



WOOLMARK

BASE-LAYER

A PRODUCT DEVELOPMENT PLATFORM FOR NEXT-TO-SKIN SYSTEMS





The science of the wool fibre and four chapters that follow the body's changing states

01
Introduction

02
The Fibre

03
Rest

04
Move

05
Perform

06
Endure

07
Index, Partners, Services



The body is never static

It rests. It moves. It performs. It endures.

Merino wool supports every transition

DYNAMIC BREATHABILITY

Performance changes minute by minute, yet most performance garments are engineered for a fixed condition. Dynamic Breathability explores how Merino wool’s natural response to heat and moisture can be amplified through yarn, textile and garment engineering to support the body across rest, movement, exertion and extended wear.

The result is a collection of 23 commercially relevant prototypes developed with specialist manufacturing partners around the world.

01
Rest

Comfort and Recovery.

02
Move

Freedom and flexible.

03
Perform

Ventilation and support

04
Endure

Built for changing conditions.

The opportunity

Brands are looking for performance apparel that works across more activities, temperatures and wearing occasions.

At the same time, advances in spinning, knitting, weaving and garment construction are expanding what is technically possible with Merino wool.

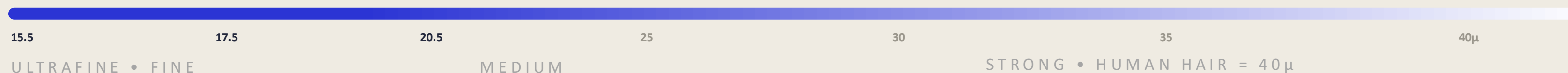
This collection brings those capabilities together in one practical development resource: 23 prototypes, 18 partners and a global network that brands can use to accelerate their own wool-rich performance products.

A library of commercially relevant constructions and product concepts that development teams can adapt to their own briefs.

Micron level shapes how wool feels and performs, with each range offering distinct benefits.

Australian Merino wool is among the finest wool grown. This collection is built entirely in the ultrafine-to-fine range — from a 15.5-micron next-to-skin knit through to a 20.5-micron woven trouser. Fibre diameter is selected according to the intended use, from next to skin comfort to more robust woven applications

THIS COLLECTION



15.5–20.5μ

THE COLLECTION

10

Categories

Sleep
Lounge
Yoga
Golf
Tennis
Running
Cycling
Skiing
Work
Hiking

23

Styles

Ultra-fine sleep set
Wool-silk sleep set
Wool-rich French terry lounge set
Santoni seamless yoga collection
Knit-to-shape golf polo
Golf performance trouser
Merino wool x silk tennis-wear
Hybrid zone running system
Engineered cycling jersey
Performance cycling glove
WHOLEGARMENT ski base-layers
Brushed thermal mid-layer
Zoned workwear base-layer
Merino moisture management hiking layer
Ripstop hiking pant

18

Partners

Südwolle Group
Xinao
Alpha
Casa da Malha
World Knitting Textile
Bangjie
Daluen Vietnam
Yu Yuang
Diyang
Cixing
Rainbow
Furun
Reda Active
Takisada-Nagoya
Shanghai Challenge
Metarino/Zefeng
Danmao
Zhong Fang Lian

7

Technologies

22-Gauge WHOLEGARMENT Knitting
Santoni Seamless Knitting
Hybrid Circular-Flat Knitting
Knit-To-Shape Construction
Body-Mapped Multi Fabric Engineering
Merino Warp-Knit Compression
Integrated Knit Components

Six natural performances

Performance begins with the fibre and is amplified through yarn, textile and garment engineering.

- 01

Temperature Regulation

Buffers heat and cold to hold a steady microclimate against the skin.
- 02

Breathability

Absorbs and releases moisture vapor in response to changing conditions.
- 03

Moisture Management

Absorbs up to one-third of its own weight in moisture while feeling dry to the touch.
- 04

Natural Elasticity

Stretches and recovers with the body, holding shape wear after wear.
- 05

Odour Resistance

Naturally resists odour, so garments stay fresher between washes.
- 06

Soft on skin

Superfine and ultrafine Merino fibres bend easily, resulting in a soft, comfortable feel against the skin.



