



ATMOSPHERE DRIVE™ CAR AIR TREATMENT SYSTEM

**Technical Information Packet (TIP)
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**Markets: Korea, Taiwan, Malaysia, Singapore, Hong Kong,
Indonesia, Thailand, Japan, China, India**

3.1 Atmosphere Drive™ Car ATS effectively reduces 12 different gaseous contaminants and 300+ pathogens and particulates from air passing through the system.

Introduction

There are many particle contaminants that can be in the air we breathe. Viruses, bacteria, dust mite allergen, animal dander and fungi are found everywhere. Automobiles have the additional burden of traveling through an environment with brake dust, road dust, tire decomposition particles, diesel particles, fabric particles from the car parts and the clothing of the passengers.

The 12 gases are detailed in section 4 of this document and include: Benzene, toluene, N-butyl acetate, ethylbenzene, p-xylene, m-xylene, styrene, o-xylene, n-undecane, nitrogen dioxide, formaldehyde, Sulphur dioxide.

Method

The Particulate Single Pass Efficiency reports were analyzed and the data input into a model that compares the particle sizes and momentum to a variety of known pathogens. The data from the particle reduction studies was used to predict the reduction rate for many other particles. This work was done by a professor at The Pennsylvania State University. He has become a recognized expert at reducing airborne microbes and particles by filtration. He has authored dozens of technical papers on the filtration of microbes and has worked in this field since 1995. The professor has also become a consultant to the US government on how to protect buildings from biological and chemical attack, using the proper filtration and building design. In addition, he has written a book on protecting buildings from biological and chemical attack.

Results

The following tables show the results of the computer models for the various particles. The tables show the log-normal diameter in microns and the single pass percent reduction.

Table 1: Summary of Contaminants Evaluated

Contaminant	Human	Animal	Total
Allergens	9	0	9
Bacteria	58	31	89
Bacterial Spores	7	1	8
Dust	4	0	4
Fungal Spores	65	6	71
Fungi (also called Yeast)	2	0	2
Pollen	61	0	61
Viruses	39	47	86
Total	245	85	330

Table 2 – List of Contaminants Removed

#	Contaminant	Group	Size mm	H/A
1	Absidia	Fungal Spore	3.536	Human
2	AC Fine Road Test Dust	Dust	0.97	Human
3	Acacia (wattle, mimosa)	Pollen	73	Human
4	Acer (maple, box elder)	Pollen	33	Human
5	Acinetobacter	Bacteria	1.225	Human
6	Acremonium	Fungal Spore	2.449	Human
7	Actinomyces bovis	Bacteria	0.5	Animal
8	Actinomyces israelii	Bacteria	0.901	Human
9	Adenovirus	Virus	0.079	Human
10	Aerococcus viridans	Bacteria	1	Animal
11	Aeromonas	Bacteria	2.098	Human
12	Alcaligenes	Bacteria	0.775	Human
13	Alnus (alder)	Pollen	25	Human
14	Alternaria alternata	Fungal Spore	11.225	Human
15	Amaranthaceae (pigweed, amaranth, cottonweed)	Pollen	30	Human
16	Ambrosia (ragweed)	Pollen	27	Human
17	Ambrosia artemisiifolia (Ragweed, common ragweed)	Pollen	27	Human
18	Ambrosia artemisiifolia (Short ragweed)	Pollen	20	Human
19	Ambrosia trifida (Giant ragweed, False ragweed)	Pollen	27	Human
20	Artemisia (sage, wormwood, mugwort)	Pollen	22	Human
21	Arterivirus	Virus	0.05	Animal
22	Arthrimum phaeospermum	Fungal Spore	5	Human
23	Asbestos	Dust	3	Human
24	Aspergillus chevalieri	Fungal Spore	3.354	Human
25	Aspergillus clavatus	Fungal Spore	3.354	Human
26	Aspergillus flavus	Fungal Spore	3.354	Human
27	Aspergillus fumigatus	Fungal Spore	3.354	Human
28	Aspergillus niger	Fungal Spore	3.354	Human

