TC005 - 2024

Fire Apparatus Standard Changes 2024

Prepared by the FAMA Technical Subcommittee

This guide does not endorse any manufacturer or product.

Contents

Introduction

The National Fire Protection Association (NFPA) has for years published standards for fire apparatus. Beginning with apparatus contracted for after January 1, 2024, these standards have been renamed and renumbered. The standards have also been revised. This document presents the highlights of these changes and is for reference only. Refer to the actual standards documents available at NFPA.org.

NFPA Standards Document Reorganization

The NFPA has been reorganizing many of its standards and combining them in various ways. Fire apparatus are now covered by two main standards:

> ***NFPA 1900 Standard for Aircraft Rescue and Firefighting Vehicles, Automotive Fire Apparatus, Wildland Fire Apparatus, and Automotive Ambulances.***

NFPA 1900 replaces NFPA 414, NFPA 1901, NFPA 1906, and NFPA 1917

> ***NFPA 1910 Standard for the Inspection, Maintenance, Refurbishment, Testing and Retirement of In-Service Emergency Vehicles and Marine Firefighting Vessels.***

NFPA 1910 replaces NFPA 1911, NFPA 1912, NFPA 1925, and NFPA 1071

Formatting Changes

The new standards have completely new chapter numbers and are much longer, since they each combine all the content that was previously in four documents. Chapter numbers have been changed, and some chapters consolidated. Many of the chapters that were unique between NFPA 1901 and 1906 were combined.

Content Change Highlights for NFPA 1901 and 1906

OPERATOR MANUAL AVAILABILITY

Manuals must be available in one of three ways:

- Hardcopy on the apparatus
- Electronic display
- Link (QR Code) to the website download

- All the information that UL would need to perform the annual and five year NFPA 1910 aerial test must be located in the operator manual

WATER FORDING

Manufacturers will be required to state the height of the lowest portion of the air intake system that is not sealed (open to water intrusion) in the operator manual.

ELECTRIC VEHICLE ACCOMMODATION

The old standards were written before the advent of electric vehicles and included requirements that were not appropriate for EVs. Chapters were rewritten in a way that makes a distinction between electric propulsion and internal combustion engine propulsion. Certain unique EV safety requirements were added as well. Requirements for batteries now make a distinction between high voltage and low voltage batteries.

REQUIREMENTS BY APPARATUS TYPE

The old standards had unique chapters for the requirements of unique apparatus types such as pumper, initial attack, mobile water supply, etc. These requirements were combined into a single chapter with a master table that indicates requirements by type. Most the of loose equipment requirements including ground ladders, hose, and nozzles are no longer required, but instead have been moved to the annex as suggestions only.

STRUCTURAL AND WILDLAND CHAPTERS COMBINED

In past revisions the apparatus committee made an effort to have 1901 (structural) and 1906 (wildland) chapters match one another wherever possible. When these chapters were combined into a single document it was clear that there was a significant amount of duplication of text. These chapters were therefore combined. For those features where there is a difference the text will call for the feature to apply only to "Structural" or "Wildland" apparatus as appropriate.

NIGHT MODE FOR WARNING LIGHTS

The committee debated extensively the need for a mode that would reduce the intensity of warning lights for nighttime operation. It became clear that the high intensity of most current warning lights is not required by the standard at all but is a result of competitive pressures within the lighting industry. The minimum intensity standards are

already appropriate for nighttime operation. Guidelines for warning light night mode features have been added to the annex.

BACKUP CAMERA

A rear view camera is now required on all apparatus.

LOW VOLTAGE BATTERY CHARGERS

Battery chargers that are permanently installed on the apparatus will need to be tested prior to delivery. The test requirements were pulled directly from the annual test required by NFPA 1911.

SEATING

The new standard is more specific about providing adequate room for occupants. A distinction is made between a seat that is intended to be occupied on every response, and those seats that are provided for occasional use. The purchaser must be intentional about seating configurations and consider more carefully how they plan to staff the cab.

CLEAN CAB

Clean cab features are not required in the new standard, but guidance is provided in the annex for those wishing to adopt clean cab procedures.

EQUIPMENT AND LADDER RACKS

The equipment rack section was revised to provide requirements for both automatic and manual racks with an eye to ergonomics of deployment.

REAR CHEVRON STRIPING

The requirement for rear chevron striping is retained, but the color requirement is now optional.

HOSE REEL REWIND

Any hose reel with more than 100 feet of hose must include a powered rewind function.

AERIAL STABILIZER PAD SIZE

The maximum aerial stabilizer pad pressure allowed has been increased from 75 psi to 100 psi. This may reduce the size of the stabilizer pads depending on the weight of the apparatus.

