



What does R-value on my sleeping mat mean?

To put it simply, R-value is a measurement of the thermal resistance of a material, or how well it resists the transfer of heat. The higher the R-value, the more insulation it will provide.

More about R-value

R-value isn't just for sleeping mats, it's also commonly used in the construction industry. In particular, for those pink insulation batts in the ceiling of your house... they all have an R-value.

R-value isn't something you need to be overly concerned with in summer when the ground doesn't get very cold. Using a high R-value mat in warm weather won't make you hot, it's only going to put a thermal barrier between you and the ground. However, when the temperatures drop and you find yourself setting up camp on wet or icy ground - R value becomes a very important consideration.



R-value is a factor you should consider when choosing a sleeping mat. Image: Sea to Summit

How is R-value tested?

If an R-value is listed on a mat, it will either mean that it has been tested independently or in-house.



Generally, there are two methods of testing R-value – the cold room test and the hot plate test. Both of these tests involve a temperature sensor on one side of the mat and a controlled temperature on the other. Then there is probably a heap of science involved to arrive at an R-value, but that's beyond our scope of knowledge. However, there is no universal standard.

As a consumer, which method used shouldn't be something that you worry too much about. If you're purchasing from a reputable brand, the lab testing should be fairly accurate and trustworthy.

If you want to use a mat for a technical expedition, it might be worth checking the manufacturer's website of the model you're interested in, as they should provide further detail on the method they use.

Does R-value correlate to a temperature rating?

R-value is a measure of the transfer of temperature from one side of a material (in this case a mat) to the other. These values can't be correlated to a temperature, but there are some guidelines for which R-values are suitable for each season.



R-value measures the thermal resistance of the material, which translates to how well it insulates. Image: Sea to Summit



How do I choose a sleeping mat based on R-value for each season?

As a rough guide, here is what we would recommend for choosing values for sleeping mats.

What R-value sleeping mat should I use in summer?

As a general rule, for sleeping in warm conditions, an R-value of 0-2 will be suitable. However, a high R-value won't make you hot, it will just insulate you from whatever the ground temperature is underneath. The exception to this is any mat with a reflective layer inside that radiates heat - these may feel hotter in summer.

What R-value sleeping mat should I use in spring/autumn?

In mild weather conditions, a sleeping pad with an R-value of 3-5 will suit. This is the most common range for general use sleeping mats.



Insulation won't be as important when the weather is warm. Image: Sea to Summit



What R-value sleeping mat should I use in winter?

If you spend a lot of time on cold weather camping or hiking trips, you may appreciate a mat with an R-value of 5 and above.

What R-value sleeping mat should I use in alpine conditions?

For alpine conditions, you will need a mat with an R-value of 6+ and you'll want to make sure you team your mat up with an appropriately rated sleeping bag and suitable clothing.

Most mats you'll see are between 0 and a 9.5 R-value rating. An example of the highest rated mats we carry is the [Exped Megamat](#) or the [Black Wolf Mega Deluxe](#) mats which have a value of 9.5. These self-inflating foam mats are too heavy for hiking and trekking adventures and are best kept for car camping.

If you're trekking or hiking in icy conditions, you will likely be looking at a lightweight and compact mat. These can range between 0.7 for an [ultralight non-insulated design](#), to a 5.9 for a [down filled model](#).

Usually the lighter the mat is = the lower the R-value. So you may need to stack a few mats together to reach a suitable R-value for alpine use.

For example, a mat with an R-value of 4 or 5 on top of a lightweight closed cell foam mat with a 1-2 R-value will give you the insulation you need without the bulk and weight, and will also make your sleeping system more versatile.



Winter camping or hiking requires adequate insulation from the cold ground. Image: Sea to Summit

If the mat doesn't have an R-value, is that bad?

There are plenty of high-quality mats that provide decent thermal resistance but don't have a value listed. This is likely due to the fact that testing can be an expensive process for the manufacturer.

However, if you want to use your mat for technical expeditions you might want to choose one that is rated to be on the safe side.

How can I increase the R-value of my current sleep system?

There are ways to improve the thermal resistance of your current sleeping system depending on the time of year you want to use it.

You can add a thin foam mat underneath or use an emergency survival blanket or bag to reflect heat back into the mat or your body. Essentially, you just need to add more layers between you and the cold ground. This could even be in the form of leaves or pine needles in an emergency situation.



We hope that answered all your questions on R-value and that you sleep well (and properly insulated) on all your future adventures.

How do you keep warm on your adventures when the temperatures drop?