

The
CHEMISTRY
of
INDUSTRIAL
TOXICOLOGY

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CHAPTER XI

NATURAL AND INDUSTRIAL PRODUCTS

MINERALS

The most important minerals, from the standpoint of industrial hygiene, are those containing free silica. These include sand, sandstone, flint, and quartz, which consist mainly of silica in the form of quartz; diatomaceous earth, which is essentially amorphous silica; and granite, which contains from 20 to 40% quartz.

Minerals that contain combined silica (silicates) but no free silica are incapable of causing silicosis. Asbestos, however, causes a fibrotic lung condition known as asbestosis, which resembles silicosis in many respects and can be almost as serious. Mica dust is also considered somewhat hazardous to inhale and in addition may cause skin irritation.

Non-siliceous minerals, like limestone, marble, dolomite, etc., which do not contain toxic elements, do not ordinarily present any significant dust hazard. Minerals containing toxic elements, such as fluorite and cryolite (fluorine), and pyrolusite (manganese) may cause systemic poisoning if the dust is inhaled or ingested in quantity. As a rule, such minerals are less reactive than synthetic compounds of the same elements, however, and may be relatively inert and innocuous in comparison.

A detailed discussion of silica and other mineral dusts, their occurrence, effects, and evaluation, is given in *Industrial Dust*, by Drinker and Hatch.²¹⁹

ABRASIVES

Abrasives containing free silica, such as sandstone grinding wheels, flint sandpaper, and sand used for abrasive blasting processes, all present a silicosis hazard. Most artificial abrasives, however, consist of silicon carbide, aluminum oxide, boron carbide, or other inert and non-toxic substances. Rouge, or iron oxide, used for polishing, is also harmless for practical purposes.

TABLE 38 (Continued)

2. Fumes, Dusts, and Mists (Continued)

Substance	MAC (mg/m ³)	Basis	Source
Dinitrotoluene	(1.5)		ACGIH *100
Diphenyl	(2)	Animal data	Deichmann ¹¹⁶
Fluorides	1	See discussion	Massachusetts *200
Hexachloronaphthalene	0.5	Animal data	Drinker *100
Hydroquinone	2	Field data	Stern ¹¹⁸
Iron (oxide fumes)	15	Field data	ACGIH *300
Lead (except chromate and sulfide)	0.15	Field studies	USPHS *44
Lead chromate and sulfide	(0.5)		
Magnesium oxide	15	Field data	Cook *118
Manganese	6	Field studies	USPHS *40
Mercury	0.1	Field studies	USPHS *44
Nickel (except oxide)	(0.5)	Reported field data	
Nitrodiphenyl	(1)	Animal data	Deichmann ¹¹⁸
Osmium (tetroxide)	(0.01)	Field studies	McLaughlin et al. ⁸²
Pentachloronaphthalene	1	Animal data	Drinker *100
Pentachlorophenol	(0.5)		ACGIH *300
Phosphorus	(0.1)	Animal data	ACGIH *300
Platinum (soluble salts)	0.002	Field studies	Hunter et al. ⁹⁰
Selenium compounds	(0.1)	Animal data	Dudley ⁷⁸
Sulfuric acid	5	Sensory response	Stern ¹¹⁸
Tellurium	(0.005)	Field studies	Steinburg ⁷⁷
Tetrachloronaphthalene	5	Animal data	Drinker ¹⁰⁰
Tetryl	1.5	Field data	USPHS *248
Thallium	(0.1)	Animal data	
Thorium	(0.5)	Analogy with radium	
TNT	1.5	Field studies	USPHS *248
Trichloronaphthalene	5	Field data	Cook *118
Uranium	(0.02)	Animal data	
Welding Fumes (N.O.C.)	15	Field data	
Zinc	15	Field data	Massachusetts *200

3. Mineral Dusts

Substance	MAC (millions of particles per cubic foot of air)	Source
Asbestos	5	Massachusetts *
Mica	50	ACGIH *
Silica	5	Massachusetts *
Foundry	25	Massachusetts *
Granite	15	Massachusetts *
Miscellaneous (nuisance)	50	Massachusetts *