NFPA

1931

FIRE DEPARTMENT GROUND LADDERS 1979

NFPA®

NATIONAL FIRE PROTECTION ASSOCIATION, INC.

470 Atlantic Avenue, Boston, MA 02210

3M-7-79-PDPS-FP

Printed in U.S.A.

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See Official NFPA Definitions at the back of this pamphlet.

Standard on

Fire Department Ground Ladders

NFPA 1931—1979

1979 Edition of NFPA 1931

This 1979 edition of NFPA 1931, *Standard on Fire Department Ground Ladders,* was prepared by the Committee on Fire Department Equipment and was adopted by the National Fire Protection Association, Inc., on May 17, 1979, at its Annual Meeting in St. Louis, Missouri. It was released by the Standards Council for publication on June 11, 1979.

Origin and Development of NFPA 1931

NFPA 193, *Standard on Fire Department Ladders, Ground and Aerial,* was first presented to the Association in 1954 and was tentatively adopted as a standard on aerial ladder testing. In 1955 it received final adoption.

In 1957 a subcommittee of the NFPA Committee on Fire Department Equipment prepared new material covering recommendations for portable ladders, ground ladders and aerial ladders; their use, maintenance and testing. In addition, revision was made in the section pertaining to testing aerial ladders. These changes were approved by the 1958 Annual Meeting and were adopted by the NFPA Board of Directors June 30, 1958.

In 1959, Article 100, covering specifications for aluminum ground ladders for fire department use, was adopted by the Association on recommendations by the Committee on Fire Department Equipment. No other change was made.

In May 1972, a complete revision of the 1959 edition of NFPA No. 193 was approved. During 1974 and 1975, NFPA 193 was studied in detail by a subcommittee of the NFPA Technical Committee on Fire Department Equipment and it was felt that NFPA 193 should be separated into two documents since the conditions of use of ground ladders and aerial ladders were so widely divergent. The subcommittee also recommended that the material on aerial ladders be made a recommended practice rather than a standard.

Due to a renumbering of fire service standards, the *Standard on Fire Department Ground Ladders* was designated as NFPA 1931 in 1975.

The 1979 edition incorporates extensive revision including editorial and style changes to bring the document into line with the Manual of Style, and to allow easier use by persons in the field.

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Standard on
Fire Department Ground Ladders
NFPA 1931–1979

NOTICE: An asterisk (*) following the number or letter designating a paragraph indicates explanatory material on that paragraph in Appendix A.

Chapter 1 Administration

1-1 Scope.

1-1.1* This Standard shall prescribe minimum requirements for the construction, care, and use of fire department ground ladders.

1-1.2* This Standard shall apply to all ladders used by fire department personnel and transported on fire department apparatus.

1-1.3 It is recognized that ladders ordered prior to November 18, 1975 may not meet the dimensional requirements of this Standard. However, all ladders in use by fire departments which are transported on fire department apparatus shall meet the test requirements as outlined in Chapter 4 of this Standard.

1-1.4 It is recognized that special purpose ladders for specific fire service needs are sometimes required and exceptions to this Standard for special purpose ladders shall be requested only if reasonable safety is assured.

1-2* Purpose.

1-2.1 The purpose of this Standard shall be to provide reasonable safety to fire fighters and victims to be rescued during the use of fire department ground ladders. This Standard may also serve as a basis for purchase requirements and instructional material in the care, maintenance, and use of fire department ground ladders.

1-2.2 This Standard shall also provide the manufacturer of fire department ground ladders with a set of performance and dimensional requirements against which the product may be checked. It is not the purpose of this Standard to specify the details of construction. Limitations imposed are for the purpose of providing minimum general requirements and establishing acceptable test methods.

1-3 Definitions.

1-3.1 Angle of Inclination. The preferred pitch for portable, non-self-supporting ladders.

1-3.2* Approved. Acceptable to the authority having jurisdiction.

1-3.3* Authority Having Jurisdiction. The organization, office, or individual responsible for "approving" equipment, an installation, or a procedure.

1-3.4 Base, (bed) Section. The lowest section of non-self-supporting ground ladders.

