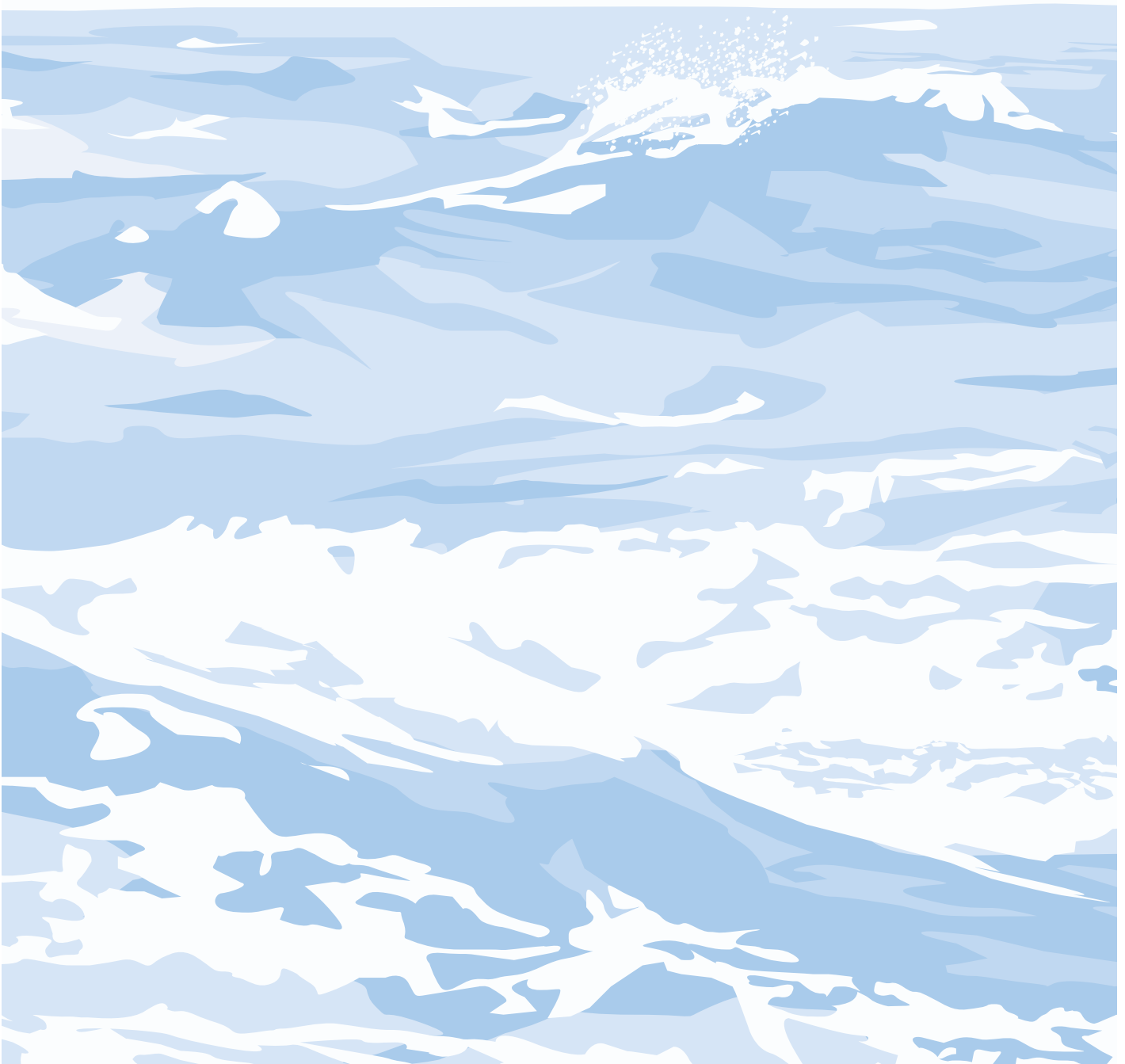




RESPECTING THE ELEMENTS™

A complete what to wear guide
to marine clothing

By Nick Gill



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Introduction

When I started sailing in the mid Sixties it was easy to decide what to wear to go dinghy sailing because all I had was a pair of Dunlop Magister blue canvas shoes; the sort that use to age well, the more faded and worn they were from the toe straps the better. It showed you had been sitting out hard and were not a beginner. If you could buy them pre-faded like jeans then I would have done. I would be packed off to the River Trent with a change of clothes and my faded blue shoes. It's not that my parents were mean, it was more that there really was little choice and that is probably one reason why I am in the sailing clothing business.

