The Ultimate Diving System

Northern Diver

www.ndiver.com

DRYSUIT MANUAL

DRYSUIT MANUAL

CONTENTS

ABOUT YOUR NORTHERN DIVER DRYSUIT

Thank you for purchasing your new Northern Diver drysuit. If you are only used to diving in a wetsuit or semi-dry then you are in for a very pleasant surprise and will be pleased with the difference it will make to your diving.

Drysuits are very simple to use but we strongly recommend that you practice your drysuit diving technique under controlled conditions in the presence of a qualified diving instructor before taking to the open water.

If you have previous experience of drysuit diving we recommend that you read this manual for its safety tips and maintenance requirements.

Northern Diver is based in Appley Bridge in Lancashire where we use the latest technology combined with attention to detail and strict quality control to ensure your suit provides you with years of trouble free service. Our fully integrated quality management system (which complies with BS EN ISO 9001 & ISO 9002) allows us to adopt a planned and disciplined approach to all aspects influencing quality. With the information in this manual you can ensure that your suit remains in good condition.

If you find any part of this manual is not clear then don't hesitate to contact us. Similarly, if you are unable to understand any information about your drysuit, from whatever source, get in touch. We are here to help.

If there is anything that isn't included in this drysuit manual that you need to know then please get in touch with your nearest Northern Diver dealer. To find your nearest dealer worldwide please visit ***www.ndiver.com/dealers***

To contact Northern Diver directly:

TELEPHONE:	UK - 01257 254444	INTERNATIONAL - 00 44 1257 254444
FAX:	UK - 01257 251234	INTERNATIONAL - 00 44 1257 251234
EMAIL:	info@ndiver.com	
WRITE/VISIT:	Northern Diver (International) Ltd. Appley Lane North, Appley Bridge Lancashire, WN6 9AE, UK	

WARNING - Northern Diver strongly recommends that you undergo training with a suitably qualified instructor before taking to the open water with a drysuit.

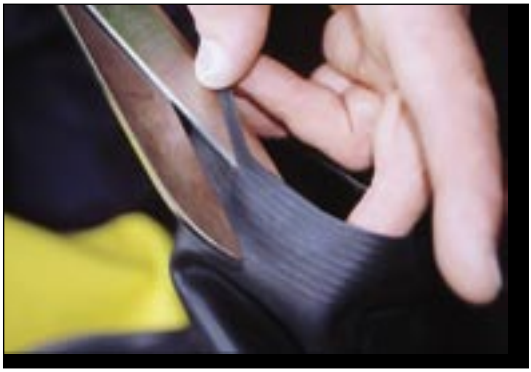
PREPARING YOUR DRYSUIT FOR DIVING

Prior to using your drysuit it is essential to adjust your latex neck and wrist seals. If your suit has neoprene seals you do not need to adjust these as they have been made to your supplied measurements.

NEOPRENE NECK SEAL

Stock size neoprene seals become more supple with use. It is possible to stretch them by inserting a ball, bowl or bucket and leaving overnight.

ADJUSTING THE LATEX NECK SEAL



As latex seals are thin rubber they are easily adjusted with a pair of sharp scissors and careful attention. The seals are watertight and seal against the skin so a comfortable but effective fit is essential. The seals are tapered so as the edge is trimmed away the hole gets larger. If you are experienced at trimming seals you may be at ease doing it yourself. Otherwise we suggest you contact your local approved Northern Diver centre and allow them to do all trimming.

The first thing to do is measure your neck circumference at collar position. This is where your neck seal will seal against your skin. For the seal to work the latex must be slightly stretched so the hole needs to be smaller than the circumference of your neck. If the hole is the same size or larger then the neck seal will leak. Ideally, the neck seal should be approximately 20% smaller than your collar circumference.

Firstly, turn your neck seal inside out where you will notice some parallel lines in the rubber. These are cutting guides to help you cut a straight line. Remove material one ring at a time until you get a good fit. Do not try to remove the exact amount in one go as any errors may make the hole too big and the neck seal will not work. Also, use large scissors and try to avoid lots of little cuts. Longer cuts will help attain a clean edge. You may find it advantageous to enlist the help of another set of hands when trimming your neck seal.

