Trilaminate

VIKING™ OWNER'S MANUAL for Trilaminate Dry Suits **VIKING™ VTS, VSN & WRS-D**







Ansell

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VIKING

1. Safety considerations

- This manual is valid only for VIKING™ VTS, VIKING™ VSN and VIKING™ WRS-D.
- All procedures described in this manual require adequate skill and knowledge in the use of dry suits through training by a qualified and certified instructor.
- If your equipment fails to work as intended: **Do not use it; have the problems corrected by a qualified dive shop or distributor**.

1.1 Definitions of important signal words used in this manual

Throughout this manual, the following signal words will be used to call your attention to conditions, practices or techniques that may directly affect your safety:

!!! DANGER !!!
Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
!! WARNING !!
Indicates a potentially hazardous situation which, if not avoided, may result in death or serious injury.
! CAUTION !
Indicates a potentially hazardous situation which, if not avoided, may cause damage to material or equipment.

1.2 Description of marking in the suit

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9 10</td></tr>
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#1: Product description and country of origin
#2: Suit model
#3: CE-mark, see chapter *EU type approval*.
#4: Standard to which the product is certified
#5: Article number of suit
#6: The suit's individual batch number
#7: Date of manufacture
#8: Suit manufacturer
#9: Address of suit manufacturer
#10: QR code linking to EU Declaration of Conformity page on manufacturer's website
#11: Warning sign
#12: Warning text
#13: Request to read instructions in this Owner's manual before using the suit and cleaning instructions (see chapter 14)
#14: Size
#15: Pictogram with measurements in centimeters (see chapter 5)

1.3 Pre-dive check list

These guidelines are recommended by Ansell. Follow them for your safety and incorporate them in your routine as a mandatory pre-dive check list.

1. Complete a dry suit diving course led by a certified instructor and maintain proficiency by regular dives.
2. Use a buoyancy compensator device for surface flotation and for your safety. This is optional when diving with surface supplied air.
3. Know your equipment and emergency procedures. Read the user manuals for all your equipment.
4. Practice your dry suit diving skills under controlled conditions until they become second nature.
5. Never dive alone. Dive with a buddy who has a thorough understanding of your dry suit system. Do always have people on land or in a boat that are able to help you in case of emergency.
6. Use the correct amount of insulation for the water conditions you are diving in and your exercise rate.
7. Your weighting should allow you to make a decompression at 10 feet (3 meters) at the completion of your dive with a tank containing 500 psi (30 bar) of air or less. Determine the appropriate weight needed to attain neutral buoyancy by for example a pool dive. Weight yourself at neutral buoyancy with an empty tank. An increased salinity in the water requires more weight.
8. Check your valves, hose, zipper and seals before each dive.
9. Perform preventive maintenance and repairs on the suit regularly. At least once a year, have the suit, valves and hose serviced by a qualified dealer service, but more frequently if the suit is in heavy or extraordinary use.
10. Know your limitations and do not exceed them.

!!! DANGER !!!

Risk of injury due to reduced body functions when diving in cold water. Water or air temperatures below 70 °F (21 °C) constitute cold water diving. Water or air temperatures below 40 °F (5 °C) constitute ice diving. Ice diving is dangerous and requires special equipment, training, preparations and procedures.

!! WARNING !!

Diving with a dry suit can be extremely dangerous. Do not attempt to use this dry suit without prior training and certification by a qualified and certified instructor, and use of all necessary and appropriate equipment.

!! WARNING !!

Risk of skin irritation and allergic reactions. The suit materials can cause skin irritation and allergic reactions to individuals sensitive to these materials. Consult a medical professional if in doubt.

1.4 Important safety information

!! WARNING !!

Improper maintenance, use or misuse of this suit may result in death or serious injury.

Follow established diving safety practice. Do not dive over the limits of your ability and training. Do not use this suit without being familiar with diving equipment and having had prior qualified training.

Do not use this suit until you have practised and mastered practical dry suit skills, including emergency skills in a controlled environment under supervision of a dive instructor certified by a nationally recognised instructional organisation and knowledgeable in the use of dry suits.

Do not use this suit without evaluating the conditions before every dive and making sure they fit your personal capabilities. Regularly service and maintain the suit and its parts! Check equipment before and during every dive.

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

Do not use this dry suit until you have read, understood and followed all instructions and safety precautions in the Owner's Manual.

Never dive without accepting your own responsibility for safety on every dive.

If the Owner's Manual is unavailable or lost, another copy can be obtained by writing the manufacturer, or downloaded at http://protective.ansell.com/en/Downloads/Manuals/Viking/

2. Description of suit

VIKING™ VSN, VIKING™ VTS and VIKING™ WRS-D are:
- Trilaminate dry suits
- Of lighter weight than the traditional VIKING™ range of vulcanised rubber dry suits
- Designed for sports, technical, military and light commercial use
- Not designed or intended for contaminated water diving where there may be oil or similar contaminants, as it is impossible to clean these off the external surfaces
- VIKING™ WRS-D is designed for use as a combined rescue/diving suit

! CAUTION !

Trilaminate suits are not designed or intended for use in contaminated water conditions where hydrocarbons in particular will render the outside of the suit unusable.

The suits are available in the following designs:
- Front entry with adjustable torso (zipper placed diagonally across the upper body)
- Rear entry with non-adjustable torso (zipper placed across the shoulders)

The suits are as standard fitted with:
- Medium Duty (MD) non-magnetic zipper
- Push protected inlet valve, positioned centrally on the chest
- Low profile adjustable exhaust valve, positioned on the upper left arm
- Surveyor latex neck seal
- Latex conical cuffs
- Rubber coated 5 mm neoprene boots

Each suit comes supplied as standard with the following items:
- Carry bag
- Suspenders
- Inflation hose
- Owner's manual
- Repair kit
- Zip care materials

!! WARNING !!

These dry suits must be worn with suitable thermal underwear. A dry suit does not provide thermal insulation.

For more information about materials, components & accessories, see chapter 17.

3. Approvals

3.1 EU type approval

The VIKING™ suits are CE marked according to the EU Regulation 2016/425 on Personal Protective Equipment. The suits fulfil the applicable harmonised standards as listed below.

Suit	Standard	Certificate number
VIKING™ VTS	EN 14225-2:2017	19A0923ETS01
VIKING™ VSN	EN 14225-2:2017	19A0922XUS01
VIKING™ WRS-D	EN 14225-2:2017	19A0924LPS01

The suits have been tested and approved by notified body No 0403;
Finnish Institute of Occupational Health, Topeliuksenkatu 41 b, FIN-00250 Helsinki, Finland.

Link to EU Declarations of Conformity page on Ansell Protective Products' website:

4. Intended use

A dry suit protects its wearer by the exclusion of water and contaminants when underwater. Latex seals are attached to the body of the suit at the neck and cuffs to prevent water from entering whilst submerged.

Various types of underwear can be worn under the suit depending on water temperature, depth and diver activity. The conservation of body heat using thermal protection in cold, deep water is vitally important to the safety and efficiency of divers, professional and amateur alike.

The following chapters describe in detail how to use, maintain and carry out certain repairs to your dry suit.

!!! DANGER !!!

Risk of injury due to reduced body functions when diving in cold water. Water or air temperatures below 70 °F (21 °C) constitute cold water diving. Water or air temperatures below 40 °F (5 °C) constitute ice diving. Ice diving is dangerous and requires special equipment, training, preparations and procedures.

!! WARNING !!

Do not use other gas than air for inflation of the suit. Using oxygen- enriched gas for inflation one is in risk of fire and explosion. Using argon there is a risk of this gas getting into a full face mask and the breathing system through the hood. This has to be avoided because the effect of breathing argon is more narcotic than nitrogen when under increased partial pressure.

!! WARNING !!

The suit itself does not have a depth limit, but all diving at large depths is potentially dangerous and requires special training, skills and know-how.

5. Selecting and fitting dry suit and underwear

5.1 Selecting and fitting a dry suit

VIKING™ dry suits come in several different sizes that fit a large percentage of divers. Since a dry suit does not need to fit snugly, each different size suit will fit a range of body shapes and sizes.

Even though the fit of a dry suit is more forgiving than a wetsuit, the suit must fit you properly. If you are unable to squat or kneel easily in the dry suit while wearing an insulating undergarment, the suit is too short.

A dry suit that is too long for your body can also be a problem. If the crotch of the suit hangs more than 4 inches (10 cm) below your crotch when you are wearing it, the suit is probably too long. Suits that are too long may allow air into the feet of the suit, causing your boots and fins to pop off while diving. This is a dangerous situation.

When you try on a dry suit to determine your size, be sure to put on the bulkiest thermal insulation you plan to use with the suit first. After you have the suit on, check to see that you can comfortably reach both the inflator and exhaust valve when you have all your equipment on.

5.1.1 VIKING™ dry suit size charts

Size charts for each style of VIKING™ suit are available on the website at http://protective.ansell.com. VIKING™ sizes are unisex.

5.2 Selecting and fitting dry suit underwear

Dry suit underwear is designed specifically for diving. Ordinary long underwear, or sweatsuits, are not designed for diving, but may provide acceptable insulation for less demanding diving conditions.