Today life is a bit more complicated. I still dinghy sail but I have a jumbo sized bag packed full of gear. Thermal underwear for warmth and moisture management control. Fleece Salopette and top. A breathable drysuit for winter sailing, Wetsuit for summer. Dinghy system waterproofs. Quick drying technical shorts with UV protection for height of the summer in light winds. I have neoprene boots, or competition ankle boots for better support. Gloves, socks and hats. The list goes on. I take it all just in case. The only thing I don't take is a change of clothes because I don't expect to get wet!

"It's easy for you!" I am told. "You have a whole warehouse to choose from." It's true I do have a lot of gear at my disposal and I am always evaluating new designs and fabrics but, actually, it is not about how much gear you have but about having the right gear for the type of sailing you do, and your budget. With 25 years of experience in the clothing business, along with all its technical design and fabric advances, I hope this Guide will enlighten you and help you to choose the best combination of clothing for your type of sailing.

Fabric selection

Later, I discuss garment design but at this point I focus exclusively on the fabric. What should you be considering for your particular type of sailing? I then move on to how we assess fabrics and know that they will do the job required.

If one word has dominated discussion in the sailing clothing world for the past five to ten years then it is "breathable". Is it breathable? How breathable is it? How does it compare? Will it last as long? Why is it so expensive? Do I need a lining and isn't it affected by salt water? These are just a few of the questions that crop up time and time again. The change over to breathable fabrics has been gradual, the price has come down and the quality has gone up as manufacturers have gone through the learning curve. Breathable fabrics have been around in the outdoor clothing market for much longer but outdoor conditions are generally less severe than sailing. You may be walking in a howling gale with torrential rain but it still is not quite the same as actually sitting in water and having solid waves hitting you hard enough to knock you over board. On top of that is the abrasion from non-slip decks and salt water.

Let's put the salt water issue to bed. In the early days of breathable fabric a high profile brand used a micro porous membrane. It had been fine in the outdoor sector so was sold into the marine trade, primarily in the USA. It was also trialled in the UK on gear used for the Whitbread Round the World Race. The garments were fine on day one but after a few days of continuous use in salt water they started to leak. To cut a very long story short it was established that the micro pores were being blocked with salt crystals causing the fabric to leak through reverse osmosis. You couldn't ask a customer to rinse his gear in fresh water everyday so that particular fabric was withdrawn from the marine market for a while. Putting a hydrophilic coating on top of the micro porous membrane to prevent contamination of the pores later solved the problem. Whilst this had a slight effect on the rate of breathability it still did the job. So today breathable fabrics do work perfectly well in sea water; it just delayed the arrival and speed of acceptance in the market.

Fabric selection

Today 90 percent of waterproof sailing clothing is made from breathable fabrics. They are without doubt more comfortable, particularly in more active racing conditions. So is there still a place for non-breathable fabrics in 21st Century?

The advantage of non-breathable fabrics is that they are cheaper to produce and they offer exceptional durability for the price. At Gill we have only one non-breathable range and that is a coastal/offshore sailing suit. It is full of features, is exceptional value and will last for years and, for many cruising sailors or for those who want an additional set to keep on board for the occasional guest, is more than adequate.

So why should I choose a breathable garment? There is no doubt it is more comfortable to wear. You probably would tell the difference trying on a garment in the shop. Put on a non-breathable garment for about four or five minutes whilst you look around, then swap it for a good quality breathable jacket and do the same. I would be surprised if you didn't notice the difference. Breathable fabrics are generally lighter and can in certain cases be worn comfortably without a lining. Having once worn one, I would be loathed to go back to a traditional non-breathable garment. It is a bit like once having had a car with central locking or power steering, it is hard to imagine life without it.

