



NURSERY MANAGEMENT GUIDE



Products and answers that work®

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Hubbard Feeds helps swine customers optimize their nursery performance by providing cost-effective nutrition programs that meet or exceed customer expectations.

GUIDE SUMMARY

Preparation and biosecurity

Animal care — daily, weekly and monthly routines

Early pig care

Feed and nutrition

Feed quality

Water quality



SECTION 1: PREPARATION AND BIOSECURITY

Providing the proper environment for the newly-weaned pig improves the health status of the pig, lessens the stress of weaning and improves performance. Below is a list of items to consider when preparing for a new group of weaned pigs.

Cleaning and disinfection

It has been well-established that animal performance is increased in a clean vs. a dirty environment. The nursery pig is more susceptible to infections from enteric organisms, so sanitation is especially important for nursery facilities.

1. Thoroughly clean the room and entryway with a high-pressure washer using hot water and a detergent. Thoroughly wash floors, walls, ceilings and curtains. Clean all equipment, including feeders, fans, fan blades, housing, shutters, heaters and floormats. Include equipment such as sort boards, rattle paddles, shakers, boots, gruel pans and carts.
2. Pay close attention to commonly missed areas during sanitation, such as gate feet, fan inlets, floor joints and cracks, chutes, syringe and bottle holders, medication totes and hand tools used in the barn.
3. Disinfect all exposed areas, such as floors, feeders, mats, walls, ceilings, entryways, loading chutes and storage rooms. Disinfect equipment kept outside of the room that potentially came in contact with pigs, such as lamps and carts. Disinfectants should be selected based on label claims, effectiveness and veterinarian recommendations.
4. Flush out the water lines and nipples using a solution of bleach or citric acid or another recommended cleaner. Run water through the lines after using the cleaners. Check screens in the nipples to make sure they are not plugged. Poor water quality can reduce intake, lead to scours and decrease performance.
5. The room should be dry and warm before pigs arrive. All equipment, such as feeders and mats, should also be dry. Set the temperature according to manufacturer guidelines. All heaters should be fully operational and functioning correctly. Make sure slats are warm.
6. When needed, place supplemental heat and comfort mats in the pens before pigs arrive.
7. Adjust pit fans to provide enough air flow for minimum ventilation, avoiding excessive airflow that causes chilling or excessive heater operation. Check all air inlets for obstructions and make sure they are fully operational. Set the ventilation rate at the minimum for newly-weaned pigs. Seal up any areas that might cause drafts.
8. All rooms or buildings should pass a pre-pig inspection prior to pig placement.

Maintenance between turns

1. Grease all pulleys and gears.
2. Reset all backup devices, being mindful of upcoming changes to ventilation parameters.
3. Test ventilation equipment after cleaning.
4. If appropriate, winterize the site.
5. Review ventilation probe accuracy.

Biosecurity principles

Biosecurity involves the implementation of preventative measures in order to avoid the introduction of, and/or to contain the spread of, infections and diseases on farms. With the increased troubles associated with the transmission of highly infectious pathogens, farm biosecurity is especially critical for farm productivity.

1. Pig transportation
 - a. It is important to recognize that animal movement between farms represents a significant risk for disease spread.
 - b. Consider taking proactive measures to limit certain pathogens from spreading, both when pigs arrive at and depart from the nursery facility.
2. Feed delivery
 - a. Appropriate protocols are needed for feed delivery, as feed trucks and their drivers may carry pathogens from farm to farm.
3. Mortality removal
 - a. Dead pigs should be removed from the facility as quickly as possible.
 - b. Consider the placement of dead pig bins and the risk posed by rendering trucks, which have often visited other farms.
4. People
 - a. Farm workers and visitors should be considered a potential source of pathogen spread.
 - b. Implement appropriate strategies to reduce the likelihood that people will spread pathogens.

