

GRAIN INSPECTION HANDBOOK  
BOOK 1, CHAPTER 2  
SAFFLOWER SEED

Grain Inspection Hand Book

Montana Standards

Book 1 - Chapter 2

Safflower Seed

GRAIN INSPECTION HANDBOOK  
 BOOK 1, CHAPTER 2  
 SAFFLOWER SEED

| <u>Section Number</u> | <u>Section</u>                                    | <u>Page Number</u> |
|-----------------------|---|--------------------|
| 2.1                   | General Information                               | 2-4                |
| 2.2                   | Grades and Grade Requirements                     | 2-4                |
| 2.3                   | Grade Designations                                | 2-5                |
| 2.4                   | General Appearance                                | 2-5                |
| 2.5                   | Special Grades                                    | 2-7                |
| 2.6                   | Basis of Determination                            | 2-8                |
| 2.7                   | Definition of Safflower Seed                      | 2-8                |
| 2.8                   | Heating   | 2-9                |
| 2.9                   | Distinctly Low Quality                            | 2-10               |
| 2.10                  | Odor  | 2-10               |
| 2.11                  | Moisture  | 2-11               |
| 2.12                  | Animal Filth, Glass and Unknown Foreign Substance | 2-12               |
| 2.13                  | Montana Sample Grade                              | 2-12               |
| 2.14                  | Dockage   | 2-13               |
| 2.15                  | Test Weight                                       | 2-15               |
| 2.16                  | Processing the Sample                             | 2-15               |
| 2.17                  | Percentages                                       | 2-17               |
| 2.18                  | Hand Picked Foreign Material                      | 2-18               |
| 2.19                  | Hulls   | 2-18               |
| 2.20                  | De-hulled and Broken Seeds                        | 2-18               |
| 2.21                  | Other Grains                                      | 2-18               |
| 2.22                  | Damaged and Heat Damaged Safflower Seeds          | 2-18               |

| <u>Tables</u> | <u>Page Number</u>                              |
|---------------|---|
| Table No. 1   | Safflower Seed Grade and Grade Requirements 2-5 |
| Table No. 2   | Insect Infestation 2-7                          |
| Table No. 3   | Basis of Determination 2-8                      |
| Table No. 4   | Odor Classification Examples 2-10               |
| Table No. 5   | Montana Sample Grade 2-12                       |
| Table No. 6   | Dividing the Work Sample 2-16                   |
| Table No. 7   | How Factors are Recorded 2-17                   |
| Table No. 8   | Approximate Analytical Portion Sizes 2-17       |

GRAIN INSPECTION HANDBOOK  
BOOK 1, CHAPTER 2  
SAFFLOWER SEED

**INDEX**

| <u>Section</u>                                    | <u>Page Number</u> |
|---|--------------------|
| Animal Filth, Glass and Unknown Foreign Substance | 2-12               |
| Basis of Determination                            | 2-8                |
| Damaged and Heat Damaged Safflower Seeds          | 2-18               |
| Definition of Safflower Seed                      | 2-8                |
| De-hulled and Broken Seeds                        | 2-18               |
| Distinctly Low Quality                            | 2-10               |
| Dockage   | 2-13               |
| Grade Designations                                | 2-5                |
| Grades and Grade Requirements                     | 2-4                |
| General Appearances                               | 2-6                |
| General Information                               | 2-4                |
| Hand Picked Foreign Material                      | 2-18               |
| Heating   | 2-9                |
| Hulls   | 2-18               |
| Moisture  | 2-11               |
| Montana Sample Grade                              | 2-12               |
| Odor  | 2-10               |
| Other Grains                                      | 2-18               |
| Percentages                                       | 2-17               |
| Processing the Sample                             | 2-15               |
| Special Grades                                    | 2-7                |
| Test Weight                                       | 2-15               |

## **2.1 - GENERAL INFORMATION**

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.

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

The inspection process provides factor information used to determine grade and to provide further information on the condition or quality of the safflower seed. 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.).