AERIAL LOAD CHART DEFINED

Every aerial device has a load chart but the requirements for the load chart have never been defined. The new standard requires the following minimum information:

- Rated capacity through the range of motion of the device
- Rated vertical height
- Rated horizontal reach
- Rated water flow (if applicable)
- Rated wind speed

Apparatus Safety through the Years

The following table provides a snapshot of common safety features and NFPA requirements going back in time. Determine the age of your in-service apparatus and use the table to see the features or NFPA requirements that have been added since your apparatus was built. This will help you determine whether a new purchase or refurbishment should be considered.

Category	Feature	Feature Change	Benefit	Approximate Year Introduced	Safety Ergonomics	Service	Durability	Performance
Aerial	Breathing Air	Aerial Mounted Breathing Air Standards	Uniform construction standard. Low air warning system. Air duration improved. Serviceability improved.	1999	X	X		X
Aerial	Controls	Aerial Multiplex Systems	Aerial information display. Serviceability improved. Envelope control avoids collision damage.	1999	X	X	X	X
Aerial	Controls	Aerial Tip Controls	Control ladder at tip for better firefighter control.	1999	X			X
Aerial	Controls	Short Jack Limitation	Range of operation defined. Narrow street and alley accommodation. Tip-over potential reduced.	1999	X			X
Aerial	Documentation	Load Chart	Requirement for a load chart that defines capabilities including wind ratings.	2024				X
Aerial	Documentation	Operator Manual	All the information that UL would need to perform the annual and five year NFPA 1911 test must be located in the operator manual.	2024		X		
Aerial	Ladder Testing	Expanded aerial and ground ladder testing standards	Uniform test standards. Third party test recommendations. Documentation and verification of performance.	1996	X		X	X
Aerial	Lighting	Spotlight or Floodlight	The required spotlight or floodlight at the tip of the aerial must be tested and certified to a minimum lighting capacity in a manner that ensures comparable ratings between lighting suppliers	2016	X			X
Aerial	Load Chart	Overload Documentation	Informs operator of potentially unsafe operating conditions.	1996	X			
Aerial	Operation	Slide Mechanism	Smoother operation. Serviceability improved. Durability improved.	1999	X	X	X	X
Aerial	Operation	Tip Camera	Remote aerial observation possible. Observation of remote controlled fire streams. Safer observation of fire ground scene.	1999	X			X
Aerial	Platform	Fall Protection Anchors	At least one attachment point shall be provided for each 250 lb. (114 kg) load rating of the platform. Anchorage points provided for fall protection harnesses shall be clearly labeled and rated for a minimum of 450 lb. (205kg)	2016	X			
Aerial	Platform	Guard Rail Strength	The continuous guard railing shall be capable of withstanding a force of 225 lbf (1000 N) applied at any point from any direction without permanent deformation. This ensures a strong railing to prevent failure.	2016	X			X
Aerial	Platform	Platform Gate Strength	Each gate shall be capable of withstanding a 1000 lb. force (4000 N) applied at the least favorable position in the least favorable direction, without opening outward	2016	X			X

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Category	Feature	Feature Change	Benefit	Approximate Year Introduced	Safety Ergonomics	Service	Durability	Performance
Aerial	Plumbing	Pinable Waterway	Protects waterway in rescue operations.	1991	X		X	X
Aerial	Plumbing	Remote Waterway Nozzle Controls	Remote control of tip mounted water nozzle. Risk to firefighters reduced.	1999	X			X
Aerial	Plumbing	Waterway Performance	Improved range of stream. Faster fire knock-down. Fewer appliances are required.	1996	X			X
Aerial	Safety Interlocks	Aerial Interlocks	Interlocks to reduce possibility of operator error.	1996				
Aerial	Safety Interlocks	Safety Interlock Expansion	Unsafe operating conditions avoided.	1991	X			
Aerial	Slip Resistance	Rung Surfaces	Firefighter Safety Improved. Consistent footing service. Slips during inclement weather avoided.	1999	X			
Aerial	Stabilizers	Stabilizer Jack Pad	Pressure rating of jack pads increased to better reflect soil requirements. Allows a smaller pad in some cases.	2024				X
Aerial	Strength	Tip Load Standard	Uniform performance standard established. Increased minimum performance.	1991	X			X
Aerial	Structure	Structural Safety Factors	Testing and inspection definition improved. Welding and weld inspection standards specified.	1999	X			
Aerial	Warning Device	Aerial Stabilizer Warning	Provides audible and visual warning of stabilizer movement and deployment.	1996	X			
Body	Access	Handrails, Steps & Ladders	Access improved with built-in steps. Three-point access provided.	1999	X			X
Body	Access	Lighted Handrails	Safety improved for night operation.	2004	X			X
Body	Access	Step Horizontal Reach	Climbing steps shall not be more than 18 inches apart horizontally to limit how far a person needs to spread their legs while ascending or descending.	2016	X			
Body	Access	Yellow Line	Designated stepping areas will be marked with a yellow line around the perimeter unless railings make the area obvious. Ensures that fire fighters understand where it is reasonable for them to be walking on the apparatus.	2016	X			
Body	Body and Tank Integration	Shaped Tanks	Equipment storage space improved. Special equipment storage possible. Through-tank ladder storage.	1999	X			X
Body	Body Mounting	Body Mounting Isolation	Body life extended by decreasing stress, vibration, and shock.	1991		X	X	X
Body	Breathing Air	Enclosed SCBA Bottle Fill Station	Improved safety during cylinder refills.	1999	X			
Body	Command Centers	Slide-Out Sections	Command center room increased.	1996	X			X
Body	Compartment Doors	Compartment Door Hardware	Increased reliability, durability and safety.	1991	X		X	X
Body	Compartment Doors	Door Seals Improved	Weather resistance improved.	1991		X	X	X
Body	Compartment Doors	Powered Doors and Door Locks	Security, reliability, and durability improved.	2003	X			X
Body	Compartment Doors	Rollup Door Offerings	Equipment access improved. Door damage risk reduced.	1996	X	X		X
Body	Compartments	Ventilation	Equipment kept drier. Equipment life extended.	1991			X	

