



tech talk

# Wetsuits *Hot or not?* *How far have we come?* anno 2010

Today's modern wetsuit embodies technology that benefits divers with an abundant choice of options to fit most any size and shape of diver, and any style of diving activities from mild tropical to very cold water.

Text by Wayne Fenior

Waterproof's new W1 suits are a good example of how far contemporary wetsuit design has come



## Birth of the wetsuit

Would you consider building your own wetsuit straight from raw materials? It hasn't been that long back in diving history when this option was widely utilized by divers trying either to save a little cash, or to get a closer custom fit. The materials and patterns were available from several dive suppliers. Fortunately, the choices now are better than ever for choosing your next perfect wetsuit.

Today's modern wetsuit embodies technology that benefits divers with an abundant choice of options to fit most any size and shape of diver, and any style of diving activities from mild tropical to reasonably cold water.

Wetsuits have long been one of the distin-

guishing marks of the scuba diver, along with our other gear like tanks, masks, and fins. But even as we've seen remarkable development over the 50-plus years of our sport, the underlying principles remain the same when considering the modern wetsuit: it must isolate and insulate.

The materials have evolved dramatically over time along with numerous styles and options available to the diver. But still the principle remains that if a suit fits poorly, even though constructed of the warmest and latest high tech materials, the diver will still get cold because of water flush (constantly needing to re-heat the water entering or sloshing around in the suit). The suit that is meant to provide protection from the elements is allowing the elements to flood in next to the diver's skin with every twist and turn of the body and fin kick.

## Poly... erh!?

Polychloroprene, invented by DuPont scientists in 1930 and originally called Duprene, was the first mass produced synthetic rubber; and eventually branded as Neoprene.

In its raw unmodified form, its characteristics and insulating properties are very similar to rubber—the same substance earliest wetsuits were constructed from. By foaming the base polymer with nitrogen gas bubbles, the insulation properties greatly improve. Since the early 1970's, what we now know as neoprene has completely replaced rubber for the suits we wear today.

**Would you believe  
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Simple-to-follow assembly instructions enable the novice to produce a professional-looking wet suit first time—easily.

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Flashback to 1971 and magazine advertisements of the day. Building your own wetsuit straight from raw materials was commonplace among divers trying either to save a little cash, or to get a closer custom fit

WATERPROOF

### Full stretch

New materials in the last few years have given the diver the benefit of “full stretch” neoprene suits, which have spandex added to the material that is able to more closely fit the diver’s body. But a possible liability of these new “super stretch suits” is the temptation for the manufacturer to utilize the materials as a quick fix for poor design. Remember also that as a suit needs to stretch to fit over problem fit areas, the insulation properties become less effective, as the suit becomes thinner. Another potentially dangerous problem that can occur as a diver squishes him- or herself into a suit that is just a bit tight is increased resistance effort in breathing underwater, as the wetsuit constricts the diver’s potential lung volume (remember your first instructor taught you to breathe slightly slower and deeper underwater from a regulator).



Stretch panel on a modern suit



## Wetsuits



*Whenever diving in the ocean, I always recommend my students wear full suits for their protection benefits from scrapes and things that may sting if they get careless.*

James Bond in *Thunderball* (1965) made wetsuits look hot... or not?

### The lightweights

At the lightest end, one and two millimeter suits are available for the warmest tropical waters, and shorties (short sleeves and shorts), for the most tepid conditions. These lightweight suits are effective above 27°C (80°F). Whenever diving in the ocean, I always recommend my students wear full suits for their protection benefits from scrapes and things that may sting if they get careless.

If you will be in the water for extended periods, or if your activity level is going to be low, opt for the heavier suit. Where and when thermoclines are possible, opt for the heavier suit! Even in my native sunny Florida on the same dive site the same day, a dramatic difference



If you will be in the water for extended periods or if your activity level is going to be low, opt for the heavier suit

from morning to afternoon can be seen because of a thermocline that moved over the area. For safety sake, the diver should opt for more insulation, as you can always vent or flush the suit.

