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ANTIBACTERIAL GLASSES CONTINUE TO PROVE REVOLUTIONARY IN PREVENTING SPREAD OF MICROBIAL INFECTIONS

Antimicrobial glass technology has emerged as one of the major innovations in glass design in recent years, and can eliminate fungi, bacteria, and other microorganisms on the surface. These coated glass products, are able to destroy nearly 99.9 per cent bacteria, which has helped propagate antibacterial glass industry trends, ensuring in applications where strict hygiene is necessary.

One of the main challenges faced by the healthcare industry is infections caused by pathogenic microorganisms, which lead to more fatalities than many other causes. Over 1,500 novel pathogens have been discovered since the 1970s and have wreaked considerable havoc on public health. The evolution of MDR (multiple drug resistant) pathogens, especially, has contributed massively to several health conditions across the global population. While once considered nosocomial, since the early 2000s, MDR infections have been increasingly observed in public areas such as airports, public transport, etc. via community-acquired pathogens like MRSA (meticillin-resistant Staphylococcus aureus). The main reason behind the rise of MDR pathogens is the overuse of antibiotics and antimicrobial treatments. The formation of biofilms mitigates the effectiveness of antibiotic therapy, leading to the rise of various antibiotic-resistant strains of bacteria, which can pose significant health risks to the public.

As the threat of this bacterial evolution intensifies, and amid persistent efforts to develop alternative prevention methods to curb microbial activity, the antibacterial glass market has emerged as one of the most promising and innovative sectors to help mitigate the growth and spread of novel microbial strains and infections.

WHAT IS ANTIBACTERIAL GLASS, AND WHY IS IT IMPORTANT?

Antibacterial glass refers to a thin, reflective surface enriched with fungicidal and bactericidal properties. The material can eliminate fungi, bacteria, and other microorganisms on the surface. Antimicrobial glass is made by means of the application of different antibacterial coatings. These coated glass products are then able to inhibit the growth and spread of bacteria on the surface, this leading to enhanced hygiene in both domestic and industrial use-cases.

Antimicrobial glass technology has emerged as one of the major innovations in glass design in recent years. According to reports, these glass types are able to destroy nearly 99.9 per cent bacteria, which has helped propagate antibacterial glass industry trends in applications where strict hygiene is necessary.

Several elements are used to create glass with antibacterial or antimicrobial coatings, including copper, silver, and zinc. Among these, silver is used most commonly in the forms of silver nanoparticles, zeolites, and salts, owing to its robust antibacterial properties and its ability to counteract chemical bonds present in bacteria.

Antimicrobial glass demonstrates myriad advantages over its traditional counterparts, including easier maintenance, high sterilization rate, better hygiene, and self-cleaning characteristics under UV (ultraviolet) light.

HAIS ON THE RISE – ANTIBACTERIAL GLASS AND ITS APPLICATIONS IN MEDICINE

The medical sector is among the most prominent application areas for the antibacterial glass industry. This is mainly due to the proliferating number of HAIs or hospital-acquired infections over the years.

According to an estimate from the CDC (Centers for Disease Control and Prevention), approximately 1.7 million patients in the United States contract HAIs. A major factor contributing to the rise of these infections is bacterial growth on various surfaces, including metal and glass. However, many cost-effective solutions are emerging in recent years to control these infections, with nearly one-third of hospital-acquired infections being considered preventable.

One of the methods used for this is the integration of antimicrobial glass technology in various surfaces and products throughout the healthcare facilities. These range from surfaces in laboratories, to burn units, isolation rooms, ICUs, and more. In 2020, Cybernet unveiled the first fully automated

antimicrobial medical computer in the world. The technology, equipped with antimicrobial touch glass, was examined and certified by the FDA for usage in both food and medical device applications and has also cleared Fungal Resistance Tests for Penicillium, Chaetomium, and Aspergillus fungi.

COVID-19 INTENSIFIES THE NEED FOR ANTIMICROBIAL SURFACES

The onset of the ongoing coronavirus pandemic imparted an unprecedented impact on the global landscape, exposing the vulnerabilities of the healthcare industry in terms of infectious disease prevention and response capabilities. In September 2020, the WHO revealed that over 27 million confirmed cases of the illness and almost 890,000 fatalities were recorded due to the virus.

The rapid spread of the COVID-19 disease, however, may prove beneficial for the antibacterial glass producers, with the healthcare industry rallying to develop and strengthen its infrastructure to combat further spread.

Studies conducted by scientists from UCLA, National Institutes of Health, Princeton, and CDC have reported that the coronavirus can survive for long periods on various surfaces, depending on factors like temperature, surface type, and virus strain. For instance, on glass and plastics, it can survive for up to 84 and 72 hours respectively.

Considering this, it has become increasingly important to develop solutions that would help neutralize or overcome the presence of microorganisms on surfaces. Researchers across the globe are making strong efforts to rally their resources and discover targeted solutions to address the urgent need for the prevention of COVID-19 transmission through surfaces.

To illustrate, a research team from the Aston University in Birmingham, UK, recently experimented with a technique similar to the stained glass technique from medieval times, in order to create a safer, medical-grade product. The research resulted in the creation of a bioactive phosphate glass, which had the ability to interact with biological tissue. The glass, 'stained' with cobalt oxide, has proved effective in eliminating fungi and bacteria, including microbes that show resistance or potential resistance to antibiotic treatment.

In a similar development, in September 2020, Ireland-based nanotechnology firm Kastus introduced a novel range of commercial antiviral and antibacterial glass screen protectors, which have demonstrated efficacy of nearly 99.9 per cent in blocking surface bacteria. The key to this innovation was the patented Kastus Antimicrobial & Antiviral surface coating technology.

This antibacterial coating was integrated into tempered glass screen protectors, which were able to deliver constant, double protection technology for various touchscreen devices. According to Kastus, the novel technology has been tested thoroughly and has demonstrated significant effectiveness against COVID-19, as well as other common bacterial strains including E. coli and Staphylococcus aureus.

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