

INSPECTION OF RAPESEED

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1. PURPOSE

This directive establishes uniform procedures for the factor analysis of rapeseed under the Agricultural Marketing Act of 1946, as amended (AMA).

2. REPLACEMENT HIGHLIGHTS

This directive is revised to specify that any moisture meter listed as approved in the Moisture Handbook can be used to determine moisture content. This directive supersedes FGIS Program Directive 9180.42, dated 5/01/13.

3. GENERAL INFORMATION

There are no classes, subclasses, or grades in rapeseed.

Inspection of rapeseed is on a factor only basis. The factors analyzed are: kind of grain, dockage, moisture, heat-damaged kernels, damaged kernels (total), odor, heating, inconspicuous admixture, conspicuous admixture, distinctly green kernels, infestation, stones, *Sclerotinia sclerotiorum* (sclerotinia), ergot, garlic bulblets, animal filth, glass, and unknown foreign substances.

The AMA regulations provide for three inspection service levels.

For all analytical tests, as outlined in section 17 of this directive, the following three inspection service levels apply: original, retest, and appeal.

The following inspection service levels apply to all other factors: original, appeal, and Board appeal.

- a. Retests. Official personnel shall perform only one retest inspection service on any original inspection. An applicant may request one retest of any one or more quality factors included in the original inspection. Quality factors included in the original inspection but not included in the retest request may not be retested at a later date.
- b. Appeals. Official personnel shall perform only one appeal inspection on any original or retest inspection service. An applicant may request an appeal inspection (1) on any of the kinds of inspection services performed for an original inspection, or (2) on a retest inspection. For appeal inspections, the field office must analyze the sample for all of the quality factors included in the original inspection. For appeal inspections of analytical factors, however, the Analytical, Reference, and Testing Service (ARTS) in Kansas City, Missouri, must perform the analysis.
- c. Board Appeals. An applicant who is dissatisfied with the original or appeal inspection results may appeal to the FGIS Board of Appeal and Review (BAR). The Board appeal shall be limited to an analysis of the file sample. When a request for a Board appeal inspection is filed, the file sample(s) and all other pertinent information shall be immediately submitted to the BAR. The field office shall act as a liaison between the BAR and the applicant.

4. PERCENTAGES

Except for stones and ergot, state all percentages to the nearest tenth percent. State the percentages of stones and ergot to the nearest hundredth percent.

Percentages on the basis of count shall be calculated by dividing the number of unsound kernels by the total number of seeds in the portion and multiplying by 100.

Percentages shall be rounded in accordance with the FGIS procedure.

5. STANDARD ABBREVIATIONS

Use the following abbreviations in the analysis of rapeseed:

Rapeseed	rap	Sclerotinia	slt
Conspicuous admixture	cadm	Ergot	erg
Damaged kernels (total)	dkt	Other material	om
Distinctly green kernels	dgk	Animal filth	anfl
Dockage (total)	dkg	Broken glass	glas
Heat-damaged kernels	ht	Unknown foreign substance	fsub
Inconspicuous admixture	iadm	Garlic bulblets	garb
Infestation	inf	Musty	must
Moisture	m	Sour	sour
Odor	odor	Commercially objectionable	
Stones	ston	foreign odor	cofo
Heating	htg		

6. BASIS OF DETERMINATION

How factors are determined:

Table No. 1 - Basis of Determination

Before the Removal of Dockage	After Removal of Machine Separated Dockage	After Removal of Machine Separated Dockage and Conspicuous Admixture
Infestation	Conspicuous admixture	Damaged kernels (total)
Moisture	Stones	Heat-damaged kernels
Dockage	Sclerotinia	Distinctly green kernels
Odor	Ergot	Inconspicuous admixture
Garlic bulblets	Odor	Odor
Animal filth		
Glass		
Unknown foreign substances		
Kind of grain		

7. 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.

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

Basis of Determination. Normally, a visual appraisal of the sample is sufficient to determine if it meets the definition of rapeseed. However, if analysis is necessary, make the determination before the removal of dockage on a portion of approximately 25 grams.

8. INFESTATION

Infestation refers to rapeseed 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 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 portion is insect free.

Live weevils shall include rice weevils, granary weevils, cowpea weevils, maize weevils, and lesser grain borers. Other live insects injurious to stored grain shall include grain beetles, grain moths, vetch bruchids, and larvae. (See Grain Inspection Handbook, Chapter 1, General Information, Section 1.2, Visual Grading Aids.)

