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ceta.org/members-covid-19/

Pressure/Power Washing White Paper on Cleaning and Sanitizing of Surfaces

Introduction

This white paper is to reinforce the process and conditions under which the cleaning process commonly known as pressure or power washing, may be used when there is a threat of exposure to transmission of disease, either bacterial or viral, from airborne aerosol droplets or from a surface to a person. Viruses are transmitted, most commonly, through respiratory droplets. The virus may remain viable in the air or on surfaces for hours into days depending on the environment.

Understanding the novel coronavirus (SARS-CoV-2)

Viruses are protein cells that can only grow inside a host such as humans. They are not technically “alive” on their own and cannot be “killed.” However, a virus can be inactivated, or its infectivity can be affected by chemical and other disinfectants as well as environmental factors such as temperature and humidity. Viruses can survive on surfaces from a few hours to a few days depending on the type of surface. It travels in droplets of saliva between human to human, and recent studies suggest it is also airborne.† Based on its structure, SARS-Cov-2 is believed to be highly sensitive to heat and moisture, but highly contagious. SARS-Cov-2’s viral envelopes are of lipid layers: Enveloped viruses like SARS-CoV-2—which rely on a protective lipid coating—are the easiest type to deactivate. In contrast with many gastrointestinal viruses like norovirus which have a tough protein shell called a capsid, viruses with this fatty wrapping are relatively vulnerable.††

†New coronavirus may spread as an airborne aerosol, like SARS from [New England Journal of Medicine, CDC](#)

††“How does EPA know the disinfectants that should deactivate the COVID-19 coronavirus” from [EPA, EPA List N](#), “Viral Envelope” from [John Hopkins Medicine](#)

Understanding differences among Cleaning, Sanitizing, Disinfecting and Sterilizing

There is often a confusion among these terms, particularly between sanitizing and disinfecting. It is paramount for a sanitation professional to understand the differences and what a particular sanitation protocol is expected or intended to achieve. The COVID-19 pandemic is caused by a virus, and “disinfection” is the main goal.

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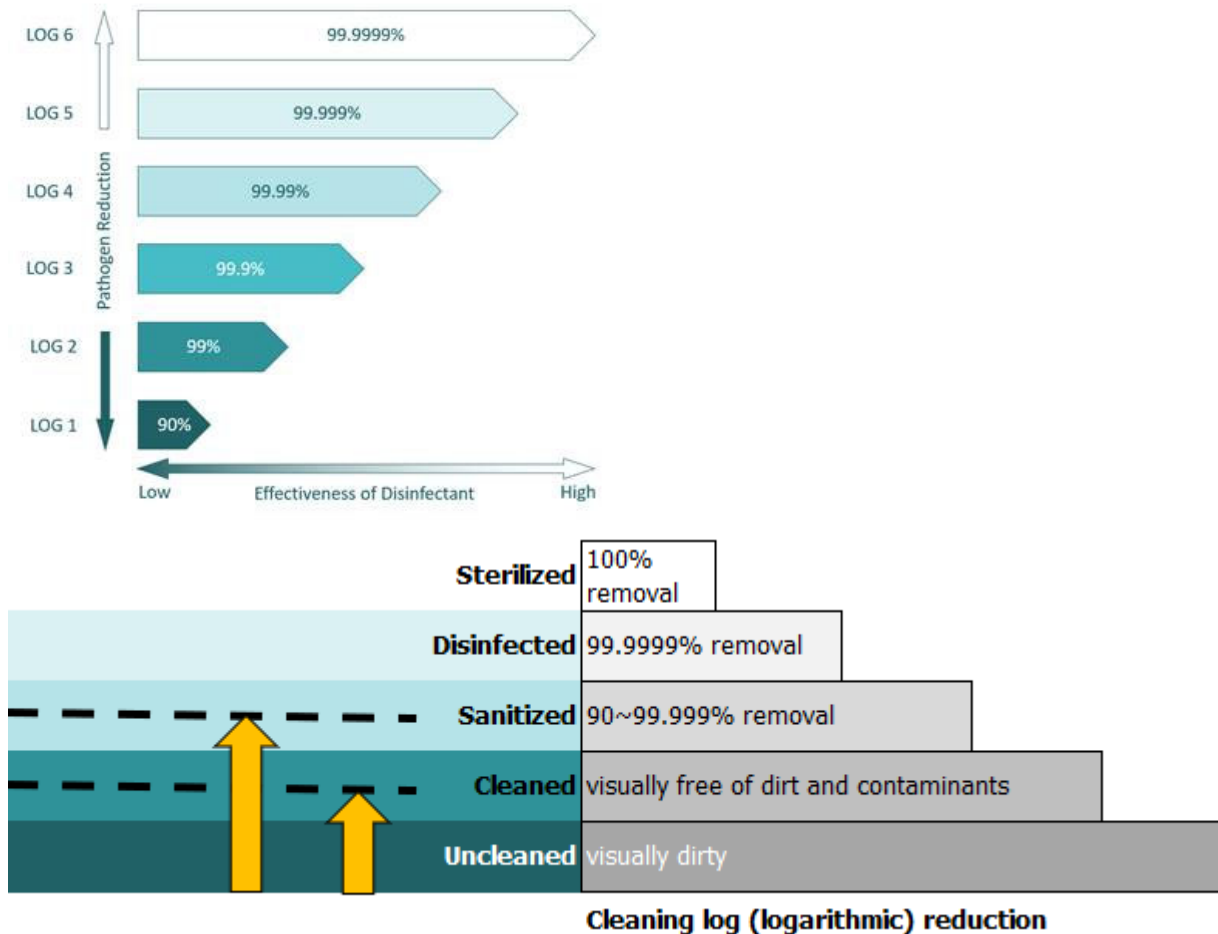
The Centers for Disease Control (CDC) definitions for cleaning, sanitizing, disinfecting, and sterilizing are:†

