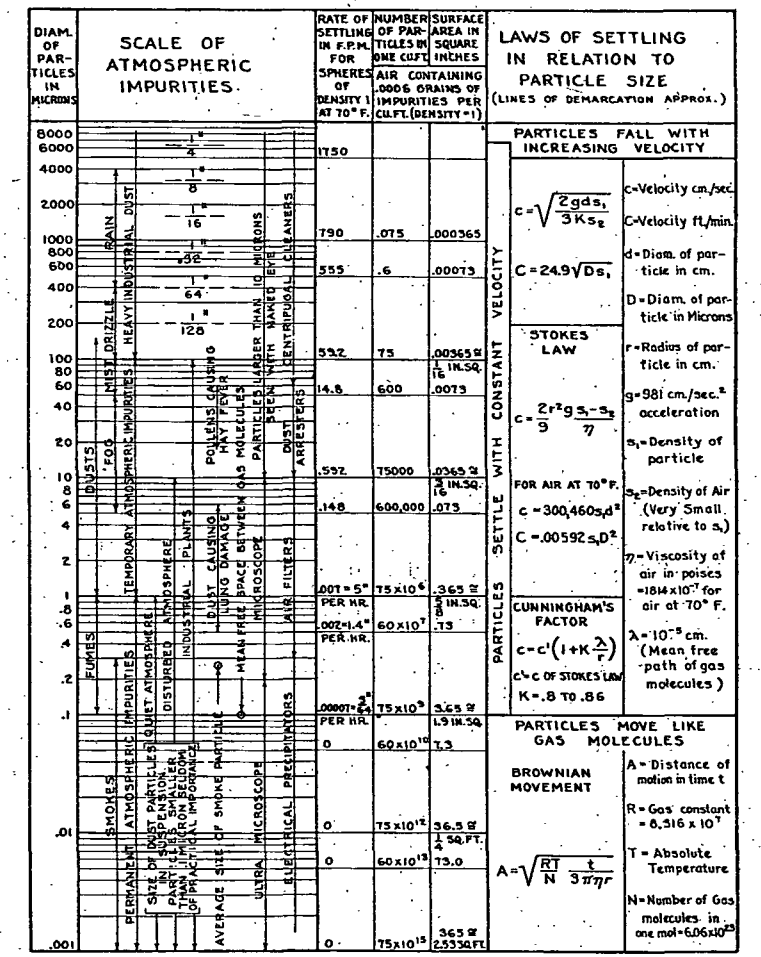


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FIG. 1. SIZES AND CHARACTERISTICS OF AIR-BORNE SOLIDS

Mineral particles, such as grains of sand, bits of rock, volcanic ash, or fly-ash, can be transported long distances under unusual circumstances. Thus, the dust storms of 1935 in the Kansas district resulted in vast amounts of fine top soil being thrown high into the air. Solar illumination as far east as Boston was affected noticeably and particles as large as 40 to 50 microns were actually carried half way across the continent before they settled out. In similar manner volcanic ash has been carried even further. It is not surprising, therefore, that fly-ash from furnace gases, cement dust and the like, can be carried for considerable distances and occasionally the engineer is confronted with the problem of removing such

TABLE 1. APPROXIMATE LIMITS OF INFLAMMABILITY OF SINGLE GASES AND VAPORS IN AIR AT ORDINARY TEMPERATURES AND PRESSURES[a]

Gas or Vapor	Lower Limit Volume in Per Cent	Higher Limit Volume in Per Cent	Gas or Vapor	Lower Limit Volume in Per Cent	Higher Limit Volume in Per Cent
Acetaldehyde	4.0	57.0	Hexane	1.2	6.9
Acetone	3.0	13.0	Hydrocyanic acid	5.6	40.0
Acetone[b]	2.5		Hydrogen	4.1	74.0
Acetylene	2.5	80.0	Hydrogen sulphide	4.3	45.5
Acetylene[b]	2.3		Illuminating gas	5.3	31.0
Allyl alcohol	2.4		Iso-amyl alcohol	1.2	
Ammonia	16.0	27.0	Iso-butane	1.8	8.4
Amyl alcohol	1.2		Iso-butyl alcohol	1.8	
Amyl chloride	1.4		Iso-pentane	1.3	
Amylene	1.6		Iso-propyl acetate	1.8	7.8
Benzene	1.4	6.7	Iso-propyl alcohol	2.6	
Benzine	1.1		Methane	5.3	14.0
Blast-furnace gas	35.0	74.0	Methane[b]	5.0	15.0
Butane	1.9	8.4	Methyl acetate	3.1	15.5
Butyl acetate (30 C)	1.7	7.6	Methyl alcohol	6.7	36.0
Butyl alcohol	1.7		Methyl bromide	13.5	14.5
Butylene	1.7	9.0	Methylbutyl ketone	1.2	8.0
Carbon disulphide	1.2	50.0	Methyl chloride	8.0	19.0
Carbon monoxide	12.5	74.0	Methyl cyclohexane	1.2	
Croton aldehyde	2.1	15.5	Methyl ethyl ether	2.0	10.1
Cyclohexane	1.3	8.3	Methyl ethyl ketone	1.8	10.0
Cyclopropane	2.4	10.3	Methyl formate	5.0	23.0
Decane	0.7		Methyl propyl ketone	1.5	8.5
Dichlorethylene	9.7	12.8	Natural gas	4.8	13.5
Diethyl selenide	2.5		Nonane	0.8	
Dioxan	2.0	22.0	Octane	0.9	
Ethane	3.2	12.5	O-Xylene	1.0	6.0
Ethyl acetate	2.0	11.5	Paraldehyde	1.3	
Ethyl alcohol	3.3	19.0	Pentane	1.4	7.8
Ethyl bromide	6.7	11.2	Propane	2.4	9.5
Ethyl chloride	4.0	14.8	Propyl acetate	1.8	8.0
Ethylene dichloride	6.2	15.9	Propyl alcohol	2.5	
Ethylene	3.0	29.0	Propylene	2.0	11.1
Ethyl ether	1.8	36.5	Propylene dichloride	3.4	14.5
Ethyl formate	2.7	16.5	Propylene oxide	2.1	21.5
Ethyl nitrite	3.0		Pyridine (70 C)	1.8	12.4
Ethylene oxide	3.0	80.0	Toluene	1.3	6.7
Furfural (125 C)	2.1		Vinyl ether	1.7	27.0
Gasoline	1.4	6.5	Vinyl chloride	4.0	22.0
Heptane	1.0		Water gas	6 to 9	55 to 70

[a]Limits of Inflammability of Gases and Vapors, by H. F. Coward and G. W. Jones (*U. S. Bureau of Mines, Bulletin* No. 279, 1939).

[b]Turbulent mixture.

material before the air in question is suitable for use in building ventilation.

The physical properties of the particulate impurities of air are summarized conveniently in the chart of Fig. 1.

In the case of gases, the objectionable features are physiological effects, inflammability (see Table 1) and odors.

Dust Concentrations

It is customary to report dust concentrations as grains per 1000 cu ft or milligrams per cubic meter (except for dusts that may cause pneumoconiosis, which are reported as so many particles per cubic foot of air). Gas concentrations are commonly recorded as milligrams per cubic meter