UVent

ultra-clean air from Mansfield Pollard

PRODUCT TESTING

ULTRA-VIOLET AIR STERILISATION SYSTEMS

MOBILE - CEILING JET - DUCT MOUNTED

OUR PARTNERS
IN DEVELOPMENT

UNIVERSITY OF LEEDS

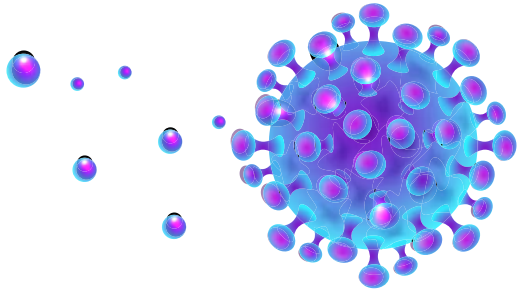
Rigorous and independently verifiable test data under laboratory conditions to reflect actual live HVAC conditions. Tests were carried out by The Pathogen Control Engineering Research Group, School of Civil Engineering (Dr CJ Noakes, Dr LA Fletcher, and Dr PA Sleigh). All data was analysed and verified by Professor Clive Beggs (then of The University of Bradford), who is one of the world leading experts in the prevention and control of healthcare associated Infections

UNIVERSITY OF BRADFORD

This association has ensured that UVent products have been subjected to rigorous but independent scientific scrutiny, tested under laboratory conditions to reflect actual live HVAC conditions.

This harmony between the exacting science of UV-C degradation of pathogens and air movement applications borne from over a century of experience within the HVAC industry has created a range of UVent products unique in the world and unrivalled in UV-C air sterilisation performance.

BACTERIAL TEST
ORGANISM

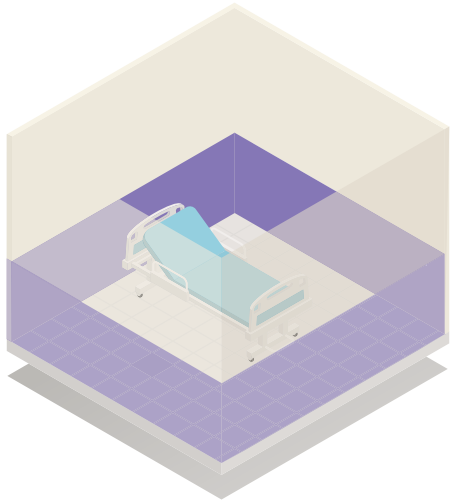


Staphylococcus aureus a gram positive bacterium that is a major cause of hospital acquired infectious. Hospital strains are usually resistant to a variety of antibiotics (e.g. MRSA) and many are resistant to antiseptics and disinfectants which aids its survival in the hospital environment.

Bacillus subtilis a gram positive spore forming bacteria often used as a safe surrogate for bacillus anthracis.

STEADY STATE
ROOM TESTS

A 32m³ aero-biology test chamber was created to simulate a room inhabited by an infectious individual who is constantly emitting harmful organisms. The device was placed into the sealed ventilated chamber and a constant supply of airborne bacteria introduced. Tests were carried out in the chamber in order to determine the efficiency of the device in terms of its ability to inactivate airborne micro-organisms.

