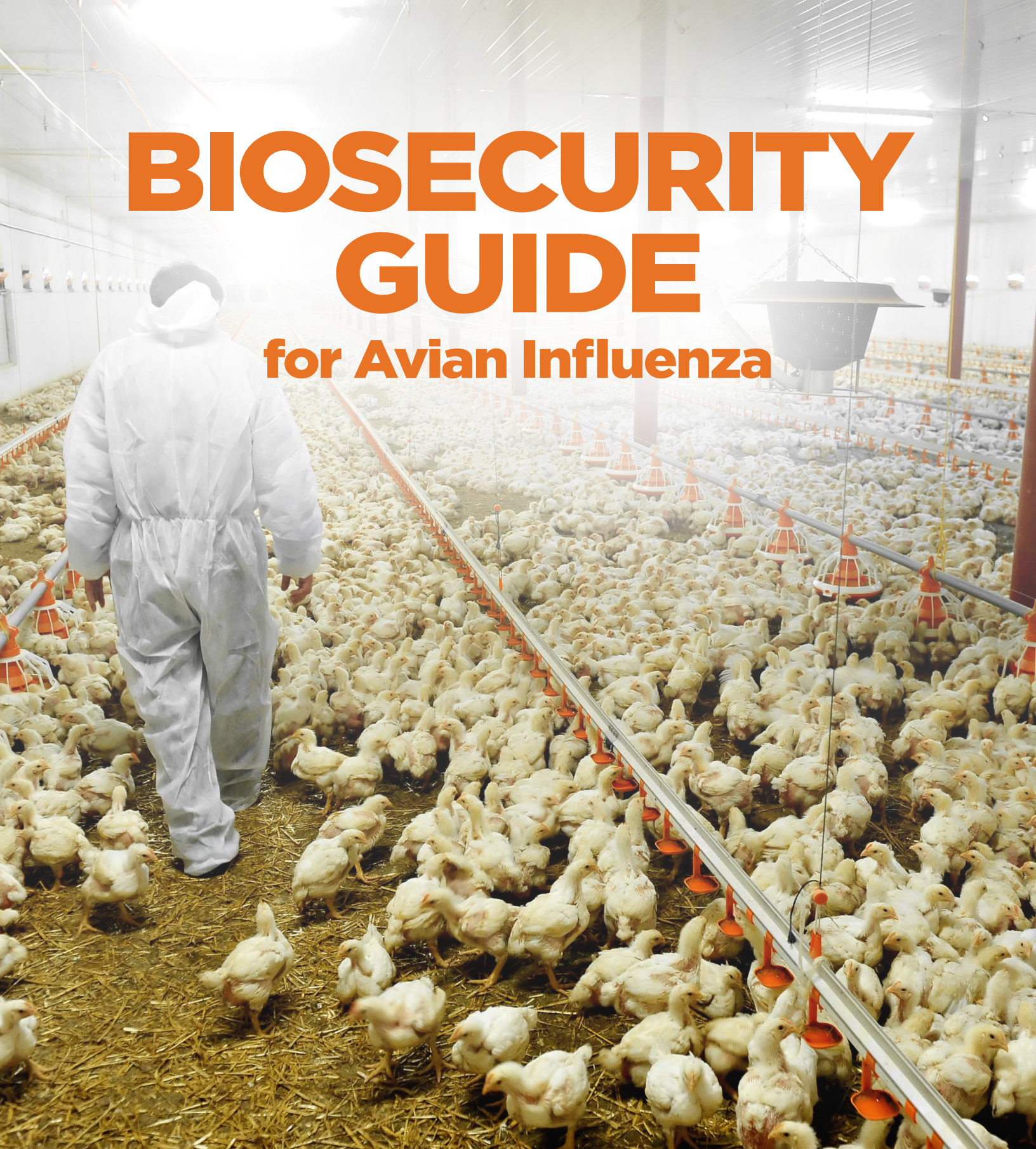


BIOSECURITY GUIDE

for Avian Influenza







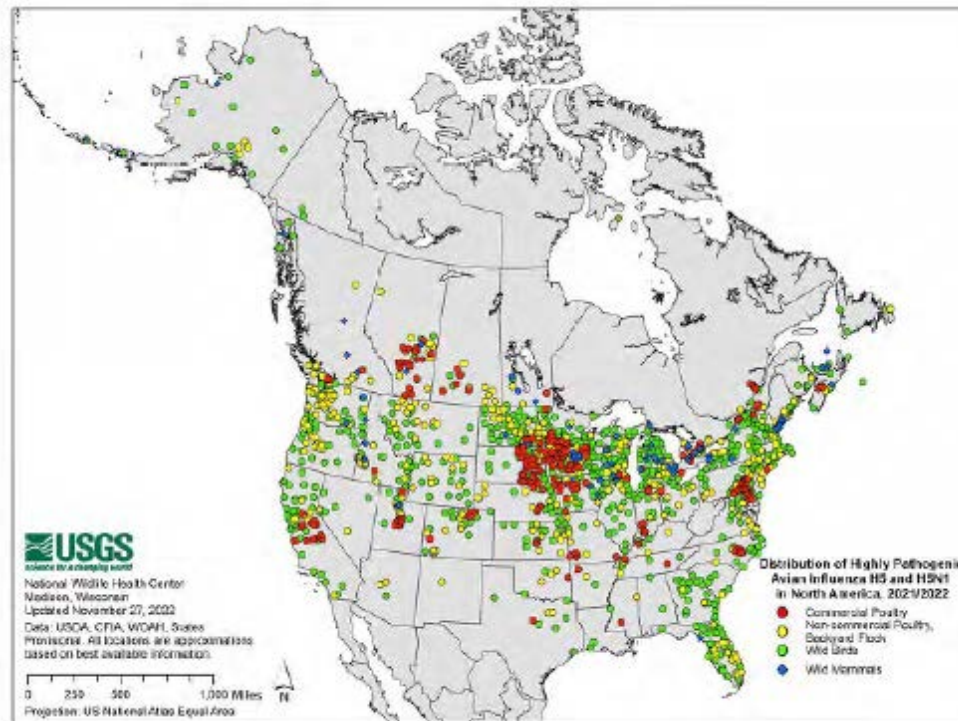
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Avian Influenza - The Bottom Line

Avian influenza (AI), also known as “bird flu”, presents a significant threat to poultry producers worldwide. AI can be caused by multiple different strains of Avian Influenza A virus, which may be classified as **highly pathogenic (HPAI)** or **low pathogenic (LPAI)** based on the severity of disease that the virus causes[1,2]. While LPAI often causes few or no symptoms, HPAI outbreaks can be devastating to poultry producers, causing widespread destruction to flocks and major business impacts as a result[1,2]. AI infections in humans are uncommon, but can occur, particularly among people working closely with poultry. As such, rigorous biosecurity is critical to protect poultry and people from the health and economic consequences that an AI outbreak would bring.

North America specifically has suffered a considerable number of positive cases in both commercial and non-commercial poultry flocks. The resulting economic loss has been devastating to producers and the industry at large. Poultry producers must stay vigilant at all times due to the fact that there may or may not be any clinical signs of infection. Therefore it is in the best interest of all poultry producers that the risks of AI are well known and procedures are implemented that limit the chances of the disease developing or spreading.



Sources/Usage: Public Domain.

Distribution of Highly Pathogenic Avian Influenza H5 and H5N1 in North America, 2021/2022. Updated November 27, 2022.

