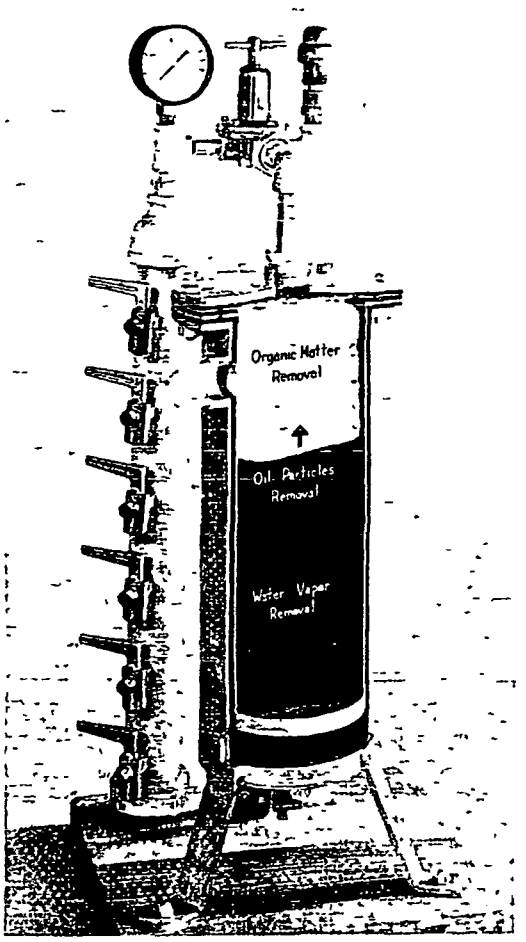

FIG 38-22 —Cutaway view showing air path through purifier and filtering materials for air line respiratory equipment Note manifold (at left) which permits 6 airlines to be connected

for ventilating, or for other purposes A flammable substance in the presence of oxygen requires only a small fraction of the energy to ignite it as does the same substance in the presence of air, and an ensuing fire or explosion is much more violent The death of three astronauts at Cape Kennedy in 1967 occurred in such an atmosphere

Air or oxygen provided by or supplied to any respiratory equipment must be free from contaminants, quality as well as quantity is important Respirable air should contain approximately 21 per cent oxygen, less than 0 005 per cent carbon monoxide, and no oil, dust, or other contaminant that cannot be filtered out (Fig 38-22)

Respiratory protective devices can be classified as follows

1 Air purifying respirators,

2 Atmosphere (air) supplied respirators, and

3 Self-contained breathing devices

In turn, these are divided into a number of subclasses

1. Air Purifying Respirators

Gas masks

The gas mask type of air purifying respirator consists of a facepiece connected by a flexible tube to a canister (Fig 38-23) Contaminated air is purified by chemicals in the canister

Because no one chemical has been found that will remove all gaseous contaminants, the canister must be carefully chosen to fit the specific need A canister designed for a specific gas or vapor (or a single class of gases or vapors) will give longer protection than a same-sized canister designed for protection against a multitude of gases and vapors

The U S Bureau of Mines tests and approves gas masks for a number of gases and vapors and combinations of these hazards Gas masks that protect against airborne particulates, in addition to gases and vapors, are available Table 38-B lists the general characteristics of gas masks and their canisters

Canister gas masks with full facepiece are for emergency protection in atmospheres immediately dangerous to life They do *not* provide protection against oxygen deficiency, their effectiveness is limited to use in atmospheres containing at least 16 per cent (by volume) oxygen, and not more than 2 per cent of those toxic gases for which it is designed (except for ammonia, for which the limit is 3 per cent, and phosphine, for which the limit is 0 5 per cent)

The period of protection that a gas mask provides depends upon (*a*) the type of canister, (*b*) the concentration of the gas or vapor, and (*c*) the activity of the user

Each person who must use a gas mask should first undergo a physical examination, especially of his heart and lungs