

GRAIN INSPECTION HANDBOOK  
BOOK 1, CHAPTER 3  
RAPESEED

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Grain Inspection Hand Book

Montana Standards

Book 1 – Chapter 3

Rapeseed

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### 3.1 - GENERAL INFORMATION

Rapeseed is a complex crop including not one but three botanical species, *Brassica napus* L., *B. campestris* L., and *B. juncea* L. Moreover, the botanical classification has become even more complicated due to the genetic altering of these species to create new varieties with varying levels of erucic acid and glucosinolates.

Currently, there are rapeseed varieties with:

- A. levels of high erucic acid and low glucosinolates (HEAR/LG),
- B. high erucic acid and high glucosinolates (HEAR/HG),
- C. low erucic acid and high glucosinolates (LEAR/HG), and
- D. low erucic acid and low glucosinolates (LEAR/LG).

Some specific types of LEAR/LG varieties are known as canola.

This handbook addresses the NON-canola types

All quantities referenced in this chapter are approximate unless otherwise specified. Use an approved divider to obtain sub portions of a sample for analysis unless otherwise specified.

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

For specific Visual Reference Images, see Chapter 1, section 1.2, Visual Grading Aids.

Official inspection personnel shall document inspection information during sampling and grading.

The inspection process provides various factor information used to determine grade and to provide further information on the condition or quality of rapeseed. Each section of this chapter provides details on recording factor information. If requested by the applicant for inspection, additional information may be provided (e.g., an exact count on stones in addition to the percentage by weight, a percentage for a specific type of damage, etc.).

### 3.2 - GRADES AND GRADE REQUIREMENTS

There are no classes or subclasses in rapeseed. Rapeseed is divided into three numerical grades and Sample Grade. Special grades emphasize qualities or conditions affecting the value of rapeseed. Special grades do not affect the numerical or sample grade designation.

**Table No. 1 – Rapeseed Grade and Grade Requirements**

Grade	Maximum Limits of Percent							
	Damaged Kernels			Conspicuous Admixture				Inconspicuous Admixture
	Heat damaged	Distinctly Green	Total	Ergot	Sclerotinia	Stones	Total	
MT No. 1	0.1	2.0	3.0	0.05	0.05	0.05	1.0	5.0
MT No. 2	0.5	6.0	10.0	0.05	0.10	0.05	1.5	5.0
MT No. 3	2.0	20.0	20.0	0.05	0.15	0.05	2.0	5.0
Sample Grade - Sample Grade is rapeseed that: (a) Does not meet the requirements for grades MT No. 1, 2, 3; or (b) Contains 1 or more pieces of glass, 2 or more particles of an unknown foreign substance(s) or a commonly recognized harmful or toxic substance(s), or 4 or more pieces of animal filth; or (c) Has a musty, sour, or commercially objectionable foreign odor; or (d) Is heating or otherwise of distinctly low quality.								

### 3.3 - GRADE DESIGNATIONS

After completing the analysis, compare the results with the limits for each grade factor specified in table 1. Use the following guidelines when assigning grades.

- A. The letters "MT",
- B. The abbreviation "No." and the number of the grade or the words "Sample Grade",
- C. The word "Rapeseed",
- D. The applicable special grade(s), and
- E. The word "Dockage" and the percentage thereof.

### 3.4 - SPECIAL GRADES

Special grades identify unusual conditions in grain and are part of the grade designation. The rapeseed standards include two special grades.

- A. Garlicky Rapeseed. Rapeseed that contains more than two green garlic bulblets or an equivalent quantity of dry or partly dry bulblets in a 500-gram portion.

Example: MT No. 2 Rapeseed, Garlicky, Dockage 7.5%

- B. Infested Rapeseed. Label rapeseed "Infested" if it is infested with live weevils or other live insects injurious to stored grain.

Example: MT No. 2 Rapeseed, Infested

### 3.5 - BASIS OF DETERMINATION

Distinctly Low Quality: The determination of distinctly low quality is made on the basis of the lot as a whole at the time of sampling when a condition exists that may or may not appear in the representative sample and/or the sample as a whole.