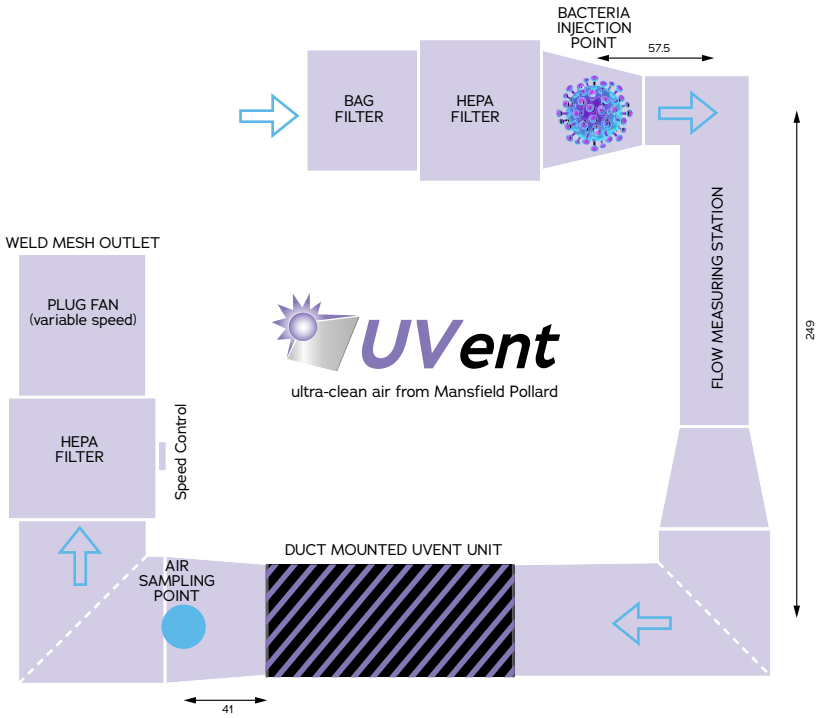


SINGLE PASS
TEST RIG

The test rig consisted of a single pass duct system fitted with a HEPA filter on the inlet and outlet in order to supply sterile air into the test system and avoid any Class II microorganisms from escaping into the test chamber.

The rig had a port upstream of the UV sterilisation unit into which an aerosolised pure culture of microorganisms was introduced from a 6-jet Collison nebuliser (Model CN 25, BGI Inc, USA). The nebuliser has its own air pump, pressure regulator and flow meter and was operated at a flow rate of 12l/m and the pressure maintained at 20psi.

Downstream of the UV sterilisation unit another port allowed samples to be taken using a 6-stage Andersen sampler (Andersen Instruments, USA). Air passes through the sampler at a flow rate of 28.3 l/min and varying sized particles impact upon sterile agar placed on 1 or more of the five sequential size stages in the sampler. A variable speed fan fitted on the downstream end of the rig allowed the flow of air through the rig to be varied.



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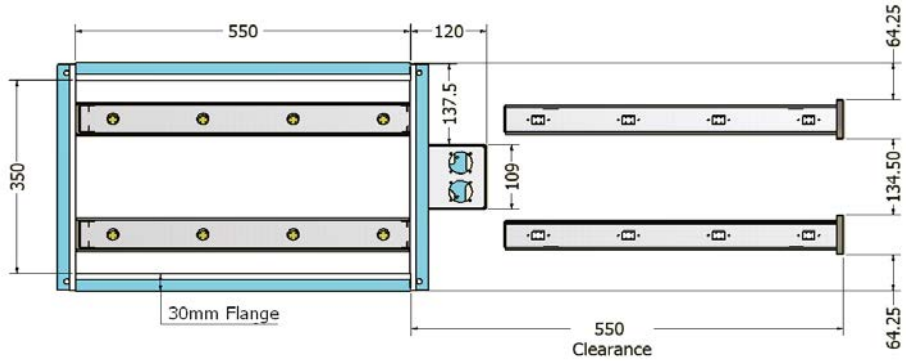
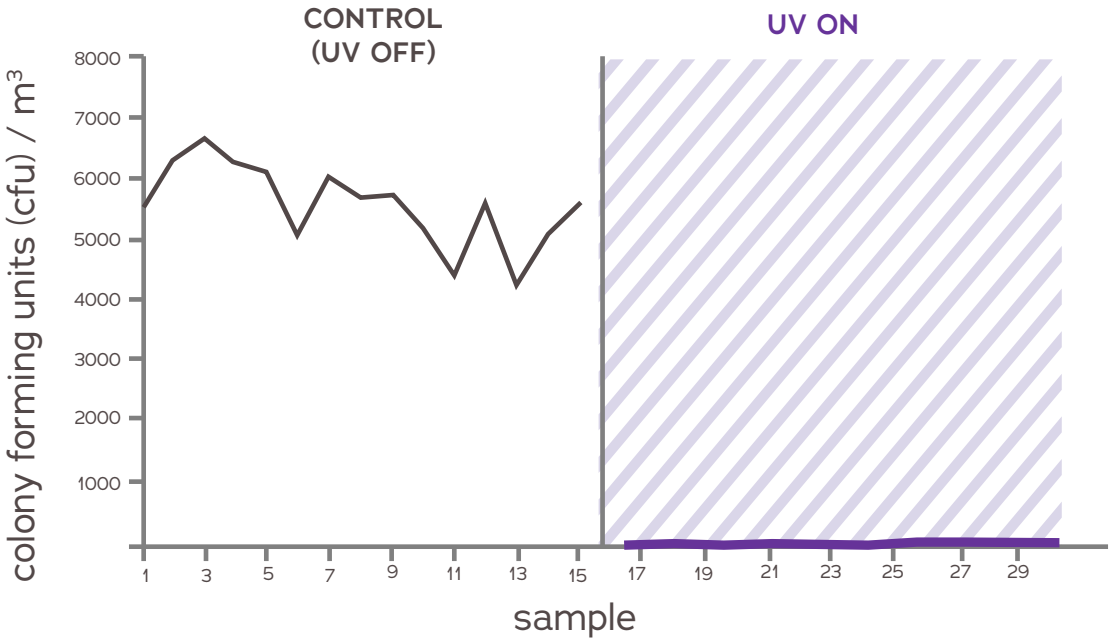
Air Volume (tested up to)

