

Fibre Sampling

by Yokum-McColl Testing Laboratories, Inc.

It is simple, but very important, to send representative fiber samples for testing. The integrity of sampling, the careful and proper selection of a sample, is the most critical factor involved in measurement of fiber diameter in individual animals. The samples must be taken at the middle of the side in the blanket location.

The sample should be uniformly cut at the skin level, which is the base of the staple, and should be no smaller than a two-inch square in size. The sample should be kept in the staple configuration, which is its natural growth state. It should not be brushed out, cleaned up, or folded. Flat bladed shears or clippers are recommended as the safest tools to use in the taking of samples.



Length of Fiber Sample

Maintaining the staple formation of the sample submitted to the laboratory is important for a practical reason: The two-millimeter sample used for measurement in the Laserscan is cut close to the base of the staple to measure fiber that has grown side by side under the same environmental conditions. These conditions include level of nutrition, pregnancy, lactation, and stress caused by sickness or trauma. Recently shorn animals with shorter staple lengths generally have not been exposed to highly variable environmental conditions, so the variability of their fiber diameter may be limited. Working with staple lengths shorter than one and a half inches is problematic because the staple configuration breaks down and we are unable to take an even cut across the base during sample preparation.

Once the two-inch square sample is taken, it should be placed in a plastic sandwich-sized bag, and clearly labeled with the following identification:

- * I.D. (Name and Registration or Eartag Number)
- * Age (Date of Birth)
- * Sex (Male, Female, Gelding/Ram, Ewe, Wether/Buck, Doe)
- * Breed or Phenotype
- * Date of Sampling (Identifies age of animal's fiber sample)

Please BE SURE to include the above information for individual animal fiber diameter testing.

Fiber Samples and How They Compare

These fiber images originated by microprojection in our laboratory darkroom. Standard magnification in the microprojection of animal fibers is 500X. Photography and computer enhancement have changed the size of the fibers, but not their appearance.

Cuticle cells form a scale-like formation on the surface of the fiber, resembling shingles on a roof. Their primary function is to protect the internal structure of the fiber and to repel water on first contact while permitting moisture to easily move in or out of the fiber's interior. These scales on the surface of the fiber open from base to tip, causing an interlocking or felting action when fibers are randomly mixed during processing.

Although all camelid fibers are not medullated, these next three fibers do show a more or less continuous hollow area (medulla) inside the center or cortical layer. Most mammalian fibers are medullated because most of them are hair fibers. There are four main types of medullation: fragmented, interrupted, continuous and discontinuous.

When viewed under the microprojector, the air filled cell walls of the medulla appear black as they reflect light. When the mounting medium (immersion oil) is absorbed by the fiber, the medulla will then appear transparent.

Wool, for all practical purposes, is a modified hair. It was developed over many generations of animals from the undercoat of the wild sheep. Fine wool and fiber is a carefully selected trait and medullation is very seldom found. Coarser wool and mohair can also show medullation.

The individual wool fiber is divided into three sections: the root, the shaft and the tip. The tip of a lamb's wool fiber is pointed, while the tip from a mature fleece is flat because of previous shearing.



Wool Fibers Showing Types of Tips and Effects of Feed and Stress on Diameter of Fibers (courtesy of Travis Jones)

The wool fiber diameter can vary along its length, primarily due to nutrition. An animal on a high plane of nutrition grows a coarser fiber than one on a poor ration. The diameter within a given fiber can vary due to nutritional levels. A break or tender spot in the fiber can be caused by an extreme drop in nutrition or stress, from an infection or illness. Remember that crimp's naturally wavy design traps air between fibers, enabling wool to insulate against heat and cold and to maintain its resilience.

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