spectral.blue®

MULTI-WAVELENGTH ANTIMICROBIAL BLUE LIGHT (ABL)

Automated, continuous contamination control for cleanroom environments

✓ *Touch-free*

✓ *Chemical-free*

✓ *UV-free*

✓ *Works on biofilms and spore-forming micro-organisms*

Spectral Blue MWHI® antimicrobial blue light

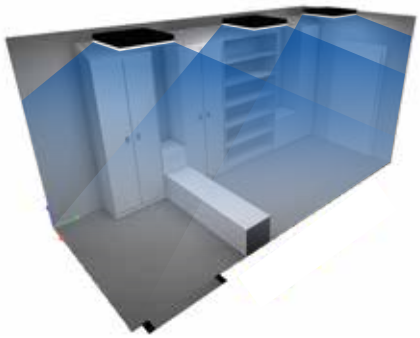
Automating cleanroom contamination control at an industrial scale

Traditionally, contamination control in cleanrooms has relied on chemical disinfectants and manual procedures. While effective, these traditional practices are often expensive and labor-intensive, and results can vary depending on execution. Today, they are increasingly challenged by concerns around chemical exposure, material compatibility, environmental impact, and microbial adaptation. As a result, the demand for more sustainable, automated contamination control continues to grow.

Spectral Blue MWHI® Multi-Wavelength, High-Intensity antimicrobial blue light (aBL) is a patented, fully automated disinfection technology for GMP and ISO cleanrooms. The chemical-free and UV-free solution provides continuous microbial control without operator input. It disinfects air, surfaces, equipment, and water, reducing the need for chemicals and manual routines. It's effective even on biofilms and spore- forming micro-organisms, while remaining uniquely safe for staff, materials, equipment, and the environment.

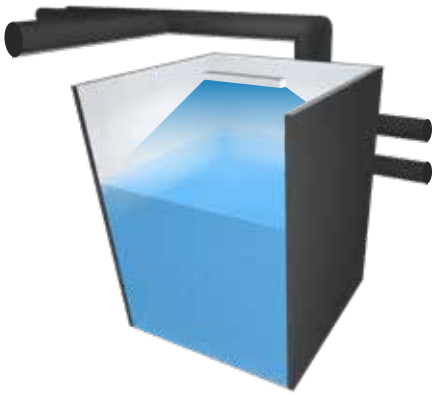
Safeguard the critical control points: personnel areas & material handling

Spectral Blue MWHI® disinfection devices operate automatically during off-hours or 24/7, continuously reducing bioburden. Deploy them in cleanroom transition areas and support areas to automatically and continuously reduce the risk of contamination entering your production. Closed water systems can also be treated continuously with Spectral Blue to control microbial growth and keep the water hygienic.



Gowning areas & material airlocks

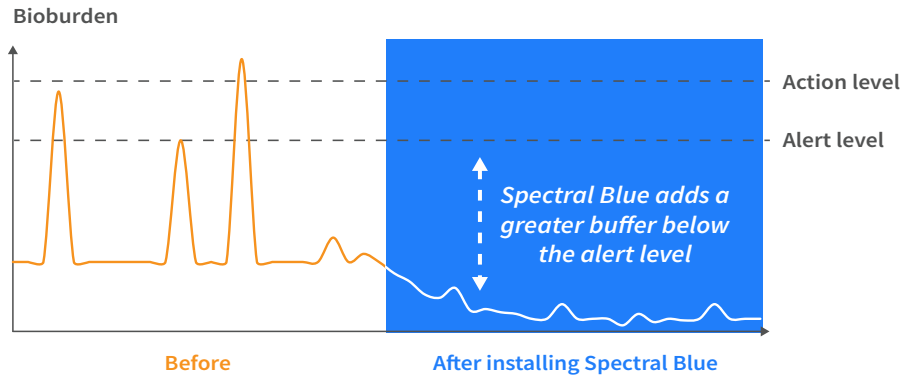
Biosafety cabinets & filling machines



Washing areas & process water

Automation improves consistency & removes human error

Less chemicals, manual effort & deviations — greater buffer below the alert level



Including the automated Spectral Blue disinfection as part of your daily contamination control strategy improves consistency and reduces deviations, allowing higher operational efficiency and lower costs. Its alternate mechanism of action also supports and enhances your existing microbial control practices and regulatory compliance.

