dry suit (excluding the dry zip) is guaranteed against defects in materials and workmanship for three years. In the unlikely event you do experience a problem during that period, if after inspection, **O'Three** are satisfied that a product is defective, and taking into account what they regard as fair wear and tear from the natural life of the dry suit, they will repair or replace it free of charge.

Commercial:
All **O'Three** products being used in a commercial environment are guaranteed against defects in materials and workmanship for 12 months. In the unlikely event you do experience a problem during that period, if after inspection, **O'Three** are satisfied that a product is defective, and taking into account what they regard as fair wear and tear from the natural life of the dry suit, they will repair or replace it free of charge.

CE All our dry suits are fully compliant to EU standards and are fully certified to EN 14225-2:2017.

Regardless of where you have bought your **O'Three** dry suit, or where you intend to use it, it is sold to you on the understanding that only English Law applies in cases of all warranty claims and product liability.

Full terms and conditions can be found at :
www.othree.co.uk

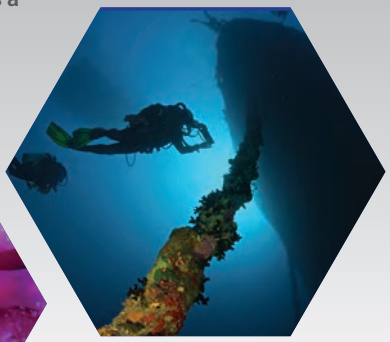






"The important thing regardless of how good your product is initially, is how well you deal with your customers when things sometimes go wrong. We all make mistakes, it's how you put them right that matters and in this case it was first class. I genuinely felt as if my custom was important to you and that's a nice thing in this day and age."

Dave Robson - Tyne & Wear



"Thanks so much, you guys still continue to offer outstanding service, no wonder everyone I know getting into diving raves about you."

Ross Davies – Swansea



Images by Rick Aryton



"Man, I went diving this weekend, water tempos are 38 Fahrenheit, which is bloody cold in the English vernacular! But I love my dry gloves!!! The folks at O3 are the BEST!!!! I cannot thank you enough! I have a summer of deep cold New England diving ahead and couldn't be more happy..."

Richie Kohler - USA



"I have just dived in my new Ri 1-100 suit which arrived a few weeks ago. Brilliant suit, never had better. Can't fault it. Highly recommended. I drove down with a friend Tina and we both had a suit fitted. Great experience and well worth the trip. Please keep up the good work, I shall promote your suits wherever I go. Many thanks..."

Paul Clarke - Stafford

"I have seen firsthand why divers who have **O'Three** suits are so happy with them and don't think twice about recommending your suits to others. Your attention to detail and rapport with the customer reinforces that great reputation."

Martin Timoney – Ireland



Limitations

We all know what the word "limitation" means. It is very difficult to give you, the end user, a definitive answer as to the limitations of the dry suit you have bought. As individuals we sometimes lose sight of our own limitations. It is these personal limitations that should be the overriding factor.


Image by Rick Ayrton

Stop!
Take Care

Too many people have died diving.

Unfortunately the vast majority of those deaths were due to personal inexperience and a lack of common sense.

Please, please do not put yourself, or allow other people, no matter how qualified they may be, to put you in a situation where you have to function beyond your safe personal limits.

When it goes wrong, what has gone wrong?

Dry suit buoyancy is not rocket science, but you could end up in orbit if it all goes wrong.

In the majority of cases it is the volume of air contained in a dry suit that could lead to difficulties. The control of this air is critical to your safety, with practice that control will become second nature.

Think about it in simple terms, a dry suit is a star fish and air will want to migrate where ever it can. It is impractical and could create other issues to put a dump valve into each limb. As you begin your dry suit journey, **it is our opinion, based on experience,** that you should use the inflation valve on your suit **for squeeze only** and **your BCD (Buoyancy Compensating Device) for buoyancy control**.

Which ever method you use to attain neutral buoyancy whilst wearing a dry suit we cannot emphasise the need to practice in a controlled environment. With a qualified and experienced buddy, make the suit do things that it should not. Experience how the suit feels when it starts to become over inflated. Orientate your body into different positions and understand how the dump valve performs.

This practice will give you experience which should help you identify and anticipate a problem before it becomes a serious situation.



Buoyancy control at its best; Paul Toomer - SSI - Director of Technical Training - Image by Danny Barber

Questions to honestly ask yourself

- Is this dive within my limits?
- Am I suitably prepared?
- Am I fit enough ?
- Am I comfortable with the weather conditions?
- Am I wearing the correct thermal protection for the dive that I am about to undertake?
- Am I comfortable with the experience of the other divers / instructors around me?

Before You Dive

Double check before you jump in

We have been fitting people into dry suits for many years. The information and picture sequence on these next few pages contain some top tips that will make getting into and out of your suit so much easier.

In the comfort of your own home and preferably with a partner / buddy nearby, try your new suit on.

Your Dry suit and undersuit are inextricably linked, if you have chosen correctly, they will work as one. Make sure you are wearing the correct under suit for the dry suit you have purchased.

Please refer to the **Thermal protection** section on page 39 of this manual for detailed information regarding our thermal protection.

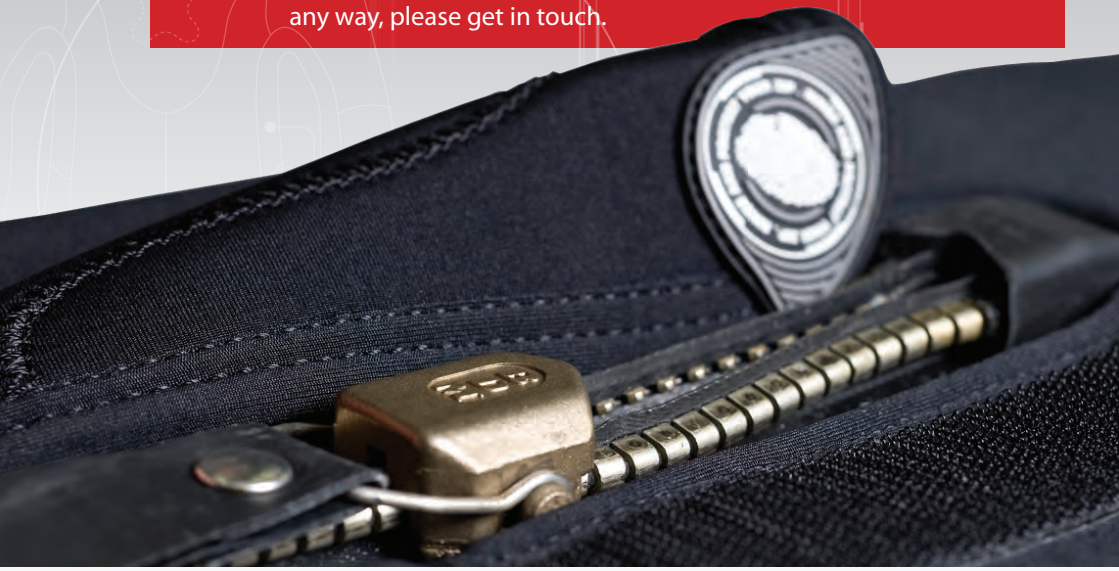


West weares - Portland, Dorset UK
Image by Ben Pipe

Stop!
Take Care

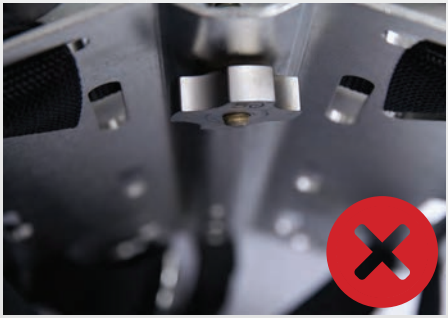
Exposed Velcro (hook) and heavy duty webbing will aggravate material and may cause fur balling to areas of your suit. Pay particular attention to BCD's and Harnesses.

If this should occur, the initial visual signs will appear fairly quickly and will then slow and stop. Simple remedies that are practical, like neoprene webbing covers can be applied. If you are concerned in any way, please get in touch.

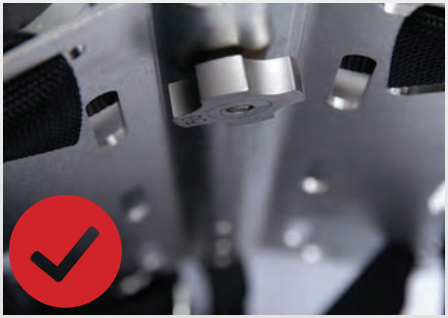


Stop!
Take Care

Exposed back plate nuts and bolts will tear holes in your suit. Take five minutes out to double check that they are covered.



Protruding bolt could tear your suit.



Bolt flush with fitting.

Donning - Back entry

1. Unfold your new dry suit. Check valves for tightness.



Stop!
Take Care

Nothing is indestructible.

However, our donning and doffing method will minimise the risk of damage to critical areas such as the dry zip and your seals.

