United States
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Division

# United States Standards for Grades of Slaughter Swine

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The following is a reprint of the Official United States Standards for the Grades of Slaughter Swine promulgated by the Secretary of Agriculture under the Agricultural Marketing Act of 1946 (60 Stat. 1087; 7 U.S.C. 1621-1627) as amended and related authority in the annual appropriation acts for the Department of Agriculture. The standards are reprinted with amendments effective January 14, 1985.

## Development of the Standards

A system of classifying and grading market hogs was formulated by the United States Department of Agriculture in 1918 for use in the livestock market reporting service. The system was developed with the cooperation and assistance of many interested agencies and represented the most generally accepted market groupings of the time. After meetings with producers, animal husbandmen, market representatives, and slaughterers in 1928 and 1929, revisions were made, consistent with changes in production and marketing conditions, and tentative standards were issued in 1930. Further revisions were incorporated into the tentative standards in 1940 when they were published in Circular No. 569.

The United States Department of Agriculture proposed new standards for grades of slaughter barrows and gilts in 1949. Field testing, discussion, and demonstration of the standards resulted in slight revisions prior to adoption as the official United States standards for grades of slaughter barrows and gilts, effective September 12, 1952.

The official standards were amended in July 1955 by changing the grade designations Choice No. 1, Choice No. 2, and Choice No. 3, to U.S. No. 1, U.S. No. 2, and U.S. No. 3, respectively. In addition the degree of finish or fatness was reduced for each grade and the descriptive specifications were reworded slightly to reflect the reduced degrees of finish and to facilitate more uniform interpretation of the standards.

On July 1, 1968, the official standards were revised to coordinate them with the revised pork carcass standards. The minimum backfat thickness for the U.S. No. 1 grade was eliminated and a new U.S. No. 1 grade was established to properly identify the superior pork carcasses being produced. The former No. 1, No. 2, and No. 3 grades were renamed No.2, No. 3, and No. 4, respectively. The former Medium and Cull grades were combined and renamed U.S. Utility. Also, the maximum allowable adjustment for variations-from- normal fat distribution and muscling was changed from one-half to one full grade to more adequately reflect the effect of these factors on yields of cuts. In addition, the text of the “Application of Standards” section was reworded to more clearly define the grade-determining factors and clarify their use in determining the grade.

On January 14, 1985, the slaughter barrow and gilt grade standards were once again revised to coordinate them with concurrent changes in the barrow and gilt carcass grade standards. The barrow and gilt carcass grade standards were updated to reflect improvements in pork carcasses

and changes in the pork slaughter industry since 1968. A 1980 grade survey found that over 70 percent of the pork carcasses being produced in the U.S. No. 1 grade, indicating a large amount of variation in yield which was not being accounted for by the grades. The changes simplified the standards by basing the grade on the backfat thickness over the last rib with a single adjustment for muscling. In addition, the grades lines were tightened to more adequately sort the hogs being produced among several grades. Some minor changes in the wording of the quality requirements were also made.

**§53.150 Swine.**

The official standards for swine developed by the U.S. Department of Agriculture provide for segregation first according to intended use -- slaughter or feeder -- then as to class, as determined by sex condition, and then as to grade, which is determined by the apparent relative excellence and desirability of the animal for a particular use. Differentiation between slaughter and feeder swine is based solely on their intended use rather than on specific identifiable characteristics of the swine. Slaughter swine are those which are intended for slaughter immediately or in the near future. Feeder swine are those which are intended for slaughter after a period of feeding.

**§53.151 Slaughter and feeder swine classes.**

There are five classes of slaughter and feeder swine. Definitions of the respective classes are as follows:

(a) *Barrow.* A barrow is a male swine castrated when young and before development of the secondary physical characteristics of a boar.

(b) *Gilt.* A gilt is a young female swine that has not produced young and has not reached an advanced stage of pregnancy.

(c) *Sow*. A sow is a mature female swine that usually shows evidence of having reproduced or having reached an advanced stage of pregnancy.

(d) *Boar*. A boar is an uncastrated male swine.

(e) *Stag*. A stag is a male swine castrated after development or beginning of development of the secondary physical characteristics of a boar. Typical stags are somewhat coarse and lack balance -- the head and shoulders are more fully developed than the hindquarter parts, bones and joints are large, the skin is thick and rough, and the hair is coarse.

