United States Department of Agriculture
Grain Inspection, Packers and Stockyards Administration
Federal Grain Inspection Service

Directive 9180.65 6/8/00

INSPECTION OF HULLESS BARLEY

1. PURPOSE

This directive establishes uniform procedures for the factor analysis of Hulless barley as "Not Standardized Grain" under the U.S. Grain Standards Act (USGSA).

2. GENERAL INFORMATION

a. Inspection of Hulless barley is upon request and on factor only basis.

b. There are no classes, subclasses, or numerical grades for Hulless barley.

c. In addition to the factor analysis described in this directive, applicant may request other quality information (e.g., an exact count on stones in addition to the percentage by weight, a percentage for a specific type of damage, etc.).

d. Official personnel shall document information observed during sampling and testing.

e. All quantities referenced in this directive are approximate unless otherwise specified.

f. Use an approved divider to obtain sub-portions of a sample for analysis unless otherwise specified.

g. If an approved mechanical shaker is unavailable, inspectors may hand-sieve the sample.

h. Under USGSA regulations there are four inspection levels: original inspection, re-inspection, appeal inspection, and board appeal inspection.

3. DEFINITION OF HULLESS BARLEY

Hulless barley, as used in this directive, is grain that before the removal of dockage,

consists of 80 percent or more of whole kernels of Hulless barley and not more than 20 percent of other grains for which standards have been established. It includes all varieties of Hulless barley.

Whole kernels are kernels with three-fourths or more of the kernel present.

Other grains for which standards have been established are barley, canola, corn, flaxseed, oats, rye, sorghum, soybeans, sunflower seed, triticale, and wheat.

Hulless barley is recognized by a non-adhering hull (palea and lemma) that is normally removed in the threshing process or can be removed easily by hand.

Visually examine the sample to determine if it meets the definition of Hulless barley. If an analysis is necessary, make the determination before the removal of dockage on a 25-gram portion.

4. BASIS OF DETERMINATION

Certain Quality Determinations. Each determination of rodent pellets, bird droppings, other animal filth, broken glass, castor beans, cockleburs, crotalaria seeds, dockage, garlic, live insect infestation, large stones, moisture, temperature, and unknown foreign substance(s), and a commonly recognized harmful or toxic substance(s) is made on the basis of the sample as a whole. When a condition exists that may not appear in the representative sample, the determination may be made on the basis of the lot as a whole at the time of sampling according to procedures prescribed in FGIS instructions.

All Other Determinations. All other determinations, except the determination of odor, are made on dockage-free Hulless barley representative sample. Odor is determined on the basis of the grain as a whole or the grain when free from dockage.

Lot as a Whole	Factors Determined Before the Removal of Dockage	Factors Determined After the Removal of Dockage
Distinctly low quality Heating Infested Odor	Distinctly low quality Garlicky Heating Infested Kind of grain Moisture Odor Purity	Broken kernels Damaged kernels Ergot Foreign material Odor Other grains Smut Stones Test weight Thin Hulless barley Wild oats

5. FACTORS DETERMINED BEFORE REMOVAL OF DOCKAGE

a. Purity

Basis of Determination. Upon request, determine purity on a representative portion of the original sample before the removal of dockage. Determine percent purity by weight of kernels and parts of kernels that meet the definition of Hulless barley using a 25-gram portion. Record the percentage of Hulless barley on the work record and the certificate

b. Heating

Hulless barley developing a high temperature from excessive respiration is considered heating. Advanced stage of heating Hulless barley will usually have a sour or musty odor. Care should be taken not to confuse Hulless barley that is heating with Hulless barley that is warm and moist because of storage in bins, railcars, or other containers during hot weather.

Basis of Determination. Determine heating on evidence obtained at the time of sampling or on the sample either before or after the removal of dockage. Record the word "Heating" on the work record and the certificate.

c. Odor

Basis of Determination. Determine odor on evidence obtained at the time of sampling or on the sample either before **or after the removal of dockage**. Odor classification examples are shown in the following table:

Sour	Musty	COFO *
Boot Fermenting Insect (acrid) Pigpen	Ground Insect Moldy	Animal hides Decaying animal and vegetable matter Fertilizer Fumigant Insecticide Oil products Skunk Smoke Strong weed

* Commercially Objectionable Foreign Odors are odors, except smut and garlic odors, foreign to grain that renders it unfit for normal commercial usage.

Fumigant or insecticide odors are considered commercially objectionable foreign odors if they linger and do not dissipate. When a sample of Hulless barley contains a fumigant or insecticide odor that prevents a determination as to whether any other odor(s) exists, apply the following guidelines:

Original Inspections. Allow the work portion to aerate in an open container for 4 hours, or less, if the odor dissipates in less time.

