



## ZPTech®: The Broad Spectrum Antimicrobial

### Introduction

The quest for cleanliness is big business. The average American spends \$42 per month on household cleaning supplies, more than they spend on cable TV, cell phones, personal care or even their beloved pets<sup>1</sup> trying to eliminate bacteria and fungi from their environments.

Moisture-retaining products, such as sponges, bath mats and shower curtains, exposed to humid environments like bathrooms and locker rooms, provide excellent breeding grounds for mold, mildew, and bacteria. These microorganisms, left uncontrolled, may lead to odor and damage to products and surfaces.

Disinfectant chemicals are an important way to keep our homes and public spaces clean, but they don't provide continuous control of microorganisms. For example, hospital-approved disinfectants quickly reduce bacteria counts, but within 120 minutes of drying bacteria will rebound above the established safe level of 250 CFU/100cm<sup>2</sup>, and disinfection must reoccur in order to keep the bacterial count down.<sup>2</sup>

Also, disinfectants can contain harsh chemicals, including bleach and peroxide, which may cause respiratory irritation, be harmful if swallowed, injure bare skin, and damage or discolor the objects they're trying to treat. Clearly, relying solely on disinfectant chemicals to continually control microorganisms is virtually impossible.

### Solution: Microban ZPTech®

A better solution is to incorporate antimicrobial technology, including Microban ZPTech®, based on zinc pyrithione into products during the manufacturing process. Unlike other antimicrobials (such as silver, which is highly effective against bacteria), Zinc pyrithione is a wide spectrum antimicrobial, effective against not just bacteria but also the growth of fungi

including mold, mildew and algae.

Zinc pyrithione was first developed in the 1930s for its antifungal and antibacterial properties, and it is still commonly used today as a main ingredient in anti-dandruff shampoos, and as an over-the-counter treatment for seborrheic dermatitis, psoriasis, eczema, athletes' foot, ringworm and other medical conditions. Zinc pyrithione is also used in paints, textiles and polymers products to inhibit the growth of bacteria and fungi on susceptible surfaces.

ZPTech from Microban offers a low solubility (8 ppm) making it a very durable antimicrobial. Durability testing shows that polymers soaked for 2000 hours at 70°C in a detergent bath containing 3000 ppm ZPTech remained 99.99% effective in preventing the growth of *Klebsiella pneumoniae*, a gram-negative bacteria associated with hospital-acquired infections.<sup>3</sup>

Its thermal stability – up to 235°C – makes it suitable for use in a variety of manufacturing applications and commodity thermoplastic polymer materials.

Microban ZPTech is not designed to replace a disinfectant, but rather complement and extend the effectiveness of standard chemical disinfecting routines. This adds another level of defense in the fight against bacteria, mold, and mildew. With Microban ZPTech the technology is constantly active on the surface and ready to be released. It's dispersed throughout the polymers during the manufacturing process, so ZPTech remains effective even if an object is nicked, scratched or abraded in use.

## **Safety and Environmental Stewardship**

ZPTech is a broad-spectrum antimicrobial, and its multiple modes of action against bacteria and fungi prevent microbes from adapting and developing resistance against it. It is FDA-approved as a treatment for dandruff and other fungal infections at high levels, and at low levels (below 1000 ppm) it is registered with the U.S. Environmental Protection Agency (EPA), and Food and Drug Administration (FDA) as safe to use in a variety of applications, including those that come in contact with food.

Pure zinc pyrithione is toxic and requires special equipment and operational procedures to handle. Microban's ZPTech encapsulates zinc pyrithione in customized carriers, which makes it not only safe for manufacturer but also minimize any change to the production. The technology is bound to the material and remains inert until it comes into contact with a moist environment in which bacteria or fungi can grow. Moisture encourages the release of minute amounts of zinc – just enough to inhibit the microbe's metabolism and prevent reproduction, without harm to humans.

ZPTech is sensitive to ultraviolet (UV) light, which poses a small challenge to outdoor-product manufacturers, but benefits the environment. Because the sun's UV rays degrade zinc, there is little risk of the technology being released into the environment.