### Mediums

Medium weight wetsuits are generally constructed with five millimeters of neoprene. Options for your style of diving include two-piece suits with farmer John/Jane bottoms and jacket style uppers that combine to give you two layers of insulation on your torso, in addition to the now traditional one piece suits.

### The 7mm

For cold water below 21°C (70°F), 7mm neoprene will be necessary for all but the most active divers. It is in this category of suits where the manufacturers have the most opportunity for innovation. In addition to one-piece suits, be sure to

One or two pieces? Advertisement for Collins & Chambers from October 1969



# tech talk

Warm enough?



*For the sake of both safety and comfort, the diver should opt for more insulation, as one can always vent or flush the suit.*

explore your options with two-piece suits and extra thermal insulation layering.

For the coldest temperatures, explore the semi-dry suits, which only allow a small quantity of water to enter the suit. Do your homework and shop well for this purchase, with your priority of properly fitting suit as your ultimate goal.

### The usual evolution

Most divers enjoying our sport today go through a metamorphosis in their thinking and shopping patterns from when they select their original exposure suit to when they vow to never again make the mistake of "buying the cheapest to save money". But the diver who has learned the cold lesson that a quality suit does indeed make a difference in how comfortable they will be underwater, still may not know the questions to ask when choosing their next suit. This article will help you know what to look for along with the proper questions to ask your local dive retailer, as you prepare to shop for that new suit!

### Ask the diveshop

Is this a company specializing in wetsuits? There is more to this question than the apparent answer. Most (if not all) major suppliers

SCUBAPRO

### "Semidry!?"



SEACSUB

Semi-dry is a bit of a euphemism for "less-wet". These suits come with snugly-fitting seals at the wrists, neck and ankles, the purpose of which is to prevent water from leaving the suit as the wearer moves around. This does not mean that the suit is water-tight. The wearer does indeed get wet in a semi-dry suit, but the water that enters is soon warmed up and does not leave the suit readily, so the wearer remains warm. Any residual water circulation past the seals still causes heat loss. But semi-dry suits are cheap and simple compared to dry suits. These suits are usually also made from thicker grades of Neoprene.

of gear have branded suits to go along with their masks, fins, and regulators, and the lion's share of divers are proud to wear a wetsuit emblazoned with their favorite manufacturer's logo. But problems begin when divers are forced to choose between only four common sizes frequently offered (small, medium, large and XL in women's or men's). Remember, functionally, the suit isolates and insulates. If the isolation fails because of improper fitting, nearly no amount of insulation will occur as water continues to pour fresh into the suit.

### What sizes are offered?

You may be lucky enough to fit

FOURTH ELEMENT

## Wetsuits

into one of the four main offered sizes, but chances are that your body type may require more specialization. The premier companies offering exposure solutions will typically offer more options for the close fit (up to 20 or more different sizes). This increases the chance that you will get "your custom tailored fit" without the need to offer a custom built suit in your size (less wait for your size and a substantial savings in cost to the diver).

**What are the layering options?** You can expect to extend your diving season with optional vests, hoods, hooded vests, and even step-in hooded vests. If the suit fits properly, the option of additional layering will insulate the water trapped in the suit from external cooling.

### Warranty?

Typically, the companies specializing in wetsuits will have longer warranties on materials and workmanship.



### What is the construction of the suit?

Usually, a heavier suit will be glued and stitched to prevent water from entering the construction seams. Lighter suits (i.e. 1-3mm) are stitched on-

### What about the kids?

Great care needs to be taken to assure that the same guidelines utilized for adults are afforded even more attention when outfitting children for scuba diving and other water sports. With close fit being the ultimate goal, remember that our little people will lose critical body heat even faster than adults, and if your water babies are typical, having extreme fun in the water will prevent them from looking for an exit long after most adults have reached their cold threshold. Be prepared to try multiple manufacturers' suits, looking for proper fit with no loose bagging along with the proper seals found on adult suits. The investment will keep your kids happier and safer as they enjoy the sport.



IC-COMPANY

ly—fine for tropical diving, but a problem whenever your diving day requires long periods in the water.

