

Innovations in wool

Gary Robinson

Wool industry consultant

Innovations in wool

**The continuing quest to maintain
and improve wool's position
in the market**

Just what is INNOVATION?

‘But for me innovation was and still is ... a battle in the marketplace between innovators and attackers trying to make money by changing the order of things, and defenders trying to protect their existing cash flows.’

Richard N. Foster

Innovation-The Attacker's Advantage

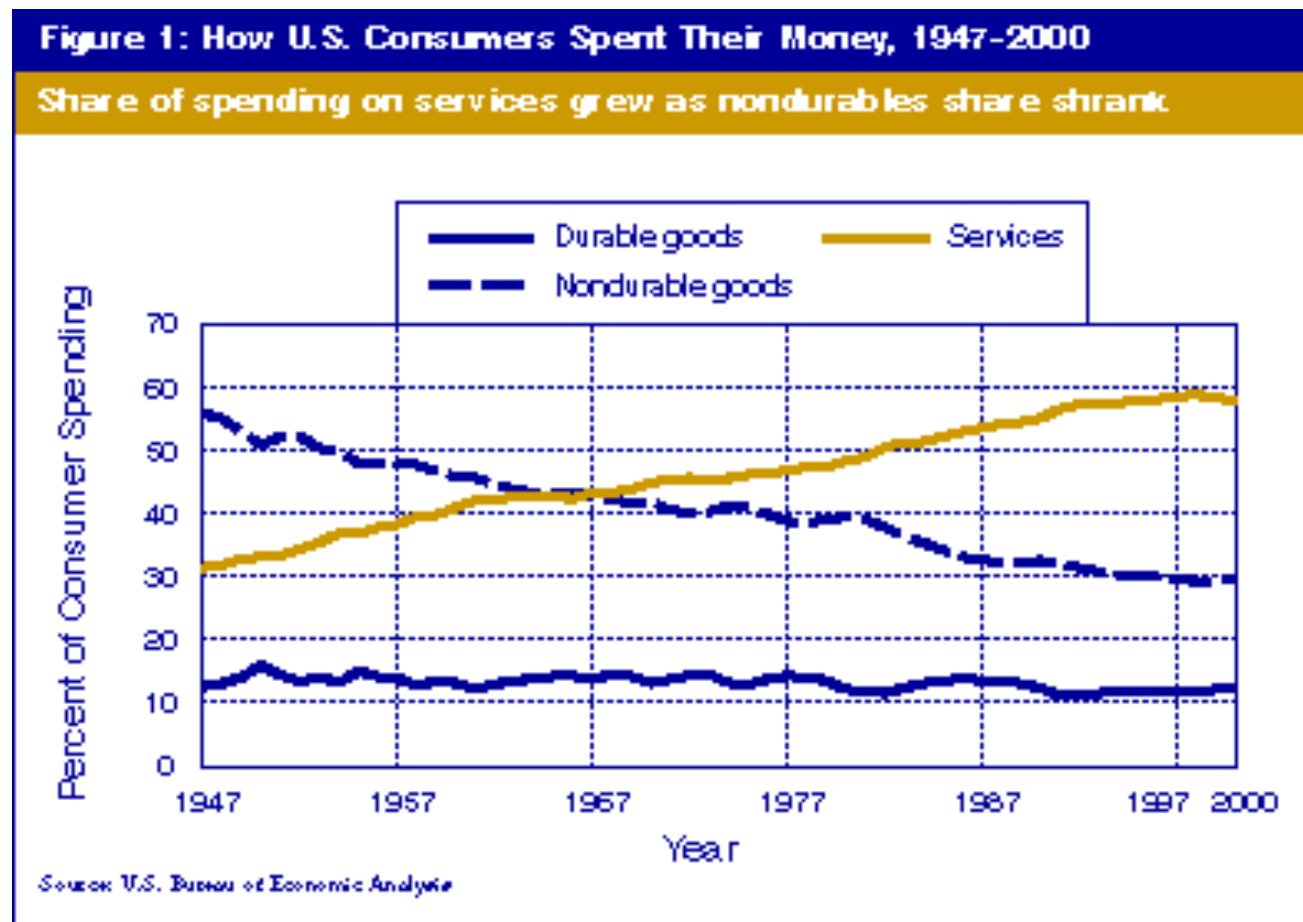
Attributes of wool

- Water repellent
- Water absorbing
- Active heating
- Breathability
- Naturally elastic
- Shape retentive
- Temporarily and permanently settable
- Flexible with superb drape
- Naturally fire resistant
- Micron selectable

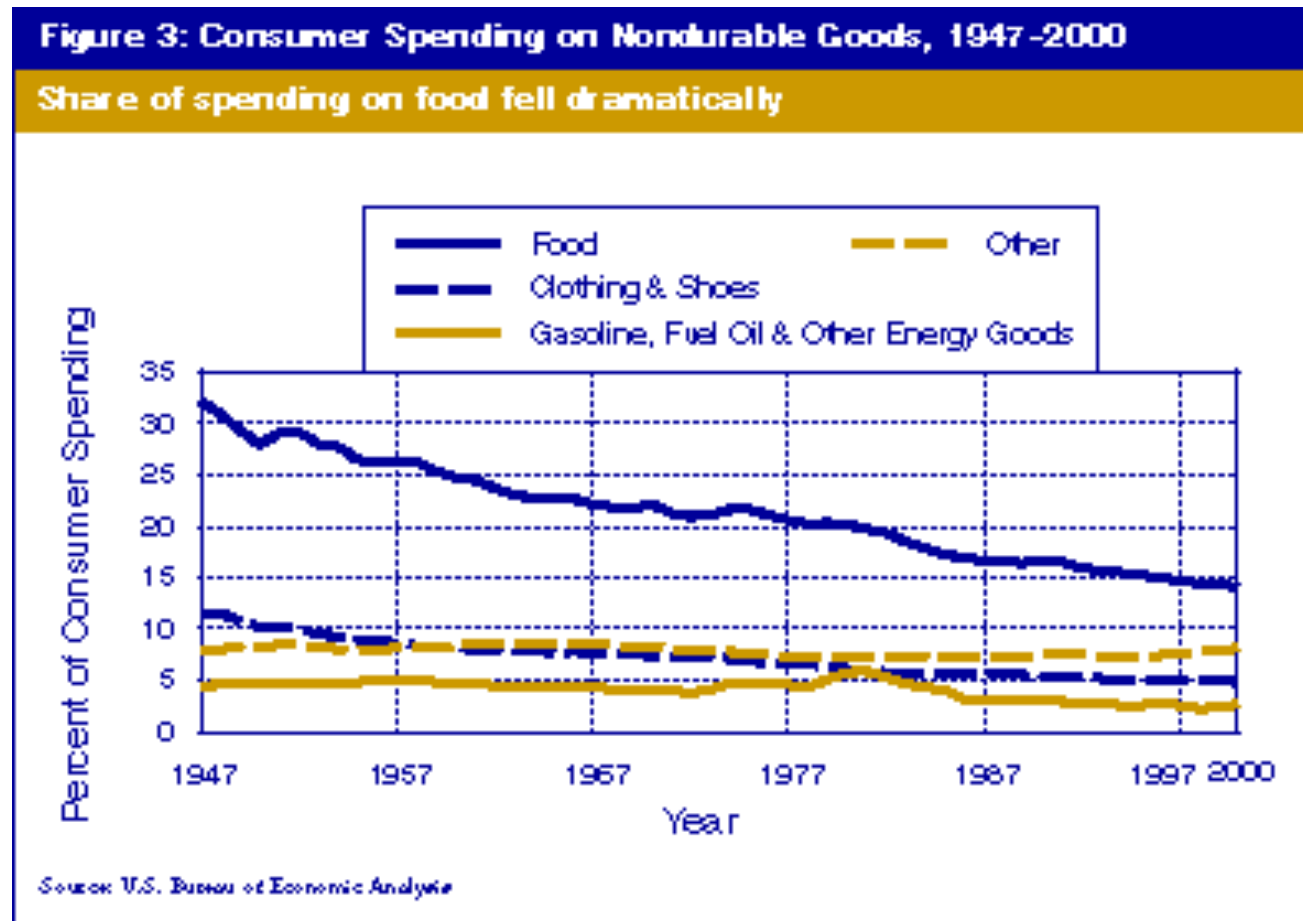
Modern people are:

- **resource rich, time poor**
- **aspirational**
- **increasingly casual in clothing**
- **wanting value for money**
- **status conscious**
- **older on average**
- **environmentally anxious**
- **obese**
- **increasingly mobile**
- **energy hungry**
- **accustomed to change**
- **increasingly service users and workers**
- **living with climate control.**

