



D3. Sanitation and Building Design

D3.1 Introduction

D3.1.1 Sanitation

Disease can either cause death or hinder normal development. Good sanitation helps to reduce disease and decreases the need for the use of antibacterial agents.

An understanding of how the microbes responsible for illness survive and multiply helps us define strategies that will also reduce food-borne diseases and the risk of antibiotic residues.

Direct contact with diseased or carrier pigs or their nasal secretions, saliva, urine and manure is the most common method of pig-to-pig disease spread. Humidity is essential for microbial survival. Therefore, water leaks and the practice of housing more animals than your building's ventilation system can cope with also readily increase humidity and the risk of disease.

Mixing pigs from different areas or sources spreads microbes. An environment such as a pen or transport vehicle, contaminated with secretions left behind by previous pigs, permits transmission by **indirect contact**. *Salmonella*, for example, can survive nine months at 22°C in stored manure.

Inadequate drainage leads to flooding of pens and feeding areas with backed-up manure and also increases bacterial contamination. Manure could also contain violative levels of antibiotics from earlier production stages, if manure pits overflow.

Mechanical vectors, such as boots, dust and tools may carry enough microbes from a pig-contaminated area to infect pigs in another area. Rodents, cats, dogs and flies can be mechanical *and* **biological vectors**. As well as

being able to carry microbes the way a pair of boots would, they are capable of multiplying microbes in their bodies. Grain litter and unswept alleyways may feed disease-spreading mice or rats. Cats that freely move in and out of the barn and throughout production areas have the potential to transmit food-borne diseases like *Toxoplasmosis*. Employees are another important mechanical vector. They must be made aware of how they can transmit organisms from one area to another, and must be provided with adequate hygiene facilities.

The simplest sanitation calls for removal of microbes and the conditions that support them.

The choice of disinfectant will vary according to the type of organism targeted and the kind of surface area to be disinfected. Some disinfectants are more costly than others; some shorten the life expectancy of barn equipment and some can be toxic to pigs if not properly rinsed away. The decision about whether to use a phenol-, hypochlorite-, quaternary ammonium or chlorhexidine-based disinfectant depends on the targeted organism.

D3.1.2 Building Design

Building integrity is essential to any production unit. Falling ceilings and other extreme forms of building deterioration do not meet the prerequisite for HACCP-based production.

Building materials must be free of chemicals that could introduce residues to the pig and remain in the pork. Pressure treated lumber should not be used in penning for the same reason that you must not use shavings from pressure treated wood as bedding. The chemicals used to preserve the wood, when ingested, remain in the fat and will result in residues.



Other construction materials used should be sturdy, easily cleaned and free from foreign objects that could become physical hazards to the pork.

A well-designed ventilation system allows for proper control of gases and humidity. Control of humidity is particularly important for food safety in order to remove moisture, the most important item for the survival of microorganisms. Proper control of gases from carbon dioxide, ammonia and hydrogen sulfide provides a healthier environment for growth and maintenance of breeding stock.

D3.2 General

(On-Farm Quality Assessment Form question #25)

- The simplest sanitation program calls for removal of microbes and the conditions that support them. Microbes require humidity to survive. Dust and cobwebs offer a place for bacteria and viruses to grow and survive. The most basic elements of your sanitation program will relate to the removal of these elements through ventilation, sweeping and routine cleaning.
- It is not necessary to apply your sanitation program to each area of the barn at the same time. The CQA® program does require, however, that your sanitation program be applied in each area of the barn at least once per year and that you have a plan for routine maintenance such as sweeping and removal of dust and cobwebs. These maintenance tasks can readily be incorporated into routines.
- All-in-all-out operations should be thoroughly cleaned following each batch of pigs.
- Continuous-flow operations should be cleaned when weather conditions permit adequate drying conditions within the barn.
- Straw-based systems, including barns, pole-barns, hoop structures or any other straw-

based system held within a structure must have all bedding materials removed at least once per year. It is recommended that bedding be removed more frequently, if possible.

- A thorough cleaning program must address clean-up of spillage of feed, feed ingredients, medications and agricultural chemicals.
- Feeders and feeding areas must be included in your barn sanitation protocol.
- Consider routine scraping of pens to remove excess pig waste while the animals are in the pens.
- Liquid manure pits must be managed to avoid overflow into the pen areas.

