

Performance of Whitebox Aircleaner X Zoonotic Pathogens



Evaluation of Zoonotic viruses and bacteria

The Whitebox aircleaner unit is designed to disinfect airborne pathogens and other contagious aerosols by using ultraviolet light (UVC spectrum). The aircleaner employs an air capacity of max 140 m³/h per unit and is designed to be applied to veterinary environments. The Whitebox unit is also installed successfully in horse stables and similar environments for the reduction of viruses, bacteria, and pathogens.

In addition to reducing human to human infection, the unit can protect human occupants from zoonotic diseases in rooms that house various types of animals and can protect animals from zoonotic diseases that hail from other animals. The animals for which it is intended to offer protection from airborne diseases include dogs, cats, poultry & birds, rodents and hamsters, horses, swine, cows, rabbits, lizards and snakes.

The pathogens that have been identified as being of greatest concern in the veterinary industry include but are not limited to *Microsporium canis*, Canine Distemper virus, Canine Influenza (H2N7), Feline Infectious peritonitis, Feline coronavirus, *Cryptococcus* spp., Feline Rhinotracheitis, Reovirus, *Micrococcus*, *Staphylococcus aureus* (MRSA), *Pasteurella multocida*, Porcine circovirus, and *Bordetella pertussis*. A complete list of airborne zoonotic pathogens is included for which the exact UV dose levels are known and how the performance of the Whitebox aircleaner unit against these pathogens are evaluated.

Not all pathogens are transmitted in air, whereby an appendix is included in the end where such pathogens are listed.

Following tables are showing different pathogens elimination for different animals in a single pass in Whitebox Aircleaner. Modelled room size is 22,5 m³ in volume and the initial concentration is assumed to be 1000 CFU/ft³.

Evaluation of Whitebox UVC Pathogen elimination in air for Dog Pathogens

PATHOGEN	Mean Dia. μm	UV D90 $\text{J}/\text{m}^2\{2\}$	Trans to Human	MERY 6 filter e.rate %	Whitebox aircleaner e.rate%
Avian Influenza A	0.098	23	Yes	7.09	100.00
Bacillus anthracis	1.118	85	Yes	18.79	99.53
Bordetella bronchiseptica	0.707	63	Yes	10.57	99.93
Brachyspira pilosicoli	0.5	71	No	6.89	99.84
Brucella abortus	0.57	75	Yes	8.05	99.77
Brucella canis	0.566	48	Yes	7.98	100.00
Brucella melitensis	0.566	49	Yes	7.98	100.00
Brucella suis	0.57	49	Yes	8.05	100.00
Burkholderia mallei	0.77	68	Yes	11.80	99.88
Burkholderia pseudomallei	0.494	67	Yes	6.80	99.89
Campylobacter coli	2.12	16	Yes	35.03	100.00
Campylobacter jejuni	2.12	16	Yes	35.03	100.00
Canine Adenovirus Type 1 (CAv-1)	0.093	89	No	7.41	99.42
Canine Adenovirus Type 2 (CAv-2)	0.093	128	No	7.41	97.17
Canine Calicivirus (CaCV)	0.034	67	No	16.39	99.89
Canine Coronavirus	0.113	6	No	6.29	100.00
Canine Distemper Virus (CDV)	0.15	21	No	5.09	100.00
Canine Influenza H3N2	0.098	23	No	7.09	100.00
Canine Influenza H3N8	0.098	23	No	7.09	100.00
Canine Norovirus	0.035	76	No	16.08	99.76
Canine Parvovirus 2	0.022	25	No	21.04	100.00
Chlamydia pneumoniae	0.283	59	Yes	4.42	100.00
Clostridium botulinum	1.975	56	Yes	33.20	100.00
Clostridium perfringens	5	38	Yes	48.83	100.00
Clostridium tetani	5	49	Yes	48.83	100.00
Coxiella burnetii	0.283	15	Yes	4.42	100.00
Cryptococcus neoformans	4.899	138	Yes	48.72	96.34
Feline Influenza A (H7N2)	0.10	23	Yes	7.09	100.00
Francisella tularensis	0.2	256	Yes	4.43	83.17
Hantavirus (Hantaan Virus)	0.095	33	Yes	7.28	100.00
Hendra Virus	0.175	10	Yes	4.67	100.00
Histoplasma capsulatum	2.236	140	Yes	36.37	96.15
Influenza A virus	0.098	23	Yes	7.09	100.00
Listeria monocytogenes	0.707	181	Yes	10.57	91.91
Louping Ill (LIV)	0.05	700	Yes	12.45	47.86
Lymphocytic choriomeningitis (LCMV)	0.087	38	Yes	7.85	100.00
Mycobacterium bovis	0.637	13	Yes	9.25	100.00
Mycobacterium tuberculosis	0.637	5	Yes	9.25	100.00
Nipah virus (Henipah virus)	0.175	7	No	4.67	100.00
Parainfluenza virus	0.194	21	Yes	4.47	100.00
Pseudorabies (PRV)	0.194	34	No	4.47	100.00
Rabies virus	0.07	11	Yes	9.46	100.00
Staphylococcus aureus (MRSA)	0.866	4	Yes	13.72	100.00
Streptococcus pyogenes	0.894	1	Yes	14.28	100.00
Swine Influenza	0.1	23	Yes	6.97	100.00
Yersinia pestis	0.707	22	Yes	10.57	100.00

