



CODE OF PRACTICE FOR PREPARATION OF WOOL CLIPS



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AMERICAN WOOL

American Wool Council: A Division of the American Sheep Industry Association

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INTRODUCTION



This booklet is prepared for all segments of the U.S. wool industry to offer a set of standards for a self-regulatory approach to clip preparation. It describes the recommended procedures for preparing all wool types and outlines basic wool handling measures.

It is the intent of this publication to offer guidelines that can be incorporated by any wool producer, regardless of breed type, operation size or geographic location. Specifics must be determined by each individual wool grower as how to best prepare their own clip. The step-wise approach allows anyone to implement improved wool preparation and packaging techniques. Whatever a grower is currently doing in the way of wool preparation, an additional step can be taken toward higher clip preparation standards.

Wool preparation and marketing are separate issues. Improved wool preparation cannot necessarily change market conditions, but it can increase the number of markets available to the grower. This concept encourages wool growers to know and understand more about their product -- wool. This increased knowledge and understanding can make growers wiser in genetic selection, management practices and marketing strategies.

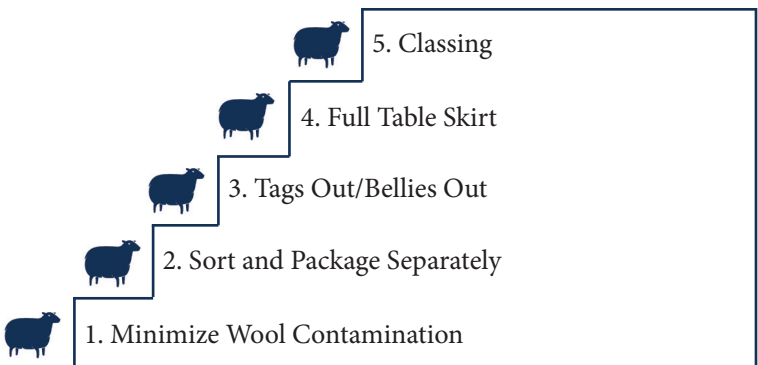
INTRODUCTION

Wool contamination is covered in this booklet from the approach of identifying potential sources and types of contamination that occur before, during, and after shearing. Discussion does not tell the reader why contaminants are detrimental. Suffice to say that wool contamination adds cost to processing raw wool, limits the end uses that raw wool can reach in the retail market, and adds labor cost to remove contamination. These costs and limited processor markets are invariably passed back to the grower in reduced prices for American wool.

Wool is a global commodity and is traded worldwide. Producers must build greater respect for the value of their product by taking pride in its production as well as its preparation. As more growers enhance wool quality by proper preparation, confidence will grow from wool buyers and processors for American wool, thus improving market conditions for all U.S. wool growers.

The Code of Practice booklet will be periodically revised and reprinted to fit the ever changing needs of the wool industry.

Preparation Steps for Wool Quality Improvement



Breed, Selection and Management

1.1 Animal Care

The well-being of sheep is an important consideration for all sheep producers, both to the success of a business and as it is simply the right thing to do. Providing appropriate care to sheep will result in healthier animals who produce a larger volume of longer, stronger, higher-quality wool.



Care should focus around the Five Freedoms which include:

1. Freedom from hunger and thirst
2. Freedom from discomfort
3. Freedom from pain, injury or disease
4. Freedom from fear
5. Freedom to express normal behavior

Additional Resources

Providing optimal care requires continual improvement. To improve your care, management and handling practices, visit: www.sheepusa.org

Sheep Care Guide – a reference for sheep producers using a variety of management and production systems.

American Wool Assurance – a program and list of standards specific to wool sheep care.

Sheep Safety and Quality Assurance – information to help produce safe, high-quality sheep products.

How to Handle Sheep videos – How to handle sheep calmly and with a high standard of animal welfare with Dr. Temple Grandin.

Sheep Production Handbook – covering the basics of sheep production, for the beginner and experienced sheep producer alike.

PREPARATION

2. PREPARATION

2.1 Preparation for Shearing

Grower Responsibility

2.2 Preparation of Sheep for Shearing

2.3 Preparation of the Clip

Sweeping

Preparation Options

Clip Preparation Standards

Skirting Standards

Classing Standards

2.1 Preparation for Shearing

Grower Responsibility

Adequate Labor: Too few or too many people can jeopardize proper wool preparation and shearing.

Adequate Space: Shearing floor should accommodate proper shearing with enough space between shearers. Adequate space must be provided for proper wool handling.

Clean Facilities: The shearing area must be clean and all contaminants (straw, twine, burrs, etc.) removed before shearing. Make sure adequate light and ventilation are provided.

Equipment: Provide sacking stand, hydraulic baler, skirting table, wool bags, brooms, tarps and offsort containers.

Planning: Contact your shearer or shearing contractor frequently to set dates and discuss what materials he will supply and what you are expected to provide. Marketing representatives and classers must be kept advised of plans.

Classer: Provide classers with full information prior to shearing, such as:

- new sheep brought onto the property since last shearing
- descriptions of all the sorted groups and whether stain has been removed (tagging)
- order of groups to be shorn and any changes as they occur during shearing and
- any special requirements for preparation of the clip.

Grower's Presence: With the owner present, shearing crews are more conscientious about their work. Other shed help will follow instructions in the owner's presence.

Objective Measurement: Grower should be aware of the availability of pre-sale objective measurements for fiber diameter and clean yield.

Shed and Pen Maintenance: Repairs need to be completed before shearing begins. Planning for this will prevent problems during shearing.

PREPARATION

2.2 Preparation of Sheep for Shearing

Wool production is a year-round process with quality determined by selection emphasis, management and environment in which the wool is produced. A year is spent growing the product, while only a few minutes are required to harvest it. It is in this brief harvest period that quality is often adversely affected. A grower can improve his returns from wool by following these simple rules.

Breed selection and management are the foundation for wool quality improvement. The grower must determine the type of operation, type of sheep and methods that will be used in preparing the wool clip. A grower must determine the classification that fits the operation. The types of sheep operations in the United States fall into two broad classifications: farm flock and range.

Best Practices:

- Shearing facility must be clean prior to shearing.
- Sheep with wet wool should not be shorn.
- Sheep should be penned at least four hours prior to shearing.
- Sheep should be held off feed and water at least 6 hours prior to shearing.
- Hold sheep in dry, clean, contaminant-free pens.



PREPARATION



Sheep should be separated into the following groups prior to shearing:
(This sorting is based on wool type, fiber diameter, fiber length and style.)

Black and Spotted Sheep: Shear these last after all other shearing has been completed.

Different Breeds: All different breeds and crossbreds should be sheared separately.

Hair-Cross Breeds: These and their offspring must be sorted separately and shorn after all other shearing has been completed.

Grades: Sheep of extremely different quality grades (fiber diameter) within the same breed should be kept separate.

Lambs and Weanlings: Sheep that have not been shorn previously should be kept separate from those that have.

One-Year-Old Sheep (if shorn previously): One-year-old sheep, which have been shorn previously, should be separated from older sheep.

New Sheep: Sheep brought onto property since previous shearing should be separated.

Sick and Diseased: Separate any sick sheep and shear them last.

PREPARATION

2.3 Preparation of the Clip

Sweeping

Maintaining a clean shearing board and floor is an important and continuous process. It must be done before, during and after shearing to insure a quality clip.

Whatever growers are currently doing in wool preparation, they can go one step further to increase their efficiency and effectiveness of current practices.



Preparation Options

There are two main wool preparation options currently practiced in the United States.

Option 1 - Bellies Out Untied (BOU)

Includes belly wool being shorn out and kept separate, with the fleece being carefully rolled flesh side out and classed without table skirting. A BOU type of preparation can include offsorts of locks, bellies and stain. Producers are limited as to the degree of skirting that can be accomplished by this method. However, much can be done to enhance the fleece quality by this preparation method if shed help is conscientious. Sweeping is very critical.

Option 2 - Full Table Skirt

Includes belly wool being shorn out and kept separate, with fleece being thrown on a skirting table, skirted, carefully rolled flesh side out and classed by a certified classer. Sweeping is very important. The skirting guidelines are described under the headings of Clip Preparation and Skirting Standards.

Best Practices:

- Remove the belly and place into a separate line.
- Remove heavy locks (tags) and place into a separate line.
- Remove stained wool from white fleeces.
- Do not bag black and white wool together.

NOTE: Contact wool buyers and brokers in your area and consider following their advice.

PREPARATION

Clip Preparation Standards

The level of skirting will depend on the quality standard of the clip. All fleeces must be carefully and minimally skirted to ensure that only inferior wool is removed and all good fleece wool remains with the fleece.

Fleece Preparation

Locks: Locks (tags) are removed in several places during shearing. As shearing occurs, many second cuts, sweat locks from the front and rear flanks and heavy dung locks will fall to the shearing board and can be easily swept away, thus preventing these from mixing with fleece wool or other offsorts. These need to be removed from a BOU and full table skirt. Once the fleece is rolled flesh side out, it is difficult to remove any inferior wool that might have remained with the fleece. Full table skirting allows additional locks to fall out on the skirting table. Heavy dung locks or wet stains need to be discarded.

Belly Wool: The belly wool is removed from the sheep in the first phase of shearing. The handler picks up this wool and places it in the line set aside for belly wool. Excessive removal of bellies by the shearer is not recommended. Any belly remaining with the fleece will be detected and removed on the skirting table. With a BOU type preparation this is more difficult.



PREPARATION

When the shearer has completed shearing, the fleece is lying flat on the shearing floor ready to be picked up by a handler. Proper shearing and shearer cooperation is vital to consistently remove the fleece from the shearing board and throw the fleece on the skirting table in a manner that allows for fast and proficient skirting.

The handler walks up to the fleece and takes hold of the area of wool from the hind legs and britch area of the fleece while keeping the neck wool bunched up against the ankles. With a single fold, the handler forms a tight bundle out of the fleece, picks it up and carries it to the skirting tables.

As shown below, the fleece is thrown onto a table so that it lands shorn side down, ready for skirting.

This Technique Allows For:

- The skirter to easily identify the various portions of the fleece.
- Second cuts and heavy locks to fall out.
- Inferior portions of the fleece to be identified and removed.
- Polypropylene to be detected.
- Skin pieces to be seen and removed when the fleece is rolled.

Karena Appleman



PREPARATION

Skirting Standards



Table skirting is necessary to remove only inferior portions of the fleece that remain at this point. Some inferior wool will have been removed before this point, but any of the following wool types will be removed once on the skirting table. The entire clip and fleece quality must be considered in determining what to skirt.

Offsorts Descriptions

Pieces: Undesirable wool from around fore and hind legs, matted or cotted wool and heavy clumps of vegetable matter.

Stained Wool: Normal crutchings with heavy locks removed.

Bellies: Entire belly wool with any locks removed.

Locks: Topknots and/or floor sweepings, including short wool which falls through the skirting table and second cuts off the shearing board.

It May Also Be Necessary To Remove:

- Clumpy vegetable matter.
- Cotted edges.
- Hairy britch wool.
- Necks (vegetable matter).
- Backs (very dusty and tender).
- Black and black-face cross bellies, pieces and locks need to be separate.

A thorough evaluation of the flock management practices and growing conditions will indicate what is necessary and practical to remove on the skirting table.

