**Standard Operating Procedure**

<Insert Company Name>

<Insert Street Address>

<Insert Town, State, Post Code>

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| **Pig transport vehicle cleaning and disinfection**  |
| SOP number:  | <Insert SOP Number>  |
| Version number:  | <Insert Version Number> |
| Effective date:  | <Insert Effective Date>  |
| Review date:  | <Insert Review Date> |
| Approved by:  | <Insert Approver Name>  |
| **Purpose**  |  |

This Standard Operating Procedure (SOP) describes procedures for the effective cleaning and disinfection of vehicles used for the transportation of pigs.

This SOP does not specifically cover procedures that may be required when the transport vehicle is contaminated with zoonotic organisms that have a high likelihood of being transmitted to humans and are known to cause serious disease in humans. In these situations, it is likely that additional precautions may need to be taken to minimize risk to people undertaking the procedures below.

# Procedure

Contaminated vehicles used to haul livestock, animal feed or products, and their drivers pose a disease dissemination risk. This is true not only for diseases that already exist in Australia but especially those disease agents that are exotic to Australia such as in the case of an Emergency Animal Disease (EAD) outbreak.

It is a priority that no vehicle enters a farm to collect pigs without having been properly cleaned and disinfected. In the situation of an EAD, it is critical that all vehicles leaving a farm known to be an Infected Premises (IP) or a Dangerous Contact Premises (DCPs) be properly decontaminated before leaving, regardless of whether it is carrying pigs or whether it is simply travelling to another location. The need to effectively clean and disinfect trucks used for transporting pigs is recognised as a critical biosecurity step.

This SOP follows the principles of Clean – Disinfect – Dry to ensure vehicles do not present an unacceptable biosecurity risk to a farm.

**Materials**

Essential safety equipment

* Eye protection
* Helmet
* Ear protection
* Waterproof clothing
* Waterproof gloves
* Slip-resistant boots

Water quality

* Drinking water must contain no chemical or biological contaminants.
* Hard water can reduce the effectiveness of soaps and disinfectants. Check the manufacturers’ recommendations for more information.
* Test deep bores once a year for chemical or biological contaminants.
* Test surface bores four times a year for microbial load.

Employees to be trained in

* The issues and importance of washing, disinfection, and drying.
* Safety
* Equipment and product use.

**Methods**

**STEP 1: CLEANING**

**Remove as much debris as possible. At the completion of this step all debris will have been removed from the exterior and interior of the vehicle.**

* Begin on the highest level of the vehicle and work towards the lower areas to avoid cross-contamination.
* Vehicle exterior: Remove accumulated dirt (wheels, mud flaps, chassis).
* Vehicle interior: Scrape off as much bedding as possible with a shovel, a rake, or a brush. All solid debris, faecal matter, and bedding must be removed. All water, feedstuff, and bedding carried in the vehicle should be managed in a way that avoids contamination of the environment that creates some other biosecurity risk.
* Rinse, wash and disinfect all cleaning tools prior to storing them for the next use.
* Remove all objects from the vehicle (clothing, boots, crates, tools) and wash, disinfect, and dry them prior to replacing them in the clean vehicle.
* Lift floor panels if they are removeable to aid in their cleaning. If it is detachable, the crate structure of the vehicle should be lifted and cleaned inside, outside, and underneath. If the vehicle flooring has a double layer (e.g., re-enforcing wire mesh), it should be lifted to aid in removing faecal material that may be trapped between it and the underlying wood or metal surface. Some trailers may carry extra equipment under the body (spare tire, jack stands, etc.). If so, this equipment must be removed, cleaned, and disinfected.
* In the event of an EAD, authorities may require that outside dual wheels be removed to ensure adequate decontamination of the wheel hubs and to allow inspection of the undercarriage.

**STEP 2. PRE-WASHING**

**At the completion of this step all debris including faeces will have been washed from the exterior and interior of the vehicle so that it is visibly clean.**

* Tools must be cleaned separately.
* Pre-washing is usually done with a low-pressure, high-volume water supply such as a fire hose. Garden hoses often do not supply enough volume or pressure to do the job effectively. High-pressure water blasters (1500 to 2500 psi) while good for cutting through caked on faeces, are often inefficient at moving large amounts of bedding or faecal material off the vehicle surfaces and towards a floor drain.
* Cold or hot water may be used.
* Especially in summer, pre-soaking the surfaces for 30-60 minutes prior to washing will help to remove debris and faecal material that has dried on the vehicle surfaces.
* In winter, ensure vehicle is de-iced, if necessary, before pre-washing.

**Pre-wash in this order:**

* Vehicle exterior
* Top to bottom, front to back.
* Storage areas.
* Tools must be cleaned separately.

