



Unique climate regulation

# The Origin

Outlast® technology was originally developed for NASA to protect astronauts in space from temperature fluctuations.

Outlast has the broadest range of phase change material (PCM) textiles in the market offering smart solutions as the global leader.

Outlast® technology is the only PCM that carries the Certified Space Technology™ seal. Worldwide, there are today only 40 companies that have received this award; Outlast® products are the only textile application to also carry the honored induction into the Space Hall of Fame.



Registered trademark of the Space Foundation, an initiative of the aerospace industry and NASA.



# The Technology

Patented Outlast® technology enhances textiles by providing the benefit of proactive temperature regulation that manages heat and moisture in many textiles.

Outlast® technology absorbs, stores and releases heat for optimal thermal comfort.



# The Benefits

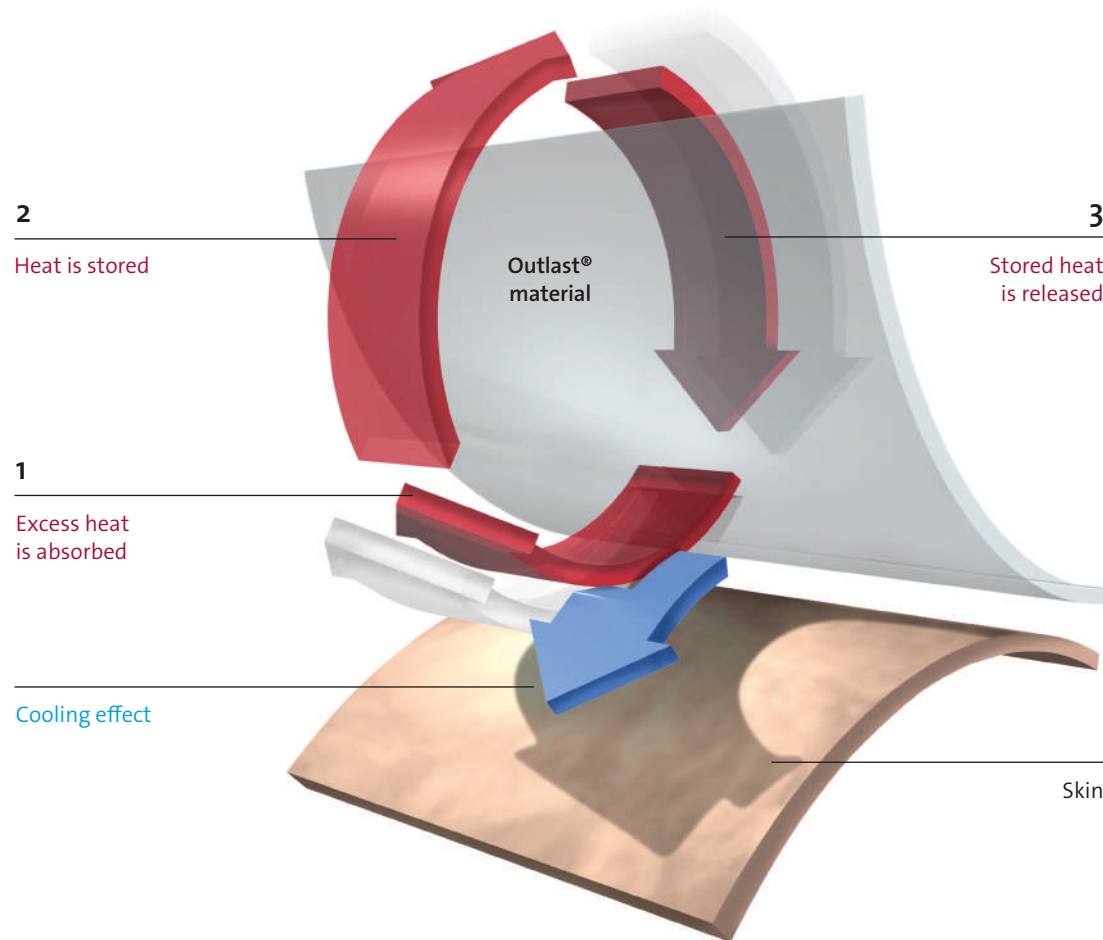
Not too hot, not too cold, but just right. Outlast® temperature regulating textiles adjust to the skin's microclimate and offer more comfort through proactive heat management. When you manage temperature, heat, and moisture you can feel just right, you can feel the Outlast® difference.