PREPARATION

Each fleece will differ in terms of the size of each segment. This fleece has been divided to illustrate the segments.

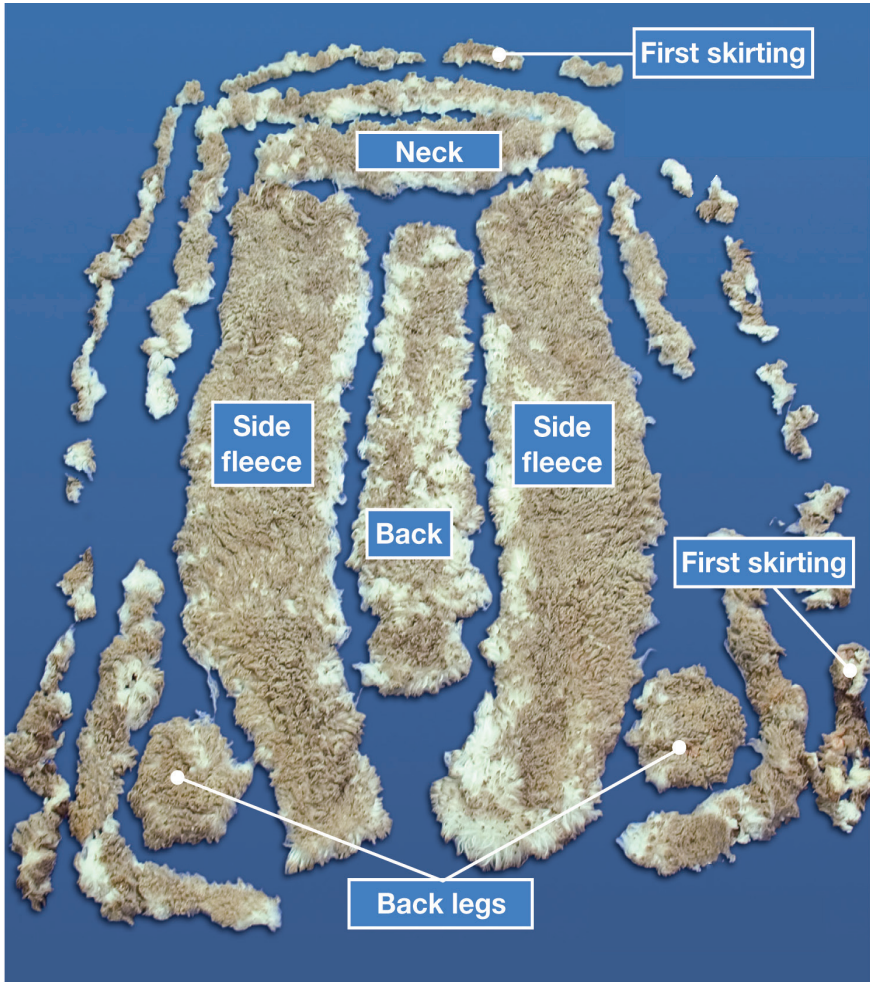


Photo courtesy of Andrew Blanch, New England Wool.

PREPARATION



Sweeper-Picker Responsibilities:

- Clean shearing board, making sure it is free from any potential fleece contaminants.
- Sweep board between each shearing.
- Pick bellies and place them in designated area.
- Quick and efficient removal of fleece from shearing board.
- Throw fleece on skirting table to enable quick and efficient skirting.
- Report improper shearing or sheep handling.

Skirter Responsibilities:

- Efficient skirting.
- Proper separation of offsorts.
- Properly roll fleece for classing (flesh side out).
- Maintain clean wool handling area free of contaminants.
- Report any polypropylene contamination.



Skirter's Main Responsibilities:

- Ensure each fleece is carefully skirled, which includes the removal of all stain, all tags, skin pieces, crutchings, topknots, leg wool (shanks) and cheeks.
- It may be necessary to remove clumpy vegetable matter, cotted edges, hairy britch wool, necks (vegetable matter) and backs (very dusty and tender).

NOTE: In most shearing sheds, many functions are combined.

Are You Saving Money By Skirting Efficiently?

Each fleece must be carefully skirled so that only inferior wool is removed and all good wool remains with the fleece. Fleeces must be skirled to remove all stain, tags, skin pieces, crutchings, top knots, shanks and heavy, clumpy vegetable matter.

Check your pieces bin frequently to ensure good fleece wool is not present. Heavy skirting may bring higher prices per pound for your pieces wool, but generally will not produce a higher return overall, as the table shows.

Example: Fleece 1 - Efficient Skirting

	Weight (lbs.)	Micron	VM (%)	Yield (%)	Price Clean (\$/lb.)	Total Value (\$)
Fleece	9.00	20.9	0.6	56.1	5.00	25.25
Offsorts	1.00	19.9	2.4	50.1	2.75	1.38
Total	10.00	20.8*	0.8*	55.5*		26.63

Example: Fleece 2 - Heavy Skirting

	Weight (lbs.)	Micron	VM (%)	Yield (%)	Price Clean (\$/lb.)	Total Value (\$)
Fleece	7.50	21.0	0.5	57.0	5.00	21.38
Offsorts	2.50	20.1	1.6	51.0	2.80	3.57
Total	10.00	20.8*	0.8*	55.5*		24.95

**weighted averages*

Gain: \$1.68 per fleece, or \$1,680 per 1,000 fleeces

PREPARATION

It is important to adequately staff the shed with competent wool handlers during shearing. This helps prevent over skirting, while making sure all inferior wool is removed.

It is the net return for the total clip, not the highest prices for an individual line, that puts the most money in your pocket.

NOTE: If the wool is badly contaminated, it has to be sorted off. Heavy skirting when sorting off lots of good wool is costly but if fleeces are heavily soiled, than heavy skirting is necessary. It is good practice to look at offsorts every once in a while to make sure you are not skirting too much good wool.

Classing Standards



The classer's duties shall be carried out in accordance with this set of standards and with the directions and orders of the grower. The clip must be classed in accordance with each sheep group that was initially separated.

After skirting, the fleeces are separated (classed) into various lines according to these characteristics:

Fineness: Mean fiber diameter.

Yield: Amount of clean wool obtained from a definite quantity of grease wool, normally expressed as a percentage.

Length: The actual length of the relaxed staple from tip to base.

Strength: Fiber should not break easily by hand.

Color and Style: The overall physical appearance with regard to crimp, handle and color.

Besides Classing, the Classer is Responsible For:

- Prevention of contamination of lines by foreign objects.
- Supervision of efficient skirting and proper packing and labeling of bales or bags.
- Avoiding unnecessary creation of small lots.
- Communicating with the grower and warehouse or broker where the wool will be marketed and develop lines with appropriate marketing factors in mind.
- Supervising the proper separation of offsorts (BLS, PCS, LKS, STN -- explained on page 20).
- Maintaining proper wool clip records.
- Insuring that wool is packaged and marked properly.

Unnecessary fragmentation of a clip does NOT enhance the wool technically, and increases handling costs. It should be avoided in the interest of overall efficiency. Variation in a line should generally not be more than 2-3 microns.

The classer is a team member and should be willing to perform any wool handling task.

Classing Line Standards for Wool and Dual-Purpose Breeds



Size and uniformity of a flock will have a tremendous effect in determining the number of lines to be planned. It is, therefore, essential that wool classers have the necessary knowledge and experience before classing wool. The classing standards were designed to provide a standard or unified approach to wool clip preparation throughout the United States.

PREPARATION

Description of Line

AAA.....	Large volume of similar wool but of a different class than AA-line
AA.....	Large volume of similar wool but of a different class than A-line
A.....	*Main line of 12-month wool (majority of clip)
A-1	Coarser end of the wool clip
A-2	Tender or short wool
A-3	Additional line with high VM, off-color, etc.
A-4	Out-cast fleeces
R.....	Risk wool when white wool sheep have been running with colored and/or hair sheep
BLS.....	Wool from the belly area of the sheep (Bellies)
PCS	Wool removed at the skirting table; not stained but containing (Pieces) high VM, matted, cotted, etc.
STN.....	Wool removed from skirting which is stained with dung, (Stains) urine, blood, paint, etc.
LKS	Tags, top knots, sweepings, second cuts, etc. (Locks)
CTH.....	Wool under 2 ^{1/4"} in length or extremely short compared (Clothing) to A~2 line
BLK.....	Wool from black sheep or black spots (Black Wool)

1. Main lines of wool from young sheep should be marked with an “L” following the line designation. Examples AL, A-1L, A-2L.

2. Rams wool can be marked RAM. Shorter, lowering yielding, less attractive rams wool would be marked RAM2.

*The “A-line” is the majority of the clip, not necessarily the best line.

WOOL PACKAGING

3. WOOL PACKAGING

3.1 | Packaging Options

3.2 | Identification of Wool Packages

WOOL PACKAGING

3.1 Packaging Options

Any wool packaging material can be a source of contamination. Proper handling of packs and sacks will minimize this problem.

Square Packs



These are hydraulically packed bales that should weigh 425-450 lbs. for white-face wool and 400-425 lbs. for black-face wool. These packs are now the international standard as they allow wool to be shipped anywhere in the world in containers – with uniform size and weight – which saves freight cost due to density and minimizes contamination. New nylon packs are preferred.



Burlap Sacks

These sacks come in two sizes, 6 feet and 8 feet. A minimum of 12 oz. quality burlap is recommended for the construction of all sacks. Only use new sacks. Heavy film sacks are also used in some areas. At least 7 mm are acceptable. Most bags are 8 feet long and capable of holding up to 250 lbs. of wool. Most burlap and film packs are opened at the warehouse or a suitable handling facility, then sorted and graded and rebaled into warehouse packs or nylon packs for shipment to processing mills.

WOOL PACKAGING

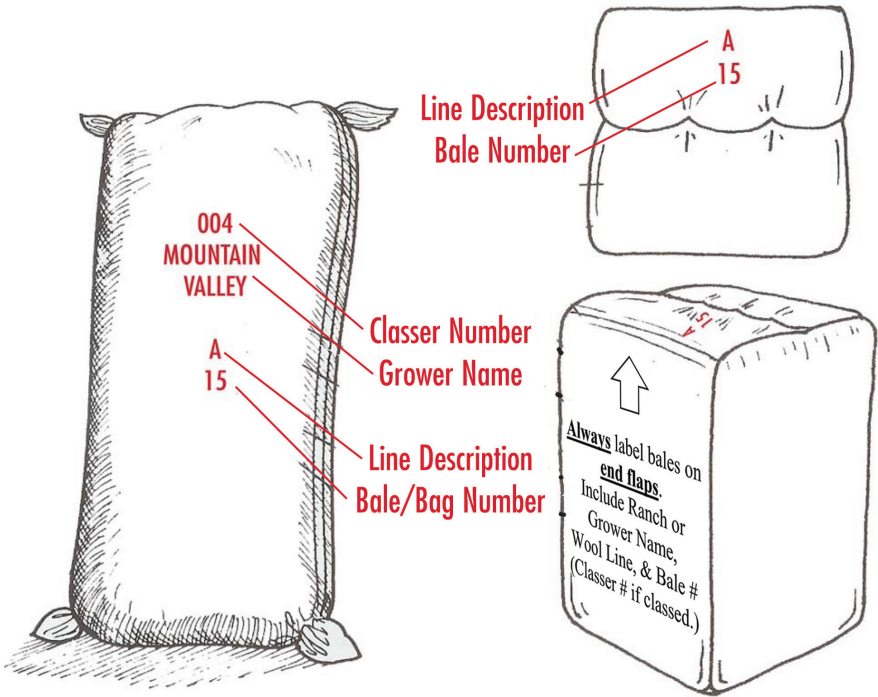
Best Practices:

- Make certain that all wool in pack/sack is uniform in classification to facilitate bulk classing.
- Place odd fleeces in smaller burlap sacks or garbage type bags. Do not use feed sacks or any poly-type sacks.
- Do not use sacks that are too weak and may tear.
- Use only new bags.
- Do not place wool in “ears” of sacks.
- Do not use woven poly totes or grain containers as they cause major contamination.
- Seams must be on the outside of packs/sacks. Store unused packs/sacks properly.
- Tie sacks with approved cotton string only. Heavier packs/sacks will decrease packaging and transportation costs.
- Whatever type of packaging material is used, care in handling is necessary to prevent wool contamination.
- Do not store packaged wool outside in direct sunlight, if possible, and only for short periods if unavoidable (less than one day).
- Do not store packaged wool directly on the ground or concrete surfaces.
- Mark bags according to standards.