1-3.5 Beam, (side rail). The main structural side of the ladder.

1-3.6 Bedded Position. Position in which fly section(s) of extension ladders are stored in the nonextended position with the pawls resting on a rung of the supporting section.

1-3.7 Butt. The end of the side rail placed on the ground, or other place of support, when ladders are in their raised position.

1-3.8 Butt Spurs (feet). That component of ladder support which is in contact with the lower supporting surface. It may be the lower end or rails or added devices.

1-3.9 Collapsible Ladder. A single ladder designed so that the rungs can be folded or moved in a manner to allow the side rails to be brought into a position of touching each other, or nearly touching each other, for storage or carrying purposes.

1-3.10 Combination Ladder. A ground ladder capable of being used either as a step, and single or extension ladder.

1-3.11 Designated Length. The length marked on the ladder or marketed length.

1-3.12 Dogs. See Pawls.

1-3.13 Extension Ladder. A non-self-supporting ground ladder adjustable in length. It consists of two or more sections traveling in guides, brackets, or equivalent so arranged as to permit length adjustment.

1-3.14 Fly Section. Upper section(s) of non-self-supporting ground ladder.

1-3.15 Ground Ladder. Ladders not mechanically or physically attached permanently to fire apparatus, and not requiring mechanical power from the apparatus for the ladder's use and operation.

1-3.16 Halyard. Rope used on extension ladders for the purpose of raising fly section(s). On the uppermost section of three or four section extension ladders, a cable may be referred to as a halyard.

1-3.17 Labeled. Equipment or materials to which has been attached a label, symbol, or other identifying mark of an organization acceptable to the "authority having jurisdiction" and concerned with product evaluation, that maintains periodic inspection of production of labeled equipment or materials and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.

1-3.18 Ladder. A device on which a person climbs for ascending or descending. This device shall consist of two beams (side rails) joined at regular intervals by cross pieces called rungs on which a person is supported during this climb.

1-3.19 Ladder Nesting. The procedure whereby ladders of different sizes are positioned partially within one another to reduce the amount of space required for their storage on the apparatus.

1-3.20 Ladder Width. The distance measured from the outside edge of one beam to the outside edge of the other beam, or the widest point of the ladder, whichever is greater.

1-3.21* Listed. Equipment or materials included in a list published by an organization acceptable to the "authority having jurisdiction" and concerned with product evaluation, that maintains periodic inspection of production of listed equipment or materials and whose listing states either that the equipment or material meets appropriate standards or has been tested and found suitable for use in a specified manner.

1-3.22 May. This term is used to state a permissive use or an alternative method to a specified requirement.

1-3.23 Maximum Extended Length. The total length of the extension ladder when all fly sections are fully extended and the pawls engaged.

1-3.24 Pawls. Devices attached to fly section(s) for the purpose of anchoring fly section(s) when extension ladders are used in the extended position. Pawls engage ladder rungs near the side rails for anchoring purposes.

1-3.25 Roof Ladder. A single ladder equipped with hooks at the top end of the ladder.

1-3.26 Rungs or Steps. The ladder cross pieces on which a person shall step in ascending or descending.

1-3.27 Shall. This term indicates a mandatory requirement.

1-3.28 Single Ladder. A non-self-supporting ground ladder, non-adjustable in length, consisting of only one section. Its size is designated by the overall length of one beam (side rail).

1-3.29 Special Purpose Ladder. A ground ladder which represents either experimentally designed ladders, or modifications of NFPA standards design or construction features used in order to adapt the ladder for special or specific uses.

1-3.30 Staypoles (tormentors). Poles attached to each beam of the base section of extension ladders and used to assist in the raising of the ladder and to help provide stability of the raised ladder.

1-3.31 Test Failure. Failure of the ladder structure or components thereof to pass the prescribed tests.

1-3.32 Tormentors or Tormentor Poles. See Staypoles.

1-3.33 Visible Damage. Damage that is clearly evident by visual inspection without recourse to optical measuring devices.

1-3.34 Visual Inspection. Inspection by the eye without recourse to any optical devices, except prescription eyeglasses.