Each individual differs in the amount of insulation they need to wear. The amount of insulation you need is determined by the following factors:

- Your body size and weight
- Your sex
- The water temperature when you dive
- Your exercise rate when diving

Always remember that each person has a different range of temperatures at which they feel comfortable. What is comfortable to your instructor may not be comfortable for you or your diving partner.

Just as too little insulation in cold water can make you quite uncomfortable, too much insulation in warmer water can also make you uncomfortable. When topside conditions are warm, it is essential to remove your dry suit between dives to allow your body to cool down.

Proper dry suit underwear must cover your arms, legs and torso. Separate socks or booties must be worn to keep your feet warm and comfortable. Ansell offers a range of suitable VIKING™ underwear.

!! WARNING !!

It is essential to adjust your insulation according to the environmental conditions where you dive. Overheating is extremely dangerous. It can lead to exhaustion, blackout and in rare instances, death.

!! WARNING !!

The type and amount of underwear used under your dry suit will affect your weight. In most situations, the more insulation you wear, the more weight you will need to dive.

!! WARNING !!

Undergarment used in combination with a dry suit shall allow free passage of air between the user's body and the deflation device.

6. Preparing for the dry suit dive

Before you use your dry suit for the first time, the neck and wrist seals must be adjusted for your individual use. The seals on all VIKING™ dry suits are made from latex or neoprene.

6.1 Adjusting latex neck seals

Latex is a flexible rubber material, similar to that used in the manufacture of dishwashing gloves. To make a watertight seal on your dry suit, latex seals are used at the wrists and neck. The seals are manufactured in a cone shape and are trimmed to the size needed by each dry suit owner.

If you are unfamiliar with trimming latex seals, Ansell recommends that you allow your dealer to trim the seals on your suit for you. If you are an experienced dry suit user you may want to trim the seals on your suit yourself.

Before you begin to trim your neck seal, measure the circumference of your neck at collar level. This is the area where the seal will sit against your neck. Next, measure the opening of the neck seal on your suit. When the neck seal is trimmed correctly, the opening will usually be approximately 15-25 % smaller than the circumference of your neck. The neck seal must stretch a bit when you wear it for it to work properly. If too much material is removed the neck seal will leak.

1. To trim a latex neck seal, turn it inside out so that you can see the cutting guides moulded into the seal. These guides are thin ridges that help you to trim the seal with an even cut, helping to ensure a good seal.

2. Have your dive partner hold the seal so that it is flattened. The fingers should grip the seal approximately 1/4-1/2 inch (6-13 mm) back from the opening on either side. The seal should be under slight tension. The two “edges” of the opening should be parallel to each other.



3. Trim the seal with the largest, sharpest scissors available, making as few cuts as possible. Trim no more than 1/4 inch (6 mm) of material during a single cut. Try to avoid leaving the edge of the seal with a jagged surface that could tear.

4. Try the neck seal on when you think you are cutting close to the right adjustment. To do this, you don't need to put the whole suit on; just spread the neck seal as explained in the section *Putting on your dry suit* and pull it over your head. Adjust the seal so that it lies flat against your neck, as low as possible. It should be snug, but not uncomfortable.

New dry suit divers usually will feel that a snug neck seal is uncomfortable and doesn't fit out of the water. However, after you have entered the water, you will find that a snug neck seal provides a good fit and a proper seal.

!! WARNING !!

If your neck seal is too tight it can restrict the flow of blood to your brain, resulting in serious injury or death.

6.2 Adjusting latex wrist seals

If you have large wrists you may find that you need to trim the wrist seals on your dry suit, too. The technique for trimming your wrist seals is similar to that used to trim your neck seal.

Measure the circumference of your wrist above the wrist bone. The wrist seal will seal from the wrist bone up your forearm another 1-1.5 inch (25-38 mm). Next, measure the opening of the wrist seal on your suit. When the wrist seal is trimmed correctly, the opening will usually be approximately 15-25 % smaller than the circumference of your wrist. The wrist seal must stretch a bit when you wear if for it to work properly. If too much material is removed the wrist seal will leak.

To trim a latex seal, have your dive partner hold the seal so that it is flattened. The fingers should grip the seal approximately 1/4-1/2 inch (6-13 mm) back from the opening on either side. The seal should be under slight tension. The two “edges” of the opening should be parallel to each other.

Trim the seal with the largest, sharpest scissors available, making as few cuts as possible. Trim no more than one quarter inch of material during a single cut. Try to avoid leaving the edge of the seal with a jagged surface that could tear.

! CAUTION !

If you damage the neck or wrist seals by trimming them excessively, replacement is NOT covered by the VIKING™ Warranty.

Try the wrist seal on when you think you are cutting close to the right adjustment. To do this, you don’t need to put the whole suit on; just insert your hand in the sleeve and slide it through the wrist seal as explained in the section Putting on your dry suit. Adjust the seal so that it lies flat against your wrist. It should be snug, but not uncomfortable.

!! WARNING !!

If the seal is too tight blood circulation to the hands will be restricted and could cause your hands to become cold or numb. This can make it difficult or impossible to operate equipment.

6.3 Connecting the low pressure inflator hose to the regulator

You must connect the low pressure hose that is supplied with your dry suit to a low pressure port on the first stage of your regulator before you use your suit. Low pressure ports are 3/8’’ UNF (9.5 mm). The maximum output pressure of an LP port should be 225 psi (15 bar). The hose must be routed so that it comes under your left arm. Accordingly, the hose must connect to a port on the “left” side of your regulator as it sits when it is connected to your tank.

To connect the hose to the first stage, you must remove one of the low pressure plugs from the first stage of your regulator. The post must either be marked “LP” or it may have no marking. Under no condition should you use a port that is marked “HP” or “high pressure”.

Use an Allen wrench or open end wrench as appropriate to remove the low pressure plug. Keep the plug in a safe place in case you change regulators. Once the plug is removed, screw the low pressure inflator hose into the opening and tighten with a wrench until snug. If you are uncertain of how to perform this procedure, have it done by your dry suit or regulator dealer.

!! WARNING !!

Do not connect the VIKING™ low pressure inflator hose to a high pressure (H.P.) port. The hose may erupt causing serious injury.

!! WARNING !!

Do not substitute any hose for the hose that was provided with your dry suit. Even though you may be able to couple another hose to the low pressure inflator, the flow capacity through the quick disconnect may not be adequate to supply the inflator valve. In addition, if the hose is too short and bent, kinked or otherwise restricted, the inflator valve on your suit may fail to operate properly.

7. Pre-dive inspection

At the dive site, you will need to spend a few minutes getting your suit ready to go diving. There are certain items that should always be part of your pre-dive check for dry suit diving.

If your dry suit has been in storage for more than a month, be sure to inspect your suit several days before you leave home to go diving. Give yourself enough time to make any necessary repairs or to have them done.

7.1 Zipper

Always check the zipper on your dry suit before diving. You should be able to close the zipper with a single finger pulling on the loop. If the zipper is hard to pull, lubricate it with either zip lube, beeswax or paraffin wax. In an emergency, you can use a bar of soap for lubrication.

To lubricate the zipper, close it all the way and lubricate the outside of the zipper only. Inspect the teeth for damage, or teeth that are not in alignment. Either of these signs indicate a damaged zipper. If these signs are present take your dry suit to the closest VIKING™ dealer for inspection and repair.

! CAUTION !

Do not use silicone spray to lubricate your dry suit zipper. Silicone spray can damage the fabric of the suit and the tape that forms the base for the zipper.

7.2 Latex seals

Check latex seals. In cold and low temperatures latex parts become stiff and brittle. Warm them gently to around 99-104 °F (37-40 °C) to soften them and improve ease of donning. You may use a hair dryer or a similar source of gentle heat for this purpose.

7.3 Inflator and exhaust valves

Prior to each dive, check the operation of both your inflator and exhaust valve. Test the inflator valve by hooking up your regulator to a scuba tank and pressing the inflator button.

To check the exhaust valve, seal the wrist and neck seals with rubber bands and inflate the suit until air escapes from the exhaust valve. Push down on the top of the exhaust valve to check the manual override function.

8. Putting on dry suit underwear & dry suit

8.1 Putting on your dry suit underwear

When the weather is warm topside, you'll want to set up all your other diving equipment before putting on your dry suit underwear and suit.

To put on your dry suit underwear, start by sitting down. Pull on the lower portion of your underwear and boots (or socks) while you are still seated. Tuck the legs of the underwear inside the boots.

Hold the upper part of the underwear as you stand up. Slip one arm into the underwear and then the other. You may need your dive partner to assist you with this, especially to get the underwear up over your shoulders. Do not force the underwear over your shoulders. Close the zipper on your underwear when it is in position on your upper body.

8.2 Putting on your dry suit

Before putting on your dry suit:

1. Remove all jewellery and your watch, as they can easily cause tears in the neck and wrist seals.

2. Lubricate neck and wrist seals with pure talcum powder. As an alternative you may use a dilute solution of mild soap, schampoo or hair conditioner (five parts water to one part detergent). Never use scented talcum powder as the oils in the perfume may damage the seals.

3. Open the zipper completely.

4. Fold the top of the suit inside out down over the outside of the suit to the waist.

8.2.1 Rear entry style

1. (If suspenders are fitted, make sure they are on the outside of your legs). Insert your feet into the legs of the suit.



2. Pull the suit up to your waist. Pull the suspenders over your shoulders. Make sure they are not twisted and adjust them so they are comfortably snug, but not tight.



