



File: ULC-S515-13
ULC-G5.2

June 12, 2013

CERTIFICATION BULLETIN 2013-08

Effective Date Announcement – CAN/ULC-S515-13, 3rd Edition of the Standard for Automobile Fire Fighting Apparatus

To: Subscribers to ULC Listing Service for Automobile Fire Fighting Apparatus, CAN/ULC-S515-13 and others interested.

AZYFC: Pumpers, Fire Department

AZYPC: Aerial Devices for Fire Fighting Apparatus

This bulletin announces changes to the ULC Program for Automobile Fire Fighting Apparatus Listed to CAN/ULC-S515-04 which will harmonize the Fire Apparatus Certification Programs into a single North American Program. The program covering certification under CAN/ULC-S515-13 will be referred to as the “**Vehicle Inspection Program – S515**” (VIP – S515).

The new edition of CAN/ULC-S515-13 mirrors the 2009 edition of NFPA 1901 and will result in a combined set of verification criteria. There will be no change to the current requirements being used for Inspection.

This approach was discussed with Canadian Regulatory Authorities at the May 2012 ULC Advisory Council Meeting and the members agreed with the program as described.

The effective date is November 1, 2014. Compliance with the requirements will be determined through factory audits to verify manufacturer conformance to the new edition of CAN/ULC S515, along with inspection of representative fire apparatus models. Audits will be scheduled to provide sufficient time to successfully complete the process prior to the effective date. Manufacturers must complete the process for ULC to evaluate production to CAN/ULC S515-13. Automobile Fire Fighting Apparatus that are contracted before November 1, 2014 may be certified to CAN/ULC-S515-04. Automobile Fire Fighting Apparatus that are contracted after November 1, 2014 shall be inspected & tested to CAN/ULC-S515-13.

The current ULC Listing Mark will be replaced with a Certificate of Inspection as detailed in the attached document titled **ULC S515 Vehicle Inspection Program for Manufacturers of Automobile Fire Apparatus**. As an extension of the certificate, the apparatus may bear a label indicating that the apparatus was inspected. The information included on the certificate will be provided by ULC.



Please contact Mr. Patrick Ginnaty-Moore (Patrick.T.Ginnaty-Moore@ul.com) or call 1.847.664.2366) or Mr. Jean Belanger (Jean.P.Belanger@ul.com) or call 1.514.247.4078) should you have any questions concerning the above.

Sincerely,

Underwriters Laboratories of Canada Inc.

A handwritten signature in black ink, appearing to read 'G. Paintal', written over a horizontal line.

Gunsimar Paintal
Regional Quality Manager &
ULC Mark Program Owner

UL LLC.

A handwritten signature in black ink, appearing to read 'Thomas Hillenbrand', written over a horizontal line.

Thomas Hillenbrand
Program Manager Product Safety

Attachments:

Appendix – Program Overview, ULC S515 Vehicle Inspection Program for Manufacturers of Automobile Fire Apparatus

Addendum – Summary of Changes, ULC S515 Vehicle Inspection Program for Manufacturers of Automobile Fire Apparatus



Appendix

Program Overview, ULC S515 Vehicle Inspection Program for Manufacturers of Automobile Fire Apparatus

The new edition of CAN/ULC S515, *Automobile Fire Fighting Apparatus* has been published and released for use. Movement to harmonize the Canadian and US standard (NFPA 1901, *Standard for Automotive Fire Fighting Apparatus*, 2009 ed.) continues in this revision. Significant changes to the CAN/ULC S515 standard include:

Adding new Sections covering:

- Foam Proportioning Systems
- Compressed Air Foam Systems
- Line Voltage Electrical Systems
- Command and Communications Vehicles
- Air Systems
- Winches
- Trailers

Other significant changes:

- Language broadening the range of accreditation options for third-party certification organizations
- Language specifying that gauges and visual displays use the metric system as the primary system of units
- Expanded requirements for vehicle stability
- Expanded options for ground ladders installed on apparatus
- Deleting references to Industrial Supply Pumps and merging the material with Chapter 15, Fire Pumps and Associated Equipment
- Expanded pump control requirements
- Revised aerial stability requirements to address aerials with variable load envelopes

An addendum is included with this document that details the differences between the two standards.

Effective Date:

An Effective Date of November 1, 2014 has been established. This will provide sufficient time for users to review the document and implement programs for bid specification and manufacturing apparatus to the 2013 edition of CAN/ULC S515.



The Effective Date provides a transition period to allow for completion of certification of fire apparatus sold and manufactured under the 2004 edition of CAN/ULC S515.

Manufacturer Facility Audits:

During this transition period, we will audit manufacturing facilities to verify that manufacturers systems are updated and comply with the new edition of the standard. Certification that fire apparatus conform to all applicable areas of the standard is built on three components:

1. Initial Audit of manufacturer's facility and processes
 - The audit is conducted to verify that components and processes applied to all apparatus conform to the standard
2. Visual Inspection of apparatus construction
 - Visual Inspection is conducted to verify that basic construction requirements are met
3. Specified system performance testing
 - Performance testing (e.g., fire pump, low voltage, line voltage, aerial device) verifies that each system performs as required

Audits will be necessary to update manufacturer coverage under the new edition of the standard. The level of audit to implement the new edition will be based on the following:

1. New Clients (Manufacturer's adding ULC coverage)
 - Initial Audit of all applicable sections
2. Current Clients with current audit records:
 - Auditing of all applicable new sections, as well as revisions to existing sections and Section 3, General Requirements
 - Review and resolution of any outstanding items from previous audits
3. Current Clients with no record of audits in the last three years
 - New Audit of all applicable sections, as well as revisions to existing sections

Manufacturers may specify sections that do not apply to them (e.g., a manufacturer that does not sell aerial devices will not need coverage under this chapter). The audits will cover the new standard, including any new sections that apply to the manufacturer's facility. It is anticipated that a typical audit will take three days at the manufacturing facility, and an additional two days to review the audit and address any findings. Actual audit time will depend on the specific situation for each manufacturer.

New manufacturers applying for the ULC S515 certification service, and existing clients wishing to add additional sections (e.g., line voltage, aerial devices, and/or foam systems) will need to have appropriate performance tests witnessed. Review of test equipment calibration records will also be conducted.

Following successful completion of the audit, and any necessary apparatus inspections and performance tests, the manufacturer will be authorized to submit fire apparatus for certification to the 2013 edition of CAN/ULC S515.

Changes to the ULC Vehicle Inspection Program:

The following table summarizes and compares the differences between the current and the new programs. Further detail is provided following the table.



Current Listing Program v VIP - S515 Program

To Enter Program	
Initial audit to entire standard	Initial audit to entire standard
Visual Inspection of representative apparatus	Same
Witness testing of all applicable performance tests	Same
ULC/UL Field Rep must witness all tests and application of ULC Label	ULC/UL Field Rep must witness all tests; issues certificate - manufacturer applies Label
Manufacturer purchase UL supplied Label	Manufacturer produces Label using UL provided language and ULC logo

Ongoing Program	
Annual audit of 1/3 of standard (Has not been performed during 2004 standard)	Same - Will be implemented for 2013 standard
ULC/UL Field Rep performs visual inspection of each apparatus	Same
ULC/UL Field Rep witnesses all applicable performance tests	ULC/UL Field Rep witnesses some tests; audits test records for all apparatus By purchaser or manufacturer request – All performance tests may be witnessed by UL/ULC Field Rep
ULC/UL Field Rep must perform all required visual inspections	Same
Manufacturer applies ULC Listing Label	Manufacturer applies Label following receipt of UL issued certificate

The current ULC fire apparatus certification program has operated as a Listing Service under ULC Engineering Services, and is administered under the Follow-up Services Program. The program has verified compliance to CAN/ULC S515 by three components:

1. Audit of manufacturer's systems and processes
2. Visual inspection of construction of each apparatus
3. Performance testing of apparatus systems

This program will now transition into an Inspection Service under UL's Fire Equipment Services (FES) program. Under the coming changes, the program will still provide full assurance to purchasers that the fire apparatus meets the applicable requirements of the standard, using the three components listed above, while providing more flexibility to manufacturers. Examples of this flexibility include:

- The purchaser wishes to install reflective striping, rather than have the striping installed by the manufacturer
- The purchaser wishes to install loose equipment at the apparatus dealer's location

Under the current ULC Listing Program, these items must be installed at the manufacturing location, and the ULC Label is applied in the presence of the ULC Field Representative. In cases where the apparatus was delivered prior to completion of the inspection, a ULC Field Representative would travel to the fire department to inspect the completed apparatus and witness application of the ULC Label. Under the proposed changes,



the manufacturer and purchaser would have the flexibility to provide alternate evidence that requirements such as these were met.

The standard requires that manufacturers conduct performance tests of installed systems such as fire pumps, line voltage systems, and foam systems. Under the new program, auditing performance tests of some systems will be available to manufacturers. However, auditing will not be available for the following systems:

- Fire pump systems
- Aerial devices
- Low voltage systems
- Line voltage systems

The visual inspections of items such as compartment dimensions, illumination levels, and step spacing will continue as before.

As noted above, initial audits will be required to update manufacturer's files, showing compliance to the 2013 edition of the standard. Annual follow-up audits will also be required in order to track manufacturer process changes, and to verify that quality systems are current. The annual audit covers 1/3 of the standard, and will include Chapter 3, General Requirements. Over a three year period the entire standard will be covered.

Typically, the annual audit takes three days by one ULC Representative. Similar to the initial audit, the ULC Representative will review the manufacturer's documentation, witness the manufacturer's test procedures, and review test equipment calibration.

We also recognize that due to regulatory requirements, some purchasers will want all inspections and performance tests completed at the manufacturer's location as before. In these cases, the purchaser will need to specify that all performance tests are conducted at the manufacturer, and this test list will need to be forwarded to the ULC Representative prior to testing. The ULC Field Representative would then personally witness all applicable inspections and tests prior to release of certification. There would be additional charges to cover the additional inspection work.

Apparatus delivered prior to certification under these purchaser requests would again require that a ULC Field Representative provide inspection of completion prior to release of certification, at additional cost.

Labels:

Previously under the Listing Program, manufacturers have been required to purchase the ULC Listing Mark Label for each truck in which ULC approved all text and design of the Label. There will be changes to the labeling requirements as the VIP for ULC S515 is implemented.

The purchase of the ULC Listing Mark used under the 2004 edition of CAN/ULC S515 will no longer be required. Manufacturers will be able to use a Label on each conforming apparatus that includes the ULC logo. The ULC Mark will no longer be included on the Label and the use of the term 'Listed' ('Homologue') will also be discontinued.

The ULC Certificate of Inspection is the only method provided by ULC or UL to identify that an apparatus has been inspected. The Certificate indicates that the fire apparatus complies with the Purchaser's Requirements as specified on the certificate based on the vehicle inspection program detailed herein.