2. Wear appropriate thermal protection.



3. Fold suit down.



4. Get into suit up to waist.



5. Set braces (where fitted).



6. Remove watches / bracelets



7. Jollop wrist seals.



8. Pull dry suit further up chest.



9. Hold both arms of under suit.



10. Push both arms into sleeves of dry suit.



Donning - Back entry continued

11. Set Neck Seal, tuck in by 4-5cm.



12. Zip up.



13. Check the zip is fully closed.



16. Check seals. Burp suit.



14. Connect Inflation Hose. Partially Inflate.



15. Close auto dump.



Doffing - Neoprene

1. Set Neck Seal. And pull over head.









2. Create fold and pull suit down.



3. Pull down arms using fold above seal.



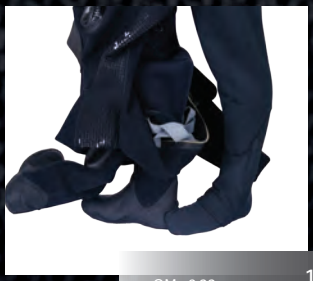
4. Pull elbows out through zip.



5. Push down on heel of boot to help release foot.



6. Same for other foot.



Donning - Front entry

1. Unfold your new dry suit. Check valves for tightness.

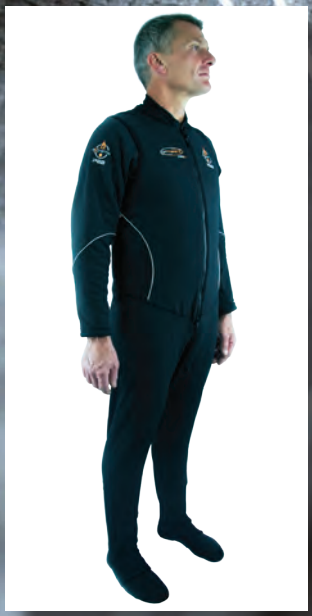


Stop!
Take Care

Nothing is indestructible.

However, our donning and doffing method will minimise the risk of damage to critical areas such as the dry zip and your seals.

2. Wear appropriate thermal protection.



3. Set suit.



4. Step into suit.



5. Pull into crotch.



6. Set braces.



7. Insert arm.

ZIP RIGHT SHOULDER:
Right arm in first.

ZIP LEFT SHOULDER:
Left Arm in first.



8. Set wrist seal.



9. Set other arm.



10. Pull folding torso up



11. Align neck seal with head.



12. Pull neck seal over head.



If using neoprene neck seals tuck in the seal by 4-5cm.

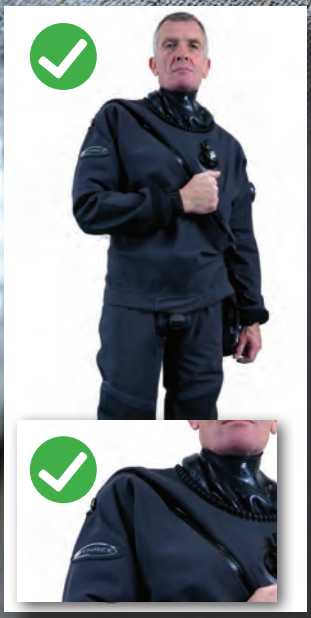
13. Pull folding torso down.



14. Set crotch strap.



15. Align zip by using other hand. A parallel zip is a happy zip when closing.





Stop!
Take Care

Increased risk of damage to zip if not kept parallel when closing.

If zip jams then STOP.

16. Slowly close zip.



17. Keep zip parallel.



17. Slowly feel the slider lock and stop.



18. Ensure the zip slider is fully locked at bottom of zip.





Ready to dive.



WHEN DOFFING THIS SUIT PLEASE FOLLOW THESE INSTRUCTIONS IN REVERSE ORDER.

Seals

Stop!
Take Care

A very tight seal could lead to blood flow restrictions.

If in doubt, please get in touch.

Top Tips:

- Use a wet lubricant like "Jollop" on your wrist seals.
- Always remember, a snug seal will be a successful seal.
- Tuck neck seal in by 4-5cm.
- Seals will always feel better in the water.
- Neoprene seals will stretch over time.
- When a neoprene neck seal is set, apply a small amount of "Jollop" to the side touching your skin. The seal will slip and slide more freely.
- Do not use oil/cream based lubricants on any seals.

Overview:

In most cases, your neoprene seals would have been sized and correctly adjusted if necessary at the time of order.

However, if you feel your neoprene seals are either too loose or too tight, please do not panic. Several "tricks of the trade" can be done to ensure you can go diving.

Please be assured, if none of the following resolves the issue get in touch.



Applying 'Jollop' after your neck seal is set. Tuck in by 4 - 5cm (this depth can vary between divers).



Colin the Conger

PDA Diver - Dunoon



Neoprene Seals, too tight?

Not a phrase people like to hear us use, but if your seals start off feeling a little snug, then that's good.

All neoprene seals will stretch off with time.

A week of diving will ease any seal and will make a "firm" feeling seal much more comfortable.

If your diving days are spread out, then this process will take a little longer.



Example of a seal that is too tight.



Peter Dan Haan - Los Angeles

Sue Daly - Jersey





Neck seal:

The stretching process can be speeded up by pulling the neck seal over a 10ltr cylinder or similar overnight. Be sensible, if you are a petite lady, then something smaller then a 10ltr will suffice. Alternatively, if this does not work after a couple of attempts, the height of the seal can be trimmed very easily. Please refer to the "Trimming Seals" section opposite.

O'Three's neoprene neck seals are supple and durable, but if abused, they are not indestructible. If you follow the guide below, you will be able to carry out the stretching process with minimum risk.



Displace force with flats of hands.



Slide down.

Wrist seals:

Always use plenty of "Jollop" (or similar water based lubricant) before putting your wrist seals on. This will make a difficult squeeze easier. The seals will feel more comfortable when on and will ensure your wrist seals last for many years.



After a few dives, if you feel that your wrist seals are tight, insert a beaker sized cup (approximately 6cm in diameter) up into the wrist seal. The easiest way to do this is to push the wrist seal back-in on its self and up into the inside of the suit arm. You will then be able to slide the beaker up into the seal with relative ease. Leave over night.



Invert wrist seal.



Appropriate cylinder will now slide on nylon.

Trimming seals:

If you are not 100% sure that your seals are too tight, dive your new suit at least five times before deciding to stretch or trim. The more you dive, the more they will ease.

You will see guide lines printed onto your seal showing where you should trim. If you are confident with a pair of scissors it is easy to make a neoprene seal bigger.

Do not trim more than one line at a time. We strongly advise you dive the seal after each trim. Do not take off more than 2.5cm. If in doubt, please call.

Stop!
Take Care

Do not be over keen to rush the stretching process or scissor happy in the trimming. Little and often is better than wham-bam…, dam, it leaks - If this should happen, please call us.



Be very careful, try not to create a feathered edge.



Neat, straight cut.



Pulpit Rock - Portland, Dorset UK
Image by Ben Pipe

Neoprene seals, too loose:

Sometimes difficult to gauge, loose seals can be overcome with some straight forward logic.

In the good old days, a compass and depth gauge worn on each wrist would resolve a leaking wrist seal, insulating tape is another quick fix.

A loose neck seal is a little more difficult to resolve, but an elasticated knife strap or similar will get you diving.

When possible, return your suit to **O'Three** and we will re-tailor your seals free of charge.



Insulating tape will rectify a lose wrist seal.



Done carefully, an elasticated knife strap can work.



Monty Halls at work
Image by Jason Brown

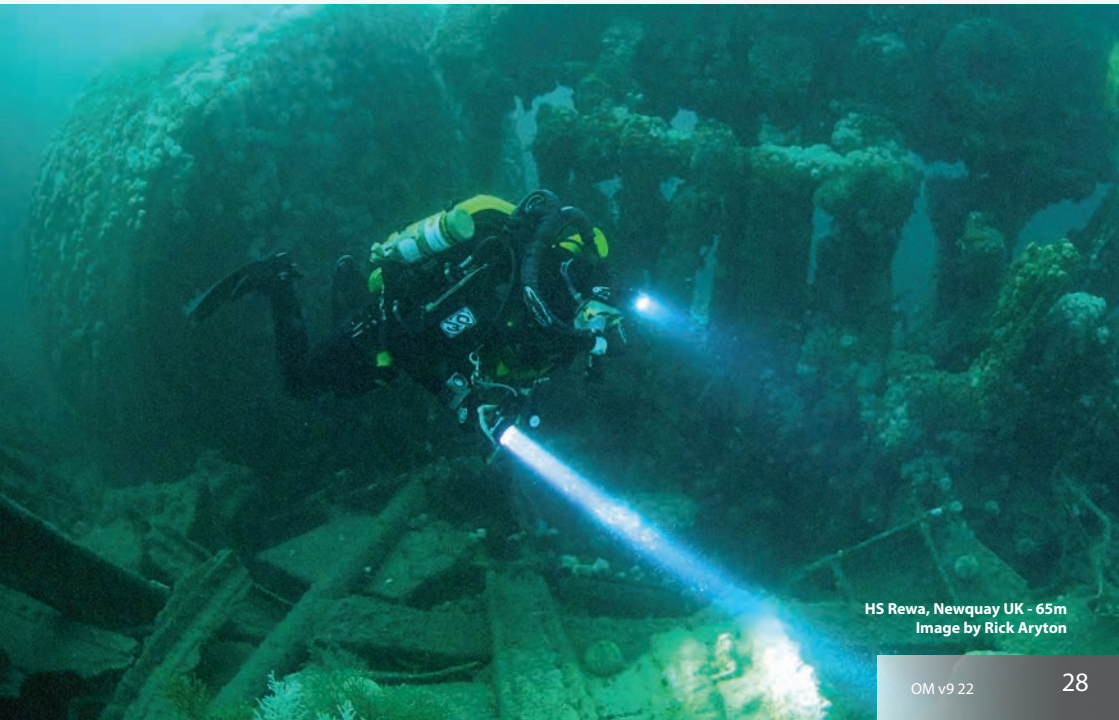
Latex seals:

When donning and doffing latex seals, most people dust the seals with French chalk or non-perfumed talcum powder. If you prefer, a wet lubricant (Jollop) can be used on the wrist seals. As with neoprene seals a good technique for donning and doffing will ensure your seals are kept in the best condition for as long as possible.