### Is the suit anatomically correct versus a flat pattern?

The companies devoted to specializing in

### A neutrally buoyant suit = less lead

Fourth Element's Thermocline neutrally buoyant system represented an evolution in thermal protection, using state of the art materials to maximize performance without compromising on comfort. The Thermocline neutrally buoyant wetsuit system is comprised of the long-sleeved top and the "explorer" and offers the equivalent protection of a 3mm wetsuit but weighing less than 1kg (2.2 lbs). Thermocline also provides a real solution for people who suffer from neoprene allergies by eliminating contact between the skin and the wetsuit.



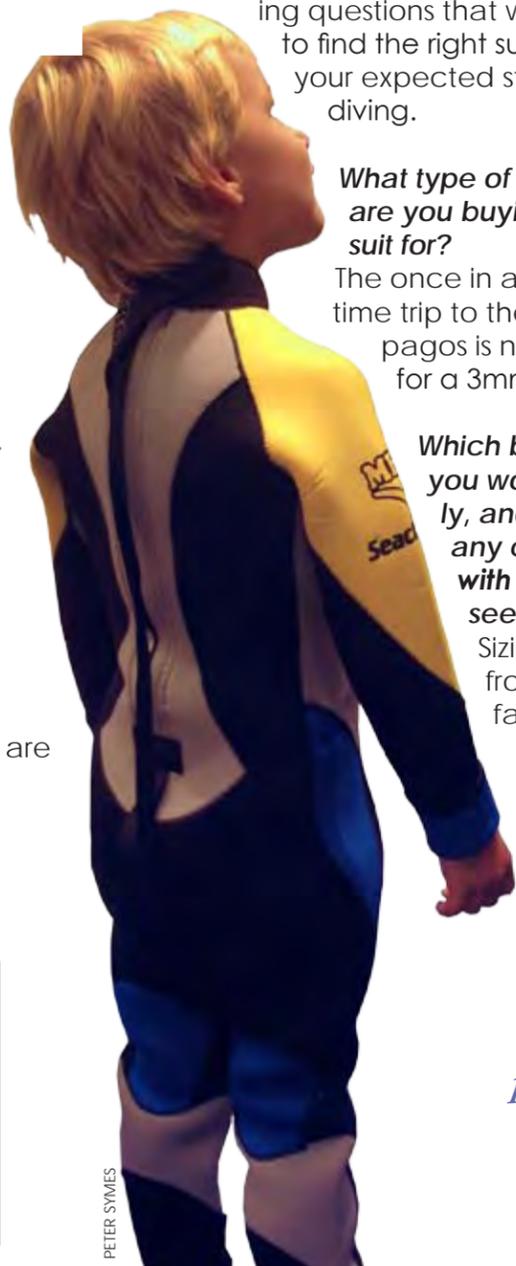


# Wetsuits

exposure suits offer their large variety of sizes based on an anatomical three-dimensional fit. When the suit fits correctly, there is very little (if any) slack areas where body mass fails to fill out the suit. These slack areas invite larger quantities of water to collect and slosh around in the suit, drawing more body heat and energy from the diver.

## See your local retailer

It seems easy enough and tempting just to surf the internet hunting for the best price and the nicest looking suit. What the diver is missing out on is the expertise gained typically over many years as a dive professional. Your retailer should ask you revealing questions that will help to find the right suit for your expected style of diving.



PETER SYMES

**What type of diving are you buying the suit for?**

The once in a lifetime trip to the Galapagos is no place for a 3mm wetsuit.

**Which brands have you worn previously, and were there any challenges with fit, flush or seepage?**

Sizing charts from manufacturers

*Do your homework and shop well for this purchase, with your priority of properly fitting suit as your ultimate goal.*

Is the suit three-dimensional or just made up of flat panels?

*Slack areas invite larger quantities of water to collect and slosh around in the suit, drawing more body heat and energy from the diver.*

### Reflective linings

Australian manufacturer Radiator led the way in developing multilayered wetsuits. The Radiator suits combines four layers one of which is a reflective titanium coating that acts as a highly efficient barrier to the outside cold. [www.radiator.net](http://www.radiator.net)

“To understand a man, walk a mile in his shoes”  
Native American Proverb

To understand a revolution in dive boot comfort and performance, walk a mile in ours.