Pest control

1. Animals, including rodents and birds, are a major vector for disease transmission.
2. To control these pests, PIC recommends taking the following measures:
 - a. Use outside bait stations and have them checked and filled on a monthly basis.
 - b. Maintain a 3-foot rock perimeter to minimize vegetation against the building.
 - c. Weeds and excess vegetation should be routinely mowed and sprayed and maintained below a height of 4 inches.
 - d. Remove unnecessary clutter or debris to eliminate potential areas of harbor.
 - e. Put bird netting in place and keep it well-maintained to prevent birds from entering the premises.
3. Fly and insect control
 - a. Some producers consider flies a normal and unavoidable consequence of pig production; however, large insect populations can have many negative impacts on animal health and welfare.
 - b. Flies can carry pig pathogens, including *E. coli*, *Salmonella*, *Brachyspira* (swine dysentery), *Lawsonia* (ileitis) and tuberculosis.
 - c. Cockroaches can spread *Brachyspira* and PCV2.
 - d. The natural tendency of insects to wander — combined with their ability to fly distances of several miles — gives them the potential to spread disease between separate farms.
 - e. Monitor the fly and insect populations throughout the year; do not wait until fly numbers are at unacceptable levels before trying to reduce them.

SECTION 2: ANIMAL CARE — DAILY, WEEKLY AND MONTHLY ROUTINES

Daily routine

- Make sure you allocate the proper amount of time in your daily routine to accomplish all of the tasks involved in pig care.
 - Individually evaluating each pig within the facility takes approximately 2 seconds per head, or approximately 30 minutes per 1,000 head.
 - To properly evaluate water, feeders and ventilation, and to perform associated tasks, plan on spending 1 hour per 1,000 head.
- Animal-care workers must enter pens daily to conduct a proper pig evaluation and verify water and feed availability.
- Workers should be equipped with the tools that support efficient care, including:
 - Syringes, medication and needles
 - Marking devices (aerosol or paint sticks)
 - A pen and notebook
 - A hydrometer and thermometer (to check humidity and temperature)
 - Potentially a panel (sorting board) to sort ill or injured pigs
- Evaluations include:
 - Identification of ill or injured pigs to treat or remove to a hospital pen
 - Evaluation and adjustments to produce proper water flow and feed pan coverage
 - Recording of daily water consumption and temperature variations (highs and lows)
 - Evaluation of humidity and airspeed to determine modifications in ventilation strategy
 - Recording the number of pigs treated, noting associated medication and dose
 - Daily evaluation of feed inventory and associated intake to predict upcoming feed orders
 - Making sure fans and heaters are appropriately functioning to produce optimal environments

Weekly routines

- Evaluate daily data to understand trends or patterns relating to:
 - Water intake
 - Health changes
 - Feed intake
 - Utility use (liquid propane levels, heater runtimes, temperature probes)
 - The availability of proper back-up devices (heater back-up thermostats, fan back-up thermostats, curtain drop thermostats, high/low alarm thermostats)
 - Visitor logs
 - Biosecurity of the site — clean showers, entryways and associated equipment
 - Biosecurity and cleanliness of mortality disposal equipment or compost management

Monthly routines

- Test emergency devices
 - Curtain drops
 - Alarms
 - Back-up heaters and fans
 - Generators, if available
- Monthly maintenance
 - Grease bearings
 - Check fan belts
 - Clean temperature probes
 - Check for sagging curtains or inlet repairs

SECTION 3: EARLY PIG CARE

The objectives of early pig care are to:

- Stimulate and maximize feed intake post-weaning
 - Provides necessary nutrients during a highly energy-dependent stage
 - Initial diet has important impact on gut structure
- Achieve optimized production levels relating to losses (1% nursery mortality)
 - Reduce losses due to failure-to-thrive syndrome
 - Control and treat secondary infections
- Accomplish optimized nursery average daily gain (ADG) and feed conversion (F:G) levels; ADG=1.00, F:G=1.3
 - Improve overall cost of production

Different strategies of care are required for varying health statuses. The following are several factors to consider for highly health-challenged pigs, as well as healthy pigs, based on the results relative to the goals.

