

GUIDE TO AN SPF-SWINE PROGRAMME¹

SPF technology and schemes of SPF animal production have become routine in several countries. Such schemes have mainly been introduced to reduce losses in animal production. However, they may become of increasing significance for projects for reducing the risk of human infection by "hidden" agents, such as invasive salmonella spp. and other toxic enterobacteriaceae, campylobacter jejuni, toxoplasma and Q-fever. In line with resolution WHA.42.40 of the World Health Assembly in 1989 on prevention and control of salmonellosis, WHO and national programme development in animal production hygiene. An important complex of these efforts concerns animal production free of pathogens. In this respect, existing SPF schemes are of interest not only from the technical but also from the organizational point of view. In some countries, such schemes are maintained by governmental agencies, in others by private enterprise. The example described in this document is based on a cooperative system, i.e. a company owned by a farmers association (the Danish Bacon and Meat Council).

The system itself, and its proven efficacy, warrants the reader's attention. WHO expresses its gratitude to this Danish institution for making the document available, including its translation into English.

¹ Original guide prepared in Danish and translated into English by SPF-SELKABET, Postboks 156, DK-6600 Vejen, Denmark, September 1988. SPF-SELKABET, referred to in the text as the SPF-Company, is owned by the Danish pig producers through a cooperative system.

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WHAT IS "SPF-PIGS"

Definition of SPF-pigs, and related terminology¹

The term "specific pathogen-free" or "SPF" was used to replace "disease-free" because SPF more precisely defines hysterectomy (or hysterotomy) repopulation pigs or their normally farrowed offspring.

Pigs are considered pathogen-free when they leave the brooder when 4 weeks old, but they may encounter marginal pathogenic bacteria in a farm environment. Although clinical disease does not ensue, consideration of these pigs as pathogen-free would be misleading. Since the term SPF does not reflect absolute freedom of all diseases in pigs, it is a flexible term which can be used to indicate freedom from those troublesome diseases which are not a problem in individual pigs or an individual herd of swine. Because of its flexibility, SPF must be qualified as to those specific pathogens from which a given population is free. As our knowledge of diseases and disease control increases, the numbers of diseases which enter into the qualifications may be increased or changed without unduly disturbing laymen by a constant change in terminology.

Two other terms, "primary SPF stock" and "secondary stock" will be used. As previously defined, primary stock refers to those animals taken aseptically by hysterectomy, raised in brooders for 4 weeks, and then placed on farms. Secondary stock pertains to the naturally farrowed offspring from primary stock and succeeding generations of naturally farrowed SPF stock.

¹ Young, G.A., SPF swine. Advances in Veterinary Science. Academic Press, 1964, 64-65.

WHAT IS SPF-PIG PRODUCTION?

The diseases which cause the largest financial losses in pig production are:

Enzootic pneumonia (caused by *Mycoplasma hyopneumoniae*);
Actinobacillus pleuropneumoniae infection;
Swine dysentery (*Treponema hyodysenteriae*);
Aujeszky's disease (Aujeszky's disease virus);
Atrophic rhinitis (*Bordetella bronchiseptica* and/or *Pasteurella multocida*).

The safest means to avoid these diseases are to remove the infectious matters from the pig house, establish an SPF-pig herd and then prevent new infections from entering the pig house.¹

SPF-pigs are free from these infections, and they are also free from mange and lice.

The majority of the SPF-pigs in Denmark today are born to SPF sows by natural birth.

The first SPF-pigs are procured by making sterile caesarean sections (hysterotomy) on conventional (non-SPF) nucleus breeding-sows. The sterile caesarean prevents transfer of infections from the sows to their offspring.

Sterile caesarean sections are still being used to introduce new breeding stock to the SPF-programme.

The only difference between SPF-pigs and conventional pigs is that the SPF-pigs are free from the above mentioned diseases. However, they can still contract diseases such as agalactia (MMA), arthritis, post-weaning enteritis, internal parasites, etc.

THE DANISH SPF-PROGRAMME

Organization

The SPF-Company is a subsidiary under The Danish Bacon and Meat Council which is owned by the Danish pig producers.

The SPF-Company has its own regulations and its own board of directors consisting of 10 members. Four of these are appointed by the board of directors of The Danish Bacon and Meat Council, one is the managing director of The Danish Bacon and Meat Council, and five members are elected by the pig producers.

The objective of the SPF-Company is to promote purchase, sale and transport of pigs - primarily SPF-pigs - and any other factors which may improve the health and the economy of Danish pig herds.

The SPF-Company establish new SPF-herds and handles the purchase, sale, and transport of SPF- and MS-pigs.

The day-to-day business is taken care of by three regional offices. The head office is situated in Copenhagen.

¹ In principle other pathogens can be added such as salmonella, Campylobacter jejuni, Toxoplasma gondii. This may call for special precautions for feed supply free of such agents.

Apart from the daily business the SPF-Company takes part in the development of measures to prevent infection and diseases, as well as other tasks concerning pigs, in cooperation with The Veterinary Department and The department of pig breeding and production under The Danish Bacon and Meat Council.

Contracts

The pig producers who want to establish an SPF-pig production, must enter into a contract with The SPF-Company before the SPF-herd is delivered. The health control in the programme is secured through this contract. It also ensures that the SPF-advantages are of benefit to the pig producers.

By signing the contract the pig producer accepts that he will adhere to the rules which govern SPF-pig production. These rules outline the rights and obligations of the producer in connection with production of SPF-pigs.

THE SPF-PRODUCTION SYSTEM

The SPF-production system is shown schematically on the next page.

There are seven different types of SPF-herds grouped under two main categories, each designated a colour:

- Red** SPF-herds:
1. Breeding herds
 2. Candidate herds
 3. Multiplying herds
 4. Supplementing herds
- Blue** SPF-herds:
5. Production herds with sale of weaners
 6. Fattening herds
 7. Production herds without sale of weaners

The colour refers to the extent of the health control. The red SPF-herds sell pigs for live use - they are therefore subject to the strictest and most intensive control.

When certain conditions are fulfilled an SPF-herd can change status to any of the mentioned herd types.

1. **Breeding herds** are engaged in elite breeding and adhere to the same rules as the conventional breeding herds.

The breeding is based upon:

Individual testing of boars on stations

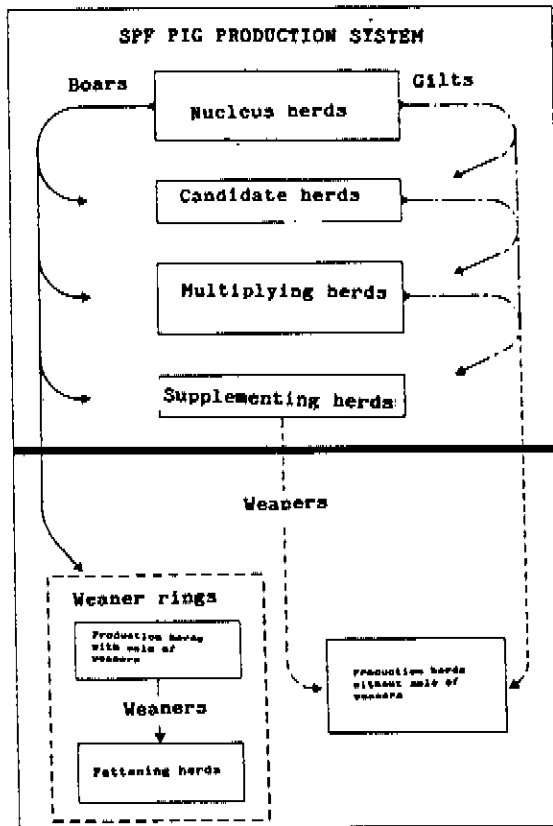
Testing off-spring on stations

Individual evaluation of breeding animals.

All necessary information is registered and electronically processed in a databank for pig breeding.

THE SPF-SYSTEM

Herd category



Health control

Red herds

Red herds produce and sell boars, gilts and weaners to other herds.

The health control is checked by the SPF-health control monthly.