Evaluation of Whitebox UVC Pathogen elimination in air for Cat Pathogens

PATHOGEN	Mean Dia. μm	UV D90 $\text{J}/\text{m}^2\{2\}$	Trans to Human	MERY 6 filter e.rate %	Whitebox aircleaner e.rate%
Avian Influenza A	0.098	23	Yes	7.09	100.00
Bacillus anthracis	1.118	85	Yes	18.79	99.53
Bordetella bronchiseptica	0.707	63	Yes	10.57	99.93
Brachyspira pilosicoli	0.5	71	No	6.89	99.84
Burkholderia mallei	0.77	68	Yes	11.80	99.88
Burkholderia pseudomallei	0.494	67	Yes	6.80	99.89
Campylobacter coli	2.12	16	Yes	35.03	100.00
Campylobacter jejuni	2.12	16	Yes	35.03	100.00
Canine Distemper Virus (CDV)	0.15	21	No	5.09	100.00
Canine Influenza H3N2	0.098	23	No	7.09	100.00
Canine Parvovirus 2	0.022	25	No	21.04	100.00
Chlamydomphila felis	0.283	60	No	4.42	100.00
Clostridium botulinum	1.975	56	Yes	33.20	100.00
Clostridium tetani	5	49	Yes	48.83	100.00
Cowpox	0.173	17	Yes	4.69	100.00
Coxiella burnettii	0.283	15	Yes	4.42	100.00
Cryptococcus neoformans	4.899	138	Yes	48.72	96.34
Feline Calicivirus (FeCV)	0.037	67	No	15.49	99.89
Feline Distemper (Feline Parvovirus, FPV)	0.022	25	No	21.04	100.00
Feline Herpesvirus T1 (Rhinotracheitis, FVR)	0.18	22	No	4.60	100.00
Feline Infectious Peritonitis virus (FIP)	0.11	434	No	6.43	64.99
Feline Influenza A (H7N2)	0.10	23	Yes	7.09	100.00
Feline Panleukopenia (Picornavirus) (FPV)	0.037	35	No	15.49	100.00
Francisella tularensis	0.2	256	Yes	4.43	83.17
Hantavirus (Hantaan Virus)	0.095	33	Yes	7.28	100.00
Hendra Virus	0.175	10	Yes	4.67	100.00
Influenza A virus	0.098	23	Yes	7.09	100.00
Listeria monocytogenes	0.707	181	Yes	10.57	91.91
Mycobacterium avium	1.118	52	Yes	18.79	100.00
Mycobacterium bovis	0.637	13	Yes	9.25	100.00
Mycobacterium tuberculosis	0.637	5	Yes	9.25	100.00
Mycoplasma spp.	0.177	8	Yes	4.64	100.00
Nipah virus (Henipah virus)	0.175	7	No	4.67	100.00
Pseudorabies (PRV)	0.194	34	No	4.47	100.00
Rabies virus	0.07	11	Yes	9.46	100.00
Staphylococcus aureus (MRSA)	0.866	4	Yes	13.72	100.00
Streptococcus pyogenes	0.894	1	Yes	14.28	100.00
Swine Influenza	0.1	23	Yes	6.97	100.00
Yersinia pestis	0.707	22	Yes	10.57	100.00