If you have opted to have latex seals fitted to your **O'Three**, the same logic applies as it does with neoprene seals with the only exception being the ability to stretch tight latex seals. Latex seals will become loose with age as the elasticity / memory properties begin to deteriorate. Unfortunately, this usually means a new seal is required.

If you are confident with a pair of scissors it is easy to make a latex seal bigger, but take your time and be careful. Using a sharp pair of scissors you can trim a line section at a time. DO NOT cut away more than one section in one go. If you go too big, it will mean a total seal replacement.

When trimming latex seals avoid a feathered edge at all cost. This feathered edge could cause the seal to split down the whole length of the seal and would mean an entire seal replacement.



HS Rewa, Newquay UK - 65m
Image by Rick Aryton

Changing an O'Three neoprene wrist on a KUBI cuffside ring



1. Fold back ring protector and remove securing O-Ring.



2. Pull seal away from cuff ring.



3. Lubricate cuff ring with a very small amount of NarkOX oil (size of a pin-head).



4. Turn seal inside-out. Locate O-Ring approximately 30mm inside seal and fold over O-Ring. Sealing surface to outside.



5. Stretch seal over cuff ring, locating O-Ring into the deep groove. Easier with a willing buddy.



6. Turn wrist seal back through cuff ring, sealing surface now to inside.



7. Ensure cuff ring is free of debris. Lubricate cuff ring with small amount of NarkOX oil.



8. Re-fit seal into suit, making sure seal seam and forearm seam align. Re-fit securing O-Ring.

For other types of seal and general KUBI dry glove system information please visit: https://www.kubistore.com/

Replacing a neoprene seal in a SI TECH Quick Neck

Make sure that you use the smaller gauge O-Ring that was supplied originally when you fit a new neoprene seal. After 6-8 weeks check the seal for tightness, change for the larger gauge O-Ring to ensure a leak free neck ring.



1. Carefully pull the seal and black O-Ring out from the inside of the neck ring and remove old neck seal.



2. Turn new seal inside-out and place onto inside of suit, nylon side up, ensuring correct orientation, place O-Ring on top.



3. Allow 3.5cm of skirt outside of O-Ring. Using the tool provided start to work O-Ring into neck ring along the white line on the neck seal.



4. Work the O-Ring into the neck ring at four opposite points. Then run the tool around to complete the fitting of the O-Ring.



5. Ensure an even skirt or approximately 2.5cm all around the neck ring.



6. Turn seal right side out and check for correct orientation.

For other types of seal and general SI-TECH Quick Neck system information please visit: https://www.sitech.se/

Valves & Hose

All valves are seated into mounting gaskets and are securely tightened before despatch with a specialist tool. When you receive your suit and prior to each dive, it is worth double checking that all your suit valves are tight and secure. After about ten dives, this check could be done on an annual basis.



Depress auto and tighten clockwise.



Rotate valve to lock position and tighten clockwise.

Hose:

All new **O'Three** suits come with an inflation hose which should be connected to a LOW pressure port on the 1st stage of your regulator. It is virtually impossible to get this wrong, but if you are not sure, do not hesitate and get in touch.

Stop!
Take Care

Make sure that the route of your inflation hose is clear and free from twists and tight turns.

A poorly routed hose.



A perfectly routed hose.



The Dry Zip

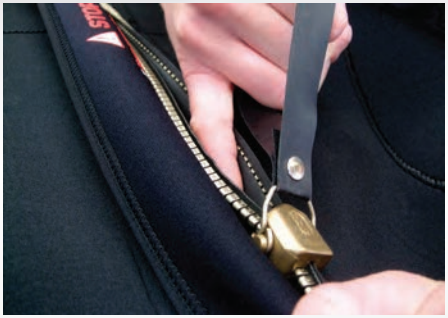
The Dry Zip is the most expensive component of your dry suit, never attempt to open/close a back mounted dry zip on your own.

You will hear some great stories of people using car roof racks…, it is a gamble with very poor odds, don't try it as the zip can be easily damaged this way.

Please leave this job to a person who has experience in the subtleties of dry zips and the opening and closing techniques required.



Classic signs of a roof rack culprit.



Careful and controlled.



Daily Care



When a suit comes back for a service or repair, we can see whether regular care and maintenance has been applied with love.

If you want your suit to give you years of trouble free diving, then the occasional splash of fresh water is not enough.

Regular maintenance will help keep your suit in good condition and will give you early notice of any area that might need more attention.

Take care of your suit and it will take care of you..

Rinse thoroughly in cold fresh water after every use.

Lubricate dry-zip with Zip-slip internally and beeswax externally.

Use a coat hanger with curved edges.

Allow to dry naturally and out of direct sun light.

Occasionally wash in very mild detergent.

HANDWASH ONLY

DO NOT TUMBLE DRY

DO NOT IRON

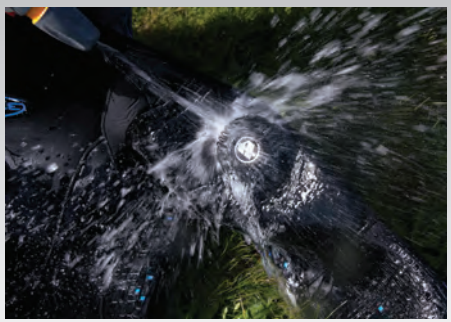
DO NOT DRY CLEAN

Rinse

For many of us, salt water will have the most destructive impact on a suit. Give your suit a thorough rinse in clean fresh water after each use, pay particular attention to the dry zip, valves and any other moving parts.



Washing inflation valve.



Flushing dump valve.



Paying attention to zip. Make sure it is fully closed.



Rinse suit surfaces.

Top tip: Do not leave to dry in direct sunlight.

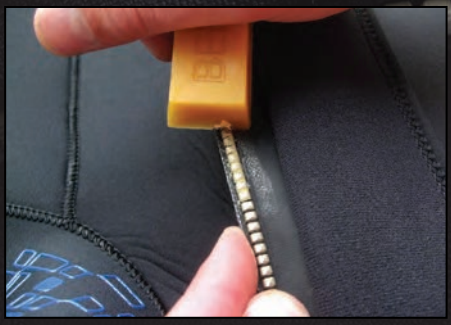


Dry zip

It is good practice to apply lubricant after your days diving.



Generously apply Zip Slip internally.



Work the Bees Wax in the teeth externally.

For a metal zip apply zip slip internally and beeswax externally.

For our 90 Ninety and other suits with plastic zips apply a coating of Zip Tech internally and externally.



Top tip: Don't forget your inflation hose. Take a look inside, there are a lot of moving parts that need to be properly rinsed and lubricated after each dive. A poorly maintained inflation hose, is usually the cause of an inlet valve that is free flowing.





Hang your suit up properly

Do not leave a neoprene suit folded up in a damp kit bag for any longer than is necessary, Neoprene will crease if you do not store it correctly. After rinsing, hang your suit on a curved/padded hanger, with the boots touching the floor.

This will help take some of the weight off the shoulders and dry zip. The all important dry zip, if it is back mounted, is at its happiest curved across the shoulders as the suit hangs. Do not hang a neoprene dry suit from the boots. This will cause the dry zip to hang in an awkward position and will cause premature damage.

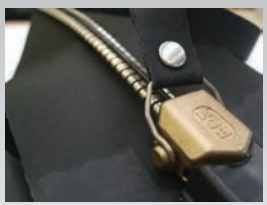


Incorrectly hung suit creating a badly kinked zip.



A correctly hung suit showing a curved back and happy zip.

Longer term care and maintenance



Metal Dry Zip

A product barely changed since the early 1950's, which is a credit to the three guys involved in its invention, the BDM dry zip remains the first choice for the vast majority of quality dry suit brands. To ensure that your zip remains dry, runs easily and last, it is important you look after it. Before any dry suit leaves **O'Three**, the zip has been coated internally with Zip Slip and externally Beeswax has been applied.





It is imperative you continue to apply both lubricants liberally. It really will make a difference. Failure to do this will result in a zip that will begin to seize and will become difficult to operate, which in turn will mean you will have to use excessive force. All of this could result in the premature replacement of your dry zip.

Do not use any other types of lubricant as this may cause untimely deterioration of the zip tape and could result in the whole dry zip delaminating.

