



United States Department of Agriculture

Grain Inspection,
Packers and Stockyards
Administration

August 14, 2017

Federal Grain
Inspection Service

Reference # 275

Field Management
Division

TO: FGIS POLICY BULLETIN BOARD

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FROM: Samantha Simon, Director
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SUBJECT: Mycotoxin Testing in Grain: Sample Preparation Guidance

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ORIGINATING OFFICE: Policies, Procedures, and Market Analysis Branch

Hotline 1-800-998-3447

1. PURPOSE

This memorandum provides new guidance on preparing samples for vomitoxin (also known as Deoxynivalenol, DON) testing in grain. Certain elements of this memorandum apply to **all** mycotoxins. In particular, this memorandum provides a new procedure to homogenize ground samples and obtain representative ground sub-portions (i.e., work and file) and test portions, provides a reminder on checking particle size, and provides a new procedure used to check particle size. The new procedure for checking particle size is included as an attachment to this memorandum. This memorandum also announces that FGIS will no longer allow stirring the sample in order to obtain a test portion.

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2. BACKGROUND

The Mycotoxin Handbook contains instructions for sample preparation including the mass of material to be ground, by grain and mycotoxin; identification of grinders that are suitable for grinding grain for mycotoxin testing; particle size requirements and testing thereof; and other instructions related to mycotoxin testing.

Inspection monitoring data indicates that samples occasionally do not meet the particle size requirement of a **minimum of 60 percent (for all mycotoxin testing unless otherwise stated)** in test kit instructions) passing a U.S. Standard No. 20 woven wire sieve. Coffee grinders and other adjustable grinders listed in the handbook may drift; and thus, they need to be checked to ensure the particle size requirement is met. The grinder used for preparing falling number samples delivers nearly 100 percent through the U.S. Standard No. 20 sieve.

Furthermore, the current Mycotoxin Handbook requires official personnel to use an approved divider to obtain a ground sub-portion (i.e., work and file) for all mycotoxins. FGIS reviewed the policy that required an approved divider to obtain a sub-portion or test portions for all ground mycotoxins. In consultation with the FGIS Technology and Science Division (TSD), this process may introduce more risk for contamination with little benefit. Consultation with TSD resulted in a simple and effective means for homogenizing ground samples and obtaining representative sub-portions and test portions.

3. POLICY

The Mycotoxin Handbook requires periodic checks to ensure a proper grind through 1) visual observation of the ground product; 2) the number of samples ground since last check; and 3) the number of days since the last check was performed. Official personnel may need to perform a check on a frequent basis (daily, weekly, etc.) when performing a high volume of mycotoxin tests. FGIS is including this information as a reminder, and with the expectation, that **all** mycotoxin tests are performed with the proper grind.

To assist official personnel in obtaining homogeneously ground samples as accurately and efficiently as possible, FGIS allows the use of shaking a ground sample to obtain a sub-portion or test portion, in lieu of using an approved divider. Further, FGIS is phasing out the use of the Boerner divider **for all ground samples**. FGIS will update the instructions and notify stakeholders in advance of this change. Effective September 5, 2017, stirring is no longer allowed for obtaining homogeneous sub-portions and test portions.

4. PROCEDURE

- a. Ensure that the grinder is operating correctly.
- b. Grind sample using a grinder that ensures delivery of a sample meeting the minimum particle size requirement.
- c. If the sample is more than approximately 1000 grams, divide the sample down to 1000 grams.¹
- d. Collect the ground sample in a plastic bag that is large enough so that the entire ground sample does not fill more than 2/3 of the bag. Sufficient headspace is needed to allow adequate mixing.
- e. Seal the bag so the ground sample is not lost while shaking to mix. Mix the ground sample thoroughly by shaking for at least 15 seconds. Do not reuse a bag for a different sample.
- f. Remove the 50.0 ± 0.2 g test portion.

- g. Seal the bag and retain the balance as a file sample. Shake the bag for 15 seconds prior to taking any subsequent test portions for reinspection, appeal, and Board appeal analyses.

¹If a divider is used to divide the ground sample for any purpose, a riffle divider is highly recommended. FGIS will continue to allow the use of a Boerner divider (until phased out) to divide the ground sample, however any lab using a Boerner divider is required to clean the Boerner divider after each sample.

5. FILING INSTRUCTIONS

File a copy of this memo with the Mycotoxin Handbook until the handbook is revised to include this change. Field office managers must ensure that a copy of this memorandum is provided to official agencies operating within their circuit.

6. QUESTIONS

Direct any questions regarding this procedure to the local field office or to Policies, Procedures, and Market Analysis Branch (PPMAB), at (202) 720-0228.

ATTACHMENT

SIEVE TEST PROCEDURE

Purpose:

This test is performed to determine the percentage of ground grain passing a U.S. Standard No. 20 sieve. The sieve analysis is performed to determine the grind fineness prior to chemical analysis. These instructions replace the procedures outlined in the Mycotoxin Handbook for sieve testing. The new procedure is performed for each commodity being ground and tested for the mycotoxin by the laboratory.

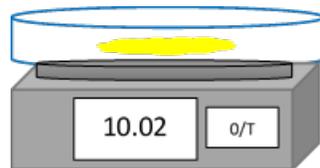
Equipment:

Balance, Weighing pan, U.S. Standard No. 20 testing sieve including lid and collection pan (meeting ASTM E-11 specifications, 8 inch diameter, 850 μm mesh, stainless steel or brass), Cleaning brush.

