



Wool Classification Manual



Foreword

South African wool is known for its quality and high standards of classification, ensuring that the product remains highly regarded and sought after on the international market. Constant review, implementing necessary changes and updating of standards, ensures staying up to date with ever changing market trends.

This manual will review important theoretical aspects of wool handling and classification, which precedes the practical portion of the Springbok Head Course.

Emphasis will be placed on the final shearing preparation and combining at farm level, in keeping with current economic trends.

The Springbok Head is known to be a trade mark and guarantee that the wool has been selected and classified with exceptionally high standards in mind.

It is of critical importance that classification standards in South Africa are consistent and of exceedingly high standards, and that initiatives are put in place to continuously promote the branding of the Springbok Head as a symbol and trade mark of outstanding quality in this industry.

Congratulations to the National Wool Growers Association, the Production Advisory Service and brokers, who compiled this manual. This will certainly ensure that effective shearing preparation will take place and industry standards will excel to greater heights from here-on. This manual will further ensure that training will be undertaken in accordance to the standards as set out by the industry.

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CHAPTER 1

INTRODUCTION

It is important that shearing is done according to set classing standards to secure the good name of the South African clip internationally.

The “National Association of Wool and Mohair Growers” was formed as early as January 1906 at a public meeting in Port Elizabeth, to create a classification system to systematically class and pack wool. This was primarily done in order to restore the name of South African wool from its bad reputation gained during the late 1800’s and early 1900 at the London markets.

Classification standards are still monitored between brokers, buyers and wool processors to ensure that the common goal is consistently strived for and attained.

Cape Wools SA, the South African wool industry’s service organization is responsible for the management and co-ordination of this process.

The classification Standards make provision for a wide range of classes and outsorts. This does not mean that all classes must be made. Unnecessary dividing and breaking up of the clip in too many classes increases handling, marketing and objective measurement costs, and does not necessarily mean higher prices for the producer.

The key to good classing is that the classer should apply his knowledge and judgement in such a way as to ensure the maximum income from the clip within the packing and marketing rules.

The following general suggestions are important for wool classing:

- Ensure that the shed and equipment are thoroughly cleaned before the commencement of shearing.
 - Make sure there is enough shelter to keep the sheep dry.
 - Consult the local veterinarian about the need for vaccination against black quarter.
 - Prevent seed contamination (such as cockle burr), remove all brands from sheep prior shearing, and crutch sheep with severe dung and urine stained wool.
 - Ensure there are enough workers for the shearing process, allow for example a cook for the shearers, sweepers, piece pickers, balers and individuals to assist with getting sheep in and out.
- Provide appropriate wool sorting facilities (such as tables, wool bins, piece tables, etc.).
 - Where possible, cut long grass around the shed to prevent necks and bellies getting wet due to dew or rain.
 - Enough sheep should be kept under shelter should it rain, as well as for the morning session.

Wet wool should not be baled under any circumstances.

- Provide sufficient tokens at the gate of the catching pens for the shearer, so he can keep count of how many sheep he had sheared.
- Provide shearers daily with fresh, strong disinfectant so that every time they shear a sheep, the shears can be disinfected.
- Sorting of fleeces will be easier if the flock can be sheared in age groups, such as lambs, hoggets and young sheep (2-tooth), etc.
- It is preferable to throw wool into bins. By comparison it can be ascertained where the wool matches.

- Under dusty conditions, it is recommended to class the mainline directly into press.
- Discuss and agree up front with the shearers about double cuts, the proper shearing of the legs, the scrotum in the case of rams, cut of teats and vulva points, as well as the unnecessary wounding/cutting of the sheep.
- Modernise shearing facilities as far as possible in order to minimize the shearers amount of energy dissipated by having a shearing platform ready to shear – it means that catching/holding pens should be as close to the shearing floor as possible.
- It is important to maintain an accurate shearing record book in order to have control over the amount of sheep shorn, as well as verification and support of any wool claims which may arise.
- Use only new prescribed wool bales and bags. As a guideline, three bales per 100 sheep, and nine metal hooks per wool bale will be needed.
- Only paper dividers should be used for SPLIT bales.
- Clip must be accompanied by a duly completed letter of advice – available from the brokers.

Keep our wool “green” – avoid poison residue in wool.

CHAPTER 2

PREVENT CONTAMINATION

Wool contamination is costly to the wool producer as well as the industry and should always be avoided. The main issue is contamination with baling twine and coloured fibres which are the biggest problems, but wool contamination can include any loose objects, as well as any marking with tar, urine, dung, blood, paint, discolouration due to fungi or chemicals, etc. Make very sure that no contamination during the shearing process, classing and packaging occur.

The following measures can be implemented to prevent contamination in wool clips:

- Clean the shearing shed well before shearing starts and keep it clean.
- Ensure that baling twine, jute or hessian bags, dogs and any loose objects that may end up in wool from the shed, is removed.
- Provide rubbish bins in which any kind of garbage can be thrown.
- Broom bristles also contaminate wool and rubber rakes or plastic scrapers used for wool gathering, is encouraged instead.
- Always shear woolbearing breeds first.
- Remove all brands from sheep before they come on the shearing floor.
- Sheep containing black and coloured fibres or hair (kemp) must be sheared and packed separately.
- It is advisable to remove seeds like “Boetebos” and Cockle Burr prior to the shearing process.
- Topknots and cheek wool should be with lox-class or individually packed. No matter how long and attractive.
 - Hairy fibres are always in the Top Knots and cheek wool. Sometimes coloured fibres are also around the horn buds. By adding this wool to bellies or fleece wool, one could inadvertently add to the wool being contaminated. Hairy shankings should also be classed in a lower-lox-class.
 - Remove all the urine and dung-stained wool and pack separately.
 - Pieces of skin and bloodstained wool should be removed.
 - Turn wool pack inside out and shake them out thoroughly outside the shearing shed to remove all foreign fibres within the wool packs.
 - Bale hooks and spikes must be sharp and smooth to prevent breaking the fibres of wool packs and thus contaminating wool.
 - Wool should preferably be pressed. Treading down wool disperses the dust in the tips even further.
 - When split bales are made only paper must be used to separate the different types. Avoid plastic bags or any other method of separation.