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Category	Feature	Feature Change	Benefit	Approximate Year Introduced	Safety Ergonomics	Service	Durability	Performance
Body	Equipment Mounting	Equipment Racks	Maximum Force Requirement for Manual Racks. Lights on the ladder rack must come on as soon as it is out of the stowed position, rather than when it is fully deployed	2024	X		X	
Body	Equipment Mounting	Equipment Storage Devices	Organization of tools for rapid deployment.	1991			X	X
Body	Equipment Mounting	Powered Equipment Racks	Ergonomic access to ladders, suction hose, etc…Compartments free for other uses.	1999	X			X
Body	Equipment Mounting	Through-Tank Ladder Storage	Ergonomic access to ladders. Allows high-side compartments on both sides.	1999	X			
Body	Ground Ladder Mounting	Requirements for Mounting of Ground Ladder Mounting	Provides clear definition for mounting of ground ladders. Protects against unnecessary wear or damage.	2009	X	X	X	
Body	Hose Storage	Extendable Hose Storage	Improved ergonomics. Risk of injury reduced. Faster re-packing time.	2003	X			X
Body	Hose Storage	Hose Storage Security	Prevents hose from falling off of truck during road travel.	2005	X			
Body	Hose Storage	Lower Hose Bed Height	Ergonomics improved. Risk of injury reduced.	1999	X			
Body	Material	Composite Bodies	Plastic, polypropylene, and composites. Corrosion resistance. Lighter Weight.	1999		X	X	X
Body	Material	Stainless Steel Bodies	Corrosion resistance improved.	1991		X	X	X
Body	Miscellaneous Equipment	Additional Safety Equipment	Requirements for additional safety equipment on all Fire Fighting Apparatus. Including AED's, Safety Vests, Traffic cones…	2009	X			
Body	Multifunctional Bodies	Rescue-Pumper Combinations	Rescue response efficiency improved.	1991				X
Body	Receiver Tubes	Receivers and anchor requirements	Increase in the Safety Factor. Increase in capability	2009	X	X	X	X
Body	Service Access	Pump Enclosure Access Panels	Ease of maintenance and serviceability.	1991		X		
Body	Tiller	Tiller Cab Integrity	Tiller cabs must meet the strength requirements of SAE J2422, Cab Roof Strength Evaluation — Quasi-Static Loading Heavy Trucks	2016	X			X
Body	Trailer Requirements	Trailer Standard	Trailers are identified as special units with some of their own criteria.	2009	X	X		X
Body	Visibility	Chevron Striping	Provides definition for conspicuity at the rear of the vehicle.	2009	X			
Chassis	Audible Warning Devices	Noise Levels Reduced	Sirens, speakers, and air horns off roof. Noise levels in the cab reduced. Crew communications improved.	1991	X			X
Chassis	Brakes	ABS Mandated	Vehicle control improved during emergency braking.	1996	X		X	X
Chassis	Brakes	Air Disk Brakes	Stopping distance reduced. Brake fade eliminated.	1990	X	X	X	X
Chassis	Brakes	Auxiliary Brake Mandated	Stopping capability improved. Operator control improved. Brake life increased.	1996	X	X	X	X

