Inspector's Guidelines for
Grading Fresh or Frozen Shrimp

The purpose of these guidelines is to assist the inspector in
using the Standards for Grades of Fresh and Frozen Shrimp - 50
CFR Subpart A.

TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>General</td>
<td>2</td>
</tr>
<tr>
<td>Materials</td>
<td>2</td>
</tr>
<tr>
<td>Documents</td>
<td>2</td>
</tr>
<tr>
<td>Equipment</td>
<td>2</td>
</tr>
<tr>
<td>Product Forms</td>
<td>3</td>
</tr>
<tr>
<td>Procedures</td>
<td>3</td>
</tr>
<tr>
<td>Score Sheet Set Up</td>
<td>3</td>
</tr>
<tr>
<td>Sampling</td>
<td>3</td>
</tr>
<tr>
<td>Sample Unit Size</td>
<td>3</td>
</tr>
<tr>
<td>Weights</td>
<td>5</td>
</tr>
<tr>
<td>Counts</td>
<td>6</td>
</tr>
<tr>
<td>Determining the Grade</td>
<td>8</td>
</tr>
<tr>
<td>Grading</td>
<td>8</td>
</tr>
<tr>
<td>Product Examination Frozen State</td>
<td>8</td>
</tr>
<tr>
<td>Dehydration</td>
<td>8</td>
</tr>
<tr>
<td>Product Examination Thawed State</td>
<td>9</td>
</tr>
<tr>
<td>Uniformity of Size</td>
<td>9</td>
</tr>
<tr>
<td>Black Spots, Improperly Headed (Throats), and</td>
<td>10</td>
</tr>
<tr>
<td>Improperly Cleaned ends</td>
<td></td>
</tr>
<tr>
<td>Pieces of Shrimp, Broken Shrimp, or Damaged</td>
<td>11</td>
</tr>
<tr>
<td>Shrimp</td>
<td></td>
</tr>
<tr>
<td>Unusable Material</td>
<td>12</td>
</tr>
<tr>
<td>Unacceptable Shrimp and Heads</td>
<td>13</td>
</tr>
<tr>
<td>Inadvertently or Improperly Peeled Shrimp</td>
<td>14</td>
</tr>
<tr>
<td>Improperly Deveined</td>
<td>14</td>
</tr>
<tr>
<td>Product Examination Cooked State</td>
<td>15</td>
</tr>
<tr>
<td>Texture</td>
<td>15</td>
</tr>
<tr>
<td>Evaluation of Flavor and Odor</td>
<td>15</td>
</tr>
<tr>
<td>Methods of Analysis</td>
<td>16</td>
</tr>
<tr>
<td>Assigning the Grade</td>
<td>17</td>
</tr>
<tr>
<td>Sample Unit Grade</td>
<td>17</td>
</tr>
<tr>
<td>Lot Grade</td>
<td>17</td>
</tr>
<tr>
<td>Appendix 1 - Blank Score Sheet</td>
<td></td>
</tr>
<tr>
<td>Appendix 2 - Example of Completed Score Sheet</td>
<td></td>
</tr>
<tr>
<td>Appendix 3 - Determination of Net Contents</td>
<td></td>
</tr>
<tr>
<td>Appendix 4 - Procedure for Cooking Samples</td>
<td></td>
</tr>
<tr>
<td>Appendix 5 - Shrimp Illustration</td>
<td></td>
</tr>
</tbody>
</table>

January 20, 1993
GENERAL

These guidelines used with the score sheet, NOAA Form 89-860, should result in a uniform interpretation of the Standards for Grades and a correct determination of the product's grade. The material is arranged in the order normally followed when grading frozen end product or when conducting a lot inspection.

The referenced sections of 50 CFR used throughout these guidelines [i.e., Selection of the Sample Unit § 265.104(b)] are provided to help locate the appropriate requirement(s) in the Standards for Grades. They must not be construed as the only requirements with which the user is to be knowledgeable since a thorough familiarity with all aspects of the standard and the product is essential if the standard is to be properly used.

Shrimp shall be processed and maintained in accordance with good commercial practice. They shall be wholesome and entirely from species which are known to be safe and suitable for human consumption.

The Standards for Grades apply to fresh or frozen shrimp of regular commercial species either raw or cooked. They do not apply to raw breaded shrimp which is covered by a U.S. Food and Drug Administration Standard of Identity (21 CFR 123) or to the breaded shrimp products covered by 50 CFR 265 Subpart B.

MATERIALS

Documents.

1. United States Standards for Grades of Fresh or Frozen Shrimp (50 CFR 265 Subpart A).
3. Score Sheet Shrimp Products, NOAA Form 89-860. See Appendix 1 and 2 of these guidelines for examples of score sheets.

Equipment.

