

preferable in that it has a longer life and provides more economical protection. The useful life of the universal, type N, canister is limited by the life of the drying agents used to protect the catalyst from moisture (2 to 6 hours). Figure 1 diagrams a typical type N canister. The continued use of a partially exhausted

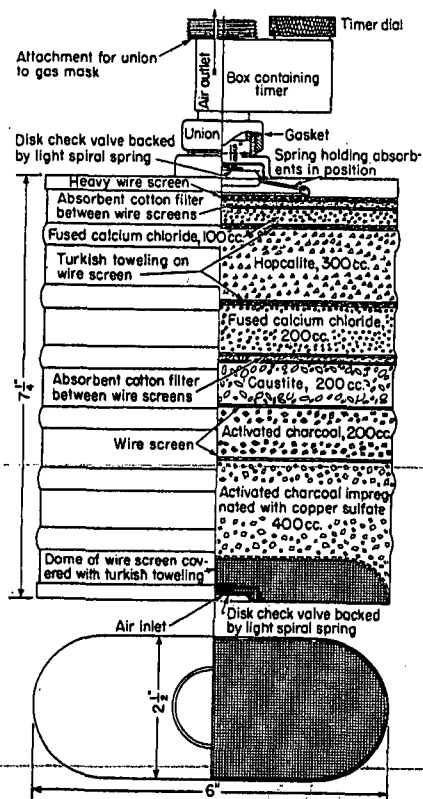


Figure 1. A type N canister. (Courtesy Bureau of Mines, U. S. Department of the Interior)

canister may be permissible in gases or vapors having distinct warning characteristics, provided it is used near an uncontaminated area so that the wearer may reach safety quickly after detecting leakage, because the end of the useful period is not sharp, but rather gradual. Any used canister should always be replaced with a new one before the mask is used in an unusually hazardous situation.

2. Chemical Cartridge Respirators

Chemical cartridge respirators usually consist of a small canister attached directly to a half-mask facepiece. The fills are similar to those used in gas masks, and in fact these respirators may be considered miniature gas masks. Filters for removing particulate matter may be incorporated. These respirators are designed for prolonged use in light exposures where workmen could work without protection, but where prolonged daily exposures might prove harmful to health. The maximum concentration of gases or vapors for which such devices are approved is 1000 ppm, 0.1 per cent by volume. Only a relatively few chemical cartridge respirators have been granted approval certificates, and the protection afforded by some of the unapproved articles is open to question. Recently, cartridge respirators have been approved for use against solvent vapors. A word of caution should be given, however, that these do not protect against lead mists, often associated with solvent vapors in paint spraying. Where lead mists are involved no cartridge respirator is approved, nor should any be depended upon; until further advances are made, some air-supplying device is required. Respirators approved for removal of lead mists as well as solvent vapors and mists have not yet appeared.

3. Mechanical Filter Respirators (for Dust, Fume, Fog, or Mist)

Mechanical filter respirators usually consist of a fibrous filter, such as felt or specially treated cellulose fiber paper, secured in a holder and connected directly to a half-mask facepiece. The filter is a maze of fine, closely packed fibers that form a network of microscopic passages. When air is drawn through this maze, the major part of the suspended dust, fume, mist, and fog is removed by physical trapping. These filters are approved for various uses, but not all of them are suitable for every purpose. Filters approved for silica dusts, however, are suitable for all fibrosis-producing and nuisance dusts. Filters approved for mechanically generated lead dusts are suitable for other mechanically generated dusts: toxic, fibrosis-producing, or nuisance. None of these is suitable for metal fumes which, owing to their smaller particle size, require a finer mesh filter. Fumes, it must be understood, are particulate matter formed by volatilization and condensation, as for instance in lead burning, and must not be construed to be gases or vapors. A filter suitable for metal fumes will filter out any particles for which any mechanical filter is approved. Unlike the gas mask, the mechanical filter improves in filtering efficiency with use or plugging. Increased breathing resistance is the major factor that limits this filter's life. These devices are intended for prolonged use and are for a relief in weight and compact. They do not seriously interfere with ordinary duties. To say that they are comfortable is stretching the imagination, and where control by other means is feasible, control by personal respiratory protection is not the method of choice. Rather, mechanical-filter respirators are to be considered as either temporary or last-resort measures; but they certainly should be recommended for any workman who is obliged to work in an atmosphere