29	Aspergillus ochraceus	Fungal Spore	3.354	Human
30	Aspergillus parasiticus	Fungal Spore	3.354	Human
31	Aspergillus ustus	Fungal Spore	3.354	Human
32	Aspergillus versicolor	Fungal Spore	3.354	Human
33	Asteracea (goldenrod, aster, cocklebur, etc.)	Pollen	24	Human
34	Aureobasidium pullulans	Fungal Spore	4.899	Human
35	Avian Adenovirus (FAV)	Virus	0.08	Animal
36	Avian Encephalomyelitis Virus	Virus	0.023	Animal
37	Avian Influenza A	Virus	0.098	Animal
38	Avian Leukosis virus (RSA)	Virus	0.107	Animal
39	Avian metapneumovirus	Virus	0.1	Animal
40	Avian Sarcoma virus	Virus	0.098	Animal
41	Bacillus anthracis	Bacterial spore	1.118	Human
42	Bacillus cereus	Bacterial spore	1.118	Human
43	Bacillus subtilis	Bacterial spore	1.12	Human
44	Bacteroides fragilis	Bacteria	3.162	Human
45	Betulaceae (birch, hazlenut, hop hornbeam)	Pollen	25	Human
46	Blastomyces dermatitidis	Fungal Spore	12.649	Human
47	Bordetella avium	Bacteria	0.7	Animal
48	Bordetella bronchiseptica	Bacteria	0.707	Animal
49	Bordetella pertussis	Bacteria	0.245	Human
50	Botrytis cinerea	Fungal spore	6.708	Human
51	Bovine Coronavirus (BCV)	Virus	0.113	Animal
52	Brachyspira pilosicoli	Bacteria	0.5	Animal
53	Brucella abortus	Bacteria	0.57	Animal
54	Brucella canis	Bacteria	0.566	Animal
55	Brucella maris	Bacteria	0.566	Animal
56	Brucella melitensis	Bacteria	0.566	Animal
57	Brucella neotomae	Bacteria	0.566	Animal
58	Brucella ovis	Bacteria	0.566	Animal
59	Brucella suis	Bacteria	0.57	Animal
60	Burkholderia cenocepacia	Bacteria	0.707	Human
61	Burkholderia mallei	Bacteria	0.674	Human
62	Burkholderia pseudomallei	Bacteria	0.494	Human
63	Calliandria (calliandria)	Pollen	73	Human

64	Campylobacter coli	Bacteria	2.12	Animal
65	Campylobacter jejuni	Bacteria	2.12	Animal
66	Canary Pox Virus	Virus	0.24	Animal
67	Candida albicans	Fungi	4.899	Human
68	Canine Adenovirus Type 1 (CAv-1)	Virus	0.093	Animal
69	Canine Adenovirus Type 2 (CAv-2)	Virus	0.093	Animal
70	Canine Calicivirus (CaCV)	Virus	0.034	Animal
71	Canine Coronavirus	Virus	0.113	Animal
72	Canine Distemper Virus (CDV)	Virus	0.15	Animal
73	Canine Influenza H3N2	Virus	0.098	Animal
74	Canine Influenza H3N8	Virus	0.098	Animal
75	Canine Norovirus	Virus	0.035	Animal
76	Canine Parvovirus 2	Virus	0.022	Animal
77	Cannabinaceae (wax myrtle)	Pollen	20	Human
78	Cardiobacterium	Bacteria	0.612	Human
79	Carpinus (hornbeam)	Pollen	35	Human
80	Carya (hickory, pecan)	Pollen	26	Human
81	Cat dander	Allergen	0.4	Human
82	Chaetomium globosum	Fungal Spore	5.455	Human
83	Chenopodiaceae (goosefoot, saltbush, Russian pigweed)	Pollen	24	Human
84	Chikungunya virus	Virus	0.06	Human
85	Chlamydia pneumoniae	Bacteria	0.548	Human
86	Chlamydophila abortus	Bacteria	0.283	Animal
87	Chlamydophila caviae (formerly C.psittaci)	Bacteria	0.283	Animal
88	Chlamydophila felis	Bacteria	0.283	Animal
89	Chlamydophila muridarum	Bacteria	0.283	Animal
90	Chlamydophila pneumoniae	Bacteria	0.283	Animal
91	Chrysanthemum (ox-eye)	Pollen	34	Human
92	Cladosporium sphaerospermum	Fungal Spore	8.062	Human
93	Clostridium botulinum	Bacterial Spore	1.975	Human
94	Clostridium difficile spores	Bacterial Spore	1.14	Human
95	Clostridium perfringens	Bacterial Spore	5	Human
96	Clostridium tetani	Bacterial Spore	5	Animal
97	Coccidioides immitis	Bacterial Spore	3.464	Human
98	Cockroach allergens	Allergen	3	Human
99	Coronavirus	Virus	0.113	Human
100	Coronavirus (SARS)	Virus	0.11	Human