Evaluation of Whitebox UVC Pathogen elimination in air for Bird Pathogens

PATHOGEN	Mean Dia. μm	UV D90 $\text{J}/\text{m}^2\{2\}$	Trans to Human	MERY 6 filter e.rate %	Whitebox aircleaner e.rate%
Avian Adenovirus (FAV)	0.08	213	No	8.44	88.22
Avian Encephalomyelitis Virus	0.023	100	No	20.57	98.95
Avian Influenza A	0.098	23	Yes	7.09	100.00
Avian Leukosis virus (RSA)	0.107	631	No	6.58	51.46
Avian Sarcoma virus	0.098	219	No	7.09	87.49
Bordetella avium	0.7	6	No	10.44	100.00
Campylobacter jejuni	2.12	16	Yes	35.03	100.00
Canary Pox Virus	0.24	16	No	4.31	100.00
Candida	4.899	230	Yes	48.72	86.19
Chlamydomphila caviae (formerly C.psittaci)	0.283	59	Yes	4.42	100.00
Clostridium botulinum	1.975	56	Yes	33.20	100.00
Clostridium perfringens	5	38	Yes	48.83	100.00
Coronavirus	0.113	230	Yes	6.29	86.19
Cryptococcus neoformans	4.899	138	Yes	48.72	96.34
Feline Influenza A (H7N2)	0.10	23	Yes	7.09	100.00
Fowlpox virus (Avian poxvirus)	0.24	16	Yes	4.31	100.00
Histoplasma capsulatum	2.236	140	Yes	36.37	96.15
Infectious Bronchitis Virus (IBV)	0.113	9	No	6.29	100.00
Infectious Laryngotracheitis (Psittacid herpes)	0.18	20	No	4.60	100.00
Influenza A virus	0.098	23	Yes	7.09	100.00
Marek's Disease Virus (Herpesvirus)	0.18	36	No	4.60	100.00
Mycobacterium avium	1.118	52	Yes	18.79	100.00
Mycoplasma gallisepticum	0.177	8	No	4.64	100.00
Mycoplasma spp.	0.177	8	Yes	4.64	100.00
Mycoplasma synoviae	0.177	8	No	4.64	100.00
Newcastle Disease Virus (NDV)	0.212	14	Yes	4.36	100.00
Papilloma virus	0.055	90	No	11.55	99.37
Polyomavirus	0.0424	564	No	14.08	55.42
Pseudomonas aeruginosa	0.494	18	Yes	6.80	100.00
Psittacine Beak and Feather Disease (PBFD)	0.055	329	No	11.55	74.99
Reovirus	0.08	144	Yes	8.44	95.79
Salmonella enteritidis	0.81	10	Yes	12.59	100.00
Salmonella typhi	0.81	16	Yes	12.59	100.00
Staphylococcus aureus (MRSA)	0.866	4	Yes	13.72	100.00

Evaluation of Whitebox UVC Pathogen elimination in air for Rodent Pathogens

PATHOGEN	Mean Dia. μm	UV D90 $\text{J}/\text{m}^2\{2\}$	Trans to Human	MERY 6 filter e.rate %	Whitebox aircleaner e.rate%
Aeromonas spp.	2.098	11	Yes	34.77	100.00
Bacillus anthracis	1.118	85	Yes	18.79	99.53
Bacteroides fragilis	3.162	34	Yes	43.79	100.00
Bordetella bronchiseptica	0.707	63	Yes	10.57	99.93
Burkholderia mallei	0.77	68	Yes	11.80	99.88
Burkholderia pseudomallei	0.494	67	Yes	6.80	99.89
Chlamydomphila caviae (formerly C.psittaci)	0.283	59	Yes	4.42	100.00
Clostridium tetani	5	49	Yes	48.83	100.00
Coxiella burnettii	0.283	15	Yes	4.42	100.00
Coxsackievirus	0.027	81	Yes	18.86	99.63
Echovirus	0.024	83	Yes	20.12	99.60
Francisella tularensis	0.2	256	Yes	4.43	83.17
Guineapig adenovirus	0.079	886	-	8.53	40.24
Hantavirus (Hantaan Virus)	0.095	33	Yes	7.28	100.00
Haemophilus spp.	0.285	38	Yes	4.43	100.00
Influenza A virus	0.098	23	Yes	7.09	100.00
Klebsiella pneumoniae	0.671	52	Yes	9.88	100.00
Listeria monocytogenes	0.707	181	Yes	10.57	91.91
Louping III (LIV)	0.05	700	Yes	12.45	47.86
Lymphocytic choriomeningitis (LCMV)	0.087	38	Yes	7.85	100.00
Mumps	0.245	30	Yes	4.31	100.00
Mycobacterium avium	1.118	52	Yes	18.79	100.00
Mycobacterium bovis	0.637	13	Yes	9.25	100.00
Mycoplasma spp.	0.177	8	Yes	4.64	100.00
Nipah virus (Henipah virus)	0.175	7	No	4.67	100.00
Parainfluenza virus	0.194	21	Yes	4.47	100.00
Pseudomonas diminuta	0.494	18	Yes	6.80	100.00
Pseudorabies (PRV)	0.194	34	No	4.47	100.00
Rabies virus	0.07	11	Yes	9.46	100.00
Reovirus	0.08	144	Yes	8.44	95.79
Salmonella enteritidis	0.81	10	Yes	12.59	100.00
Salmonella typhi	0.81	16	Yes	12.59	100.00
Staphylococcus aureus (MRSA)	0.866	4	Yes	13.72	100.00
Streptococcus pneumoniae	0.71	468	Yes	10.63	62.25
Streptococcus pyogenes	0.894	1	Yes	14.28	100.00
Yersinia pestis	0.707	22	Yes	10.57	100.00
Yersinia pseudotuberculosis	0.63	22	Yes	9.12	100.00