## **2.2 - GRADE AND GRADE REQUIREMENTS**

Safflower Seed shall be any tame cultivated safflower seed. Safflower Seed is divided into three numerical grades and sample grade. Special grades are provided to emphasize special qualities or conditions affecting the value of the safflower seed. Special grades are added to and made a part of the grade designation. They do not affect the numerical or sample grade designation.

**Table No. 1 - Safflower Seed Grade and Grade Requirements**

|       |             | Maximum Limits of |       |                   |              |                        |              |
|-------|-------------|-------------------|-------|-------------------|--------------|------------------------|--------------|
|       |             | Stones            | Hulls | Dehulled & Broken | Other Grains | Damaged Safflower Seed |              |
| Grade | Test Weight |                   |       |                   |              | Heat                   | Total Damage |
| NO.   | pounds      | Count             | %     | %                 | %            | %                      | %            |
| 1     | 40.0        | 2                 | 1.0   | 2.0               | 0.5          | 0.0                    | 3.0          |
| 2     | 38.0        | 6                 | 2.0   | 4.0               | 2.0          | 0.2                    | 5.0          |
| 3     | 35.0        | 6                 | 5.0   | 8.0               | 3.0          | 1.0                    | 5.0          |

Sample Grade shall be safflower which –

- Does not meet the requirements for the grades No. 1 Montana thru No. 3 Montana; or
- In an eight hundred grams sample contains seven or more stones; or
- Has a musty, sour or commercially objectionable foreign odor; or
- Which is heating or of distinctly low quality; or
- Has more than 2.5 percent of earth pellets after the mechanical separation of dockage
- Note 1: Slightly weather-stained safflower seeds may grade no higher than No. 2

Note 2: Badly weather-stained safflower seeds may grade no higher than No. 3

### 2.3 - GRADE DESIGNATIONS

Use the following guidelines when assigning grades on pan tickets and certificates.

- A. The abbreviation “MT”;
- B. The abbreviation “NO.” and the number of the grade or the words “Sample Grade”;
- C. The words Safflower Seed;
- D. The applicable special grade(s) in alphabetical order;
- E. The words “Total Dockage” and the percentage thereof.

## 2.4 - GENERAL APPEARANCE

General appearance factors are defined as:

Slightly Weather Stained Safflower Seeds: Safflower seeds that are slightly weather stained shall be graded not higher than U.S. No. 3.

Badly Weather Stained Safflower Seeds: Safflower seeds that are badly weather stained shall be graded not higher than U.S. No. 4.

Basis of Determination: Determine general appearance on the sample as a whole.

Characteristics of Weather Stained Safflower Seeds: The factors "Slightly Weather Stained" and "Badly Weather Stained" denote a discolored condition caused by adverse weather conditions.

- a. Slightly Weather Stained: In order for a sample of safflower seeds to be designated slightly weather stained:
  - (1) Each individual kernel must have a slightly dusty, gray appearance on the brush end in sufficient amounts to give the entire sample a slightly weathered appearance or
  - (2) The sample may contain severely weathered kernels in a sufficient number to give it a slightly weathered appearance. In either case, the safflower seeds are slightly weather stained.
- b. Badly Weather Stained: When kernel discoloration due to weather has progressed to a point where many of the kernels are badly discolored and weathered, the safflower seeds are badly weather stained.

In order to assure a more uniform application of the general appearance factors in safflower seeds, it is recommended that the following procedures be followed:

- a. Cut 350 grams from the original sample.
- b. Place the 350-gram portion into an empty plastic box approximately the same size as the interpretive line print.
- c. Compare the sample with the interpretive line print.
- d. Consider the oats slightly weather stained or badly weather stained when the sample is equal to or worse than the oats in the interpretive line print.

GRAIN INSPECTION HANDBOOK  
BOOK 1, CHAPTER 2  
SAFFLOWER SEED

Certification: Record the words "Slightly Weather Stained" or "Badly Weather Stained" in the "Results" section of the certificate and grade accordingly.

### 2.5 - SPECIAL GRADE

Special grades draw attention to unusual conditions in grain and are made part of the grade designation. Definitions and examples of the designations for special grades in wheat are:

Infested: Infested refers to safflower seed that is infested with live weevils or other live insects injurious to stored grain. The presence of any live weevil or other live insect injurious to stored grain indicates the probability of infestation and warns that the safflower seed 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 safflower seed is infested. Do not examine the file sample if the work portion is free of insect.

