MERINO WOOL WORKWEAR TOOLKIT

WOOLMARK

CONTENTS

MERINO WOOL **ENGINEERED BY NATURE, BUILT FOR WORK**

WORKWEAR APPLICATIONS

- Protection wear
- High-visibility gear
- Industrial
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- First responders
- Medical
- Defence
- Uniforms

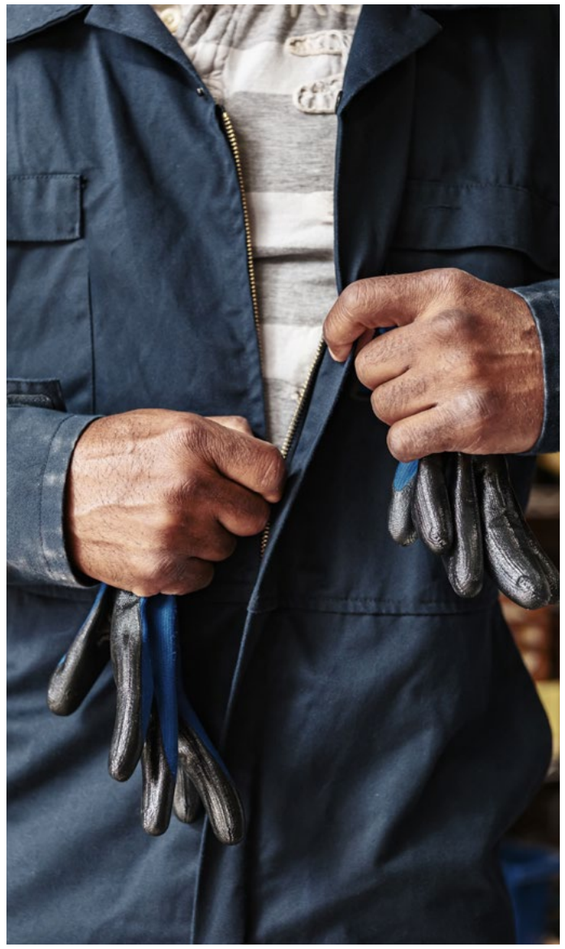
FOR GENERATIONS, WOOL HAS BEEN VALUED FOR ITS PROTECTIVE QUALITIES IN HARSH CONDITIONS.

Today, these same attributes make Merino wool an ideal fibre for workwear, uniforms and protective clothing. Whether for construction, mining, emergency services, utilities, medical, transport or outdoor trades, Merino wool delivers natural performance benefits that enhance safety, comfort and durability on the job.

PERFORMANCE MEETS PURPOSE

Merino wool's versatility makes it perfectly suited to the demands of modern workwear. Its natural ability to regulate temperature, manage moisture and resist odour ensures comfort and performance across a wide range of working conditions. From lightweight next-to-skin layers that keep workers cool and dry, to insulating mid-layers that retain warmth while allowing heat to escape, Merino wool provides adaptable comfort throughout the day. In outer garments, its resilience and weather resistance add another layer of protection against wind, rain and extreme temperatures.

Beyond comfort, Merino wool can be engineered for specialised performance needs, including flame resistance, high visibility and durability. It blends effectively with other fibres to create fabrics tailored to the specific requirements of different professions, while maintaining a natural, breathable feel that enhances wearer wellbeing and endurance.

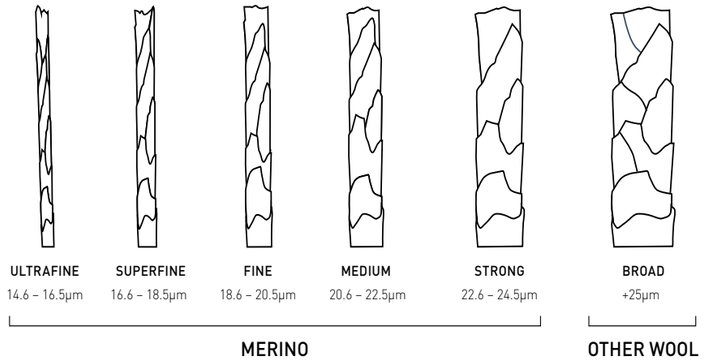


AUSTRALIAN MERINO WOOL

Australia is the world's **LARGEST** and leading producer of Merino wool, where it's grown year-round by the country's **63 MILLION** sheep.

THE WORLD'S FINEST WOOL

Merino wool comes from the Merino breed of sheep and is globally recognised as the softest, finest type of wool. Its superior fibre diameter, measured in microns, sets it apart from other wools. This provides both comfort and performance. The result is a fibre that is not only soft next to the skin but also technically capable of meeting the toughest demands of professional workwear.



RESPONSIBLE FARMING AND SUSTAINABILITY

Most Australian Merino wool-growing farms are family owned and operated, with unique skills and a great sense of pride passing from generation to generation.

Australian woolgrowers ensure their sheep are cared for in a way that provides exceptionally high standards of animal welfare.

For generations, Australian woolgrowers have shown how the Australian rural landscape can be managed effectively while protecting the natural environment, supporting rural communities and meeting the needs of increasingly environmentally aware customers.

FROM NATURE FOR NATURE

Wool is a natural, renewable, biodegradable and recyclable fibre and commonly refers to those fibres produced by sheep. However, not all wool is the same. There are more than 1000 breeds of sheep across the world which produce different types of wool, used for various purposes.

RENEWABLE

Wool is harvested from sheep and their fleece continually regrows from one year to the next. Each wool fibre grows around 6mm per month and just like human hair, it continues to grow, even after it has been shorn. Grazing on grass, every year sheep will produce around 4.5kg of new fleece; making wool a completely renewable fibre source.[1]

RECYCLED AND RECYCLABLE

Wool is the most recycled apparel fibre in the world supported by a well-established and commercially viable recycling industry. Wool garments are 3 times more likely to be donated when compared to garments of other major fibre types.[4]

BIODEGRADABLE

As a natural fibre, wool biodegrades on land and in water.