1.00m³/s





KILL PERCENTAGE

>99%	staphyloccocus aureus
>90%	bacillus subtillis (vegetative cells)
>90%	bacillus subtillis (spores)

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DUCT MOUNTED TEST UNIT 1

	UV Dose µW.sec/cm2	0.20 m³/s	0.30 m³/s	0.40 m³/s	0.50 m³/s	0.60 m³/s	0.70 m³/s	0.80 m³/s	0.90 m³/s	1.00 m³/s
Pseudomonas aeruginosa (lab)	3,900 (16)									
Avian Flu (Influenza A)	3,900 (9)									
Campylobacter jejuni	4,000 (2)									
Salmonella typhi	4,800 (2)									
Legionella pneumophila	5,500 (1,2)									
Staphylococcus aureus	5,800 (2, 5,6,8,11)									
Vibrio comma (cholera)	6,500 (9)									
MRSA	6,600 (13)									
Influenza	6,600 (3,4,5,6,9)									
E-coli	6,600 (1,2)									
Klebsiella terrigena	6,700 (2)									
Coronavirus (SARS)	7,400 (15)									
Streptococcus faecalis	8,000 (2)									
Hepatitis A	8,000 (2)									
Agrobacterium	8,500 (15)									
Bacillus anthracis	8,700 (15)									
Clostridium Difficile	10,000 (14)									
Mycobacterium tuberculosis	10,000 (3,5,6,9,10)									
Pseudomonas aeruginosa	10,500 (3,4,5,6)									
Herpes simplex	11,000 (17)									
Bacillus subtillis	11,000 (5,6,8)									
Clostridium botulinum	11,200 (15)									
Stenotrophomonas maltophilia	12,000 (7)									
Salmonella anatum	12,000 (2)									
Klebsiella pneumoniae	15,000 (2)									
Micrococcus sphaeroides	15,400 (3,5)									
Rotavirus	20,000 (1)									
Bacillus subtilis spores	22,000 (2,4,5,6,8)									
Clostridium tetani	23,100 (15)									
B. anthracis Sterne	27500 (12)									

Air Volume

MICROORGANISM KILL % PERCENTAGE

>99% | <99% >95% | <95% >90% | <89% >80% | <79% >55%

Performance tests carried out in partnership with the ***Pathogen Control Engineering Research Group,*** at the School of Civil Engineering - ***University of Leeds***