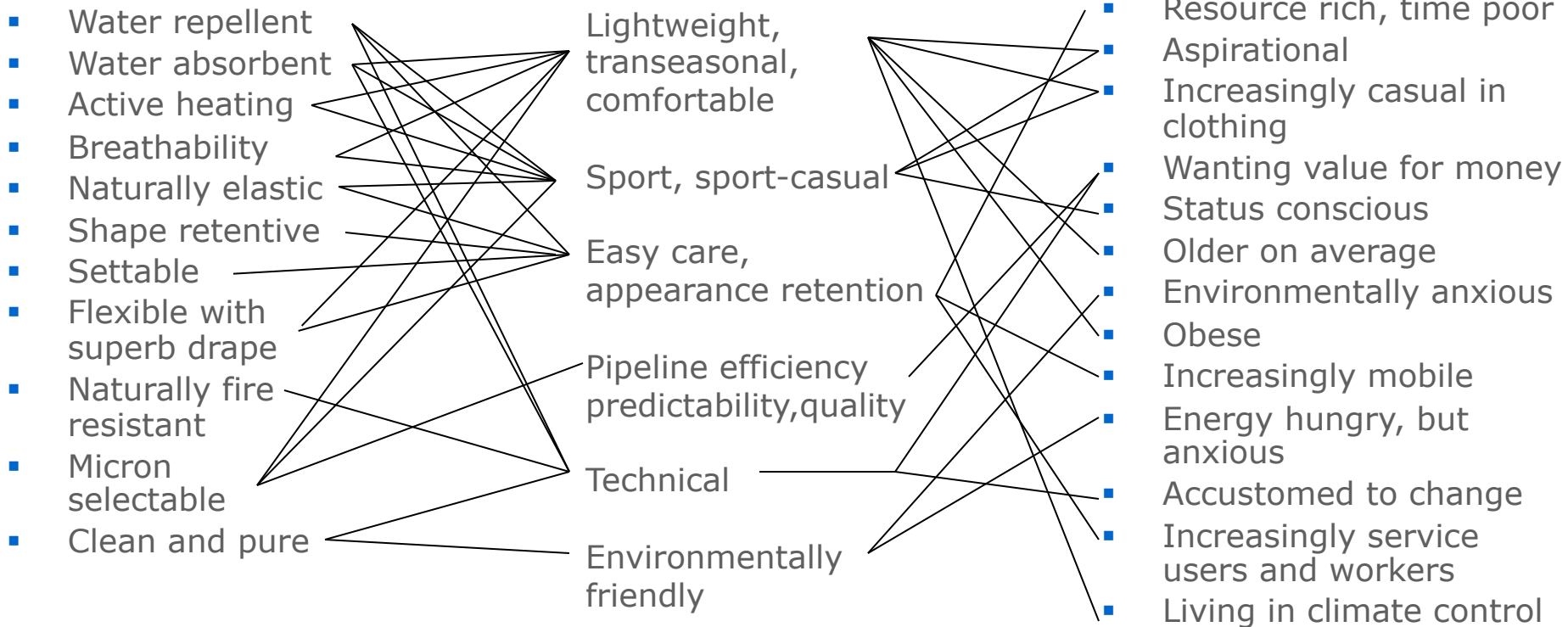
Wool and the world



Wool and the world

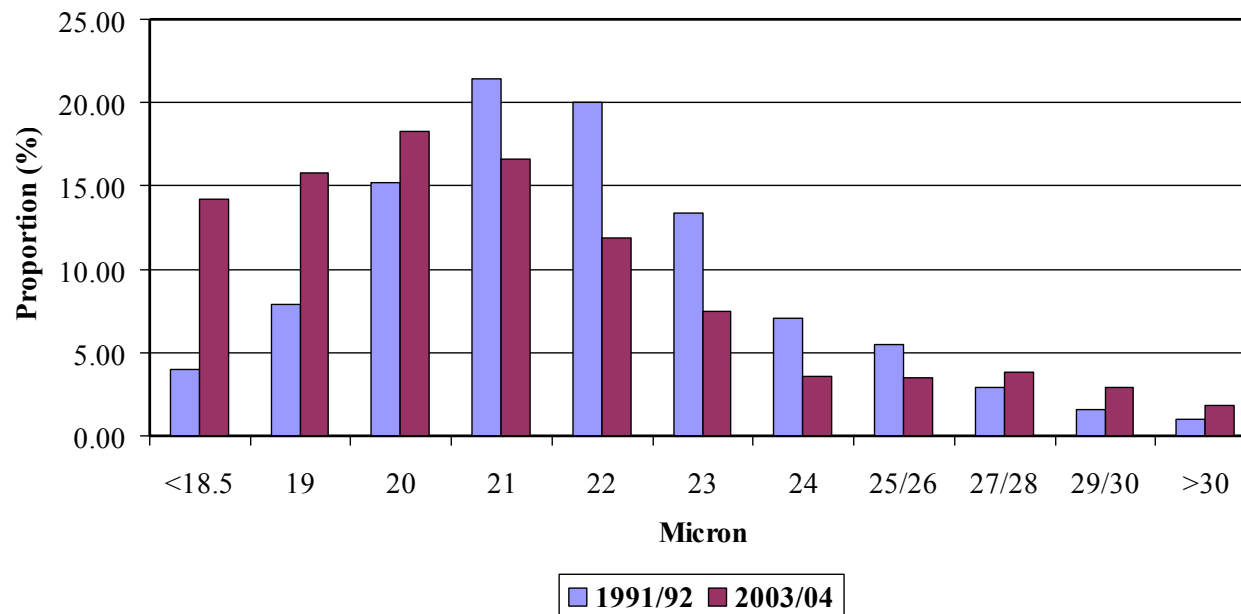


Wool's innovation links with the world



Lightweight, transeasonal, comfortable

Micron profile of wool offered at auction



Lightweight, transeasonal, comfortable

Sirolan Fleecescan™ *High volume fleece testing*

Target market:
Rural wool producers

Need addressed:
Portable, reliable on-farm fleece testing,
which assists in the classing of fibre

Benefits to the clients:
Sampling and classing done on-farm
Growers able to class their flocks
objectively



Lightweight, transeasonal, comfortable

- On Farm - OFDA 2000

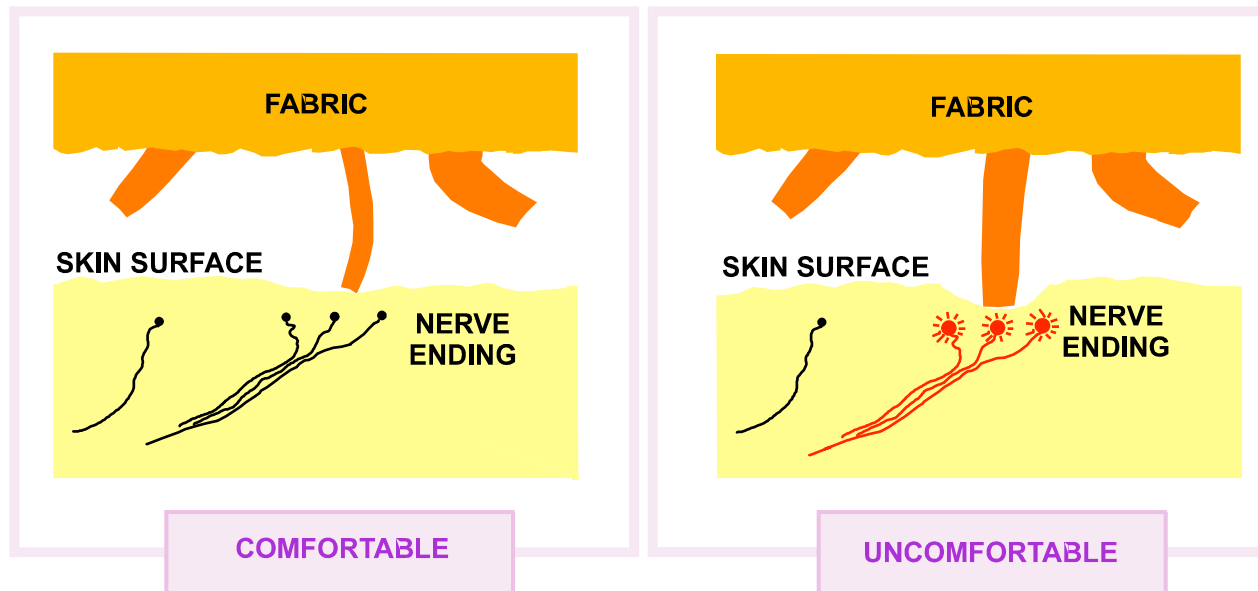


Lightweight, transeasonal, comfortable

Finer wool means finer yarns can be spun, and finer fabrics can be made from those yarns. The finest yarn in tex, or gm/km, that can be practically spun from given wool is proportional to the square of the mean fibre diameter of the fibres. Reducing the fibre diameter by 10% will allow a 20% reduction in yarn linear density. Fabric weights can be so much lighter as a result.