Evaluation of Whitebox UVC Pathogen elimination in air for Horse Pathogens

PATHOGEN	Mean Dia. μm	UV D90 $\text{J}/\text{m}^2\{2\}$	Trans to Human	MERY 6 filter e.rate %	Whitebox aircleaner e.rate%
Avian Influenza A	0.098	23	Yes	7.09	100.00
Bacillus anthracis	1.118	85	Yes	18.79	99.53
Brucella abortus	0.57	75	Yes	8.05	99.77
Brucella canis	0.566	48	Yes	7.98	100.00
Brucella maris	0.566	49	No	7.98	100.00
Brucella melitensis	0.566	49	Yes	7.98	100.00
Brucella neotomae	0.566	49	No	7.98	100.00
Brucella ovis	0.566	49	No	7.98	100.00
Brucella suis	0.57	49	Yes	8.05	100.00
Burkholderia mallei	0.77	68	Yes	11.80	99.88
Burkholderia pseudomallei	0.494	67	Yes	6.80	99.89
Canine Influenza H3N8	0.098	23	No	7.09	100.00
Clostridium botulinum	1.975	56	Yes	33.20	100.00
Clostridium difficile	0.6	60	Yes	8.58	100.00
Clostridium perfringens	5	38	Yes	48.83	100.00
Clostridium tetani	5	49	Yes	48.83	100.00
Coxiella burnettii	0.283	15	Yes	4.42	100.00
Cryptococcus farciminosus	4.9	138	Yes	48.72	96.34
Cryptococcus neoformans	4.899	138	Yes	48.72	96.34
Enterobacter	1.414	64	Yes	24.42	99.92
Equine Influenza	0.1	23	No	6.97	100.00
Feline Influenza A (H7N2)	0.10	23	Yes	7.09	100.00
Hendra Virus	0.175	10	Yes	4.67	100.00
Histoplasma farciminosum	2.236	140	No	36.37	96.15
Louping Ill (LIV)	0.05	700	Yes	12.45	47.86
Mycobacterium avium	1.118	52	Yes	18.79	100.00
Nipah virus (Henipah virus)	0.175	7	No	4.67	100.00
Salmonella enteritidis	0.81	10	Yes	12.59	100.00
Salmonella typhi	0.81	16	Yes	12.59	100.00
Staphylococcus aureus (MRSA)	0.866	4	Yes	13.72	100.00
Streptococcus pyogenes	0.894	1	Yes	14.28	100.00

Evaluation of Whitebox UVC Pathogen elimination in air for Cow Pathogens

PATHOGEN	Mean Dia. μm	UV D90 $\text{J/m}^2\{2\}$	Trans to Human	MERV 6 filter e.rate %	Whitebox aircleaner e.rate%
Bacillus anthracis	1.118	85	Yes	18.79	99.53
Bovine Coronavirus (BCV)	0.113	6	No	6.29	100.00
Brucella abortus	0.57	75	Yes	8.05	99.77
Brucella canis	0.566	48	Yes	7.98	100.00
Brucella maris	0.566	49	No	7.98	100.00
Brucella melitensis	0.566	49	Yes	7.98	100.00
Brucella neotomae	0.566	49	No	7.98	100.00
Brucella ovis	0.566	49	No	7.98	100.00
Brucella suis	0.57	49	Yes	8.05	100.00
Burkholderia pseudomallei	0.494	67	Yes	6.80	99.89
Campylobacter coli	2.12	16	Yes	35.03	100.00
Campylobacter jejuni	2.12	16	Yes	35.03	100.00
Chlamydophila felis	0.283	60	No	4.42	100.00
Chlamydophila pneumoniae	0.283	59	Yes	4.42	100.00
Clostridium botulinum	1.975	56	Yes	33.20	100.00
Clostridium perfringens	5	38	Yes	48.83	100.00
Coxiella burnettii	0.283	15	Yes	4.42	100.00
Cryptococcus neoformans	4.899	138	Yes	48.72	96.34
Listeria monocytogenes	0.707	181	Yes	10.57	91.91
Louping Ill (LIV)	0.05	700	Yes	12.45	47.86
Mycobacterium avium	1.118	52	Yes	18.79	100.00
Mycobacterium bovis	0.637	13	Yes	9.25	100.00
Pseudorabies (PRV)	0.194	34	No	4.47	100.00
Rabies virus	0.07	11	Yes	9.46	100.00
Salmonella enteritidis	0.81	10	Yes	12.59	100.00
Salmonella typhi	0.81	16	Yes	12.59	100.00
Staphylococcus aureus (MRSA)	0.866	4	Yes	13.72	100.00
Streptococcus pyogenes	0.894	1	Yes	14.28	100.00

