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- l Carbonyl
tion [abstract], 597
er names of organs
- rt of case, *143
- nylhexyl) phthalate
s, *219
nyl ketone vapors,
- le number method,
- in workers exposed
- th aerosol therapy;
- [abstract], 84
- nds
ith development of
- tract of chromium
- n chronic chromium
- l phosphate: imme-
long-term feeding
- rs
- mall industry, *227
- Miners
- mines in [Jacoe],
- ic disorders follow-
pensable situations
- ical Testimony in
389
- ation of pesticides
- posure to inorganic
8
- s in [abstract], 87
special reference to
- resulting from cot-
others], *36
- erican Medical As-
- ies resulting from
- e industry in [ab-
- nism of action of
hosphates, *350
- Curtis, G. H.
Berylliosis: summary and survey of all clinical
types observed in 12-year period, *1
- Cyanides
toxicity studies of acetone cyanohydrin and ethylene
cyanohydrin [Sunderman & Kincaid], *371
- Cyanohydrins: See Cyanides
- Cystine and Cysteine
studies in vanadium toxicology: reduction in cystine
content of rat hair [Mountain & others], *406
- Danopoulos, E.
Serious poisoning by hexachlorocyclohexane: clinical
and laboratory observations on 5 cases, *582
- Davis, M. W.
Pneumoconiosis in tungsten-carbide tool industry:
report of 3 cases, *453
- DDT
panmyelophthisis after exposure to benzene hexa-
chloride and [Friberg & Martensson], *166
- Deafness: See also Hearing
occupational, in weavers [abstract], 82
physical basis of hearing damage and tentative
damage risk criterion for steady-state noise
[Hardy], *250
- De Carlo, M. R.
Some physiological effects of disulfur decafluoride
(S₂F₁₀) after intravenous injection in dogs, with
note on its toxicity to rabbits, *436
- Degreasers: See Tetrachlorethylene; etc.
- Delahant, A. B.
Relationship between piezoelectric property and
fibrogenic capacity of dust, *109
- Delker, L. L.
Studies in vanadium toxicology: reduction in cystine
content of rat hair, *406
- DeNardi, J. M.
Berylliosis: summary and survey of all clinical
types observed in 12-year period, *1
- Dermatitis
from cement: evaluation of potassium bichromate
test [abstract], 592
from hops [abstract], 591
industrial: aggravation as factor [Appel], *133
industrial dermatoses [abstract], 195
venenata due to native woods [abstract], 193
- Deroin, J.
Studies on toxicity and mechanism of action of
some new insecticidal thionophosphates, *350
- Diet
effect on susceptibility of rat to poisoning by
2,4-dinitrotoluene [Shils & Goldwater], *262
- Diisobutyl Ketone
toxicity and hazard of vapors [Carpenter & others],
*377
- Dimercaprol
therapy in chronic lead poisoning [abstract], 486
- Dinitro-o-Cresol: See Nitrocresol
- Dinitrotoluene: See Nitrotoluene
- Di(2-ethylhexyl) Phthalate: See Plastics
- Disability
rehabilitation and placement of incapacitated work-
er [abstracts], 192
- Disk, Intervertebral: See Spine
- Disulfur Decafluoride: See Fluorides
- DNOC: See Nitrocresol
- Doull, J.
Studies on toxicity and mechanism of action of
some new insecticidal thionophosphates, *350
- Drinker, P.
Fumes and gases from selenium rectifiers abused
by gross overloading, *185
- DuBois, K. P.
Studies on toxicity and mechanism of action of
some new insecticidal thionophosphates, *350
- Dudley, H. C.
Pharmacological studies of radiogermanium (Ge⁷¹):
inhalation of dusts, *523
- Dusts: See also Pneumoconiosis
collection: cyclone collectors for boilers [abstract],
90
collection: how dust collectors perform [abstract],
89
collection: principles of present day dust collectors
and their application to mining and metallurgical
industries [abstract], 89
control: external, for pedestal grinder [abstract],
597
counting by most probable number method [Chap-
man], *234
diseases due to: prevention [abstract], 592
and fume control [abstract], 89
health hazards in dusty trades, criteria for evalua-
tion [abstract], 88
mechanism of clearance from lung: theory [ab-
stract], 590
high-speed counting of steel foundry dust particles
[abstract], 595
mineral: threshold limit values for 1953, 298
relationship between piezoelectric property and
fibrogenic capacity [Pratt & others], *109
sampling: See also Air, sampling
sampling: sampler which simulates upper and lower
lung deposition [Harris & Eisenbud], *446
sampling: to simulate human lung [abstract], 80
toxic: threshold limit values for 1953, 297
- Dutra, F. R.
Toxicity of 2-ethylhexyl diphenyl phosphate: imme-
diate toxicity and effects of long-term feeding
experiments, *170
- Ear: See also Deafness; Hearing
internal, chronic lead poisoning and changes in
[abstract], 488
new types of protectors [abstract], 598
- Education
medical research fellowships, 202
radiological health training program, 92
- Eisenbud, M.
Dust sampler which simulates upper and lower lung
deposition, *446
- England: See Great Britain
- EPEG (Ethyl Phthalyl Ethyl Glycolate): See Glycols
- Ethylene Cyanohydrin
toxicity studies [Sunderman & Kincaid], *371
- 2-Ethylhexyl Diphenyl Phosphates: See Phosphorus
and Phosphorus Compounds
- Factories: See under names of various industries
- Fatigue
critical frequency of fusion of interrupted electrical
stimulation of eye as test [abstract], 79
- Fear, Frustration, and Futility
industrial aspect [Johnstone], *391
- Fellowships
medical research, 202
- Ferguson, J. K. W.
Fluctuations of breath radon in subjects seated at
rest, *574
- Filters
molecular filter membrane and electron microscopy,
combined use in sampling and measurement of
solid air-borne particulates [Fraser], *412