Blue herds

Blue herds produce weaners for sale and/or pigs for slaughter.

The health is controlled by the herds' own veterinarian at least once every 13 weeks.

2. **Candidate herds** are herds which through a trial period of maximum three years eventually gain recognition as breeding centres.
3. **Multiplying herds.** Their jobs are to produce gilts and maiden gilts for production herds. They are based on breeding stocks constantly improved through maiden gilts bought from breeding herds.

Multiplying herds must have a considerable capacity, as they must be able to deliver large groups of animals at certain times, preferably for re-stocking complete herds.

It is permitted to breed several breeds as well as to multiply these in the same herd. By doing this all the pigs for a new herd can be delivered from the same herd.

4. **Supplementing herds** are large herds which sell weaners. They sell weaners through agreement of delivery when new herds are set up.
5. **Production herds with sale of weaners** are based upon production of weaners which are all sold to fattening herds.
6. **Fattening herds** produce slaughter pigs (from weaners which they have bought).

Weaner rings

Weaners are purchased and sold between type 5 and type 6 herds in weaner rings through written delivery agreements, preferably between one seller and one buyer. This fixed production cooperation is preferably established when a new herd is established.

This normally means that an SPF-weaner producer cannot be established unless an agreement is made with the future buyer - or vice versa.

On the questionnaire there is space for writing the name of the potential buyer/seller in such a weaner ring. The pig production advisor assists in working out the written agreement.

7. **Production herds without sale of weaners** run an integrated production, from which pigs are only sold directly to the slaughterhouse.

HOW TO ESTABLISH AN SPF-HERD

Ordering

Farmers interested in SPF-production may contact the local pig production advisor, the local veterinarian, or The SPF-Company for further information.

The SPF-Company will then send out information and a questionnaire.

The questionnaire must be filled in with information about pig house conditions, production type, production size, when to establish the SPF-herd etc. and sent to the SPF-Company.

When the SPF-Company receives the questionnaire - and not until then - the herd is entered on the list: "Interested in SPF-production".

In writing the SPF-Company confirms receipt of the questionnaire. No later than 3-4 weeks hereafter a delivery agreement is worked out and at the same time the advisor and practising veterinarian who are appointed in the questionnaire will be informed about the contract and the delivery agreement.

Time of delivery

Normally there is a lag of at least a six months before delivery of the new SPF-herd. **Pregnant animals are only bought and sold in limited numbers.**

The six months period give the seller and the buyer time to make the necessary preparations.

Herd area

In cooperation with the veterinarian and the advisor the lay-out of the herd area is planned in accordance with the regulations of the SPF-contract and guidelines on protection against infections.

Terms of delivery

About 3-4 weeks after the SPF-Company has received the order a delivery agreement stating time of delivery, number and category of pigs, and a provisional price for these is established. The agreement is signed by the buyer, the supplier, and the SPF-Company.

Three months before the agreed day of delivery the agreement automatically becomes binding. Therefore, if the agreement is violated, damages can be claimed according to the rules listed on the back of the agreement.

A fee will be charged for each change in the delivery agreement.

Three weeks before delivery - approval

The herd area where the SPF-pig production is to take place must be approved for this production before the SPF-pigs are delivered. The approval is carried out by the herd veterinarian or the pig production advisor.

The purpose of the approval is mainly to ensure that the protection against infections is carried out in accordance with the regulations. This is important for maintaining status as an SPF-herd.

The herd area does not necessarily have to be completely ready and disinfected at the time of the approval, but it **must** be completed by **the day of delivery**.

Three weeks before the week of delivery the new SPF-producer receives a "3-week package" consisting of an approval report form, 2 SPF-contracts and a herd journal. The owner himself must now make arrangements with the veterinarian or the advisor for an "approval visit", so that the approval report can be in the hands of the SPF-Company no later than Tuesday in the week before delivery.

Furthermore, one example of the SPF-contract - signed - must be in the hands of the SPF-Company at the same time.

If the SPF-Company has not received these 2 papers on Tuesdays, in the week prior to delivery, the buyer may risk the delivery postponed.

Health declaration

When the delivery agreement and the "3-week package" is sent out a health declaration is sent to the herd veterinarian - and the herd owner. This declaration is a summary of the health status of the delivery herd. The summary specifies outbreaks of diseases the herd has suffered from during the previous years; the dates of those outbreaks, the treatment which has been carried out and the prescribed drugs. The results of microbiological sensitivity tests are also given. With this summary in his hand the veterinarian of the new herd is able to diagnose faster and work out a preventive treatment programme for diseases.

This summary and the fact that SPF-pigs are free from the seven most common diseases and parasites means that:

SPF-pigs are pigs with a declared health status

Terms of payment

It has been mentioned earlier that The SPF-Company must be economically self-supporting. Any deficit which occurs must be met by all the SPF-herds through buyer- and supplier fees.

A. New SPF-herds

1. Advance payment of 100% of the expected purchase price incl. VAT (value added tax).
2. Deposit in own bank.
3. Bank guarantee.
4. Contract of sale with the slaughterhouse as guarantor.
5. Contract with slaughterhouse for weaners.

1.

This term of payment is the simplest of the 3 first mentioned.

In the mentioned "3-week package" there is a copy of the delivery agreement stating expected purchase price and a post office giro. The amount must be paid at the post office in such good time, that the amount is registered as received by The SPF-Company no later than Tuesday in the week prior to delivery.

Allow 4 - 6 days for expediting of post office payments.

The buyer may also pay by cheque.

The amount paid in advance is credited to the buyer's account and the interest is paid at the bank rate + 4% p.a. for max. 7 days before start of the delivery week up to the date of payment of the invoice.

2.

If you deposit you will have to fill in several forms to ensure that the amount may only be released by the bank when the invoice from The SPF-Company is submitted.

When you buy a complete herd, several invoices may be involved. Therefore, the buyer must go to the bank several times.

3.

A bank guarantee costs 3 3/8 o/oo stamp duty and many banks are reluctant to undertaking guarantees.

4.

In most cooperative slaughterhouse areas the purchase of an SPF-sow herd may be financed through a purchase contract between buyer and The SPF-Company and the buyer's slaughterhouse guarantees part of the purchase price, which is borrowed in the buyer's bank.

5.

Most slaughterhouses buy weaners on contract. In such cases the pigs must be marked by the SPF-Company at time of delivery.

The buyer himself must obtain a commitment from the slaughterhouse and acquire the necessary equipment for marking (can be purchased at the slaughterhouse).

B. Purchase for supplementing incl. purchase of weaners

When buying pigs for supplementing breeding animals or continuous purchase of weaners the rule is:

Cash payment on receipt of the pigs.

The payment should be settled by cheque.

An exception to this rule could be made when more than one load are delivered per week.

In this case the amount due for the whole week's delivery must be paid in advance so that the SPF-Company is in receipt of the payment no later than Friday before delivery.

c. Financing fee

A financing fee is charged in all deals where the purchase price is not paid in advance, nor paid on receipt of the pigs.

The fee comprises an administration fee and an interest compensation for The SPF-Company for 10 days from date of delivery up to the payment deadline after receipt of the invoice.

Delivery

As soon as the SPF-Company has received the approval report, the transport takes place. The SPF-Company moves the pigs in vehicles which are specially designed to protect the pigs against re-infection. The vehicles are about 10 m long and 3 m high and this should be remembered when planning the loading area.

Information about origin

With each delivery of breeding animals a document showing the origin is enclosed which also serves as delivery note. Data on the animals such as date of birth, parents and mating date are entered on the list. On reverse of delivery note the compensation rules under which the pigs are bought are stated.

Buyer signs a receipt when the pigs are unloaded, and he keeps a copy. The SPF-driver sends the top copy to the SPF-Company and on basis of this the SPF-Company issue an invoice.

Together with invoice buyer will get yet another copy on which the price for each individual animal is quoted. If buyer requires a list of the acknowledged animals in the delivery herd this may be requested.

