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for

Premium

Quality

Wool

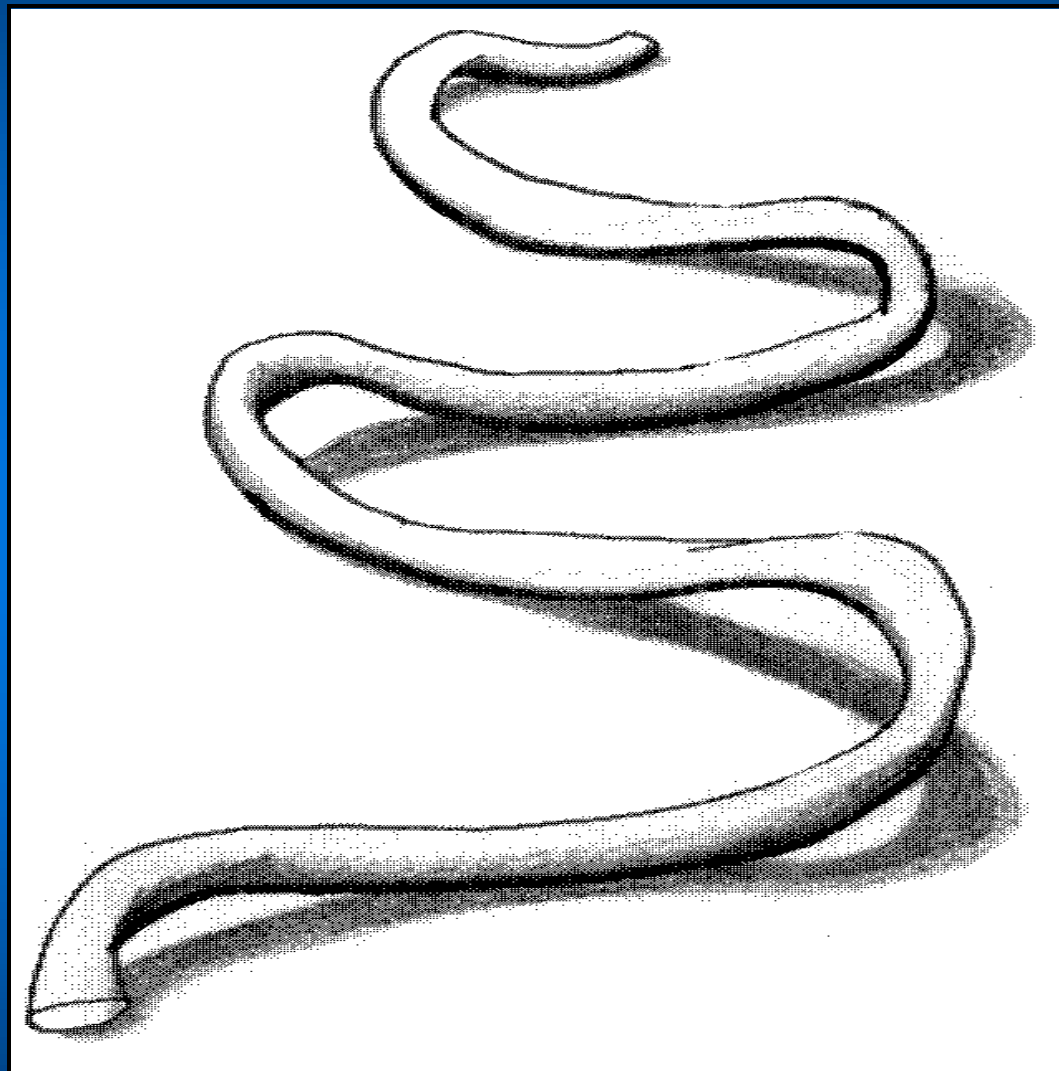
Introducing :Fibre Curvature

Produced for the CRC for Premium Quality Wool undergraduate program by;
Dr. Paul Swan, Paul G. Swan and Associates.