101	Corylus (hazel)	Pollen	22	Human
102	Corynebacterium diphtheriae	Bacteria	0.698	Human
103	COVID-19 Coronavirus	Virus	0.1	Human
104	Cowpox	Virus	0.173	Animal
105	Coxiella burnetii	Bacteria	0.283	Human
106	Coxsackievirus	Virus	0.027	Human
107	Crimean-Congo hemorrhagic fever	Virus	0.09	Human
108	Cryptococcus farciminosus	Fungal Spore	4.9	Animal
109	Cryptococcus neoformans	Fungal Spore	4.899	Human
110	Cryptomeria (evergreen, Japanese cedar)	Pollen	30	Human
111	Cryptosporidium parvum	Fungal Spore	3	Human
112	Cryptostroma corticale	Fungal Spore	3.742	Human
113	Cupressaceae (juniper family, cedar, conifers)	Pollen	27	Human
114	Cupressus arizonica (Arizona cypress)	Pollen	27	Human
115	Cupressus sempervirens (Italian cypress)	Pollen	25	Human
116	Curvularia lunata	Fungal Spore	11.619	Human
117	Cyperaceae (sedge family)	Pollen	37	Human
118	Dengue fever virus	Virus	0.045	Human
119	Dermatophilus congolensis	Fungal Spore	1	Animal
120	Desert ragweed	Pollen	27	Human
121	Dog dander	Allergen	0.4	Human
122	Drechslera	Fungal Spore	69.282	Human
123	Dust (i.e. flour, cement)	Dust	0.75	Human
124	Dust Mite (Dermatophagoides) Antigen Der fl	Allergen	1.1	Human
125	Dust Mite (Dermatophagoides) Antigen Der pl	Allergen	1.1	Human
126	Eastern Equine Encephalitis (EEE)	Virus	0.07	Human
127	Ebola	Virus	0.09	Human
128	Echovirus	Virus	0.024	Human
129	Elm	Pollen	28	Human
130	Emericella nidulans	Fungal Spore	3.24	Human
131	Enterobacter cloacae	Bacteria	1.414	Human
132	Enterococcus spp.	Bacteria	1.414	Human
133	Enterococcus faecalis	Bacteria	1.414	Human

134	Enterococcus faecium	Bacteria	1.414	Human
135	Enterovirus 71 (Human enterovirus Type 71)	Virus	0.027	Human
136	Epicoccum purpurascens	Bacteria	17.321	Human
137	Epidermophyton	Fungal Spore	8.5	Animal
138	Equine Influenza	Virus	0.1	Animal
139	Erysipelothrix spp.	Fungal Spore	1	Animal
140	Escherichia coli O157:H7	Bacteria	0.5	Human
141	Eurotium chevalieri	Fungal Spore	5.612	Human
142	Exophiala	Fungal Spore	2.121	Human
143	Fagus (beech)	Pollen	41	Human
144	Feline Calicivirus (FeCV)	Virus	0.037	Animal
145	Feline Distemper (Feline Parvovirus, FPV)	Virus	0.022	Animal
146	Feline Herpesvirus T1 (Rhinothacheitis, FVR)	Virus	0.18	Animal
147	Feline Infectious Peritonitis virus (FIP)	Virus	0.11	Animal
148	Feline Influenza A (H7N2)	Virus	0.098	Animal
149	Feline Panleukopenia (Picornavirus) (FPV)	Virus	0.037	Animal
150	Fowlpox virus (Avian poxvirus)	Virus	0.24	Animal
151	Francisella tularensis	Bacteria	0.2	Human
152	Fraxinus (ash, black ash, green ash)	Pollen	22	Human
153	Fugomyces cyanescens	Fungal Spore	2.12	Human
154	Fusarium graminearum	Fungal Spore	11.225	Human
155	Fusarium moniliforme	Fungal Spore	11.225	Human
156	Fusarium nivale	Fungal Spore	11.225	Human
157	Fusarium solani	Fungal Spore	11.225	Human
158	Fusarium sporotrichoides	Fungal Spore	11.225	Human
159	Giant ragweed	Pollen	27	Human
160	Goldenrod	Pollen	24	Human
161	Grass	Pollen	52	Human
162	Guineapig adenovirus	Virus	0.079	Animal
163	Haemophilus influenzae	Bacteria	0.285	Human
164	Haemophilus parainfluenzae	Bacteria	1.732	Human
165	Hantavirus (Hantaan Virus)	Virus	0.095	Animal
166	Hazelnut	Pollen	25	Human