**STEP 3: WASHING**

**At the completion of this step, the vehicle will be free of any visible or invisible organic material, and ready for disinfection.**

* Use of detergents are a recommended part of the washing step. Detergents are a type of soap and sometimes include a degreaser. While not strictly necessary, using a detergent will result in superior cleaning of surfaces compared to water alone. Detergents also will significantly speed up the cleaning process. When using detergents, read the product label carefully and always use at the recommended concentration.

Some detergents are applied separately from the washing step using a foam applicator. Other washing setups allow the detergent to be delivered through an inline injector with the wash water. Either system can be used successfully.

* Washing should be done using a high-pressure water blaster (usually 1500 to 2500 psi). Normal garden hose or fire hose pressure is not high enough to effectively clean livestock vehicles. Most truck washes are only equipped with cold-water supply however, hot-water or steam supplies are built into some high-pressure washing systems. These systems greatly speed the washing process.
* As in the pre-wash step, wash the vehicle in a top-to-bottom, and front-to-back order to minimize cross contaminating areas that have already been washed.
* After all surfaces have been washed, thoroughly rinse off any residual dirty wash water and detergent with a final top-to-bottom and front-to-back rinse with water only. Some detergents are not compatible with some disinfectants (next step) so this final rinse step should be done only with water.
* Minimize splashing onto previously rinsed areas or other vehicles. Keep the truck wash environment as clean as possible to avoid contaminating the “next truck”.
* Following rinsing let the vehicle drain before disinfecting to prevent water accumulation within the interior of the vehicle.

**PRIOR TO MOVING ON TO THE NEXT STEP**

Inspect the vehicle, with a torch if necessary, to ensure:

* No visible contaminated material.
* No accumulated water.

**STEP 4: DISINFECTION**

**At the completion of this step the vehicle will be ready to be air-dried; in some situations, forced-air drying using fans and heat is recommended as an additional biosecurity step.**

* Disinfectants may be highly toxic. Read the label and respect safety instructions before use.
* Disinfectants come with different specified dilution rates. Read and follow the label for the product you are using – different manufacturers of the same type of disinfectants may require different dilution rates.
* Disinfectants can be applied with either low or medium pressure. Application through high-pressure water blasters is discouraged as the disinfectant will be aerosolized and create a health hazard to the operator.
* Disinfectants don’t work instantaneously. Read the label and respect the required contact time, which is usually between 10 and 60 minutes.
* The efficiency of disinfectants is decreased in temperatures below 20°C. Add 15 minutes to the minimum contact time for every 5° under 20°C.
* The entire surface needs to be thoroughly wetted with the disinfectant solution.
* If the surface is wet before you apply disinfectant solution, be aware that this extra water further dilutes the disinfectant you are using. While not usually a problem on vertical surface, this can be a problem on floors or other horizontal surfaces.
* Do not touch, walk on, or drag hoses over disinfected areas. Let the disinfected surfaces dry before treading over them.
* Wear personal safety equipment while applying disinfectants.
	+ Eye protection
	+ Cartridge mask
	+ Waterproof gloves

Why use a disinfectant?

* Disinfectants destroy bacteria, viruses, and fungi that are invisible to the eye and that remain on surfaces even after a thorough wash.

Which disinfectant is best?

* Most commercial disinfectants are effective against a wide range of microbes (bacteria, viruses, and fungi). However consult the product label or refer to available resources online such as the excellent advice provided by the Center for Food Security and Public Health ([https://www.cfsph.iastate.edu/infectioncontrol/disinfection/)](https://www.cfsph.iastate.edu/infection-control/disinfection/).
* For EADs, there will be official advice around what disinfectants are suitable for that situation. An example of approved disinfectants for African swine fever are shown in **Table 1**. Recently, APVMA has approved an additional product for disinfecting hard surfaces, equipment, and air spaces for use during an outbreak of some viral diseases including ASF [(https://permits.apvma.gov.au/PER90975.PDF)](https://permits.apvma.gov.au/PER90975.PDF).
	+ F10SC VETERINARY DISINFECTANT (APVMA No. 54149) containing: 54g/L benzalkonium chloride and 4g/L poly (hexamethylene biguanide hydrochloride) hydrochloride diluted at 10 ml per 1L (1:100) and allowed to contact the surface for 30 minutes.

**STEP 5: DRYING**

**At the completion of this step, the vehicle interior will be ready to be re-assembled and put into use again.**

* Why is drying important? Moisture encourages bacterial survival and multiplication. Also, waiting for the disinfectant to dry almost always ensures you have provided enough contact time for the disinfectant to do its job.
* Most vehicles can be easily dried with natural ventilation (open all doors) and with the vehicle parked on a slope so that residual water can drain from the vehicle.
* Active drying with forced heat is highly effective as a further disinfecting process. Also, don’t forget sunlight. The UV rays in sunlight help to destroy pathogens and its free!

**STEP 6: CLEANING THE TRUCK CAB**

**At the completion of this step, the vehicle will be ready to be used again.**

Remove all objects including floor mats and vacuum the cab floor. Wash the floors and pedals with soapy water and a brush. Apply a disinfectant spray to the cleaned floor and other surfaces in the cab interior. Often, spray bottles of household disinfectant are convenient for this purpose.