WOOL PACKAGING

3.2 Identification of Wool Packages



Each bale or sack should contain the following labeling information:

1. Grower's name or official brand.
2. Official labeling should be used for identification between the grower and warehouse:
 - A..... Bulk line
 - A-1 Coarse or larger fiber diameter line
 - A-2 Shorter stapled line; might include tender and/or broken wool
 - A-3 Additional cast line such as heavy color, low yield, heavier vegetable matter, etc.
 - A-4 Additional cast line if needed
 - AA, AAA..... Additional fleece lines if necessary

NOTE: In large clips there can be more than one A line if necessary.
3. Bale or sack number, number in sequence.
4. Classer stencil number.

WOOL PACKAGING

Best Practices:

Use approved ink, which dries quickly and will not be absorbed into the packaging material and stain the wool. Do not use branding paint or aerosol paint. Contact the warehouse or a stencil ink manufacturer/distributor for acceptable supplies.

WOOL CONTAMINATION

4. WOOL CONTAMINATION

4.1 **Natural**

4.2 **Acquired**

Vegetable Matter

Mineral Matter

Animal Matter

4.3 **Applied**

Paint Brands

Dewormers and Medication

4.4 **Polypropylene**

4.5 **Other Fiber Contaminants**

Fibers

Hard Contaminants

WOOL CONTAMINATION



There are several sources of contaminants that reduce the value of the domestic wool clip. If these items are not kept out of the raw wool, they will inevitably show up at the manufacturing

level where costly removal must occur. Wool containing high amounts of contamination is discounted to cover the removal expense. Fundamentally, anything that is not wool is a contaminant.

There are three major categories of contamination while the wool is still on the sheep. First is naturally occurring, such as urine, dung and yolk stains. The second is acquired contaminants, which may be animal, vegetable or mineral in nature. The third is applied sources, which are generally manmade in origin and applied by man such as branding fluid, dewormer compounds and external sprays or dips.

Polypropylene contamination has become a very serious problem for American wool growers. This contaminant is subtle in raw wool, but very obvious in finished fabric. Wool mills invest much time and money in processing before the poly contaminant is detected. For this reason, processors have expressed much concern.

Other contaminants are usually a result of careless housekeeping and can be easily corrected. However, these and other extraneous materials found in wool pose a serious problem to the manufacturer.

Natural contaminants are produced by the sheep themselves. While one cannot prevent this from being produced, there are management practices that can minimize their effect on wool quality.

WOOL CONTAMINATION

4.1 Natural

Natural Contaminants

- Medulated fibers including hair sheep and hair-sheep crosses.
- Colored fibers (pigmented fibers).
- Urine.
- Dung.
- Shed stain.



Best Practices:

- Cull individual sheep with dark pigmented skin.
- Carefully select rams and replacement ewes.
- Crutch or shear prior to lambing or before placement on lush feed.
- Acclimate sheep to changes in feed.
- Maintain a sound and timely dewormer program.
- Do not over feed high-energy feeds in periods of high temperatures and humidity.
- Cull sheep or breed types that have more than normal yellowing.
- Pen and remove feed and water for at least 12 hours before shearing.

2. Acquired Contaminates

Acquired contaminants are a result of the environment in which the sheep are placed. Many other factors determine how and to what extent these contaminants can be reduced.

Vegetable Matter

- Seeds (grass and weed seeds).
- Burrs.
- Straw.
- Chaff.



If it is impractical to remove the contaminant plants from fields or rangelands, there are several alternatives.

Best Practices:

- Graze areas before the problem seeds are produced or after they are dislodged.
- Skirt the fleece to remove heavily contaminated wools.
- Do not bed sheep on hay or straw before shearing.
- Eliminate overhead hay feeders.

Mineral Matter

- Soil or dust.

Again, blowing sand cannot be prevented. Any change that will reduce the effects of dirt penetration into the fleece should be considered. Soil does not only reduce yield, but some soils can actually stain the wool. Shearing is much easier on clean sheep and usually the shearing quality reflects this.

Best Practices:

- Do not feed in only one area.
- Reduce blowing soil in handling and shearing hold pens.
- Select for fleece density.
- Avoid bedding sheep in wind-blown bare areas.
- Eliminate wind drafts on the shearing floor.

WOOL CONTAMINATION

Animal Matter



Other livestock that run in conjunction with sheep can reduce wool quality. This is not only from cross contamination with other animal fibers, but includes manure. External parasites also contribute to wool contamination from eggs, feces and the parasites themselves, all of which can stain the wool.

Best Practices:

- Avoid close proximity to animals that are shedding (hair), such as in the same barn or pens.
- Cross contamination of colored and medulated fibers from different sheep breed types (hair sheep breeds) should be minimized.
- Companion animals (guard dogs, work dogs) will shed hair that can contaminate wool.
- Llamas must be shorn to prevent the problem of shedding hair.
- Shearing shed and pens need to be thoroughly cleaned after shearing other species.
- Keds and other external parasites need to be controlled to prevent stain, broken or tender wool or rubbed out places on the fleece.
- Housing molting poultry near sheep can cause large amounts of feathers and manure to contaminate the wool.
- During shearing, chickens have a tendency to lay eggs in open wool sacks and even sometimes have a fleece thrown on top of them to be shipped to the mill.

WOOL CONTAMINATION

4.3 Applied Contaminates



These are substances applied by man usually for management reasons. The most notable ones are paint brands, dewormers and topical sprays. While all have an intended purpose, care must be taken to minimize any reduction in wool quality.

Paint Brands

Paint free wool should be first consideration, as it has been proven that if marketed accordingly, it will bring a premium.

If Sheep Must be Branded

- Use only approved scourable preparation.
- Avoid branding just prior to shearing time.
- Use a medium-size paint applicator not to exceed 4 mm in width.
- Use only one brand per sheep.
- Brand lightly.



Best Forms of Identification:

- Colored ear tags.
- Nose brands.
- Ear marks.

WOOL CONTAMINATION

Dewormers and Medications

These compounds should certainly be used in any operation even though there may exist a potential for wool to become stained. Few dewormers used today actually stain the wool; however, if it is a possibility, use care to prevent sheep from rubbing these compounds on each other. Stains from wound dressings and such should be removed at shearing.

Most wool processors do not consider external spray compounds to be a contaminant. While they do not necessarily affect wool-processing performance, they can limit lanolin recovery and how the scouring effluent is treated. Lanolin use in cosmetics and creams must meet critical standards for minimal chemical content. Chemical compounds, if used improperly in parasite control, can remain in the recovered lanolin.

Best Practices:

- Follow label instructions and withdrawal times.
- Excessive application of sprays can cause a crusting over the wool and lead to other dermal and wool problems.

WOOL CONTAMINATION

4.4 Polypropylene Contamination

While polypropylene contamination could be categorized in one of the previous headings, it is such a subtle and critical problem for processors it is discussed separately. This contaminant can occur before, during and after shearing. Most poly is picked up off the ground when sheep lay down. In such cases, skirting of the belly at shearing is beneficial.

Hay Baling Twine

- Short ends of the poly twine are clipped by the knife on the knot-tying mechanism of some hay balers.
- Hay ground in tub grinders and pellet mills, which do not remove poly twine before grinding.
- Bundles left around corrals shred in time.



Tarps and Feed Sacks

- Frayed tarps used to cover feed or around the shearing area.
- Poly feed sacks that are re-used or left undisposed.
- Round hay bale covers.



WOOL CONTAMINATION

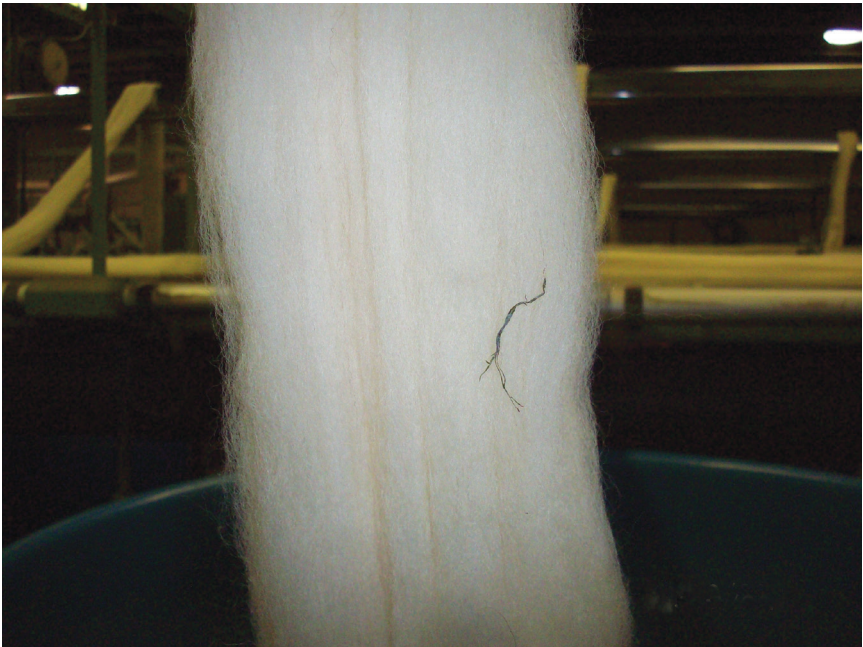
4.5 Other Fiber Contaminants

Fibers

These should never be allowed to come in contact with wool. Their presence results in small, non-wool fibers being mixed with wool fibers, which cannot be removed, resulting in defective yarn or fabric.

Examples:

- Jute (inferior or used wool bags).
- Binder twine (sisal).
- String or any loose fibered twines.
- Stained/colored fibers.
- Rags, clothing.
- Cigarette filters.
- Carpets.



Hard Contaminants

At shearing, the potential for contamination increases. All the previously mentioned contaminants can occur as the fleece is shorn and packaged. Steps must be taken to minimize any contamination threat. The shearing floor must be swept clean at all times. A clean floor keeps dust, manure, locks and litter from contaminating fleece lines. Portable shearing plants must be cleaned thoroughly prior to shearing.

