

Care and Maintenance

# WETSUITS, DRYSUITS and WOOLY JUMPERS

by Keith Cardwell



In Winter, when we were kids, Mum always wrapped us up in plenty of warm, waterproof clothing to keep away the threat of chilled extremities and/or cold, soggy bits.



Various types of light wetsuits on a warm day! Notice the pink flare on the lady and the dull black on the blokes!

I liked jumping into puddles even then so her efforts were sometimes wasted and I often turned up at school with teeth chattering and little feeling left in my blue fingers and cold frozen toes.

I'm sure that many of us have had the experience of feeling extreme cold at some stage of our lives and agree that it's pretty close to diving when not properly dressed for the (dive) occasion.

That's where wetsuits, drysuits and their associated paraphernalia make their mark as probably the most important items of diving equipment we have. Although they are certainly different in many ways (such as construction and cost) they essentially have the same intention; to slow down heat loss so we can enjoy, not endure, our time underwater.

Now we all wear some sort of rubbery stuff when we go diving and although we can be somewhat pragmatic about what works for us and not necessarily so much about how it works, it's certainly a good idea to be a little more correctly informed in choosing and using what's going to keep us warm and comfy in the water.

What is commonly known is that we lose heat about 20 times faster in water than on land and that between 40-70% (depending on whose text you read) is lost through the head. We can argue the exact numbers but needless to say we lose a lot of heat in the water. But there are some even more basic facts that are not usually remembered.

**Some misconceptions** At all the instructor courses I run, one of the questions I ask is: 'How do wetsuits work?' and I can count on the fingers of one hand when I've had the correct answer the first time around. The answer is nearly always something like 'Water trickles in, gets trapped, warms up and that's what keeps us warm! Right. So why not use 3mm stinger suits in Antarctica if that's the case?

**So how do wetsuits and drysuits really work?** Reflecting back to when our mums first started wrapping us up in warm clothes to compete with the cold weather, she was, in fact, wrapping us up in a layer of trapped air or a 'still air gap'.

A still air gap is, by itself, a great insulator and everyday examples of where this effect

is found is in: thermos flasks, double-glazing, fibreglass building insulation; chilly bins. The prime design feature of all of these is to create a still air gap by trapping air or minimising air movement



*right l-r: Trilaminare and neoprene drysuits briefly drying and hanging on broad shouldered hangers.*

to assist in preventing heat loss. And that's what wet and drysuits attempt to do.

**Wetsuits** These are made of a neoprene material laminated both sides with a nylon material - making it more tear resistant than the plain rubber material by itself. The neoprene material is mixed with additives and made into what looks like a black rubber milkshake. This is then baked to form a block of rubbery stuff that is passed on a conveyor belt, sliced to an appropriate thickness, sprayed with glue and laminated with nylon material for final fabrication. These blocks are then fashioned into different sizes, shapes and colours to suit (pun intended) what the marketers think that the 'divers du jour' desire; from Rambo black to Catwalk pink.

But the essential rubbery stuff that we dress ourselves in contains gazillions of microscopic, squishable bubbles that, just like the jumper Mum wrapped us up in, is a material that essentially contains a 'still air gap' assisting in preventing heat loss from our bodies to the environment.

**But here's the catch:** Wetsuit material is squishable. And the deeper we dive, the more it squishes, the thinner the material becomes and the smaller the 'still air gap' becomes, the less able it is to keep the heat in. That's often why many divers believe that the water temperature drops a lot the deeper they go. This is usually not so. It just appears that way because the heat loss becomes so much more at depth because of the wetsuit compression.

So the deeper we go, the colder we'll get when using a wetsuit. It just has to happen. And that's just where the drysuit comes into its own.

**Drysuits** Named for an obvious reason! Regardless of make and style (neoprene, shell, crushed neoprene, mixed fabrics) they all have the same intention as a wetsuit; to keep you warm. But they can do it so much better!

Drysuits work by being capable of constantly maintaining that still air gap. This is managed by manually injecting air into the suit as we descend. They also increase that heat retention ability by allowing us to wear clothing underneath. Often drysuit manufacturers have complementary undergarments available to go with their particular product. And at the end of a dive on a cool day, standing in the wind on deck isn't the big deal that



*above: Trilaminare drysuit with front zip and showing undergarments.*

it is to someone wearing a wetsuit. Wind chill will send those folk scuttling for shelter while the drysuit wearer can grin and comfortably sip coffee and take in the cool fresh air. Probably more to cool them down!

The only apparent drawbacks in purchasing a drysuit in favour of a wetsuit is the initial cost and a little more effort in using and looking after them. We always whine

about how much things cost but again, it's a question of endure or enjoy?

**Care and maintenance** Both wet and drysuits need to be looked after as if they were our best suit or dress. They should be rinsed in freshwater, dried and stored correctly using a proper hanger, out of the sun (or away from any heat source) and away from any type of petroleum product. So don't store them in that part of the garage where they can be splashed by lawnmower petrol. And don't use aerosols or silicon sprays around them. Especially don't use them on the zips.

