



DEPARTMENT OF PURCHASING & CONTRACT COMPLIANCE

Winner 2000- 2008 Achievement of Excellence in Procurement Award
National Purchasing Institute



Felicia Strong-Whitaker, Interim Director

REQUEST FOR QUOTE NUMBER:

09DW70091C

WILL BE RECEIVED UNTIL 2:00 P.M.

October 9, 2009

DESCRIPTION: TESTING OF AERIAL FIRE APPARATUS (FIRE DEPARTMENT)

Effective September 1, 2008, the Department of Purchasing & Contract Compliance will only accept responses to quotes electronically using our on-line Vendor Self Service system at www.fultonvendorservice.co.fulton.ga.us. You must be a registered vendor in order to respond to quotes.

ANY QUESTIONS REGARDING PURCHASING PROCEDURES OR THE SPECIFICATIONS SHOULD BE ADDRESSED ONLY TO THE PURCHASING CONTACT PERSON LISTED BELOW. BIDDERS MAY NOT HAVE CONTACT WITH COUNTY OFFICERS, ELECTED OFFICIALS OR COUNTY EMPLOYEES REGARDING THIS BID PRIOR TO AWARD OF PURCHASE ORDER. VIOLATION OF THIS INSTRUCTION WILL RESULT IN YOUR BID BEING FOUND NON-RESPONSIVE.

CONTACT NAME:
DIANN WASHINGTON

E-Mail Address :
diann.washington@ fultoncountyga.gov

Telephone Number:
404-612-1100

All information requested on this sheet must be completed. Unless specifications indicate "NO SUBSTITUTE", items determined by Fulton County to be "EQUAL OR BETTER" will be given full consideration. All prices QUOTED must be "FOB DELIVERED" unless otherwise requested, and must be submitted in the format requested. The County reserves the right to cancel the solicitation and to reject any or all quotes in whole or in part and is not bound to accept any quote if rejection of that quote is determined to be contrary to the best interest of the County.

*Person submitting this e-quote has binding authority to submit contracts on behalf of the responding company. By submitting a response, vendor agrees that their quote is an offer to sell. All bidders shall comply with all Fulton County purchasing laws, policies, and procedures, as well as relevant state and federal laws— including compliance with EEOC hiring guidelines and requirements under the Americans with Disabilities Act.

**REQUEST FOR QUOTE
GENERAL TERMS AND CONDITIONS**

The following provisions are hereby made a part of this Request for Quote. Any contract or purchase order awarded as the result of this request shall be governed by these General Terms and Conditions. By submission of your responses to this quote, vendor agrees to furnish the product(s) and/or service(s) pursuant to these conditions.

1. **GENERAL.** These provisions are standard for all County contracts. The County may delete or modify any of these standard provisions for a particular contract or purchase order by indicating a change in the special instructions or provisions. **Any vendor accepting a purchase order award as the result of this request agrees that the provisions included within this Request for Quote shall prevail over any conflicting provision within any standard form contract of the vendor.**
2. **SUBMISSION OF RESPONSES.** Responses must be submitted for quotes on-line via the Vendor Self Service system at <https://fultonvendorelfselfservice.co.fulton.ga.us/webapp/VSSPROD/Advantage>. Response to quotes must be received no later than 2:00 p.m. on the date indicated.
3. **AMENDMENTS TO THE REQUEST FOR QUOTE.** Any amendment to pricing is valid only if in writing and issued by the County.
4. **NON-COLLUSION.** Bidder certifies that this bid is made without prior understanding, agreement or connection with any other corporation, firm or person submitting a bid for the same work, labor or service to be done or the supplies, materials or equipment to be furnished and is in all respects fair and without collusion or fraud. Bidder further understands collusive bidding is a violation of state and federal law and can result in fines, prison sentences and civil damage awards. Bidder agrees to abide by all conditions of this bid and certifies that person signing is authorized to sign this bid or proposal for the bidder.
5. **CONFLICT OF INTEREST.** Vendor states that no County officer or employee, nor any business entity in which they have an interest: a) Has an interest in the contract awarded; b) Has been employed or retained to solicit or aid in the procuring of the resulting contract; c) Will be employed in the performance of such contract without immediate disclosure of such fact to the County.
6. **BASIS OF AWARD.** The County shall award to the overall lowest responsible and responsive vendor complying with the provisions of the Request for Quote. The following criteria may be considered by the County in selecting the most advantageous quote: a) Ability to perform the service required within the specified time; b) Conformance to specification; c) The quality of performance in previous contracts; d) Financial ability to perform the contract; e) Item pricing; f) vendor references. The County reserves the right to cancel the solicitation and to reject any or all quotes in whole or in part and is not bound to accept any quote if rejection of that quote is determined to be contrary to the best interest of the County.
7. **SAMPLES.** Samples of items when required, must be furnished free of expense to the County and upon request, be returned to the Vendor at the Vendor's expense. Samples of selected items may be retained for comparison purposes.
8. **NEW.** All items bid must be new. Used, rebuilt and refurbished items will not be considered unless specifically authorized by Fulton County in the written specifications.
9. **BRAND NAME SPECIFICATIONS AND APPROVED EQUIVALENTS.** Unless otherwise specified, manufacturer's names, trade names, brand names, information and/or catalog

numbers listed in the specifications are intended only to identify the quality and characteristics desired. They are not intended to limit competition. The Vendor may offer any equivalent product which meets or exceeds the specifications. If quotations are based on equivalent products, the quote must: a) Indicate the alternate manufacturer's name and catalog number; b) Include complete descriptive literature and/or specifications; c) Include proof that the proposed equivalent will meet the specifications. The County reserves the right to be the sole judge of what is equal and acceptable to meet its needs in all respects. If Bidder fails to name a substitute, goods identical to the published standard must be furnished.

10. **INDEMNIFICATION.** Contractor/Vendor hereby agrees to release, indemnify, defend and hold harmless the County, it's Commissioners, officers, employees, subcontractors, successors, assigns and agents from and against any and all losses (including death), claims, damages, liabilities, costs and expenses (including but not limited to all actions, proceedings, or investigations in respect thereof and any outcome of any such action, proceeding, or investigation), caused by, relating to, based upon or arising out of any act or omission by contractor, it's directors, officers, employees, subcontractors, successors, assigns or agents, or otherwise in connection with it's acceptance, of the performance, or nonperformance, of it's obligations under this agreements.
11. **TAXES.** Fulton County is exempt from the State of Georgia sales tax and exemption certificate will be furnished upon request.
12. **DELIVERY.** All prices must be FOB Destination, unloaded inside and assembled unless otherwise indicated.
13. **RIGHTS AND REMEDIES OF COUNTY FOR DEFAULT.** If any item furnished by the Vendor fails to conform to specifications, or to the sample submitted by the Vendor, the County may reject it. Upon rejection, the Vendor must promptly reclaim and remove such item without expense to the County, and shall immediately replace all such rejected items with others conforming to such specification and samples. If the Vendor fails to do so, the County has the right to purchase in the open market a corresponding quantity of any such items and to deduct from any monies due the Vendor the difference between the prices named in the purchase order and the actual cost to the County. If the Vendor fails to make prompt delivery of any item, the County has the right to purchase such item in the open market and to deduct from any monies due the Vendor the difference between the prices named in the purchase order and the actual replacement cost to the County. The rights and remedies of the County identified above are in addition to any other rights and remedies provided by law or under the purchase order.
14. **INVOICES AND PAYMENT TERMS.** Invoices are to be mailed to the County department specified on the resulting purchase order or master agreement. All invoices must include the purchase order number or master agreement number. Failure to comply may result in delayed payments. The County payment terms are Net 30 days unless a cash discount is allowed for payment within not less than twenty (20) days. The payment term shall begin on the date the merchandise is inspected, delivered and accepted by the County and the correct invoice is received in the office specified on the purchase order.
15. **LEGAL REQUIREMENTS.** Federal, State, County and local ordinances, rules and regulations, and policies shall govern development, submittal and evaluation of quote and disputes about quotes. Lack of knowledge by any Vendor about applicable law is not a defense.
16. **ASSIGNMENT.** Any purchase order awarded shall not be assignable by the Vendor without the express written approval of the County, and shall not become an asset in any bankruptcy, receivership or guardianship proceedings.

17. **REJECTION OF BID.** Bids may be considered irregular and may be rejected if they show omissions, alternations of form, additions not called for, conditions, limitations, unauthorized alternate bids or other irregularities of any kind. The County reserves the right to waive minor technicalities or irregularities of bid.

18. **TERMINATION.** In the event any of the provisions of the purchase order are violated, the County may serve written notice of its intention to terminate the purchase order. Such notice will state the reason(s) for such intention, and unless within ten (10) days after serving notice upon the contractor, such violation has ceased and satisfactory arrangements for correction made, the purchase order shall, upon expiration of ten (10) days, be terminated. Further, the County reserves the right to terminate for its convenience any purchase order in whole or in part upon giving thirty (30) days prior written notice to the other party.

19. **DEBARMENT.** If a Bidder is presently debarred, suspended, proposed for debarment, declared ineligible, or otherwise excluded from doing business with any government agency which prohibits your firm from participating in any procurement, the Bidder must provide the County with that information as part of its response to this solicitation. Failure to fully and truthfully provide the information required, may result in the disqualification of your bid from consideration or termination of the purchase order, once awarded.

20. **RIGHT TO PROTEST.** Any actual or prospective Bidder who is aggrieved in connection with a solicitation or award of a contract/purchase order must submit its protest in writing to the Director of Purchasing & Contract Compliance, 130 Peachtree St. S.W., Suite 1168, Atlanta, GA 30303. A protest must be submitted to the Director of Purchasing & Contract Compliance in writing within 14 days after such aggrieved entity knows or should have known of the solicitation, the award of contract/purchase order to another or other acts giving rise to a protest. An oral protest or a protest to an official, employee, user department, or other person apart from the Director of Purchasing does not comply with Fulton County Code Section 2-324 and does not toll the protest time period.

SIGNATURE BELOW IS THAT OF A PERSON AUTHORIZED TO SIGN CONTRACTS FOR THE QUOTING COMPANY WHO HAS READ, UNDERSTANDS, AND AGREES TO COMPLY WITH THE ABOVE GENERAL TERMS AND CONDITIONS.

COMPANY: _____ **SIGNATURE:** _____

NAME: _____ **TITLE:** _____ **DATE:** _____

THIS SIGNED FORM MUST BE SUBMITTED WITH YOUR BID. FAILURE TO DO SO MAY RESULT IN YOUR BID BEING FOUND NON-RESPONSIVE.

REQUEST FOR QUOTE SPECIFICATIONS
Quote Number: 09DW70091C
Opening Date: October 9, 2009 2:00 P.M. EST

TESTING OF AERIAL FIRE APPARATUS
FIRE DEPARTMENT

1. DESCRIPTION

The Fulton County Department of Purchasing & Contract Compliance is soliciting quotes from qualified vendors to provide Testing of Aerial Fire Apparatus for the Fire Department on an “as needed, when needed, and if needed” basis for a twelve month period, beginning date of award.

2. CONTACT PERSON

Please contact Diann Wathington, Procurement Officer at 404-612-1100 by e-mail diann.wathington@fultoncountyga.gov, with any procedural or technical questions. All questions should be submitted in writing to the Purchasing contact person. Any responses made by the County will be provided in writing to all Bidders by addendum. No verbal responses shall be authoritative.

You must be registered in the County’s AMS System in order for the Department of Purchasing & Contract Compliance to issue your company a Purchase Order or to receive payments. If you are not a registered vendor you may access and complete the vendor application via the County’s Vendor Registration website (www.fultonvendorselfservice.co.fulton.ga.us). You must provide a copy of your current Business License in order to complete the vendor registration process.

3. PRODUCT SPECIFICATION:

AERIAL DEVICE EXAMINATION AND TEST SPECIFICATIONS

GENERAL:

1. The bidder shall submit a complete outline of his certification requirements for evaluation by the Fire Department with his bid. Failure to comply will cause automatic rejection.
2. All exceptions and deviations to the specifications shall be noted. The absence of exceptions and/or deviations shall be interpreted as total compliance to the published specifications.
3. Total exception disqualifies the bidder.
4. The bidder shall not represent nor be a manufacturer or repairer of aerial

equipment, no exceptions.