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References:
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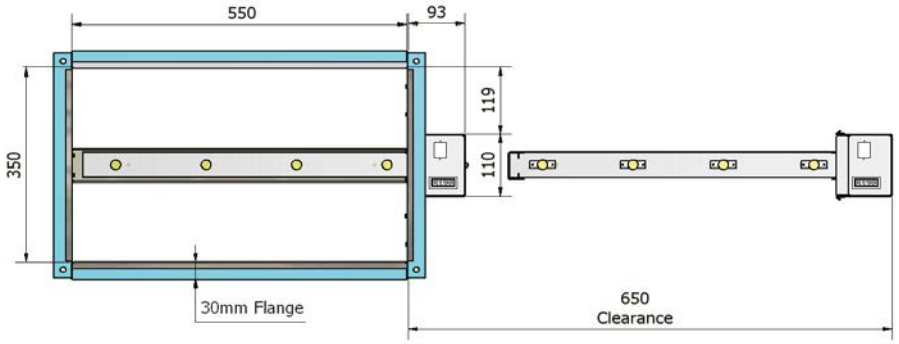
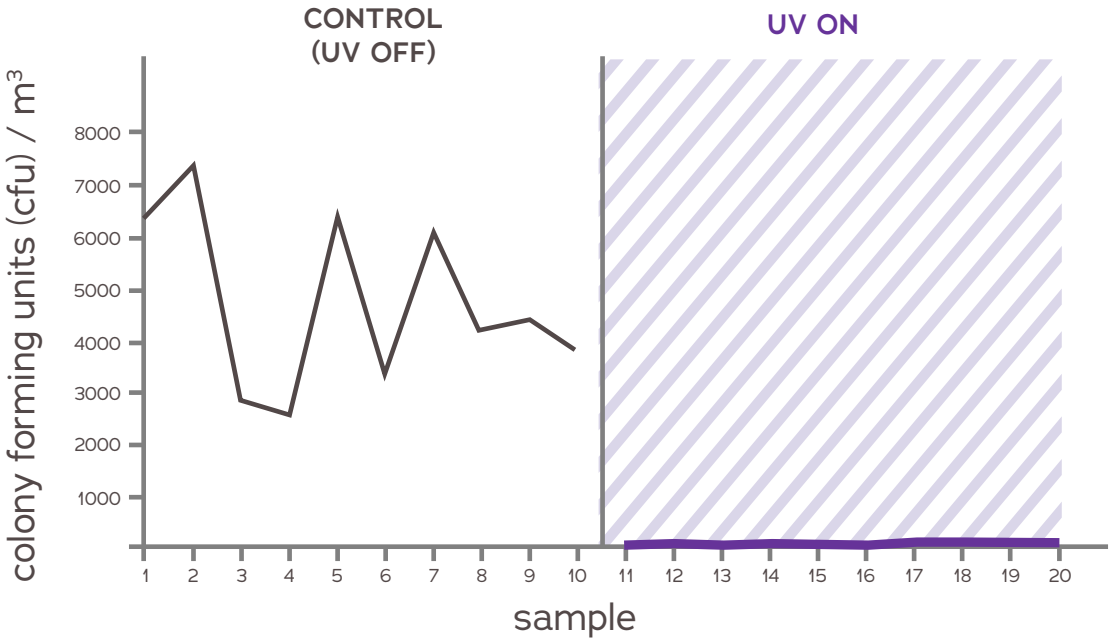
Air Volume (tested up to)

1.0m³/s





KILL PERCENTAGE

>99%	staphyloccocus aureus
>90%	bacillus subtillis (vegetative cells)
>80%	bacillus subtillis (spores)

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DUCT MOUNTED TEST UNIT 2

	UV Dose µW.sec/cm2	0.20 m³/s	0.30 m³/s	0.40 m³/s	0.50 m³/s	0.60 m³/s	0.70 m³/s	0.80 m³/s	0.90 m³/s	1.00 m³/s
Pseudomonas aeruginosa (lab)	3,900 (16)									
Avian Flu (Influenza A)	3,900 (9)									
Campylobacter jejuni	4,000 (2)									
Salmonella typhi	4,800 (2)									
Legionella pneumophila	5,500 (1,2)									
Staphylococcus aureus	5,800 (2, 5,6,8,11)									
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MRSA	6,600 (13)									
Influenza	6,600 (3,4,5,6,9)									
E-coli	6,600 (1,2)									
Klebsiella terrigena	6,700 (2)									
Coronavirus (SARS)	7,400 (15)									
Streptococcus faecalis	8,000 (2)									
Hepatitis A	8,000 (2)									
Agrobacterium	8,500 (15)									
Bacillus anthracis	8,700 (15)									
Clostridium Difficile	10,000 (14)									
Mycobacterium tuberculosis	10,000 (3,5,6,9,10)									
Pseudomonas aeruginosa	10,500 (3,4,5,6)									
Herpes simplex	11,000 (17)									
Bacillus subtillis	11,000 (5,6,8)									
Clostridium botulinum	11,200 (15)									
Stenotrophomonas maltophilia	12,000 (7)									
Salmonella anatum	12,000 (2)									
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Rotavirus	20,000 (1)									
Bacillus subtilis spores	22,000 (2,4,5,6,8)									
Clostridium tetani	23,100 (15)									
B. anthracis Sterne	27500 (12)									

Air Volume

MICROORGANISM KILL % PERCENTAGE

>99%	<99% >95%	<95% >90%	<89% >80%	<79% >55%

Performance tests carried out in partnership with the ***Pathogen Control Engineering Research Group,*** at the School of Civil Engineering - ***University of Leeds***