Complaints and damages

On reverse of all delivery notes deadlines for complaints and regulations concerning damages are stated. These regulations are sent out with the information material. The SPF-Company recommends that the new SPF-producer reads these regulations very carefully before the herd arrives.

The regulations should not be considered only restrictions on the buyer's rights. They are a set of rules which outlines how buyer and seller can/must settle disputes.

Prices - weaners

Weaners are purchased and sold - if nothing else is agreed in the weaner-ring agreement - at SPF-prices, and the country is divided up into 3 regions:

Region 1: Eastern islands
Region 2: Funen; southern, western, and eastern Jutland
Region 3: Northern and central Jutland

If weaners are bought and sold across the regional boundaries, the pigs are sold at seller's regional prices and invoiced at the purchaser's regional price.

The difference is paid by The SPF-Company.

Fees for purchase, sale and transport of pigs

The income of The SPF-Company is based purely on fees for purchase, sale, and transport for each pig. The system of fees comprises only services requested.

The programme operates with purchase, sale, and transport of pigs (weaner-rings and fixed agreements for supplementary gilts).

The fees in the pool for purchase, sale, and transport are the highest per animal - and is charged per animal. The reason is that a lot of time is spent on each single delivery to find either a supplier or buyer.

Running purchase, sale, and transport are based upon fixed terms of delivery - you save administration costs, and more effective transport can be arranged.

Thus the average fee per animal is reduced. These fees are fixed in each individual agreement according to the number of animals in the delivery and the distance between supplier and buyer. The same system is used for new herds.

SPF-Risk Fund

The SPF-Risk fund pays damages in connection with "bought" infection, delays in agreed deliveries and extraordinary problems with fertility.

The regulations are listed in "Rules of the SPF-Risk Fund" - appendix to the SPF-contract.

Note: The contribution to the SPF-Risk fund is voluntary in connection with establishing a new SPF-herd and at delivery for supplementing.

Invoicing/settling of accounts

SPF-pigs are invoiced/paid for twice weekly: Monday and Thursday.

Invoicing/payment on Mondays is for pigs purchased, sold, and transported on Tuesdays, Wednesdays and Thursdays the week before. Invoicing/payment on Tuesdays is for pigs which are purchased, sold, and transported Fridays (and Thursdays) the week before, and Mondays that same week.

Even though the animals were paid for cash on delivery, the buyer will receive an invoice about 7 days later.

Only this invoice is valid in the VAT-accounts. On the invoice you can also see that the amount **has been paid**; however, if an accounting error has taken place this will be seen as a difference on the invoice. The difference must be paid within 7 days from invoice date by the buyer/supplier.

The amount to be paid is automatically transferred to the producer's account in the bank or at the post office. The amount is normally available for withdrawal on Thursdays for Monday payment and on Tuesdays for Thursday payment, i.e. an average payment time of 10 days from date of delivery.

SALES-PERSONNEL

The SPF-Company employ sales personnel to control the standard of the deliveries.

All new SPF-herds are offered a free visit by SPF-personnel 1-2 weeks after receipt of a new herd.

During the visit the standard of the animals which have been delivered is checked.

A possible compensation is discussed - this is to make sure that problems do not get out of hand.

During the visit the salespersonnel inform about special conditions when managing an SPF-herd.

PROTECTION AGAINST INFECTIONS IN SPF-HERDS

It is very important to the SPF-herd that re-infections are avoided. Protection against infections should not, however, be more extensive than necessary to maintain the health status of the herd.

The regulations for protection against infections are based upon these terms and stated in "Rules for SPF-herds".

The necessary and adequate protection against infection is in principle the same for all SPF-herd types. However, the possible consequences of an inadequate protection against infection are of course dependent on the breeding value of the animals and the type of herd - i.e. the possibility of transferring infections to other herds through purchase, sale, and transport of pigs.

Therefore, the demands to the red SPF-herds are stricter than those to blue SPF-herds - or more correctly stated: adherence to precautions against infections is stricter in the case of red herds.

Authorized veterinarians and advisors

The protection against infections in each individual herd can be established in cooperation with the veterinarian and the local pig production advisor.

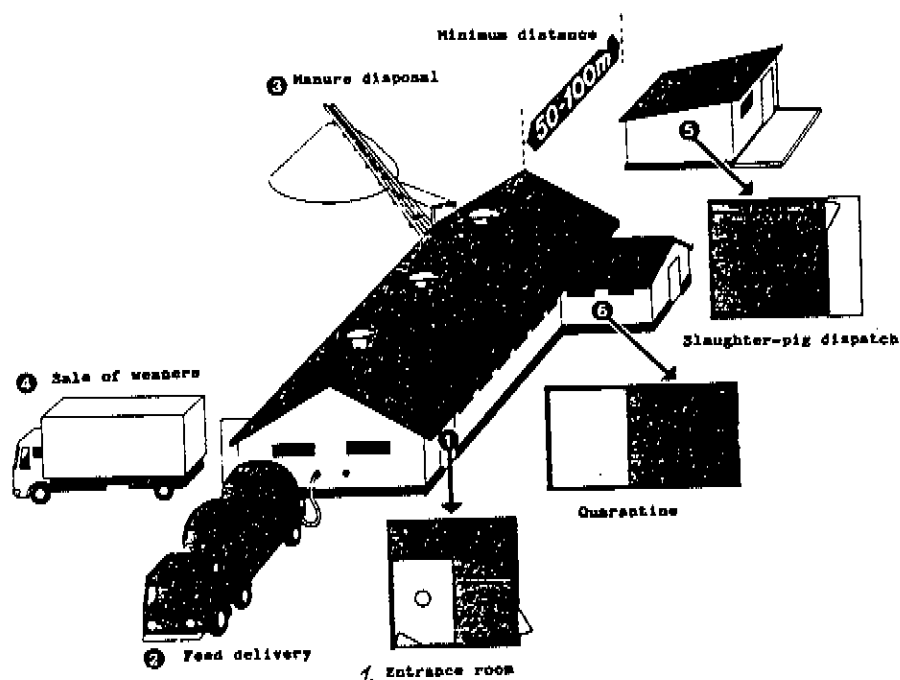
Before the SPF-herd is delivered, the protection against infections should be recommended by the veterinarian or the pig production advisor.

In order to secure a uniform recommendation procedure and increase security of the health control the SPF-Company has entered into a special agreement with about 80 pig production advisors and about 900 practising veterinarians.

Only these advisors/veterinarians are allowed to authorise the herd area, and only authorised veterinarians are able to carry out health control in blue SPF-herds (Also see page 36).

Basic rules on protection against infections

The objective of protection against infections is to preserve the health of the pigs. The health can be based either on the fact that the pigs are immune to/or are free from the diseases. The basic measures for protection against infections are:



1. Entrance room

Which is the only entrance to the pig house. Only for pig house personnel and necessary visitors.

2. Feed-stuff delivery

Feed-stuff delivered in bulk-lorries is blown in through a pipe-line from outside the pig house. The driver is not allowed in

the pig house area.

3. Manure heap

Dung-canals must be secured against rodent-invasion. Dead pigs must not be left on top of the manure heap but must be buried or sent to destruction.

4. Sale of weaners

Pigs are delivered from the delivery room of the herd. The sales personnel is not allowed entrance to the pig house.

5. Delivery room

Delivery of slaughter pigs to the slaughterhouse vehicle must take place from a delivery room placed as far away as possible from the pig house itself.

