

GRAIN INSPECTION HANDBOOK  
BOOK 1, CHAPTER 8  
KHORASAN

Grain Inspection Hand Book  
Montana Standards  
Book 1 – Chapter 8  
Khorasan

GRAIN INSPECTION HANDBOOK  
 BOOK 1, CHAPTER 8  
 KHORASAN

<u>Section Number</u>	<u>Section</u>	<u>Page Number</u>
8.1	Background	8-4
8.2	General Information	8-4
8.3	Definition of Khorasan Seed	8-6
8.4	Infestation	8-7
8.5	Heating	8-8
8.6	Odor	8-9
8.7	Animal Filth, Glass, and Unknown Foreign Substances	8-10
8.8	Garlic Bulblets	8-10
8.9	Moisture	8-11
8.10	Dockage	8-11
8.11	Test Weight	8-12
8.12	Processing the Work Sample	8-13
8.13	Ergoty Khorasan	8-15
8.14	Light Smutty and Smutty Khorasan	8-15
8.15	Treated Khorasan	8-16
8.16	Stones	8-17
8.17	Shrunken and Broken Kernels	8-17
8.18	Foreign Material	8-18
8.19	Heat-Damaged Kernels	8-18
8.20	Damaged Kernels	8-19
8.21	Defects	8-20
8.22	Contrasting Classes	8-21
8.23	Official Criteria	8-22

<u>Tables/Charts</u>		<u>Page Number</u>
Table NO 1	How Factors are Determined	8-6
Table NO 2	Insect Infestations	8-8
Table NO 3	Odor	8-9
Table NO 4	Dividing the Work Sample	8-15
Chart NO 1	Dividing the Work Sample	8-14

GRAIN INSPECTION HANDBOOK  
BOOK 1, CHAPTER 8  
KHORASAN

**INDEX**

<u>Section</u>	<u>Page Number</u>
Animal Filth, Glass, and Unknown Foreign Substances	8-10
Background	8-4
Contrasting Classes	8-21
Damaged Kernels	8-19
Defects	8-20
Definition of Khorasan Seed	8-6
Dockage	8-11
Ergoty Khorasan	8-15
Foreign Material	8-18
Garlic Bulblets	8-10
General Information	8-4
Heating	8-8
Heat-Damaged Kernels	8-18
Infestation	8-7
Light Smutty and Smutty Khorasan	8-15
Moisture	8-11
Odor	8-9
Official Criteria	8-22
Processing the Work Sample	8-13
Shrunken and Broken Kernels	8-17
Stones	8-17
Test Weight	8-12
Treated Khorasan	8-16

## 8.1 - BACKGROUND

While assisting Kamut producers to obtain crop insurance coverage, the Federal Grain Inspection Service (FGIS) worked with the Federal Crop Insurance Corporation to develop inspection procedures for the factor analysis of this organically grown wheat-like grain. FGIS used the name of Kamut in establishing the procedures. However, Kamut is not the name of the commodity, but is a registered trademark owned by Kamut International, Ltd (KI). The name Kamut is used to market a grain that has certain guaranteed quality attributes as specified by KI. The common name of the grain is Khorasan wheat. It was first identified as *Triticum Polonicum*, but further examination has shown that this variety of wheat is actually *Triticum Turanicum*.

For 2004, the Federal Crop Insurance Corporation modified its wheat crop insurance provisions to include the term Khorasan into the crop definition and to create a separate definition of Khorasan, which reads: “the common name for a variety of wheat *Triticum Turanicum* that is marketed under trademarks such as Kamut. Khorasan is considered to be spring wheat for the purpose of this policy.”

## 8.2 - GENERAL INFORMATION

There are no classes, subclasses, or grades in Khorasan seed. Inspection of Khorasan seed is on a factor only basis. The factors analyzed are: kind of grain, test weight, moisture, dockage, shrunken and broken kernels, infestation, heating, odor, bird dropping, other animal filth, broken glass, castor beans, cockleburs, crotalaria seeds, smut, ergot, garlic, treated, stones, temperature, unknown foreign substances, heat-damaged kernels, damaged kernels, and foreign material.

