

# Technical Paper

## EPA-Registered Latex Paint Kills Pathogenic Bacteria on Hard Nonporous Surfaces

Combating hospital-acquired infections (HAI) is one of the most urgent challenges facing healthcare facilities today. According to the Centers for Disease Control and Prevention (CDC), one in 25 patients in U.S. hospitals contracts an infection as part of their in-patient care. Not only is this a clinical challenge, but also every incidence of an HAI has a direct bearing on an organization's reputation and financial reimbursement levels. From a best practices standpoint, the war on HAI must be fought on a number of fronts, varying with the routes of transmittal. An estimated 20-40% of HAIs have been attributed to cross-infection via the hands of healthcare personnel. While this often stems from direct contact with patients, touching contaminated healthcare surfaces is also indirectly responsible.

### INFECTION CONTROL CHALLENGES IN HEALTHCARE FACILITIES

Recent studies regarding the presence of pathogenic bacteria in hospitals reveal the inadequacy of current infection control practices and cleaning methods for walls and adjoining surfaces in these facilities. These studies have shown, for example, that 71 percent of Vancomycin-resistant *Enterococcus faecalis* (VRE)-occupied rooms tested positive after cleaning, and that 25 percent of rooms remained contaminated with Methicillin-resistant *Staphylococcus aureus* (MRSA) even after four rounds of cleaning with bleach.

While efforts to reduce the presence of these disease-causing bacteria have intensified, most guidelines require active participation of multidisciplinary teams. But human intervention carries with it the opportunity for human error. Continued progress in adopting effective infection control practices to help prevent the spread of harmful bacteria will require a broad array of measures, including passive methods that are less dependent on human intervention.

### Interior latex paint a breakthrough to help prevent the spread of harmful bacteria<sup>†</sup> on painted surfaces

Now hospital management can take additional precautions in addressing the challenges of treatable painted surfaces where disease-causing bacteria could be a concern. Coating scientists at The Sherwin-Williams Company and expert microbiologists collaborated to determine a way to help prevent the spread of harmful bacteria on painted surfaces.

The result is Paint Shield<sup>®</sup>, the first U.S. Environmental Protection Agency (EPA)-registered microbicidal paint for hard, nonporous interior surfaces such as walls, doors, trim and ceilings of hospital corridors and walkways, patient rooms, exam rooms, and comparable spaces in assisted living facilities and nursing homes.

Paint Shield kills 99.9% (3 log reduction) of <sup>†</sup>Staph (*Staphylococcus aureus*), MRSA (Methicillin-resistant *Staphylococcus aureus*), *E. coli* (*Escherichia coli*), VRE (Vancomycin-resistant *Enterococcus faecalis*) and *Enterobacter aerogenes* within two hours of exposure to those pathogens on a surface painted with it. It also continues to kill 90% (1 log reduction) of indicated bacteria following repeated contamination of these surfaces. Paint Shield's microbicidal properties last for up to four years as long as the surface's integrity is maintained. Standard cleaning protocols do not compromise the paint's ability to kill bacteria on the painted surface.

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### **Why this paint is different**

Paint Shield® Microbicidal Paint is formulated to kill the five indicated disease-causing bacteria on hard nonporous surfaces to the 3 log reduction level within two hours of exposure on painted surfaces. As a product making a kill claim against bacteria such as E. coli and MRSA that are a threat to public health, the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) requires that it be rigorously tested, validated and registered by the EPA. Paints that contain an antimicrobial agent only inhibit the growth of microorganisms such as mold and mildew that can stain the paint film, lead to its deterioration, and cause odors. Unlike Paint Shield, they are not designed or intended to kill bacteria. While the Paint Shield formulation incorporates antimicrobial agents that protect the paint film, it also contains active ingredients that kill harmful bacteria.

### **How Paint Shield works as a supplementary strategy against pathogenic bacteria**

Paint Shield's active ingredient is alkyl dimethyl benzyl ammonium chloride, a quaternary ammonium compound ("quat") commonly used to kill bacteria in settings where cleanliness and disinfection are paramount. It is a well-studied and highly regarded compound for its bacteria-killing properties. But until now, a quat had not been successfully suspended in a paint formulation.

The chemical stability achieved with Paint Shield now places this product in the forefront of specification options – as a supplement, not a replacement, to existing infection control and cleaning practices. The elimination of surface soil and filth on non-critical surfaces will always be fundamental in the effort to help control harmful bacteria, and thorough cleaning must always take precedence over other methods to combat the spread of surface pathogens.

### **What EPA registration involves**

Just as FIFRA requires EPA to register hospital-grade germicides intended to disinfect environmental surfaces, so too does it require registration for any product making a "Public Health Claim." The EPA considers it a Public Health Claim to state that human pathogens can be killed via their direct contact with Paint Shield.

To obtain registration, Paint Shield had to successfully undergo third-party laboratory testing to validate all aspects of the Public Health Claim. Successful completion of the tests permits the manufacturer, in this case The Sherwin-Williams Company, to use the term "microbicidal paint." Following are the six components of the rigorous process that Sherwin-Williams completed to achieve this.

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1. The EPA reviewed and approved the efficacy testing protocol Sherwin-Williams designed and proposed to support the claims.
2. The product was tested using that protocol in a third party, EPA-inspected lab that follows Good Laboratory Practice (GLP).
3. The product claims were validated on painted surfaces exposed to the specified organisms, validating the claim that all five indicated pathogens collectively died off to the 99.9% level within two hours.
4. The painted panels passed a continuous kill test following repeated exposures to the indicated pathogens to validate the 90% effectiveness claim.
5. The product passed vigorous washability tests, which exposed both kinds of test panels to cleaning products and protocols typically used in healthcare facilities according to CDC guidelines. Additional within-claim and continuous-kill tests to validate the claim followed after application of the cleaners and a scrub test.
6. Raw materials that comprise the product across its supply chain were subjected to a toxicological review, a risk-based assessment of ingredient effects on human health and the environment. This ensures that all components of the product are on the EPA inert ingredients approved list.

As EPA concluded that Paint Shield could be used without causing unreasonable adverse effects, and all claims were independently validated, the product and its labeling were given an EPA registration number<sup>1</sup>, and Sherwin-Williams now sells and distributes Paint Shield in the United States.

### **Exceptions and caveats**

Paint Shield is appropriate only for hard, nonporous interior surfaces such as walls, doors, trim and ceilings. It is not suitable for floors, exterior surfaces or for any portion of an operating room, which undergoes much harsher cleaning regimens. To ensure continuous protection, damaged surfaces (cracking, chipping) or surfaces that become covered by materials such as film, wax, oils, other paints or crayons should be repainted. Alcohol-based hand sanitizers dripping on walls will degrade the paint film as they would standard latex paints.

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### References

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5. HAI Data and Statistics, Centers for Disease Control and Prevention
6. Proprietary data from Definitive Healthcare (The MAX)

<sup>1</sup> EPA Reg. No. 64695-1, effective September 21, 2015