

4123:1-21-05 Ground ladders.

(A) Requirements for all ground ladders.

- (1) Ground ladders shall be free of sharp edges, burrs in excess of one-sixty-fourth inch, or other defects that may cut or tear clothing or skin or that may result in inadequate structural strength.
- (2) The beams, at the tip of each section of ground ladders, shall be rounded to allow the ladder to slide on irregular surfaces without catching or snagging during placement or operations. This shall not apply to combination ladders, folding ladders, and pompier ladders.
- (3) Rungs shall be no less than one and one-fourth inches in diameter. This shall not apply to folding and pompier ladders.
- (4) Rungs shall be uniformly spaced on no less than twelve plus or minus one-eighth inch and no more than fourteen plus or minus one-eighth inch centers.
- (5) Rungs shall be constructed of a heavy duty corrugated, serrated, knurled, dimpled, or coated with a skid-resistant material.
- (6) Butt spurs shall be provided on the butt end of each beam of single ladders and on the butt end of each beam of the base section of extension ladders.
- (7) All ground ladders shall bear a unique, individual identification number or alphanumeric code and the month and year of manufacture. This identification shall be branded or metal-stamped on the ground ladder or stamped on a metal plate permanently attached to the ground ladder.
- (8) All ground ladders shall bear an electrical hazard warning label on the outside of each beam, four and one-half feet to six feet from the butt.
- (9) All ground ladders shall bear the ladder positioning label. This label shall be placed between four and one-half feet and six feet from the butt on the outside of both beams.
- (10) The designated length of the ground ladder shall be marked within twelve inches of the butt of each beam of single ladders and on each beam of the base section of extension ladders.
- (11) A label stating that the ground ladder meets the requirements of NFPA 1931, “Standard for Manufacturer’s Design of Fire Department Ground Ladders,” shall be affixed to the ladder.

(B) Additional requirements for metal and fiberglass ground ladders only.

- (1) All structural components of metal and fiberglass ground ladders shall be constructed of materials that maintain at least seventy-five per cent of their designated design strength at three hundred degrees Fahrenheit.
- (2) Metal and fiberglass ground ladders shall bear heat sensor labels preset for three hundred degrees Fahrenheit on the inside of each beam of each section immediately below the second rung from the tip of each section and immediately below the center rung of that section. Each heat sensor label shall bear an expiration year and wording that indicates that the expiration date is at the end of that year..

(C) Additional requirement for single ladders only.

- (1) The minimum inside width between beams for single and roof ladders shall be no less than sixteen inches.
- (2) The designated length shall be the length of one beam excluding any butt spur. The actual length of the beam shall not be less than the designated length.
- (3) The actual length of the beam shall not be less than the designated length.

(D) Additional requirements for roof ladders only.

- (1) Only single ladders shall be provided with folding roof hook assemblies for use in roof operations.
- (2) Folding roof hooks shall be solid steel and directionally spring locked. The point of the roof hook that engages the roof shall be tapered to reduce slippage.
- (3) Folding roof hook assemblies shall be attached to the beams in a manner that does not appreciably weaken the beams.
- (4) Ladders with double-tapered beams shall not be used in roof operations.

(E) Additional requirements for extension ladders only.

- (1) Extension ladders shall be constructed with a permanently affixed stop installed by the manufacturer to prevent their overextension.
- (2) Extension ladders shall not be constructed in a manner or method which necessitates the elimination of a rung on any section.

- (3) Extension ladders shall be constructed in a manner so that rungs of each section shall align with the rungs of other sections when the ladder is extended and pawls are engaged.
- (4) The minimum inside width between beams on any section of extension ladders shall be no less than sixteen inches.
- (5) The minimum inside width between beams on any section of attic extension ladders shall be no less than seven and one-half inches.
- (6) Attic extension ladders shall not exceed sixteen feet in length.
- (7) Hardware shall meet the minimum strength requirements of the ground ladder's component parts and shall be corrosion resistant or protected against corrosion.
- (8) Extension ladders over sixteen feet in designated length shall be equipped with a halyard and pulley system.
- (9) The pulley shall be attached to the ladder in a manner so as not to weaken appreciably either the rungs or the beams.
- (10) The pulley shall be no less than one and one-fourth inches in diameter measured at the base of the sleeve.
- (11) The halyard shall be no less than three-eighths inch in diameter, shall have a minimum breaking strength of eight hundred twenty-five pounds, and shall be of sufficient length for the purpose intended. Splices are prohibited.
- (12) On three- and four-section extension ladders, all fly sections beyond the first fly section may be extended by wire rope. Such wire rope shall have a 5:1 safety factor while supporting two times the dead load weight of the fly section(s) that the cable is intended to raise. When wire rope is used, a means for adjusting the length of wire rope shall be provided. Splices are prohibited.
- (13) Where a continuous halyard is used, a secondary means to secure the halyard from the ground prior to climbing shall be provided. The secondary means of securing the halyard shall be capable of supporting the pull on the halyard in case the pawl disengages while persons are on the ladder.
- (14) Pawls shall be of a positive mechanical action type and shall engage a rung of the supporting section.
- (15) Pawls shall be fastened or secured to beams in a manner so that vibration and use will not cause bolts and nuts to loosen.