**Standard Abbreviations**

Use the following abbreviations in the analysis of Khorasan seed:

Khorasan seed	KHOR	Cockleburs	CBUR
Moisture	M	Crotalaria	CROT
Dockage	DKG	Garlic bulblets	GARB
Test weight per bushel	TW	Unknown foreign substance	FSUB
Damaged kernels (total)	DKT	Odor	ODOR
Heat-damaged kernels	HT	Musty	MUST
Shrunken and broken kernels	SHBN	Sour	SOUR
Foreign material	FM	Commercially objectionable foreign odor	COFO
Infested	INF	Contrasting Classes	CCL
Heating	HTG	Smutty	SMUT
Bird excreta	BRDX	Stones	STON
Animal filth	ANFL	Treated	TRET
Castor beans	CSTB	Hard and Vitreous Kernels of Amber Color	HVAC
Broken Kernels	BN	Touched by Frost	TBF
Touched by Black-Tip Fungus	TBBT		

**Table No. 1 How Factors are Determined**

Lots as a Whole	Before the Removal of Dockage	After the Removal of Dockage	After the Removal of Dockage and Shrunken and Broken Kernels
Heating Infested Odor	Garlicky Heating Infested Kind of Grain Moisture Odor Odor (smut) Other unusual conditions	Ergot Kind of grain Odor Shrunken & broken kernels Smut Stones Test weight Treated Total Dockage	Damaged kernels (total) Contrasting Classes HVAC Foreign material Heat-damaged kernels Other Grains

### 8.3 - DEFINITION OF KHORASAN SEED

Khorasan (*Triticum Turanicum*) consists of 50.0 percent or more of whole Khorasan seed before the removal of dockage.

Khorasan is defined as grain that before the removal of dockage consists of 50 percent or more of Khorasan, and not more than 10 percent of other grains. . Other grains for which standards have been established are wheat, barley, canola, corn, flaxseed, oats, rye, sorghum, soybeans, sunflower seed, and triticale.

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

Basis of Determination: A visual appraisal of the sample is sufficient to determine if it meets the definition of Khorasan seed. However, if analysis is necessary, make the determination before the removal of dockage on a portion of approximately 50 grams.

If the sample does not meet the definition of Khorasan, examine it further to determine if it is:

- A. Another grain
- B. Not standardized grain. If the grain is a sample designated as not standardized factor results are to be given.
- C. Mixed Commodity. Khorasan that has more than 10 percent of other grains will be considered a mixed commodity and factors are to be given.

#### **8.4 - INFESTATION**

Khorasan seed that is infested with live weevils or other live insects injurious to stored grain according to procedures prescribed in FGIS instructions.

The presence of any live weevil or other live insect injurious to stored grain indicates the probability of infestation and warns you to examine carefully the Khorasan seed to determine if it is infested. In such cases, examine the work and file sample before reaching a conclusion as to whether the Khorasan seed 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 include grain beetles, grain moths, and larvae. (See Grain Inspection Handbook, Book II, Chapter 1, Section 1.2, Visual Grading Aids for Insects Commonly Found in Grain.)

Basis of Determination: Determine infestation on the lot as a whole and/or the sample as a whole. For insect tolerances, see Table 2.

**TABLE No. 2 Insect Infestation**

<p>Samples meeting or exceeding any one of these tolerances are infested:          2 lw, or 1 lw + 1 oli, or 2 oli</p>
<p>I.          1,000-gram Representative Sample 1/          (+ file sample if needed)          - Submitted Samples          - Probed Lots          - D/T Sampled Landcarriers</p>
<p>II.          Lot as a Whole (stationary)          - Probed Lots (at time of sampling)</p>
<p>III.          Online sample (In-motion) 2/          - Railcars Under Cu-Sum          - Subsamples for Sacked Grain Lots          - Components for Bargelots 3/          - Components for Shiplots 3/</p>
<p>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</p>

Certification: When applicable, record the word “infested” on the work record and the certificate.