As an extension of the UL Certificate, the apparatus may bear the following Label, which indicates the apparatus was inspected by ULC:



Inspected Fire Apparatus in
accordance with requirements
of CAN/ULC S515-13, as
specified in ULC Certificate
No. _____

Neither the ULC Certificate of Inspection nor any Label issued in connection with the UL Certificate constitute or imply a UL product safety certification for this vehicle (or any components thereof) or the right to use UL's certification marks.

The Label can include the manufacturer's name and logo. This would create a Label similar to the current Label issued under the 2004 edition of the standard. This Label may be a metal plate or may be printed on Mylar. Apparatus equipped with a fire pump will still be required to have a plate installed at the pump panel summarizing the results of the pump test.

This summarizes the changes being implemented with the new edition of the standard. Please contact Mr. Patrick Ginnaty-Moore (Patrick.T.Ginnaty-Moore@ul.com or call 1.847.664.2366) or Mr. Jean Belanger (Jean.P.Belanger@ul.com or call 1.514.247.4078) should you have any questions concerning the above.



Addendum

**Summary of Changes, ULC S515 Vehicle Inspection Program
 for Manufacturers of Automobile Fire Apparatus**

The following table details the changes in the 2013 edition of CAN/ULC S515, Standard for Automobile Firefighting Apparatus. For details and full text, please refer to the standard. To review the changes in French, refer to the Standard CAN/ULC-S515-13-FR against the specific Section / paragraph identified in the table below.

ULC Standard Differences - 2004 v 2013 Editions

CAN/ULC S515-04	CAN/ULC S515-13
Preface	Preface
See Preface in CAN/ULC S515-04	Revised paragraph concerning certification of firefighting apparatus by third parties to provide additional paths for accreditation; Deleted paragraph concerning use of English and French; Added statement that standard is intended to be used for conformity assessment
1. Scope	1. Scope
No change	No Change
2. Glossary	2. Glossary
	Added two new definitions - Eductor and Retroreflective
3. General Requirements	3. General Requirements
3.1 Common Requirements	3.1 Common Requirements
3.1.6 List 1, General Requirements, shows the requirements that shall apply to all types of <i>firefighting apparatus</i> , and the general requirements applicable to their construction, purchase, and use.	3.1.6 Deleted text
3.3 Responsibility of Contractor	3.3 Responsibility of Contractor
	3.3.4 New text - The contractor shall confirm with the purchaser and document any variation exceeding the minimum requirement as per Clause 3.2.1.
3.5 Controls and Instructions	3.5 Controls and Instructions
	3.5.9 New text - Gauges and visual displays at the firefighting apparatus operating positions shall readout in the metric system, unless the purchaser specifies a different system. Gauges and visual displays providing dual systems shall have the metric system as primary, unless the purchaser specifies otherwise. Gauges and visual displays on chassis shall be in units specified by Transport Canada.
3.7 Vehicle Stability	3.7 Vehicle Stability
3.7.1 The height of the fully loaded vehicle's centre of gravity shall not exceed the <i>chassis manufacturer's</i> maximum limit.	3.7.1 Revised text - The height of the fully loaded vehicle's centre of gravity shall not exceed the chassis manufacturer's maximum limit. The firefighting apparatus shall meet the criteria of Clause 3.7.1.1 or be equipped with a stability control system in accordance with Clause 3.7.1.2.



	3.7.1.1 New text - Either of the criteria shall be met by the firefighting apparatus:
	A New text - When tested on a tilt table in accordance with SAE J2180, A Tilt Table Procedure for Measuring the Static Rollover Threshold for Heavy Trucks, the firefighting apparatus shall remain stable to 26.5 degrees in both directions;
	B New text - The centre of gravity (CG), whether it be calculated or measured, shall be no higher than 80 % of the rear axle track width.
	3.7.1.1.1 New text - The sample apparatus shall be considered significantly similar if it includes a chassis with equal or greater centre of gravity (CG) height, equal or narrower rear axle track width, equal or greater size and CG height of water tank, front and rear suspension of same type, and aerial device be of the same type and size.
	3.7.1.1.2 New text - The firefighting apparatus shall be loaded, for the purpose of Clause 3.7.1.1, with fuel, firefighting agents, hose, ladders, a weight of 113 kg (250 lb) in each seating position, and a weight equivalent to the miscellaneous equipment allowance as defined in Table 2.
	3.7.1.1.2.1 New text - If the firefighting apparatus is designed to meet any of the following, these greater loads shall be included in the testing, calculating, or measuring:
	A New text - A specified higher equipment loading;
	B New text - Larger hose bed capacity; or
	C New text - Carry additional ground ladders.
	3.7.1.1.2.2 New text - An approximate typical in-service use weight distribution shall be met without exceeding the manufacturer's published individual compartment weight ratings when the weight is added to the firefighting apparatus for the purpose of test, calculation, or measurement.
	3.7.1.2 New text - As a minimum, an apparatus equipped with a stability control system shall have a steering wheel position sensor, a vehicle yaw sensor, a lateral accelerometer, and individual wheel brake controls.
3.13 Road Tests	3.13 Road Tests
3.13.4 There shall be two runs of the acceleration test in opposite direction over the same route.	3.13.4 Revised text - There shall be two runs of the acceleration test in opposite direction over the same route. A GPS unit may be used to verify apparatus speed during this test. The GPS unit shall be in communication with at least four satellites for the duration of the test.
3.15 Documentation	3.15 Documentation
3.15.2 Firefighting Apparatus Documentation	3.15.2 Firefighting Apparatus Documentation
3.15.2.3 If the firefighting apparatus has an aerial device, all the technical information is required for inspections to comply with NFPA 1914, Standard for Testing, Fire Department Aerial Devices.	3.15.2.3 Revised text - If the firefighting apparatus has an aerial device, all the technical information is required for inspections to comply with NFPA 1911, Standard for the Inspection, Maintenance, Testing, and Retirement of In-Service Automotive Fire Apparatus.



Part I - Apparatus Requirements	Part I - Apparatus Requirements
4. Pumper Firefighting Apparatus	4. Pumper Firefighting Apparatus
4.1 General	4.1 General
4.1.2 For pumper firefighting apparatus equipped with an aerial device, the requirements of Section 5.2, Aerial Device, shall also apply.	4.1.2 Revised text - For pumper firefighting apparatus equipped with:
	A New text - An aerial device, the requirements of Section 5.2, Aerial Device shall also apply.
	B New text - A foam proportioning system, the requirements of Chapter 18, Foam Proportioning Systems shall also apply.
	C New text - A Compressed Air Foam System (CAFS), the requirements of Chapter 19, Compressed Air Foam Systems shall also apply.
	D New text - A line voltage system, the requirements of Chapter 20, Line Voltage Electrical Systems shall also apply.
4.1.4 List 2 Pumper Firefighting Apparatus, shows the requirements that shall apply to each of the components and equipment listed above.	4.1.4 Deleted text
4.7 Ground Ladders	4.7 Ground Ladders
4.7.1 Shall meet the requirements of NFPA 1931, Standard for Manufacturer's Design of Fire Department Ground Ladders	4.7.1 Revised text - Shall meet the requirements of NFPA 1931, Standard for Manufacturer's Design of Fire Department Ground Ladders except as permitted by Clauses 4.7.3 and 4.7.4.
4.7.2 Minimum requirements: one straight ladder with roof hooks, one extension ladder and one attic ladder.	4.7.2 Revised text - Minimum requirements: one straight ladder ladder or folding ladder with roof hooks, one extension ladder and one attic
	4.7.3 New text - Step ladders and other types of multipurpose ladders meeting CAN/CSA-Z11-M81 (R2005), Portable Ladders shall be permitted to be substituted for the folding ladder required in Clause 4.7.2.
	4.7.4 New text -Step ladders and other types of multipurpose ladders shall be permitted to be carried in addition to the minimum fire department ground ladders specified in Clause 4.7.2 provided they meet CAN/CSAZ11-M81 (R2005), Portable Ladders.
4.8 Suction Hose	4.8 Suction Hose
4.8.3 For hard suction hose, a suction strainer shall be furnished; and the friction and entrance loss of the combination suction hose and strainer shall not exceed the losses listed in Table 1 of this Standard.	4.8.3 Revised text - For suction hose, a suction strainer shall be furnished; and the friction and entrance loss of the combination suction hose and strainer shall not exceed the losses listed in Table 1 of this Standard.
4.9 Minor Equipment	4.9 Minor Equipment
4.9.2 Fire Hose and Nozzles	4.9.2 Fire Hose and Nozzles
A 360 m (1200 ft) of 65 mm (2.5 in) or larger fire hose;	A Revised text - 240 m (800 ft) of 65 mm (2.5 in) or larger fire hose in any combination;
	New text - NOTE: Minimums may be exceeded as per Clause 3.2.1.
4.9.3 Miscellaneous Equipment	4.9.3 Miscellaneous Equipment



4.9.3.1 g. One 9.5 L (2.0 gal / 2.5 US-gal) or larger water extinguisher	4.9.3.1 G Deleted text, moved subsequent items up by one letter
q. Two wheel chocks, each designed to hold the firefighting apparatus when loaded to its maximum in-service weight, when on a 10 % grade with the transmission in neutral and the parking brake released, shall be mounted in readily accessible locations.	P Revised text - Two wheel chocks, each designed to hold the firefighting apparatus when loaded to its maximum in-service weight, when on a 20 % grade with the transmission in neutral and the parking brake released, shall be mounted in readily accessible locations.
5. Aerial Firefighting Apparatus	5. Aerial Firefighting Apparatus
5.1 General	5.1 General
5.1.5 List 3, Aerial Firefighting Apparatus, shows the requirements that shall apply to each of the components and equipment listed above.	5.1.5 Deleted and replaced text - If the aerial firefighting apparatus, is supplied with:
	A New text - A foam proportioning system, the requirements of Chapter 18, Foam Proportioning Systems shall also apply.
	B New text - A Compressed Air Foam System (CAFS), the requirements of Chapter 19, Compressed Air Foam Systems shall also apply.
	C New text - A line voltage system, the requirements of Chapter 20, Line Voltage Electrical Systems shall also apply.
5.7 Ground Ladders	5.7 Ground Ladders
5.7.1 Shall meet the requirements of NFPA 1931, Standard for Manufacturer's Design of Fire Department Ground Ladders.	5.7.1 Revised text - Shall meet the requirements of NFPA 1931, Standard for Manufacturer's Design of Fire Department Ground Ladders, except as permitted by Clause 5.7.4.
	5.7.4 New text - Step ladders and other types of multipurpose ladders shall be permitted to be carried in addition to the minimum fire department ground ladders specified in Clause 5.7.2 provided that they meet CAN/CSA-Z11-M81 (R2005), Portable Ladders.
5.8 Minor Equipment	5.8 Minor Equipment
5.8.2.1 j. One 9.5 L (2.0 gal / 2.5 US-gal) or larger water extinguisher	5.8.2.1 J Deleted text, moved subsequent items up by one letter
	5.8.3.1 New text - If it is intended by the purchaser that this aerial firefighting apparatus be used as a pumper firefighting apparatus, it shall meet the requirements of Chapter 4, Pumper Firefighting Apparatus.
6 Initial Attack Firefighting Apparatus (Mini-Pumper)	6 Initial Attack Firefighting Apparatus (Mini-Pumper)
6.1 General	6.1 General
6.1.4 List 4, Initial Attack Firefighting Apparatus (Mini-Pumper), shows the requirements that shall apply to each of the components and equipment listed above.	6.1.4 Deleted and replaced text - The initial attack firefighting apparatus may also be equipped with additional systems. If the firefighting apparatus is equipped with:
	A New text - A foam proportioning system, the requirements of Chapter 18, Foam Proportioning Systems shall also apply.
	B New text - A Compressed Air Foam System (CAFS), the requirements of Chapter 19, Compressed Air Foam Systems shall also apply.



