

Merino

Wool

Wovenwear Innovations



MERINO INNOVATIONS

This is a booklet of fact sheets about Merino wool innovations which have been developed by AWI, The Woolmark Company & its partners over recent years.

The driving force behind Merino wool innovations are the trends in consumer needs and attitudes because these needs and attitudes justify the extra cost of innovations. The key consumer trends associated with Merino wool knitwear in the second decade of the 21st century are:

VALUE

(luxury for less),
ie. Merino Touch

CARE FOR THE ENVIRONMENT

(reduced environmental footprint by using less energy, chemicals and water) ie. Merino Care

CASUALISATION

(less formal looks and textures) ie Merino Visual

Innovations can take many forms; for Merino wool wovenwear the focus is on adding value to the fibre, the yarn or the end product through innovation. Innovations can be introduced into Merino wool at any one of its stages in the manufacturing pipeline and indeed some of the innovations presented in this booklet can work at several places in the pipeline. Innovations take several forms, some can be thought of as mistakes or problems that have been transformed into a virtue or feature; other innovations take the form of an improvement in performance during use and permit Merino wool to be used in new products. The innovations in this booklet confirm that Merino wool

is versatile, at the cutting edge of fashion and a clever alternative to other fibres.

The information in the fact sheets is a brief introduction which explains the concept and the technology in simple terms. For more detailed information about each innovation, technical manuals are available which give step-by-step instructions on how to achieve the innovations industrially.

At the end of the booklet is a list of the partners who contributed to making the samples. A comprehensive list of Woolmark licensees who can offer innovative Merino wool garments is also available from The Woolmark Company.



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MERCERISED MERINO

The mercerisation process for Merino wool is a chemical based process normally applied to wool top or scoured loose wool which creates a “Cashmere like” feel, and a “Silk like” appearance.

THE TECHNOLOGY

The mercerisation of wool involves the removal of the scale structure from the surface of the wool fibre which creates a smoother fibre surface, the effect of which is to increase the sheen. The second part of the process involves the application of a very fine layer of silicone polymer which is grafted permanently onto the fibres’ surface. The application of the silicone polymer brings about significant improvement in the hand feel. The actual diameter (Micron) of the fibre does not change as a result of the treatment, although the perceived improvement in hand feel is the equivalent of using wool 2 – 3 microns finer.

FEATURES

- Improved hand feel.
- Brighter shades.
- Machine washable option.
- More compatible for blending with noble fibres.
- Improved drape/fluidity.
- Improved comfort.
- Suitable for both worsted-spun and woollen -spun products.

MERINO FRESH

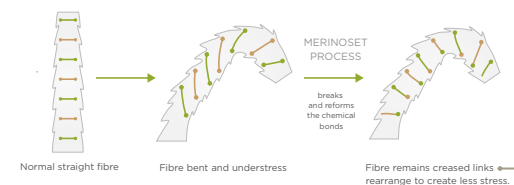
Most suits and trousers are dry-cleaned simply to refresh rather than to remove ingrained dirt and stains. This takes time, money and impacts on the environment. Merino Fresh is a means of simply showering a suit to remove dust and smells accumulated after a hard day in the city.

THE TECHNOLOGY

The Merino Fresh suit is made from normal or high twist pure new wool fabric then treated with a low level of polyurethane polymer to enhance smooth drying. The suit is constructed from water repellent chest interfacing and shoulder pads and washable trims. Other specialised elements of a Merino Fresh suit include pockets that drain water easily and drainage holes in cuffs. The creases and seams are stabilised with a special TYCS setting agent (see diagram). By using wool rich fabrics, most stains can be easily removed during showering with warm water - more persistent stains might need professional cleaning

FEATURES

- Easily refreshed wovens without cleaning and pressing.
- No loss of proper creases during rain showers.
- Overnight cleaning with no ironing.
- Water-based stain removal (oil-based stains will need traditional cleaning).
- Wrinkles and unwanted creases removed during showering.