Chapter 2 Construction

2-1 Workmanship.

2-1.1 Ladders shall be constructed in a manner so as to ensure that structural and workmanship defects do not exist. Sharp edges, burrs in excess of 1/64 in., or other defects that may cut or tear clothing or skin, or resulting in inadequate structural strength, shall be considered workmanship defects.

2-2 Materials.

2-2.1 Materials used in ladder construction shall be of sufficient strength to meet the performance requirements of this Standard. When varying types of metals are used in a construction of metal ladders, they shall be chosen or finished so as to avoid or minimize electrolytic action.

2-3 Rungs.

2-3.1 Rungs shall not be less than 1 1/4 in. in diameter.

2-3.2* Rungs shall be spaced on 14-in. centers plus or minus 1/8 in.

2-3.3 Rungs on metal and fiberglass beam ladders shall be constructed of a heavy duty corrugated, serrated, knurled, or dimpled material, or coated with a skid resistant material.

2-4 Ladder Loading.

2-4.1 The loads specified in Table 2-4 are the maximum loadings that shall be on the ladder at one time. These loads shall not be imposed upon the ladder unless the ladder has been properly positioned as specified in 6-1.4, with the top of the ladder supported. The load shall be the total weight on the ladder including persons, their equipment, and any other weight such as a charged fire hose.

Table 2-4 Maximum Ladder Loading

Type of Ladder	Load lbs
Collapsible Ladder	300
Roof Ladder Hanging from Hooks	500
Roof Ladder when Resting on Roof	500
Wall Ladder	500
Extension Ladder 26 ft or less	500
Extension Ladder 27 to 45 ft	600
Extension Ladder over 45 ft	700

2-5 Hardware.

2-5.1 Hardware shall meet the minimum strength requirements of the ladder's component parts, and shall be corrosion resistant or protected against corrosion.

2-6 Ladder Width.

2-6.1 All ladders shall meet the requirements specified in Tables 2-6.1A and 2-6.1B.

Exception: Extension ladders of designated length of 16 ft or under, designed and labeled for inside use, shall be exempt from the minimum width requirements.

Table 2-6.1A Minimum Inside Clear Width

Type of Ladder	Inside Width Between Side Rails
Extension Ladder	12 in.
Single Ladder 10 ft and under	12 in.
Single Ladder 11 ft and over	12 in., plus $\frac{1}{8}$ in. per ft of Ladder Length over 10 ft
Collapsible Ladders in Open Position	$7\frac{1}{2}$ in.

Table 2-6.1B
Extension Ladder Outside Width Excluding Staypoles

Range of Length ft	Ladder Width Minimum in.	Ladder Width Maximum in.
28 and under	18	24
30–35	22	24
40–65	23	29

2-7 Slip Resistant Base.

2-7.1 A metal reinforcement with butt spurs, or other means to reduce ladder slippage, shall be provided on the butt end of each beam of single ladders, and the base section of extension ladders.

2-8 Beams.

2-8.1 The beam, at the top 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.

Exception: Combination ladders are excluded from this requirement.

2-9 Ladder Marking.

2-9.1 The designated length of the ladder shall be marked within 12 in. of the butt of each side rail of single ladders, and the base section of extension ladders. Such markings shall be visible when ladders are in the bedded position and stored on fire apparatus.

2-9.2 The ladder manufacturer shall certify that ladder(s), purchased under specifications utilizing this Standard, meet the requirements of this Standard. This certification shall be accomplished by affixing to the ladder a label stating same.

2-9.3 All ground ladders manufactured after the adoption of this Standard shall bear a unique individual identification (I.D. number). This identification shall be embossed, stenciled, branded, or stamped on the ladder, or to a metal plate attached to the ladder.

Chapter 3 Types of Ladders

3-1 Single Ladders.

3-1.1 Length.

3-1.1.1* The designated length of a single ladder shall be the length of one side rail excluding any butt plate. The actual length of the side rail shall not be less than the designated length.

3-1.2 Roof Ladders.

3-1.2.1 Single ladders may be provided with hooks for use in roof operations. Hooks shall be tested in accordance with Section 4-5 of this Standard.