**§53.152 Application of standards for grades of slaughter barrows and gilts.**

(a) Grades of slaughter barrows and gilts are intended to be directly related to the grades of the carcasses they produce. To accomplish this, the slaughter barrow and gilt grades are predicated on the same two general considerations that provide the basis for the grades of barrow and gilt carcasses: quality -- which includes characteristics of the lean and firmness of fat, and characteristics related to the combined carcass yields of the four lean cuts (ham, loin, picnic shoulder, and Boston butt).

(b) With respect to quality, two general levels are considered, one for barrows and gilts with

characteristics which indicate that the carcass will have acceptable belly thickness and lean quality, and acceptable firmness of fat, and one for barrows and gilts with characteristics which indicate that the carcass will have unacceptable belly thickness, lean quality, and/or firmness of fat. The bellies of carcasses with acceptable quality are at least slightly thick overall and are not less than 0.6 inches thick at any point. Since carcass indices of lean quality are not directly evident in slaughter barrows and gilts, some other factors in which differences can be noted must be used to evaluate quality. Therefore, the amount and distribution of external finish and indications of firmness of fat and muscle are used as quality-indicating factors.

(c) Slaughter barrows and gilts with characteristics which indicate they will not have an acceptable belly thickness or quality of lean are graded U.S. Utility. Also graded U.S. Utility are slaughter barrows and gilts with indications that they will produce carcasses which will have oily or less than slightly firm fat.

(d) Four grades -- U.S. No. 1, U.S. No. 2, U.S. No. 3, and U.S. No. 4 are provided for slaughter barrows and gilts with characteristics which indicate that their carcasses will have an acceptable level of lean quality and acceptable firmness of fat. These grades are based entirely on the combination of factors that predict the expected combined carcass yields of the four lean cuts -- hams, loins, picnic shoulders, and Boston butts.

(e) The official grade for slaughter barrows and gilts having acceptable quality is determined by considering two characteristics: (1) The estimated backfat thickness over the last rib, and (2) the muscling score. Values for these factors are then used in a mathematical equation to arrive at the final grade.

(f) In evaluating barrows and gilts for fatness and muscling, variations in the degree of fatness have a greater effect on the yield of the lean cuts than do variations in muscling. The fatness and muscling evaluations can best be made simultaneously. This is accomplished by considering the development of the various parts based on an understanding of how the appearance of each part is affected by variations in muscling and fatness. While the muscling of most barrows and gilts develops uniformly, the fat is normally deposited at a considerably faster rate on some parts than on others. Therefore, muscling can be appraised best by giving primary consideration to the parts least affected by fatness, such as the hams. Differences in thickness and fullness of the hams -- with appropriate adjustments for the effects of variations in fatness -- are the best indicators of the overall degree of muscling. Conversely, the overall fatness can be determined best by observing those parts on which fat is deposited at a faster than average rate. These include backfat, the edge of the loin, the rear flank, the shoulder, the jowl, and the belly. As barrows and gilts increased in fatness, these parts appear progressively fuller, thicker, and more distended in relation to the thickness and fullness of the other parts, especially the thickness through the hams.

(g) When grading live animals it is usually necessary to consider indications of fatness on all parts of the animal in order to most accurately estimate the backfat thickness over the last rib. As slaughter barrows and gilts increase in fatness, they also become deeper bodied because of deposits of fat in the flanks and along the underline. The fullness of the flanks, best observed when the animal walks, and the thickness and fullness of the jowl are other indications of fatness.

(h)(1) In slaughter barrow and gilt grading three degrees of muscling -- thick (superior), average, and thin (inferior) -- are considered. In previous standards (33 FR 9249) six degrees of muscling (very thick, thick, moderately thick, slightly thin, thin, and very thin) were recognized.

The current thick (superior) muscling includes only the previous very thick degree of muscling. Current average muscling includes the previous thick and moderately thick degrees, and the current thin (inferior) muscling includes the previous slightly thin, thin, and very thin degrees.

