

The Bionic Climate Membrane

When involved in sporting activity, while motor cycling or during outdoor activities, the individual is exposed to varying climatic conditions and levels of physical exertion. c_change™, the new membrane technology from schoeller®, reacts to the different temperatures and activities. As soon as greater moisture is produced as a result of a higher prevailing temperature or greater body heat, the membrane structure opens and allows excess heat and water vapour to escape to the outside air. As soon as the body produces less heat energy, and consequently less moisture, the membrane structure contracts again. Body heat is then stored and protection from shivering and chilling built up.

Inspired by nature.

c_change™, the new membrane technology from schoeller® takes nature as its role model. Or more precisely, the effect which, for example, can be observed in pine cones which open and close in response to different weather conditions.

Reacts to changing temperatures and activities.

The c_change™ membrane reacts to different prevailing conditions. It takes into account not only the temperature but also humidity and body moisture.

Ensures a pleasant body climate.

Due to the high level of breathability, combined with heat retention adapted to the particular situation, c_change™ ensures a consistently ideal body climate.

Wind and water proof.

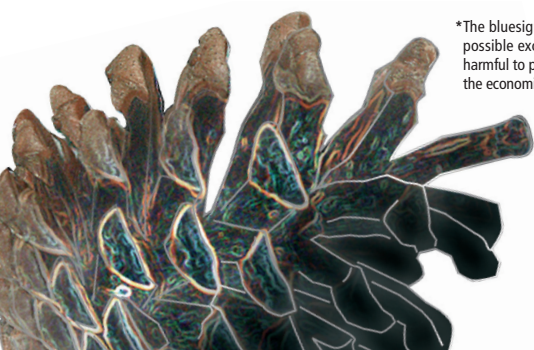
The c_change™ membrane is permanently wind and waterproof, ensuring protection no matter what the weather.

Offers a high level of breathability.

The water vapour permeability of c_change™ adapts perfectly to the prevailing conditions.

c_change™ – further arguments that speak for themselves:

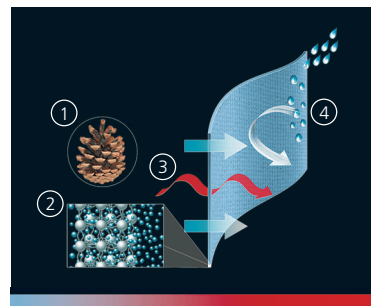
- The c_change™ membrane can be processed into membrane solutions ranging from non-elastic to highly-elastic.
- Tested in practice under extreme conditions.
- The c_change™ membrane conforms to the bluesign® standard*.



*The bluesign® standard guarantees the highest possible exclusion of substances which could be harmful to people or the environment and promotes the economical use of resources in manufacturing.

Open at higher temperatures or high levels of activity:

At high temperatures or during sporting activity, the correspondingly high level of moisture development causes the structure of the c_change™ membrane to open. Excess heat can escape to the outside.



HEAT / HIGH ACTIVITY

In nature:

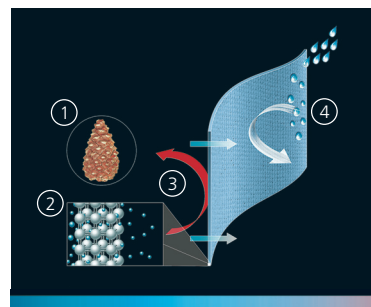
- ① Pine cones open.

In the membrane:

- ② Polymer structure opens and becomes extremely permeable for water vapour.
- ③ Excess body heat and moisture can escape to the outside air.
- ④ Wind and waterproof.

Closed at lower temperatures or periods of inactivity:

Due to the low moisture development at low temperatures or during rest periods, the structure of the membrane contracts and retains the heat close to the body. Shivering or chilling is effectively prevented.



COLD / INACTIVITY

In nature:

- ① Pine cone is closed.

In the membrane:

- ② Polymer structure contracts and thus ensures better insulation.
- ③ High level of heat retention and breathability create a pleasant body climate.
- ④ Wind and waterproof.

c_change™ – Convincing test results:

Water column: 20.000 mm
MVTR value: 18.000 g/m²/24h
RET value: * < 2

These values relate exclusively to the non-laminated membrane.

The corresponding values for the individual end products (two-layer and three-layer laminates) can be made available on request, upon provision of the article number.

*RET: 0–6 very good water vapour permeability, 6–13 good water vapour permeability, 13–20 satisfactory water vapour permeability, 20+ unsatisfactory water vapour permeability



c_change™ performance: proven in the double climate chamber

The adaptive behaviour of c_change™ can now be measured precisely in specially-developed new laboratory tests. This is done using the double-chamber measuring method developed in 2006 by Empa in St. Gallen.