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Category	Feature	Feature Change	Benefit	Approximate Year Introduced	Safety Ergonomics	Service	Durability	Performance
Chassis	Brakes	Brake System Capability	All fire apparatus, including those with an axle rated greater than 29,000 lb., shall comply with 49 CFR 571. 121. This ensures that apparatus heavy rear axles meet the same stopping distance requirements as lighter apparatus must.	2016	X			X
Chassis	Brakes	Electronic Stability Control	Brakes applied based on steering wheel inputs. Improves control of vehicle during emergency braking.	2007	X			X
Chassis	Brakes	Roll Stability Control	Brakes applied based on aggressive cornering. Reduces potential for roll-over.	2005	X			X
Chassis	Cab	Aluminum Cab Construction	Weight reduced. Payload increased. Durability improved.	1991	X		X	X
Chassis	Cab	Cab Integrity	Cab integrity standards mandated. Roof Crush Integrity Front Cab Crush Integrity	2009	X			
Chassis	Cab	Clean Cab Accommodation	Optional means of providing a clean cab suggested.	2024	X			
Chassis	Cab	Electric Windshield Wipers	Performance consistency improved over air driven units.	1991	X	X	X	X
Chassis	Cab	Noise Levels	Communication improved. Crew comfort improved.	1991	X			X
Chassis	Cab	SCBA Storage	Positive Engagement Designs Required. Ensured SCBA Retention in Crash	2003	X			X
Chassis	Cab	SCBA Storage	Hands-Free Designs Easier Release Functions. Strap-Free Designs	2016	X			X
Chassis	Cab	Tilt Cab Design	Maintenance access improved.	1991		X		
Chassis	Conspicuity	Door Reflective Material	Conspicuity of vehicle increased with doors open. Visibility of door access improved.	2003	X			
Chassis	Engine	Electronic Engine Controls	Electronically controlled pressure governor possible. Maintenance intervals increased. Higher horsepower and torque possible. Mechanical throttle linkage eliminated. Service diagnostics provided. Emissions reduced. Fuel economy improvement.	1994				X
Chassis	Engine	Mid-Engine Chassis	Cab noise level reduced. Cab room improved.	1990	X			
Chassis	Exhaust	Diesel Particulate Filter	Eliminates exhaust smoke. Cleaner Environment	2009	X			
Chassis	Exhaust	Exhaust Temperature Mitigation	Exhaust tailpipe temperatures reduced	2009	X			
Chassis	Occupant Protection	Dual-Retractor Seat Belts	Can improve ease of use.	2008	X			
Chassis	Occupant Protection	Enclosed Cab	Crew safety. Firefighter rehabilitation area. Working conditions improved. Crew comfort improved. Communication improved.	1991	X			X
Chassis	Occupant Protection	Equipment Mounting	Items in Cab Must be Secured. Safety Improved during Crash	1996	X			
Chassis	Occupant Protection	Frontal Occupant Protection	Risk of injury reduced during frontal crash.	2008	X			
Chassis	Occupant Protection	Red or Orange Seat Belts	Visibility of belts increased. Seat belt compliance enforcement simplified.	2003	X			
Chassis	Occupant Protection	Seat Belt Length	Minimum belt length established. Accommodates large fire fighters with bunker gear on.	2009	X			

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Chassis	Occupant Protection	Seat Belt Warning Device	Display shows who is belted and who is not. Visible to Driver or Officer	2009	X			
Chassis	Occupant Protection	Seat-Integrated Seat Belts	Can improve ease of use.	2003	X			
Chassis	Occupant Protection	Shoulder Harness Seat Belts	Type II shoulder harness required for outboard seating positions. Safety increased during crash.	1999	X			
Chassis	Occupant Protection	Side Roll Protection	Risk of injury reduced during roll event.	2003	X			
Chassis	Occupant Protection	Vehicle Data Recorder	Provides Fire Chief with a record of who is wearing their seat belts and how they are driving.	2009	X			
Chassis	Rear View	Backup Camera	Backup camera required for all apparatus.	2024	X			
Chassis	Safety Interlocks	Chassis PTO Interlock	Improved safety with consistent performance of interlock functions.	1996	X			X
Chassis	Seating	Buckle Stalk Length	Stalk length limited to 4 inches to improve fit of belts across the torso.	2016	X			
Chassis	Seating	Head Clearance	Head clearance for suspension seats increased. Head clearance for fixed seats increased. Safety improved.	2003	X	X		X
Chassis	Seating	Helmet Storage	Designated Helmet Storage. Safety Improved During Crash	2003	X			
Chassis	Seating	Seat Adjustment	Seat adjustment criteria. Seat adjustment time criteria.	2003	X			
Chassis	Seats	Seating Position Spacing	Guidance added to ensure that primary seating positions have adequate space between crew members while riding.	2024	X			
Chassis	Seats	Tiller Seat	Tiller training seats if provided must be within and enclosed cab.	2024	X			
Chassis	Steering	Steering Geometry	Steering cramp angles increased. Turning radius reduced. Bump steer reduced.	1999				X
Chassis	Steering	Tilt and Telescopic Steering Column	Steering ergonomics improved.	1991	X	X		X
Chassis	Suspension	Air Ride Suspension	Ride quality improved. Height adjusts to load. Body structure sees less shock.	1991	X		X	X
Chassis	Suspension	Independent Front Suspension	Ride quality improved. Cornering stability improved. Cab structure sees less shock.	2001	X		X	X
Chassis	Suspension	Taper Leaf Front Springs	Improved ride quality.	1999	X	X	X	X
Chassis	Tire Chains	Automatic Engaging Tire Chains	Tire traction in adverse weather conditions improved through automated activation without stopping the vehicle or leaving the operator's position.	1991	X		X	X
Chassis	Tires	Run-Flat Device	Allows safe steering control during tire blow-out	2005	X			
Chassis	Tires	Tire Pressure Monitor	Method of tire pressure monitoring required. Safety improved through correct tire pressure.	2009	X			
Chassis	Tires	Truck Tire Improvements	Rubber compounds improved for greater tread wear. Casing life improved. Load capacities increased.	1991	X		X	X
Chassis	Transmission	Electronic Transmission Controls	Shift performance improved. Service diagnostics provided. Engine communications capability.	1992	X	X	X	X

