

Water repellency in outdoor apparel: consumer use, maintenance and physiological wear comfort

Water@Leeds funding for external testing of repellent fabrics

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Mountaineers wearing repellent outerwear in snowy remote environments

'Waterproof' jackets are worn by a diverse consumer group, from those seeking protection on the daily commute to high-altitude mountaineers. The outer garment, or rainwear, is expected to repel water whatever the conditions keeping the wearer dry. For hill-walkers and mountaineers, rainwear offers protection from the environment, and is a key factor of health and safety for the wearer. Wet fabric rapidly accelerates cooling of the wearer posing a risk for their physiological comfort and, in extreme cases, to life.

This PhD project is studying the use of water repellent outdoor clothing using both laboratory investigation and social research to understand consumer use, care and wearer comfort. Considering sustainability, the research addresses the use of chemistry, testing procedures and brand-consumer dialogue.

During the textile finishing process, a repellent finish is applied provided repellent functionality. Fabric testing, and progressively product testing, is an integral part of the design process. Evaluating water repellency is crucial to forecast its performance during consumer use. The Spray test (BS EN ISO 4920:2012) is widely used by the industry and by textile testing companies, and testing was completed for this project.

To develop a comparative study, funding provided by Water@Leeds was used to outsource testing using a well-known, but scarcely used, test called the Bundesmann rain-shower tester. Four different repellent fabrics were tested. In contrast to the spray test, the Bundesmann test runs for a longer period and the 'rainfall' simulated is a greater intensity.

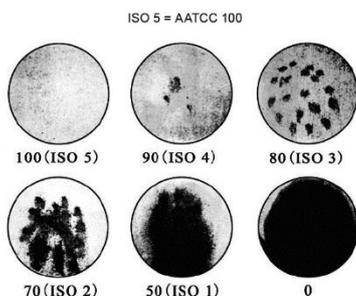
This comparative study has led to an 'extended spray test' being developed within the department laboratory. Testing is ongoing but this alteration has received interest from industrial companies. A potential publication will follow after validation of findings. Further work is to include

alterations to the spray nozzle to more closely simulate realistic rainfall, and to adapt the mainly subjective rating system of both the spray test and Bundesmann.

Thank you to Water@Leeds for providing the opportunity and funding for this section of the project.



The Bundesmann rain-shower tester, with a 300 nozzle rain system



The rating scales of the spray test (left) and the Bundesmann (right).