- Optimal temperature and humidity
 - Health-challenged pigs require warmer room temperatures and humidity control, resulting in elevated utility costs.
 - Workers should be highly sensitive to humidity and environmental changes within the barn.
- Effective timing and efficient application of critical care
 - Challenged pigs require intensive and frequent husbandry. Be prepared to increase the labor effort and oversight accordingly.
- Use of gruel-feeding strategies and equipment, to which health challenged pigs respond favorably.
- Facilitation of communication among all levels of the production team. Reaction time to achieve the best results is critical.
 - Weaned pigs' progress can change rapidly, and producers should respond quickly.
 - Critical personnel include the veterinarian, field person and producer.

Receiving

Before pigs are received, conduct an audit to ensure the cleanliness and the biosecurity of the site.

- If given the opportunity, it is ideal to receive pigs directly off the sow (preferably, from a single-sow farm). This minimizes staging nursery requirements when used in combination with a twice-per-week weaning strategy.
 - The basis of this recommendation is that multiple weaning events create added stressors. The goal is to achieve stable health status within the barn quickly.
- Space requirements:
 - PIC recommends a minimum of 2.8 sq ft per weaned pig until the pigs reach 50 pounds.
 - During the extended nursery period (50–75 lbs.), allow 3.65 sq ft/pig.
 - For health-challenged pigs, maximizing the allotted square footage (+6.5 sq ft/pig — W-F facility) when given the opportunity is preferred.
 - This practice can have a significant impact on mortality and morbidity.
- The facility should be fully warmed to the desired room temperature.
 - Health-challenged pigs often require a 5-degree increase in desired room temperature.
 - If brooders are in use, mat temperatures should be at 95°F and dry upon arrival.
 - This process may require reduced minimum ventilation and the activation of heaters and brooders 4–6 hours prior to arrival.

- Inventory within pens:
 - A strategy should be utilized to allow ample space to pull pigs from the general population into a specific intensive-care area.
 - The intensive-care area should be located toward the center of the barn, thus minimizing temperature variation throughout the day.
 - Removals from the general population should take place at different times:
 - At placement, any challenged piglets should immediately be placed in intensive-care pens.
 - During daily observations, animals with compromised body condition should be moved to the intensive-care area for both treatment and gruel feeding.

Smalls

Sorting lightweight and low-body-conditioned pigs on wean day into a separate hospital pen improves their likelihood of success. The smaller the average pig's wean weight is, the greater the number of pigs that will need to be sorted.

- Prioritize the most digestible and palatable feed that is budgeted or available in your feeding program.
- Remember to reserve the next budgeted diet so that "smalls" do not get skipped over while general population pigs consume this diet.
- Normal stocking density and feeder space apply.
- Keep gruel pans near waterer or feeder and away from sleeping area to ensure pigs stay dry.
 - Wash and clean gruel pans in alleyway to ensure pen space stays dry.
- Ideally, smalls should be placed in an area of the barn that has few drafts and can utilize a supplemental source of heat, like brooders.

Ventilation

The critical components of ventilation include:

- Desired room temperatures
 - Health-challenged pigs require a 2–5-degree warmer barn
- Humidity control
 - It is critical that the humidity remains below 65%
- Warm and dry mats

PIC generally recommends 2 CFM/pig at placement; however, in the case of PRRS-positive pigs, it may be necessary to remove air at a higher exhaustion rate to achieve less than 65% humidity.

- Brooders should produce temperatures around 95°F directly beneath them. Pigs should remain warm, dry and comfortable.
 - To accomplish this, use properly functioning brooders and ample mat space (0.4 sq ft/pig).
 - An example of warm and dry pigs with ample mat space is pictured at the right.
 - If mats become wet or caked with feed or manure, flip mats over to regain a dry, black surface that effectively absorbs heat.
 - Mat temperatures may need to extend beyond 95°F to accomplish pig comfort.



- Brooders should be in place and functional for 14–21 days, depending on pig comfort and the severity of the disease.
- Brooders should be in place within intensive-care pens throughout the grueling period.