(2) Slaughter barrows and gilts with thick muscling and a low degree of fatness will be much thicker through the hams than through the loins and the loins will appear full and well-rounded. Thick muscled animals with a high degree of fatness will be slightly thicker through the hams than through the loins, will be nearly flat over the back, and will have a slight break into the sides. Animals with average muscling and a low degree of fatness will be thicker through the hams than through the loins, and the loins, and the loins will appear slightly full and rounded. Animals with average muscling and a high degree of fatness will have about equal thickness through the hams and loins. Animals with thin muscling and a low degree of fatness usually are slightly thicker through the shoulders and the center of the hams than through the back and the loins will appear sloping and flat. Thin muscled animals with a high degree of fatness will be wider through the loins than through the hams and will have a distinct break from over the loins into the sides.

(3) Slaughter barrows and gilts with average muscling will be graded according to their estimated backfat thickness over the last rib. Animals with thin muscling will be graded one grade lower than indicated by the estimated backfat thickness over the last rib. Animals with thick muscling will be graded one grade higher than indicated by their estimated backfat thickness over the last rib, except that animals with an estimated 1.75 inches or greater last rib backfat thickness must remain in the U.S. No. 4 grade.

(i) The official grade standards contain a mathematical equation for calculating the grade and a table for determining a preliminary grade based on the estimated backfat thickness over the last rib. Also, the individual grade specifications describe the various combinations of muscling and last rib backfat thickness which qualify for that grade.

**§53.153 Specifications for official United States standards for grades of slaughter barrows and gilts.**

(a) The grade of a slaughter barrow or gilt with indications of acceptable quality is determined on the basis of the following equation: Grade = (4.0 X last rib backfat thickness, inches) (1.0 X muscling score). To apply this equation, muscling should be scored as follows: thin (inferior) = 1, average = 2, and thick (superior) = 3. Animals with thin muscling cannot grade U.S. No. 1. The grade may also be determined by calculating a preliminary grade according to the schedule shown in Table 1 and adjusting up or down one grade for superior or inferior muscling, respectively.

TABLE 1 -- Preliminary Grade Based on Backfat Thickness Over the Last Rib

| Preliminary Grade | Backfat thickness range |
|---|---|
| U.S. No. 1 ..... | Less than 1.00 inch. |
| U.S. No. 2 ..... | 1.00 to 1.24 inches. |
| U.S. No. 3 ..... | 1.25 to 1.49 inches. |
| U.S. No. 4 ..... | 1.50 inches and over.[1] |

[1]Animals with an estimated last rib backfat thickness of 1.75 inches or over cannot be graded U.S. No. 3, even with thick muscling.

(b) The following descriptions provide a guide to the characteristics of slaughter barrows and gilts in each grade.

(1) *U.S. No. 1*. (i) Barrows and gilts in this grade are expected to have an acceptable quality of lean and belly thickness and a high expected yield (60.4 percent and over) of four lean cuts. U.S. No. 1 barrows and gilts must have less than average estimated backfat thickness over the last rib with average muscling, or average estimated backfat over the last rib coupled with thick muscling.

(ii) Barrows and gilts with average muscling may be graded U.S. No. 1 if their estimated backfat thickness over the last rib is less than 1.00 inch. Animals with thick muscling may be graded U.S. No. 1 if their estimated backfat thickness over the last rib is less than 1.25 inches. Barrows and gilts with thin muscling may not be graded U.S. No. 1.

(2) *U.S. No. 2.* (i) Barrows and gilts in this grade are expected to have an acceptable quality of lean and belly thickness and an average expected yield (57.4 to 60.3 percent) of four lean cuts. Animals with average estimated backfat thickness over the last rib and average muscling, less than average estimated backfat thickness over the last rib and thin muscling, or greater than average estimated backfat thickness over the last rib and thick muscling will qualify for this grade.

(ii) Barrows and gilts with average muscling will be graded U.S. No. 2 if their estimated backfat thickness over the last rib is 1.00 to 1.24 inches. Barrows and gilts with thick muscling will be graded U.S. No. 2 if their estimated backfat thickness over the last rib is 1.25 to 1.49 inches. Barrows and gilts with thin muscling must have less than 1.00 inch of estimated backfat over the last rib to be graded U.S. No. 2.

(3) *U.S. No. 3.* (i) Barrows and gilts in this grade are expected to have an acceptable quality of lean and belly thickness and a slightly low expected yield (54.4 to 57.3 percent) of four lean cuts. Barrows and gilts with average muscling and more than average estimated backfat thickness over last rib, thin muscling and average estimated backfat thickness over the last rib, or thick muscling and much greater than average estimated backfat thickness over the last rib will qualify for this grade.

