

# Engineered Viscose Fibres Delivering Enhanced Wearer Comfort and Fabric Performance

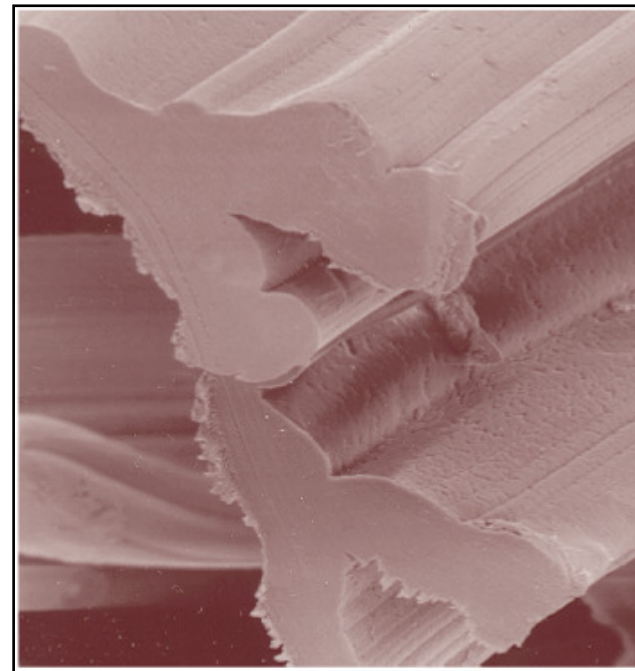
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# Man-Made vs. Natural Fibres

- Man-made fibre producers are able to engineer products to meet specific requirements
  - Fibre Count
  - Fibre Length
  - Fibre Strength
  - Fibre Colour
  - Fibre Cross-Section

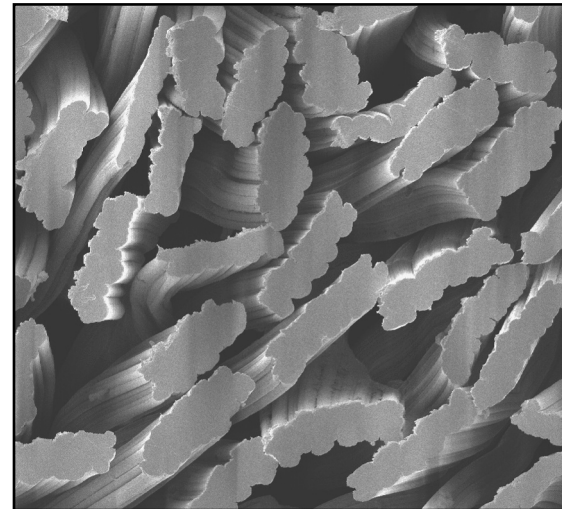
# Examples of Modified Cross Section Fibres

- Inflated fibres for enhanced product performance
- Trilobal Galaxy<sup>®</sup> fibre offering improved absorbency



# Viloft® Fibres for Apparel

- Viloft® fibre is engineered with a flat cross-section
- Improved fibre flexibility delivering softness
- Improved moisture transport and thermal insulation properties



**VILOFT®**

A natural source of inspiration

# Viloft® - a natural source of inspiration

- Viloft® fibres are produced using FSC-certified renewable raw materials
- Viloft® fibres are certified to the Öko-Tex 100 Standard
- Kelheim Fibres GmbH is certified to ISO9001:2000