5. The examination and test report provided to the county shall specify the point of inspection and the results of such examinations and test. The test report as required by NFPA 1911, Chapter 19, 2007 Edition shall include the following:
 - (a) When the torque verification of mounting bolts, as required by, NFPA 1911, Chapter 19, 2007 Edition is performed; the bolt size, grade, and torque specification shall be recorded.
 - (b) When NDT is conducted, the test record will indicate the NDT method used in each area inspected.
 - (c) Where NFPA 1911, Chapter 19, 2007 Edition requires measurements be taken such as bearing clearance and backlash, cylinder drift, relief pressure, ladder section twist, hardness readings, baserail thickness, extension brake drift, winch drift, and the like, these measurements shall be recorded in the test record in order that a year-to-year comparison can be made.
6. All test work outlined in NFPA 1911, Chapter 19, 2007 Edition including nondestructive testing shall be conducted, NO EXCEPTIONS.

BIDDER REQUIREMENTS:

1. Bidder shall be a nationally recognized testing laboratory recognized by OSHA in accordance with the OSHA regulations set forth at 29 Code of Federal Regulations, Section 1910.7, Appendix A, "OSHA Recognition Process for Nationally Recognized Testing Laboratories." NO EXCEPTIONS.
2. All testing and inspection shall be performed by a certification organization that is accredited for inspection and testing systems on fire apparatus in accordance with ISO/IEC 17020, *General criteria for the operation of various types of bodies performing inspection*.
3. Bidder shall comply with the American Society for Testing and Material Standards ASTM E543, "Standard Practice for Agencies Performing Nondestructive Testing." NO EXCEPTIONS.
4. The bidder shall have not less than 25 years of fire department equipment safety testing experience.

REFERENCES:

1. The bidder shall submit a list of ten Fire Departments for which the bidder has tested similar aerial devices as the units to be tested.
2. The bidder shall submit a list of a minimum of six aerial apparatus manufacturers for whom testing is currently being conducted on a regular basis. NO EXCEPTIONS.

LIABILITY INSURANCE:

1. The bidder shall carry not less than one million dollars in excess liability insurance for bodily injury and property damage combined. NO EXCEPTIONS.

PERSONNEL:

1. The third party test company employed to perform NDT shall meet the requirements of ISO/IEC 17020, *General criteria for the operation of various types of bodies performing inspections.*
2. The inspectors performing the test work on the units shall be certified as meeting Level II requirements as outlined in American Society for Nondestructive Testing (ASNT) document CP-189 in all methods used in the aerial inspection. The inspector shall also have had training at various aerial manufacturing locations so as to become familiar with the assembly and operation of aerial devices for fire service use.
3. Prior to award of contract, the personnel performing the inspection may be required to present for review, proof of his Level II Certification in the required NDT methods.
3. Prior to submittal to the Fire Department, the final report shall be reviewed by qualified staff that is directly involved with the aerial certification program at their company.

NECESSITY OF REINSPECTIONS:

1. If a unit shall have minor defects the county will complete minor repairs within (90) days, provide written notification to the vendor that all repairs have been completed and at that time vendor will issue a report for the aerial inspection according to NFPA 1911.

2. If a unit should have major defects, the load test shall not be conducted until such time as repairs are made and the repair work is inspected and found to be acceptable by the testing company.

CERTIFICATION:

1. When the unit successfully meets all NFPA 1911, Chapter 19, 2007 Edition requirements, the testing company shall issue a certificate stating the units compliance with NFPA 1911, Chapter 19, 2007 Edition.

NOTIFICATION TO ALL BIDDERS:

In order to comply with this specification, the bidder must have in his possession the following tolerances from the manufacturer. NO EXCEPTIONS. Proof of compliance may be required prior to award of contract.

1. Rotation bearing clearance and backlash.
2. Critical mounting bolt grade and torque.
3. Elevation cylinder drift tolerance.
4. Extension cylinder drift tolerance.
5. Outrigger cylinder drift tolerance.
6. Hydraulic relief pressure.
7. Ladder section twist.
8. Hardness for aluminum devices.
9. Hollow I-beam baserails thickness.
10. Rated load of the device.
11. Maximum rated working pressure of water system.

AERIAL DEVICE EXAMINATION AND TEST PROPOSAL

1. UL does not represent nor is in the manufacture or repair of aerial devices, NO EXCEPTIONS.
2. Prior to examination and test of the units, the personnel performing the inspection will present for review, proof of Level II Certification in the required NDT methods.
3. The examination and test Report provided to the city will specify the point of inspection and the results of such examinations and test.
4. All test work outlined in NFPA 1911, Chapter 19, 2007 Edition including nondestructive testing shall be conducted.
 - A. All ferrous welds shall be magnetic particle inspected for defects.

- B. All nonferrous welds shall be visually inspected, and if questionable defects are identified, dye penetrant shall be used to further evaluate the quality of the weld.

- C. All bolts and pins shall be ultrasonically inspected for internal flaws.

BIDDER EXPERIENCE:

- 1. UL has more than 30 years of fire apparatus safety testing experience.
- 2. UL has more than 100 years of experience developing and implementing product safety standards.

CERTIFICATION:

- 1. When the unit successfully meets all the requirements outlined below, UL will issue a certificate of aerial lift device examination and test stating the units compliance with NFPA 1911, Chapter 19, 2007 Edition.

REFERENCES:

- 1. UL has included a list of ten Fire Departments for which UL has tested similar aerial devices as the units to be tested.
- 2. UL has included a list of all aerial apparatus manufacturers for whom testing is currently being conducted on a regular basis.

LIABILITY INSURANCE:

- 1. UL carries ten million dollars in excess liability insurance for bodily injury and property damage combined.

PERSONNEL:

- 1. The inspections and tests outlined in NFPA Standard 1911, Chapter 19, 2007 Edition shall be performed by qualified personnel, a 3rd party testing company, or the manufacturer as determined acceptable by the authority having jurisdiction.
- 2. The inspectors performing the nondestructive test work on the units shall be certified as at least a Level II NDT technician in the test methods used, under the requirements outlined in ASNT document CP-189, Standard for Qualification and Certification of Nondestructive Testing Personnel. Trainees and personnel certified to Level I in the test method used shall be

permitted to conduct the nondestructive tests as long as they work under the direct and immediate supervision of either a Level II or ASNT Level III technician holding current certification in the same test method. The inspector will also have had training at various aerial manufacturing locations so as to become familiar with the assembly and operation of aerial devices for fire service use.

3. The final Inspection Report is reviewed by qualified staff that is directly involved with the aerial device certification program at UL.
4. UL will comply with the American Society for Testing and Materials (ASTM) Standard ASTM E543 "Standard Practice for Agencies Performing Nondestructive Testing."

WELDING STANDARDS:

1. All accessible structural weldments on ferrous materials shall be inspected for compliance with American Welding Society (AWS) D1.1 "Structural Welding Code – Steel", 2000 edition. All structural weldments shall meet the requirements for weld quality as defined in 6.9, Visual Inspection. The acceptance criteria are outlined in Table 6.1, under the column labeled "Tubular Connections".

The following criteria will apply:

Cracks

No cracks of any type (transverse, toe, longitudinal, crater, etc.) are permitted.

Surface Holes

The sum of diameters of piping porosity in fillet welds shall not exceed 3/8 in. (10 mm) in any linear inch (25 mm) of weld and shall not exceed 3/4 in. (19 mm) of weld in any 12 in. (305 mm) length of weld.

Complete joint penetration groove welds in butt joints transverse to the direction of computed tensile strength shall have no piping porosity. For all other groove welds, piping porosity shall not exceed 3/8 in. (10 mm) in any linear inch (25 mm) of weld and shall not exceed 3/4 in. (19 mm) in any 12 in. (305 mm) length of weld.

Lack of Fusion

Thorough fusion shall exist between adjacent layers of weld metal and between weld metal and base metal.

Undercut

Undercut shall not exceed 0.01 in. (0.25 mm) deep when its direction is transverse to primary tensile stress in the part that is undercut, nor more than 1/32 in. (1 mm) for all other situations.

- 2. All aluminum structural weldments shall meet the requirements in Paragraph 9.15.1 of the American Welding Society (AWS) Standard AWS D1.2 "Structural Welding Code -- Aluminum", 1997 edition.

The following criteria will apply:

Cracks

No cracks of any type (transverse, toe, longitudinal, crater, etc.) are permitted.

Undercut

Length, each undercut	0.20 in. (5 mm), maximum
Depth	15 % of minimum base metal thickness, maximum. (See chart, below)
Distance between undercuts	2.0 in. (50 mm), minimum.

<u>Base Metal Thickness (in.)</u>	<u>Allowable Undercut Depth (in.) 15 % of Base Metal</u>
1/16	0.009 (approximately equal to 0)
1/8	0.019 (approximately equal to 1/64)
3/16	0.028 (approximately equal to 1/32)
1/4	0.038 (approximately equal to 1/32)
5/16	0.046 (approximately equal to 3/64)
3/8	0.056 (approximately equal to 3/64)
7/16	0.066 (approximately equal to 1/16)
1/2	0.075 (approximately equal to 1/16)

Scratch or Burn Marks

Depth	15 % of minimum base metal thickness, maximum.
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1-6 Visual Inspection.

A visual inspection, prior to any operation or load testing, shall be carried out in a systematic sequence with proper attention to detail. This visual inspection of the equipment shall be for the detection of any visible defects, damage, or improperly secured parts.

1-7 Weld Inspection.

All accessible structural welds shall be visually inspected for fractures. When the nondestructive testing is required by 1-4.2 and is performed, all accessible structural welds shall be inspected by ASNT Level II NDT technicians certified in the test methods used.

1-7.1

All accessible structural welds on steel shall be inspected in accordance with the appropriate provisions of the American Welding Society (AWS) Standard AWS D1.1, Structural Welding Code--Steel. All structural welds will comply with the weld quality as defined in Table 6.1 (Visual Inspection) of AWS D1.1.

1-7.2

All accessible structural welds on aluminum shall be inspected in accordance with the appropriate provisions of the American Welding Society (AWS) Standard AWS D1.2, Structural Welding Code--Aluminum. All structural welds will comply with the weld quality as outlined in Table 9.2 of AWS D1.2.

1-7.3

The application of a particular nondestructive weld inspection technique shall be as recommended by the American Welding Society (AWS) Standard AWS B1.10, Guide for the Nondestructive Examination of Welds.

1-8 Bolt, Pin, and Washer Inspection.

Bolts and pins subjected to ultrasonic testing shall contain no ultrasonic CRT indications that can be interpreted as cracks or elongated material. All washers shall be inspected for correct installation.

1-9 Nondestructive Testing Procedure.

1-9.1

All ultrasonic inspections shall be conducted in accordance with the following American Society for Testing and Materials (ASTM) Standards:

- (a) ASTM E114, Standard Practice for Ultrasonic Pulse-Echo Straight-Beam Examination by the Contact Method
- (b) ASTM E797, Standard Practice for Measuring Thickness by Manual Ultrasonic Pulse-Echo Contact Method

1-9.2

All magnetic particle inspection shall be conducted in accordance with the following American Society for Testing and Material (ASTM) standards:

- (a) ASTM E709, Standard Guide for Magnetic Particle Examination

1-9.3

All liquid penetrant inspections shall be conducted in accordance with the following American Society for Testing and Materials (ASTM) standards:

- (a) ASTM E165, Standard Test Method for Liquid Penetrant Examination
- (b) ASTM E1220, Standard Test Method for Visible Penetrant Examination Using the Solvent-Removable Process
- (c) ASTM E1418, Standard Test Method for Visible Penetrant Examination Using the Water-Washable Process

1-9.4

All radiographic inspections shall be conducted in accordance with the following American Society for Testing and Materials (ASTM) standards:

- (a) ASTM E1032, Standard Test Method for Radiographic Examination of Weldments

1-9.5

All hardness readings shall be conducted in accordance with the following American Society for Testing and Materials (ASTM) standards:

- (a) ASTM E6, Standard Terminology Relating to Methods of Mechanical Testing
- (b) ASTM E10, Standard Test Method for Brinell Hardness of Metallic Materials
- (c) ASTM E18, Standard Test Methods for Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials
- (d) ASTM E92, Standard Test Method for Vickers Hardness of Metallic Materials
- (e) ASTM B647, Standard Test Method for Indentation Hardness of Aluminum Alloys by Means of a Webster Hardness Gauge
- (f) ASTM B648, Standard Test Method for Indentation Hardness of Aluminum Alloys by Means of a Barcol Impressor

Testing Metal Aerial Ladders

2-1 General.