Cleaning: removes germs, dirt, and impurities from surfaces or objects. Cleaning works by using soap (or detergent) and water to physically remove germs from surfaces. This process does not necessarily kill germs, but by removing them, it lowers their numbers and the risk of spreading infection.

Sanitizing: lowers the number of germs on surfaces or objects to a safe level, as judged by public health standards or requirements. This process works by either cleaning (which physically removes germs from surfaces or objects) or disinfecting (which kills germs) to lower the risk of spreading infection. Sanitizing is generally a little gentler than disinfecting. Removing or deactivating pathogens down to an “acceptable” level, often by 1 to 5 log reduction (90-99.999%).

Disinfecting: refers to using chemicals to kill germs on surfaces or objects. This process does not necessarily clean dirty surfaces or remove germs, but by killing germs on a surface *after cleaning*, it can further lower the risk of spreading infection. Removing or deactivating unwanted microorganisms down to 6 log reduction (99-99.9999%).

Sterilizing: a process that destroys or eliminates all forms of microbial life and is carried out in health-care facilities by physical or chemical methods. 100% removal or inactivation of microorganisms.



†[CDC Glossary](#)

Pressure/Power Wash Method

Pressure/Power washing is a cleaning method used generally on the outside of buildings and has been the staple to the exterior cleaning industry for nearly 100 years. Cleaning contractors are beginning to market power washing. It is similar to pressure washing in that it still utilizes an electric motor or gas engine to power a pump with a specific nozzle size that pressurizes and accelerates water to remove a stain. However, power washing is slightly different in that it uses soaps and chemistry to emulsify the stains and organic matter then uses pressure to rinse the stain away. Power washing is chemical assisted pressure washing. It uses the "power" in the chemistry of the soaps to make the "pressure washing" more effective.

The Problem

It is also notable to point out that surfaces thought to be resistant to bacteria and viruses by composition, may not be as resistant to sustaining bacteria and viruses once that same surface has built up a biofilm on that surface. Biofilms can live on residue from body oils, pollen, waste products, food, animal or insect defecation, as well as moisture from rain and or humidity. This biofilm then takes up residence allowing microbes, bacteria and viruses to grow just as they do on a petri dish in a lab. If you do not remove the biofilm, then you simply cannot effectively reduce the numbers of bacteria and viruses occurring on a surface according to the Centers for Disease Control (CDC) and World Health Organization (WHO). To return a once resistant surface to that resistant state you must conduct an initial deep cleaning, removing the biofilm, before the sanitation/disinfection process.