Live weevils shall include rice weevils, granary weevils, and lesser grain borers. Other live insects injurious to stored grain shall include grain beetles, grain moths, meal worms, 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 (about 800 grams). For specific guidelines, see table No. 2 in this handbook.

Infested: Safflower seed that are infested with live weevils or other insects injurious to stored grain need the special grade infested.

Certification: If a sample of safflower seeds is found to be infested certify the sample as follows:

Example: U.S. No. 1 Safflower Seed, Infested

#### Table No. 2 - Insect Infestation

|   |
|---|
| Samples meeting or exceeding any one<br>of these tolerances are infested:<br>2 lw, or 1 lw + 5 oli, or 10 oli   |
| 1/ Examine work portion and file sample if necessary. Do not examine file sample if work portion is insect free.<br>2/ Minimum sampling rate is 500 grams per 2,000 bushels.<br>3/ Minimum component size is 10,000 bushels.<br>Key: lw = live weevil<br>oli = other live insects injurious to stored grain |

**2.6 - BASIS OF DETERMINATION**

Distinctly Low Quality: The determination of distinctly low quality is made on the basis as a 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, live insect infestation, large stones, moisture, temperature, garlic, and unknown foreign substance(s), and a commonly recognized harmful 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.

All Other Determinations: Other determinations not specifically provided for under the general provisions are made on the basis of grain when free from dockage, except the determination for odor is made on either the basis of grain as a whole or the grain when free from dockage.

**Table No. 3 – Basis of Determination**

| Lot as a Whole   | Sample Before the Removal of Dockage  | After the Removal of Mechanically Separated Dockage  |
|--|---|--|
| Distinctly Low Quality<br>Infestation<br>Heating<br>Odor | Infestation<br>Moisture<br>Dockage<br>Odor<br>Animal Filth<br>Glass<br>Unknown Foreign Substances<br>Kind of Grain<br>Handpicked Foreign Material | Stones<br>Odor<br>Damaged<br>Kernels(Total)<br>Heat-Damaged<br>Kernels<br>Other damaged<br>kernels |

A general procedure based on the “basis of determination” definition is followed in the inspection and grading of safflower seed. However, the procedure may vary according to the test required to determine the grade. The following sections of this chapter are arranged in a logical sequence typically followed in the inspection and grading of safflower seed.

**2.7 - DEFINITION OF SAFFLOWER SEED**

Definition: Safflower Seed (*Carthamus tinctorius*) shall consist of 50.0 percent or more of whole or broken safflower seed before the removal of dockage and not more than 10 percent of other grains.



GRAIN INSPECTION HANDBOOK  
BOOK 1, CHAPTER 2  
SAFFLOWER SEED

A hull does not constitute a safflower seed. According to the definition, a safflower seed must be the hull and kernel (the size of either is irrelevant as long as they are connected) or just the kernel without the hull.

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 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 safflower seeds. If an analysis is necessary, make the determination on a representative portion of 50 grams. Determine the percentage of safflower seeds 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 safflower seeds, 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.

The following definitions apply when identifying safflower seed:

Hulls (husks): Are the ovary wall of the safflower seed without any kernel (meat) attached.

Kernels (meat): The interior contents of the safflower seed which is surrounded by the hull.

Whole seed: The term whole safflower seed includes seeds and broken seeds with kernels. Seeds that do not contain kernels will not be considered as being whole safflower seeds.

## 2.8 - HEATING

Safflower Seed developing a high temperature from excessive respiration is considered heating. Heating safflower seed in its final stages usually produces a sour or musty odor. Care should be taken not to confuse safflower seed that is heating with safflower 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: Grade heating safflower seed MT Sample Grade and record the "Heating" on the pan ticket and in the "Results" section of the certificate.

## 2.9 - DISTINCTLY LOW QUALITY

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

Basis of Determination: Use all available information to determine whether the safflower seed is of distinctly low quality. Determine distinctly low quality on the lot as a whole or the sample as a whole.