Examples:

- Combs.
- Cutters.
- Rocks.
- Wire.
- Shoes.
- Cans.
- Toys.

WOOL TESTING

5. WOOL TESTING

5.1 Core Sampling

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OFDA2000

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WOOL TESTING

Objective measurement is an assessment made without being influenced by personal feelings or prejudice. This is accomplished by the use of instruments and laboratory procedures to measure specific characteristics.

Objective qualification and quantification of raw wool is essential for a producer to set appropriate goals in selection programs and measure progress in attaining those goals. It is also essential for the grower to know what his wool is (quality and quantity) in order to effectively market the wool clip.

In order for an objective measurement of any wool characteristic to be meaningful, it is absolutely necessary that the sample being tested be representative of the bulk from which it was drawn. This is accomplished by core sampling when testing for staple length or strength is not required.



WOOL TESTING

Core and Micron Report

Description and Weight Data

Shipper's Lot No.:	XXXXX	
Buyer's Lot No.:	XXXXX	
Sale No.:	XXXXX	
Description:	XXXXX	
No. of Bales or Bags Weighed:	25	
No. of Bales or Bags Cored:	25	
Gross Weight of Wool:	12,076 lbs	5,478 kgs
Net Weight of Wool:	12,001 lbs	5,444 kgs
Tare:	75 lbs	34 kgs
Sampled by:	Client	On: 02/01/10

Laboratory Yield Data

Wool Base:	54.64 %	
Vegetable Matter Base:	0.5 %	
Schlumberger Estimated Commercial Top and Noil Yield:	63.1 %	
Total Clean Wt:	7,573 lbs	3,435kgs

Laboratory Micron Data

Mean Fiber Diameter:	19.7 microns
Standard Deviation:	4.5 microns
Coefficient of Variation:	22.8 %
Fibers Greater Than 30 microns:	1.9 %

5.1 Core Sampling

Standard practice for sampling lots of grease, pulled or scoured wool in bales and bags for yield and fiber diameter determination is provided in the American Society for Testing and Materials (ASTM) test method D1060. This method provides descriptions of suitable core sampling equipment and sampling procedure (a method to determine the number of packages to be cored in a particular lot and the number of cores to be taken from each sampled package).

Remember that a core sample must represent the entire wool lot for the integrity of testing and the confidence of using objective measurement in commerce. Sample manipulation or mishandling will affect the test results.

Core Sampling Equipment

Best Practices:

- Portable, electric coring tools must rotate 100-550 rpm.
- Metal coring tubes 2" in diameter and from 10" to 40" in length.
- Samples must be placed in an airtight container to preserve moisture content, keep them clean and preserve integrity.
- Sampling schedule for domestic wool bags (2" cores) and nylon packs (7/8" cores).
- Follow sampling procedures for 2" and 7/8" coring tubes.

WOOL TESTING

General Core Sampling Procedures

2" Core

1. A minimum number of cores taken from each lot shall be such as to give a sampling precision of ± 1 -percent clean wool content at a probability level of 95 percent.



Use the following schedule:

Small Lots of Domestic Wool Bags

(Not covered by ASTM Standards)

No. of Bags	Cores Per Bag
5	4
6-9	3
10-13	2

Large Lots of Domestic Wool Bags

(Commercial Testing Lab Recommendations)

No. of Bags	Cores Per Bag
14-19	3
20-40	2
40 and Over	1

NOTE: Each bag must be cored the same number of times. Each core must be a full tube core.

WOOL TESTING

2. Open the packaging material to provide access to the wool without contaminating the sample. Poly packs should be cut with a heated iron to melt the raw edge and prevent contamination.
3. The coring tube is inserted into a:
 - **bag** at a 45-degree angle to sample as many fleeces as possible.
 - **bale** at a 90-degree angle on the compressed bottom end of the bale.
4. Each sample is removed and immediately placed in a sealed container to prevent moisture changes and to keep it clean.
5. Special attention must be made to weigh the wool at or near the time of sampling.
 - **Bags** must be weighed within 12 hours of sampling.
 - **Bales** must be weighed within 24 hours of sampling.



7/8" Automatic Core Machine

Follow the sampling schedules previously described. When sampling is completed and sample identified, remove the excess air from the sample bag and securely tie off the sample.

Weighing the Wool

The preferred method is to weigh at time of sampling, but bales must be weighed within 24 hours. Weighing information must include: lot number, number of bales, gross weight, net weight and dates of both weighing and sampling.

WOOL TESTING

The sample is extruded from the cutting end of the tube into a plastic sample bag.

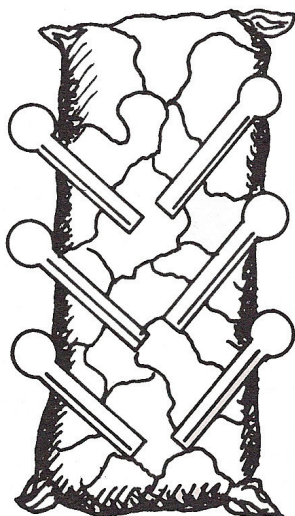
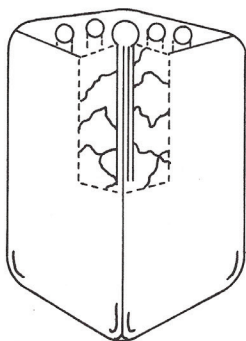
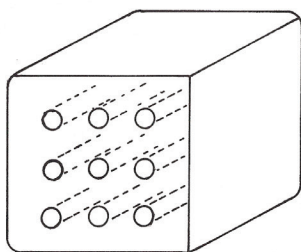
A common method of collecting the sample using the 7/8" tube is to attach the sample bag to the handles of the coring tool and extrude the wool directly into the sample bag.

The sample needs to be identified at the time of coring. A card with the lot number (printed on both sides of the card) should be placed in the sample bag so it can later be matched with the core test information.

Do not use liquid markers on the outside of the sample bag for identification. When several samples are shipped in the same box, the numbers can be rubbed off and the lab will receive samples that are very difficult or impossible to identify.

When sampling is completed and identified, remove the excess air from the sample bag and securely tie off the sample bag.

Bale and Bag Coring Diagram



WOOL TESTING

Sampling Schedule for Domestic Wool Bags (2-Inch Cores) and Nylon Packs (7/8-Inch Cores)

Sampling Schedule for 2" and 7/8" Coring Tubes

Bales/Bags	Cores/Bale or Bag	Total No. of Cores
1	30	30
2	15	30
3	10	30
4	8	32
5	6	30
7-8	4	28-32
9-13	3	27-39
14-40	2	28-80
>40 and over	1	>40

Technically, this schedule may be correct but 30 two-inch cores out of a single bag is not practical and would cut too many of the remaining wool fibers, as would 15 cores (each out of two bags) and 10 cores (each out of three bags). For smaller lots, it might be advisable to submit smaller samples for AFD only and use this information to combine small lots of similar wools into larger lots for subsequent yield testing.

Minimum net sample weight for testing is 568g or 1-1/4 lbs for 7/8" sample only. Sample weight of 2" cores varies but should fill a 20"x 40" 4 ml plastic sample bag.

NOTE: Each bag or pack must be cored the same number of times. Each core must be a full tube core.

Open the packaging material, burlap or nylon, to provide access to the wool in the bag or pack without contaminating the sample. Openings in burlap or nylon can be made with a sharp knife.

The 2" coring tube is inserted into a bag at a 45-degree angle to sample as many fleeces as possible.

The 7/8" coring tube is inserted into a pack in the same direction in which the wool was compressed.

WOOL TESTING



Grab Sampling

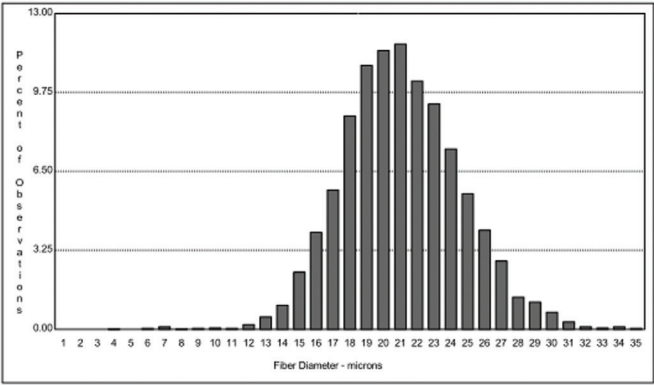
Either in the warehouse setting or on the farm, a grab sample should be obtained from each bale or bag, representative of the wool within the bale or bag. This handful is then accumulated for all bags/bales into a large, sealed plastic bag which is sent to a certified testing laboratory for strength testing (overall strength and point of break), as well as length of the wool tested.

5.2 Information Available from Testing Wool

Commercial Lots

- Average fiber diameter (microns).
- Standard deviation of fiber diameter (microns).
- Coefficient of variation of fiber diameter (percent).
- Wool base (percent).
- Vegetable matter base (percent).
- Estimated commercial top and noil yield (ECTNY percent).
- Additional information that may be available:
 - Length
 - Strength
 - Point of Break
 - Color

Optical Fiber Diameter Analyser (OFDA 100) Micron Test Report			
Computer Bank Data/This is Factual Data Yocom-McColl Testing Labs Inc Denver CO 80216-1823 USA		Date:	09/12/11
		Test No:	622304
Animal and Sample Description			
Animal Name:	XXXXX	Animal ID:	XXXXX
Breed:	Rambouillet	Sample Location:	Side
Sex:	Ram	Sample Date:	05/15/11
Color:	White	Age:	Yrlg
Laboratory Data			
Mean Fiber Diameter:	21.1 microns	Fibers Greater Than 30 microns:	0.7 %
Standard Deviation:	3.6 microns	Comfort Factor:	99.3 %
Coefficient of Variation:	16.8 %	Mean Curvature:	102.7 deg/mm
Spin Fineness:	19.9 microns	SD Curvature:	61.7 deg/mm



WOOL TESTING

Individual Animal Tests

Samples may be taken from individual animals for breed selection purposes.

Wool Tests

Sirolan LaserScan Histogram Report (2" Square Sample, Midside)

- Average fiber diameter (microns).
- Standard deviation of fiber diameter (microns).
- Coefficient of variation of fiber diameter (percent).
- Percentage of fibers greater than 30 microns.

OFDA100 Histogram Report (2" Square Sample, Midside)

- Average fiber diameter (microns).
- Standard deviation of fiber diameter (microns).
- Coefficient of variation of fiber diameter (percent).
- Percentage of fibers greater than 30 microns.
- Mean fiber curvature (deg/mm).
- Standard deviation of fiber curvature (deg/mm).
- Percentage of medullation, white samples only.

OFDA2000 (1" Square Sample)

OFDA2000 samples are tested under standard conditions for testing textiles (20-degree C, 65 percent relative humidity).