D3.3 Cleaning and Disinfection

(On-Farm Quality Assessment Form questions 25a, 25b)

- It is recommended that detergents be used in the sanitation program. Detergents help to remove biofilm, the film of organic matter that sticks to pen floors and walls. This biofilm helps to protect bacteria and viruses from removal and disinfection.
- Consider the use of a garden hose and backpack sprayer, to focus on specific pens, when cleaning in a continuous flow operation.
- Power washing or pressure washing is recommended for rooms that have no pigs in them, are made of impervious surfaces that can withstand the high pressure and which have electrical systems designed with specifications that allow it.
- Consider the use of foaming applicators to permit more visible application of cleaning and disinfecting agents. This application method helps to ensure that you have covered all surfaces and may help increase contact time with surface materials.
- Ensure that you allow surfaces to dry sufficiently. It is recommended that surfaces be allowed to dry for 24-48 hours. A minimum of 12 hours is absolutely necessary.



D3.4 Selection of disinfectants

- Disinfectant activity is improved when organic matter is thoroughly removed from the area.
- Disinfectants should:
 - Work well in the presence of organic matter;
 - Be compatible with soaps or detergents;
 - Be harmless to building materials; and
 - Be relatively non-toxic.
- Carefully read label directions to ensure proper dilution rates and exposure times.
- The various categories of disinfectants include:
 - Phenols
 - Chlorine-based
 - Iodine-based
 - Quaternary ammoniums
 - Aldehydes
 - Peroxygen formulations
 - Alcohols
 - Lime (For more information on lime, talk to your veterinarian, validator or provincial coordinator.)

Consult with your veterinarian to determine an appropriate disinfection routine for your operation.

D3.5 Boots

(On-Farm Quality Assessment Form questions #25, 26, and 27)

- Clean boots can be more effectively disinfected than dirty ones. Research has shown that, for removal of bacteria, scrubbing visible manure off boots using water is as effective as scrubbing visible manure off boots using disinfectants. It is recommended that you provide facilities to pre-clean footwear.
- Be aware that every disinfectant requires a different exposure time. Read the label carefully to ensure that you know how long your boots must be in contact with the disinfectant

- for effective use. In other words, simply walking through a boot bath will not disinfect boots.
- Boot baths should be long and wide enough so people are forced to walk through them and should be a minimum of 10 cm (4") in depth
- The design of the bath should facilitate easy drainage.
- Boot baths should be protected from the weather.
- Disinfectant should be replaced regularly following the manufacturer's directions. Dirty boot baths are not effective.
- If you have a multi-commodity farm, be aware that you may wear your boots in different areas around your farm and in transit, but that boots can act as a vector for foodborne pathogens and disease organisms. You should not wear the boots you wear on your farm when you go off your farm. (On-Farm Quality Assessment Form question #27)
- Rather than using a boot bath, you may want to consider using different boots for different areas of your production unit. Systems for changing boots range from simply limiting the use of boots to the barn to using different boots in each room and hallway. You may also want to consider having an area to wash boots.

D3.6 Equipment

- Be aware that equipment can also act as a vector for food-borne pathogens. It is recommended that incoming equipment should be cleaned and disinfected when coming from another agricultural operation (On-Farm Quality Assessment Form question #26c)
- Equipment used for storage, mixing and distribution of feedstuffs must be properly cleaned and maintained to minimize the risk of cross-contamination by medicated feeds or feed ingredients, as well as pathogenic organisms, moulds and fungi.





D3.7 Transport

(On-Farm Quality Assessment Form question #4)

- It is recommended that you avoid using the same vehicles for transporting pigs and transporting other commodities.
- If you must use the same vehicles to haul both live hogs and other products, be aware of the order in which these commodities are being hauled. Take steps to ensure that there is no cross-contamination.
- If you must use the same vehicles for transporting pigs and other commodities, it is recommended that trucks be swept clean, and where necessary and weather permitting, washed between the transport of different commodities. Medicated feed ingredients or farm chemicals may have spilled or left a residue in the truck that could cause a residue in pigs.

- It is recommended that, weather permitting, trucks be washed between shipments of live hogs. Manure can be the source of both biological (e.g. *Salmonella*) and chemical (e.g. drug residues) contaminants.

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