

Fumigation of an Intensive Care Unit (ICU) using Hydrogen Peroxide Vapour (HPV)

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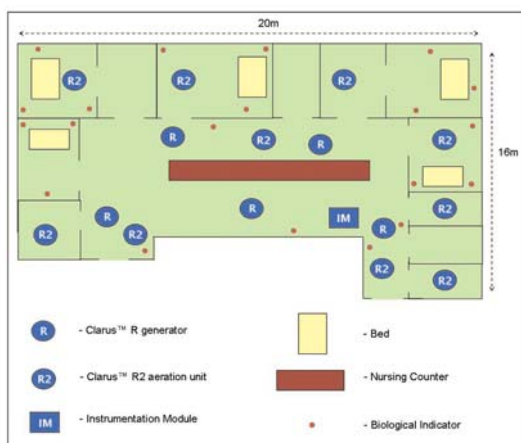
The Challenge

Henri Mondor hospital (Paris) discovered environmental contamination of *Acinetobacter baumannii* during an outbreak in its ICU, which was linked to a number of fatalities. The Unité Maurion Rapin is a 12 room, 800m³ suite located in the hospital in Paris, and as such contains a large quantity of sensitive electrical equipment and consumables which must not be affected by any cleaning process, and must be left residue-free and ready for use. In addition to this, due to the constant pressure on intensive care suites the decontamination had to be completed within a 24-hour period. This included decanting the patient, decontaminating the ward and re-stocking and reopening.



Solution

Notwithstanding a week-long intensive deep clean there was still concern about microbial contamination. Due to the vulnerability of the patients returning to this area a further treatment was required to bio-deactivate all remaining micro-organisms.



BIOQUELL's Room Bio-Decontamination Service (RBDS) was selected to treat the area. Five Clarus™ R Hydrogen Peroxide Vapour (HPV) generators were strategically placed in the suite along with 6 stirring fans to ensure even vapour distribution; ten R2 aeration units were also included to remove the HPV at the end of the cycle. An instrumentation module was located in the room to monitor the key parameters and link the equipment to the external control computer. The unit was then sealed before fumigation commenced and remained sealed until the HPV had been removed via catalytic conversion to water vapour and oxygen. The entire process was monitored and controlled from outside the room via the control computer.

Gassing Cycle Verification

Geobacillus stearothermophilus spores dried onto stainless steel discs at an inoculum of 10^6 and sealed in Tyvek pouches were used as biological indicators (BIs) to verify the gassing cycle. A total of 20 BIs were set up in challenging locations throughout the suite. A BI map was generated for the area to trace BI locations. In addition to this, specific target areas were independently swabbed before and after the RBDS to give a clear picture of the bio-burden and its subsequent reduction.

Results

The BIs were retrieved after aeration and incubated for seven days at 60°C. Control BIs that were not exposed to the fumigation process were positive. All BIs from the ICU suite were negative.

The swabbing indicated a substantial level of microbial contamination before the RBDS, and effectively complete decontamination in all areas of the suite (97% of surfaces contaminated with >1 colony forming unit (cfu) per 24cm² before RBDS compared to <1% after RBDS).



All of the sensitive electronic equipment which was exposed to the fumigation process was unaffected, demonstrating HPV's excellent materials compatibility.

Conclusion

The bio-deactivation target of a 6-log reduction in Tyvek pouched *G. stearothermophilus* spores was demonstrated in the unit. RBDS provides a very rapid and effective bio-decontamination solution, which combined with the rapid aeration method produces a minimal cycle time. After the request was made from the Henri Mondor hospital in Paris, RBDS was completed within 36 hours including dispatching a team from BIOQUELL's UK Headquarters to perform the service.

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

For further information on HPV decontamination, contact BIOQUELL.

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