NFPA®

1982

Standard on Personal Alert Safety Systems (PASS)

2018

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NFPA® 1982

Standard on

Personal Alert Safety Systems (PASS)

2018 Edition

This edition of NFPA 1982, *Standard on Personal Alert Safety Systems (PASS)*, was prepared by the Technical Committee on Electronic Safety Equipment and released by the Correlating Committee on Fire and Emergency Services Protective Clothing and Equipment. It was issued by the Standards Council on November 10, 2017, with an effective date of November 30, 2017, and supersedes all previous editions.

This edition of NFPA 1982 was approved as an American National Standard on November 30, 2017.

Origin and Development of NFPA 1982

The Technical Committee on Protective Equipment for Fire Fighters began work on this standard in 1980 in answer to requests from the fire service to establish requirements for a device that would sound an audible signal for aid if a fire fighter became incapacitated while operating at an emergency. The International Association of Fire Fighters (IAFF) was instrumental in the developmental work that resulted in this standard. Developmental work was completed in the spring of 1982 and submitted to the NFPA for official adoption. The first edition was presented at the Annual Meeting in Kansas City, Missouri, and released on June 9, 1983.

Between the first and second editions, the name of the technical committee was changed to the Technical Committee on Fire Service Protective Clothing and Equipment, and the Subcommittee on Personal Alert Safety Systems (PASS) was organized to manage this document. The second edition was presented to the membership of the Association at the 1988 Annual Meeting in Los Angeles, California, and had an effective date of June 28, 1988.

For the third edition, the Subcommittee on PASS undertook a complete revision of its work, which was completed in December 1991. The document was passed on to the Technical Committee on Fire Service Protective Clothing and Equipment, presented to the membership of the Association at the 1993 Annual Meeting in Orlando, Florida, and was issued with an effective date of August 20, 1993.

In January 1995, the Standards Council reorganized the entire project for fire service protective clothing and equipment. The new project had a Technical Correlating Committee on Fire and Emergency Services Protective Clothing and Equipment and seven technical committees operating within the project. The former standing Subcommittee on PASS was combined with the Subcommittee on SCBA to form the new Technical Committee on Respiratory Protection and Personal Alarm Equipment, which took over the responsibility for NFPA 1982.

The fourth edition represented a complete revision of the third edition and included PASS that are integrated with SCBA and automatic activation of all PASS. It was presented to the membership of the Association at the 1998 Annual Meeting in Cincinnati, Ohio, and had an effective date of August 5, 1998.

In October 2002, the NFPA Standards Council established a new committee, the Technical Committee on Electronic Safety Equipment, within the project structure. This new committee was given the responsibility for addressing all electronics in equipment used by emergency responders and was assigned responsibility for NFPA 1982.

The fifth edition of NFPA 1982 was a complete revision of the fourth edition. During this revision cycle, the Committee received reports from the National Institute for Occupational Safety and Health (NIOSH) Division of Safety Research on its investigations of fire-fighter fatalities where there was evidence the PASS alarm signal failed to function or was not heard by other personnel in the

area, and in some instances that there was water ingress to the electronic components that diminished or canceled the alarm signal. The National Institute for Standards and Technology (NIST) Building and Fire Research Laboratory partnered with NIOSH to characterize the performance of PASS devices in the fire-fighting environment. NIST determined that exposure to high-temperature environments reduced the loudness of the alarm signal. That reduction in loudness can cause the alarm signal to become indistinguishable from background noise at an emergency scene. Initial laboratory testing by NIST highlighted that this sound reduction could begin to occur at temperatures as low as 149°C (300°F). All PASS devices that were evaluated experienced significant alarm signal degradation at temperatures between 149°C and 260°C (300°F and 500°F). As the PASS cooled, the alarm signal on most of the units returned to pre-exposure sound levels.

NIOSH and others also noted that water ingress did occur or could have occurred in several cases, causing the alarm signal to cease to function effectively, but that after the PASS electronics dried, the alarm signal would again function.

The Committee addressed these issues and others and developed changes to the requirements for the fifth edition. More significant changes were the following:

(1) New water immersion requirements and testing where PASS is exposed to 177°C (350°F) for 15 minutes and then to water submersion in 1.5 m (4.9 ft) also for 15 minutes for each of six cycles. PASS is then examined to determine no water ingress, that all PASS signals function properly, and that electronic data logging functions operate properly. PASS is then reimmersed in the test water for an additional 5 minutes with the power source compartment(s) open; after those 5 minutes, the PASS is removed from water and wiped dry, and the electronics compartment is opened and examined to determine no water ingress.
(2) Revised high-temperature resistance requirements and added new high-temperature functionality requirements and testing procedures where PASS is exposed to 260°C (500°F) for 5 minutes while mounted in a circulating hot air oven. The PASS alarm signal must function at or above the required 95 dBA sound level for the required duration of the signal, electronic data logging functions must operate properly, and no part of the PASS can show evidence of melting, dripping, or igniting.
(3) New tumble–vibration requirements and testing in which PASS is "tumbled" in a rotating drum for 3 hours. The PASS alarm signal must function at the required 95 dBA sound level, and electronic data logging functions must operate properly.
(4) New requirements to prevent muffling of the alarm signal where PASS is mounted on a test subject and evaluated in five positions (face down with arms extended, supine left, supine right, fetal right with knees drawn to chest, fetal left with knees drawn to chest), and the alarm signal must function at or above the required 95 dBA sound level in each of the positions.

The 2013 edition of NFPA 1982 was a complete revision of the fifth edition. During this revision cycle, the Technical Committee received reports from NIST on technical changes with respect to the testing of PASS.

The 2013 edition added the minimum requirements for radio frequency (RF) PASS devices that are capable of transmitting a distress alarm and receiving an evacuation alarm via an RF signal. New definitions in this edition included *RF PASS*, *base station*, *evacuation alarm*, *loss-of-signal alarm*, *RF interference*, and *RF transceiver*. In addition, the informational references in Annex B were updated to include NIST publications.

In Chapter 4, the test matrices for stand-alone, removable, and nonremovable integrated PASS were updated, and in Chapter 6, alarm signals were revised. In Chapter 8, several new test methods were added, including radio system tests for RF PASS, loss-of-signal alarms, and an RF interference test for optional RF PASS.

The 2018 edition of NFPA 1982 features referenced document edition updates, additions to Chapter 2 and Annex D, clarifications and editorial changes, and harmonization with NFPA 1801, *Standard on Thermal Imagers for the Fire Service*.

The Technical Committee has added a failure mode and effects analysis (FMEA) for PASS devices to identify and prioritize critical failures that could have a serious effect on the safety and reliability of a PASS in the expected operating environment. The FMEA also will help describe how the PASS system might fail.

Also added are changes to the PASS annunciator now driven by an alarm sequence of eight steps, changes to the frequency of sweep and tone, and the pre-alarm sound specification.

Revisions also were made to the low power source warning signal due to the introduction of rechargeable batteries to SCBA/PASS alarms, and the standard now requires that the battery must be discharged to the low battery trip point voltage or the low battery trip point capacity remaining percentage.

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