Fibre Curvature

Section of Merino wool fibre



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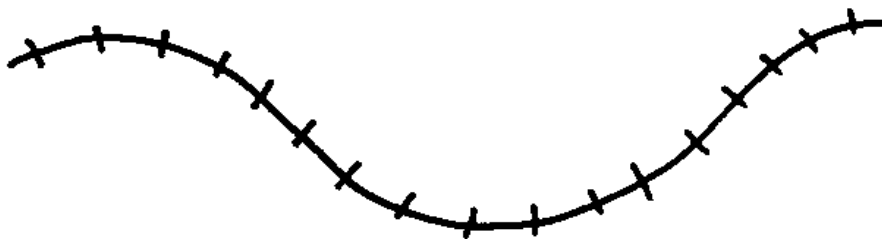
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Comparison of crimp frequency



fine crimp (e.g. 80's)



broad crimp (e.g. 56's)

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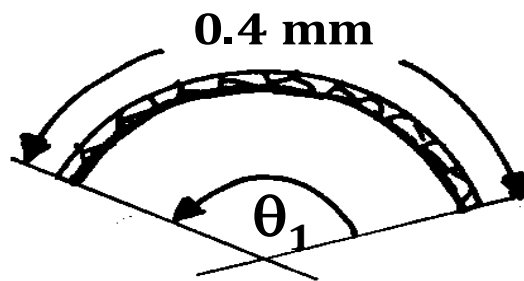
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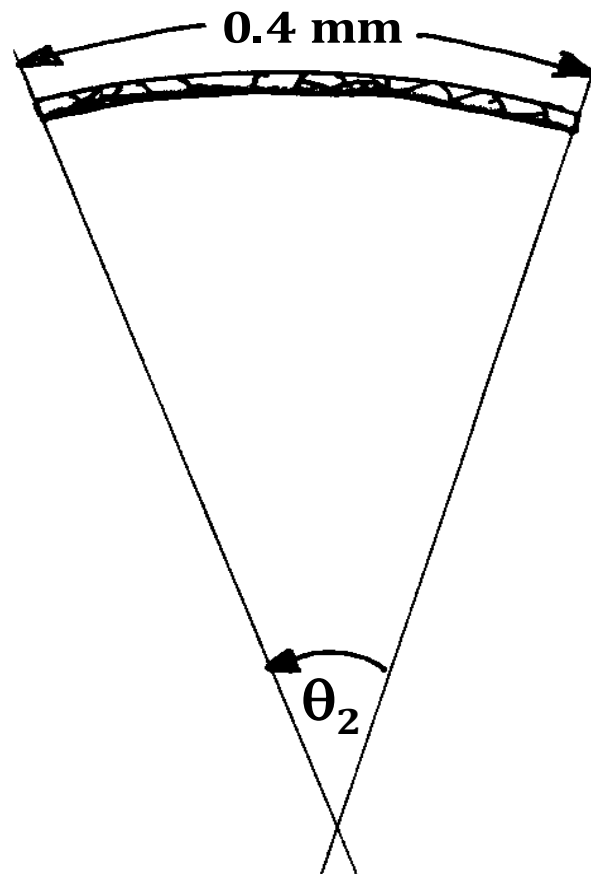
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Degree of curvature



fine crimp (e.g. 80's)



broad crimp (e.g. 56's)