CHAPTER 3

PICKING UP AND CASTING OF THE FLEECE

After the fleece has been shorn off, it lies on the floor, white side up. In getting it onto the table with the brown side up, it must be turned over in the picking up and casting process.

Stand straddle-leg over the fleece and take the two breeches firmly between thumb and forefingers so that the other fingers can be used to handle the fleece. Pull the breeches up and back over the fleece in the direction of the neck fold and let down. The fleece is then gripped by the other fingers (not holding the breeches), pulled back and placed on top of the neck fold. The whole fleece is then picked up by letting the seat down till it almost reaches the floor, grip the fleece so that it rests properly on the hands, leaving the arms thus free to move easily. Take note that the fleece is picked up with the hands and not the arms.

Stand about one pace from the wool table, pull the fleece which is still resting on the hands back against the body, turn slightly to the right and with a swinging movement from the hips and by straightening the arms, the fleece is cast. In the swinging movement, only the breeches are held with the thumb and forefingers while the other fingers let go of the fleece. Avoid all jerky or thrusting movements and allow the fleece to glide down onto the table. The correct casting of a fleece is extremely important for skirting and the fleece must be cast on the table with the back and neck in the middle of the table so that the breeches, shoulder wool, necks, backs and crow's nests are clearly identifiable. If the fleece is not cast completely extended, pull it neatly into position. Skirting is a specialized job and can only be carried out efficiently if the fleece is spread properly on the table. With the tip side (dull side) up on the table, it has the following advantages:

- Second clippings sift through;
- Any paint marks not already removed, are easily observed;
- The different parts of the fleece are easily distinguished;
- Backs can be removed easily and correctly
- The appearance of seed is easily observed
- Any hairiness or folds are easily noticed
- Any urine or paint stains are easily observed.

CHAPTER 4

SKIRTING OF FLEECES AND REMOVAL OF BACKS

Before an attempt can be made to skirt the fleece for the different faults, it must first be determined whether it is a cast fleece with regard to:

- Tenderness
- Over strongness with regard to micron
- Poor quality in respect of staple formation and uniformity (style)
- Heavy and yellow in appearance, or
- Matted

Only remove the locks if a fleece is judged as inferior. Sort the entire fleece in a separate class or add to poor sub classes. This will prevent broken fleeces and backs, from any of these cast fleeces, from contaminating the better broken and back lines.

When a fleece qualifies for skirting, the following options must be followed and carried out accurately.

- Locks and short pieces must be carefully skirted.
- Carefully skirt all seedy fleece wool from the britch, shoulder and necks according to a predetermined standard.
- Ensure that all short pieces are removed;
- Ensure that all hairy, coarse britches and necks are removed;
- Ensure that there is no belly wool on the fleece;
- Remove all matted pieces.

After the skirting has been done correctly, the backs removed ,and note taken of the following faults.

- The presence of foil consisting of leaves, sticks, straw, etc
- All sand and dust clearly visible
- All noticeable weathering

Emphasis is placed on the skirter's ability of observation not to skirt too much or too little and each fleece must be skirted on merit.

AFRANDING EN VERDELING VAN 'N VAG
SKIRTING AND DIVIDING OF A FLEECE

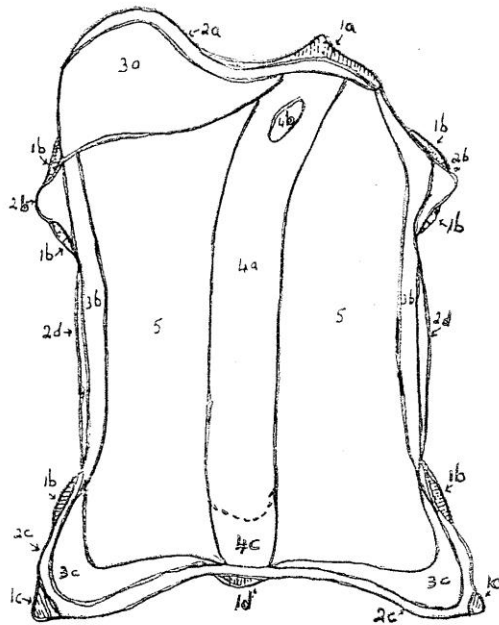


Figure above can be identified per numbers on the diagram, with the explanation reflecting in the table below:

1. LOKS/LOCKS	2. AFRANDELS/SKIRTINGS
1a: kopwol/top knots 1b: sweetloks/sweat locks 1c: pootjiewol/shankings 1d: uriene- en misbevlekte wol/urine and dungstained wool	2a: nek- en kopafrandels/neck and head skirtings 2b: bladwol/shoulder wool 2c: broekafrandels/britch skirtings 2d: waterige wol (penswol)/watery wool (belly wool) 1+2 Afrandselstrook/Skirting strip
3. VAGSTUKKE/BROKEN FLEECEES	4. RUGWOL/BACKS
3a: nekwol/neck wool 3b: saadwol/seedy wool 3c: broekwol/britch wool	4a: gewone rugwol/ordinary backs 4b: kraaines/crow's nest 4c: kruiswol/rump wool
5. VAGWOL/FLEECE WOOL	

CHAPTER 5

CLASSING STANDARDS FOR MERINO WOOL

Description: - “Merino wool” is defined as white wool that is free by nature from kemp, with a fibre diameter of no more than 27 microns and that shows all the characteristics of wool of the merino sheep.

Brands: - Wool stained with any marking fluid, either washable or non-washable, paint, tar, marking oil, etc. must be removed from the sheep before taking to the shearing floor. Wool brand clippings must be packed separately and marked **BRANDS**.

The following types of wool should always be packed separately and under no circumstances mixed with lox-class or any other classes:

Overgrown wool (130mm plus)	OG
Rain stained (fungus) wool	BKS 4
Matted Wool	MAT
Lumpy wool	LPY
Skin wool (shorn from skins)	VEL
Dead wool (sheared from dead sheep)	PLK
Maggot wool	PLK

The following lines (classes) of wool are usually shorn from sheep.

1. Locks
2. Bellies and Skirtings
3. Broken fleece
4. Backs
5. Fleece wool

1. LOX

Locks must be packed separately from all other wool – mark LOX

Three lox classes are recommended, namely:

LOX 1, Lox 2 and LOX 3 classes but in exceptional cases and big clips one can also create a LOX 4 and LOX 5 line. Irrespective of the quantity it is advisable to pack inferior locks (LOX 2 and Lox 3) separately.

