

PIC337RG Management Guide 2010



PIC

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Introduction

This publication provides a summary of farrow-to-finish management recommendations to optimize performance of PIC337RG sired pigs. Standards are based primarily on PIC management research and production experience.

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Benchmarking

Expected performance levels represent observed performance of PIC products in commercial situations. Intervention levels represent thresholds at which the assistance of PIC technical support should be considered.

Table 1. Expected levels of performance for PIC full-program products

Production Trait	Expected Performance	Intervention Level
Average Daily Gain		
Nursery, lbs/day (kg/day)	>1.0 (>.45 kg)	<.90 (<.41 kg)
Grow-Finish, lbs/day (kg/day)	>2.0 (>.91 kg)	<1.80 (<.82 kg)
Wean-to-Finish, lbs/day (kg/day)	>1.80 (>.82 kg)	<1.65 (<.75 kg)
Feed Conversion		
Nursery	<1.45	>1.65
Grow-Finish	<2.5	>2.8
Wean-to-Finish	<2.3	>2.6
Energy Conversion, ME kcal/lb (kcal/kg)		
Nursery	<2180	>2300
Finishing		>4200
Wean-to-Finish	<3800	>3900
Carcass Traits		
Market Weight, lbs (kg)	>270 (>122.47 kg)	<260 (<117.93 kg)
Carcass Yield, %	>76.5	<76.0
Carcass Weight, lbs (kg)	>206 (>93.44 kg)	<198 (<89.81 kg)
Back Fat, in (m)	<.70 (<.18 m)	>.80 (>.020 m)
Loin Depth, in (m)	>2.40 (>.061 m)	<2.30 (<.058 m)
Percent Lean, %	>55.0	<54.0
Defects, % of all Pigs		
Scrotal Hernias	<1.0	>1.5
Rigs (retained testicle)	<.25	>.5
Umbilical Hernias	<.5	>1.0
Transport Loss, %		
DOA's*	<.25	>.50
NAI/NANI's*	<.30	>.50
Mortality Plus Cull Rate		
Nursery	<1.5%	>3.5%
Finish	<4.0%	>6.5%
Wean-to-Finish	<6%	>8%
Pounds Marketed/Wean to Finish Space Per Year	>600	<550

*Refers to dead on arrival (DOA); non-ambulatory, injured animals (NAI); or non-ambulatory, non-injured, fatigued animals (NANI)

Market Weight Recommendations by Packer

- Based on individual input costs, flow restrictions, genetics, contracts, and preferred packer, PIC can assist in determining the ideal market weight for your system.

Farrowing Management

The current targets are to wean 12.0 piglets per farrowing with >13 lb (5.90 kg) average wean weight at 20-21 days of age. The goal is to wean >85% of the total piglets born.

Pre-Farrowing

- Room preparation is the key for success.
- Run farrowing rooms as all-in/all-out (AI/AO).
- Complete any repairs after the room is emptied.
- Clean and disinfect rooms between each use. Allow sufficient contact time for disinfectants to work and dry.
- Wash and disinfect mats carefully. If you have had scours on your farm, leave the mats overnight in a bleach solution or use disposable mats.
- Make sure all fans, heat lamps, nipple drinkers and feeders are functioning before loading.
- Load rooms 1-3 days prior to due dates. Feeding during this period can be ad libitum when using self-feeders. Sows will regulate themselves to an amount close to what they were eating in gestation. In hand-fed units, sows should be fed 3 lbs (1.36 kg) twice daily prior to farrowing.

Farrowing Induction

- In general do not induce:
 - When the farrowing process has already started (check sow behavior, milk ejection and contractions).
 - Before 115 days of gestation. Induction results in lower birth weight, higher pre-weaning mortality and lower weaning weight compared to non-induced piglets.
 - When there will not be people to assist sows and litters.
- Induction is a tool to increase the percentage of monitored farrowings. The target is to have two-thirds of sows induced to farrow during working hours.
If sows that farrow when labor is not present have similar or better results (in terms of stillborn rate and pre-weaning mortality) than sows farrowing during work hours you need to re-evaluate farrowing room protocols.

Farrowing Assistance

- Monitor older parity (P5 and older), lame, and over-conditioned sows every 20 minutes. Young and normal sows should be monitored every 40 minutes.
- Scrape manure from behind the sow daily starting the day prior to farrowing until day after farrowing and before a sow is sleeved.
- When sleeving, wear a lubricated plastic sleeve and introduce the hand in a cone shape. Be patient. Sometimes a piglet is close to being expelled and there is no need to reach deep into the reproductive tract. If there is no piglet low in the reproductive tract, wait 10 to 20 seconds to stimulate a contraction, which will sometimes expulse a piglet. If nothing happens, proceed with sleeving.
- Limit the use of oxytocin to sows that actually need it to support uterine contractions. The hormone can be properly used in exhausted sows, after eliminating the possibility that a piglet is blocking the birth canal. In general, it is unlikely you will need to use oxytocin in sows P5 and younger.
- When oxytocin is required, limit its use to no more than 2 injections per farrowing, at least 2 hours apart and no more than 10 IU each injection.
- Oxytocin injections are much safer when administered after the first half of the litter is born (thus, not before the sixth piglet is born).

Newborn Piglet Management

The micro-environment under the heat lap or on the heat pad should be 90-95°F. Piglet behavior should indicate that they are comfortable lying away from their dam and lying no more than 1½ pigs deep (heads on flanks, etc).

Dry off piglets as soon as they are born

- Use a cloth, paper towels, drying powder, a heated box or some combination to dry piglets. This will minimize lethargic piglets.
- Do at least two rounds of drying newborn piglets daily. Dry piglets first thing in the morning and last thing in the afternoon, before workers leave the farm.
- Drying piglets in the heated box is not split-nursing.
- Drying piglets will help piglets to stay warm and active until they get colostrum.

Split-nursing

- This management tool is the most effective way to control scours, reduce pre-weaning mortality, increase weaning weights and reduce weaning weight variations.
- Make it as simple as possible to be effective:
 - Never split nurse when piglets are still wet.
 - Split nurse in the morning for litters farrowed in the previous afternoon or night. Split nurse in the afternoon for litters farrowed that morning.
 - To initiate split-nursing, split the litter into two halves, put the heavier pigs in a heated box and leave the teats available for the lighter pigs. Typically, the heavier piglets were first born and took care of themselves so they had more opportunities to get colostrum.
 - Keep the two halves separated for 1.5 to 2 hours and then put all the piglets with their dam.

Light birth weight (<2 lbs. (.91 kg)) pig management

Pigs with birth weights less than 2 lbs (.91 kg) have a reduced chance of making full value market pigs. These pigs have a difficult time competing with their litter mates which puts them at a disadvantage post weaning. Some ground rules would be helpful to give them a chance to catch up with their heavier pen mates.

- As soon as all the piglets get colostrum and before the social order is established, create “light litters.” This means light litters should be created in the first 24 hours of the piglet’s life.
- Place 12 to 16 lightweight piglets on one P2 or P3 sow. Do not put them on a younger female unless you have a start-up farm or a parity segregation system using only P1s.
- Determine which sows should nurse light litters by counting and recording on the ID card the number of functional teats and ensuring they weaned no less than 11 piglets on their previous lactation
- Postpone any processing in the “light litters” for 3-5 days.
- If clipping teeth is part of the farm standard operation procedure, do not clip teeth in lighter litters at all. This will give the piglets more opportunities to compete and thrive.
- Light birth weight pigs should be weaned with their age group and not held back more than 7 days past the average wean age of the farm.
- Any of these pigs that do not meet minimum requirements of wean weight at this point should be flowed separately and not sent on with their wean group.

Optimize sow teats

- For the remainder of litters, load sows with no fewer piglets than their number of functional teats.
- Depending on the litter size of the farm, it may be useful to put the fall-behind piglets together 3 to 5 days after farrowing.
 - Be prepared to work with 5% of pigs as fall-behinds at that time.

Feeding Management in Lactating Sows

Feeding regimes vary by feed systems utilized. Regardless of the system utilized, the goal is to maximize feed intake, milk production, and litter growth.

Depressed feed intake will often be the first sign something is wrong with a sow. Some of the most common issues are:

- Illness in sow or litter.
- Room temperature (macro-environment) is too warm.
- Fresh water is not available.
- Feed inaccessible or not palatable (feed is moldy).
- Hoof lesions.

It is critical to identify any issues early. Monitor sows and litters closely, particularly in the first 2-3 days. Ensure every sow gets up, eats, and has access to fresh water every day. Implement treatments in sows and/or litters when needed. The sow will have a better chance of a successful lactation if issues are recognized and treated early.