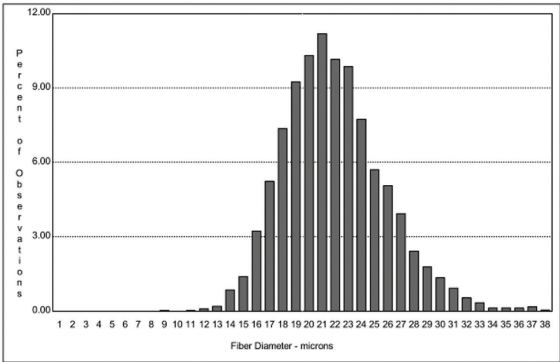
Micron Test Report (Page One)

The histogram is developed using the data collected in 5 mm increments along the staple length.

- Mean fiber diameter (microns).
- Standard deviation (microns).
- Coefficient of variation (percent).
- Spin fineness.
- Percentage of fibers greater than 30 microns.
- Comfort factor (percent, fibers 30 microns and less).
- Mean fiber curvature (deg/mm).
- Standard deviation of fiber curvature (deg/mm).

Optical Fiber Diameter Analyser (OFDA 2000) Micron Test Report

Date: 09/12/11
Test No: 622250
Farm Name: Computer Bank Data
Breeder: This is Factual Data
Address: Yocom-McColl Testing Labs Inc
Denver CO 80216-1823 USA



Tested and conditioned under standard conditions for testing textiles

Animal and Sample Description

Animal Name: XXXXX
Breed: Commo
Sex: Ram
Color: White
Animal ID: XXXXX
Sample Location: Side
Sample Date: 05/15/11
Date of Birth (Age): Yrig
Previous Shear Date: XX/XX/XX

Laboratory Data

Mean Fiber Diameter: 22.0 microns
Standard Deviation: 4.2 microns
Coefficient of Variation: 19.0 %
Spin Fineness: 21.1 microns
Fibers > 30 microns: 2.9 %
Comfort Factor: 97.1 %
Mean Fiber Curvature: 101.3 deg/mm
Standard Deviation Curvature: 66.8 deg/mm

WOOL TESTING

Staple Profile Report (Page Two)

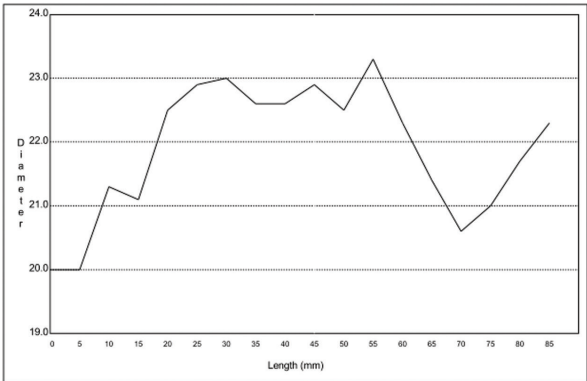
- Mean staple length (mm).
- Minimum mean fiber diameter along staple (microns).
- Maximum mean fiber diameter along staple (microns).
- Finest point from tip (mm).
- Standard deviation of fiber diameter, along staple component only (microns).

Optical Fiber Diameter Analyser (OFDA 2000) Staple Profile Report

Date: 09/12/11
Test No: 622250
Farm Name: Computer Bank Data
Breeder: This is Factual Data
Address: Yocom-McColl Testing Labs Inc
Denver CO 80216-1823 USA

Animal and Sample Description

Animal Name: XXXXX
Breed: Como
Sex: Ram
Color: White
Animal ID: XXXXX
Sample Location: Side
Sample Date: 05/15/11
Date of Birth (Age): Yrlg
Previous Shear Date: XXXXXX



Tested and conditioned under standard conditions for testing textiles

Staple Data

Staple Length: 90.0 mm
Min Diameter: 20.0 microns
Max Diameter: 23.3 microns
Finest Point From Tip: 0.0 mm
SD Along Staple: 1.1 microns

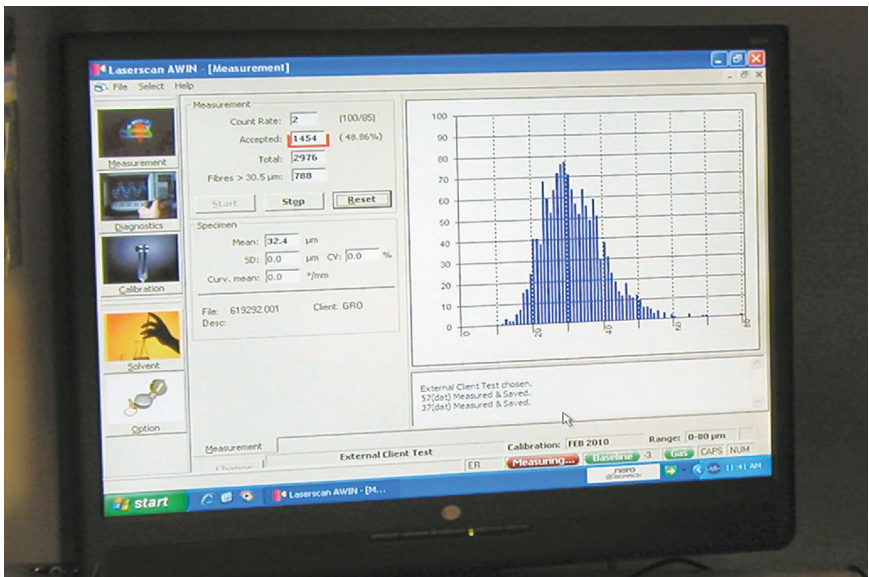
5.3 Wool Measurement Technology

Both Sirolan LaserScan and OFDA100 fiber testing methods provide the wool and textile industry with high volume testing applications but they utilize different technology. The LaserScan instrument scans fiber diameter with laser technology as its name suggests. The OFDA100 does not. OFDA instruments utilize LED (light emitting diode) technology to capture fiber images for analysis.

These instruments were developed in Australia and are calibrated using Interwoollabs tops, the only recognized supplier of calibration tops to the worldwide textile industry. A diagnostic and calibration check is performed each day on both instruments.

Testing methods are approved by the International Wool Textile Organization (IWTO) and the American Society for Testing and Materials (ASTM) and are performed in laboratories under standard conditions for testing textiles, 70-degrees F, and 65 percent relative humidity (+2 percent RH).

Sirolan LaserScan



Histogram display on computer screen of fiber measurements recorded by Sirolan LaserScan.

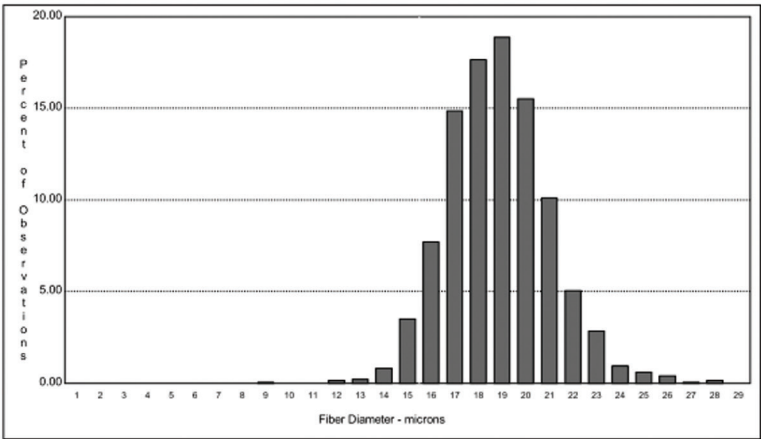
WOOL TESTING

The LaserScan instrument measures fibers by dispersing individual snippets (2 mm lengths of fiber) in a solution of isopropanol and water; this fluid transports the fibers through a glass cell where each one intersects a laser beam. The LaserScan measures the change in the signal generated when the shadow cast by the fiber snippets falls on a light detector. The signals, which are directly proportional to the fiber diameter, are recorded almost instantaneously by the computer.



Sample cups of fiber snippets for individual animal fiber diameter testing by Sirolan LaserScan instrument.

Animal and Sample Description			
Animal Name:	XXXXX	Animal ID:	XXXXX
Breed:	XXXXX	Sample Location:	Side
Sex:	Ram	Sample Date:	XX/XX/XX
Color:	XXXXX	Age:	XXXXX
Laboratory Data			
Mean Fiber Diameter:	19.0 microns		
Standard Deviation:	2.7 microns		
Coefficient of Variation:	14.3 %		
Fibers Greater Than 30 microns:	0.6 %		



This Test Performed According to I.W.T.O Method 12

Optical Fiber Diameter Analyzer (OFDA100)

OFDA100 was approved as an IWTO standard in 1995. It uses a video camera to produce electronic images of magnified fibers that are distributed over a horizontal glass slide. Software analyzes the fiber images and derives the measurement of diameter of a large number of longitudinal fiber sections. OFDA100 also measures and calculates the distribution of fibers (standard deviation or SD and coefficient of variation or CV) and average or mean fiber diameter. It also measures curvature on white or light colored fiber, percentage of medullation.

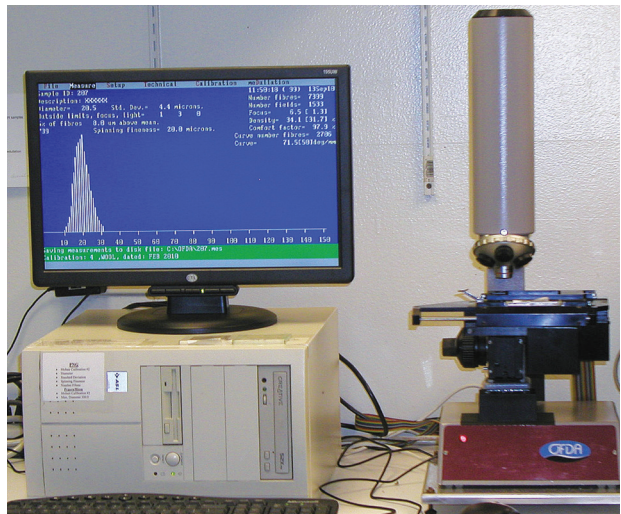
The fiber is measured for its sharpness of focus. If it is not in sharp focus, then it is not measured and if too many fibers are out of focus, the measurement stops and an error message alerts the operator.

The diameter is rounded to 1 μ m (micron) and added to a histogram.

After the whole slide has been measured, the mean and standard deviation of diameter are calculated from the mean fiber diameter histogram.

On the OFDA100 monitor, the white lines show the measurement points. The lines run in horizontal or vertical axes to allow the most accurate measurement. The diameter is corrected using the angle of the fiber at the measurement points. This method eliminates the potential for measuring hairs adjacent to each other and then identifying them as one wide snippet.

OFDA100 software analyzes fiber images and derives AFD, SD and CV measurement of 2,000 to 4,000 longitudinal fiber sections. OFDA100 also measures curvature and medullation.



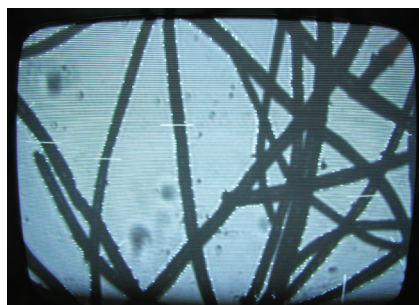
WOOL TESTING

The OFDA100 uses a monochrome digital video camera, a 4X microscope objective and an ultra bright red light emitting diode (LED). The image is digitized to a resolution of 256x256 pixels. The pixels are rectangular with the horizontal pixel width about 1.4X the vertical size.