CHAPTER 1

Rest

Sleep. Lounge.



WOOLMARK

Rest

Next-to-skin systems developed for overnight comfort, recovery and relaxation. Ultrafine fibres and refined knit constructions create softness, lightweight warmth and temperature regulation without unnecessary bulk.

PERFORMANCE NEEDS

- Next-to-skin softness
- Overnight temperature regulation
- Recovery and relaxation
- Lightweight warmth
- Everyday comfort

INNOVATION PARTNERS

- Südwolle Group
- Alpha
- Casa da Malha
- World Knitting Textile
- Zhong Fang Lian

HERO INNOVATION

Ultrafine 100% Merino sleep set

One of the collection's finest examples of pure Merino wool performance — combining ultrafine 15.5-micron wool with advanced hybrid knit engineering to deliver exceptional overnight comfort without relying on synthetic fibres.

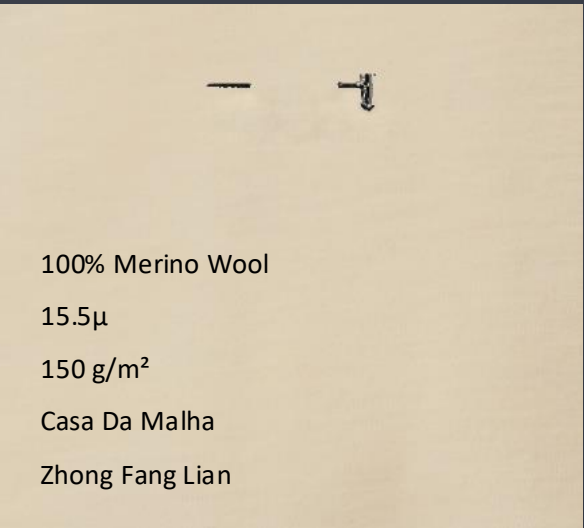
The innovation is in the hybrid knit construction. Working with ultrafine pure wool presents a technical challenge: achieving the stretch, recovery and durability required of a sleep garment without synthetic fibres. The hybrid construction delivers this performance while preserving the exceptional softness and lightweight comfort of 100% Merino wool

KEY TECHNOLOGIES

- Hybrid circular & flat-bed knitting
- Elastic-band-free integrated waistband
- Fine-gauge interlock construction
- Integrated jacquard waistband

PERFORMANCE OUTCOMES

- Exceptional softness
- Natural temperature regulation
- Reduced bulk
- Machine washable



100% Merino Wool
15.5μ
150 g/m²
Casa Da Malha
Zhong Fang Lian



TECHNICAL INNOVATION

Wool-silk sleep set

A specialised wool-silk construction engineered to combine the natural comfort of Merino wool with enhanced softness, drape and durability.

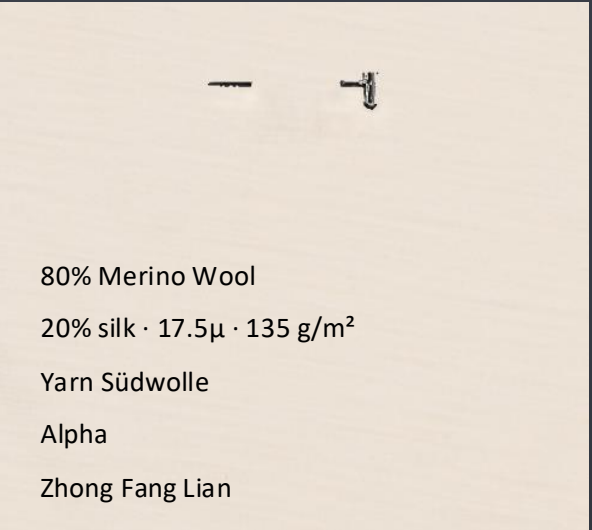
Blending Merino wool with silk enhances next-to-skin comfort and wearability, creating sleepwear that feels smoother against the skin while maintaining its appearance and performance over time.