Certain Quality Determinations: Each determination of rodent pellets, bird droppings, other animal filth, broken glass, 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: Each determination of conspicuous admixture, ergot, sclerotinia, stones, damaged kernels, heat-damaged kernels, distinctly green kernels, and inconspicuous admixture is made on the basis of the sample when free from dockage. Other determinations not specifically provided for under the General Provisions are made on the basis of the sample as a whole, except the determination of odor is made on either the basis of the sample as a whole or the sample when free from dockage. The content of glucosinolates and erucic acid is determined on the basis of the sample according to procedures prescribed in FGIS instructions.

**Table No. 2 - Basis of Determination**

Basis of Determination			
Lots as a Whole	Before the Removal of Dockage	Factors Determined After the Removal of Machine Separated Dockage	Factors Determined After the Removal of Machine Separated Dockage and Conspicuous Admixture
Distinctly low quality Heating Infested Odor	Distinctly low quality Dockage Garlicky Heating Infested Kind of Grain Moisture Odor MT Sample Grade factors	Conspicuous Admixture Ergot Erucic acid content Glucosinolates Odor Sclerotinia Stones	Damaged kernels Distinctly Green Kernels Heat damaged kernels Inconspicuous admixture Odor

**3.6 - DEFINITION OF RAPESEED**

Rapeseed (*Brassica campestris* and *B. napus*) shall consist of 50.0 percent or more of whole rapeseed before the removal of dockage and not more than 10% of other grains.

Whole kernels are kernels with one-fourth or less of the kernel removed.

Other grains for which standards have been established are barley, canola, corn, flaxseed, oats, rye, sorghum, soybeans, sunflower seed, triticale and wheat or any other grain that is recognized as a grain.

Basis of Determination: Normally, a visual appraisal of the sample is sufficient to determine if it meets the definition of rapeseed. If an analysis is necessary, make the determination on a representative portion of 10 grams. Determine the percentage of rapeseed and other grains before the removal of dockage. Determine the percentage of whole kernels after the removal of dockage.

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

- a. Another commodity for which standards have been established or
- b. Not standardized commodity and factor results will be given.



**3.7 - INFESTED RAPESEED**

Infested rapeseed is rapeseed 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 rapeseed 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 rapeseed is infested. Do not examine the file sample if the work sample 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. (See Chapter 1, Section 1.2, Visual Grading Aids.)

Basis of Determination: Determine infestation on the lot as a whole and/or before the removal of dockage on 500 grams. For insect tolerances, see table No. 3.

**Table No. 3 - Insect Infestation**

Insect Infestation		
Samples meeting or exceeding any one of these tolerances are infested: 2lw, 1 lw + 5 oli or 10 oli		
250 -gram representative sample <u>1/</u> (+ file sample if needed)	Lot as a Whole (Stationary)	Online Sample (In-Motion) <u>2/</u>
Submitted samples Probed lots D/T sampled land carriers	Probed lots (at time of sampling)	Railcars under the Cu-sum Subsamples for Sacked Grain lots Components for Barge lots <u>3/</u> Components for Ship lots <u>3/</u>
<p>1/ Examine work portion and file sample if necessary. Do not examine file sample if work portion is insect free.</p> <p>2/ Minimum sampling rate is 250 grams per 2,000 bushels.</p> <p>3/ Minimum component size is 10,000 bushels.</p> <p>Key: lw = live weevil, oli = other live insects injurious to stored grain</p>		

Certification: When applicable, record the word "Infested" on the certificate in accordance with Section 3.4, Special Grades.

### 3.8 - HEATING

Rapeseed developing a high temperature from excessive respiration is considered heating. Heating rapeseed, in its final stages, will usually have a sour or musty odor. Care should be taken not to confuse rapeseed that is heating with rapeseed 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 basis of the sample as a whole.

Certification: Grade heating rapeseed as MT Sample Grade and record the word "Heating" in the "Remarks" section of the certificate.

### 3.9 - ODOR

Basis of Determination: Determine odor on evidence obtained at the time of sampling, on the sample either before or after the removal of dockage, or on the crushed strips (used to determine heat damage and distinctly green damage). When the crushed strips are used, determine the odor immediately after crushing.