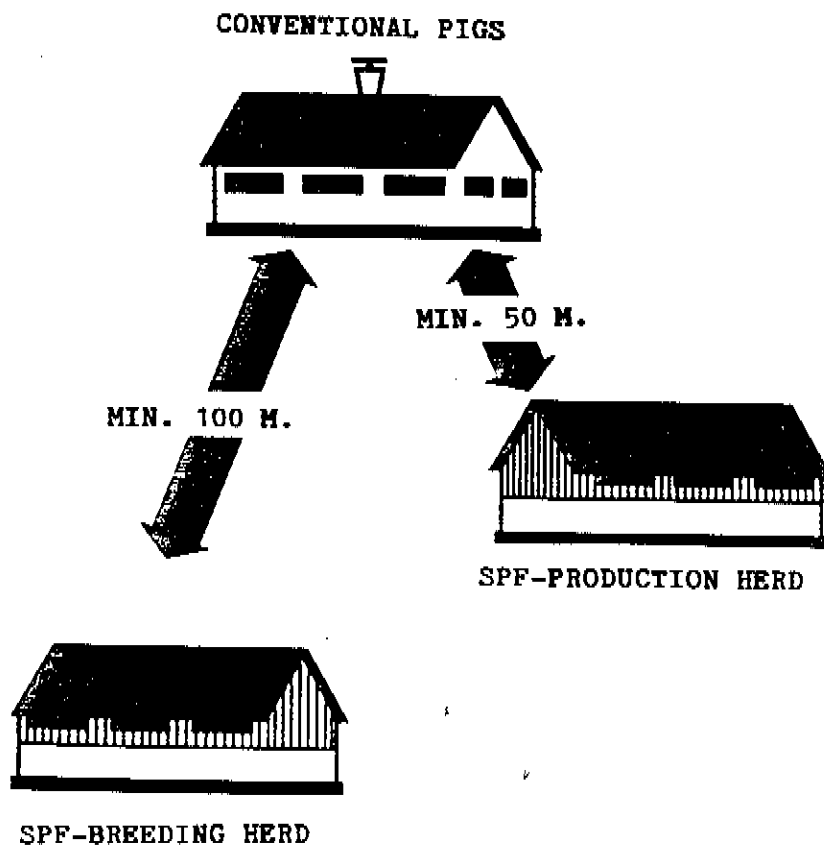
6. Quarantine room

Breeding animals must not be put into the pig house immediately but must be placed in a quarantine room for at least 6 weeks first. The quarantine room must not be in direct contact with the pig house and must be placed at least 50 meters from the pig house area.

1. Distance to neighbouring farm

A considerable distance to neighbouring farms with conventional pigs is advantageous.

The demanded minimum distances are shown on the drawings.



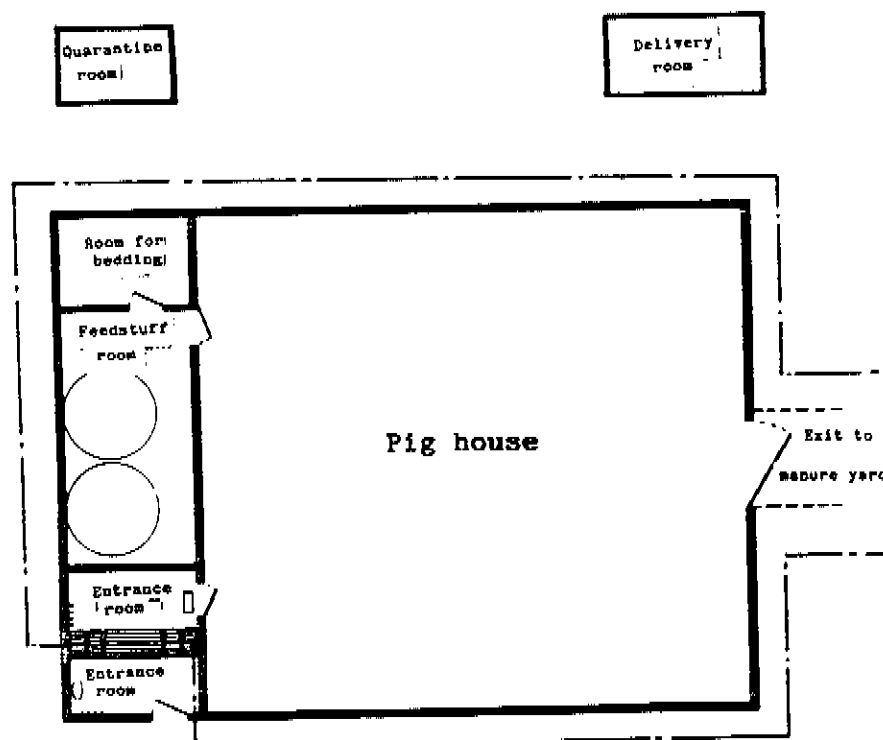
2. Herd area

All pig houses, rooms, and passages used for the SPF-herd are collectively named **the herd area**. The area must be clearly defined from the other parts of the farm and protected against interference.

The lay-outs of the pig house, fittings etc. are not very important to SPF. But the barrier around the herd area must be clearly defined. On the figures the broken lines mark the definition of the herd area.

The manure heap is included in the herd area if mucking out is done manually with a wheel-barrow. In this case the manure heap must be guarded with a fence, 1.5 m high.

Feedstuffs are blown into the herd area through pipeline from outside or is brought in in new paper-bags.



3. Entrance room

The only entrance to the herd area is through the entrance room.

On the next page you may see a draft of a typical entrance room -and some details to describe the use of it.

The walls of the entrance room should be easy to clean up to a height of 2 m and should be dustless.

The numbers on the drawing refer to the following:

1. **Only entrance** to the pig house area.
The door is equipped with a lock and it is to be kept locked. Place a bell at the door.
2. **Outdoor clothing and outdoor footwear** are taken off in the unclean area.
3. **Wooden grate** or plastic grate which must only be stepped on without footwear.
4. **Hands** are washed and disinfected.
5. **Pig-house clothing and pighouse footwear** for pig-house personnel, veterinarian and advisors and **all other necessary** visitors.
6. **Boot disinfection.** The **clean** pig house boots are disinfected in a disinfectant solution before being worn in the pig house area. The disinfectant solution should be changed daily.

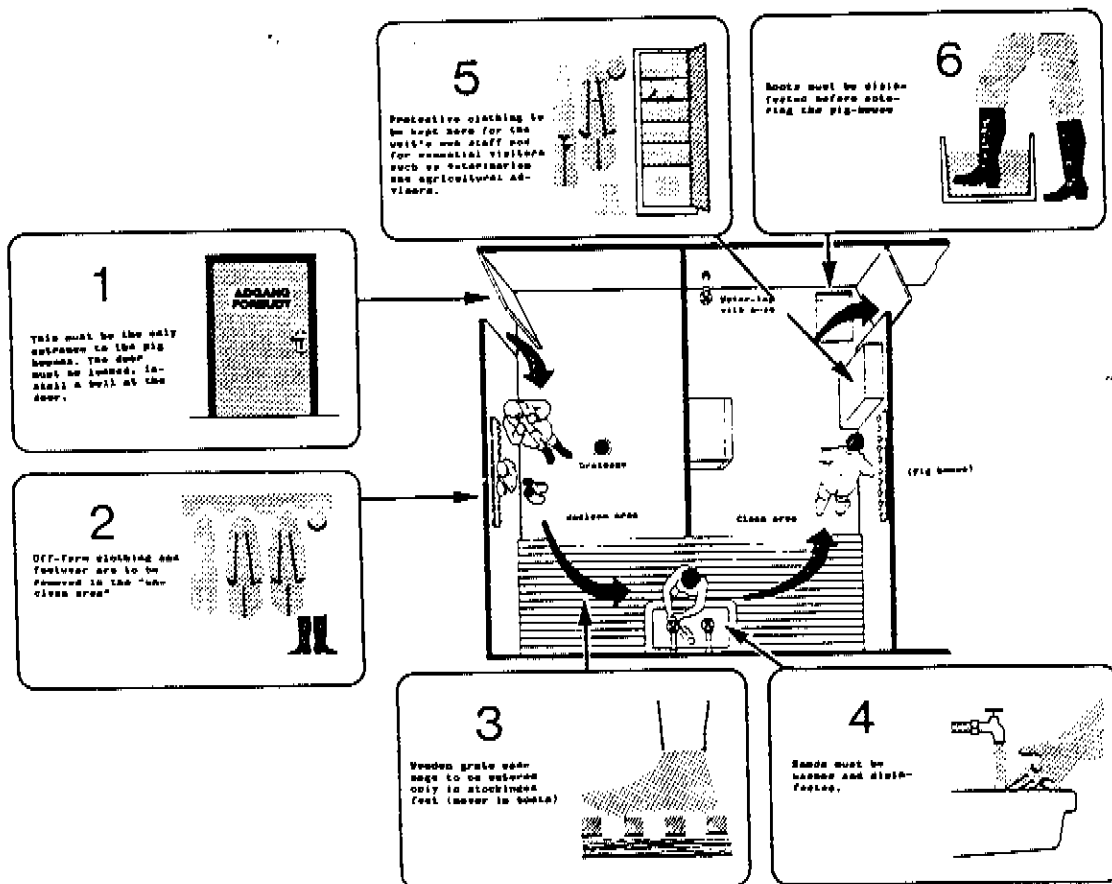
Entry should only be allowed for persons with an errand in the pig house. The visitor must - before entering the herd area - sign a statement that he has kept the hours of quarantine. This is done by signing the "Visitor's list" placed in the entrance room.

