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Corn Test Weight

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A topic that is often discussed and misunderstood this time of year is corn test weight. This measure is determined by the calculated weight of grain that fills a bushel container. Test weight impacts the bushels per load of corn and the grading standard that a load of corn receives. In this article I'll try to explain what test weight is and why we use it.

First, let's go over what constitutes a bushel. A bushel is a measure of volume (length x width x height: think bushel basket) originally used by Celtic people to facilitate fair grain trade. Traders often weren't able or weren't trusted to accurately weigh grain, so they sold it by volume and not by weight. The standard bushel is approximately 1.24 cubic feet, but other than needing to know how many bushels a grain bin will hold (another measure of volume), we rarely use a true bushel in calculations.

Grain sales in the U.S. are based on weight, but prices are still listed on a $/bushel basis. Therefore, a standard weight of grain that fills a bushel volume is needed to convert a weight (pounds of corn) into a volume (bushels of corn). For corn, that standard is 56 pounds per bushel. However, we know that not every load of corn that we put in a bushel basket will weigh exactly 56 pounds, so the true weight of the basket filled with corn is the test weight.

As an example, let's imagine that a farmer hauls a semi-load of grain to the elevator that holds exactly 1000 volumetric (length x width x height) bushels. A test weight of 52 pounds would give the farmer 52,000 pounds of corn to sell, or only 929 market bushels (52,000/56 lbs/bu). Additionally, the farmer would likely be docked for low test weight by receiving a lower USDA grade. Now let's imagine that the semi with 1000 volumetric bushels is filled with 60 lb. test weight corn. The farmer would then be paid for 1071 bushels (60,000/56 lbs/bu). So, while the trailer visually had the same amount of corn, the higher test weight load allows the farmer to sell 142 more bushels.

High test weight does not necessarily correlate to high yield. Total yield is basically the number of kernels produced per acre, while test weight is the density of the kernels that will fit into a bushel. Test weight is also impacted by how well kernels fit together and other physical characteristics.

Environmental factors have a major impact on test weight. Dry weather, clouds, insect damage, disease and virtually any other stress can decrease test weight. Damaged kernels, grain drying injury and vivipary can also lower test weight.

Test weight and grain moisture are inversely related. As grain dries the kernel volume tends to shrink while kernel weight is mostly unchanged. This allows more kernels to pack into the same space, increasing test weight. But, while lower moisture can result in higher test weight, corn should not be dried to lower than the standard 15-15.5% moisture. Water is weight. When corn has a moisture content higher than the standard, the grain weight is discounted to account for the extra moisture. However, grain buyers do not reverse the formula to add weight to corn with moisture below 15.5%, so the lost water weight is never recovered, even with higher test weights.

So, to wrap this all up, when a load of corn is sold, the farmer is selling the weight of the corn but is paid a price per 56 pounds (which we call a bushel). A higher test weight makes sellers feel better because it

takes a smaller volume of their corn to make a bushel, but in reality, the pounds of grain they sell and the yield of their fields is not changed.