WARNING - TO AVOID ANY UNNECESSARY RISK OF BLOOD RESTRICTION ENSURE THAT YOUR NECK SEAL IS NOT TOO TIGHT

If you are unfamiliar with latex seals you may feel that your neck seal is still too tight after you have trimmed it to the correct size but when in the water you are likely to find that the fit is a comfortable and snug one.
Test your seal adjustments in a swimming pool before taking to open water.

ADJUSTING THE LATEX WRIST SEAL

If you have adjustable latex seals on the wrists of your drysuit, they may only need trimming if you have large wrists. Use a similar technique to that used for trimming the neck seal, allowing the hole to be approximately 20% smaller than the diameter of your wrist when the circumference is measured. As previously, there needs to be some stretch for the seal to work properly so remove a little at a time . If too much rubber is trimmed the seal is likely to leak. Again, use large sharp scissors and make long cuts to ensure a cleaner cut.

ANY DAMAGE CAUSED TO YOUR NECK SEAL OR DRYSUIT BY TRIMMING IS NOT COVERED BY YOUR WARRANTY.

Finally, the edge of all trimming should be as smooth as possible. Any rough or jagged edges are prone to tearing when the suit is worn. Trim any uneven edge slightly to leave as smooth a finish as possible.

ATTACHING THE INFLATION HOSE

Your Northern Diver drysuit is supplied with an inflation hose.

This should be connected to your regulator's first stage using a low pressure outlet. If you have any doubts about doing this please contact your approved Northern Diver centre or your equipment service centre.

It is also possible that your drysuit may have the Blowgun inflation system. Contact us if in doubt or refer to www.ndiver.com/valves

TALCUM POWDER ON NECK AND WRIST SEALS

A talc bag is included with every Northern Diver membrane drysuit.
Your drysuit wrist and neck seals should be lubricated with talcum powder prior to putting it on. Do not use perfumed talcum powder as this may damage the seals. Alternatively, a mild soap or shampoo may be used.

PRIOR TO DIVING

Ensure the drysuit zip opens and closes easily. If a lot of effort is required the zip should be lubricated with wax (a bar of soap can be used in an emergency). Make sure that none of the teeth are damaged - if any damage is suspected the suit should be taken to a Northern Diver centre for inspection and repair.

If your suit has been in storage for more than a few weeks it should be inspected some days prior to leaving to go diving to allow sufficient time for any repairs to be carried out.

Before each dive, the inflator and exhaust valve should be checked by connecting the regulator to an air tank and connecting the inflator hose to the inflator valve. Press the suit inflator valve to test. To check the exhaust valve, the neck and wrist seals must be plugged to create an airtight seal. Various items (eg, a bottle) can be used (see picture). Inflate the suit until the exhaust valve begins to vent (you will hear the air escaping). Press the exhaust valve to check it is functioning correctly (the suit should begin to deflate). If your suit is fitted with a cuff dump it will vent as you inflate the suit.

PUTTING ON YOUR UNDERSUIT

Extra thermal protection can be gained by wearing items such as thermal underwear or t-shirts underneath your undersuit - Northern Diver Thermal *Hotsox* can also add to your comfort level. It is easiest to sit down and pull your undersuit

on up to the waist. Some undersuits, such as the Northern Diver *Flectalon* range, have footloops which prevent the undersuit legs rucking up when putting on your drysuit. Standing up will assist you in putting your arms into the undersuit. Do not use excessive force when getting the undersuit over your shoulders - if you have difficulty enlist the help of someone (and reciprocate when they need help!). Finally, close the zip ensuring no fabric or underwear is caught in the zip teeth.

PUTTING ON YOUR DRYSUIT

Most Northern Diver drysuits are shoulder entry - video guides for all drysuit entry systems will available online at ***www.ndiver.com/videos***
It is important to remove jewellery and watches before putting on your drysuit. These items can easily damage wrist and neck seals.

Open the drysuit zip fully. Fold the torso of the suit inside out down to the waist. For ease of dressing, sit down and put your feet into the legs of the suit (if your suit has braces ensure they are on the outside of your legs as you insert your feet). Stand up, pulling the suit up to your waist. Slide your (optional) braces to a good but not too tight fit.