KEY TECHNOLOGIES

- Wool-silk engineered yarn
- Hybrid circular & flat-bed knitting
- Elastic-band-free integrated jacquard knitted waistband

PERFORMANCE OUTCOMES

- Lightweight comfort
- Breathability
- Fluid drape



80% Merino Wool
20% silk · 17.5µ · 135 g/m²
Yarn Südrolle
Alpha
Zhong Fang Lian



Wool-rich French terry lounge set

Engineered brushed wool terry creates luxurious everyday comfort while maintaining the natural breathability and durability of Merino wool.

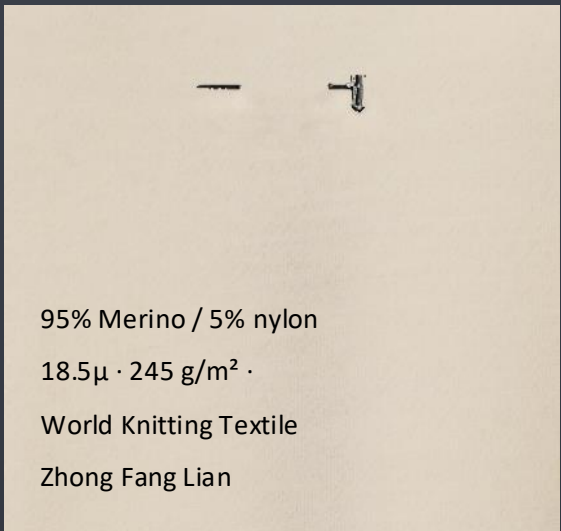
The innovation lies in achieving natural stretch through an advanced terry construction. The wool-rich French terry construction creates inherent stretch and recovery, using just 5% nylon to enhance durability. The result is a soft, breathable, and resilient lounge fabric that demonstrates how Merino wool can deliver comfort and performance with minimal synthetic fibre.

KEY TECHNOLOGIES

- Engineered French terry construction
- Core spun Merino yarn

PERFORMANCE OUTCOMES

- Cloud-soft comfort
- Lightweight warmth
- Everyday durability





CHAPTER 2

Move

Yoga. Golf. Tennis.





WOOLMARK

Move

Performance apparel developed for freedom of movement across lower-intensity activity. Seamless construction, engineered stretch and premium natural blends balance comfort, flexibility and appearance.

PERFORMANCE NEEDS

- Freedom of movement
- Lightweight comfort
- Breathability
- Stretch and recovery
- Premium appearance

INNOVATION PARTNERS

- Bangjie
- Südwolle Group
- Alpha
- Shanghai Challenge
- Yu Yuang
- Xinao
- Cixing
- Takisada-Nagoya

SUPPORTING INNOVATION

Santoni seamless yoga collection

Combining BetaSpun® Merino wool yarn with Santoni seamless knitting technology to create lightweight garments with engineered body support and exceptional next-to-skin comfort.

The innovation is in putting performance exactly where the body needs it. Body-mapped knit structures allow designers to engineer different levels of support, breathability and flexibility into a single seamless garment, reducing bulk in high-movement areas such as the knees while adding structure where greater support is needed.

KEY TECHNOLOGIES

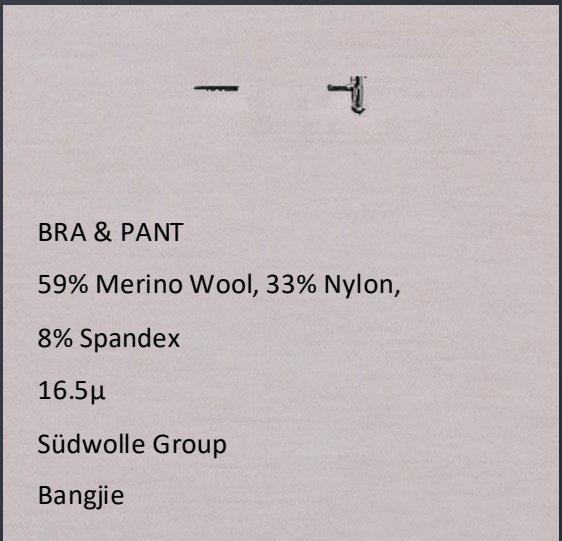
- Santoni seamless knitting
- BetaSpun® Merino yarn
- Engineered knit zones
- Controlled compression