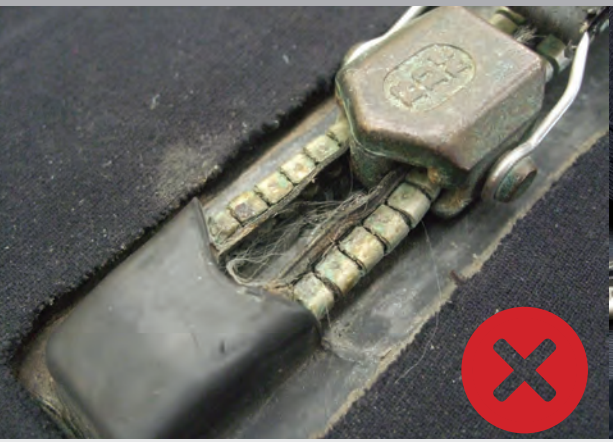
Plastic Dry Zip

For our 90 Ninety and other suits with plastic zips apply a coating of Zip Tech internally and externally



Most damage occurs when opening and closing due to lack of care and respect.
The risk of damage is compounded by lack of care and maintenance.
The choice is yours!

Stop!
Take Care



Poorly maintained zip.



Well maintained zip.

Store with zip closed or open?

'New Zipper' prefers that a dry suit be stored with the dry zip fully open. This will ensure that the sealing surfaces are not being constantly pressed together. This will help minimise wear and tear on those touching faces.

However, the two halves of the zip are no longer one unit, which means the separate halves are easier to bend. If a dry zip is allowed to bend too sharply horizontally, the zip is more susceptible to breaking between the teeth.

Which is right and which is wrong? We have replaced thousands of zips over the years, in all brands. Our experience indicates to us that most damage occurs when a zip is bent beyond its "happy point". It is easier to go beyond the "happy point" when a zip is open.



Example of a zip stored open.



Example of a zip stored closed.

Valves:

If you are using French chalk / talcum powder on your seals, residual dust will often find its way into your valves, this build up of dust can be the cause of a wet / leaking valve.

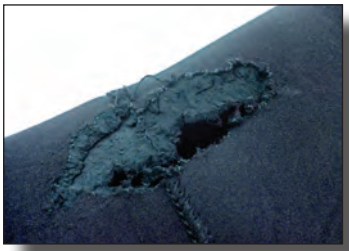
Keep an eye on the inside of your suit and rinse off any surplus powder that may have built up around your valves. If in doubt about any aspect of your dry suit valves, please get in touch.

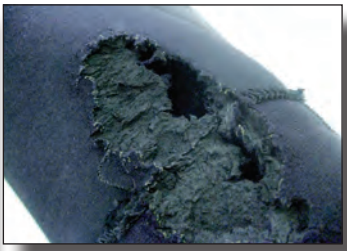


Valve with powder in.

Suit Hibernation:

When storing your neoprene dry suit for longer periods ensure that all maintenance detailed with-in this manual has been carried out, especially to the dry zip, store hung up as advised and in a clean, cool, dry place, avoiding direct sunlight and fuel emissions.







Stop!
Take Care

Mice and rodents in general love dry suits. The damage caused by these little furry friends over the winter months can leave some suits beyond repair.

Internally rinse:

Diving can be a hot and sweaty business and occasionally the inside of your suit will need a refresh. Using a very mild solution of antibacterial detergent (containing no bleach), soak your suit inside and out over night in a suitable container. Make sure the solution gets right down into the boots. Rinse through several times and then turn your suit inside out.

Please follow the picture sequence below and you will be able to turn your suit almost completely inside out. It may take a couple of days for the boots to dry out.











Thermal protection

Internal thermal insulation for dry suits is, we feel, one of the most misunderstood elements of dry suit diving. It is fundamental for divers to understand thermal layering and its buoyancy implications when deciding what to wear under a dry suit. It could revolutionise your whole dry suit diving experience.

Thermal range of a suit

Hypothermia

Your body's core generates heat, you need to retain this heat.

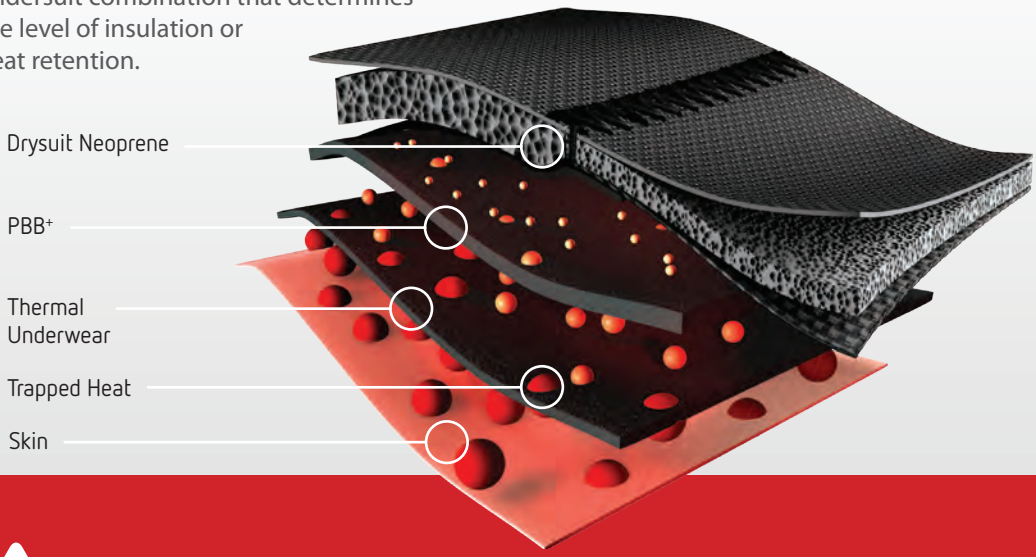
All of **O'Three's** dry suits are made of neoprene. This neoprene is simply the insulator.

Irrespective of whether your neoprene suit has been compressed, or crushed, it is the final thickness of neoprene and undersuit combination that determines the level of insulation or heat retention.

Hyperthermia

Underestimated, but as deadly as hypothermia, over heating in a dry suit is a very real possibility.

Do we wear the same coat in winter, as we do in the summer? As the water temperature rises you should make the same considerations.



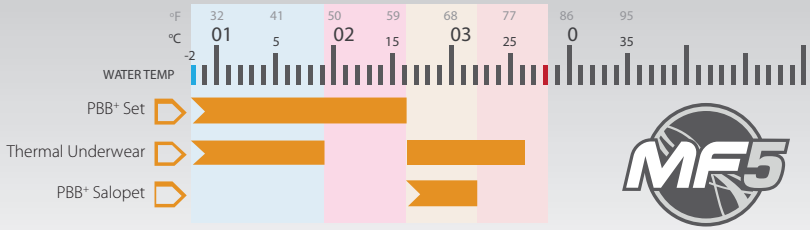
Stop!
Take Care

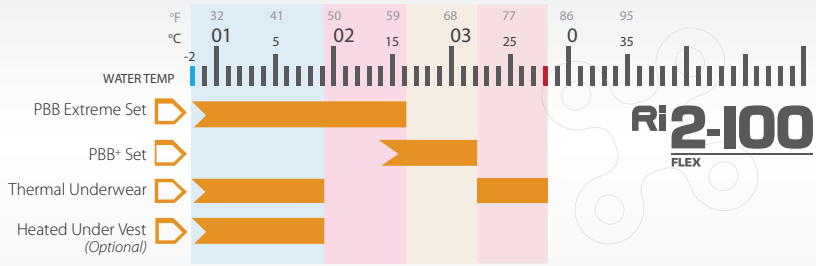
If you are a petite lady that feels the cold all year round, even when snuggled up with a Winter duvet, or you are a guy that wears a T-Shirt in the depths of winter **your reliance on an undersuit and neoprene drysuit for thermal protection will be at the extreme ends of the scale.**

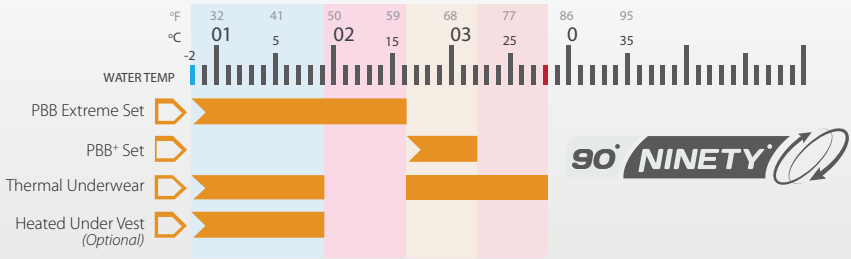
Stop!
Take Care

Any undergarment used in combination with a drysuit must allow free passage of air from the inside of the undergarment to the deflation device. Please be sensible, realistic and careful when choosing the appropriate thermal protection.

You, your dry suit, **the water temperature and the under suit combinations you choose are inextricably linked**. We are all different. Your life could depend on it. If you are not sure, please call.







What affects thermal protection?

Dive times exceeding 1 hour:

With today's techniques and equipment it is not unusual for run times to exceed 120 minutes and in the extreme, 500 minutes and more. Inevitably your ability to maintain a safe core temperature over these extended periods will be tested. You will have to adjust your combination of base layer / under suit accordingly.





Increased work rate:

You know your body better than anybody.

If an increased work rate is expected, please be aware of any signs of hyperthermia (over heating) and take immediate action.