3. Insert your right arm in the right sleeve of the suit. Insert two fingers from your left hand into the right wrist seal. Push the seal over your right hand. Cup your fingers tightly together as you push them through the seal.



! CAUTION !

Do not dig your fingernails into the wrist seals. Do not put any pressure on the wrist seals with your fingernails.

4. Adjust the wrist seal so that it lies flat against your wrist. There must be no dry suit underwear trapped underneath the wrist seal that could create a channel for water to enter your suit. The seal must be neat and even all the way around your wrist.

   NOTE: If you have prominent tendons on the inside of your wrist that form a groove when you use your hand, this can create a channel for water to enter your dry suit. In this case be sure to pull your wrist seals as far up your forearm as possible to help prevent water leakage.

5. Repeat the procedure for putting on your left sleeve and wrist seal.



6. Insert your head through the neck seal. NOTE: If you have long hair you will find it easier to put on your neck seal by covering the head first with a nylon stocking. This makes it easy for the latex to slide over your head.

   Grab the neck seal by putting both hands through the top opening and spread the neck seal by pulling against the palms of your hands. Keep your thumbs on the outside of the seal.

! CAUTION !

Do not dig your fingernails into the neck seal. Do not put any pressure on the neck seal with your fingernails.

Spread the neck seal and turn your head slightly to the side. Pull the neck seal over your head as you hold it spread open. Pull down on the seal and push up with your head.



7. Once the neck seal is over your head, adjust it so it lies flat all the way around your neck. The edge of the seal should be turned up and should sit between one and two inches above your collar bone.

! CAUTION !

There must be nothing trapped under the edge of the wrist seals or neck seal or your dry suit will leak.

8. Have your buddy close your zipper fully. Do not attempt to close the zipper by yourself.

   Hold your arms up at shoulder level and out in front of you in an arc. Have your buddy place one finger in the zipper tab and pull the zipper with a steady, even pull.



! CAUTION !

There must be no foreign matter caught in the zipper. Anything caught in the zipper, such as hair or dry suit underwear, will cause it to leak and could cause it to break.

9. You can visually check the end of the zipper yourself by looking back over your shoulder. The zipper slide must be hard up against the stop. If it is open the slightest bit, the zipper will leak and you will get wet.

10. Have your buddy close the zip flap by laying it down flat and line up the hook and loop closures.



8.2.2 Front entry "self don" style

1. Follow instructions 1-7 in *8.2.1 Rear entry style*.

2. Close the zipper fully while supporting the upper material.

   Grasp the puller on the zipper at the left shoulder with the right hand, and pull the zipper downwards to the fully closed position, hard up against the rubber end stop. It may be necessary to use the left hand to support the zip to provide resistance against the right hand pulling the suit down with the zip.



3. Close the zip flap. Lay it down flat and line up the hook and loop closures.



4. Connect the crotch strap and tuck excess body material as flat as possible underneath the waistband.



8.3 Putting on your dry suit - final preparations

8.3.1 Venting the dry suit before diving

When the zipper is closed there will normally be excess air trapped inside the dry suit. This excess air can make it awkward to walk while topside. To vent this air out of your suit, squat down and fold your arms across your chest. Push down on the top of the exhaust valve to manually vent the suit. You should hear and feel the air escaping from the valve. This action also provides a test of the exhaust valve.

!! WARNING !!

A buoyancy compensator is considered essential for dry suit diving. The buoyancy compensator is used for surface flotation and as a back-up buoyancy system. Do not use your dry suit unless you are wearing a buoyancy compensator. You must be certain that your BC does not interfere with the operation of your dry suit valves before you perform any open water dive.

8.3.2 Connecting and disconnecting the dry suit inflator hose

The low pressure inflator hose for your dry suit should be routed under your left arm to the inflator valve for your dry suit.

To connect the low pressure inflator hose, grip the hose just behind the fitting and pull back on the collar. The quick-disconnect fitting is spring loaded and should slide back easily. Hold the sleeve on the fitting back and slide the female end of the hose over the male end of the inflator valve. Push the sleeve toward the valve until it locks in position.

Test the inflator valve for proper function by pushing in on the inflator button. Air should flow through it easily.

To disconnect the hose, grab the end of the hose behind the fitting and push it toward the inflator valve.

As you hold the hose in this position, pull back on the locking outer sleeve. The hose should disconnect from the dry suit easily.

You can connect or disconnect the inflator hose whether the air in your tank is on or off. A small check valve inside the inflator hose will prevent air from leaking out of it when the hose is not connected to your suit.

!! WARNING !!

Make sure that your dry suit inflator hose easily reaches the inflator valve on your suit. There must be no bends or sharp kinks in the hose.

9. Diving with your dry suit

!! WARNING !!

This dry suit owner's manual is not a substitute for dry suit instruction from a qualified instructor. Do not use your dry suit until you have practised and mastered practical dry suit diving skills in a controlled situation. Your practice must take place under the supervision of a certified diving instructor who is skilled in the use of dry suits.

Diving with a dry suit is a skill that you can only learn through proper practice under controlled conditions. It takes time to adapt to using a dry suit in open water.

9.1 Entering the water while wearing a dry suit

!! WARNING !!

Never jump in the water while wearing your dry suit unless you have vented all the excess air from the suit first.

Be sure to exhaust all the excess air in your dry suit before you enter the water. Be sure to partially inflate your buoyancy compensator before entering the water.

9.2 Conducting a buoyancy check

Your weighting should be checked by a qualified dry suit diving instructor. You should not dive with your dry suit until you have adjusted your weights to ensure that you will be able to complete a precautionary decompression stop at a depth of 15 feet (4.5 metres) with 500 psi (30 bar) or less of air in your tank. When properly weighted, you should be able to complete this stop while wearing no additional weight and with no air in your buoyancy compensator or dry suit.

! CAUTION !

Your weight requirements will change from diving in fresh water to salt water and with changes in your diving equipment.

! CAUTION !

Your weight requirements will change with changes in the amount of dry suit underwear worn under your dry suit.

In order to check your weighting, you will need to enter the water in a controlled environment, such as a swimming pool, fully equipped with the gear that you will use for open water diving. The tank must be full.

To start your check, begin by venting all the air from you buoyancy compensator. Next, vent all the air from your dry suit. To do this, hang vertically in the water in a head up position and open the exhaust valve on your suit completely by turning the head of the valve counterclockwise until it stops. Lift your left elbow until it is at shoulder height, keeping your hand below the level of your elbow. The air in the lower part of your suit will be forced out through the exhaust valve by the water pressure.

If you are neutrally buoyant, with your lungs full of air, you should float at eye level. After exhaling as much air as possible, you should begin to sink, but very slowly. Both conditions must be met for you to be considered neutrally buoyant.

As you dive and use up the air in your tank, you will become more buoyant. This is due to a decrease in the amount and weight of the air in your tank. To complete a precautionary decompression stop you must add enough weight to your belt at the beginning of the dive to compensate for the weight of the air used during your dive. After you have achieved neutral buoyancy during test, add whatever additional weight is required to compensate for the weight of air to be consumed.

NOTE: Air weighs approximately 1.5 pounds (0.7 kg) per 20 cubic feet (566 litres). Therefore the amount of weight you should add after achieving neutral buoyancy will depend on how much air you will consume and can be estimated from the table below.

Tank capacity	**50**	**70**	**80**	**90**	**100**	**cu. ft.**
	1416	**1982**	**2265**	**2549**	**2832**	**litres**
Estimated additional weight needed	**4**	**5**	**6**	**7**	**8**	**lbs**
	1.8	**2.2**	**2.7**	**3.1**	**3.6**	**kg**

Prior to adding this additional weight, be sure to put enough air in your buoyancy compensator to make you positively buoyant on the surface.

! CAUTION !

Different tank volumes will require you to use different amounts of weight to compensate for the change in buoyancy from a full to empty tank.

When you are in the water in a vertical position with your head up, you will notice there is more pressure on your legs than your chest. This is a normal experience any time you are in the water with your head above your feet. This is known as underpressure.

When you are properly weighted and neutrally buoyant underwater, you should feel as though your dry suit is hugging your body gently but firmly all over. This sensation is markedly different than what it feels like when you are wearing a wetsuit. You won't notice this after a few dives and it is always less noticeable when your body is completely horizontal.

9.3 At the start of your dive

To start your dive, first vent all the air from your buoyancy compensator. Make sure the exhaust valve on your suit is completely open. To open the valve, turn the top portion counterclockwise until it stops rotating.

Lift your elbow until it is at your shoulder level but drop your hand below the height of your elbow. When you are underwater you will usually not be able to see the exhaust valve on your suit, but you should be able to hear the air escaping from it and feel the vibration caused by the air as it vents through the valve. Be sure that your buoyancy compensator is also completely empty of all air.

9.4 Making your descent

As you drop past 10 feet (3 metres), you will find that you start to descend faster. Leave the exhaust valve on your suit completely open; do not close it. Add air to your dry suit in short bursts to control your descent, push the inflator button for not more than a second or two at a time.

By introducing air into your suit with short bursts, you will control your buoyancy better and help prevent your inflator valve from freezing in cold water when water temperatures are below 45 °F (7 °C).

Add only enough air to your suit to prevent any uncomfortable squeeze. Adding too much air will cause your descent to stop.