Category	Feature	Feature Change	Benefit	Approximate Year Introduced	Safety Ergonomics	Service	Durability	Performance
Chassis	Vehicle Stability	Rollover Stability Standards	Minimum standards set for roll stability or the vehicle must be equipped with electronic stability control.	2009	X			X
Chassis	Vehicle Stability	Vertical Center of Gravity	Requirement added that the chassis manufacturers' maximum CG guidance should not be exceeded. This ensures that small commercial chassis apparatus will not be too top heavy.	2016	X			X
Chassis	Visibility	Mirror Remote Adjustment	Mirrors must be adjustable from Driver position. Improved safety and convenience	2009	X			
Chassis	Visibility	Rear Vision Monitors	Safety during backing improved. Blind spots reduced.	1999	X			
Chassis	Wheels	Hub Piloted Wheels	Wheel nut torque reduced. Centering of wheel improved. Wheel balance improvements reduce vibration.	1999	X	X		X
Electrical	Audible Warning Devices	Siren Standards	Audible warning standards established.	1996	X			
Electrical	Batteries	Battery Conditioner	Battery life improved. Maintenance requirements reduced. Consistent battery condition maintained.	1991	X		X	X
Electrical	Circuits	Electromagnetic Interference Suppression	Systems less susceptible to interference from communication equipment.	1991		X	X	X
Electrical	Circuits	Multiplex Control Systems	Wire harnesses simplified. Diagnostic capability. Flexible configuration of systems. Fewer connections. Serviceability and troubleshooting improvement. Reliance on relays reduced. Safety interlock capability improved.	1999		X	X	X
Electrical	Generators	Generator Design	Size reduced. Noise levels reduced. Power ratings based on temperature for more consistent performance.	2003	X	X		X
Electrical	Generators	Generator Instrumentation	Generator and equipment life increased because user can monitor power output.	1996	X	X		
Electrical	Generators	Generator Size Calculation	Method to determine the minimum size generator required to power desired loads.	2009	X			X
Electrical	Generators	Generator Testing	Recording the voltage and frequency at the lowest allowed engine speed verifies the generator operates properly at this engine RPM. wiring on the vehicle) provides verification that the generator operates as stated.	2009	X	X	X	X
Electrical	Generators	Inverter Requirements	Power will be available for equipment because inverters cannot be load managed and must operate for two hours minimum.	2003	X			X
Electrical	Generators	Low Oil Shutdown	Safety shutdown to prevent damage or catastrophic failure of the generator	2009	X	X	X	X
Electrical	Generators	Output Waveforms	If the AC power output waveform is generated electronically, it may be a modified or pure sine wave. Some equipment may not operate properly with a modified sine wave. The appendix provides information on equipment that may not operate properly.	2009			X	X

