

tration standards until we learn through experience, or research, the true maximum safe limit, and then, if necessary, change our standards accordingly.

V. Standards for Permissible Atmospheric Contamination and How They Are Set

Our present standards of practice regarding atmospheric contaminants are very helpful bench marks, as long as we regard them for what they are and do not try to set them up as absolute safe limits to be regarded as established facts comparable to, or in the same class with, flammable limits, flash points, or other properties that can be determined accurately. Rather, the idea should be fostered that the limits are flexible and are to be adjusted to conform with any new, properly weighted, evidence of facts regarding physiological effects. It must also be remembered that just as all of us are subject to occasional ill health regardless of our work environment, so are we at one time more easily affected by foreign materials than at another. There are probably too many uncontrollable factors for us to set a positively safe limit, applying to all people at all times, and still have the limit appreciably different from that of pure air. No matter how carefully our standards are established, if they are maintained at a level compatible with industrial practice, there may be occasional ill health in the especially susceptible individual. We shall always need periodic medical examinations by thorough and competent physicians.

The United States Public Health Service has been the outstanding contributor to our knowledge of maximum permissible limits for atmospheric contaminants, and some of the states have co-operated in the toxicological and chemical studies required to establish such limits. The United States Bureau of Mines, the United States Department of Labor, and a few universities and other schools of higher learning, as well as private research organizations, have added to the store of information.

Some of the states have set up "safe" standards of their own, some of which have developed into safe practice codes enforceable by law, but for the most part they have been restricted to advisory standards. A survey conducted by the author in 1943, including thirty-four states, revealed a wide range of figures adopted by these states as maximum safe concentrations. This wide variation indicated the need for a central advisory body, whether it be the United States Public Health Service, the American Standards Association, the American Industrial Hygiene Association, the American Conference of Governmental Industrial Hygienists, or some other qualified and representative body, to take the initiative in establishing permissible concentrations. More recently several states have adopted the recommendations of the Committee on Threshold Limits of the American Conference of Governmental Industrial Hygienists. This group reviews the information available to them and publishes yearly a list of "Threshold Limit Values and Tentative Threshold Limit Values." Even though this list may have several shortcomings

is widely regarded as the most reliable information on permissible contamination of the indoor environment and, therefore, serves a very useful purpose. The 1957 report of the above committee is reproduced here in its entirety.

Threshold Limit Values for 1957^a

Adopted at the Nineteenth Annual Meeting of the American Conference of Government Industrial Hygienists, St. Louis, April 20-23, 1957

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, 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 only conditions under which it is felt that workers may be repeatedly exposed, day after day, without adverse effect on their health. The figures listed refer to weighted average concentrations of an eight-hour working shift rather than a maximum which is not to be exceeded even momentarily. The amount by which these figures may be exceeded for short periods during the workday depends upon a number of factors, including the nature of the contaminant, whether very high concentrations even for short periods produce acute poisoning, whether the results are cumulative, the frequency with which high values occur, and for what periods of time. All must be taken into consideration in arriving at a decision as to whether a hazardous situation is deemed to exist.

These values are not intended for use, or for modification for use, in the evaluation or control of community air pollution or air-pollution nuisances.

The Committee welcomes the suggestion of substances to be added to the list and also comments, references, or reports of experience with these materials.

Recommended Values

GASES AND VAPORS

Substance	p.p.m. ^a	Approx. mg. per cu. m. ^b
Acetaldehyde	200	360
Acetone	10	25
Acetone anhydride	5	20
Acetone	1,000	2,400
Acrolein	0.5	1.2
Adiponitrile	20	45
Allyl alcohol	5	12
Allyl chloride	5	15
Allyl propyl disulfide	2	12
Ammonia	100	70
Amyl acetate	200	1,050
Amyl alcohol (isoamyl alcohol)	100	360
Aniline	5	19
Aspirin	0.05	0.2

(continued)

^a Allard L. Coleman et al., *A.M.A. Arch. Ind. Health*, 16, 261-65 (Sept., 1957).