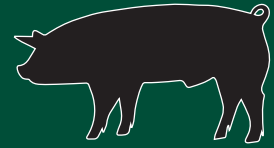


Gestation Group Sow Housing Options: Free Access Stalls



Introduction

Housing sows in individual stalls has become commonplace across the pork industry. This method of production has grown in popularity because animals can be housed and cared for individually. However, growing consumer concern has increased scrutiny on this standard industry practice. Multiple states have passed legislation that mandates pregnant females be group housed for specified portions of gestation. This change in system design and production method has raised concerns among producers, who have stated their need for information and specifications on group sow housing options. In Michigan, results from pork producer focus groups identified descriptions and cost comparisons of group sow housing options as their top educational need. This bulletin describes using free access stalls for group housing gestating sows.

General system description

FAS systems feature pens with open loafing areas where sows can congregate when they're not eating and want to be social or have room to move, stand, or lie down, and one or more rows of individual stalls where sows can:

- » Eat and drink.
- » Escape from more aggressive penmates.
- » Be inspected and treated for injuries and illnesses.
- » Be checked for pregnancy and estrus or heat.

The rear stall gate locks from the inside after a sow enters, and only opens when the sow inside exerts pressure by backing into it or when a stockperson releases the lock. The stalls in FAS systems are sometimes called “walk-in, lock-in” stalls.

While some parts of FAS systems resemble their counterparts in traditional gestation barns, there are several significant differences. See table 1 on page 2 for a summary of the similarities and differences. Three major differences follow.

- » Sows are able to enter and exit the stalls in a pen at will.
- » Wider alleys between the rows of stalls in a pen provide loafing areas for the sows.
- » All sows in a pen receive the same amount of feed because they aren't assigned to particular stalls and can access any stall in the pen.

Sow handling

All of the animals in a pen can be locked into stalls so handlers can easily and safely evaluate specific sows for injury or illness or perform routine management tasks on all sows (such as administering vaccinations and checking for estrus and pregnancy). Once the work is done, the gates can be unlocked and the sows can back out as they choose.

Typical pen layouts

How pens are laid out in an FAS system depends on the operation's needs, objectives, budget and other factors. In general:

- » The stalls are wider and longer (26 inches to 28 inches wide by 90 inches to 96 inches long) than the stalls in traditional gestation barns (24 inches wide by 84 inches long).
- » The alleys behind the rows of stalls tend to be wider (4 feet to 10 feet) than in traditional gestation barns (approximately 2 feet). The extra width gives sows room to back out of the stalls and provides loafing space. In much of Europe, where FAS systems are more common, regulations require that there be at least 6.5 feet between the backs of the rows of stalls (G. Klement, personal communication, January 2015).

