

Standard for the Inspection, Maintenance, Testing, and Retirement of In-Service Emergency Vehicles

# 2017



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# NFPA® 1911

## Standard for the

# Inspection, Maintenance, Testing, and Retirement of In-Service Emergency Vehicles

## 2017 Edition

This edition of NFPA 1911, *Standard for the Inspection, Maintenance, Testing, and Retirement of In-Service Emergency Vehicles*, was prepared by the Technical Committee on Fire Department Apparatus. It was issued by the Standards Council on November 11, 2016, with an effective date of December 1, 2016, and supersedes all previous editions.

This edition of NFPA 1911 was approved as an American National Standard on December 1, 2016.

### **Origin and Development of NFPA 1911**

The 2007 edition of NFPA 1911, Standard for the Inspection, Maintenance, Testing, and Retirement of In-Service Automotive Fire Apparatus, combined three standards into a single document: NFPA 1911, Standard for Service Tests of Fire Pump Systems on Fire Apparatus; NFPA 1914, Standard for Testing Fire Department Aerial Devices; and NFPA 1915, Standard for Fire Apparatus Preventive Maintenance Program. A chapter was added on the retirement of fire apparatus. The out-of-service criteria in NFPA 1915 were re-evaluated to define some conditions that require a fire apparatus to be taken out of service immediately and some conditions that a technician needs to evaluate on a case-by-case basis to determine if the apparatus is safe for continued use. The term service test was changed to performance test, and new testing requirements were added for the apparatus chassis, low-voltage electrical system, foam proportioning system, compressed air-foam system, line voltage electrical system, and breathing air-compressor system

The 2012 edition of this standard was a general update and review of the document, with minor editorial clarifications.

The 2017 edition contains changes the committee made in order for the document to be consistent with NFPA 1901, *Standard for Automotive Fire Apparatus*, and NFPA 1906, *Standard for Wildland Fire Apparatus*.

Because there are two editions of NFPA 1917, *Standard for Automotive Ambulances*, the Committee decided to include requirements for ambulances as well as for ultra-high-pressure pumps (UHPs) and trailers. The Committee has made a global change in the document, which has changed the title and replaced the term "fire apparatus" with "emergency vehicle." That change makes the requirements of the document more inclusive and applicable to more than just fire apparatus.

Explanatory information has been added to the document to state that the requirements in NFPA 1911 can apply to vehicles with a GVWR less than 5001 lb, if the AHJ so chooses. A new chapter includes requirements for trailers, and another new chapter includes requirements for the patient compartment of ambulances. The Committee has made several changes to the existing chapter that covers daily/weekly checks, to ensure document and project consistency as well as to address currently accepted practices. Tire load and speed rating of tires used on emergency vehicles includes changes to ensure that the correct tires are being used based on application. The Committee has also rewritten the requirement relative to wildland fire pumps and UHPs that testing be done at least annually and when any listed repair is performed.

## History of NFPA 1911

The first edition of NFPA 1911 was issued in 1987 and was titled *Standard on Acceptance and Service Tests of Fire Department Pumping Apparatus.* It incorporated much of the material formerly included in the pamphlet *Fire Department Pumper Tests and Fire Stream Tables*, published by the National Board of Fire Underwriters and later by the Insurance Services Office.

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In 1991, the requirements for the testing of fire pumps on new fire apparatus were transferred to the standards for new fire apparatus. Material previously referenced from other documents was added to make this document self-contained. The requirements were changed to include pumps of 250 gpm (1000 L/min) and larger capacity rated at 150 psi (1000 kPa).

The 1997 edition expanded the tables to include data for pumps to 3000 gpm (12,000 L/min), added accuracy requirements for flow and speed measuring equipment, and required a tank-to-pump flow-rate check. The title of the standard was changed to *Standard for Service Tests of Fire Pump Systems on Fire Apparatus* to reflect that components of the pumping system, such as the tank-to-pump piping, were being checked.