As there is no treatment currently available for birds infected with HPAI, prevention is the only protective measure in place. If a facility were to report a case of the disease, the only option would involve depopulating all the birds exposed to the virus. In addition, a reported case would trigger severe limitations on the movement and export of poultry and poultry products, creating a ripple effect throughout the industry with lasting economic consequences. For these reasons, good biosecurity is vital to prevent the entry and spread of HPAI. Preventing the spread of HPAI requires an understanding of how the virus is transmitted to commercial poultry flocks.

A few key modes of transmission have been identified:

Wild Birds and Waterfowl

Direct contact (touching) between an infected bird and a healthy bird can introduce the virus to a new host. Wild birds and waterfowl have been identified as a possible vector for the transmission of AI to domestic flocks.

Fomite Transmission

'Fomites' are surfaces that can harbour infectious pathogens, which could be picked up by an uninfected individual. On a farm setting, this can include contaminated equipment, housing surfaces, transport vehicles or even clothing or footwear worn by workers.

Airborne Transmission

While there has been some limited evidence of AI being spread via airborne transmission for short distances, the general consensus is that the risk of airborne transmission over long distances is negligible. [3]

Contaminated Feed

AIV has been demonstrated to be **able to survive in poultry feed** for extended periods of time, which can be consumed by healthy birds.