PERFORMANCE OUTCOMES

- Reduced friction
- Freedom of movement
- Lightweight breathability
- Next-to-skin comfort



TOP
55% Merino Wool
45% Nylon
16.5µ
Südwolle Group
Bangjie



BRA & PANT
59% Merino Wool, 33% Nylon,
8% Spandex
16.5µ
Südwolle Group
Bangjie



WOOLMARK

BetaSpun® is an innovative spinning technology designed to enhance the natural qualities of wool by significantly improving yarn strength, abrasion resistance and pilling performance, while maintaining a smooth surface or hand-feel. By combining Merino wool with a reinforcing polyamide filament, BetaSpun® creates durable, high-performance yarns that retain wool's natural comfort, breathability and temperature-regulating benefits.

Technical Innovation

BetaSpun Yarn

Merino Wool Fibre

Polyamide Filament

100% Merino Knit-to-shape golf polo

A technically demanding seamless polo that integrates the collar and placket directly into the garment, showcasing the possibilities of pure Merino wool knit engineering.

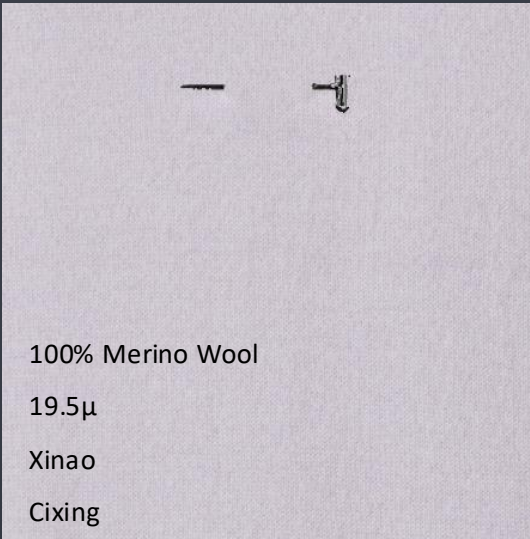
The innovation is in engineering freedom of movement into the garment. The seamless knit-to-shape construction eliminates seams and minimises tension points around the armhole, reducing restriction through the golf swing while delivering the comfort, fit and premium finish of 100% Merino wool.

KEY TECHNOLOGIES

- Knit-to-shape construction
- Integrated collar and placket
- High-twist Merino yarn

PERFORMANCE OUTCOMES

- Premium finish
- Shape retention
- Seamless comfort



HERO INNOVATION

Golf performance trouser

A refined, machine-washable woven performance trouser demonstrating the versatility of pure Merino wool beyond traditional knitwear.

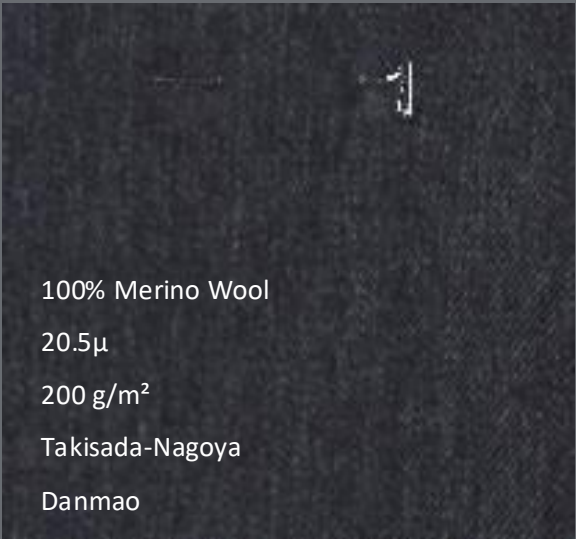
The innovation is in delivering performance without compromising a tailored aesthetic. Merino wool's natural stretch allows the trouser to move with the body, providing freedom of movement throughout the swing while retaining the refined drape, comfort and appearance of a tailored trouser.