Large Debris: Safflower Seed 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 are too large to enter the sampling devise is considered distinctly low quality.

Other Unusual Conditions: Safflower Seed that is obviously affected by other unusual conditions (including diatomaceous earth) which adversely affects the quality of the safflower seed and cannot be properly graded by use of the grading factors specified or defined in the standards is considered distinctly low quality.

Certification: Grade distinctly low quality safflower seed as MT Sample Grade and record the word “Distinctly Low Quality” and the reason(s) why on the pan ticket and in the “Remarks” section of the certificate.

## 2.10 - ODOR

Basis of Determination: Determine odor on evidence obtained at the time of sampling and on the sample either before or after the removal of dockage. Odors detected at the time of sampling must be recorded on the work record.

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

| SOUR  | MUSTY                     | COMMERCIALY OBJECTIONABLE FOREIGN ODORS  |
|---|---------------------------|--|
| Boot<br>Fermenting<br>Insect<br>(acid)<br>Pigpen<br>Smoke <u>A/</u>                     | Ground<br>Insect<br>Moldy | Animal hides<br>Decaying animal & vegetable matter<br>Fertilizer<br>Fumigant<br>Insecticide<br>Oil products<br>Skunk<br>Smoke (evidence of fire-burnt material)<br>Strong weed |
| <u>A/</u> Consider smoke odors as sour unless there is evidence of fire-burnt material. |                           |  |

GRAIN INSPECTION HANDBOOK  
BOOK 1, CHAPTER 2  
SAFFLOWER SEED

Odors from Heat-Damaged safflower Seeds: When heat-damaged kernels are present, safflower seed gives off an odor very similar to smoke. Safflower Seed 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.

Musty or Sour Odors: High temperatures resulting from excessive respiration causes safflower seed to heat and give off a Musty or Sour odor.

Musty or sour odors in safflower seed includes musty, sour, earthy, moldy, ground odor, or a rancid, sharp, and acrid insect odor. An acrid insect odor (usually referred as “lesser grain borer” odor) is considered sour. An insect odor other than acrid (usually referred to as “bran bugs” odor) is considered musty.

Commercially Objectionable Foreign Odor: Commercially objectionable foreign odor are odors that are foreign to grain and render it unfit for normal commercial usage. Fumigant or insecticide odors are considered objectionable foreign odors if they linger and do not dissipate. When a sample of safflower seed contains a fumigant or insecticide odor that prevents a determination as to whether any other odor(s) exist(s), apply the following guidelines:

- A. Allow the sample to aerate in an open metal container not to exceed four (4) hours;
- B. If the fumigant odor persists after four (4) hours, consider the sample as having a commercially objectionable foreign odor and grade it accordingly.

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 safflower seed “Sample Grade” if it contains a “Distinct” “musty”, “sour”, or “Commercially Objectionable Foreign Odor” and record the type of odor on the pan ticket and in the “Results” section of the certificate.

## 2.11 – MOISTURE

Moisture is the water content in grain as determined by an approved device.

Basis of Determination: Determine moisture before the removal of dockage on a portion of about 350 grams.

Certification: Record the percentage of moisture on the pan ticket and the certificate to the nearest tenth percent in the “Results” section of the certificate.

**2.12 - ANIMAL FILTH, GLASS AND UNKNOWN FOREIGN SUBSTANCE**

Basis of Determination: Determine animal filth, glass, and unknown foreign substances on the basis of the sample as a whole (approximately 800 grams).

Certification: Grade safflower seed “Sample Grade” if the amount of animal filth, glass, and unknown foreign substance exceeds the limits set forth in Table No. 5, and record the actual count on the work record and in the “Results” section of the certificate.

**2.13 - MONTANA SAMPLE GRADE**

Basis of Determination: Determine MT Sample Grade factors, before the removal of dockage on the lot as a whole and/ or a portion of approximately 800 to 850 grams. When a condition exists that may not appear in the sample, the determination may be made at the time of sampling.

