



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

The new ASTM F3340-18 standard

Back in 2016, a group of leading outdoor companies started developing a standard of testing R-Value in order to create consistency across the industry. This new standard is known as ASTM F3340-18 and has been introduced across several ranges as of this year including Therm-a-Rest, Sea to Summit, Exped, Black Wolf and more.

As a result of this methodology being implemented, some R-values on sleeping mats have/will change. This does not mean that the mat will be warmer or colder than before, the value is now just represented on a universal scale for an apples-to-apples comparison to other mats.

Some brands may not test their products to the ASTM standard, or will choose to only implement this testing at a future date. There will be a transition period with the new testing as we cycle through our inventory. So, in the meantime, check the product details tab online for each model and size, or the product itself in-store to confirm it's been tested to the ASTM standard.

For more details on the nitty-gritty of ASTM, head [here](#) or [here](#) for more information.

How is R-value tested?

The method for testing R-Value is extremely similar to how it was previously tested, it has just been updated to be consistent across different manufacturers. It involves a hot plate on one side of a mat and a cold plate on the other, then electronic sensors determine the energy required to keep the hot plate at a consistent body heat to measure the R-Value.



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



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.

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.



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

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

In mild weather conditions, a sleeping pad with an R-value of 2-4 will suit. This is the most common range for general use sleeping mats.

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 4 and above.



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

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 are 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. It will also make your sleeping system more versatile.



This chart gives you a full overview of R-Values for all kinds of conditions.

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 this has 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?