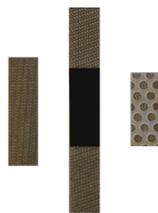


PhantomLink



NANOLEQ

TECHNICAL DATASHEET



PhantomLink is an essential part of the Nanoleq solution to connect ElectroSkin electrodes to buttons or connectors and the PhantomTape cable to electrodes, sensors, buttons or flex-PCBs. PhantomLink can easily be applied by using a hot press or simply by ironing (for prototyping).

Together with ElectroSkin or PhantomTape it can be used for many e-textile applications like ECG, EMG, EEG or for powering electrostimulation or LEDs on garments.

Physical parameters

| PhantomLink | |
|-------------------------------------|---------------------------------|
| Sheet Resistance | < 0.5 Ω /square |
| Material | Polyamide, silver, polyurethane |
| Contact resistance to PhantomTape X | 0.7 Ω |
| Weight | 180 g/m ² |
| Thickness | 0.38 mm |
| Maximum elongation length | 60% |
| Maximum elongation width | 5% |

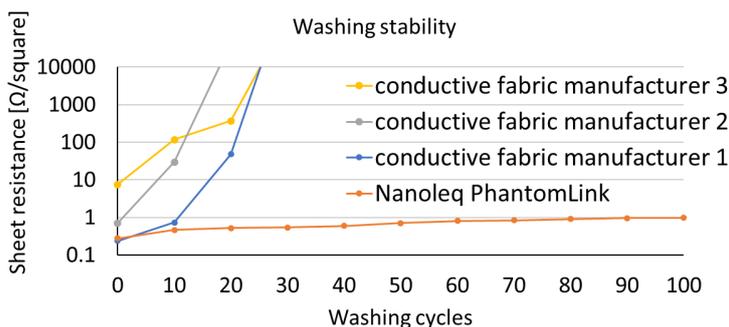
Application parameters hot press

PhantomLink can be applied onto a textile with a hot press or simply by ironing (for prototyping) within the following parameters.

| | |
|------------------------|---|
| Lamination Temperature | 130 - 150 °C |
| Lamination Pressure | 50 - 100 g/cm ³ / Medium to high |
| Lamination Time | 20 - 30 seconds |

Washing resistance

Washing is problematic for most conductive yarns and fabrics. In contrast to alternative conductive fabrics which might be used in a similar manner, the connection remains stable for PhantomLink over 100 wash cycles. Data shown below: Washing with Miele WT1, express program @ 30 °C, Miele TwinDos detergent. The names of competing manufacturers were anonymized.



Washing instructions

In order to ensure a stable performance, the following washing instructions should be followed.

| | |
|-------------|--|
| Temperature | 30 °C |
| Time | 30 minutes |
| Tours | 600 |
| Detergent | liquid, soft |
| Additional | Do not tumble dry Do not bleach Do not dry clean |

*water quality might influence the conductivity of PhantomLink. High Fluoride and low pH might create unfavourable reactions.

Sweat resistance

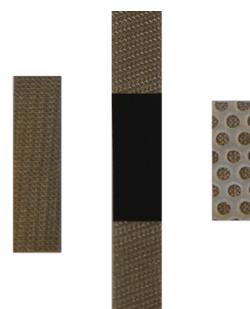
Exposure to sweat and the related wetting and drying processes can be problematic for smart textiles, especially in the combination with applied current which can initiate electrochemical processes.

PhantomLink was tested with the accelerated artificial sweat test according to ISO 3160-2. It performed well, without mechanical or electrical failure.

| | before | afterwards |
|---|------------------------|------------------------|
| Accelerated artificial sweat test according to ISO 3160-2: 24h in concentrated solution at 40°C | < 0.2 Ω /square | < 0.3 Ω /square |

Mechanical stress resistance

PhantomLink used in the Nanoleq connectivity solution is heavily resistant to mechanical stress such as flexing, twisting and stretching and its conductivity remains stable. The electrical contact resistance of PhantomLink remains below 10 Ω at all times while stretching with 30% elongation for 3'000 cycles, also after 100 wash cycles and after accelerated artificial sweat testing.



3 different shapes of PhantomLink for several connections needs.