

Honey Judging and Standards¹ Malcolm T. Sanford²

Judging honey is not like evaluating other commodities. The product itself is not examined so much as the care the exhibitor takes in putting it up for show. Criteria in judging livestock include conformation, weight distribution and behavior. The knowledge to expertly judge livestock is acquired only after a great deal of experience and specialized training.

Not so with honey, a product that is infinitely variable because of differences in floral source. A typical score card for extracted honey lists the following:

1. Container: appearance (10)
2. Density (20)
 1. Water content above 18.6% is disqualified
 2. No upgrading below 16% water content
3. Freedom from crystals (10)
4. Cleanliness and freedom from foam (30)
5. Flavor (20)
 1. Downgrade for objectionable flavor or overheating
 2. Disqualify for fermentation
6. Accuracy of filling (10)
 1. Headroom: 1/2 inch maximum, inch minimum; no visible gap between honey level and cap
 2. If multiple entries: uniformity of filling

Density is perhaps the most objective measurement of the above criteria. It is measured with a refractometer and numbers can be assigned with accuracy. Most judges do not upgrade for moisture content below 18.6%.

The rest of the judging categories are extremely subjective. In this example, the appearance of the container is awarded 10 points. This boils down to suitability and uniformity if multiple entries are provided. Usually, shows request three identical jars for comparison. Freedom from crystals, foam and overall cleanliness are 40% of the score. This can be judged using a bright light. Many judges use polarized light. The amount of foam usually is easily observed by taking off the cap.

Perhaps most controversial is judging honey flavor. The judge cannot let preferences for certain flavors prejudice the case. Only honey that tastes alcoholic (fermented) or burned can be marked down. Finally, accuracy of filling is judged. Some contests may include a category for color/clarity. Subjectiveness in honey judging, therefore, implies a

great deal of evaluating based on common sense. Expert knowhow is not needed, except perhaps in use of the refractometer.

Every contest has distinct rules and the score card should be obtained to see what criteria are being judged. Other classes of honey that might be entered include; comb honey, chunk honey and finely granulated (crystallized, creamed) honey. In addition, artistic or culinary creations and wax candles or blocks are categories found at many fairs or shows. Observation beehives and exhibits or displays advertising honey or honey bees are also judged at many fairs.

Domestic Standards

True United States Standards exist only for extracted honey. In many respects, they mirror those criteria listed above for judging honey. The latest standards were established May 23, 1985. They are classed as voluntary and are issued under the authority of the Agricultural Marketing Act of 1946. Their purpose is to provide for development of official U.S. grades to designate different levels of quality and facilitate orderly marketing of the product. Originally part of the code of Federal Regulations, Title 7- Agriculture, Part 52, the standards for honey were removed from the CFR on December 4, 1995, as part of a major revision of voluntary grade standards (see the Federal Register, 60 FR 62172). Now published separately by the Agricultural Marketing Service of the USDA and are found at <http://www.ams.usda.gov/standards/exhoney.pdf>, they are reprinted here for access by those without Internet connection.

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:

1. **Liquid honey.** Liquid honey is honey that is free from visible crystals.
2. **Crystallized honey.** Crystallized honey is honey that is solidly granulated or crystallized, irrespective of whether it is candied, fondant, creamed, or spread types of crystallized honey.

3. **Partially crystallized honey.** Partially crystallized honey is honey that is a mixture of liquid honey and crystallized honey.

52.1393 Styles

1. **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.

2. **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 Definition of Terms

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

1. **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 or 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.
2. **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.
3. **Aroma** means the fragrance or odor of the honey.
4. **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 materials 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.
5. **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.
6. **Crystallization** means honey in which crystals have been formed.
7. **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 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.

8. **Floral source** means the flower from which the bees gather nectar to make honey.

9. **Granulation** means the initial formation of crystals in the honey.

10. **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.

11. **Pollen grains** means the granular, dust-like microspores that bees gather from flowers. Pollen grains in suspension contribute to the lack of clarity in filtered style.