1. Balance or scale of adequate capacity and sensitivity of 0.1 gram or 0.01 ounce.
2. Circular U.S. number 8 wire sieve, 8 inches (20 cm) or 12 inches (30 cm) in diameter.
3. Thermometer.
4. Timepiece readable to the second.
5. Equipment for cooking product. See Appendix 4 of these guidelines for cooking procedures.
PRODUCT FORMS [§ 265.102]

The Standards for Grades list several types, styles and market forms. They also include "other forms of shrimp as specified and so designated on the label." These designations are meant to ease identification of a lot between the buyer and the seller. They are not grading factors. If a market form is declared on the label of the container, record this information on the score sheet. Later, during examination of the product, you will determine whether the actual contents comply with the declared market form as it appears on the label. If the contents do not comply with the label declaration, the lot is GNC (Grade Not Certified) (50 CFR § 260.21). Either the contents or the label declaration must be reworked before determination of grade can be completed.

PROCEDURES

Score Sheet Set Up:

Keeping accurate records is extremely important. All information that applies to the sample and lot should be recorded on the score sheet prior to the examination of the samples. This should include information regarding the type and condition of the packaging materials and all information pertinent to the species and the lot under inspection including significant information taken from the label.

Sampling §265.104(b):

To determine the number of sample units, follow the sampling plans specified in the appropriate sampling tables in 50 CFR §260.61. Sample units are drawn at random according to lot size and are examined for defects. One way to ensure a random sample is to select the sample units according to a previously prepared table of random numbers.

Sample Unit Size §265.104(b):

For the evaluation of product, the sample unit will be as follows:

For shrimp under 70 count per pound - a sample unit of as close as practical to two pounds, taken from one or more packages as necessary will be used. If the contents of one package exceeds 2 pounds, a representative sample unit of 2 pounds will be used.
EXAMPLE: The declared net weight of a 16 to 20 count per pound product is 1-1/2 pounds. Each sample unit will be a representative 2-pound portion from 2 packages.

The declared net weight of a 16 to 20 count per pound product is 4 pounds. The sample unit will be a representative 2-pound portion of the package.

For shrimp 70 - 250 count per pound - a sample unit of as close as practical to one pound, taken from one or more packages as necessary will be used. If the contents of one package exceeds 1 pound, a representative sample unit of 1 pound will be used.

EXAMPLE: The declared net weight of a 71 to 80 count per pound product is 8 ounces. Each sample unit will be two packages providing 1 pound of product.

The declared net weight of a 71 to 80 count per pound product is 3 pounds. The sample unit will be a representative 1-pound portion of the package.

For shrimp over 250 count per pound - a sample unit of as close as practical to 8 ounces taken from one or more packages as necessary will be used. If the contents of one package exceeds 8 ounces, a representative sample unit of 8 ounces will be used.

EXAMPLE: The declared net weight of a 300 to 400 count per pound product is 8 ounces. Each sample unit will be one package.

The declared net weight of a 300 to 400 count per pound product is 5 pounds. The sample unit will be a representative 8-ounce portion of the package.

When inspecting block frozen shrimp, the product will be thawed prior to removing the sample unit.

EXAMPLE: When inspecting a 5-pound block of 16/20 count per pound shrimp, first thaw the 5-pound block for determination of drained weight using the method described in Appendix 3, then randomly draw (as close as practical) a 2-pound subsample unit for inspection of quality factors.
When inspecting IQF product, the sample unit will be removed prior to deglazing.

EXAMPLE: When inspecting a 5-pound bag of IQF 16/20 count per pound shrimp, randomly draw (as close as practical) 2-pounds of shrimp; then deglaze using the method described in Appendix 3 and proceed with the inspection of quality factors.

If the declared count per pound overlaps two of the size ranges given in §265.104(b), use the sample unit size for the range which includes the smallest shrimp (highest count) of the declared range.

EXAMPLE: The declared count per pound is 65/75. The sample unit size is 1-pound.

If the count per pound is not declared, base the sample unit size on the actual count per pound of the first sample unit.

Weights §265.104(c).

Collect the sample unit according to the guidelines in the previous section "Sample Unit Size". Weigh the sample unit and record the result on the score sheet. Net weights and drained weights are determined using the procedures given in Appendix 3. Note that different procedures are given for different market forms of shrimp. For forms of shrimp such as block frozen shrimp for which only a drained weight may be determined, it is necessary to make the determination prior to removing a subsample for product examination. On the score sheet, state units of weights used (i.e., pounds, ounces, kilograms, or grams) and whether the results are net or drained weights. After determining the net weight, record the value on the score sheet. If a subsample of the package is used as the sample unit, the net weight of the package must be calculated by a ratio before recording on the score sheet.

EXAMPLE: The declared net weight of a 16 to 20 count per pound product is 4 pounds. The weight of the package is 67.2 ounces. The sample unit will be a representative 2-pound portion of the package. The weight of the frozen, glazed sample unit is recorded as 33.6 ounces. After applying the procedures in Appendix 3 for net contents, the deglazed weight of the sample unit is recorded as 31.3 ounces. The net contents of
the package is calculated as follows:

calculated net weight of the package =

\[ \frac{\text{deglazed sample unit weight} \times \text{glazed weight of package}}{\text{glazed sample unit weight}} \]

\[
\frac{31.3 \text{ ounces } \times 67.2 \text{ ounces}}{33.6 \text{ ounces}} = 62.6 \text{ ounces}
\]

Since the declared net weight is 4 pounds (64 ounces) this sample unit does not meet the declared net weight.