- (16) Pawls shall be constructed so that the hook portion of the pawl that engages or rests on the rung shall have sufficient bearing surface or area to prevent the hook from cutting into the rung(s) when engaged.
- (17) The hooks on pawls shall have no sharp edges and points.
- (18) Pawls shall be designed and attached so that they will rest on the rungs as near the beams as possible.
- (19) Staypoles shall be provided on all extension ladders of forty feet or greater designated length.
- (20) All staypoles shall be permanently attached to the ground ladder with universal swivel mounts and shall not be removed for ladder nesting.
- (21) Staypole spikes shall not project beyond the butt of the base section when the extension ladder is in the bedded position.
- (22) A means shall be provided to hold the staypoles in a secure position against the base section when the staypoles are not in use.
- (23) A label shall be provided on each staypole, located between four and one-half feet and six feet from the butt of the pole. The label shall read: "Caution: Only Place Staypoles When Both Poles Can Be Placed Properly."

(F) Additional requirements for combination ladders only.

- (1) The designated length of combination ladders shall be determined in the single or extension configuration and shall not exceed sixteen feet.
- (2) The inside width between beams for combination ladders shall be no less than twelve inches.

(G) Additional requirements for folding ladders only.

- (1) All folding ladders shall be equipped with foot pads to prevent slippage. The pads shall have a nonskid or skid reducing material on the bottom side of the foot pad.
- (2) Folding ladders shall have a positive locking device to hold the ladder in the open position.
- (3) The designated length of folding ladders shall not exceed fourteen feet.
- (4) The inside width between beams for folding ladders in the open position shall be no less than seven and one-half inches.

(H) Additional requirements for pompier ladders only.

- (1) Pompier ladders shall be equipped with a serrated steel hook permanently fastened to the center beam of the ladder.
- (2) Pompier ladders shall be equipped with a minimum of two stand-off brackets. Each stand-off bracket shall maintain a minimum distance of seven inches between the center line of the rung and the portion of the bracket that contacts the wall.
- (3) The designated length of pompier ladders shall not exceed sixteen feet.
- (4) The overall width of the rungs shall be no less than twelve inches.

(I) Inspection and maintenance of ground ladders shall be in accordance with NFPA 1932, "Standard on Use, Maintenance, and Service Testing of In-Service Fire Department Ground Ladders, 2015 Edition.

- (1) All ground ladders shall be inspected and maintained in accordance with the manufacturer's recommendations.
- (2) Ground ladders shall be visually inspected at least once every month and after each use.
- (3) Visual inspection shall include but not be limited to:
 - (a) Heat sensor label on metal and fiberglass ladders, and on wood ladders when provided, for change indicating heat exposure and expiration date;
 - (b) All rungs for snugness and tightness and for punctures, wavy conditions, worn serrations or deformations;
 - (c) All bolts and rivets for tightness;
 - (d) Welds for any cracks or apparent defects;
 - (e) Beams and rungs for cracks, splintering, breaks, gouges, checks, wavy conditions, or deformation;
 - (f) Butt spurs for excessive wear or other defects.
 - (g) Surface corrosion.
 - (h) Loss of gloss on fiberglass and wood ladder beams.