Lightweight, transeasonal, comfortable

SKIN COMFORT



CRITICAL FORCE=100mg

Lightweight, transeasonal, comfortable



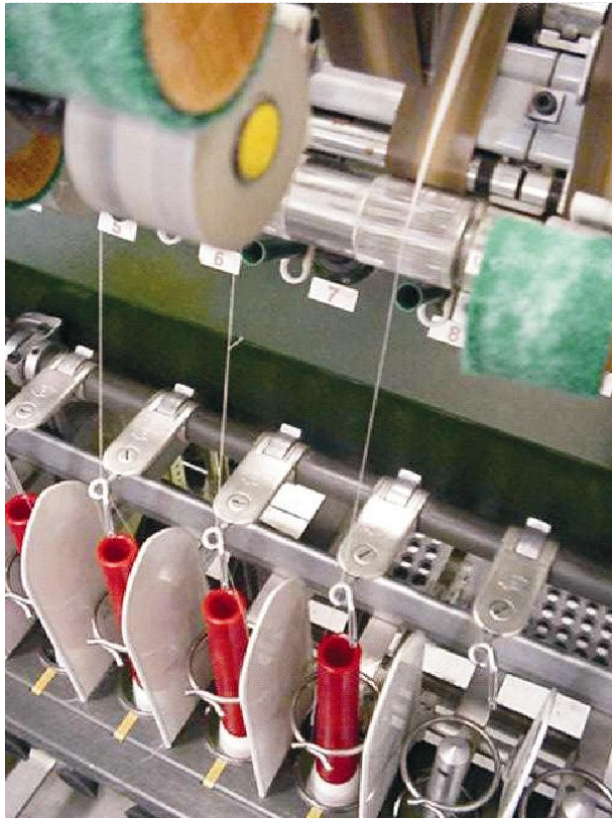
AWI development with Kookai

Photograph courtesy of AWI

POSH MERINO

Longer wool, finer
wool, lower twist
yarns

Lightweight, transeasonal, comfortable



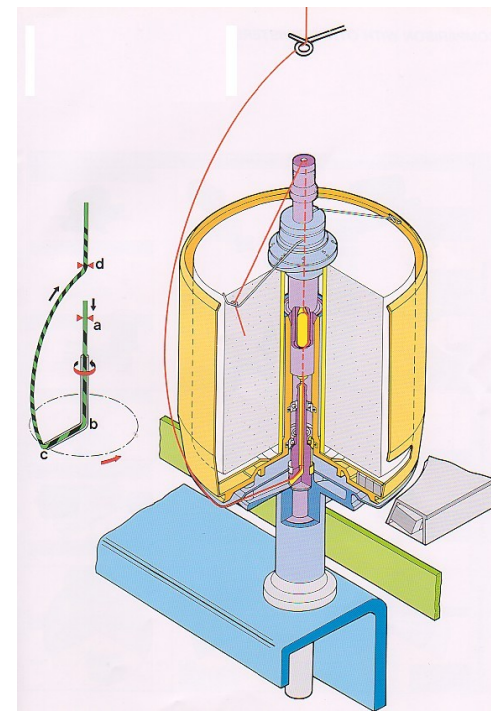
Worsted spinning
developments

Lightweight, transeasonal, comfortable

Yarn twisting



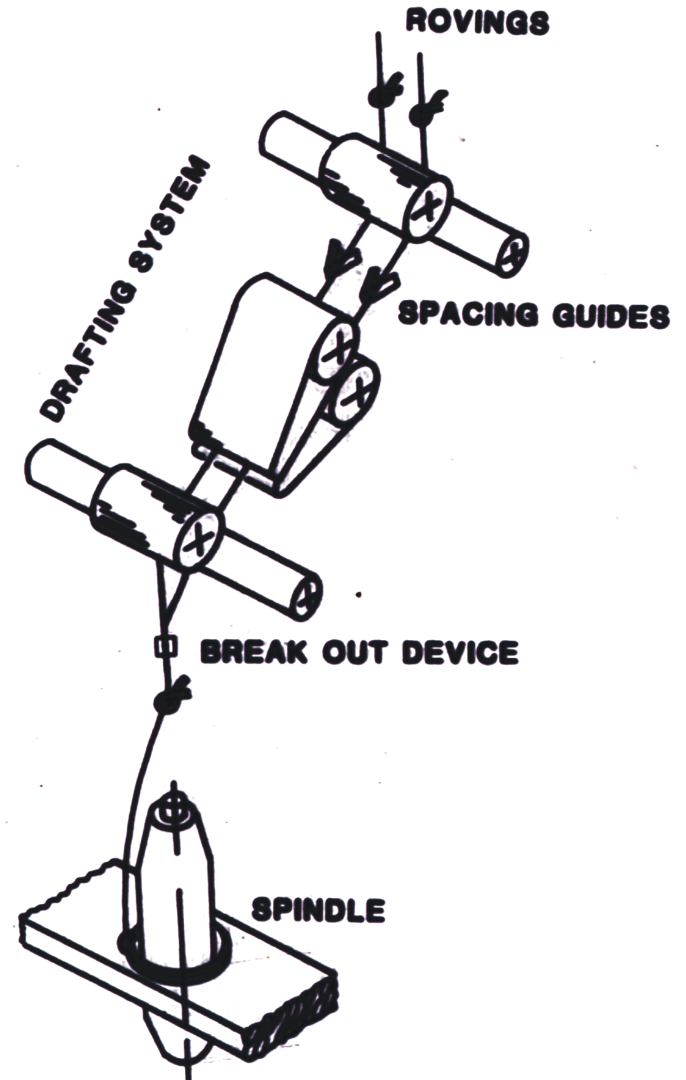
Assembly winding



Two-for-one twisting

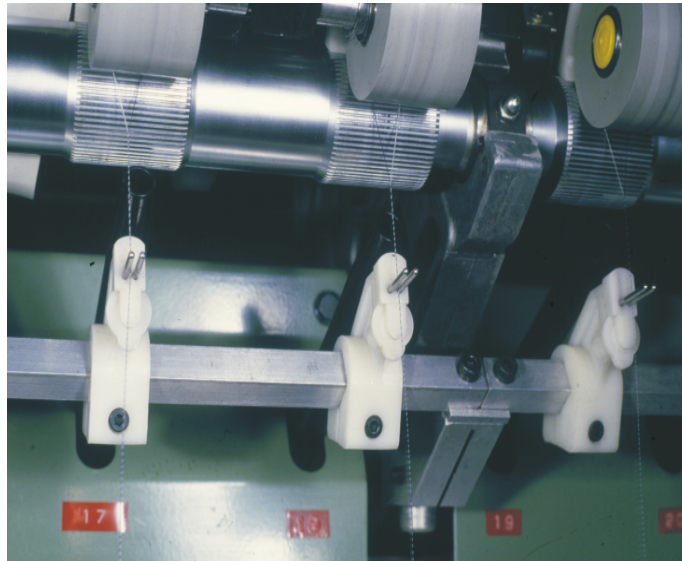
Lightweight, transeasonal, comfortable

Sirospun



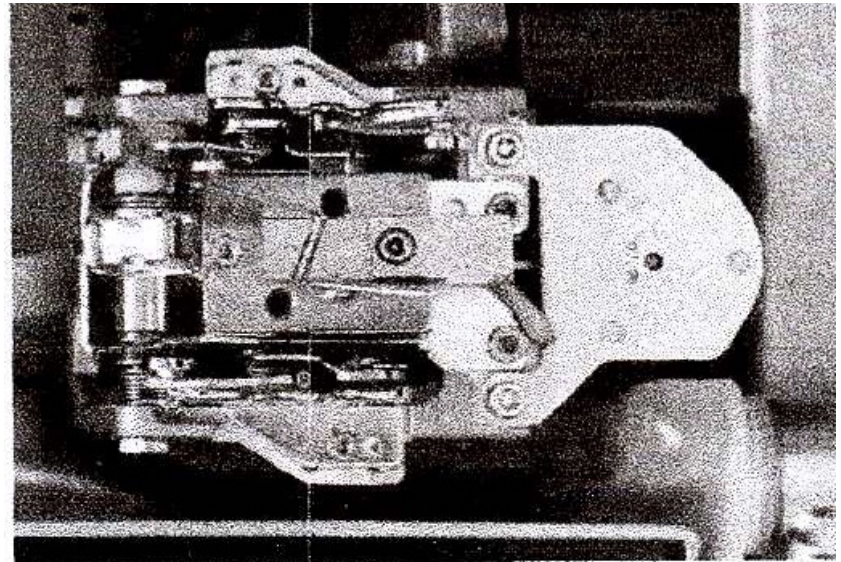
Lightweight, transeasonal, comfortable

Sirospun – break-out device



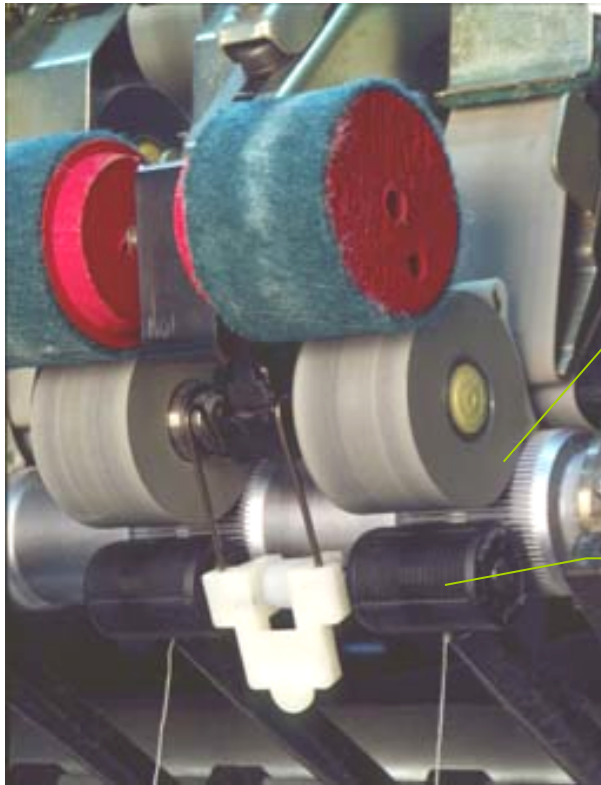
Lightweight, transeasonal, comfortable

The Thermosplicer™
uses the setting
properties of wool to
create near invisible
splices.



SCHLAFHORST

Lightweight, transeasonal, comfortable



Solospun

Solospun
rollers

Weavable
singles yarn

Lightweight, transeasonal, comfortable

The lightweight wool shirt:

- 18.5-micron pure Merino wool fabric, easy care, chemical free.
- developed for summer business shirts – also for trousers and jackets
- technology transfer completed in several countries.



AWI development with Canesis
Photographs courtesy AWI

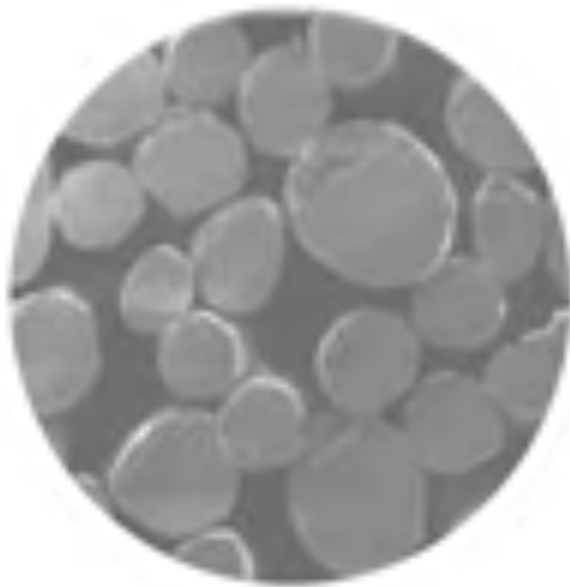
Lightweight, transeasonal, comfortable

Optim™

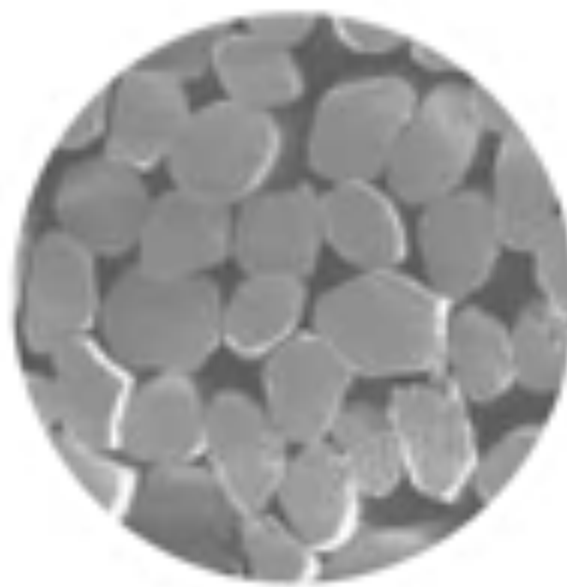
- In the early 1990s Optim™ technology radically changed the wool fibre structure and properties to make it stronger and lighter.
- Optim™ fibre treatment gives wool a silk-like quality for fine, soft and lightweight fabrics.



