

Instruction material

1. What's warmX anyway?

WarmX announces the cold weather fight!

In this way we have developed a patented technology, which makes possible for our customers to feel well and to move freely at low temperatures, also in professional or in private life.

Silvered fibres are woven into the knitted fabric and supplied with electricity by a small rechargeable battery. The knitted fabric warms directly on the skin – completely without heating wires!

We use this easy and efficient kind of warming for the development of products, which generate the warmth within different ranges of the body.

Whether at work or in your leisure time – with these new patented heatable underwear by warmX freezing out in the cold from now on is a thing of the past. Warming zones huddle closely against the skin and provide you with comforting temperatures. A mini power controller supplies the fabric with the required energy and cares for the safety of the wearer.

2. Products

2.1. warmX-undershirt

The warm-undershirt is the classic in our warmX collection. Two warming zones are placed around the kidneys. In this region the body is highly temperature sensitive and therefore must be warmed right there. The subjective feeling of „being warm“ is best when the kidneys are warmed. Furthermore also feet and hands won't cool down that fast, because the blood of the body runs through the kidneys and is warmed up there.

To achieve an optimum thermal transfer it is essential for the warming zones to be preferably close to the skin. That fact was considered of course during the design of the cut.



Models

- Available for women (sizes 36-54) and men (sizes 44-62)
- ¼ sleeve, long sleeve and sleeveless version
- Available as set (incl. undershirt, mini power controller and charger) or separately

Materials

- 100% Polycroton Microfibre
- 100% superfine merino wool
- 50% cotton and 50% acrylic

Colours

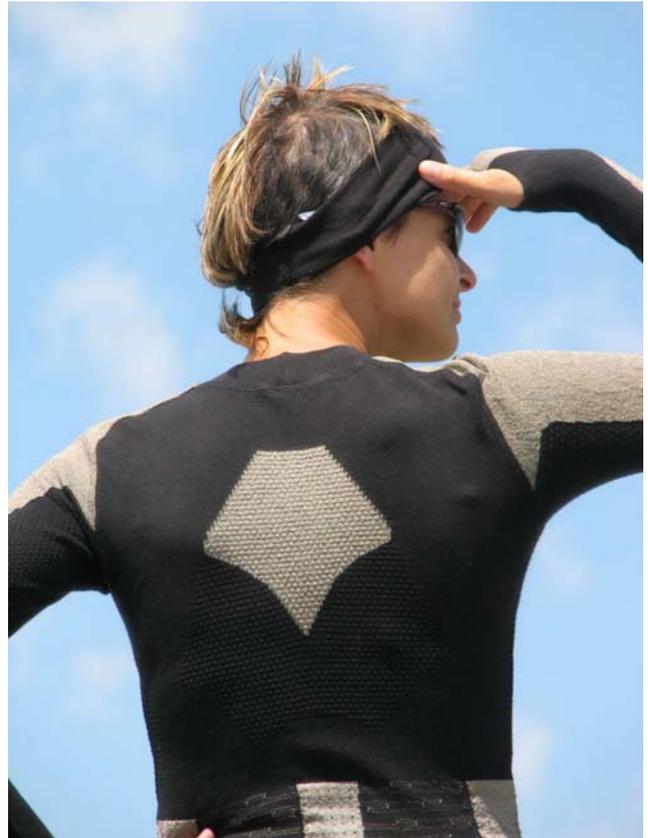
The warmX undershirt is available in the colours natural white, dark green, navy and black.

2.2 warmX silverSun

The warmX-silverSun was developed especially for the outdoor sector. Whether Nordic Walking, hiking, biking or rock-climbing – with the warmX-silverSun you will be perfectly equipped. The shirt was developed following the principle of body mapping. A variety of knitting structures ventilate respectively warm the upper part of the body in appropriate regions and provide a comforting body-climate. Furthermore the area of the kidneys is actively warmed up by the unique warmX technology.

Thus hypothermia provoked cold is efficiently prevented. Around the body regions with strong perspiration the shirt was knitted of pure silver plated thread – thus bacterial increases is inhibited and off odours are precluded.

Through intermixture of Elastan the shirt huddles closely to the skin and ensures optimum thermal transfer around the warming zones.



warmX – silverSun designed by *Michele Stinco*.

Models

- Available for women (sizes S-XL) and men (sizes S-XL), long sleeve
- Available as set (incl. SilverSun, mini power controller and charger) or separately

Materials

- 58% Merinowool extrafine / 6% Elastan / 34% PA / 2% pure Silver
- 72% Cotton / 6% Elastan / 20% PA / 2% pure Silver

Colours

The warmX-silverSun is available in black.