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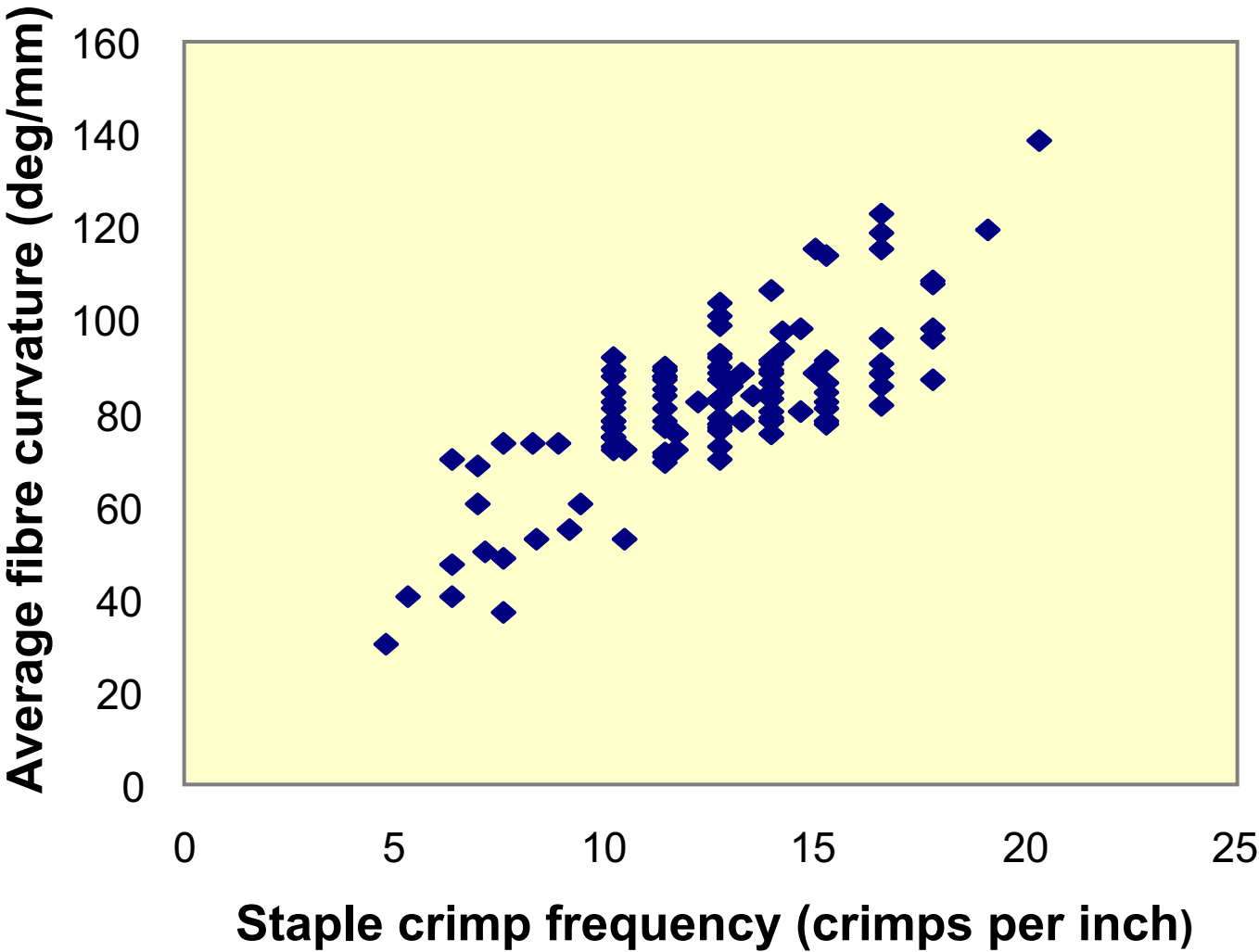
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Crimp frequency vs curvature



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Crimp & fibre curvature

Quality No.	No. crimps per inch	Fibre Curvature (c/mm)
100s up	> 23	> 140
90's	19 – 22	130 - 140
80's	18 - 19	120 - 130
74's	17 - 18	115 - 120
70s	15 – 17	100 - 110
64's	13 – 15	85 - 100
60's	10 – 13	75 - 85
56's	8 – 10	65 - 75
48's	5 – 8	45 - 65

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Why is fibre curvature important?

- relates strongly to the curvature of the follicle in the skin, an important genetic lever
- relates to staple length and fleece weight
- affects top making efficiency, and top tare ratio
- influences yarn spinning efficiency and yarn evenness and quality
- affects fabric thickness, handle, lustre, and efficiency of dyeing

