

DESIGN INNOVATION

BIONIC CASES IN SPORTS



Resistance



Trabec helmet by POC

DESCRIPTION

The Trabec is a well-ventilated in-mold helmet that combines functionality and performance for single track and enduro riders in need of the highest degree of protection. The construction is similar to the trabecular bone structure, which has excellent resistance and durability. The inner EPS core, reinforced with aramid filaments, is tough and resilient and the outer PC shell is constructed with the seams located in the areas of least exposure.

MATERIAL

ABS - PC
Aramid fiber grid covered areas

MANUFACTURER

POC
<http://www.pocsports.com/en/product/1231/trabec>



TRABECULAR
BONE

Breathability

X-BIONIC Devil Thorn Technology



DESCRIPTION

The Thorny Devil has developed a system of water transporting channels on its body. These channels transport water from moisture and fog to its mouth using capillary action. According to the fractal principle (self-replicant principle) of self-similarity the structures come up with decreasing scale. Thus the effectiveness of the water conducting structures increases at the same. X-BIONIC translated this capillary effect to athletic apparel to transport sweat to parts of the body in need of cooling.

MATERIAL

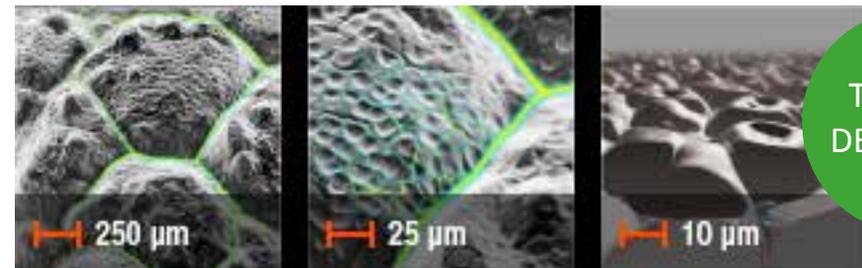
HydroPort yarns

The honeycomb-like structure renders the surface extremely hydrophilic. The water is sucked into small inter scalar channels which transport the water by capillary forces. Like a network of tiny canals, the sweat-transporting HydroPort yarn was developed using the precise principle of the Thorny Devil.

MANUFACTURER

X-BIONIC

<http://www.x-bionic.com/labs/technologies/thorny-devil-technology/534013>



THORNY
DEVIL SKIN

Breathable



DESCRIPTION

One of our biggest idea providers is 12 centimetres long. Amphibians have a unique talent: they do not drink, but instead they absorb moisture through the skin and store it in their lymph sacs. The secret lies in their extraordinary skin structure. Anyone deciphering this and imitating it with the aid of technology, has got a highly efficient system for transporting sweat through layers of clothing. X-BIONIC® has done exactly that. The unique symbionic™ membrane is based on bionic research relating to cutaneous respiration in amphibians. symbionic™ membrane based on bionic research and inspired by amphibian skin. They transport the water vapour and do not leave droplets of sweat behind until they evaporate. The tiny points and edges of the material destroy the surface tension of the droplet and distribute the moisture. The ultra-fine hairs absorb it and transport it to the outside air, where the moisture evaporates. There aren't any holes to get blocked. The symbionic™ membrane works when the outside air is dry and is even more effective at higher humidity.