EXAMPLE: The declared net weight of a 16 to 20 count per pound product is 2 pounds. The weight of the package frozen and glazed is 36 ounces. The sample unit will be the whole package. After applying the procedures in Appendix 3 for net contents, the weight of the sample unit is recorded as 33 ounces. This is the net weight of the package. Since the declared net weight is 2 pounds (32 ounces) this sample unit meets the stated net weight.

Declared weight is the weight stated on the label of the product.

Adjusted weight is the weight of all the whole, unbroken, undamaged shrimp in a sample unit. This is determined by deleting the weight of pieces, broken and damaged shrimp, unacceptable shrimp, inadvertently or improperly peeled shrimp, improperly deveined shrimp, and unusable shrimp material from the weight of the sample unit. Enter the number obtained in the calculation next to "adjusted weight" on the score sheet.

Counts §265.104(c).

Adjusted count is the number of shrimp comprising the adjusted weight. Count the number of whole, unbroken, and undamaged shrimp (the shrimp used to determine the adjusted weight). Divide this number of shrimp (the adjusted count) in the sample unit by the adjusted weight in pounds (previously recorded on the score sheet). If working in ounces, divide the adjusted count in the sample unit by the adjusted weight in ounces, then multiply the results by 16. The division should be carried to the first decimal place. This is the actual count per pound.

EXAMPLE: The declared package count is 71/80. The adjusted weight of the sample unit is 1.2 pounds.
There are 72 whole, unbroken, undamaged shrimp in the 1.2 pound (19.2 ounces) sample unit.

A. OUNCES

\[
\text{adjusted count} \times 16 = \text{count per pound} \\
\text{adjusted weight}
\]

\[
\frac{72 \text{ shrimp}}{19.2 \text{ ounces}} \times 16 = 60 \text{ shrimp per pound}
\]

B. POUNDS

\[
\text{adjusted count} = \text{count per pound} \\
\text{adjusted weight}
\]

\[
\frac{72 \text{ shrimp}}{1.2 \text{ pounds}} = 60 \text{ shrimp per pound}
\]

The sample unit does not meet the declared count per pound.

EXAMPLE: The declared package count is 16/20. The adjusted weight of the sample unit is 32 ounces (2 pounds). There are 31 whole, unbroken, undamaged shrimp in the 32 ounce sample unit.

A. OUNCES

\[
\frac{31 \text{ shrimp}}{32 \text{ ounces}} \times 16 = 15.5 \text{ shrimp per pound}
\]

B. POUNDS

\[
\frac{31 \text{ shrimp}}{2 \text{ pounds}} = 15.5 \text{ shrimp per pound}
\]

The sample unit does not meet the declared count per pound.

If the actual count per pound of a sample unit does not conform to the declared count, that sample unit is a deviant. If the number of deviant sample units exceeds the acceptance number for its sample size, it is marked a mixed lot and not graded.

EXAMPLE: The lot requires 13 sample units (accept on 2/reject on 3). If 2 sample units do not meet the declared count per pound, the lot may be graded. If 3 sample units do not meet the declared count per pound, the lot is marked a mixed lot and may NOT be graded.
Determining the Grade.

For examination of a product, use Table 1 of the Standards for Grades to assign defect points to a sample unit.

Notice that defect points are assigned to physical defects. The scoring system is based on a perfect score of zero (no physical defects).

Flavor and odor do not receive score points. These are rated by degree of acceptability and are designated "Good" or "Reasonably Good."

A final product grade is assigned to each sample unit examined. This grade represents both the scored and the unscored factors. It is determined as stated in the Standards for Grades [§265.104(g)] and page 16 of these guidelines.

NOTE: A product to be graded must meet product description and be wholesome and edible. If the product does not meet these qualifications, mark the product GNC (Grade Not Certified).

GRADING [§ 265.104]

Product Examination - Frozen State.

Dehydration [§ 265.104(e)(1)(i)]

Dehydration refers to the occurrence of dried-out, white, fibrous looking, toughened areas of shrimp flesh. On peeled market forms, dehydration is noticeable by the dull dry appearance of the flesh. On shell-on market forms, dehydration is may be observed by a motting of the shell. Points are only assessed for dehydration that affects the flesh.

Slight means that minimally noticeable areas of individual shrimp, or a small number of shrimp, in the sample unit are affected with dehydration that is color masking and can be easily removed by scraping with a fingernail or other blunt instrument.

Moderate means that large areas of individual shrimp, or a majority of the shrimp, in the sample unit are affected with dehydration that is color masking and can be easily removed by scraping with a fingernail or other blunt instrument, OR; small areas of individual shrimp, or a small number of shrimp, in a sample unit are affected with deep color masking dehydration penetrating the flesh requiring a knife or other sharp instrument to remove.
Excessive means that large areas of individual shrimp, or > 50% of the shrimp, in the sample unit are affected with deep color masking dehydration penetrating the flesh requiring a knife or other sharp instrument to remove.

