E. L. Foust Co., Inc.

PO Box 105 · Elmhurst, IL 60126
(800) 353-6878

The E.L. Foust Co., Inc., is pleased to respond promptly to the American Academy of Environmental Medicine's concern for scientific validation of claims of effectiveness on the part of air purifier manufacturers who serve the environmentally ill. The chart below highlights findings of independent tests on Foust Air Purifiers while the laboratory report following outlines the method and results of these tests.

ALLIED LABORATORIES, LTD.

PHONE 279-0390
AREA CODE 630

716 NORTH IOWA AVENUE VILLA PARK, ILLINOIS 60181

REPORT NO. 71784

DATE AUGUST 13, 1984

LABORATORY REPORT

FORMALDEHYDE	10 ppm	Reduced to a trace	15 minutes
PHENOL	5 ppm	Reduced to a trace	15 minutes
OZONE	600 ppb	Reduced to a trace	4 minutes
HEXANE (Car Exhaust)	150 ppm	Reduced to a trace	30 minutes
NITROGEN OXIDES (Natural Gas)	5 ppm	Reduced to a trace	30 minutes

Using various length of stain or color change indicator tubes, the removal of various pollutants by Foust Filters was studied.

All studies were done by polluting a well sealed room 10' x 12' x 8' (about 1000 cubic feet) in size, and then measuring the concentration of the pollutant within the room by inserting the end of a sampling tube through a small hole in the wall of the room in a manner which would not cause any changes in the concentration of the pollutant. The concentration of each pollutant was measured at various time intervals during the period that the filter under examination was operating.

Removal of pollutants by the Foust Filters was very effective. All pollutants were removed within minutes. Removal of various pollutants is shown in the tables above. Pollutants which were studied include formaldehyde, phenol, ozone, hexane, and nitrogen oxides. Other pollutants would have also been removed with equal ease.

Particle Filter Efficiency

Technostat is the optional HEPA filter that can be purchased with our 160 Series air purifiers. Technostat is comprised mainly of polypropylene and no glues or adhesives are used in its installation. The test results are as follows:

Particle Size Range (Microns)	Media Efficiency (Percent)
0.1 ≥	99.738

"...both of the polymer suppliers confirmed that at the above mentioned temperatures there would not be any off-gassing occurring.

In both cases also, they have mentioned that, if it was ever to happen, off-gassing could be an issue at higher temperatures (in the range of 200°F and more) which are nowhere near room temperature."

Hollingsworth and Vose Inc.

These results are an average of multiple readings up and down stream of the test media. Testing was performed by Hollingsworth and Vose Inc., May 2001.

A sample of "Filterdown" media was subjected to a particle size efficiency test as requested. The test was conducted in ASHRAE Duct No. 1 utilizing a Met One counter. The 24" x 24" media was tested at an airflow of 160 CFM (40 fpm). The results are as follows:

Particle Size Range (Microns)	Media Efficiency (Percent)	
	160R2	**160AN & DT**
0.3 ≥	48.8	56
0.5 ≥	62.3	72
1.0 ≥	72.1	83
2.0 ≥	82.4	95
5.0 ≥	92.5	100
10.0 ≥	93.0	100

These results are an average of multiple readings up and down stream of the test media. Testing was performed by SnyderGeneral Filtration Products Group, January 4, 1993.

