

SIOEN



FLEXOTHANE® - EXTENDED LIFE TIME

SIOEN

Durable, comfortable and supple against water and wind

What is Flexothane®?

Flexothane® is a technical fabric that offers you excellent protection. The polyurethane coating on a stretchable knitted base makes Flexothane® water and windproof, comfortable, noiseless, 150% stretchable, supple, highly tear resistant and machine washable.

Breathable, extremely comfortable

Flexothane® is a breathable fabric. The knitted fabric absorbs perspiration avoiding that clammy feeling. Your body stays dry and your body temperature is regulated.

Strong, supple, light and noiseless

Flexothane® is resistant to rough handling and foul weather. Moreover, Flexothane® is supple and 150% stretchable, which ensures your freedom of movement remains totally unrestricted. Garments manufactured from Flexothane® are long lasting.

Machine washable

Flexothane® is highly resistant to several types of oil derivatives, fuel, diesel, grease,... and the smooth outside PU coated surface can be very easily wiped clean. Our different Flexothane® fabrics are machine washable. Flexothane® Kleen is washable at 95°C, without losing its original shape. With Flexothane® you don't have to worry about getting dirty.

Colours

Flexothane® exists in a myriad of colours. Don't hesitate to ask for your company colours.

Ecological

In the production of Flexothane® we do not use chloride. Consequently when disposing of Flexothane® after use, harmful substances are not released into the environment.





Technology

Flexothane® consists of a high grade polyurethane coating on a stretchable knitted base and offers an excellent protection against rain and wind. Flexothane® has been specially engineered to form a durable, impenetrable barrier against water and wind, while retaining a high level of wearer comfort. The polyurethane coating forms an impenetrable barrier and the knitted base assures a high tear resistance and a great flexibility in addition to absorbing body moisture. The seams of all Flexothane® garments are

high-frequency welded. The Flexothane® fabric is a result of the groups' vertical integration, where the entire production process is controlled from fabric to finished product. Flexothane® is produced on the transfer coating lines of the Sioen industries group. Extended durable protection against hydrolysis is key to this fabric.

This technology guarantees the following characteristics:



Wind- and waterproof

Breathable

Comfortable

Supple

Lightweight

Strong

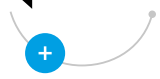
Machine washable

Ecological

Multi colour

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EXTENDED LIFETIME



The Flexothane® Experience

Put on a Flexothane® coat, and you will feel just how light and flexible Flexothane® really is. It doesn't restrict your movements in any way, on the contrary, it moves with you. So much for the comfort part. Let's get the job done. Go out and do some work in the pouring rain. Or take the high-pressure washer for a cleaning tour.

Underneath your reliable Flexothane® layer you'll be out of reach of chilly winds and you'll stay perfectly dry. And when the rain stops or you turn off the pressure cleaner, you can bet the outer layer will be dry in the blink of an eye! No need to worry about damaging your garment, the rock solid fabric can take more than you think. Or about making your

hands dirty. Flexothane® is resistant to all sorts of oil derivatives and greases (even to some chemicals and blood-borne pathogens!). The smooth surface can easily be wiped clean. And after a whole day of hard labour, you can just take off your jacket, throw it in the washing machine and sit back and relax. Because Flexothane® is perfectly machine washable. Attuned to an intensive day in day out use, a durable Flexothane® garment never lets you down offering the best value for money a hard working (wo)man can get.

Qualities



Flexothane® Essential is our basic Flexothane® quality. With its $\pm 170 \text{ g/m}^2$ it is also one of our lightest. Flexothane® Essential is a one-sided PU coating on an undyed polyester knitting.

Weight: $\pm 170 \text{ g/m}^2$



Flexothane® Classic uses polyamide fibres for its knitted base instead of polyester fibres. Polyamide fibres are exceptionally strong and resistant making our Flexothane® Classic into an extremely durable fabric. It has extended resistance against hydrolysis which results in a longer life time of your garment. Thus offering higher value for money. Flexothane® Classic is a one-sided PU coating on a polyamide knitting.

Weight: $\pm 180 \text{ g/m}^2$



Flexothane® Flame is our flame retardant Flexothane® quality. When in contact with flames it will not propagate the production of flames, so the garment doesn't become a hazard in itself for the user. Flexothane® Flame is a flame retardant treated PU coating on an inherently flame retardant polyester knitting.

Weight: $\pm 190 \text{ g/m}^2$



Our Flexothane® Anti-static is not only flame retardant it has also permanent anti-static properties. The conductive yarn which avoids the building-up of static charges -that could ignite an explosive atmosphere - is integrated in the knitting. Flexothane® Anti-static is a flame retardant PU coating on an inherently flame retardant polyester knitting including permanent anti-static properties.

Weight: $\pm 200 \text{ g/m}^2$



Flexothane® Kleen is especially designed for the food industry and for protective garments that require high temperature washing up to 95°C , which assures an optimum hygiene. Flexothane® Kleen also offers protection against liquid penetration, such as blood, body fluids and blood borne pathogens. A cytotoxicity test based on ISO 10993-5 has approved the use of Flexothane® Kleen. The tests concluded that the fabric didn't cause a cytotoxic effect. Flexothane® Kleen is a one-sided PU coating on an undyed polyamide.