Greater buffer below alert levels, lower risks

Spectral Blue keeps bioburden consistently low, providing a greater buffer below the alert and action levels. Fewer deviations mean fewer investigations, less downtime, and a lower risk of production losses.

Cost savings through reduced chemical use & lower QA workload

Spectral Blue reduces your reliance on chemicals and associated manual labor. Maintaining levels below alert levels also reduces QA workload and costs related to sampling, re-cleaning, and documentation.

More sustainable operations with safe & environmentally friendly technology

Our chemical-free and UV-free technology supports more sustainable cleanroom operations without compromising quality. The long-lifetime LED devices contain no mercury, generate no ozone, and require no routine lamp changes or special maintenance.

Proven customer results

Real-world cleanroom performance with continuous disinfection

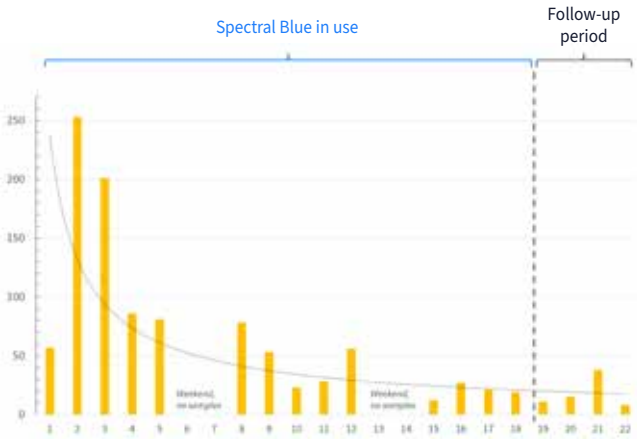
Discover three GMP & ISO cleanroom case examples demonstrating how Spectral Blue reduces bioburden, improves boundary control, and reduced dependency on chemical disinfection—without disrupting operations.

CASE 1:

Global Pharma Company, GMP facility - Eliminated dry biofilms in a gowning room

In a pharmaceutical GMP cleanroom facility, Spectral Blue was deployed for an evaluation test in a high-traffic class D personnel gowning room. The system delivered automatic, chemical-free, UV-free blue light disinfection during non-occupied periods—adding a consistent, touch-free layer of protection alongside existing hygiene routines.

The result was a substantial and lasting reduction in microbial burden, with surface contamination levels first dropping rapidly and then remaining very low throughout the evaluation period. The improvement persisted even after the test system was switched off, indicating the successful elimination of dry biofilms and enabling more effective ongoing cleaning—helping the site maintain a higher level of cleanliness with greater confidence and consistency.



Surface sampling results at a global pharmaceutical company, CFU / 25 cm²

CASE 2:

Phillips-Medisize, ISO-8 cleanroom - Reduced chemical disinfection by 80%

At Phillips-Medisize, Spectral Blue was installed in a material airlock to test its efficiency in one of the most demanding hygiene “hotspots” in the facility. The goal was simple: test if manual chemical disinfection could be reduced without compromising cleanliness or control.

The outcome was a major success in both efficiency and sustainability. Phillips-Medisize was able to cut manual chemical disinfection from five times per week to once per week—an 80% reduction—while keeping microbial counts low and well within limits throughout the evaluation period.