**Table No. 4 - Odor Classification Examples**

Odor Classification Examples		
Sour	Musty	Commercially Objectionable Foreign Odors
Boot Fermenting Insect (acid) Pigpen Smoke 1/	Ground Insect Moldy	Animal hides Decaying animal and vegetable matter Fertilizer Fumigant Insecticide Oil products Skunk Smoke Strong weed
1/ Smoke odors are considered sour only in rapeseed, canola, flaxseed, soybeans, and sunflower seed.		

Odors from Heat-Damaged Rapeseed: When heat-damaged kernels are present, rapeseed gives off an odor very similar to smoke. Rapeseed containing a "smoke" odor is considered as having a "sour" odor unless evidence of a fire-burnt material is present in the lot or the original sample. If evidence of a fire-burnt material is present in the lot or the sample, the smoke odor is considered a commercially objectionable foreign odor.

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Commercially Objectionable Foreign Odors: Commercially objectionable foreign odors are odors foreign to grain that render 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 rapeseed 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.

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. 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.

Certification: Grade rapeseed containing a "distinct" musty, sour, or commercially objectionable foreign odor as MT Sample Grade. Record the words "Musty," "Sour," or "Commercially Objectionable Foreign Odor" in the "Remarks" section of the certificate.

### **3.10 - ANIMAL FILTH, GLASS, AND UNKNOWN FOREIGN SUBSTANCES**

Basis of Determination: Determine animal filth, glass, and unknown foreign substances before the removal of dockage on a work portion of 250 grams.

Certification: Grade rapeseed "MT Sample Grade" if the level of animal filth, glass, and unknown foreign substances exceeds the limits set forth in table 1 and report the actual count.

### **3.11 - GARLICKY RAPESEED**

Rapeseed that contains more than two green garlic bulblets or an equivalent quantity of dry or partly dry bulblets in approximately a 500-gram portion.

Basis of Determination: Determine garlicky before the removal of dockage on a work portion of 250 grams. (Reference: Visual Reference Image Nos. OF-Whole Garlic and OF-Dry Garlic Bulbs).

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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: Wild onion, sometimes referred to as “crow garlic”, is considered as garlic. Three dry or partly dry garlic bulblets are equal to one green bulblet. Garlic bulblets apply in the determination of "Garlicky" but also function as foreign material.

Certification: When applicable, grade the rapeseed "Garlicky" in accordance with Section 3.4, Special Grades. Upon request, provide the number of garlic bulblets in whole and/or in decimals to the hundredths position (e.g.,  $1/3 = 0.33$ ,  $2/3 = 0.67$ ).

### **3.12 - DISTINCTLY LOW QUALITY**

Consider rapeseed distinctly low quality when it is obviously of inferior quality and the existing grade factors or guidelines do not accurately reflect the inferior condition.

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

- A. Large Debris. Rapeseed containing two or more stones, pieces of glass, pieces of concrete, or other pieces of wreckage or debris which are visible to the sampler but are too large to enter the sampling device is considered distinctly low quality.
- B. Other Unusual Conditions. Rapeseed that is obviously affected by other unusual conditions which adversely affect the quality of the rapeseed and cannot be properly graded by use of the grading factors specified or defined in the standards is considered distinctly low quality.

Rapeseed 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 rapeseed contains diatomaceous earth, then the rapeseed is not considered distinctly low quality due to diatomaceous earth. Refer to Program Directive 9180.49, Grading and Certification of Grain Containing Diatomaceous Earth and Silica Gel, for additional information regarding the testing of rapeseed for diatomaceous earth.

Certification: Grade distinctly low quality rapeseed as MT Sample Grade. Record the words "Distinctly Low Quality" and the reason(s) why in the "Remarks" section of the certificate.

**3.13 - SAMPLE GRADE CRITERIA**

Basis of Determination: Determine MT Sample Grade criteria, except for stones, before the removal of dockage based on a work portion of 250 grams. Table No. 5 shows the criteria and corresponding interpretive live slides, tolerance limits, and the appropriate basis of determination. Consider identifiable pieces of grain, processed grain products (e.g., soybean meal, sorghum grits, corn meal, bulgur, etc.), or feed pellets in grain as foreign material. Unidentifiable materials or material unrelated to grain shall function as "unknown foreign substance."