- (i) Labels present and legible.
 - (j) Ladders clean with no buildup of grease, dirt, or grime on the beams.
- (4) Any ground ladder that shows any sign of failure during visual inspection or any signs of damage beyond gouges and dents shall be removed from service and - repaired to bring it into compliance with the requirements of this rule. If repaired, it shall be service tested as specified in paragraph (J) of this rule before being returned to service.
- (5) If gouges or dents are discovered during the visual inspection, the ladder shall be subjected to the service tests specified in section (J). Gouges and dents shall not be cause to fail a ladder if it passes the service test.
- (6) Any ladder repaired shall be done in accordance with the manufacturer's instructions.
- (7) Ground ladders shall not be painted except for the top and bottom eighteen inches of each section for the purpose of identification or visibility.
- (8) When in storage, ground ladders shall not be stored in an area where they are exposed to the elements.
- (9) Additional requirements for wood ground ladders only.
- (a) Visual inspection shall include the bolts for snugness and tightness without crushing the wood.
 - (b) When a wood ground ladder develops dark streaks in the beams, the ladder shall be removed from service and service tested as specified in this rule prior to further use.
 - (c) Wood ground ladders shall be stored away from steam pipes, radiators, and out of direct sunlight.
 - (d) Wood surface finish shall be maintained in accordance with the ladder manufacturer's recommendations.
- (10) Additional requirement for fiberglass ground ladders only.
- When in storage, fiberglass ground ladders shall not be stored in direct sunlight.
- (11) Additional requirement for roof ladders only.
- Visual inspection shall include an operational check of the roof hook assemblies for proper operation.

(12) Additional requirements for extension ladders only.

- (a) Visual inspection shall include an operational check of the pawl assemblies for proper operation.
- (b) Pawl assemblies shall be kept cleaned, lubricated, and maintained in accordance with the manufacturer's instructions.
- (c) Ladder slide areas shall be kept lubricated in accordance with the manufacturer's instructions.
- (d) Halyards and wire cables on extension ladders shall be replaced when they become frayed or kinked.
- (e) Wire rope on three- and four-section ladders shall be snug, when the ladder is in the bedded position, to ensure proper synchronization of upper sections during operation.

(J) Service testing of ground ladders.

(1) Requirements for all ground ladders shall be in accordance with NFPA 1932, "Standard on Use, Maintenance, and Service Testing of In-Service Fire Department Ground Ladders."

- (a) Only employees who have been adequately trained in service testing procedures and equipment shall do service testing. The employer may contract with an approved testing organization to perform the service tests specified in this rule.
- (b) Any ladder that shows any sign of failure during service testing shall be removed from service and destroyed or repaired for fire service.
- (c) All ground ladders shall be service tested on the following schedule:
 - (i) Prior to being put into service for the first time;
 - (ii) At least annually;
 - (iii) At any time a ladder is suspected of being unsafe;
 - (iv) After the ladder has been subjected to overloading (see table 1 of this rule);

All extension ladders maximum load seven hundred fifty lbs (three hundred forty kg).

Combination ladders maximum load seven hundred fifty lbs (three hundred forty kg).

-Table 1 Ground Ladder Duty Rating-

Type	lb	Maximum Load kg
Folding ladders	300	136
Pompier ladders	300	136
Single and roof ladders	750	340
All extension ladders	750	340
Combination ladders	750	340

- (v) After the ladder has been subjected to impact loading or unusual conditions of use;
 - (vi) After heat exposure (see paragraphs (J)(1)(h) to (J)(1)(j) of this rule);
 - (vii) After any deficiencies have been repaired, unless the only repair was replacing the halyard.
- (d) All ground ladders, except pompier ladders, shall be service tested as specified in paragraph (J)(2) of this rule.
- (e) Pompier ladders shall be service tested as specified in paragraph (J)(3) of this rule.
- (f) Folding ladders shall be service tested as specified in paragraph (J)(5) of this rule.
- (g) All service test results shall be permanently recorded. The minimum information recorded shall be as required in table 2 of this rule.

-Table 2 Fire Department Ground Ladder Record-

Manufacturer's Ladder Identification Number or Code:
Fire Department Identification (if different):
Ground Ladder Manufacturer:
Fire Department Company Where Ground Ladder is Assigned:
Date Purchased:
Date Placed in Service:
Type of Ground Ladder: single; roof; extension; combination; folding; pompier.
Ladder Construction: wood; metal; fiberglass; solid beam; truss beam.
Heat Sensor Label Test:
Previous Repairs. Reason for Repair and Date of Repair:
Type of Test. Test Date, and Person(s) Performing Test:

Reason for Test:
Test Results:
Horizontal Bending Test
Amount of Permanent Deformation:
Passed:_____Failed:_____
Hardware Test
Passed:_____Failed:_____
Roof Hook Test
Passed:_____Failed:_____
Pompier Ladder Test
Passed:_____Failed:_____
Repairs Completed:
Person(s) Performing Repairs:
Date Completed:
Person Signing Record:

(h) Additional requirement for metal ground ladders only.