On the same list the owner/manager states whether he suspects a re-infection in the herd or not. The pig house personnel must also adhere to the same hours of quarantine.

The entrance room must only be used by human beings.

The floor level in the clean area should be 10-15 cm above the floor in the unclean area - and slope towards this area. Alternatively a cast, watertight edge of 10-15 cm between the 2 rooms is also adequate.

ENTRANCE ROOM, LAY OUT AND USE



Delivery room

To prevent the drivers from carrying in infections when they collect pigs for the slaughterhouse, a delivery room/pen for the slaughter pigs is established **before** the driver arrives. The best solution is mobile delivery i.e. a delivery room on wheels.

It must be stressed that the driver from the slaughterhouse bears no responsibility for transferring infections from his vehicle. The individual herd owner always bears the responsibility of safeguarding his herd.

The following page we shows a draft of one way of arranging a delivery room/pen. There are alternative ways but remember that the pigs must be able to spend the night here. Therefore, the floors should be insulated.

A delivery room should also be ventilated.

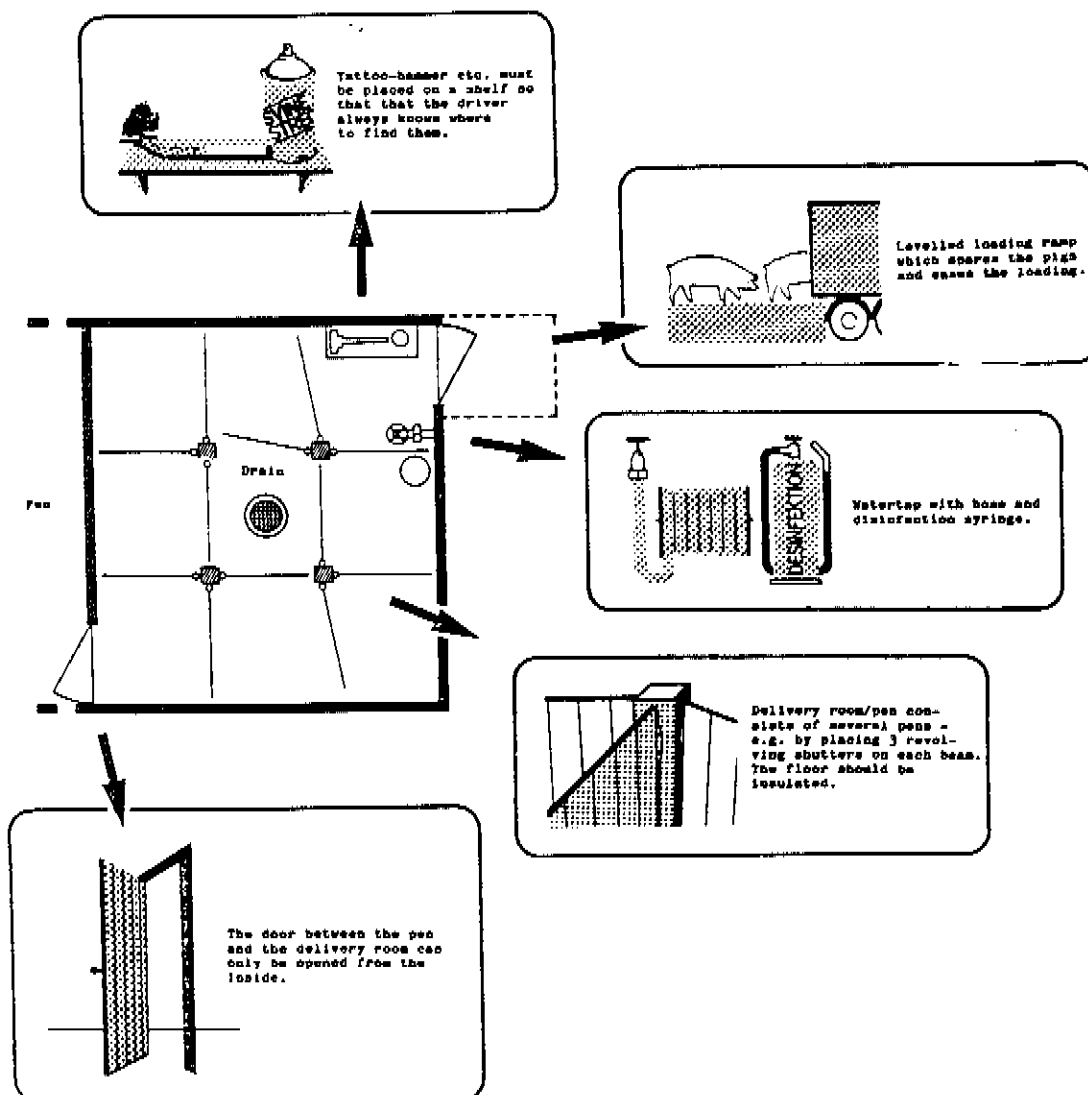
The use of delivery room/pen/vehicle:

- A. Before the driver arrives, the pig house personnel move the pigs out into the delivery room. Pigs from the same pen must be placed together.
- B. The door is locked from within.
- C. Running delivery: The vehicle is placed as far away from the pig house as possible for unloading into the slaughterhouse vehicle.
- D. It is now easy for the driver to "catch" and load the pigs.
- E. When the pigs have been removed, the room is cleaned and disinfected. This should be done from "outside".

The room is left for 24 hours before the door to the pig house is opened again.

DELIVERY ROOM, LAY OUT AND USE

1. The delivery room/pen vehicle is arranged with individual pens. One method of doing this is by installing swing doors on 3 sides of each post.
2. Tattoo hammer etc. is placed on a shelf so that the driver always knows where to find it.
3. Levelled loading ramp, which protects the pigs and facilitates the loading.
4. Watertap with hose and disinfection spray.



Quarantine room

Extract from:

RULES ON ARRANGEMENT AND USE OF QUARANTINE ROOMS FOR NEW ANIMALS IN RED AND BLUE HERDS.

NB: COMPENSATION FROM THE SPF-RISK FUND IS DEPENDENT ON WHETHER THE SUPPLEMENT ANIMALS WERE PLACED IN QUARANTINE ROOM.

1. Location: completely isolated from the herd area, ideally 50 m away. There must not be a direct entrance (door) to the herd area. (se 7).

Entry must take place from the outside. The quarantine room can also be placed on another farm.

2. Lay out: A proper entrance room is not demanded, but there has to be a grate, footbath and hangers for clothing inside the door.
 - a. Water from a tap. If this is not possible, water can be taken from a bucket. (NB: quarantine rules).
 - b. The quarantine room must not share feeding installations with the herd area. Feeding can be done automatically from a manger filled through a pipe in the wall. The pipe should be equipped with a lid. NB: The pipe must not go through to the herd area.
 - c. If the pig house is equipped with dung canals, these can be emptied when new animals are introduced/added into the herd. NB: If the animals are slaughtered because of re-infection the dung canal must not be emptied into the herd's dung canal.
 - d. Ventilation is carried out so that the outlet is situated as far away from the herd's inlet as possible. A filter on the outlet is recommended.
3. "Visiting"-rules: When you have been in contact with the animals in quarantine you must adhere to 12 hours of quarantine before you enter the herd area again.
4. Hours of quarantine: The animals ought to (**compulsory** with respect to red herds) be kept 6 weeks in a quarantine room. Transfer to the herd area must only take place with the written consent of The SPF-Company because the results of the blood test in the supplying herds taken 28 days after delivery must be known before the transfer.
5. The same requirements apply if the quarantine room is placed at the neighbouring farm or similar place.
6. Transport of the animals from the quarantine room to the herd area must take place in a way, that the risk of infection of the animals is minimized. If transport takes place from a quarantine room close to the herd area a clean and disinfected box may be used.