E. L. Foust Co., Inc.

Coconut Shell Carbon

Substance	Index
Acetaldehyde	2
Acetic acid	4
Acetic anhydride	4
Acetone	3
Acetylene	1
Acrolein	3
Acrylie acid	4
Acrylonitrile	4
Adhesives	4
Air-Wiek	4
Amines	2
Ammonia	2
Amyl acetate	4
Amyl alcohol	4
Amyl ether	4
Animal odors	3
Anesthetics	3
Aniline	4
Antiseptics	4
Asphalt fumes	4
Automobile exhaust	3
Bathroom smells	4
Benzene	4
Bleaching solutions	3
Body odors	4
Borane	3
Bromine	4
Burned food	4
Butadiene	3
Butane	2
Butanone	4
Butyl acetate	4
Butyl alcohol	4
Butyl cellosolve	4
Butyl chloride	4
Butyl ether	4
Butylene	2
Butyne	2
Butyraldehyde	3
Butyric acid	4
Camphor	4
Caprylic acid	4
Carbolic acid	4
Carbon disulfide	4
Carbon dioxide	1
Carbon monoxide	1
Carbon tetrachloride	4
Cellosolve	4
Cellosolve acetate	4
Charred materials	4
Cheese	4
Chlorine	3
Chlorobenzene	4
Chlorobutadiene	4
Chloroform	4
Chloronitropropane	4
Chloropicrin	4
Cigarette smoke odor	4
Citrus and other fruits	4
Cleaning compounds	4
Coal smoke odor	3
Combustion odors	3
Cooking odors	4
Corrosive gases	3
Creosote	4
Cresol	4
Crotona dehyde	4
Cyclonexane	4
Cyclohexanol	4
Cyclohexanome	4
Cyclohexane	4
Dead animals	4
Decane	4
Deodorants	4
Detergents	4
Dibromoethane	4
Dichlorobenzene	4
Dichlorodifluoromethane	4
Dichloroethane	4
Dichloroethylene	4
Dichloroethyl ether	4
Dichloromonofluoro-methane	3
Dichloronitroethane	4
Dichloropropane	4
Dichlorotetrafluoroethane	4
Diesel fumes	4
Diethylamine	3
Diethyl ketone	4
Dimethylaniline	4
Dimethylauifate	4
Dioxane	4
Dipropyl ketone	4
Disinfectants	4
Embalming odors	4
Ethane	1
Ether	3
Ethyl acetate	4
Ethyl acrylate	4
Ethyl alcohol	4
Ethyl amine	3
Ethyl benzene	4
Ethylbromide	4
Ethyl chloride	3
Ethyl ether	3
Ethyl formate	3
Ethyl mereaptan	3
Ethyl silicate	4
Ethylene	1
Ethylene chlorhydrin	4
Ethylene dichloride	4
Ethylene oxide	3
Essential oils	4
Eucalyptole	4
Exhaust fumes	3
Fertilizer	4
Film Processing odors	3
Fish odors	4
Floral scents	4
Flurotrichloromethane	3
Food aromas	4
Formaldehyde	2
Formic acid	3
Fuel gases	2
Fumes	3
Garlic	4
Gasoline	4
Heptane	4
Heptylene	4
Hexane	3
Hexylene	3
Hexyne	3
Household smells	4
Hydrogen	1
Hydrogen bromide	3
Hydrogen chloride	2
Hydrogen cyanide	3
Hydrogen fluoride	2
Hydrogen iodide	3
Hydrogen selenide	2
Hydrogen sulfide	3
Incense	4
Indole	4
Inorganic chemicals	3
Incomplete combustion	3
Iodine	4
Iodoform	4
Isophorone	4
Isoprene	3
Isopropyl acetate	4
Isopropyl alcohol	4
Isopropyl ether	4
Kerosene	4
Kitchen odors	4
Lactic acid	4
Liquid fuels	4
Liquor odors	4
Lubricating oils & grease	4
Lysol	4
Medicinal odors	4
Melons	4
Menthol	4
Mercaptans	4
Mesityl oxide	4
Methane	1
Methyl acetate	3
Methyl acrylate	4
Methyl alcohol	3
Methyl bromide	3
Methyl butyl ketone	4
Methyl cellosolve	4
Methyl cellosolve acetate	4
Methyl chloride	3
Methyl Chloroform	4
Methyl ether	3
Methyl ethyl ketone	4
Methyl formate	3
Methyl isobutyl ketone	4
Methyl mercaptan	4
Methylcyclohexane	4
Methylcyclohexanol	4
Methylcyclohexanone	4
Methylene chloride	4
Mildew	3
Mold	3
Monochlorobenzene	4
Monofluorotrichloro-methane	4
Moth balls	4
Naphtha (coal tar)	4
Naphtha (petroleum)	4
Naphthalene	4
Nicotine	4
Nitric acid	3
Nitro benzenes	4
Nitroethane	4
Nitrogen dioxide	2
Nitroglycerine	4
Nitromethane	4
Nitropropane	4
Nitrotoluene	4
Nonane	4
Noxious gases	3
Octalene	4
Octane	4
Odorants	4
Onions	4
Organic chemicals	4
Ozone	4
Paint & Redecorating odors	4
Palmitic acid	4
Paper deteriorations	4
Paradichlorbenzine	4
Paste and glue	4
Pentane	3
Pentanone	4
Pentylene	3
Pentyne	3
Perchloroethylene	4
Perfumes, cosmetics	4
Perspirations	4
Pet odors	4
Phenol	4
Phosgene	3
Pitch	4
Plastics	4
Poison gases	3
Pollen	2
Popcorn and candy	4
Poultry odors	4
Propane	2
Propionaldehyde	3
Propionic acid	4
Propyl acetate	4
Propyl alcohol	4
Propyl chloride	4
Propyl ether	4
Propyl Mercaptan	4
Propylene	2
Propyne	2
Putrefying substances	3
Putrescine	4
Pyridine	4
Radiation products	2
Rancid oils	4
Ripening fruits	4
Rubber	4
Sauerkraut	4
Sewer odors	4
Skatole	4
Slaughtering odors	3
Smog	4
Soaps	4
Smoke	4
Solvents	3
Sour milks	4
Spilled beverages	4
Spoiled food stuffs	4
Stoddard solvent	4
Styrene monomer	4
Sulfur dioxide	2
Sulfur trioxide	3
Sulfuric acid	4
Tar	4
Tarnishing gases	3
Tetrachloroethane	4
Tetrachloroethylene	4
Theatrical makeup odors	4
Tobacco smoke odor	4
Toilet odors	4
Toluene	4
Toluidine	4
Trichlorethylene	4
Trichloroethane	4
Turpentine	4
Urea	4
Uric acid	4
Valeric acid	4
Valericaldehyde	4
Varnish fumes	4
Vinegar	4
Vinyl chloride	3
Volatile materials	3
Wood alcohol	3
Xylene	4