Whenever any metal ground ladder has been exposed or shows evidence of having been exposed to direct flame contact, or whenever the heat sensor label has changed to indicate heat exposure, the ladder shall be service tested as specified in paragraphs (J)(2) and (J)(4) of this rule.

(i) Additional requirement for wood ground ladders only.

Whenever any wood ground ladder has been exposed to or shows evidence of having been exposed to direct flame contact, the ladder shall be service tested as specified in paragraph (J)(2) of this rule.

(j) Additional requirement for fiberglass ground ladders only.

Whenever any fiberglass ground ladder has been exposed to or shows evidence of having been exposed to direct flame contact, or whenever the heat sensor label has changed to indicate heat exposure, the ladder shall be service tested as specified in paragraph (J)(2) of this rule.

(2) Strength service testing requirements for all ladders except pompier and folding ladders.

(a) Horizontal bending test.

The ladder shall be positioned for testing and tested as shown in figure 1 of this rule. The ladder shall be placed in a flat horizontal position supported under the six inches from each end of the ladder. Extension and combination ladders shall be extended to their maximum extended length, with pawls engaged, for this test. The test load shall be applied equally to a

center span covering sixteen inches each side of the center inclusive. The test load shall be applied to a flat test surface resting on the beams in the center area. The test load shall consist of free weights in increments consistent with safety and ease of handling. All test loads shall include the weight of the test surface. If a test fixture is used with a dynamometer, the test fixture shall be designed to apply the load over the required area in a manner that allows a load shift to a weak beam and does not restrain the load directionally.

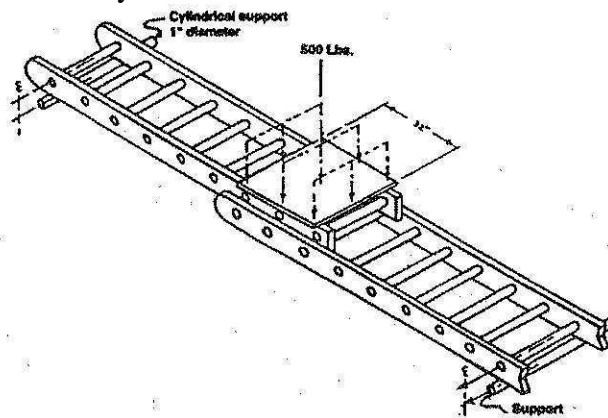


Figure 1 Extension ladder positioned for horizontal bending test.

- (b) Test procedures for metal and fiberglass ground ladders only.
- (i) The ladder shall be loaded with a pre-load of three hundred fifty pounds applied equally to the center span covering sixteen inches each side of the center inclusive. Caution shall be exercised whenever applying or removing the weights to minimize any impact loading. The load shall be allowed to remain for at least one minute to "set" the ladder prior to completing the rest of the test.
 - (ii) After the pre-load is removed, the distance between the bottom edge of each side rail and the surface upon which the ladder supports are placed shall be measured. All measurements shall be taken at a consistent location as near as practical to the center of the ladder.
 - (iii) The ladder shall be loaded with a test load of five hundred pounds applied equally to the center span covering sixteen inches each side of the center inclusive. The test load shall remain in place for five minutes.
 - (iv) The test load shall then be removed, and after five minutes have elapsed, the distance between the bottom of each side rail and the surface upon which the ladder supports are placed shall be measured.

- (v) The difference between measurements taken in paragraphs (J)(2)(b)(ii) and (J)(2)(b)(iv) shall not exceed one-half inch for ladders twenty-five feet or less in length, one inch for ladders twenty-six feet to thirty-four feet in length, and one and one-half inches for ladders thirty-five feet or more in length. Any ladder that does not meet this criterion shall be removed from fire service use and destroyed.
 - (vi) There shall be no visible, permanent change or failure of any hardware.
- (c) Test procedures for wood ground ladders only.
- (i) The ladder shall be loaded with a test load of five hundred pounds applied equally to a center span covering sixteen inches each side of the center inclusive. The test load shall remain in place for five minutes and then removed.
 - (ii) To pass the test, the ladder and all components shall not show ultimate failure. Any ladder that does not meet this criterion shall be removed from fire service use and destroyed.

