PROCEEDINGS of the

NINTH ANNUAL MEETING

of the

AMERICAN CONFERENCE of GOVERNMENTAL INDUSTRIAL HYGIENISTS

Buffalo, New York
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In order to accomplish its task of providing methods of analysis for all our toxic substances within a reasonable time, a considerable amount of overlapping will occur and has already occurred among our laboratories. This committee expects to have referees and collaborators on more than one item in the same laboratory. This is unavoidable in view of the limited number of laboratories which we have to call upon to carry out this work. One of the things this committee therefore recommends and hopes is that those who are responsible for planning their respective state and local industrial hygiene programs and budgets will provide for carrying out this referee program.

(The report of the Committee on Standard Methods was accepted)

REPORT OF THE COMMITTEE ON THRESHOLD LIMITS

DR. L. T. FAIRHALL (U.S.P.H.S.): The following report of your Committee on Threshold Limits will differ somewhat, although not seriously, with respect to a few of the limits chosen from that of the preceding year and it is hoped that early publication can be made of these values so that you will soon have the opportunity of reviewing them.

I do not need to tell you that the selection of even one maximum allowable concentration value is no easy matter. The responsibility of such a selection is very great and is clearly apprehended by your Committee. While every effort was made to assign a fair and just value, it should be clearly understood that the values selected are not permanent values but are, according to the Constitution, subject to annual revision.

There are many terms applied to the meaning of the expression "threshold limit". Some consider it as a "toxic limit"; others include the expression "nuisance values", while still others go further and feel that we should include "sensory perception" in our definition. As I view the matter I would define the maximum allowable concentration value as "that amount of gas, vapor, fume or dust which can be tolerated by man with no bodily discomfort or impairment of bodily function, either immediate or after years of exposure".

Obviously, and by its very definition, this is a difficult quantity to arrive at. We originally relied to some extent upon pharmacologist data. Now the pharmacologist is usually only incidentally interested in substances of industrial toxicological interest, and is very seldom interested - if we exclude a few gases and substances of a narcotic nature - in the effect of exposure by inhalation. Consequently a very special field of industrial toxicological investigation has grown up in which for the most part animal studies have been made to serve as the basis of information.

Here, too, difficulties are encountered. Valuable as animal studies have been, there is a wide gap between animal data and the data necessary for formulating a given maximum allowable concentration value applicable to man. It is in just this field that the industrial hygienist can exercise a most valuable and important function. The industrial hygienist is in contact with not one plant, but often a number of plants, using a given toxic substance. He knows, as no one else knows, the actual aerial concentration of contaminant encountered in practice. And he is in contact with the individuals exposed and therefore soon learns whether the concentrations measured are causing any.

injury or complaint. His judgment and the combined judgment of this entire Conference group is therefore most valuable in helping to formulate maximum allowable concentration values.

There is one further point I should mention, although it is rather obvious. That is the necessity of preserving a balance between a suitable maximum allowable concentration value and the effect of attaining this value upon the manufacturing operation or process itself. It not only requires a most careful and thorough study of plant conditions, but also requires the exercise of very mature judgment.

In presenting the values arrived at by your committee, I would like to make the suggestion that some consideration be given in the near future to (a) a re-grouping of values so that those substances of a definite and pronounced toxic nature stand apart from the remaining substances, and (b) to possible greater permanency of the maximum allowable concentration values - at least for a longer period of time than one year and more in line in this regard with those values set by the American Standards Association. However, provision should be made that given values may be presented for consideration by the committee and for vote by the Conference where the Executive Committee feels that the urgency is sufficiently justified.

DISCUSSION

MR. BROWN: As a member of the committee, I want to make sure that the Conference understood completely the point about the trend in many instances toward sensory limits. There seems to be a trend among industrial hygienists toward the observation of sensory values rather than what we have understood in the past as thresholds from the standpoint of physiological action. As a member of the code committee during the past year, I have wondered what consideration should be given to sensory versus threshold values for inclusion in the code. I believe it would be of considerable guidance to the code committee in its work, and also to the Threshold Limits Committee in making its recommendations, to be advised of the wishes of the membership regarding the type of values which should be presented for inclusion in the code.

I also would like to emphasize the fact that we would like, by all means, to receive copies in our individual jurisdictions of this report as quickly as that can be accomplished in order that we can observe the new values in our work during the next year.

CHAIRMAN MORSE: That is a good point. I think that we all have come to interpret these various terminologies, toxic limits, M.A.C. values, threshold limits, as meaning much the same thing. I don't know whether the report of the committee intended this list of limits to be based on physiological response or whether they are limits of suggested levels of good engineering practice. Would you say a word on that, Dr. Fairhall?

DR. FAIRHALL: I haven't given very much thought to the separation of the various values. I think if we are going to use any values in the code as such, we should set apart those substances that are distinctly toxic. On the other hand, to do that is extremely difficult and would require a great deal of further work by your committee.

(The report of the Committee on Threshold Limits was accepted)
(The meeting recessed at 11:30 a.m.)

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1947 M. A. C. VALUES

The following maximum allowable concentration values were a part of the report submitted by the Committee on Threshold Limits and accepted by the American Conference of Governmental Industrial Hygienists at the 1947 meeting. These values are revised annually.