Category	Feature	Feature Change	Benefit	Approximate Year Introduced	Safety Ergonomics	Service	Durability	Performance
Electrical	Generators	PTO and Hydraulic Generator Interlocks and Indicators	Generator and equipment life increased because interlocks ensure generator output is correct. Improved safety through consistent used of indicators and interlocks. Improved safety because interlocks prevent unexpected or improper operation. Hydraulic generators must operate at all engine speeds or have speed control systems.	1991	X			X
Electrical	Lights, Scene	Scene Light Standards	Scene lighting increased for improved firefighter safety.	1996	X			X
Electrical	Lights, Warning	LED Lighting	Visibility increased. Power requirements reduced. Replacement interval reduced.	1999	X		X	X
Electrical	Lights, Warning	Optical Warning Light Standards	Warning light visibility improved to 360 degrees around vehicle.	1996	X			X
Electrical	Lights, Work	Control, Indicator, and Work Area Lighting	Night visibility improved. Work area lighting provided.	1996	X			X
Electrical	Line Voltage	Cord Reel Conductor Size	Reduces the possibility of a load not operating properly due to low voltage	1999	X		X	X
Electrical	Line Voltage	Cord Reel Distribution Box	Receptacles not mounted on a horizontal surface and at least 2" from ground. Power on indicator light visible for 360 degrees. Circuit protection sized for the box receptacles.	1996	X		X	X
Electrical	Line Voltage	Cord Reel Rewind	Hose reels over 100 feet will need power rewind.	2024	X			X
Electrical	Line Voltage	Equipment Ratings by Location	Equipment must be rated for its use and location (power ratings, wet/dry environments).	1996	X		X	X
Electrical	Line Voltage	GFCI Receptacles	GFCI protected circuit requirements and information when choosing whether or not to specify GFCI outlets.	2009	X			X
Electrical	Line Voltage	Line Voltage Standards	Installation methods specified for generators and wiring. National Electrical Code (NEC) requirements specified for improved safety and quality. Frequency and voltage ranges specified for consistent power quality.	1996	X	X	X	X
Electrical	Line Voltage	Line Voltage Testing	Test criteria established for wiring, power supplies, and equipment. Equipment tested as installed to validate installation and improve reliability. Power supplies tested for two hours with the fire pump operating to validate operation as used.	1996	X		X	X
Electrical	Line Voltage	Line Voltage Testing	Added testing for proper operation of transfer switches.	2009	X	X		X
Electrical	Line Voltage	Line Voltage Testing	Added testing to verify equipment enclosure grounding.	2009	X	X		X
Electrical	Line Voltage	Load Balancing	Balancing the fixed and variable 120V loads between the legs of the power source during design increases the likelihood that the loads will be balanced in the field. Balanced loads are more likely to utilize the full capacity of the power source.	2009	X	X		X
Electrical	Line Voltage	Transfer Switch Neutral Conductor	Removes a potential path for back feed and meets the requirements of National Electric Code.	2009	X	X		X

Category	Feature	Feature Change	Benefit	Approximate Year Introduced	Safety Ergonomics	Service	Durability	Performance
Electrical	Low Voltage Power	Alternator Minimum Idle Capacity	Electrical system capacity at idle ensured.	1996	X	X	X	X
Electrical	Low Voltage Power	Electrical Load Management	Electrical system overload prevented. Battery condition preserved. Maintenance frequency reduced. Diagnostic capability and serviceability improved. Electrical system failure frequency reduced.	1996	X	X	X	X
Electrical	Testing	Battery Charger	Battery chargers that are permanently installed on the apparatus will need to be tested prior to delivery.	2024				X
Electrical	Warning Lights	Night Mode for Warning Lights	Option to dim warning lights when in low light or nighttime situation.	2024	X			
Electrical	Warning Lights	Green Lights Allowed	The option of using green warning lights is now allowed.	2024	X			
Electrical	Wiring	Function Coding of Chassis Wiring	Diagnostics and serviceability improved.	1996		X		
Electrical	Wiring	Wiring Methods and Techniques	Failure rates reduced. Serviceability improved.	1996	X	X	X	X
EV Apparatus	EV Fuel Type Identification	Safety Sign	Labeling allows first responder to recognize the type of energy storage hazards on board.	2024	X			
EV Apparatus	HV Isolation	First Responder Cut Loop	Provides first responders a means of isolating high voltage inside the battery packs when they arrive on an accident scene.	2024	X			
General	Apparatus Familiarization	Manufacturer provides apparatus familiarization	Apparatus manufacturers must provide familiarization on the operations of a new apparatus and aerial device upon delivery. The items that must be covered are detailed in the standard and include chassis, pump, generator, foam system, and aerial device.	2016	X	X		
General	Composite Materials	Plastic, Polypropylene, and Composite Components	Lighter weight. Durability improvement. Maintenance improvement. Corrosion resistance.	1991	X	X	X	X
General	Conspicuity	Reflective Striping	Visibility of vehicle increased. Risk of crash reduced.	1991	X			
General	Controls Labeling	Graphical Symbols Standardized	Apparatus manufacturers may use graphical symbols rather than words to describe controls, gauges, intakes, discharges, etc… If graphical symbols are used they must conform to the FAMA standard symbols.	2016	X			
General	Documentation	FAMA Apparatus Safety Guide	One copy of the FAMA Fire Apparatus Safety Guide must be provided with every apparatus. This guide provides safety instructions for operators of fire apparatus. Additional copies may be ordered at www.FAMA.org.	2016	X			
General	Documentation	Operator Manual	Operator manuals must be available to operator and published on the internet	2024				
General	Documentation	Statement of Exceptions	The manufacturer must provide a Statement of Exceptions specifically describing each aspect of the completed apparatus that is not fully compliant with the requirements of the standard at the time of delivery.	2009	X			