In addition to the manufacturer's recommendations, the inspections detailed below shall be performed. An inspection preceded by a plus sign (+) indicates that an appropriate nondestructive test (NDT) shall be conducted as required by 19.8.1.3 of NFPA 1911.

2-2 Service Records.

The aerial ladders service records shall be checked for any reports that may indicate defective conditions.

2-3 Hydraulic Components.

Hydraulic components shall show no signs of hydraulic fluid leakage.

2.3.1

A component shall be considered leaking if hydraulic fluid (oil) droplets are forming on the component.

2.3.2

A film of hydraulic fluid on the component shall not be considered severe enough to categorize the component as leaking.

2-4 Turntable, Torque Box, Suspension, and Tractor Drawn Components Inspection and Test.

The turntable, torque box, suspension components, and tractor drawn components, where applicable, shall be inspected on all aerial ladders in accordance with 2-4.1 through 2-4.29.

2-4.1 Rotation Bearing Mounting Bolts.

The rotation bearing mounting bolts shall be inspected as follows:

- (a) Inspect all accessible bolts for proper grade and installation as specified by the apparatus manufacturer.
- (b) Using a properly calibrated torque wrench, verify that the bolt torque on all accessible bolts meets the apparatus manufacturer's specifications.
- (c) (+) Inspect all accessible bolts for internal flaws.

2-4.2 Torque Box Mounting to Frame.

The torque box mounting to frame shall be inspected as follows:

- (a) If the torque box is bolted to the frame, inspect all accessible bolts for proper grade and installation as specified by the apparatus manufacturer.

- (b) Using a properly calibrated torque wrench, verify that the torque on all accessible bolts meets the apparatus manufacturer's specifications, if the torque box is bolted to the frame.
- (c) If the torque box is welded to the frame, visually inspect all accessible attaching welds for fractures.
- (d) (+) If the torque box is bolted to the frame, inspect all bolts for internal flaws.
- (e) (+) If the torque box is welded to the frame, inspect all accessible attaching welds.

2-4.3 Tractor Drawn Components Mounting to Frame.

If the tractor-drawn components are bolted to the frame, the mounting of the tractor drawn components to the frame shall be inspected as follows:

- (a) Inspect all accessible bolts for proper grade and installation as specified by the apparatus manufacturer.
- (b) Using a properly calibrated torque wrench, verify that the torque on all accessible bolts meets the apparatus manufacturer's specifications.
- (c) (+) Inspect all bolts for internal flaws.

2-4.4

If the tractor drawn components are welded to the frame, the mounting of the tractor-drawn components to the frame shall be inspected as follows:

- (a) Visually inspect all accessible attaching welds for fractures.
- (b) (+) Inspect all accessible attaching welds.

2-4.5 Suspension Systems.

If the suspension system components are bolted to the frame, the mounting of the suspension system components to the frame shall be inspected as follows:

- (a) Inspect all accessible bolts for proper grade and installation as specified by the apparatus manufacturer.
- (b) Using a properly calibrated torque wrench, verify that the torque on all accessible bolts meets the apparatus manufacturer's specifications.
- (c) (+) Inspect all bolts for internal flaws.

2-4.4.1

If the suspension system components are welded to the frame, the mounting of the suspension system components to the frame shall be inspected as follows:

- (a) Visually inspect all accessible attaching welds for fractures.
- (b) (+) Inspect all accessible attaching welds.
- (c)

2-4.5 Rotation Gear and Bearing.

The rotation gear and bearing shall be inspected as follows:

- (a) Inspect the rotation gear for missing or damaged teeth, pinion-to-gear alignment, proper lubrication, and backlash.
- (b) Inspect the bearing clearance.

2-4.6 Rotation Gear Reduction Box Mounting.

The rotation gear reduction box mounting shall be inspected as follows:

- (a) If the reduction box is bolted to the turntable, inspect all bolts for proper grade and installation as specified by the apparatus manufacturer.
- (b) Using a calibrated torque wrench, verify that the torque on all bolts meets the apparatus manufacturer's specifications, if the reduction box is bolted to the turntable.
- (c) Visually inspect all accessible weldments for defects and welds for fractures.
- (d) (+) If the reduction box is bolted to the turntable, inspect all bolts for internal flaws.
- (e) (+) If the reduction box is welded to the turntable, inspect all reduction box attaching welds.

2-4.7 Turntable Structural Components.

The turntable structural components shall be inspected as follows:

- (a) Visually inspect all accessible turntable structural weldments for defects and welds for fractures.
- (b) (+) Inspect all accessible turntable structural component welds.

2-4.8 Rotation Hydraulic Swivel.

Inspect the swivel for external hydraulic fluid leakage.

2-4.9 Hydraulic Lines and Hoses.

Inspect all hydraulic lines and hoses for kinks, cuts, abrasions, and hydraulic fluid leakage at connectors and fittings.

2-4.10 Elevation, Extension, and Rotation Lock(s).

The elevation, extension, and rotation lock(s) shall be inspected as follows:

- (a) Inspect the manual valve elevation, extension, and rotation lock(s) for external hydraulic fluid leakage.
- (b) Test the manual valve elevation lock for proper operation by engaging the lock and then attempting to raise and lower the ladder with the main hydraulic system operating. No detectable movement shall occur as determined by visual inspection.
- (c) Test the manual valve extension lock for proper operation by engaging the lock and then attempting to extend or retract the ladder with the main hydraulic system operating. No detectable movement shall occur as determined by visual inspection.
- (d) Test the manual valve rotation lock for proper operation by engaging the lock and attempting to rotate the turntable clockwise and counterclockwise with the main hydraulic system. The movement shall not exceed the manufacturer's specifications.

2-4.11 Power Takeoff.

Inspect the power takeoff for external hydraulic fluid leakage and proper operation (engagement and disengagement).

2-4.12 Hydraulic Pump.

Inspect the hydraulic pump for external hydraulic fluid leakage.

2-4.13 Collector Rings.

The collector rings shall be inspected as follows:

- (a) If accessible, inspect the collector rings for foreign material buildup on ring.
- (b) If accessible, inspect the collector ring terminals for damage.
- (c) Conduct tests to ensure the proper operation of the collector rings by rotating the aerial device while electric-powered devices are in operation.

- (d) If applicable, check for indications of moisture in the electrical chamber by visually inspecting the desiccant moisture indicators.

2.4.14 Elevation Cylinder Anchor Ears and Plates.

The elevation cylinder anchor ears and plates shall be inspected as follows:

- (a) Visually inspect the elevation cylinder anchor ears and plates for defects and the attaching welds for fractures.
- (b) (+) Inspect the elevation cylinder anchor ears and plate-attaching welds.

2.4.14.1

If the elevation cylinder anchor is bolted, it shall be further inspected as follows:

- (a) Inspect all accessible bolts for proper grade and installation as specified by the apparatus manufacturer.
- (b) Using a properly calibrated torque wrench, verify that the torque on all accessible bolts meets the apparatus manufacturer's specifications.
- (c) (+) Inspect all bolts for internal flaws.

2-4.15 Elevation Cylinder Pins.

The elevation cylinder pins shall be inspected as follows:

- (a) Inspect cylinder pins for alignment, proper installation, lubrication, operation, and retention.
- (b) (+) Inspect cylinder pins for internal flaws.

2-4.16 Elevation Cylinders.

The elevation cylinders shall be inspected as follows:

- (a) Inspect the cylinder rods for pitting, scoring, and other defects.
- (b) Inspect the cylinder rod-to-barrel seal and the end gland seal for excessive external hydraulic fluid leakage that exceeds the manufacturer's specifications.
- (c)* With the hydraulic oil at ambient temperature, subject the cylinders to a drift test by placing the aerial device at a 60-degree elevation, full extension, marking the cylinder position, closing manually operated locking valves, and allowing the device to stand for 1 hr with the engine off.

Measure the drift and verify that the results do not exceed the manufacturer's specifications for allowable cylinder drift.

2-4.17 Holding Valves on Elevation Cylinders.

Inspect the holding valves for external hydraulic fluid leakage.

2-4.18 Operating Controls.

The operating controls shall be inspected as follows:

- (a) Inspect the operating controls for missing or damaged control handles, proper identification, and hydraulic fluid leakage.
- (b) Verify that the controls operate smoothly, return to neutral position when released, and do not bind during operation.
- (c) If interlocks have been provided or are required to prevent unintentional operation of the aerial device, verify that the interlocks or locking devices are operating properly.

2-4.19 Load Limit Indicators.

Inspect the load limit indicators for proper operation and legibility.

2-4.20 Emergency Hand Crank Controls.

Inspect the hand crank control for proper operation.

2-4.21 Auxiliary Hydraulic Power.

Inspect the auxiliary hydraulic power for proper operation.

2-4.22 Turntable Alignment Indicator.

Verify the presence of a turntable alignment indicator.

2-4.23 Throttle Control.

The throttle control shall be inspected for proper operation. The operating speed of the engine shall be measured using a tachometer or a revolution counter and shall be checked against the manufacturer's specifications.

2-4.24 Communication System.

Inspect the communication system for proper installation and proper operation.

2-4.25 Relief Hydraulic Pressure.

Verify that the main pump relief hydraulic pressure and compensator pressure does not exceed the manufacturer's specifications.

2-4.26 Unit Main Frame.

The unit main frame shall be inspected as follows:

- (a) Visually inspect the main frame for any cracks, bends, dents, twists, or other weldment defects and any welds for fractures.
- (b) (+) Inspect all main frame welds.

2-4.27 Transmission/Aerial Device Interlocks.

If interlocks are provided that prevent operation of the aerial device until both the parking brakes have been set and the transmission has been positioned properly, verify that the interlocks are operating properly.

2-4.28 Engine Speed Interlocks.

If interlocks are provided that allow operation of the engine speed control only after both the parking brakes have been set and the transmission has been positioned properly, verify that the interlocks are operating properly.

2-4.29 Breathing Air Systems.

If a breathing air system is provided, the system shall be inspected as follows:

- (a) Verify that the breathing air system is properly installed including the integrity of the air cylinder mounting, the regulator, and the air lines from the air cylinder(s) to the top of the aerial device.
- (b) Verify that all the component parts of the system are present and in serviceable condition.
- (c) Visually inspect the air cylinder mounting brackets for defects and welds for fractures.
- (d) (+) Inspect all welds on air cylinder mounting brackets.
- (e) Check that the air pressure regulator is set at the apparatus manufacturer's recommended pressure.

2-5 Stabilizer Examination and Test.

The stabilizer components, where applicable, shall be inspected on all aerial ladder apparatus in accordance with 2-5.1 through 2-5.16.

2-5.1 Stabilizer Structural Components.

The stabilizer structural components shall be inspected as follows:

- (a) Visually inspect all stabilizer components for defects and welds for fractures.

- (b) (+) Inspect all stabilizer structural component welds.

2-5.2 Stabilizer Pads.

Verify that the stabilizer pads are present, of proper construction, and in serviceable condition.

2-5.3 Stabilizer Mounting to Frame or Torque Box.

The stabilizer mounting to the frame or torque box shall be inspected as follows:

- (a) Visually inspect the stabilizer to frame or torque box attachment for defects such as weld cracks, dents, and bends.
- (b) (+) If welded, inspect the stabilizer to frame or torque box mounting welds.
- (c) If bolted, inspect all bolts for proper fastener grade and installation as specified by the apparatus manufacturer.
- (d) Verify that the torque on all bolts meets the apparatus manufacturer's specifications using a properly calibrated torque wrench.
- (e) (+) Inspect all bolts for internal flaws.

2-5.4 Hydraulic Lines and Hoses in Stabilizer System.

Inspect the hydraulic hose lines for kinks, cuts and abrasions, and leakage at connectors and fittings.

2-5.5 Stabilizer Interlock System.

Verify that the stabilizer interlock system is operating properly.

2-5.6 Stabilizer Warning Device.

The stabilizer warning device shall be inspected to verify that it is operating properly.

2-5.7 Stabilizer Extension Cylinder Pins and Hinge Pins.