LOX - 40mm and longer

Good colour and appearance. Consists primarily of head- (top knots) and cheek pieces.

This should not be mixed with other lines; because hairy and coloured fibres may occur that causes contamination.

LOX 1 – 25 mm and longer

Consists mostly of long sweat locks, long matted brisket wool, long top knots, cheek wool and all pieces and bellies too inferior for a BP class.

LOX 2 – Shorter than 25mm

Consists primarily of shankings, short top knots and cheek wool, fribs and sweepings (long pieces removed).

LOX 3

Consists of urine-, dung- and bloodstained wool, as well as heavy sweat pieces.

LOX 4

Very heavy sweat locks, dark urine-stained wool, dung-stained wool and dung locks.

LOX 5

Matted locks with a high percentage of vegetable matter.

2. **BELLIES AND SKIRTINGS**

Bellies and skirting pieces should be packed separately from fleece wool.

Thorough skirted bellies and pieces can be packed together in two category classes:

CBP (Combing Bellies and Pieces)

Long (60 mm) lighter attractive bellies and pieces (skirtings)

BP Between 40 and 60 mm light attractive bellies and pieces.

Note: In short wool clips (under 8 months) and smaller clips, where only BP is made, the class in most cases is always light and attractive.

BP2 Short, below 40mm, heavier and less attractive bellies and pieces.

If the quantity justifies it (3 bales plus) well skirted long (50 mm and longer) light and attractive bellies, keep separate from the pieces and marked – **CB**

Mark skirtings then only with a length symbol, example **B or C**, etc

3. **BROKEN FLEECE**

Deviating parts of well-skirted fleece such as neckfold wool, britches and certain parts of fleece can be packed separately from fleece wool. **NB** *Wool is deviant from the fleece when it is stronger, shorter, or if it contains seeds.*

One or more classes, according to quantity and quality, can be made in a clip. It can be marked according to the length, with only a single symbol like **B, C, etc.**

If fleece-pieces are not enough for a class or where it is too short or less attractive it can be blended with **CBP or BP**.

Important: Bellies or wool with bellies appearance like ordinary wool skirtings and a back-wool appearance (weathered and / or dusty) should not be packed in with any fleece wool class. Rather class with CBP, BP or BKS where it fits best.

Broken fleece wool that contains only neck wool, can be marked as **NKS** e.g. **BNKS**. (the appropriate length symbol).

4. **BACK WOOL**

If wool from the back of a sheep is dusty and/or significantly weathered or includes vegetable matter, it must be removed and packed separately. Mark **BKS**

If back wool does not deviate significantly (5% clean yield), it does not need to be removed.

In short wool clips (50 mm and shorter) it is very rarely necessary to remove backs.

If there are large differences, back wool can be made into two classes, namely **BKS** and **BKS2**. Very dusty and/or weathered, shorter, heavier back wool and crows nest, mark **BKS2**.

BKS 3

Back wool with a very high percentage of vegetable matter, eg. straw (feedlot sheep)

5. **FLEECE WOOL**

This is the portion of the fleece that remains after all different parts like LOX, BELLIES and PIECES, BROKEN FLEECES and BACK WOOL has been removed. The purpose of classing must be to make fleece lines as large as possible.

Environmental factors play a major role but as a guide, the following percentages of each class can be used in the classification process.

Guidelines for Classification

CLASS	MONTHS GROWTH		
	12	8	6
Fleeces	70%	75%	80%
Backs	10%	5%	0%
Bellies	10%	10%	10%
Lox	10%	10%	10%

When classing a well skirted fleece, six properties are taken into account, each of which has a bearing on the price of the wool. These six physical properties form the basis of good classing and each one is complimentary to the other.

1. Tensile Strength (Soundness)
2. Length
3. Fineness (Fibre diameter)
4. Quality
5. Condition (Clean Yield)
6. Appearance

1. TENSILE STRENGTH

The tensile strength of wool gets subjectively determined in the shed, but lots with a length of 50 mm and longer can be tested objectively. The tensile strength is measured in units of Newtons /Ktex – the higher the N/Ktex is, the more sound grown the wool.

A practical definition of tensile strength of wool will be: - resistance of individual wool in a wool staple offered by tension, friction and wear.

Tensile strength in greasy wool stages is graded as follows:

1.1 Sound Staples

When a wool staple (pencil size) is placed between the fingers (thumb and forefinger), and flicked (with a middle finger) it will make a metallic sound. There will be no weakness from the top down to the bottom side.

Sound grown fleeces are then classed according to the remaining physical properties.

1.2 Weak Staples

When taking wool staple between the fingers and flicked, a dull sound will be heard. There can be a weak spot in the fibre growth, and with reasonable power, will eventually break.

This appearance can be attributed to the narrowing of a fibre due to factors such as poor nutrition (drought), pregnancy and lactation. Although not necessarily a tender wool, it is advisable to separate the wool if the quantity justifies it, and to advise the broker.

1.3 Tender Staples

When taking a wool staple between the fingers, and you flick it, it will immediately break the staple. Mark **TDR**.

It is necessary to test the fleece for tensile strength before any backs and pieces are removed from the fleece. This is to ensure that no tender backs and pieces are mixed with sound wool.

Lots with a fibre length of 50 mm and longer are also measured objectively and is the tensile strength measured as Newtons per kilotex. This measurement represents the force in Newtons required to break a staple one kilotex in thickness.

Wool with mean lot values of:

<25 N/Ktex	= Increased tender (low tensile strength)
25-30 N / Ktex	= Partial tender (average tensile strength)
30-40 N / Ktex	= Increasingly healthy (high tensile)
>40 N/ Ktex	= Very good/healthy wool (high tensile)

Tensile strength affects the processing of wool. As N / Ktex decreases, the % of combing waste (noils) increases and less tops are available to be sold to the spinner.

Together with the measurements in N / Ktex, it is also determined what percentage of the staples break on the tip, in the middle or at the base.

A high % middle break results into a negative HAUTEUR (length of fibre in TOPS) and is it therefore important that the % middle break is kept as low as possible by means of good management.

2. LENGTH

Wool can be divided into nine length categories.

