

F1 Inspection, Maintenance & Testing of Fire Apparatus

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Suggested Reference Material:

NFPA 1911, *Standard for the Inspection, Maintenance, Testing, and Retirement of In-Service Automotive Fire Apparatus*, including annexes National Fire Protection Association (800) 344-3555 or www.nfpa.org

OSHA 1926.552 Crane and Derricks wire rope section 1926.552(a)(3)(i)

http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=10762

Meritor Preventive Maintenance and Lubrication MM1. Sections 2, 4, 6, 7 & 8

Meritor Maintenance Manual MM4M Sections 8 & 13

Download the Meritor documents for no charge at:

<http://www.meritor.com/customer/northamerica/od/default.aspx>, then in *Search by Keyword/Publication #* box enter **MM1**, then scroll down to the list. Then the same for **MM4M**.

Pumping Apparatus DRIVER/OPERATOR Handbook, 3rd edition, Oklahoma State University, Stillwater, OK. (800) 654-4055 or www.ifsta.org; Chapters 2, 3, & 9

Selective Catalytic Reduction <http://www.dieselforum.org/about-clean-diesel/what-is-scr>

Cummins Drivers tips for Fire & Emergency Vehicles <http://cumminsengines.com/brochure-download.aspx?brochureid=307>

LEARNING OBJECTIVES

1. Definitions and Terms

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|------------------|---------------------------------|---------------------------------------|
| a. Shall | k. Class 1 Liquid Leakage | u. Ultrasonic Inspection |
| b. Should | l. Class 2 Liquid Leakage | v. Preventive Maintenance |
| c. Documentation | m. Class 3 Liquid Leakage | w. Instability |
| d. Deflection | n. Qualified Person | x. Fire Pump |
| e. Deformation | o. Non-Destructive Test (NDT) | y. SCR-Selective Catalytic Reduction- |
| f. Drive Train | p. Magnetic Particle Inspection | z. DEF-Diesel Exhaust Fluid |
| g. Interlock | q. Out of Service | (1) components |
| h. Ironing | r. Retired Fire Apparatus | aa. HEST - High Exhaust System Temp. |
| i. Leak | s. Reserve Fire Apparatus | bb. Diverter Valve |
| j. Leakage | t. In-Service Fire Apparatus | cc. Performance test |

2. General Requirements

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|--------------------------------|--|
| a. Federal, State & Local Laws | d. Qualification of Personnel to NFPA 1071 |
| b. Personal Protection | e. Lubrication-frequency, grade, amount |
| c. Documentation | f. Safety |

3. Out-of-Service Criteria

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|--|---|
| a. Steering Components
(1) 49 CFR Part 399.211, Appendix G, "Minimum Periodic Inspection Standards" | m. Axle Oil Leakage |
| b. Out-of-Service Indicators | n. Brake Fluid Leakage |
| c. Minimum Brake Lining Thickness | o. Fuel Leaking |
| d. Fluid Leak Classifications | p. Power Steering Leakage |
| e. Brake system | q. Wire Rope |
| (1) Air Brakes | r. Emergency Lights |
| (a) Air pressure drop | s. Fire pump system |
| (b) Compressor air build up | (1) Deficiencies |
| (2) Hydraulic Brakes | t. Driving and Crew Areas, Body, Compartmentation |
| (3) Wheel Chocks | u. Aerial Device Systems |
| f. Low Air Warning | (1) Audible Alarm Systems |
| g. Component Out-of-Service | (2) Intercom |
| h. Seat Belts | (3) Emergency Hydraulic Systems |
| i. Wheel & Tire Deficiencies | v. Low-Voltage and Line Voltage Electrical System |
| j. Engine Oil Leakage | w. Horn Audible Warning Devices |
| k. Transmission and clutch | x. Stop Engine Light |
| (1) Oil Leakage & Contamination | y. Wheel Chocks |
| (2) Deficiencies | z. Engine out of service |
| l. Coolant System | aa. Trailer |
| (1) Leakage | (1) Out of service |
| (2) Deficiencies | (2) Tires |
| | (3) Inspection |