Lightweight, transeasonal, comfortable



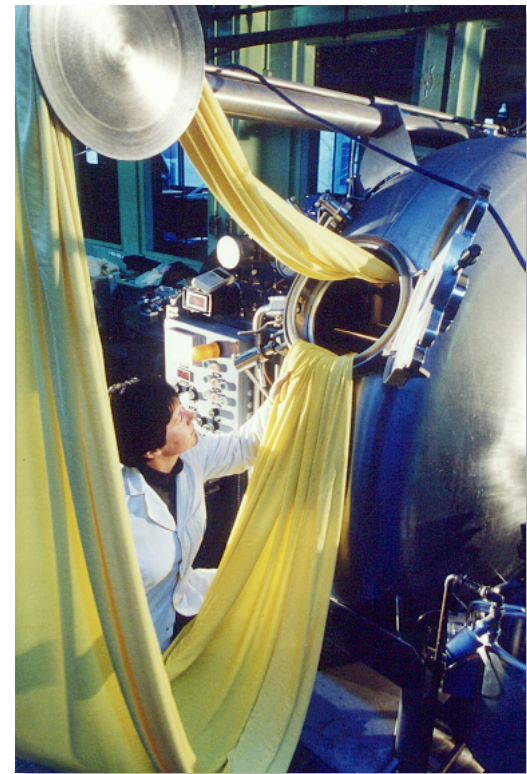
Untreated Fibre



Optim™ Fine Fibre

Lightweight, transeasonal, comfortable

Special care is required
in the dyeing of
OPTIM™ tops, yarns
and fabrics.



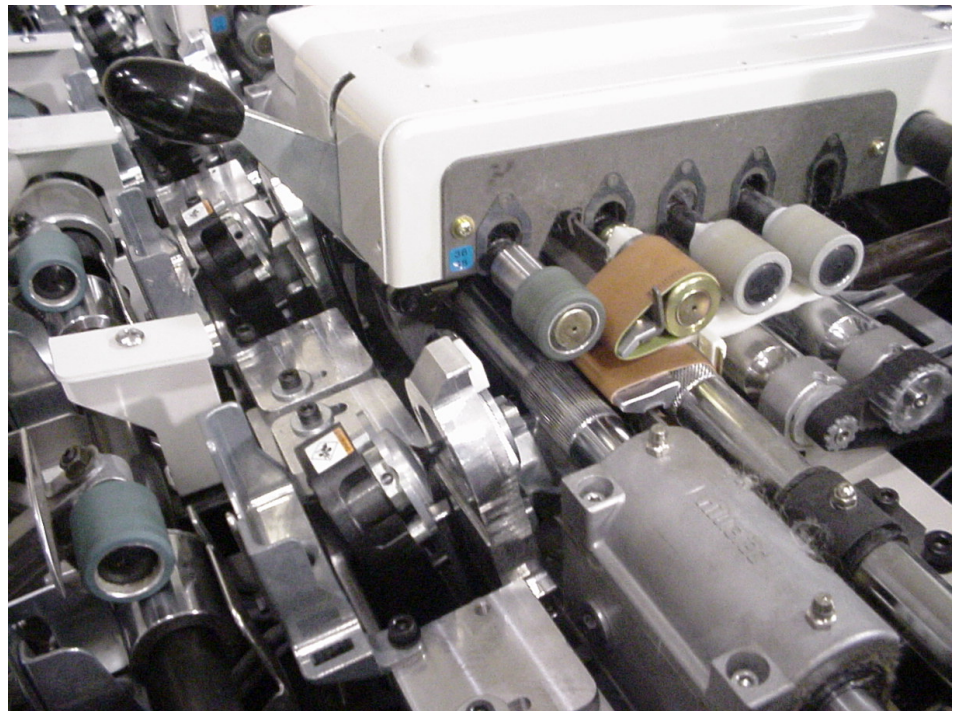
Lightweight, transeasonal, comfortable

Retraction of OPTIM™
Max fibres imparts loft
to the yarn.



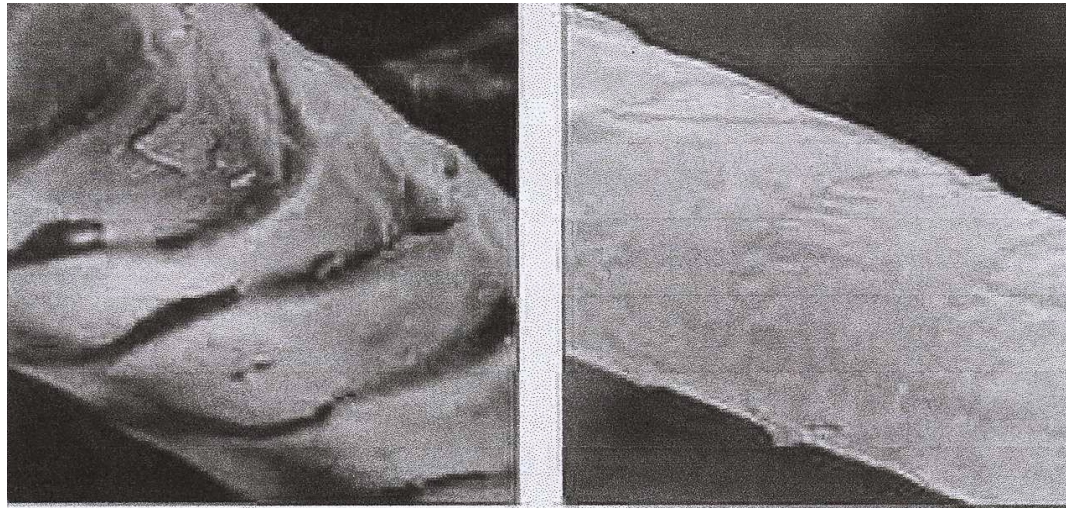
Lightweight, transeasonal, comfortable

Murata Vortex
Spinning
Drafting and Twist
Insertion.



Lightweight, transeasonal, comfortable

Soft Lustre and Basolan Treatments



Untreated Wool Fibre

Soft Lustre treated fibre

Sport and sport casual



Sport and sport casual

Nike + iPod sports kit enables ...

‘... *Nike* + footwear to talk with your iPod nano to connect you to the ultimate personal running and workout experience ...’

Sport and sport casual

Sportwool™

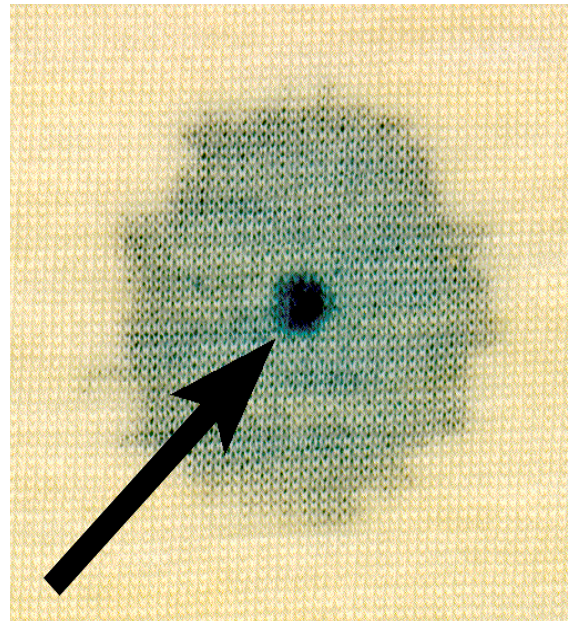
- In the 1990s a team developed Sportwool Pro™, which is a lightweight, two-layer composite fabric of Merino wool inside and man-made fibre outside.
- The fabric is engineered to 'wick' sweat away from the skin during sporting activity.
- Adopted by the Australian team at the Sydney Olympics.



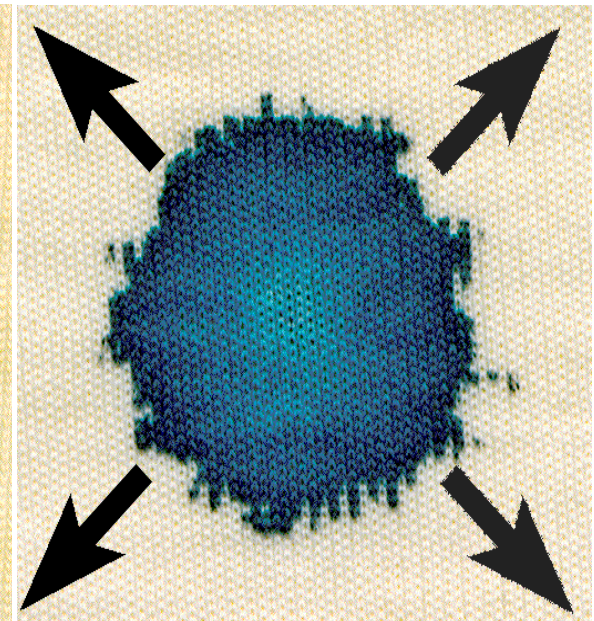
Sport and sport casual

Sportwool

Skin side



Outer face



(Sportwool Pro® developed by CTFT/The Woolmark Co Ltd)

Sport and sport casual

Cibafast W

Whiteness and Photoyellowing



Sport and sport casual

A new chemical treatment reduces wet photoyellowing.

Wet photoyellowing of FWA-treated wool samples by simulated sunlight with and without the chemical treatment.



CTFT Project funded by AWI

Sport and sport casual

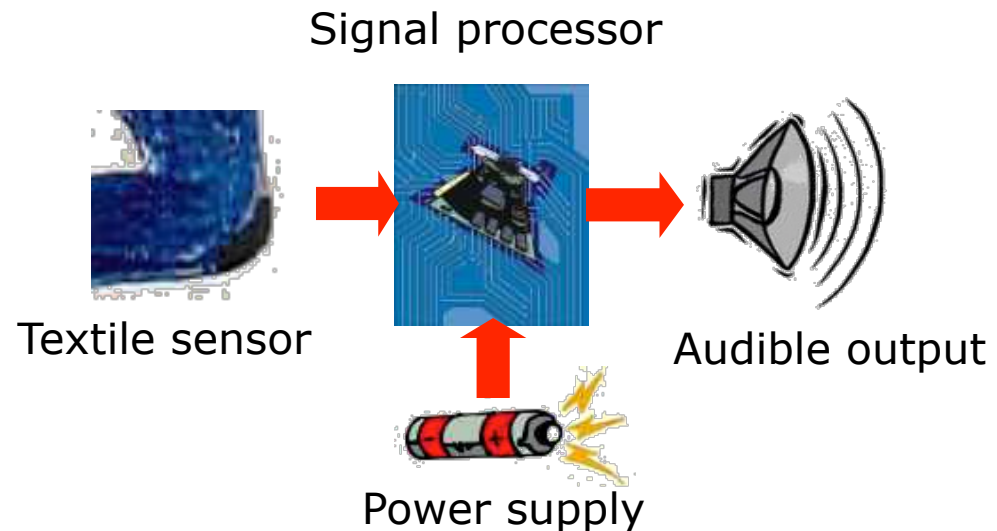
Intelligent textiles

Training device with biofeedback



Intelligent Knee Sleeve by CTFT/UoW

Layout of the components



Sport and sport casual

Smart textiles

Wearable computing



Easy care with appearance retention

Permanent press

- In the late 1950s, using a chemical process that changed the structure of wool fibres, CSIRO scientists created permanent creases in wool fabric.

