

# Directive

9180.53

March 14, 2022

## INSPECTION OF SAFFLOWER SEED

### Contents

1. PURPOSE .....	2
2. REPLACEMENT HIGHLIGHTS .....	2
3. GENERAL INFORMATION .....	2
4. PERCENTAGES AND VALUES .....	3
5. STANDARD ABBREVIATIONS .....	3
6. BASIS OF DETERMINATION .....	3
7. DEFINITION OF SAFFLOWER SEED .....	4
8. INFESTATION .....	4
9. HEATING .....	5
10. ODOR .....	5
11. ANIMAL FILTH, GLASS, AND UNKNOWN FOREIGN SUBSTANCES .....	6
12. OTHER GRAINS .....	7
13. MOISTURE .....	7
14. DOCKAGE .....	7
15. DAMAGED KERNELS .....	10
16. STONES .....	11
17. OIL, FREE FATTY ACID, AND IODINE VALUE .....	11
18. CERTIFICATION .....	13
19. QUESTIONS .....	13
Attachment .....	14

The U.S. Department of Agriculture (USDA) prohibits discrimination in its programs on the basis of race, color, national origin, sex, religion, age, disability, political beliefs, and marital or familial status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternate means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).

To file a complaint, write to the USDA, Office of Civil Rights, Room 326-W, 1400 Independence Avenue, SW, Washington, DC 20250-9410, or call (202) 720-5964 (voice and TDD). USDA is an equal employment opportunity employer.

## 1. PURPOSE

This directive establishes uniform procedures for the factor analysis of safflower seed 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 9180.53, "Inspection of Safflower Seed", dated 5/01/13.

## 3. GENERAL INFORMATION

There are no classes, subclasses, or grades for safflower seed. The inspection of safflower seed is performed on a factor-only basis. The factors analyzed are: kind of grain, infestation, heating, odor, animal filth, glass, unknown foreign substances, other grains, moisture, dockage, damaged kernels (total), other-damaged kernels, heat-damaged kernels, sprout-damaged kernels, stones, oil content, free fatty acid level, and iodine value.

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.

For all other factors, the following inspection service levels apply: 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 on (1) any of the kinds of inspection services performed for an original inspection, or (2) 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 appeals of analytical factors, however, the Quality Systems and Services Unit (QSS) must perform the analyses.

- c. Board Appeal. An applicant who is dissatisfied with the original or the appeal inspection results may appeal to the FGIS Board of Appeals 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 AND VALUES

Except for iodine value, state all percentages to the nearest tenth percent. State the iodine value to the nearest whole number.

#### 5. STANDARD ABBREVIATIONS

Use the following abbreviations in the analysis of safflower seed:

Safflower seed	SAF	Commercially objectionable	
Damaged kernels (total)	DKT	foreign odor	COFO
Dockage (total)	DKG	Stones	STON
Heat-damaged kernels	HT	Heating	HTG
Other-damaged kernels	ODK	Oil content	OIL
Sprout-damaged kernels	SPRT	Free fatty acid	FFA
Infested	INF	Iodine value	IV
Moisture	M	Other material	OM
Odor	ODOR	Animal filth	ANFL
Musty	MUST	Broken glass	GLAS
Sour	SOUR	Unknown foreign substance	FSUB
		Other grains	OG

#### 6. BASIS OF DETERMINATION

How factors are determined:

**Table No. 1 - Basis of Determination**

Before the Removal of Dockage	After Removal of Mechanically Separated Dockage
Kind of grain	Oil content
Infestation	Free fatty acid level
Odor	Iodine value
Animal filth	Odor
Glass	Damaged kernels (total)
Unknown foreign substances	Heat-damaged kernels
Other grains	Sprout-damaged kernels
Moisture	Other-damaged kernels
Dockage	Stones

## 7. DEFINITION OF SAFFLOWER SEED

Safflower seed (*Carthamus tinctorius*) shall consist of 50.0 percent or more of whole or broken safflower seed before the removal of dockage.