The Solution

Power washing can be a very effective tool for cleaning, sanitizing and disinfecting surfaces that have possibly been inhabited with bacteria and viruses. Additionally, hot water pressure/power washers can add a formidable advantage for sanitizing surfaces. Please follow the steps outlined below.

Personal Protective Equipment (PPE)

Pressure washing has hazards associated with the task i.e. pressurized water, chemical usage, high decibel ratings and the environment. Here is a common list of PPE for pressure/power washing hazards.†

Pressurized Water:

- Eye Protection in the form of safety glasses, chemical splash/impact goggles or a face shield.
- Skin protection in the form of gloves and protective coveralls.
- Foot protection in the form of rubber boots with steel toes.

Chemical Usage:

- Lung protection in the form of an N-95 respirator for protection against any particulate i.e.. pollution, silica, common dust, smoke, or flu.
- Half or Full-Face Respirator for any chemical usage with vapor levels beyond nuisance and/or suggested by the SDS sheet of the chemical.

High Decibels:

- Hearing protection should be worn when decibel levels exceed standards.

Environment:

- A wide brimmed hat is also recommended to protect against sun and overspray.
- Sunscreen when working outdoors and exposed to sun
- Hi Vis Clothing around high traffic areas

Each pressure/power washing worker must wear the proper PPE for the application as laid out by the SDS sheet of the chemicals being applied as well as considering any environmental dangers that exist.

†[OSHA 1910 Table of Contents](#)

Equipment

A standard pressure washing system can be used to perform any cleaning project. To make a pressure washer a power washer you will need to add cleaning agents.

There are four basic types of systems for applying cleaning agents:

1. Upstream systems where cleaning agents like soap/detergent/surfactant that are compatible with the system flow through the pump and system and can be applied at high or low system pressure.
2. Downstream injection systems (like a pulse pump) that inject the cleaning agent (soap/detergent/surfactants) as well as disinfectants after the heat exchanger or even at or, after the nozzle.
3. Downstream venturi injection systems where cleaning agents like soap/detergent/surfactant as well as chemicals and disinfectants are drawn into the system under low pressure after the pump causing no damage to the pumping system. A dual lance wand is also recommended so at the turn of a handle you can go from applying soap to high pressure rinsing. If able, the addition of a hot box heater or a hot water skid system. When using or adding hot water please ensure that you install your downstream venturi injector after/downstream of the hot box/heater. This will keep soaps or corrosives from harming the heating system. Adding hot water to the rinse is recommended.
4. Foamer systems which attach to the end of the lance/wand and allow foaming cleaning agents to be applied.

Chemicals/Soaps (For downstreaming)

The CDC and WHO recommend Sodium Hypochlorite (SH or Bleach) as the preferred sanitation/disinfectant for bacteria and viruses. You will need to purchase SH from a janitorial supply labeled for building disinfecting to adhere to Occupational Safety and Health Administration (OSHA) standards for labeling. To perform an initial cleaning, you will also need surfactants (bleach stable soap) to add to your pretreatment. Surfactants help break surface tension on the biofilm and promote deep penetration for cleaning and sanitation. For the final sanitation step as well for subsequent/follow-up treatments you can come back with the CDC & WHO's recommended .005 solution of SH to water, however there are various Environmental Protection Agency (EPA) registered disinfectants.†

†[EPA List N: Disinfectants for Use Against SARS-CoV-2 \(COVID-19\)](#)

Loading the Mix (For downstreaming)

WARNING: Never mix bleach and any acid-based product. Never mix with ammonia or any other household cleaner (Other than appropriate surfactants that are approved bleach)

stabilizers). Personal injury and property damage may occur. Always consult and follow label instructions.