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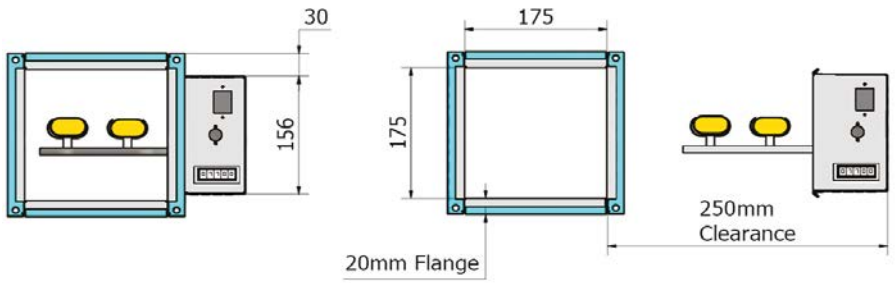
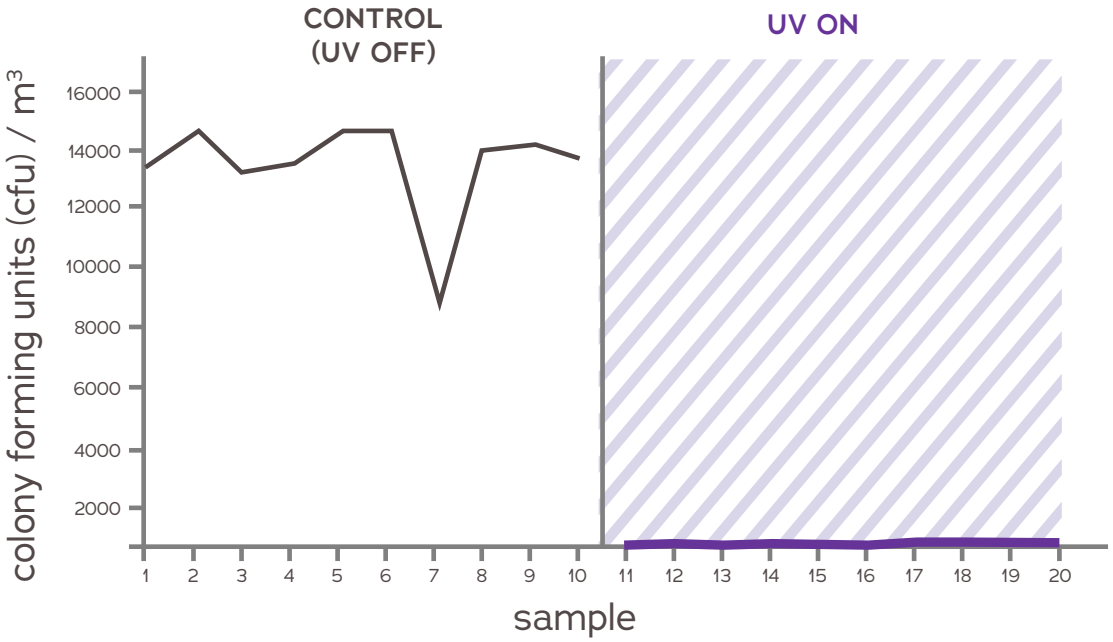
Air Volume (tested up to)

0.225m³/s





KILL PERCENTAGE

>99%	staphyloccocus aureus
>90%	bacillus subtillis (vegetative cells)
>80%	bacillus subtillis (spores)

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DUCT MOUNTED TEST UNIT 3

	UV Dose µW.sec/cm2	0.050 m³/s	0.075 m³/s	0.100 m³/s	0.125 m³/s	0.150 m³/s	0.175 m³/s	0.200 m³/s	0.225 m³/s
Pseudomonas aeruginosa (lab)	3,900 (16)								
Avian Flu (Influenza A)	3,900 (9)								
Campylobacter jejuni	4,000 (2)								
Salmonella typhi	4,800 (2)								
Legionella pneumophila	5,500 (1,2)								
Staphylococcus aureus	5,800 (2, 5,6,8,11)								
Vibrio comma (cholera)	6,500 (9)								
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Coronavirus (SARS)	7,400 (15)								
Streptococcus faecalis	8,000 (2)								
Hepatitis A	8,000 (2)								
Agrobacterium	8,500 (15)								
Bacillus anthracis	8,700 (15)								
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Clostridium tetani	23,100 (15)								
B. anthracis Sterne	27500 (12)								

