PROTECTOR®
Health & Hygiene

Health & Hygiene Antimicrobial Solutions for Pharmaceutical Industry

Designed to Protect

Provides Maximum Protection against Bacteria, Fungi and Algae



ISO 13485 ISO 22196 ASTM E 2180 ASTM D 5589-09 CE

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Highly sterile environment is vital for pharmaceutical manufacturing facilities not only to maintain quality of medicines but also for individuals working in pharmaceutical setups. A strong probability of microbial contamination can be found in pharmaceutical products. Contaminated products can be a health hazard for the patient whose health is already at stake.

Most common sources of contamination in pharmaceuticals are workers, raw materials, water, air, production equipment and packaging materials. 642 product recalls were recorded by FDA from year 2004 to 2011 of which 22% were due to microbiological contamination. ***Pseudomonas spp., B. cepacia, and R. pickettii*** were the most common species that accounted about 48% of total microbial contamination. Various infections can be transmitted by microorganisms including ***Staphylococcus aureus, Pseudomonas, E.coli, Salmonella spp, Candida albicans, Klebsiella spp.,*** *etc.* Effective measures to reduce microbial contamination along with Good Manufacturing Practices (GMPs) may save millions of lives and the industry from huge financial losses.

Personal Protective Equipment, surfaces, walls, floors, processing equipment, water and air supply systems can easily be contaminated with bacteria and microorganisms at workplaces. These microbes can survive on surfaces for surprisingly longer periods of time and can act as a permanent reservoir of cross-contamination. Reducing the risk of infections is the top priority in pharmaceutical industry. A lot of money is spent worldwide to find ways to overcome cross-contaminations and infections.

Health & Hygiene Limited, a British Company, in collaboration with Symphony Environmental Technologies, UK has developed Antimicrobial solutions for various products. These solutions prevent microbial growth & buildup and have 99.99% Antimicrobial efficacy against a wide range of bacteria and microorganisms. These products provide maximum protection against infections and promote healthy & hygienic work environment; thus, reducing the need for disinfectants and cutting the costs of treating life threatening infections.



Protector® products provide protection against:

- ✓ Bacteria
- ✓ Fungi
- ✓ Algae
- ✓ Mould
- ✓ Yeast
- ✓ Mildew







Health & Hygiene Limited, under its brand name Protector® has developed a complete range of Antimicrobial Products for pharmaceutical facilities including disposables, durables, building infrastructure, fixtures, wall paints, coatings and flooring. Protector® Antimicrobial Products provide hygienic environment to workplace & workers, and help to maintain the quality of pharmaceutical products by preventing microbial contaminations.

Protector® Antimicrobial Products act as first active line of defense against harmful bacteria and disease causing microorganisms. Bacteria and microorganisms are killed upon contact with the surface of Protector® Antimicrobial Products and provide protection to the person who comes in contact with these products. These products are completely safe to use and the materials are in compliance with US and EU regulations.

Protector® Antimicrobial Products are tested by Independent third party laboratories and proved 99.99% efficacy against bacteria and microorganisms in accordance with ISO 22196 and ASTM E 2180.



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Research & Development

Antimicrobial Solutions

Pharmaceutical industries have Standard Operating Procedures (SOPs) and work in a very systematic manner to provide quality medicines to their end users. However, they often face critical situation due to cross contaminations and require serious consideration & attention to overcome it.

Major issues in the pharmaceutical industry are microbial contamination of sterile & non-sterile products through environment, handling or packaging materials. Strict Standard Analytical Procedures (SAPs) are followed to analyze & test all raw materials and final products for microbial contaminations. However, post-manufacturing contaminations through packaging materials are beyond the control of pharmaceutical professionals and if not addressed properly, may lead to huge losses in terms of quality and health of the patients. A research reported 50% of pharmaceutical non-sterile products to be contaminated with ***Klebsiella, Bacillus, and Candida species.*** Moreover, isolated ***Bacillus and Klebsiella species*** were resistant to common antibiotics.

Microbial contamination with pathogenic and nonpathogenic bacteria may be responsible for physicochemical modifications of pharma products. All pharmaceutical products are not sterile, however certain microbial limits exist for tablets, syrups, infusions & other pharmaceutical products. If not carefully monitored, bioburden for that product may cross the acceptable limits leading to product rejection.

Health & Hygiene Ltd. is dedicated to provide you its premium services by collaborating with you as a partner to address all your hygiene issues. We have successfully developed various Antimicrobial products and keen to provide you our best services with our highly enthusiastic and target-oriented team. We offer our services for joint R & D by collaborating with your team to develop customized solutions for any hygiene issues in your industry.



