# What's next in performance wool?

Performance Days

April 29, 2015

SOPHIE BRAMEL

## Speakers

- Wool's presence has steadily increased in performance clothing. With the introduction of new blends and fabric constructions, the natural fibre is expanding into warmer seasons and from base layer to outerwear.
- This afternoon we will be discussing some of the latest developments in wool as a performance material with:

- Hamish Allan, Marketing Manager Südwolle Group
- Johann Mittermayr, Sports/Outdoor Manager Europe, Woolmark International Pty Ltd.
- Barnaby Caven, Research Fellow, University of Innsbruck
- Moderator: Sophie Bramel, freelance journalist

SOPHIE BRAMEL

# 1. Wool fibre structure

- We will begin by taking a closer look at the wool fibre itself to better understand what makes it so special. **Barnaby Caven** - can you briefly explain the molecular structure of wool and how that impacts its properties?

- **Barnaby Caven** - Wool is a complex fibre. Many of the talks at Performance Days today have discussed the treatments that can be applied to wool, but one of the main challenges is with the cuticle scales. These are effectively like armour plating, a complex, three-layer structure. These scales are aligned in such a way that the friction is very high, making it tricky to process the raw wool fibre.
- Wool is unique in that it absorbs moisture vapour into the core and repels liquid water on the surface. As that happens, the wool fibre expands and the cuticles scales lift upright which is why you get an increased itchiness and feel.

# 2. New finishes for wool

- Moving on to new developments in wool, **Hamish Allan** - can you tell us more about what Südwolle Group is working on?

- Südwolle Group is introducing a plasma treatment to remove the scales on wool, a process that is cleaner than the traditional chlorine-based process. The company has spent a lot of time tweaking the process and scaling it up so that it is available on a commercial scale. The process is applied pre-spinning on the raw fibre, it has the effect of modifying the chemical surface of the fibre to smooth the cuticles. The outcome is that the plasma treated wool can be machine washed, it won't felt or shrink.
- The plasma treatment makes the wool more hydrophilic. We are currently investigating this to see what that means in terms of performance.

# 3. New end markets for wool

- Südwolle Group is also developing new yarns for seamless knitting, can you tell us more about this project?

- **Hamish Allan**: We've been working with our customers that make seamless knits to improve the way that wool runs on seamless knitting machines. The challenge with wool is that it is a staple fibre and can be a bit hairy. If you put a 100% merino yarn into a seamless knitting machine, any variation on the yarn is going to make it break, resulting in high wastage. We're working on optimising the yarns to make them run smoothly on the machines. One way is to blend wool with a synthetic fibre, to make the yarn stronger. We are also looking at compact spinning technology to obtain a smoother yarn, and incorporating synthetic filaments for extra strength.

# 4. Wool in double-sided base layers

- As the base layer wool category expands beyond pure merino products, fabric manufacturers and brands have developed double-sided materials combining wool with a synthetic yarn. The question is: is it better to place the wool next to the skin side or on the outside of the garment?

- **Johann Mittermayr** – At Woolmark, we believe that wool next to the skin is the better way in base layers. There are three main reasons for this. One: for base layers you want to achieve a dry microclimate next to the skin. Wool is the only fibre that takes up vapour, so it keeps the skin dry. The second point is odour control: wool placed next to the skin will prevent the production of odour much better than synthetics do. The third point, proven by our panel of athletes, is that when engaging in intense physical activity, and when sweating a lot, a wool garment won't cling to the body.
- **Barnaby Caven** - In pure laboratory scale tests, using standard test methods, there is little to no difference in performance as to which side you is worn next to skin. In my opinion, it comes down to personal choice.
- **Hamish Allan** – At Südwolle Group, it makes total sense to place the merino on the inside and the synthetic on the outside, for comfort and for durability, as synthetics are normally more abrasion resistant.

# 5. Antibacterial finishes on wool

- A number of companies are now offering antibacterial finishes for merino wool. Is this really necessary?
- **Johann Mittermayr** - From our point of view at Woolmark we consider these to be marketing stories more than technical stories. Wool doesn't need an antibacterial finish. There is also the issue that some doctors raise that killing too many bacteria is negative for the body.
- **Barnaby Caven** - Wool's structure creates a very hostile environment for bacteria that can't grow or propagate on the surface. Wool is not antibacterial, as it does not actively kill the bacteria. It provides a hostile environment that bacteria can't survive on it. It doesn't allow any moisture on the surface of the fibre and bacteria need water to survive.
- **Hamish Allan** – In the past, Südwolle Group would offer a Sanitized finish, but it is no longer Oekotex certified and is dropping out of use. We are currently looking at a zinc additive, which would be used for hosiery, and is blended with polyester or polyamide. Zinc is said to be easier to apply to wool than silver. Zinc is an ingredient used in anti-dandruff shampoo, it has a history of being used for skin treatments.

# 6. Wool in outerwear

- Another growing trend is to choose a wool fabric for protective outerwear. What type of fibre and fabric construction are being promoting for performance outerwear?
- **Johann Mittermayr** - At last ispo we introduced a new fabric for outerwear. Wool is already widely used for base and second layers, we are looking now to introduce 100% merino into performance trousers, and jackets. The theory is to make the most of the moisture management and thermoregulation properties of wool, without any interfering layer in between. This fabric is made with the Optim Max technology in which the wool top (one of the production stages of wool) is stretched. A water finish is applied to the fabric to make it shrink and make it more compact. No chemicals are used, and the resulting fabric is water and wind resistant, as well as machine washable. There is no need for any membrane, it is water resistant for 2 to 3 hours.
- **Hamish Allan** - For us, this is a really interesting idea to explore, but as a spinner, these developments are downstream from us. The challenge for three-layer waterproof breathable laminates in which the backing is made in merino wool is achieving a durable laminate without using too much adhesive. There are developments in the US of new ways of combining a membrane with a wool fabric, to create a material that is not totally waterproof, but again, stretches the possibilities of wool.

# 7. Improving wool's wicking power

- AWI is working on improving wool's ability to wick with a product called Hydro-Duct. **Johann Mittermayr,** can you tell us more about this material?
- Hydro-Duct is a technology derived from the original Sport Wool fabrics which were made in wool and polyester, with wool on the inside and polyester on the outside. Hydro-Duct applies the same principle but with a 100% wool fabric. The wool yarn on the inside is hydrophobic, (it is treated superwash) and the wool yarn used on the outside is hydrophilic (it is given a different finish - a soft lustre treatment). This increases wicking and accelerates the transfer of moisture from the inside to the outside. Hydro-Duct is already commercially available.

## THANK YOU FOR YOUR ATTENTION

SOPHIE BRÆMEL