Feeding management guidelines for hand feeding

- When hand-feeding, do not feed sows on their due date or if they show signs of farrowing. If farrowing has not started by that afternoon, feed 3 pounds (1.36 kg) as usual and continue with twice-daily feedings until farrowing begins. Stop feeding as soon as signs of farrowing appear.
- Day 2 (or one day after farrowing) feed 3-4 pounds (1.36-1.81 kg) divided into two feedings.
- On day 3 feed 6 pounds (2.72 kg) divided into two feedings.
- On day 4 give 8 pounds (3.63 kg) divided into two feedings.
- Starting on day 5 after farrowing, feed ad libitum.

Maximize sow feed intake as soon as possible after farrowing:

- Target an average feed usage of 14.5 pounds (6.58 kg) per lactation day in a 20-21 day lactation.
- Identify and treat ill sows as soon as possible. Uterine infections, gastric disorders and lameness will reduce feed intake, so be sure to implement the treatment recommended by your veterinarian. Ill sows result in decreased milk production and poor quality piglets.
- Take body temperature of off-feed sows. Increased body temperature the first 2 days post-farrowing is another indicator of infection. A body temperature of 103°F or higher should trigger antibiotic treatment.
- Keep sow macro-environment (room temp.) at 70-72°F during first 3 days (day 1 to day 4) and at 66°F after that.
- Set fan bandwidths 1° to 1.5° per each stage.
- Make sure nipple drinkers provide 0.5 gallons (1.89 L) of water per minute.
- To make sure sows will have feed available at night, be aggressive with the final feeding of the day. By the next morning, less than 50% of the feeders should be totally empty. As a rule of thumb, if your farm feeds the farrowing room three times daily, add 8 pounds (3.63 kg) every time the feeder has no feed left. In the best-case scenario, that means sows eat 24 pounds (10.89 kg) daily. This is not a limitation with self-feeders.
- Self-feeders or ad-lib feeders are a recent technology, which improves lactation feed intake (>7 to 10%) due to sows having fresh feed available continuously. Make sure feed is always in the tube since sows will be able to regulate their intake themselves. An additional advantage is labor otherwise spent feeding sows can be redirected to different chores.

Milk Production

- Challenge the P1 female with 13-14 strong piglets to properly develop and stimulate all mammary glands. Loading P1 females with preferably 14 good piglets and no less than 12 will ensure mammary gland development. Put runts on P2 or P3 sows.
- At least two-thirds of litters should stay with their own mothers.
- Minimize fostering after 24 hours of age.
- Use cross-fostering in a limited way. Frequent disruptions have a negative effect by making the sows nervous, which interrupts milk let-down.

Wean Age

A minimum wean age of 17 days is recommended with an average age of 20-22 days. PIC also recommends an average wean weight of 12 pounds (5.44 kg) with a minimum of 8 pounds (3.63 kg). Pigs that are younger or smaller than 17 days of age or 12 pounds (5.44 kg) require extra care and nutrition.

Castration

- Recommended castration technique to reduce infection and scrotal hernias:
 - o Tools should be kept clean and sharp.
 - o A sharp #12 hook scalpel should be used.
 - o Handle newborn piglets as little and as gently as possible.
 - o Castrate pigs by age, not by room. Pigs should be castrated between 3-5 days of age.
 - o Do not castrate a litter less than 118 days after insemination.
 - o Spermatic cords should be cut, **not pulled.**
 - o Incisions should be disinfected.



1. Inspect pig to ensure that it is not herniated



2. With a clean, sharp scalpel, make one incision over each testicle



3. Press the testicles up through the incision



4. Expose both testicles



5. Gently pull one testicle out just enough to expose the spermatic cord



6. Cut the cord even with the skin (**DO NOT PULL THE TESTICLE OUT**)

7. Repeat with the other testicle

8. Ensure that no cord is exposed and the incision is clean

9. Treat the incision with a disinfectant such as iodine solution.

Umbilical Cords



Umbilical cords should be dipped into iodine solution when wet. Cords should be clipped off at $\frac{1}{2}$ " in (.013 m) length from the body, when dry. This can help reduce infection and umbilical hernias.



Recommended Tail Docking Techniques

Tails should be docked at 1/4" (.006 m) length. Long tail length can increase tail biting later in finishing and short tail length can lead to infection.



Tools should be kept clean and sharp.



Tail should be cauterized or disinfected with iodine solution after docking.

Early Pig Care

The first week post-weaning is a critical stage in the pig's development. This week will impact performance for the rest of the wean to finish period. Tokach, et al., 1992, demonstrated growth during the first week post weaning will affect subsequent pig performance. In that trial, pigs that grew 0.5 pound (0.23 kg) per day the first week of weaning were 17 lbs. (7.71 kg) heavier at market compared to pigs that did not gain weight the first week. Early pig care starts at weaning whether the pig is placed in a nursery, wean-to-finish facility, or holding area.

Transport and Handling

To avoid injury and lameness, weaned pigs should be handled gently. Do not drop or toss pigs. Pigs should not be picked up or carried by the front legs. At loading and unloading there should be no gaps between chute and vehicle that can catch a pig's leg.

Trailers should be well bedded and ventilation should be set up for weather conditions before pigs are loaded. Provide 0.65 ft² (0.20 m²) of trailer space per pig.

The loading chute and chute area should be clean and dry. If pigs slip, some form of traction should be added. Weaned pigs should be handled with care. Injuries at this stage will reduce the overall number of full value pigs.

Placement

Facilities

All-in/all-out (AI/AO) by site is preferred. If AI/AO out by site is not possible AI/AO by barn is a minimum requirement.

Rooms should be cleaned, inspected and dry prior to placement. All clothing and equipment, as well as the office, should be cleaned between groups. Passive immunity to some pathogens begins to decline to very low levels by 3 weeks of age. Active immunity begins to build at 3 weeks of age; however an effective immune response will take time. It is critical to wash, inspect and dry the barn. Pathogens left by the previous group can present a challenge that newly weaned pigs are poorly equipped to handle.

Room and zone temperatures should be achieved 12 hours prior to pig arrival for minimum stress in the new environment. Maintenance on the barn should be completed prior to fill. Several weeks prior to close-out preparations for maintenance should be started.

Stocking density

At stocking, provide pigs with 2.8 ft² (.85 m²) of floor space per head up to 50 lbs (22.68 kg). Pigs heavier than 50 lbs. (22.68 kg) will be crowded at 2.8 ft² (.85m²). If space cannot be increased before they reach 50 lbs. (22.68 kg), initial stocking should take this into account. If pigs cannot be relieved prior to 50 lbs. (22.68 kg), pigs should be stocked at 3.5 ft² (1.07 m²) so they will have adequate space at weights greater than 50 lbs (22.68 kg). Generally 10% of the barn space should be reserved as hospital or fall-behind pens. Depending on the age, size, and health of pigs this space will need to be adjusted. Do not include this 10% in the barn square footage for initial pig placement.

Upon arrival, place pigs in a few pens and get an accurate count of pigs received. Pull or sort off the special attention pigs first. Once pigs are sorted, move the rest of the population into the appropriate pens for square foot recommendation. After sort is completed, give the pigs a 2-hour rest period to get acquainted with the new environment and pen mates. After rest, the next focus will be to ensure pigs have found water.

Table 2. Guideline for Recommended Square Footage per Pig

	Wean pig to 50 lbs (22.68 kg)	50 lbs to 75 lbs (22.68-34.0 kg)	75 lbs to 265 lbs (34.0-120.20 kg)	>265 lbs (>120.20 kg)
PIC337 Sired Pigs	Min 2.8 ft ² (.85 m ²)	Min 3.5 ft ² (1.07 m ²)	Min 7.3 ft ² (2.23 m ²)	Min 8.5 ft ² (2.59 m ²)

PIC Internal Research

- When the correct numbers of pigs have been placed in the pens, let the pigs rest so they can get familiar with their new surroundings.
- After a few hours check the waterers to see if the pigs have found water. To assist pigs in finding water, make sure it is readily available. For bowl waterers, test the nipple to make sure water is adequately filling the bowl. Another method is to tie the nipple open so it runs and the bowl stays full for 10 to 15 minutes. While the water is running, get the pigs up and walk them towards the waterer so they can get familiar with it. You may need to do this for the first two to three days post arrival.

Fill Time

The barn should be filled in as short a time as possible. An age spread of 7 days or less within a room or barn is preferred. If a longer age spread is unavoidable pigs should be placed so there is a maximum age spread of 7 days on a feed line. If the age spread is too large pigs may be either overfed or shorted on nutrients. If there is a greater than 14 day age spread within a common airspace (barn or room) the environment can be difficult to manage.

Sourcing

Filling a barn with pigs from a single source is recommended. Single-sourced pigs typically perform better than multi-sourced pigs.

If due to system constraints multi-sourcing is unavoidable, group pigs of similar health status. Design the system with enough flexibility that if a source farm's health status should change it can be flowed separately. Otherwise all pigs in the flow will be compromised by the one source farm.

Resources

Creep Area

Pigs should be provided with 0.5 ft² (0.15 m²) per head of mat space for a creep area. Mats should be placed under the heat source in the area of the pen that pigs prefer to lie. Mats should be removed when pigs no longer use them or when pigs begin using the mat as a dunging area, typically 2 weeks post placement.