The stabilizer extension cylinder pins and hinge pins shall be inspected as follows:

- (a) Inspect all stabilizer cylinder pins and hinge pins for proper installation, lubrication, operation, and retention.
- (b) (+) Inspect all stabilizer pins and hinge pins for internal flaws.

2-5.8 Stabilizer Extension Cylinder.

The stabilizer extension cylinder shall be inspected as follows:

- (a) Inspect the stabilizer extension cylinder rods for pitting and scoring and other defects.
- (b) Inspect the cylinder rod to barrel seal and the end gland seal for excessive external fluid leakage.
- (c) With the hydraulic oil at ambient temperature, and the stabilizer's cylinders properly set, measurements shall be taken to determine the amount of drift present in 1 hr with the engine off. The results shall not exceed the manufacturer's specifications for allowable stabilizer cylinder drift.

2-5.9 Holding Valves on Extension Cylinders.

Inspect the holding valves for external leakage of hydraulic fluid.

2-5.10 Operating Controls.

The operating controls shall be inspected as follows:

- (a) Inspect the operating controls to ensure control handles are not damaged or missing, functions are identified, operating instructions and warnings are posted, and there is no hydraulic fluid leakage.
- (b) Verify that the controls operate smoothly, return to the neutral position when released, and do not bind during operation.
- (c) If interlocks have been provided or are required to prevent unintentional operation of the aerial device, verify that the interlocks or locking devices are operating properly.

2-5.11 Leveling Indicator.

If a leveling indicator(s) is provided to aid the operator in leveling the apparatus, the accuracy and legibility of the leveling indicator shall be checked.

2-5.12 Diverter Valve.

Inspect the diverter valve for external hydraulic fluid leakage.

2-5.13 Position Stops.

Inspect the mechanical stabilizers for proper operation of the positive stops to prevent over extension.

2-5.14 Stabilizer Deployment.

If the stabilizer system is hydraulically operated, verify that the system can be deployed within the time frame designated by the aerial device manufacturer.

2-5.15 Manual Spring Locks.

Inspect the condition and operation of stabilizer manual spring locks for stowed position.

2-5.16 Tractor Spring Lockout Device.

If the aerial ladder is tractor drawn, inspect the spring lockout device for any discontinuities and for proper operation.

2-6 Aerial Ladder Inspection and Test.

The aerial ladder shall be inspected in accordance with 2-6.1 through 2-6.30

2-6.1 Structural Modifications, Improper Repairs or Added Weight.

The aerial ladder shall be inspected for structural modifications or improper repairs.

2-6.1.1

The aerial ladder shall be inspected to determine that no extra equipment has been added to the aerial ladder without subtracting the weight of such equipment from the rated capacity.

2-6.1.2

Details of any structural modifications, improper repairs, or added weights shall be contained in the record required by Section 2.12

2-6.2 Aerial Ladder Weldments.

All aerial ladder weldments shall be inspected as follows:

- (a) Visually inspect all accessible aerial ladder weldments for defects and welds for fractures.
- (b) (+) Inspect all accessible welds on the ladder.

2-6.3 Aerial Ladder Fasteners.

All aerial ladder structural fasteners and fastened connections shall be visually inspected for cracked fasteners and material cracks around the fasteners.

2-6.4 Ladder Section Alignment.

Measurements shall be taken to determine the amount of ladder section twist or bow in the aerial ladder. Results shall not exceed manufacturer's specifications for allowable ladder section twist or bow.

2-6.5 Hydraulic, Pneumatic, and Electrical Lines in Ladder Sections.

All hydraulic, pneumatic, and electrical lines shall be inspected for proper mounting, wear, cracking, kinks, and abrasions.

2-6.6 Top Rails.

The top rails shall be inspected as follows:

- (a) Inspect the top rails for straightness or any signs of misalignment.
- (b) (+) Hardness readings shall be taken at intervals of 28 in. (710 mm) or less along the entire length of both top rails of aluminum ladders. Results of this test shall be compared with the manufacturer's specifications for the hardness of the material used for construction of the top rail.

2-6.7 Vertical and Diagonal Braces.

The vertical and diagonal braces shall be inspected as follows:

- (a) Inspect the verticals and diagonals for straightness, dents, and other deformities.
- (b) (+) Inspect all accessible attachment welds.

2-6.8 Base Rails.

The base rails shall be inspected as follows:

- (a) Inspect the base rail for straightness and any signs of wear, ironing, dents, and corrosion.
- (b) (+) Inspect the bottom of all hollow I-beam base rails to determine the thickness of the rail. Results shall not be less than the manufacturer's minimum specifications.
- (c) (+) Hardness readings shall be taken at intervals of 28 in. (710 mm) or less along the entire length of both base rails of aluminum ladders. Results of this test shall be compared with the manufacturer's specifications for the hardness of the material used for construction of the base rail.

2-6.9 Rungs.

Inspect all rungs of the aerial ladder for straightness, signs of fly lock damage, damage or loose rung covers and rung cap castings, and signs of cracks or missing rivets, if applicable.

2-6.10 Folding Steps.

The folding steps on the ladder shall be inspected as follows:

- (a) Visually inspect the folding steps and folding step mounting brackets for defects and welds for fractures.
- (b) (+) Inspect all welds on the folding step(s) and folding step mounting

brackets.

2-6.11 Rollers.

Inspect all rollers for proper lubrication, operation, and any signs of wear.

2-6.12 Guides, Babbits, Wear Strips, Pads, and Slide Blocks.

Visually inspect the guides for cracked welds, loose rivets, alignment, and any irregularities. Inspect babbits for signs of wear. Inspect wear strips, pads, and slide blocks for wear, gouging, and proper mounting.

2-6.13 Extension Sheaves.

The extension sheaves shall be inspected as follows:

- (a) Inspect extension sheaves for signs of wear, free movement during operation, proper retainers, and lubrication.
- (b) Visually inspect all extension sheave mounting brackets for defects and welds for fractures.
- (c) (+) Inspect all welds of extension sheave mounting brackets.

2-6.14 Extension Cables.

Inspect extension cables for compliance with Appendix A of the Society of Automotive Engineers Standard SAE J959, Lifting Crane, Wire-Rope Strength Factors.

2-6.15 Extension and Retraction Motor.

Inspect the extension and retraction motor for signs of external hydraulic fluid leakage and, where applicable, brake wear and brake alignment with the shaft.

2-6.16 Cable Separation Guide.

During operation of the aerial ladder, visually inspect the cable separation guide for free travel and any signs of misalignment.

2-6.17 Winch Holding Capacity.

Inspect the winch for holding capacity by fully elevating the aerial ladder and extending it 10 ft (3 m). Winch slippage shall be measured for a 5-min period. Slippage shall not exceed the manufacturer's specifications.

2-6.18 Brake Holding Capacity.

Inspect the brake holding capacity of the extension motor by fully elevating the aerial ladder and extending it 10 ft (3 m). Brake slippage shall be measured for a 5-min period. Slippage shall not exceed the manufacturer's specifications.

2-6.19 Extension, Elevation and Rung Alignment Indicators.

The elevation, extension, and rung alignment indicators shall be inspected for legibility, clarity, and accuracy.

2-6.20 Fly Locks.

Inspect the fly lock mechanisms for proper mounting, alignment, lubrication, and operation.

2-6.21 Ladder Cradle.

The aerial ladder cradle shall be inspected as follows:

- (a) Inspect the ladder cradle for wear, proper alignment, and the cradle pad for damage.
- (b) Visually inspect the ladder cradle for defects such as weld cracks, dents, or bends.
- (c) (+) Inspect the ladder cradle welds and bracket attachments.

2-6.21.1

If the aerial ladder cradle is bolted, it shall be further inspected as follows:

- (a) Inspect all accessible bolts for proper grade and installation as specified by the apparatus manufacturer.
- (b) Using a properly calibrated torque wrench, verify that the bolt torque on all accessible mounting bolts meets the apparatus manufacturer's specifications.
- (c) (+) Inspect all accessible bolts for internal flaws.

2-6.22 Ladder Bed Lock.

Inspect the ladder bed lock mechanism and hydraulic lines for proper mounting, signs of wear, and hydraulic fluid leakage at fittings.

2-6.23 Stop Mechanism.

Inspect stop mechanisms to ensure that they prevent overextension or over retraction of the aerial ladder.

2-6.24 Maximum Extension Warning Device.

During operation of the aerial ladder, verify the proper operation of the audible device to warn of the approach of maximum extension.

2-6.25 Ladder Illumination.

Inspect the operation of the lights that are used to illuminate the ladder.

2-6.26 Extension Cylinder Anchor Ears and Plates.

The extension cylinder anchor ears and plates shall be inspected as follows:

- (a) Visually inspect the extension cylinder anchor ears and plates for defects and the attaching welds for fractures.
- (b) (+) Inspect the attaching welds of the extension cylinder anchor ears and plates.

2-6.26.1

If the extension cylinder anchor is bolted, it shall be further inspected as follows:

- (a) Inspect all accessible bolts for proper grade and installation as specified by the apparatus manufacturer.
- (b) Using a properly calibrated torque wrench, verify that the bolt torque on all accessible mounting bolts meets the apparatus manufacturer's specifications.
- (c) (+) Inspect all accessible bolts for internal flaws.

2-6.27 Extension Cylinder Pins.

The extension cylinder pins shall be inspected as follows:

- (a) Inspect the cylinder pins for proper installation and retention.
- (b) (+) Inspect the cylinder pins for internal flaws.

2-6.28 Extension Cylinder.

The extension cylinders shall be inspected as follows:

- (a) Inspect the cylinder rods for pitting, scoring, and other defects.
- (b) Inspect the cylinder rod to barrel seal and the end gland seal for excessive external fluid leakage that exceeds the manufacturer's specifications.
- (c) With the hydraulic oil at ambient temperature, subject the cylinder(s) to drift by placing the aerial device at full elevation, 10 ft (3 m) extension, marking the cylinder position or the second section in relation to the base section, and allowing the ladder to stand for 1 hr with the engine off. The results shall not exceed the manufacturer's specifications for allowable cylinder drift.

2-6.29 Holding Valves on Extension Cylinder.

Inspect the holding valves for external and internal hydraulic fluid leakage.

2-6.30 Tip Controls.

If the aerial ladder is equipped with a secondary operating position at the tip, the controls shall be inspected as follows:

- (a) Check that the control handles are not damaged or missing, functions are identified, and operating instructions and warnings are posted.
- (b) Verify that the controls operate smoothly, return to neutral when released, and do not bind during operation.
- (c) Verify that the turntable or lower controls will override the tip controls.
- (d) Verify that any safety devices that are designed to operate in conjunction with the tip controls are fully operational.
- (e) If the aerial ladder was built to the 1996 or a later edition of NFPA 1901, *Standard for Automotive Fire Apparatus*, verify that the speed of the aerial ladder, when being operated from the tip controls, does not exceed the speeds allowed in the edition of NFPA 1901 to which the aerial ladder was manufactured.

2-7 Operating Test.

2-7.1

A complete cycle of aerial ladder operation shall be carried out after starting the engine, setting the stabilizers, and transmitting power to the ladder. The ladder shall be fully elevated out of the bed, rotated 90 degrees, and extended to full extension.

2-7.2

The ladder shall complete this test smoothly and without jerking or undue vibration within the time allowed by the edition of NFPA 1901, *Standard for Automotive Fire Apparatus*, in effect at the time of manufacture.

2-7.3

The ladder shall be retracted, the turntable rotation completed through 360 degrees, and the ladder lowered to its bed, after which a thorough inspection shall be made of all moving parts. Special attention shall be given to the security and adjustment of the ladder cables or chains.

2-7.4

The test shall demonstrate successful operation of all ladder controls.

2-8 Load Testing.

2-8.1*

Tests shall be conducted when wind velocity is less than 10 mph (16 kmph).

2-8.2

Only personnel essential to conduct the test shall be permitted near the apparatus during the test. A close watch shall be maintained during all load tests for any signs of instability, the development of conditions that could cause damage or permanent deformation, or twist that exceeds the aerial ladder manufacturer's allowance. The test shall be discontinued immediately if such conditions develop.

2-8.3 Horizontal Load Test.

2-8.3.1

The aerial ladder's turntable shall be level. The aerial apparatus vehicle shall be on a hard level surface. All stabilizers shall be deployed in accordance with the manufacturer's instructions.