## The advantages on a glance:

- Active temperature regulation
- Less overheating
- Less chilling
- Less perspiration
- More comfort



# The Effect



Outlast® technology uses phase change materials (PCM) to absorb, store and release heat to achieve an optimum heat and moisture management.

This gives any product containing Outlast® technology the ability to continually regulate the skin's microclimate. As the skin gets hot, the heat is absorbed, and as it cools, that heat is released.

Outlast® technology does not only balance temperature fluctuations but reduces moisture. Studies\* show that Outlast® products can reduce the sweat production on average between 30% and 50%.

\* Test data available on request

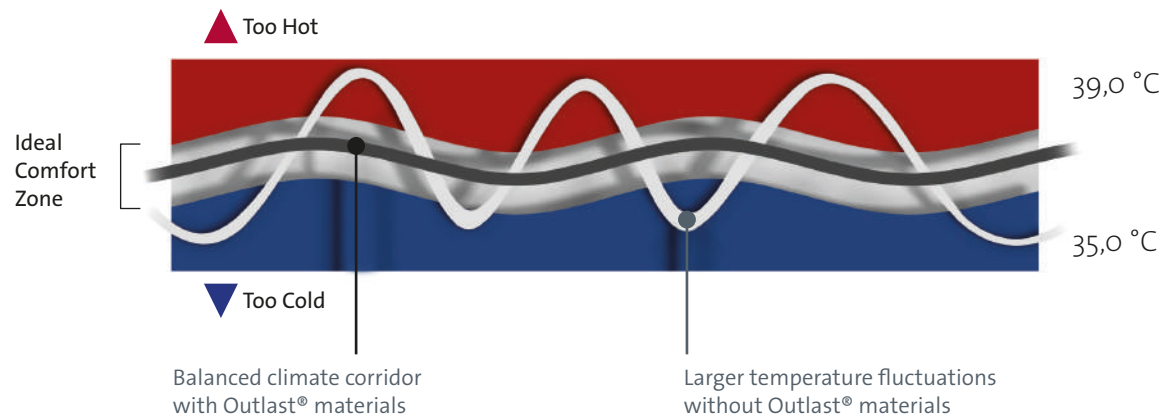
# The PCM

Outlast® phase change materials (PCMs) are comparable to ice in a drink; as it changes from solid to liquid, it absorbs heat and cools the drink, keeping that drink at the desired temperature for longer periods of time.

Outlast® technology works in the same way, but are microencapsulated to be permanently enclosed and protected in a polymer shell. We call microencapsulated phase change materials Thermocules™.



# The Comfort



Comparison of products with and without Outlast® technology

Everybody's sensitivity to temperature change is different, which means everyone sweats or becomes chilled at different rates; quickly or slowly. But the temperature corridor in which we feel comfortable is relatively narrow: when the body core temperature of 37°C fluctuates only 2°C upwards or downwards we are subject to fever or hypothermia.

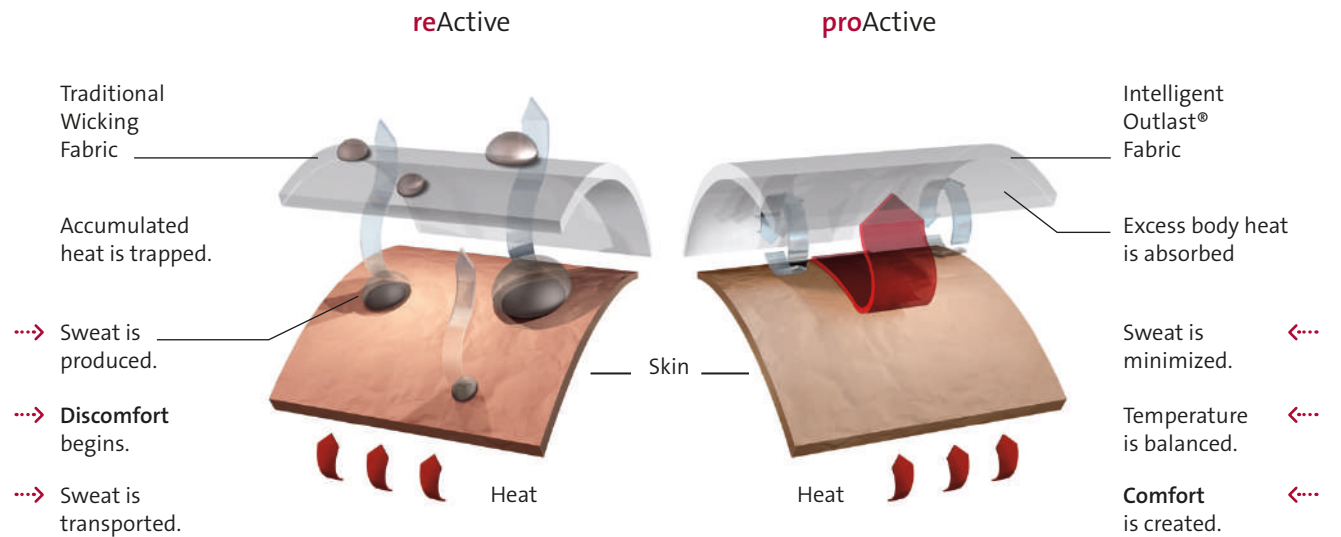
Here is where Outlast® products help. They reduce temperature swings and influence the comfort zone efficiently.