Feeder Space

Wean pigs require a 5 inch (.13 m) feeder space. One space will accommodate 10 pigs. Thirteen inch (.33 m) holes in a typical finisher feeder will provide 2 wean pig spaces. This means a 5 hole feeder with 13 inch (.33 m) hole will accommodate 100 wean pigs up to 50 lbs. (22.68 kg).

Feeder Coverage

Fresh feed should be in the feeders when pigs are placed. The feed pan should have 50% coverage. Feed pans should be checked twice daily and cleaned of old, wet or soiled feed.

- 1st week 25%-50% of pan should be covered to keep feed fresh while pigs learn to use the feeder
- After 1st week 50% of pan should be covered.

Figure 1. Proper Nursery Feeder Adjustments



Feeder Type

Bulk feeders, whether dry feeders or wet/dry, feeders are recommended for growing pigs. If wet feeders are used, turn water off to feeder, as long as the pigs have a supplemental water source, so that the feed will stay dry and fresh for the first 1-2 weeks pigs are placed. Feeders should have a low lip of no more than 3-5 inches (0.08-0.13 m) in height so that pigs can access feed comfortably.

Supplemental small round feeders are recommended for the first 2 weeks placed. Pigs generally find these more comfortable and, they provide a communal feeding atmosphere.

Before ordering the first load of nursery feed, make sure the bulk bin is empty and does not contain leftover finishing feed. If there is leftover finish feed it should be removed. If this is not possible, transfer feed to one bin and feed the first three diets from the other bin prior to blending feed. Feeding a few pounds (kilograms) of finishing feed to weaned pigs will cause low feed intake, fall-behinds pigs and variation in the group. Clean the inside of the bins between every group. Prior to placing feed into the feeders, completely close the feeder settings and then move to desired position. Ensure all mechanics work on the feeder prior to feed arrival. Once feed is placed in feeder move the agitator for feed delivery to pan. This step is a final check that all pieces are working properly.

Water

Water intake is critical for weaned pigs. It is important that pigs find fresh water as soon as possible after placement. All water sources in the pen should be turned on. If possible have nipples opened so that they are dripping during the first 24 hours pigs are placed. There should be 1 nipple per 10 pigs or 1 bowl or trough waterer per 20 pigs. A good rule of thumb for height of nipple waterers is level with the shoulder of the smallest pig in the pen.

- <12 lbs. (5.44 kg) 4-6 inches (.10-.15 m) nipple height.
- 12-30 lbs. (5.44-13.61 kg) 6-12 inches (.15-.30 m) nipple height.

Let the water run just prior to pig delivery so water is cool. This practice is very important during the warmer months of the year as pigs will search out water first.

For the first three days post delivery one should move the pigs toward the water source to ensure all pigs have found the water. Check for dehydration during the first week of placement. Sunken-eyes or lack of moisture on nose are signs of dehydration.

Zone Heat

Zone heating should be adequate to provide 82°F in the creep area and 0.25-0.5 ft² (0.08-0.15 m²) per head of heated space.

Feed Management

Remember there are extreme nutritional changes occurring in the pig at the time of weaning. While on the sow, pigs are:

- Told when to eat by the sow.
- Given equally spaced small meals throughout the day.
- Conditioned to eat at the same time.
- Provided with a highly digestible milk diet.

At weaning, pigs are taken off of this nutritional program with little or no transition period and expected to adapt to a new program which includes:

- A dry meal or pelleted feed with different composition.
- Piglets telling themselves when and how much to eat.
- Unfamiliar feed delivery system which does not accommodate group feeding very well.

By carefully managing the nutrition and management of newly weaned pigs these challenges can be overcome.

Feed Quality

Weaned pigs should be provided a high quality starter ration providing for all nutrient requirements. Fresh feed should be presented. Fill feeders with no more than 2 days of feed. Only fill the feeders for the pigs being received. For example don't fill all feeders for a 2-3 day spread in delivery. Feed will become stale and lose freshness prior to pig arrival. Clean feeders twice daily.

Creep Feeding

Creep feeding is recommended for newly weaned pigs. This stimulates pigs to eat and helps them find feed. Scatter 1 pound of feed per 30 head, on the mat 4-6 times per day. Discontinue creep feeding after one week. The purpose of creep feeding is to stimulate the pigs' appetite so that they go looking for feed when the mat is cleaned. Creep feeding for too long or with too much feed trains the pigs to wait for the caretaker.

Feed Allocation

Remember the gut of a newly weaned pig is going through significant change. Enzymes needed to digest food are changing from a milk-based diet to a dry feed diet. This process occurs as the pig ages and is not dependent on weight. All pigs should consume the budgeted amount of the first stage feed. Don't underfeed the larger pigs and never limit feed nursery pigs. Below is an example feed budget and lactose levels for healthy pigs.

- 8-12 lbs. (3.63-5.44 kg) pig (20% lactose)
- 12-16 lbs. (5.44-7.26 kg) pig (15% lactose)
- 16-25 lbs. (7.26-11.34 kg) pig (7.5% lactose)

Feed Budget		
Average Wean Age	Days	20
Average Wean Weight	lbs. (kg)	13 (5.90 kg)
Phase 1	12 – 15	4.0 (1.81 kg)
Phase 2	16 – 25	12.0 (5.44 kg)
Phase 3	26 – 50	40.0 (18.14 kg)
Total Feed	lbs. (kg)	56.0 (25.40 kg)
Total Gain	lbs. (kg)	37 (16.78 kg)
Feed: Gain	Ratio	1.50

Make sure all pigs receive **all** diets. Sometimes the smaller pigs are fed more of the Phase 1 diet, but the rest of the barn is switching diets faster and could be on Phase 3, this could cause the fall-behind pen to go from Phase 1 to Phase 3. Intake and performance are hurt if diets are skipped. Therefore, ensure the fall-behind pen will always be fed all phases.

Lower Health Pigs with Low Feed Intake

Starting low health pigs on feed is a challenge due to poor appetite and poor feed intake. In this case a pre-starter diet with higher levels of lactose (23% to 25%), plasma (5% to 6%), steam rolled oats (20%), a minimum of 3,000 ppm of zinc oxide, lower soybean meal (12%) and lower crude protein (LCP) can help with intake before starting on the Phase 1 diet.

A trial completed by Ajinomto Heartland LLC, Chicago, IL, demonstrated a reduction in percentage of pigs removed in Phase 1 (day 0 to 11 post weaned) when fed a LCP starter diet. The same group of pigs were infected with E-coli during Phase 2 (day 11 to 21) and the percent of pigs removed was still the lowest.

Table 3 shows that the average daily feed intake (ADFI) was not reduced from day 0 to 21 post weaned with LCP diets compared to diets with and without antibiotics and diets containing Arginine and higher level of L-Tryptophan.

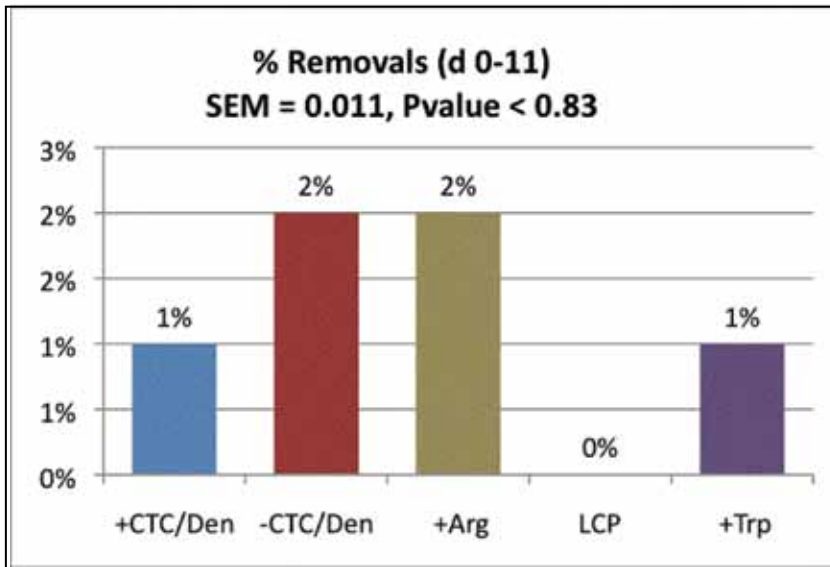


Table 1 – Phase 1

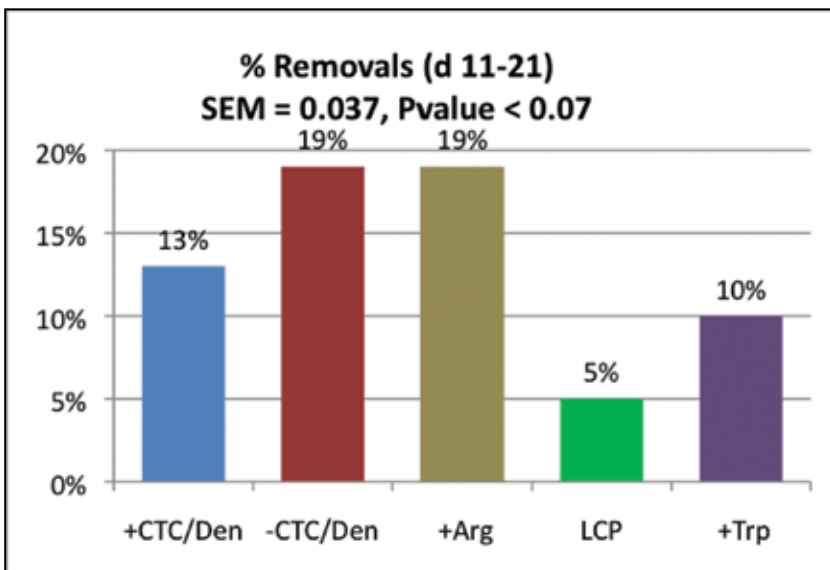


Table 2 – Phase 2
(E-coli infected barn)

