



United States Standards for Grades of Frozen Minced Fish Blocks

SOURCE: 44 FR 32368, June 6, 1979, unless otherwise noted.

Scope and product description

These standards shall apply to frozen minced fish blocks which are uniformly shaped masses of cohering minced fish flesh. A block may contain flesh from a single species or a mixture of species with or without food additives. The minced flesh consists entirely of mechanically separated fish flesh processed and maintained in accordance with good commercial practice. This minced flesh is made entirely from species which are known to be safe and suitable for human consumption.

Product forms

- (a) *Types.*
- (1) Unmodified-No food additives used.
 - (i) Single species.
 - (ii) Mixed species.
 - (2) Modified-Contains food additives (see Sec 264.155).
 - (i) Single species.
 - (ii) Mixed species.
- (b) *Color classifications.*
- (1) White.
 - (2) Light.
 - (3) Dark.

See **Appendix 1. Definition and method of measuring color classifications** for definition and method of measurement.

- (c) *Texture.*
- (1) Coarse--Flesh has a fibrous consistency.
 - (2) Fine--Flesh has a partially fibrous consistency because it is a mixture of small fibers and paste.
 - (3) Paste/Puree--Flesh has no fibrous consistency.

Grades-quality factors

- (a) *U.S. Grade A.* Minced fish blocks shall:
- (1) Possess good flavor and odor, and
 - (2) Comply with the limits of defects for U.S. Grade A quality in accordance with Determination of Grade.
- (b) *U.S. Grade B.* Minced fish blocks shall:
- (1) Possess reasonably good flavor and odor, and
 - (2) Comply with the limits of defects for U.S. Grade B quality in accordance with Determination of Grade.



(c) *U.S. Grade C*. Minced fish blocks shall:

- (1) Possess minimally acceptable flavor and odor with no objectional off-flavors or off-odors, and
- (2) Comply with the limits of defects for U.S. Grade C quality in accordance with Determination of Grade.

Determination of grade

(a) *Procedures for grade determination*. The grade shall be determined by:

- (1) Sampling in accordance with the sampling plan described in paragraph (b) of this section;
- (2) evaluating odor and flavor in accordance with paragraph (c) of this section;
- (3) examining for defects in accordance with paragraphs (d) and (e) of this section: and (4) using the results to assign a grade as described in paragraph (f) of this section.

(b) *Sampling*. The sampling rate of specific lots for all inspections shall be in accordance with the sampling plans contained in Part 260 of this chapter. For examination in the frozen state, an entire block shall be used as a sample unit. For examination in the thawed state, a subsample of at least 5 pounds weight shall be used.

(c) *Evaluation of flavor and odor*. Evaluation of flavor and odor shall take place after the sample has been cooked by any of the procedures given below. These procedures are based on heating sample to internal temperature of at least 160 · F (70 · C), but without overcooking. Cooking times vary according to size of sample and the equipment used. If determining cooking time, cook extra sample using a temperature measuring device to determine internal temperature.

- (1) Bake procedure--Wrap a minimum of 12 ounces of sample in aluminum foil and distribute evenly on flat cookie sheet or shallow flat pan. Heat in ventilated oven, preheated to 400 · F (204 · C), until internal temperature reaches at least 160 · F (70 · C).
- (2) Steam procedure--Wrap a minimum of 12 ounces of sample in aluminum foil and place on wire rack suspended over boiling water in a covered container. Heat until internal temperature of sample reaches at least 160 · F (70 · C).

(d) *Examination for physical defects*. The sample unit will be examined for defects using the list of defects definitions in Determination of Grade (e), and the defects noted and categorized as minor, major, and serious, in accordance with Table 1 of this part.

(e) *Definitions of defects-*

- (1) *Deteriorative color* refers to discoloration from the normal characteristics of the material used. Deterioration can be due to yellowing of fatty material, to browning of blood pigments, or other changes.
 - (i) Slight deteriorative discoloration--refers to a color defect that is slightly noticeable but does not seriously affect the appearance, desirability, or eating quality of the product.
 - (ii) Moderate deteriorative discoloration--refers to a color defect that is conspicuously noticeable but does not seriously affect the appearance, desirability, or eating quality of the product.