Pen walking

Pens should be walked daily to:

- Look in each feeder to ensure the feeder has the proper amount of feed and that it is clean.
- Look in the trough of each feeder to ensure that feeder is adjusted correctly and that there is the correct amount of pan coverage.
- Inspect the floor of the pens for excessive wetness, accumulation of manure and signs of diarrhea.
- Inspect each pen for damaged or bent rods that could injure pigs by sticking out into the pen.
- View every pig from snout to tail, head to toe; rule of thumb is to spend 2 seconds per pig.
 - Identify and pull fall-behinds.
 - Identify, pull and treat sick pigs.
- Check water flow rates.
- Mat feed.



Properly adjusted feeder — meal feed



Properly adjusted feeder — pellet feed.

Photos provided courtesy of Kansas State University.

Managing fallback and sick pigs

Starting weaned pigs is the most critical task in a wean-to-finish production. Pigs that start well tend to experience rapid growth and improved feed conversion unless presented with significant health challenges. Unfortunately, the opposite is true in pigs that start tough, who tend to be a challenge all the way to marketing. One of the most common challenges in hard-starting weaned pigs is identifying sick pigs vs. starve-out pigs. Medications are beneficial to sick pigs but do not provide calories to starve-out pigs. Correctly identifying the root cause allows for proper management.

Identifying sick pigs

Observe each and every pig individually every day. Identify and treat sick pigs at the direction of your veterinarian. The first 14 days post-weaning is a crucial time to find hard-starters.

- **Respiratory diseases**
 - Pigs may exhibit coughing, thumping, open-mouthed breathing or depression
- **Scours**
 - Pigs may have loose stool, inflamed rectums or feces staining the back legs
- **Lameness**
 - Pigs may be unwilling or unable to stand up, limp when walking and have swollen joints or swollen legs
- **Strep**
 - Pigs may appear uncoordinated, tilt their head, walk in circles or be down-paddling

Identifying fallback pigs

Sick or “starve-out” pigs should be moved to a hospital pen as needed upon inspection. These pigs should be restarted and pulled into a fresh pen and provided with additional nutrition, including gruel feeding and mat feeding.

- **Lost body condition score**
 - Watch for pigs with a visible spine, hip bones or ribs
- **Gut fill**
 - Identify pigs that have sunken-in flanks
 - Hold the pig upside down by its back legs and place your thumb over the pig’s back and your fingers over the pig’s abdomen, squeezing your fingers toward your thumb to evaluate gut fill
 - If your fingers easily depress the abdomen, the pig is off feed
 - If abdomen is full, with plenty of resistance, feed intake is adequate

Gruel feeding

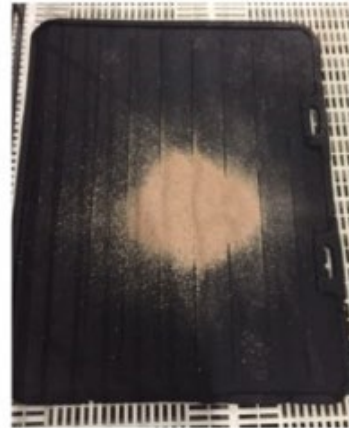
- At placement, it is preferable to supply gruel feed to each weaned pig for the first 2–3 days.
 - Each pen should have a 3-gallon pan per 15 heads or utilize a PVC trough, allowing 3 inches of bunk space per pig. (45-head pen requires a 5½-ft. canoe per pen — 4–6 inches (PVC).
 - The recipe for gruel feeding (per 15 pigs):
 - 24 oz. of water and ½ lb. of feed
 - Gruel feeding should be applied 4 times per day for maximum results
 - Gruel feed is properly calibrated when the pigs consume all of the mixture within the hour
 - This step is highly labor-intensive but is a positive step in early acclimation to a new environment for an already challenged pig. Field results have shown positive economic and performance results.
 - Gruel feed within intensive-care pens for 7 days.
- As intensive-care pigs recover and improve body condition, an evaluation should be made 3 times per week. Recovered pigs should be moved to a graduation area free of gruel feeding.