### 8.5 - HEATING

Khorasan developing a high temperature from excessive respiration is considered heating. Heating Khorasan, in its final stages, will usually have a sour or musty odor. Do not confuse Khorasan that is heating with Khorasan 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.

Certification: When applicable, record heating on the work record and certificate.



**8.6 - 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.

**Table No. 3 Odor**

Lots as a Whole Before the Removal of Dockage After the Removal of Dockage		
Sour	Musty	COFO Commercially Objectionable Foreign Odors
Boat Fermenting Insect (acid) Pigpen	Ground Insect Moldy	Animal hides Decaying animal & vegetable matter Fertilizer Fumigant Insecticide Oil products Skunk Smoke Strong weed

Commercially Objectionable Foreign Odor are odors, except smut and garlic odors, foreign to grain, which render it unfit for normal usage.

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

- A. Original Inspections: Allow the work portion to aerate in an open container for 4 hours, or less, if the odor dissipates in less time.
- B. Re-inspections: 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.

GRAIN INSPECTION HANDBOOK  
BOOK 1, CHAPTER 8  
KHORASAN

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

Final Determination: The inspector(s) is responsible for making the final determination for all odors. When possible use a consensus of experienced inspectors, on samples containing marginal odors. The consensus approach is not required if no odor or a distinct odor is detected.

Certification: If present, record the words “Musty”, “Sour”, or “Commercially Objectionable Foreign Odor” on the work record and the certificate.

### **8.7 - Animal Filth, Glass, and Unknown Foreign Substances**

Basis of Determination: Determine animal filth, glass, and unknown foreign substances on the basis of the samples as a whole (1-1/8 to 1-1/4 quarts).

Certification: Record the number of pieces of animal filth, glass, and unknown foreign substances on the work record and the certificate. Record count factors to the nearest whole number.

### **8.8 - GARLIC BULBLETS**

Basis of Determination: Determine the number of garlic bulblets on the sample before the removal of dockage (approximately 1,000 grams), except in those cases where the garlic bulblet count is in excess of 10 green bulblets. When garlic bulblets are in excess of 10 green bulblets, use a portion of 250 grams. After determining the count of bulblets on the 250-gram portion, multiply the count by 4 to obtain the equivalent number of bulblets in 1,000 grams. (Visual Reference Images: VRI -OF-Garlic Bulbs.)

Characteristics of Bulblets:

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

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

Garlic bulblets function as dockage or foreign material.

Certification: Record the number of garlic bulblets in whole and decimals to the nearest hundredth percent , on the work record and the certificate. (i.e.  $1/3=0.33$ ,  $2/3= 0.67$ )

## 8.9 - MOISTURE

Moisture: Moisture is water content in grain as determined by the UGMA moisture instrument using the approved calibration for Durum Wheat (See FGIS Directive 9180.61).

Basis of Determination: Determine moisture on a portion of approximately 450 grams before the removal of dockage

The procedures for performing a moisture determination are described in Book II, Chapter 1, Section 1.10.

Certification: Record the percentage of moisture on the work record and the certificate to the nearest tenth percent.

## 8.10 - DOCKAGE

All matter other than Khorasan that you can remove from the original sample by use of an approved device according to procedures prescribed. Also, underdeveloped, shriveled, and small pieces of Khorasan kernels removed in properly separating the material other than Khorasan.

Basis of Determination: Determine dockage on a portion of 1,000 to 1,050 grams of the original sample.

When determining dockage, check the material that passes over the riddle for threshed or unthreshed kernels and sprouted kernels of Khorasan.

Threshed and sprouted kernels that pass over the riddle are not considered dockage. Return all such kernels to the dockage-free sample. Threshed kernels of Khorasan are kernels with either no glumes attached, or not more than one glume attached.

