

# FACTORS AFFECTING DISINFECTION

## C&D Basics



The cleaning and disinfection (C&D) process is an essential step to prevent disease in animal settings. Many factors can affect disinfection success. Consider the following items, if C&D efforts do not seem to be working.

### WHAT IS THE TARGET MICROORGANISM?

Microorganisms vary in their resistance to disinfection. Most bacteria, fungi, and enveloped viruses are inactivated or killed by most disinfectant products or processes. More resistant organisms, such as non-enveloped viruses and bacterial spores are harder to destroy. Check the product label to ensure the disinfectant will kill the targeted organism.



### WHAT DISINFECTANT WAS USED AND WAS IT USED PROPERLY?

Many disinfectant products are available, but vary in their ability to kill certain organisms. No single product works for all situations.

- **Chemical ingredient(s):** Disinfectant products have different active ingredients. This affects what microorganisms it can kill. The product label will list what it is effective against.
- **Concentration used:** Disinfectants are tested to determine the best concentration to use for certain microorganism. Always measure accurately and use the concentration recommended on the product label.
- **Contact time:** Disinfectants need time to work. This necessary contact time will be listed on the product label. Surfaces must remain wet or coated for the full contact time to ensure success.
- **Product stability:** Some disinfectants degrade when stored for long periods of time. Some lose stability quickly after preparation. It is best to use fresh solutions. Check disinfectant product labels for an expiration date. Test kits can help to determine the concentration of active ingredients. Maximize shelf life by storing products in a cool, dark location.



### IS THE C&D PROCESS BEING PERFORMED PROPERLY?

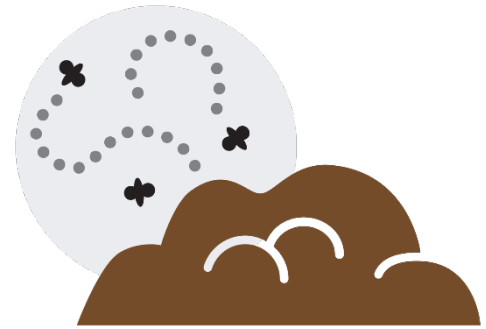
The human factor is always a consideration for success. Ensure personnel performing C&D are trained on the proper preparation and application of disinfectant products. Discuss the importance of cleaning first, rinsing away detergents, preparing the appropriate concentration, applying solutions thoroughly, and allowing the full contact time.



## ARE ENVIRONMENTAL CONDITIONS AFFECTING THE DISINFECTANT?

Certain environmental factors can affect disinfectants. Be aware of those that can influence success.

- **Presence of organic material:** Feces/manure, body fluids, such as saliva, dirt and other debris on surfaces is **one of the most common factors for disinfection failure**. This organic material hides or protect microorganisms from the disinfectant. Additionally, many disinfectants are neutralized by organic material; this is especially true for bleach solutions. Always clean surfaces before disinfecting!
- **Type of surface:** Surfaces in animal settings are quite diverse and can include various metals, glass, rubber, plastic, concrete, wood, and fabric or woven material (e.g., clothes, nets, ropes). Most disinfectants are labeled for use on hard, smooth surfaces. Surfaces that are porous, cracked, or pitted (e.g., wood, concrete) or that have complex structure, such as hinges, bends, or crevices can be challenging to disinfect effectively.
- **Temperature:** The temperature of the environment or the disinfectant solution can affect results. Most chemical disinfectants work best at temperatures above 68°F. However, too high of temperatures may break down some disinfectants, or increase evaporation and reduce the necessary contact time. Low temperatures can also reduce activity of some products. Read the product label for any specific temperature requirements.
- **Water hardness:** A factor not always considered influencing disinfectant activity is water hardness. The hardness of water is determined by the amount of dissolved minerals, primarily calcium and magnesium, in a water source. Some disinfectants can be inactivated when these ions are present at high levels (e.g., hard water).
- **Presence of soaps or detergents:** While some disinfectant products contain cleaning agents or surfactants to enhance their activity, others can be inactivated by soap or detergent residue. Be sure to rinse after the washing step of the C&D process.
- **pH:** High or low pH conditions are detrimental to microorganisms, but these conditions can also affect disinfectant effectiveness. pH changes in the environment may be caused by organic material, water hardness, or other chemical products used. Check the product label for any pH requirements for a particular product.



For more information on disinfection in animal settings, visit the [CFSPH Disinfection Website](https://www.cfsph.iastate.edu/infection-control/disinfection).

Development of this material was made possible through a grant (award number AWD-025393-00001) from the U.S. Department of Agriculture (USDA) Animal and Plant Health Inspection Service through the National Animal Disease Preparedness and Response Program (NADPRP). USDA is an equal opportunity employer and service provider. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the view of the USDA.