For downstream injectors to pull your solution into your power washing hose you will need to load a concentrate into a five-gallon bucket or an auxiliary tank. For demonstration purposes we will use a five-gallon bucket for our examples. Here are instructions for using two different products of bleach to get to the CDC and WHO's recommended .005 SH solution.

10% Downstream Injector:

Five-Gallon Bucket

4.5 Gallons of Industrial Sodium Hypochlorite at 5% (household bleach)

.5 Gallons of Bleach Stable Surfactant

20% Downstream (High-Draw) Injector:

Five-Gallon Bucket

4.5 Gallons of Industrial Sodium Hypochlorite at 10% – 12% (pool bleach)

.5 Gallons of Bleach Stable Surfactant

Once the concentrate is loaded into the five-gallon bucket then drop the downstream injector hose in the bucket. Then open your dual lance wand so that water flows from the larger orifice soap tip reducing the system pressure. This will activate the venturi in the downstream injector and the injector will start to pick up concentrate diluting it at the ratio of the injector itself. It is important to know that the length of your pressure washing/application hose and height you climb away from the injector may reduce flow to below what the downstream injector is rated for. Please try to stay reasonably close to your skid and at a level plane for working to ensure maximum pull is realized from the venturi effect of the downstream injector.

Knock Down Protocol

Before you enter a possibly infested area exercise the KNOCK DOWN PROTOCOL. Some viruses and bacteria can be airborne. If not, you can atomize them into the air accidentally with your pressure washer. To avoid this exposure, we have created this knock down protocol. With your soap tip engaged on your dual lance wand spray the air ahead of you 10 feet up sweeping potential virus out of the air towards the ground to KNOCK DOWN airborne virus to the floor. Then soak all areas with your 2% SH, Surfactant and Water solution. These areas must stay wet with sanitizer and dwell for at least 10 minutes before you can begin your wash cycle.

Deep Cleaning

Once you have adhered to the knock down protocol you can start the deep cleaning procedure. The CDC recommended sanitation solution is to use a .005 solution of sodium hypochlorite (bleach) and water to sanitize a surface. A thorough deep cleaning with a 2% sodium hypochlorite and water solution with a powerful bleach stable surfactant, should be used during an initial deep cleaning. The CDC also recommends agitation with a brush during that initial deep cleaning. Once every side and every surface has been treated and agitated with a brush, the soft wash solution needs to dwell wet on the surface for 10 minutes. After the dwell time a thorough rinse of cool clean water can be used. If it is available hot water is an added assurance for rinsing because it is known that bacteria and viruses do not tolerate temperatures above 140 degrees Fahrenheit.

Cleaning the surface areas removes dirt and impurities including germs and should be done before sanitizing/disinfecting which kills any germs remaining on the surface after cleaning, further reducing the spread of infection.

Typical cleaning application and rinse techniques:

Option 1 for vertical surfaces, start applying the cleaning agent from the ground and begin moving upward covering the entire surface. After the cleaning agent has been thoroughly applied, begin to rinse with the high-pressure spray from the top down. Please note this process possibly uses more cleaning agent.

Option 2 for vertical surfaces, start applying the cleaning agent from the top down covering the entire surface. After the cleaning agent has been thoroughly applied, begin to rinse with the high-pressure spray from the top down.

For horizontal surfaces apply the cleaning agent wetting the entire surface. After the cleaning agent has been thoroughly applied, use a flat surface cleaner to thoroughly clean the area then rinse the full surface.

All the typical accessories can be used for the deep cleaning process.

Final Sanitization

Once the initial deep clean has been concluded, the CDC recommends a solution of .005 sodium hypochlorite (one half of one percent bleach) to water and a surfactant to spray on the now restored/resistant surface. This treatment is low enough in sodium hypochlorite that it should not harm the surfaces treated. Finally, that treatment should be allowed to dry in place on the surface. Please see the EPA list for other post treat/follow-up products that can be used for subsequent visits.†

†[EPA List N: Disinfectants for Use Against SARS-CoV-2 \(COVID-19\)](#)

Frequency of subsequent treatments depends on the current threat as well as seasonality and population traffic at the treatment site. During a pandemic in an area where public will still utilize the area daily treatments will be needed. If it is flu season weekly treatments can be made with staff cleanings bolstering the efforts on surface wipe-downs throughout the day and week with sanitizing cleaners by spray bottle and cloth. Outside flu season areas should be sanitized monthly with staff doing bottle and hand cleanings to bolster the sanitation efforts.

