Infection control and floor contribution

Does the floor contribute to the spread of infections?

80% of infections are caused by hands[1]. Surfaces that are frequently touched like patient bed frames, bedside table, door knobs, light switches etc., that can easily be contaminated by hands must receive more frequent attention. While floors do not have the same interactions with hand touches they are in frequent contact with other elements in the Healthcare environment like foot traffic, cleaning equipment and carts so they should be cleaned regularly and disinfected as required depending on how the space is used.

What are the flooring requirements for Infection prevention?

Depending on the philosophy of the Healthcare organization and the authorities having jurisdiction, not all areas within a hospital require the same level of infection control. In areas where there is a need for frequent cleaning and disinfection, flooring should be seamless and smooth, slip-resistant, easily cleaned, chemical resistant and appropriately wear-resistant. An integral cove base should be employed between the floor and the wall to prevent accumulation of dust and dirt in corners and crevices while also making the floor easier to clean. Any joints should be heat welded to prevent water from seeping below the sheet and from allowing dirt and pathogens to settle. In areas where frequent wet cleaning methods are employed (for example, clinical areas, operating and procedure rooms, sterile equipment processing), floors should be able to withstand the cleaning and disinfecting methods used including products and equipment.

What are the best Tarkett products for infection control?

Eliminating places for dirt and pathogens to accumulate, material cleanability and chemical resistance are the key criteria when looking to support Infection Prevention & Control with flooring. Our Heterogeneous (HE) and Homogeneous (HO) Vinyl installed with an integral cove base and minimal heat welded seams allows for watertight, seamless installation that can be cleaned with simple methods. They are especially good for areas in Healthcare and Senior Living environments where a higher level of infection control is needed. In non- healthcare space types tile products like our Luxury Vinyl Tile (LVT) are also an option since they offer a smooth, easy to clean surface and can withstand disinfection when required.

Many suppliers highlight the antimicrobial properties of their products for infection prevention.

What is Tarkett's position?

Material cleanability is crucial and must be the first criteria taken into consideration. It is obviously important that the material does not favor bacteria growth. However, these statements should be viewed with consideration. They are based on tests carried out in a laboratory according to a standard such as ISO 22196 or ASTM E2149 under specified conditions of temperature and humidity that do not reflect real life conditions (incubation at 35°C and 90% Relative Humidity during 24h). Moreover, some studies have shown materials containing silver ion have no antimicrobial efficacy at temperature and humidity levels typical of indoor environments.

"ISO 22196 and ASTM E2149 are not appropriate efficacy tests to prove application of surfaces to be used in clinical settings. The main reason for this stems from the high temperature and high relative humidity of testing conditions in these two methods. They are not representative of the true conditions for proposed use in clinical settings" Campos, M. D., Zucchi, P. C., Phung, A., Leonard, S. N., & Hirsch, E. B. (2016). The activity of antimicrobial surfaces varies by testing protocol utilized. PloS one, 11(8), e0160728.

[1] Centers for Disease Control

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ANTIMICROBIAL PROPERTIES, STANDARDS

What is the difference between ISO 846/C standard and ISO 22196 standard?
Do Tarkett flooring pass these tests?

- ISO 846/C specifies methods for determining the deterioration of plastics due to the action of bacteria. It aims at demonstrating that the material is not a nutrient for bacteria and does not allow the proliferation of the microorganisms (Bacteriostatic effect).
- ISO22196 is a method for determining the antibacterial activity of plastics and other non-porous materials. It is specific for materials containing antibacterial treatment (biocide).
- Tarkett does not use any antibacterial treatment in its flooring. That's why we use the ISO846/C. Bacteriostaticity of our homogeneous and heterogeneous vinyl products according to the ISO 846 standard have been tested and proven by third party labs (Fraunhofer, CERA LABO).

Are products with antibacterial properties effective against COVID-19 virus?

Antibacterial activity means that the product has an ability to kill bacteria or slow their growth. It doesn't mean that the antiviral activity has been demonstrated. It can be compared to the action of antibiotics that are ineffective in case of viral infection. Additionally, having this type of material gives the EVS (Environmental Services) staff and others a false sense of security and as such, may not clean the floors as well as should be and is directed by manufacturers.

Some suppliers highlight antiviral properties of their products and refer to the ISO21702 standard. Can you tell us more about this method?

It is a recent test method to evaluate the antiviral properties of plastic based on the ISO22196. It means that the objective of this norm is to evaluate the efficiency of the antimicrobial added. The conditions used in the ISO 21702 are 25°C / > 90 % humidity / 24h that do not reflect the real conditions of use. Some suppliers claim that their products kill the coronavirus. However, strain tested are not the SARS-CoV2 but other viral strains such as HCoV-229E.

"Given the high individual specificity, the results obtained with a viral strain cannot be extrapolated to other viruses" Conti, E. (2020). Antimicrobial properties of materials: characteristics and test methods. CATAS SPA. Italy

ANTIMICROBIAL COATINGS

You state that you do not use antimicrobial coatings. Why?

Antimicrobial coatings are a controversial topic. As an eco-responsible company, Tarkett has decided to stop the use of these substances. There is, at present, no definitive data to support their efficacy in reducing Healthcare Associated Infections (HAI's). Tarkett took this position in 2013 to avoid contributing to bacterial resistance and to prevent any potential harmful impact on people, health & the environment.

Additionally, antimicrobials increase the risk of superbugs. The widespread use of antimicrobials may contribute to the formation and spread of illness causing germs that no longer respond to the medical treatment. Also, antimicrobials are, by definition, biocides. They pose an inherent hazard to human health and the environment.