100% Merino wool fabrics can biodegrade by 95% after 15 weeks of burial in soil, but the rate varies with soil, climate and wool characteristics.[2]

Wool fibres also biodegrade in a marine environment and do not contribute to microplastic pollution. Research has shown that the Chlorine-Hercosett anti-shrink treatment applied to wool (which enables wool garments to be machine washable) can accelerate biodegradation.[3]

1 Australian Wool Production Forecast Report, April 2024

2 Hodgson A, Leighs SJ, van Koten C. Compostability of wool textiles by soil burial. Textile Research Journal. 2023;93(15-16):3692-3702. doi:10.1177/00405175231163590

3 Collie, S., Brorens, P., Hassan, M.M. et al. Marine Biodegradation Behavior of Wool and Other Textile Fibers. Water Air Soil Pollut 235, 283 (2024).

4 Russell, S., Swan, P., Trebowicz, M., Ireland, A. (2016). Review of Wool Recycling and Reuse. In: Fangueiro, R., Rana, S. (eds) Natural Fibres: Advances in Science and Technology Towards Industrial Applications. RILEM Bookseries, vol 12. Springer, Dordrecht. https://doi.org/10.1007/978-94-017-7515-1_33

DYNAMIC BREATHABILITY

DESIGN FOR THE DYNAMIC

A recent PhD study from North Carolina State University confirms that 100% wool base-layers offer superior thermal comfort for "stop-go" outdoor sports (like hiking, cycling, rock climbing), compared to fabrics like cotton, viscose or polyester, when garments of similar weight and thickness are used.

Wool's natural fibre structure absorbs moisture during activity, then moderates its release during rest, while its hydrophobic outer surface delays rapid evaporation and cooling.

LEARN MORE

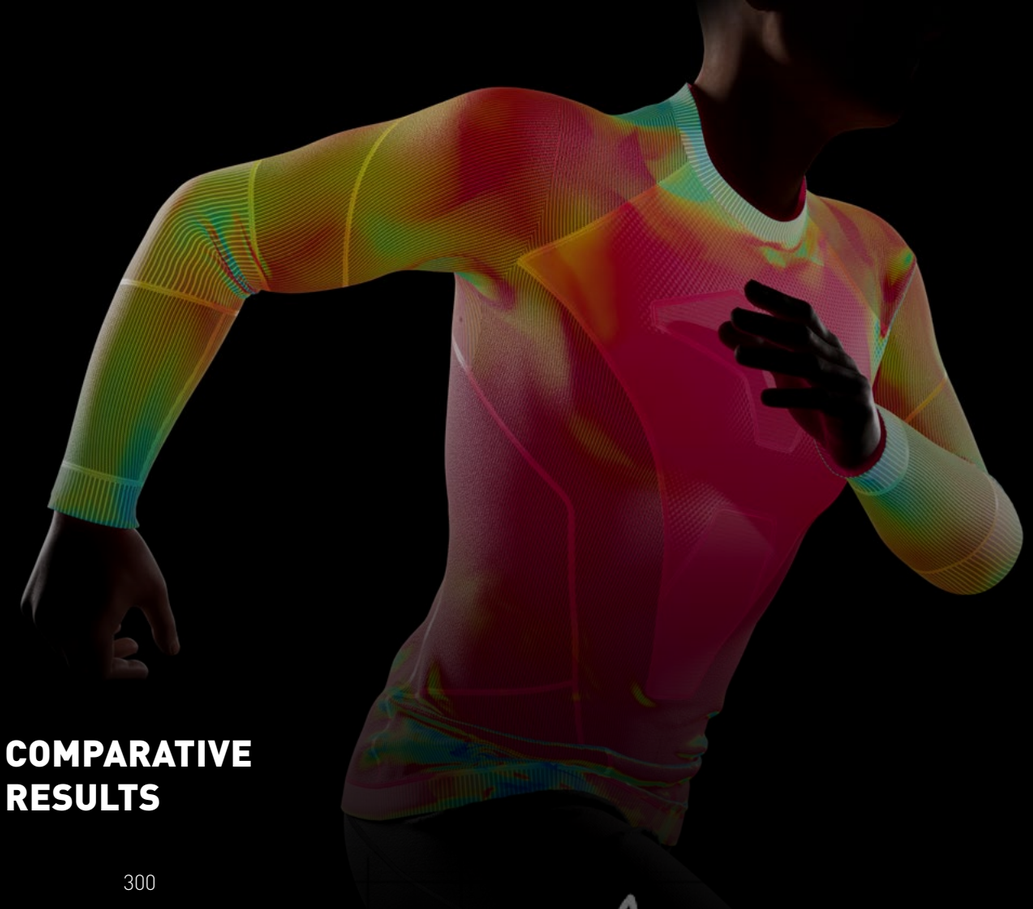
THE FINDINGS

Rapid thermal changes are greatly moderated by wool.