Unthreshed kernels that pass over the riddle are considered dockage. Unthreshed kernels are kernels with more than one glume attached. (Reference: Visual Reference Image VRI- (W) O.F.- 30.0 Threshed & Unthreshed Kernels).

Procedure for determining dockage with the Carter Dockage Tester:

Set up the Carter dockage tester as follows:

1. Air control at Number 4.
2. Feed control at Number 6.
3. Number 25 riddle in riddle carriage. If number 25 removes excess Khorasan, use a modified 25 riddle. Modified 25 riddle has alternate tangs removed.

GRAIN INSPECTION HANDBOOK  
BOOK 1, CHAPTER 8  
KHORASAN

4. No sieve in the top carriage
5. Number 2 sieve in the middle sieve carriage
6. Number 2 sieve in the bottom sieve carriage
7. Start the Carter Dockage Tester and pour sample into the feed hopper.

Dockage consists of:

- a. Material removed by the aspirator (air collection pan)
- b. Material over the riddle, except for threshed and sprouted kernels. Threshed kernels have one or no glume attached (Reference: Visual Reference Image VRI- (W) O.F.-30.0 Threshed & Unthreshed Kernels.) Place threshed and sprouted kernels in the cleaned Khorasan (over middle sieve).
- c. Material that passed over the bottom sieve except when the material consists of less than 50 percent, by weight, of Khorasan kernels. When 50 percent or more of Khorasan kernels are found, return the material to the cleaned Khorasan.
- d. Material that passed through the Number 2 sieve (bottom collection pan).

To avoid repeating operations, check the dockage for garlic bulblets, infestation, and other factors (except stones).

Certification: Record the phrase “Total Dockage” and the percentage to the nearest tenth percent on the work record and the certificate. If the Total Dockage is less than one-tenth percent, report as “Total Dockage 0.0 percent.”

### **8.11 - 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.

Basis of Determination: Determine test weight on a dockage-free portion of sufficient quantity to overflow the kettle.

The procedures for performing the test weight determination and available services are described in Book II, Chapter 1, Section 1.11.