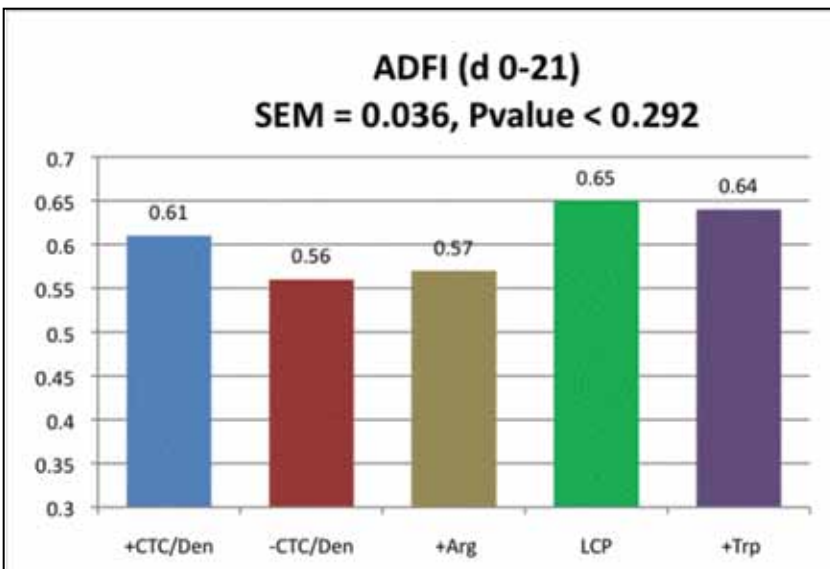
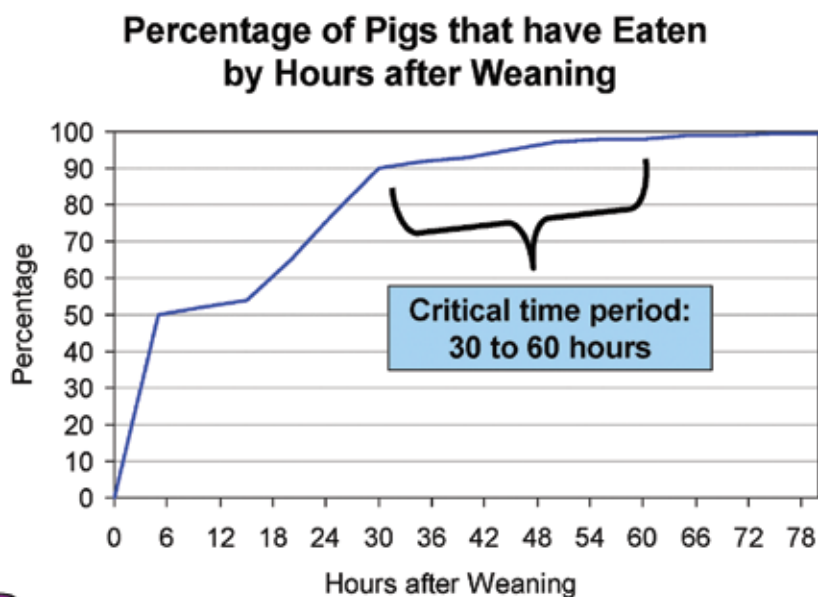


Table 3

Gruel Feeding

Gruel feeding is recommended for pigs that have trouble starting on dry feed. Ideally, gruel feeding will only be done in fall-behind pens. Gruel should be made out of water and commercially available specialized gruel products. Mixed gruel should have the consistency of oatmeal. A 60:40 ratio of feed to water will usually achieve this. Use a bowl or pan for gruel feeding. The pan should be washed and filled with fresh gruel twice daily. Pigs that do not voluntarily eat gruel may be force-fed using a 12cc syringe with the tip cut off. Hand feeding pigs that do not eat on their own 2 times a day can be enough to keep these pigs from starving. This hand feeding can give them a chance to start on feed themselves.



K-STATE

Adapted from Bruinix et al., 2001

Kansas State University Swine Day, 2004

Environment

Temperature

The ideal effective temperature for a newly weaned pig is 82°F. Barns should be 75°F when the pigs are placed and for the first 4 weeks. A desired temperature of 82°F can be achieved using zone heating. Zone temperature can be dropped 2°F per week placed is a guideline. Pig comfort should determine when to drop or increase zone temperature. Typically, zone heat is needed for 2 to 4 weeks depending on pig size, health and environment.

The general rule for zone heating in the creep area is that pigs should lay 1½ deep (Figure 1). Pigs should lay touching each other with heads on neighbors' flanks directly under the heater. If pigs are piled 2-3 layers deep (Figure 2) they are too cold. Zone heaters should be turned up or lowered closer to the floor. If pigs are lying in a doughnut shaped ring, avoiding the area under the heater, then the area is too hot. The heater should be turned down or raised.



Figure 1
Pigs with good 1½ deep laying pattern



Figure 2
Pigs that are chilled and piling

Air Flow

At placement of wean pigs ventilation should be adequate to provide 1.5-2 ft³/minute (cfm) (0.46-.061 m³/minute (cmm)) per head at minimum setting and 25 cfm (7.62 cmm) per head at maximum. As pigs grow ventilation requirements change.

Drafts

Drafts affect wean pigs more severely than older pigs. All efforts should be made to eliminate drafts. Watch laying and dunging pattern to identify drafty areas. Pay attention and fix holes and curtain sags when found as they create drafts. Ensure all inlets are equalized for even air flow throughout the barn. Place creep mats and zone heat accordingly.

Day 0-7 Pig Management

For the first 7 days it is very important to focus daily management on:

- Health.
- Environment.
- Nutrition.

A breakdown in any of these areas will result in decreased performance and increased days to market. For the first 7 days, spend a considerable amount of time observing the pigs in each pen for individual attention. At least one hour per 1000 head 2 times per day should be budgeted. At least 30 minutes of this time should be spent making individual pig observations.

Pen Walking

Pens should be walked twice daily.

- Check feeders.
- See every pig from snout to tail, head to toe.
 - Spend 2 seconds per pig.
- Identify and pull fall-behinds.
- Identify, pull and treat sick pigs.
- Check waterers.
- Creep feed.
- Fill supplemental feeders.

Double Stocking

Double stocking wean-to-finish barns is a standard practice in the industry. It is important to understand that even in barns properly designed for double stocking, pigs can be adversely affected. There are several key factors to remember when double stocking a barn:

- Resources must be provided on a per head basis.
 - Feeder space/head.
 - Cfm/head (ccm/head).
 - Water/head.
 - Creep area/head.
 - Zone heat/head.
- Initial stocking density of 2.8 ft² (.85m²) per head is recommended to 50 lbs. (22.68 kg).
- Pigs should not remain double stocked past 7 weeks placed.

Numerous studies have shown double-stocked pigs do not perform as well as single stocked pigs. Even pigs that are double stocked in facilities designed for double stocking have 2% - 4% less full value pigs than single-stocked barns.

Fall Back/Sick Pig Identification

It is important to provide sick pigs or pigs that are falling behind extra care. If given extra care these pigs usually recover and go on to perform with the group. The first step in providing extra care to challenged pigs is to identify them in a timely manner. If identified too late in the downward spiral these pigs are unable to recover. Look for pigs that exhibit these signs:

- Rough hair coat or fuzzy appearance.
- Sucked in flanks. Obvious empty belly. It is a good idea to pick the pig up and feel the belly. A rough looking pig with a full belly is probably okay.
- Depressed or lethargic. Head down or droopy.
- Not active or competing. Often these pigs will be huddled together or off by themselves.
- Temperature of $> 102^{\circ}\text{F}$

Fall-behind pigs



Sucked in flanks and stomach are a good indication that a pig has not been eating.

