

NFPA 1915

Standard for Fire Apparatus Preventive Maintenance Program

2000 Edition



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An International Codes and Standards Organization

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NFPA 1915

Standard for

Fire Apparatus Preventive Maintenance Program

2000 Edition

This edition of NFPA 1915, *Standard for Fire Apparatus Preventive Maintenance Program*, was prepared by the Technical Committee on Fire Department Apparatus and acted on by the National Fire Protection Association, Inc., at its World Fire Safety Congress and Exposition™ held May 14–17, 2000, in Denver, CO. It was issued by the Standards Council on July 20, 2000, with an effective date of August 18, 2000.

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Origin and Development 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 the NFPA to write a preventive maintenance standard for fire apparatus. NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, also requires fire departments to establish a preventive maintenance program for their apparatus and equipment.

This first edition of NFPA 1915, *Standard for Fire Apparatus Preventive Maintenance Program*, was developed to provide the minimum requirements for a preventive maintenance program for fire apparatus. Implementation of the requirements in the standard should improve the safety and reliability of fire apparatus and support the requirements in other NFPA standards dealing with 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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Maintenance Program****2000 Edition**

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

Information on referenced publications can be found in Chapter 11 and Appendix B.

Chapter 1 Administration

1.1 Scope. This standard defines the minimum requirements for establishing a preventive maintenance program for fire apparatus. These requirements shall apply to public or private organizations utilizing fire apparatus.

The standard identifies the systems and items to be inspected, frequency of servicing and maintenance, and requirements for testing. This standard is not intended to supersede any instructions, specifications, or practices defined or required by the fire apparatus manufacturer, component manufacturer, equipment manufacturer, or the authority having jurisdiction.

1.2 Purpose. The purpose of this maintenance program standard is to ensure that fire apparatus are serviced and maintained to keep them in safe operating condition and are ready for response at all times. It is not the intent of this standard to restrict any jurisdiction from exceeding the minimum requirements described in this document.

1.3 Definitions.

1.3.1 Adjust. To maintain or regulate, within prescribed limits, by setting the operating characteristics to specified parameters.

1.3.2 Alignment. To adjust components to bring about optimum or desired performance.

1.3.3* Authority Having Jurisdiction. The organization, office, or individual responsible for approving equipment, materials, an installation, or a procedure.

1.3.4 Calibrate. To correlate the reading of an instrument or system of measurement with a standard.

1.3.5 Collector Rings. A means of transmitting electrical power to the aerial device turntable from the main power supply; usually, concentric rings made of brass that are contacted by brushes to make the transfer to the specific electrical functions.

1.3.6 Component. A constituent part of a mechanical or electrical device.

1.3.7 Defect. A discontinuity in a part or a failure to function that interferes with the service or reliability for which the part was intended.

1.3.8 Defective. Having a defect, or faulty.

1.3.9 Deformation. Abnormal wear, defects, cracks or fractures, warpage, and deviations from the original condition that would affect safe and correct operation.

1.3.10 Documentation. The process of gathering, classifying, and storing information.

1.3.11 Failure. A cessation of proper functioning or performance.

1.3.12 Fire Apparatus. A vehicle used for fire suppression or support by a fire department, fire brigade, or other agency responsible for fire protection.

1.3.12.1 Combination Fire Apparatus. A vehicle consisting of a pulling tractor and trailer.

1.3.12.2 Single Fire Apparatus. A vehicle on a single chassis frame.

1.3.13 Frame. The basic structural system that transfers the weight of the fire apparatus to the suspension system.

1.3.14 Inspect. To determine the condition or operation of a component(s) by comparing its physical, mechanical, and/or electrical characteristics with established standards, recommendations, and requirements through examination by sight, sound, or feel.

1.3.15 Interlock. A device or arrangement by means of which the functioning of one part is controlled by the functioning of another.

1.3.16 Ironing. Damage in the form of wear or indentations caused to the bottom of the aerial device base rail material by misalignment or malfunction of the rollers.