**Table No. 5 – Montana Sample Grade Factors**

| FACTOR  | LINE SLIDE | NUMBER/WEIGHT LIMITS <sup>1/</sup> | BASIS      |
|---|------------|------------------------------------|------------|
| Any Grading Factor  |            | Excess of limit for MT NO. 3       | Sample     |
| Animal Filth  |            | 3 or more                          | Lot/Sample |
| Glass   |            | 1 or more                          | Lot/Sample |
| Heating   |            | Presence                           | Lot        |
| Large Debris*   |            | 2 or more                          | Lot/Sample |
| Odor  |            | Presence                           | Lot/Sample |
| Other Unusual Conditions*   |            | Presence                           | Lot/Sample |
| Stones  |            | Any number in excess of 0.05%      | Lot/Sample |
| Unknown Foreign Substance(s) Or a Commonly Recognized Harmful or Toxic Substance(s) <sup>2/</sup>   |            | 1 or more                          | Lot/Sample |
| <sup>1/</sup> Record count factors to the nearest whole number<br><sup>2/</sup> Includes palletized material other than feed pellets which are considered foreign material.<br>* For distinctly Low Quality, see section 3.8. |            |                                    |            |

GRAIN INSPECTION HANDBOOK  
BOOK 1, CHAPTER 2  
SAFFLOWER SEED

Stones: are concreted, earthy, or mineral matter and other substances of similar hardness which will not disintegrate readily in water.

Certification: Grade safflower seed MT Sample Grade when one of more limits in Table No. 5 is exceeded. Record the reason(s) why on the pan ticket and in the “Results” section of the certificate.

## 2.14 – DOCKAGE

Dockage: Is all material, including empty hulls, other than whole safflower seed, that can be easily removed with a cleaning device and by handpicking. Dockage also includes underdeveloped, shriveled, and small pieces of safflower seed that cannot be recovered by properly recleaning.

Basis of Determination: Determine dockage in safflower seed on a representative portion of approximately 800 grams cut from the original sample.

Procedure: The procedure for determining dockage is performed in two steps: machine cleaning and handpicking.

STEP 1: Procedure for Determining Dockage with the Carter Day Dockage Tester. When running samples through the Carter Dockage Tester, insert the appropriate sieves and riddle. Set the air and feed controls to the proper position.

- A. Air is 9
- B. Feed is 6
- C. Riddle # 35898
- D. NO 2 sieve in top carriage
- E. No sieve
- F. No sieve

Mechanical dockage will then consist of:

1. The material removed by the aspiration (air collection pan)
2. The coarse material, except whole safflower seeds that pass over the riddle. Whole kernels of safflower seeds that pass over the riddle shall be returned to the cleaned sample.
3. The material that passes through the number 2 sieve.

STEP 2: Procedure for Determining Dockage by Handpicking.

- A. Cut down the cleaned sample to a portion to about 30 grams.
- B. Handpick the 30-gram portion for any remaining dockage (i.e., all material other than safflower seed).

GRAIN INSPECTION HANDBOOK  
BOOK 1, CHAPTER 2  
SAFFLOWER SEED

- C. Total dockage now consists of all machine separated dockage and handpicked dockage.

Computing Total Dockage: In computing the total dockage, all dockage obtained by the use of the Carter Day Dockage Tester shall be computed on the basis of the sample as a whole. The percentage of dockage removed by handpicking, 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 safflower seed remaining after the removal of the mechanically separated dockage.

- A.  $(\text{Weight of dockage} \div \text{original sample weight}) \times 100 = \text{percent of mechanically separated dockage}$   
B.  $100 \text{ percent} - \text{percent of mechanically separated dockage} = \text{percent cleaned safflower seed}$   
C.  $(\text{Weight of handpicked separation} \div \text{weight of handpicked sample}) \times 100 = \text{percent of handpicked dockage}$   
D.  $(\text{Percent cleaned safflower seed} \times \text{percent handpicked dockage}) \times 100 = \text{adjusted percentage of handpicked dockage}$   
E.  $\text{Percent of mechanically separated dockage} + \text{adjusted percentage of handpicked dockage} = \text{percent of dockage (total)}$

Example:

Original sample weight 990 grams  
Weight of mechanically separated dockage 101.50 grams  
Weight of handpicked portion 30.36 grams  
Weight of handpicked dockage 0.67 grams

- A.  $101.50 \text{ grams} \div 990 \text{ grams} = 0.102 \times 100 = 10.20\% \text{ mechanically separated dockage}$   
B.  $100\% - 10.20\% = 89.80\% \text{ cleaned safflower seed}$   
C.  $(0.67 \text{ grams} \div 30.36) = 0.022 \times 100 = 2.20\% \text{ handpicked dockage}$   
D.  $(89.80\% \times 2.20\%) \times 100 = 1.97\% \text{ adjusted percentage of handpicked dockage}$   
E.  $10.20\% + 1.97\% = 12.17\% \text{ dockage (total) (add in hundredths, round to 12.2\%)}$

Certification: Record the percentage of dockage (total) on the work record and certificate in half and whole percent. With percentages of less than half a percent disregarded.

## 2.15– TEST WEIGHT

Test weight: The test weight is determined using an approved device according to procedures prescribed in FGIS instructions.

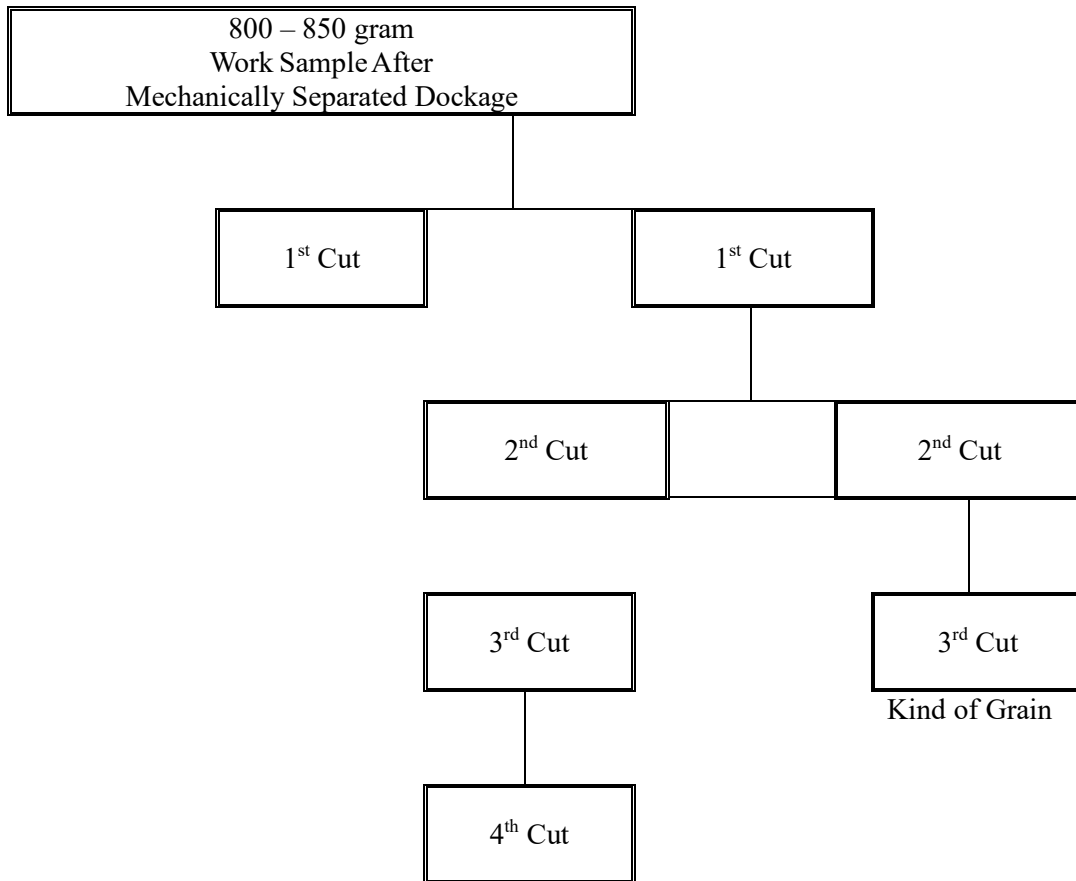
Basis of Determination: Determine test weight per bushel after the removal of mechanically separated dockage on a portion of sufficient quantity to overflow the kettle. The procedures for performing the test weight determination and available services are described in the United States Grading Standards handbook part II, chapter 1, section 1.11.

