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Effect Chemicals
BIONIC-FINISH® ECO

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BIONIC-FINISH® ECO

WATER REPELLENCY FOR ECOLOGISTS



BIONIC-FINISH® ECO

*Effective implementation
of natural functions*



BIONIC
FINISH ECO®



Why do the feathers of birds not become wet? Why does this type of water repellency in nature work without perfluorinated compounds?

The **RUDOLF GROUP** has answered these questions by means of the scientific branch Bionic.

Bionic does not mean to just imitate nature, but to realise its functional principles and to transfer them to technical solutions. Thus, novel, sustainable and ecologically advantageous technologies for imparting hydrophobic properties have been developed.

Hydrophobic finishing with **BIONIC-FINISH® ECO** is based on a fluorine-free recipe. Hyperbranched, hydrophobic polymers with ramified structures like in tree tops orientate in an orderly manner on the textile and crystallise on specifically adjusted comb polymers. The optimum arrangement of many of these functional elements is highly effective. Additional boosters (crosslinking agents) ensure the optimum attachment and durability on many fibre substrates.

Bionic is the future!

By means of Bionic RUDOLF develops novel, sustainable and ecologically advantageous technologies in the field of hydrophobic finishing.

BIONIC-FINISH® ECO combines ecology and trend-setting hydrophobic finishing of textiles.





BIONIC
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BIONIC-FINISH® ECO

Intelligent self-organisation

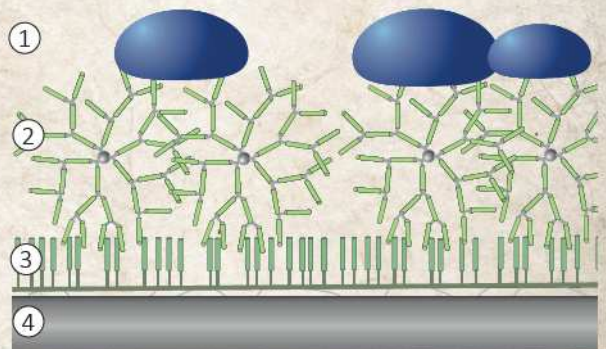
Water repellency at its best



Hyperbranched polymers can be produced step by step by combining multifunctional components. With each synthetic step the reactive end groups of the hyperbranched polymers grow exponentially resulting in an extremely high density of available water-repellent groups. These hyperbranched, hydrophobic polymers are highly effective and, due to their network structure, tend to self-organise and crystallise.

For optimum orientation and attaching to the fibre surface, ***RUCO-DRY ECO**, the finishing product of **BIONIC-FINISH*ECO**, does not only use hyperbranched polymers but also specifically adjusted "comb" polymers. The water-repellent effect level obtained by initial textile finishing has so far only been possible with fluorocarbon polymers.

Water-repellent effect of ***RUCO-DRY ECO** on textiles



- 1 ... water drop
- 2 ... hyperbranched polymer
- 3 ... comb polymer
- 4 .. textile (fibre)



BIONIC-FINISH® ECO

Ecological security

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Perfluorinated surfactants (PFTs) is the generic term for all fluoro-organic compounds with a surfactant character.

The best known representatives of this group are perfluorooctane sulfonic acid (PFOS) and perfluorooctanoic acid (PFOA). These substances are monitored because they are not degraded in the environment and, as far as toxicity is concerned, have not been thoroughly examined yet.

In media discussions, water, oil and soil repellents based on fluorocarbons, by mistake, have often been named as a source of these substances. However, neither of them are used at all for making textiles water-repellent, but are found at most in smallest quantities as a byproduct when manufacturing fluorinated impregnating agents. The majority of PFTs reach nature by way of fire-extinguishing foams, galvanic processes or the semiconductor technology.

With the so-called C₆ fluorine chemistry we have succeeded in developing PFOS and PFOA-free fluorocarbon water repellents. However, many manufacturers of brand name clothing would like to offer trend-setting fluorine-free textiles to their customers and, thus, sustainably reduce the impact on nature.

No perfluorinated compounds are used for manufacturing BIONIC-FINISH® ECO products. Such a finish avoids releasing PFOS and PFOA and opens up new perspectives to the clothing sector.

BIONIC-FINISH® ECO offers security to manufacturers - for protecting their labels and textiles.



BIONIC-FINISH® ECO

Biologically clean



BIONIC
FINISH ECO®



BIONIC-FINISH® ECO is an ecological alternative to all previous durable hydrophobic finishes. Its chemical basis is more environmentally friendly than all past durable water-repellent finishes.

No perfluorinated compounds are used for manufacturing **®RUCO-DRY ECO**, which is the finishing product of **BIONIC-FINISH® ECO**. Thus, **®RUCO-DRY ECO** is not based on substances that contain perfluorinated groups.

In principle, **®RUCO-DRY ECO** is biodegradable. Nevertheless, it cannot be called readily biodegradable according to OECD test methods, but eliminable. As the polymeric ingredients are maintained and are to be effective beyond the life-span of the article finished with it, this is quite reasonable. Neither are polyester fibres "readily biodegradable", but they can be recycled without hesitation.

According to OECD tests **®RUCO-DRY ECO** can be easily eliminated from the effluent (>80%) and is harmless regarding water toxicity (EC_{50} (bacteria) >100 mg/l, LC_{50} (fish) >100 mg/l) as well as oral toxicity (LD_{50} (rats) >5000 mg/kg).

BIONIC-FINISH® ECO is not resistant to dry-cleaning or to solvents. Solvents initiate the dissolution of the finishing film and penetrate it. This has to be considered with coatings and laminations. Oil repellency can only be reached by perfluorinated compounds.



BIONIC-FINISH® ECO

Versatile



**BIONIC
FINISH ECO®**



BIONIC-FINISH® ECO offers a variety of consumer-friendly properties:

Profile:

- Repels water and aqueous soiling substances
- Wash-resistant
- Suitable for all fibre types
- Durable up to 20 wash cycles (40°C) with final ironing
- No oil repellency due to fluorine-free formulation
- Not resistant to dry-cleaning
- Does not impart water impermeability properties (this would require a membrane or coating technology)

Benefits:

- No fluorinated compounds
- **Formaldehyde-free**
- Highly water-repellent
- No significant change of handle
- Effects are resistant to abrasion and wear
- Improves the sewability when making-up
- High wear comfort of sports and outdoor jackets with membrane technology
- No effect on breathability
- Already effective when tumble drying after home laundry
- Cost-effective alternative to fluorocarbon resin finishing

Application recommendations:

- No specialty detergents necessary
- Do not use softeners in home laundering
- After washing, tumble drying or ironing recommended
- Line drying possible, depending on the article

For durable hydrophobic finishing of textiles BIONIC-FINISH® ECO is an effective alternative to previous fluorocarbon resin finishes.

We are happy to assist you in implementing this finish on your articles.



BIONIC-FINISH® ECO

Just like nature



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BIONIC-FINISH® ECO - ecologically conscious finishing, for a better future!

Under a free-of-charge licence agreement the RUDOLF GROUP offers:

- Permission of use for word and figurative mark of BIONIC-FINISH® ECO
- BIONIC-FINISH® ECO labels for your articles
- Artwork for posters, brochures and flyers on BIONIC-FINISH® ECO

Market your articles by means of the ecological advantages of BIONIC-FINISH® ECO. Use the innovative BIONIC-FINISH® ECO for your green image. Offer articles with ecologically optimised finishes to your customers. Use BIONIC-FINISH® ECO to successfully market your articles - for more environmental awareness. Contact us: marketing@rudolf.de