



Test report of Dopair filtration system of ATA  
company: *Bacillus subtilis* spores

## Summary

1. Scientific and technological background .....	3
2. Methodology .....	4
3. Evaluation of purifier efficiency .....	5
3.1 Experimental conditions .....	5
3.2 Results : .....	6
3.3 Conclusion .....	7
<b>APPENDIX 1</b> .....	<b>8</b>

## 1. Scientific and technological background

VirNext is a technological platform of service and innovation with the aim to answer to scientific and technological needs of manufacturers in the fields of virology and microbiology. VirNext is specialized in the evaluation of physical, chemical and biological technologies for indoor air, surface and water decontamination.

ATA Company commissioned VirNext technological platform to evaluate the efficiency of the “Dopair/Room Dopair” indoor air purification system for the decontamination bacteria spores in confined space. This purification system is composed of a filter system.

Confined space indoor air favours exposition to chemical and biological harmful compounds; which can have a hard sanitary impact. Pollutants in confined space are known to be involved in respiratory deficiency, cardiovascular diseases, rhinitis, allergies and cancer. The nature of these pollutants depends on environmental confined spaces. For medical and paramedical sectors, the main biological pollutants are microorganisms, and notably bacteria spores. The bacteria spores present a spherical form of 0.5 at 2  $\mu\text{m}$ . The spores or endospores represent a particular state of bacteria. This form allows to bacteria to resist better at the extreme environmental conditions, to spread in air and moreover to form of biofilm. The main bacteria spores strain found in confined spaces are *Clostridium difficile* and *Bacillus subtilis*. They are responsible of intestinal and respiratory diseases and nosocomial infections.

VirNext has developed experimental procedures in order to evaluate the efficiency of Room Dopair/Dopair filter system to decontaminate confined space. This confined space was contaminated with bacteria spores: *Bacillus subtilis* spores.



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ATA-Medical Company

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**Test Laboratory:**

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Technical support : Anaïs Proust

## **2. Methodology**

The experimental strategy consists of the evaluation of the capacity of “Room Dopair/Dopair” system, developed by ATA-Medical Company, to decontaminate a confined space with microorganisms. This confined space was materialised by a nebulization chamber with a volume of 2.5m<sup>3</sup> where an artificial atmosphere containing microorganisms can be generated. These atmospheres were obtained by nebulization of concentrated solutions containing the microorganisms. Test samples were harvested by suction of total volume of chamber using cyclonic movement (Coriolis, Bertin Technologies). During this suction, the harvested microorganisms were resuspended in a collection buffer.

### 3. Evaluation of purifier efficiency

#### 3.1 Experimental conditions

**Date:** 20/02/2014

**Temperature:** 20°C

**Flow of Room Dopair/Dopair filter system:** 160m<sup>3</sup>/h

**Functioning time:**

Functioning time of Room Dopair system has been defined in order to evaluate decontamination efficiency on confined space after passage of 5 chamber volumes (12.5m<sup>3</sup> in 5 minutes), 10 chamber volumes (25m<sup>3</sup> in 10 minutes), 20 chamber volumes (50m<sup>3</sup> in 20 minutes).

**Number of sample** 14 for each microorganism

**Concentration of microorganism solutions:**

- *Bacillus subtilis* spores 10<sup>8</sup>CFU/mL

**Collection parameters:** 10 minutes (2.5 m<sup>3</sup>) in 8 mL of collection medium (phosphate buffer complement with tween)

**Evaluation method:** seeding on PCA medium, incubation at 30°C during 48 hours then counting.

### 3.2 Results:

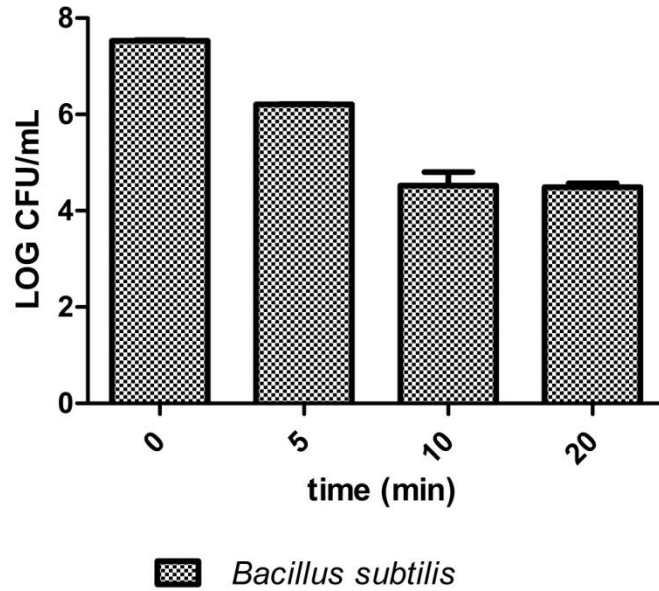


Figure 1: Evaluation of « Room Dopair » filter system on bacteria spores: *Bacillus subtilis* spores

The collecting data allow to define efficiency of « Room Dopair » system on decontamination of confined space with bacteria spores.

- Reduction Log CFU/mL *Bacillus subtilis* spores :
  - 1,3 ± 0,0 Log in 5 minutes
  - 3 ± 0,2 Log in 10 minutes
  - 3 ± 0,1 Log in 20 minutes

### 3.3 Conclusion

The « Room Dopair/Dopair » system developed by ATA-Medical Company allows the decontamination of a confined space of a volume of 2.5m<sup>3</sup> in 5 minutes with efficiencies of 95.234% for *Bacillus subtilis* spores. The « Room Dopair/Dopair » filter system allows to decontaminate air of confined space containing bacteria spores.

Lyon the 5 mars 2014,

A. PROUST  
Ingénieur R & D

A blue rectangular stamp with the text "VIRNEXT Faculté de médecine - 2ème étage 7 Rue Guillaume Paradin 69372 LYON Cedex 08" and a handwritten signature in black ink over it.

V. MOULES  
Responsable

A blue rectangular stamp with the text "VIRNEXT Faculté de médecine - 2ème étage 7 Rue Guillaume Paradin 69372 LYON Cedex 08" and a handwritten signature in black ink over it.