Basis of Determination. Determine infestation on the lot as a whole and/or the sample as a whole (approximately 500 grams). For specific guidelines, see table No. 2 and Grain Inspection Handbook, Book I, Grain Sampling.

Table No. 2 - Insect Infestation

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	- Components for Bargelots ³
- Subsamples for Sacked Grain Lots	- 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	

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

9. HEATING

Seed developing a high temperature from excessive respiration is considered heating. Heating seed in its final stages usually produces a sour or musty odor. Care should be taken not to confuse seed that is heating with seed 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 heating is detected, note on the pan ticket and certificate.

10. 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. Odors detected at the time of sampling must be recorded on the work record.

Table No. 3 - Odor Classification Examples

Sour	Musty	Commercially Objectionable Foreign Odors
Boot Fermenting Insect (acid) Pigpen Smoke *	Ground Insect Moldy	Animal hides Decaying animal and vegetable matter Fertilizer Fumigant Insecticide Oil products Skunk Smoke (evidence of fire- burnt material) Strong weed
* Consider smoke odors as sour unless there is evidence of fire-burnt material.		

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.

Commercially Objectionable Foreign Odors. Commercially objectionable foreign odors are odors that are entirely foreign to rapeseed 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. Reinspections, 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.

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

11. ANIMAL FILTH, GLASS, AND UNKNOWN FOREIGN SUBSTANCES

Basis of Determination. Determine animal filth, glass, and unknown foreign substances on the basis of the sample as a whole (approximately 500 grams).

Certification. Record the number of pieces of animal filth, glass, and unknown foreign substances on the work record and the certificate.

12. GARLIC BULBLETS

Basis of Determination. Determine the number of garlic bulblets on the sample as a whole (approximately 500 grams).

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

Certification. Record the number of garlic bulblets on the work record and the certificate.

13. MOISTURE

Moisture is the water content of rapeseed as determined by approved moisture instruments listed in the Moisture Handbook using the approved calibration (see FGIS Directive 9180.61).

Basis of Determination. Determine moisture before the removal of dockage on approximately 650 grams.

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

14. DOCKAGE AND CONSPICUOUS ADMIXTURE

Dockage is material, other than rapeseed, that can be easily removed with sieves and/or a cleaning device. Also, underdeveloped, shriveled, and small pieces of rapeseed that cannot be recovered by properly rescreening or recleaning.

Conspicuous admixture is all matter other than rapeseed which is conspicuous and readily distinguishable from rapeseed and which remains in the sample after the removal of machine separated dockage (includes dockage removed by the Carter Dockage Tester, mechanical shaker, and hand sieves).

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 a representative portion of approximately 250 grams cut from the original sample.

Procedure. The procedure for determining conspicuous admixture and dockage is performed in 3 steps: machine cleaning, handsieving, and handpicking.

Note: Rapeseed contains a high oil content and may gum sieves and other equipment. Care should be taken to clean all equipment. Mild soapy water and/or Alconox lab detergent have been found to be effective for cleaning the equipment.

STEP 1. Procedure for Determining Dockage with the Carter Dockage Tester.

- a. When running samples through the Carter Dockage Tester, insert the appropriate sieves and riddles, and set the air and feed controls to the proper position. Note that the Carter Dockage Tester must be at zero energy anytime sieves are inserted or removed.

	<u>Air</u>	<u>Feed</u>	<u>Riddle</u>	<u>Top</u>	<u>Middle</u>	<u>Bottom</u>
Rapeseed	5	3	000	4	---	---

- b. Run the portion through the Carter Dockage Tester.
- c. Dockage is all material removed by aspiration; coarse material, except threshed and sprouted kernels of rapeseed, that passed over the riddle; and material that passed through the last sieve, except for small whole and broken pieces of rapeseed which are reclaimed.

Note: Return kernels of rapeseed that may be caught in the riddle to the cleaned portion.

STEP 2. Procedure for Determining Dockage with Slotted Sieves (Reclaiming).

- a. Further reclaim the material passing through the Number 4 sieve of the Carter Dockage Tester by sieving over one or more of the following slotted sieves with an approved mechanical shaker¹:

.028 x 15/32 inch

.035 x 15/32 inch

.0395 x 15/32 inch

Use the sieve which achieves the maximum cleanout of weed seeds and other foreign material with a minimum loss of rapeseed. Indicate sieve size used on the work record and the certificate.

