

Statement of Standard

The SCBAs must meet the following minimum requirements:

- Approval under NIOSH 42 CFR Part 84, Subpart H
- Compliance with National Fire Protection Association (NFPA) Standard 1981 for Open-Circuit Self-Contained Breathing Apparatus for Fire Fighters
- Special Tests under NIOSH 42 CFR 84.63(c)
 - (1) Chemical Agent Permeation and Penetration Resistance Against Distilled Sulfur Mustard (HD) and Sarin (GB)
 - (2) Laboratory Respirator Protection Level (LRPL)

(1). Chemical Agent Permeation and Penetration Resistance Against Distilled Mustard (HD) and Sarin (GB) Agent Test Requirement

Open-circuit, positive-pressure SCBAs, including all components and accessories except the air cylinder (shell), shall resist the permeation and penetration of distilled sulfur mustard (HD) and sarin (GB) chemical agents when tested on an upper-torso manikin connected to a breathing machine operating at an air flow rate of 40 liters per minute (L/min), 36 respirations per minute, 1.1 liters tidal volume.

Test requirements for distilled sulfur mustard (HD) are shown in Table 1.

Table 1: Simultaneous Liquid and Vapor Challenge of SCBA with Distilled Sulfur Mustard (HD)

Agent	Challenge Concentration	Duration of Challenge (min)	Breathing Machine Airflow Rate (L/min)	Maximum Peak Excursion (mg/m ³)	Maximum Breakthrough (concentration integrated over Minimum Service Life) (mg-min/m ³)	Number of Systems Tested	Minimum Service Life (hours)
HD-Vapor	300 mg/m ³	30 ⁽¹⁾	40	0.60 ⁽³⁾	6.0 ⁽⁴⁾	3	6 ⁽²⁾
HD-Liquid	0.86 ml	360					

⁽¹⁾ Vapor challenge concentration will start immediately after the liquid drops have been applied and the test chamber has been sealed.

⁽²⁾ The test period begins upon start of initial vapor generation.

⁽³⁾ Three consecutive sequential test data points at or exceeding 0.6 mg/m³ will collectively constitute a failure where each test value is based on a detector sample time of approximately 2 minutes.

⁽⁴⁾ The cumulative Ct including all peak data points must not be exceeded for the duration of the 6-hour test.

Test requirements for sarin (GB) agent are shown in Table 2.

Table 2: Vapor Challenge of SCBA with Sarin (GB)

Challenge Agent	Vapor Concentration (mg/m ³)	Vapor Challenge Time (minutes)	Breathing Machine Airflow Rate (L/min)	Maximum Peak Excursion mg/m ³	Maximum Breakthrough (concentration integrated over Minimum Service Life) (mg-min/m ³)	Number of Systems Tested	Minimum Service Life (hours)
GB	2,000 mg/m ³	30 ⁽¹⁾	40	0.087 ⁽³⁾	2.1 ⁽⁴⁾	3	6 ⁽²⁾

⁽¹⁾ The vapor challenge concentration generation will be initiated immediately after test chamber has been sealed.

⁽²⁾ The test period begins upon initial generation of vapor concentration.

⁽³⁾ Three consecutive sequential test data points at or exceeding 0.087 mg/m³ will collectively constitute a failure where each test value is based on a detector sample time of approximately 2 minutes.

⁽⁴⁾ The cumulative Ct including all peak data points must not be exceeded for the duration of the 6-hour test.

(2). Laboratory Respiratory Protection Level (LRPL) Test Requirement

The measured laboratory respiratory protection level (LRPL) for each open-circuit positive-pressure self-contained breathing apparatus shall be ≥ 500 , when the SCBA facepiece is tested in a negative pressure mode in an atmosphere containing 20-40 mg/m³ corn oil aerosol of a mass median aerodynamic diameter of 0.4 to 0.6 micrometers.