Are there any scientific publications having the same position as Tarkett regarding antimicrobial coatings?

When used correctly antimicrobials have an important role to play in controlling infection (ie. treatment of antibacterial infections, skin antisepsis, and targeted surface disinfection). However, the widespread use of antimicrobials in a broad range of applications is of concern especially since there is not enough scientific data surrounding the risks associated to antimicrobial coatings (toxicity, antimicrobial resistance).

That's the reason why some experts call for a reasonable and controlled use of antimicrobial coatings not only in the hospitals but also in the community.

Antimicrobial coatings should only be used in restricted circumstances. In hospitals, the use of antimicrobial coatings should be considered in hot spots with frequent hand contact (e.g., knobs, switches, rails) but only in high risk areas with immune-compromised patients/hosts. Ahonen, M., Kahru, A., Ivask, A., Kasemets, K., Kõljalg, S., Mantecca, P., ... & Crijns, F. (2017). Proactive approach for safe use of antimicrobial coatings in healthcare settings: opinion of the COST action network AMiCI. International journal of environmental research and public health, 14(4), 366.

Do we have any documents for Tarkett products which does not use antimicrobials?

Tarkett aims at being fully transparent through third-party verified product ingredient disclosure and material assessment declarations. Developed together with the Environmental Protection Agency (EPA), the Tarkett Material Health Statement goes beyond compliance, providing clear, transparent information on the health and environmental profile of the materials in our products, including any potential risks.

Fact sheet "10 things to know about antimicrobials" is available on our website.

What are the common biocides used in flooring?

Silver-based Antimicrobial coatings and especially Nanosilver are by far the most used coatings followed by those based on Zinc and Titanium dioxide.

You mention that efficacy of antimicrobial coatings have not been proven. What do you mean?

"While the high humidity (>90% RH) and high temperature (35C) utilized in JIS Z 2801 produce measurable efficacy in a silver ion-containing material, it showed no significant response at lower temperature and humidity levels typical of indoor environments" Michels, H. T., Noyce, J. O., & Keevil, C. W. (2009). Effects of temperature and humidity on the efficacy of methicillin-resistant Staphylococcus aureus challenged antimicrobial materials containing silver and copper. Letters in applied microbiology, 49(2), 191-195.

Effects of temperature and humidity on the efficacy of methicillin-resistant Staphylococcus aureus challenged antimicrobial materials containing silver and copper.

What are the risks associated to antimicrobial coatings?

Toxicity: Nanomaterials [size, 1–100 nm] have emerged as novel antimicrobials (Nanosilver, Titanium dioxide Nano,..). However the extremely small size of these particles raises concern about the toxic effect of nanomaterials on humans.

Nanosilver, due to its small particle size and enormous specific surface area, facilitates more rapid dissolution of ions than the equivalent bulk material; potentially leading to increased toxicity of nanosilver. Reidy, B., Haase, A., Luch, A., Dawson, K. A., & Lynch, I. (2013). Mechanisms of silver nanoparticle release, transformation and toxicity: a critical review of current knowledge and recommendations for future studies and applications. Materials, 6(6), 2295-2350.

Bacteria Resistance to Silver

The potential for bacterial resistance to silver (in any of its forms) seems to be of the greatest concern. Although several studies are available, the mechanism of the appearance and spread of bacterial resistance to silver (ions and particles) is not completely clear. Despite this, we can presume that wide-spread and uncontrolled usage of products containing silver nanoforms may lead to a growing severity of this problem Reidy, B., Haase, A., Luch, A., Dawson, K. A., & Lynch, I. (2013). Mechanisms of silver nanoparticle release, transformation and toxicity: a critical review of current knowledge and recommendations for future studies and applications. Materials, 6(6), 2295-2350.

Do we have any literature/studies showing that silver technologies are not durable?

The majority of antimicrobial coatings are based on the release of the active biocidal agent from the surface. The global action mode of silver has been widely explored scientifically: to act against bacteria, silver ions (Ag2+) are emitted by the additive (leaking), which kills bacteria from the inside by cell wall penetration.

That leads to the exhaustion of the additive. However the application of silver to floors, its persistence over time and especially its durability versus maintenance protocols have not been studied as of today.

Are there any regulations around biocides/ antimicrobials?

Europe: Articles treated with biocides are covered by the rules set in the BPR (Biocidal Products Regulation). Labelling is always required when an article refers to biocidal properties as specified in Article 58 of the BPR. When a treated article is placed on the market and it refers to the biocidal properties of the active substances within it, the label also has to contain:

- a statement that the treated article incorporates biocidal products;
- the biocidal property attributed to the treated article;
- the names of the active substances;
- if present, the names of each biocidal (nano) substance followed by the word 'nano' in brackets; and
- any relevant instructions for use.

https://echa.europa.eu/documents/10162/26065889/treated_articles_inbrief_en.pdf

North America: Manufacturers do not always advertise clearly or accurately. The use of antimicrobial additives in building products is governed by the EPA, guided by a complicated regulation known as the Federal Insecticide, Fungicide and Rodenticide Act. The complexities of this law make it possible for manufactures to stretch the truth in their marketing claims about the benefits of antimicrobial products, potentially misleading customers.

https://www.epa.gov/pesticide-registration/labeling-requirements

Visit our website for more information:

https://professionals.tarkett.com/en_EU/node/infection-prevention-control-floorings-10736

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