Evaluation of Whitebox UVC Pathogen elimination in air for Reptile Pathogens

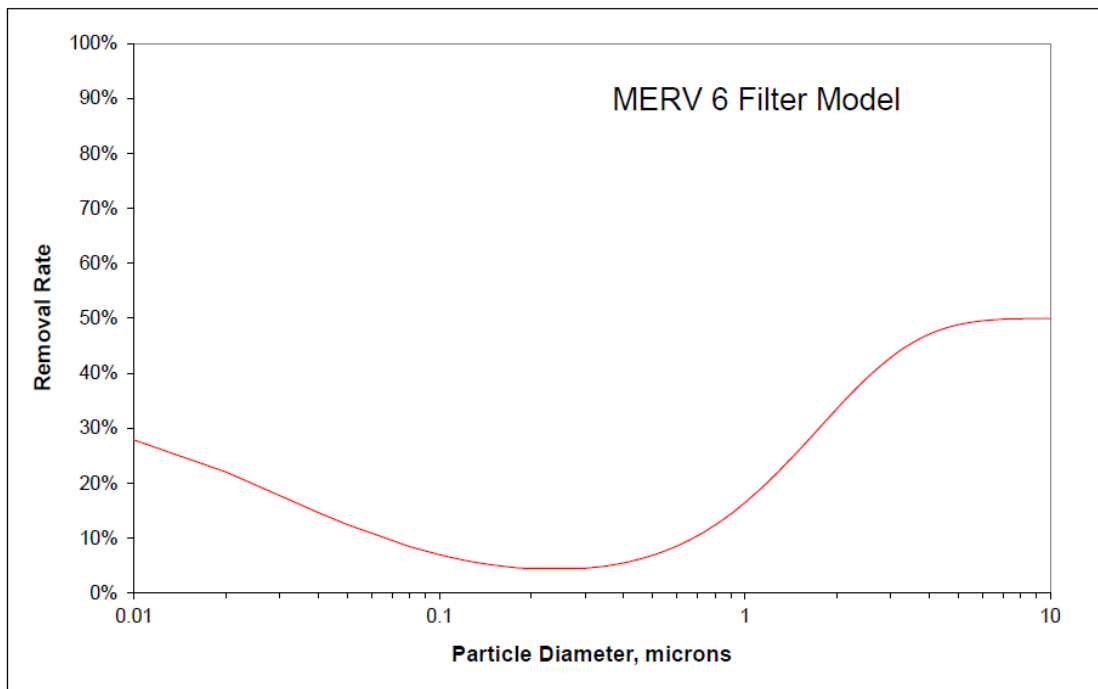
PATHOGEN	Mean Dia. μm	UV D90 $\text{J}/\text{m}^2\{\text{2}\}$	Trans to Human	MERY 6 filter e.rate %	Whitebox aircleaner e.rate%
Calicivirus	0.034	66.7416	No	16.39	99.89
Herpesvirus	0.18	41	No	4.60	100.00
Mycoplasma agassizii	0.177	8	No	4.64	100.00
Reovirus	0.08	143.9116	Yes	8.44	95.79

Evaluation of Whitebox UVC Pathogen elimination in air for Swine Pathogens

PATHOGEN	Mean Dia. μm	UV D90 $\text{J}/\text{m}^2\{\text{2}\}$	Trans to Human	MERY 6 filter e.rate %	Whitebox aircleaner e.rate%
Arterivirus	0.05	-	No	12.45	-
Bovine Coronavirus (BCV)	0.113	6	No	6.29	100.00
Brucella abortus	0.57	75	Yes	8.05	99.77
Brucella melitensis	0.566	49	Yes	7.98	99.99
Clostridium perfringens	5	38	Yes	48.83	100.00
Mycobacterium avium	1.118	52	Yes	18.79	99.98
Mycoplasma hyopneumoniae	0.177	8	No	4.64	100.00
Porcine Respiratory Coronavirus (PRCV)	0.14	13	No	5.34	100.00
Pseudorabies (PRV)	0.194	34	No	4.47	100.00
Salmonella enteritidis	0.81	10	Yes	12.59	100.00
Salmonella typhi	0.81	16	Yes	12.59	100.00
Swine Influenza	0.1	23	Yes	6.97	100.00

Comparison Whitebox aircleaner to MERV 6 Filter for Zoonotic Pathogens

The performance of the Whitebox aircleaner is evaluated to a standard aircleaner with a traditional MERV 6 filter. The performance curve for the MERV 6 filter model is based on Kowalski et al (1999) and has been extended into the virus size range (below about 0.1 micron) as shown in the Figure below. The Tables below reports type of pathogen, calculated removal rates for all the pathogens, MERV 6 filtration performance % of one single air pass in an aircleaner unit with MERV 6 filtration. Evaluation of UVC elimination % of one single pass from Whitebox UVC aircleaner unit is reported to compare effects.

