§ 84.181 Non-powered air-purifying particulate filter efficiency level determination.

(a) Twenty filters of each non-powered air-purifying particulate respirator model shall be tested for filter efficiency against:

(1) A solid sodium chloride particulate aerosol as per this section, if N-series certification is requested by the applicant.

(2) A dioctyl phthalate or equivalent liquid particulate aerosol as per this section, if R-series or P-series certification is requested by the applicant.

(b) Filters including holders and gaskets; when separable, shall be tested for filter efficiency level, as mounted on a test fixture in the manner as used on the respirator.

(c) Prior to filter efficiency testing of 20 N-series filters, the 20 to be tested shall be taken out of their packaging and placed in an environment of 85±5 percent relative humidity at 38±2.5 °C for 25±1 hours. Following the pre-conditioning, filters shall be sealed in a gas-tight container and tested within 10 hours.

(d) When the filters do not have separable holders and gaskets, the exhalation valves shall be blocked so as to ensure that leakage, if present, is not included in the filter efficiency level evaluation.

(e) For non-powered air-purifying particulate respirators with a single filter, filters shall be tested at a continuous airflow rate of 85±4 liters per minute. Where filters are to be used in pairs, the test-aerosol airflow rate shall be 42.5±2 liters per minute through each filter.

(f) Filter efficiency test aerosols.

(1) When testing N-series filters, a sodium chloride or equivalent solid aerosol at 25±5 °C and relative humidity of 30±10 percent that has been neutralized to the Boltzmann equilibrium state shall be used. Each filter shall be challenged with a concentration not exceeding 200 mg/m^3.

(2) When testing R-series and P-series filters, a neat cold-nebulized dioctyl phthalate (DOP) or equivalent aerosol at 25±5 °C that has been neutralized to the Boltzmann equilibrium state shall be used. Each filter shall be challenged with a concentration not exceeding 200 mg/m^3.

(3) The test shall continue until minimum efficiency is achieved or until an aerosol mass of at least 200±5 mg has contacted the filter. For P-series filters, if the filter efficiency is decreasing when the 200±5 mg challenge point is reached, the test shall be continued until there is no further decrease in efficiency.

(g) The sodium chloride test aerosol shall have a particle size distribution with count median diameter of 0.075±0.020 micrometer and a standard geometric deviation not exceeding 1.86 at the specified test conditions as determined with a scanning mobility particle sizer or equivalent. The DOP aerosol shall have a particle size distribution with count median diameter of 0.185±0.020 micrometer and a standard geometric deviation not exceeding 1.60 at the specified test conditions as determined with a scanning mobility particle sizer or equivalent.

(h) The efficiency of the filter shall be monitored and recorded throughout the test period by a suitable forward-light-scattering photometer or equivalent instrumentation.

(i) The minimum efficiency for each of the 20 filters shall be determined and recorded and be equal to or greater than the filter efficiency criterion listed for each level as follows:

P100, R100 and N100: Efficiency ≥99.97%
P99, R99 and N99: Efficiency ≥99%
P95, R95 and N95: Efficiency ≥95%

§ 84.182 Exhalation valve leakage test; minimum requirements.

(a) Dry exhalation valves and valve seats will be subjected to a suction of 25 mm. water-column height while in a normal operating position.

(b) Leakage between the valve and valve seat shall not exceed 30 milliliters per minute.

Subpart L—Chemical Cartridge Respirators

§ 84.190 Chemical cartridge respirators: description.

(a) Chemical cartridge respirators including all completely assembled respirators which are designed for use as respiratory protection during entry into or escape from atmospheres not immediately dangerous to life and health, are described according to the specific gases or vapors against which they are designed to provide respiratory protection, as follows:

Type of chemical cartridge respirator [1]	Maximum use concentration, parts per million
Ammonia	300
Chlorine	10
Hydrogen chloride	50
Methyl amine	100
Organic vapor	[2] 1,000
Sulfur dioxide	50
Vinyl chloride	10

[1] Not for use against gases or vapors with poor warning properties (except where MSHA or Occupational Safety and Health Administration standards may permit such use for a specific gas or vapor) or those which generate high heats of reaction with sorbent material in the cartridge.

[2] Maximum use concentrations are lower for organic vapors which produce atmospheres immediately hazardous to life or health at concentrations equal to or lower than this concentration.

(b) Chemical cartridge respirators for respiratory protection against gases or vapors, which are not specifically listed with their maximum use concentration, may be approved if the applicant submits a request for such approval, in writing, to the Institute. The Institute shall consider each such application and accept or reject the application after a review of the effects on the wearer's health and safety and in the light of any field experience in use of chemical cartridge respirators as protection against such hazards.

§ 84.191 Chemical cartridge respirators; required components.

(a) Each chemical cartridge respirator described in § 84.190 shall, where its design requires, contain the following component parts:

(1) Facepiece, mouthpiece, and noseclip, hood, or helmet;
(2) Cartridge;
(3) Cartridge with filter;
(4) Harness;
(5) Breathing tube; and
(6) Attached blower.

(b) The components of each chemical cartridge respirator shall meet the minimum construction requirements set forth in subpart G of this part.

§ 84.192 Cartridges in parallel; resistance requirements.

Where two or more cartridges are used in parallel, their resistance to airflow shall be essentially equal.

§ 84.193 Cartridges; color and markings; requirements.

The color and markings of all cartridges or labels shall conform with the requirements of the American National Standards Institute, American National Standard for Identification of Air-Purifying Respirator Canisters and Cartridges, ANSI K13.1–1973. ANSI K13.1 is incorporated by reference and has been approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies may be obtained from American