

MAXIMUM RESISTANCE—Continued  
[Millimeter water column height]

Type of chemical-cartridge respirator	Inhalation		Exhalation
	Initial	Final <sup>1</sup>	
For gases, vapors, or gases and vapors, and particulates .....	50	70	20
Single-use respirator with valves:			
For vinyl chloride .....	20	25	20
For vinyl chloride and particulates .....	30	45	2
Single-use respirator without valves:			
For vinyl chloride .....	15	20	( <sup>2</sup> )
For vinyl chloride and particulates .....	25	40	( <sup>2</sup> )

<sup>1</sup> Measured at end of service life specified in Table 11 of this subpart.

<sup>2</sup> Same as inhalation.

**§ 84.204 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.

**§ 84.205 Facepiece test; minimum requirements.**

(a) The complete chemical cartridge respirator will be fitted to the faces of persons having varying facial shapes and sizes.

(b) Where the applicant specifies a facepiece size or sizes for the respirator together with the approximate measurement of faces they are designed to fit, the Institute will provide test subjects to suit such facial measurements.

(c) Any chemical cartridge respirator part which must be removed to perform the facepiece or mouthpiece fit test shall be replaceable without special tools and without disturbing facepiece or mouthpiece fit.

(d) The facepiece or mouthpiece fit test using the positive or negative pressure recommended by the applicant and described in his instructions will be used before each test.

(e)(1) Each wearer will enter a chamber containing 100 p.p.m. isoamyl acetate vapor for half-mask facepieces, and 1,000 p.p.m. for full facepieces, mouthpieces, hoods, and helmets.

(2) The facepiece or mouthpiece may be adjusted, if necessary, in the test chamber before starting the test.

(3) Each wearer will remain in the chamber for 8 minutes while performing the following activities:

(i) Two minutes, nodding and turning head;

(ii) Two minutes, calisthenic arm movements;

(iii) Two minutes, running in place; and

(iv) Two minutes, pumping with a tire pump into a 28-liter (1 cubic-foot) container.

(4) Each wearer shall not detect the odor of isoamyl-acetate vapor during the test.

**§ 84.206 Particulate tests; respirators with filters; minimum requirements; general.**

(a) Three respirators with cartridges containing, or having attached to them, filters for protection against particulates will be tested in accordance with the provisions of § 84.207.

(b) In addition to the test requirements set forth in paragraph (a) of this section, three such respirators will be tested, as appropriate, in accordance with the provisions of §§ 84.179 through 84.183; however, the maximum allowable resistance of complete particulate, and gas, vapor, or gas and vapor chemical cartridge respirators shall not exceed the maximum allowable limits set forth in § 84.203.

**§ 84.207 Bench tests; gas and vapor tests; minimum requirements; general.**

(a) Bench tests will be made on an apparatus that allows the test atmosphere at 50±5 percent relative humidity and room temperature, approximately 25 °C, to enter the cartridges continuously at predetermined concentrations and rates of flow, and that has means

for determining the test life of the cartridges.

(b) Where two cartridges are used in parallel on a chemical cartridge respirator, the bench test will be performed with the cartridges arranged in parallel, and the test requirements will apply to the combination rather than to the individual cartridges.

(c) Three cartridges or pairs of cartridges will be removed from containers and tested as received from the applicant.

(d) Two air purifying cartridges or pairs of cartridges will be equilibrated at room temperature by passing 25 per-

cent relative humidity air through them at the flow rate of 25 liters per minute (l.p.m.) for 6 hours.

(e) Two air purifying cartridges or pairs of cartridges will be equilibrated by passing 85 percent relative humidity air through them at the flow rate of 25 l.p.m.

(f) All cartridges will be resealed, kept in an upright position, at room temperatures, and tested within 18 hours.

(g) Cartridges will be tested and shall meet the minimum requirements set forth in Table 11 of this subpart.

TABLES TO SUBPART L OF PART 84

TABLES 9-10 [RESERVED]

TABLE 11—CARTRIDGE BENCH TESTS AND REQUIREMENTS

[42 CFR part 84, subpart L]

Cartridge	Test condition	Test atmosphere		Flowrate (l.p.m.)	Number of tests	Penetration <sup>1</sup> (p.p.m.)	Minimum life <sup>2</sup> (min.)
		Gas or vapor	Concentration (p.p.m.)				
Ammonia .....	As received .....	NH <sub>3</sub>	1000	64	3	50	50
Ammonia .....	Equilibrated .....	NH <sub>3</sub>	1000	32	4	50	50
Chlorine .....	As received .....	Cl <sub>2</sub>	500	64	3	5	35
Chlorine .....	Equilibrated .....	Cl <sub>2</sub>	500	32	4	5	35
Hydrogen chloride.	As received .....	HCl	500	64	3	5	50
Hydrogen chloride.	Equilibrated .....	HCl	500	32	4	5	50
Methylamine .....	As received .....	CH <sub>3</sub> NH <sub>2</sub>	1000	64	3	10	25
Methylamine .....	Equilibrated .....	CH <sub>3</sub> NH <sub>2</sub>	1000	32	4	10	25
Organic vapors ..	As received .....	CCl <sub>4</sub>	1000	64	3	5	50
Organic vapors ..	Equilibrated .....	CCl <sub>4</sub>	1000	32	4	5	50
Sulfur dioxide .....	As received .....	SO <sub>2</sub>	500	64	3	5	30
Sulfur dioxide .....	Equilibrated .....	SO <sub>2</sub>	500	32	4	5	30

<sup>1</sup> Minimum life will be determined at the indicated penetration.

<sup>2</sup> Where a respirator is designed for respiratory protection against more than one type of gas or vapor, as for use in ammonia and in chlorine, the minimum life shall be one-half that shown for each type of gas or vapor. Where a respirator is designed for respiratory protection against more than one gas of a type, as for use in chlorine and sulfur dioxide, the stated minimal life shall apply.

Subpart M [Reserved]

Subpart N—Special Use Respirators

§ 84.250 Vinyl chloride respirators; description.

Vinyl chloride respirators, including all completely assembled respirators which are designed for use as respiratory protection during entry into and escape from vinyl chloride atmospheres containing adequate oxygen to support life, are described according to their construction as follows:

- (a) Front-mounted or back-mounted gas masks;
- (b) Chin-style gas masks;
- (c) Chemical-cartridge respirators;
- (d) Powered air-purifying respirators; and
- (e) Other devices, including combination respirators.

§ 84.251 Required components.

- (a) Each vinyl chloride respirator described in § 84.250 shall, where its design requires, contain the following component parts:
  - (1) Facepiece;