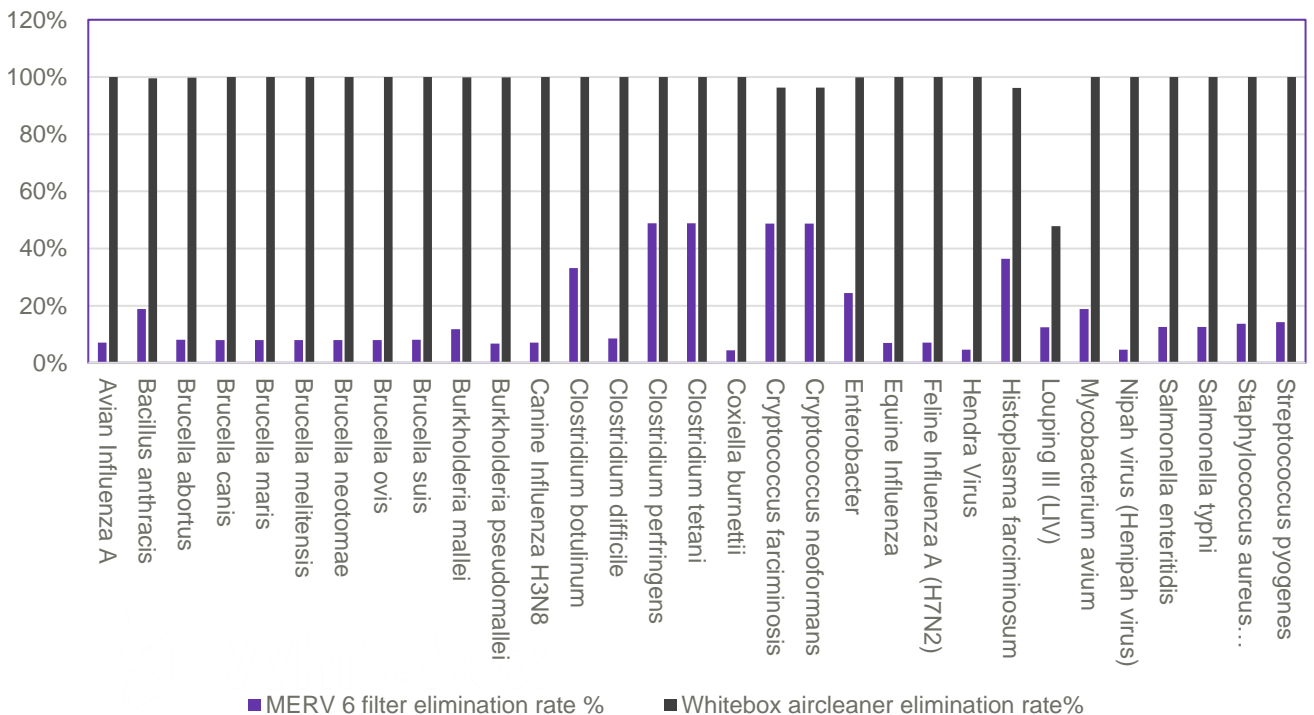


Comparative Results Zoonotic Pathogens

The comparative evaluation reports that the Whitebox UVC aircleaner unit reports a significantly higher purification capacity to defend animals, staff and visitors from airborne viruses in a standard room.

The results are consistent with previous scientific studies who demonstrate that UV-C is ideal for use in hospitals, nursing homes, surgery centers, and at veterinary facilities, where small airborne pathogens can impact patient and staff health.

Pathogen elimination in air results
MERV 6 filter VS Whitebox Aircleaner
Horse Pathogens
Single pass



Conclusion Whitebox aircleaner and Zoonotic Pathogens

The conclusion of the evaluation is that Whitebox UVC cleaning is superior when it comes to energy, efficiency and sound. Test results in laboratory indicates that the Whitebox aircleaner unit operates between 36-39 dB. Thick media type filter such as MERV 6 has in-built challenges when used for pathogen elimination. Regardless mechanical solution, with same airflow comparative dB is not possible.

In addition to the MERV 6 results reported, further evaluation suggests that higher level MERV filters can capture smaller particles and have more resistance to airflow. To filter out the smaller particles, the filter media has small openings which slow down the airflow and create other problems such as sound. Higher level MERV filters demands more energy to push or pull air through them.

Appendix: No airborne viruses, bacteria and pathogens

PATHOGEN	GROUP	HOST	DISEASE
African Animal Trypanosomiasis (AAT)	Protozoa	DCR	Nagana, Tsetse Disease
African Horse Sickness Virus (AHS)	Virus	DE	African Horse Sickness
African Swine Fever virus	Virus	S	ASF
Ainovirus (Bunyaviridae Orthobunyavirus)	Virus	O	Aino Virus Infection, Akabane
Air Sac Mite	Insect	B	lung and airway disorder
Anaplasma phagocytophilum (Ehrlichia equi)	Bacteria	DCREO	Ehrlichiosis, anaplasmosis
Ancylostoma spp.	Nematode	DC	Larva Migrans
Avian Enteric Reovirus	Virus	P	Malabsorption syndrome
Avian Pathogenic E. coli (APEC)	Bacteria	P	intestinal diseases
Avian Reovirus	Virus	P	viral arthritis
Avibacterium paragallinarum	Bacteria	P	coryza
Babesia gibsoni	Protozoa	DC	hemolytic anemia
Bartonella bovis	Bacteria	E	endocarditis
Bartonella clarridgeiae	Bacteria	C	Cat Scratch Fever
Bartonella henselae	Bacteria	C	Cat Scratch Fever
Baylisascaris procyonis	Helminth	D	Verminous myelitis
Besnoitia besnoiti	Protozoa	O	Bovine besnoitiosis
Birnavirus (Infectious Bursal Disease)	Virus	P	Gumboro disease, IBD, IBDV
Borna Disease Virus (BDV)	Virus	E	Borna disease
Borrelia afzelii	Bacteria	DC	dermatitis, arthritis
Borrelia burgdorferi	Bacteria	DCREO	Lyme Disease
Borrelia garinii	Bacteria	DC	Meningopolyneuritis
Borrelia japonica	Bacteria	DC	Lyme disease
Bovine Ephemeral Fever Virus (BEFV)	Virus	O	Ephemeral fever
Bovine Papilloma Virus	Virus	E	warts
Bovine spongiform encephalopathy (BSE)	Protozoa	O	neurodegenerative disease
Canine Herpesvirus (CHV)	Virus	D	Herpes sores, kennel cough
Capnocytophaga canimorsus	Bacteria	DC	fulminant sepsis
Capripoxvirus	Virus	O	Lumpy Skin Disease
Chicken Anemia Virus (CAV)	Virus	P	anemia
Crimean-Congo Hemorrhagic Fever (CCHF)	Virus	DRO	Hemorrhagic fever
Cryptosporidium canis	Protozoa	D	Cryptosporidiosis
Cryptosporidium felis	Protozoa	C	Cryptosporidiosis
Cryptosporidium parvum	Protozoa	DCEO	Cryptosporidiosis
Cryptosporidium spp.	Protozoa	BS	Cryptosporidiosis
Duvenhage virus	Virus	D	bat rabies, human rabies
Eastern Equine Encephalomyelitis (EEE)	Virus	DBRE	Encephalitis
Echinococcus spp.	Helminth	DR	Echinococcosis
Ehrlichia canis	Bacteria	DO	Ehrlichiosis, anaplasmosis
Ehrlichia chaffeensis	Bacteria	DRO	Ehrlichiosis, anaplasmosis
Ehrlichia ewingii	Bacteria	O	Ehrlichiosis, anaplasmosis
Ehrlichia ruminantium	Bacteria	O	Heartwater, cowdriosis

