

CLEANING AND DISINFECTION BIOSECURITY TIP SHEET



Cleaning and disinfection – also known as C&D – is a key part of any biosecurity plan. C&D reduces then kills disease causing germs, which helps to stop or reduce the spread of disease on your operation or to other locations.

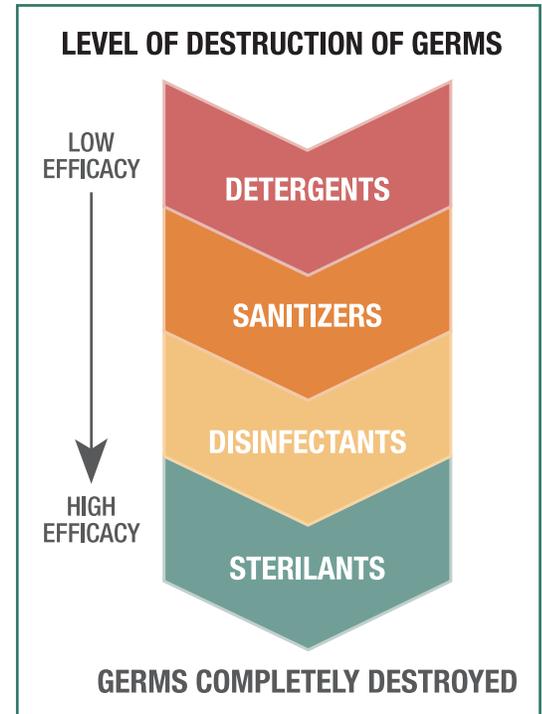
WHAT IS THE DIFFERENCE BETWEEN CLEANING AND DISINFECTION?

Cleaning removes soil and organic material from surfaces. This should always be the first step. Sanitizers kill some, but not all germs. Disinfectants kill most germs on surfaces; some have cleaning properties, others have a cleaning agent added. Some products could be used for both steps.

WHERE SHOULD C&D BE USED?

Cleaning and disinfection should be done for animal areas and items that contact animals. This includes pens, stalls or cages, footwear, and any equipment used in the care, handling or transport of animals or carcasses.

- **Animal Areas:** C&D should be used for any buildings, pens, and enclosures where animals are housed. With dirt floors, take care to clean the area well by removing all manure from the area.
- **Equipment:** Clean and disinfect any equipment used with animals, especially animals that are ill. This also includes tools used for the C&D process.
- **Vehicles:** Vehicles used for animal transport (e.g., trailers) can transfer diseases to other animals and locations. C&D vehicles between uses and before leaving your operation. Vehicles should also be cleaned, especially tires and wheel wells, upon return to your operation. It is also important to C&D any heavy machinery, such as tractors or skid steers, used in animal areas. These on-site vehicles can easily become contaminated and when moved can spread diseases to other locations on or off your farm/ranch.



ANIMAL AREAS



Source: Megan Smith, Iowa State University

EQUIPMENT



Source: Steve Goff, USDA

VEHICLES



Source: Danelle Bickett-Weddle, Iowa State University

- **Footwear:** C&D footwear after leaving animal areas, especially where sick animals are kept (e.g., isolation areas). Have boot cleaning areas near exit points to make this easier to do. Wash and scrub boots to remove visible manure or mud **before** applying the disinfectant.

Boot baths are often used when entering and exiting an area. However, boot baths should **not** be used as the only method of disinfection.

- To disinfect correctly, boot baths must be properly maintained and used, which can be difficult to do. As a result, the use of boot baths may give a false sense of security. However, the action of stepping into the disinfectant solution does make people more aware of biosecurity.
- If boot baths are used, the disinfectant solution should be prepared at least daily. If traffic levels or dirt and debris levels are high, the solution should be prepared more frequently to make sure it is more effective.
- As with disinfection of surfaces, make sure boot surfaces are covered for the full contact time required (per the label instructions).



A person scrubbing their rubber boots. Source: Danelle Bickett-Weddle, Iowa State University

CLEAN AND DISINFECT PROPERLY

While most operations use some level of cleaning and disinfection, it is important to be sure you are doing it right. If not done properly, it can lead to a false sense of security and poor results in controlling disease organisms. Best practices involve both a cleaning step and a disinfecting step.

CLEANING STEPS	
DRY CLEAN	Remove all visible dirt, manure, or debris – also called organic material. Use shovels, manure forks, brooms, and brushes to remove as much as you can. This is an important step! When present, organic material can inactivate many disinfectants.
WASH	Next, wash the item or area with a soap or detergent. Warm water (110 °F) is best and should be used if possible. Scrub items or areas with brushes to remove any dirt or debris. Pay special attention to corners or crevices. Presoaking or a degreaser may be needed to remove oils or body fluids.
RINSE	After washing, rinse the item or area with clean water to remove residue. Soaps or detergents can inactivate some disinfectants.
DRY	Allow the item or area to dry completely, or sit for 5–10 minutes at a minimum to allow water to drip off. Excess water can dilute the disinfectant when it is applied. The disinfectant might not work as well.