Points are based on an overall assessment of the sample unit. If more than one level of dehydration occurs in the same sample unit, assess points according to which level of dehydration is predominant in the sample unit.

Product Examination - Thawed State

To assess points, refer to the count per pound column in the defect table. The column used will be that which matches the declared count per pound. When the declared count per pound overlaps two of the count columns in Defect Table 1, use the count per pound column of the highest range. For example, if the declared count per pound is 36/42, use the defect column 41/70 count per pound. If the count is not declared, the actual count per pound category will be used.

"Each additional percent by weight" in Defect Table 1 means that the full additional percentage indicated must be present before assessing additional points.

EXAMPLE: Defect category "Black spot, throats, and improperly cleaned ends", up to 40 count per pound category. Percent by weight of defect is 24.00.

Deduct 16 points for the first 16.00 percent by weight.
Deduct 16 additional points for the full additional 8.00 percent by weight. Total points deducted is 32.

EXAMPLE: Defect category "Unacceptable shrimp and heads", up to 40 count per pound category. Percent by weight of defect is 22.00.

Deduct 16 points for the first 10.00 percent by weight.
Deduct 16 points for each additional full 5.00 percent by weight. In this example, there are 2 full additional percent by weight increments. Deduct an additional 32 points. Total points deducted is 48.

Uniformity of Size (§ 265.104(e)(2)(i))

Uniformity of size refers to the ratio of the large shrimp to the small shrimp. The uniformity of weight ratio is determined by first calculating 10% of the number of shrimp in the adjusted sample unit (ADJUSTED COUNT x 10%). Visually select that number of the largest shrimp in the sample unit and weigh them. Visually select the same number of the smallest shrimp and weigh them. Use
the rounding rules from NOAA Handbook Manual 25, Part III, Chapter 2, Section 05, to select only whole numbers of shrimp.

EXAMPLE: A representative 2-pound sample unit, of 26 to 30 count per pound shrimp, has 54 whole, unbroken, undamaged shrimp.

\[
10 \% \times 54 = 5.4 \text{ shrimp. Round down to 5 shrimp.}
\]

The 5 visually largest shrimp weigh 13.0 ounces.
The 5 visually smallest shrimp weigh 8.6 ounces.

Weight ratio: \[
\frac{13.0 \text{ ounces}}{8.6 \text{ ounces}} = 1.51
\]

Under the "up to 40 count" column in the defect table, the weight ratio 1.51 is assessed 0 defect points.

Black spots, improperly headed (throats) and improperly cleaned ends \([§ 265.104(e)(2)(ii)]\)

Black spots refer to the presence of any objectionable black or darkened area that affects the desirability or eating quality of the shrimp. Objectionable black spot is:

1) more than 3 instances of penetrating black spot that is visible but difficult to measure because of its small size (approximately the size of a pencil point); or,

2) any areas larger than a pencil point that penetrates the flesh; or,

3) aggregate areas of non-penetrating surface black spot on the shell or membrane that is equal to or greater than \(1/3\) the area of the smallest segment.

Black spot is considered non-penetrating if it can be readily removed by lightly rubbing the affected area.

Assessments are made on individual shrimp.

When inspecting shell-on shrimp, it may be necessary to remove the shell to determine the degree of black spot.

Improperly headed (throats) refer to the material from the head (cephalothorax) which remains attached to the first segment after heading.
The throat defect will be assessed if it is likely to be objectionable to the user. Examples of this include:
- The throat has attached non-edible material, e.g. chitin from the cephalothorax;
- The throat material is discolored, as by enzymatic action;
- The length of the throat material exceeds the length of the segment to which it is attached; or
- The throat material is ragged or stringy.

Improperly cleaned ends refer to a darkened appearance on the end of the first segment caused by mud or other means.

Affected shrimp are grouped together and weighed. The percent by weight is determined by dividing the weight of the affected shrimp by the weight of the sample unit. Defect points are determined by comparing the results to the appropriate count per pound column in the defect table.

EXAMPLE: The declared count is 21-25 shrimp per pound. The sample unit weighs 32.5 ounces. Shrimp affected with objectionable black spot weigh 0.4 ounce. Improperly headed shrimp weigh 0.7 ounce.

\[
0.4 \text{ ounce} + 0.7 \text{ ounce} = 1.1 \text{ ounces}
\]

\[
\frac{1.1 \text{ ounces}}{32.5 \text{ ounces}} \times 100 = 3.38\%
\]

Under the "up to 40 count" column in the defect table, 3.38% is assessed 3 defect points.

Pieces of shrimp, broken shrimp, or damaged shrimp

Pieces. A piece is any shrimp that does not conform to one of the following definitions of a whole shrimp:

For 70 or fewer unglazed shrimp per pound, a whole shrimp is one which has 5 segments (with or without tail fins attached) provided that the segment at the severed end may have been shortened but is still recognizable as a segment so that the appearance of the shrimp is not adversely affected.

