FeedFIT®

FEED CENTER DESIGN

# *Augers and Bins*

GPS DAIRY® CONSULTING LLC

Things to consider when implementing augers and bins into your feed center:

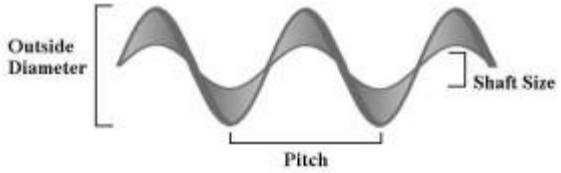
**Sizing**

Bulk bins come in a variety of sizes, normally ranging from 3-52 tons. The preferred size depends on the feeding rate of the intended ingredient and the space available. Generally, if the bins are to hold a commodity, the bin should fit a full load of an ingredient. Therefore, 30-ton bins are common for this purpose to hold a full semi-load of an ingredient (~24 ton) and still allow extra space to manage inventory. Smaller bins may be helpful to manage smaller inclusion minerals or ingredients to allow the inventory to turnover in a reasonable amount of time.

Photo: Example of various-sized bins to allow for the proper feed-out speed of an ingredient.

Auger sizing is an important consideration when designing how a bin set-up will function. Common auger diameters are 4", 6", 8", and 10" (10, 15, 20, and 25 cm). Depending on the angle of elevation auger, and ingredient, different sized augers will be needed to meet unloading speed preferences. Please use the following resource (https://extension.okstate.edu/fact-sheets/auger-conveyors.html) to better understand the interaction between auger diameter, length, pitch, and motor size. Auger length is highly dependent on the bin placement and the height of the mixer or bin the feed is unloading to. Auger length does not affect the capacity of the auger. Generally, the diameter of the actual flighting will be ½ to 1" (1-2.5 cm) smaller than the inner diameter of the tube it is installed in.

Auger pitch is equal to the distance the feed moves with each rotation of the auger. It is the distance between two corresponding points on consecutive turns of the auger flighting. It is generally equal to the auger diameter. This determines how far the product will move with each rotation of the flighting.




The flighting size and pitch are important factors when considering auger capacity.

Most augers will operate with an electric motor. These will generally range from 1 to 5 HP. The size needed depends on the length and diameter of the auger and density of the product moved. Reducing RPM through pulleys or other means may also change the horsepower requirements. Please refer to the link above to see exact tables.

The capacity of an auger depends on auger diameter, auger speed, length of the intake exposure, angle of elevation, as well as type and moisture of feed conveyed.

Several auger and bin manufacturers may assist in the proper sizing of flightings, augers, and motor. Here are a few options:

- https://premier-com.com/wp-content/uploads/2024/02/83-86.pdf
- https://schuldbushnell.com/bin_sizes_capacities/
- https://www.meridianmfg.com/smoothwall-bins/
- https://www.siouxsteel.com/explore-our-products/livestock-equipment/feeders/feed-bins

**Filling Bins**

Many bulk bins will be filled by an auger truck. Bins should be placed in an area where an auger truck can easily lift and position the auger. Preferably, the auger truck can unload and still allow feed center operations to continue.

Photo: Example of an auger truck unloading into bulk bin. Source: Sioux Steel

Bin systems may also utilize a grain pit and grain leg to assist in filling bulk bins. These systems are commonplace in grain storage facilities. Dust and density of some ingredients delivered to bulk bins makes grain legs more difficult to use for some feed ingredients. Again, truck unloading locations should be out of the way of feeding operation.

Photo: Example of grain pit feeding into a grain leg.

**Loading Mixer**

Loading speed is largely dictated by the items outlined in the "sizing" section. Different remotes and automation tools can be utilized to start and stop augers. Often, commercial electricians can outfit systems to enable the remote systems. More complex automation tools can be purchased or designed by specialty businesses. Easy Automation and milc group both have tools available for this purpose. The mixer should be able to drive under augers, but augers should have properly sized "socks" to reduce shrink and dust. Augers should be proper length so they can load in the center of the mixer.

Photo: Often several bins and augers are used in feed center operations. Remotes and automation can increase efficiency and the comfort of the feeder.

Sources for bin automation:

- https://www.easy-automation.com/
- https://www.milcgroup.com/

**Placement of Bins and Augers**

To reduce overall loading time, it is best if bins can be located near forage and/or commodity storage. Bins should be located to allow trucks to fill bins and mixers to load simultaneously. The ground underneath the auger should be flat, clean, and free from water. A pit or recessed drive under the auger may be helpful to decrease the height of the mixer and thus decrease the angle of elevation and length of the auger. Batching systems are also a consideration to utilize automation and reduce loading time of binned ingredients.

Photo: Example of clean, level loading area with appropriate-size socks on the augers.


Photo: Example of augers placing feed in the center of the mixer. This allows for proper mixing of ingredients.

Photo: Example of bins located outside of the feed center. This allows for bins to unload into mixers while being filled by an auger truck outside.

Sources:


- https://midwestagsystems.net/blogs/news/info-needed-to-order-replacement-flighting
- https://extension.okstate.edu/fact-sheets/auger-conveyors.html