KEY TECHNOLOGIES

- Performance twill weave
- Machine-washable pure Merino wool woven

PERFORMANCE OUTCOMES

- Natural stretch
- Excellent drape
- All-day comfort



100% Merino Wool
20.5μ
200 g/m²
Takisada-Nagoya
Danmao



Merino wool-silk tennis-wear

Combines wool-silk blends with performance knit structures to create lightweight garments with an elevated aesthetic.

The innovation is in combining performance with a light, fluid feel. Merino wool delivers natural breathability, softness and comfort during active movement, while silk adds enhanced smoothness, fluidity and drape. Together these fibres maintain lasting performance and a refined appearance throughout the game, set and match.

KEY TECHNOLOGIES

- Piqué knit construction
- Plated yarn engineering
- Warp-knit elastic waistband

PERFORMANCE OUTCOMES

- Breathability
- Lightweight
- Comfort
- Refined appearance





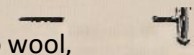
TOP

79% Merino, 19% Silk, 2% Spandex 17.5µ
200 g/m²

Südwolle Group

Alpha

Shanghai Challenge



SKIRT

54% Merino wool,
13% Silk, 33%
Nylon

(Waistband Fabric)

17.5µ
156 g/m²
Südwolle Group

50% Merino wool,
38% Nylon, 12%
Spandex

Yu Yuang
Shanghai Challenge

16.5µ
260g/m²



CHAPTER 3

Perform

Running. Cycling.





Perform

Wool-rich systems developed for higher-output activity. Zoned ventilation, compression and hybrid constructions place airflow, support and protection where the body needs them.

PERFORMANCE NEEDS

- Moisture management
- Zoned ventilation
- Lightweight performance
- Muscle support
- Stability during movement

INNOVATION PARTNERS

- Shanghai Challenge
- Furun
- Daluen Vietnam
- Yu Yuang
- Metarino/Zefeng

Hybrid zone running system

A sophisticated multi-fabric garment that combines knit, woven and compression constructions to deliver body-mapped performance exactly where it's needed.

The innovation is in engineering different performance functions into a single garment. A lightweight woven, wind-resistant panel at the lower body provides targeted protection in an area traditionally constructed from knitted fabric in synthetic running tops. Combined with strategically placed ventilation and support, the wool-rich hybrid construction delivers airflow, protection and freedom of movement where the body needs them most.



KEY TECHNOLOGIES

- Hybrid knit and woven construction
- Open mesh ventilation
- Warp-knit compression liner
- Multi-fabric engineering
- Light weight stretch woven

PERFORMANCE OUTCOMES

- Maximum airflow
- Moisture management
- Lightweight support
- Freedom of movement

(Mesh Fabric) 50% Merino Wool, 34% Coolmax, 15% Nylon, 1% Spandex, 8.5µ 145 g/m²

(Woven Fabric) 41% Merino Wool, 50% Nylon, 9% Spande, 16.5µ, 96 g/m²

Shanghai Challenge Furun

(Inner Short) 58% Merino Wool, 16% Nylon, 26% Spandex, 16.2µ 158 g/m²

Daluen

HERO INNOVATION

Engineered cycling jersey

Combines warp-knit compression with targeted ventilation zones to optimise support, airflow and stability during long rides.

The innovation is in engineering Merino wool for the demands of high-intensity cycling. Strategic compression and ventilation zones extend Merino wool into sustained athletic performance, delivering targeted support and airflow while harnessing the fiber's natural breathability, moisture management and next-to-skin comfort.

KEY TECHNOLOGIES

- Warp-knit compression construction
- Zoned mesh ventilation
- Silicone gripper stabilisation

PERFORMANCE OUTCOMES

- Muscle support
- Breathability
- Stable fit
- Long-wear comfort

(Mesh Fabric) 50% Merino Wool,
34% Coolmax, 15% Nylon,
1% Spandex, 18.5 μ , 145 g/m²
Shanghai Challenge
(Knitted Fabric) 67% Merino Wool,
18% Nylon, 15% Spande, 16.5 μ , 255
g/m², Yu Yuang, Shanghai Challenge



Performance cycling glove

An ergonomic accessory engineered to improve comfort and durability using Merino wool in high-contact performance areas.