Air Volume

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>99%	<99% >95%	<95% >90%	<89% >80%	<79% >55%

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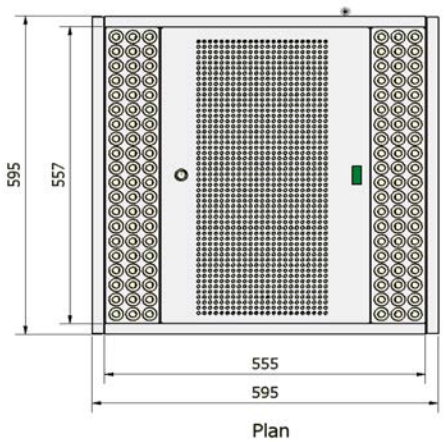
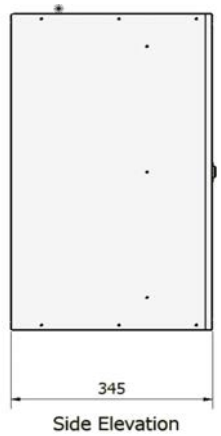
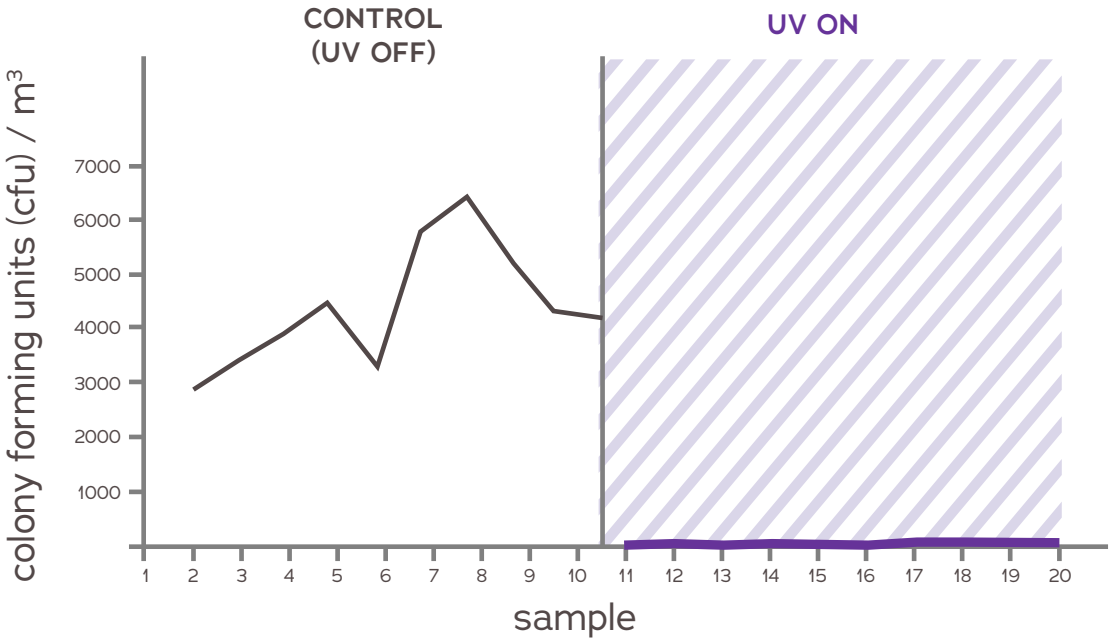
Air Volume (tested up to)

0.11m³/s







KILL PERCENTAGE

>99% staphyloccocus aureus

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CEILING JET TEST UNIT

	UV Dose µW.sec/cm2	0.11 m³/s Boost	0.05 m³/s Standard
Pseudomonas aeruginosa (lab)	3,900 (16)		
Avian Flu (Influenza A)	3,900 (9)		
Campylobacter jejuni	4,000 (2)		
Salmonella typhi	4,800 (2)		
Legionella pneumophila	5,500 (1,2)		
Staphylococcus aureus	5,800 (2, 5,6,8,11)		
Vibrio comma (cholera)	6,500 (9)		
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B. anthracis Sterne	27500 (12)		

Air Volume

MICROORGANISM KILL % PERCENTAGE

<99% >95%	<95% >90%	<89% >80%	<79% >60%

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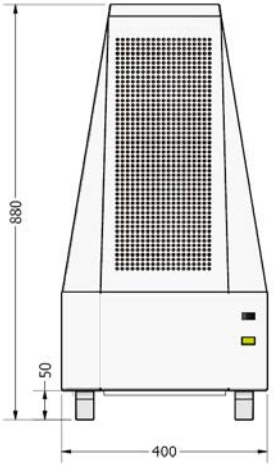