MATERIAL

Symbionic Membrane

MANUFACTURER

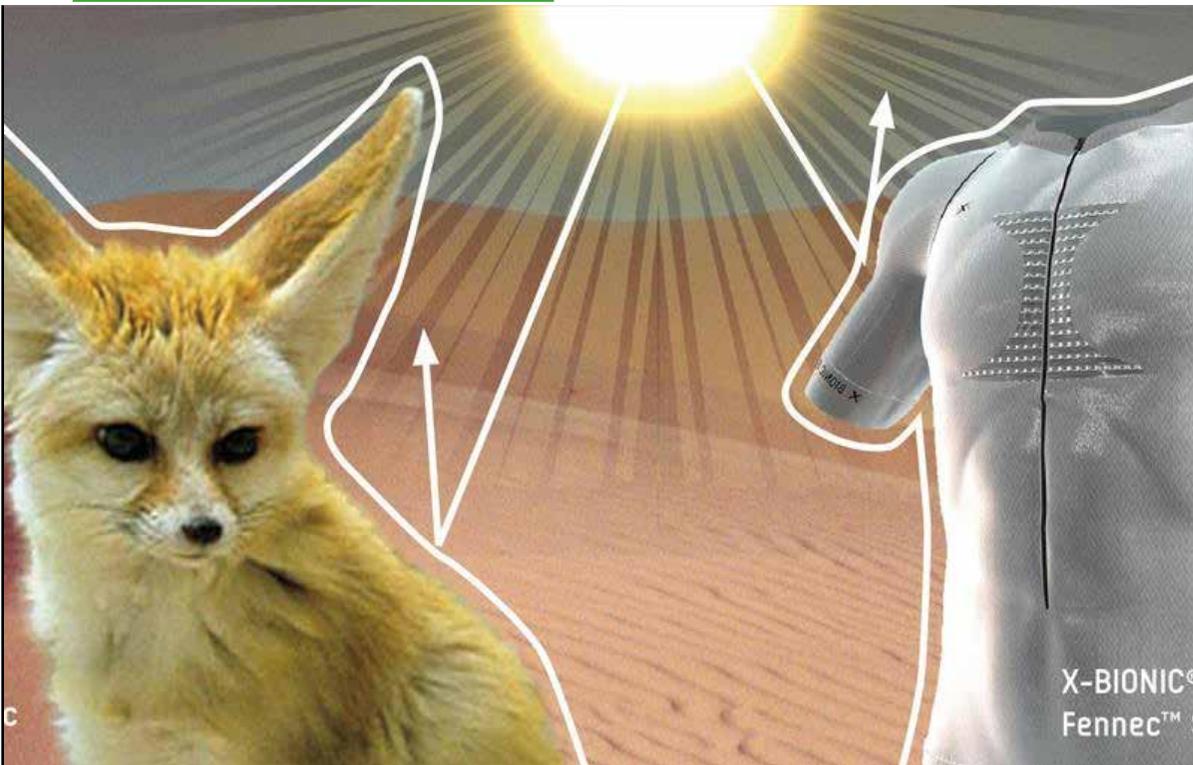
X-BIONIC
<http://www.x-bionic.com/labs>

AMPHIBIAN
SKIN



Symbionic Technology by x-bionic

Cooling



DESCRIPTION

We are saving valuable resources by learning from nature, taking advantage of the millions of years nature has already spent perfecting its developments. Fennec, the desert fox, lives and hunts in extreme heat. Invariably, it has adapted perfectly to these hostile conditions. Its glossy, silvery fur, for example, reflects the heat radiated by the sun and by its surroundings. What's more, its large ears also dissipate a great deal of heat. This is the inspiration behind our Wüstenfuchs Technologie (desert fox technology) .

The basis of the X-BIONIC® Wüstenfuchs Technologie is the unique material xitanit™, which reflects radiated heat and widely distributes sweat across the skin, to provide effective cooling. At the same time, the conductivity of the bacteriostatic yarn draws excess heat from the body and dissipates it in the outside air.

MATERIAL

Xitanit

MANUFACTURER

X-BIONIC

<http://www.x-bionic.com/labs>

Macrotermes by x-bionic

FENNEC
DESERT FOX
TECH

Water proof

Lotus effect

DESCRIPTION

The lotus effect refers to the very high water repellence (superhydrophobicity) exhibited by the leaves of the lotus flower. Dirt particles are picked up by water droplets due to a complex micro- and nanoscopic architecture of the surface, which minimizes adhesion. This effect can easily be demonstrated in many other plants, for example Tropaeolum (nasturtium), Opuntia (prickly pear), Alchemilla, cane, and on the wings of certain insects.[citation needed]

Due to their high surface tension, water droplets tend to minimize their surface by trying to achieve a spherical shape. On contact with a surface, adhesion forces result in wetting of the surface. Either complete or incomplete wetting may occur depending on the structure of the surface and the fluid tension of the droplet. [9] The cause of self-cleaning properties is the hydrophobic water-repellent double structure of the surface.[10] This enables the contact area and the adhesion force between surface and droplet to be significantly reduced resulting in a self-cleaning process. This hierarchical double structure is formed out of a characteristic epidermis (its outermost layer called the cuticle) and the covering waxes. The epidermis of the lotus plant possesses papillae with 10 to 20 μm in height and 10 to 15 μm in width on which the so-called epicuticular waxes are imposed. These superimposed waxes are hydrophobic and form the second layer of the double structure.

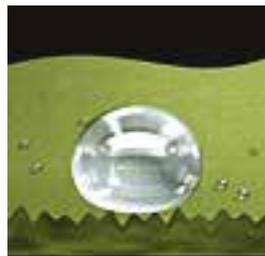
MATERIAL

Hydrophobic yarns
Tight structure

MANUFACTURER

GORE-TEX
<http://www.gore-tex.co.uk/remote/Satellite/home>

LOTUS
EFFECT



Graphic design

Kobe 8 system by Nike



DESCRIPTION

Kobe is known as the 'black mamba' and next year is also the year of the snake in Chinese culture, so snakes were the main source of inspiration for the graphics. Snakes have thermal vision, so they see their prey in sort of infrared heat. We started playing with this idea of using heat data related to the performance of the athlete. We tried to make a modern take on snakeskin. This pattern forms the signature look of the Kobe 8 shoe and apparel. Additionally, there are four small icons you can see on the sole of the shoe, which represent Kobe's mastery of his sport: accuracy, speed, vision, and focus.

