NFPA 1901 & 1906 – 2016 Revision Highlights

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New standards have been released for both NFPA 1901 and NFPA 1906. Both apply to apparatus contracted after Jan 1.

i.e. now!!!
NFPA 1901 – Standard for Automotive Fire Apparatus

NFPA 1906 – Standard for Wildland Fire Apparatus
If you don’t have a copy of either standard, you may order them from www.nfpa.org
Administratively, the format of 1901 and 1906 were made to match.

(i.e. the same chapter & paragraph numbers cover the same subject matter in both standards)
Starting with the structural world...

NFPA 1901
4.3.1 – Purchaser’s Responsibility

- Replaced the specific list of information purchasers must provide with a general statement and reference to Annex B.

4.3.1*

It shall be the responsibility of the purchaser to specify the following details of the apparatus, in addition to the requirements in NFPA 1901 needed by the manufacturer to build the apparatus, including:

- Its required performance, including where operations at elevations above 2000 ft (600 m) or on grades greater than 6 percent are required
- The maximum number of fire fighters to ride within the apparatus
- Specific electrical loads that are to be part of the minimum continuous electrical load defined in 43.3.3
- Any hose, ground ladders, or equipment to be carried by the apparatus that exceed the minimum requirements of this standard
- If a trailer for the purpose of transporting fire rescue response equipment, whether it is a Type I, Type II, or Type III configuration

(1) Requirements not uniquely specified in NFPA 1901, such as the type of apparatus desired.
(2) Any features of the apparatus desired in addition to, or in excess of, the requirements in NFPA 1901.
4.13.1.1 - CG Requirement

- Added: “The apparatus shall not exceed the chassis manufacturer’s maximum allowable vertical center of gravity for a completed vehicle, if specified, and meet...”.

- Using the 80% of rear axle track width rule in the 2009 standard can place the CG higher than what some commercial chassis manufacturers allow.
4.18.6 - New Apparatus Familiarization

- Paragraphs 4.18.3 through 4.18.6 were added.
- The apparatus manufacturer must provide familiarization and demonstration at the time of delivery on a number of specified items on:
  - Chassis
  - Pump
  - Generator
  - Foam System
  - Aerial Device
- The qualifications of the representative who will conduct the familiarization must be provided in writing
- This is not “training”, and it does not cover firefighting operations or driving.
4.20.2.1 – Operations and Service Documentation

• Only one set required. Changed from: “…at least two sets...”.
4.20.2.3 - FAMA Safety Guide

- The FAMA Safety Guide was added to the list of items required to be supplied with the apparatus.
4.21.3 - Statement of Exceptions

- Removed the paragraph stating that the apparatus must be modified to full compliance before being placed in service.
FAMA Safety Signs

- Inclusion of many of the FAMA safety signs was confirmed, a few more added, and the specification wording simplified.
• Details of the specification identifying the conditions under which the regeneration process is to be activated were removed, relying instead on the engine manufacturer’s design.

• No Manual regeneration switch is required for chassis less than 20,000 GVW.
13.10 Work Light Testing

- Test criteria for measuring light levels added.
- Light tests in the hose bed allow dividers or hose bed covers to be removed during the test.

13.10.1.1.1
The work area immediately behind the vehicle shall be illuminated to an average level of at least 3 fc (30 lx), measured at 25 equally spaced points on a 2.5 ft (762 mm) grid within a 10 ft x 10 ft (3 m x 3 m) square to the rear of the vehicle.

13.10.1.1.2
At least 80 percent of the 25 measurements shall meet or exceed 3 fc (30 lx).
14.1.3.2.3 - Seat Belt Buckle Stalk Length

- Limitation placed on the seat belt buckle stalk length of 4 inches past the h-point of the seat.
14.1.3.4 - Seat Belt Color

- Webbing color (red or orange) shall not apply to GVW less than 19500
14.1.9 – SCBA Seat Mounting

- The installation and test standards for SCBA restraints in the cab were strengthened.
14.3.2.1 - Tiller Cab Integrity

- Tiller cabs shall meet the requirements of SAE J2422, Cab Roof Strength Evaluation — Quasi-Static Loading Heavy Trucks
15.7.1.1.1 - Horizontal Step Offset