1.3.17 Leakage. The escape of a fluid from its intended containment, generally at a connection. The three classes of leakage are defined.

1.3.17.1 Leakage, Class 1. Seepage of fluid, as indicated by wetness or discoloration, not great enough to form drops.

1.3.17.2 Leakage, Class 2. Leakage of fluid great enough to form drops, but not enough to cause drops to fall from the item being inspected.

1.3.17.3 Leakage, Class 3. Leakage of fluid great enough to cause drops to fall from the item being inspected.

1.3.18 Maintenance. The act of servicing a fire apparatus or a component within the time frame prescribed by the authority having jurisdiction, based on manufacturer's recommendations, local experience, and operating conditions in order to keep the vehicle and its components in proper operating condition.

1.3.18.1 Preventive Maintenance. The act or work of keeping something in proper condition by performing necessary preventive actions, in a routine manner, to prevent failure or breakdown.

1.3.19 Manufacturer's Recommendation (Specification). Any requirement or suggestion a fire apparatus builder or component producer makes in regard to care and maintenance of its product(s).

1.3.20 Modification. An alteration or adjustment to any component that is a deviation from the original specifications or design of the fire apparatus.

1.3.21 Operator Alert Device. Any device, whether visual, audible, or both, installed in the driving compartment or at an operator's panel, to alert the operator to either a pending failure, an occurring failure, or a situation that requires his or her immediate attention.

1.3.22* Optical Source. Any single, independently mounted, light-emitting component in a lighting system.

1.3.23* Overhaul. To inspect, identify deficiencies, and make necessary repairs to return a component to operational condition.

1.3.24 Power Train. The parts of a fire apparatus that transmit power from the engine to the wheels, including the transmission, split shaft power takeoff, midship pump transmission, drive shaft(s), clutch, differential(s), and axles.

1.3.25 Powered Equipment Rack. A power-operated device that is intended to provide storage of hard suction hoses, ground ladders, or other equipment, generally in a location above apparatus compartments.

1.3.26 Proper. As recommended by the manufacturer.

1.3.27 Qualified Person. A person who, by possession of a recognized degree, certificate, professional standing, or skill, and who, by knowledge, training, and experience, has demonstrated the ability to deal with problems relating to a particular subject matter, work, or project.

1.3.28 Repair. To restore to sound condition after failure or damage.

1.3.29 Replace. To remove an unserviceable item and install a serviceable counterpart in its place.

1.3.30 Severe Service. Those conditions that apply to the rigorous, harsh, and unique applications of fire apparatus, including but not limited to local operating and driving conditions, frequency of use, and manufacturer's severe service (duty) parameters.

1.3.31 Shall. Indicates a mandatory requirement.

1.3.32 Should. Indicates a recommendation or that which is advised but not required.

1.3.33 Steering Axle. Any axle designed such that the wheels have the ability to turn the vehicle.

1.3.34 Test. To verify serviceability by measuring the mechanical, pneumatic, hydraulic, or electrical characteristics of an item and comparing those characteristics with prescribed standards.

1.3.34.1 Operational Test. A test to determine the operational readiness of a component on a fire apparatus by observing the actual operation of the component.

Chapter 2 General Requirements

2.1 Inspections.

2.1.1* All inspections shall be conducted in accordance with the manufacturer's recommended procedures.

2.1.2 It shall be the responsibility of the authority having jurisdiction to develop and implement a schedule of service and maintenance for the fire apparatus, systems, and components described in this document, based on manufacturer's recommendations, local experience, and operating conditions. Inspections shall be performed at least as frequently as the manufacturer's recommended intervals and when the fire apparatus or any component is suspected or reported to have defects or deficiencies.

2.1.3* All defects or deficiencies found during an inspection shall be repaired or corrected by a qualified person.