The microscope stage holds the fiber snippets between two hinged glass slides and automatically moves the slide under the objective lens. The LED strobes for 40-80 microseconds to freeze the image of the moving fibers onto the charge-coupled device (CCD) camera. The camera captures 50 images per second and each image is analyzed in less than 20 milliseconds.

A CCD is a silicon chip whose surface is divided into light-sensitive pixels. When a photon (light particle) hits a pixel, it registers a tiny electrical charge that can be counted. With large pixel arrays and high sensitivity, CCD's can create high-resolution images under a variety of light conditions. A CCD camera incorporates a CCD to take such pictures.

A microsecond equals one millionth of a second (think of a micron which equals one millionth of a meter). A millisecond equals one thousandth of a second (think of a millennium which is one thousand years).



OFDA100 software analyzes fiber images and derives measurement of diameter of a large number of longitudinal fiber sections.

Optical Fiber Diameter Analyzer (OFDA2000)

The OFDA2000 measures Mean Fiber Diameter (MFD) in 5 mm increments along the length of the staple, starting this procedure at the tip of the staple.

OFDA2000 was developed in Australia for on-farm fleece testing with the objectives of separating superfine wool from flocks of fine-wool sheep primarily for marketing of the superfine wool and assisting with genetic selection based on fineness characteristics. Two versions of the OFDA2000 are used: the benchtop version and the portable version.



Laboratory bench model operated under standard conditions for testing textiles, 70-degrees F, and 65 percent relative humidity (+2 percent RH). This OFDA2000 operates on staple profile or OFDA100 mode.

The OFDA2000 is not approved by IWTO or ASTM. Wools separated into different micron ranges by these instruments still have to be core sampled and tested by IWTO and/or ASTM approved methods and instruments when offered for sale. This instrument uses the same basic technology as its parent, the OFDA100, with the exception of measuring multiple fibers in profile. For each test, fewer than 100 fibers (depending on the fiber diameter and staple length) from tip to base in 5 mm increments are needed to take approximately 1,500 measurements. A fiber profile is then produced and reflects aging, health/production status and environmental conditions of the sheep during the growth of that particular staple length.

WOOL TESTING

On the staple graph (profile), the tip measurement starts at 0mm on the left corner of the x-axis (horizontal axis). The MFD of the staple is in micron increments on the y-axis (vertical axis) and the micron increments vary as the graph is generated to fit a letter size (8.5" x 11") in landscape format.

A normal distribution histogram is also generated using the measurements obtained in 5 mm increments from the staple profile. The staple profile report also documents finest point from the tip (in mm) in the staple length and that can be at the tip itself. It also documents minimum and maximum fiber diameter. To use the staple graph (profile) as a management tool, both the current and the previous shearing dates must be known in order to pinpoint timing of events that cause an increase or decrease in MFD of the staple.

Staple profile reports are useful for interpreting and correlating the effects of aging, animal health, pregnancy/nursing status, environmental conditions and management practices on the MFD of the staple produced during the growth period under consideration.

5.4 Larger Lots, Larger Savings

- Producing as few and as uniform lines as possible from the same farm or ranch will help achieve clip preparation goals of maximizing grower returns and providing a fiber that processors can use with confidence.
- There is not a minimum lot size, but larger lot sizes can reduce cost and possibly create more buyer interest.
- Most marketing charges, particularly testing, are on a lot basis. For example, if you combined two similar lines, the savings on the core test is significant.
- More bales in a lot means lower selling costs.

The shearing shed is the most economical place to make your larger sale lots. Analyze your clip using the following information to see how you can put more money in your pocket and help the industry.

Best Practices:

- Use the previous years' test results, classer's specification and the lotting advice, which follows, to identify similar flocks and lines that can be combined. Check that groups of sheep have been managed under similar conditions this year.
- Class according to standards in the Code of Practice.
- When small lots are unavoidable, selling them as matched interlots ensures full equity for the grower and helps to reduce the number of lots going through the marketing system.

WOOL TESTING

5.5 Benefits of Pre-Sale Objective Measurement

General Benefits:

- Potential to provide a common language in business transactions in the United States and worldwide.
- Improved definition of wool quality characteristics.
- More specific determination of the value of wool lots.
- More accurate feedback of wool manufacturers' requirements to producers and wool buyers.
- Potential for improved wool packaging.
- More precise matching of wools.

To the Wool Producer

- Greater equity in wool prices.
- More accurate assessments of the effects on wool growth of seasonal, nutritional, health and selection factors.
- Improved strategies for shearing, lambing and other management and breeding practices.
- Potential for improved, more standardized preparation of wool for marketing; increased profits.

To the Warehouseman, Cooperative Manager and Wool Buyer

- Potential for increased efficiency and cost reduction in marketing.
- Reduced risk when buying and selling.
- Faster, more accurate evaluation and assembly of mill lots, interlotting.

WOOL APPRAISAL

6. STANDARDIZED WOOL APPRAISAL

- 6.1 | **AWEX-ID**
Prime and Qualifier Characteristics
- 6.2 | **AWEX-ID Chart**

6.1 AWEX-ID

AWEX-ID is an appraisal system for non-measured characteristics of greasy wool. It was created in Australia in 1995 as a method of appraising and recording the non-measured characteristics of greasy wool, using a logical and intuitive code system. The number of non-measured characteristics (subjectively) appraised on any one sale lot or line of wool is dependent upon: (1) the category of wool (e.g. fleece, pieces, bellies, locks, crutchings); and (2) the available objective measurement results. It was created to supply wool appraisals for the new industry-based market reporting system with all appraisals supplied pre-sale by industry appraisers, which are routinely audited. The practice has been accepted by the Australian industry, and currently, the system is often used by both buyers and sellers to assist in determining presale valuations on sale lots.

Attributes of AWEX-ID:

- AWEX-ID is a powerful description tool.
- AWEX-ID enhances the communication process within the wool industry.
- AWEX-ID can be easily modified to reflect any changes in objective measurement testing, technology or appraiser requirements.
- The increased level of staple measurement on combing wools reduces the need for the appraisal system to describe staple length and strength.
- AWEX-ID is not a shorthand wool typing system – it uses explicit descriptive terms to describe each non-measured wool characteristic individually.

WOOL TESTING

Prime and Qualifier Characteristics

Prime Characteristics

Prime type characteristics that are reported on every appraisal include:

- Breed group – mandatory requirement.
- Wool sub category – where applicable.
- Wool category – mandatory requirement.
- Style – mandatory requirement.
- VM type – mandatory requirement.

NOTE: This group is separated from the Qualifier characteristics by a “Full Stop” (or period).

Qualifier Characteristics

Qualifiers allow characteristics to be reported conditionally, that is, each is reported provided certain conditions are met, e.g.

- Greasy length indicator - staple length is only subjectively appraised when the wool is not measured for length.
- Strength indicator – indicated with strength is not measured.
- Qualifiers – only reported when they are present in the wool.
- Standard comments – additional comments relating to the lot of wool, e.g., good for style, good for length, bold crimp, lice, keds, bellies in.

Examples of AWEX-ID Descriptions

MF4B.	Merino adult fleece, style 4, with burr and measured staple.
MF5B.GFS	Merino adult fleece, style 5 (good for style), with burr.
XWF5E.80	Crossbred weaner fleece, style 5, with seed, length indicator 80 mm.
MP6S.H2C3	Merino pieces, style 6, etc (not fleece).
ASF4S.60M	Superfine fleece, style 4, with shive, length 60 mm with scourable color.

PRIME TYPE					QUALIFIERS					WHERE APPLICABLE
MANDATORY	WHERE APPLICABLE	MANDATORY	MANDATORY	MANDATORY	CONDITIONAL Non – AM	CONDITIONAL Non- AM	WHERE APPLICABLE			
BREED GROUP	WOOL SUB CATEGORY	WOOL CATEGORY	STYLE FLC	VM TYPE	Mandatory Full Stop	GREASY LENGTH INDICATOR	STRENGTH INDICATOR =>50 mm	QUALIFIERS (Not scaled)	QUALIFIERS (Scaled)	STANDARD COMMENTS
M Merino/Rambouillet	W Combing Yearlings/Lambs	F Fleece	1 Choice	B Burr		10 6-15 mm	W1 Part Tender	E Necks	H Unscourable Color	GFS Good for Style
MX Merino Cross	L Carding Lambs	P Pieces	2 Best Spinners	E Seed		20 16-25 mm	W2 Tender	B Backs	N Water Stain	PFS Poor for Style
X Crossbred	U Plucked & Dead	B Bellies	3 Spinners	S Shive/Chaff		30 26-35 mm	W3 Very Tender	G Doggy	S Dark Stain	GFL Good for Length
D Downs	K Shorn from Skins	C Crutchings/Tags	4 Best	N Cockle/Noogoora		40 36-45 mm		M ScourableColor	Q Dags	PFL Poor for Length
T Carpet	G Fellmongered	Z Locks	5 Good	T Bean/Bathurst		50* 46-55 mm			F Soft Cott	BOLD Bold Crimp
R Hair/Shedding	O Overgrown		6 Average	M Moit/Sticks/Twigs		60* 56-65 mm			C Med/Hard Cott	PEN Pen Stain
	N Non Conforming Lot		7 Inferior	F Bogan Flea		70* 66-75 mm			J Jowls	LICE Lice affected
WHERE APPLICABLE			PCS/BLS			80* 76-85 mm			P Shanks	KEDS Sheep Ticks
BREED PREFIX			3 Spinners	WHERE APPLICABLE		90* 86-95 mm			A Dematitis	UC Unclassed BI Bellies In
R Run with Hair/Sheds			4 Best	VM SUFFIX		100 96-105 mm			V Skin Pieces	
			5 Good/Average	L Clumpy		110 106-115 mm			R Brands/Paint	
			6 Inferior			120 116-125 mm			D Mud	
			7 Stain			130 126-135 mm			Y Black/Pigmented	
			CRS/LKS TAGS			140 135-150 mm			K Kemp/Medullated	
			4 Best/Good Bulk			160 151-170 mm			U Skirting/Sweat	
			5 Average Bulk			180 171-190 mm				
			6 Inferior Bulk			200 191-210 mm				
					 300				
						Note: All wool =>50mm that is not tested for Staple Length & Strength, must have the length and strength indicator estimated				
									SCALE	
									1 Light	
									2 Medium/Line of	
									3 Heavy/Line of	

7. WOOL PREPARATION FOR FARM FLOCKS

7.1 Facilities

Minimize Contamination

7.2 Sorting Sheep

Sheep Breeds by Wool Type

7.3 Wool Packaging Materials

7.4 Clip Preparation and Skirting

Hair-Sheep Breeds
All Other Wools

7.5 Classing Farm Flock Wool

Warehouses
Wool Pools

7.1 Facilities

It is important to recognize that all wool needs to be properly prepared for marketing. Flock size, breed of sheep and wool marketing options will influence the preparation required in order to optimize wool returns. Contamination is one of the largest complaints wool mills have about farm flock wools.

Wool clips produced under farm flock conditions are subjected to more contamination. Sheep are generally housed during part of the year on straw, wood shavings or some other bedding material. Likewise, harvested forage is often fed during some portion of the production cycle.