167	<i>Helicobacter pylori</i>	Bacteria	2.1	Human
168	<i>Helminthosporium</i>	Fungal spore	11.577	Human
169	Hendra Virus	Virus	0.175	Animal
170	Hepatitis A	Virus	0.03	Human
171	Hickory	Pollen	26	Human
172	<i>Histoplasma capsulatum</i>	Fungal Spore	2.236	Human
173	<i>Histoplasma farciminosum</i>	Fungal Spore	2.236	Animal
174	HPV	Virus	0.06	Human
175	Infectious Bronchitis Virus (IBV)	Virus	0.113	Animal
176	Infectious Laryngotracheitis (Psittacid herpes)	Virus	0.18	Animal
177	Influenza A virus	Virus	0.098	Human
178	Influenza B	Virus	0.098	Human
179	Influenza C	Virus	0.098	Human
180	Japanese cedar	Pollen	30	Human
181	Japanese encephalitis	Virus	0.045	Human
182	<i>Juglans</i> (walnut, butternut)	Pollen	26	Human
183	Junin virus	Virus	0.122	Human
184	<i>Klebsiella pneumoniae</i>	Bacteria	0.671	Human
185	<i>Kocuria rhizophila</i>	Bacteria	0.5	Human
186	Kyasanur Forest virus	Virus	0.045	Animal
187	Lassa virus	Virus	0.122	Human
188	Latex	Allergen	2.5	Human
189	<i>Legionella pneumophila</i>	Bacteria	0.52	Human
190	<i>Leptospira</i> spp.	Bacteria	0.1	Animal
191	Liquidambar (sweet gum, gum tree)	Pollen	6	Human
192	<i>Listeria monocytogenes</i>	Bacteria	0.707	Animal
193	Louping Ill (LIV)	Virus	0.05	Animal
194	Lymphocytic choriomeningitis (LCMV)	Virus	0.087	Animal
195	Machupo	Virus	0.12	Human
196	Marburg virus	Virus	0.039	Human
197	Marek's Disease Virus (Herpesvirus)	Virus	0.18	Animal
198	Measles virus	Virus	0.158	Human
199	MERS Coronavirus	Virus	0.113	Human
200	<i>Micromonospora faeni</i>	Bacteria	0.866	Human
201	<i>Microsporum</i> spp.	Fungal spore	2.96	Animal
202	Monkeypox virus	Virus	0.25	Animal
203	<i>Moraxella</i>	Fungal Spore	1.225	Human
204	<i>Morus</i> (mulberry)	Pollen	17	Human
205	<i>Mucor plumbeus</i>	Fungal Spore	7.071	Human
206	Mugwort	Pollen	22	Human