Special Reports

THRESHOLD LIMIT VALUES FOR 1953

Adopted at the Meeting of the American Conference of Governmental Industrial Hygienists, Los Angeles, April, 1953

VALUES are given in the following tabulation for the maximum average atmospheric concentration of contaminants to which workers may be exposed for an eight-hour working day without injury to health.

These values are based on the best available information from industrial experience, from experimental studies, and, when possible, from a combination of the two. They are not fixed values but are reviewed annually by the Committee on Threshold Limits for changes, revisions, or additions as further information becomes available. Threshold limits should be used as guides in the control of health hazards and should not be regarded as fine lines between safe and dangerous concentrations. They represent conditions only within which it is felt that workers may be repeatedly exposed, day after day, without their health being adversely affected. It is felt, at the present time, that workers should not be exposed to a working environment containing any of these substances in excess of the value indicated.

GASES AND VAPORS

SUBSTANCE	PPM	SUBSTANCE	PPM
Acetaldehyde	200	Chloroform	100
Acetic acid	10	1-Chloro-1-nitropropane	20
Acetic anhydride	5	Cresol	5
† Acetone	1,000	Cyclohexane	400
Acrolein	0.5	Cyclohexanol	100
Acrylonitrile	20	Cyclohexanone	100
Ammonia	100	Cyclohexene	400
Amyl acetate	200	Cyclopropane (propene)	400
Isoamyl alcohol	100	* 1-2 Dibromoethane (ethylene dibromide)	25
Aniline	5	o-Dichlorobenzene	50
Arsine	0.05	Dichlorodifluoromethane	1,000
Benzene (benzol)	35	1,1-Dichloroethane	100
Bromine	1	† 1,2-Dichloroethane (ethylene dichloride)	100
1,3-Butadiene	1,000	1,2-Dichloroethylene	200
n-Butanol	100	Dichloroethyl ether	15
2-Butanone	250	Dichloromethane	500
n-Butyl acetate	200	Dichloromonofluoromethane	1,000
Butyl Cellosolve (2-butoxyethanol) ..	200	1,1-Dichloro-1-nitroethane	10
Carbon dioxide	5,000	1,2-Dichloropropane (propylene dichloride)	75
Carbon disulfide	20	Dichlorotetrafluoroethane	1,000
Carbon monoxide	100	Diethylamine	25
† Carbon tetrachloride	25	Dimethylaniline	5
Cellosolve (2-ethoxyethanol)	200	Dimethylsulfate	1
Cellosolve acetate	100	Dioxane	100
Chlorine	1		
Chlorobenzene	75		
2-Chlorobutadiene	25		

* New values.