3-1.2.2* Hooks, when provided, shall be of sufficient strength to support a minimum load of 1,000 lbs when such load is imposed on a free hanging ladder supported only by the hooks. The manner of attaching hooks to side rails shall be such that the original strength of the side rail is not appreciably weakened.

3-2 Collapsible Ladders.

3-2.1 All collapsible 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.

3-3 Extension Ladders.

3-3.1 General.

3-3.1.1* The designated length of an extension ladder shall be determined by measuring the maximum extended length along a side rail, excluding any butt plate. Minus tolerance shall not exceed 6 in.

3-3.1.2 Extension ladders shall be equipped with a permanently affixed stop installed by the manufacturer to prevent their overextension. The manufacturer shall determine the location of this permanently affixed stop to assure that the test requirements of Chapter 4 of this Standard are met when the ladder is fully extended.

3-3.1.3 Extension ladders shall not be constructed in a manner or method which necessitates the elimination of a rung on any section.

3-3.1.4 Extension ladders shall be constructed in a manner such that rungs of each section shall align with the rungs of other sections when the ladder is extended and pawls are engaged.

3-3.2 Extension Locking Devices.

3-3.2.1 Pawls shall be of a positive mechanical action type and shall engage a rung of the supporting section.

3-3.2.2 Pawls shall be fastened or secured to side rails in a manner such that vibration and use will not cause bolts and nuts to loosen.

3-3.2.3 Pawls shall be constructed such that the hook portion of the pawls that engages or rests on the rung shall have sufficient bearing surface or area so as to prevent the hook from cutting into the rungs when engaged.

3-3.2.4 The hooks on pawls shall be furnished in a manner to avoid sharp edges and points.

3-3.2.5 Pawls shall be designed and attached so that they will rest on the rungs as near the side rails as possible.

3-3.3 Staypoles.

3-3.3.1 Staypoles shall be furnished on all extension ladders of 40 ft or more designated length.

3-3.3.2 All staypoles shall be permanently attached to the ladder and shall not be removed for ladder nesting.

3-3.3.3 Staypole spikes shall not project beyond the butt of the base section when the ladder is in the bedded position.

3-3.4 Halyard and Pulley.

3-3.4.1 Extension ladders shall be equipped with a halyard and pulley.

Exception: Extension ladders of designated length of 16 ft or under, designed and labeled for inside use, shall be exempt from the above requirements for halyard and pulley.

3-3.4.2 The pulley shall be attached to the ladder in a manner so as not to weaken either the rungs or the side rails.

3-3.4.3 The pulley shall be not less than $1\frac{1}{4}$ inch in diameter measured at the base of the sheave.

3-3.4.4 The halyard shall not be less than $\frac{3}{8}$ inch in diameter having a minimum breaking strength of 825 lbs and shall be of sufficient length for the purpose intended.

Exception: On three- and four-section ladders, the third, fourth, or both fly section(s) may be extended by wire rope. Such wire rope shall not be less than $\frac{3}{16}$ inch in diameter. When wire rope is used, a means for adjusting the length of the wire rope shall be provided. Splices shall not be allowed.

3-4 Combination Ladders.

3-4.1 The designated length of combination ladders shall be determined in the single or extension configuration.

3-4.2 Combination ladders shall be tested in the single or extension configuration.

Chapter 4 Inspection and Testing

4-1 General.

4-1.1* All ground ladders shall be subjected to the tests specified in this chapter on the following schedule:

(a) At least annually.
(b) At any time that a ladder is suspected of being unsafe.
(c) After the ladder has been subjected to overloading *(see Table 2-4)*.
(d) After the ladder has been subjected to impact loading or unusual conditions of use.
(e) Whenever the ladder has been, or is suspected of having been, exposed to direct flame contact; or whenever the ladder has been hot enough to cause water contacting it to sizzle or turn to steam.
(f) After any deficiencies noted in the visual inspection have been repaired.

Exception to (f): It is not necessary to perform these tests if, during the visual inspection, the only repair was replacing the halyard.

