

COMBINING ELECTRONIC MOISTURE CONTROL  
AND SURFACTANTS FOR BEEF CATTLE:

# Taking the bumps out of feedlot feed production

by Cliff Johnson and Dave Greer

**M**oisture is frequently overlooked as an essential ingredient in beef cattle rations. However, improper amounts of moisture in feed can affect a feedlot's operation profitability. Excess moisture can cause grain to spoil. Grain with too little moisture is usually dusty. Grain dust is very explosive and can cause health problems for workers. Also, improper moisture — or variations in the moisture content of grain — can adversely affect grain processing and feed production. For example, too much moisture causes steam flaking and dry rolling equipment to run poorly. Grains that are too dry generate excessive fines that reduce feed intake, encourage feed waste, and require frequent bunk clean-

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Water tends to form a bead on the surface of grain (left). However, surfactants reduce surface tension and allow the water to spread over the surface of the grain (right).

ing. Milling dry grain also shortens the operating life of equipment.

When the moisture concentrations in grain vary, the feed mill operator must slow down or speed up equipment. One person described this as "absorbing the bumps." When the "bumps" are eliminated, the machinery can operate at its designed capacity and efficiency.

Process control technology is patented and available that changes the moisture content of ingredients from a random variable to a precisely controlled

ingredient. This technology combines electronic process monitoring and a surfactant. Surfactants are "surface active ingredients" that when dissolved in water reduce its surface tension and allow the water to coat the feed rather than form drops — or "bumps" on the surface of the grain. This "two pronged" approach to managing moisture accelerates moisture dispersion and absorption on the grain. The electronic monitoring system accurately measures the moisture content of the raw grain and then calculates how much moisture must be added.

Dean McCaffery, part-owner of North Platte Feeders, a 40,000 head feedlot near North Platte, NE, has installed a surfactant-based, electronic moisture control system in his feed production



Right: This AgriChem GrainPrep automatic moisture monitoring and delivering system is installed at Clark County Feed Yard in Minneola, KS. Below: Clark County Feed Yard has a capacity of about 15,000 head of cattle. Its feed mill, in the background, produces about 150 tons of feed per day.



## Taking the bumps out of feedlot feed production

facility. "Corn coming into our yard ranges from 13 to 17% moisture, and the system raises the moisture to 21% before it enters the steam chest," he says. "The process puts a lot more ease into the corn and softens it up for processing." The main benefit of using a surfactant rather than only water is that the outer covering of grain tends to repel water. Water may take 3-4 hours to soak into the grain. With a surfactant, the grain absorbs water in about 30 minutes.

The "ease" that McCaffery is referring to is the tendency of a kernel of corn to break into three or four pieces instead of shattering into powder. Larger pieces of corn result in more consistent textured rations. This aids palatability and reduces digestive disturbances in cattle, says John Alley of Cattleman's, Inc., a 30,000 cattle feedlot in Turon, KS.

Jern Kjerstad, manager of a 9000 head feedlot in South Dakota uses a patented moisture control and surfactant system to treat grain prior to dry rolling. He says that since his operation began controlling moisture and adding the surfactant, feed conversion has



Feed mill operator, Leland Husley checks a batch of steam flaked corn. The corn was treated with surfactant and the moisture content was standardized to a predetermined concentration.

improved. Also, the operation's energy use dropped more than 20%. Equipment maintenance costs have dropped. He says that moisture control and the addition of the surfactant has doubled the interval between having to sharpen the rolls on the roller mill.

The moisture control and surfactant addition system can be adapted treat-

ing a continuous flow of whole corn or batches of ingredients prior to pelleting.

### Making grain moisture uniform

The electronic monitoring device continually checks the moisture content and mass flow of the grain as it enters the processing area. Combining these measurements with the target moisture content previously determined by the operator or feedlot manager, the system calculates the volume of surfactant and water solution necessary to achieve the target moisture content. The process control computer in the system then adjusts the flow of solution until the computed rate matches the flow rate measured by the flow meter.

If either the mass flow of grain or its moisture content change, the application rate of the surfactant solution is adjusted accordingly. An alarm is necessary to signal workers if the grain flow or solution flow stops or becomes extremely low. The system not only monitors the moisture content on-line but also records the total amount of grain treated and solution used. This information is useful to calculate overall feed production costs. **RM**