

Proper Disinfectant Use to Prevent COVID-19's Spread

Learning how to choose the proper disinfectant for surfaces throughout your shop and then using it as directed are keys to stopping the spread of viruses such as the novel coronavirus. By: LORI BECKMAN Senior Editor *Production Machining*

Protecting employees, customers and products from harmful contaminants is a priority for all machine shops. For example, using surface disinfectants continually is vital to prevent the spread of bacteria and viruses, most recently SARS-CoV-2 (the novel coronavirus that causes [COVID-19](#) disease), in a shop environment. But unless the proper disinfectants are being used and implemented correctly,



Knowing how to read disinfectant labels and accurately interpreting their meanings is crucial in the fight against transmitting the pathogens. (Photo image courtesy of Getty images.)

the process of disinfecting will be ineffective. Knowing how to read disinfectant labels and accurately interpreting their meanings are crucial in the fight against transmitting the pathogens.

To clarify the proper use of these disinfectants, Yangsheng Zhang, Ph.D., technical director at [BHC Inc.](#), shares his insights about what to learn from [Environmental Protection Agency \(EPA\)](#) labels, including their efficacy claims and how to interpret them for use against COVID-19. He also shares disinfection strategies and application methods, as well as his thoughts on post-pandemic disinfection.

The Significance of EPA Labels

Label reading is not a strong point for some people. However, it is a critical habit to have when handling chemicals. Surface disinfectants, specifically, contain important information on their labels dictated by the EPA. The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) requires that all disinfectants must go through an EPA registration and approval process with the Antimicrobial Division, Office of Pesticide Program before the products can be manufactured or sold in United States. This registration results in an EPA registration number that appears on each product label. Products must also be registered at the state level.

“Approval requires the disinfectant manufacturer to use data to demonstrate efficacy against the microorganisms that they are claiming to kill, as well as provide safety data

to make sure the solution is safe for the environment and humans,” Zhang explains. “Non-EPA-approved products are prohibited to make any explicit or implicit disinfecting claims.”

Brulin

Uniquat® Neutral Disinfectant 256

ACTIVE INGREDIENTS:

Alkalyl (50% C14, 40% C12, 10% C16)	9.00%
Dimethyl Benzyl Ammonium Chloride	6.24%
Octyl Decyl Dimethyl Ammonium Chloride	3.37%
Diethyl Dimethyl Ammonium Chloride	3.37%
OTHER INGREDIENTS:	77.52%
TOTAL:	100.00%

KEEP OUT OF REACH OF CHILDREN

DANGER

See Side Panel for Additional Precautionary Statements.

FIRST AID

EPA registration number

NET CONTENTS:

1 Gallon (3.8 Liters)

Contento Neto:

1 Galón (3.8 Litros)

Brulin & Co., Inc.

P.O. Box 270 • Indianapolis, IN 46206

1.800.776.7149

PRECAUTIONARY STATEMENTS

HAZARDS TO HUMANS AND DOMESTIC ANIMALS

DANGER: Corrosive. Causes irreversible eye damage and skin burns. May be fatal if inhaled. Harmful if swallowed or absorbed through the skin. Do not breathe spray mist. Do not get in eyes, on skin, or on clothing. Wear goggles or face shield and chemical-resistant gloves and protective clothing when handling. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco or using the toilet. Remove contaminated clothing and wash clothing before reuse.

ENVIRONMENTAL HAZARDS

This pesticide is toxic to fish, aquatic invertebrates, oysters, and shrimp.

STORAGE AND DISPOSAL

Do not contaminate water, food, or feed by storage and disposal.

PESTICIDE STORAGE: Store only in original container. Keep this product under locked storage sufficient to make it inaccessible to children or persons unfamiliar with its proper use.

PESTICIDE DISPOSAL: Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide, spray mixture or residue is a violation of federal law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste Representative at the nearest EPA Regional Office for guidance.

CONTAINER HANDLING: For non-refillable containers equal to or less than 5 gal. Non-refillable Container: Do not reuse or refill this container. Triple rinse container promptly after emptying. Triple rinse as follows: Fill the container is full with water and recap. Shake for 10 seconds. Drain for 10 seconds after the foam begins to drip. Follow Pesticide Disposal instructions for residue disposal. Repeat this procedure two more times. Then offer for recycling if available or puncture and dispose of in a sanitary landfill, or by incineration.