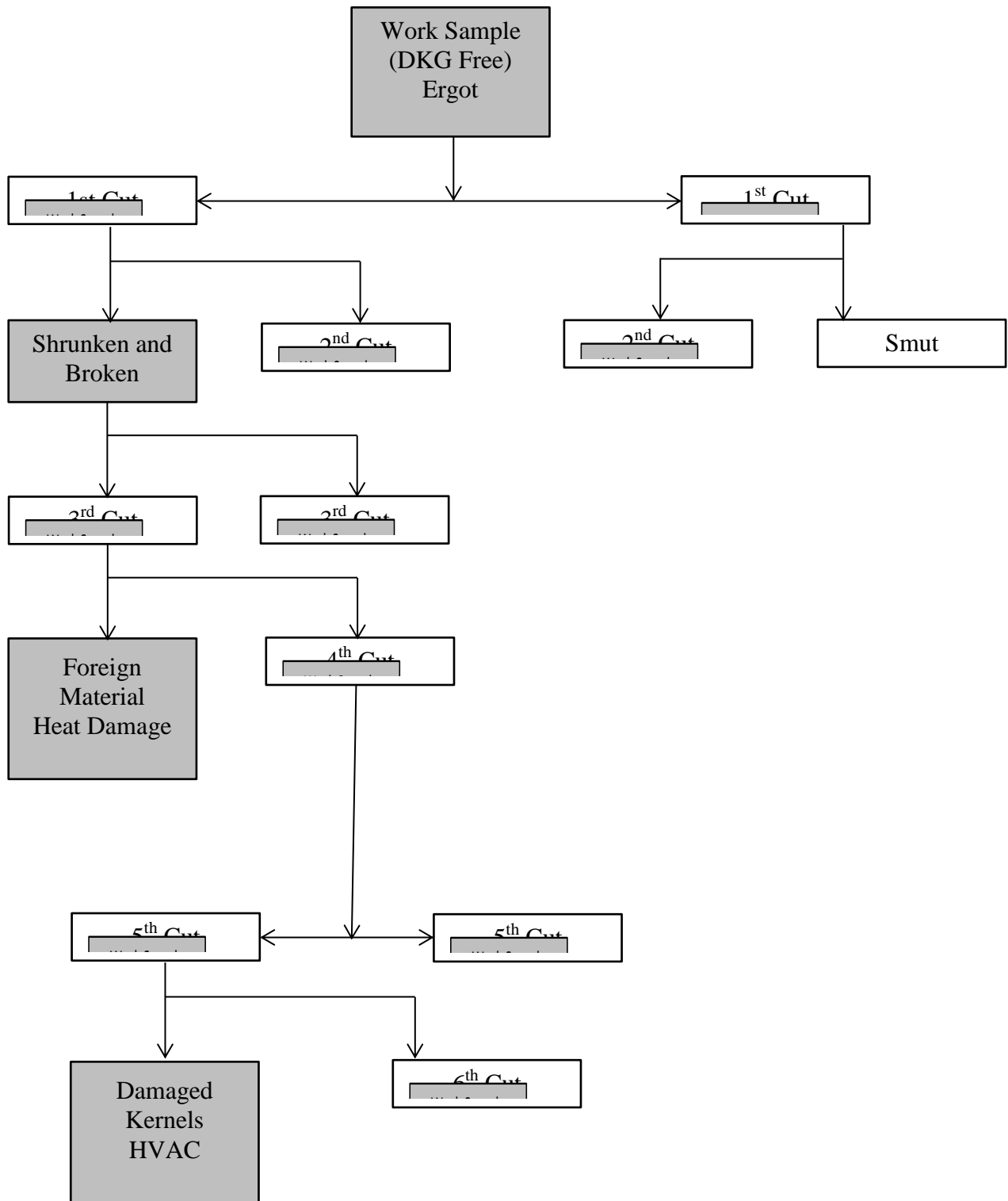
GRAIN INSPECTION HANDBOOK  
BOOK 1, CHAPTER 8  
KHORASAN

Certification: Record test weight results on the work record in whole and tenth pounds to the nearest tenth pound. Record the test weight on the certificate in whole and tenth pounds to the nearest tenth pound. If requested, convert the pounds per bushel (lbs. /bu) result to kilograms per hectoliter (kg/hl) using the following formulas: for Khorasan seed,  $[1.292 \times \text{lbs. /bu}] + 0.630 = \text{kg/hl}$ .

### **8.12 - PROCESSING THE WORK SAMPLE**

At this point, you have performed all tests required before the removal of dockage. You have determined the percentage of dockage, test weigh, and examined it for certain criteria. Now you are ready to divide the work sample into fractional portions for other determinations required after the removal of dockage. The following chart and Table 4 illustrate how you will divide the sample into fractional parts using the Boerner divider.

**Chart NO. 1 Dividing the Work Sample**



**Table No. 4 Approximate Analytical Portion Sizes**

Factors	Grams
Ergot	1,000
Shrunken and Broken Kernels	250
Smut	250
Class	15
Damaged kernels (total)	15
HVAC	15
Foreign Material	50
Heat Damaged kernels	50

### **8.13 - ERGOTY KHORASAN**

Ergoty: Khorasan that contains more than 0.05 percent of ergot.

Ergot is a hard, reddish-brown or black grain-like mass of certain parasitic fungi that replaces the kernels of Khorasan. (Reference: Visual Reference Image VRI - OF-Ergot.)

Basis of Determination: Determine ergot on a dockage-free portion of 1,000 grams. Ergot applies in the determination of ergot and it functions as foreign material.

Certification: Upon request, record the percentage of ergot to the nearest hundredth percent on the work record and the certificate.

### **8.14 - LIGHT SMUTTY AND SMUTTY KHORASAN**

Light Smutty: Khorasan that has an unmistakable odor of smut, or which contains, in a 250-gram portion, smut balls, portions of smut balls, or spores of smut in excess of a quantity equal to 5 smut balls, but not in excess of a quantity equal to 30 smut balls of average size.

