



**United States
Department of
Agriculture**

**Agricultural
Marketing
Service**

**Fruit and
Vegetable
Division**

**Processed
Products
Branch**

United States Standards for Grades of Extracted Honey

Effective date May 23, 1985

This is the fifth issue, as amended, of the United States Standards for Grades of Extracted Honey published in the **FEDERAL REGISTER** of April 23, 1985 (50 FR 15861) to become effective May 23, 1985. This issue supersedes the fourth issue, which has been in effect since April 16, 1951.

Voluntary U.S. grade standards are issued under the authority of the Agricultural Marketing Act of 1946, which provides for the development of official U.S. grades to designate different levels of quality. These grade standards are available for use by producers, suppliers, buyers and consumers. As in the case of other standards for grades of processed fruits and vegetables, these standards are designed to facilitate orderly marketing by providing a convenient basis for buying and selling, for establishing quality control programs, and for determining loan values.

The standards also serve as a basis for the inspection and grading of commodities by the Federal inspection service, the only activity authorized to approve the designation of U.S. grades as referenced in the standards, as provided under the Agricultural Marketing Act of 1946. This service, available as on-line (in-plant) or lot inspection and grading of all processed fruit and vegetable products, is offered to interested parties, upon application, on a fee-for-service basis. The verification of some specific recommendations, requirements, or tolerances contained in the standards can be accomplished only by the use of on-line inspection procedures. In all instances, a grade can be assigned based on final product factors or characteristics.

In addition to the U.S. grade standards, grading manuals or instructions for inspection of several processed fruits and vegetables are available upon request for a nominal fee. These manuals or instructions contain detailed interpretations of the grade standards and provide step-by-step procedures for grading the product.

Grade standards are issued by the Department after careful consideration of all data and views submitted, and the Department welcomes suggestions which might aid in improving the standards in future revisions. Comments may be submitted to, and copies of standards and grading manuals obtained from:

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United States Standards for Grades of Extracted Honey

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Authority:	Agricultural Marketing Act of 1946, Secs. 203, 205, 60 Stat. 1087, as amended, 1090, as amended (7 U.S.C. 1622, 1624).

Note: Compliance with the provisions of these standards shall not excuse failure to comply with the provisions of the Federal Food, Drug, and Cosmetic Act, or with applicable State laws and regulations.

§52.1391 Product description

Extracted honey (hereinafter referred to as honey) is honey that has been separated from the comb by centrifugal force, gravity, straining, or by other means.

§52.1392 Types.

The type of extracted honey is not incorporated in the grades of the finished product since the type of extracted honey, as such, is dependent upon the method of preparation and processing, and therefore is not a factor of quality for the purpose of these grades. Extracted honey may be prepared and processed as one of the following types:

- (a) **Liquid honey.** Liquid honey is honey that is free from visible crystals.
- (b) **Crystallized honey.** Crystallized honey is honey that is solidly granulated or crystallized, irrespective of whether candied, fondant, creamed or spread types of crystallized honey.
- (c) **Partially crystallized honey.** Partially crystallized honey is honey that is a mixture of liquid honey and crystallized honey.

§52.1393 Styles.

- (a) **Filtered.** Filtered honey is honey of any type defined in these standards that has been filtered to the extent that all or most of the fine particles, pollen grains, air bubbles, or other materials normally found in suspension, have been removed.
- (b) **Strained.** Strained honey is honey of any type defined in these standards that has been strained to the extent that most of the particles, including comb, propolis, or other defects normally found in honey, have been removed. Grains of pollen, small air bubbles, and very fine particles would not normally be removed.

§52.1394 Definitions of terms.

As used in these U.S. standards, unless otherwise required by the context, the following terms shall be construed, respectively, to mean:

- (a) **Absence of defects** means the degree of freedom from particles of comb, propolis, or other defects which may be in suspension or deposited as sediment in the honey. Classifications for the factor of quality, absence of defects, are:

- (1) **Practically free** - the honey contains practically no defects that affect the appearance or edibility of the product.
 - (2) **Reasonably free** - the honey may contain defects which do not materially affect the appearance or edibility of the product.
 - (3) **Fairly free** - the honey may contain defects which do not seriously affect the appearance or edibility of the product.
- (b) **Air bubbles** mean small visible pockets of air in suspension that may be numerous in the honey and contribute to the lack of clarity in filtered style.
- (c) **Aroma** means the fragrance or odor of the honey.
- (d) **Clarity** means, with respect to filtered style only, the apparent transparency or clearness of honey to the eye and to the degree of freedom from air bubbles, pollen grains, or other fine particles of any material suspended in the product. Classifications for the factor of quality, clarity, are:
- (1) **Clear** - the honey may contain air bubbles which do not materially affect the appearance of the product and may contain a trace of pollen grains or other finely divided particles of suspended material which do not affect the appearance of the product.
 - (2) **Reasonably Clear** - the honey may contain air bubbles, pollen grains, or other finely divided particles of suspended material which do not materially affect the appearance of the product.
 - (3) **Fairly Clear** - the honey may contain air bubbles, pollen grains, or other finely divided particles of suspended material which do not seriously affect the appearance of the product.
- (e) **Comb** means the wax like cellular structure that bees use for retaining their brood or as storage for pollen and honey. Fine particles of comb in suspension are defects and contribute to the lack of clarity in filtered style.
- (f) **Crystallization** means honey in which crystals have been formed.
- (g) **Flavor and aroma** means the degree of taste excellence and aroma for the predominant floral source. Classifications for the factor of quality, flavor and aroma, are:

- (1) **Good Flavor and aroma for the predominant floral source-** the product has a good, normal flavor and aroma for the predominant floral source or, when blended, a good flavor for the blend of floral sources and the honey is free from caramelized flavor or objectionable flavor caused by fermentation, smoke, chemicals, or other causes with the exception of the predominant floral source.
 - (2) **Reasonably good flavor and aroma for the predominant floral source** - the product has a reasonably good, normal flavor and aroma for the predominant floral source or, when blended, a reasonably good flavor for the blend of floral sources and the honey is practically free from caramelized flavor and is free from objectionable flavor caused by fermentation, smoke, chemicals, or other causes with the exception of the predominant floral source.
 - (3) **Fairly good flavor and aroma for the predominant floral source** - the product has a fairly good, normal flavor and aroma for the predominant floral source or, when blended, a fairly good flavor for the blend of floral sources and the honey is reasonably free from caramelized flavor and is free from objectionable flavor caused by fermentation, smoke, chemicals, or other causes with the exception of the predominant floral source.
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- (h) **Floral source** means the flower from which the bees gather nectar to make honey.
 - (i) **Granulation** means the initial formation of crystals in the honey.
 - (j) **Pfund color grader** means a color grading device used by the honey industry. It is not the officially approved device for determining color designation when applying these United States grade standards for the color of honey.
 - (k) **Pollen grains** mean the granular, dustlike microspores that bees gather from flowers. Pollen grains in suspension contribute to the lack of clarity in filtered style.
 - (l) **Propolis** means a gum that is gathered by bees from various plants. It may vary in color from light yellow to dark brown. It may cause staining of the comb or frame and may be found in extracted honey.

§52.1395 Recommended sample unit sizes.

- (a) Determination of color designation** - the amount of product required to adequately fill a color comparator cell of any approved device used for the determination of honey color.
- (b) Factors of quality and analysis** - 100 g (3.5 oz).

§52.1396 Recommended fill of container.

The recommended fill of container is not incorporated in the grades of the finished product since fill of container, as such, is not a factor of quality for the purpose of these grades. It is recommended that each container be filled with honey as full as practicable, and with respect to containers of one gallon or less, the honey shall occupy not less than 95 percent of the total capacity of the container.

§52.1397 Color.

The color of extracted honey is not a factor of quality for the purpose of these grades.

§52.1398 Color designations.

- (a) The color designation of extracted honey** is determined (after adjusting for cloudiness in the honey) by means of the USDA approved color standards in accordance with the range as given in Table I.
- (b) The respective color designations,** applicable range of each color, color range on the Pfund scale, and optical density of freshly prepared caramel - glycerin solutions are shown in Table I.