Hospital-use disinfectant, institutional disinfectant, surfaces, use sites

This product is for use on **hard, non-porous surfaces** in hospitals, nursing homes, medical and dental offices and clinics, healthcare facilities, medical research facilities, correctional facilities, athletic facilities, gyms, funeral homes, health clubs, institutional kitchens, schools, colleges, sports complexes, convenience stores, retail and wholesale establishments, transportation terminals, public transportation, medical device manufacturing facilities, factories, warehouses, shower and bath areas, dairy farms, poultry/duck farms, heavily inspected meat and poultry plants, food handling and processing areas, poultry premises (hatcheries), swine premises, veterinary, veterinary clinics, kennels, and other animal care facilities.

This product when used as directed is formulated to disinfect, clean, sanitize, and deodorize on washable hard, non-porous surfaces such as: hospital beds, examining tables, ambulance equipment/surfaces, medical equipment surfaces, counters, sinks, tub surfaces, windows, mirrors, painted surfaces, floors, finished floors, walls, ceilings, fixtures, bathroom fixtures, cages, kennel/cage floors, examination tables, hard, non-porous non-food contact surfaces in food preparation and storage areas, bulkheads, soffits, trays, racks, egg flats, chick boxes, egg cases, nests and trash containers, used houses, poultry/duck equipment, carts, nesting tables, and automated fry, rack and boggy washers, egg receiving and egg holding areas, ultrasonic baths, whirlpools, athletic mats, exercise equipment, locker rooms and, other hard, non-porous, non-food contact surfaces.

This is a one-step disinfectant cleaner and deodorant designed for general cleaning, disinfecting, deodorizing, and controlling mold and mildew on hard, non-porous, non-food contact surfaces.

surface types

Can be applied through low-pressure sprayers, burning apparatus, tanks, and misting systems. Follow manufacturers' instructions when using this equipment.

top: application methods

bottom: contact time, dilution

DISINFECTANT PERFORMANCE: This product kills the following bacteria in 10 minutes at 0.5 oz. per gal. of 400 ppm hard water (875 ppm active) on hard, non-porous surfaces: *Acinetobacter baumannii*, *Acinetobacter calcoaceticus*, *Acinetobacter sp.*, *Campylobacter jejuni*, *Corynebacterium ammonigenes*, *Enterobacter aerogenes*, *Enterobacter cloacae*, *Enterobacter faecalis*, *Enterobacter faecalis* (SRL), *Enterobacter faecium* (MDR), *Escherichia coli*, *Escherichia coli* (ESBL), *Escherichia coli* O157:H7, *Klebsiella pneumoniae*, *Klebsiella pneumoniae* (MDR), *Proteus vulgaris*, *Pseudomonas aeruginosa*, *Salmonella enterica*, *Salmonella maritima*, *Shigella dysenteriae*, *Shigella flexneri*, *Shigella sonnei*, *Staphylococcus aureus*, *Staphylococcus aureus* (HA-MRSA) (MDR), *Staphylococcus aureus* (CA-MRSA), *Staphylococcus pyogenes*

VIRUCIDAL * PERFORMANCE: This product kills the following viruses in 10 minutes at 0.5 oz. per gal. of 400 ppm hard water (875 ppm active) and 5% soil on hard, non-porous surfaces: Adenovirus A (NSA1) Virus, Herpesvirus, Hepatitis B Virus (HBV), Hepatitis C Virus (HCV), Herpes Simplex Virus Type 1, Herpes Simplex Virus Type 2, Human Coronavirus, Human Immunodeficiency Virus Type 1 (HIV-1), Influenza A (H1N1) Virus, Vaccinia Virus

ANIMAL PREMISE VIRUCIDAL * PERFORMANCE: This product kills the following viruses in 10 minutes at 0.5 oz. per gal. of 400 ppm hard water (875 ppm active) and 5% soil on hard, non-porous surfaces: Adenovirus A (NSA1) Virus, Canine Coronavirus, Canine Distemper Virus, Equine Herpes Virus Type 1, Herpesvirus, Infectious Bovine Rhinotracheitis Virus (IBR), Infectious Laryngotracheitis Virus, Newcastle Disease Virus, Porcine Rotavirus, Pseudorabies Virus