Smutty: Khorasan that contains, in a 250-gram portion, smut balls, portions of smut balls, or spores of smut in excess of a quantity equal to 30 smut balls of average size.

Basis of Determination: Determine “Light smutty” on the sample as a whole (odor only) or on a dockage-free portion of 250 grams. Determine “Smutty” on a dockage-free portion of 250 grams. Smut balls apply in the determination of “Light smutty” or “Smutty” but also function as foreign material.

Certification: If present, record the word “Smutty” on the work record and certificate. Upon request, show the odor (in the case of light smutty) or the number of smut balls.

### 8.15 TREATED KHORASAN

Treated: Khorasan that has been scoured, limed, washed, sulfured, or treated in such a manner that the true quality is not reflected.

Basis of Determination: Determine treated on the basis of the dockage-free work sample. If at the time of sampling, odor or other conditions indicate that the Khorasan has been treated, place a portion of the sample in an airtight container for examination in the laboratory.

Three qualities are associated with natural, untreated Khorasan:

1. A natural, live, healthy feeling
2. A bright, attractive appearance, and
3. A natural Khorasan odor

Any artificial or mechanical process that impairs or conceals the true quality of Khorasan causes Khorasan to grade treated. Such processes include:

Scoured or Washed: Khorasan which has been scoured or washed, in whole or in part, so that the true quality of the Khorasan is not reflected, and which meets one or more of the following conditions, is considered treated and graded as scoured or washed.

- a. Presents a blistered and/or abraded bran coat appearance as a result of treatment;
- b. Has a so-called laundry odor or wet smut odor;
- c. A dull, lifeless appearance or feeling; or
- d. Has the appearance of having been scoured for the purpose of increasing the test weight per bushel.

Sulfured Khorasan: Khorasan that in whole or in part has been bleached with any bleaching agent is considered treated (sulfured).

Limed Khorasan: The presence of lime in a sample of Khorasan (that has not been scoured) is considered as evidence that the lime was added to cover up some defect in the Khorasan. Consider such Khorasan as treated (limed).



### 8.16 - STONES

Stones shall be not easily crushed pieces of mineral matter and other substances of similar hardness. Stones are distinct from earthen material or dirt clods, which are easily crushed or dissolve in water.

Basis of Determination: Determine stones on the basis of the entire dockage-free work sample.

Certification: Record the number of stones in the results section of the certificate.

### 8.17 - SHRUNKEN AND BROKEN KERNELS

All matter that passes through a 0.064 x 3/8 oblong-hole sieve after sieving according to procedures prescribed in FGIS instructions.

Basis of Determination: Determine shrunken and broken kernels on a dockage-free portion of 250 grams using one of the following methods:

#### A. Mechanical Sieving Method.

1. Mount the sieve and the bottom pan on the mechanical sieve shaker.
2. Set the stroke counter for 30 strokes.
3. Follow the procedure described in Book II, Chapter 1, Section 1.13, "Mechanical Sieve Shaker."
4. Consider all material passing through the sieve as shrunken and broken kernels. Return the material lodged in the perforations to the Khorasan remaining on top of the sieve.

#### B. Hand Sieving Method.

1. Mount the sieve on a bottom pan.
2. Place the 250-gram portion in the center of the sieve.
3. Hold the sieve level in both hands with elbows close to the body and the sieve perforations parallel to the direction of movement.
4. In a steady motion, move the sieve from left to right approximately 10 inches and then return from right to left.
5. Repeat this operation 30 times.

6. Consider all material passing through the sieve as shrunken and broken kernels. Return the material lodged in the perforations to the Khorasan remaining on top of the sieve.

Determine shrunken and broken kernels prior to analyzing the sample for heat-damaged kernels, damaged kernels, foreign material, and contrasting classes.

Certification: Record the percentage of shrunken and broken kernels on the work record and certificate to the nearest tenth percent.