TABLE I - COLOR DESIGNATIONS OF EXTRACTED HONEY

USDA Color Standards Designations	Color Range USDA Color Standards	Color Range Pfund Scales Millimeters	Optical Density ^{1/}
Water White	Honey that is Water White or lighter in color.	8 or less	0.0945
Extra White	Honey that is darker than Water White, but not darker than Extra White in color.	Over 8 to and including 17.	.189
White	Honey that is darker than Extra White, but not darker than White in color.	Over 17 to and including 34.	.378
Extra Light Amber	Honey that is darker than White, but not darker than Extra light Amber in color.	Over 34 to and including 50.	.595
Light Amber	Honey that is darker than Extra Light Amber, but not darker than light Amber in color.	Over 50 to and including 85.	1.389
Amber	Honey that is darker than light Amber, but not darker than Amber in color.	Over 85 to and including 114.	3.008
Dark Amber	Honey that is darker than Amber in color.	Over 114

^{1/} Optical Density (absorbance) = $\log_{10} (100/\text{percent transmittance})$, at 560 nm for 3.15 cm thickness for caramel - glycerin solutions measured versus an equal cell containing glycerin.

§52.1399 Tolerance for the designation of color of officially drawn samples.

When designating the color of samples that have been officially drawn and which represent a specific lot of honey, the lot shall be considered as one color if the number of containers with honey comprised of a darker color does not exceed the applicable acceptance number indicated in the sampling plans contained in 7 CFR 52.38 of the **Regulations Governing Inspection and Certification of Processed Fruits and Vegetable, Processed Products Thereof, and Certain Other Processed Food Products**: Provided, however, that the honey in none of the containers falls below the next darker color designation. Applicable sampling plans and acceptance numbers are shown in Table II.

TABLE II - SINGLE SAMPLING PLANS AND ACCEPTANCE NUMBERS

Sample Size (number of sample units)	3	6	13	21	29
Acceptance No.	0	1	2	3	4

§52.1400 Grades.

- (a) **U.S. Grade A** is the quality of extracted honey that meets the applicable requirements of Table IV or V, and has a minimum total score of 90 points.
- (b) **U.S. Grade B** is the quality of extracted honey that meets the applicable requirements of Table IV or V, and has a minimum total score of 80 points.
- (c) **U.S. Grade C** is the quality of extracted honey that meets the applicable requirements of Table IV or V, and has a minimum total score of 70 points.
- (d) **Substandard** is the quality of extracted honey that fails to meet the requirements of U.S. Grade C.

§52.1401 Determining the grade.

Determining the grade from the factors of quality and analysis.

- (a) **For the factor of analysis, the soluble solids content of extracted honey is determined by** means of the refractometer at 20° C (68° F). The refractive indices, corresponding percent soluble solids, and percent moisture are shown in Table III. The moisture content of honey and percent soluble solids may be determined by any other method which gives equivalent results.

- (b) **For the factors of quality, the grade of extracted honey is determined** by considering, in conjunction with the requirements of the various grades, the respective ratings for the factors of flavor and aroma, absence of defects, and clarity (except the factor of clarity is excluded for the style of strained).
- (c) **The relative importance of each factor is** expressed numerically on the scale of 100. The maximum number of points that may be given each factor is:

Factors	Points
Flavor and aroma	50
Absence of defects	40
Clarity	<u>10</u>
Total Score	100

- (d) **The factor of clarity for the style of strained extracted honey is** not based on any detailed requirements and is not scored. The other two factors (flavor and absence of defects) are scored and the total is multiplied by 100 and divided by 90, dropping any fractions to determine the total score.
- (e) **Crystallized honey and partially crystallized honey shall be liquified by** heating to approximately 54.4°C (130°F) and cooled to approximately 20°C (68°F) before determining the grade of the product.

§52.1402 Determining the rating for each factor.

The essential variations within each factor are so described that the value may be determined for each factor and expressed numerically. The numerical range for the rating of each factor is inclusive (for example, **37 to 40 points** means 37, 38, 39 or 40 points) and the score points shall be prorated relative to the degree of excellence for each factor.

§52.1403 Requirements for grades.