Description	Length (minimum length)
AA	90 mm+
A	80 – 90 mm
BB	70 – 80 mm
B	60 – 70 mm
C	50 – 60 mm
DD	40 – 50 mm
D	30 – 40 mm
EE	20 – 30 mm
E	Shorter than 20 mm

Uniformity of length is also very important during the processing. The difference in staple lengths of fleece wool in the same class must not be more than 25 mm for longer than 50 mm and 20 mm for wool less than 50 mm.

However, staple length can, as in the case of tensile strength, be measured objectively. The variation (coefficient of variation) will be determined with the average staple length using the following norms.

The smaller the value, the more uniform is the length of staples in a line:

12% or less	= very good uniformity
13-20%	= Good to average uniformity
21% and above	= Very uneven staple length distribution.

There is normally a significant price difference in the end use between wool longer than 50 mm (long wool) and wool less than 50 mm (short wool). These lengths are described as the following in the trade:

- Long wool is used for worsted yarn – fibres go through a comb process, short fibres are removed and fibres are drawn parallel to ensure a smooth appearance, for example, fabrics for suits, pants, jackets and skirts.
- Short wool is used for Woolen Yarn – consists of short fibres and only go through a carding process (not combed) which forms a soft, fluffy and irregular display like blankets, thick coats and felt products.

3. FINENESS

Wool's main price determining characteristic is fineness, measured in units of micrometers (micron*). A micron (μ) denotes the diameter of the fibre and is equivalent to 1/1000 (1 thousand) of an mm.

Fibre diameter can be subjectively determined by estimating the number of crimps per 25 mm of wool taking handling, staple thickness and quality into consideration. The greater the number of crimps per 25 mm, the finer the wool. Well defined and softer handling, also indicate a finer wool and vice versa.

(These norms apply only to Merino wools.)

THE FOLLOWING CLASSING STANDARDS ARE USED FOR FINENESS

Description	Fineness Symbol	Micron - μ	Deurden – Amount crimps/25mm
Superfine	FF	19 and finer	16>
Fine	F	19.1 – 20	13 – 15
Medium	M	20.1 – 22	11 - 13
Strong	S	22.1 - 24	8 – 10
Overstrong	SS	24.1 - 27	<7

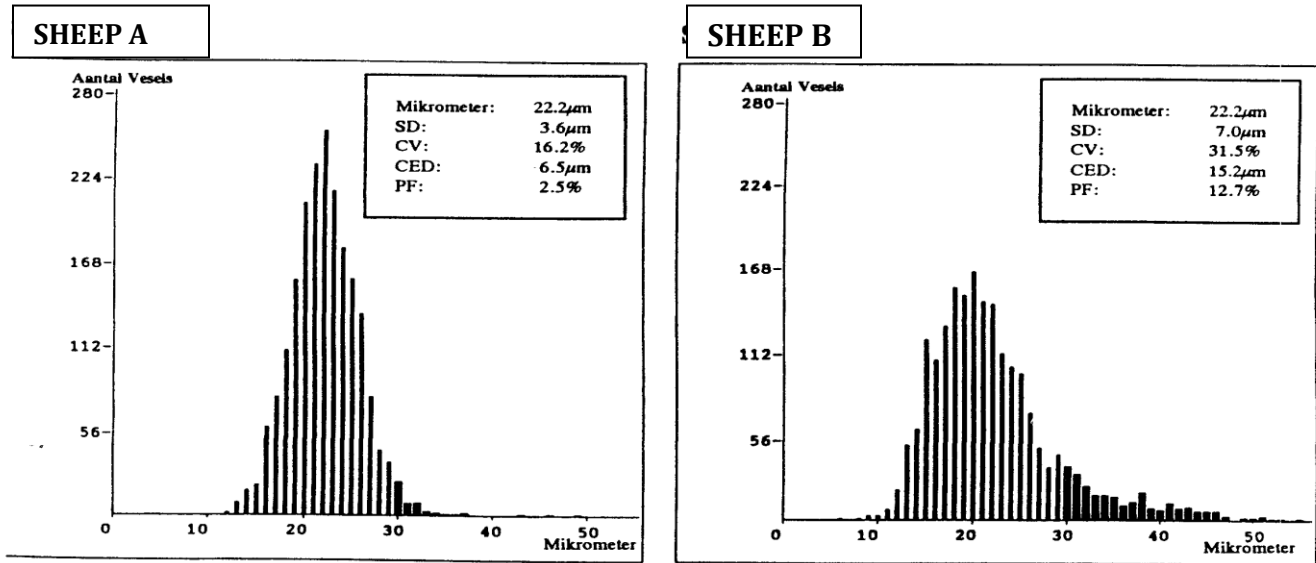
Deurden wool represents the ideal balance in terms of handle sensitivity, processing ability and features of the final product.

The wool farmers breeding policy must be to produce wool of the Deurden Standard. Adjacent fineness groups can be added together for classing purposes, if required. The fineness assigned shown of the class must be that of the strongest wool in the bale. It also means that the maximum deviation in fineness between fleeces is 2 micron.

Fineness (fiber thickness) are also measured objectively, and the following results are available.

MFD	= Mean Fibre Diameter
SD	= Standard Deviation
CV%	= Coefficient of Variation
CED	= Coarse Edge Diameter
PF	= Prickle Factor

HISTOGRAMS:



MEAN FIBRE DIAMETER

Depending on the deviation of the diameter, wool with the same average fibre diameter may be very different. Look for example to the two samples A and B. Both have the same Mean fibre diameter of 22.2 μm , but differ in distribution. Sheep A has a narrow distribution of fibre diameters with a very low percentage of coarse fibres (30 micron). Sheep B has a much wider distribution of fibre diameter and a greater coarse edge. Products manufactured from wool with this type of wide distribution (B) will be more prickly and will have a poorer handle than products manufactured from wool having a narrower fibre diameter distribution.

STANDARD DEVIATION AND COEFFICIENT OF VARIATION

SD – indicates the spread or distribution of fibre diameter of individual fibres within a tested sample. The lower the SD, the more uniform and desirable the result within all diameter categories, in terms of wool processing and product qualities.

SD may be used in the breeding program to improve the wool quality. The overall objective is to reduce the standard deviation of all wools irrespective of the average fibre diameter or wool type.