	C New text - A line voltage system, the requirements of Chapter 20, Line Voltage Electrical Systems shall also apply.
6.2 Fire Pump	6.2 Fire Pump
6.2.1 Minimum rated capacity: 950 L/min (210 gpm / 250 US-gpm).	6.2.1 Revised text - Minimum rated capacity: 1000 L/min (210 gpm / 250 US-gpm).
6.6 Ground Ladders	6.6 Ground Ladders
6.6.1 Shall meet the requirements of NFPA 1931, Standard for Manufacturer's Design of Fire Department Ground Ladders.	6.6.1 Revised text - Shall meet the requirements of NFPA 1931, Standard for Manufacturer's Design of Fire Department Ground Ladders, except as permitted by Clause 6.6.3.
	6.6.3 New text - Step ladders and other types of multipurpose ladders shall be permitted to be carried in addition to the minimum fire department ground ladders specified in Clause 6.6.2 provided they meet CAN/CSAZ11-M81 (R2005), Portable Ladders.
7 Quint Firefighting Apparatus	7 Quint Firefighting Apparatus
7.1 General	7.1 General
7.1.4 List 5, Quint Firefighting Apparatus, shows the requirements that shall apply to each of the components and equipment listed above.	7.1.4 Deleted and replaced text - If the quint firefighting apparatus, is supplied with:
	A New text - A foam proportioning system, the requirements of Chapter 18, Foam Proportioning Systems shall also apply.
	B New text - A Compressed Air Foam System (CAFS), the requirements of Chapter 19, Compressed Air Foam Systems shall also apply.
	C New text - A line voltage system, the requirements of Chapter 20, Line Voltage Electrical Systems shall also apply.
7.7 Ground Ladders	7.7 Ground Ladders
7.7.1 Minimum of 26 m (85 ft) of ground ladders to include at least one extension ladder, one straight ladder equipped with roof hooks, and one attic ladder.	7.7.1 Revised text - Minimum of 26 m (85 ft) of fire department ground ladders to include at least one extension ladder, one straight ladder equipped with roof hooks, and one attic ladder or folding ladder.
7.7.2 Shall meet the requirements of NFPA 1931, Standard for Manufacturer's Design of Fire Department Ground Ladders.	7.7.2 Revised text - Shall meet the requirements of NFPA 1931, Standard for Manufacturer's Design of Fire Department Ground Ladders, except as permitted by Clauses 7.7.3 and 7.7.4.
	7.7.3 New text - Step ladders and other types of multipurpose ladders meeting CAN/CSA-Z11-M81 (R2005), Portable Ladders shall be permitted to be substituted for the folding ladder required in Clause 7.7.1.
	7.7.4 New text - Step ladders and other types of multipurpose ladders shall be permitted to be carried in addition to the minimum fire department ground ladders specified in Clause 7.7.2 provided they meet CAN/CSA Z11- M81 (R2005), Portable Ladders.
7.9 Minor Equipment	7.9 Minor Equipment
7.9.3 Miscellaneous Equipment	7.9.3 Miscellaneous Equipment



g. One 9.5 L (2.0 gal / 2.5 US-gal) or larger water extinguisher;	7.9.3 .1 J Deleted text, moved subsequent items up by one letter
t. Two wheel chocks, each designed to hold the firefighting apparatus when loaded to its maximum in-service weight, when on a 10 % grade with the transmission in neutral and the parking brake released, shall be mounted in readily accessible locations.	S Revised text - Two wheel chocks, each designed to hold the firefighting apparatus when loaded to its maximum in-service weight, when on a 20 % grade with the transmission in neutral and the parking brake released, shall be mounted in readily accessible locations.
8 Mobile Foam Firefighting Apparatus	8 Mobile Foam Firefighting Apparatus
8.1 General	8.1 General
8.1.4 For mobile foam firefighting apparatus equipped with an aerial device, the requirements of Section 8.3, Aerial Device, shall apply.	8.1.4 Deleted and revised text - If the mobile foam firefighting apparatus is supplied with:
	A New text - A Compressed Air Foam System (CAFS), the requirements of Chapter 19, Compressed Air Foam Systems shall also apply.
	B New text - A line voltage system, the requirements of Chapter 20, Line Voltage Electrical Systems shall also apply.
8.1.5 List 6, Mobile Foam Firefighting Apparatus, shows the requirements that shall apply to each of the components and equipment listed above.	8.1.5 Deleted and replaced text - For mobile foam firefighting apparatus equipped with an aerial device, the requirements of Section 8.3, Aerial Device, shall apply.
8.8 Minor Equipment	8.8 Minor Equipment
8.8.3 Miscellaneous Equipment	8.8.3 Miscellaneous Equipment
M Two wheel chocks, each designed to hold the firefighting apparatus when loaded to its maximum in-service weight, when on a 10 % grade with the transmission in neutral and the parking brake released, shall be mounted in readily accessible locations.	M Revised text - Two wheel chocks, each designed to hold the firefighting apparatus when loaded to its maximum in-service weight, when on a 20 % grade with the transmission in neutral and the parking brake released, shall be mounted in readily accessible locations.
9. Mobile Water Supply Firefighting Apparatus	9 Mobile Water Supply Firefighting Apparatus
9.1 General	9.1 General
9.1.3 If the mobile water supply firefighting apparatus is equipped with a fire pump, it shall meet the requirements of Section 9.2, Fire Pump, and is required to have a suction hose that meets the requirements of Section 9.6, Suction Hose.	9.1.3 Revised text - If the mobile water supply firefighting apparatus is equipped with:
	A New item - A fire pump, it shall meet the requirements of Section 9.2, Fire Pump, and have a suction hose that meets the requirements of Section 9.6, Suction Hose.
	B New text - A foam proportioning system, the requirements of Chapter 18, Foam Proportioning Systems shall also apply.
	C New text - A Compressed Air Foam System (CAFS), the requirements of Chapter 19, Compressed Air Foam Systems shall also apply.



	D New text - A line voltage system, the requirements of Chapter 20, Line Voltage Electrical Systems shall also apply.
9.1.5 List 7, Mobile Water Supply Firefighting Apparatus, shows the requirements that shall apply to each of the components and equipment listed above.	Deleted text
9.8 Minor Equipment	9.8 Minor Equipment
9.8.3 Equipment	9.8.3 Equipment
9.8.3.1 e. One 9.5 L (2.0 gal / 2.5 US-gal) or larger water extinguisher	9.8.3.1 E Deleted text, moved subsequent items up by one letter
m. Two wheel chocks, each designed to hold the firefighting apparatus when loaded to its maximum in-service weight, when on a 10 % grade with the transmission in neutral and the parking brake released, shall be mounted in readily accessible locations.	L Revised text - Two wheel chocks, each designed to hold the firefighting apparatus when loaded to its maximum in-service weight, when on a 20 % grade with the transmission in neutral and the parking brake released, shall be mounted in readily accessible locations.
10 Special Services Firefighting Apparatus	10 Special Services Firefighting Apparatus
10.1 General	10.1 General
10.1.5 List 8, Special Services Firefighting Apparatus, shows the requirements that shall apply to each of the components listed above.	Deleted text
10.4 Ground Ladders	10.4 Ground Ladders
10.4.1 Shall meet the requirements of NFPA 1931, Standard for Manufacturer's Design of Fire Department Ground Ladders.	10.4.1 Shall meet the requirements of NFPA 1931, Standard for Manufacturer's Design of Fire Department Ground Ladders, except as permitted by Clause 10.4.2.
	10.4.2 Stepladders and other types of multipurpose ladders shall be permitted to be carried provided they meet CAN/CSA-Z11-M81 (R2005), Portable Ladders.
10.6 Minor Equipment	10.6 Minor Equipment
10.6.2 List of Equipment	10.6.2 List of Equipment
10.6.2.1 c. One 9.5 L (2.0 gal / 2.5 US-gal) or larger water extinguisher	10.6.2.1 C Deleted text, moved subsequent items up by one letter
g. Two wheel chocks, each designed to hold the firefighting apparatus when loaded to its maximum in-service weight, when on a 10 % grade with the transmission in neutral and the parking brake released, shall be mounted in readily accessible locations.	F Revised text - Two wheel chocks, each designed to hold the firefighting apparatus when loaded to its maximum in-service weight, when on a 20 % grade with the transmission in neutral and the parking brake released, shall be mounted in readily accessible locations.
Part II - Equipment Requirements	Part II - Equipment Requirements
11 Chassis, Engine and Apparatus Components	11 Chassis, Engine and Apparatus Components
11.1 General	11.1 General
11.1.2 List 9, Chassis, Engine and Apparatus Components, shows the requirements that shall apply to each of the components in the chassis, engine and automobile of a firefighting apparatus.	Deleted text
11.2 Carrying Capacity	11.2 Carrying Capacity