A hull alone does not constitute a safflower seed.

According to the following definition, a safflower seed can be either a combination of the hull and kernel (the size of either is irrelevant as long as they are connected) or just the kernel with no hull attached.

**Basis of Determination.** Normally, a visual appraisal of the sample is sufficient to determine if it meets the definition of safflower seed. However, if an analysis is necessary, make the determination before the removal of the dockage on a portion of approximately 60 grams.

The following definitions apply when identifying safflower seed:

- a. Hull (husk). The ovary wall of the safflower seed.
- b. Kernel (meat). The interior contents of the safflower seed which are surrounded by the hull.
- c. 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.

## 8. INFESTATION

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

The presence of any live weevil or other live insect injurious to stored grain indicates the probability of infestation and warns 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 about whether the safflower seed is infested. Do not examine the file sample if the work portion is insect free.

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, Book II, 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 (1-1/8 to 1-1/4 quarts or an equivalent number of grams). For specific guidelines, see table No. 2 and Grain Inspection Handbook, Book I, Grain Sampling.

**Table No. 2 - Insect Infestation**

<b>Samples meeting or exceeding any one of these tolerances are infested: 2 lw, or 1 lw + 5 oli, or 10 oli</b>
I. 1,000-Gram Representative Sample <sup>1</sup> (+ file sample if needed)  - 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) <sup>2</sup>  - Railcars Under Cu-Sum - Subsamples for Sacked Grain Lots - Components for Bargelots <sup>3</sup> - Components for Shiplots <sup>3</sup>
<sup>1</sup> Examine work portion and file sample if necessary. Do not examine file sample if work portion is insect free. <sup>2</sup> Minimum sampling rate is 500 grams per 2,000 bushels. <sup>3</sup> 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 states 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 applicable, record the word “Heating” on the work record 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. Odors detected at the time of sampling must be recorded on the work record.

However, the final determination for odor must be performed in the laboratory.

**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.		

Commercially Objectionable Foreign Odors. Commercially objectionable foreign odors are odors that are entirely foreign to safflower seed that render the seed 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 safflower seed 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 a period not to exceed 4 hours. Do not aerate file samples (unworked files) which were previously 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 (1-1/8 to 1-1/4 quarts).

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

## 12. OTHER GRAINS

Other grains are wheat, barley, oats, corn, sorghum, rye, and triticale.

**Basis of Determination.** Determine other grains on a representative portion of approximately 30 grams cut from the original sample.

**Certification.** Record the percentage of other grains on the work record and certificate to the nearest one-tenth percent.

## 13. MOISTURE

Moisture is the water content of safflower seed 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 on a portion of approximately 400 grams before the removal of dockage.

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

## 14. DOCKAGE

Dockage is all material, other than whole safflower seed that can be easily removed with a cleaning device and by handpicking and 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 1-1/4 quarts cut from the original sample.

**Procedure.** The procedure for determining dockage is performed in two steps: (1) machine cleaning and (2) handpicking.

**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. The Carter Dockage Tester must be at zero energy anytime sieves are inserted or removed.

**Note: To accurately remove dockage from safflower seed, the Carter Dockage Tester must be modified in accordance with procedures prescribed in the attachment.**

Safflower Seed					
Air	Feed	Riddle	Top	Middle	Bottom
*	6	8	---	8	7
* The air setting for each Carter Dockage Tester must be standardized to provide results that agree with the master machine at FGIS' National Grain Center in Kansas City, MO. Refer to procedures prescribed in the attachment.					

- b. Run the portion through the modified Carter Dockage Tester.
- c. Examine the material that passed over the bottom sieve. If the material consists of 50 percent or more of whole or broken safflower seed, return it to the cleaned safflower seed. Otherwise, add that material to the dockage.

**Note: Return safflower seed which passed over the riddle or that is caught in the riddle to the cleaned portion.**

- d. Dockage is all material removed by aspiration; material other than safflower seed that passed over the riddle; the material that passed through the bottom sieve; and the material that passed over the bottom sieve when such material consists of less than 50 percent safflower seed.