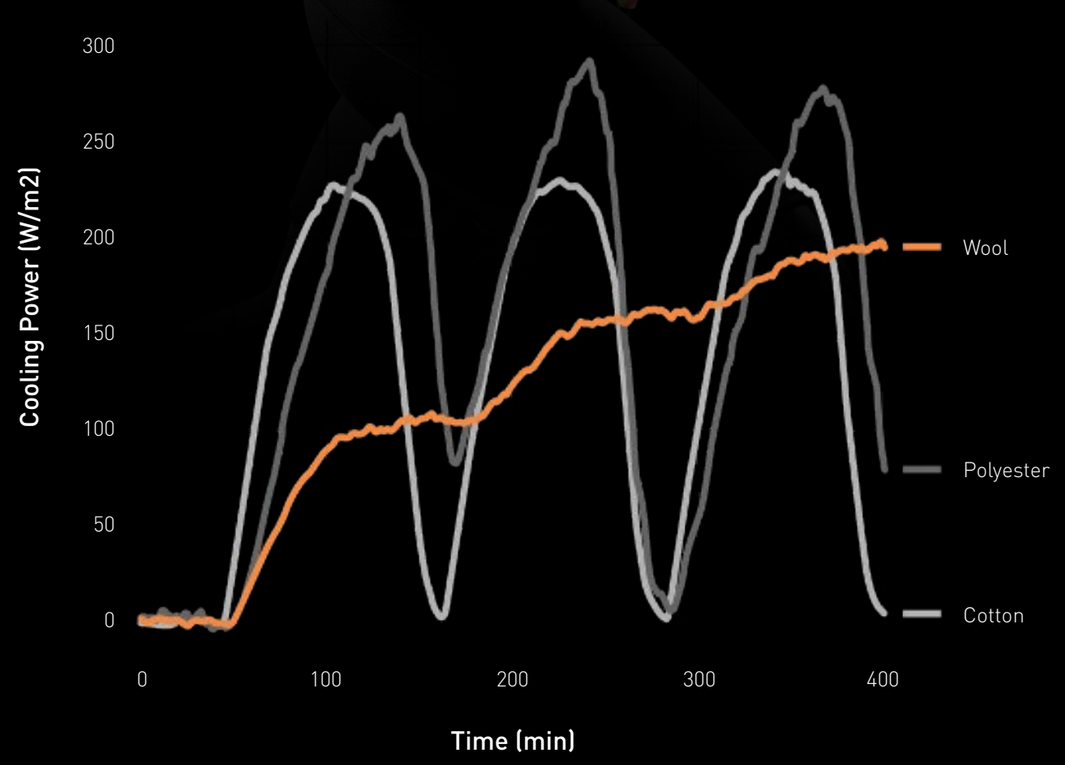
1. **Wool has superior buffering of heating and cooling.**
   It helps wearers maintain an optimal microclimate in dynamic environments.

2. **Wool gradually delivers more cooling as the need increases.**
   Workers typically require more cooling as their job progresses.

3. **The risk of after-chill is reduced.**
   Workers in polyester or cotton may experience unwanted after-chill during resting phases.



COMPARATIVE RESULTS



MERINO WOOL BENEFITS

TEMPERATURE REGULATION

Merino wool is an active fibre that reacts to body heat. It helps workers stay cool in hot conditions and warm in the cold, maintaining stable microclimates under varying workloads and weather conditions.

BREATHABILITY

Merino wool's unique structure ensures continuous airflow. It buffers changes in humidity, reducing clamminess and improving comfort for workers in both active and resting phases.

MOISTURE MANAGEMENT

Work environments often demand long hours and varying physical intensity. Merino wool naturally absorbs and gradually transfers moisture vapour away from the skin, reducing sweat build-up and helping to prevent post-activity chill.

ELASTICITY

Merino wool fibres bend thousands of times without breaking. This gives garments excellent shape retention and resilience, ensuring long-lasting performance even under daily wear and demanding conditions.

ODOUR RESISTANCE

Merino wool's fibre structure locks away odour molecules until they are washed out. This keeps garments fresher for longer and reduces washing needs, which is a practical benefit for work uniforms and multi-shift usage.

ANTI-STATIC

Because Merino wool can absorb moisture vapour, it tends not to create static electricity, helping it to drape well and be less likely to cling uncomfortably to your body than other fabrics.

FIRE RESISTANCE

Merino wool is naturally flame resistant and does not melt or drip like man-made synthetics. This makes it suitable for occupations requiring additional protection from heat and sparks, such as welding, foundry work or firefighting.