11.2.3 Calculate the unequipped personnel weight using the following value of 90 kg (200 lb) per person. To obtain the unequipped personnel weight multiply this value by the number of seating positions on the firefighting apparatus.	11.2.3 Revised text - The personnel weight shall be calculated using the value of 113 kg (250 lb) per person. The personnel weight shall be calculated by multiplying this value by the number of seating positions on the firefighting apparatus.
11.3 Engine and Engine System Design	11.3 Engine and Engine System Design
11.3.2 Engine Speed Control	11.3.2 Revised text - Engine Speed Auxiliary Control Device
11.3.2.1 An engine speed control device is required to allow an increase in the engine speed when the firefighting apparatus is parked.	11.3.2.1 Revised text - An engine speed auxiliary control device is required to allow an increase in the engine speed when the firefighting apparatus is parked.
11.3.2.2 Notwithstanding the requirement of Clause 11.3.2.1, the engine speed control device shall be rendered inoperable by an interlock mechanism unless the parking brake is fully engaged and the transmission is in neutral or park. If the engine speed control device is used with chassis engine-driven components, it shall be interlocked with the engagement of those components.	11.3.2.2 Revised text - Notwithstanding the requirement of Clause 11.3.2.1, the engine speed auxiliary control device shall be rendered inoperable by an interlock mechanism unless the parking brake is fully engaged and the transmission is in neutral or park. If the engine speed auxiliary control device is used with chassis engine-driven components, it shall be interlocked with the engagement of those components.
11.3.2.3 The engine, transmission, and engine- and transmission-driven accessories (PTOs, etc.) shall be installed in accordance with the engine and transmission manufacturer's installation recommendations for the service intended.	11.3.2.3 New text - When engine rpm control is critical for consistent apparatus functions, the engine shall be prevented from regulating its own speed.
11.3.2.4 An engine hourmeter is required.	11.3.2.4 Revised text - The engine, transmission, and engine- and transmission-driven accessories (PTOs, etc.) shall be installed in accordance with the engine and transmission manufacturer's installation recommendations for the service intended.
	11.3.2.5 An engine hourmeter is required.
12 Low-Voltage Electrical Systems and Warning Devices	12 Low-Voltage Electrical Systems and Warning Devices
12.6 Electro-Magnetic Interference	12.6 Electro-Magnetic Interference
12.6.1 Radiation limits specified in SAE J551/2 Test Limits and Methods of Measurement of Radio Disturbance Characteristics of Vehicles, Motorboats and Spark-Ignited Engine-Driven Devices, required for electromagnetic interference suppression.	12.6.1 Revised text - If any item installed in the firefighting apparatus exceeds the radiation limits specified in SAE J551-1, Performance Levels and Methods of Measurement of Electromagnetic Compatibility of Vehicles, Boats (up to 15 m), and Machines (16.6 Hz to 18 GHz), appropriate measures shall be implemented for suppression of the electromagnetic interference below the permitted maximum levels.
12.6.2 If testing for conformance to SAE J551/2, Test Limits and Methods of Measurement of Radio Disturbance Characteristics of Vehicles, Motorboats and Spark-Ignited Engine-Driven Devices, is required, it shall be indicated by purchaser.	12.6.2 Revised text - The firefighting apparatus shall be tested for conformance to SAE J551-1, Performance Levels and Methods of Measurement of Electromagnetic Compatibility of Vehicles, Boats (up to 15 m), and Machines (16.6 Hz to 18 GHz), and, if specified by the purchaser, to SAE J551-2, Test Limits and Methods of Measurement of Radio Disturbance Characteristics of Vehicles, Motorboats, and Spark Ignited Engine Driven Devices.
12.7 Optical Devices	12.7 Optical Devices
12.7.1 General	12.7.1 General



12.7.1.9 Switching system required that senses the position of parking brake or park position of an automatic transmission.	12.7.1.9 Revised text - A switching system shall sense the position of the parking brake or the park position of an automatic transmission and operate according to the requirements of Clauses 12.7.1.10 and 12.7.1.11.
12.7.6 Tests of Optical Warning Devices	12.7.6 Tests of Optical Warning Devices
12.7.6.1 Mechanical and Environmental Test	12.7.6.1 Mechanical and Environmental Test
12.7.6.1.1 Shall follow the testing requirements of SAE J595, Flashing Warning Lamps for Authorized Emergency, Maintenance, and Service Vehicles; SAE J1318, Gaseous Discharge Warning Lamp for Authorized Emergency, Maintenance, and Service Vehicles; or SAE J1889, L.E.D. Lighting Devices, for the following:	12.7.6.1.1 Shall follow the testing requirements of SAE J595, Flashing Warning Lamps for Authorized Emergency, Maintenance, and Service Vehicles; SAE J845, Optical Warning Devices for Authorized Emergency, Maintenance, and Service Vehicles; SAE J845, Optical Warning Devices for Authorized Emergency, Maintenance, and Service Vehicles; or SAE J1889, L.E.D. Lighting Devices, for the following:
12.9 Work Lighting	12.9 Work Lighting
12.9.1 Ground Lighting	12.9.1 Ground Lighting
12.9.1.1 Minimum level of illumination of at least 30 lx (3 fc) within a 3 m x 3 m (120 in x 120 in) square to the rear of vehicle for work area immediately behind the vehicle.	12.9.1.1 Revised text - The ground lighting sources shall provide a minimum level of illumination of at least 30 lx (3 fc) within a 3 m x 3 m (120 in x 120 in) square to the rear of vehicle for work area immediately behind the vehicle. The illumination shall be measured at nine points – at the corners of the square, the midpoints of the edges of the square, and the middle of the square.
10 lx (1 fc) on ground areas within 800 mm (31.5 in) of the edge of the apparatus in areas designed for personnel to climb onto the firefighting apparatus or descend from the firefighting apparatus to the ground level.	12.9.1.2 Revised text - The ground lighting sources shall provide a minimum level of illumination of at least 20 lx (2 fc) on ground areas within 800 mm (31.5 in) of the edge of the firefighting apparatus in areas designed for personnel to climb onto the firefighting apparatus or descend from the firefighting apparatus to the ground level.
12.9.3 Surface Lighting	12.9.3 Surface Lighting
12.9.3.1 Minimum level of lighting of 10 lx (1 fc) on all work surfaces, steps, and walkways required as sufficient lighting on the firefighting apparatus.	12.9.3.1 Revised text - Minimum level of lighting of 20 lx (2 fc) on all work surfaces, steps, and walkways required as sufficient lighting on the firefighting apparatus.
12.9.5 Compartment Lighting	12.9.5 Compartment Lighting
12.9.5.3 Average minimum level of lighting of 10 lx (1 fc) required for each enclosed tool and equipment compartment greater than 0.1 m ³ (3.5 ft ³) in volume and having an opening greater than 0.09 m ² (1 ft ²).	12.9.5.3 Revised text - Average minimum level of lighting of 20 lx (2 fc) required for each enclosed tool and equipment compartment greater than 0.1 m ³ (3.5 ft ³) in volume and having an opening greater than 0.09 m ² (1 ft ²).
12.10 Hazard Light	12.10 Hazard Light
12.10.2 Manually raised pole lights with an extension of less than 1.5 m (5 ft) shall not be applicable to subsection 12.10.1.	12.10.2 Revised text - The following shall be exempt from the requirements of Clause 12.10.1.
	A New text - Compartments with a volume less than 0.1 m ³ (4 ft ³), whose opening area does not exceed 92,900 mm ² (144 in ²), whose sideways extension when open does not extend beyond the mirrors or the top of the firefighting apparatus, and all equipment in the compartment is restrained so that it cannot fall out should the door be open;
	B New text - Manually raised pole lights with an extension of less than 1.5 m (5 ft).



12.12 Stop, Tail, and Directional Lights	12.12 Stop, Tail, and Directional Lights
12.12.3 A turn signal shall be mounted approximately midway along the firefighting apparatus at approximately running board height, on the firefighting apparatus 10 m (33 ft) or longer in length.	12.12.3 Revised text - A turn signal shall be mounted approximately midway along the firefighting apparatus at approximately running board height, on the firefighting apparatus 9.1 m (30 ft) or longer in length.
13 Driving and Crew Areas	13 Driving and Crew Areas
13.2 Seat Head Height	13.2 Seat Head Height
13.2.1 General	13.2.1 General
13.2.1.1 Each belted seating position from the seat H-point to the ceiling shall be limited to the following minimum vertical dimension:	13.2.1.1 Revised text - Each belted seating position from the seat H-point to the ceiling shall be determined as defined in ISO 3411, Earth-moving machinery Human physical dimensions of operators and minimum operator space envelope, Figure 2.
a. Minimum vertical dimension: 940 mm (37 in) measured with height adjustment in lowest position and suspension inflated and/or raised to upper limit of its travel, for suspension style seats with independent height adjustment;	Deleted text
b. Minimum vertical dimension: 940 mm (37 in) measured with suspension inflated and/or raised to upper limit of its travel, for suspension style seats without independent height adjustment; and	Deleted text
c. Minimum vertical dimension 880 mm (35 in) measured with seat adjusted to its lowest position, for non-suspension style seats.	Deleted text
	13.2.1.4 New text - The following statement shall be included in the operator's manual: "Fire helmets shall not be worn by persons riding in enclosed driving and crew areas. Fire helmets are not designed for crash protection and they will interfere with the protection provided by head rests. The use of seat belts is essential to protecting fire fighters during driving."
	13.2.1.5 New text - A storage location for fire helmets shall be provided.
	13.2.1.6 New text - Helmets shall be secured in compliance with Clause 13.2.4.3 if the helmets are to be stored in the driving or crew compartment.
	13.2.1.7 New text - From each seating location a label stating "DO NOT WEAR HELMET WHILE SEATED" / « NE PORTEZ PAS VOTRE CASQUE LORSQUE VOUS ÊTES ASSIS » shall be visible.
13.4 Driving Compartment	13.4 Driving Compartment
13.4.2 Driver's Seat	13.4.2 Driver's Seat
	13.4.2.4 New text - All primary rear view mirrors used by the driver shall be adjustable from the driver's position.
13.5 Tractor-Drawn Vehicles	13.5 Tractor-Drawn Vehicles
13.5.2 Seat Arrangement	13.5.2 Seat Arrangement
13.5.2.5 Minimum adjustment range of at least 75 mm (3 in) from front to rear of seat, adjustable by the tiller operator.	13.5.2.5 Revised text - The tiller operator's seat shall have a minimum adjustment range of at least 77 mm (3 in) from front to rear of seat, adjustable by the tiller operator whilst seated.