Most of these modes of viral transmission can be prevented to a great extent by good biosecurity practices. Biosecurity encompasses many different types of strategies, but in the context of AI includes ensuring that wild birds are prevented from entering poultry houses, feed is sourced from reputable suppliers and ensuring that surfaces are thoroughly cleaned and disinfected between flocks.

In addition, **ensuring that farm staff or visitors are not bringing any contaminated materials**, whether through food, clothing, or equipment, is essential. This means **thoroughly cleaning and disinfecting contaminated items** (including clothing and footwear) before they are introduced into a poultry facility, and making use of a **Danish entry system** for visitors such as a Biosecurity Boot Bench. Persons entering the production area of a poultry facility should either **change, cover or disinfect their footwear** prior to entry. When implemented correctly, a rigorous biosecurity protocol acts as the first line of defense in preventing the entry and spread of this virus throughout poultry operations.

References:

1. Government of Canada. (2022). "Fact Sheet - Avian Influenza". <https://inspection.canada.ca/animal-health/terrestrial-animals/diseases/reportable/avian-influenza/fact-sheet/eng/1356193731667/1356193918453>.
2. USDA Animal and Plant Health Inspection Service. (2022). "Protect Your Poultry from Avian Influenza"
3. Risk of airborne transmission of avian influenza from wild waterfowl to poultry negligible (2021)<https://phys.org/news/2021-09-airborne-transmission-avian-influenza-wild.html>

Prevail® Proven Effective Against AIV

In response to the ongoing threat of Avian Influenza, Prevail Concentrate was tested against Avian Influenza Virus (AIV) at an accredited laboratory in compliance with Health Canada guidelines, which led to the receipt of a Health Canada-approved virucidal efficacy claim. A standardized quantitative carrier test method was used, to conform to the rigorous methodologies used by the EPA and Health Canada, which regulate disinfectants in the United States and Canada, respectively.

Standard Carrier Test Method for Virucidal Activity (ASTM E1053)

- Two lots of Prevail were tested against AIV on a hard surface, in the presence of 5% soil load.
- A surface (carrier) was inoculated with a solution containing a high titer of the virus, and allowed to dry for at least 20 minutes under controlled conditions.
- The virus dried films were subsequently treated with Prevail Concentrate, diluted at a ratio of 1:40. The carriers were allowed to sit for 5 minutes, per the disinfectant contact time.
- At the end of the contact time, the virus-disinfectant mixture is neutralized using neutralizer solution or filtering through Sephadex columns to stop the activity of the disinfectant.
- Each resultant mixture was serially diluted, and selected dilutions were inoculated in the host cell culture. These cell cultures were incubated under controlled conditions to allow for virus replication.
- The presence of virus-specific cytopathic effect in the cells was evaluated and viral infectivity (TCID) was calculated for each test sample and virus control sample using the Spearman-Kärber method.
- Neutralization and cytotoxicity controls were run in parallel to ensure that the neutralizer was effective at stopping virucidal activity, and that the test mixture was non-toxic to the host cells.

Did you know?

Contact time is the length of time that a disinfectant must remain wet on the surface to be fully effective. This information can be found on the product label.

Test Results:

Prevail Concentrate demonstrated complete inactivation of the viral titre (≥ 4.25 log reduction), indicating that it is highly effective against AIV.

Furthermore, Prevail carries a Health Canada-approved label claim for use against AIV.

7 Steps of Cleaning and Disinfection

A cornerstone of biosecurity is cleaning and disinfection, and the importance of this process cannot be underestimated when it comes to preventing the spread of infection. While most people recognize the importance of cleaning and disinfection in promoting good biosecurity, there are a variety of factors that are involved in making sure this process is successful.

It's important to understand the difference between cleaning and disinfection, and why both are vital components in eliminating pathogens. Cleaning and disinfection work together to eliminate pathogens from surfaces, preventing their spread throughout a facility.

Cleaning vs. Disinfection – What's the Difference?

Cleaning is the process of physically removing soils from a surface. A surface must be cleaned in order for disinfection to be effective, as soil residues on surfaces may block the activity of the disinfectant, or may bind to the disinfectant and prevent it from working properly.

Disinfection is the process of killing infectious microorganisms, which can include bacteria, viruses and fungi. This must be completed with an Health Canada registered disinfectant with label claims against pathogens of concern.