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General	Equipment Mounting	Interior Equipment Mounting and Storage	Interior equipment mounting criteria. Interior storage compartment performance criteria. Crew safety improved during crash.	1996	X		X	X
General	Handrails	Handrail Grip Material	Grip material specified for handrails.	1996	X			X
General	Paint	Paint Process System Improvement	Harder finish. UV protection improvements. Adhesion qualities improved.	1991			X	
General	Safety Signs	Safety Signs Standardized	Standardized FAMA Safety Signs required for specific hazards throughout the apparatus. Provides consistency of safety messages between apparatus regardless of the manufacturer	2016	X			
General	Safety Signs	Warning Labels Specified	Safety improvement through increased identification of hazard areas.	1996	X			
General	Stepping and Walking Surfaces	Slip Resistance Criteria	Interior slip resistance criteria established. Exterior slip resistance criteria established. Testing of surfaces mandated. Documentation of slip resistance mandated.	1999	X			X
General	Steps	Folding Step Standards	Performance standards established. Safety and ergonomics improved.	1999	X			
General	Steps	Step Performance Criteria	Step height criteria established. Step size criteria established. Minimum load capacity.	1991	X			
General	V2V	DAWS	Digital Alert Warning System (DAWS) optional	2024	X			
Pump	Aux Pump	Pump Capacity Label	A rating label showing the rated flow and pressure capacities of the auxiliary pump system shall be supplied at the pump operator's location.	2016				X
Pump	Foam	Class A Foam Systems	Superior fire knockdown over plain water (2 to 3 times faster). Reduced water consumption and damage. Faster cleanup. Rekindle risk reduced. Environmental damage reduced. Faster recovery of visibility.	1991	X	X	X	X
Pump	Foam	Compress Air Foam Systems (CAFS)	Superior fire knockdown over plain water (3 to 5 times faster). Reduced water consumption and damage. Faster cleanup. Rekindle risk reduced. Environmental damage reduced. Faster recovery of visibility. Firefighter fatigue reduced. Exposure protection enhanced.	1991	X			X
Pump	Foam	Foam Agents & Additives	Improved chemical properties. More efficient heat absorption. Overall reduction in proportioning rates. Longer shelf life. No environmental damage. Reduced maintenance.	1991	X	X	X	X
Pump	Foam	Foam Proportioning System Enhancements	Accuracy and performance improved. Broader operating range. Easier to use. Reliability improved.	1996	X	X	X	X
Pump	Foam	Foam System Testing	Improved safety and accuracy.	1999	X			X
Pump	Foam	In-Tank Foam Cells	Reduced firefighter fatigue. Maximize space requirements in hose bed and compartments. Improved accessibility for plumbing to pump and proportioning equipment.	1991	X			X

Category	Feature	Feature Change	Benefit	Approximate Year Introduced	Safety Ergonomics	Service	Durability	Performance
Pump	High Pressure Pump	Pressure Limit	If the pump is a high-pressure pump system, the pump shall be equipped with a means that will limit the pump discharge pressure at the maximum discharge pressure capability rating. If a relief valve is provided that discharges to atmosphere, it shall be directed away from the pump operator's position.	2016	X			X
Pump	High Pressure Pump	Thermal Relief Valve	If the pump is a high-pressure pump, the pump shall be equipped with an automatic thermal relief valve to protect the pump that releases away from the pump operator or into the tank.	2016				X
Pump	Plumbing	Flanged Pump Connections	Improved safety. Serviceability improved. Pipe thread connection eliminated. Extended system life.	1991	X	X	X	
Pump	Plumbing	Flexible Hose Used in Pump Compartment	Improved water flow efficiency by eliminating plumbing elbows. Plumbing flexibility improved.	1991		X	X	X
Pump	Plumbing	Inlets and Outlets Increased	Higher pump flow rates possible.	1991				X
Pump	Plumbing	Intake and Discharge Cap Relief	Caps must relieve pressure before getting to the ends of the threads or have integral bleeder valves.	2016	X			
Pump	Plumbing	Pump Cooling Line Strainer	The pump cooling or recirculation line will be required to have a strainer with a clean-out. The pump recirculation line be routed back near the fill opening in the tank, or some other means be provided to allow physical confirmation that the line is not blocked (Wildland only).	2024	X	X		
Pump	Plumbing	Remote Electrically Actuated Valves	Remote pump panel possible. Smaller more efficient pump panels. Controlled operation.	1991				X
Pump	Plumbing	Slow Close Valves	Pressure spikes avoided. Improved operator safety. Stress on plumbing components reduced.	1991	X			X
Pump	Plumbing	Stainless Steel Plumbing	Corrosion resistant. Increased life of plumbing system. Maintenance requirements reduced.	1996			X	
Pump	Plumbing	Thermal Relief Valve	Pump component protection. Enhanced engine cooling.	1991	X			X
Pump	Pressure & Flow Indicators	Digital Flow Indication Devices	Accuracy improved. Easier to read.	1991	X			X
Pump	Pressure Indicators	Analog Vacuum Gauges with	Improved accuracy. Easier to use during drafting operations.	2006				X
Pump	Pressure Indicators	Intake and Discharge Gauge Accuracy Test	Improved safety & accuracy.	2003	X	X		
Pump	Primer	Oil-Less or Biodegradable Pump Primer	Meets EPA requirements. Environmentally safe.	1996	X	X		X
Pump	Pump	Improved Transmission PTO Designs	Allows flexible body designs. Pump and roll options. Ability of PTO to drive larger pumps.	1996				X