- The maximum horizontal offset between steps shall not exceed 18 in. (460 mm).
15.7.1.2 - Step Toe Clearance

- Toe clearance from leading edge of step to any obstruction reduced from 8 to 6 inches.
15.7.1.6 - Designated Walking Areas

- Requirements for designating standing/walking surfaces on upper areas of apparatus.
- Intent is to force manufacturers and purchasers to consciously determine and communicate where FFs should and should not be standing/walking.
15.7.1.6

• Designated horizontal standing or walking surfaces...
• ... higher than 48 in. (1220 mm) from the ground and not guarded by a railing, or structure at least 12 in. (300 mm) high when measured with the apparatus at curb weight
• ... shall have at least 1 in. (25 mm) wide safety yellow or orange line delineation that contrasts with the background to mark the outside perimeter of the designated standing or walking surface area
• ...excluding steps and ladders.
16.3 – Pump Water Engine Cooler Removed

- The requirement (16.3.5) to have an auxiliary engine cooler that uses pump water to cool the engine has been eliminated.

*(Though it may still be a good idea...)*
16.5.3 – Plumbing System Pressure Capacity

- The pressure capability for the intake and discharge sides of the plumbing system are not the same. These changes account for this. Intake side capacity is 250 psi while discharge side capacity is 500 psi (depending on pump pressure). Aerial waterway and CAFS systems are also 250 psi.
- Testing may be “hydrodynamic”.
16.7.4.3 – Intake and Discharge Cap Relief

- Caps must relieve pressure before getting to the ends of the threads, or have integral bleeder valves.

16.7.4.3
Caps shall automatically release pressure in the discharge outlet before the threads are completely disengaged unless the outlet and the cap are equipped with drains or bleeder valves.

16.7.4.4
The pressure relief shall discharge to atmosphere, and the discharge shall direct away from the operator's position.
16.10 Pump Engage Interlock

• 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.
16.12.2.3.4 - Pump & 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 of the type required by 16.12.2.1.2 shall be mounted in the driving compartment in view of the driver.

(Always a good idea, but now required...)
16.13.8 Engine Speed Advancement Interlock Test.

- Test condition tables moved to body from the annex.
- Testing required for each apparatus
- Ensures that the engine speed control interlocks and indicators are operating correctly.

<table>
<thead>
<tr>
<th>Transmission Type</th>
<th>Chassis Transmission Gear Selected</th>
<th>Parking Brake Status</th>
<th>Pump Shift Control Action Status (Driving Compartment)</th>
<th>Pump Indicator Status (Driving Compartment)</th>
<th>Pump Indicator Status (Pump Operator's Panel)</th>
<th>Engine Speed Control in Cab</th>
<th>Engine Speed Control at Pump Operator's Panel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Either</td>
<td>Neutral</td>
<td>On</td>
<td>Road</td>
<td>None</td>
<td>None</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Either</td>
<td>Neutral</td>
<td>On</td>
<td>Road</td>
<td>None</td>
<td>&quot;Throttle Ready&quot;</td>
<td>Yes or No</td>
<td>Yes</td>
</tr>
<tr>
<td>Either</td>
<td>Neutral</td>
<td>Off</td>
<td>Road</td>
<td>None</td>
<td>None</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Automatic</td>
<td>Neutral</td>
<td>On</td>
<td>Engaged</td>
<td>&quot;Pump Engaged&quot;</td>
<td>None</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Automatic</td>
<td>Neutral</td>
<td>On</td>
<td>Engaged</td>
<td>&quot;Pump Engaged&quot;</td>
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<td>Yes</td>
</tr>
</tbody>
</table>
16.13.1 - Remote Pump Test Witnessing

• Option for off-site witnessing of pump testing by the certification agency so long as technology is in place that will ensure verification.
18.2.2 – Opaque Water Tanks

- 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.
19.3.4 Aerial Operating Capacity Label

- Rated capacity must be provided on a label or on an electronic display.

A.19.3.4

Ladder capacity ratings are established in many different operating positions other than full extension and zero degrees elevation. Ladders are often rated at higher tip capacities as elevation angles increase or when the ladder is not fully extended. Most manufacturers provide distributed load capacities (several persons), depending on the ladder’s extension and elevation. Combination ratings that include capacity at the tip while discharging water are normally provided. These can vary with elevation and extension and are examples of multiple configurations. It is important that the manufacturer define for the user the ladder’s rated capacity in various positions and operation modes.