For more than 70 unglazed shrimp per pound, a whole shrimp is one which has 4 segments (with or without tail fins attached) provided that the segment at the severed end may have been shortened but is still recognizable as a segment so that the appearance of the shrimp is not adversely affected;

OR

11
a shrimp with a break in the flesh greater than 2/3 of the thickness of the shrimp measured where the break occurs. If a shrimp is broken to such an extent that a piece is hanging, the shrimp is a piece.

Broken refers to shrimp having a break in the flesh between 1/3 and 2/3 of the thickness of the shrimp measured where the break occurs.

Damaged refers to shrimp that is crushed or mutilated so as to materially affect its appearance and usability. Shell-on shrimp with the tail fin or telson missing is considered inadvertently peeled. However, if the last segment of flesh is missing, the shrimp is damaged.

Affected shrimp are grouped together and weighed. The percent by weight is determined by dividing the weight of the affected shrimp by the weight of the sample unit. Defect points are determined by comparing the results to the appropriate count per pound column in the defect table.

EXAMPLE: The declared count is 71-75 shrimp per pound. The sample unit weighs 16.31 ounces. The defective shrimp weigh .77 ounce.

\[
\frac{.77 \text{ ounce} \times 100}{16.31 \text{ ounces}} = 4.7\%
\]

Under the "71 - 130 count" column in the defect table, 4.7% is assessed 8 defect points.

**Unusable material [§ 265.104(e)(2)(iv)]**

This defect includes walking legs, flippers, loose shell, antennae, and extraneous material. Unusable material is defined as follows:

Legs refer to walking legs only; not swimmerets. If attached, they should be detached to be weighed separately from the body of the shrimp. NOTE: "Legs" is not a defect for Market Form 1 - Heads on.

Loose shell and antennae refers to any piece of shell or antennae which is completely detached from the shrimp.

Flipper refers to any detached tail fin with or without the last shell segment attached, with or without flesh inside.

Extraneous material refers to any non-harmful material in a sample unit which is not shrimp material. It consists of non-harmful material such as seaweed that may be accidentally present in a
NOTE: Unacceptable levels of filthy or harmful substances in food products constitute a violation of the Food, Drug, and Cosmetic Act. Products containing such substances are ineligible for grading.

The unusable material is grouped together and weighed. The percent by weight is determined by dividing the weight of the unusable material by the weight of the sample unit. Defect points are determined by comparing the results to the appropriate count per pound column in the defect table.

EXAMPLE: The declared count is 21-25 shrimp per pound. The sample unit weighs 32.56 ounces. The defective material weighs .09 ounce.

\[
\frac{.09 \text{ ounce} \times 100}{32.56 \text{ ounces}} = 0.28\%
\]

Under the "up to 40 count" column in the defect table, .28% is assessed 16 defect points.

Unacceptable shrimp and heads [§ 265.104(e)(2)(v)]

Unacceptable shrimp refer to the shrimp which are visibly abnormal or diseased. Diseased shrimp include those referred to as "cotton" or "milky" caused by microsporidian parasites. Abnormal shrimp refers to shrimp which exhibit pronounced deviations from the normal appearance of freshly caught, properly processed shrimp. This includes, but is not limited to, excessive sliminess, translucency and moderate pink backs (fevered shrimp). When in doubt about the appearance of the shrimp, contact your supervisor.

Heads refer to the cephalothorax which may be either missing or attached depending on the market form being evaluated. (Do not assess points for "heads" in this category if you assessed points for the same shrimp in the Improperly Headed category).

NOTE: "Heads" is not a defect for Market Form 1 - Heads on.

Affected shrimp are grouped together and weighed. The percent by weight is determined by dividing the weight of the affected shrimp by the weight of the sample unit. Defect points are determined by comparing the results to the appropriate count per pound column in the defect table.
EXAMPLE: The declared count is 26-30 shrimp per pound. The sample unit weighs 32.5 ounces. The defective shrimp weigh 1.1 ounces.

\[ \frac{1.1 \text{ ounces} \times 100}{32.5 \text{ ounces}} = 3.38\% \]

Under the "up to 40 count" column in the defect table, 3.38% is assessed 6 defect points.

Inadvertently or improperly peeled shrimp (\$ 265.104(e)(2)(vii)]

Improperly or inadvertently peeled refers to a shrimp with a full shell segment, swimmeret, tail fin or telson missing or intact depending on the market form being evaluated (e.g., shell segment missing on shell-on market forms; swimmeret present on peeled market forms). Shell-on shrimp with tail fins and/or telson missing are evaluated in the damaged category if the last segment of flesh is missing.

Affected shrimp are grouped together and weighed. The percent by weight is determined by dividing the weight of the affected shrimp the weight of the sample unit. Defect points are determined by comparing the results to the appropriate count per pound column (the defect table).