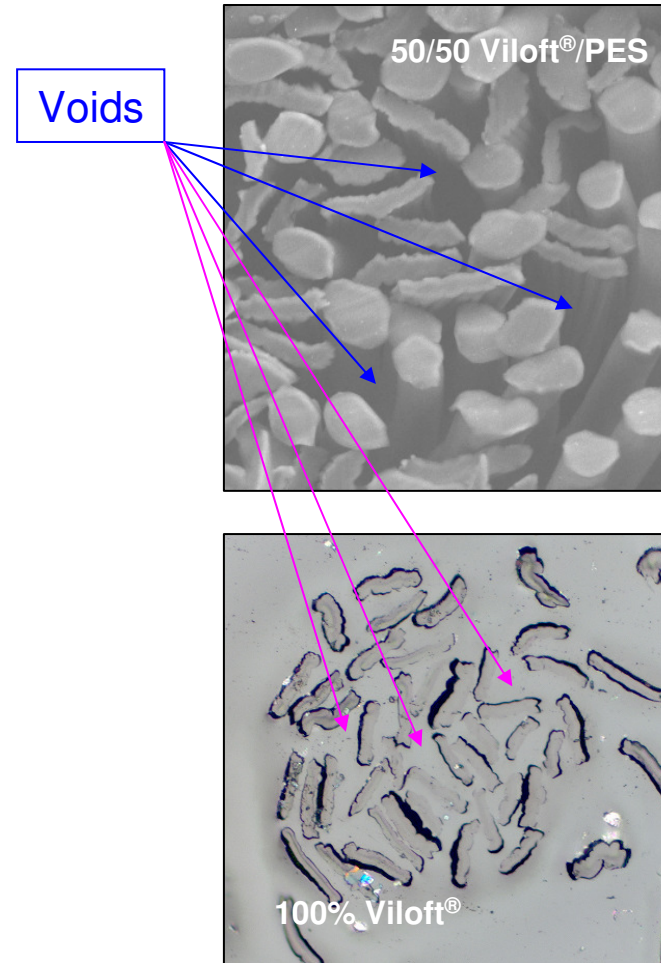


# Cross-Section – Influence on Fabric Performance

- The behaviour of the individual fibres in the yarn increases the number of voids (air pockets) in the yarn
- The amount of air in the fabric is increased and contributes to the improved thermal and moisture management performance of the fabrics
- The flat cross-section of Viloft<sup>®</sup> fibre has a significant influence on wearer comfort

# Behaviour of Fibre in Yarn

- A combination of Viloft<sup>®</sup> fibres with round fibres increases the number of voids in the yarn
- In 100% yarns, Viloft<sup>®</sup> fibres also promote the creation of voids



# Objectives

- Determine the potential benefits of the use of Viloft® fibres in apparel fabrics
- Investigate the link between cross-section, yarn air content, and wearer comfort
- Validate the assumptions relating to the performance of fabrics manufactured with Viloft® fibres

# Viloft® - Comparative Fabric Performance

- Compare fabrics containing Viloft® fibres...
  - In 100%
  - In blends with cotton
  - In blends with viscose
  - In blends with Modal
  - With other cellulosic fibres
- ...in identical fabric constructions

# Viloft® - Fabric Ranges for Comparison

- Single Jersey + Single Jersey Elastic
- Nm85/1 Ring E36/30 Gauge S + Z (Viloft® 1,9 dtex)
- Yarn blends

**100% Viloft®**

**67%/33% Viloft®/Cotton**

**50%/50% Viloft®/Cotton**

**100% Cotton**

**50%/50% Viloft®/viscose microfibre**

**50%/50% Viloft®/MicroModal®**

**50%/50% Cotton/MicroModal®**

**100% MicroModal®**

# Viloft® - Fabric Ranges for Comparison

- Single Jersey + Single Jersey Elastic
- Nm50/1 E28/26 Gauge Z (Viloft® 1,9 dtex)

- Yarn blends:

**100% Viloft®**

**100% Cotton**

**67%/33% Viloft®/Cotton**

**50%/50% Viloft®/viscose**

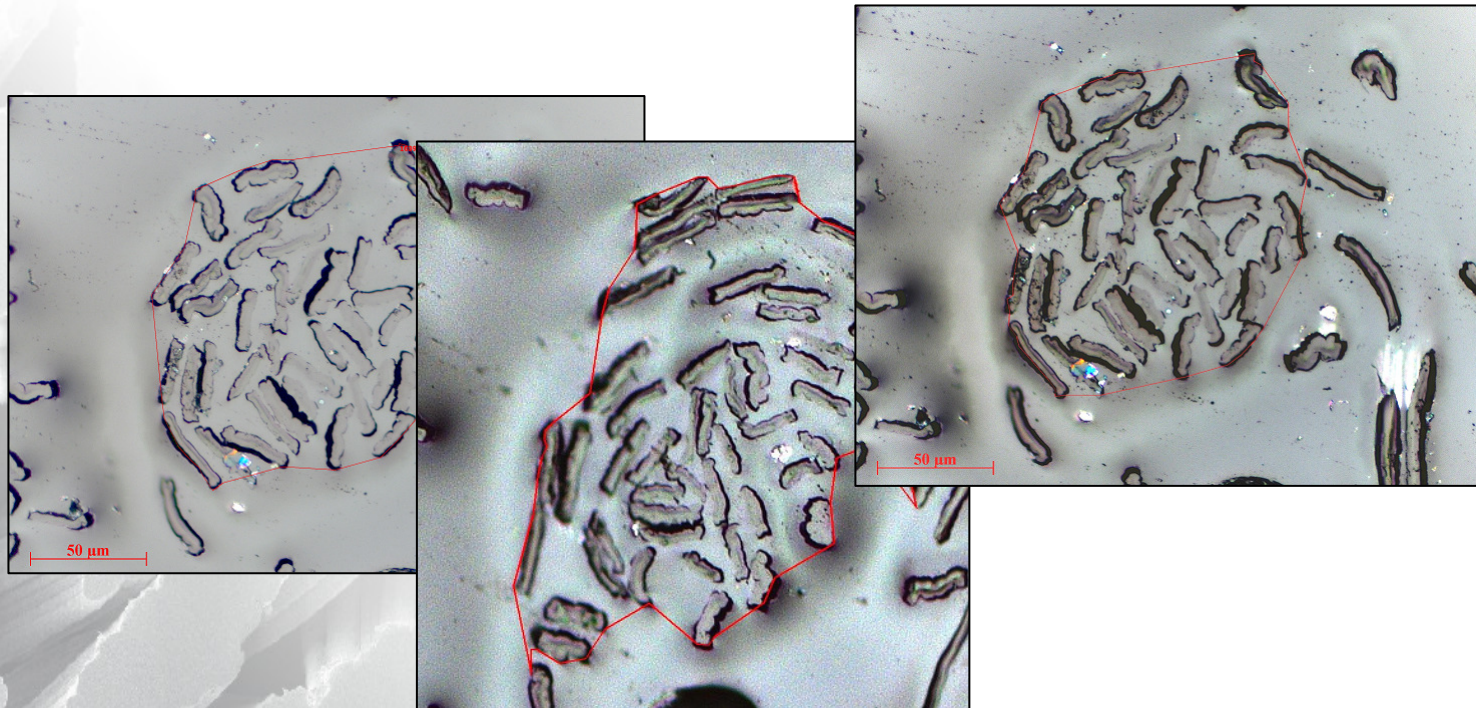
**50%/50% Viloft®/Cotton**

**50%/50% Viloft®/Cotton\***

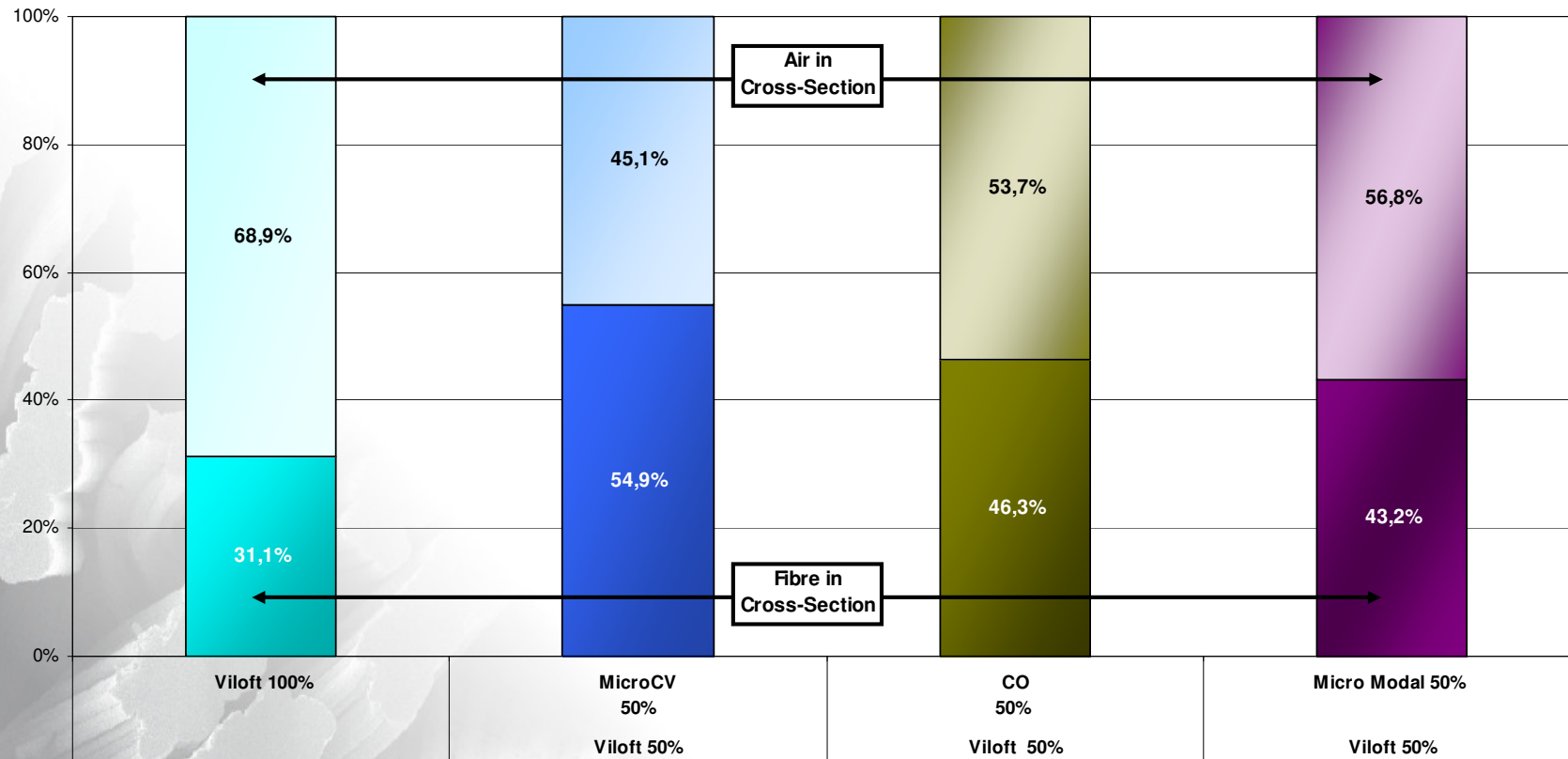
\*Compact Spun

# Air Content of Yarns

- Using microscopy in combination with AxioVision software from Zeiss, the air content of a selection of the fabrics tested was determined