Re-inspection, Appeal, and Board Appeal Inspections. Allow unworked file samples and new samples to aerate in an open container for 4 hours, or less, if the odor dissipates in less time. The 4-hour aeration requirement does not apply when the original work portion was aerated and retained as the final file.

Consider the sample as having a commercially objectionable foreign odor if the fumigant or insecticide odor persists based on the above criteria.

Final Determinations. The inspector is responsible for making the final determination for all odors. A consensus of experienced inspectors is used, whenever possible, on samples containing marginal odors. The consensus approach is not required if no odor or a distinct odor is detected. Record the words "Musty," "Sour," or "COFO" on the work record and the certificate.

d. Moisture

Water content determined by oven method or using the Dickey-john GAC-2100 Two-rowed barley calibration.

Basis of Determination. Determine moisture on a representative portion of the original sample before the removal of dockage. Record the method used and the percent of moisture to the nearest tenth percent on the work record and the certificate.

e. Garlicky Hulless Barley

Hulless barley that contains three or more green garlic bulblets or an equivalent quantity of dry or partly dry bulblets in 500 grams of Hulless barley.

Basis of Determination. Determine garlicky on a 500-gram representative portion of the original sample before the removal of dockage.

Green garlic bulblets are bulblets which have retained all of their husks intact. Dry or partly dry garlic bulblets are bulblets which have lost all or part of their husks. Consider bulblets with cracked husks as dry bulblets.

NOTE: Three dry or partly dry garlic bulblets are equal to one green bulblet.

If three or more green garlic bulblets or equivalent dry or partly dry bulblets are present in 500-gram representative portion, apply the special designation "Garlicky." Garlic bulblets used in the determination of "Garlicky" also function as dockage or foreign material.
When applicable, record the word "Garlicky" on the work record and the certificate. Upon request, provide the number of garlic bulblets in whole and thirds.

f. **Infested Hulless Barley**

Hulless barley that is infested with live weevils or other live insects injurious to stored grain.

The presence of any live weevil or other live insects injurious to stored grain found in the work sample indicates the probability of infestation and warns that the Hulless barley must be carefully examined to determine if it is infested. In such cases, examine the work sample and the file sample before reaching a conclusion as to whether or not the Hulless barley is infested. Do not examine the file sample if the work portion is insect free.

Live weevils include rice weevils, granary weevils, maize weevils, cowpea weevils, and lesser grain borers. Other live insects injurious to stored grain shall include grain beetles, grain moths, and larvae.

Determine infestation on the lot as a whole and/or the sample as a whole. Insect tolerances are shown in the following table.

Samples meeting or exceeding any one of these tolerances are infested: **2 lw, or 1 lw + 5 oli, or 10 oli**
I. 1,000-Gram Representative Sample (+ file sample if needed) 1/ - Submitted Samples - Probed Lots - D/T Sampled Landcarriers
II. Lot as a Whole (Stationary) - Probed Lots (at time of sampling)
III. Online Sample (In-Motion) 2/ - Railcars Under Cu-Sum - Subsamples for Sacked Grain Lots - Components for Bargelots 3/ - Components for Shiplots 3/
1/ Examine work portion and file sample if necessary. Do not examine file sample if work portion is Insect free. 2/ Minimum sampling rate is 500 grams per 2,000 bushels. 3/ Minimum component size is 10,000 bushels. Key: lw = live weevil Oli = other live insects injurious to stored grain

When applicable, record the word "Infested" on the work record and the certificate.

g. Distinctly Low Quality

Consider Hulless barley distinctly low quality when it is obviously of inferior quality and the existing factors or guidelines do not properly reflect the inferior condition.

Use all available information to determine whether the Hulless barley is of distinctly low quality. This includes a general examination of the Hulless barley during sampling and an analysis of the obtained sample(s).

Large Debris. Hulless barley containing two or more stones, pieces of glass, pieces of concrete, or other pieces of wreckage or debris which are visible to the sampler and too large to enter the sampling device is considered distinctly low quality.

Other Unusual Conditions. Hulless barley that is obviously affected by other unusual conditions which adversely affect the quality of the Hulless barley and cannot be properly defined by use of the quality factors specified is considered distinctly low quality.

Hulless barley suspected of containing diatomaceous earth is considered distinctly low quality unless the applicant specifically requests an examination to verify the presence of diatomaceous earth. If the laboratory examination verifies that the Hulless barley contains diatomaceous earth, the Hulless barley is not considered distinctly low quality due to diatomaceous earth.