**fourth element footwear**

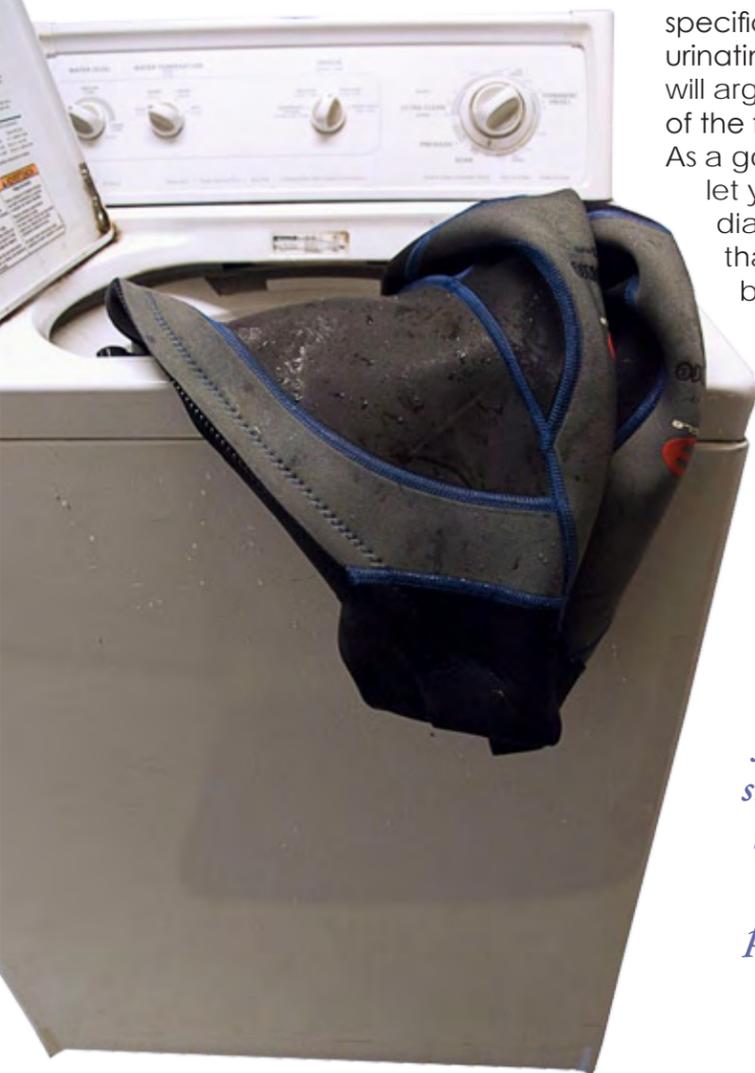


# tech talk

helpful for finding your best fitting size, but they are only a guideline. Your retailer should help you in the fitting process to insure that your new wetsuit will fit well, so that you can stay warm.

## Care

Neoprene will eventually fail as the material breaks down and nitrogen bubbles in the materials are crushed, broken and diminished. Rinsing your suit in fresh water after usage and drying out of the sun will keep the suit newer for a longer period of time.



Sun and salt takes it toll. Rinse well while your are out and hang to dry in a cool, airy and shaded place when you get home

I have certain associates that are in the water nearly every day with students, and they regularly will run their wetsuits through the washing machine on the gentle cycle with cold water and a mild detergent. Suit life is greatly extended by this practice, they have reported. Wetsuits should then be stored hanging loose to prevent crushing of the neoprene, in a dry cool place guarded from sunlight.

