



Photo courtesy of NEMO

WHAT'S UP WITH DOWN

April 2016 // Bikepacking/Touring // Tech Tips & Info

When it comes to insulation, there's no right or wrong. There's only the matter of choosing what's best for your needs. Join us as we fill you in on what's up with down (and synthetics).

Whether you're heading out into the wild for just a night or sleeping under the stars for an entire month, your choice of insulation can easily make or break the adventure. While the outdoor industry offers no shortage of great options to keep you warm, that's not necessarily a plus. Sometimes the sheer number of options – and the technical terms that go with them – are enough to keep you awake at night.

To learn more on the matter, we thought we'd talk to someone who knows a thing or two about insulation: Cam Bresinger, Founder and CEO of NEMO Equipment. Here's what we learned about keeping warm.

Insulation & How To Choose It

Down or Synthetics? Goose or Duck? And Hydrophobic? What's that? With so many options available, it doesn't take long to fall down a pretty deep rabbit hole on the subject.

Basically, it comes down to two contenders: Down vs. Synthetics.

And In This Corner...Down

For centuries, humans have looked to down as an effective source of insulation — and with good reason. Down is lightweight, easily packable, and — most importantly — warm.

So what exactly is down, and how does it provide warmth?

Down is the middle layer of extra-fine, almost fur-like feathers found between a bird's skin and its outer coating of vaned feathers. Not only is this middle layer of down feathers fluffier and loftier than the rest, it efficiently traps air, thereby preventing heat loss and providing superior thermal insulation. When down is used to insulate a jacket or sleeping bag, these same principals hold true – explaining why down is such a great source of warmth.

Simply put, nature has evolved a design with thermal-efficient properties that humans have never been able to fully replicate.

While down provides supreme insulating power and packability over other materials, there is a downside to down. Whether from weather, perspiration, or puddles, when down gets wet its insulating ability becomes compromised. For this reason, extra care is needed to keep down-insulated products dry during extended use. Well-designed down products prevent this issue by providing external moisture protection and/or allowing a maximum exchange of air through breathable fabrics.

Another potential drawback of down is how the material is sourced, particularly in regards to the act of live plucking and other inhumane treatments. While responsible brands such as NEMO do their part to ensure this doesn't happen, the sad truth is that these troubling procedures are still very much a part of the process for some brands.

Additionally, down is generally more expensive than synthetics. This is due in part to the fact that down provides more insulation and is both lighter and more packable. Also playing into price is the fact that down is a limited resource, especially when compared to synthetic. Being a man-made product, synthetic has a more constant price tag, while the price of nature-made down fluctuates with the availability of the material.

Still, despite these few drawbacks, down is widely considered to be the vastly superior method of keeping warm.

And In This Corner...Synthetic

While it is commonly observed that down is the better insulator, there is definitely something to be said about synthetic insulation. Not only does it provide an adequate amount of warmth, it's more cost effective for many people. In addition, synthetic retains more of its insulating properties when it gets wet and is generally manufactured to be resistant to mildew and other forms of degradation.

But what exactly is it?

Synthetic insulations can be divided into two basic categories: **short/cut-staple** and **continuous filament**. Cut-staple insulation consists of short (generally less than two-inch) fibers that are held together by a resin. It's relatively compressible but less durable when compared to continuous filament. Continuous filament insulation, on the other hand, is made up of long, single fibers that are intertwined and set by a resin. The end result is a product that is more durable but less compressible than cut-staple insulation.

While synthetics provide a little less warmth and are bulkier and heavier than down, there are definitely instances where it makes sense to go the man-made route. Synthetic is a great choice when you know you won't be able to keep things dry or when your budgetary concerns take priority.

Overall, if you are willing to pay the premium, there's no beating the performance and packability of natural down feathers, especially if they're inside high-quality, moisture-protected fabrics. But, if you're on a budget and aren't counting grams to keep your set up svelte, synthetics will do just fine.

Would You Prefer the Goose or the Duck?