### **8.18 - FOREIGN MATERIAL**

All matter other than Khorasan that remains in the sample after the removal of dockage and shrunken and broken kernels.

Basis of Determination: Determine foreign material on a dockage-free and shrunken and broken-free portion of 50 grams.

Other grains including wheat, oat groats, hull-less oats, glumes on threshed or unthreshed kernels, and all matter other than Khorasan, are considered foreign material and removed from the portion. Remove the glumes from the kernels of Khorasan and add to the foreign material.

Certification: Record the percentage of foreign material on the work record and certificate to the nearest tenth percent.

### **8.19 - HEAT-DAMAGED KERNELS**

Heat Damage Kernels: Are pieces of Khorasan kernels, and other grains that are materially discolored and damaged by heat that remains in the sample after the removal of dockage and shrunken and broken kernels.

Basis of Determination: Determine heat-damaged kernels on a dockage-free and shrunken, and broken-free portion of 50 grams.

(Visual Reference Image VRI - W-6.0 Heat Damage (Durum))

Certification: Record the percentage of heat-damaged kernels on the work record and certificate to the nearest tenth percent.

## 8.20 - DAMAGED KERNELS

**Damaged Kernels:** Kernels, pieces of Khorasan seeds, and other grains 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.

Special Insect Damage Analysis: To coincide with the Food and Drug Administration's defect action levels, the U.S. Standards for Wheat consider wheat containing 32 or more insect-damaged kernels per 100 grams as U.S. Sample Grade.

Basis of Determination: Determine damaged kernels on a dockage-free and shrunken and broken-free portion of 15 grams.

### Types of Khorasan damage:

1. Black Tip Fungus: Kernels affected by black tip fungus to the extent that the fungus growth is on the germ and extends into the crease of the kernel.  
(Visual Reference Image VRI - W-1.0 Black Tip Damage (Fungus).)
2. Heat-Damaged Kernels: Kernels materially discolored and damaged by heat. It is necessary, in most cases, to cut the kernels and make a cross-section analysis to determine if the color is reddish-brown, mahogany, or creamy.  
(Visual Reference Image VRI - W-6.0 Heat Damage (Durum), and VRI - W-6.1 Heat Damage (Other Than Durum).)
3. Blight or Scab: Kernels with a dull, lifeless, and chalky appearance resulting from disease. The germ and crease may also have a moldy appearance. Kernels which are not damaged enough to function as scab damage should be examined further for moldy germs and creases.  
(Visual Reference Image VRI - W-2.0 Scab Damage.)
4. Frost-Damaged Kernels (Blistered): Kernels with distinct frost blisters extending around the back of the kernel and into the crease.  
(Visual Reference Image VRI- W-3.0 Frost Damage (Blistered).)
5. Frost-Damaged Kernels (Candied): Kernels that have a distinctly wax-like or candied appearance. Frost-damaged (candied) kernels can be greenish, greenish- yellow, brownish, or blackish in color. They frequently have dark stripes showing through the sides of the kernels.  
(Visual Reference Image VRI - W-3.1 Frost Damage (Candied) Frost Damage (Candied).)
6. Frost-Damaged Kernels (Flaked): Kernels that have slightly flaked-off bran coat due to frost. Evidence of frost must be present. Do not confuse flaked-by-frost with kernels which have had the bran coat rubbed off because of handling.