The following is a guide for a maximum SD per Fineness Class

MICRON	MAXIMUM SD
< 17,5	3,5
17,6 – 19	4
19,1 – 20,5	4,5

20,6 – 22	5
22,0 23,5	5,5

Coefficient of Variation (CV) is calculated by dividing the standard deviation (SD) by the mean fibre diameter (μm) and multiplying by 100 to give a percentage. CV measures the spread of fibre diameter variation relative to the average (mean). The lower the CV, the narrower and more uniform the fibre diameter distribution is and this leads to improved staple structure, style, spinning performance and resistance to fleece rot.

As a rule of thumb, for each 5% reduction in CV there could be an improvement in spinning performance equivalent to that achieved by reducing the mean fibre diameter by almost 1 micron. In other words, wool from sheep A will have a superior spinning performance to wool from sheep B

COURSE EDGE DIAMETER (CED)

CED is measured in micrometer and represents the number of micrometers greater than the average diameter where the coarsest 5% of fibres are found. This measure of “coarseness” is strongly associated with the CV of diameter. Generally, the lower the CED, the better the wool Quality and the more uniform the fibre diameter distribution. Sheep with a low CED relative to their mean fibre diameter generally also have a more productive wool producing skin.

PRICKLE FACTOR

Wool worn next to the skin causes a sensation with many people which is best described as “prickle”.

It is due to coarser fibres digging into the skin with sufficient force to excite the pain receptors in the skin. Sensitivity differs greatly from person to person, but in general, fibres need to be coarser than 30 micrometre before they can generate sufficient force to excite the pain receptors. As a guide, fabrics from wool with less than 5% of fibres coarser than 30 μm will not be perceived as prickly by most people.

4. QUALITY

Quality can be described as the definition and evenness of crimp in wool, soft handle, free of kemp, coarse and coloured fibres.

Quality is graded as:

Good: A well defined and even crimp with a soft handle and the absence of deviating fibres.

Average: Irregular or indistinct crimp (dull appearance), a somewhat coarse handle of the wool and indications of deviating fibres. Wool with a average quality must be marked down a fineness for example a medium (M) becomes a strong (S)

Poor: A lack of definition or regularity of crimp, a harsh handle of the wool and/or the presence of noticeable coarse fibres or hair. Wool with a poor quality must be classed down to crossbred wool for example XM

Quality plays an important role in determining the fineness – the better the quality the finer and vice versa.

With the valuing of wool in the trade quality is defined as style. Style plays an important role in the processing and quality of the final product.

5. CONDITION (CLEAN YIELD)

Condition can be defined in terms of the degree of presence of any other material other than clean wool fibre and includes the following:

Wool yolk and Wool sweat	-15 to 30%
Sand and dust	-5 to 40%
Vegetable Matter	-0.5 to 10%+
Moisture	-8 to 12%

Condition is divided into three categories, namely:

- Light clean yield of 60% and higher
- Medium clean yield of 50-60%
- Heavy clean yield of 50% or lower

The amount and quality of yolk present in the fleece protects the wool from weathering and dryness caused by dust, sun, wind and weather.

From a production point the % clean yield produced is the important factor and is a clean yield percentage of 65 the ideal. If the clean yield is too low, it is an indication of too much foreign material and wool oil I (yolk) in the fleece. When clean yield is more than 72% the fleece can be in danger of too little wool oil to protect the fibre against weathering.

6. APPEARANCE

Appearance (style) is subjectively determined taking into consideration colour, staple formation and the tip of the staple.

There are three grades, namely:

- **GOOD:**
White to light cream, good staple formation and the absence of a weathered or pointed tip and too much foreign matter.
- **MEDIUM:**
Deep cream to slightly yellow colour, ropy staple formation or noticeable weathered or pointed tip and a greater percentage of foreign matter.
- **HEAVY:**
Yellow to rusty colour, watery staple formation or excessively weathered or pointed tip.

Colour can, on request, be measured objectively, and in short summarized as follows:

Basically, there are seven colours in the spectrum and 3 (Red = X, Green = Y and Blue = Z) together play a role in the colour of wool.

The X factor not playing a significant roll, therefore it is the other two factors that have a role to play on a person's retina to determine colour.

If Z (blue) is subtracted from Y (green), the result will be yellow.

$Y - Z = \text{Yellow}$

The following Y-Z values on a scale determines the colour of wool:

7 = brilliant white

8 = White

11 = creamy

18 = canary yellow

It is therefore important to select white to cream wool in the breeding program. This will increase the different colours in which the wool can be dyed significantly.

The colour of a consignment of wool is important after the washing process and in the Top making process.

If any amount of wool with a poor appearance (colour) is in a consignment of the wool it will negatively affect the combing process and dyeing of the fabric.

Appearance plays a major role in determining the style reflected in the price.

CHAPTER 6

CAST FLEECES

The main object in classing must be to make fleece lines as big as possible. When any wool deviates in any way from the main classes in a clip, such wool is defined as cast wool. (ODD)

When cast fleeces is insufficient to justify a separate line, the following recommendations are made with the classing of cast fleeces.

1. TENSILE STRENGTH

Tender fleeces must not be divided into different lines, but only skirted and the whole fleece typed as **TDR**.

Odd tender fleeces can be classed with the **BKS2**-class, or kept separate.

If the whole clip is tender it is treated and marked in the usual way as a sound clip and the broker notified.

2. LENGTH

If wool is too short for the existing length classes in a clip, a few short fleeces can be added to example **B** or **CBP** and/or **BP** classes – depending where it fits best.

Fleeces that are too long, eg. over-grown fleece wool, must always be packed separately,, and marked **OG**.

3. FINENESS

Odd stronger fleeces – class with broken fleece, example, **B**.

4. QUALITY

Fleeces with a fair quality, can be classed with a lower spinning count wool, or classed as broken fleece.

Fleece with a poor quality (no hair) is classed as cross-bred wool. If any hair present in wool, pack separately, and mark **XX**.

5. CONDITION

Odd heavy fleeces can be added to back or belly classes.

If heavy fleeces is enough for a class, keep separate and mark eg. **AM2/AS2**, etc.

6. APPEARANCE

Odd unattractive fleeces can, depending on clean yield and quality be added to back or belly classes.