Examples of gruel feeders



Mat feeding

- The goal of mat feeding is to stimulate the activity level of the pigs and act as a “dinner bell” to eat.
- The transition from a sow’s 20–24 lactation events per day to an ad-lib environment sometimes challenges piglet feed intake.
- Consider mat feeding for a minimum of 7 days post-weaning.
- Schedule
 - Mat feeding should take place:
 - At the beginning of morning chores
 - At the conclusion of morning chores
 - Noon
 - With evening chores



SECTION 4: FEED AND NUTRITION

Hubbard pig starters provide the proper balance of complexity and fortification for specific ages and weights of pigs. The unique, research-tested combinations of protein products and amino acids result in improved weight gain and feed conversion. Steam-rolled oats and milk products offer highly digestible carbohydrates. Feed intake enhancers promote greater feed intake. Probiotics, prebiotics and other nutritional additives enhance the growth of beneficial gut bacteria, decrease gut upsets and improve the gut environment for the digestion and absorption of nutrients. Each program is designed for smooth transitions at weaning and between nursery phases.

Hubbard Feeds nursery programs:

First Course and Lean Start: These are pre-starters that are formulated to minimize pig variation and maximize pounds of pork produced in the nursery when health and management conditions are constrained.

Powerstart: The Powerstart program is designed for pigs weaned at 19 days of age or older and weighing 13 pounds. It contains a less complex diet for older pigs but still provides the right blend of nutrients for fast, efficient gains.

Powerstart Solo: Powerstart Solo is a unique, single-phase diet formulated for pigs weighing a minimum of 13 pounds and fed until pigs reach 25 pounds. It contains a blend of ingredients that provide the optimal level of nutrient complexity to assist young pigs as they transition to dry feed at weaning and continues to provide the proper formulation as pigs age.

The Hubbard nursery program provides several proven technologies from Alltech® designed to maintain gut health and integrity and to support overall performance.

Powerstart Multi-Stage nursery program

Diet	Initial weight	Final weight	ADG	F:G	Feed/pig (lb)	Days on feed
Lean Start 2	11	13	0.30	1.0	2.0	7
Powerstart 19/13	13	16	0.40	1.0	3.0	7
Powerstart 25/16	16	25	0.75	1.33	12	12
Powerstart Nursery Premix	25	50	1.35	1.75	42	18.50

Powerstart Solo Single-Phase nursery program

Diet	Initial weight	Final weight	ADG	F:G	Feed/pig (lb)	Days on feed
Powerstart Solo	13	25	0.53	1.25	15	23
Powerstart Nursery Premix	25	50	1.35	1.70	42.50	18

Benchmarking:

The following chart is a guideline on expected performance for pigs in a broad range of health and management scenarios.

Weight range, lbs	Gain, lb./d	Intake, lb./d	Feed:Gain
10–13	0.25–0.40	0.35–0.50	1.00–1.20
13–16	0.40–0.65	0.65–0.78	1.10–1.30
16–25	0.60–0.85	0.95–1.20	1.20–1.40
25–40	0.80–1.10	1.45–1.80	1.50–1.70
40–60	1.10–1.40	2.20–2.90	1.80–2.20

SECTION 5: FEED QUALITY

Providing a high-quality feed to pigs involves many aspects along the production chain. It starts with ingredients that are of high nutrient value and free of contaminants. Processing, delivery and storage of the diets can also affect the quality and final composition of the feeds. Understanding the factors that affect feed quality and implementing a quality-assurance program will help ensure that the best possible nutrition is delivered to the pigs.

Test weight:

Corn weighing between 40 and 55 lbs/bushel will produce the same weight gain in finishing pigs as corn with a 56-lb/bushel test weight when compared on an equal moisture basis. A reduction in feed efficiency can be expected when test weight is reduced more than 10%. When test weight drops below 40 lbs./bushel, growth rate and feed efficiency may decrease by 5–10%.

Light test-weight grains have a lower bulk density than normal grains, which makes it important to add grains to the diet according to weight, not volume. Lightweight grains also contain more fiber and less oil, so they tend to be dustier during the grinding process. They may also cause bridging problems in bulk bins. It will take more bin space to hold the same weight of lightweight corn, so additional bin space may need to be added to accommodate that.