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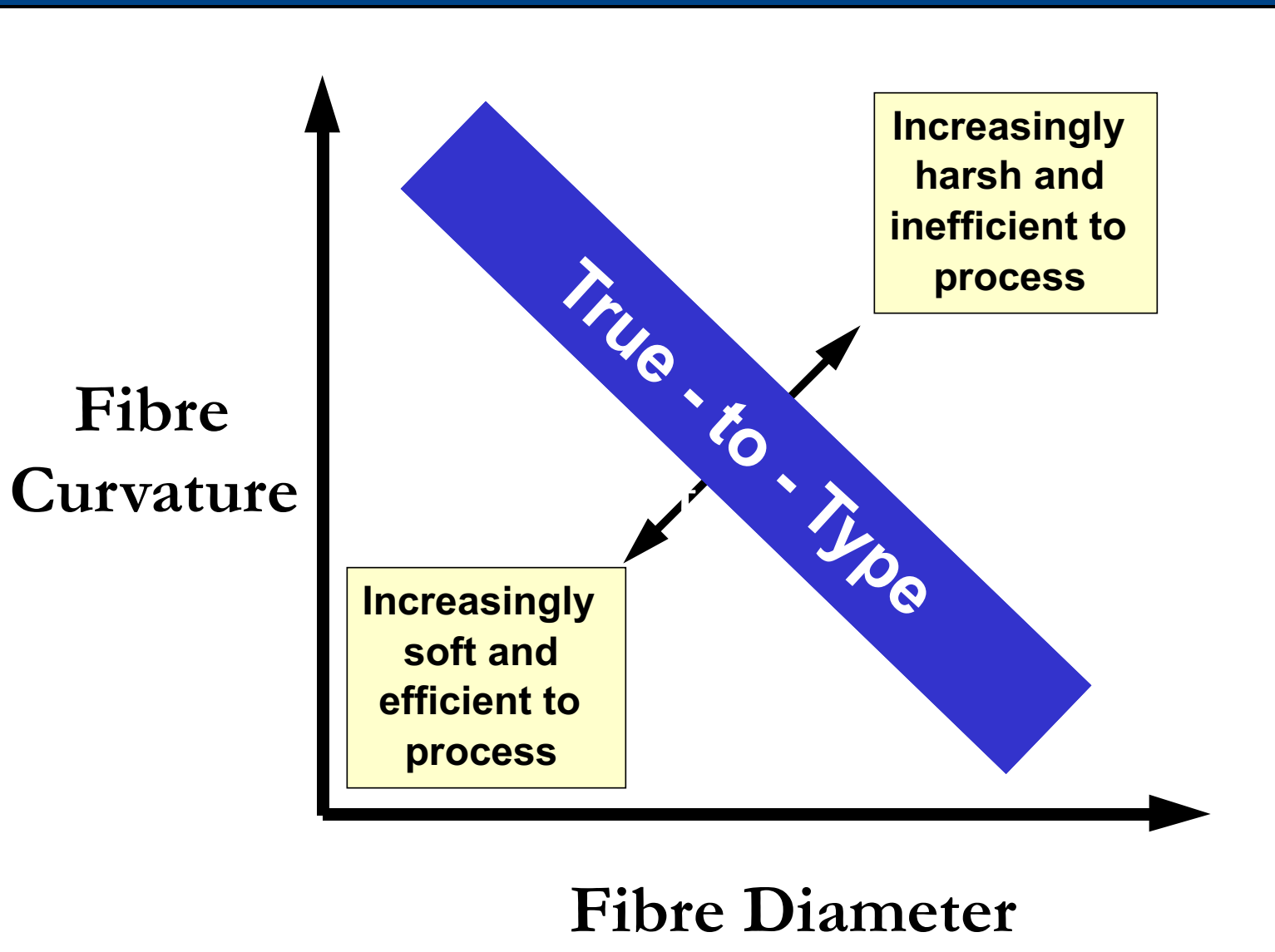
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How should fibre curvature be used?



