

Wool: the Fibre

Produced for the CRC for Premium Quality Wool undergraduate program by; Dr. Peter Auer, The University of New South Wales.



CRC

for

Premium

Quality

Wool

Fibre Classification

Natural

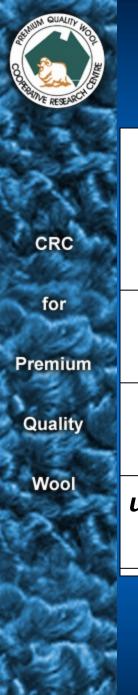
- wool
- cotton
- silk, cashmere, alpaca
- mineral

Regenerated

- natural raw material
 - cellulose
 - protein (discontinued)
- rayon
 - ~1900
- re-launched Tencel
 - 1990's

Synthetic

- polyester
 - 1940
- nylon
 - 1939
- acrylic
 - 1942
- polypropylene
 - 1960
- re-launched fibres
 - 1980's onwards



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Fibre Production

4		wool	cotton	synthetic	regenerated
	Raw material	amino acids	carbohydrates	petroleum by- products	cellulose
) 	Polymer synthesis	biosynthesis	biosynthesis	synthetic polymerisation	N/A (some modified)
1	Production unit	follicle	boll	extruder / spinneret	extruder / spinneret
	usable form	fibre	fibre	fibre filament	fibre filament

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Fibre Properties

	wool	cotton	polyester	rayon
diameter	15 – 25 μm	7-9 µm (equiv.)	to 5 µm	~ 12 µm
length (processed)	50 – 110mm	20 – 40 mm	able to be specified	able to be specified
strength (fibre)	1.0 (relative)	2.5	3.5	1.3
elongation at break	~40%	5 – 10%	10 – 40%	~25%
shape	elliptical	flat tube	varies	varies
surface texture	scales	convoluted	able to be modified	striated
absorbs water	YES	YES	NO	YES



Discussion

- Comment on the properties of wool compared to competing fibres
 - see Fibre Properties
- fibre fineness (diameter)
- fibre length
- fibre shape
- tensile properties
- surface properties

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Fibre Comparison: Wool

- relatively coarse
- relatively long
- high degree of fibre length variation
- processed on a long staple system
 - approx. 20 year technology lag
- relatively weak but has good elongation
- absorbs moisture well
 - gives off heat when absorbing moisture
 - finishes well (can be set)
- subject to shrinkage in use (scales)

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Fibre Users: Early Stage

- Topmakers, Commission Combers
 - quantity, diameter, processed length, short fibre content, specified VM, processing efficiency, colour
 - yield, diameter, strength, length, contamination, colour

Spinners

- spinning efficiency, yarn evenness, yarn performance, colour, yarn faults
- diameter, CV diameter, processed length, short fibre content, contamination, colour

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Fibre Users: Later Stage

- Weavers, Knitters, Dyers, Finishers
 - yarn construction, yarn performance, fabric performance
 - contamination, fibre type, colour
- Garment-makers
 - fabric performance, design, price
 - contamination, colour, fibre type

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Fibre Users: Retail

- Retailers
 - price, design
 - colour, fibre type

- Customers
 - comfort, easy care, performance, fashion, price
 - colour, fibre type?

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