14 Body, Compartments, and Equipment Mounting	14 Body, Compartments, and Equipment Mounting
14.7 Stepping, Standing, and Walking Surfaces	14.7 Stepping, Standing, and Walking Surfaces
14.7.2 Slip Resistance	14.7.2 Slip Resistance
	14.7.2.1 General
14.7.2.1.1 Minimum Slip Resistance – EXTERIOR SURFACES The minimum slip resistance in any orientation for all materials used for exterior surfaces designated as stepping, standing, and walking areas and all interior steps shall be 0.68 when tested wet using the English XL tester in accordance with ASTM F 1679, Standard Test Method for Using a Variable Incidence Tribometer (VIT), or 0.52 when tested wet using the Brungraber Mark II Tester in accordance with ASTM F 1677, Standard Test Method for Using a Portable Inclineable Articulated Strut Slip Test (PIAST).	14.7.2.1.1 Revised text - Minimum Slip Resistance – EXTERIOR SURFACES The minimum slip resistance in any orientation for all materials used for exterior surfaces designated as stepping, standing, and walking areas and all interior steps shall be 0.68 when tested wet using the English XL tester in accordance with the test equipment manufacturer’s instructions, or 0.52 when tested wet using the Brungraber Mark II Tester in accordance with the test equipment manufacturer’s instructions.
14.7.2.1.2 Minimum Slip Resistance – INTERIOR FLOORS The minimum slip resistance in any orientation for all materials used for interior floors shall be 0.58 when tested dry using the English XL tester in accordance with ASTM F 1679, Standard Test Method for Using a Variable Incidence Tribometer (VIT), or 0.47 when tested dry using the Brungraber Mark II Tester in accordance with ASTM F 1677, Standard Test Method for Using a Portable Inclineable Articulated Strut Slip Tester (PIAST).	14.7.2.1.2 Revised text - Minimum Slip Resistance – INTERIOR FLOORS The minimum slip resistance in any orientation for all materials used for interior floors shall be 0.58 when tested dry using the English XL tester in accordance with the test equipment manufacturer’s instructions, or 0.47 when tested dry using the Brungraber Mark II Tester in accordance with the test equipment manufacturer’s instructions.
14.9 Metal Finish	14.9 Metal Finish
14.9.2 Painting	14.9.2 Painting
14.9.2.6 The retroreflective material shall be affixed to at least 50 % of the cab and body length on each side, at least 50 % of the width of the rear, and at least 25 % of the width of the front of the apparatus.	14.9.2.6 Revised text - The retroreflective material shall be affixed to at least 50 % of the cab and body length on each side, excluding pump panel areas, and at least 25 % of the width of the front of the firefighting apparatus.
14.9.2.7 All or part of the required stripping material is permitted to have a graphic design meeting the reflectivity requirements of Clause 14.9.2.5, if the design or combination thereof covers at least the same perimeter length(s) requirement.	14.9.2.7 Revised text - At least 50 % of the rear-facing vertical surfaces, visible from the rear of the firefighting apparatus, excluding any pump panel areas not covered by a door, shall be equipped with retroreflective striping in a chevron pattern sloping downward and away from the centerline of the vehicle at an angle of 45°.
	14.9.2.7.1 New text - Each stripe shall be 150 mm (6 in) in width.
	14.9.2.8 New text - All or part of the required striping material is permitted to have a graphic design meeting the retroreflectivity requirements of Clause 14.9.2.5, if the design or combination thereof covers at least the same perimeter length(s) requirement.
14.10 Hose Storage	14.10 Hose Storage
	14.10.1 E New text - Interior shall not be required to meet slip resistance requirements given in Subsection 14.7.2, Slip Resistance.
14.11 Receivers and Anchors for Rope and Removable Winches	14.11 Receivers and Anchors for Rope and Removable Winches



14.11.1 For receivers or anchors used as removable winch anchors, designed and affixed to provide at least a 1.5 to 1 safety factor over the load rating of the removable winch.	14.11.1 Revised text - Receivers or anchors installed at any location on the firefighting apparatus use as removable winch anchors, shall be designed and affixed to provide at least a 2.0 to 1 straight line pull no-yield safety factor over the load rating of the removable winch.
14.11.2 For receivers or anchors used with rope operations, designed and affixed to the firefighting apparatus to provide at least a 5 to 1 safety factor over the breaking strength of the rope that will be used.	14.11.2 Revised text - Receivers or anchors used with rope operations shall be designed and affixed to the firefighting apparatus to provide at least a 2 to 1 safety factor over the maximum straight line pull rating of the receiver or anchor.
14.11.3 Routine maintenance of the pump, engine, or auxiliary systems shall not be obstructed by the intake and discharge piping, and shall not unduly restrict the servicing of these components.	14.11.3 Revised text - A label placed on or near each receiver or anchor shall state the maximum straight line pull rating that the receiver or anchor can support.
15 Fire Pumps and Associated Equipment	15 Fire Pumps and Associated Equipment
15.2 Design and Performance Requirements	15.2 Design and Performance Requirements
15.2.1 Fire Pump Rated Capacity	15.2.1 Fire Pump Rated Capacity
15.2.1.1 Mounted on the firefighting apparatus with minimum rated capacity: 950 L/min (210 gpm / 250 US-gpm) at 1000 kPa (145 psi) net pump pressure.	15.2.1.1 Revised text - Any fire pump mounted on the firefighting apparatus shall have a minimum rated capacity of 1000 L/min (210 gpm / 250 US-gpm) at 1000 kPa (145 psi) net pump pressure.
15.2.2 Pumping System Capacity	15.2.2 Pumping System Capacity
15.2.2.1 The pumping system shall be capable of delivering:	15.2.2.1 Revised text - If the pumping system is rated at less than 12 000 L/min (2600 gpm / 3000 US-gpm), it shall be capable of delivering:
	15.2.2.2 Replaced/New text - If the pumping system is rated at 12 000 L/min (2600 gpm / 3000 US-gpm) or greater, it shall be capable of delivering the following:
	A New text - 100 % of rated capacity at 700 kPa (100 psi) net pump pressure;
	B New text - 70 % of rated capacity at 1000 kPa (145 psi) net pump pressure; and
	C New text - 50 % of rated capacity at 1350 kPa (195 psi) net pump pressure.
15.2.2.2 Dry pump system shall be capable of meeting the requirements of Clauses 15.2.2.3 through 15.2.2.6.	15.2.2.2.1 Renumbered/No change to text - Dry pump system shall be capable of meeting the requirements of Clauses 15.2.2.3 through 15.2.2.6.
15.2.2.3 Pumps rated less than 6000 L/min (1300 gpm / 1500 US-gpm), shall be capable of taking suction through 6.1 m (20 ft) of suction hose under the conditions specified in Table 3 for the rated capacity of the pump and discharging water in not more than 30 s.	15.2.2.3 Revised text - Pumps rated less than 6000 L/min (1250 gpm / 1500 US-gpm), shall be capable of taking suction through 6.1 m (20 ft) of suction hose under the conditions specified in Table 3 for the rated capacity of the pump and discharging water in not more than 30 s.
15.2.2.4 Pumps of 6000 L/min (1300 gpm / 1500 US-gpm) or larger capacity shall be capable of taking suction through 6.1 m (20 ft) of suction hose under the conditions specified in Table 3 for the rated capacity of the pump and discharging water in not more than 45 s.	15.2.2.4 Pumps of 6000 L/min (1250 gpm / 1500 US-gpm) or larger capacity shall be capable of taking suction through 6.1 m (20 ft) of suction hose under the conditions specified in Table 3 for the rated capacity of the pump and discharging water in not more than 45 s.
15.2.3 Vacuum	15.2.3 Vacuum



15.2.3.1 Using the pump priming device, the completed pumping system shall be able to achieve a vacuum of 75 kPa (11 psi) at altitudes up to 600 m (1960 ft), and sustain the vacuum for at least 5 min with a loss not to exceed 34 kPa (5 psi).	15.2.3.1 Revised text - Using the pump priming device, the completed pumping system shall be able to achieve a vacuum of 75 kPa (11 psi) at altitudes up to 610 m (2000 ft), and sustain the vacuum for at least 5 min with a loss not to exceed 34 kPa (5 psi).
15.2.4 Pump Suction Capability	15.2.4 Pump Suction Capability
15.2.4.1 The fire pump shall pump 100 % of rated capacity at 1000 kPa (145 psi) net pump pressure from draft through 6.1 m (20 ft) of suction hose with a strainer attached under the following conditions:	15.2.4.1 Revised text - The fire pump shall pump 100 % of rated capacity at 1000 kPa (145 psi) net pump pressure for pumps rated at less than 12,000 L/min (2500 gpm / 3000 US-gpm) or at 700 kPa (100 psi) for pumps rated at 12,000 L/min (2500 gpm / 3000 US-gpm) or greater from draft through 6.1 m (20 ft) of suction hose with a strainer attached under the following conditions:
a. An altitude of 600 m (1960 ft) above sea level;	A Revised text - An altitude of 610 m (2000 ft) above sea level;
15.2.4.2 The fire pump shall pump its rated capacity at 1000 kPa (145 psi) net pump pressure at any one of the following special conditions when these conditions are specified by the purchaser.	15.2.4.2 Revised text - The fire pump shall pump its rated capacity at 1000 kPa (145 psi) net pump pressure for pumps rated at less than 12,000 L/min (2500 gpm / 3000 US-gpm) or at 100 psi (700 kPa) for pumps rated at 12,000 L/min (2500 gpm / 3000 US-gpm) or greater at any one of the following special conditions when these conditions are specified by the purchaser.
a. An altitude of 600 m (1960 ft);	A Revised text - At an elevation above 610 m (2000 ft);
15.3 Pumping Engine Requirements	15.3 Pumping Engine Requirements
15.3.2 Engine Speed	15.3.2 Engine Speed
15.3.2.3 The engine/pump combination shall be capable of delivering the rated pump capacity at 1100 kPa (160 psi) net pump pressure, on fire pumps of 3000 L/min (625 gpm / 750 US-gpm) or greater.	15.3.2.3 Revised text - The engine/pump combination shall be capable of delivering the rated pump capacity at 1100 kPa (160 psi) net pump pressure, on fire pumps of 3000 L/min (625 gpm / 750 US-gpm) or greater but less than 12 000 L/min (2500 gpm / 3000 US-gpm).
15.5 Construction Requirements	15.5 Construction Requirements
15.5.3 Pulsation-Free Fire Streams	15.5.3 Pulsation-Free Fire Streams
15.5.3.2 The accumulator shall be constructed and tested in accordance with the ASME Boiler and Pressure Code Section VIII, Division 2, when an accumulator is used to provide pulsation-free fire streams.	15.5.3.2 Revised text - The accumulator shall be constructed and tested in accordance with ASME BPVC-VIII-2 2011, Boiler and Pressure Vessel Code (BPVC), Section VIII, Division 2, when an accumulator is used to provide pulsation-free fire streams.
15.6 Pump Intake Connections	15.6 Pump Intake Connections
15.6.2 Intake Strainer	15.6.2 Intake Strainer
15.6.2.6 A slow-operating valve shall be used for any 75 mm (3 in) or larger intake valve, except the tank-to-pump intake valve.	15.6.2.6 Revised text - A slow-operating valve shall be used for any 77 mm (3 in) or larger intake valve, except the tank-to-pump intake valve.
	15.6.2.10 New text/Inserted in numbering sequence - Bleeder valves for valved intakes 100 mm (4 in.) and larger shall be located where the bleeder valve controls are visible and operationally functional if the bleeder valves are not located at the pump operator's panel.