When applicable, record the word "Distinctly Low Quality" and the reason(s) why on the work record and the certificate.

h. Dockage

All matter other than Hulless barley that can be removed from the original sample by use of an approved device according to procedures prescribed in FGIS instructions for dockage determination in barley.

Determine dockage on a portion of approximately 1000 grams representative sample using a dockage tester as follows:

(1) Set air control on 4 and the feed control to 6.

(2) Insert No. 6 riddle in the riddle carriage, No. 8 sieve in the top sieve carriage, and No. 6 sieve in the middle sieve carriage.

Aspirated material in air collection pan, materials over No. 6 riddle (excluding barley), and material that passed through the No. 6 sieve (bottom collection pan) is dockage. For more information, see Section 2.15 of the Grain Inspection Handbook, Book II, Barley.

Record the word "Dockage" and the percentage of dockage on the work record and on the certificate. Record the percentage of dockage in half and whole percent with fraction less than one-half percent disregarded.

6. FACTORS DETERMINED AFTER REMOVAL OF DOCKAGE

a. Test Weight

The weight per Winchester bushel (2,150.42 cubic inches) as determined using an approved device according to procedures prescribed in FGIS instructions.

Determine test weight (TW) on **a dockage-free portion** of sufficient quantity to overflow the kettle.

Record TW on the work record and on the certificate in half and whole pounds with fraction less than one-half pound disregarded.

b. Ergoty

Hulless barley that contains more than 0.10 percent ergot.

Ergot is a hard, reddish-brown or black grain-like mass of certain parasitic fungi that replaces the kernels of Hulless barley.

Basis of Determination. Determine ergot on a dockage-free portion of 250 grams. Ergot also functions as foreign material. Record the word “Ergoty” and the percentage of ergot to the **nearest hundredth percent** on the work records and certificate.

c. Smut

Smut is a plant disease characterized by the appearance of smut balls or smut spores. Hulless barley that has kernels covered with smut spores to give a smutty appearance in mass, or which contains more than 0.20 percent smut balls.

Basis of Determination. Determine the appearance by weight of smutty Hulless barley on a dockage-free work portion of 500 grams. Smut balls also function as foreign material. Record the word "Smutty" and the percentage of smut balls to the **nearest hundredth percent** on the work record and certificate.

d. Thin

Thin Hulless barley is barley that passes through a 4.5/64 x 3/4 slotted-hole sieve in accordance with procedures prescribed in FGIS's instructions.

Basis of Determination. Determine thin barley on a dockage-free portion of 250 grams using either the mechanical sieving method or the hand sieving method. When hand-sieving, hold the sieve level in both hands with elbows close to the sides. In a steady motion, move the sieve from left to right approximately 10 inches and then return from right to left. Repeat this motion 30 times. Return all material lodged in the perforations of the sieve to the barley remaining on top of the sieve. Record the percentage of thin barley on the work record and the certificate to the nearest tenth percent.

e. Damaged

Kernels, pieces of Hulless barley kernels, other grains, and wild oats that are badly ground-damaged, badly weather-damaged, diseased, frost-damaged, germ-damaged, heat-damaged, insect-bored, mold-damaged, sprout-damaged, or otherwise materially damaged.

In general, kernels of Hulless barley, other grains, or wild oats are considered damaged for inspection purposes only when the damage is distinctly apparent and of such character as to be recognized as damaged for commercial purposes.

Basis of Determination. Determine damaged kernels on a dockage-free portion of 25 grams. Record the percentage of damaged kernels on the work record and on the certificate in tenth percent.

f. Foreign Material

All matter other than Hulless barley, other grains, and wild oats that remains in the sample after the removal of dockage.

Basis of Determination. Determine foreign material on a dockage-free portion of 25 grams. Record the percent of foreign material on the work record and the certificate to the nearest tenth percent.

g. Wild Oats

Seeds of Avena fatua L. and A. sterilis L.

Basis of Determination. Determine wild oats on a dockage-free portion of 25 grams.

Wild Oats Characteristics. Wild oats are usually identified by their slender kernels and twisted awns so called "sucker mouths" and basal hairs or bristles on the germ end of the kernel. Record the percentage of wild oats on the work record and the certificate to the nearest tenth percent.

h. Broken Kernels

Broken kernels are Hulless barley kernels with more than 1/4 of the kernel removed.

Basis of Determination. Determine broken kernels on a dockage-free portion of 25 grams. Record the percent of broken kernels on the work record and the certificate to the nearest tenth percent.

7. CERTIFICATION

Record "**Not Standardized Grain"** on the "Grade and Kind" line and **"Hulless barley"** in the "Remarks" section of the official inspection certificate. Report factor results and other information in the appropriate factor block or in the "Remarks" section of the certificate.

David Orr, Director
Field Management Division