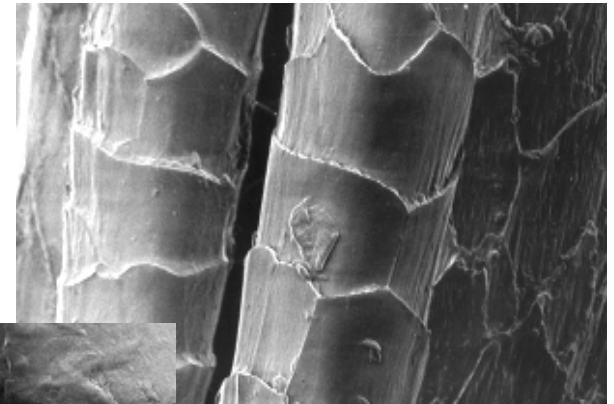


Easy care with appearance retention

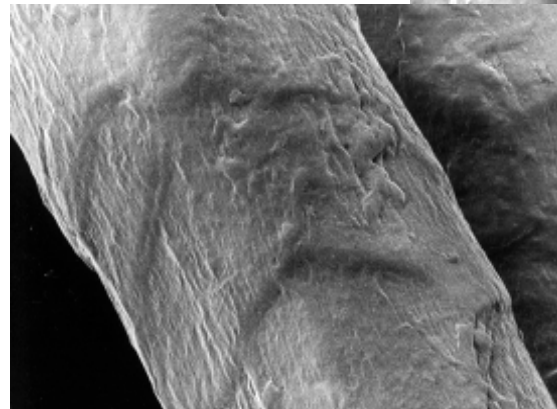
Shrinkproofing

In the 1960s scientists at CTFT developed a procedure to prevent wool from felting and shrinking during machine washing.

- The Chlorine-Hercosett shrinkproofing process provides a simple method of treating wool for the manufacture of fully machine washable/tumble dry garments.



Untreated wool



Chlorine/Hercosett

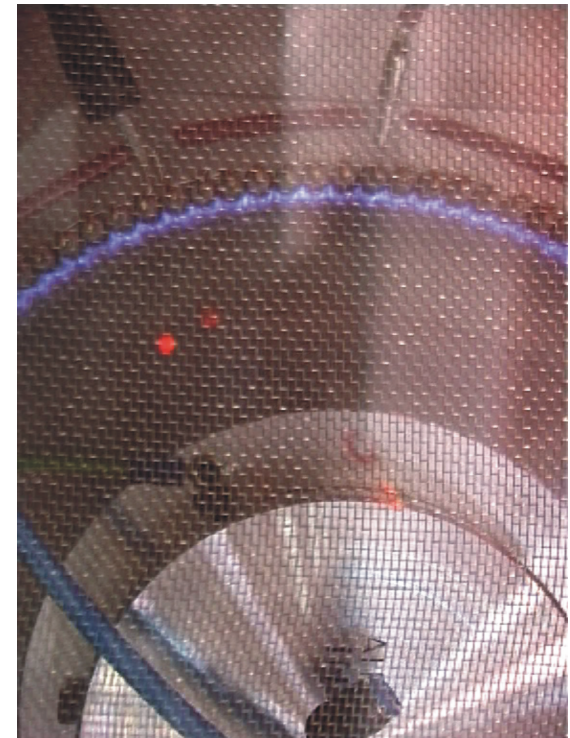
Easy care with appearance retention



The machine-washable,
wool blend suit.

Easy care with appearance retention

- **Plasma treatment for wool**
- **Objective:**
 - to improve product performance -**
 - softer fabrics
 - shrink-proofed
 - low pill
 - low cost
 - environmentally friendly.



Project funded by AWI

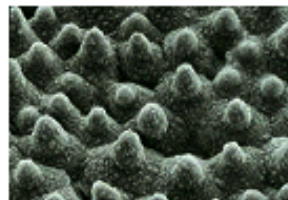
Easy care with appearance retention

Non-chlorine shrink-resist.

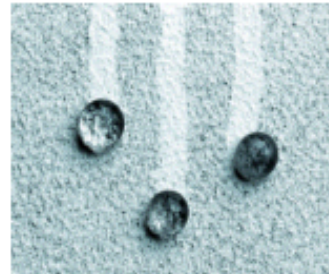
Easy care with appearance retention

**Nanoparticles
and surface
effects**

Self-cleaning/
non-wetting



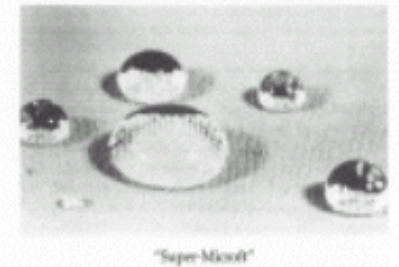
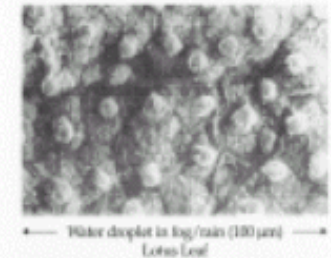
Lotus Flower



Self Cleaning Paint



Non Stick/Wetting Surface



Self Cleaning / Non Wetting Fabric

Project funded by AWI

Predictable, efficient, quality production and transformation

SIROMARK



Predictable, efficient, quality production and transformation



**Merino x
Damara lambs**



**Pre-sale bale
sampling**

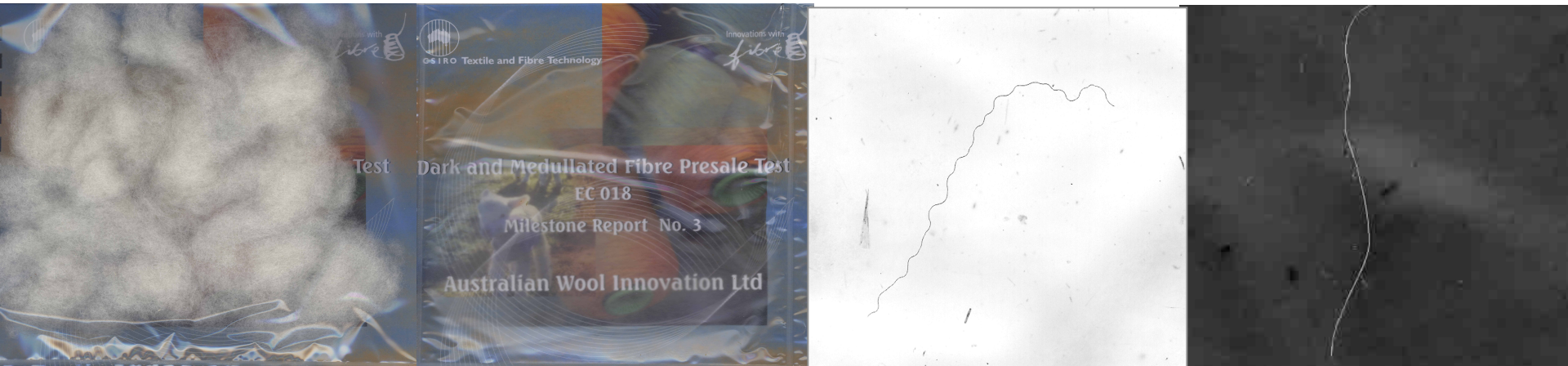


**Scoured core
samples**

A rapid, low-cost pre-sale test for dark and medullated fibre contamination.

CTFT Project funded by AWI

Predictable, efficient, quality production and transformation



Dry wool

**Wool in index-
matching fluid**

Dark fibre

**Medullated
fibre**

A rapid, low-cost pre-sale test for dark and medullated fibre contamination.

CTFT Project funded by AWI

Predictable, efficient, quality production and transformation

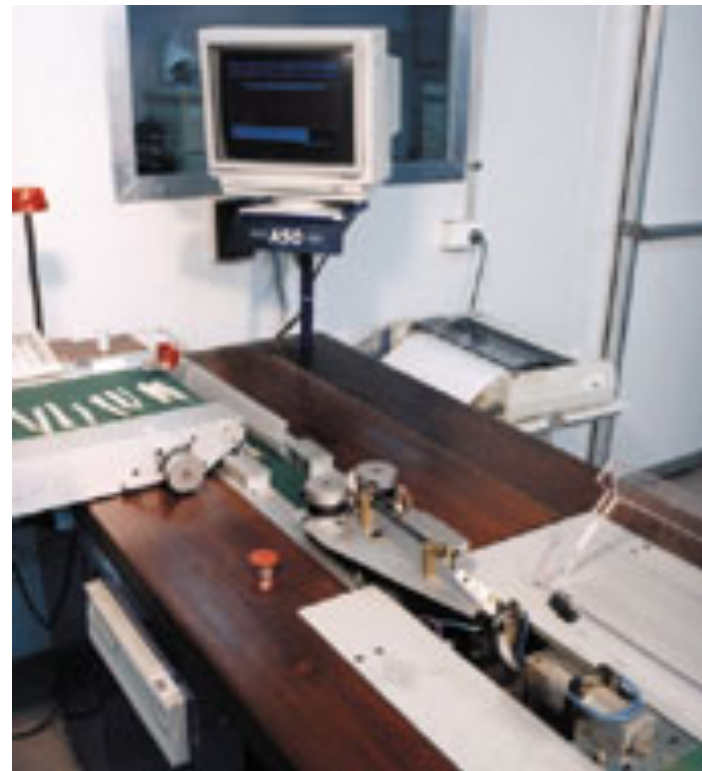
Sale by sample



Predictable, efficient, quality production and transformation

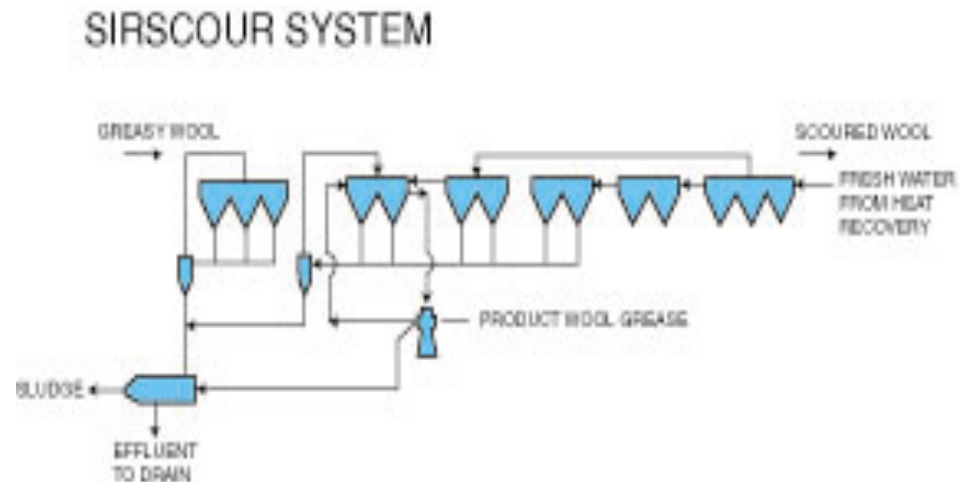
ATLAS testing for length and strength.