The microclimate is balanced, one sweats less and is less chilled. You feel not too hot, not too cold, but just right™.



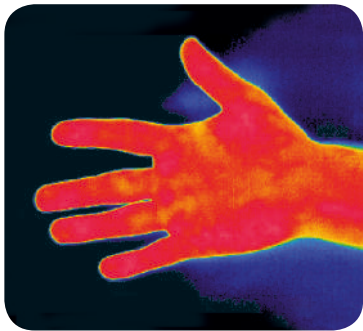
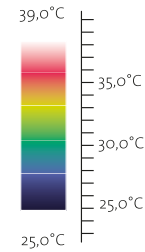
# Less Sweating

In contrast to other materials and insulations, Outlast® products continuously and proactively regulate the temperature to maintain a balanced climate. Overheating and perspiration are significantly reduced. Outlast® textiles provide a measurable advantage compared to wicking technologies, which manage moisture only by reacting to sweat and pulling it away from the skin. Outlast® technology will proactively manage heat while controlling the production of moisture before it begins.

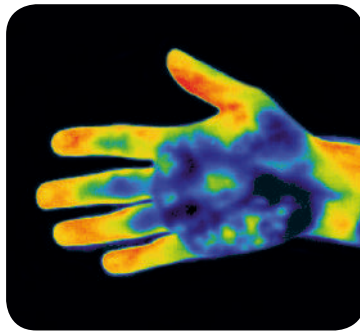




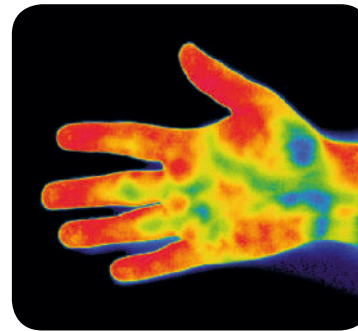
# Less Freezing



A hand at normal temperature (before the test)



Gloved hand without Outlast® material after exposure to ice



Gloved hand with Outlast® material after exposure to ice

Infrared pictures clearly show how Outlast® materials work. Due to basic physics laws all bodies (humans, plants, objects) release energy in terms of thermal radiation. The higher the object's temperature, the more intensive the infrared radiation which it releases.

A test was done with a pair of gloves. One glove with Outlast® material and the other one without Outlast® material. Both gloved hands were laid on a ice block for five minutes.

The test demonstrates that Outlast® products can significantly reduce heat loss; therefore you stay warmer.

# The Product Range

Our product range is very versatile. Tell us your needs and we will recommend an Outlast® phase change material suited for your end product. You can purchase Outlast® fabrics from us or source fibers and knits direct from one of our certified spinners or mills.

For over 20 years, Outlast has been committed to the development, applications, branding and sales support of phase change materials.

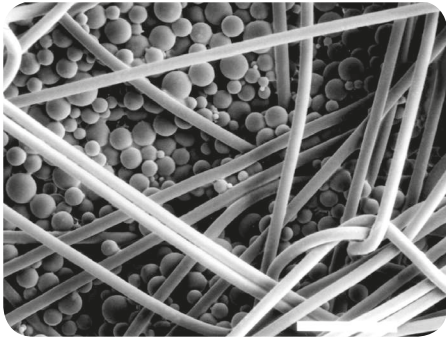
There are different ways to incorporate Outlast® technology depending on the end product and the performance you want to obtain.



