

# Clarus Technology

## Hydrogen Peroxide Technology

Bio-decontamination within a room or chamber is achieved by depositing an even layer of 'micro-condensation' of  $H_2O_2$  over all surfaces. The term micro-condensation may be defined as a microscopic film of  $H_2O_2$ , which being at a sub-micron level is invisible to the naked eye. Scientific research has proven that it is this low temperature, residue-free deposit that actually deactivates micro-organisms during the gassing process.

The micro-condensation process ensures that the optimum conditions for biological inactivation are achieved. When the process reached the dew point the time required for a log reduction of activity (the D-Value) is shortest. This occurs when the kill kinetic curve plotted against time is steepest. The transition between the shallow curve and the steep section coincides with the onset of micro-condensation.

Patented Clarus dual circuit technology combined with Siemens PLC control allows optimum performance of a bio-decontamination cycle, considerably reducing consumed rates of hydrogen peroxide during operation.

The combination of a Clarus vapour generator and BIOQUELL high velocity gas distribution nozzles and fans provides an even spread of  $H_2O_2$  vapour which can be introduced in the optimum combinations to all areas of a room or enclosure.

Utilising this system of active distribution, all surfaces are uniformly exposed to hydrogen peroxide vapour. This system is operated at ambient room temperature and relative humidity, without the need to attain significantly reduced humidity traditionally associated with hydrogen peroxide bio-decontamination systems. The benefit of being residue-free means no further wiping down of surfaces is required on completion of decontamination.

A BIOQUELL decontamination system is designed around the following elements :-

- Clarus vapour generator
- Vapour distribution system
- Aeration systems

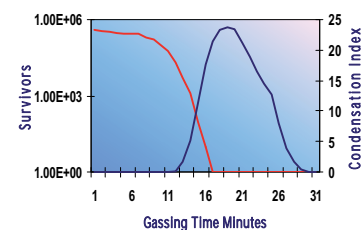
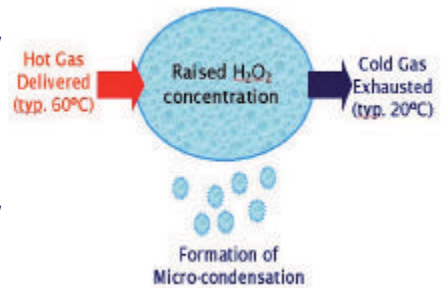
During the decontamination cycle the ventilation system will need to be isolated by means of gas tight dampers on the supply and extract ducts to each room. The Clarus vapour generator will function in three separate phases i.e.

### Phase 1 Pre-conditioning

Temperature conditioning and stabilisation of the delivery pipe work.

### Phase 2 $H_2O_2$ gassing

Hydrogen peroxide is flash evaporated into the carrier air stream and re-circulated within the chamber, to achieve an appropriate micro-condensation level of hydrogen peroxide, via the vaporiser circuit.



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Bio-decontamination solutions

An extended contact period or Dwell time is sometimes added to the gassing phase to ensure that the surfaces in the room have been exposed to the action of the disinfectant for an adequate period to achieve the required level of bio-deactivation.

### Phase 3 Aeration

The hydrogen peroxide vapour decomposes to oxygen and water, hence the bio-decontamination process is residue free. Hydrogen peroxide vapour concentration is reduced to below a 1ppm concentration level, which is the current time-weighted average safe exposure limit, before re-entry to the room is permitted of hydrogen peroxide, via the vaporiser circuit.



Following the end of the gassing phase, a period of aeration is required. This can be carried out by:-

- Using the Clarus vapour generator alone
- Using the room ventilation system in conjunction with the vapour generator
- Using a separate catalytic aeration device in conjunction with the vapour generator

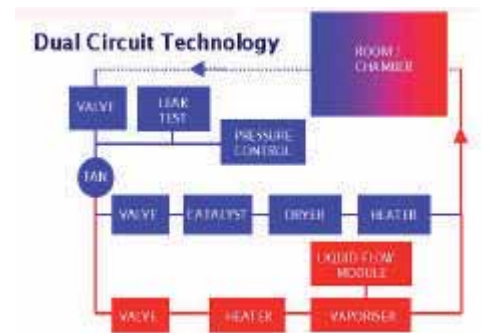
Providing the ventilation system is of the single pass type, and will not circulate the hydrogen peroxide vapour into adjacent rooms, at the start of the aeration phase the dampers can be opened to allow the ventilation system to purge the hydrogen peroxide vapour from the room. This operation can be carried out manually or, if the dampers are electrically actuated, it can be completed automatically by the building management system upon receipt of a signal from the vapour generator.

Alternatively, if the dampers can only be accessed from inside the room being decontaminated, or if the ventilation system is of the recirculation type, BIOQUELL can provide internal catalytic aeration units which can be placed in the room and will be automatically activated by the vapour generator at the appropriate time.

### Vapour Generator Design

Each Clarus vapour generator features patented 'Dual Circuit' technology. The benefits of the latest development in hydrogen peroxide gassing equipment include: -

- Uses less Hydrogen Peroxide
- Lower Power Consumption
- Optimum kill conditions can be quickly established
- Active vapour distribution
- Faster and more reliable kill
- Continuous operation without downtime for regeneration



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