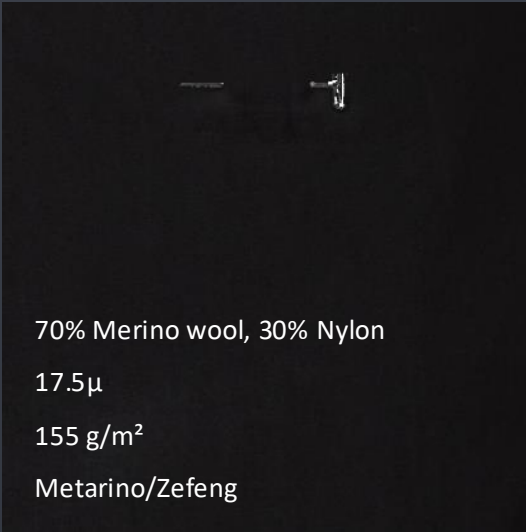
The innovation is in putting Merino wool where its natural performance can make a tangible difference. Merino wool padding brings natural moisture and temperature management directly to the palm, helping hands stay drier and more comfortable while providing cushioning and protection over longer rides.

KEY TECHNOLOGIES

- Wool-padded palm
- Reinforced construction
- Wrap spun yarn

PERFORMANCE OUTCOMES

- Cushioning
- Grip and comfort
- Reinforced durability





CHAPTER 4

Endure

Ski. Workwear. Hiking.



Endure

Layering systems developed for extended wear and changing conditions. Seamless thermal construction, body mapping and reinforced textiles combine protection with long-duration comfort

PERFORMANCE NEEDS

- Thermal regulation
- Durability Layering
- Long-duration comfort
- Weather adaptability

INNOVATION PARTNERS

- Rainbow
- Reda Active
- Diyang
- Danmao
- Alpha

HERO INNOVATION

WHOLEGARMENT ski base-layer

One of the most advanced garments in the collection, produced using Shima Seiki WHOLEGARMENT technology to knit an entire seamless garment in one piece.

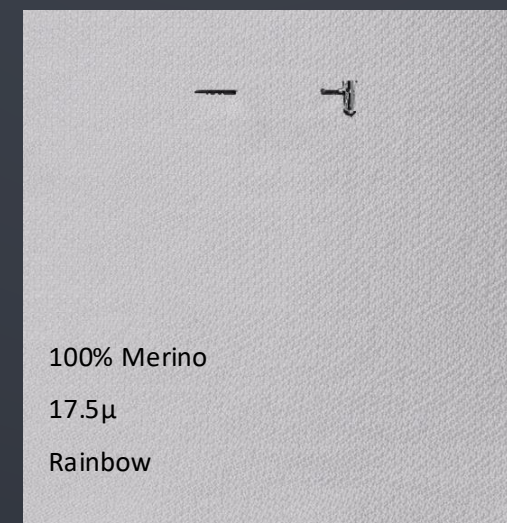
The innovation is in achieving complex, fine-gauge construction in 100% Merino wool without cut and sew. Advanced WHOLEGARMENT technology enables intricate paneling and precision body shaping to be knitted directly into the garment at an ultrafine 22 gauge: demonstrating the increasingly sophisticated fine-gauge constructions now achievable in pure Merino wool.

KEY TECHNOLOGIES

- WHOLEGARMENT knitting
- 22-gauge seamless construction
- Precision body shaping

PERFORMANCE OUTCOMES

- No pressure points
- Lightweight warmth
- Premium fit
- Natural odour resistance



HERO INNOVATION

100% Merino Brushed thermal mid-layer

A premium thermal layer using engineered brushing techniques to maximise insulation while maintaining the natural breathability of Merino wool.

The innovation is in creating greater warmth without unnecessary bulk. Engineered brushing lifts the Merino wool fibres to create additional thermal loft, delivering lightweight insulation while preserving freedom of movement and helping regulate body temperature as activity levels and conditions change.

KEY TECHNOLOGIES

- Brushed Merino construction to create a soft, lifted inner surface
- Thermal loft engineering

PERFORMANCE OUTCOMES

- Enhanced warmth
- Lightweight insulation
- Breathability



Zoned workwear base-layer

A body-mapped workwear base-layer that combines durability and ventilation using multiple knit structures in pure Merino wool.

