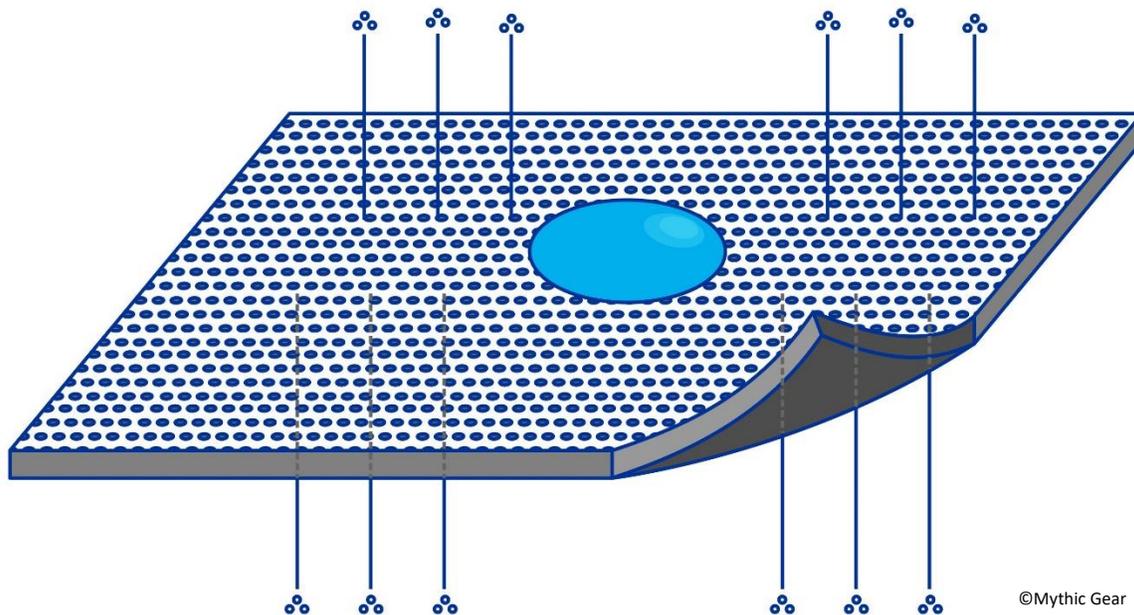


Breathable Drysuit Fabric Basics

Most drysuits for paddling and other surface water sports are made from breathable waterproof fabric – waterproof because of course, and breathable to vent moisture from perspiration inside the suit to the outside. The ability to transport moisture out of the suit keeps you drier, and thus warmer and more comfortable.



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The microporous membrane sandwiched in the middle of a breathable fabric laminate has billions of microscopic holes per square inch. These are large enough to allow free-floating water molecules to escape, but too small for liquid water to go through. (The image is schematic: the membrane doesn't really look like this under an electron microscope.)

Most drysuit fabrics operate on the principle of microporosity to achieve breathability. A special plastic membrane is sandwiched between two or more layers of conventional synthetic woven fabrics. The membrane has billions of microscopic holes through every square inch. These holes are large enough for free-floating molecules of H_2O – i.e., water in its gaseous state – to pass through, allowing it to “breathe,” or vent moisture from the inside. That gasified water is actually your sweat, which evaporates inside the suit from your own body heat.

That's how the moisture gets out from the inside. What keeps it out from the outside?

Water in its liquid state exhibits a property called surface tension: the molecules tend to stick together, which is why water forms droplets instead of spreading out indefinitely. A single drop of water is huge in comparison to the pores in the membrane, and its surface tension holds it together, preventing it from passing through the pores.

Generally, there are at least two layers of nylon or other synthetic woven fabric protecting the membrane, one on each side. Neither of these is waterproof. The inner layer basically keeps liquid sweat on your body or undergarments away from the membrane, where it would clog the pores. The outer layer blocks the wind and protects you and the membrane from physical damage. But it serves another important function.

The outer layer is treated with a slippery chemical known as a Durable Water Repellent (DWR). This does not make the outer layer waterproof, but it does cause water to bead up and run off readily – like a fresh coat of wax on a car. Without it, the outer layer of fabric would become saturated, and that would prevent gaseous water from passing through it. In other words, the DWR is essential to the fabric's breathability.

After much use and exposure, DWR loses its juice. When you notice that water no longer beads and runs off, it can be reinvigorated by ironing the fabric on low heat. Be careful not to overheat the fabric or to touch the gaskets with the iron.

When DWR can no longer be refreshed by heat treatment, it can be reapplied. It's available as a liquid in two versions: one you add in the washing machine; the other you brush on the exterior. The kind you brush on treats only the outer layer of fabric, and this is the way to go. Don't use the wash-in version: it will clog the pores of the membrane and wreck the fabric's breathability.

Drysuits are sewn together with needle and thread, and that, of course, creates thousands of small holes through which water could pass. This is overcome by covering all the seams inside the garment with heat-sealed fabric tape. The tape has adhesive on the back, and it is applied with an iron or industrial heat-taping machine, which melts the adhesive to seal the holes and fasten the tape over the seam. Tape can be removed for repairs by heating it again with an iron to soften the adhesive.

In addition to the fabric, two components are essential to the functioning of a drysuit. We've covered these in previous blog posts about [drysuit zippers](#) and [drysuit gaskets or seals](#).

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Visit the Mythic Gear website for [tips on drysuit care](#).

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