15.6.2.14 When the pump is equipped with one or more intakes larger than 90 mm (3.5 in) that are not valved, an adjustable automatic pressure relief device shall be installed on the pump system to bleed off excess pressure using a connected hose.	15.6.2.15 Revised text - When the pump is equipped with one or more intakes larger than 77 mm (3 in) that are not valved, an adjustable automatic pressure relief device shall be installed on the pump system to bleed off excess pressure using a connected hose.
15.6.2.21 Closures or caps for 90 mm (3.5 in) and smaller intakes shall remain secured to the firefighting apparatus, but shall be removable from the intakes.	15.6.2.22 Revised text - Closures or caps for 100 mm (4 in) and smaller intakes shall remain secured to the firefighting apparatus, but shall be removable from the intakes.
15.7 Pump Discharge Outlets	15.7 Pump Discharge Outlets
15.7.1 General	15.7.1 General
15.7.1.2 The discharge from a waterway that is permanently connected to the pump of a firefighting apparatus equipped with an aerial device, shall be permitted to be credited as a 4000 L/min (880 gpm / 1050 US-gpm) outlet.	15.7.1.2 Revised text - The discharge from a waterway that is permanently connected to the pump of a firefighting apparatus equipped with an aerial device, shall be permitted to be credited as a 4000 L/min (840 gpm / 1000 US-gpm) outlet.
15.7.2 Discharge Outlet Connections	15.7.2 Discharge Outlet Connections
15.7.2.5 For outlets 90 mm (3.5 in) and smaller in size the caps or closures shall be removable from the outlet but must remain secured to the firefighting apparatus.	15.7.2.5 Revised text - For outlets 100 mm (4 in) and smaller in size the caps or closures shall be removable from the outlet but must remain secured to the firefighting apparatus.
15.7.2.8 For any discharge valve 75 mm (3 in) or larger a slow-operating valve shall be used.	15.7.2.8 Revised text - For any discharge valve 77 mm (3 in) or larger a slow-operating valve shall be used.
15.9 Pump Operator's Panel	15.9 Pump Operator's Panel
15.9.2 A minimum lighting level of 50 lx (4.6 fc), shall be used to illuminate all gauges, discharge outlets, pump intakes, and controls.	15.9.2 Revised text - Compliance with Clause 3.5.2 shall be used to illuminate all gauges, discharge outlets, pump intakes, and controls.
15.10 Pump Controls	15.10 Pump Controls
15.10.1 General	15.10.1 General
	15.10.1.7 New text - For pump driven by the chassis engine and transmission through a split shaft PTO, the transmission shall shift to neutral when the parking brake is engaged.
15.10.6 Pump Operator's Panel Engine Speed Advancement - Automatic or Manual Chassis Transmissions	15.10.6 Pump Operator's Panel Engine Speed Advancement - Automatic or Manual Chassis Transmissions
15.10.6.1 An interlock system shall be provided at the pump operator's panel to prevent advancement of the engine speed unless (1) the chassis transmission is in neutral and the parking brake is engaged or the apparatus is in the "OK to Pump" mode for an automatic chassis transmission, or (2) the parking brake is engaged or the firefighting apparatus is in the "OK to Pump" mode for a manual chassis transmission.	15.10.6.1 Revised text - Control for engine speed shall be installed at the pump operator's panel.
	15.10.6.2 New text - When the pump is in the "OK to Pump" mode, a "Throttle Ready" indicator, installed at the pump operator's panel, shall light.



	15.10.6.3 New text - The “Throttle Ready” may light when the parking brake is engaged and (if the firefighting apparatus is equipped with an automatic chassis transmission) the chassis transmission is in neutral.
	15.10.6.4 New text - An interlock system shall be provided to prevent advancement of the engine speed at the pump operator’s panel unless the firefighting apparatus is equipped with “Throttle Ready” indication.
	15.10.6.4.1 New text - If the firefighting apparatus is equipped with an automatic chassis or manual chassis transmission, and the interlock system in Clause 15.10.6.3 experiences a loss of power, then the engine speed shall be returned to idle and the interlock shall prevent advancement of the engine speed at the pump operator’s panel.
	15.10.6.5 New text - If the firefighting apparatus is equipped with a manual chassis transmission, and a pump shift manual override is provided, then the “Pump Engaged,” “OK to Pump,” and “Throttle Ready” indicators and the pump operator’s panel engine speed advancement interlock system shall be operationally functional when the manual override device is used to shift the pump.
15.10.8 Pressure Control System	15.10.8 Pressure Control System
15.10.8.4 It shall be possible for either system to be controllable by one person at the pump operator position.	15.10.8.4 Revised text - It shall be possible for either of the systems identified in Clauses 15.10.8.2 and 15.10.8.3 to be controllable by one person at the pump operator position.
15.11 Pump Engine Controls	15.11 Pump Engine Controls
15.11.2 From the operator's standing position the throttle control shall be located not higher than 1.8 m (6 ft) nor lower than 1.1 m (3.6 ft) with all instruments in full view.	15.11.2 Revised text - From the operator’s standing position at a vertical control panel (greater than 45° from horizontal), (commonly referred to as a side mount), 1830 mm (6 ft) nor lower than 1070 mm (3.6 ft) when all instruments are in full view. Measurement to be the throttle control shall be located not higher than taken from the centre line of the control device.
	15.11.3 New text - From the operator’s standing position at a horizontal control panel (less than or equal to 45° from horizontal), (commonly referred to as a top mount), the throttle control shall be located not higher than 1270 mm (4.2 ft) nor lower than 810 mm (2.7 ft) when all instruments are in full view. Measurement to be taken from the centre line of the control device.
	15.11.4 New text - If the operator’s control panel is design to be from a seated position, all pump and engine controls must be clearly visible and within easy reach of the seated position.
15.12 Instrumentation	15.12 Instrumentation
15.12.2 Master Pump Intake and Pressure-Indicating Devices	15.12.2 Master Pump Intake and Pressure-Indicating Devices
15.12.2.7 Gauges shall be accurate to a minimum of Grade 1A as defined in ASME B40.100, Pressure Gauges and Gauge Attachments.	15.12.2.7 Revised text - Analog gauges shall be accurate to a minimum of Grade 1A as defined in ASME B40.100, Pressure Gauges and Gauge Attachments, when the vacuum portion of the display covers an arc of 45° or less.



	15.12.2.8 New text - If an analog gauge has a vacuum display covering an arc greater than 120°, then the accuracy shall be at least 3.5 % for the entirety of the respective scales.
	15.12.2.9 If an analog gauge has a vacuum display covering an arc greater than 120°, then the vacuum scale shall have graduation lines every 5 kPa (1 in. Hg); major and intermediate graduation lines shall be emphasized, and at least every 50 kPa (10 in. Hg) there shall be a figure.
15.2.2.8 The height of numerals for master gauges shall be a minimum of 6 mm (0.25 in).	15.12.2.10 Changed numbering - The height of numerals for master gauges shall be a minimum of 6 mm (0.25 in).
15.12.2.9 These devices shall have graduation lines that shall show at least every 70 kPa (10 psi), with major and intermediate graduation lines emphasized and figures at least every 700 kPa (100 psi).	15.12.2.11 Revised text/Changed numbering - These devices shall have graduation lines that shall show at least every 50 kPa (7.3 psi), with major and intermediate graduation lines emphasized and figures at least every 500 kPa (73 psi).
15.12.2.11 The requirements of Clauses 15.12.2.12 through 15.12.2.14 shall be met by any digital master pressure indicating devices used.	15.12.2.13 Revised text/Changed numbering - The requirements of Clauses 15.12.2.14 through 15.12.2.16 shall be met by any digital master pressure indicating devices used.
15.12.3 Discharge Outlet Instrument	15.12.3 Discharge Outlet Instrument
15.12.3.1 For each discharge outlet 38 mm (1.5 in) or larger in size, a flowmeter or a pressure-indicating device shall be provided which shall be marked with a label to indicate the outlet to which it is connected.	15.12.3.1 Revised text - For each discharge outlet 38 mm (1.5 in) or larger in size, a pressure-indicating device shall be provided which shall be marked with a label to indicate the outlet to which it is connected.
15.12.3.2 A pressure-indicating device shall be provided for any discharge outlet 90 mm (3.5 in) or larger equipped with a flowmeter.	15.12.3.2 Revised text - A pressure-indicating device shall be provided for any discharge outlet equipped with a flowmeter.
15.12.3.9 These devices shall have graduation lines that shall show at least every 70 kPa (10 psi), with major and intermediate graduation lines emphasized and figures at least every 700 kPa (100 psi).	15.12.3.9 Revised text - These devices shall have graduation lines that shall show at least every 50 kPa (7.3 psi), with major and intermediate graduation lines emphasized and figures at least every 500 kPa (73 psi).
15.12.3.13 Pressure on Digital pressure-indicating devices shall be displayed in increments of not more than 70 kPa (10 psi).	15.12.3.13 Revised text - Pressure on Digital pressure-indicating devices shall be displayed in increments of not more than 50 kPa (10 psi).
15.13 Testing	15.13 Testing
15.13.1 General	15.13.1 General
15.13.1.2 As a minimum the tests shall consist of the pumping test (refer to Subsection 15.13.3), the pumping engine overload test (refer to Subsection 15.163.4) the pressure control system test (refer to Subsection 15.13.5), the priming device tests (refer to Subsection 15.13.6), the vacuum test (refer to Subsection 15.13.7).	15.13.1.2 Revised/deleted text - As a minimum the tests shall consist of the pumping test (refer to Subsection 15.13.3, Pump Test), the pressure control system test (refer to Subsection 15.13.5, Pressure Control System Test), the priming device tests (refer to Subsection 15.13.6, Priming Device Tests), the vacuum test (refer to Subsection 15.13.7, Vacuum Test) and the gauge and flowmeter test (refer to Subsection 15.13.10, Gauge and Flowmeter Test).
	15.13.1.3 New text - The pumping engine overload test (refer to Subsection 15.13.4, Pumping Engine Overload Test) shall be conducted if the pump has a rated capacity of at least 3000 L/min (650 gpm / 750 US-gpm), but less than 12,000 L/min (2500 gpm / 3000 US-gpm).



	15.13.1.4 New text - The engine speed advancement interlock test (refer to Subsection 15.13.9, Engine Speed Advancement Interlock Test) shall be conducted if the chassis engine drives the pump.
15.13.3 Pump Test	15.13.3 Pump Test
15.13.3.1 Test Conditions	15.13.3.1 Test Conditions
15.13.3.1.1 The selected test site shall be adjacent to a supply of clear water of at least 1.2 m (4 ft) in depth, with the water level not more than 3 m (9 ft) below the centre of the pump intake, and close enough to allow the suction strainer to be submerged at least 0.6 m (2 ft) below the surface of the water when connected to the pump by 6.1 m (20 ft) of suction hose.	15.13.3.1.1 Revised/deleted text - The selected test site shall be adjacent to a supply of clear water of at least 1.2 m (4 ft) in depth, and close enough to allow the suction strainer to be submerged at least 0.6 m (2 ft) below the surface of the water when connected to the pump by 6.1 m (20 ft) of suction hose.
	D New text - The minimum lift distance shall be 1 m (3 ft) from the centre of pump intake to the surface of the water.
	15.13.3.1.3 New text - If the pump passes the tests and the tests need to be performed outside the air or water temperature ranges stated in Clause 15.13.3.1.2, the test results shall be acceptable.
15.13.3.3 Procedure	15.13.3.3 Procedure
	15.13.3.3.3 New text - The no-load governed speed of the engine shall be checked and recorded.
	15.13.3.3.3.1 New text -The manufacturer shall adjust the engine speed to within acceptable limits if the speed of the engine is not within 2 % of the rated no-load governed speed as recorded on the manufacturer engine curve.
	15.13.3.3.9 New text - For apparatus with a fire pump rated at 12,000 L/min (2500 gpm / 3000 US-gpm) the following test shall be conducted:
	New text - Subject the pump to a 3 h pumping test from draft consisting of 2 h of continuous pumping at rated capacity at 700 kPa (100 psi) net pump pressure, followed by 30 min of continuous pumping at 70 % of rated capacity at 1000 kPa (145 psi) net pump pressure and 30 min of continuous pumping at 50 % of rated capacity at 1350 kPa (195 psi) net pump pressure.
	15.13.3.3.10 New text - Unless it becomes necessary to clean the suction strainer, the pump shall not be stopped until after the 2 h test at rated capacity.
	15.13.3.3.11 New text - The pump may be stopped between tests in order to change the hose or nozzles, clean the strainer, or add fuel for the pump drive engine.
	15.13.3.3.12 New text - Recording of the capacity, discharge pressure, intake pressure, and engine speed, shall be taken at least every 15 min but not less than three times for each test sequence.
	15.13.3.3.13 New text - The calculation and recording of the average net pump pressure, shall be based on the average values for discharge and intake pressure.