An effective cleaning and disinfection program can be broken down into 7 general steps:

1 Dry Cleaning and Removal of Gross Soils

The first step is to remove any major dirt and debris to prepare for cleaning and disinfection. This means removing any items from the area that can be removed, and using a scraper, shovel, or brush to remove feces, dirt, feedstuffs, and bedding. This step must occur in order for cleaning and disinfection to be successful.

2 Soaking of Surfaces

This step involves soaking the surface with water and a detergent. This will help suspend soil residues in the wash solution, and dislodge tough, hydrophobic soils such as feces and biological fluids. Ideally, the detergent should be applied from the bottom to the top of the surface, to avoid runoff and to be able to clearly see where the detergent has been applied. Some disinfectants, such as Prevail®, contain detergents built into their formulation. In this case, the disinfectant may be used at a higher dilution to perform the pre-soak step.

3 High Pressure Cleaning

Once the detergent has been allowed to soak on the surface and dislodge soil residues, the next step is to remove these soils by rinsing with water at a high pressure (750 - 1800 psi). This should ideally be done with hot water to aid the cleaning process, and should be applied in the opposite direction as the detergent (from top to bottom).



5 Disinfection

This is the process of applying a Health Canada registered disinfectant to kill pathogens of concern. This is done by evenly applying the chemical to the surface, and letting the solution remain wet for the required contact time, which is specified on the product label.

There are a few factors to consider when selecting a disinfectant. The ideal disinfectant is non-toxic and non-irritating to people and animals, and is also non-corrosive to equipment. In addition, it is ideally environmentally friendly, as runoff will ultimately end up in the environment or in wastewater treatment systems that depend on microflora. However, the disinfectant should have strong efficacy against a wide range of pathogens, and do so in a realistic contact time. It should also be able to be applied as a foam, to improve surface coverage.

4 Drying Prior to Disinfection

Once the surface has been rinsed, it should ideally be allowed to dry prior to the disinfection step. There are two reasons for this:

- Water left behind on the surface can dilute the disinfectant, resulting in a weaker solution than what may be required to successfully kill pathogens.
- If there is any detergent left after the rinse step, this could potentially interact with the disinfectant and interfere with its efficacy.

If a full drying step is not possible, this can be addressed by selecting a detergent with some biocidal activity, or in using a disinfectant that is highly effective against a broad spectrum of organisms in a rapid contact time, as this product would unlikely be inactivated by low levels of residual water on a surface. If the same product is used for the pre-soak and disinfection step, this can also prevent any interactions between different chemicals.

6 Drying Prior to Restocking

The purpose of this step is to protect the animals from exposure to harmful chemical residue. If a non-toxic and non-irritating disinfectant is used, as recommended in the previous step, then this drying step is not required.



7 Surface Sampling

Surface sampling can be performed to validate the efficacy of the cleaning and disinfection process, by detecting the presence of dirt or pathogens remaining in the surface. There are several methods available:

- ATP bioluminescence measures the efficiency of cleanliness by assessing the bioburden (organic matter) on a surface.
- Agar contact plates or swab sampling provide a more in-depth analysis of the types of organisms, but are more time consuming.
- PCR testing provides a snapshot of the amount of viral material on a surface, but does not distinguish between infective and “dead” inactivated virus.

Proceed with Certainty.

Prevail® Disinfectants, powered by Accelerated Hydrogen Peroxide® technology, offer unique benefits in the fight against Avian Influenza Virus. Here's why Prevail® is different:

- Its gentle formulation is highly effective against pathogens, while remaining non-toxic and non irritating to the animals and users at in-use concentrations.
- It is formulated with powerful detergents, allowing strong efficacy when used as a pre-soak and a disinfectant.
- When applied using a power washing system with a foaming gun, Prevail® produces a thick foam. This allows for increased surface coverage with less product, resulting in cost savings.





Disinfectant Application – Tips and Tricks

Perhaps even more important than choosing the right disinfectant product is pairing it with the appropriate method of application.

- ✓ For disinfecting large areas, a **power washing system with a foaming gun will help cover surfaces rapidly**. If using a concentrated disinfectant product, an automated dilution system can help eliminate human error from the process.
- ✓ **Selecting a disinfectant that will produce foam** when applied at pressure will allow for easy validation that the surface is covered evenly. It will also allow for increased surface coverage with less product, resulting in cost and resource savings.
- ✓ **Ensure that footwear is either changed, covered or are disinfected** with Prevail® before entering the Restricted Access Zone or Production Area. The use of a Biosecurity Boot Bench as part of a Danish Entry System is recommended.
- ✓ For smaller surfaces throughout production facilities or even in the cab of transport vehicles, **pre-moistened wipes** can be used to easily apply the right volume of disinfectant, and physically remove dirt and debris in the process.
- ✓ **Ensure all equipment and materials are disinfected** prior to entry into the poultry facility. This includes tools, brooms, shovels, and loader tractors.
- ✓ Implement an **effective pest control program**. Ensure all cracks or openings in the building are sealed so that pests and wild birds can not enter facility.
- ✓ Make sure all **staff and visitors are informed and trained** on your facility's biosecurity protocols.