WRIST SEALS

Some under suits, such as the Northern Diver *Flectalon* range, have thumb loops which assist in preventing the undersuit rucking up when inserting your hands through wrist seals.

Insert one arm into the suit sleeve. A couple of fingers from your other hand can help the seal pass over your hand. Take care as long fingernails can damage the seal. Keep your fingers together as you push your hand through the seal.

The wrist seal should be flat against your wrist. Ensure there is no material from your undersuit trapped beneath the seal as this may cause a leak. If you have any channels caused by tendons when you move your hand, pull the wrist seal as far as you can up your forearm. The procedure should be repeated for the other arm.

Neoprene wrist seals may be lubricated with baby lotion or any non-oil based lubricant. Talcum powder may be used for latex seals.

CAUTION - TAKE CARE WITH FINGERNAILS AND NECK & WRIST SEALS

NECK SEALS

Put both hands through the top opening of your neck seal. Grip the edge of the seal (fingers inside the opening, thumbs on the outside) and spread the seal, taking care to avoid damage to the seal from your fingernails. Turn your head slightly to one side and pull the neck seal over your head, keeping the seal spread with your fingers. Pull the neck seal down as you push up with your head.

Divers with long hair will find it easier to fit the seal if wearing a nylon stocking over their hair. Latex will slide easily over the stocking.

The neck seal should be adjusted so that it lies flat against your neck after it is over your head. Turn the edge of the seal so that it sits between one and two inches above your collar bone. Ensure the seal is even around your neck with no hair or undersuit trapped underneath it as this may cause the suit to leak.

Neoprene neck seals may be lubricated with baby lotion or lubricating jelly. Talcum powder may be used for latex seals.

CAUTION - ENSURE NOTHING IS TRAPPED UNDER NECK & WRIST SEALS

CLOSING THE ZIP

Do not attempt to close the zip yourself, enlist the help of your diving buddy. Your arms should be held at shoulder level in front of you. The zip should be pulled with a steady even action ensuring that there is no hair or clothing caught in the zip. The zip should be hard against the stop when fully closed. It is essential that the zip is fully docked with the rubber stop to avoid leaks.

VENTING THE DRYSUIT

Now you are fully enclosed in your drysuit you will be sharing it with some trapped air. This air should be vented from your suit - crouch down and cross your arms across your chest. Press the exhaust valve and you should hear the trapped air escaping. You may wish to repeat the procedure if any trapped air remains in the suit.

If your suit does not have a push button exhaust valve, air may be expelled from the suit by pulling the neck seal away from the neck when crouching down.

You are now ready to put your diving rig on. You may find this easier if you sit down and enlist the help of your diving buddy again.

CONNECTING/DISCONNECTING YOUR INFLATION HOSE

The inflator hose from your regulator first stage should be fed beneath your arm. To connect it to the inflator valve on your drysuit hold the hose just behind the fitting and pull the collar back. This collar is spring loaded and will slide back when you let go of it. Holding the collar back, push the end of the hose onto the inflator valve fitting. Push the collar forward to lock it in position. Ensure the hose is attached properly and push the inflator button to check that it is functioning properly.

CAUTION - A BUOYANCY COMPENSATOR (STAB JACKET, ABLJ, BC, ETC.) IS ESSENTIAL FOR DRYSUIT DIVING
YOU SHOULD NOT DEPEND ON YOUR DRYSUIT AS YOUR ONLY SOURCE OF BUOYANCY

To remove the hose, hold the end of the hose just behind the fitting and push it towards the inflator valve. Hold the hose in this position and pull back on the spring loaded collar. This should disconnect the hose from the inflator valve. The inflator hose should connect and disconnect from the inflator valve regardless of whether your air tank is turned on or off.

CAUTION - ENSURE THE INFLATOR HOSE HAS A CLEAR PATH TO YOUR INFLATOR VALVE WITH NO TIGHT BENDS OR KINKS

USING AND MAINTAINING YOUR DRYSUIT

With the correct maintenance, your Northern Diver drysuit will give you many years of enjoyable diving.