2.3 warmX-tights

WarmX finally prevents your feet from getting cold!

With our new, patented warmX-tights we present the world's first heatable flat-knitted tights and by doing so setting new standards in the wide field of Smart Textiles.

Warming zones have been placed at the feet and around the knees and provide comforting temperatures – completely wireless and directly upon the skin. The mini power controller is situated in a small pocket in the upper left side front of the tights. If that positioning should be found disturbing the extension included in the set can be used. Thus the power controller can be worn comfortably in the trouser pocket.

The tights are knitted in one piece and thus they are *completely seamless*.

As feet and knees are the regions that cool down most rapidly the warming zones were placed just in these areas. Nearly 50% of the tights consist of pure silver plated thread. Around the feet it is even more than 50%. The silver avoids bacterial increase and precludes off odours – especially at the feet.

Due to medical advice the heat output at the feet was optimized just for preventing the feet from getting cold. A distinct heat source shall not be sensible as feet may overheat. A healthy heat source makes sure that the feet just feel “normal”. If the feet are frozen to the marrow a “normal” level shall be reached after about 20 minutes.





Models

- Available for women (sizes S-L) and men (sizes S-L)
- Available as set (incl. Tights, mini power controller, charger and extension)

Materials

WarmX-tights are available consisting of following basic materials:

- 39% Merinowool extrafine / 9% Elastan / 50% PA / 2% pure Silver
- 49% Cotton / 9% Elastan / 40% PA / 2% pure Silver

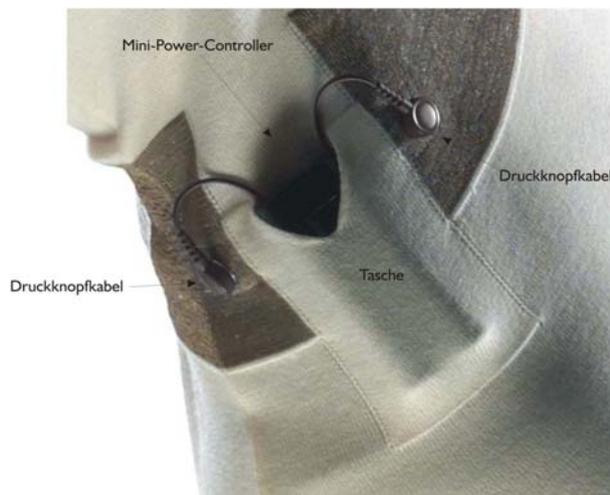
Colours

The warmX-tights are available in black.

3. Functionality and technical principles

To explain the functionality we shall cite the warmX-undershirt as an example. The functionality is analogously effective for all warmX-products.

Around the waist a silver plated thread of polyamide (not a wire!) was knitted into the fabric which is then able to conduct a current. The Mini-Power-Controller is located in a small waist pocket at the front right-hand side. It is connected with the conductive fabric through two snap fasteners.



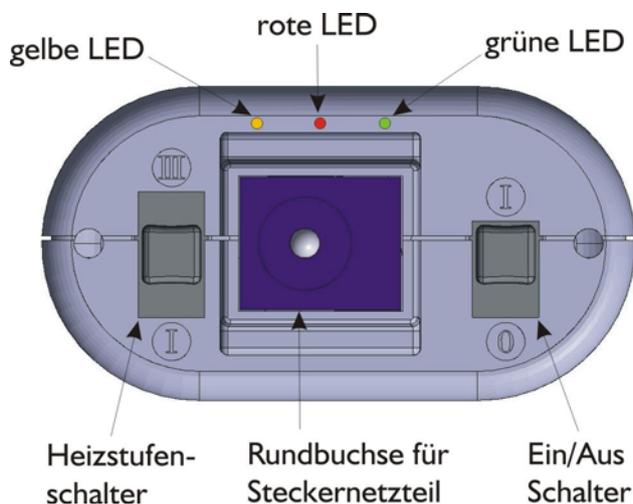
At the height of the kidneys there are two meandering heating zones, one at the right side and one at the left side. These heating zones are connected with the conductive fabric.



The Mini-Power-Controller and the heating zones are forming an electric circuit around the waist. The conductive fabric is made exclusively from silver plated polyamide so that the resistance is very

small and the current can flow without any obstructions. However in the heating zones the polyamide thread has not been knitted into every course. Thus the resistance is higher and therefore heat is produced in these zones.