- (iii) Excessive deteriorative discoloration--refers to a defect that is conspicuously noticeable and that seriously affects the appearance, desirability, or eating quality of the product.
- (2) *Dehydration* refers to a loss of moisture from the surfaces of the product during frozen storage.
- (i) Slight dehydration--is surface color masking, affecting more than 5 percent of the area, which can be readily removed by scraping with a blunt instrument.
 - (ii) Moderate dehydration--is deep color masking penetrating the flesh, affecting less than 5 percent of the area, and requiring a knife or other sharp instrument to remove.
 - (iii) Excessive dehydration--is deep color masking penetrating the flesh, affecting more than 5 percent of the area, and requiring a knife or other sharp instruments to remove.
- (3) *Uniformity of size* refers to the degree of conformity to the declared contracted dimensions of the blocks. A deviation is considered to be any deviation from the contracted length, width, or thickness; or from the average dimensions of the blocks, physically determined, if no dimensions are contracted. Only one deviation from each dimension may be assessed. Two readings for length, three readings for width, and four readings for thickness will be measured.
- (i) Slight--two or more deviations from declared or average length, width, and thickness up to $\pm \frac{1}{8}$ inch.
 - (ii) Moderate--two or more deviations from declared or average length, width, and thickness from $\pm \frac{1}{8}$ inch to $\pm \frac{3}{8}$ inch.
 - (iii) Excessive--two or more deviations from declared or average length, width, and thickness over $\pm \frac{3}{8}$ inch.
- (4) *Uniformity of weight* refers to the degree of conformity to the declared weight. Only underweight deviations are assessed.
- (i) Slight--any minus deviation of not more than 2 ounces.
 - (ii) Excessive--any minus deviation over 2 ounces.
- (5) *Angles*. An acceptable edge angle is an angle formed by two adjoining surfaces of the fish block whose apex is within $\frac{3}{8}$ inch of a carpenter's square placed along the surfaces of the block. For each edge angle, three readings will be made and at least two readings must be acceptable for the whole edge angle to be acceptable. An acceptable corner angle is an angle formed by 3 adjoining surfaces whose apex is within $\frac{3}{8}$ inch of the apex of a carpenter's square placed on the edge surfaces. Any edge or corner angle which fails to meet these measurements is unacceptable.
- (i) Slight--two unacceptable angles.
 - (ii) Moderate--three unacceptable angles.
 - (iii) Excessive--four or more unacceptable angles.



- (6) *Improper fill* refers to surface and internal air or ice voids, ragged edges, or damage. Improper fill is measured as the minimum number of 1-ounce units that would be adversely affected when the block is cut. For this purpose, the dimensions of a 1-ounce unit are 4 x 1 x $\frac{5}{8}$ inch.
- (i) Slight--1 to 3 units adversely affected.
 - (ii) Excessive--over 3 units adversely affected.
- (7) *Blemishes* refer to pieces of skin, scales, blood spots, nape (belly) membranes (regardless of color), or other harmless extraneous material. One instance means that the area occupied by a blemish or blemishes is equal to a $\frac{1}{4}$ inch square. Instances are prorated on a per pound basis.
- (i) Slight--5 to 15 instances per pound.
 - (ii) Moderate--more than 15 but less than 30 instances per pound.
 - (iii) Excessive--30 or more instances per pound.
- (8) *Bones* refer to any objectionable bone or piece of bone that is $\frac{1}{4}$ inch or longer and is sharp and rigid. Perceptible bones shall also be checked by their grittiness during the normal evaluation of the texture of the cooked product (10). Bones are prorated on a five pound sample unit basis.
- (i) Slight--1 to 2 bones per five pound sample unit.
 - (ii) Moderate--3 to 4 bones per five pound sample unit.
 - (iii) Excessive--over 4 bones, but not to exceed 10 bones, per five pound sample unit.
- (9) *Flavor and odor* are evaluated organoleptically by smelling and tasting the product after it has been cooked in accordance with Determination of Grade (c).
- (i) Good flavor and odor (essential requirements for a Grade A product) means that the cooked product has the flavor and odor characteristic of the indicated species of fish and is free from staleness, bitterness, rancidity, and off-flavors and off-odors of any kind.
 - (ii) Reasonably good flavor and odor (minimum requirements of Grade B product) means that the cooked product is moderately absent of flavor and odor characteristic of the indicated species. The product is free from rancidity, bitterness, staleness, and off-flavors and off-odors of any kind.
 - (iii) Minimal acceptable flavor and odor (minimum requirements of a Grade C product) means that the cooked product has moderate storage induced flavor and odor, but is free from any objectionable off-flavors and off-odors that may be indicative of spoilage or decomposition.
- (10) *Texture defects* are judged on a sample of the cooked fish.
- (i) Slight--flesh is fairly firm, only slightly spongy or rubbery. It is not mushy. There is no grittiness due to bone fragments.
 - (ii) Moderate--flesh is mildly spongy or rubbery. Slight grittiness may be present due to bone fragments.
 - (iii) Excessive--flesh is definitely spongy, rubbery, very dry, or very mushy. Moderate grittiness may be present due to bone fragments.