15.13.4 Pumping Engine Overload Test	15.13.4 Pumping Engine Overload Test
15.13.4.1 The apparatus shall be subjected to an overload test consisting of pumping rated capacity at 1100 kPa (160 psi) net pump pressure for at least 10 min, if the pump has a rated capacity from 3000 L/min (625 gpm / 750 US-gpm) or greater.	15.13.4.1 Revised text - The firefighting apparatus shall be subjected to an overload test consisting of pumping rated capacity at 1100 kPa (160 psi) net pump pressure for at least 10 min, if the pump has a rated capacity from 3000 L/min (625 gpm / 750 US-gpm), but less than 12,000 L/min 2500 gpm / 3000 US-gpm.
15.13.5 Pressure Control System Test	15.13.5 New text - Pressure Control System Test
	15.13.5.2 New text - If the pumping system is rated at 12,000 L/min (2500 gpm / 3000 US-gpm) or greater, the pressure control system on the pump shall be tested as follows:
	A New text - Operate the pump at draft, delivering rated capacity at a discharge gauge pressure of 700 kPa (100 psi);
	B New text - Set the pressure control system in accordance with the manufacturer's instructions to maintain the discharge gauge pressure at 700 kPa (100 psi) \pm 5 %;
	C New text - The time for all discharge valves to close shall not be faster than 3 s and not slower than 10 s;
	D New text - The rise in discharge pressure shall not exceed 200 kPa (29 psi) and shall be recorded;
	E New text - The original conditions of pumping rated capacity at a discharge gauge pressure of 1000 kPa (145 psi) shall be re-established;
	F New text - Operate the pump at draft, pumping 50 % of rated capacity at a discharge gauge pressure of 1350 kPa (195 psi);
	G New text - Set the pressure control system in accordance with the manufacturer's instructions to maintain the discharge gauge pressure at 1350 kPa (195 psi) \pm 5 %;
	H New text - The time for all discharge valves to close shall be not faster than 3 s and not slower than 10 s; and
	I New text -The discharge pressure shall not rise in excess of 200 kPa (29 psi) and the rise shall be recorded.
15.13.6 Priming Device Tests	15.13.6 Priming Device Tests
	15.13.6.6.1 New text - The additional 15 s shall not apply to valved intake pipes such that when the valve is closed, the pipe volume between the fire pump and the valve is reduced to less than 0.03 m ³ (1 ft ³).
15.13.7 Vacuum Test	15.13.7 Vacuum Test
15.13.7.1 The test shall subject the interior of the pump, with all intake valves open, all intakes capped or plugged, and all discharge caps removed, and with 6.1 m (20 ft) of large suction hose connected to the intake, to a vacuum of 75 kPa (22 in Hg) by means of the pump priming device.	15.13.7.1 Revised/deleted text - The test shall subject the interior of the pump, with all intake valves open, all intakes capped or plugged, and all discharge caps removed, to a vacuum of 75 kPa (22 in Hg) by means of the pump priming device.



15.13.7.2 Above an altitude of 600 m (1960 ft), the vacuum attained shall be permitted to be less than 75 kPa (22 in Hg) by 3.4 kPa (1 in Hg) for each 305 m (1000 ft) of altitude above 600 m (1960 ft).	15.13.7.2 Revised text - Above an altitude of 610 m (2000 ft), the vacuum attained shall be permitted to be less than 75 kPa (22 in Hg) by 3.4 kPa (1 in Hg) for each 305 m (1000 ft) of altitude above 600 m (1960 ft).
15.13.8 Water Tank-to-pump Flow Test	15.13.8 Water Tank-to-pump Flow Test
15.13.8.2 Volume Discharge Calculation	15.13.8.2 Volume Discharge Calculation
15.13.8.2.1 The volume discharge calculation formula shall be as follows:	15.13.8.2.1 The volume discharge calculation formula shall be as follows:
A Multiply the rate of discharge in litres per minute times the time in minutes elapsed from the opening of the discharge valves until the discharge pressure drops by at least 70 kPa (10 psi) or more.	A Revised text - Multiply the rate of discharge in litres per minute (gpm, if specified by the purchaser) times the time in minutes elapsed from the opening of the discharge valves until the discharge pressure drops by at least 70 kPa (10 psi).
15.13.9 Engine Speed Advancement Interlock Test	15.13.9 New Clause - Engine Speed Advancement Interlock Test
	15.13.9.1 New text - The test shall verify that the engine speed control at the pump operator's panel cannot be advanced when either of the following conditions exist if the firefighting apparatus is equipped with a stationary pump driven through split shaft PTO:
	A New text - The chassis transmission is in neutral, the parking brake is off, and the pump shift in the driving compartment is in the road position;
	B New text - The chassis transmission has been placed in the position for pumping as indicated on the label provided in the driving compartment, the parking brake is on, and the pump shift in the driving compartment is in the road position.
	15.13.9.2 New text - If the firefighting apparatus is equipped with the following:
	A New text - A stationary pump driven through a transmission mounted PTO;
	B New text - Front-of-engine crankshaft PTO; or
	C New text - Engine flywheel PTO;
	New text - the test shall verify that the engine speed control on the pump operator's panel cannot be advanced when either of the following conditions exist:
	i New text - The chassis transmission is in neutral, the parking brake is off, and the pump shift status in the driving compartment is disengaged.
	ii New text - The chassis transmission is in any gear other than neutral, the parking brake is on, and the pump shift in the driving compartment is in the "Pump Engaged" position.
	15.13.9.3 New text - The test shall verify that the engine speed control at the pump operator's panel cannot be advanced when either condition A or B exists if the firefighting apparatus is equipped with a pump driven by the chassis engine designated for both pump-and-roll and stationary pumping:



	A New text - The chassis transmission is in any gear other than neutral, the parking brake is on, and the pump shift in the driving compartment is in the “Pump Engaged” or the “OK to Pump & Roll” position;
	B New text - The chassis transmission is in neutral, the parking brake is on, and the pump shift status in the driving compartment is disengaged.
	15.13.9.4 New text - The test shall verify that the engine speed control on the pump operator’s panel cannot be advanced when one of the conditions A, B, or C exists if the firefighting apparatus is equipped with a stationary pump driven through transfer case PTO:
	A New text - The chassis transmission is in neutral, the transfer case is in neutral, the parking brake is off, and the pump shift in the driving compartment is in the road position;
	B New text - The chassis transmission is in neutral, the transfer case is engaged, the parking brake is off, and the pump shift in the driving compartment is in the road position;
	C New text - The chassis transmission has been placed in the position for pumping as indicated on the label provided in the driving compartment, the parking brake is on, and the pump shift in the driving compartment is in the road position.
	15.13.10 New Clause - Gauge and Flowmeter Test
	15.13.10.1 New text - While pumping at rated capacity at 1000 kPa (145 psi), the intake and pump gauges for the pump shall be checked for accuracy.
	15.13.10.2 New text - Gauges shall be compared to the calibrated test gauge; any gauge that differs by more than 70 kPa (10 psi), shall be recalibrated, repaired, or replaced.
	15.13.10.3 New text - While pumping at rated capacity at 1000 kPa (145 psi), flowmeters shall be checked for accuracy.
	15.13.10.4 New text - Flowmeters that differ by more than 10 %; shall be recalibrated, repaired, or replaced.
16 Water Tanks	16 Water Tanks
16.1 General	16.1 General
16.1.3 List 14, Water Tanks, shows the requirements that shall apply to water tanks.	Deleted text
16.2 Tank Construction	16.2 Tank Construction
16.2.2 Clean-out Sumps	16.2.2 Clean-out Sumps
16.2.2.2 Minimum of 75 mm (3 in) or larger of removable pipe plug for each sump.	16.2.2.2 Revised text - A removable pipe plug of minimum diameter 77 mm (3 in) shall be provided for each sump.
17 Aerial Devices	17 Aerial Devices
17.1 General	17.1 General
17.1.5 List 15, Aerial Devices, shows the requirements that shall apply to each of the components of an aerial device.	Deleted text



17.2 Aerial Ladder Requirements	17.2 Aerial Ladder Requirements
17.2.2 Obstructions Below the Ladder	17.2.2 Obstructions Below the Ladder
17.2.2.11 Aerial ladder shall be capable of being raised from the bedded position to maintain elevation and extension and rotated 90°, with the stabilizers set.	17.2.2.11 Combined text - Simultaneous operation of two or more of the following functions shall be permitted. The aerial ladder shall be capable of being raised from the bedded position to maximum elevation and extension and rotated 90°, with the stabilizers set.
17.2.2.12 Two or more of these functions can be performed simultaneously.	Text merged into 17.2.2.11
17.2.2.14 Where a breathing air system is provided, it shall be supplied for a minimum of one person at the secondary aerial ladder operator's position and shall meet the requirements of Clauses 17.2.2.15 through 17.2.5.6.	17.2.2.13 Revised/deleted text - Where a breathing air system is provided, it shall meet the requirements of Clauses 17.2.2.14 through 17.2.4.6.
17.2.2.15 The breathing air system shall include storage for at least 5.6 m ³ (200 ft ³) of breathing air. In addition, the breathing air system shall also meet the requirements of NFPA 1901, Standard for Automotive Fire Apparatus.	17.2.2.14 Revised text - The breathing air system shall include storage for at least 5.6 m ³ (200 ft ³) of breathing air. In addition, the breathing air system shall also meet the requirements of Chapter 22, Air Systems.
	17.2.2.15 New text - If a secondary operator's position is provided, the breathing air system shall provide air for a minimum of one person at the secondary operator's position.
17.2.5 Aerial Ladder Rated Capacity	17.2.5 Aerial Ladder Rated Capacity
	17.2.5.2 New text - The minimum rated capacity shall remain constant throughout the entire operating envelope of the aerial ladder.
17.2.8 Aerial Ladder Water Delivery System	17.2.8 Aerial Ladder Water Delivery System
17.2.8.17 If a prepped waterway is not provided, the following equipment shall be provided:	17.2.8.17 If a prepped waterway is not provided, the following equipment shall be provided:
B Sufficient length(s) of 75 mm (3 in) or larger attack hose complying with the requirements of CAN/ULC-S511, Standard for Lined Fire Hose for Interior Standpipes and Municipal and Industrial Fire Protection Services, to reach between the installed ladder pipe and the ground with at least 3 m (120 in) of hose available on the ground with the ladder at full extension;	B Revised text - Sufficient length(s) of 77 mm (3 in) or larger attack hose complying with the requirements of CAN/ULC-S511, Standard for Lined Fire Hose for Interior Standpipes and Municipal and Industrial Fire Protection Services, to reach between the installed ladder pipe and the ground with at least 3 m (120 in) of hose available on the ground with the ladder at full extension;
17.6 Control Devices	17.6 Control Devices
17.6.7 An interlock system shall be provided to prevent the following:	17.6.7 An interlock system shall be provided to prevent the following:
	C New text - Operation of the aerial device into an unstable position when the aerial device can be operated with the stabilizers not fully deployed on at least one side of the vehicle.
17.11 Quality Control	17.11 Quality Control
17.11.1 General	17.11.1 General