Healthy Pigs



Rough hair coats may be typical 3-6 days post-weaning, but round bellies indicate that the pigs are on feed and doing well.

Fall Back Management

Fall back pigs are pigs that simply had trouble starting on solid feed and competing with their pen mates. There is generally no disease issue with these pigs. Once identified, fall back pigs should be placed in a pen with other fall back pigs. This pen should have additional resources for these pigs including:

- Extra supplemental heat;
- Extra mat space;
- Gruel feeding station;
- Small round supplemental feeder.

Extra time should be spent managing the fall-behind pen. Gruel feed should be changed twice daily. Bowl should be dumped and rinsed out before fresh feed is placed. If pigs do not voluntarily eat gruel feed then they should be hand fed. Hand feeding fall-behind pigs 4-6 times per day can be enough to keep these pigs from starving and give them a chance to recover.

Hospital Pen Management

Once a pig has been identified as being sick, it either needs to be treated in its current pen or removed, treated, and placed in a hospital pen. If the pig is still fairly active and competitive, it can be treated and left in its current pen. Mark the pig for follow-up treatments and observation. If a pig is deemed non-competitive, it needs to be removed and placed in a hospital pen. The pig will have a better chance of recovery in the hospital pen.

Hospital pens should be located in the middle or end of the barn. Hospital pens should also be half-sized pens to make pig management and observation easier.

Consult your herd veterinarian for the proper treatment for the clinical signs observed. Once a pig has recovered, it should be moved to a recovery pen.

Once it is determined that a pig does not have a reasonable chance of recovery or does not respond to treatment within two days, it should be humanely euthanized using an approved method. The National Pork Board and AASV have published guidelines for the humane euthanasia of pigs.

Growing Pig Care

Standard Animal Care Practices (day to day)

- Barns must be walked daily:
 - Farm staff should carry basic equipment that might be needed during the walk through.
 - Syringes and needles.
 - Medication.
 - Paint sticks.
 - Pen and notebook.
- Walk every pen and make sure every pig stands.
- Mark any pigs that are sick, lame, injured or poor doing for further care and/or placement in the sick pen.
- Check waterers in every pen for proper flow.
- Check and adjust feeders in every pen.
- Remove any moldy feed from feed pan.
- Remove and record any mortality.
- Check barn high and low temperatures from the previous 24 hours and adjust ventilation as needed.
- Record daily: high and low temperatures, number of dead, number of pigs receiving treatment (include location and withdrawal), any observations that can influence pig performance.
 - All observations and treatments should be recorded in the Daily Observations Log, Appendix A.

Treatments

- Treat sick, lame, injured, or poor-doing pigs with the appropriate medication as directed by a veterinarian.
- Mark the pig so follow-up treatments can be given as per direction.
- Move animals unable to compete to a hospital pen.
- If more than 10% of the animals are affected, consult your herd veterinarian and consider mass medication.
- Work with your veterinarian to achieve the proper diagnosis and treatment plan.

Environmental Guidelines

Supplemental Heat

- Larger pigs (150 pounds (68.03 kg) plus) do not generally need supplemental heat except in harsh climates.
- Supplemental heat is needed for wean pigs and smaller pigs. Appendix B, Table B-1.
- Forced air heaters are recommended to warm barn.
 - Properly size heaters. Heaters that are too large or small for the space will be less efficient at maintaining desired temperature than properly sized heaters.

Supplemental Cooling

- Larger pigs will require supplemental cooling in warmer weather.
 - Measure air speed at pig level and 100% ventilation.
 - 90ft/min (27.43 m/min) air flow provides 10 degrees of effective cooling.
 - 300ft/min (91.44 m/min) air flow provides 15-20 degrees of effective cooling.
- Water misters can be used to provide further cooling.
 - Misters work through evaporative cooling by wetting the pig and allowing the water to evaporate.
 - Misters should spray coarse droplets that wet the pigs. Fine droplets evaporate in the air adding to the relative humidity and doing little to cool the pigs.
 - Misters should cycle on and off in order to conserve water and allow the cooling effect of evaporation to occur.
 - As a general rule, misters should be on one minute out of ten.
 - Misters should not run so long that the floor stays wet. This can lead to soft hoofs and increase the risk of lameness.
 - Misters without adequate airflow are of no value in cooling.

Ventilation

- Suggested range of relative humidity is 40-50%.
- Ventilation Maintenance:
 - o Poorly maintained ventilation components have reduced efficiency. This could cause the ventilation system to function improperly and provide the pigs with inadequate ventilation.
 - o Remove dust from all components weekly. Dust built up on louvers, inlets and fan blades can lower cfm (cmm) being moved.
 - Inspect and replace loose fan belts weekly.
 - Patch holes in curtains.
 - Monthly grease and service appropriate ventilation components.

Air Quality

- Air quality should be assessed at summer and winter ventilation settings.
- Inexpensive yet effective tools available for measuring noxious gases can be used, such as a gas diffusion tube.
- Part of the full PQA+ farm evaluation.

Table 3. Air Quality Levels

Contaminant	Human Health	Swine Health
Total Dust (mg/m ³)	2.40	3.70
Respirable Dust (mg/m ³)	0.23	0.23
Endotoxin (mcg/m ³)	0.08	0.15
Carbon Dioxide (ppm)	1,540	2,500
Ammonia (ppm)	7	11-25
Carbon Monoxide (ppm)	50	50-100
Total microbes (cfu/m ³)	4.3x10 ⁵	4.3x10 ⁵

Published by Donham in 1989

Lighting Requirements

Application	Illumination	Florescent	Incandescent
	Foot-candles	Watts/ft ² (m ²)	Watts/ft ² (m ²)
Nursery	10	0.4 (0.12 m)	1.6 (0.49 m)
Growing-finishing	5	0.2 (0.06 m)	0.8 (0.24m)

Swine Housing and Equipment Handbook

Vices

Various vices can occur in growing pigs, typically between 7 and 15 weeks of age. Various environmental and nutritional factors have been identified as causative agents for vices, but many of these factors have not been quantified. Nutritional strategies to address this issue include increasing salt levels and/or increasing magnesium in the diet. If these strategies are employed, ensure water is readily available to the pigs.

Tail biting may occur at various times throughout the year. The incidence typically is greater in the fall and spring. Preparations should be made to minimize the incidence. Both management and nutritional factors must be considered and individual factors should be evaluated in a sequential approach in order to address tail biting.

Environmental Factors

- Pen Density — Overcrowding of pigs at any stage of growth can increase the incidence of tail biting and other vices. Key areas of concern include late nursery and finishing. Over-crowding pigs in late nursery can lead to increased incidence of tail biting that can carry into the finishing phase. Failure to properly top pens may increase the incidence of tail biting in older pigs.
- Air Quality and Temperature — Ensure minimum ventilation rates are maintained throughout the entire finishing period. Reduced air exchange can result in increased temperature and/or humidity that can lead to increased tail biting. Tail biting often occurs in the dead air spaces of a building. Increased concentrations of gases such as NH₃, H₂S and CO₂ can also increase the incidence of tail biting. Prolonged periods of hot temperatures and/or extreme daily variation in temperature are also possible causes of tail biting.
- Feed and Water Availability — Restriction of either feed or water can increase frustration and aggression in pigs and increase the incidence of vices such as tail biting. Key areas of concern for limited feed and water availability include the late nursery and/or late finisher when overcrowding may occur. Proper feeder management should also be addressed as feeders need to be adjusted to minimize wastage, but not restrict feed. Short periods of feed outages due to improper ordering or feed system malfunction can also lead to aggression and tail biting.

Nutritional Factors *(For specific requirements see PIC Nutrition Specifications)*

- Diet/Formulation Staging — Proper feed changes and formulation consistency are essential to minimize aggression and tail biting in growing pigs. Improper staging (e.g. late finisher diet fed to early growing pigs) can result in alterations in feeding patterns that lead to tail biting. Also, abrupt changes in formulation (e.g. large changes in midds concentration or switching to high levels of DDGS too quickly) can alter feed behavior patterns. Large changes in ingredients should be staged in small increments to prevent abrupt changes. Do not implement more than a 10% ingredient change at one time.

Key Nutrient Deficiency

- Deficiency in a key nutrient can lead to increased aggression. Key nutrients include lysine and amino acid balance, salt, phosphorus, and magnesium. Lysine deficiency, especially in late nursery and early finisher periods can be especially problematic. Minimum sodium level is 0.25%. Minimum level of magnesium in the diet is 0.16% and may be increased if there are issues with tail biting. Nutritional strategies to address tail biting include increasing salt levels and/or increasing magnesium in the diet, if these strategies are employed, ensure water is readily available to the pigs.

Mycotoxins

- Elevated levels of mycotoxins can result in increased aggression and lead to tail biting. Maximum recommended levels of mycotoxins are listed in Table 9.

