ASME A90.1-2023

(Revision of ASME A90.1-2015)

Safety Standard for Belt Manlifts

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

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The American Society of Mechanical Engineers
Two Park Avenue • New York, NY • 10016 USA

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CONTENTS

Form

FOREWORD

ASME A90.1-2023 is a revision of A90.1, Safety Code for Belt Manlifts, which was originally drawn up and approved in 1949 and reaffirmed in 1956. The original sectional committee consisted of 19 members representing manufacturers, users, insurance groups, enforcement officials, and independent specialists.

Work began in 1966 on a revision of A90.1. Each provision of the code was carefully evaluated in light of considerable practical field experience. A draft revision was completed in 1967 and approved by letter ballot in 1968. The USA Standards Institute [now called the American National Standards Institute (ANSI)] approved the revised standard on February 7, 1969.

In 1970, several serious manlift accidents prompted the committee, through correspondence, to consider additional changes to the 1969 standard. Subsequently, the committee issued ANSI A90.1a-1972, a supplement to ANSI Standard A90.1-1969, in 1972. That year, new committee officers were appointed, and committee membership was expanded to include new members, many of whom have since made significant contributions to the work of the A90 Standards Committee.

Due to changes in technology and the desire to maximize manlift safety, the committee set about the task of totally revising the A90.1 standard. This was accomplished with a great deal of individual member research and study, coupled with numerous meetings of the entire committee. In 1976, following three years of concentrated work, the committee approved by ballot a completely revised draft of the A90.1 standard. This draft was approved by ANSI for issuance as American National Standard A90.1-1976.

In 1981, the A90 Standards Committee was converted from an American National Standards Committee to an American Society of Mechanical Engineers (ASME) Accredited Organization Committee, operating under procedures developed by ASME and accredited by ANSI. Several new members were added to the committee in this process. After several years of work, a revision to ANSI A90.1-1976 was approved by the A90 Standards Committee and the sponsor organization and was designated an American National Standard by ANSI on September 10, 1985.

ASME A90.1-2003 was approved by ANSI on August 14, 2003.

ASME A90.1-2009 was approved by ANSI on March 23, 2009.

ASME A90.1-2015 was approved by ANSI on January 13, 2015.

ASME A90.1-2023 has been extensively revised. All tables and figures have been redesignated and the relevant cross-references have been updated. The references in section 2 have also been updated, and new definitions have been added to section 3. Section 8 has been revised to offer more detailed guidance for tests and inspections. Section 9 has been added to address maintenance, repair, replacement, and alteration criteria. In addition, the Belt Manlift Inspection Report (Form II-1) in Mandatory Appendix II has been revised in its entirety. Following approval by the ASME A90 Committee, ASME A90.1-2023 was approved by ANSI on August 1, 2023.

ASME A90 COMMITTEE
Safety Standards for Belt Manlifts

(The following is the roster of the committee at the time of approval of this Standard.)

STANDARDS COMMITTEE OFFICERS

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General. ASME codes and standards are developed and maintained by committees with the intent to represent the consensus of concerned interests. Users of ASME codes and standards may correspond with the committees to propose revisions or cases, report errata, or request interpretations. Correspondence for this Standard should be sent to the staff secretary noted on the committee's web page, accessible at https://go.asme.org/A90committee.

Revisions and Errata. The committee processes revisions to this Standard on a continuous basis to incorporate changes that appear necessary or desirable as demonstrated by the experience gained from the application of the Standard. Approved revisions will be published in the next edition of the Standard.

In addition, the committee may post errata on the committee web page. Errata become effective on the date posted. Users can register on the committee web page to receive e-mail notifications of posted errata.

This Standard is always open for comment, and the committee welcomes proposals for revisions. Such proposals should be as specific as possible, citing the paragraph numbers, the proposed wording, and a detailed description of the reasons for the proposal, including any pertinent background information and supporting documentation.

Cases. The committee does not issue cases for this Standard.

Interpretations. Upon request, the committee will issue an interpretation of any requirement of this Standard. An interpretation can be issued only in response to a request submitted through the online Interpretation Submittal Form at https://go.asme.org/InterpretationRequest. Upon submitting the form, the inquirer will receive an automatic e-mail confirming receipt.

ASME does not act as a consultant for specific engineering problems or for the general application or understanding of the Standard requirements. If, based on the information submitted, it is the opinion of the committee that the inquirer should seek assistance, the request will be returned with the recommendation that such assistance be obtained. Inquirers can track the status of their requests at https://go.asme.org/Interpretations.

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Committee Meetings. The A90 Standards Committee regularly holds meetings that are open to the public. Persons wishing to attend any meeting should contact the secretary of the committee. Information on future committee meetings can be found on the committee web page at https://go.asme.org/A90committee.

ASME A90.1-2023
SUMMARY OF CHANGES

Following approval by the ASME A90 Committee and ASME, and after public review, ASME A90.1 was approved by the American National Standards Institute on August 1, 2023.

ASME A90.1-2023 has been revised in its entirety.

SAFETY STANDARD FOR BELT MANLIFTS

1 GENERAL

1.1 Scope

This Standard applies to the manufacture, installation, maintenance, inspection, and operation of belt manlifts. Belt manlifts covered by this Standard consist of steps (platforms) and accompanying handholds mounted on or attached to an endless belt that operates vertically in one direction only and is supported by and driven through pulleys at the top and bottom. These belt manlifts are for the conveyance of people only. This Standard does not cover moving stairways, elevators with enclosed platforms (paternoster elevators), gravity lifts, or conveyors used only for transporting materials.

1.2 Purpose

This Standard establishes safety requirements for belt manlifts. It is intended as a standard reference for use by manufacturers, architects, plant designers, installers, consulting engineers, users of belt manlifts through voluntary application, and governmental authorities.

1.3 Application

(a) This Standard applies to belt manlifts used only to carry authorized personnel trained in their use. Belt manlifts shall not be available to the general public.

(b) Belt manlifts are not recommended for use on construction sites because of the difficulty in enforcing paras. 4.2 and 7(a) on-site.

(c) One year after the date of issuance, all provisions of this Standard shall apply to both new and existing installations, except as noted in individual sections.

1.4 Exceptions

In case of practical difficulty or unnecessary hardship, the authority having jurisdiction may grant exceptions from the literal requirements of this Standard or permit the use of alternate methods, but only when it is evident that equal safety is thereby secured.

NOTE: Where exceptions are asked for, the authority having jurisdiction should consult with The American Society of Mechanical Engineers, Attn: Secretary, A90 Standards Committee, Two Park Avenue, New York, NY 10016-5990.

1.5 Units of Measurement

This Standard contains U.S. Customary units as well as SI (metric) units. The SI units have been directly (softly) converted from the U.S. Customary units.

2 REFERENCES

The following is a list of publications referenced in this Standard. Unless otherwise specified, the latest edition shall apply.

ANSI A12.1. Safety Requirements for Floor and Wall Openings, Railings, and Toe Boards. American National Standards Institute.

ANSI/ASC A14.3-2018. Ladders - Fixed - Safety Requirements. American National Standards Institute.

ASME B18.5-2012 (R2017). Round Head Bolts (Inch Series). The American Society of Mechanical Engineers.

NFPA 70 (2020). National Electric Code. National Fire Protection Association.

3 DEFINITIONS

alteration: any change to the original equipment, including its parts, components, or subsystems, other than maintenance, repair, or replacement.

authority having jurisdiction: the organization, office, or individual responsible for enforcement of this Code. Where legislation or regulation mandates compliance with this Code, the “authority having jurisdiction” is the regulatory authority.

authorized personnel: a person who has been trained in accordance with Mandatory Appendix I and is authorized by the belt manlift owner to operate the belt manlift. This person shall be trained in the purpose and operation of the control rope, all safety stop devices, and floating-type hoods if applicable.

belt-breaking strength: the amount of tensile load [pounds (Newtons)] applied to a belt to cause its fracture.

belt manlift: a power-driven endless belt that moves in one direction only and has steps (platforms) and handholds for the transportation of personnel from floor to floor.

belt manlift personnel: a person who is trained and has knowledge of all applicable codes and is allowed by the owner or authority having jurisdiction or both to do maintenance and repairs and replace parts on the

belt manlift. This person may need to be licensed when required by the state or city agency to complete the tasks and requirements in Mandatory Appendix II.

belt travel: the distance between the centers of the top and bottom pulleys when the bottom pulley is at its highest position.

coupler: the means by which two shafts are positively connected and held in place.

debris deflector: a protective shield positioned to deflect falling objects away from the bottom pulley.

elevator bolt: a flathead, countersunk elevator bolt as defined by ASME B18.5.

equivalent: the same in strength, function, and fit as the manufacturer's original design.

factor of safety: the ratio of the tensile strength of the material to the allowable stress when a part is subjected to full-load operation.

floor opening: the cylindrical space that the belt passes through at each landing.

foot assembly: the complete bottom unit that consists of foot pulley, foot shaft, bearings, support legs, anchor plates, foot circle or bands, and a means of belt take-up.

foot circle: a component that guides the transition of the steps around the foot pulley from the descending to the ascending side of the belt manlift.

foot shaft: a part of the foot assembly that consists of the horizontal shaft that runs through the pulley at the bottom and maintains alignment and tension of the belt.

handhold: a cup-shaped device securely attached to the belt that can be grasped by the passenger to maintain balance. Also called a *handgrip*.

head assembly: the complete drive unit that consists of a bedplate, gearbox, motor, motor brake, head shaft, lagged head pulley, head circle or bands, bearings, and supports. It also may include coupler and emergency brake with guards.

head circle: a component that guides the transition of the steps around the head pulley from the ascending to the descending side of the belt manlift.

head shaft: a part of the head assembly that consists of the horizontal shaft connected to the gearbox and runs through the pulley at the top of the belt manlift.

housekeeping: the act of removing dirt, debris, dust, and grease from the belt manlift components, floor landings, and pit.

landing: the area immediately adjacent to the floor opening used for mounting and dismounting the belt manlift.

maintenance: a process of routine examination, lubrication, cleaning, and adjustment of parts, components, or subsystems performed in accordance with the applicable requirements of this Standard.

pit: the portion of the belt manlift that extends from the bottom terminal landing to the floor and contains the foot assembly (see Figure 4.4-3).

rated speed: the speed of the belt at which the manlift is designed to run (see para. 5.4).

repair: the reconditioning or renewal of parts, components, or subsystems necessary to keep the belt manlift in compliance with the applicable requirements of this Standard.

replacement: the substitution of a device or component or subsystem, in its entirety, with a unit that functions the same as the original to ensure performance in accordance with the applicable requirements of this Standard.

safety device: any electrical or electromechanical device (such as a limit switch, photoelectric eye, or proximity probe) that shall cause the electric power to be removed from the driving machine motor and brake, stopping the manlift.

split-rail safety device: an electric limit switch operated mechanically by the rollers on the manlift steps.

treadle safety device: a safety device that incorporates a plate or board and switch and is located at the base of the belt manlift on the descending side.

severe belt damage: a cut, crack, or separation of the protective outer cover of a belt that exposes damaged inner fabric, and such damage that extends across the full width of the belt or spans between adjacent bolt holes. A torn belt is also considered severe.

step: a passenger-carrying unit.

superficial belt cover damage: a scratch, cut, or crack of the protective outer cover of a belt that exposes the inner fabric. Such damage is not continuous across the full width of the belt.

tear: a severance of any length or width that goes through the entire thickness of the belt.

verify: to visually and physically check belt manlift components.