Having finished your day's diving, rinse the outside of the suit thoroughly with fresh clean water to remove any dirt, sand or salt. Any stubborn stains can be removed by rubbing the area gently with soapy water. After you have rinsed out the suit, hang it over a drying rack or line in a shady spot.

NEVER LEAVE YOUR SUIT IN THE SUN - IT MAY CAUSE COLOURS TO FADE.

VALVES

After diving, always rinse the inlet and outlet valves with cold running fresh water. To flush the inlet valve, simply connect the valve to an air supply and operate whilst flushing the push button area with water. This will help prevent sand and debris entering the valve seals.

WARNING - VALVES MUST BE PROPERLY CLEANED AFTER EVERY DIVE
VALVES MAY STICK OWING TO A BUILD UP OF SALT, DIRT, HAIR, etc.
USE THE SAME RESPECT AND CARE AS YOU WOULD FOR A BREATHING REGULATOR

ZIP

The drysuit zip seals on the inside teeth and rubber surface. The zip needs special maintenance and attention.

BEFORE DIVING

Close the zip and lubricate it with Northern Diver's Zip-Lube.
A complimentary pack has been provided with your new suit. Replacements can be ordered from Northern Diver or your local dealer.

AFTER DIVING

The zip must be fully opened before attempting to remove your drysuit. Failure to open completely may result in the zip being damaged.

Clean the zip by rinsing with fresh water. If the zip is particularly dirty with sand

or dirt after diving it can be cleaned by using an old toothbrush and fresh water (mild soapy water can be used for heavy soiling).

Lubricate the zip with Northern Diver's ZipLube or wax by rubbing the teeth and stringers before each new dive and after cleaning. A complimentary pack of wax/Zip-Lube is included with your new suit. Replacements can be ordered from Northern Diver. It is important to do this - if not regularly lubricated the zip may seize up and fail.

DO NOT USE SILICON SPRAY TO LUBRICATE YOUR DRYSUIT ZIP
THIS CAN DAMAGE THE SUIT AND THE MATERIAL USED AS THE BASE OF THE ZIP

LATEX SEALS

Clean the Latex seals using cold fresh water. Latex seals will perish quickly if any kind of moisturising cream, body oils or oil is applied to them. After dives clean the seals using mild soapy water to remove dirt and body oils.

STORAGE OF YOUR DRYSUIT

Once the drysuit valves are thoroughly clean and dry and the zip lubricated, you should store your drysuit in a cool dry place away from devices that produce ozone such as motors and heaters. It is preferable that the suit is stored hung up with the zip closed.

TROUBLESHOOTING YOUR DRYSUIT

IS MY SUIT LEAKING OR IS IT CONDENSATION?
REMEMBER, YOU WILL PROBABLY PRODUCE A NOTICEABLE AMOUNT OF PERSPIRATION WHEN DIVING

ZIP LEAKS

1 - The zip is not fully closed
2 - The zip is damaged or has failed. Ensure the zip is fully open when putting on and removing the drysuit
3 - Sand, dirt or salt has become trapped in the zip when opening or closing.
4 - Improper or inadequate lubrication of the zip.
5 - Under garments have become trapped in the zip.
6 - The zip has been over-stressed.
7 - The zip is very old or has been subjected to heavy usage.

SEAL LEAKS

1 - Drysuit under garments are caught beneath the seal.
2 - Hair is caught beneath the seal.
3 - Wrinkles or folds in the seals.
4 - Improper adjustment of the seals resulting in channels around tendons.
5 - Deterioration of the seal (cracks/tears) due to age or usage.
6 - Over trimming (Latex seals only).
7 - Holes caused by jewellery or over-pulling when putting on and taking off the drysuit.

VALVE LEAKS

1 - The valve is not properly fastened to the drysuit and needs tightening, especially on neoprene suits where the neoprene is compressed.
2 - Improper adjustment of the exhaust valve.
3 - The exhaust valve is jammed open.
4 - Minor leakage when the valve is closed.
5 - Dirt, sand, salt or debris in the valve.
6 - The valve parts are worn with age or heavy use.

SUIT FABRIC LEAKS

1 - Tears, punctures or splitting of the drysuit material.
2 - Cuts due to sharp objects.
3 - Failure of the seams or chafing.
4 - Delamination of suit material due to age, use or exposure to chemicals.