Minimize Contamination By:

- Proper feeding practices.
- Forage feeding systems that reduce contamination.
- Pasture management.
- Other contaminants that directly affect wool quality.

Please refer to contamination section for sources of wool contamination and control measures on pages 30-37.

Sheep Pens

- Do not bed immediately prior to shearing.
- Bed pens to allow bedding material time to dislodge from the fleece (one week).

Shearing Time

- Shearing area must be free from potential wool contaminants.
- Holding pens free of bedding.
- Sheep held off feed and water for at least 6 hours.
- Catch pen adjacent to shearing board must not have bedding.

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Shearing Board

- Must be solid, level and provide a sweepable surface.
- Two 4' x 8' sheets of plywood provide room for shearing and wool handling.
- Raising shearing board (4"-6") will help reduce contamination.
- Do not shear on old rugs, carpets or poly tarps.

Shearing on the back of an old carpet exposes the freshly shorn fleece to the carpet backing, which will contaminate the fleece. In addition, cross contamination of wool and communicable diseases from the previous flock may occur.



It is advisable to have your own shearing board.

Sweeping

Maintaining a clean shearing board is an important and continuous process. It must be done before, during and after shearing to insure a quality clip.

7.2 Sorting Sheep

Prior to shearing, all flocks should be separated into groups according to wool quality. This is particularly true for flocks with more than one breed of sheep. Refer to section below for a breakdown of sheep breeds by wool type.

Example Sheep Breeds by Wool Type

Wool Breeds:

American Cormo, Booroola Merino, Debouillet, Delaine Merino, Rambouillet, Targhee

Dual-Purpose Breeds:

Columbia, Corriedale, Panama, Finnsheep*, Polypay **

*Cross-breeding with Finnsheep often produces variable fleece quality.

**Due to the recent formation of the Polypay breed, fleece traits are variable.

Shear wool and dual-purpose breeds first and package wool separately from other groups.

NOTE: The categories are suggested guidelines for sorting and packaging wool separately at the producer level. Wool quality will vary within breed due to individual producer emphasis on wool.



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Meat Breeds - White Face:

Cheviot, Dorset, Finnsheep, Gulf Coast Native, Montadale, North Country Cheviot, Polypay, Texel

Meat Breeds - Black Face:

Clun Forest, Hampshire, Oxford, Shropshire, Southdown, Suffolk, Tunis

In meat-breed sheep, separate wool by fiber length and degree of contamination. Wools of meat-type breeds can be classified a number of different ways so discuss with marketing representatives how to best separate flock.

NOTE: Differences in fiber diameter can be separated when volume and market opportunities are financially rewarding. Typically, wool from the meat breeds of sheep fall into two fiber diameter groups - medium and coarse. Definitions as to what constitutes a medium or coarse grade are vague. Check with your local marketing representatives or wool pools as to definitions in your area.

When marketing opportunities exist, further separation of meat type wools can take place based on the following guidelines:

White-Face Meat Breeds

- Must be kept separate from wool and dual-purpose breeds.
- Includes offspring of wool and dual-purpose breeds crossed with white-face meat breeds.
- Typically, only long stapled, medium grades are kept separate.

Black-Face/White-Face Crosses

- Separate when market opportunities and volumes are large enough to be financially rewarding.
- Separate long stapled, medium grades or combine with medium black-face wool depending on fiber diameter.

Black-Face Breeds

- Historically, this term has referred to all meat-breed sheep.
- As new markets develop, it is becoming more pertinent to keep this wool separate.
- Fleeces with comparatively large amounts of colored fibers may warrant being classified as black wool for commercial marketing purposes.



Market Lambs and Show Sheep

- Short wool from market lambs.
- Sheep shorn twice a year.
- Show sheep with irregular fleece length.

Long Wool and Carpet Breeds:

Black Welsh Mountain, Bluefaced Leicester, Border Leicester, Coopworth, Cotswold, Icelandic, Jacob, Karakul, Lincoln, Navajo Churro, Perendale, Romney, Scottish Blackface, Shetland, Wiltshire Horn

- Separate prior to shearing.
- Package wool separately from other groups.
- Shear white-face sheep before black-face sheep.

Volume of this wool type is small, and commercial marketing is limited in the United States. Much of this wool is niche marketed to hand spinners and fiber artists. Fleeces are often packaged and sold individually.

Black or Naturally Colored Sheep

- Must be separated.
- Shear after black-face meat breeds.
- Package wool separately.

Commercially there are limited outlets for this wool. Prices are maximized by selling to niche markets.

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Hair-Sheep Breeds:

Barbados Blackbelly, California Reds, Katahdin, Romanov*, Dorper, St. Croix

*Hair-breed sheep and their crosses.

Hair-sheep breeds should be run separately from wool breeds on sheep operations. Hair contamination of wool can occur while running sheep together and before shearing. Any hair fibers in wool can devalue wool or render wool unusable for normal commercial products.

NOTE: Cross-breeding with Romanov sheep often produces variable fleece quality.

7.3 Wool Packaging Materials

Improper packaging results in decreased prices for your wool.

Use Only New and Acceptable Materials

- Used wool sacks increase contamination risks and identification problems.
- Never package fleece wool in poly or burlap feed bags as contamination can occur and the wool is difficult to remove.

Package Sacks to Acceptable Weights

- Less-than-full sacks need to be repackaged at the wool pool.
- Heavier sacks decrease shipping costs.

Label Wool Sacks to Denote Contents

- Growers name.
- Wool type and line description: breed or wool type, wool line, preparation.
- Bag number.

Check with marketing representatives for labeling instructions.

Use Only Cotton String to Tie Wool Bags

- Wool bags tied with poly and sisal twine are not acceptable.
- Hog rings should not be used to close wool sacks.

Package Off-Sorts Separately

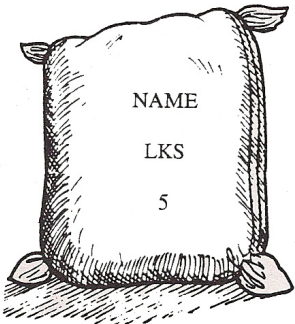
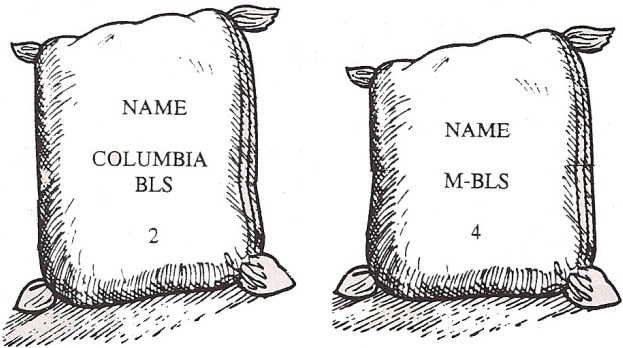
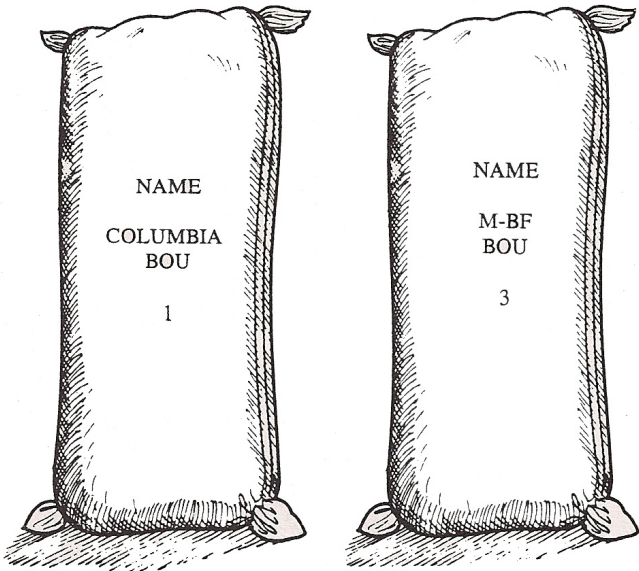
Keep the following separate:

- Fleece wool.
- Belly wool and high contamination areas that were skirted.
- Locks - the combination of tags, top knots, floor sweepings, second cuts, crutchings, etc.

Fleece and belly wools from the various breed-type categories should be kept separate. Locks from the various groups can be combined at the farm level.

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Proper Labeling of Wool Sacks



7.4 Clip Preparation and Skirting

Farm flock wools must be prepared in a manner to facilitate marketing. Degree of clip preparation will depend upon marketing alternatives and type of wool produced.

Hair-Sheep Breeds and Crosses

- Require minimal preparation.
- Belly wool can remain with fleece if contamination is not severe.
- Skirt (remove) only heavy tags and areas with large amounts of vegetable matter or other contaminants.
- Fold fleece into thirds and roll from rear of animal to front shoulder.
- There is no need to tie fleeces.
- Package and label this wool separately from all other wools.

All Other Wools

Bellies Out Untied (BOU)

This includes belly wool being shorn out and kept separate with the fleece being lightly skirted.

Only remove belly wool from black-face sheep and their crosses to:

- Restrict poly contamination.
- Reduce VM and dirt contamination.
- Reduce short wool in fleece lines.
- Increase clean yield in fleece wool.
- Increase uniformity in fiber length.
- Increase uniformity of fleece lines.
- Increase market outlets for wool.

Light skirting to remove:

- Belly and place into a separate line.
- Areas with high concentration of contamination.
- Stained wool from white fleeces.
- Top knots, tags and place into a separate line (locks). Remove and discard skin.

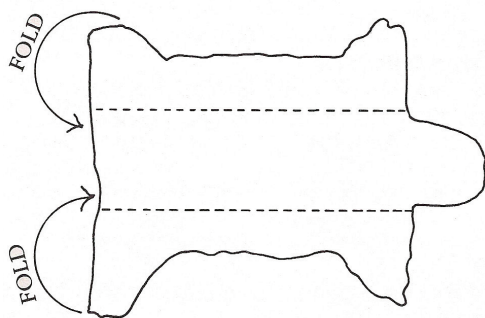
FARM FLOCKS

The level of skirting will depend on the quality standard of the clip. All fleeces must be carefully and minimally skirting to ensure that only inferior wool is removed and all good fleece wool remains with the fleece.

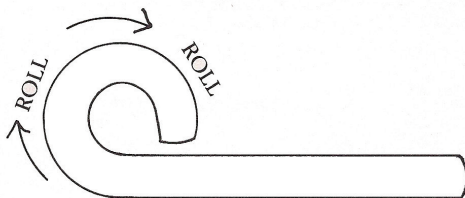
Specialty wools require additional skirting. Skirt these fleeces to individual marketing needs.

Rolling the Fleece (All Wools)

- Spread skirted fleece on skirting table or clean wool-handling area gray side up.
- Fold fleece into thirds.
- Roll fleece from rear of animal to front.
- Roll fleece flesh side out.
- In uniform clips, there is no need for tying skirted fleeces.



Roll fleece from rear of animal to front.



RECOMMENDATION: Contact marketing representatives and woolpools in your area for further information.

7.5 Classing Farm Flock Wool

Classing is the allocation of the fleece to any particular standard quality according to its diameter, length, yield, etc. Sufficient volumes of wool are necessary in order for wool classing to be meaningful.