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Fibre
Curvature

Fibre Diameter

Increasingly
soft and
efficient to
process

Increasingly
harsh and
inefficient to
process

True - to - Type



Assessing wool

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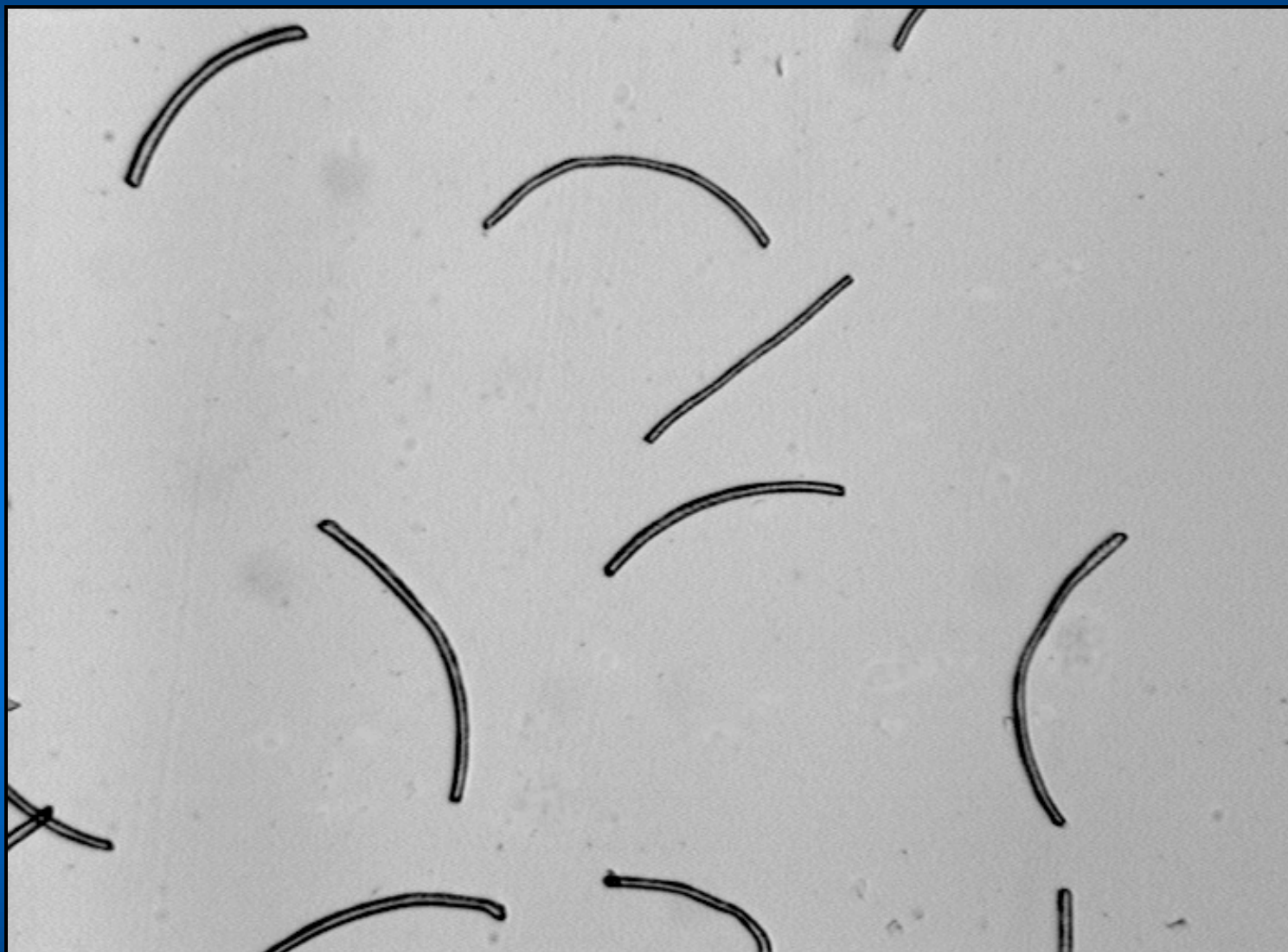
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**Fibre
Curvature
(deg / mm)**

Fibre Diam. (μm)								
	14.5 – 15.4	15.5 – 16.4	16.5 – 17.4	17.5 – 18.4	18.5 – 19.4	19.5 – 20.4	20.5 – 21.4	21.5 – 22.4
140 +	True to Type	True to Type						
130 – 139		True to Type	True to Type					
120 – 129	Possible ELITE		True to Type	True to Type				
110 – 119	Possible ELITE	Possible ELITE		True to Type	True to Type			
100 – 109	Possible ELITE	Possible ELITE	Possible ELITE		True to Type	True to Type		
90 – 99		Possible ELITE	Possible ELITE	Possible ELITE		True to Type	True to Type	
80 – 89			Possible ELITE	Possible ELITE	Possible ELITE		True to Type	True to Type
70 – 79				Possible ELITE	Possible ELITE	Possible ELITE		True to Type
60 – 69					Possible ELITE	Possible ELITE	Possible ELITE	
50 – 59						Possible ELITE	Possible ELITE	Possible ELITE