Table III - Refractive Indices, Corresponding Percent Soluble Solids, and Percent Moisture in Extracted Honey ^{1/}

Refractive Index @ 20°C (Range)	Percent Soluble Solids	Percent Moisture	Refractive Index @ 20°C (Range)	Percent Soluble Solids	Percent Moisture
1.4817 - 1.4818	78.1	21.9	1.4930 - 1.4932	82.6	17.4
1.4819 - 1.4820	78.2	21.8	1.4933 - 1.4934	82.7	17.3
1.4821 - 1.4823	78.3	21.7	1.4935 - 1.4936	82.8	17.2
1.4824 - 1.4825	78.4	21.6	1.4937 - 1.4939	82.9	17.1
1.4826 - 1.4828	78.5	21.5	1.4940 - 1.4941	83.0	17.0
1.4829 - 1.4830	78.6	21.4	1.4942 - 1.4944	83.1	16.9
1.4831 - 1.4833	78.7	21.3	1.4945 - 1.4946	83.2	16.8
1.4834 - 1.4835	78.8	21.2	1.4947 - 1.4949	83.3	16.7
1.4836 - 1.4838	78.9	21.1	1.4950 - 1.4951	83.4	16.6
1.4839 - 1.4840	79.0	21.0	1.4952 - 1.4954	83.5	16.5
1.4841 - 1.4843	79.1	20.9	1.4955 - 1.4957	83.6	16.4
1.4844 - 1.4845	79.2	20.8	1.4958 - 1.4959	83.7	16.3
1.4846 - 1.4848	79.3	20.7	1.4960 - 1.4962	83.8	16.2
1.4849 - 1.4850	79.4	20.6	1.4963 - 1.4964	83.9	16.1
1.4851 - 1.4853	79.5	20.5	1.4965 - 1.4967	84.0	16.0
1.4854 - 1.4855	79.6	20.4	1.4968 - 1.4969	84.1	15.9
1.4856 - 1.4858	79.7	20.3	1.4970 - 1.4972	84.2	15.8
1.4859 - 1.4860	79.8	20.2	1.4973 - 1.4975	84.3	15.7
1.4861 - 1.4863	79.9	20.1	1.4976 - 1.4977	84.4	15.6
1.4864 - 1.4865	80.0	20.0	1.4978 - 1.4980	84.5	15.5
1.4866 - 1.4868	80.1	19.9	1.4981 - 1.4982	84.6	15.4
1.4869 - 1.4870	80.2	19.8	1.4983 - 1.4984	84.7	15.3
1.4871 - 1.4873	80.3	19.7	1.4985 - 1.4987	84.8	15.2
1.4874 - 1.4875	80.4	19.6	1.4988 - 1.4990	84.9	15.1
1.4876 - 1.4878	80.5	19.5	1.4991 - 1.4993	85.0	15.0
1.4879 - 1.4880	80.6	19.4	1.4994 - 1.4995	85.1	14.9
1.4881 - 1.4883	80.7	19.3	1.4996 - 1.4998	85.2	14.8
1.4884 - 1.4885	80.8	19.2	1.4999 - 1.5000	85.3	14.7
1.4886 - 1.4888	80.9	19.1	1.5001 - 1.5003	85.4	14.6
1.4889 - 1.4890	81.0	19.0	1.5004 - 1.5005	85.5	14.5
1.4891 - 1.4893	81.1	18.9	1.5006 - 1.5008	85.6	14.4
1.4894 - 1.4896	81.2	18.8	1.5009 - 1.5011	85.7	14.3
1.4897 - 1.4898	81.3	18.7	1.5012 - 1.5013	85.8	14.2
1.4899 - 1.4901	81.4	18.6	1.5014 - 1.5016	85.9	14.1
1.4902 - 1.4903	81.5	18.5	1.5017 - 1.5018	86.0	14.0
1.4904 - 1.4906	81.6	18.4	1.5019 - 1.5021	86.1	13.9
1.4907 - 1.4908	81.7	18.3	1.5022 - 1.5024	86.2	13.8
1.4909 - 1.4911	81.8	18.2	1.5025 - 1.5026	86.3	13.7
1.4912 - 1.4913	81.9	18.1	1.5027 - 1.5029	86.4	13.6
1.4914 - 1.4916	82.0	18.0	1.5030 - 1.5031	86.5	13.5
1.4917 - 1.4918	82.1	17.9	1.5032 - 1.5034	86.6	13.4
1.4919 - 1.4921	82.2	17.8	1.5035 - 1.5037	86.7	13.3
1.4922 - 1.4923	82.3	17.7	1.5038 - 1.5039	86.8	13.2
1.4924 - 1.4926	82.4	17.6	1.5040 - 1.5042	86.9	13.1
1.4927 - 1.4929	82.5	17.5	1.5043 - 1.5044	87.0	13.0

^{1/} Temperature corrections: If refractometer reading is made at temperature above 20° C (68° F) add 0.00023 to the refractive index for each degree C, or 0.00013 for each degree F. If made below 20° C (68° F), subtract correction. The moisture content of honey and equivalent values may be determined by any other method which gives equivalent results.