2-8.3.2*

A test cable hanger shall be attached to the top rung of the top ladder section and properly centered.

2-8.3.3

The rated capacity in the horizontal position at full extension shall be determined from the manufacturer's load chart or operator's manual. If full extension is not permitted in the horizontal position with a specified rated capacity, then the maximum permissible extension with a specified rated capacity shall be used for the purpose of this test.

2-8.3.4

For single chassis apparatus, the ladder shall be rotated, if necessary, until the ladder is positioned over the rear and parallel to the vehicle centerline. For tractor-drawn apparatus, the ladder shall be positioned in the most stable position as recommended by the manufacturer.

2-8.3.5

The ladder shall be placed in the horizontal position and extended to full extension or maximum permitted extension as determined in 2-8.3.3. The base section shall not be allowed to rest in the bed.

2-8.3.6

The ladder section locks, either manual pawls or hydraulic holding valves, shall be properly closed or applied.

2-8.3.7

The elevation cylinder integral holding valve or shutoff safety valve shall be properly closed or applied.

2-8.3.8

A weight equal to the manufacturer's specified rated live load, determined in 2-8.3.3, shall be gradually applied to the top rung of the aerial ladder by utilizing the test weight container or other suitable means of applying the weight.

2-8.3.9

The test weight shall be sustained by the unsupported aerial ladder for 5 min.

2-8.3.10

The test weight that is equal to the rated capacity shall be applied gradually to the top rung of the aerial ladder utilizing a test weight container or other suitable means of applying the weight. The weight shall be suspended by a cable and shall not be more than 3 ft. (1 m) above the ground. The combined weight of the test cable hanger and cable, the test weight container, and the test weights shall not exceed the rated capacity. The weights shall be added to the ladder in a manner that does not shock load the ladder.

2-8.3.10.1

The test weight shall hang freely from the tip of the aerial ladder. If the test weight hanger and ladder deflection are such that the test weight comes to rest on the ground, it shall be permissible to raise the ladder elevation slightly above the horizontal position. The ladder shall not be moved while the test weight is applied.

2-8.3.12

After removal of the test weight, a complete visual inspection shall be made of all load-supporting elements. Any visually detectable signs of damage, permanent deformation, or twist exceeding the manufacturer's allowance shall constitute noncompliance with the load test requirements. The aerial device shall also meet the requirements of Section 2-7 after the horizontal load test.

2-8.4 Maximum Elevation Load Test.

2-8.4.1

The-ladder turntable shall be level. The aerial apparatus vehicle shall be on a hard level surface. All stabilizers shall be-deployed in accordance with the manufacturer's instructions.

2-8.4.2

A test cable hanger shall be attached to the top rung of the top ladder section and properly centered.

2-8.4.3

The maximum rated capacity in the maximum-elevated position at full extension shall be determined from the manufacturer's load chart or operator's manuals.

2-8.4.4

The ladder shall be rotated, if necessary, until the ladder is positioned over the rear and parallel to the vehicle centerline. Midship-mounted devices may have to be rotated slightly off of the vehicle centerline in order to apply the test load without interference with the body of the apparatus.

2-8.4.5

The ladder shall be elevated to maximum elevation and fully extended.

2-8.4.6

The ladder section locks, either manual pawls or hydraulic holding valves, shall be properly applied.

2-8.4.7

The elevation cylinder integral holding valve or shutoff safety valve shall be properly closed or applied.

2-8.4.9

A free-hanging weight equal to the manufacturer's specified rated capacity, determined in 2-8.4.3, shall be gradually applied to the top rung of the aerial ladder by utilizing a test weight container or other suitable means of applying the weight. The weight shall be suspended by cable and shall be not more than 3 ft (1 m) above the ground. The combined weight of the test cable hanger and cable, the test weight container, and the test weights shall not exceed the rated capacity. The weights shall be added to the ladder in a manner that does not shock load the ladder.

2-8.4.10

The test weight shall be sustained by the unsupported aerial ladder for 5 min.

2-8.4.11

The test weight will hang freely from the tip of the aerial ladder. The aerial ladder shall not be moved while the test weight is applied.

2-8.4.12

After removal of the test weight, a complete visual inspection shall be made of all load supporting elements. Any visually detectable signs of damage, permanent deformation, or twist exceeding the manufacturer's allowance shall constitute noncompliance with the load test requirements. The aerial device shall also meet the requirements of Section 2-7 after the load test.

2-9 Waterway System Test.

2-9.1

The following examination and test will apply only to permanently piped aerial ladder aerial ladder waterway systems.

2-9.2

The waterway system shall be inspected for proper operation of all components. It shall be free of rust, corrosion, blockage, or other defects.

2-9.3

The waterway attaching brackets shall be inspected as follows:

- (a) Inspect the brackets for loose bolts, weld fractures or other defects.
- (b) (+) Inspect all attaching welds.

2-9.4 Pressure Test.

The water system shall be pressure tested.

2-9.4.1*

The aerial ladder shall be positioned between 0 and 10 degrees elevation and fully retracted. The water system shall be filled with water and the valve at the discharge end closed. If there is not a valve at the discharge end, a valve shall be attached for the purpose of this test.

The pressure on the system shall be raised to the water system manufacturer's maximum rated working pressure and maintained for the duration of the test. The aerial ladder shall be raised to full elevation and rotated 360 degrees. The water system, including the turntable swivel, shall be checked for leaks. Care shall be taken not to overheat the water pump.

2-9.4.2

The aerial ladder shall be positioned between 0 and 10 degrees elevation and extended to its maximum permissible limit. The water system shall be filled with water and the valve at the discharge end closed. If there is not a valve at the discharge end, a valve shall be attached for the purpose of this test.

The pressure on the system shall be raised to the water system manufacturer's maximum rated working pressure and maintained for the duration of the test. The entire length of the water system shall be checked for leaks. Care shall be taken not to overheat the water pump.

2-9.4.3

The water system will operate properly and with an absence of leaks during these tests.

2-9.5 Flow Meter(s).

If the waterway system is equipped with a flow meter(s), the flow meter(s) shall be checked for accuracy. Flow meters shall be tested at the water system manufacturer's maximum rated water system flow. Any meter that reads off by more than 10 percent shall be recalibrated, repaired, or replaced.

2-9.6 Pressure Gauges.

If the waterway system is equipped with a water pressure gauge(s), each water pressure gauge shall be checked for accuracy. Pressure gauges shall be checked at least three points, at 50 psi intervals (3.45 bar) without exceeding the maximum rated working pressure of the waterway system. Any gauge that reads off by more than 10 psi (0.7 bar) shall be recalibrated, repaired or replaced.

2-9.7

If the waterway system is equipped with a relief valve, this relief valve shall be checked to verify that it is operational at the waterway manufacturer's recommended pressure setting.

2-10 Signs.

Ensure that all signs are in place and legible.

2-11 Hydraulic Fluid.

After the operational tests have been conducted, a sample of the hydraulic fluid shall be removed from the hydraulic reservoir and subjected to spectrochemical analysis, particle count, viscosity check, and water content analysis.

2-12 Records.

A comprehensive record shall be completed for all tests conducted on the aerial ladder and signed by the person responsible for the test. The test record will include the following:

- (a) When the torque verification of mounting bolts is conducted, as required by this standard, the bolt size, grade, and torque specification shall be recorded.
- (b) When NDT is conducted, the test record will indicate the NDT method used in each area inspected.
- (c) Where this standard requires measurements be taken such as bearing clearance and backlash, cylinder drift, relief pressure, ladder section twist, hardness readings, base rail thickness, extension brake drift, winch drift, and the like, these measurements shall be recorded in the test record in order that a year-to-year comparison can be made.

Testing Elevating Platforms

3-1 General.

In addition to the manufacturer's recommendations, the inspections and tests detailed below shall be performed. An inspection preceded by a plus sign (+) indicates an appropriate nondestructive test (NDT) shall be conducted as required by 19.9.1.2 of NFPA 1911.

3-2 Service Records.

The elevating platform's service records shall be checked for any reports that may indicate defective conditions.

3-3 Hydraulic Components.

Hydraulic components shall show no signs of hydraulic fluid leakage.

3-3.1

A component shall be considered leaking of hydraulic fluid (oil) when droplets are forming on the component.

3-3.2 A film of hydraulic fluid on the component shall not be considered severe enough to categorize the component as leaking.

3-3 Turntable and Torque Box Inspection and Test.

The turntable and torque and torque box components, where applicable, shall be inspected on all elevating platforms in accordance with 2-4.1 & 2-4.2; 2-4.4 through 2-4.13; and 2-4.18 through 2-4.29

3-4 Stabilizer Examination and Test.

The stabilizer components, where applicable, shall be inspected on all elevating platform apparatus in accordance with 2-5.1 through 2-5.16.

3-5 Platform and Boom Inspection and Test.

All platforms and booms shall be inspected in accordance with 3-5.1 through 3-5.13.

3-5.1 Structural Modifications, Improper Repairs, or Added Weights.

The platform and booms shall be inspected for structural modifications or improper repairs.

3-5.1.1

The platform shall be inspected to determine that no extra equipment has been added to the platform without subtracting the weight of such equipment from the rated capacity.

3-5.1.2

Details of any structural modifications or added weight shall be contained in the required report.

3-5.2 Platform Mounting Brackets.

The platform mounting brackets shall be inspected as follows:

- (a) Visually inspect all platform mounting brackets for defects such as weld cracks, dents, or bends.
- (b) (+) Inspect all welds in the platform mounting brackets.
- (c) (+) Inspect all bolts and pins structurally involved with the platform mounting to the ladder or boom for internal flaws.

3-5.3 Platform.

The platform shall be inspected as follows:

- (a) Visually inspect platform for defects, such as weld cracks, dents, or bends.
- (b) (+) Inspect all welds on platforms.

3-5.4 Hydraulic, Pneumatic, and Electrical Lines in Platform.

Inspect all lines for proper mounting, wear, cracking, kinks, and abrasions.

3-5.5 Auxiliary Winch Mounting.

The auxiliary winch mounting shall be inspected as follows:

- (a) Inspect all mounting bolts for proper grade and installation as specified by the apparatus manufacturer.
- (b) Using a calibrated torque wrench, verify that the torque on all winch mounting bolts meets the apparatus manufacturer's specifications.
- (c) If welded, visually inspect the winch mounting for weld fractures.
- (d) (+) Inspect the mounting bolts for internal flaws.
- (e) (+) If brackets are welded, inspect all welds on mounting brackets.

3-5.6 Winch Controls.

The winch controls shall be inspected as follows:

- (a) Inspect controls for proper identification as to function and operation.

- (b) Verify smooth operation of the winch controls.

3-5.7 Elevating Platform Rated Capacity Identification.

Verify that the proper platform rated capacity identification plate is present, accurate, and legible.

3-5.8 Platform Gate Latches and Hinge Points.

Inspect the platform gate latches for proper alignment and the latch and hinges for smooth operation.

3-5.9 Platform Hinge Pins.

The platform hinge pins shall be inspected as follows:

- (a) Inspect platform hinge pins for proper installation, lubrication, and any irregularities.
- (b) (+) Inspect the platform's hinge pins for internal flaws.

3-5.10 Platform Controls.

The platform controls shall be inspected as follows:

- (a) Inspect the platform operating controls for identification of functions, posted operating instructions, and warnings.
- (b) Verify that the controls operate smoothly, return to neutral when released, and do not bind during operation.
- (c) Verify that the turntable or lower controls will override the platform controls.

3-5.11 Platform Monitor and Nozzle.

The platform monitor and nozzle shall be inspected as follows:

- (a) Inspect the complete operation of the platform monitor and nozzle.
- (b) Inspect the monitor's mounting brackets for any defects and welds for fractures.

3-5.12 Boom Illumination.

Verify the operation of spotlights used to illuminate the boom.

3-6 Articulating Boom--Lower Boom Examination and Test.

For apparatus equipment with an articulating boom, the lower boom shall be inspected and tested in accordance with 3-6.1 through 3-6.14.

3-6.1 Hinge Pins.

The hinge pins shall be inspected as follows:

- (a) Inspect the boom hinge pins for proper installation, lubrication, operation, and any discontinuities.
- (b) (+) Inspect the boom hinge pins for internal flaws.