Table 1. Comparison of FAS systems and traditional gestation barns

Feature	FAS system	Traditional gestation barn
Minimum recommended floor space per sow (includes stall & common areas)	Gilts: 15–18 sq. ft. Mature sows: 19–24 sq. ft. Mixture of gilts & sows: 18–23 sq. ft.	Gilts: 14 sq. ft. Mature sows: 14 sq. ft.
Typical stall size	7.5–8 ft. long & 26–28 in. wide	7 ft. long & 24 in. wide
Stall placement	In rows inside a larger pen	Individual stalls in rows, no common areas
Width of alleys behind stalls	Varies by operation: 4–10 ft.	Varies by operation; typically only used by handlers
Loafing areas (common areas where sows can walk, stand & lie down naturally, & congregate if they wish)	Available	Not available
Typical pen configurations	I-shaped – Only common space provided is the alley between rows of stalls. L-shaped – Extra common space is provided by extending the pen to form an <i>L</i> at the end of the alley. T-shaped – Extra common space is provided by extending the pen to form a <i>T</i> at the end of the alley.	Not applicable
Sow access to stalls	Sows enter & exit any unoccupied stall at will (gates lock automatically to prevent aggression from other sows & reduce competition during feeding). Sows are fed in stalls & locked inside (with automatic release mechanism disabled) for inspection & treatment by human handlers.	Sows locked inside individual stalls.
Freedom of movement	Sows move between loafing areas & stalls at will.	Sows confined to stalls.
Floor & flooring options	Completely slatted concrete floors are most common. Some designs provide solid concrete floors or use straw in loafing areas.	Completely slatted floors are most common. Older barns may have partially slatted floors, with solid floors under the front portion of the sow.
Ease of monitoring & handling sows	Sows monitored & handled individually while locked inside stalls.	Sows monitored & handled individually while locked inside stalls.
Feeding system	Noncompetitive	Noncompetitive
Feed delivery	Via feed lines that run along each row of stalls & drop feed into troughs at front of stalls.	Via feed lines that run along each row of stalls & drop feed into individual troughs at front of stalls.
Sow diets	All sows in a pen group receive the same kind & amount of feed because all sows can access any stall.	Diets can be tailored to individual sow's needs.
Water source	Water available from troughs or drinkers in stalls & possibly from drinkers in loafing areas.	Water available from troughs or drinkers in stalls.



Figure 1. I-shaped pen layout in an FAS system.

Photo courtesy of the PIGTEK Pig Equipment Group.

Pen layouts where the sows' only loafing area is in the alley between the stall rows are referred to as I-shaped (see fig. 1). If the alley is fully slatted, rubber slat mats can be used to provide a comfortable surface and environmental enrichment (opportunities to engage in natural behaviors such as exploring, rooting and manipulating materials in the pen) for the sows.

Some pen layouts provide more loafing space at the end of stall rows. These may be L-shaped (see fig. 2) or T-shaped (see fig. 3). The extra free space gives sows more room to move, stand and lie down naturally, and to interact with other sows. Straw bedding or rubber slat mats can be used in either of these configurations.

Group size & makeup

FAS is a noncompetitive or protected feeding system that allows sows to eat without interference from

other sows. But because there's no way to predict which stall a sow will choose to enter at any particular feeding, all of the sows in the same pen are fed the same amount. This limits the producer's ability to provide a specific amount of feed to an individual sow to improve her body condition.

One way to work around this limitation is to split breeding groups (sows bred at about the same time so they will farrow at roughly the same time) into pens of similar size, age and category (such as gilts, small sows, older sows and over-conditioned sows) that have similar body condition scores (BCS). The sows' diets can then be adjusted by pen according to the category the group falls into.

No matter how many sows are housed in a pen, every sow must have access to one feeding space. Overloading the pen and forcing sows to share feeding



Figure 2. L-shaped pen layout in an FAS system.

Photo courtesy of Dr. Niels-Peder Nielsen, Pig Research Center, Danish Agriculture and Food Council, Copenhagen, Denmark.



Figure 3. T-shaped pen layout in an FAS system.

Photo courtesy of Egebjerg International, Sjaelland, Denmark.