(d) Additional requirements for roof ladders only -- roof hook test.

- (i) The ladder shall be positioned for testing and tested as shown in figure 2 of this rule. The ladder shall be hung solely by the roof hooks, with the hooks supported only by the points of the hooks, in a vertical position from a fixture capable of supporting the entire test load and weight of the ladder. The ladder shall be secured in such a manner to retain the ladder in the test position to prevent injury to test personnel, if the hooks fail during the test.

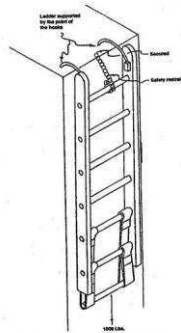


Figure 2 Roof ladder positioned for roof hook test.

- (ii) A test load of one thousand pounds shall be placed over as many rungs as needed. The test load shall consist of weight increments consistent with safety and ease of handling.
- (iii) The test load shall be applied for a minimum of one minute.

- (iv) Ladder and roof hook assemblies shall sustain this test load with no permanent deformation.
 - (v) Variations from the specific methods depicted in figure 2 of this rule shall be acceptable provided such alternative means provide equivalent results and comply with the intent of the specified test method.
- (e) Additional requirements for extension ladders only -- hardware test.
- (i) The ladder shall be positioned for testing and tested as shown in figure 3 of this rule. The ladder shall be extended a minimum of one rung beyond the bedded position.

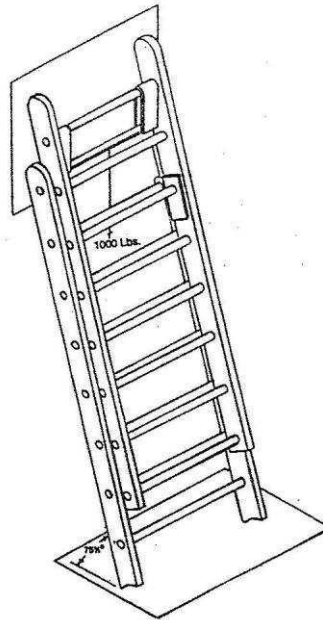


Figure 3 Extension ladder positioned for hardware test.

- (ii) A test load of one thousand pounds shall be placed on the rungs of the fly section. The test load shall consist of weight increments consistent with safety and ease of handling.
 - (iii) The test load shall be applied for a minimum of one minute.
 - (iv) Ladders shall sustain this test load with no permanent deformation or other visible weakening of the structure.
 - (v) Variations from the specific methods depicted in figure 3 of this rule shall be acceptable provided such alternative means provide equivalent results and comply with the intent of the specified test method.
- (3) Strength service testing requirements for pompier ladders only.

- (a) The ladder shall be positioned for testing and tested as shown in figure 4 of this rule. The ladder shall be tested in the vertical hanging position supported only by its hook from a fixture capable of supporting the entire test load and weight of the ladder. The ladder shall be secured in such a manner to retain the ladder in the test position to prevent injury to test personnel, if the hook fails during the test.

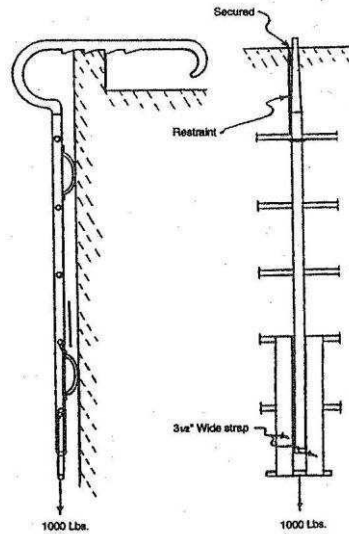


Figure 4 Pompiers ladder positioned for test.

- (b) A test load of one thousand pounds shall be applied over multiple rungs.
- (c) The ladder shall withstand this test without ultimate failure. Any pompiers ladder that does not meet this criterion shall be removed from fire service use and destroyed.
- (d) Variations from the specific methods depicted in figure 4 of this rule shall be acceptable provided such alternative means provide equivalent results and comply with the intent of the specified test method.
- (4) Strength service testing requirements for folding ladders only.