4 GENERAL REQUIREMENTS

4.1 Floor Openings

4.1.1 Allowable Size. New installations shall have minimum floor openings of 30 in. (760 mm) and maximum floor openings of 38 in. (965 mm).

(a) Floor opening widths for both up- and down-runs for existing installations shall be in accordance with Figure 4.1.1-1 and Table 4.1.1-1.

Figure 4.1.1-1
Typical Floor Openings [for 14-in. (355-mm) Belts]

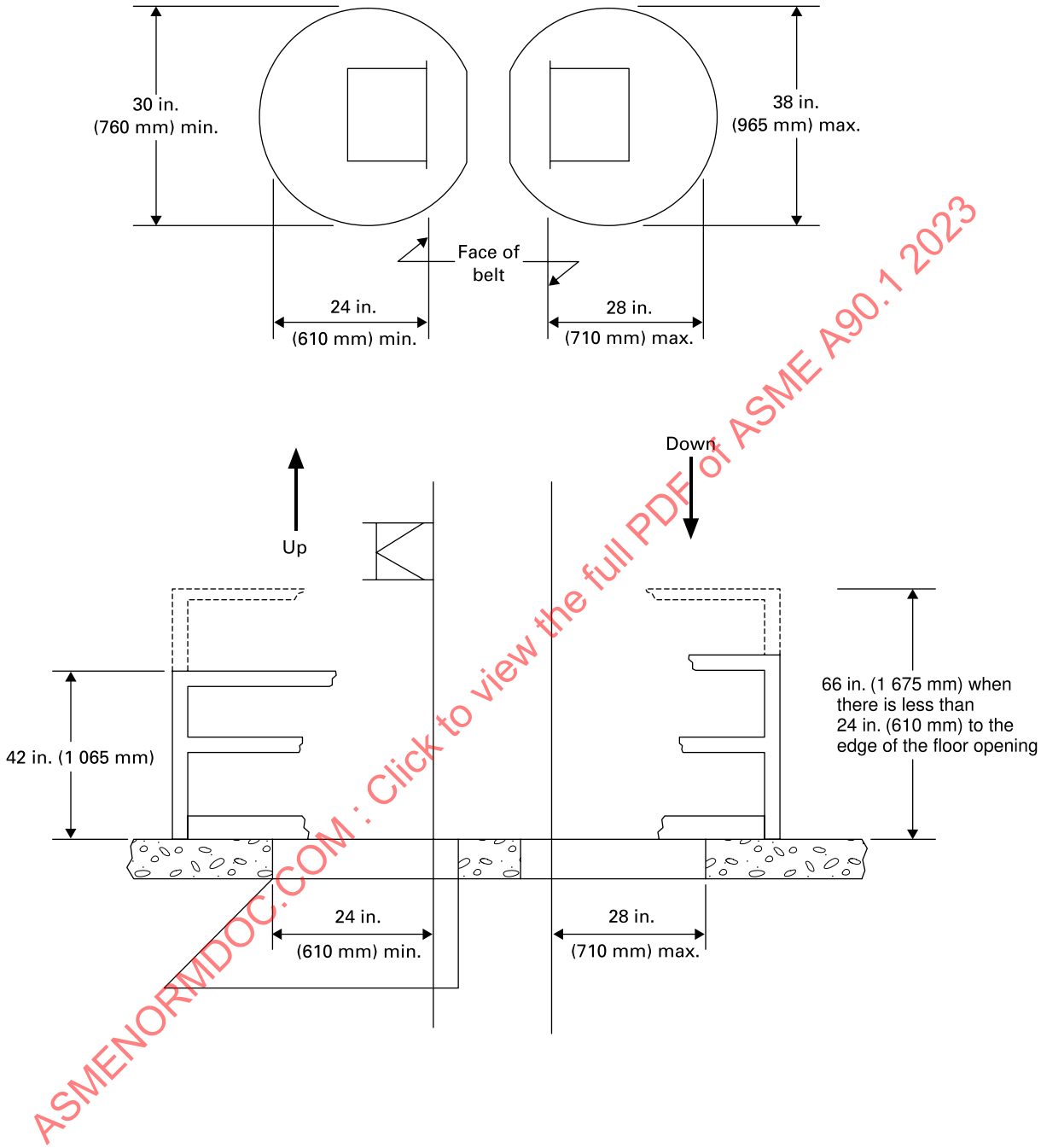


Table 4.1.1-1
Allowable Size for Floor Openings

Belt Width, in. (mm)	Minimum Floor Opening Width, in. (mm)	Maximum Floor Opening Width, in. (mm)
12 (305)	28 (710)	36 (915)
14 (355)	30 (760)	38 (965)
16 (405)	30 (760)	40 (1015)

GENERAL NOTE: The minimum and maximum distance from face of belt to edge of floor openings as shown in Figure 4.1.1-1 is applicable to 14-in. (355-mm) belts.

(b) The distance from the face of the belt to the back side of the floor opening for a given belt manlift shall comply with the dimensions shown in Figure 4.1.1-1.

4.1.2 Uniformity. All floor openings for a given belt manlift shall be uniform in size and shall be approximately circular, and each shall be located vertically above the opening below it. A square or rectangular floor opening is prohibited.

4.2 Riding Clearance

(a) To ensure riding clearance, there shall be no encroachment of any kind within the cylindrical space defined by the outer edges of the floor openings for the entire run of the belt manlift.

(b) The belt manlift it shall be taken out of service when maintenance or construction work is planned in close proximity to it.

4.3 Landings

4.3.1 Vertical Clearance. The vertical clearance between the floor or mounting platform and the lower edge for the underfloor hood above it required by para. 4.4 shall be not less than 7 ft 6 in. (2 285 mm). Where this clearance cannot be obtained, no access to the manlift shall be provided, and the manlift runway shall be enclosed where it passes through such a floor. The enclosure shall be equipped with an emergency exit.

4.3.2 Clear Landing Space. The landing space adjacent to the floor openings shall be free from obstruction and kept clear at all times. The landing space shall be at least 24 in. (610 mm) wide from at least one edge and up to three edges of the floor opening used for mounting and dismounting (see Figures 4.3.2-1 through 4.3.2-3 for typical landing spaces).

4.3.3 Landing Surface. The landing surface at the entrances and exits to the belt manlift shall have a nonslip surface and be kept free of dirt and debris.

4.3.4 Emergency Landings. Where there is a travel of 50 ft (15 m) or more between floor landings, emergency landing(s) shall be provided so that there is a landing (either floor or emergency) for every 25 ft (7.5 m) or less of manlift travel.

(a) Emergency landings shall be accessible from both up- and down-runs of the manlift and shall give access to the ladder as required in para. 4.8.

(b) Emergency landings shall be provided with standard railings and toeboards.

(c) Platforms constructed to give access to bucket elevators or other equipment for the purpose of inspection, lubrication, and repair may also serve as emergency landings under this paragraph. All such platforms shall then be considered part of the emergency landing and provided with standard railings and toeboards.

4.4 Emergency Exit Ladder

A fixed metal emergency exit ladder accessible from both the up- and down-run of the manlift shall be provided for the entire travel of the manlift (see Figure 4.4-1). Such a ladder may be built into the supporting structure of the manlift and may be parallel to the plane of the manlift or perpendicular to the plane of the manlift (see Figures 4.4-2 through 4.4-4), and it shall be in accordance with provisions of ANSI A14.3. The purpose of this rule is to provide an exit from a manlift step to the floor or platform below it should a mechanical or power failure strand passengers between floors. No ladder passage through a floor or platform is required.

4.5 Hoods on Underside of Floor Openings

4.5.1 Fixed Type. On the up side of the manlift floor, openings shall be provided with an underfloor hood meeting the following requirements (see Figure 4.4-2).

(a) Slope. The underfloor hood shall make an angle of not less than 45 deg with the horizontal.

(b) Extent. The lower edge of this hood shall extend at least 44 in. (1 118 mm) outward from the face of the belt. It shall not extend beyond the upper surface of the floor above.

(c) Material and Construction. The hood shall be made of not less than No. 18 U.S. gage sheet steel or material of equivalent strength or stiffness. The lower edge shall have a minimum diameter of ½ in. (13 mm) and the interior shall be smooth with no protruding rivets, bolts, or screws.

4.5.2 Floating Type. Where the fixed hood specified in para. 4.5.1 is not used, a floating-type hood may be used. Such floating hoods shall be mounted on hinges a maximum of 6 in. (150 mm) below and parallel to the underside of the floor, and so constructed as to actuate a safety switch that shuts off the manlift should a force of 2 lb (9 N) be applied on the edge of the hood closest to the hinge. The switch shall be a manual reset type and shall be part of the safety circuit. The depth of this floating hood need not exceed 12 in. (305 mm).