The 2002 edition added requirements for testing the priming device, the intake relief valve system, and, for pumps rated at 750 gpm (3000 L/min) or more, the pumping engine overload capability.

#### History of NFPA 1914

The first edition of NFPA 1914 dates to 1954, when the Fire Department Equipment Committee presented a document titled *Standard Procedure for Aerial Ladder Testing*, which was designated as NFPA 193 for tentative adoption. In 1955, it received final adoption. The document contained separate tests for wood and metal aerial ladders.

In 1958, material covering the use, maintenance, and testing of in-service ground ladders was added to the document, and a single procedure for testing both wood and metal aerial ladders was approved. The 1959 edition added requirements for new aluminum ground ladders for fire department use. The 1972 edition introduced tests for evaluating platforms.

In 1975, NFPA193 was separated into two documents, one for aerial ladders and the other for ground ladders. The new *Recommended Practice for the Maintenance, Care, Testing, and Use of Fire Department Aerial Ladders and Elevating Platforms* was designated as NFPA 1904. The ground ladders were covered in NFPA 1931, *Standard on Fire Department Ground Ladders*.

A complete revision in 1980 changed the document to a standard and retitled it *Standard for Testing Fire Department Aerial Ladders and Elevating Platforms.* In 1988, more details on required inspections were included, and requirements for nondestructive testing of critical components and the testing of water towers were added. The document was renumbered and retitled NFPA 1914, *Standard for Testing Fire Department Aerial Devices.* 

The 1991 edition added clarification to the acceptance criteria for weld and other nondestructive testing inspections, revised the requirements for water system tests, and included required testing of additional components of the aerial devices. The 1997 edition added text to provide repair recommendations when the manufacturer is no longer in business, required that free weights be used in testing, allowed for acoustic emission testing, added requirements for testing secondary operating controls, and added a suggested form for recording inspection and test results.

The 2002 edition revised the qualifications for test ng personnel, added additional requirements for the inspection and testing of tractor-drawn components, and more clearly delineated when nondestructive testing is required in addition to the inspections, operational tests, and load tests.

#### History of NFPA 1915

The National Transportation Safety Board (NTSB) report "Special Investigation Report—Emergency Fire Apparatus," adopted March 19, 1991, raised concerns about the quality and type of service and repair being done on fire apparatus. Subsequent inquiries from the Federal Department of Transportation (DOT) about the different types, uses, and weights of apparatus and how they are maintained prompted the International Association of Fire Chiefs (IAFC) Apparatus Maintenance Section to petition NFPA to write a preventive maintenance standard for fire apparatus. While NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, requires fire departments to establish a preventive maintenance program for their apparatus and equipment, there was no standard on the development of such a program.

The first edition of NFPA 1915, *Standard for Fire Apparatus Preventive Maintenance Program*, was issued in 2000 to establish minimum requirements for a preventive maintenance program for fire apparatus. The requirements were designed to improve the safety and reliability of fire apparatus and to support the requirements in other NFPA standards related to emergency vehicle maintenance programs.

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NOTE: Membership on a committee shall not in and of itself constitute an endorsement of the Association or any document developed by the committee on which the member serves.

Committee Scope: This Committee shall have primary responsibility for documents on the design and performance of fire apparatus for use by the fire service.

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#### NFPA 1911

### Standard for the

# Inspection, Maintenance, Testing, and Retirement of In-Service Emergency Vehicles

#### 2017 Edition

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NOTICE: An asterisk (\*) following the number or letter designating a paragraph indicates that explanatory material on the paragraph can be found in Annex A.

A reference in brackets [] following a sec ion or paragraph indica es material that has been extracted from another NFPA document. As an aid to the user, the complete title and edition of the source documents for extracts in mandatory sections of the document are given in Chapter 2 and those for extracts in informational sections are given in Annex E. Extracted text may be edited for consistency and style and may include the revision of internal paragraph references and other references as appropriate. Requests for interpretations or revisions of extracted text shall be sent to the technical committee responsible for the source document.

Information on referenced publications can be found in Chapter 2 and Annex E.