Microban is committed to environmental stewardship. We utilize low- and no-VOC products, non-formaldehyde formulations and recycled materials to ensure our products comply with applicable environmental regulations, such as Restriction of Hazardous Substances (RoHS) and REACH, when used as directed and in the nations where they are sold.

## **Microban's Market Advantage for Polymer Manufacturers**

Microban ZPTech's antibacterial and antifungal properties make products more appealing to cleanliness-conscious consumers and business buyers, particularly in polymer products most likely to be used in moist, humid environments.

These include cleaning sponges, shower curtains, bath mats, foam sandals, polyolefin film liners (often used in lunchboxes), molded safety shower seats, toilet seats, commercial cleaning trolleys and buckets, commercial refrigerator door handles and even mattresses.

Consumers perceive the Microban brand as a valuable trustmark that says they're getting durable and effective antimicrobial protection that actively enhances a products' safety, functionality, or aesthetics.

## **How ZPTech is Implemented**

Microban works individually with polymer converters to make ZPTech integration as simple and seamless as possible without disruption to existing manufacturing processes.

Our engineers develop customized formulations of ZPTech for each product. The formulations are tested with manufacturers' own polymers both for antimicrobial effectiveness and to ensure that ZPTech will not degrade the aesthetics or function of the product, including those likely to be exposed frequently to UV light, which may yellow zinc-containing products.

Safety is always our primary concern, and we use our expertise to ensure that ZPTech is safe and non-toxic throughout the supply chain, from transport to manufacture to end users.

By providing ZPTech to manufacturers in encapsulated form, thermoplastic masterbatches or liquid dispersions, and training manufacturing staff on its proper use, Microban makes it very safe and easy to produce ZPTech polymer products.

## **Why Microban?**

Microban International is the global leader for built-in antimicrobial protection – with 46% brand awareness, more than twice all other antimicrobial companies polled.

Microban's full range of services offers distinct advantages over competitors for polymer manufacturers.

**Research & Development** - Engineers in our state-of-the-art research facility will work with you to understand your product and develop safe, effective, and durable solutions to enhance your product.

**Safety** - You can be confident that Microban-labeled antimicrobials are safe to use as directed. We will train your manufacturing staff on the proper use of ZPTech to ensure that they, and the people who use your products, are at no risk from zinc in ZPTech.

**Analytics** - Our cutting-edge analytics ensures that ZPTech works continually to inhibit the growth of fungi and bacteria across your product's expected lifespan.

**Quality Control** - Scientists at Microban company headquarters and staff in local offices in South America, Asia, Europe and North America partner with your manufacturing team to deliver training and other resources targeted to ensure the highest quality.

**Marketing and Compliance** - Microban support extends well beyond manufacturing to help you leverage the Microban

name. We'll consult with you to ensure that your marketing materials comply with all local regulations and effectively communicate the benefits of Microban antimicrobial coverage to your customers.

From durability requirements to marketing support and patent counsel, Microban supplies partners with thorough and advanced services to help seamlessly deploy new antimicrobial products. Microban provides you with turnkey support including technical development, regulatory assistance, patent counsel, training, technical and marketing support to get your product to market quickly and effectively.

More than 250 smart companies are leveraging the Microban brand as an important differentiator to help grow their businesses. For more information about Microban, including case studies, testimonials, learnings and best practices, and how your business can become part of our success story, contact us today.

## Sources

<sup>1</sup>Consumer Spending Statistics, April 2015. <http://www.statisticbrain.com/what-consumers-spend-each-month/>

<sup>2</sup>Attaway, Hubert H. et al. Intrinsic bacterial burden associated with intensive care unit hospital beds: Effects of disinfection on population recovery and mitigation of potential infection risk. *American Journal of Infection Control*, 2013; 40(10), 907-912.

<sup>3</sup>Centers for Disease Control and Prevention. *Klebsiella pneumoniae* in Healthcare Settings. <https://www.cdc.gov/HAI/organisms/klebsiella/klebsiella.html>