Pressure/power wash systems might be degraded by some of these sanitation products. Because they might include caustics like sodium hypochlorite (bleach). Pressure/power washers are constructed of metals, tanks, pumps, reels, and hoses that might breakdown for caustic sanitizers like sodium hypochlorite. Be aware that you cannot convert most pump sprayers, backpack sprayers or pest control equipment into effective soft washing equipment without damaging those sprayers. It is imperative that pressure/power washers, including the downstream injector system, be rinsed out completely with cool/clean water after every use to eliminate deterioration. Additionally, any trailers, skids and trucks should be washed down with a neutralizing soap daily to reduce harm to that equipment as well.

Manufacturers & Distributors

CETA is an industry association comprised of the leading cleaning equipment manufacturers, suppliers and distributors. The COVID-19 CETA Technical Committee believes items recommended in this paper will increase in demand and that all CETA members are advised to evaluate the products they have to ensure

they have proper levels to meet increased demand. CETA is committed to our members and the role we play in helping to win this war. Now is a great time to find an expert near you at www.ceta.org.

Conclusion and Disclaimer

The COVID-19 causing virus known as the novel coronavirus is so new that at this present time, there is no validation available for pressure/power washing specifically for SARS-CoV-2. Above information and recommendations based on existing scientific data on known pathogens and what is known about viruses in general. Currently using pressure/power washing equipment is recommended as an additional tool to enhance sanitation, not as a sole “disinfectant” to combat COVID-19.

Refer to the [CDC](http://www.cdc.gov) website for the most up-to date information about the novel coronavirus (SARS-CoV-2) and how to protect yourself and prevent its spread.

Additional references:

[CDC](http://www.cdc.gov) (Centers for Disease Control and Prevention)

[CDC Coronavirus \(COVID-19\)](#)

[CDC Cleaning and Disinfection for Households](#)

[CDC Cleaning and Disinfection for Community Facilities](#)

[WHO](http://www.who.int) (World Health Organization)

[EPA](http://www.epa.gov) (Environmental Protection Agency)

[EPA Coronavirus \(COVID-19\)](#)

[OSHA](http://www.osha-slc.gov) (Occupational Safety and Health Administration)

[OSHA COVID-19 Control and Prevention](#)

OSHA 1910 Standards:

[1910.133\(a\)](#)

[1910.133\(a\)\(1\)](#)

[1910.133\(a\)\(2\)](#)

[1910.133\(a\)\(3\)](#)

[1910.133\(a\)\(4\)](#)

[1910.133\(a\)\(5\)](#)

[1910.133\(b\)](#)

[1910.133\(b\)\(1\)](#)

[1910.133\(b\)\(1\)\(i\)](#)

[1910.133\(b\)\(1\)\(ii\)](#)

[1910.133\(b\)\(1\)\(iii\)](#)

[1910.133\(b\)\(2\)](#)

[1910.138\(a\)](#)

[1910.138\(b\)](#)

[1910.132\(a\)](#)

[1910.136\(a\)](#)

[1910.136\(b\)](#)

[1910.136\(b\)\(1\)](#)

[1910.136\(b\)\(1\)\(i\)](#)

[1910.136\(b\)\(1\)\(ii\)](#)

[1910.136\(b\)\(1\)\(iii\)](#)

[1910.136\(b\)\(2\)](#)

[1910.134\(a\)\(1\)](#)

[1910.134\(a\)\(2\)](#)

[1910.134\(d\)\(1\)](#)

[1910.134\(d\)\(1\)\(i\)](#)

[1910.134\(d\)\(1\)\(ii\)](#)

[1910.134\(d\)\(1\)\(iii\)](#)

[1910.134\(d\)\(1\)\(iv\)](#)

[1910.95\(b\)\(1\)](#)

[1910.95\(b\)\(2\)](#)