EXAMPLE: The declared count is 21-25 shrimp per pound. The sample unit weighs 32.5 ounces. The affected shrimp weigh 2.1 ounces.

\[ \frac{2.1 \text{ ounces} \times 100}{32.5 \text{ ounces}} = 6.46\% \]

Under the "up to 40 count" column of the defect table, 6.46% is assessed 8 defect points.

Improperly deveined (\$ 265.104 (e)(2)(vii)]

Improperly deveined refers to the presence of dark sand vein (alimentary canal) or roe which should have been removed for certain market forms. This does not include the tail segment. Lengths of dark sand vein should be aggregated and considered a defect if the aggregate length exceeds the following:

For shrimp 70 count per pound or less - dark vein or roe longer than 1 full segment.

For shrimp 71 - 500 count per pound - dark vein or roe longer than 2 full segments.
For shrimp over 500 count per pound - this defect does not apply.

If both vein and roe defects are present, assess defect points only for the longer of the two.

Affected shrimp are grouped together and weighed. The percent by weight is determined by dividing the weight of the affected shrimp by the weight of the sample unit. Defect points are determined by comparing the results to the appropriate count per pound column in the defect table.

EXAMPLE: The declared count is 131 - 250 shrimp per pound. The sample unit weighs 16.5 ounces. The weight of the shrimp with dark sand vein longer than 2 segments (not including the tail segment) is 2.5 ounces.

\[
\frac{2.5 \text{ ounces} \times 100}{16.5 \text{ ounces}} = 15.15\% 
\]

Under the "131-500 count" column of the defect table, 15.15% is assessed 8 defect points.

Product Examination - Cooked State

Texture [§ 265.104(e)(3)]

Texture defects are those that vary from the normal characteristics of the species being examined. Texture defects include toughness, dryness or mushiness.

Points are assessed based on the severity of the deviation from the normal textural qualities of freshly caught, properly processed shrimp.

- **Slight:** Slightly tough or dry; but not mushy.
- **Moderate:** Moderately tough, dry or mushy.
- **Excessive:** Excessively tough, very dry or very mushy.

Judging texture is subjective and expertise is acquired largely through experience and training.

EVALUATION OF FLAVOR AND ODOR [§ 265.104(d)].

Sensory evaluation of flavor and odor of each of the sample units shall be carried out only by those trained to do so. For raw evaluation, the fresh or thawed shrimp are broken and the broken
flesh is immediately held close to the nose to detect any off-odors. Any shrimp which have objectionable odor or color in the raw state should be cooked.

Cooked forms of shrimp shall be evaluated for flavor and odor in the thawed state. They may be heated, if necessary, to facilitate the evaluation.

For evaluating the flavor and odor of fresh or frozen uncooked styles of shrimp, use the procedure in Appendix 4 of these guidelines for cooking sample units. The cooking procedure is based on heating the product to an internal temperature of 160° F (70° C). If determining cooking time, cook sample units of the product which have the same size and shape. Use a thermometer to determine internal temperature. Sensory evaluation of cooked sample units shall be completed as soon as practical after cooking while the sample units are still warm.

After cooking the product, smell and taste it. This must be done immediately because some off-odors are fleeting and are quickly lost. Any off-odors present can be easily detected if the product is broken open while still warm. The product should have the flavor and odor characteristic of the species. At least 4 ounces of product from each sample unit should be cooked to determine flavor and odor.

Raw odor and cooked flavor and odor do not receive score points. Instead, the degree of acceptability is indicated as "Good" or "Reasonably Good" on score sheet.

U.S. Grade A product will possess the normal pleasant flavor and odor which is typical of the species and contains no off odors of any kind. A natural flavor or odor reminiscent of iodoform is acceptable.

Reasonably good flavor and odor are the minimum requirements of U.S. Grade B products. This means the product may be somewhat lacking in good flavor and odor characteristic of the species, but is free from objectionable off odors and off flavors of any kind.

Sample units which contain odors of decomposition cannot be given a grade and are rated GNC (Grade Not Certifiable).

METHODS OF ANALYSIS

The methods of analysis are given in the Appendices of these guidelines. Product samples are analyzed in accordance with the "Official Methods of Analysis" of the Association of Official Analytical Chemists (AOAC), Fourteenth Edition (1984), and these Guidelines. Copies of the AOAC methods may be obtained from AOAC, 1111 North Nineteenth Street, Arlington, VA, 22209.
ASSIGNING THE GRADE

Sample Unit Grade ([§ 265.104(f) and § 265.104(g)])

Using the score sheet, make appropriate assessments of each sample unit in accordance with Table 1 - Defect Table of the Standards for Grades. The points assigned for each defect are added together to give a figure for the total number of points for physical defects. Flavor and odor are assigned letter grades (see "EVALUATION OF FLAVOR AND ODOR" above).

If a sample unit has been assigned a grade for flavor and odor different than the grade indicated by the number of defect points, the sample unit will be the lower grade.