Some of the contaminants listed in the table are specific chemical compounds, some represent classes of compounds, and others are mixtures and of variable composition. Activated charcoal's capacity for odors varies somewhat with the concentration in air, with humidity and temperature, and with the actual velocity used through the filters. The numbers given represent typical or average conditions and might vary in specific instances. The values in the table have been assembled from many sources including laboratory tests and field experience. In cases where numerical values were not available, the author has listed his opinion of the probable capacity based on general experience. The table should be used as a general rule only.

The capacity index has the following meaning: ---

4. High capacity for all materials in this category. One-pound takes up about 20% to 50% of its own weight—average about 1/3 (33 1/3%). This category includes most of the odor causing substances.
3. Satisfactory capacity for all items in this category. These constitute good applications but the capacity is not as high as for category 4. Absorbs about 10% to 25% of its weight—average about 1/6 (16.7%).
2. Includes substances which are not highly adsorbed but which might be taken up sufficiently to give good service under the particular conditions of operation. These require individual checking.
1. Adsorption capacity is low for these materials. Activated charcoal cannot be satisfactorily used to remove them under ordinary circumstances.

Potassium permanganate (PuraPel)

The life expectancy of a PuraPel product (CP1) is dependent on the concentration of contaminates to which the product is exposed; the nature of those contaminants; and their generation rates.

The following table gives consumption data on a number of specific contaminants which may not conform with the normal wet chemistry stoichiometry of alkaline permanganate. This is due to the presence of other reactive chemicals in the air upstream of the PuraPel bed. For example, SO_2 is removed much more efficiently in the presence of H_2S; Ammonia control is improved by the presence of acid gases (No, So_2, Cl_2, etc.). Capacity data noted "F" has been corrected to reflect field results.