If enough for a class, keep separate and mark for example **AM2**.

CHAPTER 7

OTHER TYPES OF MERINO WOOL

1. RAM WOOL

The recommendation is that the wool shorn from rams, must be classed in with the clip, where it fits into the physical characteristics best.

If it deviates from the clip it can be packed separately and marked = **RAM**

Heavy, short and less attractive ram wool can also be marked **RAM2**.

2. SEEDY WOOL

If a clip is badly contaminated with seed and fleece wool cannot be made seed free with skirting, it should be ignored and just be treated as a seed-free clip, and broker advised.

Wool contaminated with burr weed, cockle-burr and burr, should always be packed separately. If possible, it is advisable to remove the contamination before starting with shearing.

If seed wool can be cleaned through the skirting process, it can be mixed with **CPB or BP**. When seed is found from only in a certain number of sheep or part of a clip, it is advisable not to mix it with seed-free wool, but to treat it as a separate clip, and mark **BSDY**.

3. LAMBS' WOOL

Lambs' wool is the wool of lambs under 8 months of age.

Lambs' wool to be kept and classed separately for the following reasons:

- The structure of lamb's wool fibre is different to that of full grown sheep. Lamb's wool has a spiral tip which causes poorer tear.
- The micron measurement of lamb's wool from any given flock is the finest.
- Lamb's wool is a speciality type of wool provided that they are not longer than 50mm, shorter than 15mm, not exceeding 23 microns, of good style and practically free from vegetable matter (max 0,5%)

Lamb's wool is classed in the following lines:

50mm>	Mark CL
40 -50 mm	DDL
30 – 40mm	DL
20 – 30 mm	EEL
10 – 20 mm	EL
Lambs' bellies and pieces	LBP
Lambs' lox	LLOX
Very hairy and coarse lambs' wool	XL

As mentioned, fleeces must be kept separate at all times, but if broken, backs, bellies and lox are only small quantities it can be blended with adult sheep

4. HOGGETS

This is wool shorn from lambs between 8 and 12 months of age that were not shorn previously. When hoggets wool is mixed with full grown sheep's wool of the same age, it can have a detrimental effect on the type and also on the clean yield.

Due to the fact that hogget's wool is also finer than full-grown sheep's wool, It will also be to one's advantage to offer it separately.

The following classing standards are applied:

Hoggets more than 80 mm	-mark AH
70-80mm	- BBH
60-70mm	- BH

Depending on the fineness of the flock, hoggets can be classed according to fineness with the finest, (that is 20 microns and finer) eg. as **AFH** and the rest as e.g. **AH** etc.

Broken fleece, skirtings, backs, bellies, pieces and LOX can be classed in separate classes if the quantity justifies it. In most cases it can be classed in similar classes as adult sheep, with preference to broken fleece, backs, skirtings, bellies and pieces from young sheep fleeces to fill bales.

When classing broken fleece, backs and skirtings separately, mark as **HA, HB** or **HC** for broken fleece, **HBKS** for backs, and **HCBP** or **HBP** for bellies and skirtings.

5. YOUNG SHEEP

Young sheep wool is from sheep that was shorn as lambs, and then been shorn for the second time – usually on a 2 tooth age. As hoggets wool, it is kept separate and marked with **Y**, eg. **YBM, YCBP**, etc.

6. OTHER

The following types of wool should always be packed separately and under no circumstances added to a lox-, or any other class:

Overgrown wool (130mm plus)	OG
Rain stained (fungus) wool	BKS4
Matted wool	MAT
Lumpy wool	LPY
Skin wool (shorn from skin)	VEL
Dead wool (wool shorn from dead sheep)	PLK
Maggot wool	PLK

CHAPTER 8

CLASSING OF WHITE WOOL, CROSSBRED WOOL AND COARSE WHITE AND COLOURED WOOL

1. WOOL FROM WHITEWOOL BREEDS

This is wool shorn from pure white wool breeds that by nature is free of kemp, hair and coloured fibres with their typical breed properties, although not of a Merino wool type.

Examples: SA Mutton Merino / Land sheep

No provision is made in classing standards for individual class symbols. Apply the same 6 physical properties with “W” as prefix in mind when classing.

Fleeces	WBM, WCS, etc
Backs	WBKS, WBKS²
Skirtings	WB, WC, etc.
Bellies	WCBP, WBP
Hoggets	WCBP, WBP
Lambs wool	WCL
Tender wool	WTRDR
LOX	WLOX, WLOX², etc

Important: Different breeds should always be classed separately.

2. CROSS BRED WOOL

This is white wool practically free by nature of all kempy, coloured fibres and hair.

Examples: Cross breeds of Dormers, Vandors, etc., with Merino or other white wool breeds.

Prefix “X” is used.

The following classes can be made:

XF	Good quality, fine (<27 microns)
XM	Good quality, (27-30 microns)
XS	Good quality (30-33microns)
XX	Coarse / hairy (33 micron>)
XBKS	Back wool
XCBP, XBP	Bellies and skirtings
XLOX	Lox classes
XL	Cross breed lambs

3. COARSE WHITE AND COLOURED WOOL

This type of wool contains by nature kempy and/or pigmented fibres.

Examples: Dorpers, van Rooy's
 Van Rooy's
 Crosses with above

Note: It is of the utmost importance that these breeds are shorn last in the shearing shed so as to avoid any contamination with Merino wool as regards to kempy and coloured fibres.