- b. Mount the appropriate sieve and a bottom pan on an approved mechanical shaker.
- c. Set the count stroker at 30 and pour the material which passed through the Number 4 sieve in the appropriate reclaiming sieve and turn on the shaker.
- d. Return the material remaining on the slotted sieve(s) and in the perforations to the clean sample and the material passing through the slotted sieve to the machine dockage.

STEP 3. Procedures for Determining Conspicuous Admixture by Handpicking.

- a. Cut down the cleaned sample to a portion of not less than 10 grams.
- b. Handpick the 10-gram portion for conspicuous admixture (matter other than rapeseed) which is readily distinguishable by visual inspection.

Determine the percentage of total conspicuous admixture. Also, determine the percentage of stones, ergot, and sclerotinia on the hand-picked portion.

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

Sclerotinia are the dark-colored black resting bodies of the fungi Sclerotinia and Claviceps.

- c. Total dockage now consists of all mechanically separated dockage (including any handsieved dockage, if applicable) and conspicuous admixture (which is equivalent to handpicked dockage).

¹ If an approved mechanical shaker is unavailable, inspectors may hand sieve the sample. When handsieving, 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.

Computing Total Dockage. In computing the total dockage, all mechanically separated dockage (as removed by the Carter Dockage Tester, mechanical shaker, and hand sieves) shall be 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.

Proceed as follows:

- a. $(\text{Weight of Dockage} \div \text{original sample weight}) \times 100 = \text{percent machine separated dockage.}$
- b. $100 \text{ percent} - \text{percent machine separated dockage} \div 100 = \text{change of base factor.}$
- c. $(\text{Weight of handpicked separation, including stones, ergot, sclerotinia, and any other conspicuous admixture} \div \text{weight of handpicked sample}) \times 100 = \text{percent conspicuous admixture.}$
- d. $(\text{Weight of stones} \div \text{weight of handpicked sample}) \times 100 = \text{percent of stones.}$
- e. $(\text{Weight of ergot} \div \text{weight of handpicked sample}) \times 100 = \text{percent of ergot.}$
- f. $(\text{Weight of sclerotinia} \div \text{weight of handpicked sample}) \times 100 = \text{percent of sclerotinia.}$
- g. $\text{Percent conspicuous admixture} \times \text{change of base factor} = \text{percent conspicuous admixture (adjusted)} .^1$
- h. $\text{Percent stones} \times \text{change of base factor} = \text{percent stones (adjusted)} .^1$
- i. $\text{Percent ergot} \times \text{change of base factor} = \text{percent ergot (adjusted)} .^1$
- j. $\text{Percent of sclerotinia} \times \text{change of base factor} = \text{percent sclerotinia (adjusted)} .^1$
- k. $\text{Percent conspicuous admixture (adjusted)} \div \text{percent machine separated dockage} = \text{dockage (total).}$

¹ The adjusted percentages of conspicuous admixture, stones, ergot, and sclerotinia are recorded on the certificate.

Example:

Original sample weight	250 g
Weight of machine separated dockage	24.70 g
Weight of handpicked portion	10.24 g
Weight of handpicked dockage (conspicuous admixture)	0.20 g
Weight of stones	0.13 g
Weight of ergot	0.02 g
Weight of sclerotinia	0.00 g

- a. $(24.70\text{g} \div 250\text{g}) \times 100 = 9.88\%$ machine separated dockage.
- b. $(100\% - 9.88\%) \div 100 = 0.90$ change of base factor.
- c. $(0.20\text{g} \div 10.24\text{g}) \times 100 = 1.95\%$ conspicuous admixture.
- d. $(0.13\text{g} \div 10.24\text{g}) \times 100 = 1.26\%$ stones.
- e. $(0.02\text{g} \div 10.24\text{g}) \times 100 = 0.19\%$ ergot.
- f. $(0.00\text{g} \div 10.24\text{g}) \times 100 = 0.00\%$ sclerotinia.
- g. $1.95 \times 0.90 = 1.75\%$ conspicuous admixture (adjusted).
- h. $1.26 \times 0.90 = 1.13\%$ stones (adjusted).
- i. $0.19 \times 0.90 = 0.17\%$ ergot (adjusted).
- j. $0.00 \times 0.90 = 0.00\%$ sclerotinia (adjusted).
- k. $1.75\% + 9.88\% = 11.63\%$ dockage (total). (Add in hundredths, round to 11.6%).

Certification. Show the percentage of dockage (total), conspicuous admixture, and sclerotinia on the work record and certificate to the nearest tenth percent. Show the percentage of stones and ergot on the work record and certificate to the nearest hundredth percent.