Aerial control systems can now limit the motion of the aerial device based on the following conditions:

1. Geometric position of the aerial device
2. Weights and loads (ice, wind, nozzle reactions, slope conditions, etc.) applied to the aerial device that create overturning loads
3. Stabilizer extension at each location
4. Position of the aerial device with respect to the centerline of the truck

These geometric conditions are complex, and the electronic systems should clearly monitor the required inputs and validate the range of motion with the loads applied while maintaining the required safety factors for vehicle stability and structural safety.
19.7.6.2.1 - Aerial Platform Railing

- 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.
19.7.6.2.6 - Aerial Platform Gate

- 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.
19.7.6.6 - Aerial Platform Fall Protection

- Provisions shall be made so that personnel working on the platform can attach fall protection harnesses.
- 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 (205 kg).
19.18.6 - Aerial Floodlight Brightness

- Luminosity requirements revised for the aerial floodlight from 10,500 to 4,000 lumens.
- Requirement added to measure the actual light output using a goniophotometer or other instrument that measures actual light output rather than a theoretical calculation.

A **Goniophotometer** is a device used for measurement of the light emitted from an object at different angles. The use of **goniophotometers** has been increasing in recent years with the introduction of LED-light sources, which are mostly directed light sources, where the spatial distribution of light is not homogeneous.
19.21.2.1 Aerial Stability Worst Case Defined

- The worst case for stability test shall be the greater of the following:
  - (1) Rated capacity with no water in the waterway system.
  - (2) Rated capacity while flowing the aerial waterway’s rated flow. This test shall include 1.33 times the rated capacity plus the equivalent weight of the water in the aerial waterway and the downward load caused by nozzle reaction force applied at the aerial tip.
22.10.5 – Line Voltage Splices

- Splices shall be made in a listed junction box or in accordance with Section 110.14(B) of NFPA 70, National Electrical Code, and they shall be in an accessible location that can be exposed without damaging the structure or finish of the vehicle.
23.13 Power Operated Masts.

- Added safety factor for strength
- Added wind resistance requirement
- Defined “safe” failure modes for how the mast can come down
24.5.1 Transportable Air Tanks

- Added requirements for marking of air cylinders based upon type of cylinder (ASME or UN/DOT) and changed testing requirements to rely upon those markings.
25.4.1 – Winch Controls

- Operation of the winch shall be from a remote location at least 12 ft from the winch or within an enclosed area.
- Requirements for specifics around how the remote control shall be designed have been removed.
New chapter 28 provides requirements for Ultra High Pressure pumping systems.
Taking this off-road...
NFPA 1906

About 90% of NFPA 1906 is exactly the same as NFPA 1901.
NFPA 1906 applies to vehicles “designed specifically for supporting wildland fire suppression.”
1.3.1 – Application

The 1906 standard applies to vehicles with a minimum 10,001 lbs GVWR.
Defined the difference between a fire pump and a wildland fire pump.

(Any pump larger than 250 gpm must meet NFPA 1901.)
Chapter 10 Wildland Fire Crew Carrier Apparatus

- New chapter defines a wildland crew carrier.
  - Seats & occupant restraints.
  - Doors
  - Structural Integrity
  - Means of Escape
12.1.2 Carrying Capacity

The personnel weight allowance was increased to 250 lbs per seating position.
12.1.3 – Carrying Capacity

The required equipment weight allowance for the apparatus was changed.

(The required numbers are lower than you might expect, so be aware...)
14.4 On-Board Pump and Roll Fire Fighting

- Text in first draft was retained.
  - Seated and belted position located behind cab
  - Roll cage / mostly-enclosed
  - Safety signs max 10 mph while occupied
  - Communication with driver.
14.4 On-Board Pump and Roll Fire Fighting

NFPA 1500 still does not allow anyone to ride on the vehicle outside of the cab.

(That committee is reviewing whether to change their standard.)
Those are the highlights.

Now the process starts again with the next editions for 2020.

Public input is from now until June, 2018.
Questions?