To equalise the pressure in the boots of your dry suit, you must get air into the boots. This can only happen when you are lying parallel to the surface or in a slight feet-up posture.

!! WARNING !!

Never close your dry suit exhaust valve all the way while you are underwater. The valve has been designed to vent automatically whenever the valve is above the rest of your body. By closing the valve, you will trap more air in your suit, possibly leading to a loss of buoyancy control and a rapid ascent. Rapid ascents are extremely dangerous and can cause air embolism and/or decompression sickness, either of which can result in serious injury or death.

9.5 Surface swimming with your dry suit

!! WARNING !!

Do not use your dry suit for surface flotation. If you inflate your dry suit enough to give you positive buoyancy on the surface, this may put unwanted pressure on your neck. Increased neck pressure causes discomfort and can lead to blackout due to decreased blood flow to the brain. This can cause drowning.

Inflating your buoyancy compensator will allow you to swim comfortably on the surface without the need to inflate your dry suit.

Some divers prefer to close the exhaust valve on their dry suits while surface swimming to ensure buoyancy and prevent water leakage through the valve. Although you may close the valve completely while on the surface, be sure to open it completely before you dive again.

9.6 Buoyancy control

Proper buoyancy control is always essential in diving. Most divers find that with a bit of training, buoyancy control with a dry suit can be more precise than when using a wetsuit and buoyancy compensator.

9.6.1 Attaining neutral buoyancy at depth

When you reach your desired depth, add just enough air to your dry suit to make yourself neutrally buoyant. Skilled dry suit divers dive with the minimum volume of air in their dry suit. Proper weighting is a key element in the ability to dive with the minimum volume of air in your suit.

Underwater, use your dry suit to control your buoyancy. If you pick up items that have any significant weight during your dive, such as game or salvage items, use a lift bag to raise this additional weight to the surface. A small lift bag can be clipped to your goody bag if necessary. If the lift bag and goody bag become too buoyant, and you are unable to control it, just let it go to the surface by itself.

!! WARNING !!

If you must release an item you are raising to the surface, be aware that it may lose buoyancy if the lift bag breaks the surface. The lift bag may lose all buoyancy and the object may sink again. Watch carefully for the object as it sinks down through the water so that it does not hit you and causes injury.

Do not use your dry suit as a lifting device. If you try to use the buoyancy of your dry suit for lifting while you are wearing the suit, and you lose your grip on the object, you may become excessively buoyant. This may result in rapid ascent.

!! WARNING !!

Never use the buoyancy of your dry suit for lifting heavy objects underwater. If you lose your grip on the object you are lifting, you may experience a rapid ascent. Rapid ascents are dangerous.

As you breathe the air from your tank during the dive, you will gradually experience an increase in buoyancy. To decrease your buoyancy, vent air from your dry suit by rasing your left arm.

For most single tank recreational dives, you can achieve neutral buoyancy at depth with the exhaust valve on your suit completely open. A diver who is more heavily weighted may need to partially close the exhaust valve so the dry suit will retain enough air to maintain neutral buoyancy.

!! WARNING !!

Under normal conditions you should not inflate your buoyancy compensator underwater while using your dry suit. Controlling two separate air bladders, i.e. the BC and the dry suit, is extremely difficult. It is easy in this situation to lose control of your buoyancy and suffer a rapid ascent. Rapid ascent is dangerous and may cause air embolism or decompression sickness, both of which can result in serious injury or death.

The only circumstances under which you should consider inflating your buoyancy compensator underwater is if your dry suit is damaged and will not hold air.

While diving, you may find small amounts of water entering your suit through the wrist or neck seals. If you turn your head sharply to the side, the tendons in your neck may create channels for water to enter your suit. This can also be a problem if you have prominent tendons in your wrists. These situations are not uncommon, but can be avoided with experience.

9.6.2 Trim

In most situations in open water, when you are swimming underwater, you should be neither head up nor head down. When your body is horizontal underwater we call this “neutral trim”. When you have neutral trim and neutral buoyancy, you can move in any direction underwater with minimal effort. Some divers use ankle weights to help keep their legs down but this is not essential in most cases.

9.6.3 Ascending

At the end of your dive, be sure to check your dry suit exhaust valve before beginning your ascent. Make sure that the exhaust valve is completely open by turning the head of the valve counterclockwise until it stops.

Your ascent must be controlled and at the speed required by the dive computer or dive table you are using. As you start towards the surface, you will become positively buoyant because the air in your dry suit is expanding. To maintain control of your buoyancy, you need to vent air from the dry suit exhaust valve.

Your ascent should be slow enough that you can stop it at any time by merely exhaling.

!! WARNING !!

Your first few ascents in your dry suit should be made next to a weighted line that can be used to regain control of your ascent if needed.

Monitor your rate of ascent by watching your dive computer or timer and depth gauge. Always stay within the ascent rate limits of your dive computer or dive tables unless you are making an emergency ascent.

!! WARNING !!

Most dive tables and dive computers require ascent rates that are slower than 60 feet (18 metres) per minute.

To control your ascent, raise or lower your left elbow, which will raise or lower the exhaust valve on your suit.

If you are ascending too fast, raise your left arm higher to allow the exhaust valve to vent more air. If this action does not slow you adequately, push down on the top of the exhaust valve to activate the manual override.

If you are negatively buoyant and find it difficult to ascend, lower your left arm and add a bit of air to your dry suit to increase your buoyancy. Once you start to ascend, be ready to vent air through the exhaust valve to maintain control of your ascent.

Be prepared to stop your ascent at any moment. Control your rate of ascent so that you can make the recommended precautionary decompression stop at a depth of 10-15 feet (3-4.5 metres). Once you have reached the surface, partially inflate your buoyancy compensator before you swim back to the beach or the boat.

10. Emergency procedure skills

!! WARNING !!

The emergency procedure skills described in this manual should be practised in a controlled environment, such as a swimming pool, under the supervision of a qualified dry suit diving instructor. This manual is not considered a substitute for pool and open water training in the use of a dry suit. Knowing the procedures for a dry suit emergency is not enough. You must be able to perform the emergency procedure skills. Like any skills, you can only learn dry suit skills through instruction and practice.

You will want to master the following emergency skills (unless otherwise noted) before you use your dry suit in open water.

10.1 Recovering from an inverted position

If you are positively buoyant in you dry suit and turn upside down, you will find yourself drifting towards the surface feet first. It is essential that you regain control immediately since air cannot be vented from your dry suit when you are upside down.

In a situation where you are close to the bottom and find yourself upside down, use the following procedure to right yourself and regain control:

1) Swim hard towards the bottom.
2) Push off the bottom with your hands.
3) Roll your body to an upright position.
4) As soon as you are upright, vent your dry suit through the exhaust valve.

In mid-water, use a slightly different procedure:

1) Swim hard towards the bottom.
2) Bend forward at your waist.
3) Roll to an upright position.
4) Immediately vent your dry suit through the exhaust valve once you are upright.
   If you are unable to recover to an upright position and are in an uncontrolled ascent, flare your body to reduce the speed of your ascent. Spread your arms and legs out away from your body, and try to get your fins parallel to the surface of the water. Try to slow your ascent as much as possible by creating drag and keep exhaling.

!! WARNING !!

Flaring is a last ditch procedure to be used in an emergency only. Do not practise this procedure unless you are under the supervision of a qualified dry suit diving instructor. Rapid ascents are dangerous and can cause air embolism or decompression sickness. Either of these accidents can result in serious injury or death.

10.2 Inflator valve stuck open

If the inflator valve on your dry suit becomes stuck in the open position, immediately disconnect the low pressure inflator hose from the valve and simultaneously vent any excess air through the exhaust valve. Be sure to practise this skill when you are wearing gloves. You must be able to disconnect the hose quickly and easily.

If you can't remember which direction to turn the exhaust valve to open it (counterclockwise), you can still manually vent your suit through the valve. Lift your elbow until it is the highest point on your body and push down on the top of the valve. Air will vent from your dry suit.

In a situation where you are unable to vent enough air through the exhaust valve, you can also vent air by opening your wrist or neck seal to allow air to escape from your suit.
Of course, when you do this, water will enter your dry suit.

If you are still unable to vent sufficient air from your suit to slow your ascent, and you are experiencing an uncontrolled ascent, flare your body to reduce your speed through the water. Spread your arms and legs away from your body, move your fins parallel to the surface of the water, and slow your ascent by creating drag. Be sure to keep exhaling as you ascend.

! CAUTION !

If you continue to push down on the top of the exhaust valve after all the air is vented from your suit, water may enter your dry suit.

10.3 Inflator valve stuck closed

If the inflator valve is stuck in the closed position, terminate your dive at your first opportunity and do not descend any further. You may need to use your buoyancy control device to return to the surface. Be sure to vent any expanding air from your suit to control your ascent.

10.4 Water leaking through the exhaust valve

If the exhaust valve is allowing water to enter your suit, the dry suit will not hold air properly. Abort your dive immediately. Use your buoyancy control device as needed to help control your buoyancy and return to the surface immediately.

10.5 Exhaust valve stuck open

If the exhaust valve is stuck open, your dry suit will not hold air properly. Water will probably enter your dry suit through the open valve. If the exhaust valve is stuck open, end your dive immediately. Use your buoyancy control device as needed to return to the surface.