The innovation is in engineering different performance zones within a 100% Merino wool garment. By placing different structures where the body needs them most, the garment adapts to the demands of physical work, enhancing comfort and supporting unrestricted movement throughout the day.

KEY TECHNOLOGIES

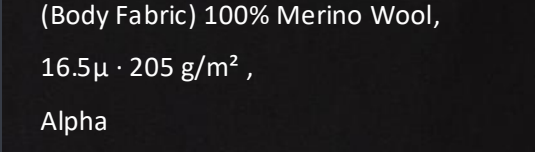
- Interlock knit construction
- Zoned mesh ventilation
- Multi-knit engineering

PERFORMANCE OUTCOMES

- All-day comfort
- Breathability
- Durability



(Body Fabric) 100% Merino Wool,
16.5µ · 205 g/m² ,
Alpha



(Sleeve Fabric) 100% Merino Wool,
16.5µ 170 g/m²
Diyang



Merino moisture management hiking layer

Combines engineered knit base-layers with moisture management technology to create a versatile outdoor system capable of withstanding demanding environments.

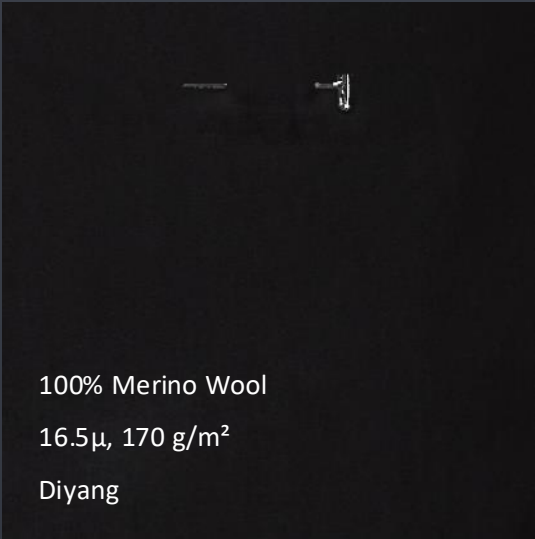
The innovation lies in enhanced moisture management through a double-sided Merino wool knit. A hydrophilic treatment is combined with hydrophobic wool yarn to help manage both moisture vapour and liquid sweat. The construction draws moisture away from the skin and transports it through the fabric, helping the wearer feel drier and more comfortable during activity.

KEY TECHNOLOGIES

- Moisture management technology
- Merino wool engineered knit construction
- Light-weight double knit

PERFORMANCE OUTCOMES

- Supersoft handle
- Natural odour control
- Temperature regulation
- Outdoor durability



SUPPORTING INNOVATION

Ripstop hiking pant

Wool and nylon are blended and woven into a ripstop fabric, a reinforced grid construction designed to resist tearing, combining the tear strength and abrasion resistance of a technical outdoor pant with the dry-touch feel and natural comfort of Merino wool.

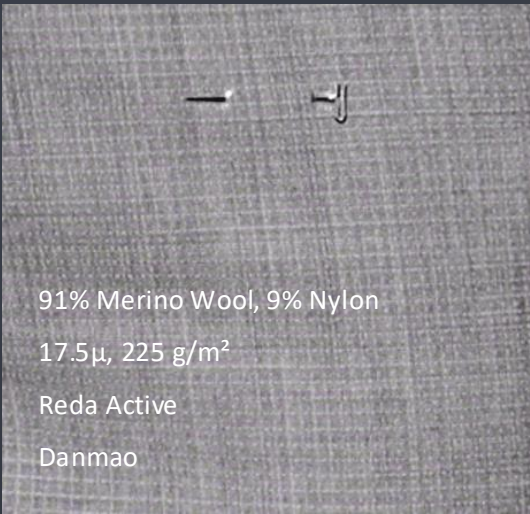
The innovation is in balancing rugged protection with all-day comfort. The wool-rich ripstop construction delivers strength and durability without the weight and rigidity often associated with technical hiking fabrics, creating a lighter, more versatile pant that supports freedom of movement and comfort over long days on the trail.