To avoid a short circuit, for example, from putting layers of the conductive fabric on top of each other a complex control unit is necessary. For this the Mini-Power-Controller was designed which is a microprocessor control which forms the heart of the warmX-undershirt. The control unit guards the resistance in the circuit and ensures that anyone wearing the shirt is safe.



4. Consumer benefit

For the first time it is possible to have a knitted fabric produce heat itself without any additional tools like heating wires or other devices. The highest effect is achieved through direct skin contact with the source of the heat. Therefore, the heatable clothing has been designed as underwear which is preferably close-fitting. This has also been taken into account in the design of the different sizes of all models.

The heating effect can be enhanced with further layers of insulating outerwear. The heat is kept close to the body and it can circulate well under the outerwear.

The heatable underwear by warmX is an excellent companion for all activities which are undertaken in cool surroundings no matter whether that is for leisure or during working hours. Not only does it enhance your comfort but also helps to prevent illnesses which benefit from being cold.

5. Customer groups

With its above-mentioned properties our heatable underwear is suited best for the following customer groups:

Outdoor/sports

- Hiker/walker
- Cyclists/bikers (kidneys, knees and feet especially need to be warmed)
- fans at sports events (standing and sitting in the cold over a long period)
- gliding (gliders do not have a heating, it is very cold in there)
- Huntsmen/angler (sitting and waiting over hours)
- Divers (to be worn inside the dry diver's suit)
- Horse riding

Working clothes

- Purchasing heatable underwear can be profitable for many a mercantilist. For employees working out in the cold can avoid illnesses much better wearing warmX underwear. Thus warmX contributes to the diminution of the status of employee's illness.
- Building worker
- Agriculture and forestry
- Horticulture
- Employees in cold storage rooms
- Cinematographers
- In short: all people working in the cold

6. Features

6.1 Mini power controller

- Microprocessor controller
- High quality LI-ION cells without memory effect
- Short circuit protection

- Rapid shut down - when a certain temperature is exceeded (measured with a temperature sensor)
- 3 heating modes (2, 4.5 and 7 watt)
- Operating time:
 - Mode 1: 2 Watt - approx. 5.5 hours
 - Mode 2: 4.5 Watt - approx. 4 hours
 - Mode 3: 7 Watt - approx. 2.5 hours
- Controlled charging (3 hours)
- Continuous heating, even when the battery voltage is getting lower
- It is not possible to state the exact temperature for the different heating modes as they depend on various factors such as surrounding temperature, insulation of the outerwear and absorption of heat by the skin. Besides the sensation for temperatures differs with every customer.
- Capacity of rechargeable battery: 2200 mAh
- Durability of the rechargeable battery: 500 recharge cycles are guaranteed

6.2 Materials

100% Polycolon Microfibre

- Fibre made of polypropylene
- does not absorb any moisture
- leads moisture to the outer layer of the knitted fabric
- forms a dry grid between the skin and the outer layer of the knitted fabric
- Polycolon is 41% lighter than cotton
- It has a comforting, soft and warm grip
- It has a high breaking strength and elasticity and therefore is extremely sturdy
- Low heat conductance -> high level of heat retention without any heat accumulation
- Therefore Polycolon is suited for sportswear as well as health wear
- Polycolon has a high crease proofing

- It is resistant against most acids and bases
- Polycolon is soil-resisting and fast drying
- Machine washable at 30°C

100% Superfine Merino Wool

- Wool is a natural fibre
- Superfine Merino Wool is a term given to merino wool fibres which are under 17 micron thickness
- It is itch-free
- Wool absorbs moisture up to 40% of its own weight without losing any of its insulating capacity
- Crease-proof
- Machine washable at 30°C

50% Cotton/50% Acrylic

- If an allergy to wool exists this is a perfect alternative
- Very comfortable to wear
- Easy to take care of due to the mixture with acrylic
- Machine washable at 30°C

Merino Wool / PA / Elastan

- Features identical to 100% Superfine Merino Wool
- The share of Elastan provides a close fit to the skin and therefore an optimum heat transfer.

Cotton / PA / Elastan

- Cotton is a pure natural fibre
- Extremely sturdy

- Eudemic
- Breathable
- Machine washable with 30°C

6.3 Battery charger

- Input: 230 volt, 50 Hz
- Output: 12 volt, 1000 mAmper

7. FAQ

Can I burn myself while wearing the warmX-underwear?