Figure 4.3.2-1
Guardrail and Wall

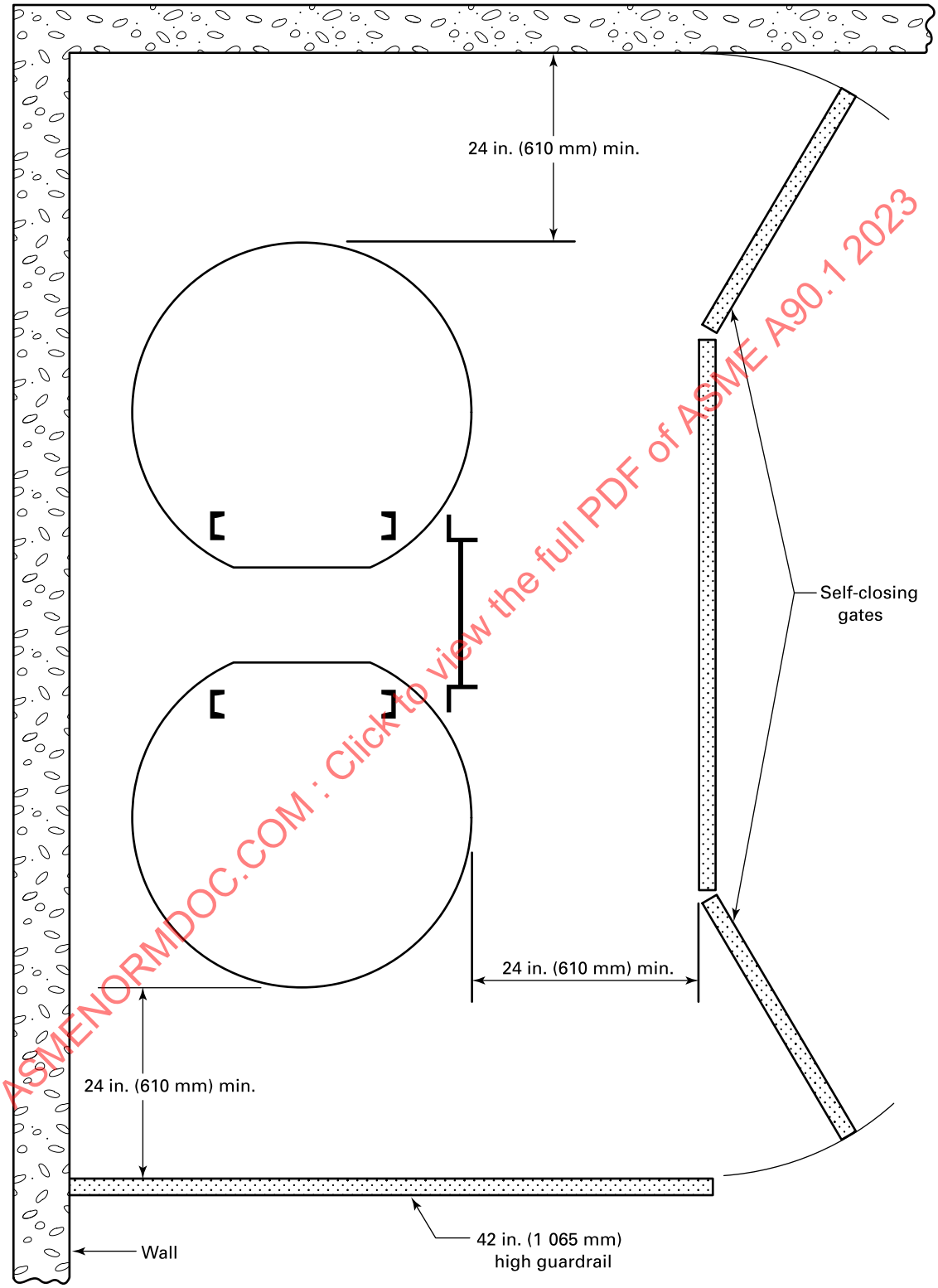


Figure 4.3.2-2
Guardrail or Screened Enclosure

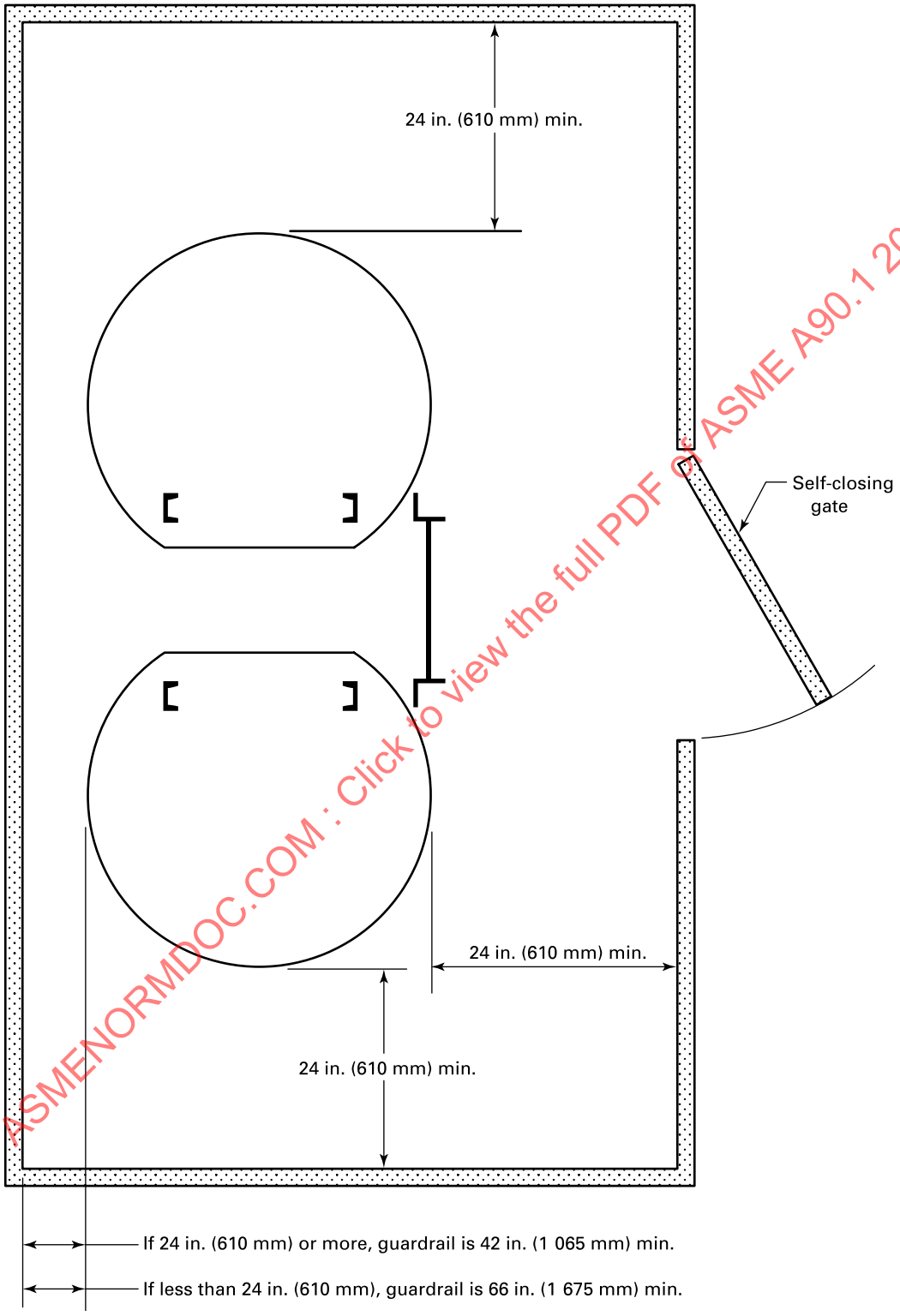
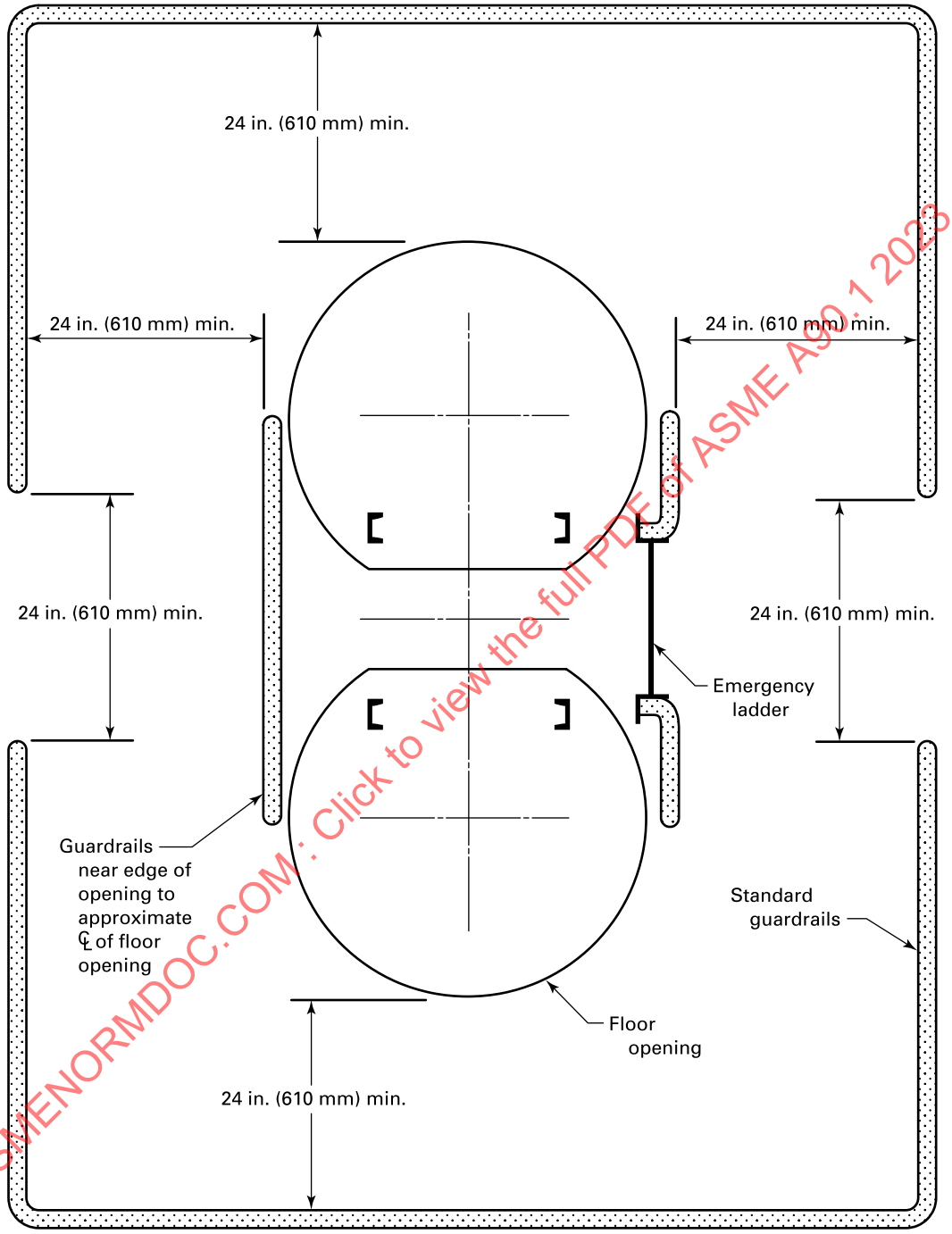


Figure 4.3.2-3
Example of Maze Entrance to Manlift



GENERAL NOTE: Entry shown on two sides; entry on one side is adequate.