# The Applications

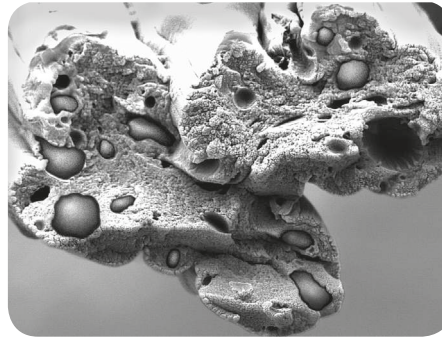
## ■ Coating

Outlast® coated materials offer a higher capacity to store heat than any of our other applications. They are intended to be used in products that are not in direct contact with the skin i.e. footwear, mattresses, duvets, outerwear etc. A wide range of materials as nonwovens, foams or fabrics can be coated.



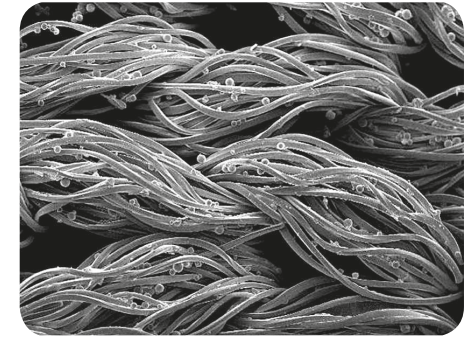
## ■ Fibers

Outlast® PCM can be located inside the fiber. Available Outlast® fibers include acrylic, viscose, polyester and polyamide. These fibers can then be spun into yarns being manufactured into fabrics or finished products being worn directly on or next to skin. Also, to note, Outlast® polyester fiber is suited very well for fillings, i.e. for duvets, pillows or sleeping bags.



## ■ MIC

An advanced formulation of Outlast® Thermocules™ is finely printed onto flat fabric. Outlast® MIC is intended for products worn next to skin and is perfect for the active, casual and sportswear markets (underwear, t-shirts...). This process is ideal for brands seeking a larger volume program using their own fabrics.



# The End Uses

There are tens of thousands of finished products that could be improved by the added benefit of heat management and moisture reduction.

Outlast® technology has many applications and can be added to the following products:

- **Bedding** (mattresses, toppers, duvets, pillows, bed linen, sleeping bags)
- **Apparel** (outerwear, underwear, gloves, accessories)
- **Headgear** (helmets, beanies)
- **Footwear** (shoes, rubber boots, insoles, socks)
- **Seating**
- **Others**



# The Quality



Outlast demands a great deal of quality control and assures that every Outlast® branded product offers measurable advantages to consumers.

Outlast is dedicated to comfort and cooperates with different well-known testing institutes. Outlast® technology is continuously and rigorously tested, ensuring the highest standards of quality and reliability. We can assure: Outlast® materials are ecologically harmless and do not contain harmful substances. Evidence is given for example, by Oeko-Tex® Standard 100 which Outlast® materials meet.



# The Marketing

A high performance product needs to be explained in a professional, way easily understood by all. We offer our support – from hang tags, sew-in labels and helpful demo tools to extensive partner and event programs. We also provide assistance for public relations. Moreover, we are happy to develop mass-customized packages for our licensees.

There are also a variety of trainings. From inperson onsite training to online training, we make it easy to get you and your sales team educated.

Our online training offers up-to-date background knowledge helping you to better understand Outlast® technology and to translate it for customers in a profit bringing way. We offer more know-how and more competence for manufacturers and retailers.





# The Company

Outlast Technologies was founded in 1990 and is headquartered in Colorado/USA with operations across Europe (Germany) and Asia (Hong Kong and Japan).

For over two decades, Outlast has been at the forefront of phase change material development and its application for everyday use. Outlast is considered to be the pioneer but continue to prove again and again the position as market leader in the field of PCM textiles.

Today Outlast owns numerous patents around temperature regulating materials and offers hundreds of commercialized phase change materials from fibers, fabrics, nonwovens to foams containing smart Outlast® technology.

Outlast has partnered with over 300 companies in sports, bedding, apparel, accessories, footwear and other markets.





For over two decades, Outlast has been at the forefront of phase change material development and its application for everyday use. Our experience is global. With operations in Germany, the United States, Hong Kong and Japan, Outlast is always available to answer any inquiries.

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