

How to reduce contact time with Phileas technology in an airlock transfer?

Animal research lab, 10 m³ airlock transfer to production area

Objective

The objective is to validate the airlock material decontamination by O2SAFE (7,4%) with biological indicators, and the possibility to reduce contact time by modulating O2SAFE concentration.

Airlocks should be decontaminated under the following conditions:

- ☑ Daily equipment/material entry,
- ☑ When the type of micro-organisms is drastically changed,
- ☑ After a serious spill of dangerous micro-organisms,
- ☑ In case of emergency, allows the faster entry of material for intervention.

Material & Equipment

Item	Specification	Remarks
Diffuser	Phileas 75	DEVEA/Flow rate: 1200mL/h
Disinfectant	O2SAFE	DEVEA/dosage: 10 to 20mL/m ³ ; 7,4% H ₂ O ₂
Biological Indicator (BI)	- Apex Biological Indicator for Gaseous - Hydrogen Peroxide - <i>Geobacillus Stearothermophilus</i>	2,3.10 ⁶ CFU per stainless steel carrier
Culture Media	Tryptic soy broth	55-60°C for 7 days
Airlock	10m ³	



BI locations

10 BI have been positioned in the Airlock (locations previously determined to be the most difficult to sterilize) before the diffusion:

Airlock decontamination

Protocol steps:

1. Place generator on the working place
2. Close the Airlock
3. Conduct diffusion & aeration (cycles)
4. After ventilation, remove indicators and deliver them to the laboratory for sterility testing – reading after 7 days at 55-60°C

Estimated volume of disinfectant:

$$10 \text{ (m}^3\text{)} * 10 \text{ to } 20 \text{ (mL/m}^3\text{)} = 100 \text{ to } 200 \text{ mL}$$

Estimated H₂O₂ concentration (in case of Vol 10m³): d:m/V

$$100 \text{ (mL)} * 7,4 \text{ (\%)} * 1,1 \text{ (g/mL; density)} / 10 \text{ (m}^3\text{)} = 0,81 \text{ mg/L}$$

$$200 \text{ (mL)} * 7,4 \text{ (\%)} * 1,1 \text{ (g/mL)} / 10 \text{ (m}^3\text{)} = 1,63 \text{ mg/L}$$

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Decontamination cycle

N°	Cycle	Time (hh:mm)	Remarks
1	Dehumidification (drying)		
2	H ₂ O ₂ Diffusion	00:05 to 00:10	No delay time
3	Contact time	00:20 to 00:30	7,4% H ₂ O ₂
4	Ventilation	00:03 to 00:06	Capacity: 2000 m ³ /h
	TOTAL	00:28 to 00:46	

Results

Dose	Time	4log	5log	6log	Comment
12mL/m ³	00:20	10/10 neg*	10/10 neg	5/10, 9/10 and 10/10 neg	3 repetition trials
13L/m ³	00:20	10/10 neg	10/10 neg	5/10 neg	1 trial
20mL/m ³	00:20	10/10 neg	10/10 neg	0 to 10/10 neg	10/10 neg in 2 repetition trial
10mL/m ³	00:20	10/10 neg	10/10 neg	5/10 neg	1 trial

* Out of the 10 Biological Indicators, 10 are read negative after 7 days (decontamination efficient on this log 4 indicator, in this case)

Conditions

- ☑ Diffuser Phileas 75
Flow rate 1200mL/h
- ☑ Disinfectant O2SAFE 7,4% H₂O₂
doses 10 to 20mL/m³
- ☑ 10 m³ airlock
- ☑ 10 Biological Indicators



Conclusions

The Phileas 75 generator / O2SAFE hydrogen peroxide disinfectant are an effective airlock decontamination solution in as fast as 20 minutes.

- ☑ Reaches 4log and 5log at all doses / times
-> decontamination compliant with NF EN 17272
- ☑ For faster turn-around, dose increase is possible:
20mL/m³ for a 20 minute contact time is equivalent to 10mL/m³ for a 30 minute contact time
- ☑ Overdosage can be counter-productive (microdrops evaporation is key to decontamination)