**Table No. 5 - Montana Sample Grade**

Montana Sample Grade			
Criteria	Visual Reference Image	Number/Weight 1/	
		Sample Basic	Lot Basis 2/
Any numerical grading factor	OF – Animal Filth	Excess of limit for MT No. 3	NA
Animal Filth		4 or more	N/A
Glass		1 or more	
Odor	OF-Fertilizer	Presence	N/A
Unknown foreign substances 3/		2 or more	N/A
Heating		Presence	
Large Debris		N/A	2 or more
Other unusual conditions *		Presence	Presence
1/ Record count factors to the nearest whole number. 2/ The entire sample of a submitted sample is considered as the lot. 3/ Consider feed pellets and processed grain products as foreign material, not unknown foreign substance. * For Distinctly Low Quality, see section 6.13			

Certification: Grade rapeseed MT Sample Grade when one or more of the limits in table 5 are observed. Record the reason(s) why in the "Remarks"

### 3.14 - MOISTURE

Water content in grain as determined by an approved device according to procedures prescribed in FGIS instructions.

Basis of Determination: Determine moisture before the removal of dockage on a portion of approximately 400 grams.

The procedures for performing a moisture determination using UGMA moisture meter.

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

### 3.15 - DOCKAGE AND CONSPICUOUS ADMIXTURE

Dockage is:

1. All material removed by aspiration;
2. Coarse material, except threshed and sprouted kernels of rapeseed, that passed over the riddle; and
3. Material that passed through the Number 4 sieve, except for small whole and broken pieces of rapeseed which are reclaimed.

Conspicuous Admixture: Conspicuous admixture is all matter other than rapeseed, including but not limited to ergot, sclerotinia, stones, and yellow mustard which is conspicuous and readily distinguishable from rapeseed and which remains in the sample after the removal of machine separated dockage.

The adjusted percentage of conspicuous admixture is added to the percentage of machine separated dockage in the computation of total dockage (refer to example at the end of this section).

Basis of Determination: Determine dockage in rapeseed on 250 grams cut from the original sample.

Procedure: The procedure for determining conspicuous admixture and dockage is performed in two steps: machine cleaning (Carter Dockage Tester and mechanical shaker) and handpicking.

**Chart 1 - Procedure for Determining Dockage**

**STEP 1: Carter Dockage Tester**

- A. Set air control on 5 and the feed control on 3.
- B. Insert No. 000 riddle in the riddle carriage and No. 4 sieve in the top sieve carriage.
- C. Start carter Dockage Tester and pour 250 gram sample into feed hopper.
- D. Return any kernels that may be caught in the riddle to the cleaned portion.
- E. Return threshed and separated rapeseed from material over the riddle and add to cleaned rapeseed.

**STEP 2: Reclaim Seed**

**Sieve sizes:** Use sieves which achieve maximum cleanout of weed seeds and similar foreign material with a minimum loss of rapeseed.

**Material over No. 4 sieve:** Visually examine the material that passed over the No. 4 sieve. If the sample contains wheat, buckwheat, weed seeds, or similar foreign material, use a round-hole sieve (5/64, 5.5/64, 6/64, 6.5/64, or 7/64 inch (or larger) as an aid to separate the material from the rapeseed. Return the rapeseed passing through and remaining on top of the round-hole sieve to the clean sample.

**Material through the No. 4 sieve:**

- A. Use the .035 x 15/32 inch slotted sieve to reclaim material through the No. 4 sieve. (Upon request, a .028 x 15/32 or .0395 x 15/32 inch slotted hole sieve may be used. When a requested sieve is used, record the sieve size in the remarks section of the certificate). Return the material remaining on the slotted-hole sieve(s) and in the perforations to the clean sample and the material passing through the slotted-hole sieve to the dockage.
- B. Sieve the material (30 strokes) that passed through the No. 4 sieve.
- C. Determine dockage/clean rapeseed.

**STEP 3: Handpick (Conspicuous Admixture)**

- A. Combine the two mechanically cleaned portions.
- B. Cut down the cleaned sample to a portion of not less than 10 grams.