We can also provide solution to your packaging requirements with an approach of preserving your products, minimize contaminations and pave your way to become leader in terms of quality. In addition, we can also provide solutions to various issues including **fungal clogging of HVAC ducts, cracked and damaged floors that provide space for microbial buildup and cross contamination through frequently used surfaces & areas.**

Our product development team will work with you to determine your product's antimicrobial performance needs, durability requirements, usage conditions, compatibility needs and manufacturing parameters. We will develop an optimal antimicrobial solution for your unique packaging applications.

Our solutions are proven to inhibit the growth of bacteria, fungus, mold, mildew and Algae. Products engineered with H&H Antimicrobial protection have been tested by independent International labs and proven 99.99% efficiency against over 50 dangerous microorganisms.



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Antimicrobial Packaging

Pharmaceutical packaging is a sensitive element of pharmaceutical products & drug delivery systems in the pharmaceutical industry. Pharmaceutical packaging is aimed to shield the medicinal elements from physical damage, microbial contamination and from all major external impacts which may transform the chemical properties of medicinal products. However, packaging material itself serve as a major source for microbial contamination that minimizes the shelf life of medicines and may result in major health and financial losses.

Various cases of microbial contaminations are reported and products are recalled by FDA every year; that severely damages the credibility of the manufacturing companies and risk the health of patients.

Recently in 2018, products of a renowned homeopathic pharmaceutical industry of USA were recalled due to severe microbial contamination of ***Pseudomonas brenneri, Pseudomonas fluorescens, and Burkholderia multivorans*** in them during FDA inspection.

Another medicine of muscle relief was found highly contaminated due to microbial contamination in water. Higher microbial loads of *Salmonella* spp. were reported in another product of a US based company.

In year 2017, contamination of medical cannabis with rare bacterial and fungal species resulted in a fatality. The person was struggling hard to beat his cancer however, his fight ended up as he could not resist the severe fungal infection.

In year 2012, 753 cases of fungal infection were reported with death of 64 persons, and the contamination was traced back to fungal contamination in medication prescribed to them that resulted in a large number of lawsuits against the provider.



Global market of plastic packaging in pharmaceutical industry is increasing substantially with higher demand of technological innovations & improved packaging solutions to minimize microbial contamination in the products.

Plastic packaging used in pharmaceutical industry includes **blister packs and bottles for tablets & capsules, syrups, aqueous solutions, drops, vials, ampoules and infusions.**

High-density polyethylene (HDPE), low-density polyethylene (LDPE), polypropylene (PP), polyvinyl chloride (PVC) and polyethylene terephthalate (PET) containers are used for packaging different pharmaceutical products depending upon the specifications and type of product.

A slight change in moisture content, pH and other parameters of the product may lead to microbial contamination in the products. Therefore, industries are focusing on finding ways to keep products safer and contamination free for a longer time. Minimizing the product contamination and cross contamination through outer packaging is a serious concern nowadays.

Health & Hygiene Ltd. offers a smart & promising solution to these challenges in the form of Antimicrobial Packaging that will reduce microbial contamination and reduce the health risks associated with such incidences. The technology can be incorporated in all types of plastic packaging and micro-organisms will be killed on contact with the packaging material, ensuring safe medicines for the consumers.



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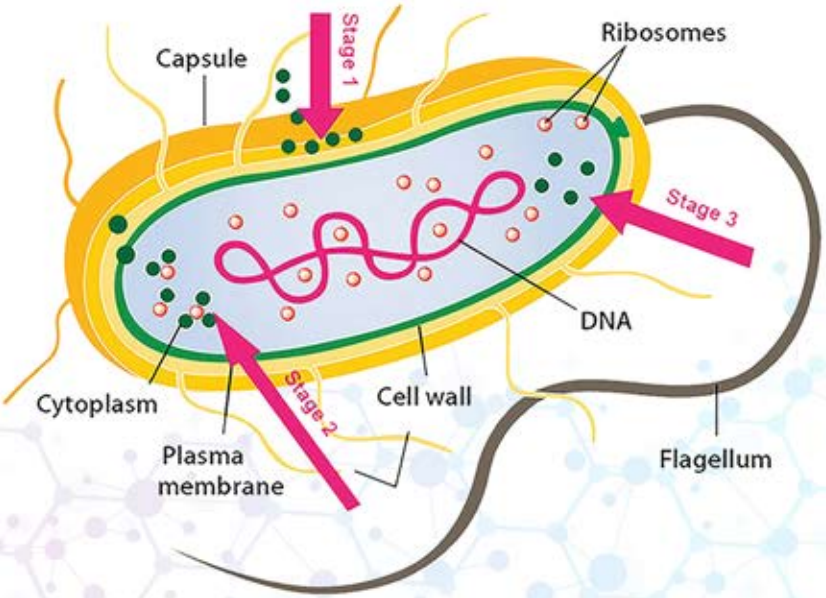
d2p Antimicrobial Technology