10.6 Exhaust valve stuck closed

If the exhaust valve sticks in the closed position, you will be unable to vent air properly from your dry suit. This may result in an uncontrolled ascent.

If the exhaust valve is stuck in the closed position, vent air from the dry suit by opening your neck or wrist seal(s). if you use this technique, water will enter the suit.

If sufficient air cannot be vented and you are experiencing an uncontrolled ascent, flare your body to reduce your speed through the water. Spread your arms and legs away from your body and position your fins parallel to the surface of the water. Slow your ascent by creating as much drag as possible. Be sure to keep exhaling as you ascend.

10.7 Slow air leak through the inflator valve

If you discover that your inflator valve is leaking air into your suit, disconnect the low pressure inflator hose and terminate your dive immediately. Ascend, venting air through the exhaust valve as you normally would.

10.8 Flooded dry suit

In the event of a zipper failure, a major tear in the suit, or a seal failure, your dry suit may flood. If your dry suit is flooded, use the following procedures:

1) Inflate your buoyancy compensator to establish positive buoyancy.
2) Position the leak as low as possible to minimise air loss.
3) Perform a controlled ascent.
4) Exit the water immediately after surfacing.

! CAUTION !

Practise the emergency skills listed in this chapter under the direct supervision of a qualified dry suit diving instructor. If you practise in a swimming pool, be sure to adjust your insulation for the water temperature.

If you are unable to establish positive buoyancy by using your dry suit or inflation of your buoyancy compensator, at that point you should drop your weight belt. Keep in mind that dry suits rarely flood, although a small amount of water may seem like a catastrophic failure. Make every effort to ascend using your buoyancy compensator before dropping your weight belt.

If your suit feels flooded, but in fact is not, inflating your buoyancy compensator and ditching your weight belt could result in extreme positive buoyancy. Depending on the volume of your buoyancy compensator, and the amount of weight you wear, you could be as much as 100 pounds (45 kg) positively buoyant. This much buoyancy would be nearly impossible to control and would result in an extremely rapid uncontrolled ascent.

!!! DANGER !!!

Ditching your weight belt after inflating your buoyancy compensator can result in serious injury or death due to rapid ascent. Do not ditch your belt unless you have already inflated your buoyancy compensator and are still unable to ascend and death is imminent.

10.9 Dealing with a dropped or lost weight belt

! CAUTION !

Read and study the emergency procedures for a dropped or lost weight belt until you understand them. Do not practise these skills except under the direct supervision of a qualified diving instructor.

If you drop or otherwise lose your weight belt:

1) Attempt to recover the weight belt. If you are unable to grab the belt...
2) Grab hold of any other stationary object – the anchor line or a rock – and vent your suit.
3) If you are still unable to control your ascent, get into a flared body position.
4) Remember to continue to exhale as you ascend.

11. Between dives

When the weather is warm, you will probably want to unzip your suit while you are out of the water between dives. If you are still too warm, you may need to remove the upper part of the suit or remove it and your dry suit underwear completely.

12. Removing your dry suit

12.1 Rear entry style

Before removing your dry suit:

1. Remove all other scuba equipment.

2. If the outside of your dry suit got dirt or sand on it after the dive, wash this material off. Pay extra attention to the zipper. Wash it thoroughly before opening the suit if it is coated with sand or dirt.

3. Have your buddy unzip your suit completely before attempting to remove it.

! CAUTION !

The zipper on your dry suit must be completely open before you attempt to remove your dry suit. Failure to fully open the zipper can lead to damage or failure of the zipper.

Remove the neck seal:

4. Make sure your suit is pulled up as high on your body as possible. Reach through the neck seal opening with both hands. Spread the neck seal by pulling against the palms of your hands.

! CAUTION !

Do not dig your fingernails into the neck seal. Do not put any pressure on the neck seal with your fingernails.

5. While you pull the neck seal, use your arms to lift as you tuck your head to your chest. Gently pull the seal over your head.

NOTE: Smaller divers sometimes need assistance in removing their neck seals. If you need help, have your buddy place one hand on your shoulder to brace you and with the other hand grab the suit at the opening for the zipper. They should then pull the suit towards them as you lift at the same time. Make sure they understand that they must not put undue stress on the dry suit zipper.

Remove the wrist seals:

6. Insert the index and middle fingers of your left hand under the right wrist seal on your suit. Slide your fingers along the inside of your wrist, keeping your fingernails against the inside of your wrist and away from the seal.

7. When your fingers are past the wrist seal, grab the sleeve of the suit between your fingers and thumb and pull the seal over your wrist. Pull your arm out of the suit.

8. Repeat this operation for your opposite wrist seal using your right hand.

9. Slide the suspenders off your shoulders and fold the suit down to your waist.

10. Sit down to remove the legs of the suit.

12.2 Front entry “self don” style

1. First undo the external crotch strap. Pull excess body material up as high as possible.

2. Unzip your suit using left hand initially, while holding the suit material with right hand. When the zipper is approximately half way up, switch to undoing with right hand, until the zipper is fully open.

3. Follow instructions 4-10 in *12.1 Rear entry style*.

13. Troubleshooting your dry suit

There are many different ways that a dry suit can leak if it is improperly maintained or used carelessly. The table below helps you to find possible source and solutions to the leaks:

Problem	Possible reason/defect	Solution
Zipper leaks	Zipper not fully closed	Close the zipper fully. If rear entry suit, have your buddy close it.
	Damage or failure of zipper, possibly due to failure to open fully when dressing or undressing	Do not dive. Have zipper replaced by your nearest VIKING™ dealer.
	Sand, dirt or salt caught in the zipper when opened or closed	Wash the zipper with water before attempting to close it again.
	Improper or inadequate lubrication of zipper	Lubricate the outside teeth with zip lub, beeswax or paraffin wax.
	Underwear caught in zipper when closed	Undo zipper and remove the offending material. Close zipper again and check for damage.
	Failure due to overstress	Have zipper replaced by a VIKING™ dealer.
	Failure due to age or heavy use	Have zipper replaced by a VIKING™ dealer.
Seal leaks	Dry suit underwear caught under the edge of seal	Push back/remove material.
	Hair caught under seal	Try to push back/remove the hair from the seal. If you have long hair, you may cover your head with a nylon stocking before dressing to overcome the problem.
	Wrinkles or folds in seal	Adjust the wrist seal so that it lies flat against your wrist. Adjust the neck seal so that it lies flat against your neck.
	Improper adjustment of wrist seals in relation to tendons	Pull the seals as far up your forearm as possible to help prevent water leakage.
	Age of seal leading to cracks or tears	Have the seal replaced.
	Overtrimming	Have the seal replaced.

Problem	Possible reason/defect	Solution
Valve leaks	Dirt, sand or debris caught in valve	Remove valve and rinse thoroughly with cold water. check operation before diving.
	Improper adjustment of exhaust valve	Refer to 8.3.1 , 9.2, 9.3, 9.4, 9.6.1, 9.6.3.
	Exhaust valve stuck open	Refer to 10.5.
	Minor leaks when valve is closed	Refer to 10.7 if inflator valve. If exhaust valve, abort dive as soon as possible.
	Valve not properly fastened on suit	This should be checked before commencing a dive. Tighten valve by hand without damaging valve.
	Valve parts worn through heavy use or age	Have the parts, or the valve, replaced.
Leaks in suit fabric	Failure of seams or chafing	Take suit to your nearest VIKING™ dealer for inspection.
	Tears, punctures or splitting of material, possibly due to cuts from sharp objects.	Perform a pressure test and repair the damage (see chapter 15) or seek advice from a VIKING™ dealer.
	Delamination of material with age, use or exposure to chemicals.	Scrap the suit and have it replaced.

14. Maintenance of your dry suit

14.1 Cleaning

With proper maintenance, your VIKING™ dry suit will give you many years of diving.

When you finish diving for the day, rinse the outside of your suit thoroughly with fresh, clean water. Be sure to remove any dirt, sand or salt that may have dried on the suit.

Pay particular attention to the zipper and the valves. Rinse both the exhaust valve and the inflator valve with running water. The preferred method to rinse the inflator valve is to connect it to an air supply and operate the valve while flushing it with fresh water. The air pressure will help keep sand and debris from entering the valve seals.

!! WARNING !!

Dry suit valves must be carefully cleaned after every use with the same attention that should be used for a regulator. Inflator valves may stick open or shut due to lint, dirt or hair in the valve.

If the inside of your dry suit has become wet, either because the suit leaked or you perspired inside the suit, rinse the inside also. Feel all the way down into the boots to be sure the suit is completely dry. If there is dampness only in the boots, this is probably due to sweat and should be rinsed out.

Use a mild solution of soap and water to wash the latex seals on your dry suit after every dozen or so dives. Body oils from your skin will shorten the life of your latex seals.

After you have rinsed the suit, open the zipper and hang the suit by the boots over a line or drying rack in a shady spot.

! CAUTION !

Never leave your dry suit in the sun.

When the dry suit is completely dry on the outside, feel inside the suit all the way down to the bottom of the boots. Any moisture inside the suit must be dry before the suit can be stored. Turn the suit inside out if needed so it will dry, too.

After your suit has dried completely and has been turned right side out, apply talcum powder to both sides of the latex seals. Close the zipper and lubricate the outside teeth with zip lub, beeswax or paraffin wax.