U.S. Grade A shrimp shall:
1. Possess good flavor and odor characteristics of the species being evaluated; and
2. Possess a score of no more than 15 points for physical defects.

U.S. Grade B shrimp shall:
1. Possess reasonable good flavor and odor characteristics of the species being evaluated; and
2. Possess a score of no more than 30 points for physical defects.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Flavor and odor</th>
<th>Max. # of defect points</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. Grade A</td>
<td>Good</td>
<td>15</td>
</tr>
<tr>
<td>U.S. Grade B</td>
<td>Reasonably Good</td>
<td>30</td>
</tr>
</tbody>
</table>

Flavor and odor are non-scorable factors. They are defined in the Standards for Grades ([§ 265.104(d)]).

The scoring system is based upon a perfect score of zero (no physical defects).

As stated in the Standards for Grades, the sample unit grade shall be the lowest grade level among the grades assigned for physical defects and flavor and odor.

Lot Grade ([§ 260.21, 260.61, and 265.105])

After determining the grade for each sample unit, the grade of the
lot is determined and certified. Use the procedures and sampling plans in 50 CFR §§ 260.21 and 260.61.

The grade assigned to a lot is the grade indicated by the majority of the sample unit grades provided that the number of sample units in the next lower grade does not exceed the acceptance number as given in the sampling plan. The acceptance number criteria for scorable factors identified in the sampling plan shall apply to flavor and odor in determining the grade of the lot.

EXAMPLE: The lot is being evaluated for Grade A and requires 13 sample units (accept on 2 and reject on 3). The lot may be graded if the number of count per pound deviants does not exceed the accept/reject numbers. For grading purposes, the lot is accepted under the following circumstances:

1 - Two sample units are "Reasonably Good" for flavor and odor; or
2 - Two sample units have scores between 16 and 19 (inclusive); or
3 - One sample unit has a "Reasonably Good" flavor and odor and 1 sample unit has a score of between 16 and 19 (inclusive).

When 50 CFR § 260.21 is used, note that it is based on a scoring system of 100 points for a perfect sample and defect points are subtracted. However, these standards for Grades are based on zero for a perfect sample and defect points are added. Therefore, in 260.21(b)(4)(ii), substitute "above the maximum" for "below the minimum." In § 260.21(b)(4)(iii), substitute "4 points above the maximum" for "4 points below the minimum."
Appendix 3. Determination of Net Contents.

Regulatory tolerances for net weights are established under the provisions of the Federal Food, Drug and Cosmetic Act, as amended.

Procedures for determining net or drained weight of packaged, unbreaded, frozen shrimp are provided in the National Marine Fisheries Service's Fishery Products Inspection Manual 25, Part III, Chapter 01, Section 06, and are as follows:

Definitions:

**Clump** - A cluster of three or more shrimp or pieces of shrimp frozen together, which cannot be separated readily. OVER 15% CLUMPING CANNOT BE NET WEIGHT, MUST BE DRENCHED WEIGHT.

**Drained weight** - The weight of the shrimp of a sample unit after the sample unit has been completely thawed and drained.

**Glaze** - A layer (coating) of ice applied to the product’s surface to serve as a barrier to air, to retard dehydration of the product. It must be removed to determine accurately a packaged product’s net weight.

**Glazed weight** - The weight of the entire package contents (i.e., excluding the weight of packaging material) of a sample unit that has been covered (coated) with a protective layer.

**Gross weight** - The weight of the entire packaged sample unit including its packaging material.

**Individually Quick Frozen (IQF)** - The freezing of each shrimp separately and apart from other shrimp, i.e., not frozen together in a block or clump. Shrimp frozen in this manner are usually glazed before packaging to delay the onset of dehydration.

**Net Contents or Net weight** - The weight of the shrimp in a sample unit that remains after all deductions for tare and/or glaze have been made.

**Tare (Tare Weight)** - The weight of the container, wrapper, or other packaging material of a sample unit that is deducted from the gross weight to obtain the net weight.
OFFICIAL METHODS OF WEIGHT DETERMINATION: The procedures contained in the publication: Official Methods of Analysis of the Association of Official Analytical Chemists (AOAC), 14th Edition, 1984, will be used to determine the weight of the various forms of unbreaded shrimp. The procedures are identified by boldfaced paragraph numbers in the publication. For the purpose of these guidelines, a "common name," i.e., a term descriptive of the principal action involved in the procedure, has been assigned to each of the methods. The procedures and the products to which they apply are as follows:

A. AOAC 32.060(a) - Net Contents of Frozen Food Containers - Unglazed Frozen Foods (subsequently referred to as the Net Contents Method). This method will be used to determine the net weight of packaged, unglazed shrimp products. Results will be reported as net weight.

Procedure:

Set scale on firm support and level it. Adjust zero load indicator or rest point and check sensitivity.

(1) Unglazed frozen foods - Remove package from low temperature storage, remove frost and ice from outside of package, and weigh immediately (W). Open package and remove contents, including any product particles and frost crystals. Air-dry empty package at room temperature and weigh (E).