#### Chapter 1 Administration

#### 1.1 Scope.

**1.1.1** This standard defines the minimum requirements for establishing an inspection, maintenance, and testing program for in-service emergency vehicles.

**1.1.2** This standard includes guidelines for emergency vehicle refurbishment and retirement.

**1.1.3** This standard identifies the systems and items on an emergency vehicle that are to be inspected and maintained, the frequency of such inspections and maintenance, and the requirements and procedures for conducting performance tests on components.

**1.1.4** This standard provides sample forms for collecting inspection and test data.

#### 1.2 Purpose.

**1.2.1** The primary purpose of this standard is to provide requirements for an inspection, maintenance, and testing program that will ensure that in-service emergency vehicle are serviced and maintained to keep them in safe operating condition and ready for response at all times.

**1.2.2** The secondary purpose of this standard is to establish that safety is a primary concern for the continued in-service use of an emergency vehicle and the ultimate decision to refurbish or retire that emergency vehicle.

**1.2.3** It is not the intent of this standard to restrict any jurisdiction from exceeding the minimum requirements described in this document.

# 1.3 Application.

**1.3.1** This standard shall apply to public, governmental, military, and private organizations providing rescue, fire suppression, emergency medical services, hazardous materials mitigation, special operations, or other emergency services.

**1.3.2** This standard shall apply to all in-service emergency vehicles, regardless of the year of manufacture.

**1.3.3** This standard shall apply to permanently installed components on emergency vehicles.

**1.3.4** This standard shall not apply to portable equipment carried on emergency vehicles unless otherwise stated in specific requirements.

**1.3 5** The provisions of this standard shall not supersede any instructions, specifications, or practices defined or required by the emergency vehicle manufacturer, component manufacturer, equipment manufacturer, or authority having jurisdiction.

**1.4 Equivalency.** Nothing in this standard is intended to prevent the use of systems, methods, or devices of equivalent or superior quality, strength, fire resistance, effectiveness, durability, and safety over those prescribed by this standard.

**1.4.1** Technical documentation shall be submitted to the authority having jurisdiction to demonstrate equivalency.

**1.4.2** The system, method, or device shall be approved for the intended purpose by the authority having jurisdiction.

# 1.5\* Units and Formulas.

**1.5.1** In this standard, values for measurement in inch-pound units are followed by an equivalent in metric units.

**1.5.2** Either set of values shall be permitted to be used, but the same set of values (either inch-pound units or metric units) shall be used consistently.

#### **Chapter 2** Referenced Publications

**2.1 General.** The documents or portions thereof listed in this chapter are referenced within this standard and shall be considered part of the requirements of this document.

**2.2 NFPA Publications.** National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 1002, Standard for Fire Apparatus Driver/Operator Professional Qualifications, 2017 edition.

NFPA 1071, Standard for Emergency Vehicle Technician Professional Qualifications, 2016 edition.

NFPA 1901, Standard for Automotive Fire Apparatus, 2016 edition.

NFPA 1906, Standard for Wildland Fire Apparatus, 2016 edition.

NFPA 1961, Standard on Fire Hose, 2013 edition.

NFPA 1962, Standard for the Care, Use, Inspection, Service Testing, and Replacement of Fire Hose, Couplings, Nozzles, and Fire Hose Appliances, 2013 edition.

NFPA 1989, Standard on Breathing Air Quality for Emergency Services Respiratory Protection, 2013 edition.

#### 2.3 Other Publications.

**2.3.1 ASME Publications.** American Society of Mechanical Engineers, Two Park Avenue, New York, NY 10016-5990.

ASME B30.5, Mobile and Locomotive Cranes, 2014.

ASME B40.100, Pressure Gauges and Gauge Attachments, 2013.

**2.3.2 ASNT Publications.** American Society for Nondestructive Testing, Inc., P.O. Box 28518, 1711 Arlingate Lane, Columbus, OH 43228-0518.

ASNT CP-189, Standard for Qualification and Certification of Nondestructive Testing Personnel, 2011.