Mycotoxins:

Environmental conditions that place stress on grains may also cause those grains to be susceptible to mold growth. However, it's important to remember that it's not the mold itself that causes performance problems; rather, it's the mycotoxins the molds produce that cause the negative effects. The mycotoxins that are of primary concern in swine diets include aflatoxin, zearalenone, vomitoxin or deoxynivalenol (DON) and fumonisins.

Mycotoxin	Negative effects	Level of concern
Aflatoxin	Immune system suppression Reduced growth performance	200 ppb in finishing diets 100 ppb for growing pigs
Zearalenone	Red, swollen vulvas in prepubertal gilts Reduced reproduction performance	1 ppm for grower diets/3 ppm for finishers 500 ppb for replacement gilts
Vomitoxin	Feed refusal; decreased ADG	1 ppm
Fumonisins	Respiratory problems	5 ppm

Mycotoxins can have an additive effect. The levels of individual mycotoxins may be not be high enough to cause concerns; however, the combination of multiple mycotoxins, even at low levels, can have a significant effect. Drying the grain and adding mold inhibitors to mycotoxin-contaminated grains will decrease any further mold growth but will have no effect on the mycotoxins already present.

Particle size and grind

Grinding grains for swine diets improves feed utilization. By reducing the particle size, the surface area of the grain particle is increased, which allows for greater interaction with digestive enzymes. Swine feed efficiency is generally improved by 1% for each 100-micron reduction in particle size, from 1,000 microns down to 400 microns. As micron size decreases, the cost of grinding increases and mill throughput decreases. Taking into account improvements in feed efficiency, processing costs, incidence of gastric ulcers and the potential for feed bridging, the

recommended particle size for meal diets is between 650–750 microns.



The photo above illustrates corn ground to various particle sizes.

Hammermill vs. roller mill

The most popular grain processing options are the hammermill and the roller mill. Hammermills are effective at grinding an array of feedstuffs and are capable of producing a wide range of particle sizes. In comparison to roller mills, hammermills are noisier and generate more dust and heat during the grinding process while also consuming more energy.

Roller mills generate less noise and dust and provide a more uniform particle size/grind, which may improve digestibility and feed flowability. However, roller mills require more oversight to maintain a gap with that will produce the targeted particle size. This gap changes as rollers wear and grain qualities change. Hammermills require less oversight, by comparison. However, most swine farms prefer roller mills, given the more uniform particle size and improved flowability, which potentially reduces the incidence of feed bridging in bins and feeders and, subsequently, out-of-feed events. Many swine farms that utilize roller mills are decreasing ground corn to 500–600 microns. The improvement in feed efficiency needs to offset any increased incidence of feed bridging.