† Changes from the 1952 list.

THRESHOLD LIMIT VALUES

297

SUBSTANCE	PPM	SUBSTANCE	PPM
Ethyl acetate	400	Methylcyclohexanone	100
Ethyl alcohol	1,000	Methyl formate	100
Ethylamine	25	Methyl iso-butyl ketone	100
Ethyl benzene	200	Naphtha (coal tar)	200
Ethyl bromide	200	Naphtha (petroleum)	500
Ethyl chloride	1,000	Nickel carbonyl	1
Ethylene chlorohydrin	5	Nitrobenzene	1
Ethylene oxide	100	Nitroethane	100
Ethyl ether	400	Nitrogen oxides (other than N ₂ O)	25
Ethyl formate	100	Nitroglycerin	0.5
Ethyl silicate	100	Nitromethane	100
*Fluorine	0.1	2-Nitropropane	50
Fluorotrichloromethane	1,000	Nitrotoluene	5
Formaldehyde	5	Octane	500
Gasoline	500	Ozone	1
Heptane	500	Pentane	1,000
Hexane	500	Pentanone (methyl propanone)	200
Hydrogen chloride	5	Phenol	5
Hydrogen cyanide	10	Phosgene	1
Hydrogen fluoride	3	Phosphine	0.05
Hydrogen selenide	0.05	Phosphorus trichloride	0.5
Hydrogen sulfide	20	Propyl acetate	200
Iodine	1	Stibine	0.1
Isophorone	25	Stoddard solvent	500
Isopropyl alcohol	400	Styrene monomer	200
Isopropyl ether	500	Sulfur chloride	1
Mesityl oxide	50	Sulfur dioxide	10
Methanol	200	1,1,2,2-Tetrachloroethane	5
Methyl acetate	200	†Tetrachloroethylene	200
Methylal	1,000	Toluene	200
Methyl bromide	20	Toluidine	5
Methyl butanone	100	*1-1-1 Trichloroethane (methyl chloroform)	500
Methyl Cellosolve (2-methoxyethanol)	25	†Trichloroethylene	200
Methyl Cellosolve acetate	25	Turpentine	100
Methyl chloride	100	Vinyl chloride	500
Methylcyclohexane	500	Xylene	200
Methylcyclohexanol	100		

TOXIC DUSTS, FUMES, AND MISTS

SUBSTANCE	MG. PER CU. M.	SUBSTANCE	MG. PER CU. M.
Antimony	0.5	Chromic acid and chromates as CrO ₃	0.1
Arsenic	0.5	Cyanide as CN	5
Barium	0.5	*O,O-Diethyl-O- <i>p</i> -nitrophenyl thiophosphate (parathion)	0.1
Cadmium	0.1	Dinitrotoluene	1.5
Chlorodiphenyl	1		

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SUBSTANCE	MG. PER CU. M.	SUBSTANCE	MG. PER CU. M.
<i>o</i> -Dinitroresol	0.2	Phosphorus pentasulfide	1
Fluoride	2.5	Selenium, as Se	0.1
Iron oxide fume	15	Sulfuric acid	1
Lead	0.15	Tellurium	0.1
Magnesium oxide fume	15	Tetryl	1.5
Manganese	6	Trichloronaphthalene	5
Mercury	0.1	Trinitrotoluene	1.5
Pentachloronaphthalene	0.5	*Uranium (soluble compounds).....	0.05
Pentachlorophenol	0.5	*Uranium (insoluble compounds) ...	0.25
Phosphorus (yellow)	0.1	Zinc oxide fume	15
Phosphorus pentachloride	1		

MINERAL DUSTS

SUBSTANCE	MPPCF	SUBSTANCE	MPPCF
Alundum	50	Silica	
Asbestos	5	high (above 50% free SiO ₂).....	5
Carborundum	50	medium (5 to 50% free SiO ₂)....	20
Dust (nuisance, no free silica).....	50	low (below 5% free SiO ₂).....	50
Mica (below 5% free silica).....	20	Slate (below 5% free SiO ₂)	50
Portland cement	50	Soapstone (below 5% free SiO ₂)....	20
Talc	20	Total dust (below 5% free SiO ₂)...	50

RADIATIONS

MATERIAL OR RADIATION		MATERIAL OR RADIATION	
Gamma (roentgens per week).....	0.3	Roentgen (roentgens per week)....	0.3

WILLIAM L. BALL
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Archives

VOLUME 8

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transient type and were not seen by the dermatologist. Of the six which were seen, one was severe, two were moderate, and three were mild. From this report, it seems possible that a mild dermatitis was fairly common in Herefordshire in 1952, about 1 picker in 30 being affected. Thus while severe cases are rare, mild cases are fairly common.