Figure 4.4-1
Distance Between Handhold and Step

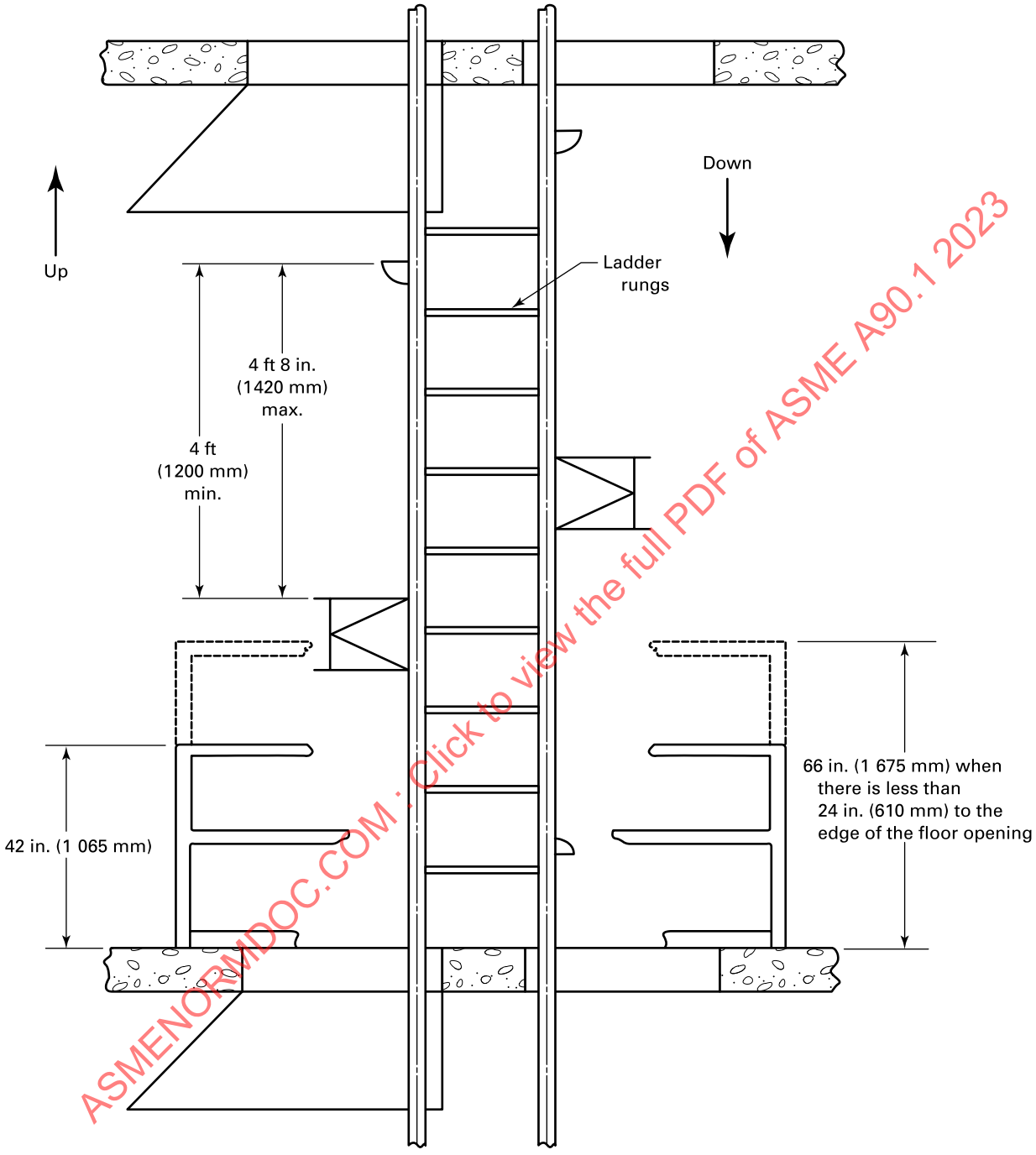


Figure 4.4-2
Fixed-Type Underfloor Hoods and Guardrail

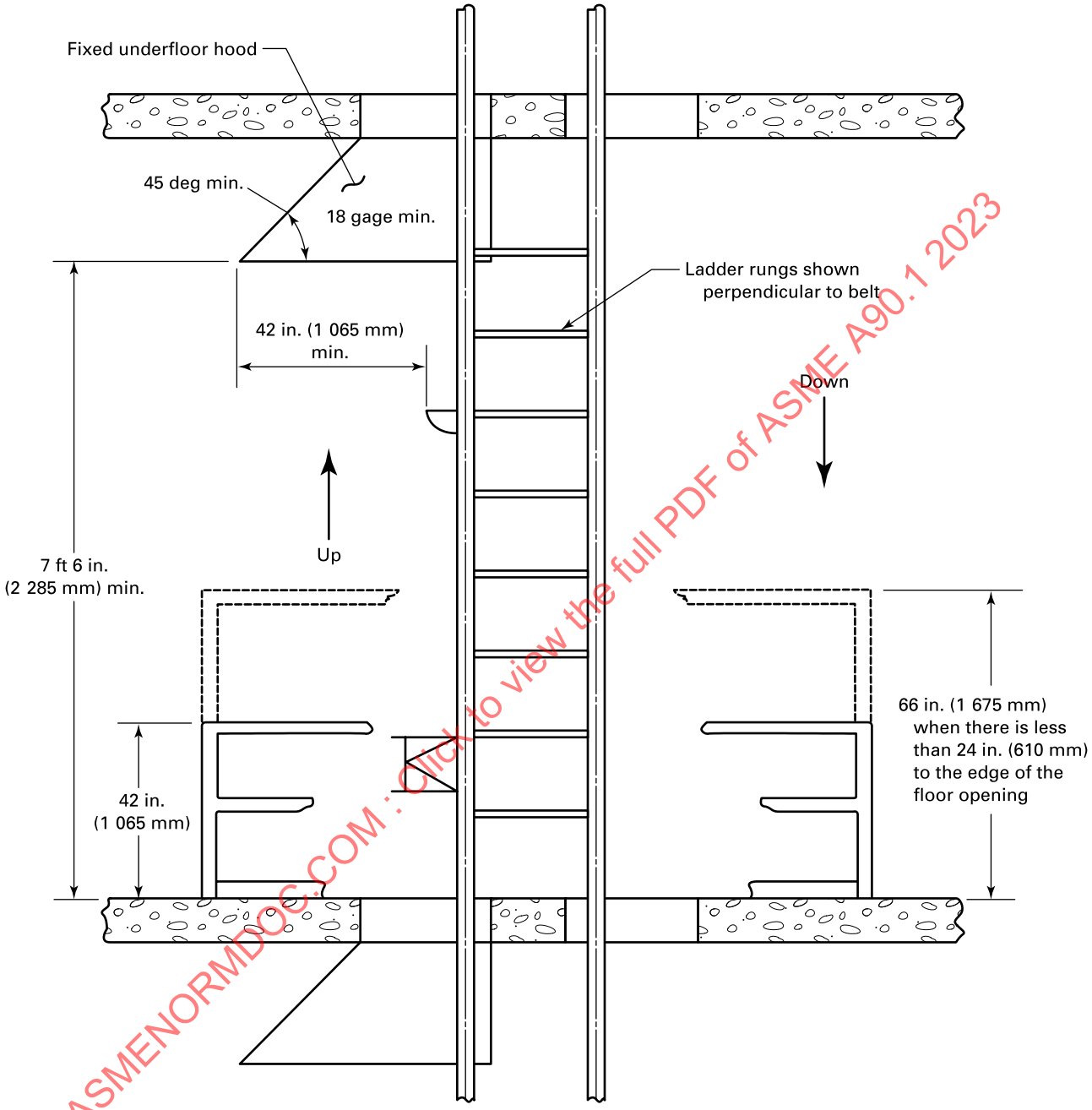


Figure 4.4-3
Typical Pit Location Detail (for New Installations)