TEAM formula for predicting fibre length after topmaking.



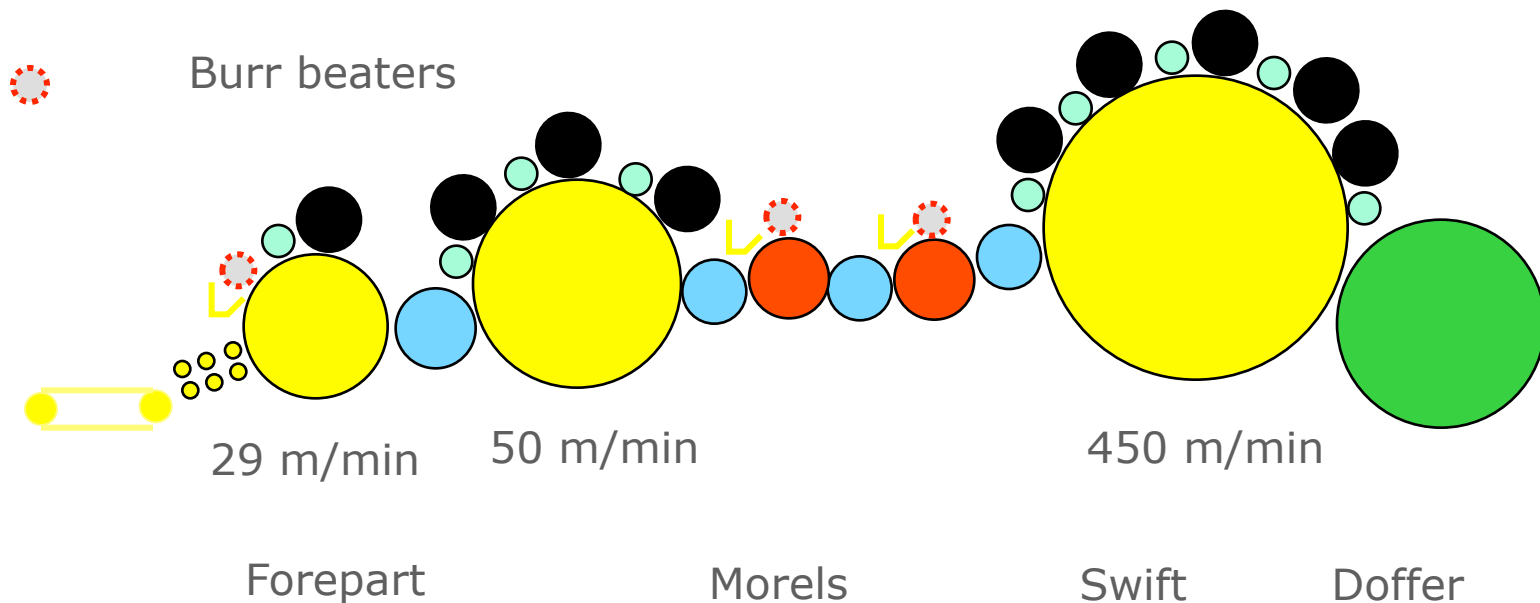
Predictable, efficient, quality production and transformation

- A package of technologies designed by CSIRO in the 1980s to produce optimum results in multi-stage scouring of greasy wool. The resulting product is scoured wool that is clean, undamaged and free from entanglement.



Predictable, efficient, quality production and transformation

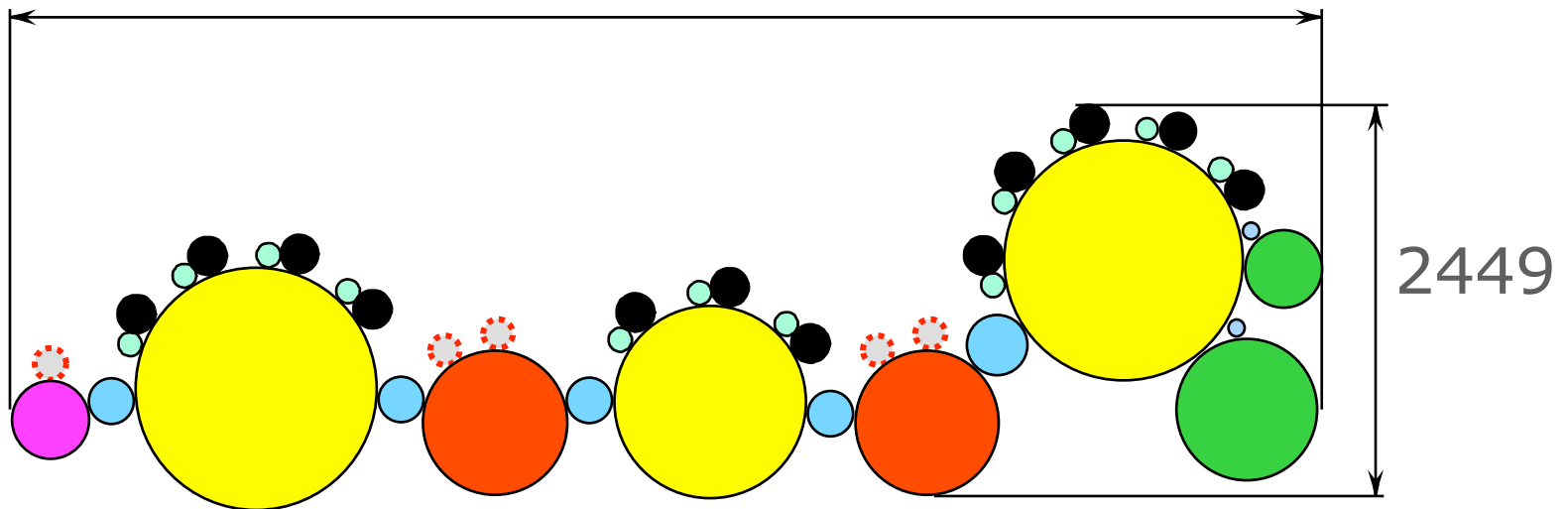
Thibeau CF Card



Predictable, efficient, quality production and transformation

Thibeau CA7 Card

8250



Predictable, efficient, quality production and transformation

New lubricants for wool processing

Reducing damage during carding

Target market:

Wool combing industry; carding lubricants suppliers.

Need addressed:

Reduce breakage and waste in worsted processing.

How CTFT helped:

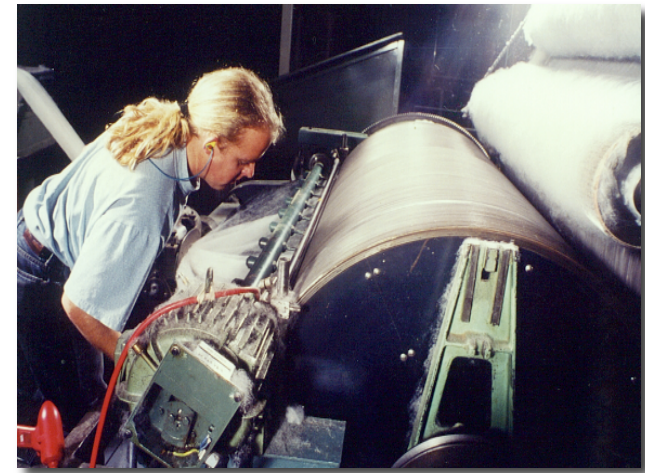
New understanding of interactions between wool, lubricant and the carding elements.

Benefits to the clients:

New wool lubricants developed. Improved fibre length and quality yield.

Results:

New range of wool lubricants marketed by Henkel. New lubricants now approx. 80% of the world market.