Image courtesy of The Professional Diving Academy - Dunoon, Scotland

Depth – Reduced thermal protection

Inevitably depth will affect the thermal properties of both suit and under suit. In an attempt to counteract these changes, we sometimes forget logic and rush into the purchase of a garment that is better suited for curling up in a tent on Mont Blanc. Because of depth, a big and bulky under suit is not necessarily the answer. By adding quality layers of thin breathable thermals, the changes to buoyancy and thermal insulation can be kept to a minimum. As you ascend, buoyancy and insulation properties will return.

Mont Blanc

Inflation Gas:

There are one or two alternatives to air as a suit inflation gas, of which there is plenty of conflicting data that can be found as to the pros and cons of each.

Keep it simple. Air has been used as a suit inflation gas for decades. It has a proven and safe track record.

More people are breathing Nitrox. If used as a suit inflation gas it will not offer the same insulation properties as air.

Stop!
Take Care

If you are qualified in Advanced Decompression Procedures, be very careful when using a 'rich' decompression gas as a suit inflation gas. Not only will the insulation properties be reduced, there is evidence to suggest that there could be additional risks.

Hydration:

In recent years, new research and improvements in the understanding of decompression sickness has only added to the growing mountain of evidence that it is imperative we remain hydrated before and during long dives.

The consequences of hydration should no longer be an issue above or below the water. **O'Three** has two styles of P-Valve that can be fitted to all makes of dry suit.

For more information go to www.othree.co.uk



Causes of buoyancy change

At some stage or another most of us have experienced problems with buoyancy control. As your dry suit and under suit are inextricably linked, from a buoyancy perspective we need to look at them as one unit.

Stop!
Take Care

Always take time to carry out a buoyancy check. It is critical that you dive correctly weighted. Do not rely on your dry suit as your only source of buoyancy control. Never dive in a dry suit without wearing an industry recognized buoyancy compensator.

Being correctly weighted at the outset will alleviate a lot of issues. Being correctly weighted **and dressed** will alleviate even more of those issues.

Depth – Loss of buoyancy

As you descend, the buoyancy afforded at the surface by the combination of your neoprene dry suit and under suit will decrease. Assuming you are using your suit inflation for suit squeeze, adjust and control this buoyancy change with your BCD.

Equipment change

A change in tank configuration or under suit could have a big effect on your buoyancy.



Summary

From the freezing Poles to the Red Sea in winter

We are firm believers in the virtues of using layers of wicking thermal protection.

This versatile approach will mean that it is possible to use your dry suit across a wide range of temperatures. Adapting those layers across the seasons will become second nature. If you are unsure on what to wear and when, please call **O'Three** where one of the team will be able to offer more help and advise.

A membrane style of dry suit will offer virtually no thermal protection.



Martin McGrath - Expedition leader.
Antarctic 1.8°c
Dry Suit - Ri2-100
Undersuit Combo - PBB base, PBB extreme, HUV.

John Keen
Red Sea 21°c
Dry Suit - Ri2-100
Undersuit Combo - PBB base, PBB+ Salopette only.

Troubleshooting

In very rare cases some people may have an allergic reaction to some kinds of neoprene or latex.

If a rash of any kind does appear whilst you are wearing your suit, please remove immediately and observe how long it takes for the rash to subside. ***Please call and we will advise on a course of action and possible solution.***

Your dry suit is a sealed environment and depending on several factors will create its own atmosphere internally.

Although it can be minimised, it is impossible to stop the creation of perspiration and condensation, which in some people can be considerable and can be mistaken for a leaking suit.

I think my new dry suit leaks

Every single **O'Three** dry suit has been tested for porosity at least twice through its manufacture. Our testing procedure is unique to **O'Three** and has been designed to test your suit beyond the limits that most recreational and commercial divers would experience. If you find that you are getting small air bubbles expelling from your boot or boots, please be aware that air can become trapped between the rubber section of the boot and the neoprene. The Neoprene will still be the part of the boot that keeps you dry. If you are really concerned please contact us.

99 times out of 100, it will be the fitting of the seals against your wrist and neck that are the source of a leak in a NEW suit.

Before we can proceed, we need to ascertain where the water ingress is actually coming from. Today, most under suits are made using materials that are breathable and hydrophobic (does not absorb water). This material, along with the effects of gravity, invariably means that if a suit should leak through a seal or a valve, the majority of water will end up around your waist and boots.

If you are unsure or you do suspect a bigger problem it is obviously a huge disappointment for you and us. Be assured that, in the unlikely event that it is the fault of the construction process or materials used, **O'Three** will do whatever is necessary to resolve the situation. We want to know ASAP if you are experiencing any leaking issues.

Listed below are several possible reasons why a NEW dry suit may leak, all of which are easily rectified. **Please do not attempt any kind of repair until you have contacted one of the team at O'Three HQ**.

This is not because we will try and wriggle out of any guarantee/warranty. Some glues and inexperienced makeshift repairs can lead to more damage and in many cases will not have solved the original problem.

Do **not** use AquaSure (or similar) on any part of your dry suit.

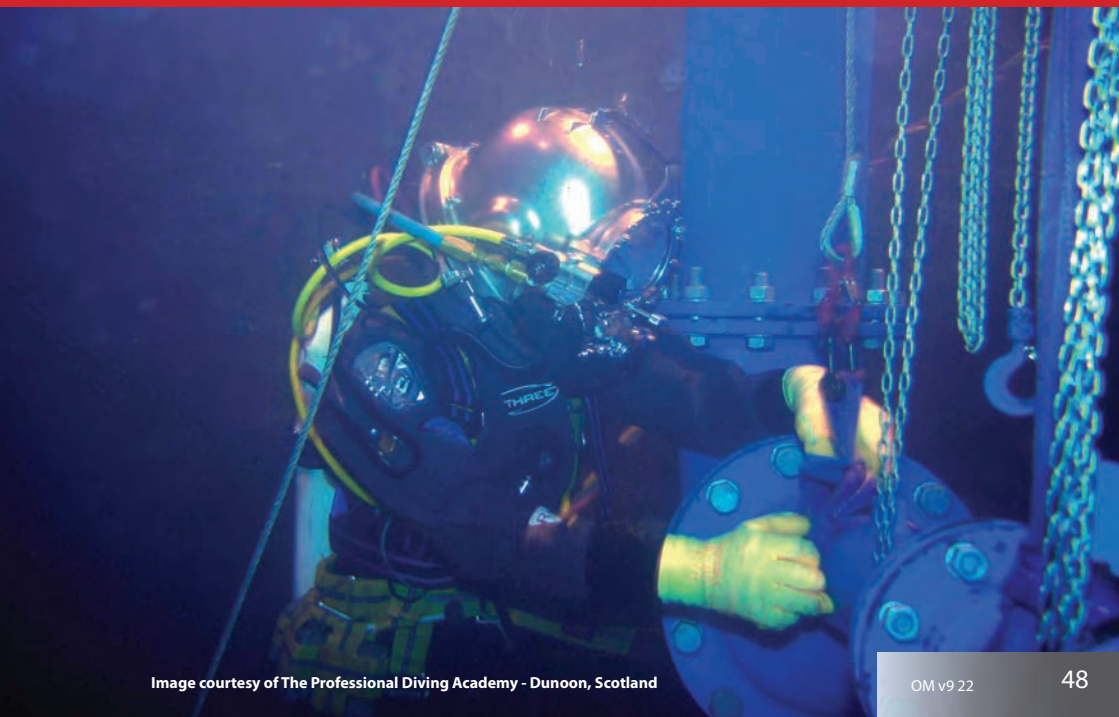


Image courtesy of The Professional Diving Academy - Dunoon, Scotland

Leaking seals

- Be sure that your seals are fitting correctly, **refer to page 23 of this manual**.
- Ensure that all seals are set correctly. **Refer to page 23.**
- Make sure your base layers are not interfering with your seals.
- Check if excessive hair is interfering with the roll of the neck seal.
- Seam stress on older suits can lead to stitches becoming exposed, which can cause a major leak. Re-gluing a seal seam is very easy and very effective, if done properly. Do not use AquaSure (or similar) on any part of your suit, especially your seals.
- Check to see if there is tearing of the seal caused by bad Donning or Doffing technique. **Please refer to page 16 of this manual.**
- Check to see if there is damage of the seal caused by watches , bracelets, earrings etc.

Leaking valves

- The valves may have become loose. Tighten valves. **Please refer page 29.**
- Before you tighten, make sure the valve is seated correctly in the grooves of the valve mounting pad.
- Talcum powder, sand, dirt, dust or a build up of salt can find their way into the internal working of your valves. **Please refer to Page 37.**



Miranda Krestovnikoff at work
Image by Rob Franklin

Under no circumstances should valves be glued into an **O'Three** dry suit in an attempt to stop a suspected leaking valve. This is not the long term solution.

Auto or Cuff Dump not releasing air.

If you are wearing a traditional style under suit with an outer nylon shell, on ascent, as air expands inside your suit, it could become trapped underneath that nylon shell.

Ensure that the under suit is not excessively big in those areas. Some divers will punch holes in the under suit in the area of the dumps. Not pretty, but it works.

Leaks specific to cuff dumps.