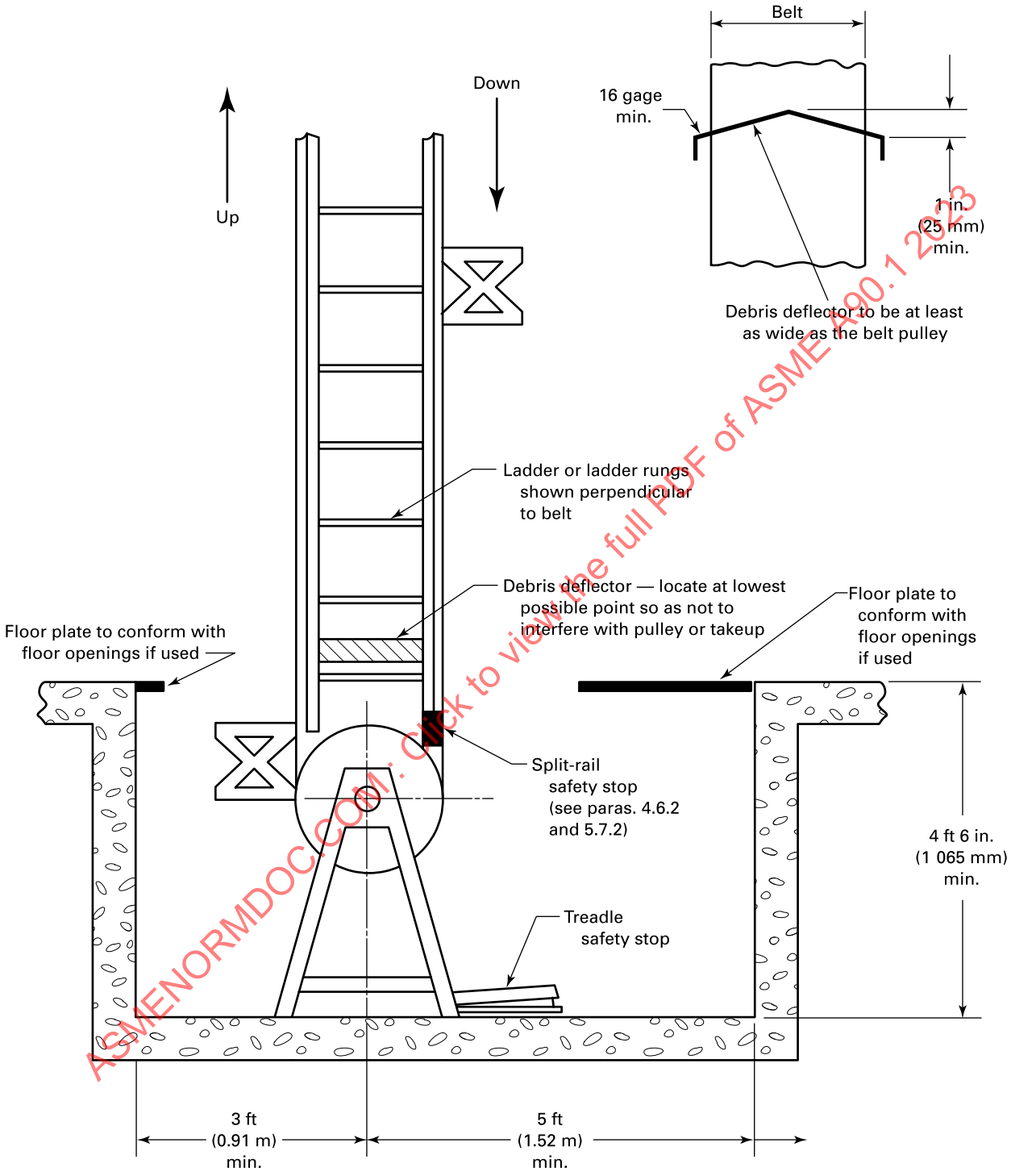
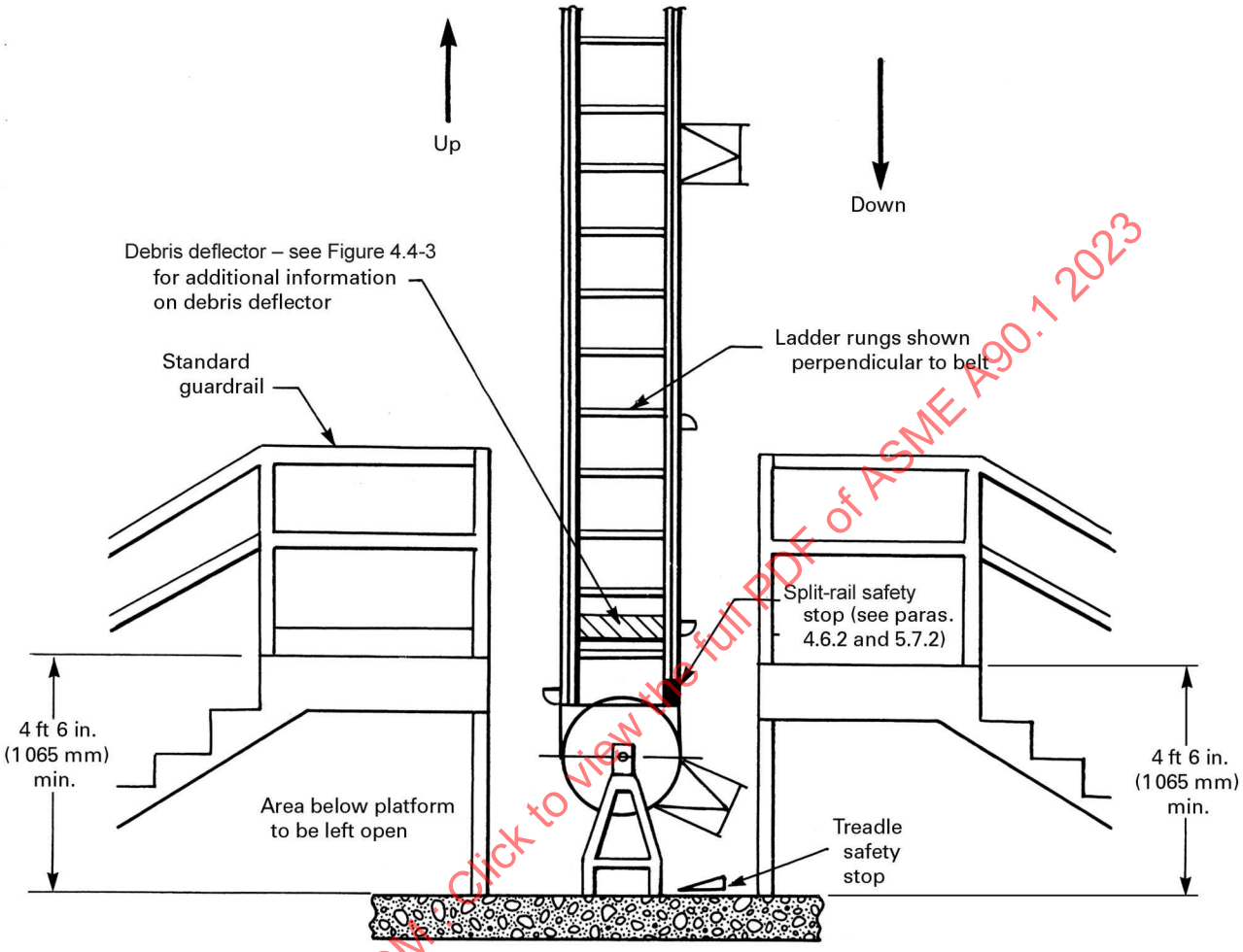


Figure 4.4-4
Typical Lower Landing Detail



GENERAL NOTE: Refer to paras. 4.6 and 4.7.4 for guardrail arrangement on down side.

4.6 Protection of Entrances and Exits

4.6.1 Guardrail Requirement. The entrances and exits at all floor landings affording access to the manlift shall be guarded by a maze (staggered railing) or handrail equipped with self-closing gates (see Figures 4.3.2-1 through 4.3.2-3). The guardrails should be located a minimum of 24 in. (610 mm) from the edge of the floor opening on those sides used as landings.

4.6.2 Construction. The rails shall be standard guardrails with toeboards meeting the provisions of ANSI A12.1. On those sides not used as a landing, the guardrails shall be extended to a minimum height of 66 in. (1 675 mm) when less than 24 in. (610 mm) away from the edge of the floor opening. In lieu of the 66 in.- (1 675 mm-) high guardrail, a wall of wire mesh, expanded metal, or solid panels may be used. This minimum 66 in.- (1 675 mm-) high guardrail is intended to prevent anyone alongside the manlift from leaning over the guardrails and into the floor opening area.

4.6.3 Gates. Gates, if provided, shall open outward and shall be self-closing. Corners of gates shall be rounded. Gates shall be the same height as the adjacent guardrail.

4.6.4 Maze. Maze or staggered openings shall offer no direct passage between enclosure and outer floor space (see Figure 4.3.2-3).

4.6.5 Entrance Position. Entrances at all landings shall be in the same relative position.

4.6.6 Security. Manlifts shall not be available to the general public. If located in buildings to which the public has access, manlifts shall be located in an enclosure protected by self-closing, spring-locked doors. Keys to such doors shall be limited to authorized personnel.

4.7 Bottom Arrangement

4.7.1 Bottom Landing. At the bottom landing, the clear area shall be a minimum of 30 in. (750 mm) wide directly in front of the belt on both the up and down sides.

A side landing area is not required at the bottom landing. Any wall in front of the down-running side of the belt shall be not less than 48 in. (1 220 mm) from the face of the belt. This space shall not be encroached on by stairs or ladders.

If a dismounting platform is used, the edge of this platform should be in line with the outer edge of the openings at the upper floors.

NOTE: Where there is a difficulty of dismount at the bottom landing, a riser may be used if it does not exceed 10 in. (254 mm) in height.

4.7.2 Location of Bottom Pulley. The bottom pulley shall be installed so that it is supported by the lowest floor served; or, where it is necessary to gain required clearance (see para. 4.3.1), it may be located in a pit below the lowest floor served. Where a pit is used or a dismounting platform is provided, two safety stops shall be installed on the down-run to stop the manlift in case the step is ridden past the dismounting level (refer to para. 5.7.2). Where no pit is used, a dismounting platform on the down side is not required (see Figure 4.4-4). When a pit is used or a dismounting platform is provided, the dismounting level shall be at or above the point at which the upper surface of the descending step is in the horizontal position and the step has not contacted the bottom safety stops prior to beginning its turn. The pit opening or floor plate, if used, shall conform to para. 4.1.1.

4.7.3 Mounting Platform. A mounting platform shall be provided in front of the up-run at the lowest landing, unless the floor level or platform shall be at or above the point at which the upper surface of the ascending step completes its turn and assumes a horizontal position.

If a mounting platform is used, the edge of this platform should be in line with the outer edge of the openings at the upper floors.

4.7.4 Guardrails. To guard against anyone walking under a descending step, the area on the down side of the manlift shall be guarded in accordance with para. 4.6.

To guard against anyone getting between the mounting platform and an ascending step, the area on the up side of the manlift shall be guarded in accordance with para. 4.6.

4.8 Top Arrangement

4.8.1 Clearance From Floor. A top clearance shall be provided of at least 11 ft (3.4 m) above the top landing (see Figure 4.8.1-1). This clearance shall be maintained from a plane through each face of the belt to a vertical cylindrical plane having a diameter 24 in. (610 mm) greater than the diameter of the floor opening, extending upward from the top floor to the ceiling on the up-running side of the belt. There shall be no encroachment of structural or machine supporting members within this space.

4.8.2 Pulley Clearance

(a) There shall be a clearance of at least 5 ft (1.5 m) between the center of the top pulley shaft and any ceiling obstruction.

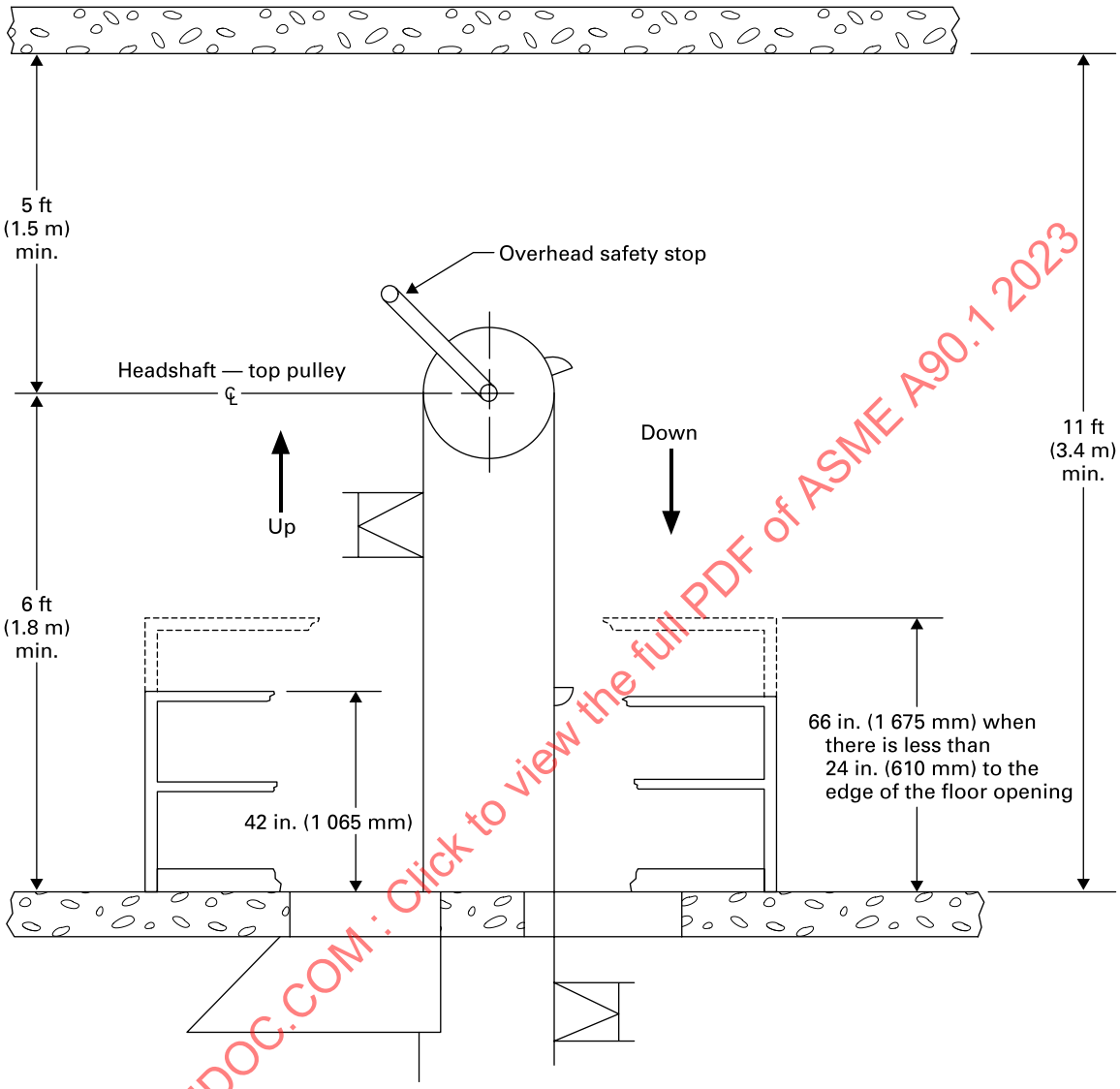
(b) The center of the top pulley shaft shall be not less than 6 ft (1.8 m) above the top landing.