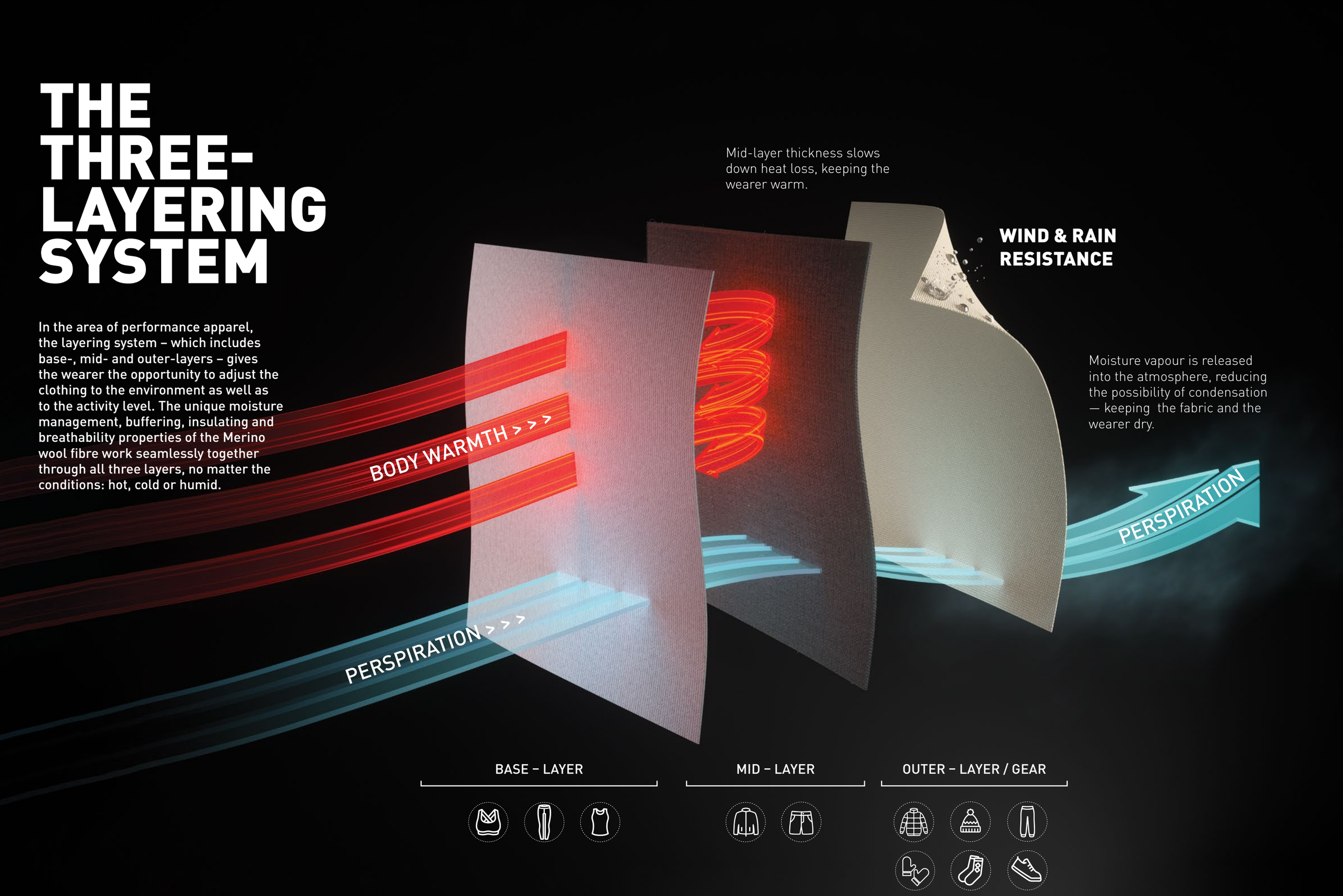
This table summarises the key measures of flammability for untreated textile fibres. Wool provides the highest protection when considering all the flammability characteristics together.

FIBRE	LIMITING OXYGEN INDEX (%)	HEAT OF COMBUSTION (KCAL/G)	IGNITION TEMP (°C)	MELTING TEMP (°C)
Wool	25.2	4.9	570-600	Does not melt
Cotton	18.4	3.9	255	Does not melt
Nylon	20.1	7.9	485-575	160-260
Polyester	20.6	5.7	485-560	252-292
Rayon	19.7	3.9	420	Does not melt

Source: CSIRO Factsheet - Flame Resistance of Wool

THE THREE-LAYERING SYSTEM

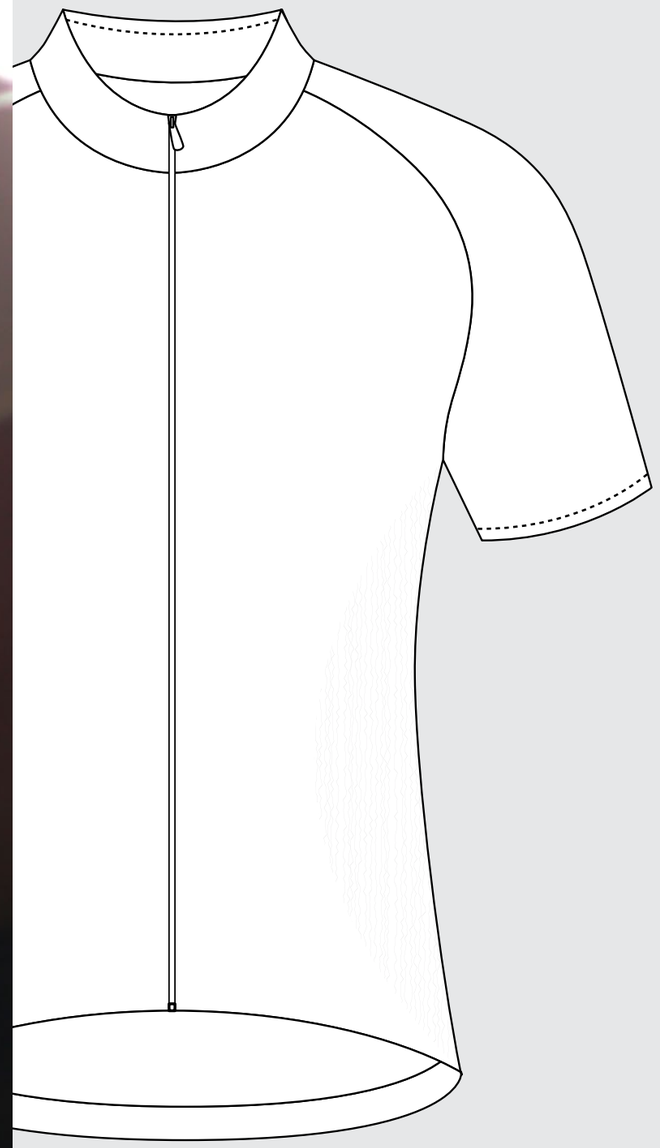
In the area of performance apparel, the layering system – which includes base-, mid- and outer-layers – gives the wearer the opportunity to adjust the clothing to the environment as well as to the activity level. The unique moisture management, buffering, insulating and breathability properties of the Merino wool fibre work seamlessly together through all three layers, no matter the conditions: hot, cold or humid.



BASE LAYERS

Base-layers are the foundation of any effective workwear system. For those working long shifts in variable conditions, garments worn next-to-skin must deliver consistent comfort, moisture management and stretch. Merino wool's inherent softness and elasticity make it ideal for this layer.