Name	Formula	M.W.	Reactability	lbs. of Gas/ lbs. Of PuraPel	lbs. PuraPel/ PPM/MCFM/MO
Acetaldehyde	CH3CHO	44.05	Rapidly	0.016	335
Acetic acid	CH3COOH	60.05	Rapidly	0.055	133
Acetone	CH3COCH3	58.08	Rapidly	0.117F	60
Acetylene	C2H2	26.04	Rapidly	0.014	225
Acrolein	C3H4O	56.06	Rapidly	0.123F	56
Allyl chloride	C3H3Cl	76.53	Rapidly	0.015	Note 1
Ammonia	NH3	17.03	Rapidly	0.019F	109
Amyl acetate	C7H14O2	130.19	Rapidly	0.012	Note 1
Arsine, chlorodiphenyl	(C6H5)2 AsCl	264.57	Yes	0.024	Note 1
Benzene	C6H6	78.11	No	0.004	Note 2
Butadiene	C4H6	54.09	Slowly	0.004	Note 1
Butane	C4H10	58.12	No	0.006	Note 2
Butyl amine	C4H9NH2	73.14	Rapidly	0.022	405
Butyl mercaptan	C4H9SH	90.18	Slowly	0.103F	107
Butyric acid	C3H7COOH	83.10	Slowly	0.060	179
Caproic acid	C5H11COOH	116.16	Slowly	0.090F	157
Caprylic acid	C7H15COOH	144.21	Slowly	0.100F	175
Carbon monoxide	CO	28.01	Slowly	0.017	201
Carbon tetrachloride	CCl4	153.84	No	0.005	Note 2
Chlorine	Cl2	70.91	No	0.123F	Note 3
Chloroform	CHCl3	119.39	Rapidly	0.008	Note 1
Chloropicrin	CCl3NO2	164.39	Rapidly	0.015	Note 1
3-Chloroprene	C4H5Cl	88.54	Rapidly	0.014	Note 1
Diethylamine	(C2H5)2NH	73.14	Slowly	0.036	247
Dimethylamine	(CH3)2NH	45.08	Rapidly	0.035F	157
Ethanol	C2H6O	46.07	Rapidly	0.060	94
Ethyl acrylate	C5H8O2	100.12	Slowly	0.012	Note 1
Ethylene	C2H4	28.05	Yes	0.004	Note 1
Formaldehyde	HCHO	30.03	Rapidly	0.150F	25
Hydrogen	H2	2.02	Slowly	0.002	123
Hydrogen sulfide	H2S	34.08	Rapidly	0.076F	55
Indole	C8H7N	117.14	Slowly	0.018F	Note 1
Iodoform	CHI3	393.78	Rapidly	0.016	Note 1
Isopropanol	C3H8O	60.09	Rapidly	0.055	133
Isovaleric acid	C4H9COOH	102.13	Slowly	0.080F	155
Methane	CH4	16.04	No	0.004	Note 2
Methanol	CH3OH	32.04	Rapidly	0.045	87
Methyl acrylate	C4H6O2	86.09	Rapidly	0.008	Note 1
Methylamine	CH3NH2	31.06	Rapidly	0.019	199
Methyl chloroform	CH3CCl3	133.42	Rapidly	0.012	Note 1
Methyl ethyl ketone (MEK)	C4H8O	72.10	Rapidly	0.115F	76
Methyl mercaptan	CH3SH	48.10	Rapidly	0.084	70
n-Methyl pyrrolidine	C5H11N	85.15	Slowly	0.102F	102
Nicotine	C10H14N2	162.23	Slowly	0.162F	122
Nicotinic acid	C5H4NCOOH	123.11	Slowly	0.087	172
Nitric oxide	NO	30.01	Rapidly	0.032	114
Nitrobenzene	C6H5NO2	123.11	Slowly	0.007	Note 1
Nitrogen dioxide	NO2	46.01	Rapidly	0.040	140
Nitrous oxide	N2O	44.02	No	0.005	Note 2
Ozone	O3	48.00	No		Note 4
Phenol	C6H5OH	94.11	Rapidly	0.103F	111
Phosgene	COCl2	98.92	Slowly	0.014	Note 1
Propane	C3H8	44.09	No	0.005	Note 2
Pyridine	C5H5N	79.10	Slowly	0.015	Note 1
Skatole	C9H9N	131.57	Slowly	0.020F	Note 1
Stibine	Sb(CH3)3	166.86	Rapidly	0.011	Note 1
Styrene	C8H8	104.14	Yes	0.020	Note 1
Sulfur dioxide	SO2	64.06	Rapidly	0.110-0.680F	71-9
Toluene	C7H8	92.13	Slowly	0.004	Note 1
Trichlorethylene	C2HCl3	131.40	Rapidly	0.019	Note 1
Triethylamine	(C2H5)3N	101.19	No	0.020	Note 2
Trimethylamine	(CH3)3N	59.11	No	0.081	Note 2
Xylene	C8H10	100.16	Slowly	0.005	Note 1