

60°F Cold Test for the Cotton Seed Industry

SoDak Labs, Inc. is introducing a new test to evaluate cotton seed vigor, the cold test is conducted for 10 days [7 days at 60°F imbibition/cellular repair followed by 86°F warm grow out to 100 Growing Degree Days (GDD) units for seedling evaluation]. To reduce test variability, SoDak Labs is planning to perform the 60°F cold test on 400 seed sample compared to a 200 seed sample routinely used for the Cotton Cool Test. The 60°F cold test emulates vigor tests used for corn and soybeans, but uses a base temperature of 60°F or 15.5°C. The current Cotton Cool (Seed Vigor Testing Handbook, 2009) test uses a temperature of 18°C or 64.4°F, so the 60°F cold would have a lower imbibition temperature and greater stress than the cool test. The 60°F cold test is conducted using the "Top of Creped Cellulose with Sand" (TCS) method (Rules for Testing Seeds, 2022) (Figures 1. and 2.). TCS is a high throughput method and widely used in vigor testing. After seven days of 60°F cold the trays are transferred to 86°F for the growout. Figure 3. shows growth during the first day at 86°F. Closeup photos of cotton seedlings are shown in Figure 4. representing growth at 100 GDDs. The TCS method allows evaluation of strong and slow cotton seedling growth at 100 GDDs (Figure 4.). Slow seedlings are circled in red within Figure 4. A visual report is provided at the conclusion of testing (Figure 5.). SoDak Labs expects this test to be most helpful to cotton growers wanting to plant earlier and into 60F soil temperatures.

SoDak Labs believes cotton growers will appreciate the photo report as a visual to help evaluate the seed quality of the cotton seed purchased. Emerged normal seedling percentage is reported on the Analysis Report and is a total of strong and slow normals (Figure 5.)



FIGURE 1. The top of crepe cellulose and tray method allows easy application of a constant volume of 700ml of water to each test.



FIGURE 2. Four hundred cotton seeds are placed and pressed into the moist crepe cellulose paper and covered with "kiln dried" 60F sand for uniform imbibition and emergence through ½" depth of moist sand, emulating 60F field conditions.



FIGURE 3. Cotton seedlings breaking through sand on day 8 of test, first 7 days were at 60F chill.



FIGURE 4. Note the five circled "slower seedlings" at 100 Growing Degree Units, these would be reported as "slow normals" if all seedling structures are developing normally.

LITERATURE CITED:

1. Rules for Testing Seeds. 2022. Association of Official Seed Analysts. Section 6.9 a. pages 6-13 and 6-14.
2. Seed Vigor Testing Handbook. 2009. Association of Official Seed Analysts. Section VI. Cool Germination Test pages 182-185.

REPORT OF SEED ANALYSIS

Customer: 4 Corners Ag 236 32nd Ave Brookings, SD 57006 Acct. Num: 205	Date Received 08/29/23	Date Sample Completed 09/13/23	Date of Report 09/27/2023	Sample 43054
SENDER'S INFORMATION *				
Kind/Brand Name:		COTTON		
Variety:		test		
Genus/Species:		GOSSYPIUM SPP		
Lot Number:		test		
Size/Count:				



60F Cold:

Normal Seedlings = 97% (93% Strong + 4% Slow) ABN: 3% DEAD: 0%

GDD =101 GDD =Growing Degree Days

Comments:

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-- END OF REPORT --

FIGURE 5. SoDak Labs provides a visual report of the cotton growth along with the percentage of strong and slow seedlings.