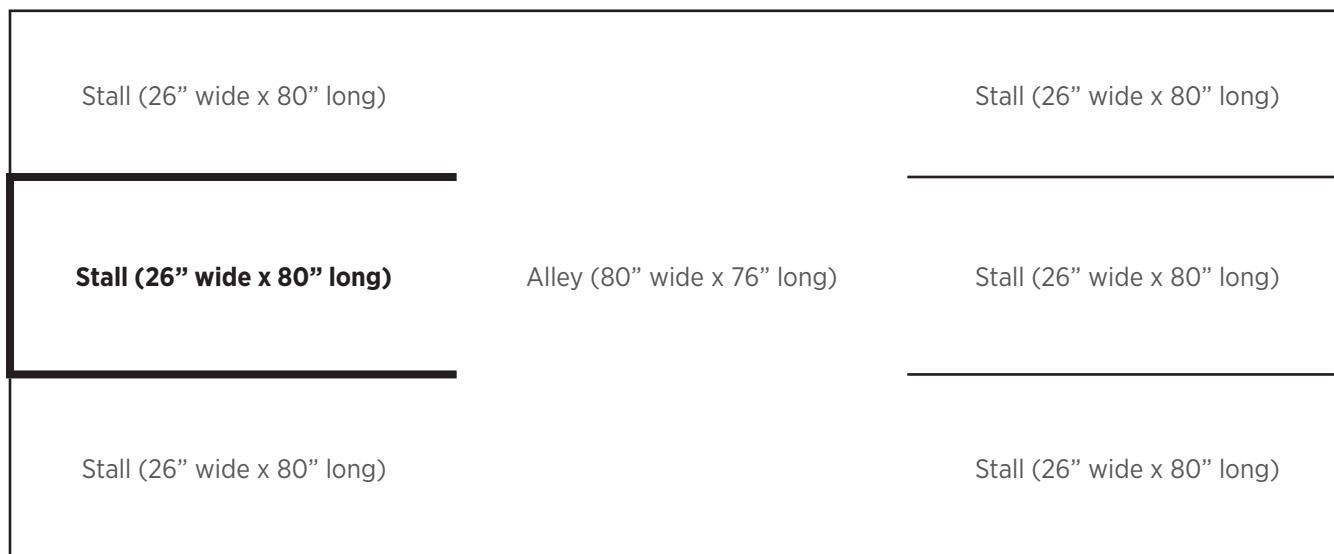


Figure 4. Calculating the square footage per sow in an I-shaped pen in an FAS system (drawing not to scale).

spaces will reduce the producer's ability to manage the sows' BCS and will increase the sows' aggression as they struggle to claim stalls at feeding time.

Per-sow floor space calculations in FAS systems include both stall and shared space (see fig. 4). For example, a 26-inch by 80-inch stall has 14.4 square feet. With another 80 inches provided in the alley behind the stalls, each sow has access to 21.7 square feet of floor space. This meets the space recommendations for gestating females from Gonyou, Rioja-Lang, and Seddon (2013):

- » **Gilts** - 15 to 18 square feet each
- » **Mature sows** - 19 to 24 square feet each
- » **Mixed pen of gilts and sows** - 18 to 23 square feet each

Calculating stall area:

Parameters: Stalls are 26 inches wide by 80 inches long, and 144 square inches = 1 square foot.

$$26 \times 80 = 2,080 \text{ square inches}$$

$$2,080 \div 144 = \mathbf{14.4 \text{ square feet}}$$

Calculating alley area:

Parameters: The alley behind the stalls (between the rows of stalls) is 80 inches wide and the length of the three stalls in this example ($26 \times 3 = 78$ inches). All six sows have access to the space behind the stalls.

$$78 \times 80 = 6,240 \text{ inches} \div 6 \text{ sows} = 1,040 \text{ square inches}$$

$$1,040 \div 144 = \mathbf{7.2 \text{ square feet}}$$

Calculating one sow's full space allotment:

Parameters: Stall area is 14.4 square feet and alley area is 7.2 square feet.

$$14.4 \text{ sq ft} + 7.2 \text{ sq ft} = \mathbf{21.6 \text{ square feet}}$$

Static versus dynamic groups

In group-housed production systems, how sows are grouped is extremely important. Gestating females are typically penned in either static or dynamic groups.

Static groups are pen groups in which all of the sows that will make up that group are placed into it at once, and no new animals are added to the pen after that. Sows that become open or are injured, lame or sick may be removed, but no new animals are added to the pen.

Dynamic groups are those in which females are regularly added to pens with females already in them. Dynamic groups are typically large, with more than 40 animals in the pen (though these groups can be as large as several hundred sows).

In FAS systems, sows are typically penned in smaller, static groups.