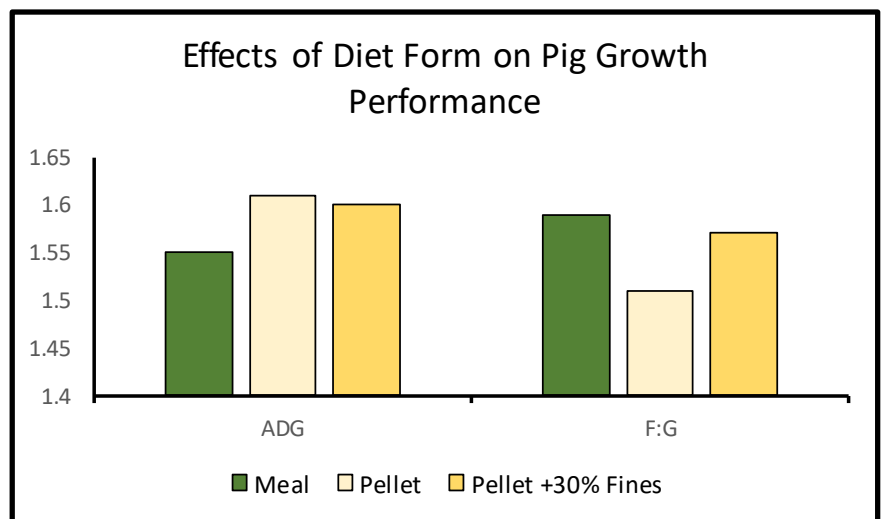
Pelleting

Pelleting diets is an effective way of improving feed efficiency in all phases of swine production. In addition to enhancing performance, pelleting decreases diet segregation and reduces dustiness and issues with feed bridging. Multiple studies conducted by Hubbard Feeds have consistently shown a 5% improvement in ADG and a 6% improvement in feed efficiency when healthy nursery pigs were fed pelleted vs. meal diets. To maintain the feed efficiency benefits of feeding pelleted diets, pellet fines must be minimized. Since having zero fines in swine diets is not realistic, Hubbard conducted a study looking at the performance of pigs fed pelleted diets compared to pigs fed pellets that contained fines to determine at which level fines would be detrimental to performance.

Results of that trial are shown to the right and indicate that performance benefits associated with pelleting diets were lost when pigs were fed pelleted diets with over 30% fines. These findings indicate that some fines can be in the pellets and not affect performance.

Good Manufacturing Practices (GMP)

Quality ingredients and manufacturing processes are the key components of any nutrition program. The FDA has established guidelines and standards for Good Manufacturing Practices (GMP) for animal feeds that must be followed by all feed mills. Good manufacturing practices are the backbone of a good quality control program. They are designed to ensure proper usage of feed additives and prevent feed contamination. Providing a residue-free supply of pork for human consumption is extremely important. The Food Safety Modernization Act (FSMA) will provide more direction on manufacturing and producing safe feed for animals intended for human consumption.



Sampling ingredients and finished feeds is an integral part of any quality assurance program. Working with a reputable supplier of ingredients can help ensure that quality expectations are met. Yearly maintenance tasks, such as a mixer uniformity tests, can help uncover potential problems before they occur. Keeping retainer samples of manufactured feeds is a good practice so, if questions arise, the feed sample can be sent off for analysis.

Ingredient storage and shelf life

To prolong ingredient shelf life and quality, follow these guidelines:

1. Keep ingredients at a cool temperature or avoid excessive heat.
2. Keep ingredients dry to prevent mold and bacteria growth.
3. Prevent rodents and insects from entering the feed.
4. Use antioxidants to preserve fats and oils in ingredients and feed.
5. Rotate stock and pay attention to expiration dates.

Feed delivery

Delivery of finished feeds is an important part of GMP. Sequencing the unloading process to make sure non-medicated feeds are unloaded first can prevent drug residues. Flushing between medicated feeds can also help prevent residue concerns. Proper identification of bulk bins can reduce the chance of unloading feed into the wrong bin and potentially creating drug withdrawal concerns for pigs near market weight.

Feed Quality FAQs

Q: I want to take samples of my feed. What's the best way to do that?

A: In order to get the most accurate feed analysis, it is important to take multiple samples of a single batch of feed to ensure that you are getting the most representative sample. Taking samples of feed as it's being discharged from the auger to the bulk bin is one of the most convenient ways to obtain samples. Another option would be to take probes from each feeder. Regardless of sample location, subsamples should be combined together to create one large sample. A small, representative sample can then be taken and stored for later analysis or sent to a lab.

Q: Where can I find more information on GMP and FSMA?

A: More information on FSMA can be found on the Food and Drug Administration website at <http://www.fda.gov/fsma>. The American Feed Industry Association (AFIA) also has a number of resources for feed manufacturers on their website, www.afia.org.

SECTION 6: WATER QUALITY

The quality of water and the amount consumed is extremely important in pork production, but unfortunately, it can also be one of the most overlooked aspects of production. Pigs that don't drink enough water won't consume enough feed.