12. **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

1. 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.
2. 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 practical, and with respect to containers of one gallon or else, 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.

52.1397 Color Designations

1. 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 1](#) .
2. The respective color designations, applicable range of each color, color range on the Pfund scale, and optical density of freshly prepared carmel-glycerin solutions are shown in [Table 1](#) .

52.1399 Tolerance for the Designations 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 Vegetables, Processed Products Thereof, and Certain Other Processed Food Products." Provided, however, the honey in none of the containers falls below the next darker color designation. Applicable sampling plans and acceptance numbers are shown in [Table 2](#) .

52.1400 Grades

1. **U.S. Grade A** is the quality of extracted honey that meets the applicable requirements of [Table 3](#) or [Table 4](#) , and has a minimum total score of 90 points.
2. **U.S. Grade B** is the quality of extracted honey that meets the applicable requirements of [Table 3](#) or [Table 4](#) , and has a minimum total score of 80 points.
3. **U.S. Grade C** is the quality of extracted honey that meets the applicable requirements of [Table 3](#) or [Table 4](#) , and has a minimum total score of 70 points.
4. **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.

1. 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 5](#) . The moisture content of honey and percent soluble solids may be determined by any other method which gives equivalent results.
2. 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).
3. 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 (100 total points):
Flavor and aroma 50 points Absence of defects 40 points Clarity 10 points
4. 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.

5. Crystallized honey and partially crystallized honey shall be liquefied 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.

See [Tables 3](#) and [4](#) . **International Standards**

An international code exists for honey, but is variable and regulations are generally unique to each country. Often, specific levels of enzyme activity (diastase) and/or HMF (hydroxymethylfurfural) are allowed in imported honey. Both are influenced greatly by heating honey and can change significantly during storage or transit if the honey becomes too hot.

In addition, the level of sucrose may also be stipulated. It cannot be over emphasized that those interested in exporting honey check with their freight forwarder to determine specific standards the product must adhere to. Honey arriving at ports of entry has been

refused and shipped back if standards were not met. This resulted not only in a no sale, but also in the shipper having to pay freight both ways.

For further information on International Standards see:

http://beekeeping.com/articles/us/honey_quality.htm

Other technical information on honey can be found at the National Honey Board's technical site: <http://www.honey.com/foodindustry/techspecs>

For general information on beekeeping please visit the APIS site at

<http://aphis.ifas.ufl.edu>

Tables

Table 1. Color Designations of Extracted Honey

USDA Color Designation	USDA Color Standards	Pfund Scale Millimeters	Optical Density*
Water White	Water White or lighter	8 or less	0.0945
Extra White	Water White to Extra White	8 including 17	.189
White	Extra White to White	over 17 including 34	.378
Extra Light Amber	White to Extra Light Amber	over 34 including 50	.595
Light Amber	Extra Light Amber to Light Amber	over 50 including 85	1.389
Amber	Light Amber to Amber	over 85 including 114	3.008
Dark Amber	Darker than Amber	over 114	---

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

Table 2. Single Sampling Plans and Acceptable Numbers 3 6 13 21 29

Table 3. Filtered Style Grade Requirements

Sample Size (number of sample units)

Acceptance No.

0

1

2

3

4

FACTORS	GRADE A	GRADE B	GRADE C	SUBSTANDARD
Percent Soluble Solids (Minimum)	81.4	81.4	80.0	Fails Grade C
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 - 34 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	Fairly good - reasonably free from caramelization; free from smoke, fermentation, chemicals and	Poor - Fails Grade C

		other causes.	other causes.	
Score Points	45 - 50	40 - 44 ₁	35 - 39 ₁	0 - 34 ₁
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 ₁	0 - 3 ₂

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 4. Strained Style Grade Requirements

FACTORS	GRADE A	GRADE B	GRADE C	SUBSTANDARD
Percent Soluble Solids (Minimum)	81.4	81.4	80.0	Fails Grade C

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.				