DISINFECTION

- **Read the label first:** It lists many things including:
 - The germs the disinfectant will kill.
 - How to use the product. Does it require mixing or is it ready to use?
 - Does it include both a cleaner and a disinfectant?
 - The contact time needed to kill the germs.
 - Rinsing and drying steps.
 - Safety steps.
- **Select the right disinfectant:** Disinfectants vary in their ability to kill germs. Some products kill only a few kinds of organisms. Others can kill a wide range. Choose a product that kills the germs commonly seen on your operation. The Environmental Protection Agency (EPA) oversees disinfectant testing and quality in the United States. Only use EPA-registered products. The EPA number is listed on the product label.
- **Prepare the disinfectant:** It is important to read and follow the product label before preparing and using any disinfectant product. Some products are ready to use, others require dilution. Fresh solutions are best. Some disinfectant solutions may only be active on the day they are made. Always use the correct concentration for the task you are doing. Stronger solutions are not always better. Higher concentrations can sometimes damage surfaces or lead to health or safety issues.



A person reading a disinfectant label.
Source: Danelle Bickett-Weddle, Iowa State University

DISINFECTION STEPS

APPLY	This may involve spraying, soaking, misting, or wiping. It depends on the product and where it is being used. Pay special attention to any cracks or crevices. If not used correctly, a disinfectant may not kill the germs.
CONTACT TIME	Let the disinfectant “sit” and work (contact time). Items or areas must remain “wet” with the disinfectant the entire contact time to kill the germs. This step is often overlooked and is very important.
RINSE	Most disinfectants need to be rinsed off as they may be toxic to animals. Others may be safe and can continue to work on the surface. Read the product label for instructions.
DRY	When possible, allow the area or item to dry thoroughly before allowing animal contact.

SAFETY WHEN USING DISINFECTANTS

Disinfectants are chemicals and most have some level of hazard. This can range from irritation of the skin, eyes or respiratory system to chemical burns. Read the product label for any hazards and recommended protection.

- Some items such as rubber gloves, aprons, or goggles should be worn when handling, mixing and applying disinfectants.
- Anyone who prepares or applies disinfectants should be trained on their safe use.
- Be aware of any physical hazards (e.g., slips, trips, or falls) when surfaces become slippery while doing C&D.
- Avoid any runoff of product into the environment (e.g., waterways or wetlands) or animal areas. Many chemical disinfectants are toxic to fish and other aquatic species. Some disinfectants are toxic to animals, even after dilution.



A person wearing protective clothing while preparing disinfection solutions.
Source: Don Rush, USDA

MORE TIPS FOR GOOD CLEANING AND DISINFECTION

- Have a system: For example, start at the top and work your way down, using small sections to make sure you cover all areas. This will help to make sure all areas are covered.
- Use special care for parts of any watering systems (e.g., water lines, dispensers, nipple drinkers, troughs), feeding equipment (e.g., feed lines, augers, hoppers), or other mechanical structures (e.g., fans, casings, motors, belts, curtains, ventilation pads, louvers) within an animal area.
- Equipment such as thermostats, scales, time clocks, electrical panels, switches, and light bulbs may need to be individually wiped, cleaned, and sanitized, to protect them from harmful effects of the disinfectant.

OTHER THINGS AFFECTING DISINFECTION

- **Dirt, manure, bedding, animal body fluids:** If organic material is present when a disinfectant is applied, 1) it may give disease organisms a place to “hide” from the disinfectants, and 2) it will inactivate many types of disinfectants.
- **Surfaces:** Smooth surfaces (e.g., metal) are easier to disinfect than rough or porous surfaces (e.g., wood, concrete). Some disinfectants can damage certain surfaces or metals.
- **Water hardness and temperature:** “Hard” water can make some disinfectants less effective.
- **Other chemicals:** Other chemicals (e.g., soaps, detergents) or the material itself being cleaned and disinfected (e.g., metals, rubber) can reduce how well a disinfectant works.



Manure on a slatted floor and metal rail around a cattle footbath.
Source: Danelle Bickett-Weddle, Iowa State University

DISINFECTANT REGULATION

Disinfectants are regulated as “antimicrobial pesticides” by the U.S. Environmental Protection Agency (EPA). It is very important to use disinfectant products exactly as directed on the label. If the label directions are not carefully followed, the disinfectant may not work properly. **The person responsible for using the disinfectant incorrectly could also be punished.** There can also be risks of harm to humans, animals, and the environment.

ASSESSMENT CHECKLIST

Use the following checklist to determine areas where you are doing well and others that need to improve.

YES	NO	After answering, pick one or two “No” answers and make an improvement plan with the resources below.
		Do you thoroughly clean (remove any visible manure, dirt, bedding) and wash all objects before applying a disinfectant?
		Are disinfectants used according to the product label (storing, mixing, concentration, protective gear, rinsing, etc.)?
		Do you always allow a disinfectant contact time to “sit” and work?
		Are safety measures (e.g., avoiding runoff, wearing safety gear) taken during C&D?

MORE RESOURCES:

[Disinfection resources](#). Center for Food Security and Public Health.

[Cleaning and disinfection protocol](#). Center for Food Security and Public Health.

[Disinfection 101](#). Center for Food Security and Public Health.

[Reading a disinfectant product label](#). Center for Food Security and Public Health.

ACKNOWLEDGMENTS

This document was developed and revised with funding from the USDA Animal and Plant Health Inspection Service through the National Animal Disease Preparedness and Response Program and the National Institute of Food and Agriculture. [Iowa State University is an equal opportunity provider](#).