# Air Content of Yarns

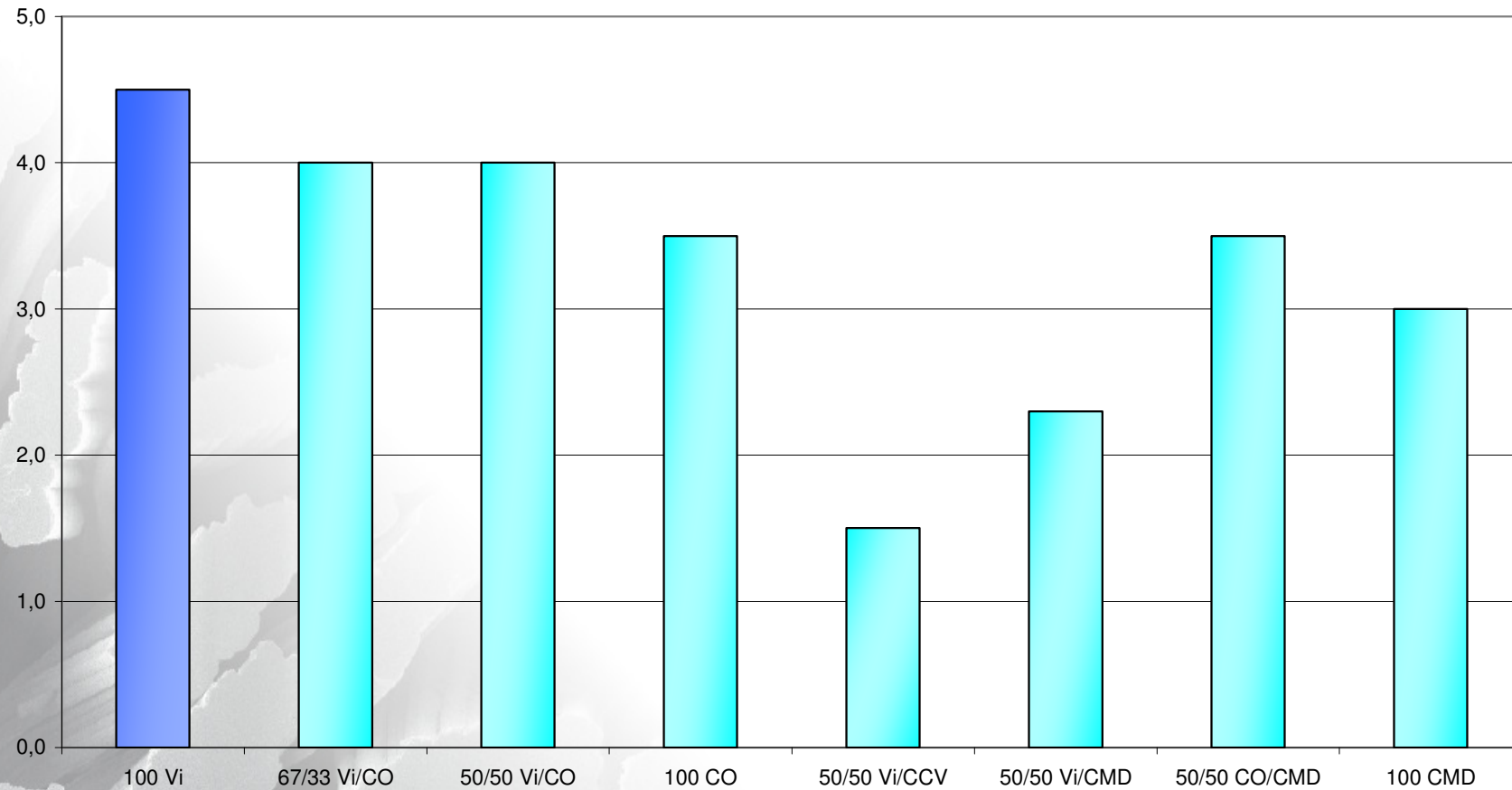


# Fabric Testing

- Residual Shrinkage
- Elasticity
- Wash Pilling
- Martindale Pilling
- Burst Strength
- Fabric Twist
- Wash Fastness

# Martindale Pilling – Nm85/1 Single Elastic

## Viloft® Basic Trials Pilling Martindale after 2000 rev.



# Viloft® - Tests at the Hohenstein Institute

- Thermal Insulation ( $R_{ct} \cdot 10^3 \text{ m}^2 \text{ K/W}$ )
- Water Vapour Permeability Index ( $i_{mt}$ )
- Water Vapour absorbency potential ( $F_i \text{ g/m}^2$ )
- Perspiration Buffering Test

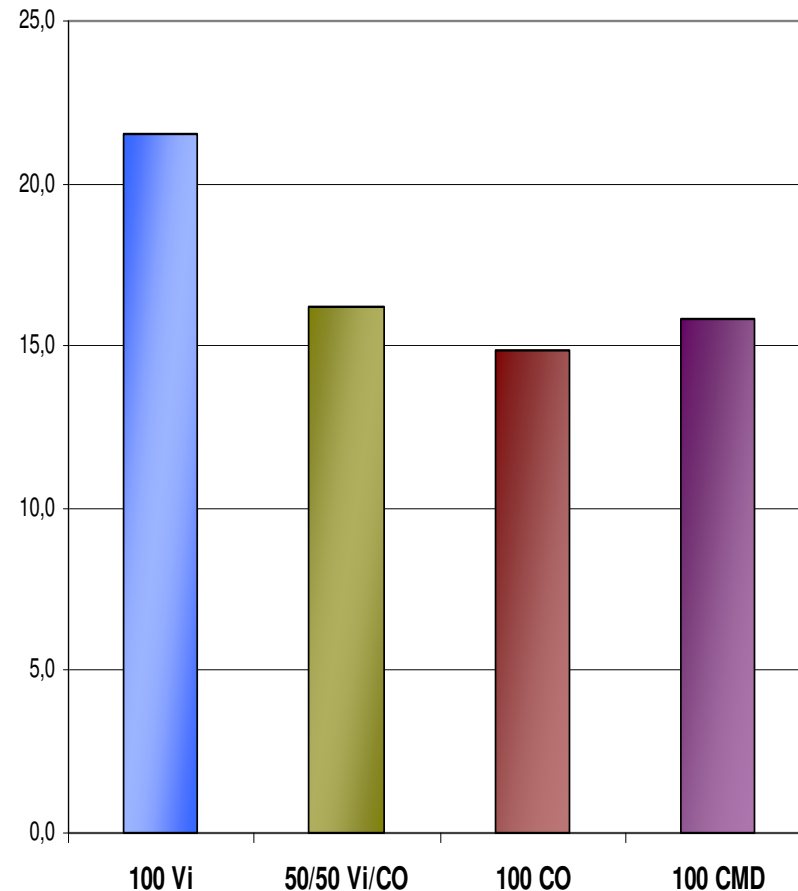
[www.hohenstein.de](http://www.hohenstein.de)