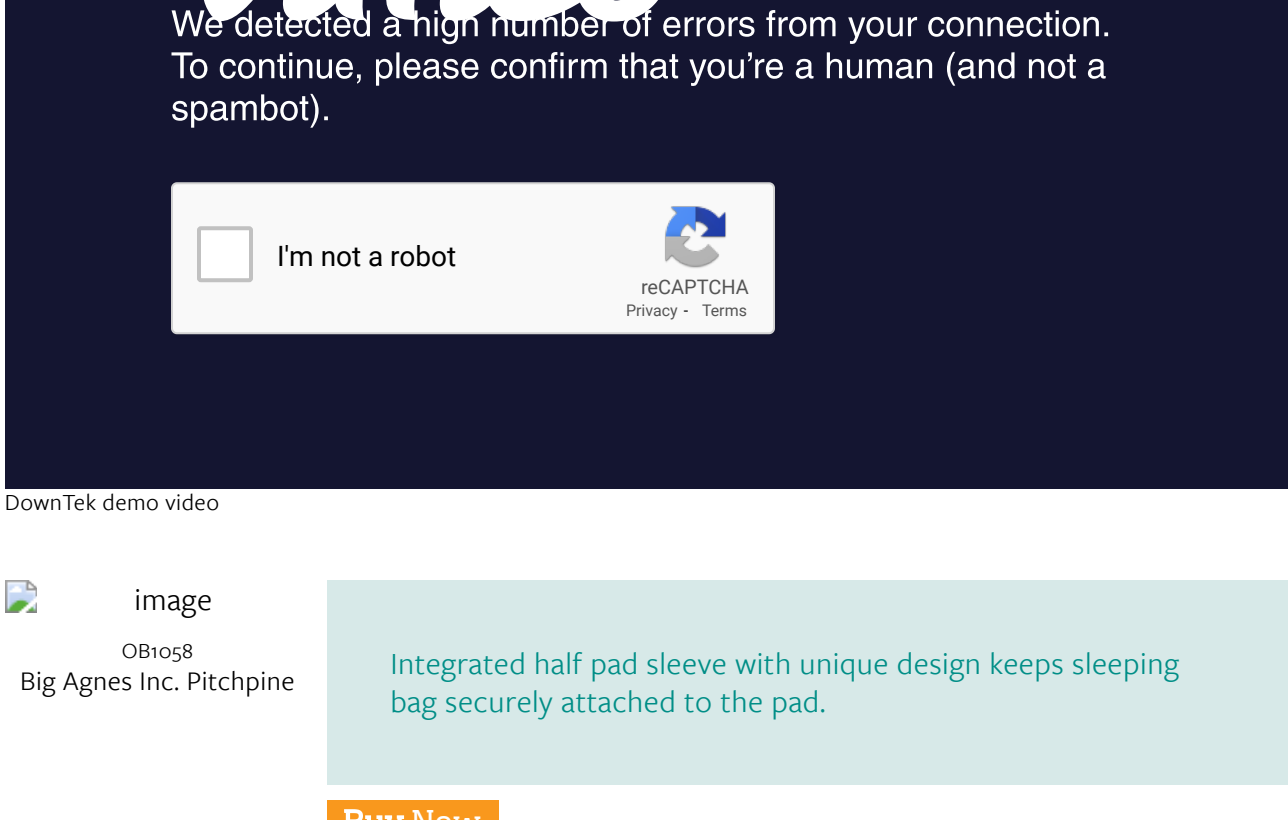
While down is traditionally made with goose plumage, many brands and manufacturers have been switching to duck — or a goose and duck blend — in recent years. The main reason for this is a decreasing supply of goose down.

Down is technically a byproduct of the food industry, so it is directly tied to how much goose is consumed by humans. In recent years, goose consumption has drastically declined, making goose down harder to come by. This low supply, combined with the general misperception that goose down is superior to duck down (it's not), has led to higher prices. As a result, a number of brands have made the shift to duck down.

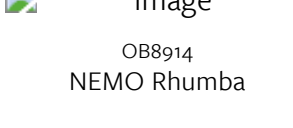
From a performance standpoint, there is relatively no difference between goose and duck down. For example, 700FP duck down will perform just as well as 700FP goose down. The only real difference between the two is that duck down can have a stronger odor than goose down, though recent improvements in the down cleaning process have made that a non-issue.

Hydrophobic Down? This Changes Everything

As stated earlier, one of the biggest drawbacks to down insulation is its inability to maintain insulating power when wet. Enter: hydrophobic down. Simply put, hydrophobic down is just down that has been treated with a durable water repellent (DWR) finish. DWR increases the surface tension of the down, causing water to bead up and roll away. With water banished, you're kept warm and dry. While hydrophobic down is relatively durable, dirt and oils from your skin will reduce its efficacy over time. Aftermarket applications, such as Nikwax Down Proof, can be used to clean the down and revitalize the DWR.



DownTek demo video



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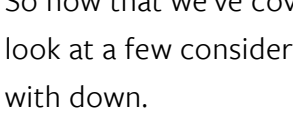
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Down & How To Use It

So now that we've covered the different types of material that keep you warm at camp, let's take a look at a few considerations when thinking about insulation – specifically if you're choosing to go with down.