GASES AND VAPORS

Substance	M. A. C. (ppm*)
Acetaldehyde	200
Acetic acids	10
Acetic anhydride	5
Acetone	500
Acrolein	0. 5
Acrylonitrile	20
Ammonia	100
Amyl acetate	200
iso-Amyl alcohol	100
Aniline	5
Arsine	0. 05
Benzene (benzol)	50
Bromine	1
1,3-Butadiene	1, 000
n-Butanol	50
2,Butanone	200
n,Butyl acetate	200
Butyl "cellosolve"	200
arbon dioxide	5, 000
arbon disulfide	20
Carbon monoxide	100
Carbon tetrachloride	50
"Cellosolve"	200
"Cellosolve" acetate	100
Chlorine	2
2-Chlorobutadiene	25
Chloroform	100
1-Chloro-1-nitropropane	20
Cyclohexane	400
Cyclohexanol	100
Cyclohexanone	100
Cyclohexene	400
Cyclopropane (propene)	400
o-Dichlorobenzene	50
Dichlorodifluoromethane	1, 000
1,1-Dichloroethane	100
1,2-Dichloroethane (ethylene dichloride)	75
1,2-Dichloroethylene	200
Dichloroethyl ether	15
Dichloromethane	500
Dichloromonofluormethane	1, 000
1,1-Dichloro-1-nitroethane	10
Dichlorotetrafluoroethane	1, 000
Dimethylaniline	5
Dimethylsulfate	1
Dioxane	100
Ethyl acetate	400
yl alcohol	1, 000
nyl benzene	200
Ethyl bromide	200
Ethyl chloride	1, 000
Ethylene chlorhydrin	5
Ethylene oxide	100
Ethyl ether	400
Ethyl formate	100
Ethyl silicate	100
Formaldehyde	10
Gasolene	500
Heptane	500
Hexane	500
Hydrogen chloride	10
Hydrogen cyanide	20
Hydrogen fluoride	3
Hydrogen selenide	0. 1
Hydrogen sulfide	20
Isophorone	25
Mesityl oxide	50
Methanol	200
Methyl acetate	200
Methyl bromide	20
Methyl butanone	100
Methyl "cellosolve"	25
Methyl "cellosolve" acetate	25
Methyl chloride	100
Methylcyclohexane	500
Methyl cyclohexanol	100
Methyl cyclohexanone	100
Methyl formate	100
Methyl iso-butyl ketone	100
Monochlorobenzene	75
Monofluortrichloromethane	1, 000
Mononitrotoluene	5
Naphtha (coal tar)	200
Naphtha (petroleum)	500
Nickel carbonyl	1
Nitrobenzene	1
Nitroethane	100
Nitrogen oxides (other than nitrous oxide)	25
Nitroglycerine	0. 5
Nitromethane	100
2-Nitropropane	50
Octane	500
Ozone	1
Pentane	1, 000
Pentanone (methyl propanone)	200
Phosgene	1
Phosphine	0. 05
Phosphorus trichloride	0. 5
iso-Propanol	400
Propyl acetate	200
iso-Propyl ether	400
Stibine	0. 1
Stoddard solvent	500
Styrene monomer	200
Sulfur chloride	1
Sulfur dioxide	10
1,1,2,2-Tetrachloroethane	5
Tetrachloroethylene	100
Toluene	200
Toluidine	5
Trichloroethylene	150
Turpentine	100
Vinyl chloride (chloroethane)	500
Xylene	200

TOXIC DUSTS, FUMES, AND MISTS

Substance	Mg/M³*
Antimony	0. 1
Arsenic	0. 1
Barium	0. 5
Cadmium	0. 1
Chlorodiphenyl	1
Chromic acid and chromates (as CrO_3)	0. 1
Cyanide as CN	5
1, 2-Dichloropropane (propylene dichloride) (ppm)	75
Dinitrotoluene	1. 5
Fluorides	2. 5
Iodine	0. 1
Iron oxide fume	15
Lead	0. 15
Magnesium oxide fume	15
Manganese	6
Mercury	0. 1
Pentachloronaphthalene	0. 5
Pentachlorophenol	0. 5
Phosphorus (yellow)	0. 1
Phosphorus pentachloride	1
Phosphorus pentasulfide	1
Selenium, compounds as selenium	0. 1
Sulfuric acid	0. 5
Tellurium	0. 1
Tetryl	1. 5
Trichloronaphthalene	5
Trinitrotoluene	1. 5
Zinc oxide fumes	15

MINERAL DUSTS

Substance	M. P. P. C. F.*
Alundum	50
Asbestos	5

M. A. C. VALUES—

Carborundum	50
Dust (nuisance, no free silica)	50
Mica (below 5 percent free silica)	50
Portland cement	50
Silica—high (above 50 percent free SiO_2)	5
Silica—medium (5 to 50 percent free SiO_2)	20
Silica—low (below 5 percent free SiO^2)	50
Slate (below 5 percent free SiO_2)	50
Soapstone (below 5 percent free SiO_2)	50
Talc	20
Total dust (below 5 percent free SiO_2)	50

RADIATIONS

Material or radiation	Radiant energy
Gamma radiation	0.1 roentgen per day.
Radon	10^{-8} curies per cubic meter.
Thoron	10^{-8} curies per cubic meter.
X-ray	0.1 roentgen per day.

*ppm = parts per million.
*Mg/M³ = milligrams per cubic meter.
*M. P. P. C. F = million particles per cubic foot of air, standard light field count.

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