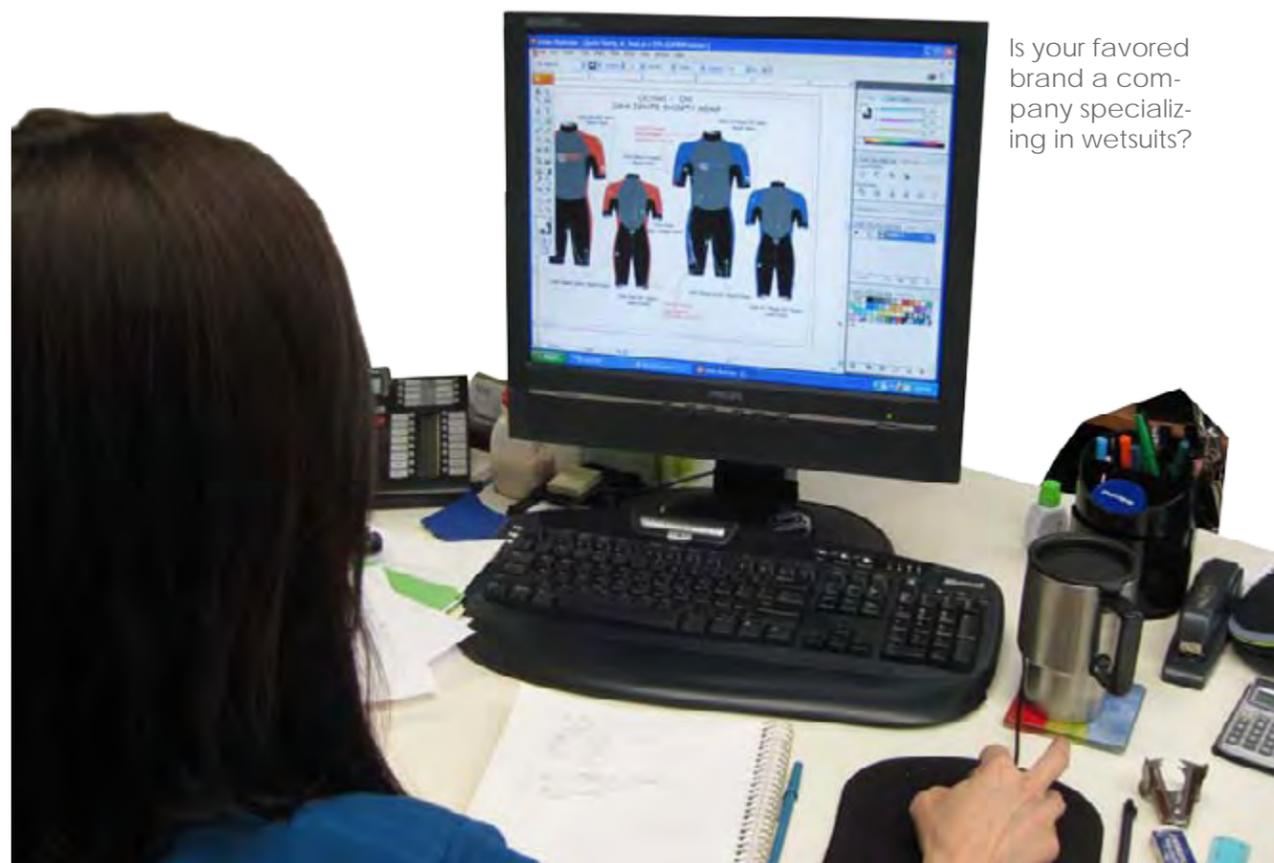
## Wetsuit hygiene

A topic typically untouched by a lot of instructors is wetsuit hygiene, or more specifically the sound advice of not urinating in your wetsuit. A lot of divers will argue the point, but remember one of the functions of the suit is to isolate. As a good parent, I hope you wouldn't let your child sit for hours in a wet diaper, and it goes without saying, that I have seen what appears to be diaper rash on a few divers in my day. The practice of more and more dive centers today is the option not to rent wetsuits because of health issues. For those still wishing to rent, the vehicle rental practice is certainly worth considering: "An accident is as good as a sale." ■

*As a good parent, I hope you wouldn't let your child sit for hours in a wet diaper, and it goes without saying, that I have seen what appears to be diaper rash on a few divers in my day.*



PETER SYMES



Is your favored brand a company specializing in wetsuits?

## Stats from our survey

Some interesting facts about your fellow divers wetsuit usage:

- What percentage of your dives in the past two years were made without a wetsuit?