**STEP 2.** Procedure for Determining Dockage by Handpicking.

- a. Cut down the cleaned sample to a portion of not less than 30 grams.
- b. Handpick the 30-gram portion for any remaining dockage (i.e., all material other than safflower seed).
- c. Total dockage now consists of all machine separated dockage and handpicked dockage.

Computing Total Dockage. All dockage obtained by the use of the Carter 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	990.00 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 to the nearest one-tenth percent.

## 15. DAMAGED 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.

- a. Damaged Safflower Seed. Kernels and pieces of kernels of safflower seed that are damaged by blight and/or mold, heat-damaged, sprout-damaged, frosted, badly ground-damaged, badly weather-damaged, weevil-bored, or otherwise materially damaged.
- b. Heat-Damaged Kernels. Kernels and pieces of kernels of safflower seed that have been materially discolored and damaged by heat.
- c. Frosted. Kernels and pieces of kernels of safflower seed that are badly shrunken and distinctly discolored black or brown by frost.

**Basis of Determination.** Determine damaged kernels on a representative portion of not less than 30 grams cut from the work sample after the removal of mechanically separated dockage.

Procedure. Refer to the visual reference images when handpicking for damaged kernels. Reference Image: [Safflower Damage](#) (ILP: SAF-1.0 Badly Ground and/or Weathered and ILP: SAF-2.0 Sprout Damage).

**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 that are heat-damaged usually have a dull dead appearance and are discolored brown or black. The oil-bearing portion of the seed is brown or black and has a mealy consistency with little or no oil content.**

To compute damaged kernels (total), add the percentage of heat-damaged, sprout-damaged, and other-damaged kernels of safflower seed.

Proceed as follows:

- a.  $(\text{Weight of other-damaged kernels} \div \text{weight of representative portion after the removal of dockage}) \times 100 = \text{percent of other-damaged kernels.}$
- b.  $(\text{Weight of heat-damaged kernels} \div \text{weight of representative portion}) \times 100 = \text{percent of heat-damaged kernels.}$
- c.  $(\text{Weight of sprout-damaged kernels} \div \text{weight of representative portion}) \times 100 = \text{percent of sprout-damaged kernels.}$
- d.  $\text{Percent of other-damaged kernels} + \text{percent of heat-damaged kernels} + \text{percent of sprout-damaged kernels} = \text{percent of damaged kernels (total).}$

Example:

Weight of representative 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.  $0.07 \text{ grams} \div 30.04 \text{ grams} = 0.002 \times 100 = 0.20$  percent of other-damaged kernels
- b.  $(0.10 \text{ grams} \div 30.04 \text{ grams}) = 0.003 \times 100 = 0.30$  percent of heat-damaged kernels
- c.  $0.12 \text{ grams} \div 30.04 \text{ grams} = 0.003 \times 100 = 0.30$  percent of sprout-damaged kernels
- d.  $0.20\% + 0.30\% + 0.30\% = 0.80$  percent of damaged kernels (total)  
(add in hundredths and round to 0.8%)

**Certification.** Record the percentage of damaged (total), other-damaged, heat-damaged, sprout-damaged kernels on the work record and certificate to the nearest one-tenth percent.

## 16. STONES

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

**Basis of Determination.** Determine stones on a representative portion of approximately 1-1/8 to 1-1/4 quarts after the removal of dockage (as removed by the Carter Dockage Tester).

**Certification.** Record the number of stones and percentage of stones by weight (to the nearest one-tenth percent) on the work record and certificate.