(ii) Barrows and gilts with average muscling will be graded U.S. No. 3 if their estimated backfat thickness over the last rib is 1.25 to 1.49 inches. Barrows and gilts with thick muscling will be graded U.S. No. 3 if their estimated backfat thickness over the last rib is 1.50 to 1.74 inches. Barrows and gilts with 1.75 inches or more of estimated backfat thickness over the last rib cannot grade U.S. No. 3. Barrows and gilts with thin muscling will be graded U.S. No. 3 if their estimated backfat thickness over the last rib is 1.00 to 1.24 inches.

(4) *U.S. No. 4*. (i) Barrows and gilts in this grade are expected to have an acceptable quality of lean and belly thickness and a low expected yield (less than 54.4 percent) of four lean cuts. Barrows and gilts in the U.S. No. 4 grade always have more than average estimated backfat over the last rib and thick, average, or thin muscling, depending on the degree to which the estimated backfat thickness over the last rib exceeds the average.

(ii) Barrows and gilts with average muscling will be graded U.S. No. 4 if their estimated backfat thickness over the last rib is 1.50 inches or greater. Barrows and gilts with thick muscling will be graded U.S. No. 4 with estimated backfat thickness over the last rib of 1.75 inches or greater, and those with thin muscling will be graded U.S. No. 4 with 1.25 inches or greater estimated backfat over the last rib.

(5) *U.S. Utility*. All barrows and gilts with probable unacceptable quality of lean or belly

thickness will be graded U.S. Utility, regardless of their muscling or estimated backfat thickness over the last rib. Also, all barrows and gilts which may produce soft and/or oily fat will be graded U.S. Utility.

**§53.154 Application of standards for grades of slaughter sows.**

(a) The standards for grades of slaughter sows are based on (1) differences in yields of lean cuts and of fat cuts and (2) differences in quality of cuts. These characteristics vary rather consistently from one grade to another. The U.S. No. 1 grade has about the minimum degree of finish necessary to produce pork carcasses with quality characteristics indicative of acceptable palatability in the cuts. The U.S. No. 2 grade is overfinished and the U.S. No. 3 grade is decidedly overfinished in relation to the minimum finish associated with acceptable palatability. Yields of lean cuts are lower and yields of fat cuts are higher, in proportion to the degree of overfinish, in these grades than in the U.S. No. 1 grade. Medium grade sows are underfinished and produce carcasses which are soft and have indications of insufficient quality for acceptably palatable cuts. Cull grade sows are decidedly underfinished and the pork is soft and watery with little or no marbling and low palatability.

(b) The grades for slaughter sows are closely related to the grades for sow carcasses, and the desired objective in grading sows is the accurate prediction of the carcass grade that will be produced. Degree of finish is an important factor in grading, and the expected average back fat thickness of carcasses produced by each grade of slaughter sows forms a part of the standards. The results of study of carcass measurement and cutting data show that carcasses equal in fat thickness are approximately equal in yields of cuts regardless of differences in weight. Therefore, the expected back fat thickness of carcasses from each grade of slaughter sows is the same at all weights. The following table outlines the carcass fat thickness guides for each grade of slaughter sows.

| Grade | Average back fat thickness[1] |
|---|---|
| U.S. No. 1 ..... | 1.5 to 1.9 inches. |
| U.S. No. 2 ..... | 1.9 to 2.3 inches. |
| U.S. No. 3 ..... | 2.3 or more inches. |
| Medium ..... | 1.1 to 1.5 inches. |
| Cull ..... | Less than 1.1 inches. |

[1]Average of three measurements, skin included, made opposite first and last ribs and the last lumbar vertebrae.

(c) The standards for grades also include descriptive specifications of the characteristics of slaughter sows with the minimum degree of finish for each grade. Application of the standards requires an accurate appraisal of these live animal characteristics indicative of carcass finish and grade. No attempt is made to describe in the standards the many combinations of characteristics which may qualify an animal for a particular grade, and sound judgment is required to appropriately analyze varying combinations.