4-1.2* Caution shall be used when testing ground ladders to prevent damage to the ladder or injury to personnel during testing. The test load shall be placed on the ladder in a manner so as to avoid any shocks or impact loading. Testing of this type may require the purchase of measuring instruments.

4-1.3* All test results shall be permanently recorded.

4-2 Inspection.

4-2.1 All ground ladders shall be visually inspected at least once in every six-month period, and after each usage. The inspection shall include, but not be limited to:

(a) All rungs for snugness and tightness.
(b) All bolts and rivets for tightness.
(c) Bolts on wood ladders for snugness and tightness without crushing the wood.
(d) Rivets on metal and fiberglass ladders for no signs of looseness.
(e) Welds, for any apparent defects.

(f) Beams, for cracks, splintering, breaks, gouges, checks, wavy conditions, or deformation.

4-3 Horizontal Bending Test.

4-3.1 The test load shall be applied across the center of the ladder on a 4-in. wide surface and the ladder shall be tested as follows:

(a) The center of the ladder shall be loaded with 50-lb weights until a maximum of 200 lbs is reached. The load shall be placed on a flat base which is large enough to rest on both side rails and is capable of transferring the load to both side rails. The weight shall be allowed to remain for at least one minute, to "set" the ladder, prior to completing the rest of the test.

(b) After removing this preload, the distance between the bottom edge of each side rail and the surface upon which the ladder supports are placed shall be measured.

(c) All measurements shall be taken at a consistent location as near as practical to the side rail position where the load is applied.

(d) The center of the ladder shall be loaded with 50-lb weights until a maximum of 250 lbs is reached. Load shall be applied as in 4-3.1(a).

(e) The 250-lb load shall remain in place for 5 min.

(f) After 5 min, the test weight shall be removed and the distance between the bottom of each side rail and surface upon which the ladder supports are placed shall be measured. After load removal, 5 min shall elapse before conducting this measurement.

(g) Differences between measurements taken in 4-3.1(b) and 4-3.1(f) shall not exceed 1/1000 of the distance between the ladder supports. Differences exceeding 1/1000 of this ladder span distance shall be considered evidence of failure of ladder and the ladder shall be discarded from fire service use.

(h) During the conduct of the test, there shall be no visible weakening or failure of any component of the ladder.

4-4 Hardware Test.

4-4.1 The ladder shall be placed in a vertical position with the butt resting on a horizontal surface. Extension ladders shall be extended a minimum of one rung beyond the nested position. The following test procedure shall be followed:

(a) A downward load of 1,000 lbs shall be placed equally over the ends of both side rails of the top end of the ladder.
(b) Test load shall be applied for a minimum of 1 min.
(c) Ladders shall withstand this test with no deformation or other visible weakening of the structure.

4-5 Roof Hook Test.

4-5.1 The ladder shall be placed in a vertical position supported solely by the roof hooks, and the following procedure followed:

(a) A downward load of 1,000 lbs shall be placed equally over the ends of both side rails of the top end of the ladder.
(b) Test load shall be applied for a minimum of 1 minute.
(c) Ladders shall withstand this test with no deformation or other visible weakening of the structure.

4-6 Rung Bending Strength Test.

4-6.1 The ladder shall be placed at an angle of 75½ degrees to the horizontal with the top supported, and tested as follows:

(a) The distance between the test rung and the next rung above shall be measured.
(b) A load of 1,000 lbs shall be applied to any base section rung above the third rung from the butt of the ladder. Loads shall be distributed across 4 in. of the rung as near the center of the rung as possible.
(c) Test load shall be applied for a minimum of 1 minute.
(d) After removing the test load, wait 5 minutes then repeat step (a). Permanent set shall not exceed 1/100 of the rung length. The rung length shall be the distance along the rung as measured between the inside of the side rails.
(e) Any set exceeding 1/100 of the rung length shall be deemed as a test failure and the ladder shall be removed from fire department service.
(f) Rungs of fly sections of an extension ladder shall be tested individually in a similar manner only when the fly sections can be disassembled from the other sections.

4-7 Rung to Side Rail Shear Strength Test.