4.9 Superstructure

The superstructure shall consist of guiderails, head circle(s), foot circle(s), frame bracing, and supports that shall comply with paras. 4.9.1 through 4.9.5.

4.9.1 Belt manlift guide rails shall be secured in a manner that avoids spreading, vibration, and misalignment. The guide rails shall be approximately centered within the floor openings.

Figure 4.8.1-1
Head Shaft Dimensions — Top Landing



4.9.2 Each frame brace shall be attached to all four guiderails to maintain the distance between guiderails per manufacturer's specifications throughout the entire path of step travel.

4.9.3 When there is more than 30 ft (9 m) between landings, a structural support to the wall shall be provided that prevents the guide rails from moving side to side. These structural supports shall be spaced at approximately equal distances of not more than 20 ft. (6 m).

4.9.4 Splice plates shall be used to attach one guiderail end to another. The gap between the guiderail ends shall be no more than 0.125 in (3 mm).

4.9.5 All bolts used to attach components to the guiderails shall be a minimum of grade 5 and must not interfere with any moving components.

4.10 Illumination

4.10.1 General. Both runs of the belt manlift shall always be illuminated when the lift is in operation. An intensity of not less than 5 fc (54 lx) shall be maintained at all points.

4.10.2 Control of Illumination. Lighting of belt manlift runways shall be by circuits permanently tied into the building circuits (no switches), or lighting shall be controlled by switches at each landing. Where separate switches are provided at each landing, any one switch shall turn on all lights necessary to illuminate the entire runway.

4.10.3 Lighting of Landings. Adequate lighting not less than 5 fc (54 lx) shall always be provided at each floor landing when the belt manlift is in operation.

4.11 Weather Protection

The manlift and driving mechanism shall be protected from adverse effects of the weather so that the other provisions of this Standard can be met. It is not the intent of this requirement to provide total enclosure.

5 MECHANICAL REQUIREMENTS

5.1 Drive Assembly

5.1.1 Types. Drive assembly shall be the direct-connected type. Cast iron gears shall not be used. There shall be no 90 deg shoulders machined onto any shaft in belt manlift machines or pulleys.

NOTE: Existing multiple V-belt drive systems are permissible. All new installations shall be the direct-connected type. When one V-belt is replaced, all belts shall be replaced.

5.1.2 Couplers. Couplers, when provided, shall comply with the manufacturer's specification.

5.1.3 Brake. A mechanically applied, electrically released brake shall be provided. The brake shall be capable of stopping and holding the belt manlift within 24 in. (610 mm).

5.1.4 Emergency Brake. Belt manlifts and complete drive assemblies installed after ASME A90.1-2009 shall be equipped with a mechanically applied, manually released emergency brake that will prevent free-wheeling of the head pulley or head pulley shaft or both due to coupler, shafting, or reducer failure. This brake, when applied, shall cut off the power to the belt manlift motor and prevent rotation of the head pulley or head pulley shaft or both.

5.2 Belt

5.2.1 Material. The belt material shall be laminated belting, solid-woven PVC belting, or other types of belting meeting the strength requirements of para. 5.2.3.

5.2.2 Width. Minimum tolerances shall be as follows (see Table 5.2.2-1):

(a) New Installations. For new belt manlift installations, the width of the belt shall be not less than 14 in. (355 mm) for a travel not exceeding 150 ft (46 m) and 16 in. (405 mm) for a travel exceeding 150 ft (46 m).

(b) Existing Installations. For existing belt manlift installations, the width of the belt may be less than the dimensions specified in (a) but never less than 12 in. (305 mm) nor less than that of the original belt. If a belt at least 12 in. (305 mm) wide is used for a travel that exceeds 100 ft (30 m), the total tensile strength of the belt (its tensile strength rating per inch of width multiplied by its width) shall meet the total tensile strength of the belt as called for by the strength requirements and safety factor specifications in para. 5.2.3.

Table 5.2.2-1
Rubber Manufacturers Association Tolerances for Width of Belting

Type of Belting (All Belt Widths)	Wide Tolerance, Plus or Minus			Maximum Width Variation in Any One Belt		
	in.			in.		
	Fraction	Decimal	mm	Fraction	Decimal	mm
Molded edge	1/4	0.250	6.35	1/4	0.250	6.35
Slit edge	1/8	0.125	3.17	1/8	0.125	3.17

Table 5.2.3-1
Belt Breaking Strength

Belt Travel Pulley Centers, ft (m)	Belt Width, in. (mm)	Minimum Belt Breaking Strength of Belt Width, lb/in. (N/mm)	Minimum Belt Breaking Strength per Full Belt Width, lb (N)
0–100 (0–30)	12 (305)	2,550 (445)	30,600 (136 100)
	14 (355)	2,250 (395)	31,500 (140 100)
	16 (405)	2,000 (350)	32,000 (142 300)
100–150 (30–46)	12 (305)	3,675 (645)	44,100 (196 200)
	14 (355)	3,200 (560)	44,800 (199 300)
	16 (405)	2,850 (500)	45,600 (202 800)
150–250 (46–76)	12 (305)	6,000 (1 050)	72,000 (320 300)
	14 (355)	5,225 (915)	73,150 (325 400)
	16 (405)	4,625 (810)	74,000 (329 200)

5.2.3 Strength. The belt-breaking strength of the manlift belt shall be not less than 30,600 lb (136 000 N) minimum tensile strength for belts with 100 ft (30 m) of travel or less; 44,100 lb (196 200 N) minimum tensile strength for belts with 101 ft to 150 ft (31 m to 46 m) of travel; and 72,000 lb (320 300 N) minimum tensile strength for belts with 151 ft to 250 ft (46 m to 76 m) of travel. No manlift shall have a travel greater than 250 ft (76 m) (see Table 5.2.3-1 for breakdown by belt width).

5.2.4 Belt Fastenings. Belts shall be fastened by one of the following methods:

(a) Butt Splice, With a Strap of Equal Strength on the Side Away From the Pulleys. The strap shall extend not less than 3 ft (0.9 m) on each side of the butt for manlift travel up to 100 ft (30 m), and not less than 4 ft (1.2 m) on each side of the butt if the travel exceeds 100 ft (30 m) (see Figure 5.2.4-1 for correct method and Table 5.2.4-1 for minimum number of bolts).

(b) Lap Splice, With the Leading Edge of the Belt Away From the Pulleys. The overlap of the belt at the splice shall be not less than 3 ft (0.9 m) when the travel of the manlift does not exceed 100 ft (30 m), and not less than 4 ft (1.2 m) if the travel exceeds 100 ft (30 m) (see Figure 5.2.4-2 for correct method and Table 5.2.4-1 for minimum number of bolts).

NOTE: When replacing old belts with new belts meeting tensile strength requirements for 12 in. (305 mm) and 14 in. (355 mm) manlift belts exceeding maximum height limitations, be aware that, due to increased thickness, belts with lap or butt splices may lose flexibility at the splice when passing over the top pulley. The resulting stress on the splice may cause a premature elongation of bolt holes and fracture or tearing of the belt. This potential problem should be reviewed with the belt supplier prior to installation.

More frequent checks should be made during the first few months of operation to detect if such conditions are developing.

(c) Mechanical Splice, Using Cast Fasteners Approved by Their Manufacturer for Manlift Applications

(1) Fastener installation shall be in accordance with the manufacturer's recommendations, as clamp bolt torque is critical (see Figure 5.2.4-3 for correct method and for minimum number of fasteners).

(2) Mechanical splices shall only be used on new belting.

5.2.5 Repairs Prohibited. A belt that has evidence of severe belt damage while in use on a manlift shall not be repaired or returned to service.

5.2.6 Steps Prohibited. Steps or handholds are prohibited on the belt splice.

5.2.7 Elevator Bolts. Elevator bolts used for joining the belt or securing handholds or steps to the belt shall be installed and maintained so that the heads do not project beyond the inner surface of the belt (see Table 5.2.4-1). To prevent snagging issues, there shall be no more than three threads exposed beyond a single nut application. See also ASME B18.5.

