

TEXSHIELD: Environmentally friendly and durable oil and water repellent finish on Technical Textiles

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Introduction/target

In the current market, well-known textile brands are usually protected with perfluorocarbon chemistry to provide a highly durable oil and water repellent finish (OWR). Most common treatments consist of padding the fabrics with perfluorocarbons (PFCs). Unfortunately, the best performing PFCs, known as C8 also raise significant health and environmental concerns, due to their very low biodegradability (bioaccumulative). Research has indicated that PFCs most probably carcinogenic and, consequently, PFCs-C8 are currently subject to high regulatory pressure.

Methodes & Materials

The main purpose of the TEXSHIELD project is to address the problems associated with textile protection by:

1. Eliminating problems with PFCs-C8 by the use of other products in finishing processes;
2. Providing cost-effective alternative treatments to PFC-C8 with durable water (and oil) repellency;
3. Reducing the total fluorine content in the treatment by means of new sol-gel derived additives in the form of nanoparticles or inorganic-organic hybrid networks;
4. Developing a durable and flexible solution for a broad range of textile substrates with a low ecological footprint, based on REACH-proof chemicals and taking into account safety and health issues;
5. Demonstrating performance on a representative scale, with regard to the key technical parameters including soil resistance, abrasion resistance, cleaning cycle resistance;
6. Providing a full Life Cycle Analysis (including washability cycle) and assessment of techno-economic benefits, via benchmarking against current products;
7. Providing the necessary technological transfer and training via SME associations to ensure awareness and take up throughout the EC

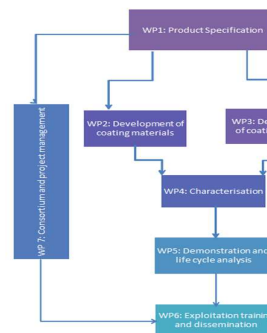
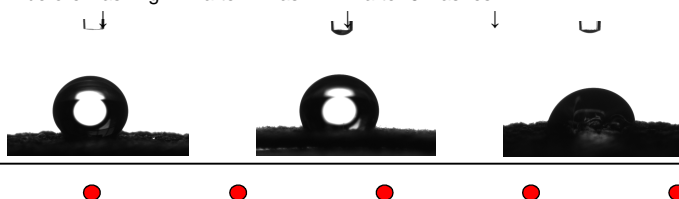
Results

A key aspect of the project is to look at the progression of sol-gel solutions and the development of materials to address performance requirements, particularly the identification of the optimum siloxane composition including all key functional groups such as:

- Chemical ligands to provide covalent bonding to a range of textiles
- Stable long-chain hydrocarbon groups to provide low surface energy
- Hydrophilic groups to enable water dispersion

The UV-curable systems integrating C6 or shorter chain chemistry applied in a waterborne formulation.

before washing after 1 wash after 5 washes



Acknowledgements

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