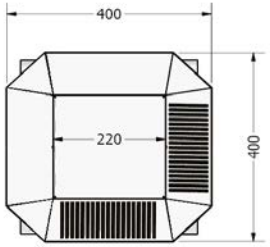

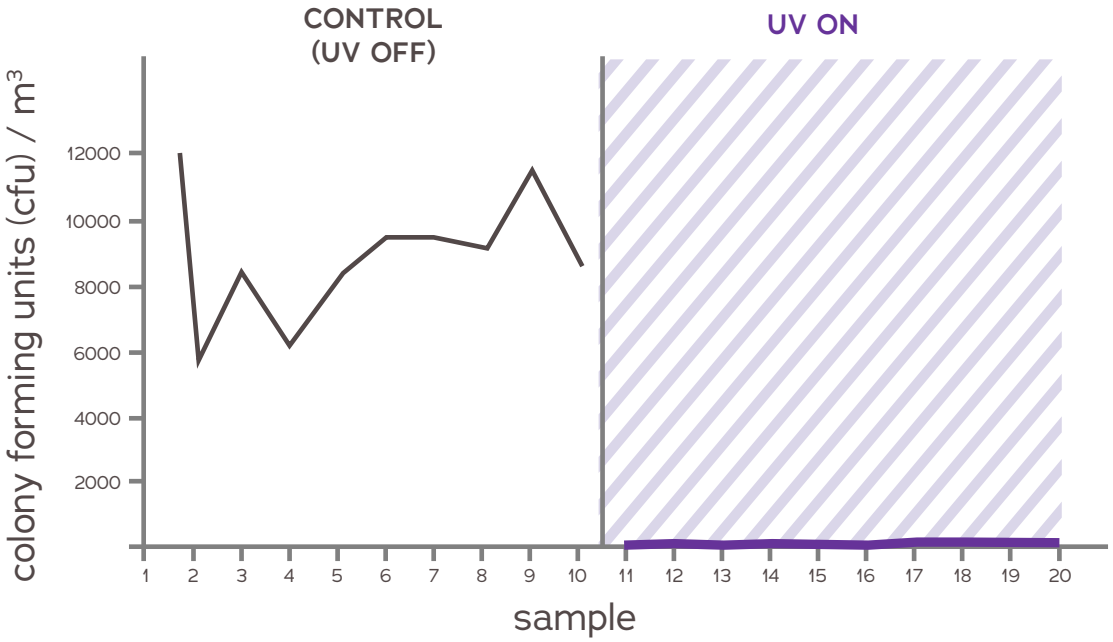

KILL PERCENTAGE

>97.6% staphyloccocus aureus

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MOBILE TEST UNIT

	UV Dose µW.sec/cm2	0.11 m³/s Boost	0.05 m³/s Standard
Pseudomonas aeruginosa (lab)	3,900 (16)		
Avian Flu (Influenza A)	3,900 (9)		
Campylobacter jejuni	4,000 (2)		
Salmonella typhi	4,800 (2)		
Legionella pneumophila	5,500 (1,2)		
Staphylococcus aureus	5,800 (2, 5,6,8,11)		
Vibrio comma (cholera)	6,500 (9)		
MRSA	6,600 (13)		
Influenza	6,600 (3,4,5,6,9)		
E-coli	6,600 (1,2)		
Klebsiella terrigena	6,700 (2)		
Coronavirus (SARS)	7,400 (15)		
Streptococcus faecalis	8,000 (2)		
Hepatitis A	8,000 (2)		
Agrobacterium	8,500 (15)		
Bacillus anthracis	8,700 (15)		
Clostridium Difficile	10,000 (14)		
Mycobacterium tuberculosis	10,000 (3,5,6,9,10)		
Pseudomonas aeruginosa	10,500 (3,4,5,6)		
Herpes simplex	11,000 (17)		
Bacillus subtillis	11,000 (5,6,8)		
Clostridium botulinum	11,200 (15)		
Stenotrophomonas maltophilia	12,000 (7)		
Salmonella anatum	12,000 (2)		
Klebsiella pneumoniae	15,000 (2)		
Micrococcus sphaeroides	15,400 (3,5)		
Rotavirus	20,000 (1)		
Bacillus subtilis spores	22,000 (2,4,5,6,8)		
Clostridium tetani	23,100 (15)		
B. anthracis Sterne	27500 (12)		