PIC Nutrition Recommendations

The following pages are a summary of nutrient recommendations for PIC pigs. Recommendations are based on published and PIC internal research, research from the University of Missouri and Ajinomoto Heartland with commercial PIC products. The nutrient specifications have been validated in commercial environments. The 1998 NRC publication serves as the basis for certain information. For more detail and references, refer to the 2008 PIC Nutrition Recommendations.

Table 7. Nutrition Recommendations

Nutrient	Unit	Early Wean 8-12 lbs (3.63-5.44 kg)	Phase 2 12-16 lbs (5.44-7.26 kg)	Phase 3 16-25 lbs (7.26-11.34 kg)	Phase 4 25-50 lbs (11.34-22.68 kg)
Growth rate	lb/d (kg/d)	0.34 (0.154 kg)	0.50 (0.227 kg)	0.90 (0.408 kg)	1.45 (0.658 kg)
Feed Intake ^a	lb/d (kg/d)	0.35 (0.159 kg)	0.58 (0.263 kg)	1.18 (0.535 kg)	2.20 (0.998 kg)
Feed:Gain	Ratio	1.03	1.16	1.31	1.52
NRC ME	Kcal/lb	1550	1550	1530	1525
Lactose ^b	%	20.0	15.0	7.5	0.0
Total Fat	%	3 to 6	3 to 6	2 to 4	2 to 4
SID lysine ^c	%	1.46	1.46	1.42	1.30
Calcium	%	0.85-0.95	0.85-0.95	0.80-0.90	0.80-0.90
^a Phosphorous	%	0.55	0.52	0.40	0.40
Sodium	%	0.35-0.85	0.35-0.60	0.25-0.40	0.25-0.40
Chloride	%	0.40	0.40	0.36	0.36
Added salt	%	0.20	0.25	0.40	0.40
Soybean meal ^d	%	15	18	28	28-32

^a Average Intake shown for 25-50 lb. (11.34-22.68 kg) pig assumes pelleted. Add 5% for grind and mix.

^b Lactose or equivalent sugars. Sucrose can replace 50% Lactose after 5-7 day of feeding to induce digestive enzymes.

^c SID = standard ileal digestible.

^d Diet with < 1% blood cells.

^e Suggested levels for commercial production and good to high health. High health pigs can tolerate higher levels of SBM (16-25 lbs (7.26-11.34 kg), 30% ; 25-50 lbs (11.34-22.68 kg), 32%)

Feed Budget

- A feed budget is the amount of feed recommended per head for each phase of growth.
 - Follow the feed budget as closely as possible so expensive feed is not fed too long resulting in over-budget feed cost, and not fed too short resulting in reduced pig performance.
- (See PIC Nutrition Recommendations for specific budgets)

Toxins

- Toxins in the feed should be tested in grain sources as well as co-products like DDGS.

Table 9. Maximum Toxin Levels

Toxin ^a	Dietary Level
Aflatoxins	
Nursery to Finish	<100 ppb
Replacement gilts and sows	<500 ppb
Ochratoxin and Citrinin	
Finishing	<200 ppb
Replacement gilts and sows	<3 ppm
Deoxynivalenol (vomitoxin)	
All swine	<2 ppm
Zearalenone	
Replacement gilts and sows	<1 ppm
Ergot	
All swine	<0.1%
Fumonisin	
All swine	<25 ppm

^aAdopted from Mycotoxins, by G.D. Osweller in Diseases of Swine, 9th Ed.

Feeder Management Recommendations

Feed Outages

PIC337 sired pigs visit the feeder relatively few times during the day, but quickly consume large amounts (up to 4 pounds (1.81 kg)) of feed at a time. Because of this intake pattern, PIC337 progeny are susceptible to feed disruptions. It is critical to eliminate feed outages to obtain the full potential of this animal.

Feed outages can lead to:

- Reduced growth rates.
- Increase in vices.
- Reduction in full value pigs to market.

Feeder Type

There are many feeder designs for wean-to-finish. Wet/dry feeders tend to improve feed efficiency over dry feeders. Wet/dry feeders may lead to an increase in backfat and decrease yield and percentage lean. Analyze total economics specific to your operation before deciding on a feeder type. Bulk feeders are recommended over tube feeders.

Table 10. Feeder Type Trial Results

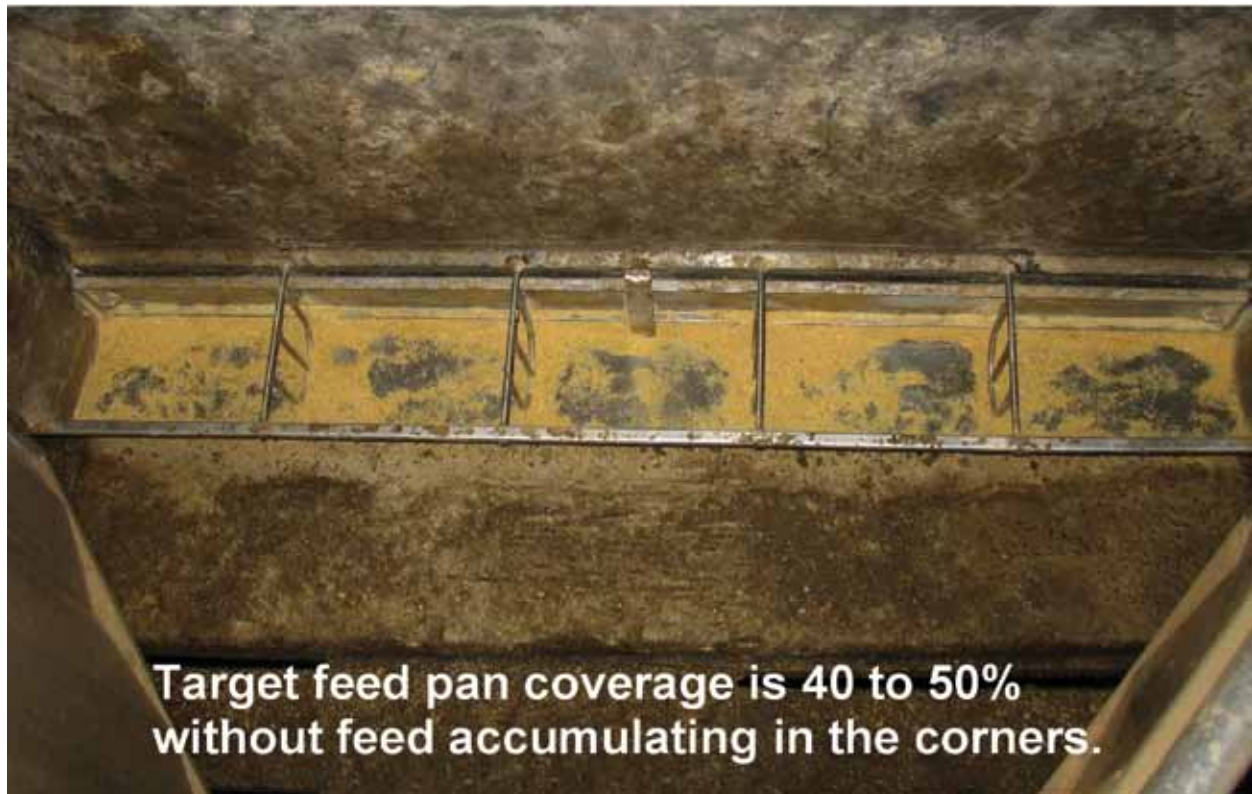
Criteria	Wet	Dry	Probability
Start Wt., lb (kg)	13.7 (6.21 kg)	13.7 (6.21 kg)	
End Wt, lb (kg)	290.8 (131.90 kg)	289.4 (131.27 kg)	.99
ADG, lb/day (kg/day)	1.95 (0.88 kg)	1.95 (0.88 kg)	.22
ADFI, lb/day (kg/day)	4.29 (1.95 kg)	4.36 (1.98 kg)	.18
Feed/gain, lb:lb (kg:kg)	2.20	2.27	.15
Backfat Depth, in. (m)	0.78 (0.02 m)	0.74 (0.019 m)	.06
Loin Depth, in. (m)	2.40 (0.06 m)	2.40 (0.06 m)	.01
% Lean	52.48	52.86	.99

Results from a Trial with PIC337 x C22 – comparing dry feeders to wet/dry feeders

Feeder Adjustment

Proper feeder adjustment is critical to achieving maximum average daily gain and feed conversion. If feeder adjustment is too tight, growth is restricted. Feeders which are too open waste feed. Current Kansas State University research indicates 40% – 50% pan coverage to optimize performance (Figure 2).

Figure 2. Proper Finishing Feeder Adjustment



Feeder Space Width

The feeder space should be wide enough for the shoulder of the largest pig (minimum 13 inches (0.33 m) for a 270 pound (122.47 kg) pig).

Figure 3. Ideal Feeder Head Space



Proper feeder space allocation is critical to optimizing performance. PIC has evaluated both feed intake pattern and space requirements of its growing pig products to develop recommendations to optimize performance.