The footwear features a graphic snakeskin print which not only draws from Kobe's on-court alter ego the 'black mamba', but also from the 2013 Chinese calendar's animal, the snake.

MATERIAL

Flyknit

MANUFACTURER

X-BIONIC

<http://www.x-bionic.com/labs/technologies/thorny-devil-technology/534013>

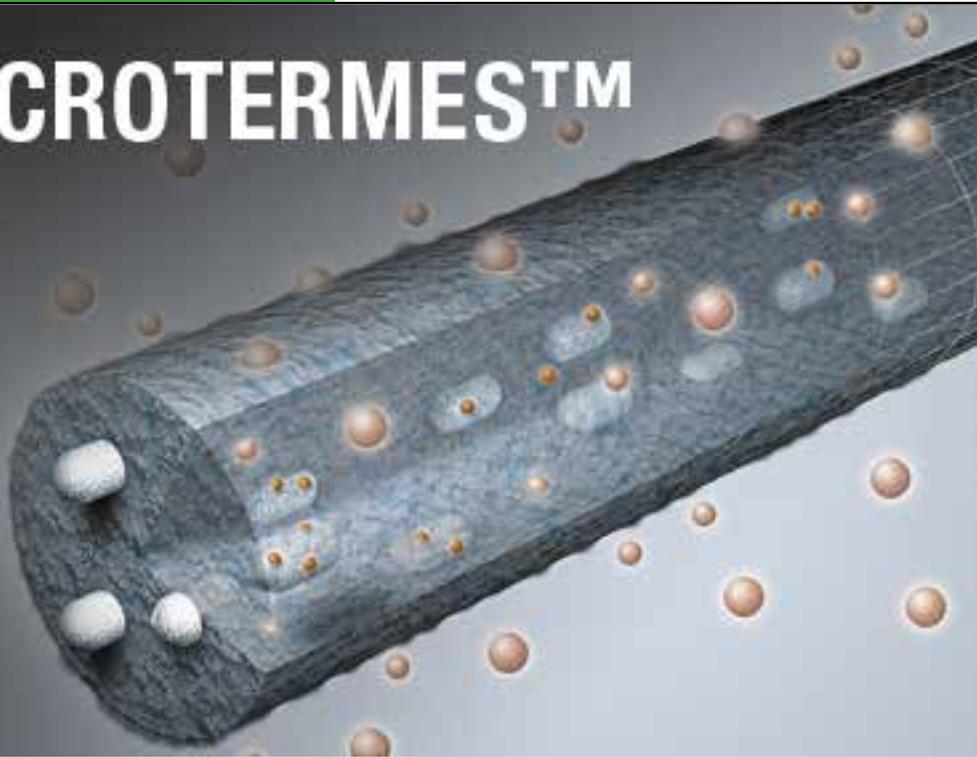


GRAPHIC
SNAKESKIN



Anti-bacterial

MACROTERMES™



Macrotermes by x-bionic

DESCRIPTION

The unique air conditioning system of a termite nest was the basic concept leading to the development of the new, high-performance Macrotermes™ fibre, named after Macrotermes Bellicosus, the African termite that was its inspiration. The construction of channels leading to ground water and the porous structure on the mound's interior brings about natural climate control. This active principle provided the model for the texture of the fibre. Since untexturised fibre is smooth and doesn't retain air, it remains cool and lacks any real moisture-regulation properties. Texturisation is the process which turns the material into Macrotermes™.

MATERIAL

inorganic, bacteriostatic ingredient in the fiber interior

MANUFACTURER

X-BIONIC

<http://www.x-bionic.com/labs/materials/skin-nodor/1930>

AFRICAN
TERMITE

Grip

Dunlop Gecko-Tac Grip



GECKO
TAC GRIP

DESCRIPTION

This unique nano-scopic surface treatment on the grip is inspired by gecko setae. The perforated design increases moisture reduction and provides up to 50% more grip and tack. This results in enhanced control, precision and comfort.

MATERIAL

- 3 layer construction
- > Perforated PU outer skin layer.
- > PU foam and woven fibre central layer
- > Microfibre base layer

MANUFACTURER

DUNLOP

