What is Fitness for purpose?

On the catwalks of Paris, Milan and New York, the fibre properties of wool are not a consideration. This is unfortunate because certainly the fibre properties do contribute to the important attributes that the designer seeks in modern clothing. Softness of touch, luster, bright colours and drape are all-important considerations in final design of the most modern textile apparel.

At the turn of the century, suppliers of wool and manufactures were aware of the contribution the attributes of wool made to the final garment. With the increasing trend to modernization, the wool industry turned to blending of fibre components to meet the specifications of the down stream processors, but usually at a nominal cost. This meant in most situations any outstanding fibre attributes were lost. Additionally, the horizontal development of the structure of the wool industry meant that the messages relating to the attributes of the wool fibre, and their contribution to improved processing or the individualization of product rapidly disappeared. Currently there is some re-awakening of the contribution of individual fibre components to product attributes but this is at a reasonably small level. Further in considering this topic it needs to be realized that the majority of the wool fibre is blended with synthetic fibres. In this situation the importance of the fibre attributes is less important than in pure wool fabrics. Nevertheless the recognition of the importance of some fibre attributes to fabric properties in blends while not well recognized.

1 Fibre Properties of Importance

1.1 Fibre Diameter

It is clear from the price paid at auction that this property is the most important considered by both suppliers and processors of wool. Its importance is largely due to its contribution to softness and to the fact that the finer the fibre, then with the same number of fibres in the cross section, proportionally finer yarns can be generated.

This is critical to wool in the modern textile industry as the demand by the modern consumer is to seek comfort and enjoyment in wear. This is found in lighter and lighter weight fabrics. This has been seen in recent times as the average fibre diameter and the distribution of fibre diameter in the Australian clip has trended towards the finer end. It is critical that those responsible for relating trends in modern textiles monitor this trend carefully and give accurate feedback to the growers of the wool fibre as to future needs in breeding strategies. Having said that, it is clear that elite growers of wool are continuing to seek finer and ??? wools.

All other things being equal, finer fibres also tend to give softer handle; again it has been a trend in modern consumer trends to desire softer more luxurious products that are a joy to wear next to the skin. This feature is also important in interior textiles where the 'cocooning' of the consumer is an important recent trend resulting in the desire for soft to touch interior textiles, particularly in home furnishings.

Finer wools tend to be more difficult and more costly to process and it is therefore important to know and understand the optimum way in which to mechanically process fine wool fibres.

1.2 Staple Strength

Traditionally this property has been of lesser importance. In recent times, however, possibly due to the shortfall in the supply with the recent drought in Australia, the role of staple strength has become increasingly important in wool selection by buyers. It remains to be seen if this situation remains as the effects of the drought disappear.

Nevertheless, staple strength is very important in contributing to the average fibre length and distribution of fibres in the top. It is important to realize however, that once the top has been made then the contribution to processing and product of staple strength is relatively unimportant (ref????). Further, as more and more of the Australian wool clip is blended particularly with synthetic fibres then the role of staple strength in post top manufacture becomes less and less important. This is because once the weak place in the staple is broken, predominantly in carding and combing, then the remaining keratin in the individual fibres remains sufficiently strong to meet the downstream processing and product requirements. Over the past few years, many suppliers and processors of wool have realized this and taken advantage of the relatively low price of low staple strength wools, particularly for use when blending with synthetic fibres.

This highlights a major point for wool in the growing trend in new wool processing countries such as China and India, for the manufacturing enterprises to be more vertical in nature. It is these vertical enterprises that can more readily see the apparent relationships between fibre properties and the benefits in down stream spinning, fabric manufacture, and product performance. This is a growing trend to buyers seeking special wools for particular needs of different end products may increase.

1.3 Staple Length

Length is a poorly understood property by many of the processors of wool. It is clear that longer staple length gives longer top length and this in turn improves spinning performance and in turn product performance particularly with reference to fuzziness of the surface and potential pilling of the end product. Nevertheless, longer staple length tends to be discounted at auction.

There are many traditional views about the role of variation in fibre length and staple length to the performance of knitted and woven products that many of these are based on traditional views and are not supported by recent technologies at all in investigations. Recent studies at CSIRO have revealed that earlier claims about the importance of CVN were clearly overrated. Improved understanding of the role of staple length to processing efficiency and product performance should see the importance of staple length increase in the next decade.

1.4 Co-efficient of variation of diameter (CVD)

Co-efficiency of this property can be important in pure wool next to the skin application or in high wool content blends. It is important that suppliers and processors understand that in other applications such as outerwear the role of CVD is less important and selection of wools and the specifications for the CVD should be dependant more on the final end use of the wool.

1.5 Fibre Crimp

With the development in recent times of niche marketing of wool this property has become of increasing importance. Recent work by Robinson and Haige has indicated that fibre crimp is particularly important in the looser more open structures of knitted products where it has a significant influence on determining movement of fibres and of yarns and fabrics in determining final fabric weights, shrinkage and pilling behavior of knitwear. In the higher twisted, tighter set products in wovens fibre crimp plays a lesser role. Nevertheless, as higher crimp fibres tend to move more during finishing operations, this fibre property contributes to the fabrics dimensional stability and final fabric geometry. The knowledge and understanding of the contribution of this fibre attribute is becoming more important. It remains to be seen how valued this property will become as the understanding improves.