(f) *Grade assignment.* The sample unit shall be assigned the grade into which it falls in accordance with the limits for defects, summarized as follows:

Flavor and odor		Maximum number of physical defects permitted		
		Minor	Major	Serious
Grade A	Good	3	0	0
Grade B	Reasonably good	5	1	0
Grade C	Minimally acceptable	7	3	1

Each lot of minced blocks shall be assigned that grade which corresponds to the acceptance number for deviants prescribed in Tables II, V, or VI of 50 CFR 260.61.

Additives

Minced fish blocks may be modified with food additives as necessary to stabilize product quality in accordance with the requirements of the regulations contained in 21 CFR Part 171.

Hygiene

The fish material shall be processed and maintained in accordance with the requirements of 50 CFR §§ 260.98 to 260.104 and the requirements of good manufacturing practice contained in 21 CFR Part 110.

Appendix 1. Definition and method of measuring color classifications

Appendix 1. Definition and Procedure of measuring color classifications cited in Sec 264.152(b). This appendix is intended for laboratory use to classify color when a field procedure is questioned.

Introduction. The procedure described below is to be followed when a photoelectric or visual reflectometer is used. The light source and filters for a photoelectric or visual reflectometer are designed to view a sample primarily in the red region of the spectrum, at or near 640 nanometers. The geometry of its illumination and observation conditions provide directions approximately 45 degrees and 0 degrees from a common perpendicular. The viewing area is, preferably, approximately six square inches or 39 square centimeters. Reflectometers having much smaller viewing areas may be used if enough measurements are made on different areas of the sample to describe its average reflectance accurately. The receptor characteristics provide reflectance measurements that are accurate to within 1 percent of full-scale reading using Munsell neutral value standards as described below.

This description of a reflectometer is intended to avoid undue restrictions to equipment provided by one, or a very few, manufacturers. In the majority of situations, a variety of reflectometers will be suitable for color classification of samples from minced fish blocks. In the event of a borderline sample whose color classification is disputed, the sample is measured again using a different, more accurate, reflectometer. For example, if a visual reflectometer had been used to classify a disputed sample, a more accurate photoelectric reflectometer should be used for the remeasurement.



Sample preparation. The color of the sample must represent the average color of the block when it is cut from that block. At least one of its sides must be large enough and flat enough to completely cover the reflectometer's viewing area. The sample must be cooked from the frozen state by the bake procedure or, if previously coated with batter and breading, by the deep fat frying procedure, 18.001 in “Official Methods of Analysis” 2nd supplement to the 12th edition, of the Association of Official Analytical Chemists. If the sample is covered with batter and breading for cooking, this cover should be removed with a sharp serrated knife so that the viewing area surface remains flat. The cooked sample must also be thick enough to prevent transmission of external, ambient light into the viewing area of the reflectometer.

