

Adding extra insulation to Sea to Summit Ether Light and Comfort Light sleeping mats / pads

Background

The Ether Light and Comfort Light mats from Sea to Summit both have a layer of insulation inside them. This consists of a layer of metallised fabric ("Exkin Platinum") with a few mm of fibrous insulation ("Thermolite").

- "Comfort Light Insulated" mat R value = 3.7 (? In torso double layer zone)
- "Ether Light Insulated" mat R value = 3.2

I have found that at about 5°C I start to notice that the cold coming through the mat when wearing fleece pants and using Mont Helium 450 sleeping bag with down distributed about 70%:30% on top:bottom.

Solution

I found I could add 70-80g of ClimaShield Apex insulation to the two mats by feeding it through a tube inserted in the inflation port.

This document describes how I did this. It was easier and quicker to do with the Ether Light mat than the Comfort light.

ClimaShield Apex

The insulation that I used was ClimaShield Apex 3.6oz/sq yd (122g/m²) from Ripstop by the roll. This was 1.5m wide and about 2cm thick. It cost US\$9/yd in 2019.

The ClimaShield has a VERY IMPORTANT characteristic: The fibres are very long and run across the roll. This means that you can cut a 4cm or 7cm strip of ClimaShield across the roll and if you pull from each end it stretches a bit but does not easily pull apart. This characteristic is essential for putting the insulation inside the mats.

Construction of the Mat

The Sea to Summit inflatable mats consists of two surfaces dot welded together with a layer of metallised foil insulation between them. The construction is slightly different between the Ether Light and the Comfort Light but the principles are the same.

The dot welds form channels down the mat. When the Ether Light mat is inflated the dots are about 6cm apart. They are a bit closer on the Comfort Light and have a more complex pattern.



Cut insulation

For the Ether Light mat, I cut 6 lots of 7cm strips across the roll of ClimaShield Apex 3.6oz. These were about 1.5m long. This is shorter than the length of the mat but they stretched out during insertion into the mat. The photo shows one of these strips on the mat.



For the Comfort Light mat I cut 10 lots of 4cm wide strips. Two of these were cut in half to make 4 half-length strips and 8 full length strips. This was needed because of the dot-weld pattern of the Comfort Light.

Load ClimaShield into pipe

I used 19mm “polypipe” irrigation pipe. This was about 90cm long and 21mm outside diameter. Make sure this is clean inside and out so no dirt is introduced into the mat.

The ClimaShield was loaded into the pipe by tying string onto the insulation and using the string to pull the ClimaShield through the pipe, until it was just poking out the end. It is important to remove the string because the knot would form a hard lump in the mat, which could quickly wear away the airtight coating inside the mat when the mat is rolled.



For the comfort Light mat, I had to use 13mm polypipe (instead of 19mm) because the dot welds of this mat were closer together.

Insert pipe into mat

1. Inserted the pipe (with a little ClimaShield poking out the end) into the deflation port of the mat.
2. Threaded the pipe down one of the channels between the dot welds. Was careful to do this against the fluffy “Thermolite” side of the existing insulation layer and not against the foil side. My rationale is that the Thermolite insulation will help hold the ClimaShield in place, whereas the foil side of the existing insulation would allow the ClimaShield to slide about more. On the Ether Light mat the Thermolite insulation was on the valve side while on the Comfort Light it was on the non-valve side.
3. Bunched up the mat so that the pipe made it all the way to the bottom of the mat while the other end of the pipe was still outside the mat.



Feed ClimaShield through pipe.

1. Held down the ClimaShield at the end of the mat and pulled the pipe out about 20cm, which pulled some ClimaShield through the pipe.

2. While still holding down the end of the ClimaShield, inserted the pipe about 5cm back into the channel to take the tension off the ClimaShield.
3. Moved thumb to hold down ClimaShield close to the new end position of the pipe and repeated the process of pulling the pipe out and partially reinserting until the pipe had been completely removed.
4. For the Ether Light mat, I fed 7cm strips of ClimaShield down the middle 6 channels of the mat and left the outermost channels without added insulation.
5. For the Comfort Light mat, I fed 4cm strips of ClimaShield down the narrower channels of the mat. 8 of the channels were full length but 4 of the channels ended halfway down the mat so half lengths of ClimaShield were used for these.



Final result

The ClimaShield stretched a bit as it was inserted into the mat so it ran most of the length of the mat. I was not concerned about missing insulation in the head region as that is usually covered by a pillow.

I massaged the ClimaShield so that it lay flat in each channel.

I was able to fold the Ether Light in half and roll it so that it still just fitted into the supplied pump sack. The Comfort Light needed a new sack to contain its added girth. Stuff sack internal dimensions about 22.5x36cm when flat.

I store my mats partially inflated so that the ClimaShield is not compressed unnecessarily.

Ether Light mat showing location of added insulation. I would consider adding some insulation to the outer channels too.



Ether Light mat with added insulation only just fits in the supplied pump sack bag.



Comfort Light mat, partially inflated, showing the location of added insulation.



Before and after comparison

	Ether Light Insulated Regular		Comfort Light Insulated Regular		Ether Light Extreme
	Before	After	Before	After	
Weight	486g	554g	651g	730g	720g
Rolled dimensions	24cm x 11cm diam	27cm x 13.7cm diam	24cm x 11cm diam	24cm x 13.7cm diam	24cm x 17.5cm diam
Volume	2.2 L	4.0 L	2.2 L	3.5 L	5.7 L
R value	3.2	Not tested	3.7	Not tested	6.2

The Ether Light appears to have a larger volume than the Comfort Light after adding insulation but this is because when it is rolled, after folding in half, one end of the cylinder is considerably concave. The true volume of the mat alone would be similar to the Comfort Light.

The specs of the Ether Light Extreme Regular mat are provided for comparison as this is an obvious alternative to DIY adding insulation.

How warm is it?

I don't yet know how much of a difference adding the insulation makes. It has not been cold enough to test and I can't travel anywhere due to lockdown. I expect it to add at least 5°C to the comfort temperature, based on the benefit of a similar thickness of a ClimaShield quilt on top of my sleeping bag.

Caution – do at your own risk

- I don't know if, over time, the ClimaShield will be excessively abrasive and wear through the airtight coating inside the mat. Obviously, this puts your warranty at risk.
- I don't expect that the ClimaShield has any antimicrobial treatment. This may cause issues with mould after breath inflation.