Hop dermatitis in some cases tested seemed to be due to a sensitivity to fresh hop oil, of which myrcene may be the active ingredient. In three cases sensitivity to hop resins was also present.

It is suggested that the rarity of hop dermatitis among workers in dried hops is due to the fact that the sensitizing agent is driven off in the drying process.

PREVENTION OF THE DUST DISEASES. A. I. G. McLAUGHLIN, *Lancet* 2:49 and 99 (July 11 and 18) 1953.

If the lungs are healthy, they can deal with a considerable quantity of dust or fume without becoming damaged. The concentration of dust which can be inhaled without danger varies according to the nature of the dust and also according to the length of time that a man is breathing it. Again, intermittent exposure to high concentrations of dust may be more dangerous than exposure to lower concentrations over a longer period. The harder the job is, the more deeply will a man have to breathe, and in consequence he will breathe more dust. Workers too vary greatly in their capacity to deal with dusts, and of two men who have been working at the same job for the same length of time one may get a disease of the lungs and the other may be unaffected. This is one reason why the author is not greatly impressed by the validity of what are known as the maximum allowable concentrations of dusts (M. A. C.), of which lists have been drawn up in various countries. The M. A. C.'s seem to be based on the assumption that man is a standardized machine, which clearly he is not.

After citing figures on the incidence of dust diseases in England, McLaughlin in the second installment of his paper points out that many factory processes and most types of mining are inherently dusty but that in some instances the process can be altered so that no dust is formed. Again, it is possible occasionally to replace the substance which gives rise to the dangerous dust by another not so harmful. In jobs in which it has not been possible to control the dust, it is necessary for the worker to be protected by respirators or by a breathing apparatus.

After commenting on replacing a harmful material, McLaughlin discusses dust suppression or control by ventilation and by changing or by isolating a manufacturing process. Wet methods of allaying dust, electrostatic precipitation, and good housekeeping are also discussed.

In reviewing methods for the personal protection of the worker, the author describes and evaluates several types of respirators. He also comments on antidotal dusts, particularly the aluminum dusting chamber, pointing out that it will require years before any definite evidence of the value of the treatment can be obtained and only then if adequate control groups are studied. He thinks that it should be used with caution, since he cannot readily believe that it is a good thing to put more dust into a lung which is already overloaded with dust.

With regard to medical examinations and in particular x-ray examinations, McLaughlin says that it is useful to examine all workers before they are engaged in the dusty trades and then at intervals afterward. A diagnosis of pneumoconiosis cannot be made without an x-ray film of the chest, but x-ray examination does not prevent dust disease of the lungs. It does, however, help to get the worker out of a dusty industry before the damage to his lungs has gone too far. X-ray and other examinations can also indicate in which part of the job the danger lies, and greater attention can be given to dust control in the dangerous job. It is not fair to the workers, however, to use x-ray surveys in order to save the time and trouble of the engineers whose business it is to control dust clouds wherever they arise.

EVALUATION OF THE POTASSIUM BICHROMATE TEST FOR CEMENT (DERMATITIS). E. FREY, *Dermatologica* 105:244, 1952.

Seventy-three cases of industrial dermatoses were tested with patch tests of 0.5% solution of potassium bichromate. Seven doubtful cases were excluded; 33 cases of cement eczema gave a positive result. Of 33 patients with industrial eczema of other origin, only 2 factory workers showed reaction; these 2 women were employed in cleaning metal objects and may have become sensitized to chromate during that work.

BIOL. ABST. [INDUST. HYG. DIGEST.]

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TREATMENT OF HYD
(Aug. 8) 1953.

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