3-6.2 Lower Boom Elevation Cylinder Anchor Ears and Plates.

The lower boom elevation cylinder anchor ears and plates shall be inspected as follows:

- (a) Visually inspect the anchor ears and plates for defects and the attaching welds for fractures.
- (b) (+) Inspect all welds on the anchor ears and plates.

3-6.3 Lower Boom Elevation Cylinders.

The boom elevation cylinder shall be inspected as follows:

- (a) Inspect the cylinder rod(s) for pitting, scoring or other defects.
- (b) Inspect the cylinder rod to barrel seal and the end gland seal for excessive external hydraulic fluid leakage.
- (c) With the hydraulic oil at ambient temperature, measurements shall be taken in accordance with the manufacturer's recommendations to determine the amount of drift present in the boom elevation cylinders. Results of this test shall not exceed the manufacturer's specifications for allowable lower boom cylinder drift.

3-6.4 Holding Valves on Boom Elevation Cylinder.

Inspect the holding valves for signs of external hydraulic fluid leakage.

3-6.5 Boom Assembly.

The lower boom assembly shall be inspected as follows:

- (a) Visually inspect the boom for defects such as weld cracks, dents, or bends.
- (b) Visually inspect all structural fasteners and fastened connections for cracked fasteners and material cracks around the fasteners.
- (c) (+) Inspect all welds on the boom for any structural discontinuities.
- (d) (+) Hardness readings shall be taken at intervals of 28 in. (710 mm) or less on booms constructed of aluminum. Results of this test shall be compared

with the manufacturer's specifications for the hardness of the material used for construction of the boom assembly.

3-6.6 Cylinder Link Pins.

The cylinder link pins shall be inspected as follows:

- (a) Inspect the cylinder link pins for proper installation, lubrication, operation, and any fractures.
- (b) (+) Inspect the cylinder link pins for internal flaws.

3-6.7 Platform Leveling Linkages.

The platform leveling linkages shall be inspected as follows:

- (a) Visually inspect linkages for defects such as weld cracks, dents, and bends.
- (b) (+) Inspect all welds of the leveling assembly.
- (c) (+) Inspect all leveling linkage pins for any internal flaws.

3-6.8 Hydraulic Lines and Hoses in Lower Boom.

Inspect all hydraulic lines in the lower boom for proper mounting, abrasion, hydraulic fluid leakage, and wear.

3-6.9 Hydraulic Lines in Knuckle.

Inspect all hydraulic lines in the knuckle for hydraulic fluid leakage, abrasion, and any signs of wear.

3-6.10 Cables, Chains, and Rods.

Inspect all cables, chains, and rods for signs of wear and for proper adjustment.

3-6.11 Sprockets, Pulleys, and Hooks.

Inspect all sprockets, pulleys, and hooks for proper lubrication, signs of wear, distortion, and proper operation.

3-6.12 Boom Support.

The boom support shall be inspected as follows:

- (a) Inspect the boom support for wear and proper alignment and the cradle pad for damage.
- (b) Visually inspect the boom support for defects such as weld cracks, dents, or bends.

- (c) (+) Inspect the boom support welds and bracket attachment.

3-6.12.1

If the boom support is bolted, it shall be further inspected as follows:

- (a) Inspect all accessible bolts for proper grade and installation as specified by the apparatus manufacturer.
- (b) Using a properly calibrated torque wrench, verify that the bolt torque on all accessible mounting bolts meets the apparatus manufacturer's specifications.
- (c) (+) Inspect all accessible bolts for internal flaws.

3-6.13 Lower Boom Angle Indicator Lights.

Verify the proper operation of the lower boom angle indicator lights.

3-6.14 Pneumatic and Electrical Lines.

Inspect all pneumatic and electrical lines in the lower boom and the knuckle for proper mounting, wear, cracking, kinks, and abrasions.

3-7 Articulating Boom--Upper Boom Examination and Test.

For apparatus with an articulating boom, the upper boom shall be inspected and tested in accordance with 3-7.1 through 3-7.15.

3-7.1 Upper Boom for Alignment with Lower Boom.

Verify that the upper boom is aligned with the lower boom.

3-7.2 Platform Leveling Linkages.

The platform leveling linkages shall be inspected as follows:

- (a) Visually inspect linkages for defects such as weld cracks, dents, or bends.
- (b) (+) Inspect all welds of leveling assemblies.
- (c) (+) Inspect all leveling linkage pins for any internal flaws.

3-7.3 Boom Boost Cylinder Brackets.

The boom boost cylinder brackets shall be inspected as follows:

- (a) Visually inspect the boom boost cylinder brackets for defects such as weld cracks, dents, or bends.
- (b) (+) Inspect the boom boost cylinder bracket welds.

3-7.4 Boom Boost Cylinders.

Inspect the boom boost cylinders for any external hydraulic fluid leakage.

3-7.5 Cylinder Link Pins.

The cylinder link pins shall be inspected as follows:

- (a) Visually inspect the cylinder link pins for proper installation, lubrication, operation, and any irregularities.
- (b) (+) Inspect the cylinder link pins for internal flaws.

3-7.6 Boom Assembly.

The upper assembly shall be inspected as follows:

- (a) Visually inspect the boom for defects such as weld cracks, dents, or bends.
- (b) Visually inspect all structural fasteners and fastener connections for cracked fasteners and material cracks around the fasteners.
- (c) (+) Inspect all welds on the boom.
- (d) (+) Hardness readings shall be taken at intervals of 28 in. (710 mm) or less on booms constructed of aluminum. Results of this test shall be compared with the manufacturer's specifications for the hardness of the material used for construction of the boom assembly.

3-7.7 Hydraulic Lines and Hoses in Upper Boom.

Inspect all hydraulic hoses/lines in the upper boom for proper mounting, abrasions, hydraulic fluid leakage, and wear.

3-7.8 Cables, Chains, and Rods.

Inspect all cables, chains, and rods for signs of wear and for proper adjustment.

3-7.9 Sprockets, Pulleys, and Hooks.

Inspect all sprockets, pulleys, and hooks for proper lubrication, signs of wear, distortion, and proper operation.

3-7.10 Upper Boom Hold-Down Device.

The upper boom hold-down device shall be inspected as follows:

- (a) Visually inspect the upper boom hold-down device for defects and for proper operation.

- (b) (+) Inspect all welds of the upper boom hold-down device.

3-7.11 Safety Stop Mechanism.

Verify that the safety stop mechanism operates properly.

3-7.12 Upper Boom Elevation Cylinder Anchor Ears and Plates.

The upper boom elevation anchor ears and plates shall be inspected as follows:

- (a) Visually inspect the anchor ears and plates for defects and welds for fractures.
- (b) (+) Inspect all welds on the anchor ears and plates.

3-7.13 Upper Boom Elevation Cylinder(s).

The upper boom elevation cylinder(s) shall be inspected as follows:

- (a) Inspect the cylinder rod(s) for pitting, scoring, and other defects.
- (b) Inspect the cylinder rod to barrel seal and the end gland seal for excessive external hydraulic fluid leakage.
- (c) With the hydraulic oil at ambient temperature, measurements shall be taken in accordance with the manufacturer's recommendations to determine the amount of drift present. Results of this test shall not exceed the manufacturer's tolerance for allowable upper boom cylinder drift.

3-7.14 Holding Valves on Upper Boom Elevation Cylinder.

Inspect the holding valve(s) for signs of external hydraulic fluid leakage.

3-7.15 Pneumatic and Electrical Lines.

Inspect all pneumatic and electrical lines in the upper boom for proper mounting, wear, cracking, kinks, and abrasions.

3-8 Telescoping Boom Examination and Test.

For platforms equipped with a telescoping boom, the boom shall be inspected and tested in accordance with 2-4.14 and 2-4.17, 3-6.10 through 3-6.12, and 3-8.1 through 3-8.14.

3-8.1 Boom Assemblies.

The boom assemblies shall be inspected as follows:

- (a) Visually inspect booms for defects such as weld crack, dents, or bends.
- (b) Visually inspect all structural fasteners and fastened connections for

cracked fasteners and material cracks around the fasteners.

- (c) (+) Inspect all welds on booms.
- (d) (+) Hardness readings shall be taken at intervals of 28 in. (710 mm) or less on booms constructed of aluminum. Results of this test shall be compared with the manufacturer's specifications for the hardness of the material used for construction of the boom assembly.

3-8.2 Ancillary Boom Ladder.

The ancillary boom ladder shall be inspected as follows:

- (a) Inspect the ancillary boom ladder for any defects and welds for fractures.
- (b) Inspect the mounting brackets for loose bolts, weld fractures, or other defects.
- (c) (+) Inspect all welds on the ladder and attaching welds.

3-8.3 Guides, Wear Strips and Pads, and Slide Blocks.

Inspect guides, wear strips, pads, and slide blocks for proper installation and signs of wear.

3-8.4 Extension Sheaves.

The extension sheaves shall be inspected as follows:

- (a) Inspect the extension sheaves for proper mounting, alignment, and signs of wear.
- (b) (+) Inspect all welds of the extension sheave mounting brackets.
- (c) (+) Inspect retaining bolt for internal flaws.

3-8.5 Extension Cables.

Inspect extension cables for compliance with Appendix A of the Society of Automotive Engineers Standard SAE J959, Lifting Crane, Wire-Rope Strength Factors.

3-8.6 Elevation Indicator.

Inspect the elevation cylinder indicator for legibility and clarity.

3-8.7 Maximum Extension Warning Device.

During operation, verify the proper operation of the audible device to warn of the approach to maximum extension, if so equipped.

3-8.8 Platform Leveling Cylinders.

The platform leveling cylinders shall be inspected as follows:

- (a) Inspect the cylinder rod(s) for pitting, scoring, and other defects.
- (b) Inspect the cylinder rod to barrel seal and the end gland seal for excessive external hydraulic fluid leakage.
- (c) Visually inspect the leveling system for proper installation.
- (d) Visually inspect the mounting of the leveling system for defects and welds for fractures.
- (e) (+) Inspect all welds for mounting of the leveling system.
- (f) (+) Inspect all leveling cylinder pins for any internal flaws.

3-8.9 Hydraulic Lines and Hoses in Boom Assemblies.

Inspect all hydraulic lines and hoses in the boom assemblies for hydraulic fluid leakage, abrasions, and any signs of wear.

3-8.10 Extension Cylinder Anchor Ears and Plates.

The extension cylinder anchor ears and plates shall be inspected as follows:

- (a) Visually inspect the extension cylinder anchor ears and plates for defects and attaching welds for fractures.
- (b) (+) Inspect the extension cylinder anchor ears and plate attaching welds.

3-8.11 Extension Cylinder Pins.

The extension cylinder pins shall be inspected as follows:

- (a) Inspect the cylinder pins for proper installation and retention.
- (b) (+) Inspect the cylinder pins for internal flaws.

3-8.12 Extension Cylinder.

The extension cylinders shall be inspected as follows:

- (a) Inspect the cylinder rods for pitting, scoring, and other defects.

- (b) Inspect the cylinder rod to barrel seal and the end gland seal for excessive external hydraulic fluid leakage.
- (c) With the hydraulic oil at ambient temperature, subject the cylinder(s) to drift by placing the aerial device at full elevation, 10 ft (3 m) extension, marking the cylinder piston or the second section in relation to the base section, and allowing the ladder to stand for 1 hr with the engine off. The results shall not exceed the manufacturer's specifications for allowable cylinder drift.

3-8.13 Holding Valves on Extension Cylinder.

Inspect the holding valves for external hydraulic fluid leakage.

3-8.14 Pneumatic and Electrical Lines.

Inspect all pneumatic and electrical lines in the booms for proper mounting, wear, cracking, kinks, and abrasions.

3-9 Operational Tests from Lower Controls.

3-9.1

With engine speed set to allow maximum speed as permitted by the manufacturer, the elevating platform shall be operated in all positions, as allowed by the manufacturer, using the lower or ground controls.

3-9.2

The operation of the elevating platform shall include, but not be limited to, movement of the platform basket from ground to maximum elevation as well as revolving the platform basket 360 degrees to the left and to the right while the unit is at its maximum horizontal reach.

3-9.3

The boom shall operate without any improper or unusual motion or sound.

3-9.4

All safety devices shall operate properly.

3-9.5

All controls shall operate smoothly, return to the neutral position when released and not bind during operation.

