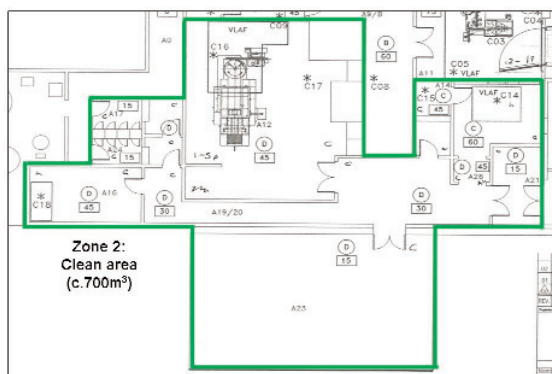
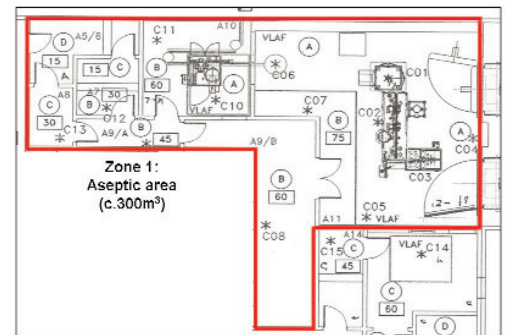


# Fumigation within a Pharmaceutical Aseptic Filling Line

## Major Multi-national Pharmaceutical Company, Madrid, Spain

### The Challenge

A pharmaceutical production facility required Bioquell's Room Bio-Decontamination Service (RBDS) to remove *Staphylococcus epidermidis* contamination of an aseptic filling suite (c.1000m<sup>3</sup>). The target area consisted of an aseptic zone (c.300m<sup>3</sup>) and a clean zone (c.700m<sup>3</sup>) with areas ranging from European GMP Grade A to Grade D. The key criteria used to select the method employed were: (i) proven efficacy against *S. epidermidis*; (ii) ability to meet FDA regulatory requirements; (iii) in situ fumigation of intricate filling, capping, washing and freeze-drying machinery; (iv) residue-free technology to ensure that no toxic residues contaminated the product; (v) minimisation of lost production time; and (vi) documented verification of the biological efficacy of the process.



### Solution

Bioquell's RBDS, as the only solution to fulfil all the above criteria, was selected to treat the area. The aseptic and clean zones were fumigated sequentially. Six Clarus 'R' Hydrogen Peroxide Vapour (HPV) generators were strategically placed in the zones to ensure even vapour distribution, eight Clarus R2 aeration units were also included to remove the HPV at the end of the cycle and an instrumentation module

was located in each zone to monitor the key parameters in real time. Each zone was then sealed before fumigation commenced and remained sealed until the HPV had been removed at the end of the process via catalytic conversion to water vapour and oxygen (the air-handling unit (AHU) within the building was also used to accelerate the aeration process). The entire process was monitored and controlled from outside the room via the control computer and the perimeter of each zone was monitored for leakage using hand-held HPV sensors.

## Gassing Cycle Verification

*Geobacillus stearothermophilus* spores dried onto stainless steel discs and sealed in Tyvek pouches were used as biological indicators (BIs) to verify the efficacy of the fumigation. Two different inocula were used: BIs inoculated at  $>1.0 \times 10^6$  for standard locations and BIs inoculated at  $>1.0 \times 10^4$  for challenge locations.

Standard BIs were distributed around the building according to Bioquell's protocols. Challenge BI locations were established prior to fumigating each zone. In addition, metal discs experimentally inoculated with *S. epidermidis* were included in the target area.

## Results

The *G. stearothermophilus* BIs were retrieved after aeration and incubated for seven days at 60°C. Positive control BIs that were not exposed to the fogging process showed signs of growth. 72/72 BIs from standard locations and 15/15 BIs from challenge locations were fully deactivated, showing no signs of growth. BI challenge sites included: inside the filling, capping, washing and freeze-drying machines, inside AHU ducts and inside a transfer hatch. 37/37 *S. epidermidis* discs used as additional BIs were fully deactivated.

None of the equipment that was exposed to the HPV was affected, demonstrating the excellent materials compatibility of the RBDS process.

## Conclusion

The bio-deactivation target of a 6-log reduction in Tyvek pouched *G. stearothermophilus* spores in standard locations and a 4-log reduction in challenge location was demonstrated throughout the suite. The entire fumigation procedure was completed in three working days. The RBDS system provides a very rapid and effective fumigation system, which combined with the rapid aeration method, produces a minimal cycle time.

This system is frequently used in many other applications such as the decontamination of specific problem-causing micro-organisms or for general fumigation of laboratories, including CL3 facilities, cleanrooms, pharmaceutical manufacturing plants and hospitals. The RBDS system is infinitely scalable so that very large areas and entire buildings (as in this case) can be rapidly and effectively decontaminated.

For further details of HPV bio-decontamination solutions including equipment and room services, please contact Bioquell.