Weight: $\pm 170 \text{ g/m}^2$

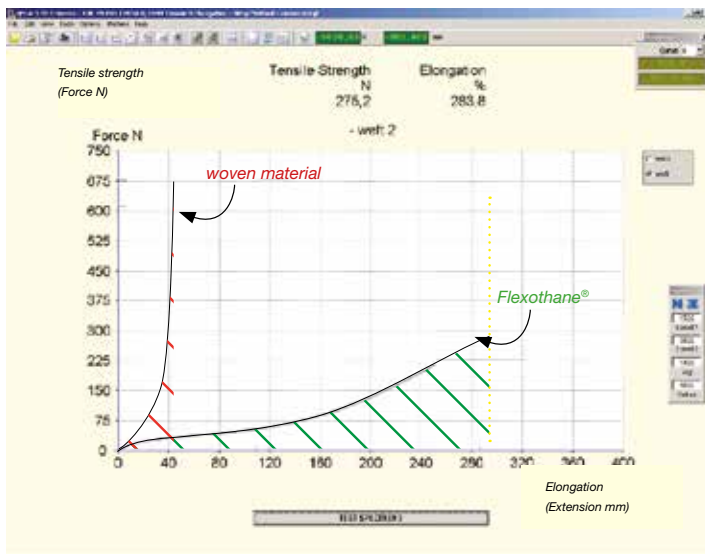
Flexothane®: extended life time

What makes Flexothane® Classic such a unique and better product than the competition ?

Because it respects the original 'classic' rules of good workmanship, a balanced combination between the properties of the base knitting and a high grade PUR applied by state of the art coating technology, which guarantees a high and durable quality and comfort for the wearer.

We use a PA 6.6 (which guarantees high colour fastness, excellent RF welding properties of the seams, ...) weft knitted base fabric which with an optimized strength and elasticity balance.


150% stretchable




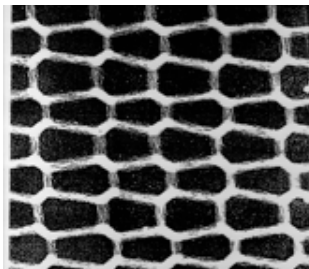
The stress-strain curve illustrates how the mechanical force is absorbed and distributed by the deformation and elasticity of the knitted loop structure which explains the 'toughness' of the material and the limitation of the damaged area in case of mechanical damage (eg. accidental contact with a nail,...)

We get an elongation at break over 150%.

Of course it's also important that after a 'foreseeable conditions of use stretching' that the fabric returns to it's original shape and that the waterproofness is still guaranteed.

 toughness woven material

 toughness Flexothane®



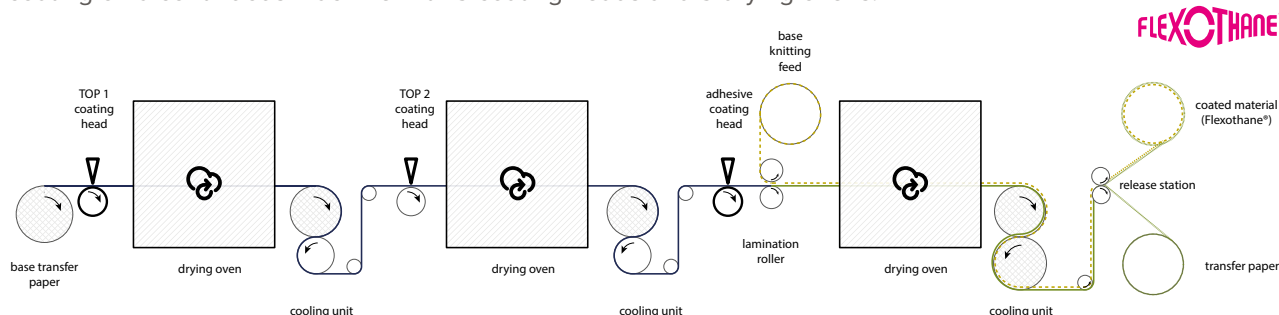
The mechanical force can be absorbed and distributed by the deformation and elasticity of the knitted loop.



The above microscopic picture of a cross section of FLEXOTHANE® shows how homogenous the PUR coated layer is.

3-layer transfer coating on a continuous machine

When you paint your house at home, you know it's much better to apply several thin layers of paint one after the other, and allow the previous layer to dry first. That is exactly what we do. We apply a 3 layer transfer coating on a continuous machine with 3 coating heads and 3 drying ovens.



Competitors materials are often based on a 1 coating head machine combining top 1 and 2 in one thicker layer in which the solvent is forced to evaporate through a thick layer of PUR during one oven passage. This can create pinholes which cause problems with waterproofness, and even more problems after stretching the material.

Furthermore, the elasticity of the coating must be optimized so that it's a perfect marriage with the elasticity of the base fabric.