If the transport covers longer distances it must be done in an SPF-vehicle or a vehicle approved by the SPF-health control offices.

7. Every door to the herd area must be air tight and completely sealed off during the time of quarantine.
8. Lay out, transport, and other conditions should always be approved by the herd veterinarian (in red herds by the SPF-health control). The approval should be added to the SPF- or MS-declaration if this was not done when establishing the herd.
9. Quarantine rooms are always included in the regulations of the SPF-contract as well as rules for SPF- and MS-herds.

CLEANING AND DISINFECTION IN SPF-HERDS

1. Before establishing the SPF-herd

Cleaning of the herd area

The pig house is emptied of all animals and is mucked out thoroughly. Manure heap is removed, and liquid manure tank is emptied.

Thereafter walls, floors, ceiling, and fittings of the pig house are soaked with plenty of water.

You start the cleaning by daubing cleaning material on all surfaces and after half an hour these are flushed with the high-pressure cleaner until all visible dirt has been flushed away. Wooden partitions, cracks, crevices, protrusions and corners make it necessary to be very thorough. Pig house tools etc. are soaked and flushed clean.

Everything else that belongs to the internal herd area i.e. connection corridors, feedstuff room, bedding room, silos, and attics are cleaned thoroughly.

Cleaning is finished off with a thorough flushing.

Sewers, mud boxes, dung canals etc. are cleaned.

Manure storage location is cleaned out.

The liquid manure tank is emptied again.

Establishment of infection protection measures and repairs to the pig house.

Measures for protection against infections (entrance room, delivery room etc.) demanded according to the SPF-contract are established.

Repairs in the pig house are carried out. Broken wooden material is replaced, and cracks in the floor and mangers are repaired.

When all repair work has been carried out a final cleaning of the pig house area in question takes place.

Disinfection

The pig house is sealed i.e. all valves, doors, windows and openings are closed, and all cracks are sealed with plastic.

Hereafter all surfaces in pig house, entrance room, delivery room, connecting corridors, feedstuff room, bedding room, silos, and attics are sprayed with a 3% formalin-solution with a hand sprayer or a high pressure cleaner. Spraying with formalin is only effective when temperature is above 4 C. The effectiveness increases with the temperature, and a temperature above 15 C is recommended.

All feedstuff equipment, pig house tools, heating lamps etc. already thoroughly cleaned and placed inside the herd area are also sprayed with the 3% formalin solution.

Rubber gloves and protection masks with charcoal filter are necessary when disinfecting with formalin.

The pig house should be sealed off for 24 hours and afterwards aired for 48 hours. Mangers and floors are then flushed with clean water, so formalin residues are removed.

Sewers, mud-boxes, dung-canals etc. are disinfected with 3% formalin solution at the same time as the pig house is disinfected.

The manure yard is soaked with a thin solution of milk of lime or covered with chloride of lime (1.5 kg calcium oxide in 10 l water).

It is advised to order the formalin solution 1-2 months before expected use. By doing this you avoid delays that might affect delivery of the pigs.

After disinfection

After disinfection the herd area is considered an SPF-area. The doors are kept locked, and admittance of persons to the herd area must only take place through the entrance room.

Admittance of the SPF-herd

At least 3 weeks must pass from the time when the old herd has been taken out and till the new SPF-herd is admitted. These three weeks can be used for cleaning and disinfection.

2. When the SPF-herd has been established

During your daily work you must ensure a high level of hygiene - just like in a non-SPF-herd - as this is one basis for a good healthy condition of the herd. The pens must be clean and dry, and mangers and water cups kept clean. When farrowing is about to take place you must ensure an especially good hygiene of the

sows (farrowing hygiene). At suitable intervals a thorough cleaning of the pens or preferably the whole pig house at a time should take place - for instance in connection with batch production.

The cleaning is carried out using the same methods as those defined under point 1 "Before admitting the SPF-herd".

Disinfection can be carried out with one of the following four materials:

1% chloramine solution.

1% chloride solution.

NB: Iron fittings must be flushed about half an hour after disinfection with the chloride.

0.3% sodium hydroxide solution.

3% formalin solution.

NB: Formalin and sodium hydroxide solution must not be used while animals are present in the pighouse, and you must use protection mask and rubber gloves when disinfecting. By use of formalin disinfection the mask must be equipped with a charcoal filter.

Entrance room

A vessel containing the materials for disinfecting boots, clothing, pighouse tools, instruments, etc. is placed in the entrance room. The disinfection solution is changed when it is contaminated and **at least once a day**. In the disinfection vessels you use chloramin in a 1% commercial solution.

NB: No disinfection material will function if the material to be disinfected is dirty. Therefore, make sure that especially the boots you use in the pig house are clean - also on the sole - before dipping them into the disinfection vessel. Cleaning of boots must not take place in the entrance room but in the pig house room. Therefore, a watertap and brush must be situated just by the door between the entrance room and the pig house.

DELIVERY OF PIGS

Delivery room or pen for slaughter pigs must be cleaned and disinfected very thoroughly when the driver has collected the pigs for the slaughterhouse - but it **must** be done from the outside.

Delivery locations for animals for live use must be cleaned and disinfected **before** use.

For disinfection you use chloramin in a 1% commercial solution (100 g chloramin powder in 10 litres of water.)

Manure heap

When you have removed the manure heap you must clean and disinfect the location of the heap. For the disinfection you use milk of lime (see page 32) or 0.3% sodium hydroxide solution.

Cleaning- and disinfection materials

When you disinfect the pig house use the following commercial solution per 10 m² of surface area:

Porous surfaces: 2 l (about 0.8 l per m² floor)
Light porous surfaces: 1.5 l (about 0.6 l per m² floor)
Non-porous surfaces: 1 l (about 0.4 l per m² floor)

Measures stated in parentheses can normally be used for calculating the amount of solution to be used for disinfection of all surfaces including partitions between the pens.

HEALTH CONTROL IN SPF-HERDS

The SPF-health control monitors the health status in the SPF-herds and controls whether the agreed rules for protection against infections are adhered to.

Health control is carried out by the owner himself by daily checking that the pigs are free from coughing, short breath, loss of appetite, diarrhoea, mange, lice, sneezing, crooked noses and notifications about diseases from the slaughterhouse.

The SPF-producers carry out the health control in close cooperation with the herd veterinarian.

If any particular problems arise contact the SPF-health control which is attended to by the district veterinarian.

In **red** SPF-herds the health control must be very thorough, as these herds deliver breeding animals and weaners with a declared SPF-status for establishing new production herds and supplement to existing herds. The health control in these herds is attended to by the district veterinarian. The district veterinarian or his veterinary technician visits the herd monthly.

The fees for the health control is fixed by The Danish Bacon and Meat Council.

If possible an agreement is made with the chief veterinarian of the slaughterhouse in order to carry out an extended disease check on slaughtered pigs.

In **blue** SPF-herds the health control is attended to by the owner and the herd veterinarian.

The owner checks the health during his daily supervision of the herd and the herd veterinarian once every 13 weeks.

During his visits the veterinarian of the herd should check the pigs and check that measures for protection against infections (in entrance room, delivery room, etc.) are carried out correctly.

SPF-declaration

If the veterinarian finds that conditions are satisfactory he will fill in an SPF-declaration and sign this. The declaration is sent to the district veterinarian in his region. Only **authorised** veterinarians can sign SPF-declarations. A running control is carried out every 13 weeks to make sure that a SPF-declaration is made up for each herd.