Standard deviation of curvature



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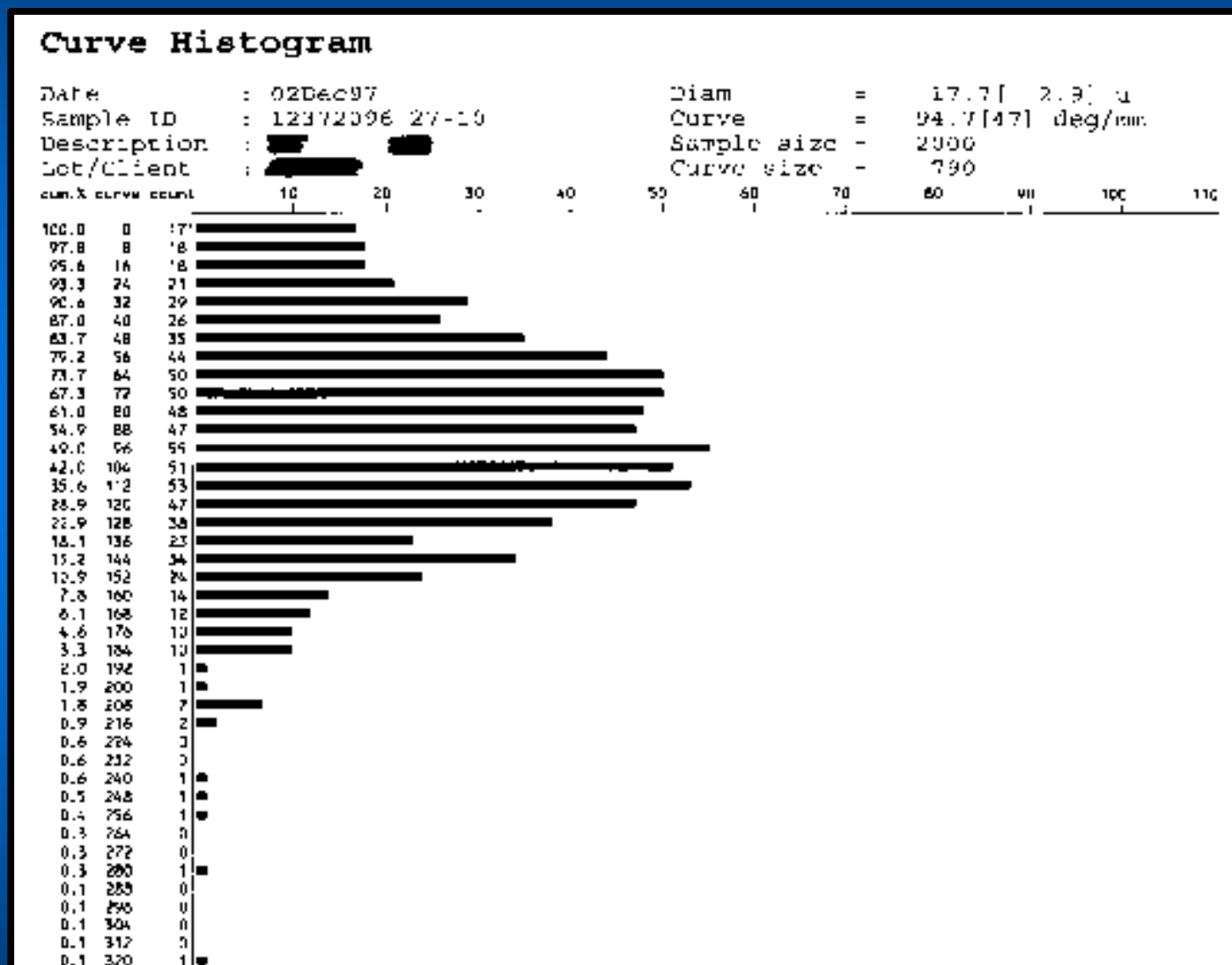
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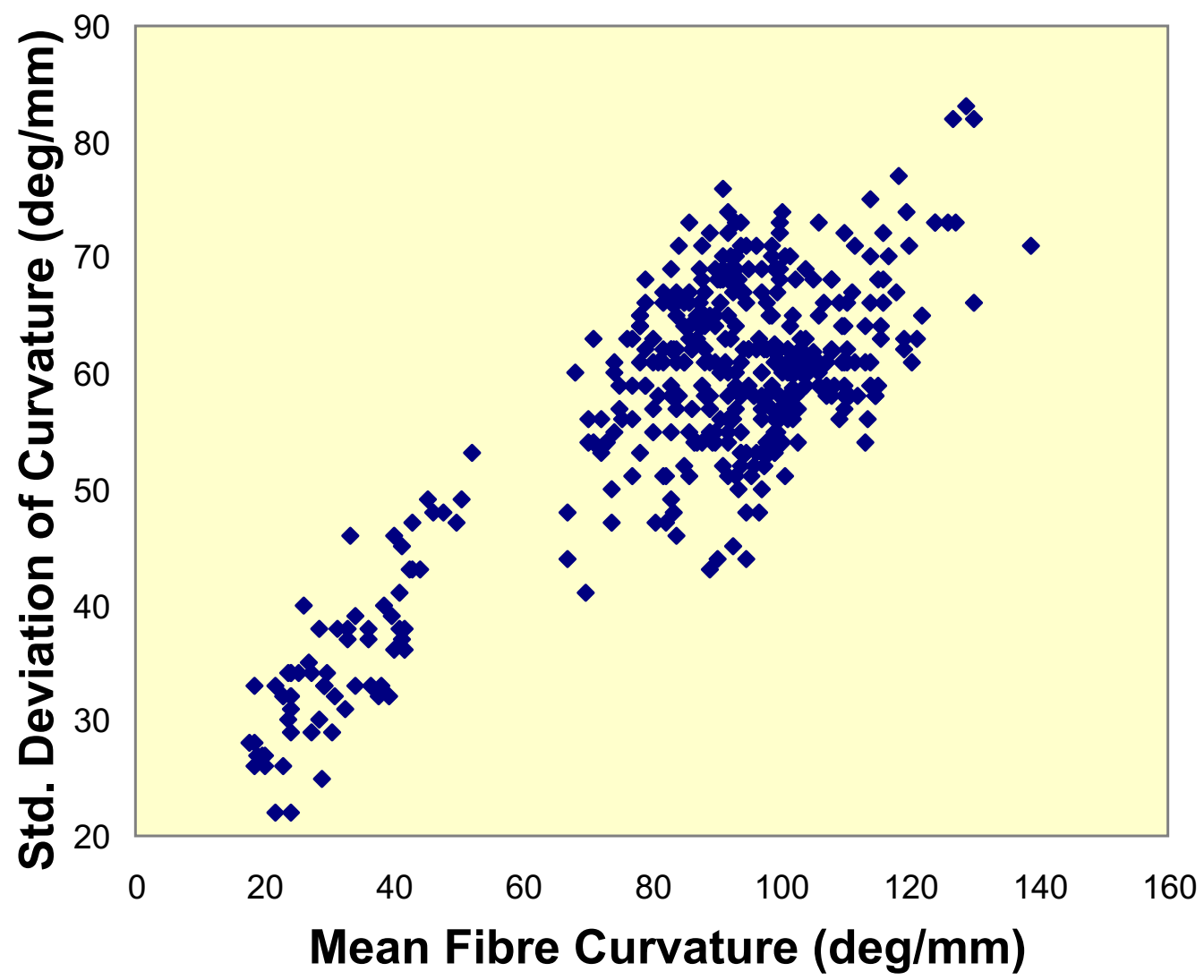
OFDA curvature histogram