Appendix: No airborne viruses, bacteria and pathogens

PATHOGEN	GROUP	HOST	DISEASE
<i>Eimeria</i> spp.	Protozoa	P	Coccidiosis
<i>Encephalitozoon cuniculi</i>	Protozoa	R	microsporidiosis
<i>Encephalitozoon intestinalis</i>	Protozoa	R	microsporidiosis
<i>Encephalitozoon hellem</i>	Protozoa	R	microsporidiosis
Equine Herpes Virus (EHV) Type 1	Virus	E	colds, fever, rhinopneumonitis
Equine Herpes Virus (EHV) Type 3	Virus	E	colds, fever, rhinopneumonitis
Equine Herpes Virus (EHV) Type 4	Virus	E	colds, fever, rhinopneumonitis
Equine Infectious Anemia Virus	Virus	E	Anemia
Equine Rabies	Virus	E	rabies
<i>Erysipelothrix rhusiopathiae</i>	Bacteria	S	Erysipelas
<i>Escherichia coli</i>	Bacteria	DCBPES	various, colibacillosis
<i>Escherichia coli</i> F4	Bacteria	S	diarrhea
<i>Escherichia coli</i> F5	Bacteria	S	diarrhea
Feline Immunodeficiency Virus (FIV)	Virus	C	Immunodeficiency
Feline Leukemia Virus (FeLV)	Virus	C	Leukemia
Feline Spongiform Encephalopathy (FSE)	Protozoa	C	Scrapie, neurodegeneration
FMD virus (Aphthovirus Picornaviridae)	Virus	SO	Foot and Mouth Disease
<i>Giardia duodenalis</i>	Protozoa	O	Giardiasis
<i>Giardia intestinalis</i>	Protozoa	O	Giardiasis
<i>Giardia lamblia</i>	Protozoa	O	Giardiasis
<i>Giardia</i> spp.	Protozoa	DCBR	Giardiasis
<i>Helicobacter pylori</i>	Bacteria	DC	digestive illness
Hepatitis E Virus (HEV)	Virus	S	fever
<i>Hippobosca longipennis</i>	Insect	DC	Infestation
Ibadan shrew virus	Virus	D	rabies-like infection
<i>Isospora</i> spp.	Protozoa	DC	Coccidiosis
<i>Ixodes ricinus</i>	Insect	DCR	Infestation
Japanese Encephalitis	Virus	DCRE	Encephalitis
<i>Lawsonia intracellularis</i>	Bacteria	S	proliferative enteritis (PE)
<i>Leishmania</i> spp.	Protozoa	DCR	Leishmaniasis
<i>Leptospira</i> spp.	Spirochete	DCRO	Leptospirosis
Lymphoid Leukosis virus	Virus	P	Leukosis
Mokola virus	Virus	D	rabies-like infection
<i>Mycobacterium lepraemurium</i>	Bacteria	R	leprosy
<i>Mycobacterium microti</i>	Bacteria	R	leprosy
<i>Mycoplasma haemocanis</i>	Bacteria	DC	haemobartonellosis
<i>Neorickettsia helminthoeca</i>	Bacteria	D	Ehrlichiosis
<i>Neorickettsia risticii</i>	Bacteria	E	Potomac Horse Fever
<i>Neorickettsia sennetsu</i>	Bacteria	O	Ehrlichiosis, anaplasmosis
<i>Neospora caninum</i>	Protozoa	D	ascending paralysis
<i>Notoedres cati</i>	Insect	R	infestation
<i>Ornithonyssus sylviarum</i>	Insect	R	infestation
<i>Ornithonyssus bacoti</i>	Insect	R	infestation