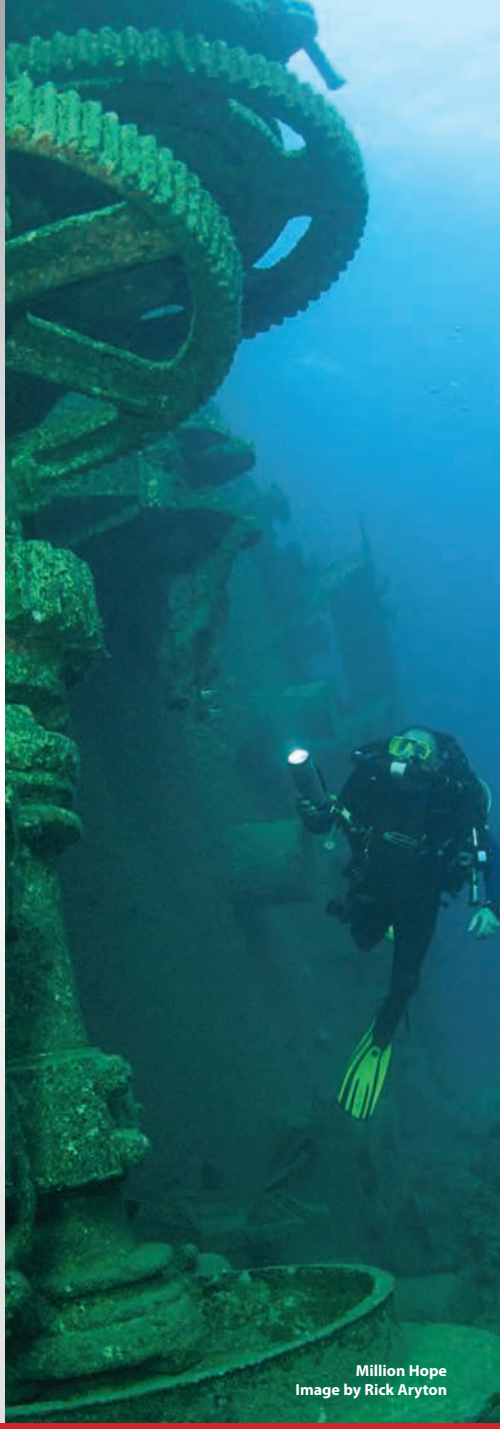
Cuff dumps are incredibly simple in their design and therefore it is very easy to solve most issues.

Most cuff dump leaks are caused because the mushroom valve is unable to seal against the surface of the valve body.

A build up of sand, grit or talcum powder is usually the cause, which can be easily flushed away with fresh water.

Distortion of the mushroom valve can occur over time for a number of reasons, some of which are over exposure to direct sunlight or a splash of fuel.

Unscrew the external part of the valve, remove the mushroom valve, clean the face of the valve body thoroughly and replace with a new mushroom valve.



Million Hope
Image by Rick Aryton

Stop!
Take Care

Diving correctly weighted will help reduce many issues that can arise when dry suit diving.

Leaks specific to auto dumps

Even when an Apeks auto dump is fully closed (clockwise), air will still be able to leak out very slowly. This is correct. It does not mean that water will be able to seep in.

1. If a mechanical failure has occurred, this can be very difficult to ascertain.

If removal of the valve is possible, there is a very simple test. Shake the valve and listen for any moving parts. If a rattling sound is heard, return the valve to **O'Three** and we will replace it within the terms of your warranty.

If you hear nothing, below is a test that is easy to carry out at home and will give you a better understanding of how simple the auto dump operates and will establish whether it is the valve or another factor that is causing the issue.

Suck: Form a good seal around the threaded part of your auto dump and suck as hard as you can. You should not be able to draw any air through the valve.

Try this with the valve set in different positions. The outcome should be the same.



Blow: With the valve completely open (anti clockwise), it will take very little effort to blow air through. As you begin to close the valve, this should become more difficult.

With the valve completely turned (clockwise) until it stops, it will take considerably more effort to blow air out through the valve. You should not be able to stop the flow of air completely.



2. If you dive your dry suit with very little air inside, although difficult to prove, through experience and customer feedback, we believe it is possible for a partial vacuum to occur, which we believe could lead to the non-return valve becoming "distorted" which may result in a leak.

As you gain in experience you will discover the correct amount of air for your perfect boyancy.

Leaks specific to inlet valves

Assuming you have carried out the simple checks detailed at the top of this section and referred to the Apeks dry suit valve manual, one more area to look at is the inflation hose routing (see page 25). The simple solution is to re-route or get a longer hose.

Inflation hose too short

If an inflation hose is too short or has been routed badly, it could pull or tilt the inlet valve to one side, allowing water to seep between the valve and the valve pad.

Apeks have been designing and manufacturing dry suit valves for decades. Apeks excel in this area and they support us 100% with any issues that may arise with any of their valves. It is for these two reasons we choose to supply all our suits with Apeks valves. Please call if you require any more information on dry suit valves.



Image courtesy of The Professional Diving Academy - Dunoon, Scotland

Zip leaks

Things to check...

1. The zip has not been fully closed.

2. Undergarments or the internal zip guard have been caught between the teeth.

3. The inside surfaces of the zip faces are dirty.

4. Insufficient Zip Slip / Beeswax has been used. A dry zip devoid of lubricant will not seal so well.

5. The docking end of the zip has been allowed to dry out.



Testing a suit at home

If you are happy to pressure test your suit at home the easiest way to do this is to follow the procedure outlined below.



STEP 1

Get into your suit and close the dry zip.



STEP 2

Close auto dump.



STEP 3

Inflate your suit via the inflation valve until the auto dump begins to release pressure.



STEP 4

With a soft paint brush and mild soapy water, get a buddy to paint over the seams. Look carefully and bubbles should appear close to where you feel the suit is leaking. Mark the leak with a white chinagraph pencil.

Just to be 100% sure, it would be wise to check all seams and panels of the entire suit.

Some leaks may take a little longer to show and may need to be pressurized for a longer period.

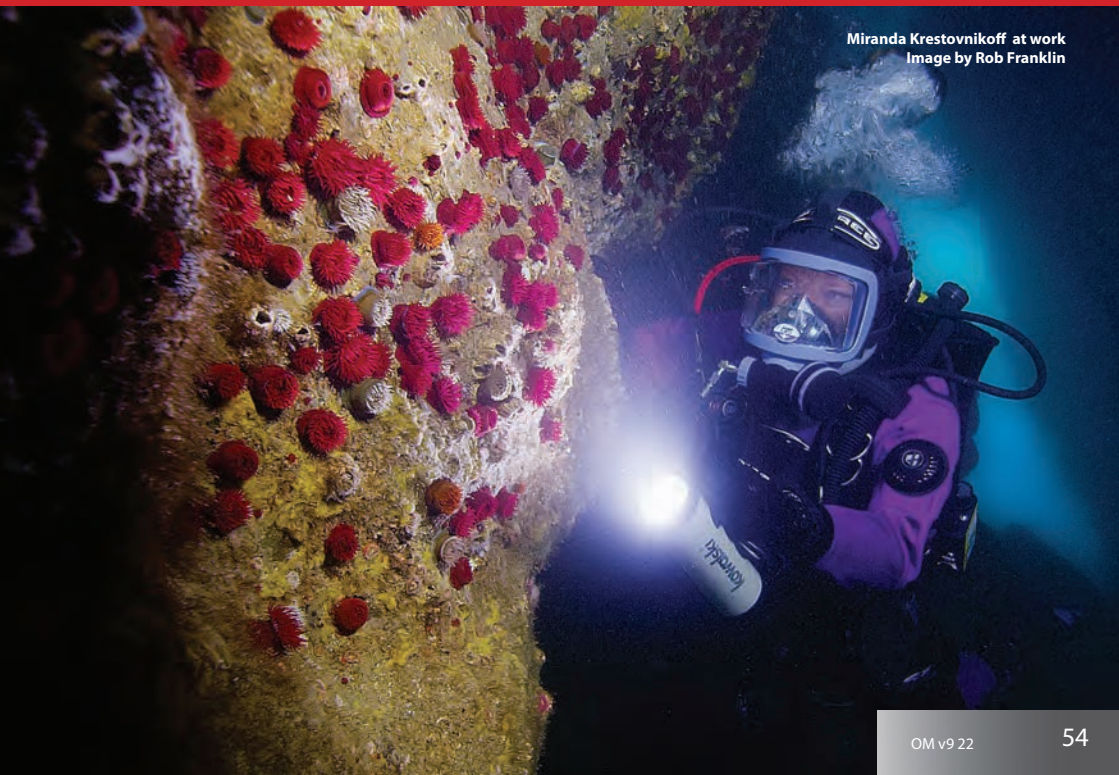
Do not rush a pressure test.

Stubborn and complicated leaks may require greater pressure. For safety reasons, you will never be able to fully close an auto dump. When **O'Three** carry out a pressure test, we use a modified auto dump that is set to a higher then normal release pressure. This increased pressure will expose the smallest and most difficult to locate leaks.

Always thoroughly rinse your dry suit in fresh water to remove any excess washing up liquid /soap. If you are successful in finding a leak, allow the suit to dry (inside and out) before attempting a repair.

Applying Aquasure / Sikaflex will actually make things worse.

Very often, the leak will continue and simply find its way along the external nylon and out from underneath the sealant you have applied.



Miranda Krestovnikoff at work
Image by Rob Franklin

Repairing a suit

If you are unlucky enough to have put a hole in your dry suit…, don't panic. It is not difficult to carry out a quick and effective repair on a neoprene dry suit.

Before you begin, just think about what you are going to do and prepare.