They say if you wait around long enough everything will go full circle, from flares to skirt length; linings on sailing gear have not been exempt from these cycles. When I began making sailing clothing everything was heavy and unlined. We then discovered we could improve comfort by putting a lining in; this created a double glazing effect. Condensation could move away from the body, through the lining where it would form as moisture droplets when it hit the impermeable membrane. It could then drain away between the layers. It was often felt that linings in a jacket meant it was a better quality garment and more comfortable to wear. However during the 1997 Whitbread Race trials the crew of Chessie Racing were crossing the North Atlantic from West to East when a crew member suddenly took a pair of scissors to his breathable Ocean jacket and cut out the lining. He noticed an immediate improvement. Breathability was improved because it was one less barrier, the garment was lighter and also dried faster.



Fabric selection

The following season Gill introduced top of the range garments without linings; as with all new concepts it took a while for it to become accepted but today is acknowledged as the best way to do it. So the fashion has gone from no lining to lined garments and back again.

Product design and fabric selection are two key elements in sailing clothing. If the fabric is not right, at best you will be uncomfortable and at worst cold, wet and miserable. For over twenty years I have sat across the desk with fabric manufacturers listening to their sales patter on why their fabric is the best. They talk about "hydrostatic head pressure", "martindale abrasion tests" and "inverted cup methods". When breathable fabrics came onto the market the jargon shifted up a gear. "Hydrophilic vs. microporous", "wick siphoning ability"; these are just a few terms that were banded about. I was shown fancy diagrams, technical sounding names and eulogies that all added to the confusion. The fun really began when I tried to compare one fabric with another. Manufacturer "A" tested one way and Manufacturer "B" another. Each manufacturer chose the test method that suited them, their fabrics or their technology the best. None of this helped me decide which fabric to use. It was also clear, that the higher profile the brand name the higher the premium we had to pay. When we pushed for better prices I was sometimes told that if we bought the fabric un-branded it could be much cheaper. It would not have the swing tickets with fancy diagrams or the well known brand names but the fabric would be the same.

It was also becoming clear to me that you, the consumer, were becoming even more confused than I was. I would listen to customers at boat shows and they would say how does "thistex" compare with "thattex". Which is more breathable? What is an RET test? Is "thistex" really worth the extra? The more I thought about it the more I came to the conclusion that it probably was not. Customers were looking to us for guidance; they wanted the wood separating from the trees and did not need us to add to the confusion. They trusted us and we needed to be fair and honest about what we were doing.

Fabric selection

There had to be a better way and the answer was already deep inside the bowels of the Gill technical department in Nottingham. For over five years we had been working with the textile department of a leading University. We had been sending them every fabric we worked with, or were considering working with, for independent analysis. We had manufacturers specification sheets but they were all different and all tested in different ways. We wanted everything tested in the **same** way and we wanted all the tests done- not just the tests they wanted us to see. We wanted Marine-grade tests, tests that simulated sitting in water, tests that flexed fabric as if it had been used in a force 8 gale. We also wanted to see all the results graded so we could select the right fabric for the job.

So if we had all this information to help us make the right decision why were we not using it to help the customer make the right decision? Why were we still adding to the confusion using "thistex" and "thattex" and even worse, our customers were having to pay a premium for the privilege of being confused and having an additional glossy swing ticket?

The more we thought about it the clearer it became. We would forget branded fabrics; we would evaluate every fabric in the same way and select the right fabric for the job in hand. We would then grade them in a clear and precise way so the customer knew that this fabric was better than that one. We would then communicate this information clearly on the garment and in all our supporting literature. So how could we do this?



The answer was actually staring us in the face. We looked at it everyday and it was clear and it stood out. It was the yellow dot that had been used in our logo for the last ten years. We would grade the fabrics with yellow dots and quite simply and clearly, the more breathable and the more durable a fabric, the more dots we gave it. We began to work on our system for testing, grading and classifying fabrics. This required us to sort the wheat from the chaff, remove the confusion, the phoney names and eulogies.

Fabric selection

Before I start to describe how the yellow dot system works it would be worth looking at how fabrics are tested at Gill. We apply these tests to every single fabric we use and not just in the development process but, most importantly, before each production batch. In this way we ensure the performance of our garments and can therefore guarantee that they are fit for purpose. Every fabric is tested in the same way and tested independently of us and the fabric manufacturer. When you ask us the question, how do we know that this fabric is better than that one or does heavier really mean better? Here is the answer. Coating strength is no longer measured in thickness and weight; it is down to the chemical structure and not obvious to the naked eye.