CASE 3:

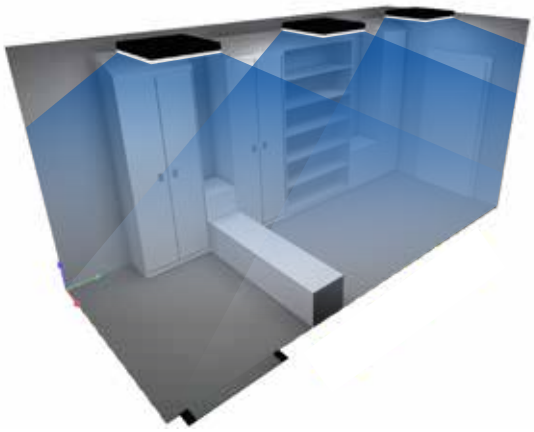
NextPharma, GMP facility - Reduced contamination entering production by 90%

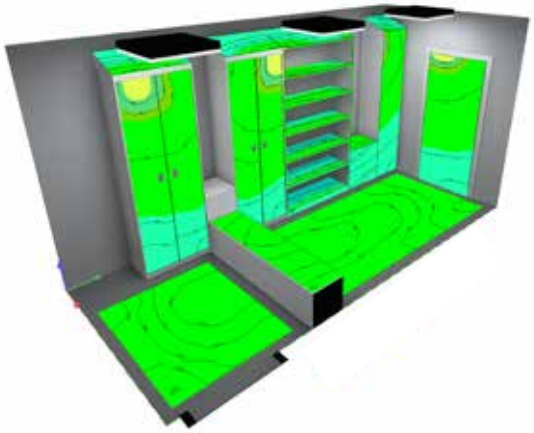
At NextPharma’s GMP cleanroom facility, Spectral Blue was deployed in cleanroom boundary areas: a class C material airlock and a class D equipment washing room. By adding Spectral Blue to these transition zones, the site targeted contamination before it could reach critical production areas.

The impact was clear and measurable: microbial contamination detected in the adjacent clean production area dropped by 90%. The results demonstrated that protecting key transition areas with Spectral Blue is a highly cost-efficient strategy to reduce microbial transfer into production.

3D disinfection planning

Optimal device placement through simulation





Every site is different and every microbial challenge is unique. Using a proprietary simulation model developed by our scientists, we create a 3D model of your space and Spectral Blue device placements. We verify the blue light coverage and optimize the setup, ensuring a solution that works in real operating conditions and delivers faster return on investment.

How the simulation process works

We simulate different device layouts and refine the design with you until the setup matches your goals — whether you want to reduce microbial burden, protect boundary areas, or reduce chemical disinfection.

What you will receive

You will get a clear recommendation for the optimal Spectral Blue MWHI® setup for your site, including:

- Recommended device type(s) and quantity
- Suggested placement for best coverage
- Price, either as an investment or as a monthly subscription fee

What we need from you

To get started, we only need basic information, such as:

- A floor plan or drawing (PDF or CAD if available — a sketch works too)
- Room dimensions and ceiling height
- Major equipment or furniture placement
- Notes on room usage and operational routines

Spectral Blue is your long-term partner in contamination control

Our approach is to help you strengthen hygiene performance, protect critical boundary areas, and achieve measurable, sustainable results in day-to-day operations. We measure success by the results you achieve.

Ready to let us run a simulation for you?

Simply send us your layout and requirements and we'll propose an optimized Spectral Blue MWHI® setup for your facility. The planning is a free service from us and there's no obligation to purchase.

Get your free planning service:

www.spectral.blue/free-planning

Spectral Blue devices for cleanrooms

Designed & made in Finland

CLASS A/B/C/D AREAS:

P100 DUAL-MODE recessed ceiling panel

- Has both MWHI antimicrobial blue light and white light modes
- Install above an existing sealed 600×600 glass ceiling panel
- Power consumption: 100 W
- Dimensions: LxWxH 595x595x110 mm
- Control method: DALI or on/off

CLASS C/D PERSONNEL AND MATERIAL HANDLING AREAS:

L100 & L200 disinfection devices

- Surface installation on walls or ceilings
- Available with IP44 and IP65 enclosure
- Power consumption: 100 W / 200 W
- Dimensions: L x W x H 650/1200 x 90 x 59 mm
- Control method: DALI or on/off