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PATHOGEN	GROUP	HOST	DISEASE
Pacheco's Disease virus (Herpesvirus)	Virus	B	viral hepatitis
Parasitic Feather Mites (Red Mite)	Insect	B	skin infestation
Pasteurella multocida (& other spp.)	Bacteria	DCBPRS0	Pasteurellosis, fowl cholera
Porcine Circovirus Type 2	Virus	S	PMWS
Porcine Epidemic Diarrhea (PED) virus	Virus	S	Diarrhea, (Coronavirus)
Porcine Parvovirus (PPV)	Virus	S	Parvovirosis
Rickettsia rickettsii	Bacteria	DR	Rocky Mountain Spotted Fever
Rift Valley Fever	Virus	DCRO	Infectious Enzootic Hepatitis
Rotavirus	Virus	S	diarrhea
Salmonella arizona	Bacteria	B	Arizonosis
Salmonella bongori	Bacteria	DCRS	Salmonellosis
Salmonella enterica	Bacteria	DCRS0	Salmonellosis
Salmonella pullorum	Bacteria	P	Fullorum disease
Sarcocystis falcatula	Protozoa	DCBR	Sarcocystosis
Sarcoptes spp.	Insect	D	Acariasis, scabies
Scaly Face (Leg Mite)	Insect	B	infestation
Screwworm Myiasis	Insect	DCR	infestation
Streptococcus equi	Bacteria	EO	Strangles, Streptococcosis
Strongyloides spp.	Helminth	DC	Larva Migrans
Surra	Protozoa	DCRO	Trypanosomosis
Swine Vesicular Disease Virus (SVDV)	Virus	S	Swine vesicular disease
Taenia spp.	Helminth	DCR	Taeniasis
Taylorella equigenitalis	Bacteria	E	Contagious Equine Metritis (CEM)
Togaviridae alphavirus	Virus	E	Encephalitis
Toxocara spp.	Nematode	DCR	Toxocariasis
Toxoplasma gondii	Protozoa	DCRS	Toxoplasma infection
Transmissible gastroenteritis virus	Virus	S	diarrhea
Tritrichomonas foetus	Protozoa	O	Trichomoniasis
Trichomonas gallinae	Protozoa	B	Trichomoniasis, cankers
Trichuriasis	Nematode	D	Whipworm infestation
Trixacarus caviae	Insect	R	infestation
Tritrichomonas foetus	Protozoa	DC	infestation
Trypanosoma cruzi	Protozoa	DCR	Trypanosomiasis
Venezuelan Equine Encephalomyelitis (VEE)	Virus	DRE	Encephalitis
Vesicular Stomatitis (VSV)	Virus	DREO	ulcers, lesions, fever
Wesselsbron Disease	Virus	DREO	flu-like illness
West Nile Virus	Virus	DCBRE	flu-like illness
Western Equine Encephalomyelitis (WEE)	Virus	DRE	Encephalitis
Brachyspira hyodysenteriae	Bacteria	S	dysentery
Campylobacter fetus	Bacteria	O	Campylobacteriosis
Corynebacterium bovis	Bacteria	R	hyperkeratosis
Corynebacterium kutscheri	Bacteria	R	pseudotuberculosis
Haemophilus parasuis	Bacteria	S	Glasser's Disease

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PATHOGEN	GROUP	HOST	DISEASE
Herpes virus BHV-1 (IBR virus)	Virus	O	Infectious bovine rhinotracheitis
Ibaraki virus	Virus	O	Ibaraki Disease
Junin virus	Virus	R	hemorrhagic fever
Klebsiella orthinolytica	Bacteria	R	pneumonia
Klebsiella oxytoca	Bacteria	R	pneumonia
Klebsiella planticola	Bacteria	R	pneumonia
Morbillivirus	Virus	O	Rinderpest
Mousepox	Virus	R	pox
Mycoplasma mycoides	Bacteria	O	Contagious bovine pleuropneumonia
Pestivirus	Virus	SO	Classical Swine Fever, BVD
Pneumonia Virus of Mice (PVM)	Virus	R	pneumonia
Pseudocowpox	Virus	O	viral skin disease
Rhadinovirus	Virus	O	Malignant catarrhal fever (MCF)
Sendai	Virus	R	Sendai disease
Staphylococcus hyicus	Bacteria	S	Epidermitis
Streptococcus canis	Bacteria	O	Streptococcosis
Streptococcus iniae	Bacteria	O	Streptococcosis
Streptococcus suis	Bacteria	SO	URD, Streptococcosis

Notes for Appendix	D = Dog	R = Rodent	
	S = Swine	C = Cat	E = Horses
	O = Cow, Bovine	P = Poultry (non-pet)	B = Birds (pets)