14.2 Zipper care

The dry suit zipper seals using the inside teeth and rubber sealing surfaces. As you might expect, this sealing surface requires some special care and attention. How long your zipper lasts and how well it works will depend on how good you are at taking care of your zipper. The majority of zipper problems are caused by either a lack of maintenance or improper maintenance. To get the most life out of your dry suit zipper we recommend the following procedures:

1) Before diving, close the zipper and lubricate it with zip lube, beeswax or paraffin wax on the outside teeth only.
2) Prior to each dive, make sure the inside teeth and sealing surfaces on your zipper are clean. If they are dirty, clean them with a toothbrush and soapy water.
3) If the zipper is covered with sand or dirt after diving, clean it with a toothbrush and fresh water before you try to open the zipper.
4) Whenever your buddy opens or closes your zipper, they must take care to avoid catching underwear material in the zipper as this will damage it in most cases and will prevent the zipper from sealing properly if undetected.
5) Clean the zipper at least every 90 days with an old toothbrush and a dilute solution of soapy water.
6) Always store your dry suit rolled up with the zipper open. This will reduce the stress on the zipper.
7) Inspect the zipper for teeth that are broken, missing or out of alignment. These conditions indicate zipper damage and must be inspected by a VIKING™ dealer before you use the suit again.

!! WARNING !!

The zipper is an expensive component, and must be regularly inspected and maintained. Care instructions are provided, and should be followed.

! CAUTION !

Never use any aerosol lubricants, such as silicone spray, on your zipper. Never lubricate the inside teeth of your zipper because wax and dirt will accumulate on the teeth. Any foreign matter that sticks on this sealing surface will prevent the zipper from sealing properly.

14.3 Valve maintenance and handling

14.3.1 Maintenance

Both inlet and exhaust valves should be checked/serviced annually by an authorised VIKING™ dealer.

Inlet valve

- Avoid exposing the quick connector socket on both valve and hose to water and sand. Use the protective cap when the hose is not attached.
- Rinse the dry suit and inlet valve with fresh water after every dive. After rinsing, attach the hose and purge air through the valve until clean and dry. If the action of the inflate button becomes stiff, spray a suitable silicone based spray into the quick connect socket and work the push/slide button.

Exhaust valve

- After each dive, especially if water contains debris and sand, flush the exhaust valve thoroughly with fresh water while turning the cover/lid back and forth. Make sure the valve is empty from water when diving in cold conditions.
- The exhaust valve is equipped with a filter that prevents lint from your undergarments getting stuck in the check valve, which could cause the valve to leak. Flush the filter through the attachment nut (see pictures below).





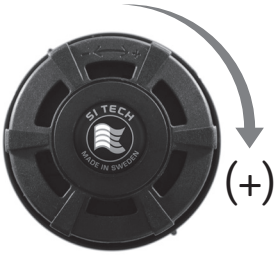
Before each dive, check that the ratchet action of the lid is detectable. Old models of valves might be without ratchet action.

14.3.2 Mounting

These instructions ensure a safe and tight fitting according to standard requirement.

1) Prior to detachment from the suit and prior to re-attachment into the suit valve port, make sure that the exhaust valve cover is adjusted clockwise to full stop (+).

1



! CAUTION !

Do not hold the cover on the exhaust valve when mounting or tightening the valve!



Incorrect

! CAUTION !

Make sure not to mix up the exhaust and inlet and inlet attachment nuts when refitting the valves. Note that the exhaust valve attachment nut has a filter.

NOTE: If the valve is impossible to detach, although using the appropriate tools correctly, contact your dealer.

2) Hold the protection ring in a firm grip.

2



3) Turn the attachment nut on the inside of the drysuit by hand until you feel its firmly tightened.

3



4) The anti-friction washer should always be used, positioned between the suit and the nut.

4



5) Use the attachment tools when applying torque. Make sure that the valve is settled correctly into the guide ridge of the valve port.

14.3.3 Usage of attachment tools



Exhaust valve



Inlet valve

1) Match the notches on the tools to the barbs on the valves.

1





Incorrect



Correct

! CAUTION !

DO NOT OVER TIGHTEN THE VALVE!
This might cause damage to the dry suit and/or the valve. Please use the attachment tools. If you have any doubts, please contact a qualified technician.

14.4 Folding and storing your dry suit

1. Be sure the zipper is open.
2. Lay the suit out on its back on the floor.
3. Turn the feet of the suit in towards each other and roll the suit from the boots up.
4. Place the suit in its bag and store in a cool, dry place, away from devices that produce ozone, such as electric motors, heaters, etc.

! CAUTION !

Ozone will shorten the life of latex seals.

! CAUTION !

Extreme cold will cause latex seals to become brittle.

15. Repairing a dry suit

15.1 General rules for repairs

Wherever possible, dry suit repairs should be undertaken by a qualified dry suit repair service. If the dry suit owner undertakes any repairs, the following procedures should be followed to ensure that proper techniques are employed.

Do not inhale glue or hardener. See warnings in this manual and on glue container.

15.1.1 Adhesives

Use only glue recommended by Ansell. Other types of glue may damage the suit material.

Due to health and safety and transport limitations, Ansell is not able to supply adhesives particularly with accelerators. It may be neccessary to source similar adhesives locally.

Adhesives are changing all the time, so please check with customer services which adhesives are applicable to suit materials such as nylon, cordura and polyester.

Adhesives such as Bostik 2402, Tivofix 8000 or similar 2-part adhesives work well for attaching seals etc. to trilaminate materials.

Rubber/vulcanisation solution may be applied inside most trilaminate suit materials.

Please consult the following chart which lists adhesives and solvents for after market repairs. This is by no means an exhaustive reference, but does include adhesives which are known to be effective.

SUIT STYLE	**AFTERMARKET REPAIRS**		
VTS, VSN, WRS-D	**SOLVENT/CLEANER**	**ADHESIVE**	**HARDENER**
Latex components	Ethylacetate + Trichloroisocyanuric Acid	Evostik 8000	Bostik Acc F
Neoprene components	Ethylacetate + Trichloroisocyanuric Acid	Evostik 8000	Bostik Acc F
Rubber rings	Ethylacetate + Trichloroisocyanuric Acid	Evostik 8000	Bostik Acc F
Bayonet rings	Ethylacetate + Trichloroisocyanuric Acid	Evostik 8000	Bostik Acc F
Zipper	Ethylacetate + Trichloroisocyanuric Acid	Evostik 8000	Bostik Acc F
Pockets	Ethylacetate + Trichloroisocyanuric Acid	Evostik 8000	Bostik Acc F

15.1.2 Patching

Trilaminate suits should be patched on the inside surface. Use Black Witch adhesive with rubber patches.

Rubber patches will work on some trilaminate materials, such as polyester and VSN.

15.1.3 Gluing preparations

- Ensure the damaged area is dry. Clean the surface to be glued.
- Remove remains of old loose glue, oil and grease.
- Thoroughly sand down all new dry suit parts where they will be glued.

15.1.4 Gluing

- Apply a thin layer of glue on both surfaces to be glued. Let dry for 15 minutes.
- Apply a second layer of glue and let dry a minimum of 15 minutes or until tacky.

15.1.5 Neutralising

- Neutralise excessive glue by applying unscented talcum powder.

15.1.6 Curing

- Curing time will vary with room temperature. At 20 °C (68 °F) a minimum of 60 minutes is required, but the repair area should not be stressed for 3 hours and will be fully cured in 24 hours.
- If possible, avoid using the suit for 24 hours after a major repair.

!! WARNING !!

The glue and hardener may be harmful to your health by inhalation or skin contact or contact with your eyes. Read warning note below and follow the instructions on the kit.

!! WARNING !!



Hardener — Harmful
Contains Diphenylmethane - 4,4 - Diisocyanate and Ethylacetate.
Contains Isocyanates; See information supplied by the Manufacturer.
Harmful by inhalation. Irritating to eyes, respiratory system and skin.
May cause burning sensation by inhalation. In case of contact with
eyes rinse immediately with plenty of water end seek medical advice.
In case of accident or if you feel unwell, seek medical advice mmediately.
(Show label where possible.) Use only in well ventilated conditions.



Glue — Harmful — Highly flammable
Harmful by inhalation.
Contains Toluene and Butanone. Irritating to eyes and respiratory system.
Keep container in a well ventilated place. Keep away from sources of
ignition – No smoking. Do not breathe fumes. Avoid contact with eyes.
Do not empty into drains.
Take precautionary measures static discharges.

15.1.7 Tools for repairs

Ansell has wooden tools available, which are handy equipment for major repairs of latex parts:
- Cylinder with spherical top, for exchange of latex hoods and neckseals.
- Topped cone, for exchange of latex cuffs.

Contact Customer Service for more details and pricing.

15.2 Pressure test

To determine the position of a leak/damaged area of the suit, carry out a pressure test as follows:

1. Seal openings
Seal neck opening, by for example placing a suitable-sized ball in the neck seal. Make sure the seal stretches and grips the ball.

Seal cuffs, by for example placing an empty plastic bottle in each of the cuffs making sure the latex grips the bottles.

2. Inflate and find leaks
Inflate the suit and locate the leak by using soapy water or by partial submergence of the suit in water. Mark the leak with a chalk before deflating the suit.

! CAUTION !

Risk of damage to the suit material due to over inflating. Do not over inflate the suit.