## 17. OIL, FREE FATTY ACID, AND IODINE VALUE

- a. General. FGIS will test safflower seed at QSS for its iodine value, oil content, and free fatty acid level. Persons interested in receiving these services may contact QSS directly or may request service through their local field office. Application forms may be obtained from any FGIS field office.
- b. Kind of Services. Upon request, QSS will provide oil, free fatty acid, and/or iodine value analyses on all submitted and official samples. A retest analysis is based on the official file sample. Only one retest inspection service may be performed on any original inspection service. An appeal analysis is based on the official file sample or a new sample. An appeal inspection shall be based on a new sample only if the lot can be positively identified by official personnel as the one that was inspected previously and the entire lot is available and accessible for sampling and inspection.

- (1) Submitted Sample Inspection Service. A submitted sample is a sample, other than an official sample, submitted by or for an interested person for official inspection. A minimum 50-gram sample is required for each analysis (i.e., 50 grams must be submitted for an oil analysis but 150 grams must be submitted for an oil, free fatty acid, and iodine value analyses).
  - (2) Quality Inspection Service. A quality inspection service involves official personnel obtaining a sample from an identified lot and forwarding a representative portion to QSS for analysis. A minimum 50-gram sample is required for each analysis (i.e., 50 grams must be submitted for an oil analysis but 150 grams must be submitted for an oil, free fatty acid, and iodine value analyses). An official sample(s) being mailed or shipped via courier service by an applicant must be sealed (i.e., numbered seal or lead wire seals) in order to maintain its identity.
- c. General Procedures. For quality inspection service, official personnel shall sample according to the guidelines in Book I of the Grain Inspection Handbook. A minimum 50-gram sample is required for each analysis (i.e., 50 grams must be submitted for an oil analysis but 150 grams must be submitted for an oil, free fatty acid, and iodine value analyses).
- QSS shall maintain a file sample (balance of the representative portion after testing) on each original, retest, and appeal inspection service.
- d. Test Procedure. QSS uses a modified solvent extraction procedure (A.O.C.S. Official Method) in the determination of oil content and A.O.C.S. Official Methods in the determination of free fatty acid levels and iodine values. Samples are analyzed 2 or 3 business days after QSS receives the sample. Results are reported immediately to the appropriate FGIS field office after analyses are recorded by QSS (see Certification and Billing).
- e. Certification and Billing. For all oil, free fatty acid, and iodine value testing services performed by QSS, the field office nearest the location where the request originated shall issue the applicable certificate(s) based on the results from QSS and complete the billing. Testing fees will be assessed in accordance with Section 868.90 of the AMA regulations.

The appropriate field office will show the oil content, free fatty acid level on the work record and certificate to the nearest one-tenth percent. The iodine value will be shown to the nearest whole number.

## **18. CERTIFICATION**

The analysis of safflower seed shall be certified on a commodity inspection certificate. A commodity submitted sample certificate must be issued for a sample submitted by an applicant or an agent.

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

“Specific factor analysis only.”

## **19. QUESTIONS**

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

Attachment

## SAFFLOWER SEED MODIFICATION PROCEDURE FOR CARTER DOCKAGE TESTER

The following information explains the modification procedure to be used to convert a dockage tester for use with safflower seed, in addition to grain. Figures 1 and 2 show the machine before and after modification, and the step-by-step procedure is shown in Figure 3. [NOTE: The "Control" (Ctrl) end of the fan shaft is the end facing the side of the tester where the Feed and Air adjustment knobs are located. The "Non-Control" (Non-Ctrl) end faces toward the link-type V-belt.]