The following classing standards are applied:

CW (Coarse White)	-White woolly appearance with little kemp and coloured fibres.
CW2	- White kempy fibres
C + C (Coarse and Coloured)	- Coloured woolly appearance wool with less kemp.
C + C2	- Coloured kempy fibres

CHAPTER 9

GROUPING OF FLEECE WOOL CLASSES

The objective with the grouping of fleeces will be as follows:

1. The economical value taking into consideration the average price per kilogram of the clip.
2. Acceptable within the NWGA Classing Standards.
3. Objective Measurement lots preferable 3 bales and more except for the finer and speciality lots of high financial value. Note that OM costs are also based on a sliding scale and one bale lot will be considerable more expensive than multiple bales per kilogram.
4. Single bales and SPLIT (more than one type in a bale) bales are allocated to the Bin and Blend division at additional costs to the producer.
5. Bales must have a minimum weight of 100 kilogram and a maximum for fleece lines of 190 kg and LOX of 220 kilograms, maximum
6. Maintain the following principles when grouping:
 - That the smaller quantities of better wool can be blended with the bigger quantities of poorer wool in order to get a possible big top line, eg.
1AM + 2AS = 3 AS
 - Of not blending under any circumstances bigger quantities of better wool with smaller quantities of poorer wool, eg.
15 AM + 3 BM = BBM
 - Of approximately equal quantities of higher and lower standard.
Large quantities of each – keep separate
10 AM + 12 AS
Small quantities of each – class together
2AM + 2 AS = 4 AS
7. Coefficient of Variation (C of V) for
 - Length – long wool 50 mm + = 25 mm
 - Short wool < 50 mm = 20 mm
 - Fineness = 2 micron
8. Keep different breeds separate. Even if it is merino type wools, there could be a difference in style. Broken, Bellies and Lox lines can be grouped.
9. Keep Lamb and Hogget fleeces separate (reasons discussed in chapter 7)
10. As discussed in Chapter 5, the following types must always be packed separately.
 - Overgrown wool
 - Branded wool
 - Rain-stained wool

- Matted wool
- Lumpy wool
- Skin wool
- Dead wool

Example of grouping with the following criteria:

3 bales per "OM" Lot

30 fleeces per bale

Normal outsorts – B, CBP, BP, LOX

Specialty type = 19 Micron and finer.

EXAMPLE OF GROUPINGS WITH THE FOLLOWING INFORMATION:

3 bales = "OM" Lot

NO	CLASS	NUMBER OF FLEECES	REMARKS
1	AFF	60	18,9 Good
2	AF	30	Good
3.	AAM	60	Good
4	BBF	60	Good
5	AM	90	Good
6	BM	60	Good
7	BS	60	Good
8	BM	15	Dusty
9	AS	15	Heavy, Black Tip
10	RAM	15	23,0μ oily
11	CM	15	Yellow
12	TDR	10	80 mm length

SUMMARY OF GROUPING

CLASS GROUPINGS	NUMBER OF FLEECES	NUMBER OF BALES	MARK	REMARKS
1	60	2	AFF	"OM" – Spes
2 + 4	90	3	BBF	"OM"
3 + 5	150	5	AM	"OM"
6 + 7	120	4	BS	"OM"
9 + 10	30	1	RAM	B+B"
8	15			TO BKS
11	15			TO CBP
12	10			TO BKS 2

CHAPTER 10

WOOL AS TEXTILE FIBRE

The wool fibre is a small percentage (<3%) of the total textile industry and thus competes price wise with these fibres. About 70% of wool produced is used in apparel wool and the remaining 30% in carpets, blankets and upholstery.

The fleece of the Merino sheep grows more or less continuously through the year. A merino sheep has around 60 million fibre producing follicles over its body and grows wool at about 2 mm per week. This means a sheep produces about 120 km of fibre per week.

Wool fibres are complex structures made up of layers of cells to form the cuticle on the outer side which overlaps (scales) and comprises nearly 10% of the fibre mass. The cortex is about 90% of the fibre mass made up of macrofibrils which in turn are composed of microfibrils packed in amorphous matrix.

Chemically wool is protein and falls under the type keratin. Wool consists of mainly five chemical elements namely carbondioxide ($\pm 50\%$), hydrogen ($\pm 7\%$), oxygen (22-25%), Nitrogen (16–17%), sulphur (3-4%). These elements in ratio vary between different types of wool and also between different fibres of animal origin. This variation in the chemical compound is not only between breeds, but also between the different parts of the fleece. For example the belly, neck, back and fleece wool differ and is it for this reason that wool is classed to eliminate these differences.

Fibres that wool competes with can be summarized as follows:

(1) NATURAL

ANIMAL

Wool
Mohair
Silk

VEGETABLE

Seed (Cotton)
Bast (Linen)
Leaf (Sisal)
Fruit (Koya-Coconut)

MINERAL

Asbestos

(2) NATURAL POLYMER FIBRES

Viscose

Acetate

Tri-acetate

(3) SYNTHETIC FIBRES

Polyester
Polyolefin
Acrylic
Modacrylic
Polyamide (Nylon)

WOOL PRODUCTS AND MICRON RANGE MAINLY USED

Men's woven Outwear	24 – 28 Micron
Woman's woven Outwear	20 – 26 Micron
Knitwear	19 – 22,5 and 26 – 30 Micron

Underwear	21 – 23 Micron
Socks	26 – 31 Micron
Hand knitted yarn	26 – 27,5 and 31 – 34 Micron
Pressed Felts	26 – 35 Micron
Quilt Fillings	26 – 35 Micron
Furnishing	26 – 36 Micron
Carpets	34 – 37 Micron
Mattress Fillings	32 – 37 Micron
Blankets	27 – 34 Micron

CHAPTER 11

STYLE/TRADE TYPES

In the trade, wool is divided according to style and different brokers use different valuing systems. BKB uses a system – AWEX-ID (*Australian Wool Exchange Identification Document*) to so be compatible internationally with a pricing and market reporting system.

Style is a ranking scale related to the greasy appearance or conformation of the sale lot within a wool category and breed.

The following characteristics are kept in mind in determining the style of wool:

- Staple density
- Regularity of length between staples (coefficient of variation)
- Tip dust penetration
- Degree of weathering of staples
- Regularity and consistency of sample (clip preparation)
- Crimp character regularity and definition
- Staple tip structure (e.g. weaners)
- Frib content (e.g pieces)
- Visual appearance

AWEX - ID Version 2.1 (SAF)
(Non - measured Characteristics)