207	Mulberry	Pollen	17	Human
208	Mumps virus	Virus	0.164	Human
209	Mycobacterium abcessus	Bacteria	0.69	Human
210	Mycobacterium avium	Bacteria	1.118	Human
211	Mycobacterium bovis	Bacteria	0.637	Animal
212	Mycobacterium chelonae	Bacteria	0.64	Human
213	Mycobacterium chimaera	Bacteria	1.64	Human
214	Mycobacterium fortuitum	Bacteria	0.637	Human
215	Mycobacterium kansasii	Bacteria	0.637	Human
216	Mycobacterium marinum	Bacteria	0.637	Human
217	Mycobacterium tuberculosis	Bacteria	0.637	Human
218	Mycobacterium ulcerans	Bacteria	0.564	Human
219	Mycoplasma gallisepticum	Bacteria	0.177	Animal
220	Mycoplasma hyopneumoniae	Bacteria	0.177	Animal
221	Mycoplasma pneumoniae	Bacteria	0.177	Human
222	Neisseria meningitidis	Bacteria	0.775	Human
223	Nettles	Pollen	13	Human
224	Newcastle Disease Virus (NDV)	Virus	0.212	Animal
225	Nipah virus (Henipah virus)	Virus	0.175	Animal
226	Nocardia asteroides	Bacteria	1.118	Human
227	Nocardia brasiliensis	Bacteria	1.414	Human
228	Norwalk virus	Virus	0.029	Human
229	Olea (olive)	Pollen	22	Human
230	Omsk hemorrhagic fever	Virus	0.043	Animal
231	Orchard grass	Pollen	52	Human
232	Ornithobacterium rhinotracheale (ORT)	Bacteria	0.64	Animal
233	Paecilomyces variotii	Fungal Spore	2.828	Human
234	Paper mulberry	Pollen	17	Human
235	Papilloma virus	Virus	0.055	Animal
236	Paracoccidioides brasiliensis	Fungal Spore	4.472	Human
237	Parainfluenza virus	Virus	0.194	Human
238	Parietaria (pellitory)	Pollen	14	Human
239	Parvovirus B19	Virus	0.022	Human
240	Penicillium citrinum	Fungal Spore	3.262	Human
241	Penicillium crustosum	Fungal Spore	3.262	Human
242	Penicillium cyclopium	Fungal Spore	3.262	Human
243	Penicillium expansum	Fungal Spore	3.262	Human
244	Penicillium islandicum	Fungal Spore	3.262	Human

245	Penicillium purpurogenum	Fungal Spore	3.262	Human
246	Penicillium roquefortii	Fungal Spore	3.262	Human
247	Penicillium viridicatum	Fungal Spore	3.262	Human
248	Phialophora	Fungal Spore	1.47	Human
249	Phoma	Fungal Spore	3.162	Human
250	Pinaceae (pine family)	Pollen	117	Human
251	Pinus radiata D (New Zealand pine)	Pollen	71	Human
252	Plantago (English plantain)	Pollen	28	Human
253	Platanus (sycamore, plane tree)	Pollen	18	Human
254	Pneumocystis carinii	Fungal Spore	2	Human
255	Poaceae (grass family, Gramineae)	Pollen	52	Human
256	Pollen fragments	Pollen	5	Human
257	Polygonaceae (buckwheat, rumex, sorrel)	Pollen	32	Human
258	Polyomavirus	Virus	0.0424	Animal
259	Populus (poplar, cottonwood, aspen)	Pollen	32	Human
260	Porcine Respiratory Coronavirus (PRCV)	Virus	0.14	Animal
261	Proteus mirabilis	Bacteria	0.494	Human
262	Pseudallescheria boydii	Bacteria	3.162	Human
263	Pseudomonas aeruginosa	Bacteria	0.494	Human
264	Pseudomonas diminuta	Bacteria	0.494	Animal
265	Pseudorabies (PRV)	Virus	0.194	Animal
266	Psittacine Beak and Feather Disease (Pbfd)	Virus	0.055	Animal
267	Quercus (oak)	Pollen	27	Human
268	Rabies virus	Virus	0.07	Animal
269	Reovirus	Virus	0.075	Human
270	Respiratory Syncytial Virus (RSV)	Virus	0.19	Human
271	Rhinovirus	Virus	0.023	Human
272	Rhizomucor pusillus	Fungal Spore	4.183	Human
273	Rhizopus	Fungal Spore	6.928	Human
274	Rhodoturula	Fungal Spore	13.856	Human
275	Rickettsia prowazeki	Bacteria	0.6	Human
276	Rickettsia rickettsii	Bacteria	0.6	Human
277	Rift Valley fever	Virus	0.0922	Human
278	Rotavirus	Virus	0.073	Human
279	Rubella virus	Virus	0.061	Human