Though FAS systems provide noncompetitive feeding, any time that even one or two new sows are added to an existing group, the residents and newcomers will fight for dominance. Newcomers to an FAS system tend to be at a disadvantage in such fights

because they're outnumbered and they aren't likely to recognize that they can go into a stall and stay there to avoid aggressive interactions.

Sows that are badly hurt in dominance fights may need to be removed from the pen, and the newcomers are often the ones who wind up being hurt. Therefore, adding new sows to an existing group generally doesn't work out well, and we strongly discourage it.

If producers must add new animals to an established pen, they may need to lock the newcomers into stalls for an extended period (possibly 2 to 4 weeks) so they and the current residents have time to get used to each other. This confinement can work from a practical standpoint if feed and water are available in the stall, but it may cause legal problems by violating the laws in some states that mandate group sow housing.

Managing replacement gilts

Managing replacement gilts in a group sow housing system is a critical component of maintaining a high-performing sow herd. Because gilts are smaller than older sows, they don't need as much floor space and can be housed in 15 to 18 square feet without decreasing their performance (Gonyou, Rioja-Lang, & Seddon, 2013).

When forming gestation pen groups (females placed into a pen together), gilts should be penned only with other gilts, or possibly with younger parity sows (parity 1 and 2 sows), depending on the amount of feed that sows from both groups will need.

Gilts will need to be trained to use the FAS system (Levis & Connor, 2013). The first step is often to lock the animals into stalls for a few days so they can adjust to their surroundings and learn the feed and watering systems. After that, the rear gates can be opened so they can back out, explore the loafing area and work out their pen group hierarchy. When they hear the feed delivery system turn on at feeding time, most gilts will return to a stall. A few may need to be directed into stalls for the first few feedings.

Mature sows that aren't familiar with an FAS system can be trained in the same way.

Equipment & technology needs & maintenance

As mentioned earlier, FAS systems and traditional gestation barns with stalls use similar equipment (particularly for feeding and watering sows) and technology. The sow monitoring and management practices in FAS systems and traditional gestation barns, however, are fairly low-tech when compared to systems such as electronic sow feeding. See *Gestation Group Sow Housing Options: Electronic Sow Feeding* (Ferry, Betz, & Bates, 2015) for information about electronic sow feeding systems.

The rear stall gates and locks used in FAS systems must be checked daily to ensure that they're working properly, and repairs must be made as needed. A broken gate or lock may prevent sows from entering or exiting the stall. It may also allow aggressive sows to crowd into already occupied stalls.

Decreasing aggressiveness with multiple feedings

With competitive feeding systems it is recommended that sows be fed multiple times per day. This does appear to decrease the aggressive nature of dominant sows and positively affect the nature of the group as a whole. Feeding sows two or three times per day has been reported to decrease aggressive behavior, which should result in less fighting and injuries (DeRouchey & Tokach, 2013), though this management practice has not been suggested for FAS systems. However, it must be remembered that sows in FAS will establish their dominance hierarchy, thus there is potential that feeding two to three times per day could help reduce aggressiveness (DeRouchey & Tokach, 2013).

Managing sow body condition, sickness, lameness & injuries

In FAS systems, body condition is managed by penning sows of like size and condition together so they can be given the approximate amount of feed they need to reach and maintain optimum body condition. Because individual sows won't receive rations tailored specifically to their needs, it may be difficult to maintain an optimum BCS for every sow in a pen.

Producers and employees must develop and follow observation protocols to identify and treat sick, lame or injured animals right away. Ideally, sows should

stay with their original pen groups throughout treatment. If a sow must be removed from her pen for treatment, she should be moved to an individual stall or a small pen where she can recover without being vulnerable to aggressive sows.

Training will improve employees' ability to identify sows soon after they are injured or become lame or sick, and to provide aggressive medical care. Early treatment can help keep sows in their pen groups and minimize the number of sows that have to be housed individually due to injury or illness. This allows for maximum use of the space in a facility.