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- C. Handpick the 10-gram portion for conspicuous admixture.
- D. As part of conspicuous admixture, handpick stones, ergot, and sclerotinia (refer to section 6.16 for details).

Final Calculation: Total dockage now consists of all mechanically separated dockage (including any hand sieved dockage if applicable) and conspicuous admixture (which is equivalent to handpicked dockage).

Computing Total Dockage: In computing the total dockage, all mechanically separated dockage (as removed by the Carter Dockage Tester, mechanical shaker, and hand sieves) is computed on the basis of the sample as a whole. The percentage of conspicuous admixture (handpicked dockage), which is determined on the basis of the weight in grams of the portion used for the hand separation, must be multiplied by the fractional proportion of rapeseed remaining after the removal of the mechanically separated dockage.

Example:

Original sample weight	250 grams
Weight of mechanically separated dockage	24.70 grams
Weight of handpicked portion	10.24 grams
Weight of handpicked dockage (conspicuous admixture)	0.20 grams

- A.  $(\text{Weight of Dockage} \div \text{original sample weight}) \times 100 = \text{percent mechanically separated dockage. } (24.70 \text{ g} \div 250 \text{ g}) \times 100 = 9.88\% \text{ mechanically separated dockage.}$
- B.  $(100 \text{ percent} - \text{percent mechanically separated dockage}) \div 100 = \text{change of base factor. } (100\% - 9.88\%) \div 100 = 0.90 \text{ change of base factor.}$ 
  - a.
- C.  $(\text{Weight of handpicked separation, including stones, ergot, sclerotinia, and any other conspicuous admixture} \div \text{weight of handpicked sample}) \times 100 = \text{percent conspicuous admixture. } (0.20 \text{ g} \div 10.24 \text{ g}) \times 100 = 1.95\% \text{ conspicuous admixture.}$
- D.  $\text{Percent conspicuous admixture} \times \text{change of base factor} = \text{percent conspicuous admixture (adjusted) } 1/. \ 1.95 \times 0.90 = 1.75\% \text{ conspicuous admixture (adjusted).}$



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- E. Percent conspicuous admixture (adjusted) + percent mechanically separated dockage = dockage (total).  $1.75\% + 9.88\% = 11.63\%$  dockage (total). (add in hundredths) round to 11.6%)

1/ Record the adjusted percentage of conspicuous admixture on the certificate.

Certification: Record the word "Dockage" and the percentage to the nearest tenth percent in accordance with Section 3.3, Grade Designations. Also record the adjusted percentage of conspicuous admixture to the nearest tenth percent.

### 3.16 - STONES, ERGOT, AND SCLEROTINIA

Stones: Stones are concremented earthy or mineral matter and other substances of similar hardness that do not disintegrate in water.

Ergot: Ergot is a hard, reddish-brown or black grain-like mass of certain parasitic fungi that replaces the kernels of certain grains. (Reference: Visual Reference Image No. OF-Ergot)

Sclerotinia: Sclerotinia are the dark-colored black resting bodies of the fungi Sclerotinia and Claviceps. (Reference: Visual Reference Image No. OF-Sclerotinia)

Basis of Determination: Make the determination for ergot, stones, and sclerotinia on the handpicked portion used in the determination of conspicuous admixture (refer to Section 3.16, Dockage and Conspicuous Admixture, step 3).

Computing Stones, Ergot, and Sclerotinia: To compute the percentages of stones, ergot, and sclerotinia, procedures are as follows:

Example:

Weight of handpicked portion	10.24 grams
Weight of stones	0.13 grams
Weight of ergot	0.02 grams
Weight of sclerotinia	0.29 grams
Change of base factor	0.90

- A.  $(\text{Weight of stones} \div \text{weight of handpicked sample}) \times 100 = \text{percent of stones.}$   
Percent of stones x change of base factor = adjusted percent of stones