If more than 13 weeks have passed without a visit from the veterinarian and issue of SPF-declaration, a sales stop is issued for the herd immediately. Notification is sent to the herd owner in writing and he will be allocated a period of 14 days in which to send in the SPF-declaration. Furthermore an administration fee will be charged. If the declaration and fee has not been sent in within 14 days the herd loses its SPF-status.

The consequences are manifold and some of them are:

No sale of SPF-pigs, problems on delivery of SPF-pigs (boars, gilts etc.). The herd owner is still tied by the SPF-contract concerning sale etc.

Sales stop

If suspicion of infection arises this **must** be notified to the SPF-Company immediately and a sales stop is imposed. This sales stop is notified to the herd owner in writing. The sales stop means that the herd can no longer sell pigs - except for delivery to the slaughterhouse and weaner-ring-partners; furthermore ultra sonic scanning cannot be carried out in the herd.

The basis for this drastic measure is the fact that the suspected infection could be carried to other herds. In other words it is a measure of protection.

Of course the suspicion should be confirmed or invalidated. The district veterinarian and/or the herd veterinarian carry out the inspections - dependent on whether the herd has red or blue status.

Inspection includes a thorough check-up of the herd (clinical control) and autopsies, bloodtests, etc.

Organs from dead pigs are checked at the National Veterinary Serum Laboratory. These investigations normally take 3-4 weeks.

If the suspicion is invalidated this is notified in writing. If the suspicion is confirmed, the herd is declared re-infected.

Suspicion of purchased pigs

The health control in the red herds includes monthly visits, and a minimum of 10 bloodsamples are taken and sent to The Danish Meat Research Institute for examination for anti-bodies against the diseases from which SPF-pigs should be free. Sometimes the laboratory technique is so sensitive that it proves positive - a result which later turns out to be false. However, whether the test is positive or negative it can only be checked by taking new samples. Therefore a sales stop may suddenly be imposed on a breeding herd prior to or during delivery to a new SPF-herd.

Of course both events are unpleasant but essential for the functioning of the SPF-programme.

In each individual case the buyer is thoroughly notified of the basis for the suspicion and the possibilities for delivery of pigs from other herds.

Usually deliveries from other herds are not allowed because all breeding animals are assigned to other buyers.

Compensation can only be demanded for deliveries postponed according to the rules of the SPF-Risk Fund.

If it is ascertained that purchased pigs were infected already when bought compensation is paid according to the rules of the SPF-Risk Fund.

Re-infection

Re-infection of an SPF-herd means that the pigs have been re-infected with one or several of the diseases from which SPF-pigs should be free.

We therefore recommend that protection against infections and good hygiene in the herd are fully maintained - this includes purchase of SPF-pigs only.

When ascertained that a herd has been re-infected a re-infection report is written stating the causes of the infection.

At the same time the herd owner gets a written note about the re-infection and that the health control has been discontinued.

If the pigs are infected with Enzootic Pneumonia specific rules are followed.

FEEDING SPF-PIGS

SPF-sows and weaners are fed according to normal standards.

The slaughter pigs can be fed according to standard guidelines. It is recommended however, that a feeding plan is worked out in cooperation with the pig production advisor.

The feed-stuff must not contain antibiotics unless it has been prescribed by the herd veterinarian for treatment of diseases. Feed-additives in the officially allowed doses may be used for pigs under 30 kg.

Waste (kitchen-, industrial waste etc) must not be used.

BEDDING

Chips for bedding must be delivered on a vehicle which does not transport pigs. Foreign chips must not be received until 48 hours after import to Denmark.

ARTIFICIAL INSEMINATION

Inseminators are not allowed in SPF- and MS-herds. However, in certain areas of the country the inseminators distribute semen. They are also allowed to distribute to SPF-herds but on the following conditions:

The semen containers must be packed on the AI-station.

During transport the AI-package must be kept separate from the inseminator's other AI-materials. The AI-package must **not** be delivered directly to the herd area/entrance room but must be delivered to the farmhouse or some other location agreed in advance.

Artificial Insemination (AI) can be used to advantage in SPF-herds if you want to use boar material with a high breeding value. Batch production and crossbreeding are easier when using AI and demand less boar material.

If you use AI in SPF-herds you must be aware of the risk of carrying in infections - not with the boar semen itself - but through the packaging. Semen and equipment should be taken into the herd area according to regulations. By using disinfection materials you must be aware that the semencells are killed by disinfection materials.

When the semen is dipped into disinfection fluids you should know that semen cells are very sensitive to temperature. The disinfection bath temperature must be 18-20°C.

To be able to obtain the best results with AI regarding gestation percentage and the size of the litter, we strongly recommend that you follow courses in owner insemination.

PRACTICAL INFORMATION

Purchase and sale of weaners

The purchase and sale of weaners normally take place according to weaner-ring-agreements.

Ordering and entering weaners can take place in two ways:

1. A weaner delivery note
2. By telephone

1.

When you deliver/pick up pigs state number of weaners on the delivery note and when you want the pigs delivered/picked up next time.

The herd owner receives a copy of the note so that he can always see what is registered. This order/entry is considered binding until any other message is given.

NB:

This method cannot be used if you deliver/pick up pigs on Wednesdays, Thursdays and Fridays and you want the pigs delivered/-picked up the week after. The reason for this is that the transport list for the whole week is prepared on Thursdays and the order/entry will arrive too late at the SPF-Company

Ordering/entering weaners can be done over the automatic telephone answering service all week - however not later than Wednesday when ordering for the week after.

The telephone answering service starts by informing you about the prices of weaners, and then you have 30 seconds to state your message: herd no. name, number of pigs and, if necessary, your normal supplier (pig-ring-partner).

The information about delivery/pick up will be given by the SPF-driver with 2 days' notice. If the pigs cannot be delivered/picked up the week mentioned, this will be notified the Friday before.

By order back up or surplus of pigs the priority is as follows:

1. Pig rings
2. Permanent buyers/sellers
3. All other buyers/sellers

Purchase and sale of breeding animals

Only breeding-, candidate and multiplying herds are allowed to sell breeding animals. Any surplus of gilts in production herds **can** be sold when authorisation has been given by the SPF-Company but authorisation is only given in very few cases.

Supplementary female animals can be ordered at the SPF-Company on a special order card. It will always be advantageous to buy these as maiden gilts. It is not advised to buy gilts.

We recommend that you enter a permanent delivery agreement for supplementing of maiden gilts. Boars are ordered as early as

possible with the SPF-Company on a special order card. Exceptionally the boars can be delivered from one week to the next. A new card will be sent out together with the invoice. If you fill in the card completely and accurately there is a greater possibility that you get exactly the boar you want.

Loading and unloading of SPF-pigs

According to the SPF-contract sellers and buyers must help with the loading and unloading of pigs with at least one man.

To maintain the security of the SPF-programme the loading of supplemental breeding animals - especially boars - must not be done directly into the herd area.

The animal/animals must be received in an empty and clean transport box at least 50 m from the pigs house area. The SPF-driver disinfects the box.

If possible the animals can be loaded into a room which is not directly connected with the pig house. The reason for these measures is that infections may be carried to the other animals on the vehicle which are to be delivered to other herds.

The transport box solution is recommended as the box may also be used for transport of slaughterhouse sows to a place where the driver can load them with no risk of re-infecting the herd.

It is the duty of the buyer to receive bedding and manure remains when unloading. It will also be an advantage if the SPF-vehicles could be washed on the buyer's farm. A location with a firm surface and a watertap is therefore desirable.

Access requirements for SPF-lorries

Access to delivery room or loading ramp should be possible without problems. A firm base/surface is preferable and please allow room for manoeuvring of the SPF-vehicle which is about 10 meters long.

Loading ramps

For picking up weaners and pigs for the slaughterhouse it is an advantage for pigs as well as humans that loading can take place with the help of a ramp. On the following pages some diagrams show some of the existing solutions with dimensions.