Neoprene



STEP 1

If the cause of your leak is obvious, apply some pressure with a finger and push the hole from the inside out to expose the raw edges.



STEP 2

Apply a small amount of neoprene glue like Black Witch to the exposed neoprene. Make sure all of this exposed neoprene is coated properly.



STEP 3

Ensure both surfaces remain apart until completely dry.



STEP 4

Apply a second coat of glue and allow to dry again.

Neoprene continued



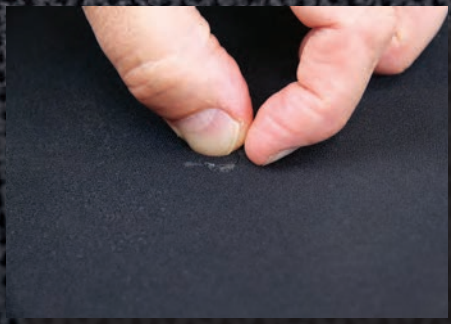
STEP 5

Apply a third coat of glue and leave until it becomes tacky. Again, make sure the edges do not touch until you are ready.



STEP 6

Carefully allow the surfaces to come together.



STEP 7

Firmly pinch seams together. If you have done a respectable job, you will not need to apply a patch of any kind.

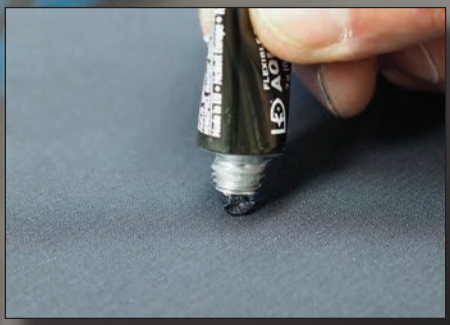
A patch the size of a small picnic blanket, or a liberal spread of sealant splattered over the top, will not always solve a leak. It will make you feel better, however, in most cases the cause of the leak will still remain and after a short while you will be getting wet again. Repairs undertaken in this way can be difficult and therefore costly to rectify.

If you are unable to get your suit back to **O'Three**, then follow this step by step guide and you will soon be diving again.

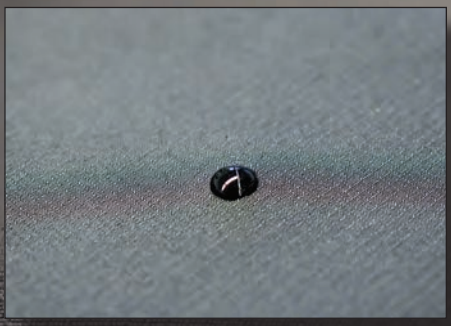
Repairing Trilaminate - Small Tear



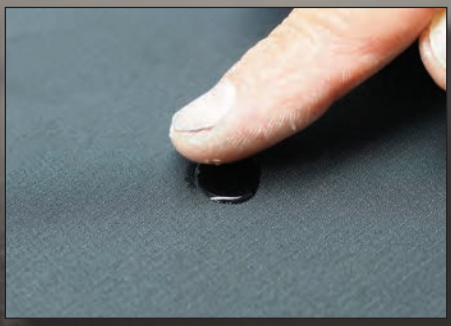
1. If you have a small tear or hole you can use a blob of AquaSure to fix it.



2. On the INSIDE of the suit apply a small blob of AquaSure.



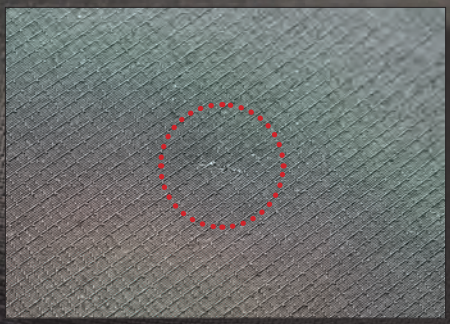
3. Make sure the AquaSure covers the tear or hole.



4. Using a damp finger gently smooth out the blob.



5. The AquaSure should be smooth, flat and slightly domed.

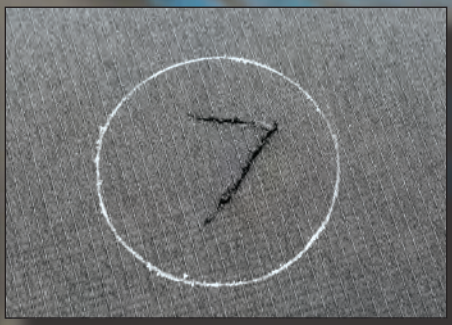


6. Once fully cured the outside of the suit should appear flat and sealed.

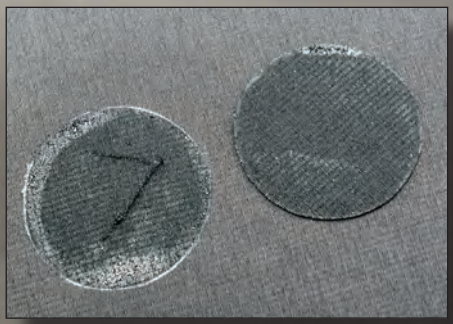
Repairing Trilaminate - Larger Tear



1. A typical larger tear will look something like this.

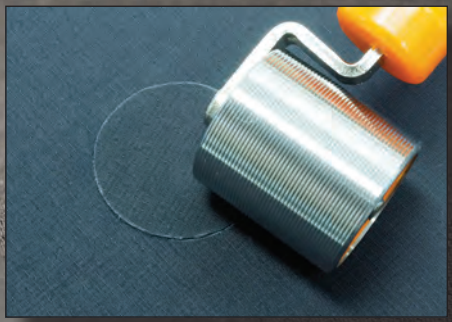


2. Identify and mark the tear from the INSIDE of the suit.



3. Using a suitable adhesive (such as Black Witch) prime the damaged area (inside the suit) and the patch. Allow to dry completely.

4. Apply another coat of glue and allow to almost dry until slightly tacky.



5. Apply the patch to the suit and press firmly, use a small roller for an even pressure if you can.



6. Once the glue is fully dry the outside of the suit should appear flat, neat and most importantly sealed.

Mens Size Guide

	Height	Weight	Chest	Waist	Hip	Inside Leg	Boots
Small	5' 5" - 5' 7" 165 - 170cm	9.5 - 10.5stn 60 - 67kg	36" - 38" 92 - 97cm	29" - 31" 74 - 79cm	34" - 36" 86 - 91cm	27" 69cm	7 - 8 40 - 42
Medium	5' 7" - 5' 9" 170 - 175cm	10.5 - 11.5stn 67 - 73kg	38" - 40" 97 - 101cm	31" - 33" 79 - 84cm	36" - 38" 91 - 97cm	28" 71cm	8 - 9 42 - 43
Medium Tall	5' 9" - 5' 11" 175 - 180cm	11.5 - 12.5stn 73 - 80kg	38" - 40" 97 - 101cm	31" - 33" 79 - 84cm	36" - 38" 91 - 97cm	29" 74cm	8 - 9 42 - 43
Medium Large Short	5' 7" - 5' 9" 170 - 175cm	11.5 - 13stn 73 - 83kg	40" - 42" 101 - 107cm	33" - 35" 84 - 89cm	38" - 40" 97 - 101cm	28" 71cm	8 - 9 42 - 43
Medium Large	5' 9" - 5' 11" 175 - 180cm	12 - 13.5stn 76 - 86kg	40" - 42" 101 - 107cm	33" - 35" 84 - 89cm	38" - 40" 97 - 101cm	29" 74cm	8 - 9 42 - 43
Medium Large Tall	5' 11" - 6' 1" 180 - 185cm	12.5 - 14stn 80 - 90kg	40" - 42" 101 - 107cm	33" - 35" 84 - 89cm	38" - 40" 97 - 101cm	30" 76cm	9 - 10 43 - 44
Large Short	5' 9" - 5' 11" 175 - 180cm	12.5 - 14stn 80 - 90kg	42" - 44" 107 - 112cm	35" - 37" 89 - 94cm	40" - 42" 101 - 107cm	29" 74cm	9 - 10 43 - 44
Large	5' 11" - 6' 1" 180 - 185cm	13.5 - 15stn 85 - 95kg	42" - 44" 107 - 112cm	35" - 37" 89 - 94cm	40" - 42" 101 - 107cm	30" 76cm	9 - 10 43 - 44
Large Tall	6' 1" - 6' 3" 185 - 190cm	13.5 - 15.5stn 85 - 98kg	42" - 44" 107 - 112cm	35" - 37" 89 - 94cm	40" - 42" 101 - 107cm	32" 81cm	10 - 11 44 - 45
Extra Large Short	5' 11" - 6' 1" 180 - 185cm	14.2 - 15stn 90 - 100kg	44" - 46" 112 - 117cm	37" - 39" 94 - 99cm	42" - 44" 107 - 112cm	30" 76cm	9 - 10 43 - 44
Extra Large	6' 1" - 6' 3" 185 - 190cm	14.5 - 16stn 95 - 106kg	44" - 46" 112 - 117cm	37" - 39" 94 - 99cm	42" - 44" 107 - 112cm	32" 81cm	10 - 11 44 - 45
Extra Large Tall	6' 3" - 6' 5" 190 - 195cm	15.5 - 17.5stn 98 - 108kg	44" - 46" 112 - 117cm	37" - 39" 94 - 99cm	42" - 44" 107 - 112cm	33" 84cm	11 - 12 45 - 46
Extra Extra Large	6' 3" - 6' 5" 190 - 195cm	16.5 - 19stn 105 - 121kg	46" - 48" 117 - 122cm	39" - 41" 99 - 104cm	44" - 46" 112 - 117cm	33" 84cm	11 - 12 45 - 46
Extra Extra Extra Large	6' 5" - 6' 7" 195 - 201cm	18.5 - 21.5stn 117 - 137kg	48" - 51" 122 - 130cm	41" - 44" 104 - 112cm	46" - 49" 117 - 125cm	34" 86cm	11 - 12 45 - 46