HOHENSTEIN  
INSTITUTE



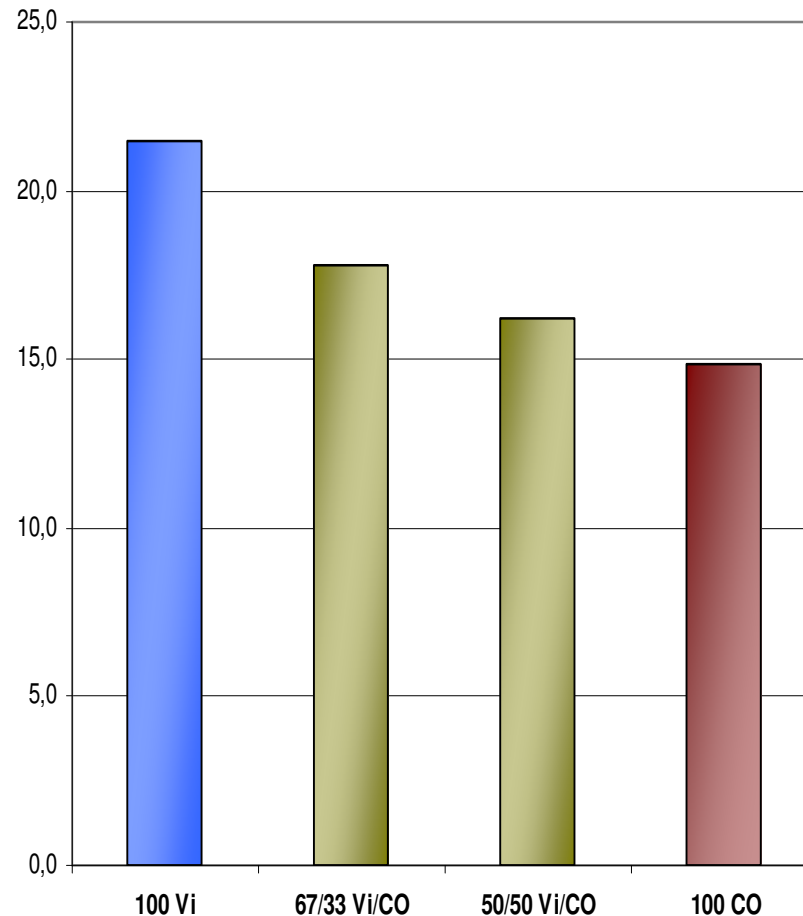
# Thermal Insulation ( $R_{ct} * 10^3 \text{ m}^2 \text{ K/W}$ )

- Of the fabrics tested 100% Viloft® delivered the highest thermal insulation result
- Fabrics containing man-made cellulosic fibres generally gave better performance than cotton



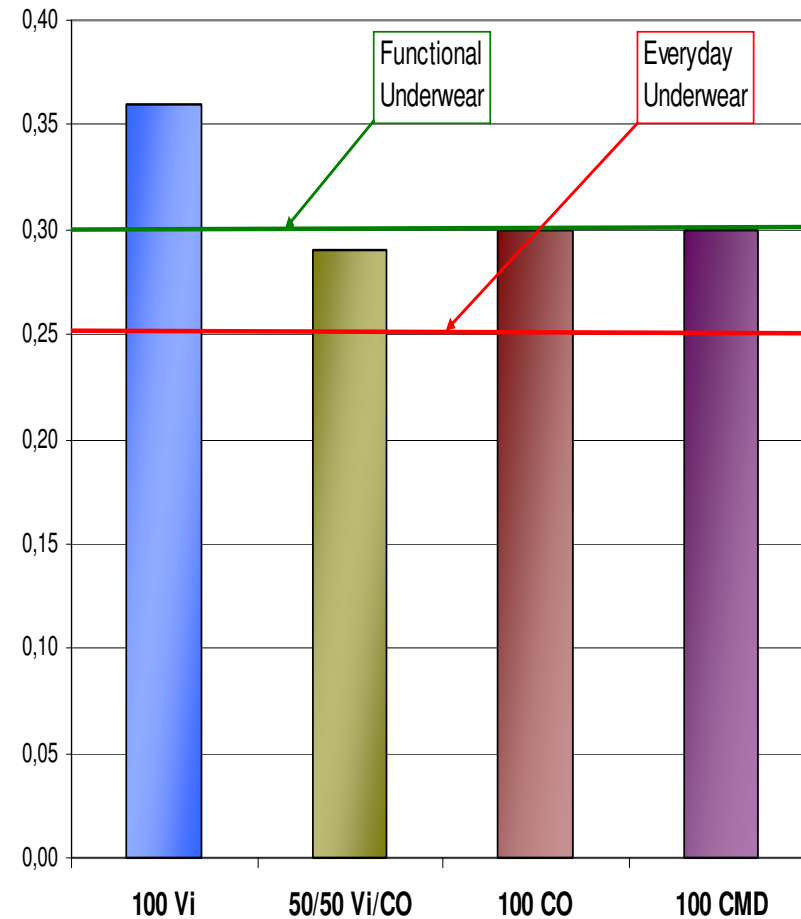
# Thermal Insulation ( $R_{ct} * 10^3 \text{ m}^2 \text{ K/W}$ )

- The thermal insulation value of a cotton fabric can be increased by adding Viloft<sup>®</sup> fibre to the blend
- An increase of 19% was achieved by increasing the level of Viloft<sup>®</sup> from 0 to 67%