Relationship between mean curvature & SD

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Crimp definition

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All fibres of similar curvature, able to be well aligned

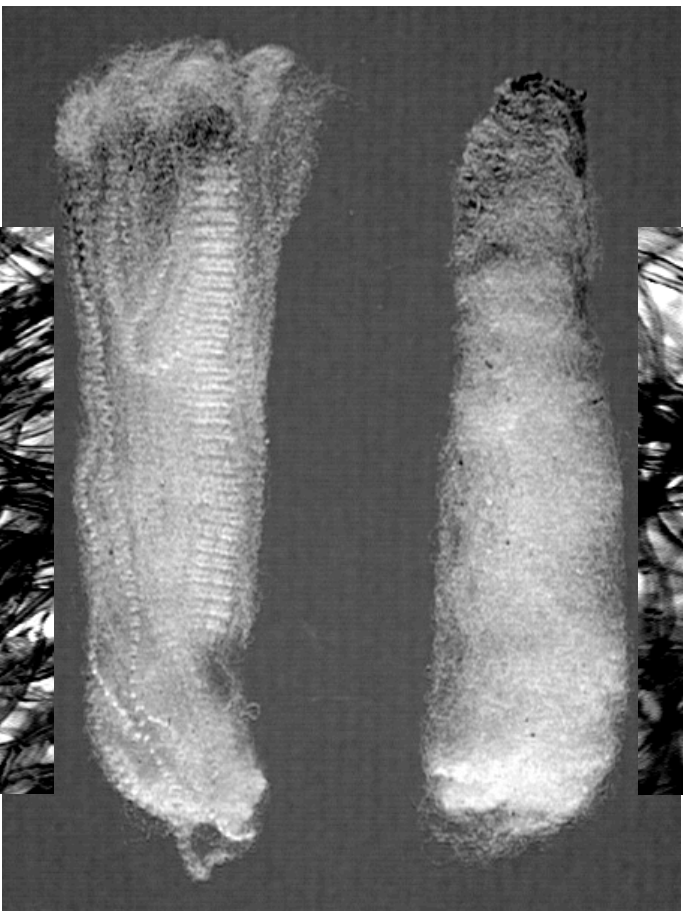


All fibres of different curvatures, impossible to align.