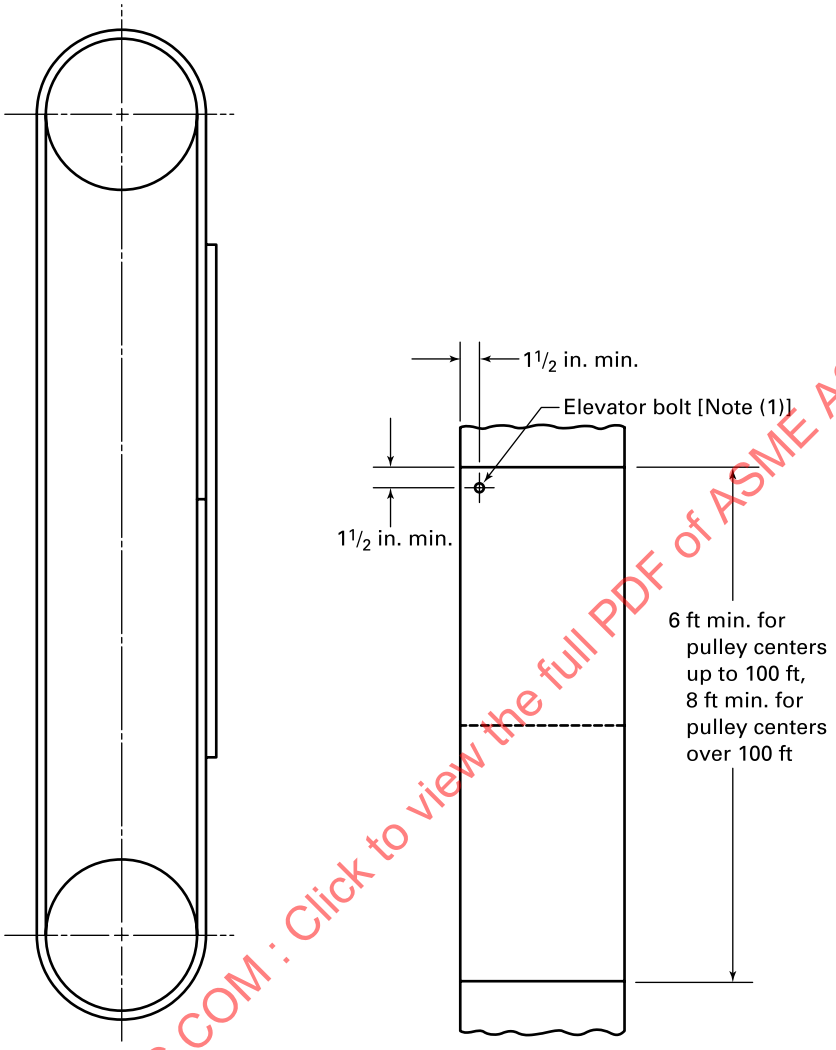
This excludes mechanical splice bolts (see para. 5.2.4).

5.2.8 Splice. Only one splice per manlift belt shall be permitted.

NOTE: A lap splice that has become cracked or damaged may be converted to a butt splice and returned to service, provided that the damaged area of the splice is completely removed.

5.2.9 Belt Location. Belt shall be centered between the rails.

Figure 5.2.4-1
Typical Butt Splice Detail



Metric Conversion

5/16 in. = 7.9 mm	16 in. = 405 mm
1½ in. = 40 mm	6 ft = 1.8 m
12 in. = 305 mm	8 ft = 2.4 m
14 in. = 355 mm	100 ft = 30 m

Minimum Number of Bolts

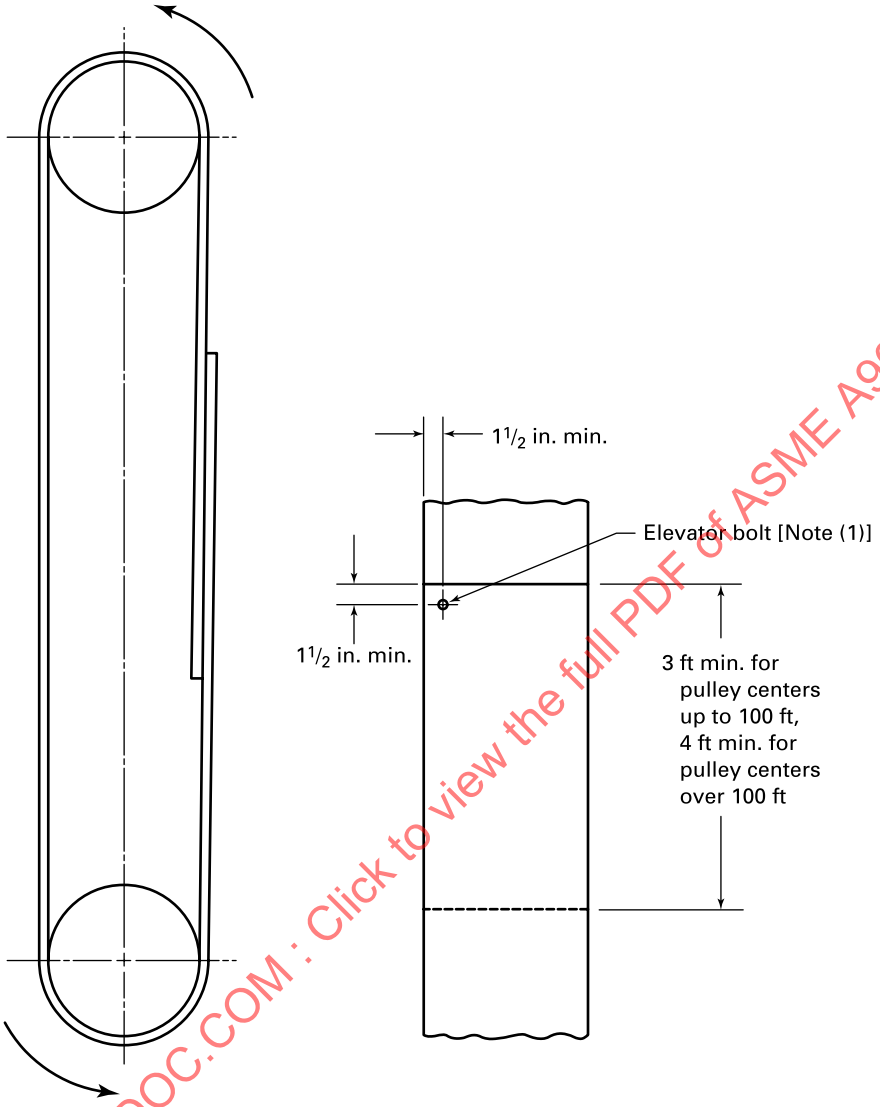
12-in. Belt	14-in. Belt	16-in. Belt
40	46	54

GENERAL NOTE: Follow manlift manufacturer's recommended bolt pattern.
NOTE: (1) Minimum bolt size of 5/16 in. with locknut or lock washer backed with flat washer.

Table 5.2.4-1
Minimum Number of Bolts

Type of Splice	Width of Belt, in. (mm)	Minimum Number of Bolts
Butt	12 (305)	40
	14 (355)	46
	16 (405)	54
Lap	12 (305)	20
	14 (355)	23
	16 (405)	27

Figure 5.2.4-2
Typical Lap Splice Detail



Metric Conversion

5/16 in. = 7.9 mm	16 in. = 405 mm
1½ in. = 40 mm	3 ft = 0.9 m
12 in. = 305 mm	4 ft = 1.2 m
14 in. = 355 mm	100 ft = 30 m

Minimum Number of Bolts

12-in. Belt	14-in. Belt	16-in. Belt
20	23	27

GENERAL NOTE: Follow manlift manufacturer's recommended bolt pattern.
NOTE: (1) Minimum bolt size of 5/16 in. with locknut or lock washer backed with flat washer.

5.3 Pulleys

5.3.1 Dimensions. Top pulleys and bottom pulleys shall have a diameter of not less than 20 in. (505 mm).

5.3.2 Pulley Lagging. All head pulleys shall be lagged (i.e., covered with nonslip material and securely fastened in place). The fasteners shall be below the surface of the lagging. Head-pulley lagging shall be changed in conjunction with belt replacement.

5.3.3 Pulley Protection. The manlift drive machine shall be designed and constructed so that the main drive supporting members are located directly beneath the head pulley and between the up and down sides of the belt. These main drive supporting members shall be designed to support the entire combined loads of the pulley, belt, steps [200 lb (90 kg) on each step], handholds, and all of the drive machinery plus the bottom pulley and related bottom pulley components that contribute to the load on the head pulley. Appropriate design safety factors shall be used when designing the main drive supporting members.

5.3.4 Bottom Pulley Protection. The bottom pulley shall be provided with a debris deflector (see Figures 4.4-3 and 4.4-4).

5.3.5 Pulley Shafts. The pulley shaft shall comply with the following:

(a) Head Shaft. The strength and diameter of the head shaft shall meet the manufacturer's requirements.

(b) Foot Shaft. The strength and diameter of the foot shaft shall meet the manufacturer's requirements.

(c) Modifications. Modifications to the shaft are prohibited, including machining of existing shaft.

5.4 Speed

5.4.1 Maximum Speed. No manlift with a belt speed greater than 80 ft/min (0.4 m/s) +10% shall be installed.

5.4.2 Consistency. All manlifts in a given location should run at approximately the same speed.

NOTE: To accommodate variations in voltage, etc., the actual free-running speed of the belt (no load) may exceed rated speed by not more than 10%.

5.5 Steps

5.5.1 Depth. Steps shall be not less than 12 in. (305 mm) nor more than 14 in. (355 mm) deep, measured from the belt to the edge of the step.

5.5.2 Width. The width of the step shall be not less than the width of the belt to which it is attached.

5.5.3 Distance Between Steps. The distance between steps shall be not less than 16 ft (4.8 m), measured from the upper surface of one step to the upper surface of the next step above it. The steps shall be uniformly spaced within +10% of the distance between steps.

5.5.4 Angle of Step. The surface of the step shall be at a right angle to the up- and down-runs of the belt and shall travel in the horizontal position with the up- and down-runs of the belt under rated load.

5.5.5 Surface of Step. Each step shall be protected with a nonslip tread.

5.5.6 Strength of Step Supports. When subjected to a load of 400 lb (180 kg) applied at the approximate center of the step, step frames or supports and step support guides shall be of adequate strength to prevent

(a) the disengagement of any step roller

(b) any appreciable misalignment

(c) any visible deformation of the steps or their supports

5.5.7 Steps. Steps shall be attached using elevator bolts. Each bolt shall be secured by a locking washer and nut or equivalent. See also para. 5.2.7.

5.5.8 Prohibition of Steps Without Handholds. No step shall be provided unless there is a corresponding handhold above and below it that meets the requirements of para. 5.6.

5.5.9 Temporary Removal of Step. If a step is removed for any reason, it shall be replaced within 60 days or sooner if required by the authority having jurisdiction. When the step is removed, the handholds immediately above and below it shall be removed before the manlift is again placed in service.

CAUTION: If this requirement is not met, the belt manlift shall be taken out of service until repairs are completed.

5.5.10 Color. The color of each step or step surface shall contrast with the color of the belt.

5.6 Handholds

5.6.1 Location. Handholds attached to the belt shall be provided and so installed that they are not less than 4 ft (1.2 m) nor more than 4 ft 8 in. (1 420 mm) above the step tread and centered on the belt (see Figure 4.4-1). These handholds shall be so located as to be available on both the up- and down-runs of the belt. All handholds on any given manlift should be located the same distance above the step treads.

5.6.2 Size. The grab surface of the handhold shall be not less than 4½ in. (115 mm) wide and no less than 3 in. (75 mm) deep. The handhold shall provide 2 in. (50 mm) of clearance from the belt at the top. Fastenings for handholds shall be located at least 1 in. (25 mm) from the edge of the belt.

5.6.3 Strength. The handhold shall be capable of withstanding without damage a load of 300 lb (135 kg) applied parallel to the run of the belt. The handhold shall be attached to the belt with elevator bolts.