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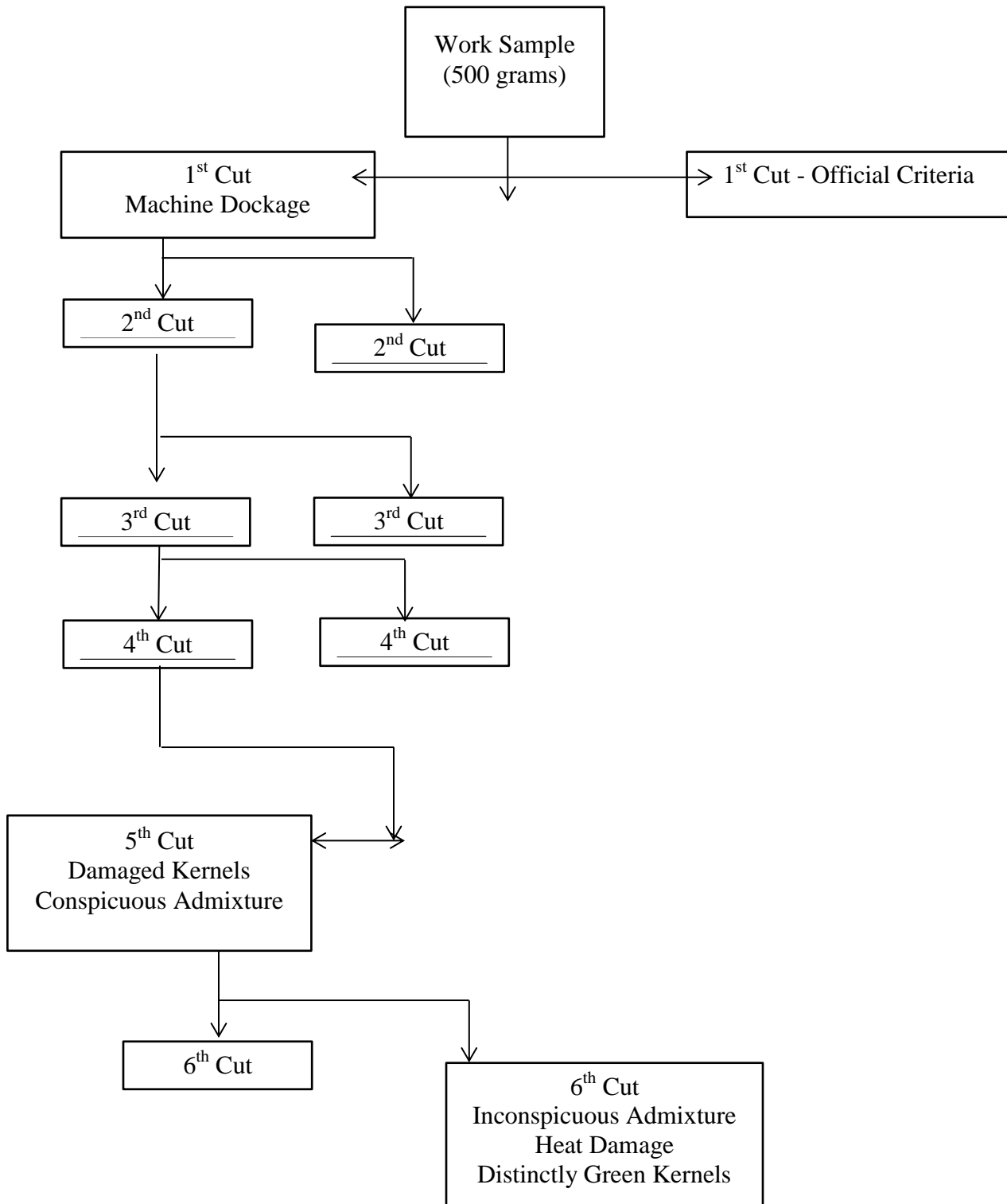
- B.  $(0.13 \text{ g} \div 10.24 \text{ g}) \times 100 = 1.27\%$  stones.  $1.27 \times 0.90 = 1.14\%$  stones (adjusted)
- C. (Weight of ergot  $\div$  weight of handpicked sample)  $\times$  100 = percent of ergot.  
Percent of ergot  $\times$  change of base factor = adjusted percent of ergot
- D.  $(0.02 \text{ g} \div 10.24 \text{ g}) \times 100 = 0.20\%$  ergot.  $0.20 \times 0.90 = 0.18\%$  ergot (adjusted)
- E. (Weight of sclerotinia  $\div$  weight of handpicked sample)  $\times$  100 = percent of sclerotinia.  
Percent of sclerotinia  $\times$  change of base factor = adjusted percent of sclerotinia
- $(0.03 \text{ g} \div 10.24 \text{ g}) \times 100 = 0.29\%$  sclerotinia.  $0.29 \times 0.90 = 0.26\%$  sclerotinia (adjusted)