Producers are encouraged to keep noticeable differences in wool quality separate. This includes different wool or breed types, length, belly wool and locks. Bulk classing is inter-lotting of similar wool from different growers for marketing. Farm flock wools can be bulk classed at wool pools or warehouses (graded wools).

Warehouses

- Trained or experienced personnel are employed for bulk classing or grading.
- Farm flock bags are received at warehouse and opened.
- Fleeces are individually bulk classed or graded into pre-determined lines.
- Lines are baled and stored until marketed.

Prices for warehouse bulk classed wools are influenced by:

- Year-round operation and marketing.
- Volume of wool handled.
- Quality control standards.
- Uniformity of bulk classed lines.
- Packaging and freight efficiency.

FARM FLOCKS

Wool Pools

Trained and experienced personnel are required as only properly prepared wools can be efficiently bulk classed.

Individual Fleeces

- Fleeces or partial bags are classed into pre-determined lines.
- Individual grower lines are weighed and recorded.
- Similar grower lines are combined and re-packaged for shipping.

Entire Wool Sacks or Bales of Properly Sorted and Prepared Wools

- Individual bags are sampled and classed into pre-determined lines.
- Bags are weighed and recorded.

Producers with less than a full wool sack or bale of any one type or kind of wool should have their wool repackaged at the pool. This includes belly wool and locks. Less-than-full bags of pre-sorted wool are easily weighed, bulk classed and repackaged for shipping.

Prices wool pools receive are affected by reputation. One or two bags of improperly prepared wool damages the reputation of the entire wool pool and affects bid prices next season. Trying to “sneak one by” will not work and this practice results in low wool prices and loss of wool markets for everyone.

Meat Sheep Breeds Classing Line Standards

	DESCRIPTION OF LINE
MMM	Large volume of similar wool, but of a different class than MM-line
MM	Large volume of similar wool, but of a different class than the M-line
M	* Main line of 12-month wool (majority of clip)
M-1	Coarser end of the wool clip
M-2	Tender or short wool
M-3	Additional line with high VM, off-color, etc.
M-4	Out-cast fleeces
R	Risk wool when white sheep run with colored and/or Hair Sheep
M-BLS (Bellies)	Wool from the belly area of the sheep
M-PCS (Pieces)	Wool removed at the skirting table; not stained but containing high VM, matted, cotted, etc.
M-STN (Stains)	Wool removed from skirting which is stained with dung, urine, blood, paint, etc.
M-LKS (Locks)	Tags, top knots, sweepings, second cuts, etc.
M-CTH (Clothing)	Wool under 2" in length or extremely short compared to A-2 line
BLK (Black Wool)	Wool from black sheep or black spots

White-face/black-face separations can occur where necessary, lines should be denoted as: M-WF, M-BF, MM-WF, MMM-WF, etc. Separations should only be made where economically reasonable.

*The "M-line" is the majority of the clip, not necessarily the best line.

FARM FLOCKS

Wool Pools Bulk Classing Line Standards

WOOL&DUAL PURPOSE BREED LINES	DESCRIPTION OF LINE	MEAT-BREED LINES
AAA	Large volume of similar wool, but of a different class than the AA or MM lines	MMM
AA	Large volume of similar wool, but of a different class than the main lines	MM
A	* Main line of 12-month wool (majority of each wool type)	M(-WF,-BF)
A-1	Coarser end of wool pool	M-1
A-2	Tender/short wool	M-2
A-3	Additional line with high VM, off-color, etc.	M-3
A-4	Out-cast fleeces	M-4
R	Risk wool when white-faced wool sheep run with colored or hair-fiber sheep	
BLS (Bellies)	Wool from the belly (white-face sheep only)	M-BLS
PCS (Pieces)	Wool removed at the skirting table; not stained but containing high VM, matted, cotted, etc.	M-PCS
STN (Stain)	Wool removed from skirting which is stained with dung, urine, blood, paint, etc.	STN
LKS (Locks)	Tags, top-knots, sweepings, 2 nd cuts, etc.	M-LKS
CTH	Wool under 2 ^{1/4} " length or extremely short compared to A-2 or M-2 lines	M-CTH
BLK	Wool from black sheep or black spots	BLK

NOTE: Volume and economics will determine the number of lines necessary for the wool pool. Over classing (creating too many lines) should be avoided. Separate wool according to wool-breed type. Within meat type, separate white-face (M-WF) from black-face (M-BF). Use fiber diameter, VM contamination, length and style to separate lines. *The "A or M-line" is the majority of that wool type, not necessarily the best line.

8. WOOL GLOSSARY

WOOL GLOSSARY

Bale - A compressed pack of wool varying in weight from 400-450 pounds.

Belly wool - Wool that grows on the belly of the sheep. It is often uneven and tender and shorter than wool from other parts of the body. It is often stained and low yielding.

Britch wool - Wool from the hindquarters of the sheep, usually the coarsest on the body, often approaching hair in its characteristics.

Broken wool - Due to illness or lack of nutrition of the sheep at some time during the growth of the wool, it is weak at one particular point of the staple but sound above and below the break.

Band - A group of sheep of the same breed that has run together under similar environmental conditions since the previous shearing.

Burr - A rough or prickly seed-vessel that becomes entangled in wool.

Carbonizing - The removal of vegetable matter from wool, noil, waste or rags after converting it into carbon by the action of acid and heat.

Classing (wool) - The allocating of the fleece to any particular standard quality, according to its diameter, length, yield, etc.

Clean wool fibers present (CWFP)

- The weight of wool base present in the raw wool, adjusted to a moisture content of 12 percent, and alcohol extractives content of 1.5 percent and mineral matter content of 0.5 percent. Wool base divided .86.

Clip - One season's yield of wool.

Clothing wool - Fiber too short to comb and used in the manufacture of woolsens. It possesses the property of felting readily. Also called carding wool.

Coefficient of variation (CV%) -

A statistical term used to describe the amount of variation within set of measurements; it is the standard deviation expressed as a percentage of the mean value.

Colored defect - Presence of colors, other than white, which cannot be removed in scouring.

Colored fiber content - An important factor when manufacturing pastel or white fabrics. It is the number of colored fibers in specific weight of white wool. (e.g. 10 colored fibers per ounce). Sources are colored and black-face sheep, colored genetic faults (spots) in white wooled sheep, stained wool and contamination from other animals such as cattle and goats. Hair sheep are a source of contamination in a wool clip.

WOOL GLOSSARY

Combing - Process by which short fibers, entangled fibers and vegetable material are separated from the long fibers. The latter are subsequently straightened and laid parallel to each other in a sliver form.

Core sample - The sample extracted from a bag or bale of wool by inserting a sharpened hollow tube. The diameter of the hand core tube is normally either 0.5" or 2.0". Subsamples of the composite core sample are used for testing yield, mean fiber diameter and vegetable matter content. (The core sample may also be used to measure clean color.) Automatic coring machines use a 7/8" core tube.

Cotted fleeces - A cotted fleece is one in which fibers are matted or tangled.

Crimp - The natural waviness of the wool fiber.

Crossbred - The offspring resulting from mating a ram and ewe of different breeds.

Crutchings - Wool removed from the crutch of the sheep before the final shearing.

Culls - Sheep that are below a required standard.

Dead wool - Removed from the skin of dead sheep (not slaughtered) by sweating.

Density - The number of fibers produced on a given area of the sheep's body. The more numerous the fibers, the greater the density.

Ewe - A female sheep.

Fiber diameter - Thickness of individual wool fibers. Wool is inherently variable in fiber diameter but the average fiber diameter of any sale lot is by far the most important characteristic in terms of processing value.

Fine - A description of wool in the American system of grading. Originally applied to pure Merino fleeces. Equivalent to 64s, 70s and 80s grade.

Fleece - The entire coat of wool shorn from the sheep at one time.

French combing wool - A length grade denoting a wool long enough to be combed on a French or rectilinear comb.

Frowsy wool - A lifeless appearing wool with the fibers lying more or less in random directions. Usually dry and harsh.

Grade - The quality or relative fineness of the wool. (Defined by USDA and ASTM Standard Specification D 3991).

WOOL GLOSSARY

Grading - Classifying the fleece according to fineness.

Grease wool - Wool in its natural state.

Hair - Usually straight, non-elastic and glossy. Stronger, smoother and usually coarser than wool. Lacks felting properties.

Handle - This term denotes the degree to that all the attributes which comprise quality, such as softness, fineness, length and elasticity, are noticeable when wool is subjectively judged.

Kemp - An opaque and structureless fiber present in badly bred wools that appears not to absorb dye and consequently is prominent in the finished fabric unless further treated in some way.

Lamb's wool - Wool shorn from lambs. Soft and possessing superior spinning properties.

Length - Describes the length of a wool fiber or group of fibers (staple).

Line - Any portion of wool with different characteristics, which must be kept separate from one another.

Lofty wool - Open wool, full of 'life.' Springs back into normal position after being crushed in the hand. Very elastic.

Matchings - The different sorts of wool into which the fleece is divided in wool sorting.

Mean - The same as average. It is derived by dividing the sum of the individual values of a measurement by the number of individual tests.

Off-sorts - The by-products of skirting consisting of the less valuable parts of the fleece.

Pulled wool - Wool pulled from the skin of a slaughtered sheep after the flesh side of the skin has been painted with depilatory.

Quality - The average diameter or fineness of wool.

Ram - A male sheep used for breeding.

Scoured wool - Wool from which the bulk of impurities has been removed by an aqueous or solvent washing process.

Scouring - The removal of grease, soil and suint from wool by washing with water, soap and alkali.

Schlumberger dry top and noil yield (second cuts) - Careless shearing sometimes results in cutting wool that has already been shorn once. This produces short fibers known as

WOOL GLOSSARY

second cuts.

Shearing - The removal of wool from sheep.

Skirting - A practice of removing off sorts from the fleece, such as stained, inferior wool, and wool that grows on the belly and legs of the sheep.

Sorting - The classification and division of the wool fibers in a fleece into various groups or sorts, according to fineness, length, soundness, elasticity, spinning and other properties.

Sound wool - Wool of any quality that is strong in staple.

Stained wool - Wool which has become discolored through the effects of urine, feces or any other coloring agent.

Staple - In a general sense, it is used to describe a group of undisturbed fibers.

Staple length - The length of a staple from tip to base.

Staple strength - The force required to break a staple of given thickness. Staple strength is expressed in newtons/kilotex.

Suint - Excretions from sweat glands deposited in the wool.

Tags - Large dungy locks. Also a trade term for dung locks, floor sweepings, etc. In Australia called stained pieces.

Tender fleeces - Wool having weak places in the fibers and consequently used only for carding even if they are of combing length.

Tippy wool - Wool in which the tip portions of the fibers have been so damaged by natural weathering as to have markedly different dyeing properties from the root portions.

Vegetable matter base - Oven-dry, scoured burrs, seeds, twigs, leaves and grasses, free of mineral matter and alcohol extractable matter.

Yolk - The combination of excretion from the sweat and wax glands that are deposited in the wool.

Wool - The fibrous covering of the sheep, genus *Ovis*.

Wool wax (grease) - Excretions from wax (sebaceous) glands deposited in the wool.



American Sheep Industry Association

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A M E R I C A N W O O L

American Wool Council: A Division of ASI

www.americanwool.org