Weight of contents = W - E.

B. AOAC 18.002(a) - Net Contents of Frozen Seafood - Drained Weight - Glazed Seafood (subsequently referred to as the Spray - Deglazed Method). This method will be used to determine the net weight of packaged, glazed, IQF shrimp products. This method will not be used for block-frozen shrimp, or for shrimp that are of such small size that the glaze cannot be removed practically by an inspector without thawing, or partially-thawing, some of the shrimp. This method also will not be used for IQF products that contain clumps or clusters in excess of 15 percent by weight of the glazed weight. Results of this method will be reported as net weight, regardless of the designation "Drained Weight" in the paragraph heading. The product is not thawed before draining, hence it is not a drained weight.

Procedure:

Set scale on firm support and level it. Adjust zero load indicator or rest point and check sensitivity.

(1) Glazed Seafood - Remove package from low temperature storage, open immediately, and place contents under gentle spray of cold water. Agitate carefully so product is not broken. Spray until all ice glaze that can be seen or felt is removed. Transfer product to circular U.S. number 8 sieve, 5 inches (20 cm) diameter for product less than or equal to 2 pounds (0.9 kg) or 12 inches (20 cm) for product greater than
2 pounds (0.9 kg). Without shifting product, incline sieve at angle of 17° - 20° to facilitate drainage and drain exactly 2 minutes (stop watch). Immediately transfer product to tared pan (B) and weigh (A).

Weight of product = A - B.

C. AOAC 18.016 and 18.017 - Drained Weight of Frozen Shrimp and Crabmeat (subsequently referred to as the Immersion-Thaw Method). This method will be used to determine the drained weight of shrimp frozen together in a block. The shrimp are not readily separable in the frozen state. This method will also be used for IQF shrimp of such small size that the glaze cannot be removed practically without thawing some of the shrimp. It will also be used for IQF products which contain clumps or clusters in excess of 15 percent by weight of the glazed weight. Results of this method will be reported as drained weight.

NOTE: As the guidelines that follow indicate, drained weight can be determined whenever requested, however net weight cannot be determined and certified on all lots. When net weight and drained weight can both be determined and the applicant has requested both, the inspector must draw two separate sets of samples, one set for determining the net weight, and one set for determining the drained weight. The applicant must be advised before sampling that two separate sets of samples will be drawn.

In the event that an applicant has requested a net weight determination, and the product contains in excess of 15 percent clumped product, the applicant must be advised that a net weight cannot be determined accurately, and permission received to perform a drained weight (immersion method) determination instead.

Procedure:

Place contents of individual package in wire mesh basket and immerse in container of fresh water so top of basket extends above water level. Introduce water at 80° F ± 5° F (26° C ± 3° C) at bottom of container at a flow rate of 1-3 gallons per minute. As soon as product thaws transfer all material to an 8 inch (20 cm) sieve for packages less than 1 pound, or a 12 inch (30 cm) sieve for packages greater than 1 pound distributing evenly. Tilt sieve at 30° and drain for exactly two minutes. Immediately transfer shrimp to a tared container (T) and weigh (W) using AOAC procedure 32.060.

Drained weight = W - T.
APPENDIX 4. Procedure for Cooking Sample.

For sensory evaluation of a product in the cooked state, a sample unit is cooked by one of the following procedures based on Procedure 18.01 in the AOAC (4th supp., 13th edition). Each procedure is based on heating product to an internal temperature of at least 160° F (70° C). Cooking times vary according to the size of the product and the equipment used. To determine cooking time, cook an extra sample using a temperature measuring device to determine internal temperature, then cook all test samples in the same manner.

A. Bake procedure - Wrap sample in aluminum foil and distribute evenly on flat cookie sheet or shallow flat bottom pan of sufficient size so that the packages can be spread evenly on the sheet or pan. Heat in ventilated oven, preheated at 400° F (240° C) until internal temperature of product reaches at least 160° F (70° C).

B. Boil-in-Bag Procedure - Place thawed sample in a boilable film-type pouch. Fold open end of pouch over suspension bar. Clamp to provide loose seal to let vapors escape during heating. Immerse pouch and contents in boiling water and heat until temperature of product reaches at least 160° F (70° C).

C. Steam Procedure - Wrap sample in aluminum foil and place on a wire rack over boiling water in a covered container. Heat until temperature of product reaches at least 160° F (70° C).

D. Microwave Procedure - Wrap in plastic wrap or microwave food bags with uniform thickness. Put on food paper plate. Rotate plate 1/4 turn, halfway through cook cycle. Heat until internal temperature of product reaches 160° F (70° C).

E. Other Procedures - Other cooking procedures may be used if they provide thermal conditions that are repeatable in heating samples to an internal temperature of at least 160° F (70° C) without scorching; and substances (other than liquid or vegetable oil for frying) are not used which alter the natural flavor and odor of the cooked sample.
APPENDIX 5. Shrimp Illustration.

Super family Caridea (Caridean Marine and fresh water shrimp have overlapping 1st pleura)