(d) Slaughter sows that have produced several litters of pigs may show considerable roughness along the underline due to extensive development of mammary tissue. In addition, sows from which pigs were weaned only a short time prior to grading may show evidence that the mammary tissue is still active in milk production and not completely dry. Since smoothness and dryness of the underline have little effect on the basic grade determining factors, no provision is made in the standards for altering the grade of slaughter sows due to differences in these characteristics. It is recognized that the value determining factors to be considered in marketing sows include dryness and smoothness as well as such other factors as weight, degree of finish, quality, and fill. However, consideration of all such factors in determining grade would require a complicated system with a great number of grades in order to make each grade sufficiently restrictive to be practical and useful. Therefore, the grades outlined in these standards identify differences in slaughter sows with respect to yields of cuts and quality. They were designed as practical aids in evaluating slaughter sows when used in conjunction with other factors such as weight, fill, smoothness, and dryness.

**§53.155 Specifications for official U.S. standards for grades of slaughter sows.**

(a) *U.S. No. 1 grade*. U.S. No. 1 grade slaughter sows have an intermediate degree of finish near the minimum required to produce pork cuts of acceptable palatability. Sows with the minimum finish for U.S. No. 1 grade are moderately long and slightly wide in relation to weight. Width of body is rather uniform from top to bottom and from front to rear. The back, from side to side, is moderately full and thick with a well-rounded appearance and blends smoothly into the sides. The sides are moderately long and slightly thick; the flanks are slightly thick and full. Depth at the rear flank may be slightly less than depth at the fore flank. Hams are usually moderately thick and full with a slightly thick covering of fat. Jowls are usually moderately thick and full but appear trim. Sows in this grade produce U.S. No. 1 grade carcasses.

(b) *U.S. No. 2 grade*. U.S. No. 2 grade slaughter sows have a moderately high degree of finish that is somewhat greater than the minimum required to produce pork cuts of acceptable palatability. Sows with the minimum finish for the U.S. No. 2 grade are slightly short and moderately wide in relation to weight. Width of body is often greater over the top than at the underline and tends to be slightly greater through the shoulders than through the hams. The back, from side to side, is full and thick and appears slightly flat with a noticeable break into the sides. The sides are slightly short and moderately thick; the flanks are moderately thick and full. Depth at the rear flank is nearly equal to depth at the fore flank. Hams are usually thick and full with a moderately thick covering of fat, especially over the lower part. Jowls are usually full and thick, and the neck appears rather short. Sows in this grade produce U.S. No. 2 grade carcasses.

(c) *U.S. No. 3 grade*. U.S. No. 3 grade slaughter sows have a high degree of finish that is considerably greater than the minimum required to produce pork cuts of acceptable palatability. Sows with the minimum finish for U.S. No. 3 grade are short and wide in relation to weight. Width of body is often somewhat greater over the top than at the underline and tends to be greater through the shoulders than through the hams. The back, from side to side, is very full and thick and appears nearly flat with a pronounced break into the sides. The sides are short and thick; the flanks are thick and full. Depth at the rear flank is equal to depth at the fore flank.

Hams are usually very thick and full with a thick covering of fat especially over the lower part. Jowls are usually very full and thick, and the neck appears short. Sows of this grade produce U.S. No. 3 grade carcasses.

(d) *Medium grade*. Medium grade slaughter sows have a low degree of finish which is somewhat less than the minimum required to produce pork cuts of acceptable palatability. Sows with the minimum finish for Medium grade are long and moderately narrow in relation to weight. Width of body is often less over the top than at the underline and tends to be slightly less through the shoulders than through the hams. The back, from side to side, is moderately thin and appears rather peaked at the center with a distinct slope toward the sides. The hips are moderately prominent. The sides are long and moderately thin; the flanks are thin. Depth at the rear flank is less than depth at the fore flank. Hams are usually moderately thin and flat and taper toward the shank. Jowls are usually slightly thin and flat, and the neck appears rather long. Sows in this grade produce Medium grade carcasses.

(e) *Cull grade*. Cull grade slaughter sows have a very low degree of finish which is considerably lower than that required to produce pork cuts of acceptable palatability. Sows with the finish typical of the Cull grade are long and narrow in relation to weight. Width of body is often somewhat less over the top than at the underline and tends to be less through the shoulders than through the hams. The back, from side to side, is thin and lacks fullness and is peaked at the center with a decided slope toward the sides. The hips are prominent. The sides are very long and thin; the flanks are very thin. Depth at the rear flank is considerably less than depth at the fore flank. Hams are usually thin and flat with a definite taper toward the shank. Jowls are usually thin and flat, and the neck appears long. Sows in this grade produce Cull grade carcasses.