Protector® has incorporated d2p Antimicrobial Technology in its products. It is an innovative technology and designed to prevent the development and growth of bacteria and microorganisms.

d2p provides broad spectrum Antimicrobial Protection (Antibacterial, Anti- fungal and Anti-algae)

- Antibacterial protection - Protection from bacteria (Gram +ve and Gram –ve) > 99.99%
- Antifungal protection - Protection from fungi, yeast, mould and mildew > 99.99%
- Anti-algae protection - Protection from algae > 99.99%

How d2p Works ?



Stage - 1 d2p enters the bacterial membrane and causes damage and disruption to the cellular wall before penetrating the cell

Stage - 2 d2p is highly reactive with the cell enzymes and can deactivate these vital molecules

Stage - 3 Interrupts the cell DNA preventing replication and cell formation

Effective against over 50 microorganisms

d2p is effective against over 50 dangerous microorganisms including:

E.coli	*MRSA*	*Pseudomonas*
Staphylococcus aureus	*Salmonella*	*Candida*
Klebsiella	*Penicillium chrysogenum*	*Listeria*
Corynebacterium	*Aspergillus niger*	*Enterobacter*



Bacteria & microorganisms land on the product surface



d2p starts acting against bacteria & microorganisms



d2p attacks bacterial & microbial cells, disrupting their function and reproduction



99.99% reduction of bacteria & microorganisms

d2p: Conformance Standards

- Anti-bacterial testing: ISO 22196:2011, JIS Z 2801 & ASTM E 2149
- Anti-fungal testing: ISO 16869:2008 & ASTM E 2180
- Anti-algal testing: ASTM D 5589-09

d2p: Regulatory Approvals

The active ingredient of d2p is:

- Registered with US Environmental Protection Agency (US EPA)
- In compliance with US FDA for food contact safety
- Notified under EU's Regulation (BPR-EU-no. 528/2012)



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Protector-Antimicrobial Building Infrastructure, Fixtures & Durables

Despite of good manufacturing practices, official guidelines, regular monitoring and cleaning protocols there are chances that microbes can contaminate the workers, processes and products. Even little spaces, grooves and crevices serve as a cling surface for microbial attachment, development and spread. In pharmaceutical industry foreign particles and microorganisms can be introduced via various routes including, air, water, raw materials, workplace surfaces & equipment etc.

These microbes can develop colonies in the form of biofilm in the ducts of air circulating systems and water pipes thus contaminating incoming air and water. Moreover, microbes especially mold & mildew growth can be found on walls and ceilings & is very difficult to remove. The consequences of microbial contamination are quite serious and go beyond the direct costs involved in batch rejections or product recalls, as microbial contamination represents major risks to the patient's health and may even be life threatening.

Protector® Antimicrobial Building Infrastructure, Fixtures and Durables provide maximum protection against microbial build-up and spread. Microbes are killed upon contact with Protector® products thus, inhibiting microbial growth and risk of microbial infections.



Antimicrobial Wall Paints

Antimicrobial wall paints provide round the clock protection by inhibiting the buildup and growth of microorganisms on the wall surfaces
Conforms to ISO 22196 and ASTM E 2180 for Antimicrobial performance

Antimicrobial Seamless Flooring

Antimicrobial seamless flooring is 99.99% effective against microbial buildup and acts as an important preventive measure in infection control
Conforms to ISO 22196 and ASTM E 2180 for Antimicrobial performance





Antimicrobial HVAC Ducts Treatment

HVAC ducts with Antimicrobial coating kill bacteria & microorganisms on contact and minimize airborne spread of Microorganisms
Conforms to ISO 22196 and ASTM E 2180 for Antimicrobial performance

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Antimicrobial Doors & Door Knobs

Coated with Antimicrobial spray for
protection against bacteria & microorganisms
Conforms to ISO 22196 and ASTM E 2180
for Antimicrobial performance

Antimicrobial Chairs, Stools & Other Furniture

Coated with Antimicrobial Spray for
protection against bacteria & microorganisms
Conforms to ISO 22196 and ASTM E 2180
for Antimicrobial performance



Antimicrobial Water Pipes

HDPE, PVC and PPRC
Prevent the development of biofilm
Conforms to ISO 22196 and ASTM E 2180
for Antimicrobial performance





Antimicrobial Waste Bins

Material: High density polyethylene (HDPE),
polypropylene (PP)
Prevent the growth & spread of microorganisms
Conforms to ISO 22196 and ASTM E 2180
for Antimicrobial performance



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Protector-Antimicrobial Disposable Products

Personal protective equipment including gloves, gowns, shoe covers etc. continuously gets exposed to microbes via various routes including worker's own microflora, raw materials, processing equipment & packaging and get contaminated. Such contaminated personal protective clothing can further contaminate products, surfaces and processes with microbes. It serves as a source of microbial build-up, cross contamination and infection spread. Thus, contaminated personal protective equipment can be a health hazard for workers, handlers and patients & ultimately it damages the customer's confidence and company's reputation.