Disinfecting Against Avian Influenza Using Prevail® Concentrate

GETTING STARTED

Dilute Prevail™ Concentrate to the desired concentration. AHP1750 test strips should be used regularly to confirm proper dilution.

Diagram 1


| SELECT YOUR DILUTION | ADD Prevail® CONCENTRATE | ADD WATER |
|----------------------|--------------------------|-----------|
| Pre-Soak - 1:128 | 8 mL | 1 L |
| Disinfection - 1:40 | 25 mL | 1 L |

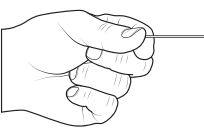
Note: Make sure that you have Prevail® approved equipment and that it is properly installed. Always follow the protocols and dilution rates set by your veterinarian.

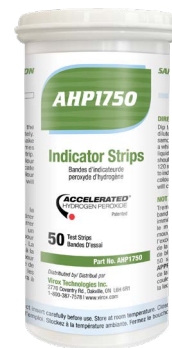
Confirming Dilution by Using AHP1750 Test Strips

1:40 Dilution

- 1** Dip the padded end of the test strip into the diluted solution and remove immediately.


- 2** At the same time start the timer and shake the strip in a whipping motion three times to prevent excess liquid pooling on the strip.


- 3** The test strip colour should match the colour block between 35 and 40 seconds to indicate a **PASS**.



AHP1750 Test Strips

Cleaning and Disinfecting

1 Dry Clean (Remove Solid Waste)

Using a shovel or scraping tool, remove as much debris and organic matter as possible. Starting at the top of the building and working down to the floors from one end of the building to the other.



2 Pre-Soak (if required)

Pre-soak all surfaces and equipment with Prevail® Disinfectant using a dilution of 8 mL/L of water (1:128) - see diagram 1 for dilution directions. Apply from the bottom to top.



3 Rinse with Water

Rinse with high pressure washer (>1000 psi), working from top to bottom. Use hot water if available.

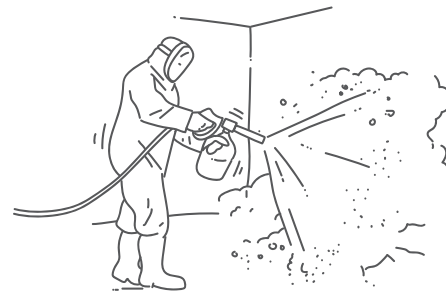


4 Disinfect

For routine disinfecting apply Prevail® Disinfectant using a dilution of 100 mL per 4 L of water (1:40) - see diagram 1 for dilution directions.

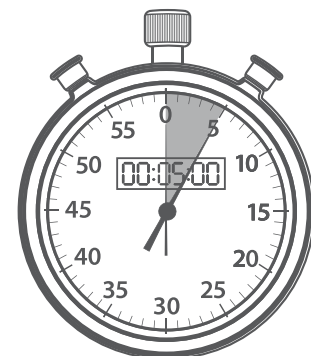
A foaming application is recommended to help cover surfaces quickly.

Using water and pressure from power washer lines, attach foaming gun properly adjusted to deliver 1:40 dilution. Move foaming gun quickly and evenly, cover all surfaces and equipment with foam, moving from the bottom up.



5 Wait 5 Minutes

Wait for the required contact time of 5 minutes to be reached. No need to rinse or wait for surfaces to dry.



How to Disinfect Livestock Trailers Using Prevail®

GETTING STARTED

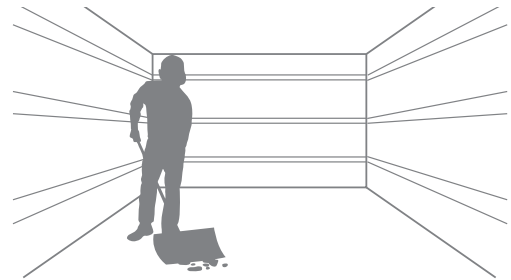
Dilute Prevail® concentrate to the desired concentration. AHP1750 test strips should be used regularly to confirm proper dilution.