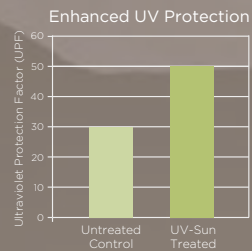
UV-CONTROL MERINO

It is recommended by medical professionals to limit exposure to UV radiation. Merino wool is naturally UV absorbing but as with all textiles its efficacy is limited by fabric density and colour. Where additional UV absorption required a special finish can be applied to create UV-Control Merino.

THE TECHNOLOGY

A UV absorbing finish is applied to the Merino wool product during dyeing or bleaching at either yarn stage, fabric stage or during garment finishing.

The finish can also be applied after dyeing either by exhaustion or by padding. After treatment the finish is fixed by drying at the highest temperature that is consistent with the colour and handle of the fabric.



FEATURES

- Can increase the Sun Protection factor by up to 20UPF units (see diagram).
- Durable to dry-cleaning and machine washing.
- Prevents yellowing due to UV light.
- Reduces fibre degradation due to UV exposure.
- Maintains the soft handle and moisture management properties of the Merino fibre.





CRINKLE MERINO

Crinkle Merino is fabric with permanent random creases or wrinkles which give the garment a relaxed and contemporary look.

THE TECHNOLOGY

The fabric or garment is impregnated with a special fixing agent which can be applied by printing, coating or dip-hydro techniques. Creases or wrinkles are deliberately inserted into the damp fabric by folding or simply bunching the fabric into a ball. The fixing agent is allowed to react with the fibre (modifying the cysteine links) thus binding the fibres in the creased configuration. The fixing process can be done with elevated temperature, steam or overnight at room temperature.

FEATURES

- Random permanently creased garment.
- Durable to machine washing.
- Creases can be confined to specific parts of the garment by print application of the fixing agent.



QUICK-DRY MERINO

Merino wool, by nature, dries faster than cotton. This can mean less time in the tumble dryer which importantly saves energy. Quick Dry Merino technology cuts drying time even further – potentially by up to one-third – perfect for people on the go.

THE TECHNOLOGY

Quick Dry Merino is a finishing technique normally applied to perfectly clean fabrics during the final wet-finishing stage by a padding or exhaustion method. The drying and curing stage is important because it ensures complete fixing of the polymer to the fibre surface.

FEATURES

- Treated garments dry faster after wetting in a rain shower.
- Energy-saving – less tumble drying required in domestic laundering.
- Inherently stain-resistant – reduces the need for frequent laundering.
- Cleans more effectively in domestic washing machines.

MACHINE WASHABLE WORSTED

The high costs, to the environment and bank balance, of dry-cleaning Merino wool wovenwear are a concern to many potential consumers. A better option especially for younger consumers is to simply machine-wash a suit, especially as most stains and smells are water based. Machine washable Merino wool suits and trousers are suitable for cleaning in a domestic washing machine then hanging on a line to dry.

THE TECHNOLOGY

A machine washable suit combines several technologies. The yarns are made from easy-care treated fibre to prevent felting shrinkage and the fabric is specially treated with a polyurethane polymer to improve afterwash appearance and then carefully finished to reduce relaxation and hygral (expansion due to absorbing water) changes to the minimum. The garments are constructed using washable trims that are compatible with the Merino wool fabric then creases and seams can be sprayed with a setting agent to maintain sharpness and appearance during washing.

FEATURES

- Garments are suitable for hand washing, domestic washing machines and even dry-cleaning if necessary.
- As seams remain smooth and trouser creases are durable to washing, the garment needs only a light press after drying.
- No loss of appearance during rain showers.

MACHINE WASHABLE WOOLLENS

The high costs, to the environment and bank balance, of dry-cleaning Merino wool wovenwear are a concern to many potential consumers. A better option especially for younger consumers is to simply machine-wash a garment especially as most stains and smells are water based. Machine washable Merino wool jackets and trousers are suitable for cleaning in a domestic washing machine then hanging on a line to dry.