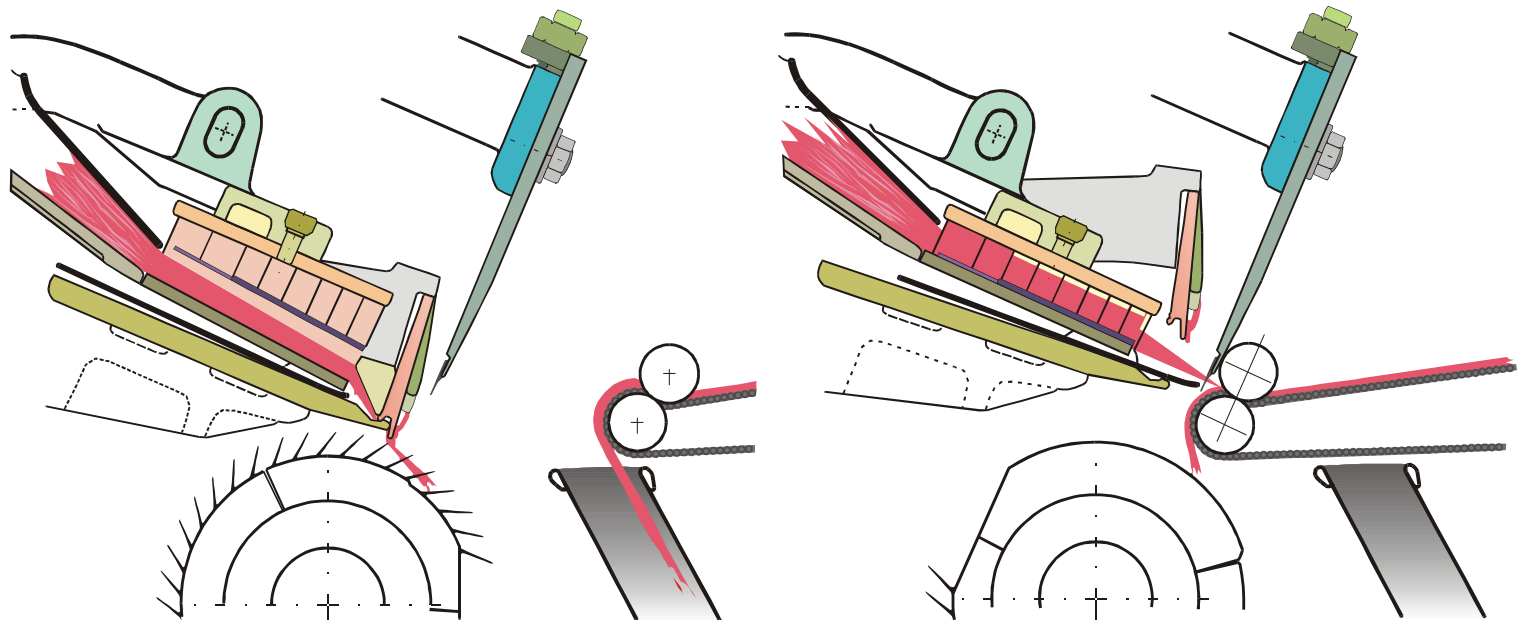


Henkel

now **cognis**

Predictable, efficient, quality production and transformation

Combing



Predictable, efficient, quality production and transformation

Combing



Predictable, efficient, quality production and transformation

The Almeter

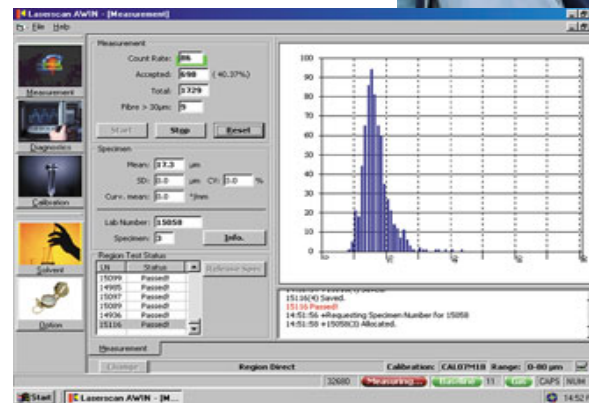


PEYER

Predictable, efficient, quality production and transformation

Laserscan

- Average Fibre Diameter
- CV Diameter
- Comfort Factor
 - Percentage < 30 microns
- Fibre Curvature



Predictable, efficient, quality production and transformation

Decision support tools

- Topmaker
- Sirolan Topspec

Predictable, efficient, quality production and transformation

Sirolan Yarnspec

Given top properties and fibre bundle strength, this PC-based package will predict:

- Yarn unevenness (CV%)
- Thin and thick places per kilometre (50%)
- Neps per kilometre (+200%)
- Yarn tenacity (at test speeds from 0.1 to 500m/min)
- Elongation of break (at test speeds from 0.1 to 500m/min)
- Yarn hairiness

Ends-down per 1000 spindle hours.

Predictable, efficient, quality production and transformation

- Sirolan Tensor
- Measures fibre bundle strength



Predictable, efficient, quality production and transformation

Compact spinning

Predictable, efficient, quality production and transformation

Siroclear



Predictable, efficient, quality production and transformation

Reduction of damage in dyeing

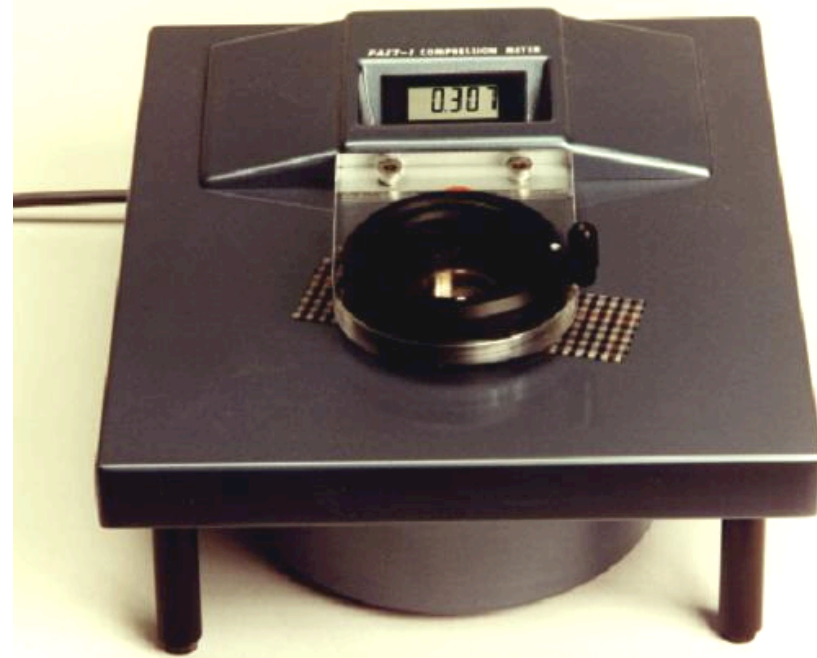
Low temperature dyeing: Valsol LTA-N

Anti-setting agent: Basolan ASA

Predictable, efficient, quality production and transformation

SiroFAST-1

- Concept of surface thickness
- Use of proximity meter

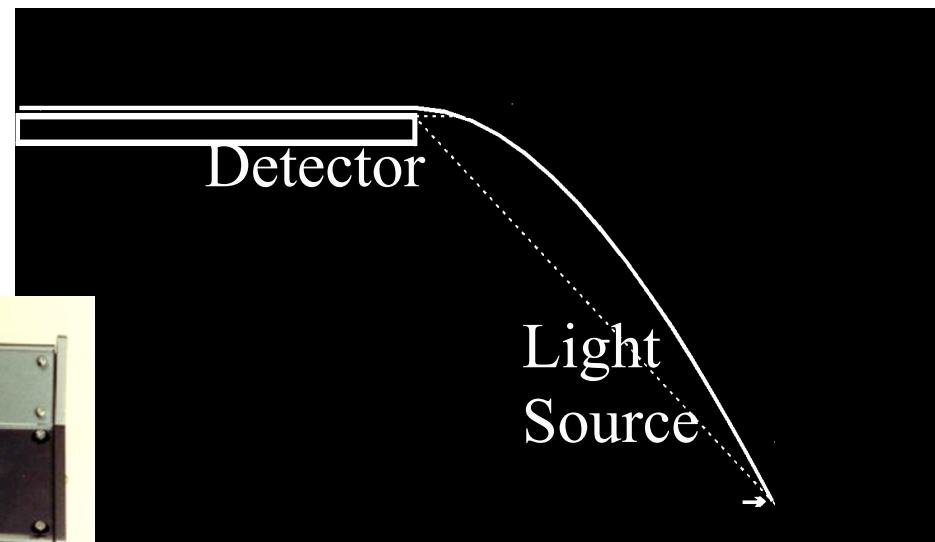
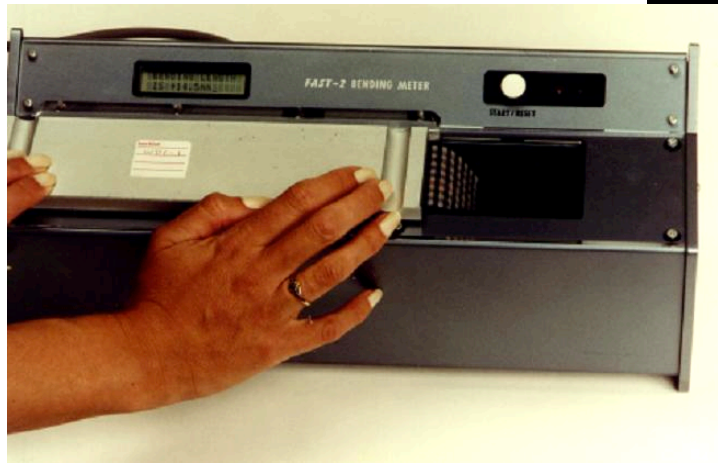


Photograph courtesy AWI

Predictable, efficient, quality production and transformation

SiroFAST-2

- Electronic eye
- Calibration tool

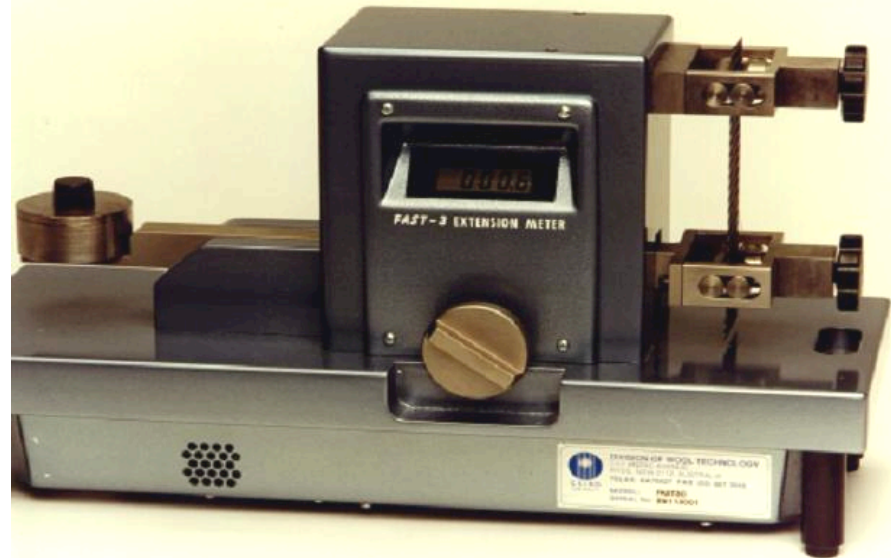


Photographs courtesy of AWI

Predictable, efficient, quality production and transformation

SiroFAST-3

- Fabric deformation



Photograph courtesy of AWI

Predictable, efficient, quality production and transformation

SiroFAST-4



Photograph courtesy of AWI

Predictable, efficient, quality production and transformation

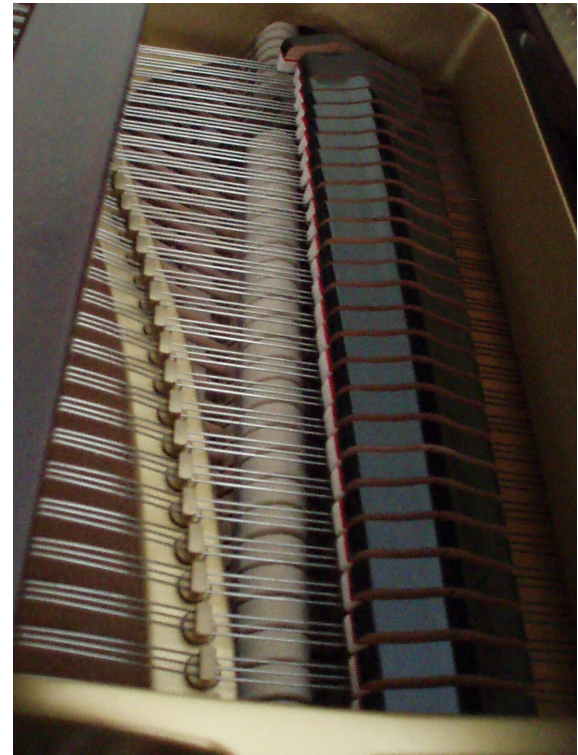
SiroFAST-PressTest



Photograph courtesy of AWI

Technical wool

Piano felt



Technical wool

Medical textiles

- Harnessing wool's natural attributes for insulation and moisture transmission in a range of injury prevention and wound dressing products providing:
 - optimum patient comfort and security
 - control of wound surfaces
 - integration of sensory systems.

