

Pelleting

Monitoring and data collection during the pelleting process

- *Steam conditioning*
 - The way in which feed moves from the feeder through conditioner is determined by paddle tip angle and speed.
 - Evaluation of conditioners to clean and examine feed build up should be done weekly or more frequently, depending on pelleting tonnage.
 - A continuous flow of feed is important for equal distribution of steam. Steam traps should be checked and cleaned weekly.
 - To maintain steam quality, steam traps should be placed every 100-ft in the steam line and right before entering the conditioner. Excess steam condensation will introduce too much moisture into the mash feed.
- *Mash conditioning targets*
 - Target total added moisture is 17 to 18% when mash feed hits the die and 180 to 200°F conditioning temperature for typical corn-soybean meal diets.
 - Lower conditioning temperatures are needed to pellet more complex nursery diet formulations but will increase frictional heat, require more energy, decrease throughput, and increase die wear.
 - In general, for every 25°F temperature increase there is 1% moisture added to the feed in the conditioner.
 - Above 18% can cause pellet mill plugging but may vary depending on pellet mill specifications.
- *Achieving conditioning temperature*
 - Conditioning temperature should be achieved by a steam regulator and flow control valve.
 - A steam regulator (i.e. cospect valve) will regulate the pressure at the flow control valve.
 - The flow control valve will regulate the amount of steam in the conditioner.
- *Conditioner retention time*
 - The conditioner retention time is influenced by conditioner length, pick angles and speed by use of variable frequency drives, based on production rate.
 - Longer conditioner retention times can improve pellet quality by increasing heat and moisture absorption but decrease pellet mill throughput.
 - The length of conditioner retention time is determined by the ingredients included in the diet formulation and their ability to absorb water.
 - A typical corn soybean meal-based finishing diet will require a longer conditioner retention time than a nursery diet containing large amounts of dried milk products.
 - There are 3 options when considering measuring conditioner retention time: 1) amp load, 2) corn/dye method, or 3) weighing entire conditioner contents.
- *Dies*
 - To monitor die performance, tons per die, hours of use and die specifications should be recorded with each pelleting run.
 - Higher throughput pellet mill dies should be inspected weekly checking for uneven die wear.
 - Indications that a new die is needed include - the rolls no longer make any contact with the die, poor pellet quality with excessive fines, or the die is damaged.
 - Prior to die placement, bolts and clamps should be inspected and replaced if the die is new.
 - After each run, dies should be inspected for tramp metal to protect the die from corrosion.

- *Pellet cooling*
 - Air flow, feed bed depth and uniformity, air and pellet temperature, relative humidity, pellet size and density, moisture content, pellet quality and time spent cooling will determine rate and uniformity of cooling.
 - **Create an even bed depth with pellets evenly distributed inside the cooler for uniform air flow and drying capabilities.**
 - Thicker diameter and density pellets require a longer cooling time and air flow to allow moisture to migrate to the surface for drying.
 - Accumulation of fines in the cooler will reduce airflow by pulling fines into air flow ducts, therefore duct work, fans and belts should be inspected in cleaned weakly.
- *Post pellet liquid application*
 - Liquid ingredients can be applied via spray nozzles or spinning discs.
 - Liquid should be applied by weight to the pellets with a 360-degree uniform coating of material.
 - There should be uniform distribution, and an even flow of feed.
 - **Liquid meters should be checked quarterly for accuracy which can be accomplished with a bucket test.**
 - When applying liquid to already cooled pellets, a stand-alone system of a sprayer in a screw or conveyor system is an option. Even so, a continuous flow of pelleted product is required for even and accurate application from either system.
 - Weekly cleaning and maintenance of the system should be scheduled to ensure appropriate application.