4-7.1 The ladder shall be placed at an angle of 75½ degrees to the horizontal with the top end supported, and tested as follows:

(a) A load of 1,000 lbs shall be applied to any base section rung above the third rung from the butt of the ladder and as near the side rail as possible. Test load shall be evenly distributed over a 4-in. wide area of the rung.

(b) Test load shall be applied for a minimum of 1 minute. Upon removing the load, the ladder shall show no indication of failure either in the fastening means of attaching the rung to the side rail or to the side rail itself.

(c) Any indication of failure shall require the ladder to be removed from service until repaired.

4-8 Rung Torque Test.

4-8.1 The ladder may be placed in any convenient position, and any rung shall be tested as follows:

(a) A test load of 30 lbs shall be applied to a test bar with a 30-in. long lever arm, first in a counterclockwise direction. Test load shall be applied to a 3½-in. wide area of the center of the rung.

(b) This procedure shall be performed ten times alternating between the clockwise and counterclockwise directions.

(c) This alternating torque load test shall not cause any visible relative motion between the rung and the side rails.

(d) Any motion shall be deemed as a test failure and the ladder removed from service until repaired.

4-9 Deflection Test.

4-9.1 The ladder shall be placed in a flat horizontal position supported 6 in. from the end of each side rail. When testing extension ladders, the extension ladder shall be extended to the maximum extended position. The following test procedure shall be followed:

(a) All measurements shall be taken at a consistent location as near as practical to the side rail position where the load is applied.

(b) A test load of 60 lbs shall be suspended from one of the side rails. The test load shall be distributed over a 3½-in. length of the side rail midway between the ladder supports.

(c) Test loads shall be applied for a minimum period of 1 minute.

(d) Before removing the test load, measurements shall be taken from the top of the rail loaded during the test to the surface on which the ladder supports are resting.

(e) The angle α between the loaded and unloaded rails shall be calculated from the trigonometric method equation:

$$\text{Sin } \alpha = \frac{\text{difference between the two side rail deflections}}{\text{maximum ladder width}}$$

(f) Measurements taken in the deflection test shall agree with values specified in Table 4-9.

(g) Any deflection exceeding the Table 4-9 value for the size of ladder involved shall be removed from fire department service.

(h) The test shall be repeated by loading the other rail.

Table 4-9 Deflection Test Values

Single and Extension Ladders—Size of Ladder in Ft	Maximum Deflection of Loaded Rail	Maximum Difference in Deflection Between Loaded and Unloaded Rail as Measured from the Horizontal
		α
(ft)	(in.)	(deg)
10	1	2.1
12	1 3/8	2.5
14	1 7/8	2.8
16	2 3/8	3.3
18	2 3/4	3.5
20	3 1/8	3.6
22	3 1/2	4.0
24	3 7/8	4.7
28	4 5/8	5.4
30	5 1/8	5.6
32	5 5/8	5.7
35	6 1/2	6.0
38	7 3/8	6.3
40	8	6.5
45	9 1/4	7.0
50	10 1/4	7.5
55	11	8.1
60	11 1/2	8.6
65	13	9.0

Chapter 5 Care and Maintenance of Ground Ladders

5-1 All Ladders.

5-1.1 Ladders shall not be forced into brackets or slides on fire apparatus.

5-1.2 The rollers and other moving parts of the frame holding the ground ladders on the apparatus shall be greased at least every six months. When regreasing rollers or moving parts, old grease shall be removed. If rollers and other moving parts are rusted, they shall be brushed with a wire brush and cleaned to remove all loose scale, and then painted before greasing.

5-1.3 When ladders are used for other purposes than ascending or descending in an emergency, they shall be inspected and tested prior to further use.

5-1.4 Ropes and wire cables on extension ladders shall be replaced when they become frayed or kinked.

5-1.5 Ladders shall be maintained as free of moisture as is possible and shall be wiped after being sprayed with water, or used in the rain.

5-1.6 Ladders shall not be stored in an area where they are exposed to the elements.

5-1.7 Ladders stored in a horizontal position shall be supported at a sufficient number of points to avoid sagging and permanent set.

5-1.8 Fire department ground ladders shall not be painted.