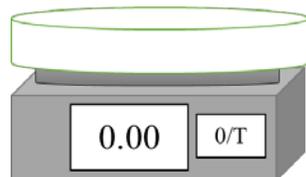
Test Procedure

Sieve Analysis:

- (1) Grind approximately 100 g of the grain of interest and collect in a plastic bag that is large enough so the entire ground sample fills no more than 2/3 of the bag. Sufficient headspace is needed to allow adequate mixing. Alternatively, a sample that was recently ground for an inspection service using the grinder can be used for the sieve test. Again, the ground sample must be in a plastic bag filled no more than 2/3 full.
- (2) Place a pan on the balance and tare the balance. Shake the ground sample in the bag for at least 15 seconds. Transfer 10 - 11 g to the tared pan and record the original mass (M_i) to two decimal points. For example, 10.02 g.

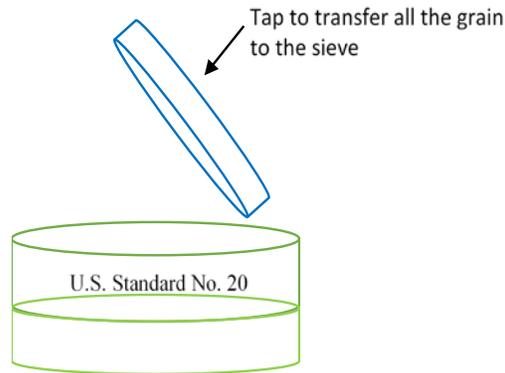


- (3) Remove this pan from the balance and place the sieve collection pan on the balance. After placing the sieve collection pan on the balance, tare the balance.

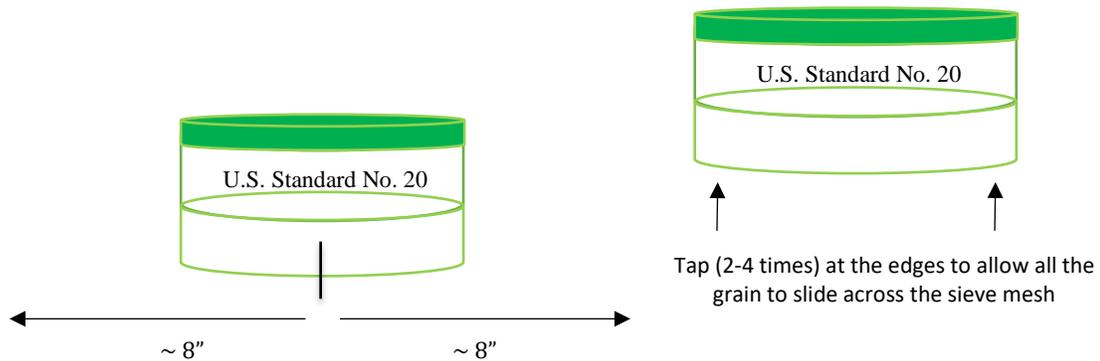


- (4) Remove the sieve collection pan from the balance. Place the sieve mesh pan on the sieve collection pan.

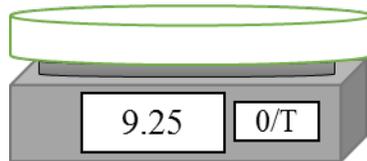
Transfer the weighed sample onto the sieve and place the lid on the sieve mesh pan.



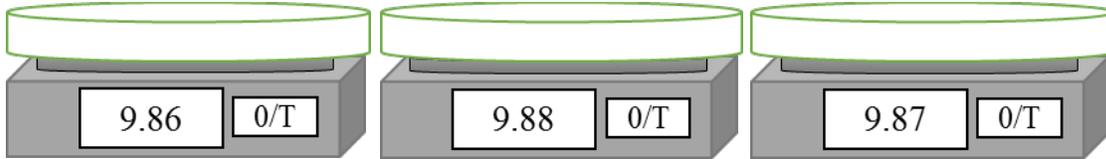
- (5) Shake the sieve using a side-to-side action while occasionally tapping the pan on the bench top (see illustration below). This helps the fine particles pass through the mesh.



- (6) Remove the lid and sieve mesh pan. Place the sieve collection pan on the previously tared balance from Step 2. Observe the mass. This mass represents the mass passing through the No. 20 sieve (M_p).



- (7) Remove the sieve collection pan from the balance and place the sieve pan over the sieve collection pan. Cover the sieve pan with the lid. Repeat steps 6 and 7 until the mass passing through the sieve remains close to constant (± 0.02 g) between weighings. Record this mass as M_p .



- (8) Remove the ground material from the sieve mesh pan and the sieve collection pan. Clean each pan with a brush as necessary.

Data Analysis:

Sieve Analysis:

- (1) Obtain the percentage sample passing a U.S. Standard No. 20 sieve by dividing M_p by M_i and multiplying by 100.

For example: Mass initial = 10.02 g
Mass passing = 9.87 g

The percentage passing is calculated as;
 $\% \text{ passing} = (\text{Mass passing}/\text{Mass initial}) \times 100$
 $= (9.87/10.02) \times 100 = 98.5 \%$