Womens Size Guide

WOMENS	Height	Weight	Bust	Waist	Hip	Inside Leg	Boots [UK Male]
Extra Extra Small	5' 0" - 5' 2" 152 - 157cm	7 - 8.5stn 44 - 54kg	30" - 32" 76 - 81cm	23" - 27" 59 - 64cm	34" - 36" 86 - 91cm	25" 63cm	5 - 6 37.5 - 38.5
Extra Small	5' 2" - 5' 4" 157 - 162cm	7.5 - 9stn 48 - 57kg	33" - 34" 84 - 89cm	25" - 27" 64 - 69cm	36" - 38" 91 - 97cm	26" 66cm	5 - 6 37.5 - 38.5
Small	5' 4" - 5' 6" 162 - 167cm	9 - 10.5stn 57 - 67kg	34" - 36" 89 - 91cm	27" - 28" 69 - 71cm	38" - 40" 97 - 101cm	27" 69cm	6 - 7 38.5 - 40
Medium	5' 6" - 5' 8" 167 - 172cm	10.5 - 12stn 67 - 76kg	36" - 38" 91 - 96cm	28" - 30" 71 - 76cm	40" - 42" 101 - 107cm	28" 71cm	6 - 7 38.5 - 40
Medium Large	5' 8" - 5' 10" 172 - 178cm	12 - 13.5stn 76 - 86kg	38" - 40" 96 - 102cm	30" - 32" 76 - 81cm	42" - 44" 107 - 112cm	29" 74cm	7 - 8 40 - 42
Large	5' 10" - 6' 178 - 183cm	13.5 - 15stn 86 - 95kg	40" - 42" 101 - 107cm	32" - 35" 81 - 89cm	44" - 46" 112 - 117cm	30" 76cm	7 - 8 40 - 42
Extra Large Short	5' 10" - 6' 178 - 183cm	15 - 16stn 95 - 102kg	42" - 44" 107 - 112cm	35" - 38" 89 - 96cm	46" - 48" 117 - 122cm	30" 76cm	7 - 8 40 - 42

"Off the Peg - Made to Fit" Service

These size charts are specific to "Off the Peg" suits.

Although "Off the Peg", **O'Three** will ensure that a good fit is achieved. Our extensive size range and the large amount of adjustments that can be made, for example, tweaks to the seals, arms and legs that might need shortening, or a change in boot size, means that we can correctly fit many shapes and sizes into "off the peg" suits.

We have been doing this for many years and we have called this process, "Off the Peg - Made to Fit".

Taking into account this unique fitting service, our standard size chart above should be used as a guide.

The last resort

Dry suits are very easy to use and will open up a whole new underwater experience. Unfortunately, in this litigious world we now live in, within this manual we have to make continual reference to the possible dangers of dry suit diving. Continuing in that vein, listed below are some extreme scenarios that may occur. **This list is not definitive**.



PLEASE REMEMBER; Experience gained slowly and methodically under qualified and experienced supervision and then practiced, will enable you to safely maximise the benefits of diving in a dry suit and should help prepare you for the unexpected.

In an emergency

Flooded suit

Incredibly rare, but it can happen. As controlled as possible, abort the dive immediately.

Make your buddy aware as soon as possible and keep them close at all times.

If diving in very cold water, the risk of hypothermia is dramatically increased.

If you have a decompression obligation, you must try and fulfill it. You will have to evaluate the situation as best as you can.





Stop! - Take Care: Prevention is better than cure. Regular care and maintenance could give you early warning of any serious problem that may be developing. If your diving eventually takes you into the realms of technical diving, decompression will be the norm and could easily exceed 60minutes and more.

This prevention could save your life.

Air not dumping

Air will not dump through your Auto Dump. If not rectified immediately, a rapid and uncontrolled ascent may occur. If you are using the air in your suit for squeeze only, you will have a little more time to resolve the problem.

Air can be released through your wrist seal or neck seal. Pull the seal away from the skin. This will break the seal and allow air to escape. Yes, some water may come in.

Dump valve stuck open

The first sign of this will be the ingress of water. Abort the dive and make a controlled accent using your BCD.

Inflation valve stuck closed (not allowing air into suit)

If you have carried out a buoyancy check and are correctly weighted, your BCD (Buoyancy Compensating Device) will get you to the surface. As you ascend, the little air that is in your suit will begin to expand. It is for this reason that the ditching of your weight belt should be an absolute last resort.

Inflation valve stuck open (free flowing air into suit)

Disconnect hose. Abort the dive and make a controlled accent using your BCD.



Monty Halls at work
Image by Jason Brown

Last Thoughts

The information contained within this owner manual is not just about the ABC's and do's and don'ts of dry suit diving. Much of the information is geared towards helping you keep safe, dry and in the water.

The sea can be brutal. A large degree of responsibility is placed on you to ensure your suit remains in the best condition possible. Look after it and it will look after you.

Whether you are diving for a living or just for fun, if anything untoward should happen, where ever you may be, **O'Three** will do all it can to keep you diving.



Disposal

Sadly, nothing lasts forever.

When a suit has reached the end of its natural life, the correct method of disposal will depend on the laws and regulations within your country.

Please ensure you dispose of this suit in a thoughtful and careful way.

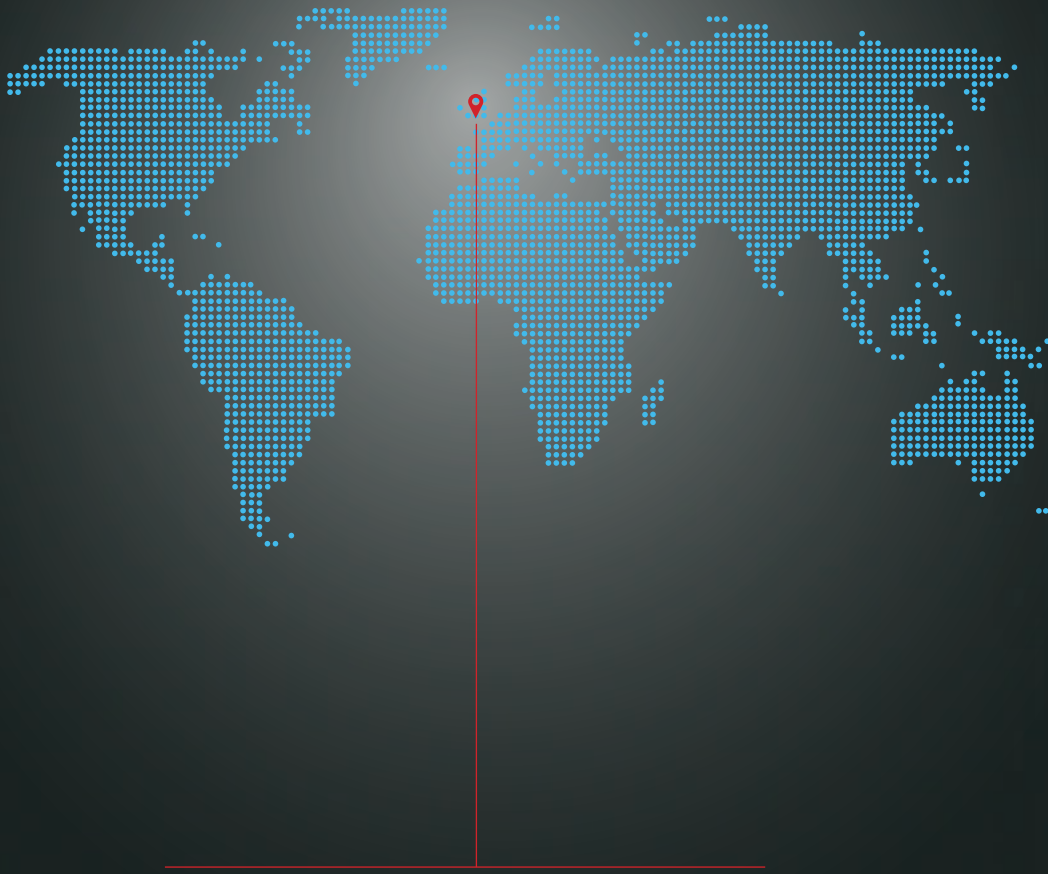
For suits that may have become contaminated with chemicals, additional expert advice should be sought. Before disposal, as an additional safety measure, we advise you cut the suit in half.

Notes

The information contained within this owner manual is a culmination of over 30 years experience and has taken a considerable time to put together in this one document. We are happy for you to, and encourage you to pass on our knowledge; however, if you wish to re-produce any part of this manual, in print, in digital format, or on the web, you are legally obliged to contact **O'Three** Ltd first.

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♥ *A big thank you to everyone who has worked so hard to help us create this manual.*



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