

# Achieving Zero Bioburden: HiTech Health's Use of Ecolab Bioquell RBDS to Commission an Aseptic Cell and Gene Therapy Manufacturing Facility

**Application:** Sterile manufacturing

**Segment:** Cell and Gene Therapy

**Challenge:** Commissioning manufacturing space

**Recommended Solution:** Ecolab's Bioquell RBDS

## Situation

HiTech Health, a renowned Contract Development and Manufacturing Organisation, constructed a new Cell and Gene Therapy Sterile manufacturing facility in Galway, Ireland. Prior to commencing operations, HiTech Health had to ensure that the surrounding environment would not be the cause of a potential contamination event. Construction materials and staff can leave behind microorganisms that may create potential hazards in the future despite following proper cleaning protocols. A quick, validated, and comprehensive solution was

required to help alleviate concerns and avoid costly, avoidable setbacks to HiTech Health, their clients, and patients. In total, ~300 cubic metres needed to be treated.

## Solution

Ecolab's Bioquell Rapid Bio Decontamination Service (RBDS) team was contracted to perform a hydrogen peroxide vapour bio-decontamination within all classified production areas after construction completion. This ensured the facility started clinical operations with a zero level of background bioburden as every exposed surface area receives a 6-log sporicidal kill during a bio-decontamination cycle. It was decided to treat the entire facility as a single bio-decontamination zone to eliminate any potential for cross-contamination between adjacent zones. The facility comprises two Grade B laboratories supported by a

suite of Grade C and D support areas, with all open aseptic processing activities completed within Grade A Biological Safety Cabinets (BSCs). The Bioquell RBDS intervention was the final step in the construction process, with all works having been completed and all equipment installed and commissioned prior to undergoing bio-decontamination in-situ.

**About the Process:** The Bioquell Hydrogen Peroxide Vapour (HPV) generators were strategically placed in the facility along with a real-time sensor to record the key cycle parameters - temperature, humidity, and vapour concentration. As a surface bio-decontamination technology, it was critical to prepare the area for bio-decontamination by maximising the exposed surface area. Incubators were cooled, cleaned and, like cupboards and hatches, left with the doors opened to allow easy ingress of the vapour.

## RBDS

**Ecolab's Bioquell Rapid Bio Decontamination Service (RBDS) provides a fully inclusive service providing everything required to complete a 6-log sporicidal kill on all exposed surfaces within your facility.**

The service is designed to work with your operational requirements, whether in an emergency situation or as part of a pre-planned intervention. You can even use our rapid response service to bio-decontaminate critical equipment such as a laminar flow hoods, isolators, lyophilisers and more.



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The facility operators ensured all areas had been pre-cleaned prior to the RBDS deployment to ensure removal of all particulate matter (dust/dirt) and any visible gross contamination (mould flora / biofilms) that could potentially harbour viable microorganisms.

After a successful systems test, the target area was sealed and the dedicated HVAC system serving the facility was shutdown. The vapour injection phase introduced peroxide into the facility to reach the required saturation conditions. Saturation sees the formation of an invisible layer of micro-condensation on all exposed surfaces. In addition, airborne particles and microorganisms act as nodes for condensation, thus the Bioquell RBDS process bio-decontaminated both the surfaces and the environment itself.

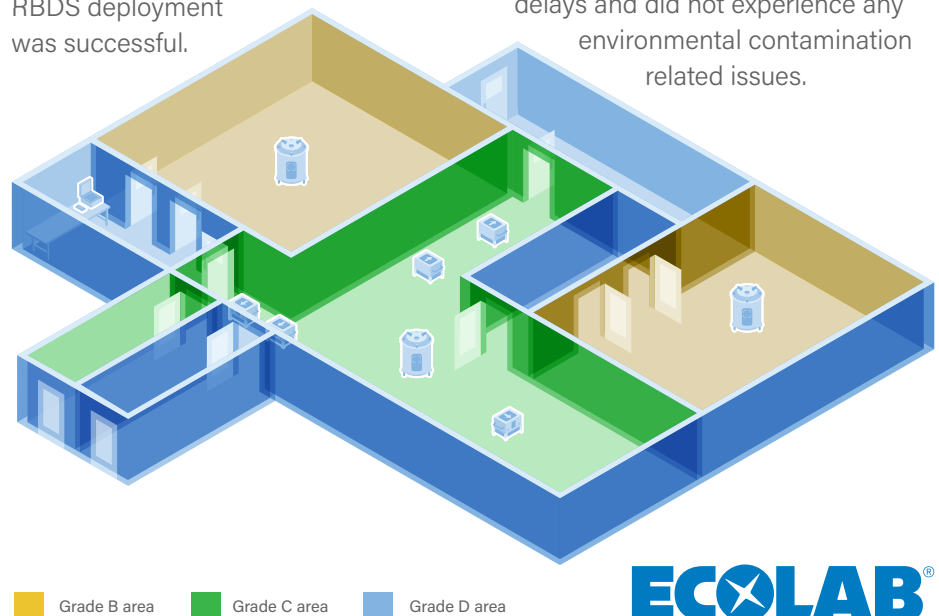
After a dwell phase, ensuring adequate vapour distribution throughout the whole facility, the HVAC system was reinstated to restore the positive pressure cascade and purge the vapour from the facility. The vapour concentration continued to be monitored and once below the HSA Occupational Exposure Limit, the Ecolab Bioquell RBDS team donned sterile cleanroom gowns, in accordance with facility protocols,