Certification: Record test weight results on the work record and on the certificate in whole and half pounds. Disregard fractions of a half-pound. If requested, convert the pounds per bushel (lbs. /bu) result to kilograms per hectoliter (kg/hl) using the following formula:  $\text{lbs./bu} \times 1.287 = \text{kg/hl}$  and record in the "Remarks" section in whole and tenths.

## 2.16 - PROCESSING THE WORK SAMPLE

At this point, determinations have been made for those factors determined before the removal of handpicked foreign material. Now divide the work sample into fractional portions for those determinations required after the removal of dockage. The following chart and table No. 6 illustrate how to divide the sample into fractional parts using the Boerner divider.

**Table No. 6 – Dividing The Work Sample**



Handpicked Foreign Material  
 Heat-Damaged  
 Damaged kernels (total)  
 Hulls  
 Dehulled and broken Seed  
 Other grains



**2.17 – PERCENTAGES**

Percentages: Determine percentages on a weight basis to a nearest tenth percent or in whole and half except for stones. Report stones by count. Calculate percentages by dividing the weight of the material removed by the weight of the portion used and multiplying by 100%.

**Table No. 7 – How Factors Are Recorded**

| WHOLE AND HALF                    | NEAREST TENTH PERCENT   | BY COUNT   |
|-----------------------------------|---|--|
| Dockage<br>Test Weight per Bushel | Moisture<br>Kind of Grain<br>Handpicked Foreign Material<br>Heat-Damaged Kernels<br>Damaged Kernels (Total)<br>Hulls<br>Dehulled and Broken Seeds<br>Other Grains | Animal Filth<br>Garlic Bulblets<br>Glass<br>Insects<br>Large Debris<br>Stones<br>Unknown Foreign Substance(s) or a Commonly Recognized Harmful or Toxic Substance(s) |

**Table No. 8 - Approximate Analytical Portion Sizes**

| APPROXIMATE ANALYTICAL PORTION SIZES |       |
|--------------------------------------|-------|
| Factors                              | Grams |
| Kind of grain                        | 60    |
| Handpicked foreign material          | 30    |
| Heat-damaged kernels                 | 30    |
| Damaged kernels (total)              | 30    |
| Hulls                                | 30    |
| Dehulled and broken seeds            | 30    |
| Other grains                         | 30    |

### **2.18 - HANHPICKED FOREIGN MATERIAL**

Handpicked Foreign Material: Is all matter other than whole safflower seeds that can be removed from the original sample by handpicking a portion of the sample. Foreign material is added to the dockage as stated in the dockage procedure 3-13.

Basis of Determination: Determine handpicked foreign material after the removal of mechanically separated dockage on a portion of 30 grams.

Certification: Record the percent of total dockage on the certificate in whole and half percent.

### **2.19 – HULLS**

Hulls (husks): Are the ovary wall of the safflower seeds without any kernel (meat) attached.

Basis of Determination: Determine hulls after the removal of mechanically separated and handpicked dockage on a portion of 30 grams.

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

### **2.20 - DEHULLED AND BROKEN SEEDS**

Dehulled and Broken Seeds: Are safflower seeds and pieces of safflower seeds that have the hull completely removed from the safflower kernel.

Basis of Determination: Determine dehulled seeds after the removal of mechanically separated and handpicked dockage on a portion of 30 grams.

Certification: Record the percent of dehulled and broken seeds on the certificate to the nearest tenth percent.

### **2.21 - OTHER GRAINS**

Other Grains: Other grains 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: Determine other grains after the removal of mechanically separated and handpicked dockage on a portion of 30 grams.

Certification: Record the percent of other grains on the certificate to the nearest tenth percent.