NON-FOOD CONTACT SURFACE SANITIZING PERFORMANCE: This product is an effective one-step sanitizer in 5 minutes at 0.5 oz. per gal. of 400 ppm hard water (875 ppm active) and 5% soil on hard, non-porous surfaces: *Klebsiella pneumoniae*, *Staphylococcus aureus*

MILDEWSTATIC PERFORMANCE: This product controls the following mildew/mold at 0.5 oz. per gal. of water (875 ppm active) and 5% soil on hard, non-porous surfaces for up to 7 days: *Aspergillus niger*

DIRECTIONS FOR USE

It is a violation of federal law to use this product for a manner inconsistent with its labeling. This product is not for use on food contact surfaces.

FOR USE AS A ONE-STEP, GENERAL, HOSPITAL, DISINFECTANT, VIRUCIDE*, DEODORIZER, CLEANER:

1. Pre-cleaning

Pre-cleaning

1. Pre-clean with soap and water.

2. Apply one solution or 0.5 oz. of this product per gal. of water to disinfect hard, non-porous surfaces with a sponge, brush, cloth, mop, by immersion, auto scrubber, mechanical spray device, hand pump trigger spray device. For spray applications, spray 6-8 inches from surface. Do not breathe spray.

3. Treated surfaces must remain wet for 10 minutes. Rinse with potable water after use on surfaces that come in contact with food.

4. Allow to air dry. Rinsing of floors is not necessary unless they are to be waxed or polished.

5. Prepare a fresh solution daily or when visibly dirty.

The EPA label's purpose is to provide confines that hold the user responsible for staying within them for effective disinfecting and safety. The more critical information is in the red highlighted areas. (Photo courtesy of BHC Inc.)

Beyond the formalities of gaining EPA registration, the label's purpose is to provide confines that hold the user responsible for staying within them for effective disinfecting and safety. And, according to Zhang, it is a violation of federal law to use EPA-registered products in a matter inconsistent with its label.

He compares the importance of using these disinfectants correctly (as stated on their labels) with interpreting parts cleaning solvent labels properly. “We can draw parallels for the precision cleaning professionals when they find a (cleaning agent) product that is conformed to OEM approvals and industrial specifications,” Zhang explains. “They are supposed to follow those specification approvals and procedures, and not migrate outside of them.”

EPA labels also include an active ingredient list, concentration of the ingredient, efficacy claims, dilution ratio, contact times, surface types, use areas, application methods and directions for use.

Efficacy Claims and COVID-19

First, for disinfectants to be effective on a surface, precleaning is necessary. “Soils act as a protective barrier to pathogens and prevent the disinfecting agent from contacting the bacteria and/or virus particles to destruct the proteins,” Zhang says. He adds that, although new EPA efficacy protocols require the use of 400 ppm hard water and 5% serum to represent the light soils during testing, applying disinfectant on heavily soiled surfaces without precleaning them is a waste of time. “Cleaning is the only effective way to remove pathogens attached to or embedded in the surface soil,” he says. “Therefore, disinfecting after cleaning is the only way to ensure that the surface is fully decontaminated.”

“Continuing to decontaminate a workplace even after the pandemic is over might be the best routine to keep other viruses and bacteria at bay.”

Second, pairing efficacy claims to pathogens that shop management is concerned about is critical when choosing an effective disinfectant for a particular environment. This is because different microorganisms listed on the label can have different dilution and contact time. Normally, one would look on the label for the dilution and contact time for the pathogen he/she wants to kill. However, unlike established pathogens (such as hepatitis B, hepatitis C and HIV), novel coronavirus (SARS-CoV-2) is not yet listed on product labels.

To address this issue, the EPA has established an [Emerging Viral Pathogen Program](#) that provides clear guidelines as well as authorization for users to select appropriate disinfectant against an emerging viral pathogen (such as the SARS-CoV-2 virus) based on existing label claims. This program is triggered only if the CDC confirms there is an outbreak and it inactivates 100 days after the outbreak has ended. “The principle behind the authorization is based on scientific evidence that the susceptibility of pathogens to chemical disinfection correlates to the virus structure,” Zhang says.