Delivery of breeding pigs from **red SPF-herds** must take place along a stationary ramp.

Pigs for slaughter must be delivered from these herds through a mobile delivery room.

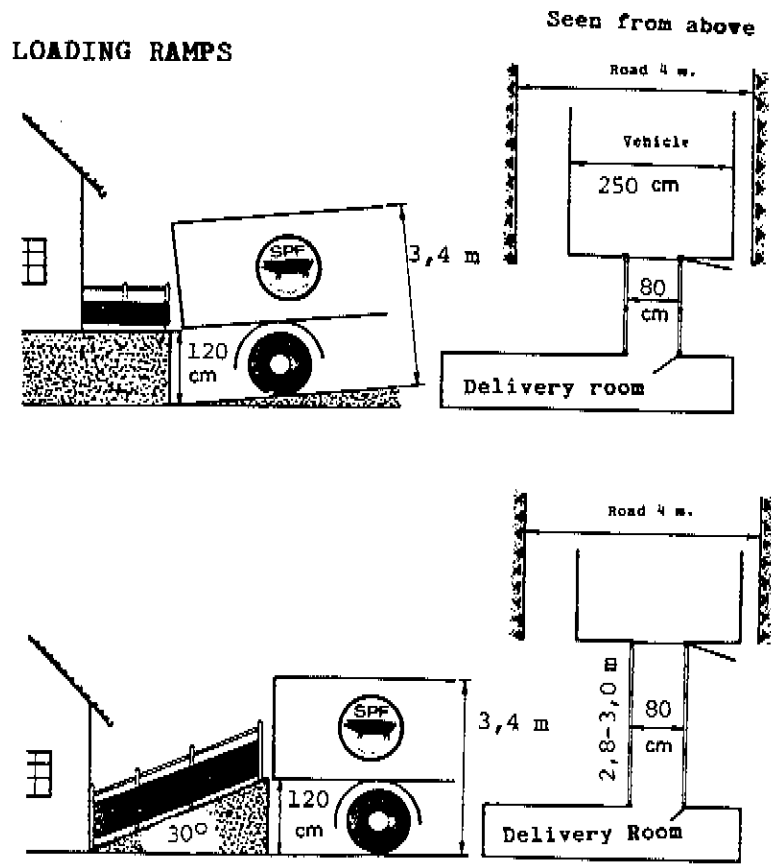
Delivery/receipt of SPF-weaners in **blue herds** must take place along a stationary ramp, if you have a running sales/purchase agreement for weaners.

Ramps for weaners (for live use) may be placed in direct connection with the pig house, whereas ramps for pigs for slaughter

ought to be moved as far away from the pig house as possible. In principle the same ramp must not be used both for live animals and for slaughterhouse-pigs.

When SPF-weaners and SPF-breeding animals are collected a rebate can be made if they cannot be loaded through a ramp.

There may also be a fee if the loading of SPF-pigs takes longer than normal.



Emergency slaughter/destruction

Pigs with an incurable disease or who have suffered damages (e.g. dislocations, fractures, etc.) must not suffer and must therefore be emergency slaughtered or destroyed.

Emergency slaughter must only be performed after having consulted the herd veterinarian who has been instructed about how this is done in SPF-herds.

Destruction may be carried out by the herd owner. For this purpose a stunning gun is advised. You may find further instructions in the herd journal.

Dead pigs

Dead pigs should be collected as far away from the herd area as possible. The vehicle from the incineration plant is a very great infection risk. **Therefore:** avoid leaving dead animals in the delivery room for longer than the time necessary for the completion of the morning's duties.

Do have a post-mortem performed and ask the veterinarian who carries this out to look for signs of infections of "SPF-diseases".

If you send material to the serum laboratory the herd veterinarian must always use the note which is in the herd journal. By doing this you ensure that the laboratory can see that it is an SPF-herd, and a copy of the answer is automatically sent to the SPF-health control.

Locking of doors

Do remember to lock all doors - while you work in the pig house as well as after you have finished. Not everybody respects the signs "No Admittance" - some even get more curious.

Lock the door and place a bell at the door to the entrance room.

We also recommend that you put up a "STOP" sign for pig transport vehicles in the driveway.

Health problems

If health problems occur in the herd always contact the herd veterinarian. He may then seek advice from the district veterinarian.

The herd veterinarian notifies the district veterinarian if there are any signs of re-infection.

Management problems

To work with an SPF-herd is in principle not different from working with a conventional herd. Therefore, the herd veterinarian and the local advisor can advise and guide you on most questions that may arise.

Therefore: always contact the advisor and the veterinarian when you have problems. The SPF-Company and the district veterinarian are of course always available, if you have special problems.

DISEASES IN PURCHASED PIGS

Porcine Parvovirus infection (SMEDI)

SMEDI is a virus disease caused by porcine enterovirus or parvovirus. In a typical outbreak of disease embryonic deaths will occur contemporarily in all pregnant animals in the herd.

If SMEDI occurs during the first month of pregnancy, an involution of the embryos will take place, and in many cases the animal will come in heat and be able to become pregnant again.

If SMEDI breaks out later in the pregnancy, the embryos cannot be involuted, and they become mummified. The dead embryo remains in the uterus, or stillbirth will take place about one week after expected farrowing date.

PREVENTION

1. Avoid buying pregnant animals - also when you establish the herd.
2. Only buy maiden gilts. These are vaccinated twice against porcine parvovirus 4 and 2 weeks before pregnancy.

Pregnant animals and maiden gilts over 24 weeks are vaccinated - otherwise the vaccination programme will commence at the seller's expense.

3. Supplementary breeding animals (female animals) ought to be bought when they are 3 - 4 months old so that they have sufficient immunity against the new herd's infectious matters. On the other hand they can very well bring in diseases which might attack the new herd.

Therefore always buy supplementary breeding animals from the same herd and place them in the quarantine room.

GLASSER'S DISEASE

Glässer's disease is caused by a bacterium *Haemophilus parasuis*, widely spread within SPF-herds as well as conventional herds.

The disease is often associated with stress during transportation of piglets.

The disease may, however, hit all ages of pigs - purchased as well as own pigs.

An outbreak of Glässer's disease takes a rapid course. Early treatment is absolutely necessary.,

The herd journal distributed to new SPF-herds 3 weeks before delivery has a description of symptoms and correct treatment.

ENTERITIS CAUSED BY CL. PERFRINGENS TYPE C

The enteritis is caused by a bacterium, Clostridium perfringens type C. This disease is included in the SPF-programme, as the bacterium is able to survive for a long period (years) and is difficult to control by a sanitation programme.

The disease may be prevented by vaccination of the pregnant animals or serum treatment of newborn pigs.

In order to protect the buyers against losses caused by outbreaks of enteritis with purchased animals, all pregnant animals to be sold are vaccinated against enteritis Cl. perfringens Type C in accordance with the current vaccination programme.

THE MS-PROGRAMME

Since the SPF-programme was started up approx. 1000 herds have been re-infected - most of these (80%) with Enzootic Pneumonia. It is characteristic for the Mycoplasma infections that they have minimal health and economical consequences. However, the herds have lost their SPF-status, and their ties to the SPF-Company. Many owners of infected herds have from time to time told us that they would like to keep their ties to the SPF-Company.

We have therefore established a parallel system to the SPF-PROGRAMME for these Mycoplasma-reinfected herds. The programme is named MS.

MS-herds must adhere to the SPF-contract and the rules on all points - only with a few changes which means that the MS-pigs are not guaranteed free from Enzootic Pneumonia. The MS-pigs are purchased sold and transported by the SPF-Company - but of course totally separated from the SPF-pigs. The transport of MS-pigs takes place in SPF-transport vehicles after special guidelines. It is the plan however, to use a number of vehicles especially for these transports.

When an SPF-herd has been declared infected with Mycoplasma it automatically enters the MS-programme.

The MS-programme consists of red as well as blue MS-herds. The status as a red MS-herd will normally only be achieved by red SPF-herds which are infected with Enzootic pneumoniae.

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