



Date: June 2023

Subject: **HYGEN™ Disposable Microfiber and Microbe Removal**

Importance of Microbe Removal

The goal of cleaning in any setting, but particularly in the healthcare setting, is to remove dirt and debris and any microorganisms that may pose an infection risk. Numerous studies have shown that hand contact with contaminated surfaces plays a pivotal role in the transfer of pathogens between patients and healthcare workers.¹⁻³ Accordingly, in their Guidelines for Environmental Infection Control in Health-Care Facilities, the Centers for Disease Control and Prevention (CDC) state that “cleaning and disinfecting environmental surfaces as appropriate is fundamental in reducing their potential contribution to the incidence of healthcare-associated infections.”¹ The COVID-19 pandemic, along with outbreaks of infectious diseases on cruise ships and in the food processing industry, have demonstrated that these principles don’t just apply to healthcare settings.⁴⁻⁵

The CDC identifies cleaning as the first step in the disinfection process, because organic matter and debris interfere with the microbial inactivation of disinfectants.¹ Friction is a critical component of cleaning, whether it be surface cleaning or hand hygiene, because the mechanical action of scrubbing dislodges contaminants from surfaces, facilitating their removal.¹

Microbe Removal Test Method

Rubbermaid Commercial Products HYGEN™ Disposable Microfiber Pads (2135890, 2136051, 2135887, 2135889) and HYGEN™ Disposable Microfiber Cloths (2136053, 2136054, 2135888, 2136052) were evaluated for their ability to remove microorganisms from a contaminated surface. The tests were performed at independent labs. Methicillin-resistant *Staphylococcus aureus* (ATCC 33591), *Pseudomonas aeruginosa* (ATCC 9027) and *Clostridioides difficile* (ATCC 9689) were used as the contaminating bacteria species. *Feline calicivirus* (ATCC VR-782), human coronavirus OC43 and SARS-CoV-2 Omicron Variant (Lineage B.1.1.529, BEI Resources #NR-56461) were used as the contaminating virus species, and *Candida auris* (ATCC B11903) was used as the contaminating fungus species.

The test surface, (VCT) tile, was cleaned and polished following standard procedures. It was then inoculated with prepared inoculum and allowed to incubate. The tile was wiped along three planes: horizontal, vertical, and diagonal, with a 3” x 5” damp textile. The number of viable microorganisms on the tile was counted according to standard laboratory practice. The percent reductions and log₁₀ reductions from the initial populations of each microorganism were determined.

Microbe Removal Test Results

When applied to the surface of contaminated VCT surface material, HYGEN™ Disposable Microfiber Pads removed 99.97% of the viable population of bacteria Methicillin-resistant *Staphylococcus aureus* (ATCC 33591). When applied to the surface of contaminated VCT surface material, HYGEN™ Disposable

Microfiber Cloths removed 99.96% of the viable population of bacteria Methicillin-resistant *Staphylococcus aureus* (ATCC 33591).

When applied to the surface of contaminated VCT surface material, HYGEN™ Disposable Microfiber Pads removed 99.99% of the viable population of bacteria *Pseudomonas aeruginosa* (ATCC 9027). When applied to the surface of contaminated VCT surface material, HYGEN™ Disposable Microfiber Cloths removed 99.95% of the viable population of bacteria *Pseudomonas aeruginosa* (ATCC 9027).

When applied to the surface of contaminated VCT surface material, HYGEN™ Disposable Microfiber Pads removed 99.97% of the viable population of bacteria *Clostridioides difficile* (ATCC 9689). When applied to the surface of contaminated VCT surface material, HYGEN™ Disposable Microfiber Cloths removed 99.79% of the viable population of bacteria *Clostridioides difficile* (ATCC 9689).

When applied to the surface of contaminated VCT surface material, HYGEN™ Disposable Microfiber Pads removed 99.97% of the viable population of virus *Feline calicivirus* (ATCC VR-782). When applied to the surface of contaminated VCT surface material, HYGEN™ Disposable Microfiber Cloths removed 99.97% of the viable population of virus *Feline calicivirus* (ATCC VR-782).

When applied to the surface of contaminated VCT surface material, HYGEN™ Disposable Microfiber Pads removed 99.99% of the viable population of virus human coronavirus OC43. When applied to the surface of contaminated VCT surface material, HYGEN™ Disposable Microfiber Cloths removed 99.99% of the viable population of virus human coronavirus OC43.

When applied to the surface of contaminated VCT surface material, HYGEN™ Disposable Microfiber Pads removed 99.99% of the viable population of virus SARS-CoV-2 Omicron Variant (Lineage B.1.1.529, BEI Resources #NR-56461). When applied to the surface of contaminated VCT surface material, HYGEN™ Disposable Microfiber Cloths removed 99.99% of the viable population of virus SARS-CoV-2 Omicron Variant (Lineage B.1.1.529, BEI Resources #NR-56461).

When applied to the surface of contaminated VCT surface material, HYGEN™ Disposable Microfiber Pads removed 99.99% of the viable population of fungus *Candida auris* (ATCC B11903). When applied to the surface of contaminated VCT surface material, HYGEN™ Disposable Microfiber Cloths removed 99.99% of the viable population of fungus *Candida auris* (ATCC B11903).

The below chart provides a summary of the removal results.

| | <i>Methicillin-resistant Staphylococcus aureus</i> | <i>Pseudomonas aeruginosa</i> | <i>Clostridioides difficile</i> | <i>Feline calicivirus</i> | <i>Human coronavirus OC43</i> | <i>SARS-CoV-2 Omicron</i> | <i>Candida auris</i> |
|-------------------------------------|--|-------------------------------|---------------------------------|---------------------------|-------------------------------|---------------------------|----------------------|
| HYGEN™ Disposable Microfiber Pads | 99.97% | 99.99% | 99.97% | 99.97% | 99.99% | 99.99% | 99.99% |
| HYGEN™ Disposable Microfiber Cloths | 99.96% | 99.95% | 99.79% | 99.97% | 99.99% | 99.99% | 99.99% |

¹Centers for Disease Control and Prevention. Guidelines for Environmental Infection Control in Health-Care Facilities. 2003. Available from: <https://www.cdc.gov/infectioncontrol/pdf/guidelines/environmental-guidelines-P.pdf>. Accessed 3 April 2020.

²Weinstein RA. Epidemiology and control of nosocomial infections in adult intensive care units. *Am J Med* 1991; 9(Supp3B): S179-S184.

³Stiefel U, Cadnum JL, Eckstein BC, Guerrero DM, Tima MA, Donskey CJ. Contamination of hands with methicillin-resistant *Staphylococcus aureus* after contact with the skin of colonized patients. *Infect Control Hosp Epidemiol* 2011; 32: 185-7.

⁴National Institutes of Health. New coronavirus stable for hours on surfaces. Available from: <https://www.nih.gov/news-events/news-releases/new-coronavirus-stable-hours-surfaces>. Accessed 9 April 2020.

⁵Centers for Disease Control and Prevention. Norovirus: common settings for norovirus outbreaks. Available from: <https://www.cdc.gov/norovirus/trends-outbreaks/outbreaks.html>
Accessed 9 April 2020.