He continues by explaining enveloped, large (50-nm) non-enveloped and small (< 50-nm) non-enveloped viruses and how this model helps determine which disinfectants to use against new outbreaks. The SARS-CoV-2 virus is an enveloped virus, which is the easiest of the three virus classes to kill. Knowing this, the EPA’s Emerging Viral Pathogen Program allows products that are effective against small non-enveloped viruses to claim efficacy against the SARS-CoV-2 virus. “Because small non-enveloped viruses are harder to kill, if a product is effective against that, then the product is expected to be effective against a virus that is easier to kill,” Zhang explains.

The [norovirus](#) is a common, small non-enveloped virus that most disinfectant manufacturers use as the basis to make emerging viral pathogen claims against SARS-CoV-2 virus. “Such claims allow you to use such product to fight COVID-19 when following the use instruction for norovirus,” Zhang says.

A list of based registration disinfectants approved to make SARS-CoV-2 claims under the emerging viral program (EVP) can be found in [List N](#) on the EPA's website.

Disinfection Strategies



It's critical to use a disinfectant that is formulated for hard, nonporous, inanimate surfaces. The product should also explicitly list "manufacturing facility" on the label as one of the use sites for the disinfectant to be applied. (Photo courtesy of Getty Images.)

Understanding that a disinfectant is formulated for specific surfaces and learning how to find this information on the label are other essential steps for proper prevention of COVID-19. All EPA-approved labels clearly specify the surface types on which the disinfectant should only be applied. Zhang recommends finding a disinfectant that is for hard, nonporous, inanimate surfaces. These surfaces include benches, tables, desks, doors, handles, machine controls and push carts. The product should also explicitly list "manufacturing facility" on the label as one of the use sites for the disinfectant to be applied.

Knowing where to apply disinfectant then leads to the next step of how often to apply it. Zhang points to using a risk mitigation strategy to determine targets for frequent (or infrequent) disinfection. "Risk is a combination of hazard and exposure," he explains. "A high hazard with no exposure leads to low risk, and a low hazard with high exposure can actually mean higher risk."

Based on that concept, Zhang advises shops to consider initiating a risk assessment of all surfaces, which entails identifying touch points throughout the facility and then categorizing those touch points as high or low touch points. "The high touch points will be your primary targets for frequent disinfection because they are the surfaces with more chances to transmit the pathogen," he says. These high touch point objects can be anything from machine controls and door handles to writing pens for a white board. These should always be pre-cleaned. "I won't necessarily recommend manufacturers spray disinfectant over floors and walls," he adds. "They can do that now and then, but they aren't high touch points."

Application Methods

Once management has chosen the appropriate disinfectant for the shop environment and is ready to apply it to the appropriate shop surfaces, using the application methods listed on the EPA label is essential.

Although spray is the common method, there are other methods that are approved. “For example, if you want to use a fogger to disinfect a small space, you must use a product that specifically lists ‘fogger’ as one of the application methods on the label,” Zhang explains.



Although spray is a common method for applying disinfectant, there are other methods that are approved by the EPA. These methods are listed on an EPA label.

(Photo courtesy of Getty Images.)

Continuing Disinfection Post-Pandemic

Although it has become commonplace to disinfect surfaces regularly since the COVID-19 outbreak, continuing to decontaminate a workplace even after the pandemic is over might be the best routine to keep other viruses and bacteria at bay.

“The COVID-19 event really opens up a new perspective on how we deal with these hidden enemies, so to speak,” Zhang says. “Thinking back to flu viruses we have dealt with; we are probably under protecting ourselves. Luckily, the flu is not as fatal as coronavirus, but it prevails and is everywhere.”

Keeping a routine and correct practice of disinfection will help operations have a healthy workforce and reduce the amount of sick days employees take, he concludes.

For the EPA’s list of disinfectants for use against COVID-19, visit [gbm.media/coviddisin](https://www.epa.gov/pesticide-registration/covid-19-disinfectants).