to re-enter the facility and recover the BIs, CIs, and HPV equipment.

**Verification:** 6-log *Geobacillus stearothermophilus* Biological Indicators (BIs) were placed around the facility to provide the formal cycle verification. A Chemical Indicator (CI) was also placed alongside each BI location to provide an instantaneous initial result.

## Results

All CIs showed a colour change in line with a  $\geq 6$ -log bioburden reduction. The BIs were incubated the same day and after 7-days incubation, all exposed BIs were successfully deactivated thus proving the Bioquell RBDS deployment was successful.



## Summary

Within just six hours including set-up and run time, the Bioquell RBDS deployment at HiTech Health was successful having demonstrated a 6-log bioburden reduction throughout the whole classified facility, from the Grade A BSCs to the Grade D support areas.

To achieve the final sign-off that the facility was both functional and operational, the team at HiTech Health decided to leave the facility empty with the HVAC running for 5 days after which environmental monitoring and air sampling was completed. All returned samples were within specification for their grade demonstrating that the facility and the HVAC system were able to maintain the aseptic conditions achieved by the RBDS intervention. The facility was then certified to begin the GMP manufacture of aseptic Advanced Therapy Medicinal Products (ATMP). As a result of these efforts, the facility was able to be open without any delays and did not experience any environmental contamination related issues.

# How Ecolab adds value



## Site Surveys

Ecolab offers site-surveys from a trained technical team to review new or existing manufacturing and cleaning process.

### VALUE+

- Technical recommendations are matched to your most relevant objectives and key performance indicators (safety, water savings, efficiency, etc.)
- Formal report summarises potential savings
- Delivers implementation strategy that minimises production disruptions



## Lab Studies

Ecolab offers a laboratory team that can analyse soils, identify residues and test samples.

### VALUE+

- Creates a quicker and more successful cleaning recommendation
- Ensures the chemistry solution is effective against your unique, targeted soils
- Helps determine optimal dilution and implementation parameters



## Disinfection with Chemistry vs. Water

Ecolab can help implement a validated strategy to clean CIP systems with registered chemical disinfectants as an alternative to water and heat.

### VALUE+

- Saves water which can help meet sustainability goals
- Reduce energy and time needs by removing need to heat water to required temperature



## Validation Assistance

Ecolab can assist with the complex validation process and change controls by providing guidance and documentation.

### VALUE+

- Guidance includes:
  - Cleaning process design and development
  - Cleaning process validation
  - Continuous cleaning process verification
- Helps ensure process stays in line with regulatory expectations and acceptance criteria



## Dedicated Regulatory Team

Ecolab leverages industry expertise to deliver insights and guidance on regulatory expectations, trends and available tools to help ensure compliance for product safety and quality.

### VALUE+

- Helps ensure compliance with cGMP to ensure cleaning and disinfection meet product safety and quality requirements
- Help implement validations that meet regulatory expectations



## Customer Training

Ecolab's team is comprised of experts to help you implement, manage, and maintain quality & compliance requirements and protocols.

### VALUE+

- Gain valuable best-practices and implementation strategies from trained field and technical experts
- Reduce troubleshooting time from on-site support and process training to resolve problems quickly

USE BIOQUELL PRODUCTS SAFELY. ALWAYS READ THE LABEL AND PRODUCT INFORMATION BEFORE USE.

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