CLASS C/D PERSONNEL AREAS:

CL35 & CL65 disinfection devices

- Low-profile surface installation in the wall-ceiling corner
- Power consumption: 35 W / 65 W
- Dimensions: L x W x H 660/1220 x 48 x 42 mm
- Control method: DALI / on/off

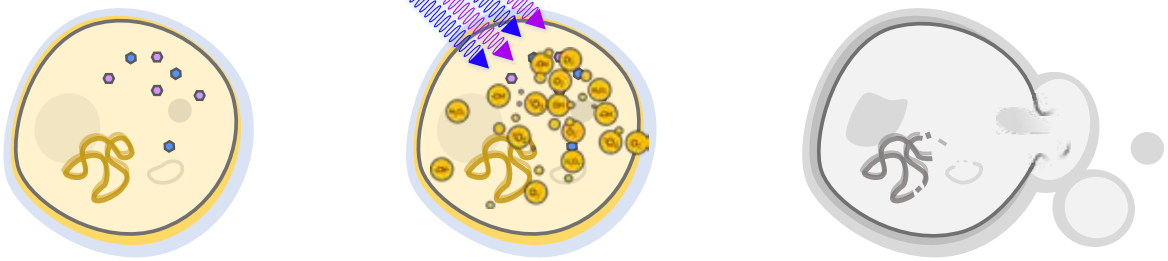
BIOSAFETY CABINETS & LAMINAR FLOW HOODS

SALO & SALO XL plug & play disinfection devices

- Magnetic mounting for quick deployment and removal
- Power consumption: 50 W / 100 W
- Dimensions: L x W x H 604/1160 x 109 x 66 mm
- Control method: on/off

The science & how it works

Multi-wavelength, High-Intensity MWHI blue light technology



Microbial cells contain light-absorbing compounds such as porphyrins and flavins.

Spectral Blue wavelengths activate the compounds. ROS start forming inside the cell.

The ROS damage the cell's vital structures, leading to microbial inactivation and death.

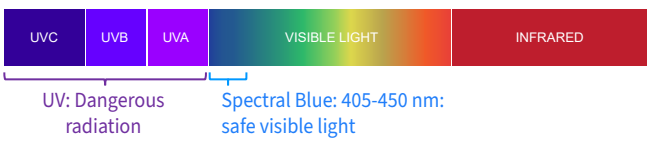
How it works

Spectral Blue MWHI® devices emit safe visible blue light at 405 nm and 450 nm wavelengths. When exposed to these specific wavelengths of high-intensity blue light, light-absorbing compounds naturally occurring within microbial cells are activated.

This activation triggers a cascade of reactions, leading to the intracellular production of reactive oxygen species (ROS). The ROS cause widespread, non-specific damage to vital cellular structures, resulting in microbial inactivation and death.

Spectral Blue wavelengths travel well through water and other clear materials such as glass and plastics. The light can also penetrate biofilms, allowing it to efficiently attack colonies protected inside biofilms.

The spectrum of light



Scientifically & field proven

Backed by nearly 3,000 peer-reviewed studies and proven in real-world pharmaceutical manufacturing environments, Spectral Blue has demonstrated efficacy on bacteria, yeasts, molds, and viruses—including spore-forming micro-organisms and biofilms.

Learn more about the science and efficacy of Spectral Blue at: www.spectral.blue/science

Safe for people

Human cells do not contain these same light-sensitive compounds in a way that causes this reaction. As a result, blue light does not trigger the same effects in human skin, eyes, or tissues—making it safe for human environments when used as intended.

Learn more about the safety profile of Spectral Blue at: www.spectral.blue/safety

spectral.blue®

Your manufacturing processes run on automation. Why should your contamination control still be manual?

Learn more & request free 3D disinfection planning

www.spectral.blue/cleanrooms

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Spectral Blue MWHI® is a next-generation disinfection technology patented in the USA, Europe, and China

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your science enabled