



# SHEEP SHEET

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Typically wool is graded in the United States by one of three existing methods:

1. **The American or Blood System.**
2. **The British, Bradford or Spinning Count System.**
3. **The Micron Count System or micron measurement procedures.**

These systems are based on Average Fiber Diameter, which is the most important wool fiber property in the context of quality and value. For coarser wools, diameter has a rapidly decreasing effect on price. Diameter has a major influence on many carding, combing, spinning and fabric properties. For example, as diameter increases while propensity for felting decreases. In carding and combing, fiber breakage and noil production decrease as fiber diameter increases. The limiting yarn count that can be spun from a particular batch of wool, yarn hairiness and thickness all decrease as fiber diameter decreases. An increase in fiber diameter results in increased fabric harshness, flexural rigidity and abrasion resistance, while fabric felting propensity, breaking strength and pilling propensity decrease and wrinkle resistance is unaffected.

The first U.S. grade standards for wool were introduced in 1926. These standards were based entirely on subjective, visual appraisal of average fiber diameter. Recognizing the limitations of this method of quality assessment and with advancements in fiber sampling and objective measurements, the United States Department of Agriculture (USDA) developed and introduced a revised set of official standards for grades of wool in 1966. Assignment of grade is based on objectively determined average fiber diameter and standard deviation (a measure of variability) of diameter. For each of 14 grades the USDA

## Wool Grading and Evaluation

### Sheepdex W-1

specifies a range for average fiber diameter and a maximum number standard deviation. Provision is made that samples having standard deviations greater than the specified maximum are to be downgraded.

It is interesting to note that the numbers used to express wool grade are the same as those used in the English Worsted Yarn Count Systems (spinning count). When used to quantify yarn count, the number and letter 's' represents the number of 560 yarn lengths of yarn that can be spun from one pound of wool top. At one time, it was theoretically possible to manufacture 64s yarn from 64s wool. Because of increased machine speeds and greater productivity, this is no longer practical in today's worsted system. The double meaning of the symbol for count has been a source of confusion for many people involved with the U.S. sheep and wool industries. See below table for a comparison of the grades.

A COMPARISON OF THE GRADES*		
Spinning Count	Blood System	Micron System
Finer than 80s	Fine	under 17.70
80s	Fine	17.70 - 19.14
70s	Fine	19.15 - 20.59
64s	Fine	20.60 - 22.04
62s	½ Blood	22.05 - 23.49
60s	½ Blood	23.50 - 24.94
58s	3/8 Blood	24.95 - 26.39
56s	3/8 Blood	26.40 - 27.84
54s	1/4 Blood	27.85 - 29.29
50s	1/4 Blood	29.30 - 30.99
48s	Low 1/4 Blood	31.00 - 32.69
46s	Low 1/4 Blood	32.70 - 34.39
44s	Common	34.40 - 36.19
40s	Common	36.20 - 38.09
36s	Braid	38.10 - 40.20
Coarser than 36s	Braid	over 40.20

\* According to ASTM Standard Specification D 3991

The practice of using wool grades in production, marketing and manufacturing situations is declining on an international basis. It seems likely that the use of specifications for grades of wool will also decline in the U.S. and ultimately be replaced by a measurement of diameter (in microns) and variability (standard deviation).

## Uses of Wool by Micron:

Although you will find no absolute rules, generally the range of micron diameters for value-added products is as follows:

<b>Micron Range</b>	<b>Value-Added End Use</b>
16 - 19	Fine worsted and intimate wear
19 - 23	Apparel, outerwear, quilt-batting, felts
23 - 28	Sweaters, light upholstery coatings, fiberfill (comforters)
28 - 32	Upholstery, tapestries, some carpets
32 - 38+	Carpets, industrial use

Not surprisingly, coarser fibers also generally have higher abrasion resistance and are stronger, that or more resistant to breaking. Therefore as the rigorousness of the end use increases, so should the fiber diameter.

## Medium Grade Wools:

These are wools that are suitable for value-added processing, and with normally higher yields than the finer grades of wool. Wools that range from 62s and finer in the spinning count system or roughly 22.9 microns and finer in the micron system. Wools having lower spinning counts and/or larger average fiber diameters than 22.9 microns would be considered in the medium categories. These are wools that are primarily only suitable for use in the woolen system, and/or hand processing.

## Marginal Wools:

The name 'marginal' implies wool of questionable quality for restricted utilization or processing. In any sector of the U.S. wool industry marginal wools are usually present and must be dealt with in the market. These wools are discounted heavily in the raw wool market. These are wools that could have one or more of the following faults or problems::

- a. colored fiber contamination;
- b. excessive vegetable matter contamination;
- c. branding paint stains;
- d. tender or 'hunger-fine' fibers;
- e. chemical contaminants;
- f. heavy urine and fecal stains;
- g. mixed fiber types presents, i.e. kemp and medullated fibers; many other types of wools

with obvious negative faults would be considered in this category.

Generally, these marginal wools have limited use outside of the normal processes. In recent years some research and development has been undertaken to investigate possible market uses for so called marginal wools.

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*For more information write The Navajo Sheep Project, Inc. PO Box 4454, Logan, UT 84323-4454. The Navajo Sheep Project is a registered non-profit Utah corporation.*