These innovations create base-layers that not only protect against temperature swings but also reduce wearer fatigue and discomfort across long, physically demanding workdays.



SEAMLESS TECHNOLOGY

Eliminates bulky seams that can cause chafing during repetitive movement. By integrating compression, breathability and support zones into a single garment, seamless Merino wool base-layers enhance comfort while reducing textile waste.

WARP-KNITTING

Combines the structure of woven fabrics with the flexibility of knits. Wool-rich warp knits contour closely to the body, offering compression, breathability and enhanced elasticity, particularly useful in protective underlayers.

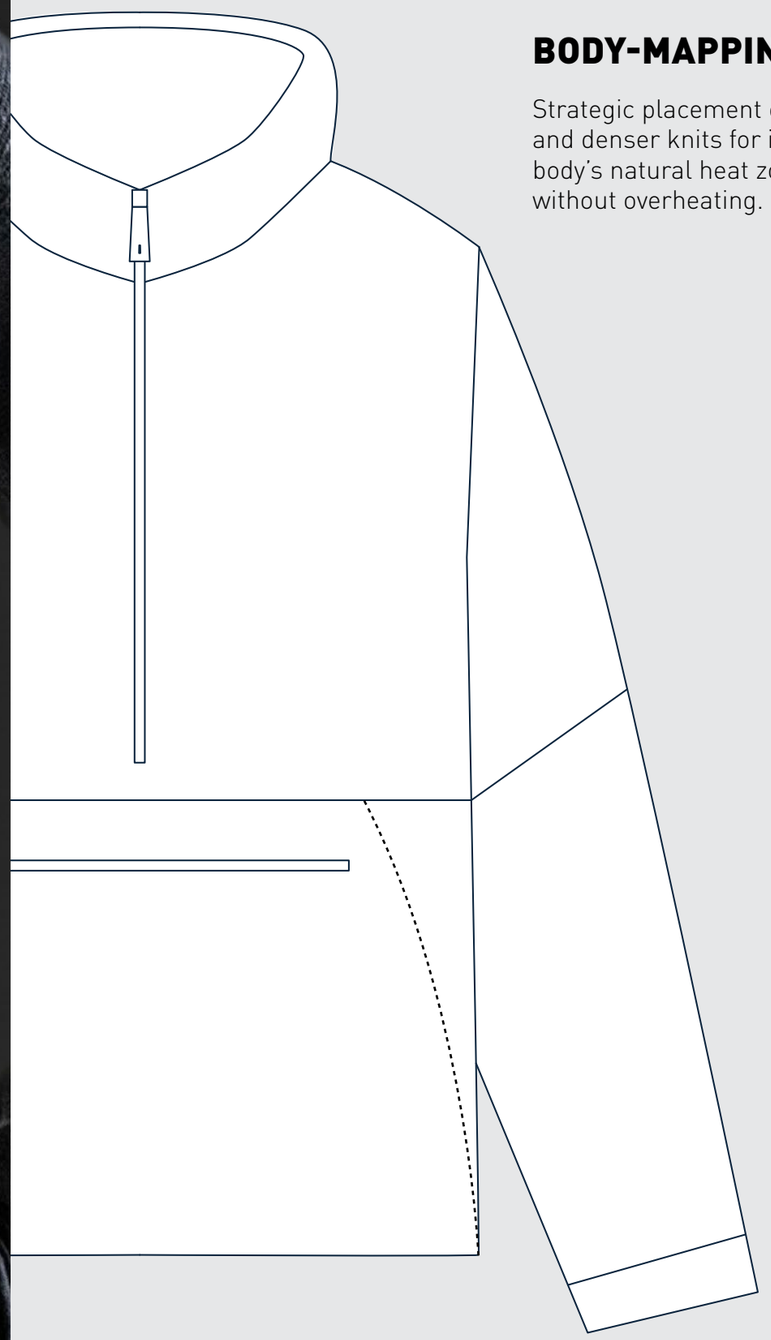
COMPRESSION STRUCTURES

Merino wool-rich compression fabrics support blood circulation and muscle performance. They regulate temperature and manage moisture while providing targeted stretch and recovery.

MID LAYERS

The mid-layer must strike a balance between retaining warmth and allowing heat and moisture to escape. For workers who shift constantly between active tasks and waiting periods, this balance is critical.

These technologies make mid-layers highly adaptable, whether for cold outdoor shifts, variable warehouse climates or emergency response conditions.



BODY-MAPPING KNITS

Strategic placement of open knit zones for ventilation and denser knits for insulation. This design mimics the body's natural heat zones, ensuring workers stay warm without overheating.

POINTELLE STITCHING

Creates small mesh-like windows within the garment, enhancing breathability and acting as built-in ventilation channels.

AIR-TRAPPING FABRICS

Constructions such as mesh or terry-loop create pockets that trap warm air close to the body while remaining lightweight. Terry-loop Merino wool jerseys provide warmth without bulk and deliver excellent moisture management.

