

TABLE 3. PHYSIOLOGICAL RESPONSE TO GASES AND VAPORS^a
Concentrations in Parts of Substance per Million Parts of Air by Volume (ppm)

SUBSTANCE	RAPIDLY FATAL	DANGEROUS TO LIFE IN ¼ TO 1 Hr	MAXIMUM ALLOW- ABLE CONCENTRATION FOR DAILY EXPOSURES
Acrolein	2,000	100	0.5
Ammonia	5,000	2,500	100
Anyl acetate	—	—	200
Aniline	—	200	5
Arsine	250	10	0.05
Benzene (benzol)	20,000	5,000	100 ^b
Bromine	500	40	1
Butyl acetate	—	10,000	200
Carbon dioxide	100,000	50,000	5,000
Carbon disulfide	2,000	1,000	20 ^b
Carbon monoxide	4,000	1,000	100 ^b
Carbon tetrachloride	50,000	—	50
Chlorine	1,000	10	1
Dichlorobenzene	—	—	50
Dichloroethyl ether	—	500	15
Ether (diethyl)	—	35,000	400
Ethyl acetate	40,000	10,000	400
Ethyl alcohol	—	—	1,000
Ethylene dichloride	—	4,000	100
Formaldehyde	—	—	10 ^b
Gasoline	—	—	500
Hydrogen chloride	1,000	—	10
Hydrogen cyanide	200	100	20
Hydrogen fluoride	—	50	3
Hydrogen sulfide	600	200	20 ^b
Methyl acetate	—	—	200
Methyl alcohol (Methanol)	—	—	200 ^b
Methyl bromide	20,000	2,000	20
Methyl chloride	150,000	20,000	100
Methylene chloride	—	—	500
Monochlorobenzene	—	—	75
Nitrobenzene	—	—	1
Nitrogen oxides	300	100	25 ^b
Phosgene	50	5	1
Phosphine	1,000	400	0.05
Styrene	—	—	400 ^b
Sulfur dioxide	400	150	10
Tetrachloroethane	7,000	—	5
Tetrachloroethylene	—	—	100
Toluene (toluol)	20,000	5,000	200
Trichloroethylene	—	—	200 ^b
Turpentine	—	—	100
Xylene (xylol)	20,000	5,000	200 ^b

^aAdapted from: Manual of Industrial Hygiene, by W. M. Gafafer et al, U. S. Public Health Service (W. B. Saunders Co., 1943); Analytical Chemistry of Industrial Poisons, Hazards and Solvents, by M. B. Jacobs (Interscience Publishers, 1941); Noxious Gases, by Henderson and Haggard (Reinhold Publishing Co., N. Y., 1943). 1947 report of the Committee on Threshold Limits of the American Conference of Governmental Industrial Hygienists; and other authoritative sources.

^bAdopted by the American Standards Association (American Standard Z-37).

prudent engineer will design equipment using these values as the upper limits of air contamination, and will incorporate a reasonable margin of safety in his estimates of ventilation capacity.

Information on the properties and effects, with respect to health, of

TABLE 4. MAXIMUM ALLOWABLE CONCENTRATIONS OF DUSTS, FUMES AND MISTS^a

SUBSTANCE	MILLIGRAMS PER CUBIC METER, DAILY EXPOSURES ^b
Antimony	0.1
Arsenic; arsenic trioxide	0.15 ^c
Cadmium, and compounds	0.1 ^c
Chlorodiphenyls	1.0
Chromic acid mist and Chromates (as CrO ₃)	0.1
Fluorides	2.5
Lead; lead carbonate; lead chloride; lead nitrate; lead oxides; lead sulfate	0.15 ^c
Manganese, and compounds	6.0 ^c
Mercury, and compounds	0.1
Pentachloronaphthalene	0.5
Selenium	0.1
Tellurium	0.1
Trichloronaphthalene	5.0
Trinitrotoluene	1.5
Zinc oxide fume	15.0

^aAdapted from: Manual of Industrial Hygiene, by W. M. Gafafer, et al, U. S. Public Health Service (W. B. Saunders Company, 1943); and other authoritative sources.

^b1 milligram per cubic meter = 0.44 grain per 1000 cu ft.

^cAdopted by the American Standards Association (American Standard Z-37).

TABLE 5. MAXIMUM ALLOWABLE CONCENTRATIONS OF DUSTS^a

SUBSTANCE	MILLION PARTICLES PER CUBIC FOOT OF AIR, DAILY EXPOSURES ^b
Aluminum oxide abrasive	15-100
Asbestos	5
Carborundum (silicon carbide)	15-100
Cement (Portland)	50-100
Coal (less than 5 per cent quartz)	50-100
Dusts containing less than 10 per cent free silica	10-100
Granite	10-25
Gypsum (hydrated calcium sulfate)	50-100
Limestone (calcium carbonate)	50-100
Marble (calcium carbonate)	50-100
Mica	10-100
Nuisance dusts (non-toxic, non-silica)	50-100
Quartz (silicon dioxide)	5
Sand (silica, silicon dioxide)	5
Sandstone	5
Silica (free or uncombined silicon dioxide)	5
Silicates (combined silicon dioxide)	15-100
Slate	15-100
Talc	10-50
Total (maximum concentration for mixed dusts)	50-100

^aAdapted from: Study of Asbestosis in Asbestos Textile Industry, U. S. Public Health Service Bulletin No. 241, 1938; Industrial Dust, by Drinker and Hatch (McGraw Hill Book Co., 1938); Industrial Code, Bulletin No. 35, New York State Department of Labor; recommendations of state and local industrial hygiene agencies compiled by the American Conference of Governmental Industrial Hygienists; and other authoritative sources.

^bIncludes only particles from 1 to 10 microns approximately, as determined by the light field microscope counting technique, using the 10X objective. Dark field counts (and the corresponding allowable concentrations) are anywhere from 2 to 100 times the light field counts for the same sample, according to the proportion of dust smaller than 1 micron (See Industrial Dust, Chapter VII, by Drinker and Hatch, McGraw Hill Book Co.).

specific industrial air contaminants has developed rapidly within the past decade into an extensive literature. Some of the more readily available publications are listed at the end of this chapter.