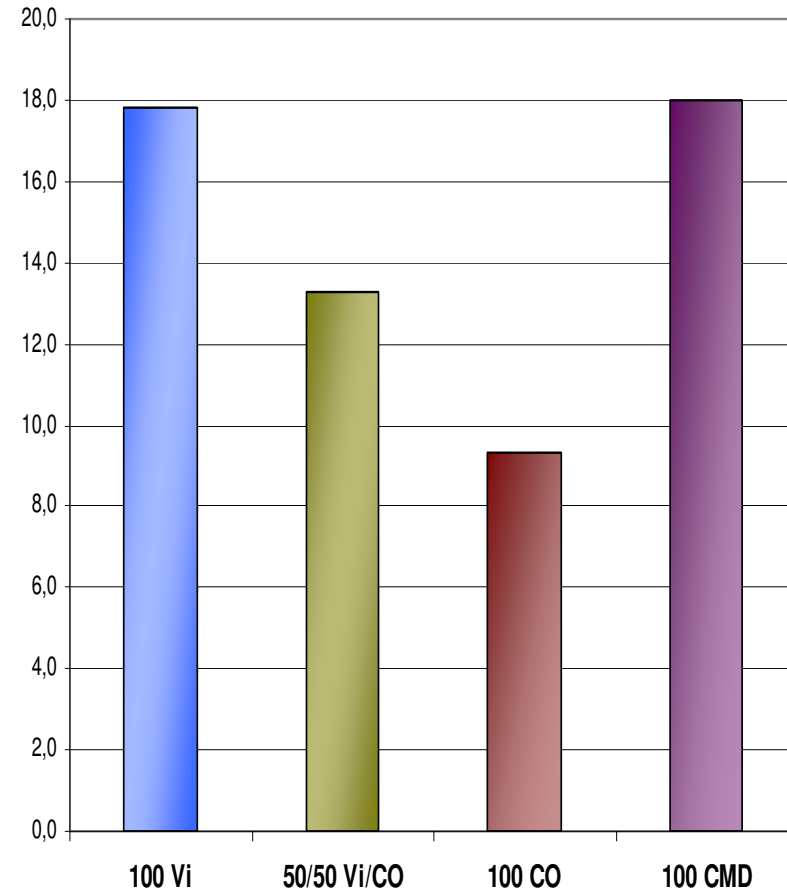
# Water Vapour Permeability Index ( $i_{mt}$ )

- Fabrics in 100% Viloft<sup>®</sup> deliver the best performance
- 100% Viloft<sup>®</sup> fabrics exceed the criteria defined by Hohenstein for functional underwear



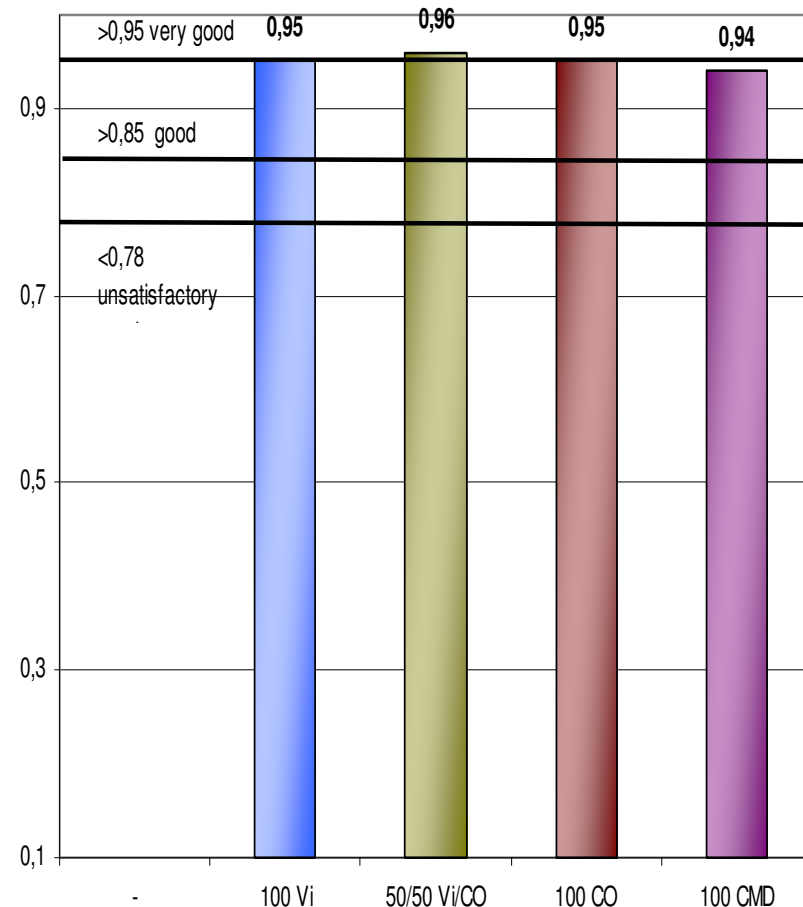
# Water Vapour Absorbency Potential ( $F_i$ g/m<sup>2</sup>)