The next few paragraphs talk about how fabrics can be tested to ensure they are durable enough for the job, some of the detail of the tests may seem a bit laborious. If you are not interested in the finer points then you can skim the headlines and move on to the next section.

Resistance to water pressure

First of all the fabric is tested for water pressure resistance. The British Standard sets a minimum hydrostatic head water pressure but at Gill we have set our own minimum of five times greater than that standard in order to be absolutely certain that we can trust our fabrics to perform.

Machine Wash

We then machine wash and tumble dry the fabric five times. (more than most people would do in a garment's life) and test the water pressure again. It must still exceed our minimum water pressure to pass.

Artificial ageing

After that we will artificially age the fabric with flexing and abrasion.

For flexing we use a test known as the Shildknecht test. This simulates the type of rapid flexing found when sailing in strong winds. (Rather than the walking motion flexing found in outdoor clothing) Again the fabric is tested for water pressure and must still exceed our minimum.

Fabric selection

Next the fabric is aged in a high humidity incubator for 168 hours at 70 degrees C and high humidity. This will simulate literally years of active use in a short time and if a fabric is going to fail it will normally fail here.

Again the fabric is tested for water pressure and it still must exceed our minimum. Most fabric suppliers do not recognize this test as it is deemed too harsh, but it enables us to set a bench mark of performance.

Fabric Abrasion

The next test is for abrasion on both the face and coated surface. This will simulate the wear and tear found on the seats and knees of garments. The fabric is abraded for 6,000 cycles against a 320 grade standard grit sandpaper. Not unlike the decks of many boats! The fabric must withstand the 6,000 cycles.

Coated Abrasion

The coating must also withstand 5,000 cycles of rubbing with a standard worsted material. This will simulate the garment being rubbed against clothing worn under the foul weather gear. After this test the fabric must still exceed our minimum of water pressure.

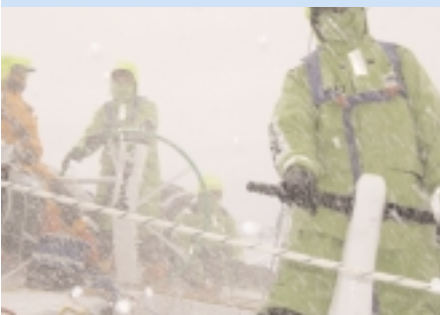
Tear Strength

Finally it will be tested for tear strength and must exceed 45 Newton's as laid down in the BS3424.

All the above test methods are carried out to the procedures laid out in the British Standard Tests and are independently overseen by the textile department of a leading British University.

Field Testing

Once a fabric has passed all our minimum criteria it will then be put out for field-testing. The amount and type of use a garment has received is carefully monitored and tests for wear are compared against laboratory tests. Field testing includes Racing Yachts like illbruck, winners of the Volvo Ocean Race and the Scottish National Sailing centre at



The illbruck crew, part of the Gill field-testing team deep in the Southern Ocean

Fabric selection

Cumbrai where the garments are used day in and day out by these instructors in the worst conditions the Scottish weather can throw at them.

Then, and only when we are completely satisfied that a fabric is fit for the purpose, will it be given a yellow dot rating and released for production. It is not a one-off test. Each production batch will be re-tested to ensure the fabric is up to the required standards.

This may all seem a little excessive but we know from experience that when you are out in appalling conditions, struggling against the elements, the last thing you need to worry about is your equipment. We do this testing so that when you see our yellow dots you know that the garment is fit for purpose.

Yellow Dot Fabric System Summary:

The choice of fabric for sailing type is very complicated as you can see from the previous sections so what we have done is created a categorisation of fabrics so that all you have to do is check the type of sailing you do and then look at the number of yellow dots assigned to the ideal fabric for that sailing type. As you can see from the sections on testing, durability and breathability we have done the rest on your behalf so if, for example you are a dinghy sailor, you can rest assured that a two dot fabric is the best type of fabric for your needs.

Fabric	Ocean	Offshore	Coastal	Dinghy/ One Design	Inshore	Onshore	Breathability		Durability	
		5 dots	4 dots	3 dots	2 dots	2 dots	1 dot	Good	Moderate	Good
							Good	Good	Good	Good
							High	Good	Good	Good
							High	High	High	High
							Very High	Very High	Very High	Very High