Certification: Record the percentage of stones, ergot, and sclerotinia on the certificate to the nearest hundredth percent.

### 3.17 - PROCESSING THE WORK SAMPLE

At this point, determinations have been made for kind of grain, infestation, heating, odor, garlic bulblets, sample grade criteria, moisture, dockage, conspicuous admixture, sclerotinia, stones, and ergot. Now divide the work sample into fractional portions for those determinations required after the removal of machine separated dockage and conspicuous admixture. The following chart and table No. 6 illustrate how the sample is divided into fractional parts using the Boerner divider.

**Chart 2 - Dividing the work Sample**



**Table No. 6 Approximate Analytical Portion Size**

APPROXIMATE ANALYTICAL PORTION SIZES	
Factors	Grams
Damaged Kernels	10
Heat Damaged Kernels	5
Distinctly Green Kernels	5
Inconspicuous Admixture	5
Kind of Grain	10

### **3.18 - DAMAGED KERNELS**

Rapeseed and pieces of rapeseed that are heat-damaged, sprout-damaged, mold-damaged, distinctly green-damaged, frost-damaged, rimed-damaged, or otherwise materially damaged.

Basis of Determination: Determine the amount of damaged kernels on a representative portion cut from the work sample after the removal of dockage and conspicuous admixture. Use the portion which was used for picking dockage and conspicuous admixture. Note that this portion must be reweighed.

Damage must be distinct: In general, a kernel of rapeseed is considered damaged when the damage is distinctly apparent and of such character as to be recognized as damaged for commercial purposes. Insect-bored kernels are not considered damaged.

Distinctly Green Kernels: Rapeseed and pieces of rapeseed which, after being crushed, exhibit a distinctly green color. (Reference: Visual Reference Image No. Canola-1.0 Distinctly Green)

Heat-Damaged Kernels: Rapeseed and pieces of rapeseed which, after being crushed, exhibit that they are discolored and damaged by heat. (Reference: Visual Reference Image No. Canola-2.0 Heat Damage)

Procedure: The steps for determining the various damages are as follows:

**STEP 1** Handpick the 10-gram portion (clean of dockage and conspicuous admixture) for distinctly shrunken or shriveled kernels (frost-damaged), kernels discolored by mold, rimed kernels (kernels that are completely covered with a whitish coloration), sprouted kernels, excessively weathered kernels, and any other kernels of rapeseed that are distinctly damaged. These kernels are other-damaged kernels. (Reference: Visual Reference Images No's Canola-3.0 Other Damage. and Canola-4.0 Sprout Damage).

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- STEP 2 Cut down the balance of the 10-gram portion to 5 grams.
- STEP 3 Sprinkle the 5-gram portion across the damage seed counter to fill the 100-hole board (must be repeated five times) or once for the 500-hole board.
- STEP 4 After each filling (total of 5 fillings when using the 100-hole board) and before crushing, tape and observe for inconspicuous admixture 1/.
- STEP 5 With a roller, crush the rapeseed, examine the rows, and count the number of heat-damaged kernels, distinctly green kernels, and seeds that are obviously not rapeseed, (inconspicuous admixture 1/).
- STEP 6 After the strip (all 5 strips when using the 100-hole board) has been crushed and kernels counted, calculate the percentage of each type of damage.

1/ Refer to Section 3.20, Inconspicuous Admixture, for details.

Determine all percentages of damage, except for distinctly green and heat-damaged kernels, upon the basis of weight. Determine the percentage of distinctly green and heat-damaged kernels on the basis of count.