It is important to remember with lower energy diets pigs will typically increase their intake to compensate. If a lower energy diet is being fed, previous feeder space and settings might not provide adequate feed availability.

Table 14. Feeder Space Recommendations for PIC337 Sired Pigs

PIC337 Sired Pigs	Dry Feeders (pigs/space)
High energy Diet (>2% added fat)	Max 12 per feeder space Min 13 inches (0.33 m) of head space
Low Energy diets (no added fat)	Max 11 per feeder space Min 13 inches (0.33 m) of head space

Feed form and particle size influence growth performance as well as percentage of top hogs marketed. PIC has evaluated this in various commercial trials and has developed the following recommendations.

Table 15. Feed Form and Particle Size Recommendations for Historically Healthy Systems Marketing as Full Value Pigs (>93% Top hogs Marketed)

	Preferred Form	Microns	Over 1 mm	Under 300 microns	Under 150 microns
PIC337 Sired Pigs	Pelleted	400-600	<30%	<30%	<7.5%

Table 16. Feed Form and Particle Size Recommendations for Historically Challenged Systems Marketing as Full Value Pigs (<93% Top Hogs Marketed)

	Preferred Form	Microns	Over 1 mm	Under 300 microns	Under 150 microns
PIC337 Sired Pigs	Mash	700-800-600	<30%	<20%	<2.5%

Transport Requirements

Preparing to load:

- It is very important pens are walked daily and every pig is made to stand even as pigs get close to market. This conditions the pigs to human contact and will make moving the pigs easier and less stressful.
- Correct any deficiencies in loading facilities that cause distraction or stress to animals during the loading process.
- The day before pigs are scheduled to leave, sort off those that will be loaded.
- If pre-sorting is not possible, exercise pigs housed in small pens the day before loading. This can be done by moving pigs from one pen to an empty pen and back. Studies have shown that this small amount of exercise the day before loading can reduce loading time, dead on arrival (DOA) pigs, dead in plant (DIP) pigs, and non-ambulatory pigs in the plant.
- If possible, remove feed from pigs 12-24 hours prior to loading. Have water source available at every loading chute so pigs or bedding can be sprinkled with water during hot weather.

Loading

- Lower curtains if needed to create equal air pressure inside and outside of barn. Pigs do not like to walk into strong head winds created by negative ventilation
 - o Use appropriate equipment such as sort boards.
- Two people should always be used to sort pigs out of pens.
- Move market animals in small, easily handled groups (≤ 5). The handler should be able to reach the lead pig in a group.
- Move animals in a calm, steady manner.
- Never force animals to move faster than normal walking pace.
- Never send an animal that is unable to walk, ill, or significantly injured to market channels.
- Load animals furthest from the chute onto the bottom deck. Load animals closest to the chute onto the top deck. This reduces stress on animals in the back of the barn that have the farthest to walk.
- Limit the use of electric prods.
 - o If a pig has to be prodded more than twice, re-evaluate loading procedures and facilities.
 - o Prod pigs in the center of the back, behind the shoulder blades for less than one second and no more than 2x's in a 5-minute period.
- If the outside temperature is above normal, use the trailer sprinkler system to wet pigs and bedding before leaving the farm.

Space requirements on Trucks

- Calculate available square footage for every trailer type.
- Do not calculate available square footage by simply multiplying trailer width by length.
- Calculate square footage of every compartment and load accordingly.
- Loading density varies based on the weight of pigs.
 - o A general rule is to load 55-58 pounds (24.95-26.30 kg) per square foot (meter).
 - o ELANCO® has provided a loading calculator free of charge.

Table 5. Transport Space Requirements per Pig

Pig Weights	Transport Floor Space
250-275 lbs (113.39-124.74 kg)	5.00 ft ² /pig (1.54 m ² /pig)
275-300 lbs (124.74-136.01 kg)	5.25 ft ² /pig (1.60 m ² /pig)

Transport

- Do not exceed legal load weights.
- Never crowd trailer, based on the calculations for available square footage. (Table 5)
- Provide appropriate ventilation and bedding for weather conditions. (Table 6)

Table 6. Guidelines for Trailer Ventilation and Bedding to use for Market Hogs

Air Temp degrees F	Bedding	Closed Slats	Open Slats
<10	Heavy	90%	10%
10-19	Medium	75%	25%
20-39	Medium	50%	50%
40-49	Light	20%	75%
>50	Light	0%	100%

- Adjust load times for weather conditions.
- Animals should be transported at a steady pace avoiding unnecessary sudden stops or starts.
- Keep animals on a trailer for as little time as possible.

Unloading

- Animals should be unloaded at a slow and steady pace.
- Animals should be unloaded in manageable groups to avoid piling.
- If there is a down animal on the trailer, the plant should be informed before unloading begins.
- **Do Not** use electric prods.

Appendix A - Daily Observation Log

Site: _____ Barn: _____ Date Filled: _____

Days to Fill: _____ Fill Date 1 (date/#hd): _____

Fill Date 2 (date/#hd): _____ Total Number Placed: _____

Source: _____

Mortality and Daily Temps

Week	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Total Mortality
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
Total								

Treatments

Date	Locations and # of head	Drug

Appendix B

Table B-1. Temperature and CFM Requirements by Stage of Growth

Week Post Wean	Weight	ADG	Daily Feed Intake	Feed to Gain	Cumulative Feed Intake	Desired Room Tem	Minimum CFM/head	Air Exchange Rate Summer	CFM/hd Summer
Weaning	12					84	1.1	40 sec	25
1	15	0.43	0.45	1.04	3.1	82	1.4	40 sec	25
2	19	0.61	0.71	1.16	8.1	80	1.6	40 sec	25
3	26	0.92	1.15	1.25	16.2	78	1.9	40 sec	25
4	33	1.07	1.57	1.46	27.2	76	2.2	40 sec	25
5	43	1.38	1.82	1.31	39.9	74	2.6	40 sec	25
6	54	1.54	2.30	1.50	55.9	72	3.0	35 sec	25
7	66	1.69	2.56	1.52	73.9	70	3.4	35 sec	25
8	77	1.69	2.72	1.61	92.9	69	4.0	35 sec	25
9	90	1.77	2.88	1.62	113.1	68	4.6	35 sec	75
10	103	1.83	3.04	1.67	134.4	67	5.2	35 sec	75
11	116	1.86	3.41	1.83	158.2	67	5.4	35 sec	75
12	129	1.95	3.77	1.94	184.6	66	6.0	35 sec	120
13	143	2.01	4.10	2.04	213.3	66	6.7	35 sec	120
14	158	2.06	4.41	2.14	244.2	66	7.3	35 sec	120
15	172	2.11	4.69	2.23	277.1	66	8.0	35 sec	120
16	187	2.13	4.95	2.33	311.7	66	8.7	35 sec	120
17	202	2.15	5.18	2.41	348.0	66	9.4	35 sec	120
18	218	2.17	5.38	2.48	385.7	66	10.1	35 sec	120
19	233	2.17	5.56	2.56	424.6	66	10.8	35 sec	120
20	248	2.17	5.72	2.63	464.7	66	11.5	35 sec	120
21	263	2.16	5.86	2.71	505.7	66	12.2	35 sec	130
22	278	2.15	5.99	2.78	547.6	66	12.9	35 sec	130
23	293	2.13	6.10	2.86	590.3	66	13.6	35 sec	130
24	308	2.11	6.19	2.94	633.6	66	14.3	35 sec	130
25	322	2.07	6.28	3.02	677.6	66	15.0	35 sec	150
26	337	2.04	6.34	3.11	722.0	66	15.7	35 sec	150
27	351	2.01	6.41	3.19	766.8	66	16.3	35 sec	150
28	365	1.98	6.45	3.26	812.0	66	17.0	35 sec	150

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Appendix C – Finishing Specifications

Table C-1. Finishing Gilt Specifications

Gilts		Phase of growth, lb (kg)									
Item	Unit	50-90 (22.68-40.82 kg)		90-130 (40.82-58.97 kg)		130-180 (58.97-81.65 kg)		180-230 (81.65-104.33 kg)		230-280 ^e (104.33- 127.01 kg)	
Growth rate	Lb/d (kg/d)	1.78 (0.81 kg)		1.91 (0.87 kg)		2.15 (0.98 kg)		2.08 (0.94 kg)		1.98 (0.898 kg)	
Feed intake	Lb/d (kg/d)	3.00 (1.36 kg)		4.28 (1.94 kg)		5.59 (2.54 kg)		2.72 (1.23 kg)		5.98 (2.71 kg)	
Feed:Gain	Ratio	1.69		2.24		25.60		2.75		3.02	
NRC ME	Kcal/lb (Kcal/kg)	1500	1600	1500	1600	1500	1600	1500	1600	1500	1600
Added fat	%	0	5	0	5	0	5	0	5	0	5
SID lysine/Mcal ME ^b	g/Mcal	3.17	3.17	2.76	2.76	2.39	2.39	2.11	2.11	1.96	1.96
SID Lysine ^{cd}	%	1.05	1.12	0.91	0.97	0.79	0.84	0.70	0.74	0.65	0.69
Calcium	%	0.75		0.63		0.61		0.58		0.56	
^a Phosphorus	%	0.36		0.30		0.28		0.26		0.22	
Added salt	%	0.40		0.40		0.40		0.35		0.30	
L-lysine max	%	0.45		0.40		0.375		0.325		0.225	