TABLE IV - FILTERED STYLE

	Factors	Grade A	Grade B	Grade C	Substandard
Analytical	Percent Soluble Solids (Minimum)	81.4	81.4	80.0	Fails Grade C.
Q u a l i t y	Absence of Defects	Practically free- practically none that affect appearance or edibility.	Reasonably Free- do not materially affect the appearance or edibility.	Fairly free - do not seriously affect the appearance or edibility.	Fails Grade C.
	Score Points	37 - 40	34 - 36 <u>1/</u>	31 - 33 <u>1/</u>	0 - 30 <u>1/</u>
	Flavor & Aroma	Good - free from caramelization, smoke, fermentation, chemicals, and other causes.	Reasonably good- practically free from caramelization; free from smoke, fermentation, chemicals, and other causes.	Fairly good - reasonably free from caramelization; free from smoke, fermentation, chemicals, and other causes.	Poor - Fails Grade C.
	Score Points	45 - 50	40 - 44 <u>1/</u>	35 - 39 <u>1/</u>	0 - 34 <u>1/</u>
	Clarity	Clear - may contain air bubbles that do not materially affect the appearance; may contain a trace of pollen grains or other finely divided particles in suspension that do not affect appearance.	Reasonably clear - may contain air bubbles, pollen grains, or other finely divided particles in suspension that do not materially affect the appearance.	Fairly clear- may contain air bubbles, pollen grains, or other finely divided particles in suspension that do not seriously affect the appearance.	Fails Grade C.
	Score Points	8 - 10	6 - 7	4 - 5 <u>1/</u>	0 - 3 <u>2/</u>

- 1/ Limiting rule - sample units with score points that fall in this range shall not be graded above the respective grade regardless of the total score.
- 2/ Partial limiting rule - sample units with score points that fall in this range shall not be graded above U.S. Grade C regardless of the total score.

Table V - Strained Style

	Factors	Grade A	Grade B	Grade C	Substandard
Analytical	Percent Soluble Solids (Minimum)	81.4	81.4	80.0	Fails Grade C.
Q u a l i t y	Absence of Defects	Practically free- practically none that affect appearance or edibility.	Reasonably Free- do not materially affect the appearance or edibility.	Fairly free - do not seriously affect the appearance or edibility.	Fails Grade C.
	Score Points	37 - 40	34 - 36 ^{1/}	31 - 33 ^{1/}	0 - 30 ^{1/}
	Flavor & Aroma	Good - free from caramelization, smoke, fermentation, chemicals, and other causes.	Reasonably good- practically free from caramelization; free from smoke, fermentation, chemicals, and other causes.	Fairly good - reasonably free from caramelization; free from smoke, fermentation, chemicals, and other causes.	Poor - Fails Grade C.
	Score Points	45 - 50	40 - 44 ^{1/}	35 - 39 ^{1/}	0 - 34 ^{1/}

^{1/} Limiting rule - sample units with score points that fall in this range shall not be graded above the respective grade regardless of the total score.

§52.1404 Sample size.

The sample size to determine meeting the requirements of these standards shall be as specified in the **Regulations Governing Inspection and Certification of Processed Fruits and Vegetables, Processed Products Thereof, and Certain Other Processed Food Products** (7 CFR 52.1 - 52.83) for lot grading and on-line grading, as applicable.

§52.1405 Determining the grade of a lot.

A lot of extracted honey is considered as meeting the requirements for quality and analysis if:

- (a) The requirements specified in Table IV and V, as applicable, are met; and
- (b) The requirements for the procedures set forth in the **Regulations Governing Inspection and Certification of Processed Fruits and Vegetables, Processed Products Thereof, and Certain Other Processed Food Products** (7 CFR 52.1 - 52.83) are met.

Done at Washington, D.C. on: April 16, 1985

/s/ _____

William T. Manley
Deputy Administrator
Marketing Programs