<p>17.11.1.6 All testing shall be performed by one of the following who have been certified in the test methods used in accordance with ASNT CP-189, Standard for Qualification and Certification of Nondestructive Testing Personnel:</p>	<p>17.11.1.6 Revised text - Any person who performs NDT should have received suitable formal training or sufficient experience.</p>
	<p>NOTE: New text - In Canada, a person may be certified in the test methods used in accordance with ASNT CP-189, Standard for Qualification and Certification of Nondestructive Testing Personnel as either:</p>
<p>17.11.2 Welder Certification</p>	<p>17.11.2 Welder Certification</p>
<p>17.11.2.1 Welds for all structural load-supporting elements shall be performed by certified welders approved by the Canadian Welding Bureau to CSA W47.1, Certification of Companies for Fusion Welding of Steel, or CSA W47.2, Certification of Companies for Fusion Welding of Aluminum, or the equivalent certification to AWS D1.1, Structural Welding Code - Steel; AWS D1.2, Structural Welding Code - Aluminum; and AWS D1.3, Structural Welding Code - Sheet Steel. Welding performed by machines shall be considered equivalent to welding performed by certified welders.</p>	<p>17.11.2.1 Revised text - Welds for all structural load-supporting elements shall be performed by a person who has received suitable formal training or sufficient experience acceptable to the authority having jurisdiction. Welding performed by machines shall be considered equivalent to welding performed by welders who have received suitable formal training or sufficient experience acceptable to the authority having jurisdiction.</p>
	<p>NOTE: New text - Certified welders should be approved by the Canadian Welding Bureau to CSA W47.1, Certification of Companies for Fusion Welding of Steel, or CSA W47.2, Certification of Companies for Fusion Welding of Aluminum or the equivalent certification to AWS D1.1, Structural Welding Code – Steel; AWS D1.2, Structural Welding Code – Aluminum; and AWS D1.3, Structural Welding Code – Sheet Steel.</p>
<p>17.13 Tests</p>	<p>17.13 Tests</p>
<p>17.13.1 General</p>	<p>17.13.1 General</p>
<p>17.13.1.1 Prior to being subjected to the tests defined in Subsections 17.13.2, Stability Test, through 17.13.4, Aerial Device Water System Test, the aerial device shall be inspected and tested in accordance with the requirements of NFPA 1914, Standard for Testing Fire Department Aerial Devices.</p>	<p>17.13.1.1 Revised text - Prior to being subjected to the tests defined in Subsections 17.13.2, Stability Test, through 17.13.4, Aerial Device Water System Test, the aerial device shall be inspected and tested in accordance with the requirements of NFPA 1911, Standard for the Inspection, Maintenance, Testing, and Retirement of In-Service Automotive Fire Apparatus.</p>
<p>17.13.2 Stability Tests</p>	<p>17.13.2 Stability Tests</p>
	<p>17.13.2.1 New Sub-Section - General</p>



	<p>17.13.2.1.1 New text - Stability of aerial devices has been based on designs that assure that the rated capacity may be used at maximum reach with the aerial device at any elevation. This has been the traditional design practice, and verification testing has been conducted to verify stability of aerial devices built to this design. The advent of computerized controls and load monitoring systems has led to designs that can control the position of the tip of the aerial device, limiting extension based on applied load and elevation. Examples of these designs are shown in Figure 1. These aerial devices may also be designed to allow use with the stabilizers on one side of the truck only partially extended. Additional verification testing is described to assure the stability of aerial devices built to these designs.</p>
	<p>17.13.2.2 New Sub-Section - Common Requirements for Stability Testing</p>
<p>17.13.2.1 The aerial device shall be mounted on an apparatus that is in a service-ready condition and is placed on a firm, level surface.</p>	<p>17.13.2.2.1 Deleted text - The aerial device shall be mounted on an apparatus that is in a service-ready condition.</p>
	<p>17.13.2.2.3 New text - Stability testing shall be conducted with the firefighting apparatus placed on a firm, level surface. A second set of stability tests shall then be conducted with the firefighting apparatus placed on a firm surface sloping downward at 5° (8.7 % grade) in the direction most likely to cause overturning.</p>
	<p>17.13.2.3 New Sub-Section - Requirements for Full Operating Envelope Aerial Devices</p>
	<p>17.13.2.3.1 New Sub-Section - Stability Testing on Level Surface</p>
<p>17.13.2.7 The test shall not cause permanent deformation of any components and the firefighting apparatus shall show no signs of instability.</p>	<p>17.13.2.3.1.5 Revised text - In all cases, the aerial device shall be operated to carry the test load through the area of least stability. The test shall not cause permanent deformation of any components and the firefighting apparatus shall show no signs of instability.</p>
	<p>17.13.2.3.2 New Sub-Section - Stability Testing on a 5° Slope</p>
<p>17.13.2.8 Further test the stability in accordance with Clauses 17.13.2.9 through 17.13.2.13.</p>	<p>17.13.2.3.2.1 New text -Further test the stability in accordance with Clauses 17.13.2.3.2.2 through 17.13.2.3.2.5.</p>
<p>17.13.2.13 The test shall not cause permanent deformation of any components and the firefighting apparatus shall show no signs of instability.</p>	<p>17.13.2.3.2.5 Revised text - In all cases, the aerial device shall be operated to carry the test load through the area of least stability. The test shall not cause permanent deformation of any components and the firefighting apparatus shall show no signs of instability.</p>
	<p>17.13.2.4 New Sub-Section - Requirements for Limited Reach Operating Envelope Aerial Devices</p>
	<p>17.13.2.4.1 New Sub-Section - General</p>



	17.13.2.4.1.1 New text - The aerial device manufacturer shall define the operating envelope and the loading conditions for the aerial device. The boundary of the operating envelope is defined as the set of points determined by the maximum allowable horizontal reach at any given angle of elevation. This will establish the full range of the operating envelope and loading conditions for the aerial device. These designs may require operation with the stabilizers fully deployed only, or may allow operation over the side with the stabilizers partially deployed (i.e., 'short jacked').
	17.13.2.4.1.2 New text - Prior to stability testing, the manufacturer shall define the positions of minimum stability of the aerial device, based on the operating envelope defined by the manufacturer.
	17.13.2.4.1.3 New text - Determination of minimum stability shall include loads, forces, and conditions which, in combination, create the worst overturning moment. Examples of these loads, forces, and conditions include (but are not limited to):
	A New text - Dead load;
	B New text - Working load;
	C New text - Wind load;
	D New text - Nozzle reactions;
	E New text - Ancillary loads (equipment, ice, etc.);
	F New text - Inertial forces (dynamic movements of the aerial device);
	G New text - Effects of ground slope angle.
	17.13.2.4.1.4 New text - Systems that allow the aerial device to be operated over the side with the stabilizers not fully deployed shall be tested with the stabilizers in three positions:
	A New text - At the minimum extension as defined by the manufacturer;
	B New text - Extended to midpoint between the points of minimum and full extension;
	C New text - Fully deployed.
	17.13.2.4.2 New Sub-Section - Stability Testing on Level Surface
17.13.2.3 If the stabilizers are intended to be extended as part of the configuration, the stabilizers shall be deployed to the point where the interlock system allows operation of the aerial device.	17.13.2.4.2.1 If the stabilizers are intended to be extended as part of the configuration, the stabilizers shall be deployed to the point where the interlock system allows operation of the aerial device.
	17.13.2.4.2.2 When the aerial ladder, or the platform of the elevating platform, is in the position of least stability, a load of 1.5 times the rated capacity, as specified by the manufacturer, shall be suspended from the tip of the aerial ladder or the platform of the elevating platform.



	17.13.2.4.2.3 If the water flow is included in the rated capacity (i.e., while water is flowing) specified by the manufacturer, one times the water load and the worst case nozzle reaction shall be added to the stability test weights.
	17.13.2.4.2.4 The stability test for a water tower shall include the weight of the water in the system and 1.5 times the maximum nozzle reaction force when the water tower is in the position of least stability.
	17.13.2.4.2.5 In all cases, the aerial device shall be operated to carry the test load through the area of least stability. The test shall not cause permanent deformation of any components and the firefighting apparatus shall show no signs of instability. Stabilizers on the offside of the firefighting apparatus shall maintain contact with the ground during the stability testing.
	17.13.2.4.3 Stability Testing on a 5° Slope
	17.13.2.4.3.1 Further test the stability in accordance with Clauses 17.13.2.4.3.2 through 17.13.2.4.3.5.
	17.13.2.4.3.2 The stabilizers shall be deployed in accordance with the manufacturer's recommendations if the stabilizers are intended to be extended as part of the configuration.
	17.13.2.4.3.3 When the aerial ladder or the platform of the elevating platform is in the position of least stability, a load of 1.33 times the rated capacity shall be suspended from the tip of the aerial ladder or the platform of the elevating platform.
	17.13.2.4.3.4 When the water tower is in the position of least stability, the stability test shall include the weight of the water in the system and 1.33 times the maximum nozzle reaction.
	17.13.2.4.3.5 In all cases, the aerial device shall be operated to carry the test load through the area of least stability. The test shall not cause permanent deformation of any components and the firefighting apparatus shall show no signs of instability. Stabilizers on the offside of the firefighting apparatus shall maintain contact with the ground during the stability testing.
	18 Foam Proportioning Systems
	Entirely New Section
	19 Compressed Air Foam Systems
	Entirely New Section
	20 Line Voltage Electrical Systems
	Entirely New Section
	21 Command and Communications
	Entirely New Section
	22 Air Systems
	Entirely New Section
	23 Winches
	Entirely New Section
	24 Trailers



	Entirely New Section
	Figures
	Figure 1 - New
	Tables
	Table 3 - Revised: Added capacities; revised Note
	Table 4 - Revised: Added Imperial gallon flow rates
	Table 5 - Revised: Added Imperial gallon flow rates
	Table 6 - New
	Table 7 - New
	Appendices
	Appendix B (Informative and Non-mandatory) - New