PIC Internal Research

^aExpected growth and suggested nutrient levels for high health and thermal neutral conditions. Lysine specifications are based on a series of trials leading to curve validation studies: PIC Technical Memos 160 and 183; PIC USA Experiment 9611

^bEquation used: $0.000027 * \text{weight}^2 - 0.015318 * \text{weight} + 4.114302$

^cEquation used: $(\text{SID lysine per NRC ME} * \text{NRC ME per lb} * 2.2) / 1000$

^dSID= standard ileal digestible

Table C-2. Finishing Barrow Specifications

Barrows		Phase of growth, lb									
Item	Unit	50-90 (22.68-40.82 kg)		90-130 (40.82-58.97 kg)		130-180 (58.97-81.65 kg)		180-230 (81.65-104.33 kg)		230-280 ^e (104.33-127.01 kg)	
Growth rate	Lb/d (kg/d)	1.82 (0.83 kg)		1.98 (0.898 kg)		2.25 (1.02 kg)		2.15 (0.98 kg)		2.00 (0.91 kg)	
Feed intake	Lb/d (kg/d)	3.15 (1.43 kg)		4.55 (2.06 kg)		5.81 (2.64 kg)		5.88 (2.67 kg)		6.10 (2.77 kg)	
Feed:Gain	Ratio	1.73		2.30		2.58		2.73		3.05	
NRC ME	Kcal/lb (Kcal/kg)	1500	1600	1500	1600	1500	1600	1500	1600	1500	1600
Added fat	%	0	5	0	5	0	5	0	5	0	5
SID lysine/Mcal ME ^b	g/Mcal	3.17	3.17	2.66	2.66	2.24	2.24	1.97	1.97	1.89	1.89
SID Lysine ^{cd}	%	1.05	1.12	0.88	0.94	0.74	0.79	0.65	0.69	0.62	0.67
Calcium	%	0.75		0.63		0.61		0.58		0.56	
^a Phosphorus	%	0.36		0.30		0.28		0.26		0.22	
Added salt	%	0.40		0.40		0.40		0.35		0.30	
L-lysine max	%	0.45		0.40		0.375		0.325		0.225	

PIC Internal Research

^aExpected growth and suggested nutrient levels for high health and thermal neutral conditions. Lysine specifications are based on a series of trials leading to curve validation studies: PIC Technical Memos 160 and 183; PIC USA Experiment 9611

^bEquation used: $0.000027 \times \text{weight}^2 - 0.015318 \times \text{weight} + 4.114302$

^cEquation used: $(\text{SID lysine per NRC ME} \times \text{NRC ME per lb} \times 2.2) / 1000$

^dSID= standard ileal digestible

Appendix C – Finishing Specifications — Continued

Table C-3. SID Amino Acid Ratios for Wean to Finish Pigs

Amino Acid	Nursery			Finish			Paylean [®]
	8-50 lb (3.63-22.68 kg)	50-90 lb (22.68-40.82 kg)	90-130 lb (40.82-58.97 kg)	130-180 lb (58.97-81.65 kg)	180-230 lb (81.65-104.33 kg)	230-280 lb (104.33-127.01 kg)	230-280 lb (104.33-127.01 kg)
Lysine	100	100	100	100	100	100	100
M + C	58	55	55	55	55	55	55
Threonine	60	61	62	63	64	66	68
Typtophan	16	16	16	16	16	16	16
Valine	65	68	68	68	68	68	68
Isoleucine	55	56	56	56	56	56	56

Appendix D – Water Requirements

Table D-1. Water Mineral Content

Pig Weight (lbs) (kgs)	<12 (<5.44 kg)	12-30 (5.44-13.61 kg)	30-75 (13.61-34.02 kg)	75-150 (34.02-68.04 kg)	150-Market (68.04-Market)
Nipple Height (in) (m)	4 to 6 (0.10-0.15 m)	6 to 12 (0.15-.030 m)	12 to 18 (0.30-0.46 m)	18 to 24 (0.46-0.61 m)	24 to 30 (0.61-0.76 m)
Pigs per Nipple	10	10	10	12-15	12-15
Flow Rate (cups/min) (cl/min)	0.65 (15.38 cl)	1 (23.66 cl)	1.5 (35.49 cl)	2 (47.32 cl)	3 (70.98 cl)
Daily Intake (qts) (L)	0.2-5 (.22-.55 L)	2-4 (2.20-4.40 L)	4-6 (4.40-6.61 L)	5-10 (5.51-11.01 L)	6-18 (6.61-19.82 L)

Iowa State University PM 1493, 1992

Table D-2. Water Mineral Content

Total Dissolved Solids (ppm)	Rating	Comments
<1,000	Safe	No risk to pigs
1,000-2,999	Satisfactory	Mild diarrhea in pigs not adapted to it
3,000-4,999	Satisfactory	May cause temporary refusal of water
5,000-6,999	Reasonable	Higher levels for breeding stock should be avoided
>7,000	Unfit	Risky for breeding stock and pigs exposed to heat stress

Adopted from NRD (1974)

Table D-3. Water Quality for Livestock

Item	Recommended Maximum (ppm)	
	TFWQG ^a	NRC ^b
Calcium	1,000	-
Nitrate-N + Nitrite-N	100	440
Nitrite-N	10	33
Sulfate	1,000	-
Aluminum	5.0	-
Arsenic	0.5	0.2
Beryllium	0.1	-
Boron	5.0	-
Cadmium	0.02	0.05
Chromium	1.0	1.0
Cobalt	1.0	1.0
Copper	5.0	0.5
Fluoride	2.0	2.0
Lead	0.1	0.1
Mercury	0.003	0.01
Molybdenum	0.5	-
Nickel	1.0	1.0
Selenium	0.05	-
Uranium	0.2	-
Vanadium	0.1	0.1
Zinc	50.0	25.0

^aTask Force on Water Quality Guidelines, 1987

^bNational Research Council, 1974

- Water should be tested annually or more frequently if pig behavior indicates.
- Water intake requirements by weight state:
 - o Remember, water intake does not equal water used by the barn
 - o As a general rule, 0.36 gals/pound of feed intake
 - Wean – 60 lbs. (27.22 kg) 0.7 gals/day (2.65 L)
 - 60 – 100 lbs. (27.22-45.36 kg) 2-3 gals/day (7.57-11.36 L)
 - 100 – 250 lbs. (45.36-113.40 kg) 3-5 gals/day (11.36-18.93 L)

References

- PIC Executive Summary 4. March 2006. *Effects of Stocking Density on PIC280, PIC327, and PIC337 Sired Pigs.*
- PIC Executive Summary 9. March 2006. *Effects of Space Allowance and Feed Type of Grow – Finish Performance of PIC337 Sired Pigs.*
- PIC Executive Summary 10. March 2006. *Effects of Space Allowance and Feed Type on Grow – Finish Performance of PIC280 Sired Pigs.*
- PIC Executive Summary 16. March 2006. *Grow – Finish Performance, Carcass Composition, Loin and Ham Meat Quality for PIC280 Sired Pigs at Three Market Weights.*
- PIC Executive Summary 17. March 2006. *Grow – Finish Performance, Carcass Composition, Loin and Ham Meat Quality for PIC327 Sired Pigs at Three Market Weights.*
- PIC Executive Summary 18. March 2006. *Grow – Finish Performance, Carcass Composition, Loin and Ham Meat Quality for PIC337 Sired Pigs at Three Market Weights.*
- PIC Executive Summary 30. October 2007. *Grow – Finish Performance of PIC380 Sired Pigs: Effects of Space Allowance and Feed Form.*
- PIC Executive Summary 38. September 2008. *A Commercial Trial to Estimate Sire Line x Feed Type Interactions for PIC280, PIC337, and PIC380 Sired Pigs.*
- Neill, C., R. D. Boyd, N. H. Williams. 2008. *PIC Nutrition Recommendations.*
- Swine Care Handbook.* 1996. Published by the National Pork Producers Council in Cooperation with the National Pork Board.
- Ritter et al. J. Anim Sci. 2007; 85: 3454 – 3461. *Effects of distance moved during loading and floor space on the trailer during transport.*
- DISCLAIMER:** Performance data shown in Nutrient specification tables were obtained in Commercial settings and under conditions of high health, thermo-neutral temperature and good management. They are not guaranteed levels of performance. A competent Nutritionist should adapt suggested Nutrient levels to specific conditions.

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