Diagram 1

| SELECT YOUR DILUTION | ADD PREVAIL™ CONCENTRATE | ADD WATER |
|----------------------|--------------------------|-----------|
| Pre-Soak - 1:128 | 8 mL | 1 L |
| Disinfection - 1:40 | 25 mL | 1 L |

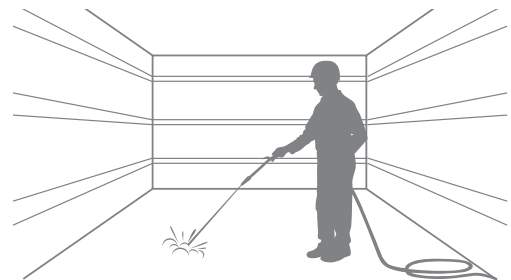
STEP 1

- Remove any crates or bedding and ensure that they are cleaned and disinfected.
- With the aid of a shovel or scraper, remove as much debris from the exterior of the vehicle as possible. Be sure to also target the wheels and mud flaps in addition to the vehicle's body.
- Working from front to back, scrape out all organic matter from the interior of the vehicle. In the case of multiple levels, start from the highest level and work downward.



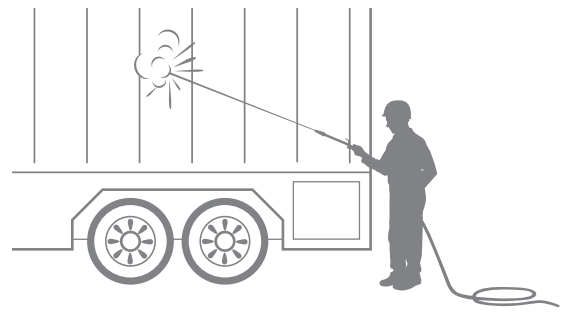
STEP 2

- Using a foam gun, apply Prevail® Disinfectant with hot water using a dilution of 8 mL per 1 L of water (1:128) - see diagram 1 for dilution directions. Start with the exterior of the vehicle, working from front to back, and then proceed to spray down the inside, from bottom to top and from front to back.
- Also, be sure to target loading docks, removable floor panels, wheels and wheel wells.
- Rigorously scrub surfaces to loosen remaining debris.



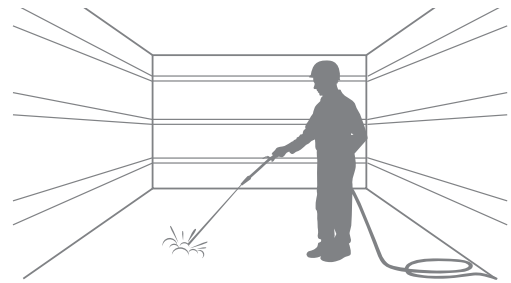
STEP 3

- Use a pressure washer (>1000 psi) and hot water to rinse off detergent. Start with the exterior, and proceed to the interior, working from front to back. Be sure to spray the underside of fender wells and vehicle frames.



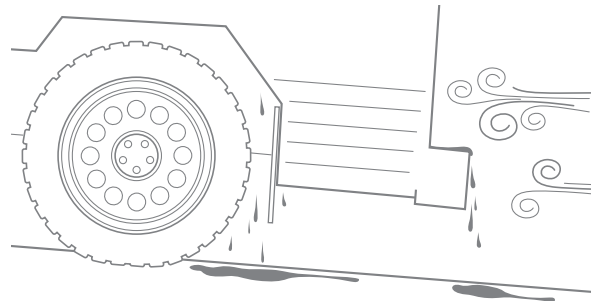
STEP 4

- Apply Prevail® Disinfectant, using a dilution of 25 mL per 1 L of water (1:40 - see diagram 1 for dilution directions) to the entire surface in the same manner as used with the cleaner. Allow the disinfectant to remain on the surface for the required contact time.



STEP 5

- Ideally, dry the vehicle with heat and ventilation, or by parking the vehicle on a slope to allow liquid to drip out.



STEP 6

- Remove all objects inside the cab and vacuum surfaces.
- Using Prevail® Wipes, wipe down any surfaces that the driver has touched or handled, including pedals. Use a new wipe when the wipe becomes visibly soiled or dry. Allow 1 minute for the disinfectant to reach its contact time.



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For more information, visit
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