THE TECHNOLOGY

Machine washable jackets and trousers combine several technologies. The yarns can be made from easy-care treated fibre to prevent felting shrinkage and the fabric is specially treated with a polyurethane polymer to improve afterwash appearance. Where a milled or flannel finish is needed, the fabric usually contains untreated yarns which can be milled before the polyurethane is applied by padding. After polymer treatment the fabric must be carefully finished to reduce relaxation and hygral (expansion due to absorbing water) changes to the minimum. The garments must also be constructed using washable trims that are compatible (similar dimensional stability) with the Merino wool fabric.

FEATURES

- Milled/raised finishes are possible.
- Garments are suitable for hand washing, domestic washing machines and even dry-cleaning if necessary.
- As seams remain smooth, the garment needs only a light press after drying.
- No loss of appearance during rain showers.



MERINO RETRACT (ELASTANE)

Boiled wool is a term given to a product that has been pre-shrunk to the extent that it has felted and lost most of the resilience and softness associated with wool. Boiled wool is popular for urbanwear because it gives a casual look to garments and an alternative texture. Boiled wool does however suffer from pilling, stiffness, and is limited to hand wash or dry-clean-only care claims. The lack of resilience means that garment styling has to be loose fitting rather than next to skin. Merino Retract wovenwear looks like boiled wool but has the resilience and anti-pilling performance of normal wool. Machine washable versions are feasible.

THE TECHNOLOGY

Merino wool yarns are combined with high-power elastane yarns before or during weaving so that in wet-finishing the elastane retracts and the fabric structure contracts. The fabric is woven 15% to 20% looser than normal so that the retracted garment does not end up too dense after finishing. Several trials are normally needed to determine the optimum fabric set and finishing routine especially if close fitting garments are being made.

FEATURES

- Contemporary boiled wool looks.
- Resilience of normal Merino fabric.
- Machine washable option possible.
- Tighter fitting garments possible.



VINTAGE MERINO GARMENT WASH

Faded and washed out effects are popular in casual garments but are surprisingly difficult to create in Merino wool which is renowned for its vivid, vibrant and durable colours. The classic approach to creating the faded look is to simply use pigments which can be bonded to the fibre with binders; these are characterised by poor handle and poor rubbing fastness. When garments fade during washing they do so unevenly, especially on seams and raised areas, and it is this effect that is reproduced in Vintage Merino wovens.

THE TECHNOLOGY

Alternatives to using pigments include direct or vat dyes which are traditionally used on cotton denim. Recently developed liquid sulphur dyes can now be applied to wool fabrics by coating or printing the woven fabric. The printed fabric can then be made into garments designed to meet machine wash standards of dimensional stability, then washed. Some of the dye is removed during the early stages of garment washing to create the vintage look but the rest of the dye is fixed (under oxidising conditions which render the sulphur dye highly insoluble) and made difficult to remove during normal washing and wearing.

FEATURES

- Sulphur dyes can be applied to woven fabric by printing or knife on air coating systems.
- Soft handle is maintained due to lack of binder and the use of a wash-off stage.
- Machine wash levels of colour fastness and dry rubbing fastness are possible.
- Can be applied to undyed, colour wovens or pre-dyed fabrics.
- A range of effects, from subtle to dramatic, is possible.



3-D MERINO WOVENS

3-D Merino for woollen-spun wovens takes advantage of Merino wool's felting propensity in a designed pattern, where milled and non-milled areas can be seen.

THE TECHNOLOGY

Milling or controlled felting obliterates the weave structure to create the classic flannel finish. 3-D Merino enables a pattern of milled and non-milled areas to be created. The technology uses CO₂ laser engraving, normally used to etch patterns on denim fabric by destroying the indigo dye. In this innovation, the laser is used to burn away the pile created using milling to reveal the weave-structure underneath. Any digital design can be used permitting very intricate patterns which would normally be impossible using traditional jacquard weaving. After laser-etching the fabric is washed to remove the burnt fibre.

FEATURES

- Late-stage design decisions.
- Ideal for flannels and drawn pile coating fabrics.
- No loss of fabric strength.

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The following companies gave invaluable assistance in creating the technical collection of innovative fabrics.

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