280	<i>Saccharomyces cerevisiae</i>	Fungi	6	Human
281	<i>Saccharopolyspora rectivirgula</i>	Fungal Spore	1.342	Human
282	<i>Salix</i> (willow)	Pollen	25	Human
283	<i>Salmonella enteritidis</i>	Bacteria	0.81	Animal
284	<i>Salmonella typhi</i>	Bacteria	0.806	Human
285	<i>Scedosporium</i> spores	Fungal Spore	3.162	Human
286	<i>Scopulariopsis</i>	Fungal Spore	5.916	Human
287	<i>Serratia marcescens</i>	Bacteria	0.632	Human
288	<i>Shigella dysenteriae</i>	Bacteria	0.801	Human
289	<i>Shigella paradysenteriae</i>	Bacteria	0.801	Human
290	<i>Shigella sonnei</i>	Bacteria	0.801	Human
291	Silkworm (<i>Bombyx mori</i>) fragments	Allergen	10	Human
292	Slender ragweed	Pollen	20	Human
293	Spider Mite allergens	Allergen	1.1	Human
294	<i>Spirillum minus</i>	Bacteria	1	Animal
295	<i>Sporothrix schenckii</i>	Fungal Spore	6.325	Human
296	<i>Stachybotrys chartarum</i>	Fungal Spore	5.623	Human
297	<i>Staphylococcus aureus</i> (MRSA)	Bacteria	0.866	Human
298	<i>Staphylococcus epidermis</i>	Bacteria	0.866	Human
299	Storage Mite allergens	Allergen	1.1	Human
300	<i>Streptobacillus moniliformis</i>	Bacteria	0.707	Animal
301	<i>Streptococcus pneumoniae</i>	Bacteria	0.707	Human
302	<i>Streptococcus pyogenes</i>	Bacteria	0.894	Human
303	Swine Influenza	Virus	0.1	Animal
304	<i>Taraxacum</i> (dandelion)	Pollen	34	Human
305	<i>Taxodium</i> (Cypress)	Pollen	27	Human
306	<i>Taxodium distichum</i> (Bald cypress)	Pollen	27	Human
307	<i>Thermoactinomyces sacchari</i>	Bacteria	0.855	Human
308	<i>Thermoactinomyces vulgaris</i>	Bacteria	0.866	Human
309	<i>Thermomonospora viridis</i>	Bacteria	0.52	Human
310	<i>Tilia</i> (baswood, linden)	Pollen	31	Human
311	Tobacco smoke	Dust	0.025	Human
312	<i>Trichoderma viridae</i>	Fungal Spore	4.025	Human
313	Trichophyton	Fungal Spore	4.899	Human
314	Trichosporon	Fungal Spore	8.775	Human
315	<i>Typha</i> (cattail)	Pollen	23	Human
316	<i>Ulmus</i> (elm)	Pollen	28	Human
317	<i>Ulocladium</i>	Fungal Spore	14.142	Human

318	Urticaceae (nettle family, pellitory)	Pollen	13	Human
319	Ustilago	Fungal Spore	5.916	Human
320	Ustilago maydis (Corn smut)	Fungal Spore	5.916	Human
321	Vaccinia virus	Virus	0.224	Human
322	Varicella-zoster virus (VZV)	Virus	0.173	Human
323	Variola (Smallpox)	Virus	0.224	Human
324	Venezuelan Equine Encephalitis (VEE)	Virus	0.06	Human
325	Verticillium	Fungal Spore	4.796	Human
326	Vibrio cholerae	Bacteria	2.12	Human
327	Wallemia sebi	Fungal Spore	2.958	Human
328	Western Equine Encephalitis (WEE)	Virus	0.07	Human
329	Yersinia pestis	Bacteria	0.707	Human
330	Yersinia pseudotuberculosis	Bacteria	0.63	Animal