TESTING FOR LEAKS

Should you wish to test your drysuit for leaks after a period of storage, you can do this in your bath. Plug the wrist and neck seals very carefully. A bottle or similar

object may be used for this. Connect the inflator hose to an air supply and the suit and inflate the suit. Immerse the suit in a bath and look for any bubbles.

Pouring soapy water over the offending area also easily identifies any leaks.

IMPORTANT INFORMATION

1 - Follow all instructions. Improper use of a drysuit can cause loss of buoyancy control including uncontrolled descents and ascents with a risk of serious injury or death.

2 - Improper use or misuse of a drysuit can result in exposure to thermal hazards and rapid body overheating or cooling which could result in stroke, seizure, hypothermia and death.

3 - This manual is NOT a substitute for proper qualified drysuit instruction and is not supplied as such. This manual is supplied as a guideline for drysuit maintenance only.

4 - Diving in conditions that contain chemical, biological or nuclear contaminants is extremely hazardous and should not be attempted without being specially trained and equipped. The Northern Diver suit you have purchased has not been adapted for use in polluted or abnormal conditions and is therefore not covered under warranty.

EMERGENCY PROCEDURES

INFLATOR VALVE IS STUCK OPEN

If your drysuit inflator valve becomes stuck open, meaning the suit is inflating uncontrollably, disconnect the inflation hose and press your dump valve at the same time. This exercise should be practised in a safe environment whilst wearing normal diving gloves. If you have a cuff dump you will be able to dump the excess air by raising your arm. In an extreme emergency, such as when you cannot vent sufficient air through the exhaust valve then you can raise you arm whilst lifting the seal on your wrist or by pulling the neck seal away from your skin. These procedures will allow air to escape from the suit quickly but will also allow water to enter the drysuit.

If you experience an uncontrolled ascent due to over inflation it is important to exhale as you ascend.

INFLATOR VALVE IS STUCK CLOSED

If your drysuit inflator valve becomes stuck closed, do not descend further and abort the dive. Use your buoyancy control device to return to the surface remembering to vent any air within your drysuit as you ascend.

EXHAUST VALVE IS STUCK OPEN

If your drysuit exhaust valve becomes stuck open, your drysuit will not retain air and will therefore not give proper buoyancy. Water is also very likely to enter the suit via the valve. Abort the dive and use your buoyancy device to return to the surface.

EXHAUST VALVE IS STUCK CLOSED

If your drysuit exhaust valve becomes stuck closed it may not be possible to vent air from your drysuit which could result in an uncontrollable ascent. Air can be dumped by pulling the wrist or neck seals away from the skin allowing air to escape. This action may cause water to enter the drysuit.

WATER ENTERS THROUGH EXHAUST VALVE

This may be caused by dirt, etc. under the valve or a damaged diaphragm. Abort the dive immediately and use your buoyancy device to return to the surface.

AIR LEAKS THROUGH INFLATOR VALVE

If this occurs you should disconnect the inflator hose from your drysuit and use your buoyancy device to return to the surface. Air will need to be dumped as usual when ascending.

DRYSUIT BECOMES FLOODED

In the unlikely event of this happening, it may be caused by a tear, seal or zip failure, etc. You should use your buoyancy device to return to the surface.

It may help to keep the leaking area as low in the water as possible to help keep any remaining air in the suit. Cold water in the suit means that it should be removed as soon as possible after surfacing.

Be aware that it is normal for the inside of a drysuit to be damp with perspiration

and a small amount of water should not be assumed to be because of a leak or suit failure.

DROPPED OR LOST WEIGHT BELT

If you intend to practise this procedure, you should do so only under the close supervision of a suitably qualified instructor in a controlled environment.

Do not attempt to drop your weight belt until you are clear about the emergency procedures in your training.

YOUR DRYSUIT DETAILS

Please note your drysuit details for future reference:

DRYSUIT SERIAL NUMBER

DATE OF PURCHASE

SUIT TYPE

SIZE

COLOUR(S)

BOOT SIZE

NOTES (Repairs, etc.).

NORTHERN DIVER (INTERNATIONAL) LTD.
www.ndiver.com