Water intake considerations

- Water is the first limiting nutrient — far above energy, amino acids, vitamins and minerals.
- The cost of water acquisition, along with the storage and disposal of wasted water, has led to a need for a greater understanding of the water availability needs of the pig.
- Water consumption has a distinct pattern based on the feeding period when nose-operated drinkers are used.
 - Peaks two hours after the morning feeding period and one hour after the afternoon feeding period
 - The greatest water usage occurs in late afternoon and early evening
 - Having an adequate number of drinkers, along with sufficient water pressure, is key to water intake
- The type of drinker affects water usage and wastage.
 - 14% decrease in manure volume with swinging drinker vs. gate-mounted nipple drinker
 - 25% decrease in water usage with steel bowl drinker vs. swinging drinker
 - Manure quality and ease of handling can be positively affected by reducing water wastage into the pit. With less wasted water ending up in the pit, nutrients are more concentrated, reducing the application expense and increasing storage capacity.
- The general recommendation is to limit water pressure to 20 psi in drinking supply lines.
 - Reduces wastage and makes delivery devices (paddles, nipples) easier to use
- Daily water usage is a good indicator of pig health.
 - When water usage drops for 3 continuous days or drops by more than 30% in one day, this may indicate that a potential health challenge is occurring

Water quality guidelines

Below is a table that lists the most common components that are evaluated in a water quality test, as well as the acceptable guidelines.

Component	Caution level
Calcium	150 ppm
Chloride	500 ppm
Hardness	20 grains/gal
Iron	0.3 ppm
Magnesium	80 ppm
Manganese	0.5 ppm
Nitrate	50 ppm
pH	<6.5, >9.0
Sodium	150 ppm
Sulfate	300 ppm
Total dissolved solids	1,000 ppm

Water requirements

Below are guidelines for the proper drinker height, flow rate and daily water consumption for wean-to-finish pigs.

Pig weight	<12 lbs	12–30 lbs	30–75 lbs	75–150 lbs	150–Market
Nipple height (in)	4 to 6	6 to 12	12 to 18	18 to 24	24 to 30
Pigs/nipple	10	10	10	12 to 15	12 to 15
Flow rate (cups/min)	2/3	1	1 ½	2	3
Daily intake (qts)	0.2 to 0.5	2 to 4	4 to 6 (1–1 ½ gal)	5 to 10 (1 ½–2 ½ gal)	6 to 18 (1 ½–4 ½ gal)

Water quality FAQs

Q: How can I tell if my pigs are getting enough water?

A: Using the table above will give broad guidelines on where the water usage should be depending on the size of the pig. The best way to determine if pigs are receiving adequate water is at the slat level. Observations should be made when pigs are active and undisturbed by chore activities. If there is a line greater than three pigs at the water source during an active period, water is limiting. Water demand in the summer increases because of the extra water pigs need to drink in order to stay cool and hydrated. Also, the pigs' active periods are reduced, causing higher demand on a water source during shorter time windows.

Q: Are there any obvious signs of water-quality issues?

A:

- Obvious signs of water quality problems can be observed by sight, smell and pig observation.
- Visual signs of poor water quality include off color, uncleaness or visual sediment in the water. In addition, heavy discoloration of equipment and walls around water sources can indicate high levels of manganese or iron.
- Poor-quality water can have a foul odor. This can indicate high bacterial counts or high levels of sulfur and nitrates.
- Pig observation can indicate water quality problems as well. One indicator of poor-quality water is if pigs refuse water upon initial entry into a site. In addition, when pigs scour without any pathogen present, this indicates poor-quality water.

Q: I think I have a water-quality problem on my farm. How can I get my water tested?

A: In most cases, there are local labs that do water-quality testing in your area. Speak with your veterinarian or nutritionist for help with collecting water samples. New wells and existing wells should be tested on a consistent basis for water quality.

Q: What can I do to improve water quality on my farm?

A:

- Flushing water lines upon entry of new pigs to a site is a great practice that should be followed with every turn of pigs.
- Adding chlorine to the water decreases bacterial counts in the water and has been shown to increase water intake.
- Using low-cost acidifiers like citric acid decreases the water pH and inhibits bacterial growth.
- Utilizing a rural water system may be a good option if it is available in your area.