Table 5. Refractive Indices, Corresponding Percent Soluble Solids, and Percent Moisture in Extracted Honey*

Refractive Index @ 20(Range)	Percent Soluble Solids	Percent Moisture	Refractive Index @ 20(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

1.4826 - 1.4828 1.4829 - 1.4830 1.4831 - 1.4833 1.4834 - 1.4835 1.4836 - 1.4838
1.4839 - 1.4840 1.4841 - 1.4843 1.4844 - 1.4845 1.4846 - 1.4848 1.4849 - 1.4850
1.4851 - 1.4853 1.4854 - 1.4855 1.4856 - 1.4858 1.4859 - 1.4860 1.4861 - 1.4863
1.4864 - 1.4865 1.4866 - 1.4868 1.4869 - 1.4870 1.4871 - 1.4873 1.4874 - 1.4875
1.4876 - 1.4878 1.4879 - 1.4880 1.4881 - 1.4883 1.4884 - 1.4885 1.4886 - 1.4888
1.4889 - 1.4890 1.4891 - 1.4893 1.4894 - 1.4896 1.4897 - 1.4898 1.4899 - 1.4901
1.4902 - 1.4903

78.4 21.6

78.5 21.5 78.6 21.4 78.7 21.3 78.8 21.2 78.9 21.1 79.0 21.0 79.1 20.9 79.2 20.8 79.3
20.7 79.4 20.6 79.5 20.5 79.6 20.4 79.7 20.3 79.8 20.2 79.9 20.1 80.0 20.0 80.1 19.9
80.2 19.8 80.3 19.7 80.4 19.6 80.5 19.5 80.6 19.4 80.7 19.3 80.8 19.2 80.9 19.1 81.0
19.0 81.1 18.9 81.2 18.8 81.3 18.7 81.4 18.6 81.5 18.5

1.4937 - 1.4939

1.4940 - 1.4941 1.4942 - 1.4944 1.4945 - 1.4946 1.4947 - 1.4949 1.4950 - 1.4951
1.4952 - 1.4954 1.4955 - 1.4957 1.4958 - 1.4959 1.4960 - 1.4962 1.4963 - 1.4964
1.4965 - 1.4967 1.4968 - 1.4969 1.4970 - 1.4972 1.4973 - 1.4975 1.4976 - 1.4977
1.4978 - 1.4980 1.4981 - 1.4982 1.4983 - 1.4984 1.4985 - 1.4987 1.4988 - 1.4990
1.4991 - 1.4993 1.4994 - 1.4995 1.4996 - 1.4998 1.4999 - 1.5000 1.5001 - 1.5003
1.5004 - 1.5005 1.5006 - 1.5008 1.5009 - 1.5011 1.5012 - 1.5013 1.5014 - 1.5016
1.5017 - 1.5018

82.9 17.1 83.0 17.0 83.1 16.9 83.2 16.8 83.3 16.7 83.4 16.6 83.5 16.5 83.6 16.4 83.7
16.3 83.8 16.2 83.9 16.1 84.0 16.0 84.1 15.9 84.2 15.8 84.3 15.7 84.4 15.6 84.5 15.5
84.6 15.4 84.7 15.3 84.8 15.2 84.9 15.1 85.0 15.0 85.1 14.9 85.2 14.8 85.3 14.7 85.4
14.6 85.5 14.5 85.6 14.4 85.7 14.3 85.8 14.2 85.9 14.1 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

* Temperature corrections: If refractometer reading is made at temperature above 20°C (68°), 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.

Footnotes

1. This document is ENY-129, one of a series of the Entomology and Nematology Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Original publication date July 1988. Revised June 1999. Reviewed May 2003. Visit the EDIS Web Site at <http://edis.ifas.ufl.edu>.

2. Malcolm T. Sanford, professor/extension apiculturist, Entomology and Nematology Department, Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, 32611.

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