- 100% Viloft<sup>®</sup> Fabrics deliver comparable performance to MicroModal fabrics
- Man-made cellulosic fibre fabrics outperform cotton fabrics
- Addition of Viloft<sup>®</sup> to the blend enhances the performance of cotton



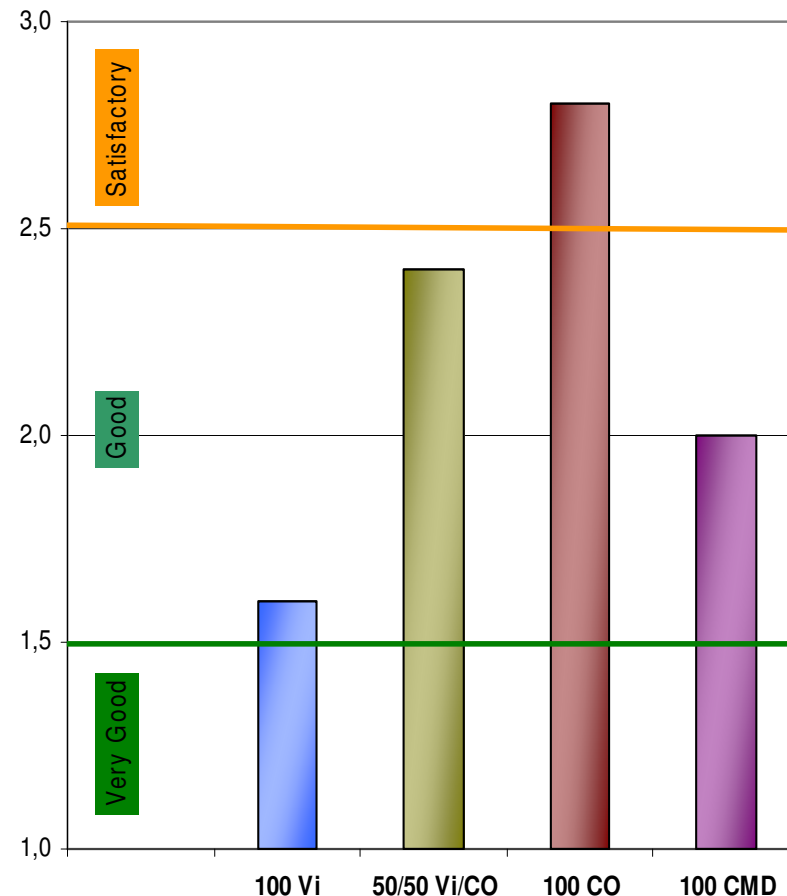
# Perspiration Buffering Index

- The index is a combination of the capability of a fabric to absorb and transport perspiration
- All the fabrics tested had similar levels of performance
- Most fabrics met the criteria for “very good” performance



# Thermophysiological Wearer Comfort

- The results of these tests are combined to deliver an objective measure of wearer comfort
- Fabrics in 100% Viloft<sup>®</sup> delivered the highest level of wearer comfort of the fabrics tested



# Summary of Hohenstein Results

- Fabrics containing 100% Viloft<sup>®</sup> fibres achieve the highest wearer comfort rating of the fabrics tested
- The incorporation of Viloft<sup>®</sup> fibres can improve the thermal insulation performance of blends
- Fabrics containing Viloft<sup>®</sup> fibres
  - deliver high levels of thermal insulation
  - meet the moisture management criteria for functional underwear
  - show excellent levels of wearer comfort
- The fabric series based on Nm50/1 yarns mirrored these results

# Conclusions

- Of the fabrics tested, those with a high air to fibre content ratio deliver better wearer comfort results
- The unique flat cross-section of Viloft<sup>®</sup> fibres lead to a higher air content in yarns and fabrics
- The results of the Hohenstein tests confirm the superior performance of Viloft<sup>®</sup> fabrics in terms of wearer comfort

# Thanks

Our thanks are due to:

*Linea K* - Roger Kargel

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and to you, for your attention