

## PERSONAL PROTECTIVE EQUIPMENT



Fig. 36-20. Single-cartridge chemical respirator. Twin-cartridge units are also available and give longer life and less breathing resistance

gency situations, that is, for atmospheres which are harmful only after prolonged or repeated exposures

At the present time, Bureau of Mines' approval has been given *only* for type B (organic vapor) and type BE (dusts, fumes, and mists in combination with organic vapors). These types are approved for concentrations not in excess of 1,000 parts of organic vapor per one million parts of air

### Mechanical filter respirators

A mechanical filter respirator can be designed to give satisfactory protection against any kind of particle (Fig. 36-21). The major items to be considered are the resistance to breathing offered by the filtering element, the adaptation of the facepiece to faces of various sizes and shapes, and the fineness of the particles to be filtered out

The types of mechanical filter (dispersed) respirators approved by the Bureau of Mines are as follows.

*Pneumoconiosis-producing and nuisance dust*

*respirators*, which provide respiratory protection against pneumoconiosis-producing dusts, such as aluminum, cellulose, cement, charcoal, coal, coke, flour, gypsum, iron ore, limestone, and wood

*Toxic dust respirators*, which provide respiratory protection against toxic dusts that are not significantly more toxic than lead, such as arsenic, cadmium, chromium, lead, manganese, selenium, vanadium, and their compounds

*Mist respirators*, which provide respiratory protection against pneumoconiosis-producing, chromic acid, and nuisance mists

*Fume respirators*, which provide respiratory protection against fumes (solid dispersoids or particulate matter formed by the condensation of vapors such as those from heated metals and other substances)

Dispersoid respirators have been approved that will give respiratory protection against two or more of the above types of contaminants.

The Bureau of Mines requires that the complete respirator show a resistance to inhalation not in excess of 50 mm (2 in.) of water pressure at an inhalation rate of 85 liters (3 cu ft) of air per minute. Many respirators approved by the Bureau of Mines have considerably lower resistance

Low breathing resistance requires a fairly large area of filtering medium. Fineness of the filter is fixed by the permissible leakage for various dusts. It is important that breathing resistance be low even after the respirator has had considerable use under dusty conditions. Excessive breathing resistance wastes energy and may be the source of lung injury if long continued

Filters of high porosity may give low breathing resistance with small filter area, but they will not stop fine dust. All such filters do is to improve comfort by catching the larger particles, which are usually caught in the nose and throat anyhow

Breathing out against resistance does not engender the psychological effect that resistance to inhalation does. However, it can be detrimental in that it is physically tiring.

### Combination respirators

Combination chemical and mechanical filter respirators utilize dust, mist, or fume filters with a chemical cartridge for dual or