Air Volume

MICROORGANISM KILL % PERCENTAGE

<99% >95%	<95% >90%	<89% >80%	<79% >60%

Performance tests carried out in partnership with the ***Pathogen Control Engineering Research Group,*** at the School of Civil Engineering - ***University of Leeds***

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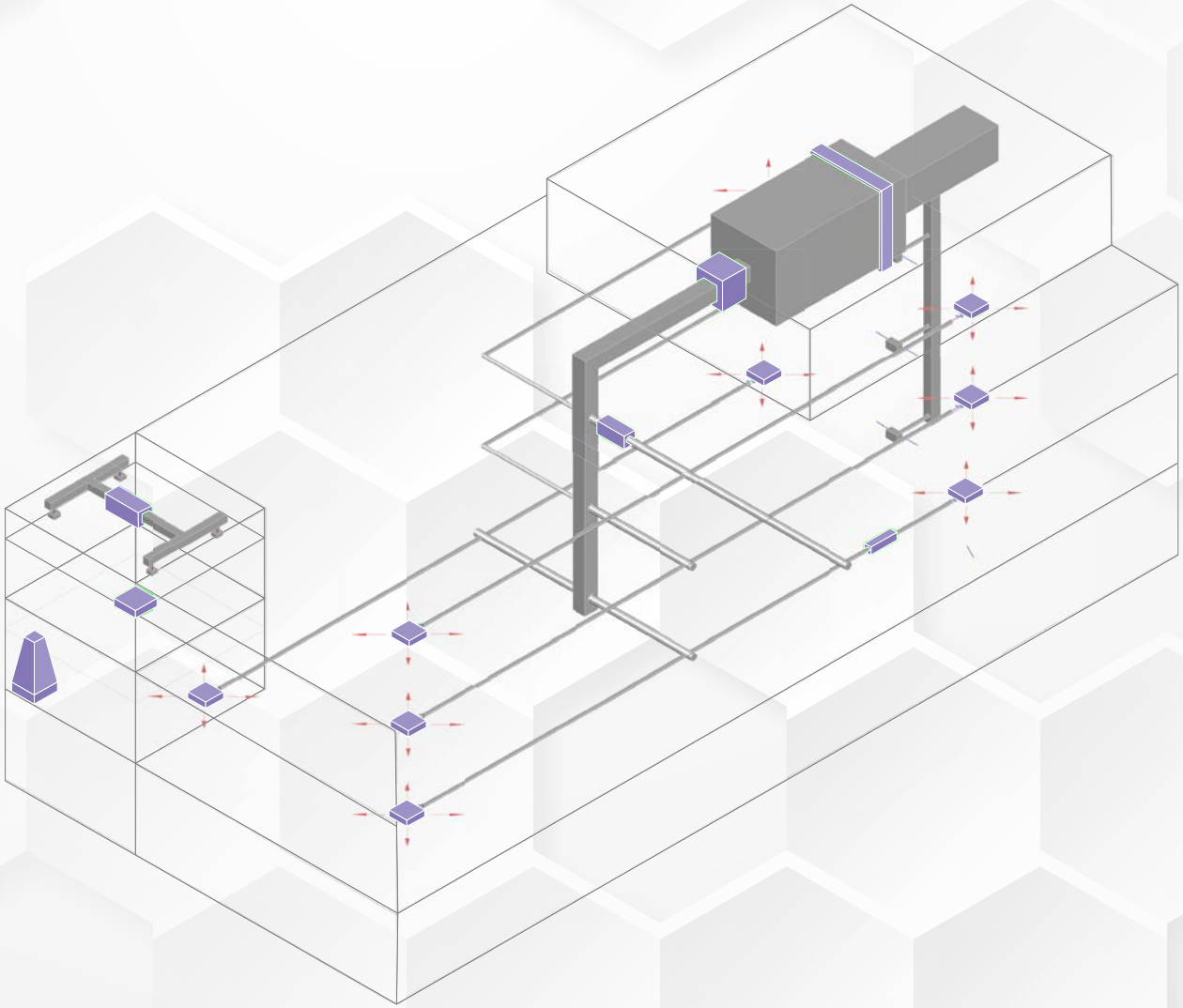

UVent

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