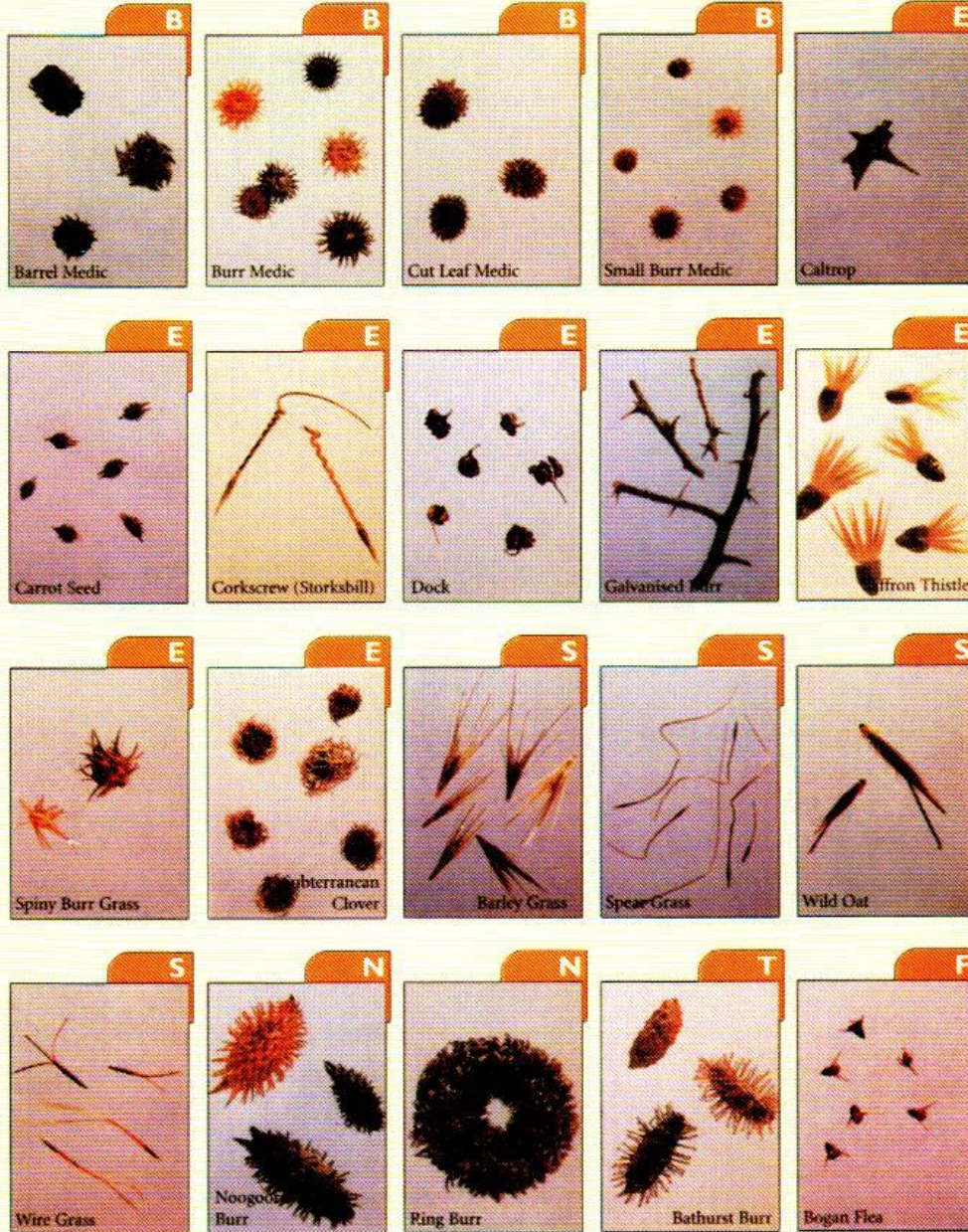
PRIME				QUALIFIERS					
MANDATORY	WHERE APPLICABLE	MANDATORY	MANDATORY	MANDATORY	MANDATORY	CONDITIONAL (NON - AM)	CONDITIONAL (NON - AM)	WHERE APPLICABLE	
BREED	WOOL SUB-CATEGORY	WOOL CATEGORY	STYLE	VM TYPE	FULL STOP	GREASY LENGTH INDICATOR (F/P/B/C)	STRENGTH INDICATOR (Combing)	QUALIFIER (Not scaled)	QUALIFIERS (scaled)
AS (Australian Superfine)	W (Combing Weaners & Lambs)	F (Fleece)	FLC	B (Burr)	.	10 (6 - 15)	W1 (Part Tender)	M (Scourable Colour)	H (Unscourable Colour)
M (Merino)	L (Carding Lambs)	P (Pieces)	2 (Superior)	E (Seed)		20 (16 - 25)	W2 (Tender)	E (Necks)	N (Water Stain)
X (Crossbred)	U (Plucked & Dead)	B (Bellies)	3 (Spinners)	S (Shive)		30 (26 - 35)	W3 (Very Tender)	G (Doggy)	S (Dark Stain)
D (Downs)	K (Shorn from Skins)	Z (Locks)	4 (Best)	N (Noogora/Ring)		40 (36 - 45)			Q (Dags)
T (Carpet)	M (Fellmongered)	C (Crutchings)	5 (Good)	T (Bathurst)		50* (46 - 55)			C (Cotts)
	O (Overgrown)		6 (Average)	M (Mott)		60* (56 - 65)			J (Jowls)
	N (Non-conforming lot)		7 (Inferior)	F (Bogan Flea)		70* (66 - 75)			K (Shanks)
			PCS / BLS (Inferior)	WHERE APPLICABLE		80* (76 - 85)			A (Dermatitis)
			3 (Spinners)	L (Clumpy)		90* (86 - 95)			V (Skin Pieces)
			4 (Best)			100* (96 - 105)			R (Brands)
			5 (Good)			110* (106 - 115)			D (Mud)
			6 (Average)			120* (116 - 125)		SCALE (Y&P Qualifiers)	Y (Black & Grey)
			7 (Inferior/Stain)			130 (126 - 135)		1 (Odd Floating)	P (Kemp)
			LKS / CRT			Etc		2 (Light <25%)	SCALE (Not including Y&P Qualifiers)
			4 (Best)					3 (Light/Med 25-50%)	1 (Light/odd)
			5 (Good)					4 (Med/Heavy 51-75%)	2 (Medium)
			6 (Average)					5 (Heavy 76-100%)	3 (Heavyline of...)
			7 (Inferior/Stains)						

* 5mm increments on ASF Styles 1&2 ONLY

AWEX-ID

(Version 2.1)

Major Vegetable Matter Types



OTHER VM CODES USED BUT NOT SHOWN IN PHOTOGRAPHS

M Moit (Twigs, Leaves & Sticks) **L** Clumpy VM



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