



MANAGEMENT

Grades and Length of Wool

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Quick Facts...

Grade refers to the relative diameter of the wool fibers (fineness) and should not be confused with quality and type.

The three systems that describe wool grades in the United States are blood, numerical count and micron.

Grease wools are processed into finished products by either the worsted or the woolen system.

Visual grading and microscopic examination are used to place wools according to their various characteristics.

Wool represents less than 5 percent of the world consumption of fibers. Wool is an expensive fiber to produce and process; consequently, it must be economically applicable to the product demanded by the consumer.

The sheep producer, particularly of wool breeds, must understand the basic technology of wool to recognize the needs of the mills and the spectrum of prices offered for wool. A better understanding of wool and its grades will enable the producer to recognize and address two major areas of concern: genetic uniformity and management techniques of wool harvesting and preparation.

Separation of wools into the various utility classes is based on relative fineness and the diameter of the fiber. The diameter of the fiber is indicative of the weight of material that can be produced from a given lot. Wools whose fibers are finer in diameter will produce lighter weight materials, while larger diameter fibers produce heavier weight materials.

Sheep wool is classified as follows:

Fine Wools	fine and 1/2 blood wool	60s and finer
Medium Wools	3/8s and 1/4 blood	50s to 58s
Long Wools	low 1/4 blood, common and braid wool	48s and coarser
Crossbred Wools	obtained from long-wool x fine-wool breeding, usually 3/8s or 1/2 blood	56s to 62s

Grading Systems

Three systems that describe wool grades in the United States are blood, numerical count and micron.

The **blood system** divides all wool, from finest to coarsest, into six market grades: fine 1/2 blood, 3/8s blood, 1/4 blood, low 1/4 blood, common and braid. Originally, these names referred to the fraction of Merino blood in the sheep that produced the wool. Today, blood grades are trade names only and indicate wool of a general diameter range. The blood system, for most all useful purposes, is outdated and has not been recognized by USDA since 1955.

The **numerical count system** divides all wools in 14 grades, each designated by a number that classifies wool by fiber diameter. Numbers range from 80s for the finest wool to 36s for the coarsest. The count refers to the hanks of yarn, each 560 yards long, which can be spun from 1 pound of wool top. A 64s wool yields 35,840 yards (560 times 64) of yarn from 1 pound of 64s top.

The **micron system** most accurately measures the average diameter of the wool fiber. The micron (1/25,400 inch) is the actual average diameter measurement.

The grading system recognized by law and described in the Federal Register utilizes a numerical designation. Individuals involved in wool trade use the numbers in communications relative to descriptions of wool grade. For example, "62s" would refer to a lot of wool in which practically all of the fibers

Table 1: Grades of grease wool.

Blood	Numerical	Range of average fiber diameter (microns)
Fine	64s, 70s, 80s	Under 22.04
Half-blood	60s, 62s	22.05 to 24.94
Three-eighths blood	56s, 58s	24.95 to 27.84
Quarter blood	50s, 54s	27.85 to 30.99
Low-quarter-blood	46s, 48s	31.00 to 34.39
Common	44s	34.40 to 36.19
Braid	36s, 40s	36.20 to 40.20

fell in the range of this grade. “62s/60s” refers to a lot of wool in which the bulk grade would be that of “62s” with a minor and coarser part falling into the 60s grade.

A wool grader classifies the whole fleece according to its grade (fineness) and length. The grader looks at fineness (fiber diameter) and crimp. Crimp is the waviness of the wool fiber, and the crimp count per inch (2.5 centimeters) usually will be higher (more) in finer grades and lower (less) in coarser grades. Grading by crimp alone is not encouraged because a perfect relationship between crimp count and fiber diameter does not exist. The grader also checks for weak fiber or tender spots along with a wool length determination. Finally the grader places the fleece with others that have similar characteristics.

Processing Methods

Grease wools are processed into finished products via the worsted processing system or the woolen system. The worsted system utilizes wools of longer length within a grade and the woolen system the shorter length wools. The length measurements for the different classifications listed in Table 2 refer to unstretched measurements of a lock of wool and are excellent indicators of actual fiber lengths found in the lock of wool.

In the **worsted system** of manufacturing, the wool, after scouring and drying, is carded to lend some organization to the fiber mass and then the wools are “combed.” This combing process can only be accomplished on longer length wools and results in the fibers being laid parallel to each other prior to drawing and spinning. At one time, only the extremely long wools within a grade were combed because of the limitations of available equipment. With the invention of the French comb, the intermediate length wools can be combed and has led to a separate designation of “French.” Worsted materials generally have a smooth firmer finish, are thinner with more twist of the yarn, and are the most durable of wool materials. They are used primarily in gabardine fabrics and garments with a tailored look.

The **woolen system** of manufacturing utilizes wools of shorter length; i.e., clothing length or reused wools within a grade. These wools are carded on a woolen card but are not combed. The resulting materials have a “nap,” are thicker and have a spongy feel. Examples of woolens are wool blankets, hosiery and flannels. Garments tend to be bulky in appearance.

Table 2: Length classes by grade (in inches).¹

Length class	Fine 64/70/80s	Half-blood 60/62s	Three-eighths-blood 56/58s	Quarter-blood 50/54s
Staple	2.75	3.00	3.25	3.50
Good French	2.25	2.50	2.25	2.50
Average French	1.25	1.50		
Short French and clothing	<1.25	<1.50	< 2.25	<2.50

¹Minimum average requirement, except for short length class.

Table 3. Comparison of wool grading systems.¹

USDA Standard Wool Specifications				
Type of Wool	Old Blood Grade	Numerical Count Grade	Limits for Average Fiber Diameter	Variability Limit for Standard Deviation Maximum
			(microns)	(microns)
Fine	Fine	Finer than 80's	<17.70	3.59
Fine	Fine	80's	17.70-19.14	4.09
Fine	Fine	70's	19.15-20.59	4.59
Fine	Fine	64's	20.60-22.04	5.19
Medium	1/2 Blood	62's	22.05-23.49	5.89
Medium	1/2 Blood	60's	23.50-24.94	6.49
Medium	3/8 Blood	58's	24.95-26.39	7.09
Medium	3/8 Blood	56's	26.40-27.84	7.59
Medium	1/4 Blood	54's	27.85-29.29	8.19
Medium	1/4 Blood	50's	29.30-30.99	8.69
Coarse	Low 1/4	48's	31.00-32.69	9.09
Coarse	Low 1/4	46's	32.70-34.39	9.59
Coarse	Common	44's	34.40-36.19	10.09
Very coarse	Braid	40's	36.20-38.09	10.69
Very coarse	Braid	36's	38.10-40.20	11.19
Very coarse	Braid	Coarser than 36's	>40.20	--

¹The blood system for most all useful purposes is outdated and has not been recognized by USDA since 1955.