4. Inspection, Diagnostic Checks and Maintenance

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| a. Chassis | | |
| (1) King Pins | (a) tread depth | (17) Drive Line |
| (a) Lubrication of Meritor King Pin Bushing | (10) Tire coding | (18) Brake Lining, Drums & Rotors |
| (2) Steering Gear Box | (11) Battery Conditioner | (19) filter intervals |
| (3) Steering Stops | (12) Frame Rails | (a) air |
| (4) Drive Belts | (13) Engine Cooling | (b) hydraulic |
| (5) Alternator | (14) Engine Air Intake and Exhaust Systems | (20) U-Joint Movement & Lubrication |
| (6) Ignition System | (15) Engine Service Intervals | (21) Axle |
| (7) Work Lights | (a) severe service | (a) Driving |
| (8) Air Leak Down Rates | (b) oil | (i) Fluid Level |
| (9) Wheels & Tires | (16) Transmission Heat Exchanger | (b) Steering |
| | | (22) Tie rod ends Continued other side |

- (23) Automatic Slack Adjuster (ASA)
- (24) Packing drip rate
- (25) Idle RPM
- (26) Battery
- (27) Steering wheel free play
- (28) Instruction plates and warning signage
- (29) Slip Yokes
- (30) Steering troubleshooting
- (31) Spring Brake Travel
- (32) Brake Diagnosis
- (33) ABS Historic Codes
- (34) Pressure Maintaining Valve
- (35) Turbo
- (36) Characteristics of DEF
 - (a) solution of purified water & urea
 - (b) non-toxic, non-hazardous
 - (c) freezing point
- (37) Engine ECM

- b. Low Voltage
 - (1) Components
 - (2) Alarm
 - (3) Apparatus Lighting
 - (4) Voltage Drop Test
 - (5) Starting system
- c. Water Pumping Systems and Water Tanks
 - (1) Transfer valve
 - (2) Priming System
 - (3) Pressure Controls
 - (a) Test for Fire Pumps
- d. Aerial Devices
 - (1) Deformation
 - (2) Nondestructive Testing
 - (3) Breathing Air
- e. Foam Proportioning Systems
 - (1) Foam Sampling
 - (2) Inspection
 - (3) Foam Concentration Inspection
- f. Line Voltage
 - (1) Testing
 - (2) Power Sources
 - (3) GFCI
- g. Utility Air and Breathing Air
 - (1) Hydrostatic Bottle Testing
 - (2) Maintenance Requirements
- h. Winch Systems
 - (1) Wire Rope
 - (2) Inspections
 - (3) Out of service criteria as stated in OSHA 1926.552 (a)(3)(I)
- i. Service criteria for out of business manufacturers

5. Road Tests

- a. Fire Apparatus Axle Weight Test
 - (1) Weight Verification
 - (2) Fully Loaded State
- b. Braking System
 - (1) Braking Test
 - (2) ABS Braking
 - (3) Performance Test
 - (4) Air Brake Alarm
- c. Parking Brake System
 - (1) Testing
- d. Road Test
 - (1) Requirements
 - (2) Recording
- e. Hest Lamp Operation
- f. DPF Lamp Operation

6. Performance Testing

- a. Low Voltage Electrical Systems
 - (1) Voltage Regulator Testing
 - (2) Battery Testing
 - (3) Conductivity Test
 - (4) Voltage Drop Test
 - (5) Alternator Test
 - (6) Continuous Electrical Load
 - (7) Solenoid Voltage Drop Test
 - (8) Load Testing
 - (9) Battery conditioner test
- b. Fire Pumps & Industrial Supply Pumps
 - (1) Gauges - Master
 - (2) Gauges Discharge
 - (3) Interlocks
 - (4) Flow meter
 - (5) Automatic Transmission
 - (6) Hydro testing time
- c. Aerial Device
 - (1) Wire Rope inspection (OSHA 1926.552)
 - (2) Interlocks
 - (3) Inspections
 - (4) Testing Intervals
 - (5) Practical Testing
 - (6) Elevation load test
 - (7) Dye Penetrate Testing
 - (8) Breathing Air Supply
 - (9) Hydraulic Components
 - (10) Nondestructive Test
- d. Foam Proportioning Systems
 - (1) Operational testing
 - (2) Testing Methods
- e. Compressed Air Foam Systems (CAFS)
 - (1) Test Procedures
 - (2) Compressor Test
 - (3) Performance
- f. Line Voltage Electrical Systems
 - (1) Testing Procedures
 - (2) Full Load Test