

# Soybean Drying and Storage

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Why would you artificially dry a crop that normally dries in the field? One reason would be late planting due to double cropping or wet fields, or poor fall weather may result in soybeans that are too wet to store. Second, harvesting early, when soybeans are still wet, reduces field losses, harvest losses, and market weight losses and allows more time for other fall fieldwork.

## Harvest moisture

The optimum harvest moisture range is 13 percent to 15 percent for maximum weight and minimum field losses. Soybeans can generally be harvested any time after the seeds are mature and the foliage is dry. But threshing is difficult and more beans are crushed and bruised when harvested with more than 18 percent moisture.

When moisture is less than 13 percent:

- Field losses from lodged plants and open pods may be greater.
- Combine shatter losses are high, and can be 10 percent of yield or more.
- Market weight, and thus value, decreases about 1.15 percent per percentage point below 13 percent. At \$6.00/bu., this represents about 7 cents per bushel per point; at \$2.00 per bushel it's 14 cents per point.
- When moisture is less than 10 percent, soybeans themselves are brittle and more likely to split during harvest and handling. Cleaning and handling seed beans at this moisture can reduce germination.

## Storage moisture

When storage moisture is too high, spoilage is likely and germination can be reduced in just a few days. High oil content makes soybeans slightly more susceptible to spoilage than corn, so soybeans need to be about two points drier than corn for the same storage period. For winter storage, store commercial soybeans at 13 percent moisture or less, 12 percent or less for up to one year, and 11 percent or less for more than one year. Soybeans

with less than 15 percent moisture can generally be dried with fans sized for routine aeration (0.1-0.2 cfm/bu.).

Soybean seed stored one planting season should be 12 percent moisture or less. Store carryover seed at 10 percent moisture or less.

## Preparation for Drying

You can dry soybeans in several types of high- or low-temperature dryers, but be careful. Soybeans are fragile and can be damaged by air that is too hot (over 140°F), as well as by rough handling.

Avoid dryers that recirculate or stir grain constantly. Arrange drying systems to minimize drop heights and conveying. Grain spreaders are suitable for commercial soybeans but not for seed beans.

When a spreader isn't used, withdraw several loads from the bin center during filling to help level grain and remove accumulated fines. This practice is called coring.

Because clean soybeans have about 25 percent less airflow resistance than shelled corn, fans sized for corn drying will produce greater airflow through soybeans. Greater airflow means faster drying.

Consider cleaning soybeans (with a rotary-screen cleaner and 3/16 inch square mesh screens, for example) to remove weed seeds and fines. They increase airflow resistance, invite mold and insect invasion, and can cause market discounts.

## High-temperature drying

On many farms that produce both corn and soybeans, it may be possible to use the same high-temperature drying equipment for both crops. You should reduce heat for soybeans, however. Limit drying air temperature to 130°-140°F for commercial beans, and 100°-110°F for seed beans. Retention time in the heat section of dryers should be less than 30 minutes.

To avoid excessive moisture differentials from top to bottom in batch-in-bin dryers, use shallow batch depths (two to three feet) when drying soybeans. Stir once if the bin has stirring. For seed beans, suggested airflow in batch-in-bin dryings is six to nine cfm/bu. Check moisture frequently; soybeans dry rapidly.

### **Low-temperature drying**

Low-temperature dryers should have a full perforated floor and a fan that can push an airflow of one to two cfm/bu. up through the grain. A drying front develops near the floor and moves slowly upward. Drying time depends on air flow, weather, and initial moisture content but will probably be three to six weeks.

Most years in Iowa, natural (unheated) air will dry soybeans to 13 percent moisture or less. But in unusually cool, wet falls, supplemental heat may be required. Heating air lowers its relative humidity—as a rule, heating air 20°F cuts its relative humidity in half. Prolonged exposure to air drier than 40 percent relative humidity causes excessive soybean cracking. Also, air that is too warm and dry causes overdrying. To avoid overdrying and cracking of soybeans, size heaters on low-temperature bins for no more than 20°F temperature rise and use an in-plenum humidistat to shut off the heater when relative humidity of the drying air is below 45 percent.

Check soybean moisture and condition every day or two. Run the fan continuously until the drying front reaches the top layer of beans or average outdoor temperatures fall below freezing. Resume drying in spring if necessary. If you detect mold, heating, or foul odors during drying, unload the bin and sell or high-temperature dry the beans.

Sharing a low-temperature dryer between corn and soybeans is difficult unless: 1) you provide high airflow to speed drying by installing larger than normal fans or only filling bins part way; 2) you can wait several weeks between bean and corn harvest; and 3) you sell or move soybeans to other storage immediately after drying.

### **Soybean storage**

Aerate stored soybeans to maintain grain temperature at 35°-40°F in winter and 40°-60°F in summer. These temperatures reduce mold and insect activity and moisture movement within the bin.

Check stored soybeans for heating or spoilage once a week in warm weather and every two weeks in cold weather. In addition, conduct periodic germination tests to monitor viability of seed beans.

Aerate to try to control heating or other early storage problems. If that fails, move, redry, or sell the beans.

### **“Green” beans**

In a late year, or when an early frost occurs, there will be “green” beans in harvested grain. The greenness is due to chlorophyll in immature seed. It will subside somewhat after several weeks of aerated storage, often to the point where damage discounts can be avoided. The greenness is a problem because it carries into the extracted oil, where it must be refined out at considerable cost.

The green and immature yellow (lima) beans are wetter than sound beans in a sample. Electronic moisture meters read green and immature beans drier than they actually are. This is important to know for storage. Protect yourself by mentally adding about 1.5 percentage points of moisture to readings on immature beans mixed with sound beans.

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