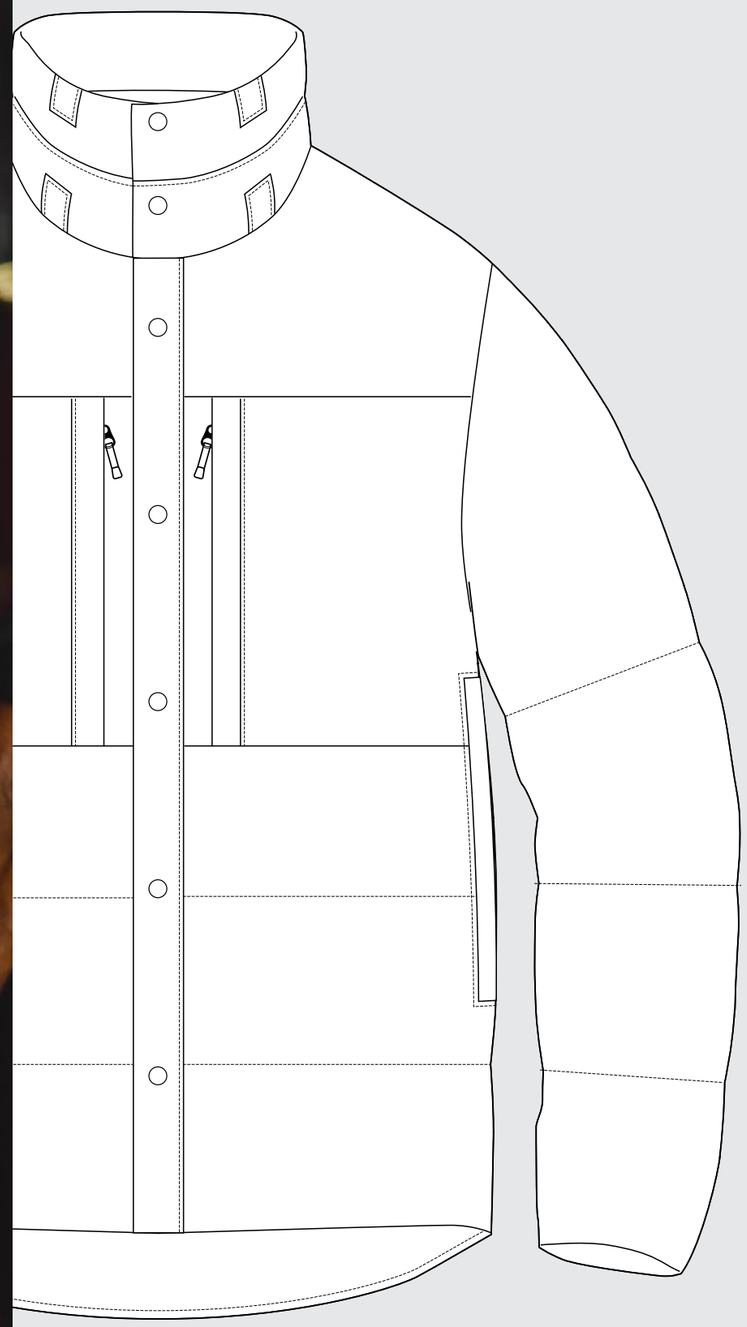
SEAM BINDING AND SEALING

Taped or sealed seams reduce water ingress, increase comfort and help maintain stable microclimates during outdoor or wet-weather work. No-sew taping further reduces bulk and increases flexibility.

OUTER LAYERS

The outer-layer shields the worker from wind, rain and extreme temperatures. Merino wool, when combined with advanced textile engineering, offers natural resistance to the elements without the downsides of heavy coatings or synthetic laminates.

These innovations make Merino wool outer-layers highly suitable for jackets, protective coats and high-visibility workwear that need to perform in all weather conditions.



OPTIM™ FIBRE STRETCHING TECHNOLOGY

Pre-stretched wool fibres are spun into yarns and woven into compact fabrics that shrink during finishing. This creates wind- and water-resistant fabrics made from 100% wool, eliminating the need for chemical membranes while maintaining breathability.

WOOL FILLINGS AND WADDINGS

Provide lightweight insulation that continues to trap heat when damp. Unlike synthetic or down fills, wool insulation does not collapse when wet, ensuring consistent performance in demanding outdoor work.

DURABLE WEATHERPROOF FINISHES

Combined with seam-sealing techniques, Merino wool outer-layers achieve water resistance while maintaining natural softness and flexibility.

ACCESSORIES & GEAR

Workwear systems are only as effective as their ability to protect the whole body. Extremities such as feet, hands and the head are particularly vulnerable to heat loss and discomfort, and the inherent properties of Merino wool protect against this.

HEADWEAR

Beanies and helmet liners made from Merino wool regulate moisture and maintain warmth without bulk, keeping workers comfortable in all seasons.

GLOVES

Merino wool blends in gloves provide dexterity, warmth, and moisture control, helping workers maintain grip and precision in challenging conditions.

FOOTWEAR INSOLES

Wool insoles use warp or circular knitting to provide cushioning, odour resistance and breathability inside work boots.

COMPRESSION SOCKS

Incorporating Merino wool into compression knits enhances blood circulation while regulating temperature and reducing odour build-up.

UNIFORMS

URBAN KNITS CAPSULE COLLECTION

For the Urban Knits Capsule Collection, Woolmark collaborated with Shima Seiki Italia S.p.A. and leading Merino wool yarn producers to explore how Merino wool can be engineered into protection-inspired garments for modern urban wear. The project focused on combining Merino wool's natural performance with enhanced durability, resilience and comfort through advanced knitting technology and blended yarn structures.

The collection comprises four outfits designed to withstand demanding conditions. High-twist Merino wool yarns were used to produce a reversible hoodie and trousers with compact structures that resist abrasion and repel water while remaining lightweight and soft. A jacket coat integrated Kevlar® reinforcements at stress points such as elbows and back panels, significantly improving resistance to tearing and wear while maintaining Merino wool's thermoregulation and moisture-management benefits.

A Merino wool/Cordura® blend was applied in a jacket and trousers to deliver exceptional abrasion resistance, ensuring long-lasting performance even under heavy use. Kevlar® inlays provided targeted protection in high-impact zones, while the garments remained machine-washable and breathable. A seamless Merino wool dress demonstrated how urban silhouettes can benefit from protection wear principles, with monolithic construction offering durability, elasticity and comfort alongside high-visibility detailing.