- (Visual Reference Image VRI - W-3.3 Frost Damage (Flaked).)
7. Frost-Damaged Kernels (Discolored Black or Brown): Kernels which are discolored black or brown and/or have a bleached or blistered appearance with dark lines showing through both sides.  
(Visual Reference Image VRI - W-3.2 Frost Damage (Discolored Black/Brown).)
  8. Germ-Damaged Kernels (Mold): Kernels which have mold in the germ. The bran coat covering the germ should be removed carefully as scraping the bran coat too deep could remove the mold.  
(Visual Reference Image VRI - W-4.1 Mold Damage.)
  9. Green Damage (Immature): Kernels which are intense green (immature) and without any yellow appearance.  
(Visual Reference Image VRI - W-5.0 Green Damage.)
  10. Mold-like Substance: Whole kernels of Khorasan which are 50 percent or more covered and pieces of kernels which are discolored and covered with a mold-like substance.
  11. Other Damage: Kernels with cracks, breaks, or chews and which contain mold or fungus.  
(Visual Reference Image VRI - W-7.0 Other Damage (Mold).)
  12. Sprout-Damaged Kernels: Kernels with the germ end broken open from germination exhibiting sprout or from which the sprouts have been broken off.  
(Visual Reference Image VRI - W-8.0 Sprout Damage.)
  13. Insect-Bored Kernels: Kernels that have been bored or tunneled by insects.  
(Visual Reference Image VRI - W-9.0 Weevil or Insect-Bored.)
  14. Germ-Damaged Kernels (Sick): Kernels damaged as a result of heat but are not materially discolored. Sick kernels should be scraped very carefully to avoid the loss of discoloration and/or popping or removal of the germ.  
(Visual Reference Image VRI - W-4.0 Germ Damage)

## 8.21 - DEFECTS

Defects: Damaged kernels, foreign material, and shrunken and broken kernels.

Basis of Determination: Determine defects on the sum of damaged kernels, foreign material, and shrunken and broken kernels.

A percentage for defects cannot be shown when only one or two of the factors defined as defects have been determined.

GRAIN INSPECTION HANDBOOK  
BOOK 1, CHAPTER 8  
KHORASAN

Certification: Record the percentage of defects on the work record and certificate to the nearest tenth percent.

When the percentages for damaged kernels, and shrunken and broken kernels, and foreign material are added together and the total exceeds 100 percent, adjust the percentage of defects by adjusting damaged kernels (total).

## 8.22 - CONTRASTING CLASSES

Contrasting classes are defined as:

Durum Wheat, Hard Red Spring wheat, Hard Red Winter wheat, Hard White wheat, Soft Red Winter wheat, Soft White wheat, and Unclassed wheat in the class Khorasan.

Basis of Determination: Determine contrasting classes on a dockage-free and shrunken and broken-free portion of 15 grams. Use kernel and varietal characteristics when making this determination.

Kernel Characteristics: Kernel characteristics include the color, shape, and length of the kernel and the shape of the germ, crease, and brush. Inspection personnel should be familiar with kernel characteristics of all classes of wheat handled in their market.

Varietal Characteristics: Some varieties possess characteristics of two or more classes. Knowledge of distinct varietal characteristics is necessary in making class determinations. Inspection personnel should be familiar with the characteristics of all varieties of wheat handled in their market.

Certification: Record the percent of contrasting classes on the certificate to the nearest tenth percent.

### **Kernels of Hard and Vitreous Color - HVAC**

1. Consider Khorasan kernels which are bleached but which are hard and vitreous as HVAC.
2. Consider Khorasan kernels which have cracks or checks that cause a cloudy or shadowy spot on the kernel but which are otherwise hard and vitreous as HVAC.
3. Kernels with mottled or chalky spots, regardless of size, are not considered HVAC.
4. Distinctly green immature kernels, kernels affected by scab, sprouted kernels, foreign material, and all other classes of wheat are not considered HVAC.

### **8.23 - OFFICIAL CRITERIA**

The factors; protein, falling number and Vomitoxin are considered as "official criteria factors" that are determined upon request and do not affect the grade.

Basis of Determination: All such analyses shall be determined in accordance with official procedures established by the Grain Inspection, Packers and Stockyards Administration.

Vomitoxin level is determined by test kit "R-BIOPHARM, RIDASCREEN FAST, DON TEST METHOD" or any system of method that gives equivalent results shall be used for Khorasan Vomitoxin determination. This methodology is described in FGIS Program Notice PN – 10 – 06 dated 12/28/09.

Results are certified under Montana Form 914 in the results section of the certificate.