Only 3% answering said none, with an overwhelming 52% answering 90-100% of the time.

- What are the water temperatures in which you conduct most of your dives?

Above 25°C/77°F for 30% of the majority, then diminishing with the water temp colder.

*Many thanks to everyone who participated in our online survey and helped us prepare this article.*

- What pieces of thermal protection do you own?

The highest percentage was the 3mm one-piece suit, with 61% of the respondents owning this suit. In second place was the 3mm shorty at 45%, and the least popular was the 5mm two-piece.

- What are the most and least important criteria you use in choosing a suit?

35% responded that price was most important; 25% said that their instructors opinion was least important; 26% said a friend's opinion was least important. Fit was overwhelmingly the strongest criteria for choosing a suit by 79% of the respondents. ■



# The latest & coolest

Some of the

Some two months prior to going to press, we wrote all known manufacturers of wetsuits asking them to supply us with information and images on the latest models. Some did, others didn't

## SeacSub SkinFlex

"300% stretch," boasts the Italian manufacturer. In a dynamic and continually changing world, here is the new frontier of wetsuits: "Hyper Flex" Neoprene with a new generation, ultra-elastic lining that stretches up to 300% and the water-resistant Silver Seal Titex zipper that allows high performance plus great fit and comfort.

Outer lining: Hyper Flex  
 Inner lining: Fine Plush  
 Zipper: Super Seal Titex  
 Wrists and ankles: Glide Skin Hood:  
 Integrated in the vest and with the "Air Draining" system  
[seacsub.com](http://seacsub.com)



## Scubapro Everflex

Scubapro's advanced, extra-comfortable EverFlex line has been stylishly redesigned for an even better fit and freedom. The new EverFlex neoprene steamers are now in a pre-formed dimensional shape, so it fits and moves more naturally with your body and delivers unparalleled comfort, stretch and flexibility. Scubapro also added heliospan lining in the torso area of the steamers, for added protection and insulation. EverFlex provides excellent fit for a wide range of people. If you are tired of the struggle to get into your suit, EverFlex is for you.

[www.scubapro.com](http://www.scubapro.com)



## Camaro Seamless Pronomic

Camaro's seamless suit is hailed as a world's first thanks to a patented seamless bonding technology. The Hydronomic Series is the first Seamless generation and has been completely redesigned. The seamless bonding technology used with highly flexible material has created a suit with a high degree of comfort and freedom of movement.

The suit comes with a double collar, a release-zip and a G-Lock Zipper at the back. The 7 and 5mm suits are equipped with double cuffs and zips on arms and legs. The 3mm version is equipped water flap on arms and legs for warm water.  
[camaro.at](http://camaro.at)



## Bare Elastek

The Bare Elastek 5mm is a double glued full-stretch suit with high-end features and anatomically correct pattern for three-dimensional fit throughout. Features a heavy-duty, color coordinated, G-lock back zipper with stainless steel slider, skin-to-skin internal sealing zipper flap and embossed inner elbow flex panels.  
[barescubadiving.com](http://barescubadiving.com)