The capsule highlights how the Merino wool fibre's natural advantages such as breathability, elasticity, temperature regulation, and fire resistance are strengthened when combined with engineered yarns and modern knitting techniques. This creates versatile apparel that delivers the durability of protective gear without compromising on comfort, softness, or style.

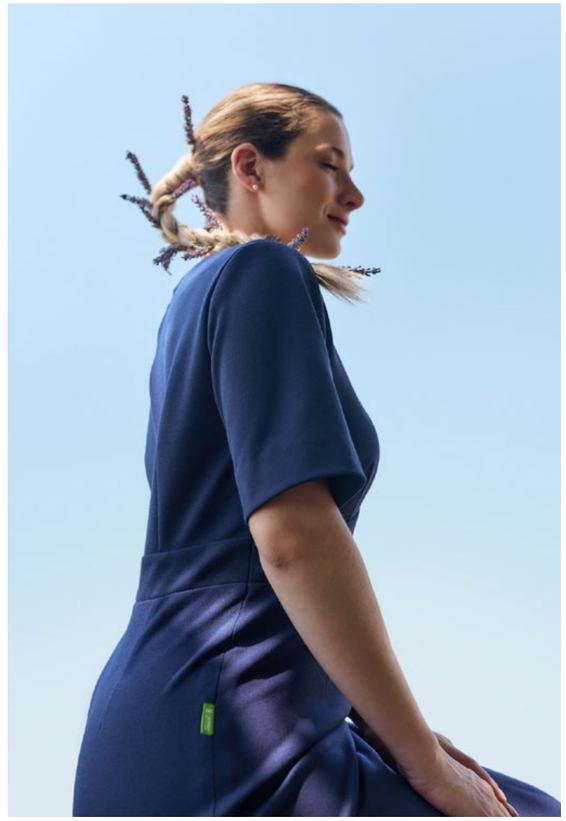
UNIFORMS

WOOLMARK SKYPRO WOOL KNIT UNIFORMS

Using Merino wool in uniforms offers a variety of performance benefits, from comfort and stretch to thermoregulation and odour resistance. To turn this vision into reality, Woolmark partnered with SKYPRO, a trusted industry leader known for developing smart and sustainable uniform solutions for global clients in aviation, hospitality and beyond.

SKYPRO took the lead in product development, working closely with one of Portugal's oldest and most respected wool mills, also a SKYPRO supplier. They developed two new wool knits specifically tailored for professional use. These fabrics meet Woolmark's strict certification standard, ensure breathability, durability and full washability, delivering long-lasting performance and low maintenance care without compromising aesthetic standards.

This is a pioneering solution that responds to the evolving needs of modern professionals: uniforms that look sharp, feel comfortable and support operational efficiency through simplified garment care.



The partnership with Woolmark reflects SKYPRO's ongoing mission to improve every stage of the uniform lifecycle, from responsible material sourcing to end-user experience. This project illustrates how collaboration between two industry leaders can explore the new potential for wool in sectors where perfomance and practicality are equally critical.

UNIFORMS

FARAGE AUSTRALIAN DEFENCE FORCE

All female personnel in the Australian Defence Force (ADF) have had an entitlement to wear a wool blend General Duty dress produced by Australian clothing brand and Woolmark licensee Farage.

Australian wool is included in the General Duty dress worn by female personnel across the tri-service of the Australian Defence Force (ADF): the Royal Australian Navy, Australian Army, and Royal Australian Air Force. Introduced in 2020, it is a completely new item of non-combat clothing for the ADF, providing female personnel with the option of wearing a tailored dress.

Renowned Australian brand Farage was contracted by the ADF in 2019 for the design and production of several corporate garments, in particular the General Duty dress.

Farage had previously designed and produced uniforms for the flight crew of the Royal Australian Air Force's 33/34 Squadron, a dedicated fleet servicing Australia's top ministers and international delegates.

Following successful trials of the General Duty dress by ADF personnel, from across a variety of ranks, the garments commenced being issued to female personnel in October 2020.

Farage worked with Woolmark on a wool blend fabric comprising 40% wool along with polyester, nylon and elastane for enhanced elasticity.

The dress is Woolmark certified and carries the 'Wool blend performance' logo. It is a short-sleeved, scoop-necked and knee-length dress that has been produced in brown for the Australian Army, black for the Royal Australian Navy and blue for the Royal Australian Air Force.

Farage has also produced a trench coat, for men and women, which has been produced for some personnel in the Royal Australian Navy and Royal Australian Air Force.

PROTECTIVE OUTERWEAR

HAINSWORTH PROTECTIVE FABRICS

"The kit is a significant improvement on our previous garments. They are lighter, more comfortable and the fit is a lot better. The clothing is repelling water more effectively with the added benefit of the Hainsworth protective fabrics eco-dry active lining that successfully pulls the moisture away."

Shane Redhead
Operational Support Technician, Lincolnshire Fire & Rescue Service

Hainsworth Protective Fabrics is a specialist textile company that has been an unrivalled market leader in the provision of personal protective equipment (PPE) fabric for more than 150 years. All its fabric is manufactured from its mill in West Yorkshire, England, which contains cutting edge looms and textile machinery.

Modern, innovative cloth manufactured by Hainsworth Protective Fabrics is worn by and protects thousands of firefighters across the world. As well as delivering textiles for firefighters, the company has also developed fabrics specifically for use by police (riot coveralls) and military. Hainsworth Protective Fabrics offers a wide range of quality textiles and technical expertise, one of the fabrics being ECO-DRY.

Heat stress is the biggest single threat to the health and safety of firefighters. ECO-DRY contains a unique blend of wool with Lenzing FR that absorbs and repels water respectively.