3-9.6

Telescoping elevating platforms, rollers, slides, and sheave wheels shall demonstrate proper alignment, function, and free operation.

3-9.7

A complete cycle of elevating platform operation shall be carried out after starting the engine, setting the stabilizers, and transmitting power to the platform booms or sections.

3-9.7.1

Operating the machine from the lower control station, the elevating platform shall be raised out of the bed, extended to full specified height, and rotated through a 90 degree turn. This shall be completed smoothly and without undue vibration within the manufacturer's recommended time.

3-9.7.2

The elevating platform shall be retracted, and the turntable rotation completed through 360 degrees. The elevating platform shall be lowered to its bed and a thorough inspection made of all moving parts. Special attention shall be given to the platform leveling system.

3-9.7.3

The test shall demonstrate successful operation of all elevating platform controls.

3-10 Operational Tests from Platform Controls.

3-10.1

With engine speed set to allow maximum speed as permitted by the manufacturer, the elevating platform shall be operated in all positions, as allowed by the manufacturer, with only one operator in the platform basket operating from the platform control station.

3-10.2

The operation of the elevating platform will include, but not be limited to, movement of the platform basket from ground to maximum elevation, as well as revolving the platform basket 360 degrees to the left and to the right while the unit is at its maximum horizontal reach.

3-10.3

All safety devices shall operate properly.

3-10.4

The platform basket deactivation control, from the ground or lower controls, shall be demonstrated to operate properly.

3-10.5

The platform basket shall level properly as the booms are moved through all allowable positions.

3-10.6

The mechanical override on a hydraulically leveled elevating platform basket shall operate properly during emergency lowering of the boom without hydraulic power.

3-11 Load Test.

3-11.1

With the unit located on a hard level surface and allowing sufficient room for unrestricted boom movements, a stability and structural test shall be performed. This test shall determine the elevating platform's ability to perform properly while carrying rated capacity loads in the platform basket.

3-11.2

A close watch shall be maintained during all load tests for any signs of instability, the development of conditions that could cause damage or permanent deformation, or twist that exceeds the elevating platform manufacturer's allowance. The test shall be discontinued immediately such conditions develop.

3-11.3

The unit shall be properly stabilized according to the manufacturer's recommendation.

3-11.4

The platform basket shall be placed near the ground and loaded to the manufacturer's rated capacity. Care shall be exercised to assure that the weight of equipment added to the platform basket after delivery is subtracted from the weight of the test load being added. The platform basket load shall be properly secured.

3-11.5

The unit shall be operated from the lower controls through all allowable phases of operation. The manufacturer's operational limits shall not be exceeded.

3-11.6

All boom movements shall exhibit no abnormal noise, vibration, or deflection.

3-11.7

The platform basket shall level properly as the booms are moved through all allowable positions.

3-11.8

At the conclusion of the load test, weld joints at stabilizer structure, stabilizers, frame, main frame, frame reinforcements, turntable, cylinder anchors, boom joints, leveling system, platform basket, and pivot pin bosses shall be inspected and shall show no signs of deterioration.

3-12 Water System Examination and Test.

3-12.1

The waterway and system shall be inspected for proper operation of all components. It shall be free of rust, corrosion, other defects, or blockage.

3-12.2

The waterway attaching brackets shall be inspected as follows:

- (a) Inspect the brackets for loose bolts, weld fractures, or other defects.
- (b) (+) Inspect all attaching welds.

3-12.3 Pressure Test.

The water system shall be pressure tested.

3-12.3.1

If the elevating platform has a telescoping boom, the water system shall be tested following the procedure in 2-9.4.1 and 2-9.4.3.

3-12.3.2

If the elevating platform has an articulating boom, the boom shall be positioned in the road travel position. The water system shall be filled with water and the valve at the discharge end closed. If there is not a valve at the discharge end, a valve shall be attached for the purpose of this test.

The pressure on the system shall be raised to the water system manufacturer's maximum rated working pressure and maintained while the elevating platform is raised to its rated vertical height and rotated 360 degrees. The water system including the turntable swivel, shall be checked for leaks. Care shall be taken not to overheat the water pump.

3-12.3.3

If the elevating platform has both a telescoping boom and an articulating boom, it shall be tested in accordance with 3-12.3.1 and 3-12.3.2.

3-12.3.4

The water system shall operate properly and with an absence of leaks during these tests.

3-12.4 Flow Meter(s).

If the waterway system is equipped with a flow meter(s), the flow meter(s) shall be checked for accuracy. Flow meters shall be tested at the water system manufacturer's maximum rated water system flow. Any meter that reads off by more than 10 percent shall be recalibrated, repaired, or replaced.

3-12.5 Pressure Gauge(s).

If the waterway system is equipped with a water pressure gauge(s), each water pressure gauge shall be checked for accuracy. Pressure gauges shall be checked at least three points at 50 psi (3.45 bar) intervals without exceeding the maximum rated working pressure of the waterway. Any gauge that reads off by more than 10 psi (0.7 bar) shall be replaced, repaired, or recalibrated.

3-12.6

If the waterway system is equipped with a relief valve(s), the relief valve(s) shall be checked to verify that it is operational at the waterway manufacturer's recommended pressure setting.

3-13 Signs.

Ensure that all signs are in place and legible.

3-14 Hydraulic Fluid.

After the operational tests have been performed, a sample of the hydraulic fluid shall be removed from the hydraulic reservoir and subjected to spectrochemical analysis, particle count, viscosity check, and water content analysis.

3-15 Records.

A comprehensive record shall be completed for all tests of the elevating platform and signed by the personnel responsible for the test.

3-15.1

When torque verification of mounting bolts is performed as required by the standard, the bolt size, grade, and torque specifications shall be recorded.

3-15.2

When NDT is conducted, the test record shall indicate the NDT method used in each inspected area.

3-16.3

Where this standard requires measurements to be taken – such as bearing clearance and backlash, cylinder drift, relief pressure, ladder section twist, hardness readings, base rail thickness, extension brake drift, winch drift, and the like – these measurements shall be recorded in the test record so that a year-to-year comparison can be made.

Testing Water Towers

4-1 General.

In addition to the manufacturer's recommendations, the inspections and tests detailed below shall be performed. An inspection preceded by a plus sign (+) indicates an appropriate nondestructive test (NDT) shall be conducted as required by 19.10.1.2 of NFPA 1911.

4-2 Service Records.

The water tower's service records shall be checked for any reports that may indicate defective condition.

4-3 Hydraulic Components.

Hydraulic components shall show no signs of hydraulic fluid leakage.

4-3.1

A component shall be considered leaking if hydraulic fluid (oil) droplets are forming on the component.

4-3.2

A film of hydraulic fluid on the component shall not be considered severe enough to categorize the component as leaking.

4-4 Turntable and Torque Box Inspection Test.

The turntable and torque box components, where applicable, shall be inspected on all water tower apparatus in accordance with 2-4.1 through 2-4.29.

4-5 Stabilizer Examination and Test.

The stabilizer components, where applicable, shall be inspected on all water tower apparatus in accordance with 2-5.1 through 2-5.16.

4-6 Articulating Boom--Lower Boom Examination and Test.

For water tower apparatus equipped with an articulating boom, the lower boom shall be inspected and tested in accordance with 3-6.1 through 3-6.6 and 3-6.8 through 3-6.14, as applicable.

4-7 Articulating Boom--Upper Boom Examination and Test.

For water tower apparatus equipped with an articulating boom, the upper boom shall be inspected and tested in accordance with 3-7.1 and 3-7.3 through 3-7.15, as applicable.

4-8 Telescoping Boom Examination and Test.

For water tower apparatus equipped with a telescoping boom, the booms shall be inspected and tested in accordance with 3-6.10 through 3-6.14, 3-8.1 through 3-8.7, and 3-8.7 through 3-8.14, as applicable.

4-9 Operating Test.

4-9.1

A complete cycle of water tower operation shall be carried out after starting the engine, setting the stabilizers, and transmitting power to the water tower. The water tower shall be fully elevated out of the bed, rotated 90 degrees, and extended to full extension.

4-9.2

A water tower shall complete this test smoothly and without undue vibration within the time allowed by the current Edition of NFPA 1901, Standard for Automotive Fire Apparatus, in effect at the time of manufacture.

4-9.3

The water tower shall be retracted, the turntable rotation completed through 360 degrees, and then the water tower lowered to its bed, after which a thorough inspection shall be made of all moving parts.

4-9.4

The test shall demonstrate successful operation of all water tower controls.

4.10 Water System Examination and Test.**4-10.1**

The waterway system shall be inspected for proper operation of all components. It shall be free of rust, corrosion, blockage or other defects.

4-10.2

The waterway attaching brackets shall be inspected as follows:

- (a) Inspect the brackets for loose bolts, weld fractures, or other defects.
- (b) (+) Inspect all attaching welds.

4-10.3 Pressure Test.

The water system shall be pressure tested.

4-10.3.1

If the water tower has a telescoping boom, the water system shall be tested following the procedure in 2-8.4.1 and 2-8.4.2.

4-10.3.2

If the water tower has an articulating boom, the water system shall be tested following the procedure in 3-12.3.2.

4-10.3.3

If the water tower has both a telescoping boom and an articulating boom, it shall be tested in accordance with 4-9.3.1 and 4-9.3.2.

4-10.3.4*

The water system shall operate properly and with an absence of leaks during these tests.

4-10.4 Flow Meter(s).

If the waterway system is equipped with a flow meter(s), the flow meter(s) shall be checked for accuracy. Flow meters shall be tested at the water system manufacturer's maximum rated water system flow. Any meter that reads off by more than 10 percent shall be recalibrated, repaired, or replaced.

4-10.5 Pressure Gauge(s).

If the waterway system is equipped with a water pressure gauge(s), each water pressure gauge shall be checked for accuracy. Pressure gauges shall be checked at least three points at 50 psi (3.45 bar) intervals without exceeding the maximum rated working pressure of the waterway system. Any gauge that reads off by more than 10 psi shall be replaced, repaired or recalibrated.

4-10.6

If the waterway system is equipped with a relief valve, the relief valve shall be checked to verify that it is operational at the waterway manufacturer's recommended pressure setting.

4-10 Signs.

Ensure that all signs are in place and legible.

4-12 Hydraulic Fluid.

After the operational tests have been performed, a sample of the hydraulic fluid shall be removed from the hydraulic reservoir and subjected to spectrochemical analysis, particle count, viscosity check, and water content analysis.

4-13 Records.

A proper record shall be completed for all tests of the water tower by the personnel responsible for the test. The test record shall include the following:

- (a) When the torque verification of mounting bolts, as required by this standard, is performed, the bolt size, grade, and torque specifications shall be recorded.
- (b) When NDT is conducted, the test record shall indicate the NDT method used in each area inspected.
- (c) Where this standard requires measurements be taken such as bearing clearance and backlash, cylinder drift, relief pressure, ladder section twist, hardness readings, base rail thickness, extension brake drift, winch drift, and the like, these measurements shall be recorded in the test record in order that a year-to-year comparison can be made.

Referenced Publications

5-1

The following documents or portions thereof are referenced within this proposal and shall be considered part of the requirements of this document. The edition indicated for each reference is the current edition as of the date of the NFPA issuance of this document.

5-1.1 ASTM Publications.

American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

ASTM B648-1978 (Reapproved 2006), Standard Test Method for Indentation Hardness of Aluminum Alloys by Means of a Barcol Impressor

ASTM E6-2006, Standard Terminology Relating to Methods of Mechanical Testing

ASTM E114-1995 (Reapproved 2005), Standard Practice for Ultrasonic Pulse-Echo Straight-Beam Examination by the Contact Method

ASTM E165-2002, Standard Test Method for Liquid Penetrant Examination

ASTM E543-2006, Standard Practice for Agencies Performing Nondestructive Testing

ASTM E709-2001, Standard Guide for Magnetic Particle Examination

ASTM E797-2005, Standard Practice for Measuring Thickness by Manual Ultrasonic Pulse-Echo Contact Method

ASTM E1220-2005, Standard Test Method for Visible Penetrant Examination Using the Solvent-Removable Process

ASTM E1316-2007, Standard Terminology for Nondestructive Examinations

ASTM E1418-2005, Standard Test Method for Visible Penetrant Examination Using the Water-Washable Process

5.1.2 ASNT Publication.

American Society for Nondestructive Testing, Inc., 1711 Arlingate Lane, Columbus, OH 43228.