Calculation: To compute damaged kernels (total), add the percentage of distinctly green, heat-damaged, and other-damaged kernels of rapeseed.

Example:

Weight of representative portion	10.04 grams
Weight of other-damaged kernels	0.10 grams
Number of non-rapeseed kernels	10
Number of heat-damaged kernels	25
Number of distinctly green kernels	12

- A.  $(\text{Weight of other-damaged kernels} \div \text{weight of representative portion}) \times 100 = \text{percent other-damaged kernels.}$

$$0.10 \text{ g} \div 10.04 \text{ g} = 0.0099 \times 100 = 0.99\% \text{ other-damaged kernels.}$$

- B.  $500 - \text{number of non-rapeseed kernels} = \text{number of rapeseed kernels.}$

$$500 - 10 \text{ non-rapeseed kernels} = 490 \text{ rapeseed kernels.}$$

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- C. (Number of heat-damaged kernels ÷ number of rapeseed kernels) x 100 = percent heat-damaged kernels.

$$25 \text{ kernels} \div 490 \text{ kernels} = 0.0510 \times 100 = 5.10\% \text{ heat-damaged kernels.}$$

- D. (Number of distinctly green kernels ÷ number of rapeseed kernels) x 100 = percent distinctly green kernels.

$$12 \text{ kernels} \div 490 \text{ kernels} = 0.0244 \times 100 = 2.44\% \text{ distinctly green.}$$

- E. Percent other-damaged kernels + percent heat-damaged kernels + percent distinctly green kernels = percent damaged kernels (total).

$$0.99\% + 5.10\% + 2.44\% = 8.53 \text{ percent damaged kernels (add in hundredths) (round to 8.5\%)}$$

Certification: Record the percentages of heat-damaged kernels, distinctly green kernels, and damaged kernels (total) on the certificate to the nearest tenth percent.

### 3.19 - INCONSPICUOUS ADMIXTURE

Any seed which is difficult to distinguish from rapeseed. This includes, but is not limited to, common wild mustard (*Brassica kaber* and *B. juncea*), domestic brown mustard (*Brassica juncea*), and seed other than the mustard group.

Basis of Determination: Make the determination for inconspicuous admixture on the 5-gram portion used in the determination for heat-damaged and distinctly green kernels (refer to Section 3.19, Damaged Kernels, and steps 2-4).

Prior to crushing, mark any seeds suspected of not being rapeseed and observe with a dissecting scope or magnifying glass. Use the reference samples and photographs as an aid in identification.

NOTE: It is extremely important for inspectors to rely on a dissecting scope or a magnifying glass and the crushed strips for identification of inconspicuous admixture.

Any seeds suspected of not being rapeseed should be marked to be confirmed after crushing.

After crushing, rapeseed tends to be a golden yellow while crushed wild mustard is pale yellow to white and cow cockle is white.

Calculate the percentage of inconspicuous admixture on the basis of count.

$$\text{Example: } 10 \text{ kernels} \div 500 \text{ kernels} = 0.02 \times 100 = 2.0\% \text{ inconspicuous admixture.}$$

Certification: Record the percentage of inconspicuous admixture on the certificate to the nearest tenth percent.

### **3.20 - GLUCOSINOLATES – OIL PROFILE**

Testing for glucosinolates and oil profile will be done upon request of the applicant. Samples will be sent to the Technical Services Lab at FGIS. The applicant is responsible for associated fees.

TSD  
USDA, GIPSA, FGIS Technical Center  
10383 N. Ambassador Drive  
Kansas City, Missouri 64153-1394

Fax: (816) 891-7314

Tel: (816) 891-0437

Include the following information with the sample: analysis required, sample ID, field office and/or official agency, and date mailed.

Place the sample portion in a moisture-proof plastic bag (6-mil) and securely close or seal the bag. Place the sample and sample ticket inside a canvas mailing bag. Do not place the sample ticket inside the plastic bag in direct contact with the sample.

Use a buff colored mailing tag to send samples. Indicate on the reverse of the mailing tag the analysis to be performed by the laboratory.

Samples should be mailed at the expense of the field office or agency sending the sample. FGIS

Business Reply Mail is not appropriate for this purpose.