Fibre alignment

Good



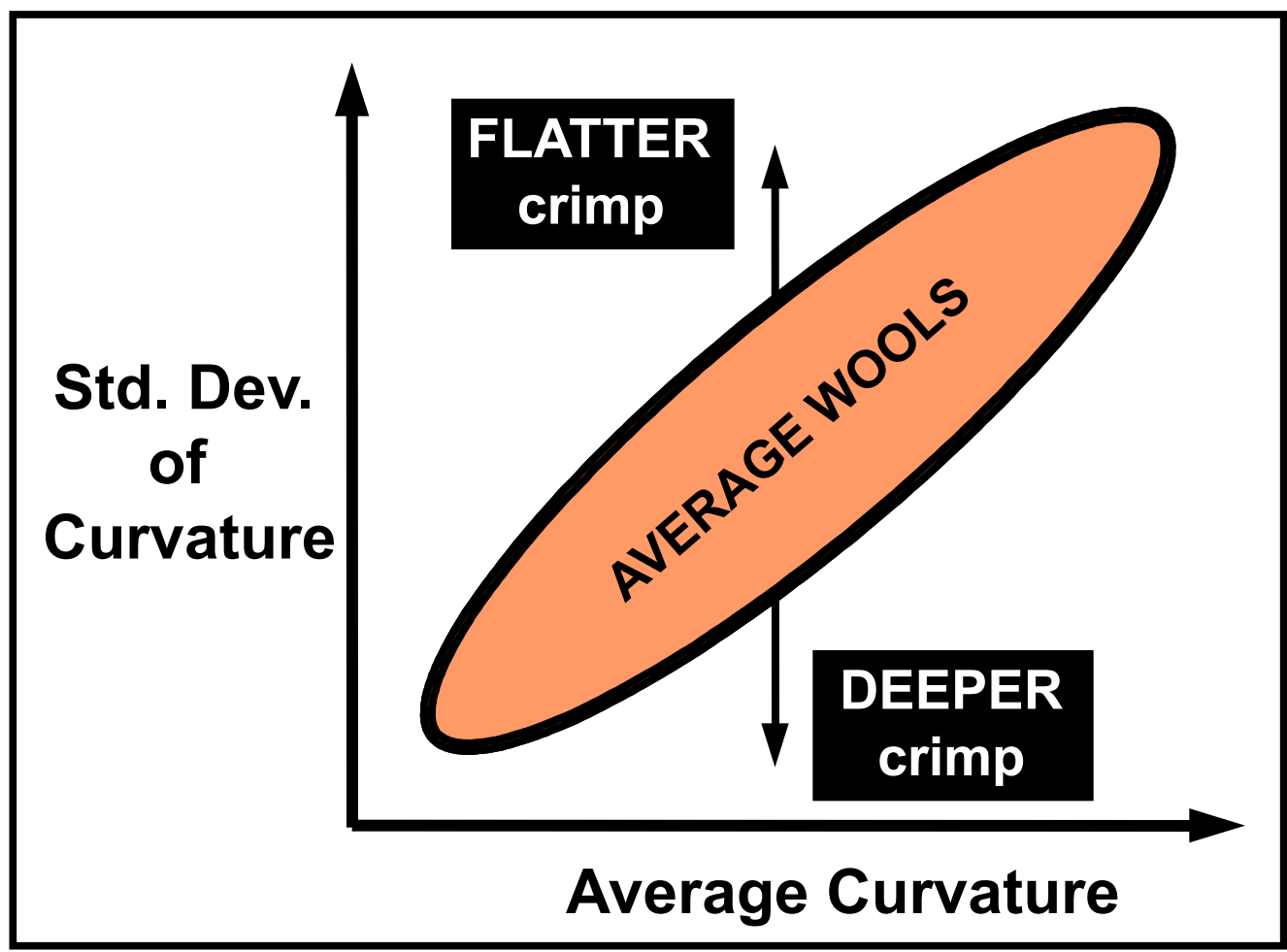
Poor



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Word of caution

- Curvature is a new technology
- OFDA and Laserscan measurement techniques to be perfected
- International standards to be established
- More research required

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