But drysuits need a little more specific care and attention. First and foremost, read and follow the manufacturer's directions. Next, and before putting it on, dust the seals with unscented talcum powder

Wrist dust before putting the drysuit on and make sure you take off all jewellery, belt buckles and anything else (eg car keys) out of your pockets that may present a sharp edge (if you wear your pants as an undergarment). Make sure the zips are lubricated with an appropriate compound such as bees wax or the sticks surfies put on their boards.

**Zip waxing** When doing the zips up, be careful not to catch undergarments or tear any internal rubber seals. Make sure you put on a thick pair of woolly socks! These not only help to keep your pinkies warm but stop your bare feet sticking to the inside of the moulded rubber boot when taking your legs out of the suit.

Now go and have fun but be careful not to get too close to sharp objects underwater that may puncture or rip the suit. Otherwise you may end up with an unwanted damp spot.

# DRYSUITS and WOOLLY JUMPERS

*right top to bottom: Wrist dusting before putting the drysuit on; Zip waxing; Lubricating wrist seal for easier arm removal. below: Rolled up drysuit ready for storage.*

After the dive have someone assist you out of your suit carefully. Have them first unzip you (if the zip's on your back) and then pop your head through the neck seal. Before taking the arms out of the suit, lubricate the wrist seals with a bit of soapy water.

When removing the arms and legs, do so without turning the suit material inside out. You'll probably be rolling the drysuit up and putting it in its own bag while transporting home from the dive site. Be careful to cover the inlet valve; it commonly abrades or causes puncture to the material it's rubbing up against on the home run.

When you do get home, rinse with the zip closed and then thoroughly inspect the zip for any residual crusty stuff from previous lubes and/or other accumulated grime. Use a toothbrush and soapy water to clean and clear the zip teeth. Every so often (10-15 dives), be a little more meticulous with the wrist and neck seals by washing with soapy water to remove any other residues such as found with oily skin or anything applied to the skin such as cosmetics.

Once rinsed, hang upside down with the zip done up and let it drip dry. When dry, lubricate the seals again with talcum



powder and follow the manufacturer's recommendations regarding storage. Some suggest with zips done up, some without. If hanging in a closet with your other clothes (or in the garage), use a substantial hanger. However, if rolled up, pack loosely and be careful not to have sharp bends in the zip. Ensure that the inlet valve is covered and pack the suit in its own bag and keep somewhere dark and cool.

**Leaks** If you got too close to something sharp and you think you may have a leak somewhere, it's usually easy to fix. But just be sure that it's not something like sweat or leakage from the use of the inlet or exhaust valves. If connecting/disconnecting the inflator hose underwater or sloppy use of



right: Drysuit 'blown up' and sealed with empty plastic bottles to isolate leaks.

below: Samples of sealant compounds.

'Other' drysuit accessories; talcum powder, zipwax, toothbrush, soapy solution and a good pair of warm socks!



the exhaust valve, water can also find its way in at these sites. Some avoid using the exhaust valve altogether and simply lift their arm for the air to escape. This can also allow water to trickle in.

But if it's a 'fair dinkum' weird leak nowhere near the valves, further investigation is needed and from my experience, the holes are usually pinhole size and found fairly easily. This type of leak can be found by blocking off the arms and neck by stuffing in empty plastic soft drink bottles and then over-inflating the suit. Using a soapy solution around where the leak is suspected will often clearly indicate where the hole is as the excess air escapes through it. If it is a small leak like this, a product like 'Aquaseal' should do the trick and you'll be back in the water as soon as it, and the now wet-ish drysuit is dry again. Again, follow the instructions when using any sealing compound.

More serious leaks should be referred to the place you either bought your suit from or take it to a reputable repairer.

For the keenly interested, one drysuit manufacturer, Diving Unlimited International (DUI) has a web site listing an array of videos covering everything from materials, manufacture to repairs. Well worth the surf!

**One last thing: Accessories** For the wetsuit wearer it's often just hood, gloves and boots (if wearing open heeled fins). For



the drysuit wearer, boots are more often than not moulded into the suit itself and may demand a larger fin size if upgrading from using a wetsuit.

But drysuits require a couple of extra bits and pieces to help not just with getting them on and off but also in maintaining their integrity. These items are zip wax, talcum (or similar) powder, soapy solution, a good pair of warm socks, and a toothbrush to clean your drysuit's teeth every now and then.

I don't know about you, but keeping warm is one of my constant priorities whether I'm on land or underwater. None of us needs a lecture on hypothermia to tell us how our bodies react to lowered temperatures. Suffice it to say, we shiver, we feel awful and it's worse if we're wet. But on top of this, our faculties become increasingly impaired the longer we're exposed to these conditions.

And that's no fun.

Like the woolly jumpers our Mums dressed us in we need to wrap up warm for the sport we're already, in another way, wrapped up in.

Take a bit of time out to get yourself the right gear to keep you warm. Then give it plenty of TLC to keep you that way!



Wet (and some drysuit) accessories and the best way to hang to dry.