No! Firstly, the underwear works with a small battery current which is not able to produce such high temperatures. Secondly, the Mini-Power-Controller guards the value of resistance in the circuit and adjusts the heating output accordingly. When the value of resistance gets too high, the Mini-Power-Controller cuts off the energy. And thirdly, the Mini-Power-Controller is equipped with a sensor for the temperature which also leads to a power cut if there should be any overheating.

What happens when the underwear gets wet while heating?

Nothing happens. The underwear also functions when damp whether that is due to water or perspiration. A short circuit cannot be produced through any dampness or moisture.

What happens when the underwear is put into the laundry?

Nothing happens. The underwear can be washed in the machine at 30°C using a wool cycle. A mild detergent or a special soap for wool should be used. If the washing instructions are adhered to the ability to conduct a current is not effected even if the underwear is washed many times.

I have worn the heatable underwear for a while and now it doesn't heat anymore. Is it broken?

Usually not! Sometimes the conductivity of the knitted fabric is affected by secretions of the skin (such as sweat). In an extreme case the resistance rises until it breaks the predefined frame so the mini power controller activates the safety shut-down, which prevents further heating. Therefore the underwear needs to be washed each second day if worn intensively (please consider washing instructions!). The conductive fabric is thus cleaned and the full conductivity is restored.

Does the silver present a health hazard when worn directly on the skin?

No! On the contrary, the anti-allergical and anti-bacterial effect of silver is already well-known. Women who show an allergic reaction to metallic jewellery usually do not have any problems wearing silver jewellery. Therefore, silver can also be worn on the skin without any concerns.

Which temperatures does the warmX-undershirt produce?

The temperatures are influenced by many different factors such as the surrounding temperature, insulation of the outerwear and heat absorption of the skin. The heating power in the three modes can be specified as follows:

Mode 1: 2 watt

Mode 2: 4.5 watt

Mode 3: 7 watt

The heating output of the entire human body is about 100 watt, which means that the warmX-undershirt produces about 7% of the heating output of the human body.

Are other devices such as mobile phones or cardiac pacemakers affected in their function while the heatable underwear is in use?

No. All warmX-products are EMC-safe. They do not send out disturbing radiation and are themselves secured against it.

Why isn't the entire underwear heated?

For producing such a high level of energy a much larger rechargeable battery would be necessary.

Why were the heating zones of undershirt and silverSun placed in the kidney area?

In that area the human body is particularly receptive to heat. When heat is applied in this area the person wearing the warmX-shirt feels very comfortable. Here heat is received far better than anywhere else.

Why were the heating zones of the tights placed around knees and feet?

These areas usually cool down fastest and therefore must be particularly warmed to prevent health consequences (like colds). In addition a comforting feeling is best achieved if the feet are kept warm.

Does the Mini-Power-Controller get into the way while undertaking particular activities and couldn't it have been placed somewhere else?

Many tests have shown that the location of the Mini-Power-Controller at the side has been found the least disturbing. Further, the Mini-Power-Controller is quite small and can be compared to a mobile phone which is often worn in unsuitable places. The placement of the Mini-Power-Controller is ideal for most activities.

How long does the power of the rechargeable battery last?

The operating time depends on the mode which is chosen:

Mode 1: approx. 5.5 hours

Mode 2: approx. 4 hours

Mode 3: approx. 2.5 hours.

How long does recharging the battery take?

With a mains supply of 230 volt it takes about 3 hours.

How can I change the battery?

Changing the battery is not possible. In order to provide the necessary energy with such a small battery the Mini-Power-Controller has a special high-performance battery which is produced for industrial use. For safety reason the consumer must not be able to have any direct access to the battery. The case in which the battery is located is firmly closed and may not be opened.

What do I do when the battery is worn out?

In that case warmX offers to change the battery. You only have to send in your shirt to warmX.

Do I have to discharge the battery completely before recharging it?

No, because the memory effect which is known from Ni-Cd batteries does not occur with the LI-ION batteries which are used in warmX-undershirts. Therefore, the battery can be recharged at any time without losing any of its capacity

Do the batteries collapse when temperature outside falls below 0°C?

If the Mini-Power-Controller is placed inside the waist pocket, it is very close to the body. That's why it will have body temperature even if it is switched off. So it will be ready to use all the time – despite of the temperature outside.

I cannot feel heat at the feet of my tights. Are they broken?

No, usually not. Due to medical advice the heat output at the feet was optimized just for preventing the feet from getting cold. A distinct heat source shall not be sensible as feet may overheat. Overheated feet are as dangerous for health as frozen feet. A healthy heat source makes sure that the feet just feel “normal”. If the feet are frozen to the marrow a “normal” level shall be reached with warmX after about 20 minutes.