Figure 1

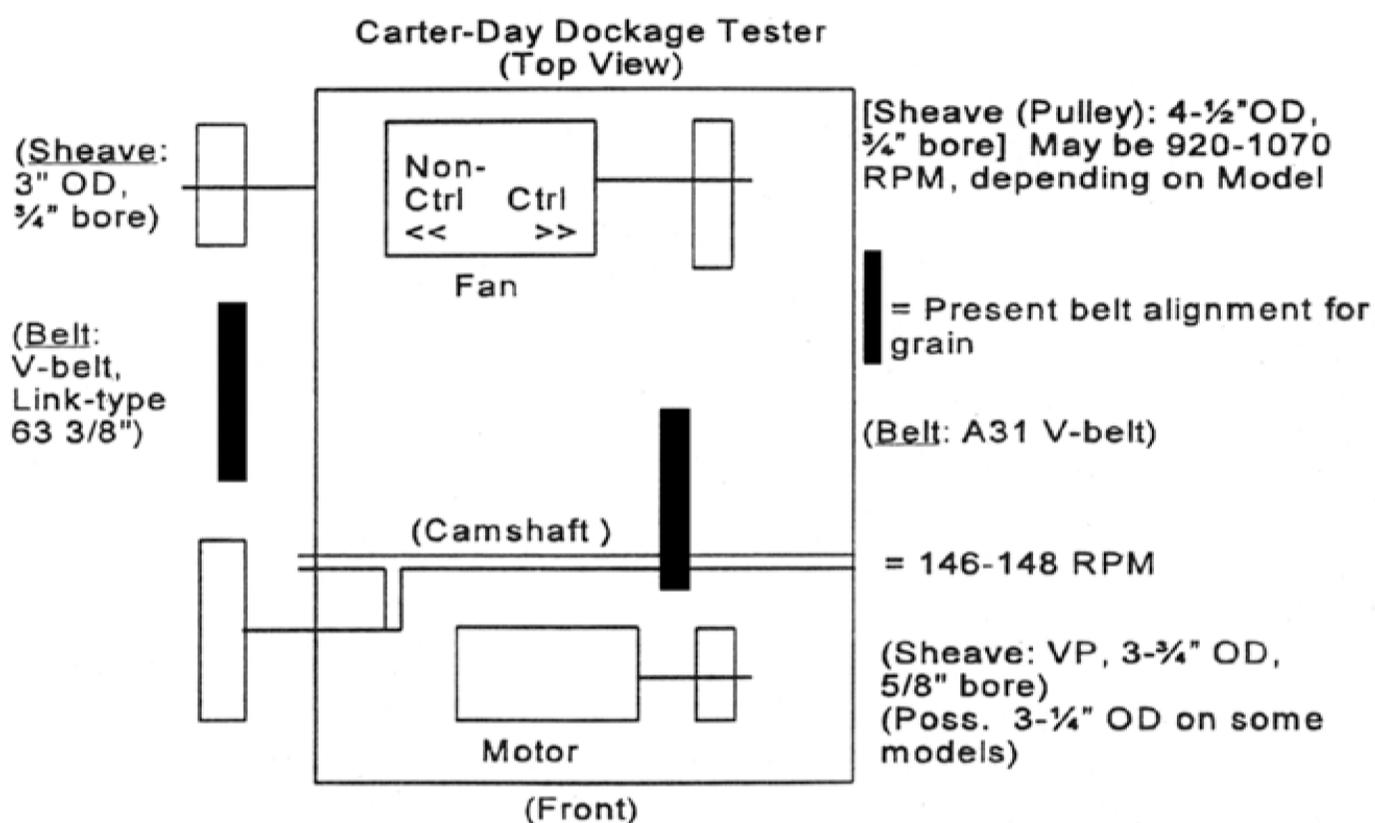


Figure 2

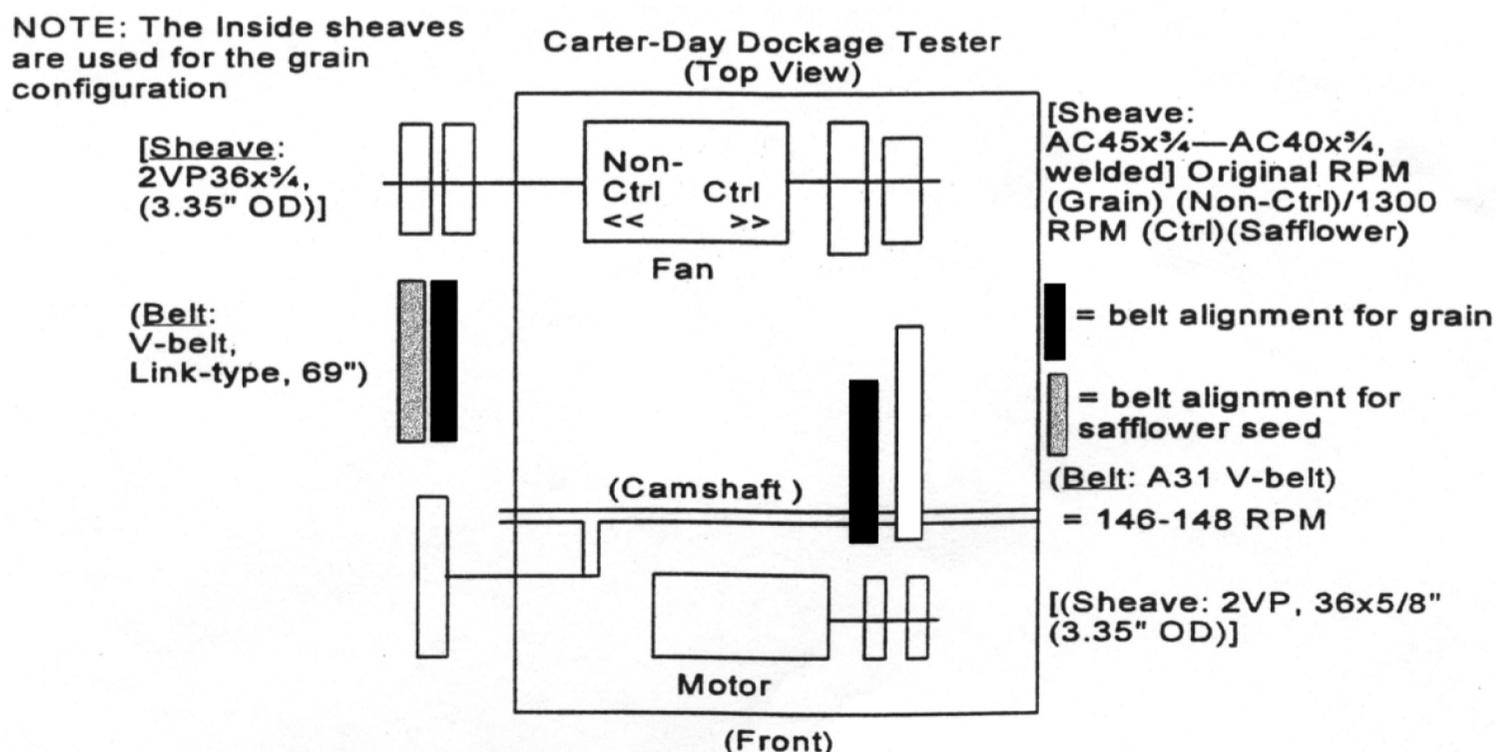
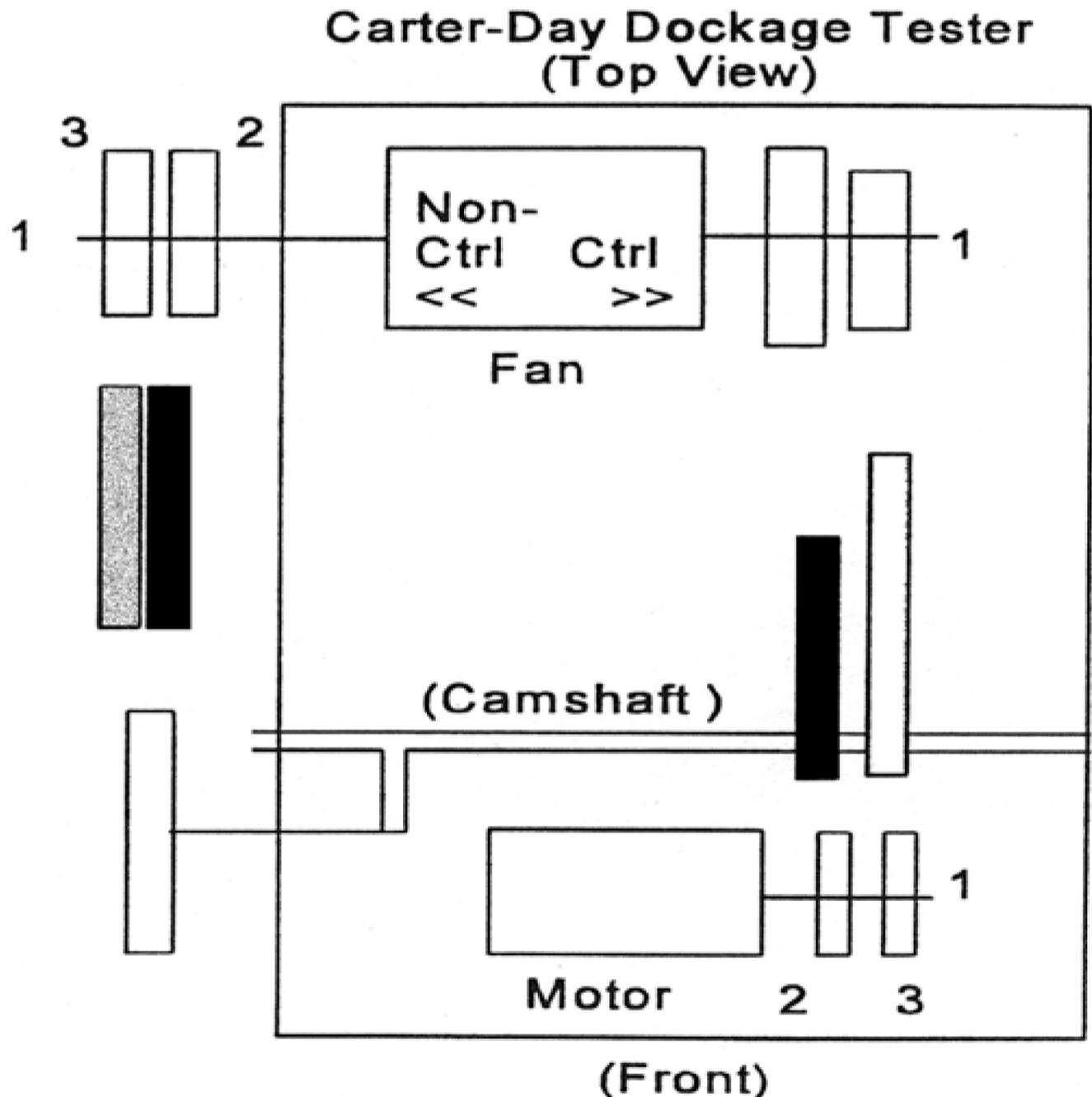




Fig. 3 STEP-BY-STEP PROCEDURE

- STEP 1:** Install sheaves on motor and fan shafts, V-belt A31 on motor-to-fan link, and the 69-inch link-type V-belt on the fan-to-camshaft link. See Fig. 2 above for location of sheaves. Line up the matching sheaves as parallel as possible with the belt's route of travel.
- STEP 2:** Adjust inside motor sheave to achieve the original fan shaft (Ctrl) RPM speed (before modif.). Adjust inside fan shaft sheave (Non-ctrl) to achieve a camshaft speed of 146 - 148 RPM.

Figure 3



- STEP 3:** Adjust outer motor sheave to achieve fan speed of 1300 RPM, and adjust outer fan shaft sheave (Non-ctrl) to achieve cam speed of 146 - 148 RPM.

All modified FGIS dockage testers shall be tested and calibrated against the designated Headquarters Standard machine located at the FGIS National Grain Center in Kansas City.

**Note: Whenever belt guards have been removed, they must be returned to position prior to machine start up.**