- (a) Horizontal bending test.

The ladder shall be positioned for testing and tested as shown in figure 5 of this rule. The ladder shall be placed in a flat horizontal position and supported six inches from each end of the ladder. Folding ladders shall be in their unfolded configuration for this test. The test load shall be applied equally to a center span covering eight inches on each side of the center inclusive. The test load shall be applied to a flat test surface resting on the beams in the center area. The test load shall consist of weight increments consistent with safety and ease of handling. All test loads shall include the weight of the test surface. If test fixture is used with a dynamometer, the test fixture shall be designed to apply the load over the required area in a

manner that allows a load shift to a weak beam and does not restrain the load directionally.

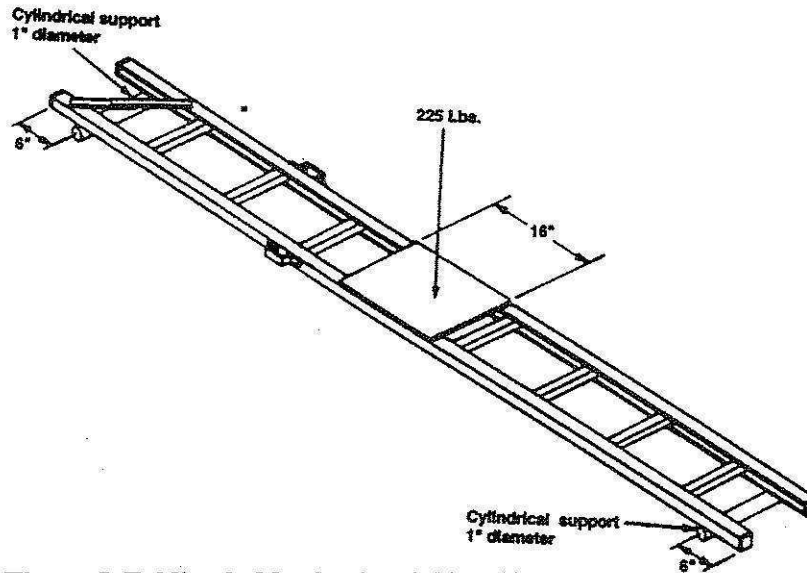


Figure 5 Folding ladder horizontal bending test

- (b) Test procedures for metal and fiberglass folding ladders only.
- (i) The ladder shall be loaded with a pre-load of one hundred sixty pounds applied equally to the center span covering eight inches on each side of the center inclusive. Caution shall be exercised whenever applying or removing the weights to minimize any impact loading. The load shall be allowed to remain for at least one minute to "set" the ladder prior to completing the rest of the test.
 - (ii) After the pre-load is removed, the distance between the bottom edge of each side rail and the surface upon which the ladder supports are placed shall be measured. All measurements shall be taken at a consistent location as near as practical to the center of the ladder.
 - (iii) The ladder shall be loaded with a test load of two hundred twenty-five pounds applied equally to the center span covering eight inches on each side of the center inclusive. The test load shall remain in place for five minutes.
 - (iv) The test load shall then be removed, and after five minutes have elapsed, the distance between the bottom of each side rail and the surface upon which the ladder supports are placed shall be measured.
 - (v) The difference between measurements taken in paragraphs (J)(5)(b)(ii) and (J)(5)(b)(iv) shall be no more than one-half inch. Any ladder that

does not meet this criterion shall be removed from fire service use and destroyed.

(vi) There shall be no visible, permanent change or failure of any hardware.

(c) Test procedures for wood folding ladders only.

(i) The ladder shall be loaded with a test load of two hundred twenty-five pounds applied equally to a center span covering eight inches on each side of the center inclusive. The test load shall remain in place for five minutes and then be removed.

(ii) To pass the test, the ladder and all components shall not show any permanent damage. Any ladder that does not meet this criterion shall be removed from fire service use and destroyed.

(K) Application.

The requirements of this rule shall apply only to ground ladders contracted for or bought on or after the effective date of this rule, except that the requirements of paragraph (J) of this rule shall also apply to all ground ladders owned before the effective date.

Effective: 10/1/2015
Five Year Review (FYR) Dates: 7/6/2015 and 10/01/2020

CERTIFIED ELECTRONICALLY

Certification

09/14/2015

Date

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