Measurement of color. The reflectometer itself is described above at “Introduction.” It may be calibrated and used with neutral value standards furnished by the manufacturer of a reflectometer or with Munsell matte-finish neutral value standards. When other standards are used, they must have been calibrated against Munsell matte-finish neutral value standards using the same reflectometer. All standards must be large enough and thick enough to cover the reflectometer’s viewing area and prevent transmission of external ambient light into this viewing area. Munsell neutral value standards are based on the Munsell notation system as defined in terms of the CIE (International Commission on Illumination) standard observer and coordinate system for color specification. Chip or swatch samples of Munsell standards may be obtained from Munsell Color, Inc., Baltimore, Md. 21218, or made as given by the relationship between Munsell value and luminous reflectance derived by a subcommittee of the Optical Society of America and Published in the “Journal of the Optical Society of America,” volume 33, page 406 (1943). This relationship is based on the equivalence in luminous reflectance of light of 555 nanometer wave length to a given percent of the luminous reflectance of magnesium oxide. For the Munsell values used in this section, this relationship has been extracted from page 406 of this reference and is given in the following table, where “N” is the Munsell value and “Yv” is the equivalent luminous reflectance of the stated percent of magnesium oxide:

N	Yv
N2.00	3.13
N6.00	30.05
N6.25	33.04
N6.50	36.20
N7.00	43.06
N7.25	46.77
N7.50	50.68
N9.00	78.66

Definition of “white” samples. Calibrate the reflectometer to 0-percent reflectance using a N2.0 standard, then to 90 percent using a N9.0 standard. Place a sample on the viewing area and measure its reflectance. Samples from “white” blocks have a relative reflectance greater than a N7.25 standard; but if a particular sample has a relative reflectance between N7.0 and N7.5 standards, its reflectance is measured again using an expanded scale before defining it as “white.” Recalibrate the reflectometer using a N7.0 standard to set 0-percent reflectance and a N7.5 standard to set 100-percent reflectance on its scale. With these calibration settings, a “white” sample is defined as having a greater relative reflectance than a N7.25 standard.

Definition of “dark” samples. Calibrate the reflectometer to a 0-percent reflectance using a N2.0 standard, then to 90 percent reflectance using a N9.0 standard. Place a sample on the viewing area and measure its reflectance. Samples from “dark” blocks have a relative reflectance less than a N6.25 standard; but if a particular sample has a relative reflectance between N6.0 and N6.5 standards, its reflectance is measured again using an expanded scale before defining it as “dark.” Recalibrate the reflectometer using a N6.0



standard to set 0-percent reflectance and a N6.5 standard to set 100-percent reflectance on its scale. With these calibration settings, a “dark” sample is defined as having a lower relative reflectance than a N6.25 standard.

Definition of “light” samples. If a sample does not satisfy the criteria given above for “white” or “dark” samples, it is classified as “light.”

TABLE 1

Physical Defects		Categories		
Types	Degrees	Minor	Major	Serious
Frozen State: Deteriorative color	Slight	101	---	---
	Moderate	---	201	---
	Excessive	---	---	301
Dehydration	Slight	102	---	---
	Moderate	---	202	---
	Excessive	---	---	302
Uniformity of size	Slight	103	---	---
	Moderate	---	203	---
	Excessive	---	---	303
Uniformity of weight	Slight	104	---	---
	Excessive	---	---	304
Unacceptable angles	Slight	105	---	---
	Moderate	---	205	---
	Excessive	---	---	305
Improper fill	Slight	106	---	---
	Excessive	---	---	306
Thawed State: Blemishes	Slight	107	---	---
	Moderate	---	---	---
	Excessive	---	207	307
Bones	Slight	108	---	---
	Moderate	---	208	308
	Excessive	---	---	---
Cooked State: Texture	Slight	109	---	---
	Moderate	---	209	---
	Excessive	---	---	309

NOTE: The code numbers shown in the above Table are for identification of defects for recording purposes only. They are keyed to the nature and severity of the defect. They are not scores.

[44 FR 32368, June 6, 1979, as amended at 51 FR 34991, Oct. 1, 1986]