## 2.22 - DAMAGED AND HEAT-DAMAGED SAFFLOWER SEEDS

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

Damaged Safflower Seed: Kernels and pieces of kernels of safflower seed which are, heat-damaged, damaged by heat, badly ground-damaged, badly weather-damaged, immature, mold damaged, sprout-damaged or injured by sprout.

Heat-Damaged Kernels: Kernels and pieces of kernels of safflower seed which have been materially discolored and damaged by heat. (Reference: Visual Reference Image No. SS-2.0 Heat Damage)

Damaged by Heat: Seed and pieces of seed which are slightly discolored as a result of heating are considered damage. (Reference: Visual Reference Image No. SS-1.0 Damage by Heat)

Mold Damage: Kernels and pieces of kernels of safflower seed which are visibly damaged by mold or a mold like substance. (Reference: Visual Reference Image No. SS-3.0 Surface Mold)

Sprout-Damaged Kernels: Kernels with the germ end broken open from germination exhibiting sprout which is visibly protruding out form the kernel.

Immature Kernels: Are kernels of safflower seeds that are underdeveloped seeds and are at least 50% covered with a purple or black color on the seed coat. Most times the seed will not contain a kernel.

**NOTE: Injured by Sprout: Kernels with the germ end broken open from germination exhibiting a split in the germ area but not exposing any sprout (commonly called splits) may be picked and recorded on the certificate but are not considered damage.**

Basis of Determination: Determine damaged kernels on a representative portion of 30 grams cut from the work sample after the removal of mechanically separated dockage.

Procedure: Refer to the Visual Reference Images for sunflower seeds when handpicking safflower seeds for damaged kernels.

**NOTE: When using the Visual Reference Image for mold damage in safflower remember that sunflower seeds are larger than safflower seeds. Only half of the mold present on the sunflower seed should be considered when picking mold on safflower.**

**NOTE: For the determination of heat-damaged kernels, the kernels often need to be cross-sectioned to determine the extent of damage. Safflower seed kernels which are heat-damaged usually have a dull dead appearance and are discolored brown or black. The oil-**

GRAIN INSPECTION HANDBOOK  
BOOK 1, CHAPTER 2  
SAFFLOWER SEED

**bearing portion of the seed is brown or black and has a mealy consistency with little or no oil content.**

**NOTE: Insect damaged kernels of safflower seeds are sound.**

**NOTE: Safflower seed variety named “NutraSaff” or “Hulless Safflower” or equivalent types have distinct reddish-brown streaks on the surface of the kernel. These kernels are sound.**

Computing Damaged Kernels (total): To compute damaged kernels (total), add the percentage of heat-damaged, sprout damaged and other-damaged kernels of safflower seed as follows. After removing handpicked foreign material reweigh the cleaned safflower seeds.  
Weight of each damaged kernels ÷ weight of representative portion (after the removal of handpicked foreign material) x 100 = percent of each damaged kernels  
Add all percentages of damaged kernels together to get damaged kernels total

Example:

Weight of representative portion 30.24 grams  
Weight of handpicked foreign material 0.20 grams  
Weight of handpicked foreign material free portion 30.04 grams  
Weight of other-damaged kernels 0.07 grams  
Weight of heat-damaged kernels 0.10 grams  
Weight of sprout-damaged kernels 0.12 grams

- A.  $30.24 \text{ weight of representative portion} - 0.20 \text{ weight of handpicked foreign material} = 30.04$
- B.  $0.07 \text{ grams} \div 30.04 \text{ grams}) = 0.002 \times 100 = 0.20 \text{ percent of other-damaged kernels}$
- C.  $(0.10 \text{ grams} \div 30.04 \text{ grams}) = 0.003 \times 100 = 0.30 \text{ percent of heat-damaged kernels}$
- D.  $. 0.12 \text{ grams} \div 30.04 \text{ grams}) = 0.003 \times 100 = 0.30 \text{ percent of sprout-damaged kernels}$
- E.  $. 0.20\% + 0.30\% + 0.30\% = 0.80 \text{ percent of damaged kernels (total) (add in hundredths and round to } 0.8\%)$

Certification: Show the percentage of damaged kernels (total), on the work record and on the certificate to the nearest tenth percent.