15. DAMAGED KERNELS

Damage must be distinct. In general, a kernel of rapeseed shall be considered damaged when the damage is distinctly apparent and of such character as to be recognized as damaged for commercial purposes.

- a. Damaged Rapeseed. Kernels and pieces of kernels of rapeseed which are heat damaged, sprout damaged, mold damaged, distinctly green, frost damage, rime damaged (rimed), or otherwise materially damaged.
- b. Heat-Damaged Kernels. Kernels and pieces of kernels of the rapeseed which, after being crushed, are materially discolored and damaged by heat.
- c. Distinctly Green Kernels. Kernels and pieces of kernels of the rapeseed which, after being crushed, are a distinct green throughout the kernel.

Basis of Determination. The determination for damaged kernels shall be made 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.

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 damage), 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 (refer to Interpretive Line Prints).

STEP 2. Cut down the balance of the 10-gram portion to approximately 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 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

¹ Refer to section 16 for details.

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.

All percentages of damage, except for distinctly green and heat-damaged kernels, shall be determined upon the basis of weight. The percentage of distinctly green and heat-damaged kernels shall be determined on the basis of count.

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

Proceed as follows:

- a. $(\text{Weight of other-damaged kernels} \div \text{weight of representative portion}) \times 100 =$ percent other-damaged kernels.
- b. $500 - \text{number of non-rapeseed kernels} =$ number of rapeseed kernels.
- c. $(\text{Number of heat-damaged kernels} \div \text{number of rapeseed kernels}) \times 100 =$ percent heat-damaged kernels.
- d. $(\text{Number of distinctly green kernels} \div \text{number of rapeseed kernels}) \times 100 =$ percent distinctly green kernels.
- e. Percent other-damaged kernels + percent heat-damaged kernels + percent distinctly green kernels = percent damaged kernels (total).

Example:

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

- a. $0.10\text{g} \div 10.04\text{g} = 0.0099 \times 100 = 0.99\%$ other-damaged kernels.
- b. $500 - 10 = 490$ rapeseed kernels.
- c. $25 \text{ kernels} \div 490 \text{ kernels} = 0.0510 \times 100 = 5.10\%$ heat-damaged kernels.
- d. $12 \text{ kernels} \div 490 \text{ kernels} = 0.0244 \times 100 = 2.44\%$ distinctly green kernels.
- e. $0.99\% + 5.10\% + 2.44\% = 8.53\%$ percent damaged kernels (add in hundredths and round to 8.5%).

Certification. Show the percentages of all damages on the work record and the percentages of heat-damaged kernels, distinctly green kernels, and damaged kernels (total) on the certificate. Record all percentages to the nearest tenth percent.

16. INCONSPICUOUS ADMIXTURE

Inconspicuous admixture is any seed which is difficult to distinguish from rapeseed. For example, wild mustard seed is inconspicuous admixture in rapeseed samples.

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 15, 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 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.

Note that all electrical units must have a seal of approval from Underwriters Laboratory (U/L) or a similar testing laboratory.

Any seeds suspected of not being rapeseed should be marked to be confirmed after crushing. After crushing, rapeseed tends to be dark yellow while crushed wild mustard is white or light yellow. Calculate the percentage of inconspicuous admixture on the basis of count.

Example:

10 kernels ÷ 500 kernels = 0.02 x 100 = 2.0% inconspicuous admixture.

Certification. Show the percentage of inconspicuous admixture on the work record and the certificate to the nearest tenth percent.

17. CERTIFICATION

The analysis of rapeseed shall be certified on a commodity inspection certificate. A lot inspection certificate must be issued for those lots that are officially sampled. A submitted sample certificate must be issued for a sample submitted by an applicant or an agent.

A rapeseed analysis shall be shown on a commodity inspection certificate in the following order:

- | | | |
|-------------------------------|---------------------------|------------------------------|
| 1. Infestation | 7. Garlic bulblets | 14. Heat-damaged kernels |
| 2. Heating | 8. Moisture | 15. Distinctly green kernels |
| 3. Odor | 9. Dockage (total) | 16. Damaged kernels (total) |
| 4. Animal filth | 10. Conspicuous admixture | 17. Inconspicuous admixture |
| 5. Glass | 11. Sclerotinia | |
| 6. Unknown foreign substances | 12. Stones | |
| | 13. Ergot | |

When an applicant requests analysis for only specific factors, record the following sentence on the certificate:

“Specific factor analysis only.”

18. QUESTIONS

Direct any questions concerning this directive to the Policies, Procedures, and Market Analysis Branch at (202) 720-0228.