3. Verify repairs
After repairs, allow 3 hours for curing, and then carry out another pressure test to ascertain the integrity of the suit. Most adhesives do not reach full cure until approximately 24 hours from application.

15.3 Patching - procedure

1. Locate the leak
Carry out a pressure test as described in chapter 15.2.

2. Cleaning/Sanding
The suit must be dry. Wash hands; oil and grease must be removed. Clean damaged area by rubbing with sand paper and remove loose particles.

3. Patching
Trilaminate suits should be patched on the inside surface. Choose a suitable sized patch and remove the backing. Apply two layers of Black Witch adhesive on the patch and on the inside of the suit, allowing 15 minutes drying time per layer. Apply the patch to cover the damaged area.

4. Fixing the patch
Use a roller over the glued area to press out any air bubbles and to make sure the surfaces are firmly bonded. Pay special attention to the areas where the glued parts cross over tape.

5. Talcum powder
Neutralise excessive solution with unscented talcum powder.

The mix of talcum powder and rubber may aggregate the risk of latex allergic reactions. By using unscented talcum powder for neutralising, this risk is reduced.

6. Verify repairs
After repairs, allow 3 hours for curing, then carry out a pressure test to ascertain the integrity of the suit, as described in chapter 15.2.

15.4 Exchange of latex cuffs

Wherever possible, dry suit repairs should be undertaken by a qualified dry suit repair service. If the dry suit owner undertakes any repairs, the following procedures should be followed to ensure that proper techniques are employed.

15.4.1 Gluing preparations

1. On suits with tape around the latex cuffs, remove the tape by using heptane or white gas.

!! WARNING !!

Risk of eye injury from contact with solvent. Wear proper eye covers to protect your eyes.

2. Remove the cuff by pulling the latex until the old glue releases.

3. Sand the new latex 20 mm (3/4") on the inside, and when using tape, 12 mm (1/2") on the outside as well.

4. Also sand the suit sleeve 25 mm (1").

5. Clean all surfaces to be glued with heptane or white gas.

15.4.2 Gluing

1. Apply two layers of glue with 15 minutes drying time for each layer, both on the inside of the new latex cuff and on the outside of the sleeve.

   Trilaminate materials may require more layers of glue as it sinks into the surface.

2. Use a bottle or a round piece of wood inside the sleeve as a form to ease the installation of the new latex cuffs.

3. Apply the new latex cuff. Avoid streching the latex cuff. Attach by using two opposite points and work your way around one side at a time. (Pull it loose and begin again if it becomes uneven). There must be no folds or creases, the latex should lie smoothly along the cuff.

4. When the latex is properly attached, secure it by pressing firmly with a roller or another appropriate tool.

If using tape:
Apply two layers of glue to the area it will cover, on the outside.
Trilaminate materials may require more layers of glue as it sinks into the surface.

Apply rubber tape half on suit and half on latex cuff to cover the joint between latex and suit material. Smooth with a roller. Overlap tape.

5. Neutralise excessive glue with unscented talcum powder, especially on the inside of the latex part.

   The mix of talcum powder and rubber may aggregate the risk of latex allergic reactions. By using unscented talcum powder for neutralising, this risk is reduced.

6. After repairs, allow 3 hours for curing, then carry out a pressure test to ascertain the integrity of the suit, as described in chapter 15.2.

15.5 Service

Let an authorised VIKING™ dealer service your dry suit, valves, inflator hose, zipper and seals on regular basis and for more complicated repairs. At least one service per year must be undertaken, but more frequently if the suit is in heavy or extraordinary use.

! CAUTION !

Risk of severe damage to the dry suit or its equipment leading to malfunction, if the suit is not properly serviced. Service must be undertaken, even if the suit is not in regular use.

16. Disposal

All suits that are damaged beyond repair and cannot be made to pass all inspections and checks described above, must be taken out of service and disposed of.

The proper method of disposal will depend on local regulations. In general the suit should be treated as rubber waste and as such the proper method of disposal is normally incineration or landfill.

For suits that are contaminated, local regulations for the contaminants in question must be taken into account.

17. Technical information

17.1 Suit material and seams

Suit	Material	Seams	Colour
VIKING™ VTS	Cordura/Butyl/Polyester	**External**: Stitched **Internal**: Vulcanised	Black
	Nylon/Butyl/Nylon		
	Polyester/Butyl/Polyester		
VIKING™ VSN	Armatex nylon/Rubber/Armatex nylon	**External**: Stitched with elastic tape **Internal**: Vulcanised	Black
VIKING™ WRS-D	Nylon/Butyl/Nylon	**External**: Stitched **Internal**: Vulcanised	Black/yellow

17.2 Sizes

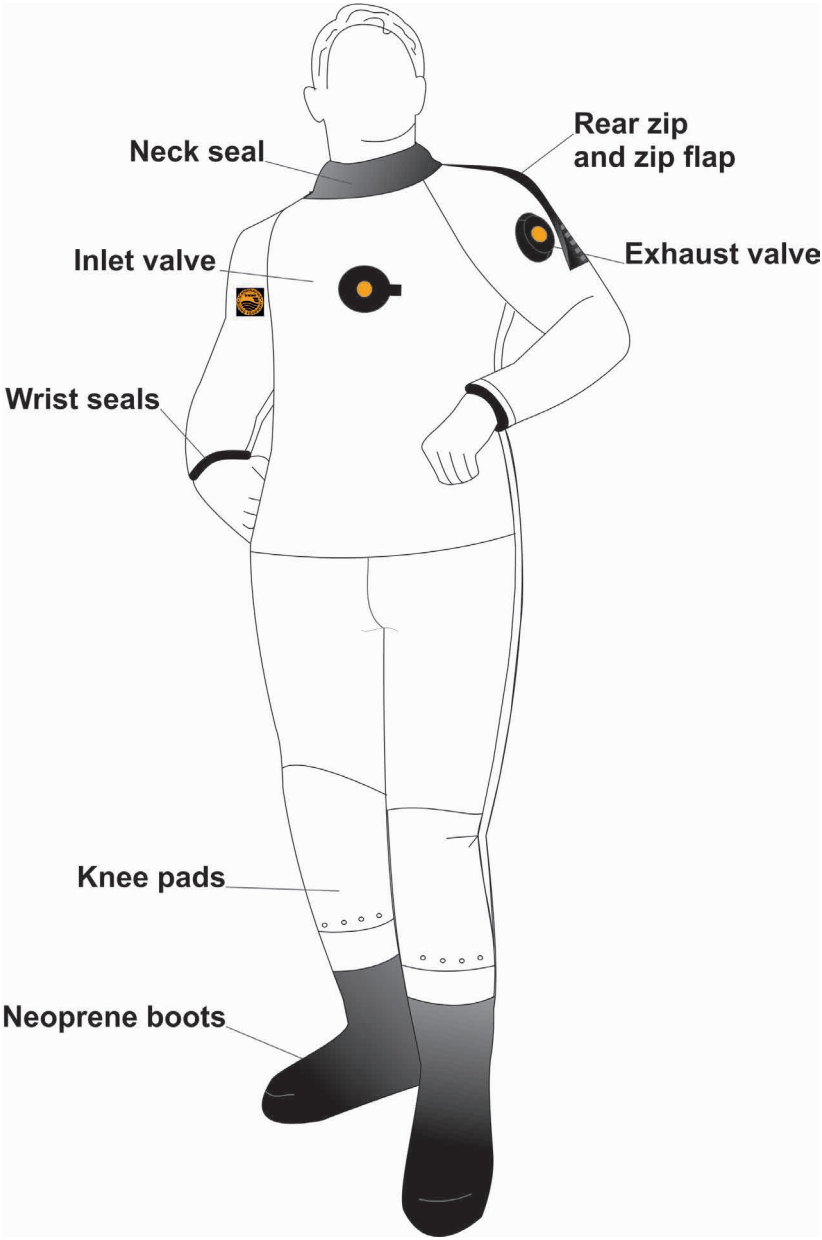
VIKING™ VTS, VSN and WRS-D are available in the following size range:

- Regular 00/SML-04/XXL
- Wide 00/SML-04/XXL
- Double Wide 00/SML-04/XXL

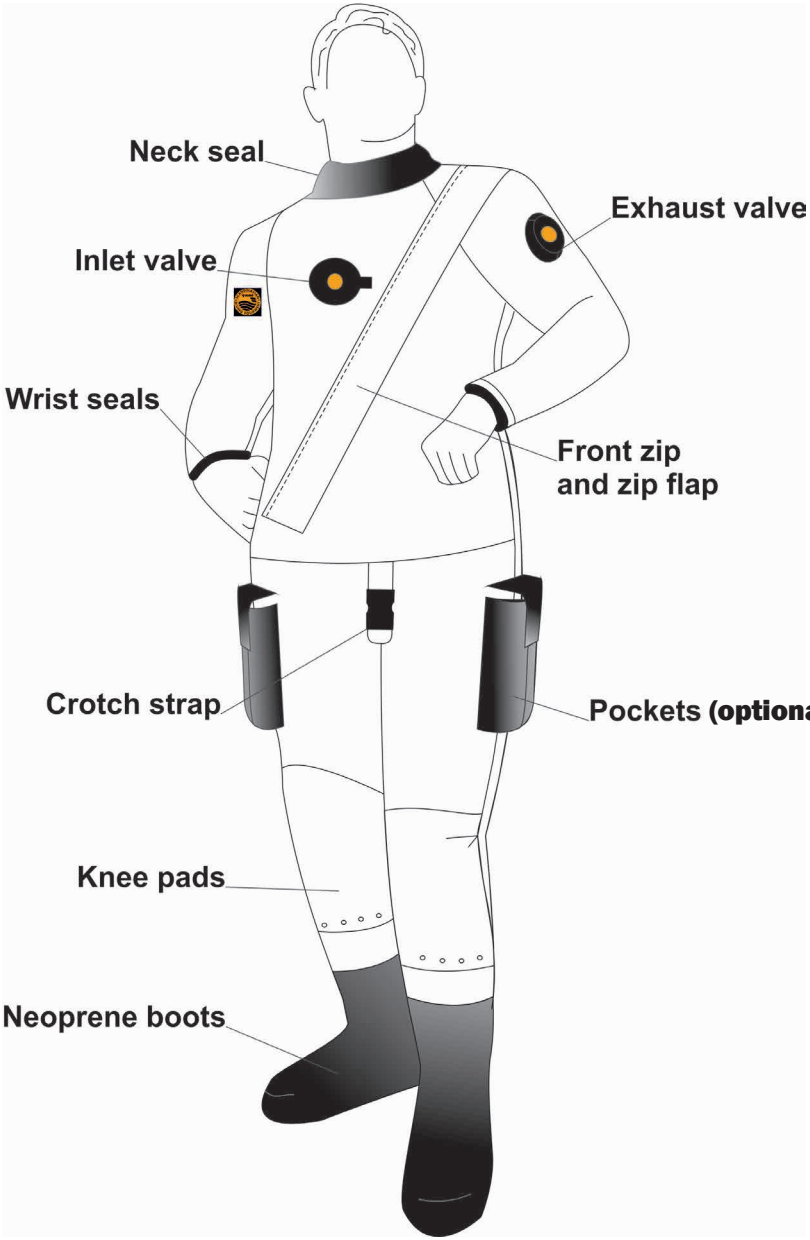
See http://protective.ansell.com for details including a measuring guide.

17.3 Components

17.3.1 VIKING™ VTS and VSN Rear Entry



17.3.2 VIKING™ VTS, VSN and WRS-D Front Entry



17.4 Dry suit components explained

16.4.1 Neck and wrist seals

The neck and wrist seals are fitted to the suit to provide a watertight seal. Latex seals are most commonly used, but neoprene seals may be fitted on request. Latex seals are adjustable for fit and comfort, whilst neoprene wrist and neck seals generally come in a range of sizes.

17.4.2 Waterproof zipper

All trilaminate suits are fitted with a MED duty zipper as standard. HD zippers are an option. The zipper is an expensive component, and must be regularly inspected and maintained. Care instructions are provided, and should be followed.

17.4.3 Boots

VIKING™ VTS, VSN and WRS-D are fitted with rubber coated 5 mm neoprene boots as standard, to form a watertight closure for the feet. Safety boot and latex sock options are available on request.

17.4.4 Dry suit valves

Trilaminate suits are generally fitted with a low profile swivel inflation valve which is fitted to the chest of the suit, and a low profile adjustable exhaust valve usually fitted to the upper arm. An LP hose is also supplied.

The inlet valve is attached to your air supply by way of an LP hose with UNF 3/8" coupling, and allows you to put air into the suit to avoid getting squeezed as depth increases, or to add air on the surface to aid flotation.

The exhaust valve is used to remove unnecessary air from the suit either automatically or manually. See information about buoyancy in chapter 9.

17.4.5 Suspenders

Elastic, adjustable suspenders are supplied with all suits., and allow for the suit to be worn when on standby, with the top of the suit around the waist. They also ensure comfort for a range of sizes by adjusting the legs up or down. On front entry adjustable torso suits, the suspenders form part of the telescoping system.

17.4.6 Zip flap

A zip flap is fitted to all suits whether front or rear entry. This helps to prevent damage to the zipper.

17.4.7 Knee pads
Although all trilaminate membrane materials are inherently strong, a knee pad material is also applied to the knees to protect the suit material from damage.

17.4.8 Crotch strap (front entry design)
Front entry suits (except VIKING™ WRS-D) have additional material in the length of the torso to assist with donning. A crotch strap is fitted to the outside to allow for the excess material to be tucked away under the waistband.

17.5. Optional accessories

A full range of accessories is available to add to the comfort or practicality of using your VIKING™ dry suit. Below is a selection. For details, please refer to the VIKING™ price list and/or website http://protective.ansell.com.

17.5.1 VIKING™ Quick Neck System
A kit for connecting a latex neck seal to the dry suit. It makes the neck seal easily removed and replaced without the need for adhesives.

A plastic collar is glued onto the suit, and a latex neck seal is then attached to the collar with a plastic ring. A combined latex hood and neck seal may be added in the same way.

17.5.2 Hoods
Latex or neoprene hoods may be attached to the suit to help attain warmth and comfort.

!! WARNING !!

Latex hoods must always be used with a hood liner to avoid burst ear drum, and for warmth.

Separate neoprene semi dry hoods are also available. A warm neck collar may be fitted to provide additional thermal protection.

17.5.3 Gloves and glove systems
For a dry dive, you can choose the VIKING™ rubber ring system which can be permanently attached to the suit, and allows for easy removal and replacement of cuff seals without the need for adhesives. The second reason is to provide a rigid platform for mounting latex gloves, which are also easily replaceable.

A bayonet glove ring system is also available for easy donning of dry gloves. The wrist ring is fixed to the sleeve end, making the seal easily removable. The gloves are attached to a glove ring which can then be combined with the wrist ring.

17.5.4 Relief zip

A convenience or relief zip can be fitted to allow for a comfort break while on standby for a dive.

17.5.5 Pockets

Pockets made from the same material as the suit can be added to carry small items.

18. VIKING™ dry suit limited warranty

Ansell Protective Solutions AB (Ansell) warrants that your VIKING™ Dry Suit will be free of defects in material and workmanship for a period of one (1) year.

Ansell warrants that latex parts of the VIKING™ Dry Suit, such as hoods, neck seals and cuffs, will be free of defects in material and workmanship for thirty (30) days from date of purchase.

If any VIKING™ Dry Suit (or component) is found to be defective under normal use and care during an applicable warranty period, Ansell will repair, replace or refund the purchase price of the VIKING™ Dry Suit, free of charge, at the sole discretion of Ansell. This is the exclusive remedy provided by Ansell under this warranty. To obtain warranty service, either contact your local authorised dealer, visit http://protective.ansell.com or contact Ansell Customer Service on telephone number +46 (0)10 205 1800. If a repair is performed at no charge under this warranty, the date of purchase by the ultimate purchaser remains as the date for the start of the warranty. A new warranty period does not begin when service is performed.

The decision to repair, replace or refund the purchase price of the VIKING™ Dry Suit will be made after receipt of the Suit, satisfactory proof of purchase, documentation specifying the claimed defect, requested action and all relevant information. Suits without a copy of the purchase receipt will **not be covered under this warranty**.

VIKING™ Dry Suits must always be worn and cared for in accordance with the Ansell Use and Care instructions contained in the applicable Owner's Manual included with each VIKING™ Dry Suit. The above warranties are VOID if any VIKING™ Dry Suit has been subjected to misuse, abuse, unauthorised alterations, improper or incorrectly performed maintenance, fading from sunlight or unauthorised repair or service.

This is a limited warranty. The above warranties are the sole and exclusive warranties made by Ansell with respect to its VIKING™ Dry Suits. The warranty or product guarantee cannot be prolonged by anything stated in the Owner's Manual. Ansell makes no other warranties express, implied, or statutory; including without limitation any implied warranty of fitness for a particular purpose or merchantability.

In no event shall Ansell be liable for any punitive, exemplary, or consequential damages, anticipated or lost profits, incidental damages, loss of time, or other indirect losses or expenses that arise from any cause relating to its Dry Suits, regardless of the form of the action, whether in tort (including negligence), contract, strict liability or otherwise, and regardless of whether the company has been advised of the possibility of such consequential damages. Notwithstanding any contrary provision, in no event shall the total liability of Ansell (together with the liability of its officers, directors, employees, and agents) exceed the purchase price actually paid for the suit that gives rise to such liability. The foregoing disclaimers are subject to any applicable law that regulates product warranties.

To obtain warranty service, contact your local authorised dealer or call Customer Service at +46 (0)10 205 1800.

Appendix: Customer information to be provided at the point of sale

In accordance with EN 14225-2 we provide the following information which is intended to be made available at the point of sale.

Risks, conditions and limitations of use
Please see the information in following sections:
- WARNING! on page 7 of this manual.
- Pre-dive check list on page 6 of this manual.
- Warning on allergic reactions on page 6 of this manual.

Size designations
For sizes, see the marking in the suit which is explained on page 5 of this manual. Charts of available sizes are available at http://protective.ansell.com. See also *Selecting and fitting a dry suit* on page 11 in this manual.

Compatibility
Dry suits with latex neck seal and cuffs may be combined with a hood and gloves of your choice. Fixed gloves and hoods must be VIKING™ brand.

The inflator hose is manufactured with UNF 3/8" coupling and is compatible with all major diving breathing apparatuses.

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