Fill Power

Fill power is a measurement of loft, meaning it measures the volume — in cubic inches — of one ounce of down. For example, 1 ounce of 600FP down fills 600 cubic inches of volume. The higher the fill power, the more air that gets trapped and the more efficient — and expensive — it is. Because higher fill power down is better at insulating, less down is needed. This results in an overall lighter weight end product. For example, a 15" sleeping bag made with 800FP down will weigh less than the same bag made with 600FP down.

A Baffling Concept

Down sleeping bags and jackets can be constructed in one of two ways: **baffled** or **quilted**. Baffled construction uses mesh panels called — you guessed it — baffles. The baffles connect the outer shell fabric to the inner lining. These baffles help keep the down in place and ensure it is distributed evenly to prevent cold spots.

Quilted construction, on the other hand, consists of the outer shell and inner lining being sewn together. While quilted construction is a simpler and cheaper means of trapping down, it creates a lack of insulation at the seams. This results in a less thermally efficient product.

Shape Up, Dream On

One product that down is nearly synonymous with is the sleeping bag. For many years, there were really only two choices in sleeping bag shapes: mummy and rectangular. A mummy bag is beneficial when weight or warmth is a concern, while a rectangular bag is better when comfort is most important. With either shape, the following fact holds true: the smaller the interior volume, the less air you have to heat up. But the larger the interior volume, the more space there is to spread out or sleep on your side (which most people do).

In extreme environments — or when every ounce counts and comfort isn't a big consideration — mummy bags, and even, quilts have always been the streamlined choices. That all changed a few years ago when NEMO launched the Spoon™ shaped bag. This new design is essentially a compromise between the two longstanding shapes. It allows more room in at the knees and elbows, while keeping the rest of the bag slim. For most users, the Spoon™ offers just the right balance of roominess to stretch out and sleep on your side, without all the unnecessary interior volume.

Tried and Tested

You've probably noticed that different sleeping bags have different temperature ratings... but do you know what those ratings actually mean? Several years ago NEMO and a number of other high-end sleeping bag brands adopted EN13537 testing — the European norm for establishing the temperature rating of sleeping bags. This test method uses a thermal mannequin in a controlled environment to determine the rating.

The EN Comfort rating (for women) is the lowest average temperature at which a bag will keep the woman warm, while the Lower-limit rating (for men) is the lowest average temperature at which the bag will keep a man warm. An Extreme rating, used only to measure the lowest temperature at which survival is assured, has also been adopted.

While the EN rating does provide a useful tool for comparing sleeping bags, it's also important to remember that there are a number of variables that affect your ability to stay warm. Your metabolism, hydration level, caloric intake, and choice of pad and clothing all have a hand in warmth. A good understanding of these variables can make the difference between a warm, comfortable night and a cold, miserable one.

The Ethics of Sourcing Down

The quality of down – not to mention the ethical treatment of the birds it's derived from – can be greatly affected by where and how the down was initially sourced. As a general rule, down that's sourced by a premium brand usually offers greater assurance that it was processed in a higher-quality facility that adheres to principles like proper cleaning and freedom from fat, oils, dirt, and other contaminants. In addition, brands such as NEMO only use down from sources that have been certified to be free of inhumane practices such as force feeding and live plucking.

So while that big box brand jacket or sleeping bag might have an attractive price tag, know that its quality might be lesser than that of a smaller specialty brand. Perhaps even more importantly, its ethical practices might put your moral compass in an ethical quandary.

That's all a lot of information, we know, but hopefully you're now equipped to make a well-informed choice the next time you're looking to keep warm and stay active on your next cycling adventure or bikepacking trip.

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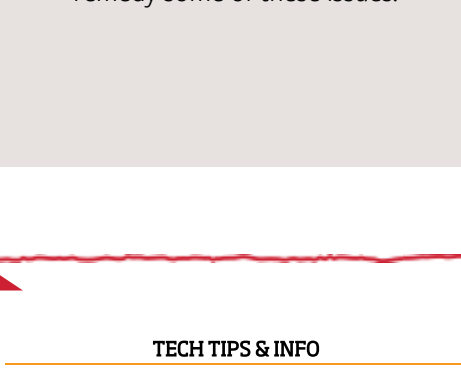
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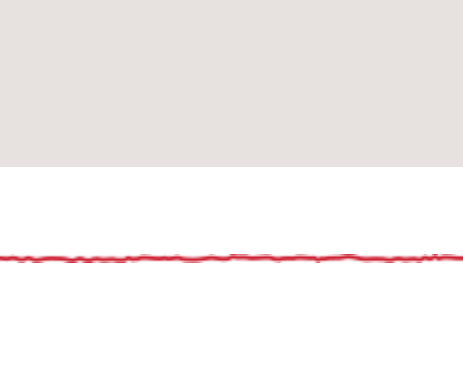
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