**2.3.3 ASTM Publications.** ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959.

ASTM B647, Standard Test Method for Indentation Hardness of Aluminum Alloys by Means of a Webster Hardness Gage, 2010.

ASTM B648, Standard Test Method for Indentation Hardness of Aluminum Alloys by Means of a Barcol Impressor, 2010.

ASTM E6, Standard Terminology Relating to Methods of Mechanical Testing, 2011 e1.

ASTM E10, Standard Test Method for Brinell Hardness of Metallic Materials, 2012.

ASTM E18, Standard Test Methods for Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials, 2014.

ASTM E92, Standard Test Methods for Vickers Hardness and Knoop Hardness of Metallic Materials, 2016.

ASTM E114, Standard Practice for Ultrasonic Pulse-Echo Straight-Beam Examination by the Contact Method, 2010.

ASTM E165/E165M, Standard Test Method for Liquid Penetrant Examination, 2012.

ASTM E569/E569M, Standard Practice for Acoustic Emission Monitoring of Structures During Controlled Stimulation, 2013.

ASTM E650/E650M, Standard Guide for Mounting Piezoelectric Acoustic Emission Sensors, 2012.

ASTM E709, Standard Guide for Magnetic Particle Examination, 2014.

ASTM E797/E797M, Standard Practice for Measuring Thickness by Manual Ultrasonic Pulse-Echo Contact Method, 2010.

ASTM E1004, Standard Practice for Determining Electrical Conductivity Using the Electromagnetic (Eddy-Current) Method, 2009.

ASTM E1220, Standard Test Method for Visible Penetrant Examination Using the Solvent-Removable Process, 2010.

ASTM E1316, Standard Terminology for Nondestructive Testing, 2013.

ASTM E1418, Standard Test Method for Visible Penetrant Examination Using the Water-Washable Process, 2010.

**2.3.4 AWS Publications.** American Welding Society, 8669 NW 36 Street, #130, Miami, FL 33166-6672.

AWS B1.10/B1.10M, Guide for the Nondestructive Examination of Welds, 2009.

AWS D1.1/D1.1M, Structural Welding Code — Steel, 2011.

AWS D1.2/D1.2M, Structural Welding Code — Aluminum, 2014.

**2.3.5 ISO Publications.** International Organization for Standardization, ISO Central Secretariat, BIBC II, Chemin de Blandonnet 8, CP 401, 1214 Vernier, Geneva, Switzerland.

ISO/IEC 17020, Conformity assessment — Requirements for the operation of various types of bodies performing inspection, 2012.

**2.3.6 U.S. Government Publications.** U.S. Government Publishing Office, 732 North Capitol Street, NW, Washington, DC 20402-0001.

Title 49, Code of Federal Regulations, Part 399.211, Appendix G, "Minimum Periodic Inspection Standards."

#### 2.3.7 Other Publications.

Merriam-Webster's Collegiate Dictionary, 11th edition, Merriam-Webster, Inc., Springfield, MA, 2003.

#### 2.4 References for Extracts in Mandatory Sections.

NFPA 70<sup>®</sup>, National Electrical Code<sup>®</sup>, 2017 edition.

NFPA 99, Health Care Facilities Code, 2015 edition.

NFPA 414, Standard for Aircraft Rescue and Fire-Fighting Vehicles, 2017 edition.

NFPA 1451, Standard for a Fire and Emergency Service Vehicle Operations Training Program, 2013 edition.

NFPA 1901, Standard for Automotive Fire Apparatus, 2016 edition.

#### **Chapter 3 Definitions**

**3.1 General.** The definitions contained in this chapter shall apply to the terms used in this standard. Where terms are not defined in this chapter or within another chapter, they shall be defined using their ordinarily accepted meanings within the context in which they are used. *Merriam-Webster's Collegiate Dictionary*, 11th edition, shall be the source for the ordinarily accepted meaning.

## 3.2 NFPA Official Definitions.

**3.2.1\* Approved.** Acceptable to the authority having jurisdiction.