Category	Feature	Feature Change	Benefit	Approximate Year Introduced	Safety Ergonomics	Service	Durability	Performance
Pump	Pump	Industrial Fire Pumps Curves for Pumps over 3000gpm	Provides defined performance criteria for larger flow pumps	2009				X
Pump	Pump	Pump Service Access	Minimum pump access established. Improved serviceability. Less downtime.	1996		X		
Pump	Pump	Pump Transmissions Improved	Accommodates torque from higher performance engines. Handles torque reversals from transmission mounted retarders.	1994			X	X
Pump	Pump Controls	Enclosed Top-Mount Pump Panel	Safety of operator away from traffic. Safety of operator away from hose. Visibility for pump operator improved. Service access to pump and plumbing improved. Crew comfort improved. Crew communication improved.	1994	X			X
Pump	Pump Controls	Pressure Governor	Pressure control improved. Water stream protected from variation.	1991	X			X
Pump	Pump Controls	Pump and Roll Discharge Gauge in Cab	If the apparatus is designed for pump-and-roll operations using the chassis engine–driven pump, a second discharge pressure gauge shall be mounted in the driving compartment in view of the driver.	2016	X			
Pump	Pump Controls	Pump Engage Inter-locks	Multiple indicators to verify pump engagement. Pump panel throttle lockout. Ability to preset pressure. Improved safety.	1996	X			X
Pump	Pump Controls	Rear Mount Pump Panel	Safety of operator away from traffic. Service access to pump and plumbing improved.	1999				
Pump	Pump Controls	Top-Mount Pump Panel	Safety of operator away from traffic. Safety of operator away from hose. Visibility for pump operator improved Service access to pump and plumbing improved.	1991	X	X		X
Pump	Pump Controls	User-Friendly Pump Panels	Simplified operation. Operator efficiency. Training time reduced. Crew safety improved.	1996	X	X		X
Pump	Safety Interlocks	Pump Engage Inter-locks	Where the pump is driven by the chassis engine and automatic transmission through a split shaft PTO, an interlock system shall be provided to prevent the pump drive system from being shifted out of the "pump engaged" pumping mode of operation when the chassis transmission is in pump gear.	2016	X			
Pump	Safety Interlocks	Pump Interlock	Interlocks to ensure that pump is engaged. Safety Ensured	1996		X		
Pump	Safety Interlocks	Throttle Ready Interlock	An interlock system shall be provided to prevent advancement of the engine speed at the pump operator's panel unless the apparatus has "Throttle Ready" indication	2016	X			
Pump	Testing	Hydrostatic Testing Requirements	Plumbing system integrity verified. Safety factors increased.	1991	X		X	
Pump	Water Tank	Algae Growth	Water tanks exposed to sunlight shall be opaque to prevent light from entering, with the exception of the water level visual indicator panel, if equipped	2016		X	X	
Pump	Water Tank	Dump Chutes	Chutes required on rear and both sides of apparatus. Safety improved by providing more flexibility to operator. Speed of operations improved during water shuttle operations.	1996	X			X

Category	Feature	Feature Change	Benefit	Approximate Year Introduced	Safety Ergonomics	Service	Durability	Performance
Pump	Water Tank	Polypropylene Water and Foam Tanks	Lighter weight. Longer lasting. Maintenance requirements reduced. Corrosion resistant.	1991	X	X	X	X
Pump	Water Tank	Spill Proof Tank Overflows/Vents	Improved safety preventing water spillage onto the highways	2007	X			