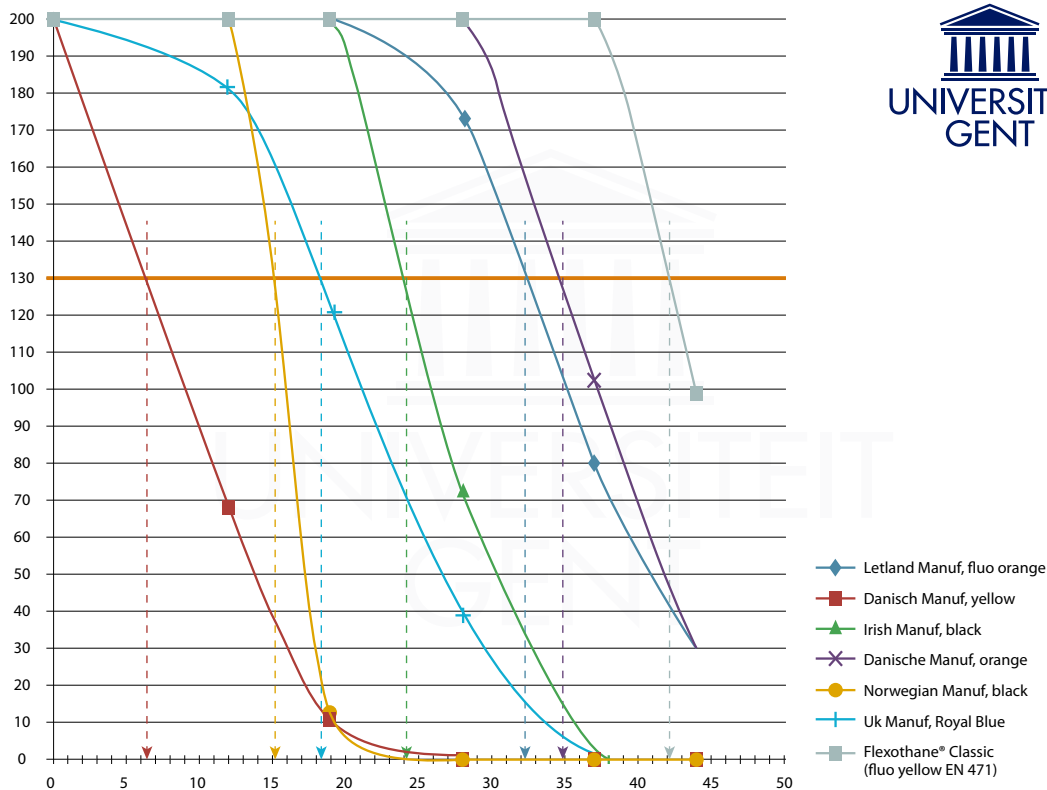
The applied Flexothane® coating formula is of key importance. We use an European origin high grade hydrolysis resistant PUR. The European standard EN 343 class 3 (meaning minimum 130 cm of waterproofness) is applying a range of pre-treatments to the fabric after which we still need 130 cm waterhead. As received we easily have waterproofness results of >8m (or 800 cm).

The EN 343 pre-treatments are washing & drying, abrasion, crumple flexing and submersion in oil and fuel. Flexothane® is systematically subjected to an additional (not specified in the standard) hydrolysis or 'jungle' test as an accelerated ageing test. The combination of moisture and temperature can cause depolymerisation of the PUR chain causing loss of elasticity, deterioration of waterproofness, stickiness, etc...

Synopsis of the Flexothane® Classic properties:

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|--|---|--|
| » EN 343 tested | » High tear resistance | » Mould resistant |
| » Higher waterproofness for the foreseeable conditions of use | » Very supple & comfortable; stays supple at low temperatures | » Easy wipe cleanable |
| » Seams are easily RF welded | » High hydrolysis resistance (test report available) | » Machine washable/dry cleaning |
| » Windproof | » longer end of life period = lower total cost of ownership | » Repair kit available |
| » Blood borne pathogens resistant (ASTM test report available) | » Lightweight | » Ökotex 100 tested |
| » Good chemical resistance (permeation list available) | » Noiseless | » Logo's, reflective stripes are RF welded |
| » Up to > 150% stretchable | » Hygienic | » EN ISO 20471 hi-vis yellow, orange-red (incl. GORT) and red possible |

High Hydrolysis resistance = extended life time



We asked the University of Ghent in Belgium to test our Flexothane® Classic and some competitors products against the hydrolysis behavior. All samples had an original waterhead of >200 cm 'as received'.

The same samples were subjected to an increasing period of accelerated ageing (after 12, 19, 28, 37 and 44 days continuous at 70°C and 90% RH) and asked them to evaluate the waterproofness.

The exposure times of this accelerated ageing test is not representative and can not be correlated to an exact real life ageing or utilization period but these graphs show that Flexothane® Classic has up to a factor 6 longer end of life period than competitors products, which translates in a far lower cost of ownership when choosing for Flexothane®.





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