2.1.4* It shall be the responsibility of the authority having jurisdiction to develop written criteria for when the apparatus is to be taken out of service. The presence of defects and defi-

ciencies that reduce the operational safety and performance of the apparatus below the level established in the 49 *CFR*, part 390, "Federal Motor Carrier Safety Regulations"; applicable federal, state, and local regulations; applicable nationally recognized standards; manufacturers' recommendations; and guidelines established by the fire department or its designated service and maintenance organization shall be considered when developing the out-of-service criteria. The apparatus shall be returned to service only after defects and deficiencies have been corrected.

2.1.4.1* Driving and Crew Areas, Apparatus Body, and Compartmentation. The following defects and deficiencies of the driving and crew areas, the apparatus body, and the compartmentation reduce the operational safety and performance of the fire apparatus and shall be considered when developing the out-of-service criteria:

- (1) Body mounting that is defective
- (2) Cab mounting that is defective
- (3) Seat belts that are torn or have melted webbing, missing or broken buckles, or loose mountings. Due to the extreme safety-related consequences of a defective seat belt, and the fact that one defective seat belt (unless it is the driver's seat belt) does not render a piece of apparatus unusable, the authority having jurisdiction shall take any seating position with a defective seat belt out of service
- (4) Cracked or broken windshield that obstructs the driver's/operator's view
- (5) Missing or broken rearview mirrors that obstruct the driver's/operator's view
- (6) Windshield wipers that are missing or inoperable
- (7) Steering wheel that has a deficiency
- (8) Oil pressure gauge or engine or transmission temperature gauges that have failed
- (9) Air gauge or audio low air warning device that has failed
- (10) Door latches that are defective
- (11) Defrosters that are defective
- (12) Foot throttle that is defective

2.1.4.2* Chassis, Axles, Steering and Suspension Systems, Driveline, Wheels, and Tires. The following defects and deficiencies of the chassis, axles, steering and suspension systems, driveline, wheels, and tires reduce the operational safety and performance of the fire apparatus and shall be considered when developing the out-of-service criteria:

- (1) Tires that have cuts in the sidewall that penetrate to the cord
- (2) Tires that are defective
- (3) Tires that have a tread depth of $\frac{4}{32}$ in. (3.2 mm) or less on any steering axle or $\frac{2}{32}$ in. (1.6 mm) or less on any non-steering axle at any two adjacent major tread grooves anywhere on the tire
- (4) Suspension components that are defective
- (5) Wheel fasteners that are missing or broken
- (6) Wheels that are defective
- (7) Axle flanges that have Class 3 leakage
- (8) An axle that has any Class 3 leakage
- (9) Steering components that are defective
- (10) A steering component that has Class 3 leakage
- (11) Driveline components that are defective

2.1.4.3* Engine Systems. The following defects and deficiencies of the engine systems reduce the operational safety and

performance of the fire apparatus and shall be considered when developing the out-of-service criteria:

- (1) Air filter restriction indicator that shows maximum restriction
- (2) Engine that won't crank or start
- (3) Engine system that has Class 3 leakage of oil
- (4) Engine that is overheating
- (5) Oil that contains coolant
- (6) Oil that is diluted with fuel
- (7) A fuel system component that has Class 2 leakage of fuel
- (8) Fuel tank, mountings, or straps that are defective
- (9) Stop-engine light that fails to turn off after engine is started

2.1.4.4 Engine Cooling System. The following defects and deficiencies of the engine cooling system reduce the operational safety and performance of the fire apparatus and shall be considered when developing the out-of-service criteria:

- (1) Cooling system component that has Class 3 leakage
- (2) Coolant that contains oil
- (3) Radiator that is defective
- (4) Water pump bearing that is defective
- (5) Cooling fan that is defective
- (6) Coolant system components that are defective

2.1.4.5 Transmission and Clutch. The following defects and deficiencies of the transmission and clutch reduce the operational safety and performance of the fire apparatus and shall be considered when developing the out-of-service criteria:

- (1) Clutch components that are defective
- (2) Transmission components that are defective
- (3) Shift linkages that are defective
- (4) Automatic transmission that overheats in any range
- (5) Automatic transmission that has a "Do not shift" light on
- (6) Transmission components that have Class 3 leakage of transmission oil