These different characteristics have been intelligently blended using Fibre Positioning Technology to work in combination as a moisture pump and heat regulator to maximise moisture management in moving sweat from the skin.

The wool fibre, Lenzing FR and Meta-Aramid are all inherently fire retardant. This means that unlike treated fire retardant fabrics, the excellent thermal protection of ECO-DRY products will not wash out, wear off or degrade over time.

Whether as a single layer for bushfire firefighting garments, or a liner for structural firefighting gear, this fabric is woven to provide benefits to the firefighter including comfort, ease of movement, breathability, thermal performance and durability – all perfect on long, demanding shifts for keeping firefighters cool, dry and comfortable.

PROTECTIVE OUTERWEAR

THE ARCTIC COLLECTION

For the Arctic Collection, Woolmark consulted with three prolific explorers preparing for a trip to the Arctic in winter. The focus was on developing a base- and mid-layer performance wear system designed to meet physiological and environmental needs, surpassing the performance and comfort of kit worn on previous expeditions.

Woolmark and textile innovation studio BYBORRE developed a wool-rich base- and mid-layer system from technical Merino wool yarns from the Südwolle Group, providing next-to-skin comfort, superior breathability and enhanced protection from the elements. By using innovative Merino wool yarns and fabrics, the explorers were able to dress lighter, without losing protective benefits such as warmth.

The wool single jersey base-layer developed for the expedition successfully outperformed the single jersey base-layer previously worn by the explorers, securing a reduction in total weight of 18%, an increase in thermal resistance of 26%, a 3% increase in breathability and a dry time and drying rate improved by 28% and 61% respectively. The fabric is a blend of 82% Merino wool, 10% polyamide and 8% elastane.

Other garments include thermal leggings in single jersey, a terry combined with single jersey base-layer made from 89% Merino wool/11% polyamide, plus a mid-layer in 3D wool fill. The base- and mid-layer fabrics underwent Woolmark's rigorous quality assurance testing.

PROTECTIVE OUTWEAR

BURLINGTON FABRICS BODYSHIELD™

"Unlike traditional flame resistant fabrics, onto which molten metal can stick, our fabric allows liquids to roll off, ensuring safety and comfort. It proudly holds the highest ISO 11612 rating of D3/E3, guaranteeing exceptional protection."

Bertrand Ross
Account Manager at Burlington

US company Burlington Fabrics uses Australian Merino wool to manufacture a commercially successful fabric that flame resistant and also repels molten metal splashes.

One of Burlington's standout innovations is BodyShield™, a fabric designed specifically for PPE used in smelters, foundries, steel mills and aluminium plants. Engineered with Merino wool, BodyShield™ combines natural comfort with advanced protection, resisting both flames and molten metal contact.

In addition to its protective performance, BodyShield™ offers workers greater comfort on the job. Merino wool's natural thermoregulation keeps wearers warm in cold conditions and cool in the heat, while its moisture management properties absorb sweat and maintain dryness during physically demanding tasks.

The fibre's elasticity and tear strength add durability, ensuring the garments withstand the rigours of heavy industry.

Made from 100% Merino wool, the fabric naturally decomposes at end of life without leaving harmful residues. Importantly, it has been developed without PFAS or other harmful chemical treatments, giving workers effective protection without compromising health or environmental standards.

Burlington collaborated with its long-term garment development partner Noriske during the creation of BodyShield™, a partnership that continues to deliver functional, durable solutions that prioritise both safety and comfort.

WOOLMARK IS THE GLOBAL AUTHORITY ON **WOOL.**

TECHNICAL TEAM

We have a dedicated technical team of experts that have specialist knowledge in all areas of the supply chain and are available to assist our partners with technical transfer, troubleshooting, process and product development and supply chain optimisation. We develop new processes and products bespoke to our partners to commercialise innovations in yarns, textiles, garments, products and processes.

SOURCING

We provide sourcing support for all tiers of the supply chain with direct access to the global wool manufacturing industry, The Wool Lab and bespoke material sourcing. The Wool Lab is a premier sourcing guide to the world's best commercially available wool fabrics and yarns, sourced from more than 100 of the world's best spinners, knitters and weavers in our global supply network.

SUPPLY CHAIN OPTIMISATION

We partner with designers, brands and retailers to commercialise new wool product lines. We offer design team support with supply chain assistance, quality assurance, seasonal consultation, product innovation and marketing.

INDUSTRY RESEARCH

We take the lead in funding and delivering research that innovates what wool is capable of, and ensure what wool means to the market is ever-evolving. These breakthroughs in fibre science, traceability and practices that promote sustainability and animal welfare are passed onto the industry and our partners have access to the latest research and information.

TRAINING AND EDUCATION

Wool education programs for the entire wool supply chain, including free online learning via the Woolmark Learning Centre and custom training programs are delivered by Woolmark including staff training for brands and retailers.

CERTIFICATION

We provide independent certification for quality wool products and the world's most iconic textile fibre brand – the Woolmark logo. Only Woolmark licensees, who have met strict performance and quality standards, can use the Woolmark logo on their products. The brand's use is administered through the Woolmark Certification Program.

WOOLMARK LICENSEES

We promote our Woolmark licensees throughout our global network and support them with supply chain assistance, quality assurance, technical consultation, product innovation, marketing and promote their product throughout our network. Woolmark licensees have been awarded the Woolmark logo to signify the quality assurance of their product.

WOOLMARK
PURE NEW WOOL

WOOLMARK
MERINO PERFORM

WOOLMARK
WOOL RICH BLEND

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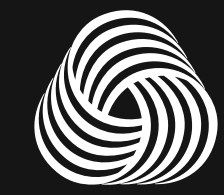

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