**Quality control**

* Visual inspection following washing, disinfection, and drying steps.
* It is good practice to rotate your choice of disinfectants every 3-6 months.
* Think about your overall cleaning process, including vehicle and human traffic. Takes steps to avoid recontaminating or cross-contaminating areas or vehicles that have already been cleaned and disinfected.
* Clean vehicles:
	+ Must not use the same route as soiled vehicles.
	+ Must be parked far from soiled vehicles.
	+ Must remain inaccessible to animals.

**STEP 7: WASH / DISINFECT / DRY CYCLE FREQUENCY**

* Ideal: After unloading at the abattoir.
* Required: At the end of each day.
* Consider the sanitation status of the loading and unloading sites. Monitor movements, organize your route, etc.
* Consider the biosecurity of your movement between sites, but also within a farm or production system. Always move from the most biosecure area (a breeding herd, for example) to the least biosecure area (a commercial finishing farm, for example).
* Don’t re-use bedding.
* The frequency of the wash / disinfect / dry cycle may be modified based on discussions with your veterinarian.

**Further guidance**

For further guidance, please see:

<https://australianpork.com.au/best-practice-truck-wash-biosecurity-guidelines>

**Table 1. Australian Pesticides and Veterinary Medicines Authority (APVMA) list of approved disinfectants and concentrations for treatment of ASF virus.d**

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| **Disinfectant**  | **Rate** | **Applicationa,b** |
| 494 g/kg of potassium peroxymonosulfate triple salt, 132 g/kg of sodium dodecylbenzene sulfonate, 44 g/kg sulfamic acid, and 15 g/kg of sodium chloride (Virkon S)497 g/kg potassium peroxymonosulfate, 49 g/kg sulfamic acid, and 15 g/kg sodium chloride (Virkon Aquatic) | 20 g/L | Final dose: 2-3% solution (equivalent to 20 g/L).Soak clothes/small items and equipment for at least 10 minutes. For surface cleaning, apply at rate of 1-1.5 L/m2. Do not use high pressure sprays. Decontaminate removed organic matter before disposal.  |
| Sodium hypochlorite 125 g/L  | 40 ml/L | Final dose: 0.5% solution (equivalent to 40 ml/L). Soak clothes, footwear, and small equipment for 15-30 minutes. For surfaces, apply at a rate of 1-1.5 L/m2 and soak for 15 minutes on non-porous surfaces and 30 minutes on porous surfaces.  |
| Calcium hypochlorite 700 g/kg  | 7.2 ml/L | Final dose: 0.5% solution concentration (equivalent to 7.2 ml/L) for 10-30 minutes. |
| Sodium hydroxide 400 g/L  | 50 ml/L | Final dose: 2% solution (equivalent 50 ml/L). Soak clothes, footwear, and small equipment for at least 10 minutes. For surfaces, apply at a rate of 1-1.5 L/m2 and soak for at least 10 minutes.  |
| Sodium carbonate anhydrous | 40 g/L | Final dose: 4% solution (equivalent to 40 g/L) for 20 minutes. |
| Sodium carbonate washing soda | 100 g/L | Final dose: 10% solution (equivalent to 100 g/L) for 30 minutes. |
| Glutaraldehyde with quaternary ammonium compounds**c**Available as 150 g/L of glutaraldehyde. One part of 15% glutaraldehyde to 7.5 parts water = 2% final concentration = 133 ml/L. | 133 ml/L | Final dose: 2% solution (equivalent to 133 ml/L). Clean equipment with soap or detergent first then rinse with water. Immerse for minimum of 10 minutes at 35°C and 20 minutes at 25°C. Maintain solution at pH>7. Efficacy may be increased by raising the solution temperature to 60°C. |
| Citric acid | 30 g product/L | Final dose: 3% solution (equivalent to 30 g/L).Non-porous surfaces apply for 15 minutes; porous surfaces apply for 30 minutes. |
| a Efficacy of some of the products and proposed uses under this permit has not been thoroughly determined. However, efficacy is reasonably expected due to the broad-spectrum nature of the product. 1. For all situations, APVMA requires that users clean with soap or detergent first and then rinse with water to remove organic matter before applying disinfectant and that users must comply with their relevant state and territory Environmental legislation.
2. Glutaraldehyde and quaternary ammonium compounds are only available as a combined product. The final concentration is based off the glutaraldehyde % or ppm.
3. Anonymous. Permit to allow minor use of registered and unregistered agvet chemical products for use as disinfectants for treatment of equipment, fabric and surfaces in case of an outbreak of African swine fever or classical swine fever (Permit number PER88135, [https://permits.apvma.gov.au/PER88135.PDF)](https://permits.apvma.gov.au/PER88135.PDF). Australia Department of Agriculture and Water Resources, Canberra, ACT, Australia, 2019:6.
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