KEY TECHNOLOGIES

- Wool-nylon ripstop weave
- Reinforced grid structure
- Full length trousers that convert into shorts

PERFORMANCE OUTCOMES

- Enhanced tear and abrasion strength
- Natural odour control
- Temperature regulation
- Outdoor durability





THE TECHNOLOGY LENS

Innovation Index

The marquee constructions threading through all four chapters — and the categories that carry them.

1. SANTONI SEAMLESS - **YOGA**

Circular seamless knitting that reduces seams, while allowing for body mapping.

2. WARP KNIT- **CYCLING, RUNNING, TENNIS**

Vertical-loop structure for compression, support and stability.

3. WOOL-SILK BLENDS - **SLEEP, TENNIS**

Silk adds smoothness, drape and quiet lustre to fine Merino.

4. ZONED & MESH VENTILATION - **RUNNING, CYCLING, WORK**

Open-knit and woven panels mapped to the body's heat and airflow.

5. WHOLEGARMENT & KNIT-TO-SHAPE – **SKI, GOLF**

One-piece seamless knitting that eliminates seams and reduces waste.

6. BETASPUN® & WRAP SPUN YARN – **YOGA, CYCLING**

Fine polyamide filament twisted around Merino for resilience and comfort.

7. WOOL-RICH TERRY - **LOUNGE**

Brushed French terry for soft, lofted, everyday warmth.

8. RIPSTOP & MOISTURE MANAGEMENT - **HIKING**

Reinforced grid weave and moisture management by absorbing water vapour and sweat.

Where to start

IF YOUR BRIEF IS

NEXT-TO-SKIN COMFORT

LIGHTWEIGHT WARMTH

FREEDOM OF MOVEMENT

SUPPORT AND STABILITY

HEAT MANAGEMENT

EXTREME CONDITIONS

EXPLORE

Ultrafine Merino and wool-silk blends

Wool-rich terry and Shima Seiki WHOLEGARMENT

Santoni seamless knitting and BetaSpun® stretch yarns

Merino warp knit structures and engineered compression

Zoned mesh, open-knit structures and body mapped ventilation

Merino ripstop constructions and performance fibre blends

WHAT IT UNLOCKS

Silk-smooth drape and quiet lustre, wrapped for durability.

Brushed loft for everyday warmth, or one-piece knitting at 22 gauge.

Circular knitting with no side seams — fewer pressure points, less waste.

Vertical-loop structure for compression, support and hold.

Open-knit and woven panels mapped to the body's heat and airflow.

Reinforced grid weave and engineered cooling fibre for the extremes.



18 PARTNERS, 7 COUNTRIES

Manufacturing Partners

The spinners, knitters, weavers and garment makers who built the collection.

SPINNERS

- Südwolle Group
- Xinao

KNITTERS

- Alpha
- Casa da Malha
- World Knitting Textile
- Bangjie
- Daluen Vietnam
- Yu Yuang
- Diyang
- Cixing
- Rainbow
- Shanghai Challenge
- Metarino/Zefeng

WEAVERS

- Furun
- Reda Active
- Takisada-Nagoya

GARMENT MAKERS

- Zhong Fang Lian
- Shanghai Challenge
- Diyang
- Danmao

MANUFACTURED ACROSS

**CHINA • GERMANY • ITALY • PORTUGAL
JAPAN • VIETNAM • THAILAND**



Our services

From fibre to finished garment — support to bring Merino performance to market

01 Technical Development

Product and fabric development across yarn, knit and weave — engineering wool to a performance brief.

03 Certification & the Woolmark logo

Quality assurance and licensing of the Woolmark — the world's best-known textile-fibre mark.

02 Supply-chain Connection

Introductions to our global network of spinners, knitters, weavers and garment makers.

04 Education & Advocacy

Training, insight and marketing that champion the natural performance of Australian Merino.

*Dynamic Breathability is only the beginning.
- Talk to us about building your next collection in wool.*



WOOLMARK

BRING US THE PERFORMANCE PROBLEM.
WE WILL HELP YOU DEVELOP THE NATURALLY INTELLIGENT SOLUTION