2.1.4.6* Low-Voltage and Line Voltage Electrical Systems. The following defects and deficiencies of the low voltage electrical system and the line voltage electrical system reduce the operational safety and performance of the fire apparatus and shall be considered when developing the out-of-service criteria:

- (1) Federal Department of Transportation lighting that is defective
- (2) Ignition system that is defective
- (3) Charging system that is defective
- (4) Grounding and bonding of the line voltage electrical system that is defective

2.1.4.7 Braking Systems.

2.1.4.7.1* Air Brake Systems. The following defects and deficiencies of the air brake system reduce the operational safety and performance of the fire apparatus and shall be considered when developing the out-of-service criteria:

- (1) Service brakes that have an air pressure drop of more than 2 psi (13.8 kPa) in 1 minute for single fire apparatus or more than 3 psi (20.7 kPa) in 1 minute for combination fire apparatus, with the engine stopped and the service brakes released
- (2) Leak-down rate (time) of the applied side of the air brake that is more than 3 psi (20.7 kPa) in 1 minute for single fire apparatus or more than 4 psi (27.6 kPa) in 1 minute for combination fire apparatus, with the engine stopped and the service brakes applied

- (3) Brakes that are out of adjustment
- (4) Braking system components that are defective
- (5) Braking operation that is ineffective
- (6) Parking brake operation that is ineffective
- (7) Air compressor that fails to build air pressure
- (8) Air compressor that fails to maintain 80–90 psi (552–621 kPa) pressure in the system with the service brakes applied and the engine at idle, or air compressor that fails to fill the air system to the air compressor governor cutout pressure with the service and parking brakes released
- (9) Friction surfaces, brake shoes, or disc brake pads that have grease or oil on them
- (10) Brake lining or pads that are worn beyond the brake system manufacturer's minimum specifications
- (11) Rotors and drums that are worn beyond the brake system manufacturer's minimum specifications
- (12) Antilock braking system (ABS) warning indicator that is activated

2.1.4.7.2* Hydraulic Brake Systems. The following defects and deficiencies of the hydraulic brake system reduce the operational safety and performance of the fire apparatus and shall be considered when developing the out-of-service criteria:

- (1) Brake system components that have Class 2 leakage of brake fluid
- (2) Friction surfaces, brake shoes, or disc brake pads that have grease or oil on them
- (3) Braking system components that are defective
- (4) Braking operation that is ineffective
- (5) Parking brake operation that is ineffective
- (6) Brake warning light that is activated or brake pedal that falls away or drifts toward the flooring when brake pressure is applied
- (7) Brake lining or pads that are worn beyond the brake system manufacturer's minimum specifications
- (8) Rotors and drums that are worn beyond the brake system manufacturer's minimum specifications
- (9) ABS warning indicator that is activated

2.1.4.8* Fire Pump System. The following defects and deficiencies of the fire pump system reduce the operational safety and performance of the fire apparatus and shall be considered when developing the out-of-service criteria:

- (1) Pump test results that fall below 90 percent of the original rating of the pump when tested in accordance with NFPA 1911, *Standard for Service Tests of Fire Pump Systems on Fire Apparatus*
- (2) Pump that will not engage
- (3) Water tank that will not hold water
- (4) Pressure control system that is not operational
- (5) Pump transmission components that have Class 3 leakage of fluid
- (6) Pump transmission lubricant that is contaminated
- (7) Pump panel throttle that is defective

2.1.4.9* Aerial Device Systems. The following defects and deficiencies of the aerial device and its systems reduce the operational safety and performance of the fire apparatus and shall be considered when developing the out-of-service criteria:

- (1) Power takeoff (PTO) that will not engage
- (2) Stabilizer system that is defective
- (3) Aerial device that is defective
- (4) Hydraulic system components that are defective
- (5) Cable sheaves that are defective