

rates have not yet been determined by the Research Laboratory but from the best data available, they are as follows:—

At rest.....	64 deg. E. T.
Light Work.....	62.5 deg. E. T.
Moderate Work.....	62 deg. E. T.
Hard Work.....	59.5 deg. E. T.

One hundred per cent perfection in ventilation, for people at rest exists when the effective temperature is 64 deg. Life is impossible for any

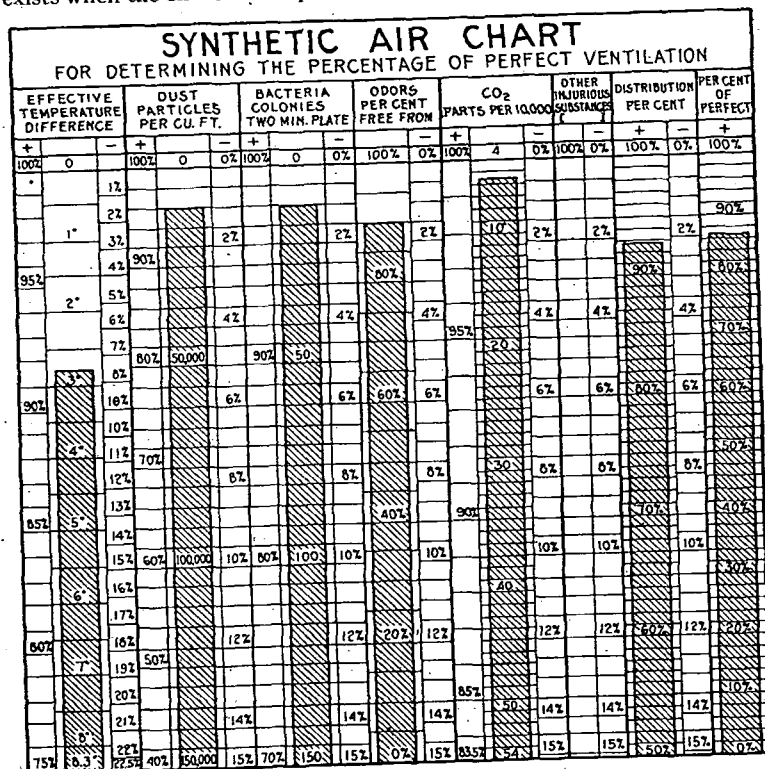


FIG. 71. SYNTHETIC AIR CHART

considerable length of time in an effective temperature of 97½ deg. and a condition having this effective temperature is therefore, rated zero per cent perfect, is penalized 100 per cent as regards this factor and 90 per cent for imperfection in ventilation. The penalization for variation in temperature from the ideal is therefore 3 per cent per deg. E. T. It will be noticed that this will give zero per cent perfection for 31 deg.—a condition at least nearly impossible for life for a person normally clothed and at rest.

Dust.—Dust is inimical to health and comfort. It is, however, more difficult to arrive at a basis of penalization since it is hard to say that any degree of dustiness is impossible for life. Dust free air is 100 per cent perfect and 250,000 particles per cu. ft. of air as determined by the Hill counter is considered zero per cent perfect, or is penalized 100 per cent as regards the dust factor and 25 per cent for imperfection of ventilation. The percentage of perfection is reduced by 1 per cent for each 2500 particles.

Odors.—In the case of odors it is even more difficult to arrive at a basis for penalization. The following arbitrary scale has been adopted:—

Free from odor.....	100 per cent perfect
Very faint odor.....	95 " " "
Faint odor.....	90 " " "
Noticeable odor.....	85 " " "
Distinct odor.....	80 " " "
Decided odor.....	75 " " "
Strong odor.....	70 " " "

Penalization for imperfection of ventilation is 0.15 of that for the odor factor.

Bacteria.—While all bacteria are not harmful and some may be desirable, the number of bacteria in the air generally indicates the surrounding sanitary condition and the chances for harmful bacteria may be assumed to be roughly proportional to the total number of bacteria in the air. According to the synthetic air chart, the percentage of perfection depends upon the number of bacteria in the air as determined by the number of growth appearing in a culture which has been exposed to the air for two minutes in a 4 in. petri dish and then incubated for 48 hrs. at 72 deg. If no colonies appear the condition is rated at 100 per cent and if 500 colonies appear it is rated at zero per cent perfect. The percentage of perfection is reduced by one for each 5 colonies for this factor while penalization for poor ventilation is one-half as great.

Carbon Dioxide.—The carbon dioxide content of the air may be taken as an indication of its purity. The percentage of perfection is 100 per cent if the carbon dioxide content is the same inside and outside and is reduced by 1 per cent for every three parts per 10,000 over that found in outside air. This gives 100 per cent penalization for 300 parts CO₂. Penalization for imperfect ventilation is 0.9 that for the CO₂ factor.

Distribution.—The distribution of the air throughout the room is an important factor in ventilation. Imperfection in this factor is determined by the variation in percentage of carbon dioxide in various parts of the room. In operating the synthetic air chart as many samples, as there are 200 sq. ft. of floor space in the room, or not less than four, of air from different parts of the room are analyzed. The percentage, which the average variation, of the various samples, is of the average CO₂ content, is the percentage penalization for poor distribution. Penalization for imperfect ventilation is 0.3 that for the distribution factor.