This permits the simulation of numerous real-life situations as well as the determination of values for the following c_change™ properties:

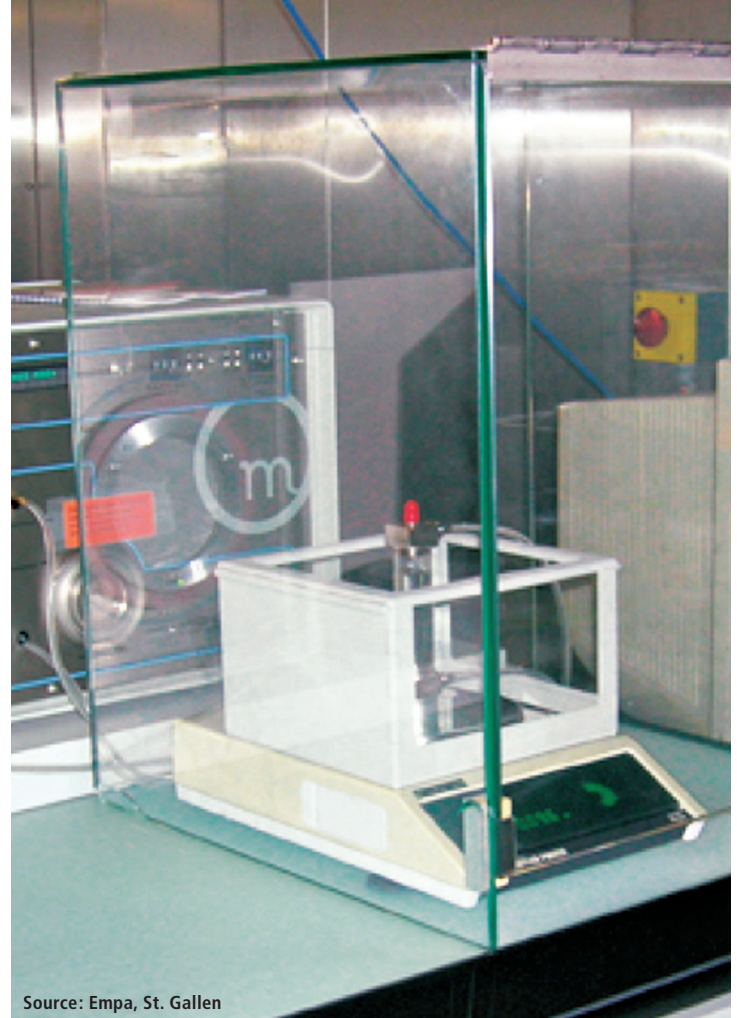
- Alteration of breathability at different temperatures and in different moisture situations
- Heat retention properties of the clothing
- Moisture transport – quantity related to time

Everyday simulations in the double-climate chamber.

In the double climate chamber, specific “real-life situations” are replicated. In the large Climate Chamber 1, the outdoor climate is simulated: Here different temperature levels (e.g. 10 °C), humidity values (e.g. 50%) and wind speeds (e.g. 20 km/h) can be pre-set. In Climate Chamber 2, also integrated into the same test appliance, the interior climate, i.e. the climate close to the body in the interior of the clothing, can be very flexibly simulated (e.g. 25 °C and 90% humidity).

c_change™ results:

- In contrast to the hydrophobic membrane system, c_change™ membrane allows 25% more moisture to escape from the inside to the outside within the same period.
- With a temperature increase from 10 °C to 20 °C, the c_change™ membrane increases water vapour permeability (breathability) by 50%. When, in the opposite case, the outside temperature drops, for example, from 20 °C to just 10 °C, the polymer structure of the membrane contracts and the heat retention capacity increases.

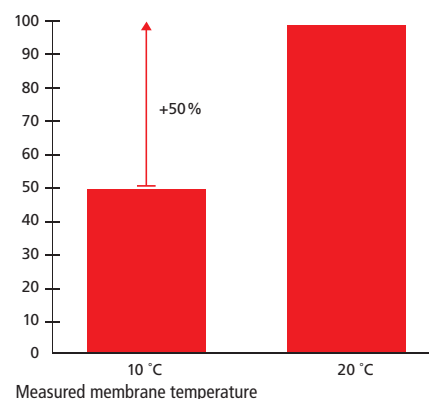


Source: Empa, St. Gallen

Example: Measurement of water vapour permeability (Breathability)

Breathability in relation to membrane temperature.

Breathability in %



With a temperature increase from 10 °C to 20 °C, c_change™ increases water vapour permeability (breathability) by 50%.

Source: See Empa Test Report No. 841192-2 dated 15.12.2006.

The method is still under development and has therefore not yet been definitely evaluated.