# Fourth Element Proteus

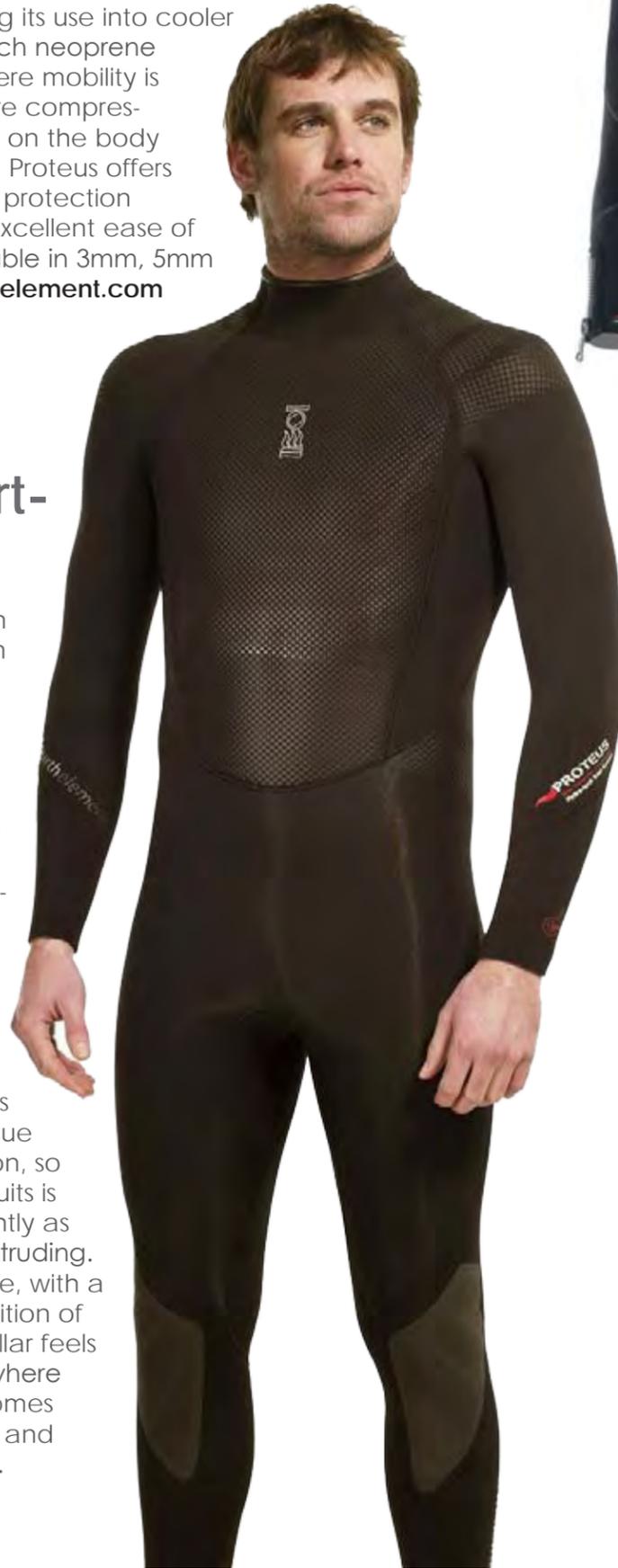
Ideal for use in temperate to warm waters, this versatile dive wetsuit can also be combined with the Short John wetsuit extending its use into cooler conditions. With superstretch neoprene on the arms and legs where mobility is required and thermocore compression resistant neoprene on the body core panels, the 5mm Proteus offers outstanding thermal protection and comfort with excellent ease of movement. Available in 3mm, 5mm and 7mm. [fourthelement.com](http://fourthelement.com)



## IQ Comfort-flex

The Smoothskin is laminated on one side and has a closed rubber surface on the other side. The smooth surface seals well with the skin and prevents the intrusion of water. An additional zipper at the collar provides additional wearing comfort. Under water, the throat is usually stretched due to the lying position, so the collar of wetsuits is tailored more tightly as to avoid water intruding. But on the surface, with a more natural position of the head, the collar feels restricting. This is where the neck zipper comes in; Open the zipper and breathe more easily.

[iq-company.com](http://iq-company.com)



## Cressi Lontra

New version of the Lontra wetsuit, made entirely from 7mm Ultraspan neoprene, which is exceptionally supple and soft. It is lined with Helioflex, a material that has excellent thermal characteristics. Produced in two versions: one for men (Lontra Man) and one for women (Lontra Lady), this is a modular wetsuit that includes an all-in-one jacket and hood, which can be purchased separately. [www.cressi.com](http://www.cressi.com)



## Waterproof W2

W2 is Waterproof's new back-zip wetsuit. After all the excitement created by the W1 front-zip suit, the W2 had to exceed this suit, so the task set for the design team was challenging. The result, W2 available in two versions—5mm and 7mm—surpassed expectations. W2 features include anatomical gender-specific design, comfort front neck zipper, inner plush lining and a moulded rubber kneepad featuring a "hinge" effect. For further W2 suit and W2 icevest features and product information, please visit: [www.waterproof.eu](http://www.waterproof.eu)