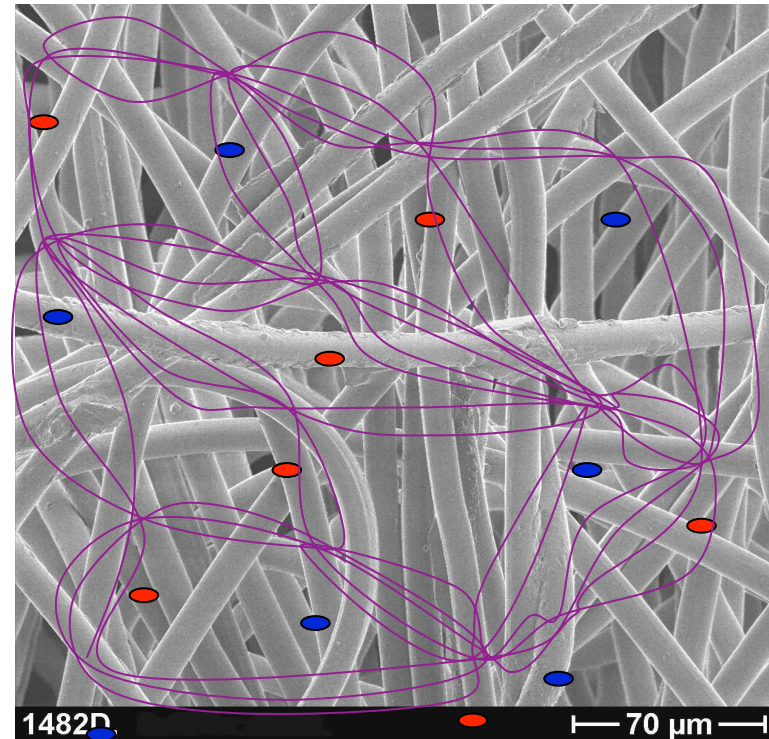
The next generation of products should be more than just dressings.

CTFT Project funded by AWI

Technical wool

Electrostatic filter media

- Mechanical assembly of fibres, consolidated in a web.
- Positive and negative charges embedded in fibre surfaces.
- Generated electrostatic field captures particles.

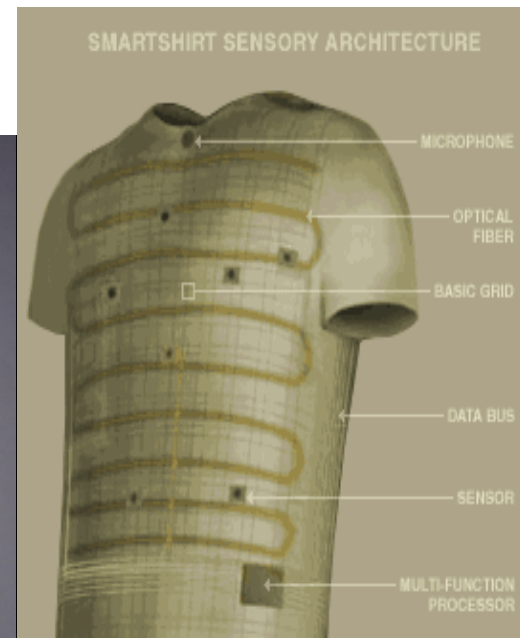


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Technical wool

Intelligent textiles

- Physiological monitoring



LifeShirt by Vivo Metrics®

Technical wool

Novel application of known technologies

Non-wovens

- Jetlace hydroentanglement
- Bicomponent fibre extrusion
- Dilo needle punch line
- Trials of splittable and other extruded and natural fibres.
- Some of these fibres will be blended with wool and turned into microfibre-blend fabrics.
- Manufacture and test functional fibres made from various combinations of polymers and exotic additives.



Project funded by AWI

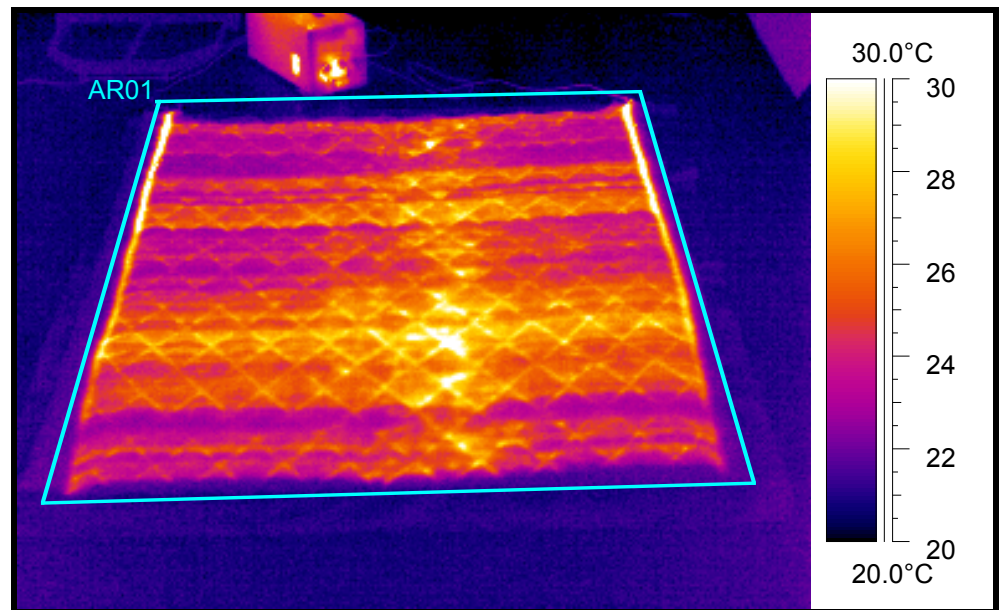
Technical wool

Heated socks and blanket.

Wireless heating system using conductive polymer technology.

Commercial trials about to begin with two large retailers in the UK.

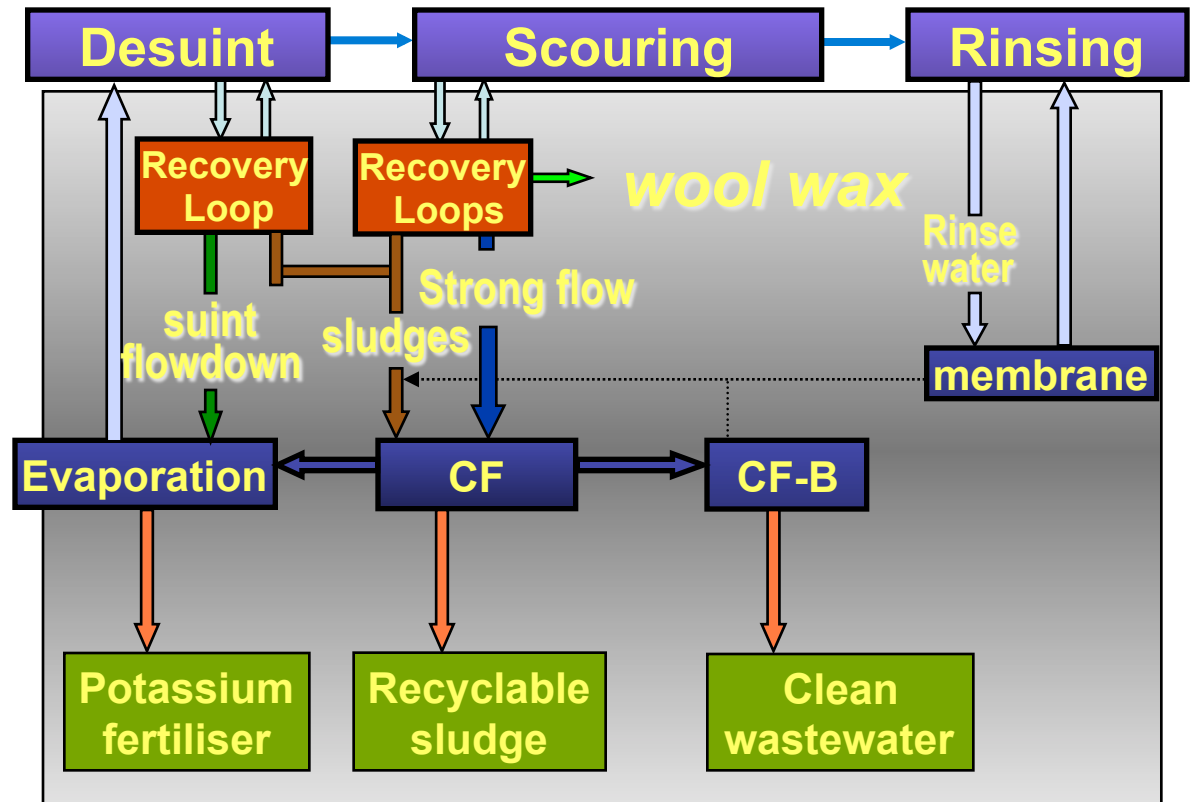
AWI development



Photograph courtesy of AWI

Environmental friendliness

Sirolan - SWIMS



Environmental friendliness

- Alternative metal-free dyes to remove chromium from the dye cycle.
- Use of appropriate fly and lice treatments with accurate record-keeping will enable wool to meet ever more stringent standards, particularly in Europe.

The battle continues