Protector® Antimicrobial Disposable Products provide maximum protection against microorganisms. Microbes are killed upon contact with Protector® Products thus reducing the risk of cross contamination to processes & products.



Antimicrobial Examination Gloves (Standard)

Material: Latex powder free
Non-sterile
Glove weight: 5 grams
Sizes: XS, S, M, L & XL
Packaging: 100 gloves/Box, 10 pairs/box
Product Code: AEG-001, AEGS-001
Conforms to ISO 22196 and ASTM E 2180
for Antimicrobial performance

Antimicrobial Examination Gloves (Premium)

Material: Latex powder free
Non-sterile
Glove weight: 5.5 grams
Sizes: XS, S, M, L & XL
Packaging: 100 gloves/box, 10 pairs/box
Product Code: AEG-002, AEGS-002
Conforms to ISO 22196 and ASTM E 2180
for Antimicrobial performance





Antimicrobial Face Masks (Ear-loop)

Material: SBPP 20 GSM + Filter Paper + 25 GSM
Style: Ear-loop
Color: White
Packaging: 50 pcs/box, 10 pcs/OPP Bag
Product Code: AFME-001, AFMES-001
Conforms to ISO 22196 and ASTM E 2180
for Antimicrobial performance
Conforms to ASTM F2100 for VFE, BFE, PFE and ΔP

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Antimicrobial Face Masks (Tie On)

Material: SBPP 20 GSM + Filter Paper + 25 GSM
Style: Tie-on
Color: White
Packaging: 50pcs/box, 10 pcs/OPP Bag
Product Code: AFMT-001, AFMTS-001
Conforms to ISO 22196 and ASTM E 2180 for Antimicrobial performance
Conforms to ASTM F2100 for VFE, BFE, PFE and ΔP

Antimicrobial Mob Caps

Material: Nonwoven, SBPP, 10 GSM
Style: Double elastic
Color: Blue
Packaging: 100 pcs/polybag
Product Code: AMC-001
Conforms to ISO 22196 and ASTM E 2180 for Antimicrobial performance





Antimicrobial Doctor Caps

Material: SBPP, 25 GSM
Style: With ties
Color: Blue
Packaging: 100 pcs/polybag
Product Code: ADC-001
Conforms to ISO 22196 and ASTM E 2180 for Antimicrobial performance



Antimicrobial Lab Coat

Material: Nonwoven, SBPP, 30 GSM
2 pockets, with four buttons and elastic cuffs
Color: White
Sizes: S, M, L, XL
Packaging: 10 pcs/polybag
Product Code: ALC-001
Conforms to ISO 22196 and ASTM E 2180 for Antimicrobial performance



Antimicrobial Isolation Gown

Material: Nonwoven, SBPP, 20 GSM
Elastic cuff, ties on waist and neck
Color: Blue
Sizes: S, M, L, XL
Packaging: 10 pcs/polybag
Product Code: AIG-001
Conforms to ISO 22196 and ASTM E 2180 for Antimicrobial performance



Antimicrobial Nonwoven Shoe Covers

Material: Nonwoven, SBPP, 30GSM, Anti-Skid
Color: Blue
Packaging 100 pcs/polybag
Product Code: ASCP-001
Conforms to ISO 22196 and ASTM E 2180 for Antimicrobial performance

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Antimicrobial CPE Shoe Covers

Anti-skid
Color: Blue
Packaging: 100 pcs/polybag
Product Code: ASCC-001
Conforms to ISO 22196 and ASTM E 2180
for Antimicrobial performance





Antimicrobial Waste Bags (General Waste Bags)

Size: 30" x 36"
Color: White
Product Code: AWB-001
Conforms to ISO 22196 and ASTM E 2180
for Antimicrobial performance

Antimicrobial Waste Bags (Bin Liners)

Size: 18" x 24"
Color: Gray
Product Code: AWB-002
Conforms to ISO 22196 and ASTM E 2180
for Antimicrobial performance





Antimicrobial Waste Bags (High Risk Waste Bags)

Size: 30" x 36"
Color: Yellow
Product Code: AWB-003
Conforms to ISO 22196 and ASTM E 2180
for Antimicrobial performance

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