Exception: That area of the side rail used for identifying the ladder length or the marking itself.

5-1.9* Solvent cleaners shall be used to remove oily or greasy surface substances.

5-2 Wood Ladders.

5-2.1 Damaged ladders, or ladders having defects, shall be marked and taken out of service until repaired.

5-2.2 Wood ladders shall be stored away from steam pipes, radiators, and out of the direct sunlight.

5-2.3 Wood ladders shall not be stored in areas where humidity is reduced.

5-2.4 Wood ladders shall be protected by at least two coats of a good quality, clear spar varnish.

5-2.5 If the spar varnish coating becomes damaged, the following procedure shall be conducted to repair surface:

(a) Remove peeling areas by scraping and sanding with sandpaper to remove all the loose or damaged finish.
(b) Spot prime bare sanded spots with shellac or varnish.
(c) Resand and coat with at least two coats of good quality, clear spar varnish.

Chapter 6 The Use of Ladders

6-1* All Ladders.

6-1.1 Ladders shall not be used for purposes other than that for which they are designed.

6-1.2 Ladder butts shall be placed on a secure footing with a firm level base before using.

6-1.3 The ladder shall not be placed on ice, snow, or slippery surfaces unless suitable means to prevent slipping are employed.

6-1.4* To provide the optimum combination of load carrying and stability, ladders shall be set by positioning the base a horizontal distance from the vertical wall equal to ¼ the effective working length of the ladder (an angle of 75½ degrees).

6-1.5 Raised ladders shall not be slid along cornices.

6-1.6 Ladders shall not be "rolled" beam-over-beam to reach a new position.

6-1.7 Extension ladders shall be used in the fly-up position.

6-1.8 Fly sections of extension ladders shall not be used as single ladders unless they have been identified by the manufacturer as being suitable for single ladder use.

6-1.9* For safety purposes, ground ladders shall be secured at the top by the first person to climb the ladder.

6-1.10* Ladders shall not be tied together to provide longer units.

6-1.11 Extension ladders shall only be operated from the ground or other suitable stationary points. Adjustments shall not be made from the top of the ladder.

6-1.12 Electrical Hazards. All metal ladders shall be kept away from power lines. Extreme caution shall be used when working around charged electrical circuits since metal ladders, as well as wet wood and wet fiberglass ladders, will conduct electricity.

Appendix A

This Appendix is not a part of this NFPA Standard, but is included for information purposes only

A-1-1.1 Ground ladders used in the fire service must be constructed to rigid standards of the highest quality. These ladders are often the only means of fire fighter entry into a building or portions of a building and may be the only means of egress for victims trapped by a fire within a building. Fire department ladders serve as a means of transporting people, equipment and extinguishing agents from one area to another. Since the lives of the fire fighters and fire victims often rely on the performance without failure of these valuable pieces of fire department equipment, these standards of performance must be such that ladders can be used with the maximum of ease and assurance at all times.

A-1-1.2 Ladders used by fire department personnel solely in station maintenance, etc., and not transported should be covered by the applicable ANSI and OSHA Standards for the same.

A-1-2 It is recognized that specific details on ladder construction materials have been established by other organizations such as the American National Standards Institute, U.S. Department of Agriculture Forest Products Laboratory, and the Aluminum Association. This Standard should never be interpreted as establishing lower materials strength criteria than what may be set forth in other recognized standards such as these.

A-1-3.2 The National Fire Protection Association does not approve, inspect, or certify any installations, procedures, equipment, or materials nor does it approve or evaluate testing laboratories.

A-1-3.3 The phrase "authority having jurisdiction" is used in NFPA standards in a broad manner since jurisdictions and "approval" agencies vary as do their responsibilities. Where public safety is primary, the "authority having jurisdiction" may be a federal, state, local, or other regional department or individual such as a fire chief, fire marshal, chief of a fire prevention bureau, labor department, health department, building official, electrical inspector, or others having statutory authority. For insurance purposes, an insurance inspection department, rating bureau, or other insurance company representative may be the "authority having jurisdiction." In many circumstances the property owner or his delegated agent