ASNT CP-189-2001, Standard for Qualification and Certification of Nondestructive Testing Personnel

5.1.3 AWS Publications.

American Welding Society, Inc., 550 NW LeJeune Road, P.O. Box 351040, Miami, FL 33135.

AWS B1.10-1999, Guide for the Nondestructive Examination of Welds

AWS B1.11-2000, Guide for the Visual Examination of Welds

AWS D1.1-2006, Structural Welding Code—Steel

AWS D1.2-2003, Structural Welding Code—Aluminum

5.1.4 SAE Publication.

Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA 15096.

SAE J959-1991, Lifting Crane, Wire-Rope Strength Factors

4. PRICING SHEETS:

1. \$ _____/Test -Annual Testing
2. \$ _____/Test – Non-Destructive Testing
3. \$ _____/Re-Inspection (Annual Testing)
4. \$ _____/Re-Inspection (Non-Destructive Testing)

5. SPECIAL CONDITIONS/INSTRUCTIONS

All testing will be performed onsite at the Fulton County Fire Department Logistics Division, 5890 Plummer Road, Atlanta, Georgia 30336.

Test completion requirements will be as required by the department at the time of order placement. The quoter is required to respond to a request in accordance with the following criteria:

- A. Emergency Requests: Will be completed within forty-eight (48) hours of order placement.
- B. Urgent Requests: Will be completed within seventy-two (72) hours of order placement.
- C. Routine requests: Will be completed within seven (7) days of order placement.

All testing must be performed in compliance with the National Fire Protection Association (NFPA) 1914 Standard for Testing Fire Department Aerial Devices.

All inspectors utilized in the performance of testing must, at a minimum, hold a Level II SNT-TC-1A Certification, proof of certification must be submitted to the Fire Department prior to the start-up of any testing.

Quoter will be required to submit with quote, a list indicating all training courses successfully completed within the last twelve (12) months for the Level II Inspectors who will be assigned the task of testing Fulton County Apparatus.

Note: training for all Level II Inspectors shall include, at a minimum, magnetic particle inspection, ultrasonic inspection, and dye penetrant training and techniques.

Quoter will be required to submit a final test report within forty-eight (48) hours of test completion. Each final report must indicate review and sign-off of both an inspector, who holds a current American Society for Non-Destructive Testing (ASNT) Level III Certification, and a Mechanical Engineer, the Level III Inspector and the Mechanical Engineer must be assigned to the quoter's Aerial Certification Program.

Quoter must submit with quote, a list of all ASNT Level III Inspectors and Mechanical Engineers whose primary job/duties are performed under the quoter's Aerial Certification Program/Department.

Each quoter must submit with quote, proof documenting a minimum of five (5) years experience in the performance of Fire Department Equipment Safety Testing.

If an apparatus is found to have defects during the testing process, the quoter shall assume the following procedure:

Minor Defects – Fulton County will have an opportunity to complete repairs within twenty-four (24) hours, at which time the vendor will perform the inspection.

-OR-

Fulton County will complete repairs within thirty (30) days provide written notification to the vendor that all repairs have been completed, and at that

time vendor will issue compliance certificate, without the need for a re-inspection.

Major Defects –Fulton County will have an opportunity to complete repairs within ninety (90) days, at which time the vendor will conduct a re-inspection of the unit.

Quoter must be capable of performing the following in compliance with the manufacturer's recommended tolerances.

- A) Rotation bearing maximum clearance and backlash.
- B) Critical mounting bolt grade and torque.
- C) Elevation cylinder drift tolerance.
- D) Extension cylinder drift tolerance.
- E) Outrigger cylinder drift tolerance.
- F) Hydraulic relief pressure.
- G) Ladder section twist.
- H) Hardness for aluminum devices.
- I) Hollow I-beam base rails thickness.
- J) Rated load of the device.

The quoter shall list on a separate sheet of paper any variations from, or exceptions to, the conditions and specifications of this quote. This sheet shall be labeled "exceptions to bid conditions", and shall be attached to quote.

Insurance and Risk Management Provisions

It is Fulton County Government's practice to obtain Certificates of Insurance from our Contractors and Vendors. Insurance must be written by a licensed agent in a company licensed to write insurance in the State of Georgia. Respondents shall submit with the bid/proposal evidence of insurability satisfactory to Fulton County Government as to form and content. Either of the following forms of evidence is acceptable:

- A letter from an insurance carrier stating that upon your firm/company being the successful Bidder/Respondent that a Certificate of Insurance shall be issued in compliance with the Insurance and Risk Management Provisions outlined below.
- A Certificate of Insurance complying with the Insurance and Risk Management Provisions outlined below (Request for Bid/Proposal number and Project Name and Description must appear on the Certificate of Insurance).
- A combination of specific policies written with an umbrella policy covering liabilities in excess of the required limits is acceptable to achieve the applicable insurance coverage levels.

Upon award, the Contractor/Vendor must maintain at their expense, insurance with policy limits equal to or greater than the limits described below. Any and all Insurance Coverage(s) and Bonds required under the terms and conditions of the contract shall be maintained during the entire length of the contract, including any extensions or renewals thereto, and until all work has been completed to the satisfaction of Fulton County Government.

Accordingly the Respondent shall provide a certificate evidencing the following:

1. WORKERS COMPENSATION/EMPLOYER'S LIABILITY INSURANCE – STATUTORY (In compliance with the Georgia Workers Compensation Acts and any other State or Federal Acts or Provisions in which jurisdiction may be granted)

Employer's Liability Insurance	BY ACCIDENT - EACH ACCIDENT	\$1,000,000.
Employer's Liability Insurance	BY DISEASE - POLICY LIMIT	\$1,000,000.
(Aggregate)	BY DISEASE - EACH EMPLOYEE	\$1,000,000.

2. COMMERCIAL GENERAL LIABILITY INSURANCE (Including contractual Liability Insurance)

Bodily Injury and Property Damage Liability	Each Occurrence	-	\$1,000,000
(Other than Products/Completed Operations)	General Aggregate	-	\$2,000,000

To include Designated Per Project/Location Endorsement #CG2503/CG2504

Products\Completed Operation	Aggregate Limit	-	\$1,000,000
Personal and Advertising Injury	Limits	-	\$1,000,000
Fire Damage	Limits	-	\$ 100,000

3. BUSINESS AUTOMOBILE LIABILITY INSURANCE

Combined Single Limits	Each Occurrence	-	\$1,000,000
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(Including operation of non-owned, owned, and hired automobiles)

4. **UMBRELLA LIABILITY**

(In excess of Auto, GL and Employers Liability) Each Occurrence - \$2,000,000

5. **FIDELITY BOND and CRIME**

(Employee Dishonesty - Theft) Each Occurrence - \$100,000

Above to include 3rd Party Coverage

Certificates of Insurance

Certificates shall state that the policy or policies shall not expire, be cancelled or altered without at least sixty (60) days prior written notice to Fulton County Government. Policies and Certificates of Insurance are to list Fulton County Government as an Additional Insured (except for Workers' Compensation) and shall conform to all terms and conditions (including coverage of the indemnification and hold harmless agreement) contained in the Insurance and Risk Management Provisions. The General Liability Additional Insured language should apply to on-going and completed-operations, using ISO form CG 2010 (11/85 version) or equivalent.

The Contractor agrees to name the Owner and all other parties required of the Contractor/Vendor shall be included as insureds on the CGL, using ISO Additional Insured Endorsement forms CG 2010 11/85 or its equivalent coverage to the additional insureds. This insurance for the additional insureds shall be as broad as the coverage provided for the named insured Subcontractor. It shall apply as Primary Insurance before any other insurance or self-insurance, including any deductible, non-contributory, and Waiver of Subrogation provided to the Additional Insureds.

Additional Insured under the General Liability, Auto Liability, Umbrella Policies (with exception of Workers Compensation and Professional Liability), with no Cross Suits exclusion.

If Fulton County Government shall so request, the Respondent, Contractor or Vendor will furnish the County for its inspection and approval such policies of insurance with all endorsements, or confirmed specimens thereof certified by the insurance company to be true and correct copies.

Such certificates should be sent to Fulton County Government and must identify the "Certificate Holder" as follows:

Fulton County Government – Department of Purchasing & Contract Compliance
130 Peachtree Street, S.W.
Suite 1168
Atlanta, Georgia 30303-3459

It is understood that **Insurance in no way limits the Liability of the Contractor/Vendor.**

USE OF PREMISES

Contractor shall confine its apparatus, the storage of materials and the operations of its workers to limits/requirements indicated by law, ordinance, permits and any restrictions of Fulton County Government and shall not unreasonably encumber the premises with its materials.

PROTECTION OF PROPERTY

Contractor will adequately protect its own work from damage, will protect Fulton County Government's property from damage or loss and will take all necessary precautions during the progress of the work to protect all persons and the property of others from damage or loss.

Contractor shall take all necessary precautions for the safety of employees of the work and shall comply with all applicable provisions of the Federal, State and local safety laws and building codes to prevent accidents or injury to persons on, about, or adjacent to the premises where work is being performed.

Contractor shall erect and properly maintain at all times as required by the conditions and progress of the work, all necessary safeguards for the protection of its employees, Fulton County Government employees and the public and shall post all applicable signage and other warning devices to protect against potential hazards for the work being performed.

INDEMNIFICATION AND HOLD HARMLESS AGREEMENT

Contractor/Vendor hereby agrees to release, indemnify, defend and hold harmless Fulton County, its Commissioners, officers, employees, subcontractors, successors, assigns and agents, from and against any and all losses (including death), claims, damages, liabilities, costs and expenses (including but not limited to all actions, proceedings, or investigations in respect thereof and any costs of judgments, settlements, court costs, attorney's fees or expenses, regardless of the outcome of any such action, proceeding, or investigation), caused by, relating to, based upon or arising out of any act or omission by Contractor/Vendor, its directors, officers, employees, subcontractors, successors, assigns or agents, or otherwise in connection (directly or indirectly) with its acceptance, or the performance, or nonperformance, of its obligations under these agreements. Such obligations shall not be construed to negate, abridge or otherwise reduce any other rights or obligations of indemnity which would otherwise exist as to any party or person as set forth in this paragraph.

Contractor/Vendor's obligation to protect, defend, indemnify and hold harmless, as set forth hereinabove, shall also include, but is not limited to, any matter arising out of any actual or alleged infringement of any patent, trademark, copyright, or service mark, or other actual or alleged unfair competition disparagement of product or service, or other tort or any type whatsoever, or any actual or alleged violation of trade regulations.

Contractor/Vendor further agrees to protect, defend, indemnify and hold harmless Fulton County, its Commissioners, officers, employees, subcontractors, successors, assigns and agents from and against any and all claims or liability for compensation under the Worker's Compensation Act, Disability Benefits Act, or any other employee benefits act arising out of injuries sustained by any employees of Contractor/Vendor. These indemnities shall not be limited by reason of the listing of any insurance coverage.

If the bid/quotation involves construction services Contractor/Vendor will be responsible fully for any and all damage to the work during the course of construction, until the point of Final acceptance by Fulton County.

FULTON COUNTY ACKNOWLEDGES THAT ALL PROVISIONS OF THIS INDEMNITY AGREEMENT MAY NOT BE APPLICABLE TO THE CONTRACTOR/VENDOR'S BUSINESS. TO THE EXTENT THAT CONTRACTOR/VENDOR MAY DEMONSTRATE SUCH NONAPPLICABILITY, FULTON COUNTY MAY NEGOTIATE AMENDMENTS TO THIS AGREEMENT AS THE CIRCUMSTANCES DICTATE.

CONTRACTOR/VENDOR ACKNOWLEDGES HAVING READ, UNDERSTANDING, AND AGREEING TO COMPLY WITH THIS INDEMNIFICATION AND HOLD HARMLESS AGREEMENT, AND THE REPRESENTATIVE OF THE CONTRACTOR/VENDOR IDENTIFIED BELOW IS AUTHORIZED TO SIGN CONTRACTS ON BEHALF OF THE RESPONDING CONTRACTOR/VENDOR.

COMPANY: _____ SIGNATURE: _____

NAME: _____ TITLE: _____ DATE: _____