In an FAS system, a sow can be locked into an individual stall while receiving treatment and stay in her pen group. This is possible as long as she can access water and is able to stand up and lie down in the stall. If water isn't available in the stalls, separate pens or stalls must be available so that injured or sick sows can be moved to them and cared for appropriately.

Labor needs & requirements

As producers convert their farms from individual stall to group sow housing, it will be important for them to train or retrain employees to use their observation skills differently than they have in the past.

Traditionally, swine producers have hired and trained employees to be task-oriented – to focus on completing tasks one at a time throughout the work day. When working with sows housed in groups, employees will have multiple tasks to work on at one time and must also be aware of what is happening in the whole barn and in each pen. Improving employees' observation skills is challenging, but will help improve the operation's overall efficiency.

The daily work routine of swine breeding operations will differ depending on the group housing system they use. Production staff employees and farm managers should develop an outline of important areas to be evaluated or tasks to be completed each day. The outline will need to be updated periodically to reflect changes on the farm.

Employees working in FAS systems need to develop techniques for thoroughly observing all sows as individuals, even though the animals are housed in groups. Good management of group-housed sows often hinges on the caretakers' ability to identify lame,

injured or sick animals and to care for them in their resident pens.

Although the number of employees needed on most farms moving to group sow housing is not expected to change, the employees' daily tasks and routines will need to be adjusted.

Producers will need to focus their hiring efforts on finding people who can adapt to working with sows in groups. Employees will have to constantly be evaluating sows in pens while also completing their regular work through the day.

Advantages & disadvantages

All group sow housing systems have advantages and disadvantages. Those related to FAS systems follow.

Advantages

- 1. Limited moving and computerized parts** – FAS feeding systems have relatively few parts that may break down and need to be replaced, which may help reduce building maintenance costs. Much of the equipment in an FAS system will be similar to that used in conventional gestation barns with individual stalls. One difference is that the rear stall gates must be checked frequently and repaired as needed.
- 2. Noncompetitive feeding system** – All sows are locked in stalls while feeding. As long as every sow has a feeding space, there will be no fighting during feeding.
- 3. Sows feeding in stalls are more easily checked** – Having all of the animals up and eating at the same time may make it easier for employees to evaluate and treat them for lameness, injury or illness, and to check them for pregnancy and estrus.
- 4. Employees adapt relatively easily to the system** – Employees who have experience working in conventional gestation barns with stalls may more easily adapt to working in an FAS system than to working in other group sow housing systems.

Disadvantages

- 1. Lack of individualized feeding plans** – In an FAS system, all of the animals in a pen are fed the same amount of feed, at the same time. This can increase BCS differences among sows in the same pen.

- 2. Limited retrofit possibilities** – The wide alleys between rows of stalls in an FAS system make it difficult to convert traditional gestation barns with stalls to the FAS system without having to move or adapt feed lines, watering systems and other fixtures.
- 3. Takes more space** – FAS systems require more space than the other major group sow housing systems (electronic group housing, floor feeding, and short stalls and trickle feeding). The total square footage – including stall space, loafing areas and walkways – can be 28 to 30 square feet per sow or greater.
- 4. High conversion costs** – The increased interior space, the larger stalls and the rear stall gates needed in an FAS system can make it more expensive to set up and maintain than other group sow housing systems.

Conclusion

Free access stall systems that offer noncompetitive feeding in individual stalls are a viable option for group sow housing. The labor needs and expectations for an FAS system are similar to those of a traditional individual stall system, only with more emphasis on observing and treating sick, lame or injured sows in their original pens. Producers considering converting to an FAS system need to:

- » Decide how many stalls they would need and in what configuration before they calculate the total amount of interior space needed for the stalls and the alley behind the stall rows.
- » Identify any training they would have to provide to help employees develop any new skills they may need.
- » Determine the cost of conversion to a FAS system compared to other group sow housing options being considered.

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For more information

Visit the Gestation Group Sow Housing page on the MSU Extension website at bit.ly/SowHousingOptions.

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