5.6.4 Prohibition of Handhold Without Steps. No handhold shall be provided without a corresponding step.

5.6.5 Surfaces. All handholds shall be the closed type. The color of the handholds shall contrast with the color of the belt. For existing installations, any damaged handhold must be replaced with a new handhold. Repairs of any handholds are prohibited.

5.7 Safety Devices

5.7.1 Upper Limit Safety Devices. Three separate automatic safety devices shall be provided to shut off the power and apply the brake when a loaded step passes the top landing. Two of these shall consist of split-rail safety devices or in-track equivalent safety devices located on opposite guide rails that are staggered and actuated by the rollers. These two safety devices shall function so that the manlift will be stopped before the loaded step has reached a point 24 in. (610 mm) above the top landing.

The third automatic stop device shall consist of one of the following:

(a) a switch actuated by a lever, bar, or plate placed at the top pulley on the up side. This switch shall be at a 45 deg angle with a maximum of 1 in. (25 mm) clearance from a passing step. The actuating bar shall be hinged or of a breakaway type so as not to create a hazard.

(b) for existing installations, an electronic device is allowed as the third automatic stop device if it complies with the UL listing of the manufacturer of the belt manlift.

5.7.2 Lower Limit Safety Devices. Two separate automatic safety devices shall be provided to shut off the electric power and apply the brake when a loaded step passes the bottom landing (see para. 4.6.2). One of these devices shall activate while the step is still in the horizontal position. Each automatic safety device shall consist of a treadle safety device and one of the following:

(a) a split-rail safety device (or equivalent)

(b) a treadle safety device stop

For existing installations, an electronic device is allowed as one of the safety devices if it complies with the UL listing of the manufacturer of the belt manlift.

No lower-limit safety devices are required for a permanently installed riser, provided it is 10 in. (250 mm) in height or less from the floor.

5.7.3 Manual Reset Location. After the manlift has been stopped by an automatic safety device, the electrical control circuit shall be reset manually. A manual reset shall always be located at the top landing.

When safety devices are provided at the bottom landing, a reset button shall also be included at the bottom landing. The reset shall be so located that a person resetting it shall have a clear view of both the up- and down-runs of the manlift. It shall not be possible to reset the electrical control circuit from any step. Manual resets are permissible at top and bottom landings only.

5.7.4 Electrical Requirements

(a) Where switches open the main motor circuit directly, they shall be of the multiple type (i.e., all conductors entering the switch shall be opened).

(b) Where electronic devices are used, they shall be so designed and installed that failure will result in cutting off the power to the drive motor.

(c) All electrical installations shall be classified in accordance with the requirements of NFPA 70, to the latest edition specified by the authority having jurisdiction.

(d) Contacts carrying the main motor current shall be broken at two or more points simultaneously in each phase of the circuit. One point of each phase may be the motor starter contacts and the other point should be an auxiliary contact with load-carrying capacity equal to or greater than the motor starter contacts. If copper to carbon contacts are used, then only one break in each phase is required.

(e) Reverse phase relay and phase failure protection are required on all manlift installations.

NOTE: All electrical motor control apparatus and safety relays should be placed in a locked enclosure to prevent tampering by unauthorized individuals.

5.8 Start/Stop Control Rope

5.8.1 Location and Requirements. A single start/stop control rope shall be provided within easy reach of the up- and down-runs of the belt, and it shall incorporate rope guides and pulley arrangements to restrict lateral movement. Additional ropes in the vertical cylindrical area shall be prohibited.

5.8.2 Operation. This control rope shall be connected to a control lever or operating mechanism in a manner that will cut off the electric power and apply the brake when pulled in the direction of travel. When the control rope is pulled in the opposite direction of travel, the power will be restored and the brake released, without motor controls having to be reset.

5.8.3 Control Rope. The control rope shall consist of a wire-center rope with a minimum diameter of $^{3}/_{8}$ in. (9.5 mm). Wire rope shall not be used.

5.9 Factor of Safety

All load-bearing components of the belt manlift shall have a safety factor based on the original equipment manufacturer's specification at the time of manufacture.

6 INSTRUCTION AND CAUTION SIGNS

6.1 Instruction Signs at Landings and on Belt

Signs of a conspicuous and easily read style giving instructions for the use of the manlift shall be posted at each landing and on the belt at each handhold.

6.1.1 Size and Legibility. Such signs shall use letters not less than 1 in. (25 mm) in height. The color of the letters shall contrast with the color of the surface on which they are stenciled or painted.

6.1.2 Stenciling (Inscription). The instructions shall read approximately as follows:

Face the Belt
Use the Handhold
To Stop, Pull Rope in Direction of Travel

6.1.3 Directional Arrows. Arrows pointing in the direction of belt travel shall be marked on the belt below or above each handhold.

6.2 Data Tags and Plates

Manufacturer's data tags or plates are required on the following components:

(a) motor
(b) motor brake
(c) gearbox
(d) emergency brake

6.3 Top Floor Caution Sign and Light

6.3.1 Requirements. Immediately below the top floor a caution sign shall display the following wording:

TOP FLOOR — GET OFF

The sign shall use block letters not less than 2 in. (50 mm) in height and it shall be located within easy view of an ascending passenger not more than 24 in. (610 mm) below the top landing.

6.3.2 Additional Caution Light. In addition to the sign required by para. 6.3.1, a red warning light of not less than 40 W rating shall be provided immediately below the top landing and so located as to illuminate the caution sign.

6.4 Bottom Floor Caution Sign

A sign within easy view of descending passengers shall display the following wording:

APPROACHING BOTTOM FLOOR — PREPARE TO GET OFF

The sign shall use block letters not less than 2 in. (50 mm) in height.

NOTE: It may be useful to have all floors and landings numbered or identified by name to avoid confusing riders.

6.5 Visitor Warning Sign

A conspicuous sign shall display the following wording at each landing:

AUTHORIZED PERSONNEL ONLY

The sign shall use block letters
(a) not less than 2 in. (50 mm) in height and
(b) in a color offering high contrast to that of the background

NOTE: See section 3 for definition of "authorized personnel."

7 OPERATING RULES FOR PROPER USE OF MANLIFTS

(a) Only authorized personnel trained in their use shall be permitted to use manlifts. See Mandatory Appendix I for training guide and program.

(b) Unsafe conditions on manlifts shall be reported immediately and the manlift shall be taken out of service until the condition is corrected.

(c) When riding a manlift, the rider shall stand squarely on the top surface of the step, in an upright position, and face the belt while grasping the handhold securely with both hands. Jumping on the step, yanking on the handhold, or horseplay of any kind is prohibited. Only one rider per step is permitted.

(d) No freight, packaged goods, pipe, lumber, or materials of any kind shall be carried or transported on any manlift.

(e) No tools, except those fitting entirely within a pocket, tool pouch, or holster designed specifically for small hand tools and attached to an employee's belt (the kind from which no tools can protrude), shall be carried on any manlift.

(f) Written procedures shall be developed by the owner/operator outlining the proper starting and restarting of a belt manlift, including alerting all riders and those in the vicinity of the belt manlift prior to a start.

8 TESTS AND INSPECTIONS

8.1 Acceptance and Annual Tests

An acceptance test shall be performed on completion of the manlift installation.

(a) Tests shall be verified in compliance with section 8 by an inspector employed by the authority having jurisdiction or by a person authorized by the authority having jurisdiction or by the owner if not regulated by the state or local authority having jurisdiction.

(b) Under no circumstances shall humans be used as weights for testing.

(c) The tests outlined in paras. 8.1.1 through 8.1.10 shall be performed annually.

8.1.1 Up Capacity. Test the up capacity of the manlift as follows:

Step 1. Place a 200-lb (90-kg) load on each horizontal step of the up-run.

Step 2. Observe the belt. The belt shall show no slipping under the test load while the manlift is stationary.

Step 3. Run the manlift at rated speed.

Step 4. Observe the belt. The belt shall show no slipping under the test load while the manlift is running at rated speed.

8.1.2 Down Capacity — Brake. Test the down capacity and brake of the manlift as follows:

Step 1. Place a 200-lb (90-kg) load on each horizontal step of the down-run.

Step 2. Observe the belt. The belt shall show no slipping under the test load while the manlift is stationary.

Step 3. Run the manlift at rated speed.

Step 4. Observe the belt. The belt shall show no slipping under the test load while the manlift is running at rated speed.

Step 5. Stop the manlift. The brake shall stop and hold the test-loaded belt within a maximum of 24 in. (610 mm) of travel.

8.1.3 Loaded Step Deflection. Each step shall be subjected to a 400-lb (180-kg) mass load applied to its center while the step is stationary. The weighted step shall conform to the following:

(a) The step shall not be displaced from the guide rails.

(b) There shall be no deflection of metal step treads and no more than ¼ in. deflection for wood step treads.

(c) There must be no damage to the step, the step fastenings, or the belt.

8.1.4 Strength of Handhold. To test handhold strength, place a 300-lb (135-kg) load on one of the handholds while the machinery is stationary. The handhold shall support the load without damage to the handhold, handhold fastenings, or belt. Repeat the test on the other handhold.

8.1.5 Safety Stops. Test the split-rail safety stops or in-rail equivalent safety stops as follows:

Step 1. Place a weight of 100 lb (45 kg) on the approximate center of the step or platform.

Step 2. Run the manlift in the appropriate direction until the manlift is stopped by the safety stop.

Repeat the test for each safety stop and step.

8.1.6 Start/Stop Control Rope. Test the start/stop control rope as follows:

Step 1. Run the manlift at rated speed.

Step 2. Pull the start/stop control rope in the direction of travel. The pull of the rope shall cause the electric power to cut off and the brake to be applied.

Step 3. Pull the start/stop control rope in the direction opposite to the direction of travel. The pull of the rope shall cause the power to be restored and the brake to be released.

8.1.7 Movable Hood/Cone. If guards such as movable hoods or cones are installed, test each one by applying a force of not more than 2 lb (9 N) on the edge of the guard nearest the hinge. The application of the force shall cause the electric power to cut off and the brake to be applied.

8.1.8 Speed Tests. Speed tests shall be taken and checked against specified (rated) speed. The rated speed shall not be exceeded by more than 10% when the manlift is running empty. The speed must be tested and verified by a tachometer.

Test the speed of the manlift as follows:

Step 1. Run the manlift without any load.

Step 2. Use a tachometer to measure the speed of the manlift.

Step 3. Compare the measured speed with the specified (rated) speed. The manlift's measured speed shall not exceed the specified (rated) speed by more than 10%.

8.1.9 Emergency Brake. Test the emergency brake, if installed, per the manufacturer's procedure.

8.1.10 Mechanical Splice. Verify proper bolt torque on mechanical splice per the manufacturer's procedure.

8.1.11 Test Tag. A test tag documenting the results of the tests required by paras. 8.1.1 through 8.1.10, as applicable, shall be located on or near the head assembly.

8.2 Periodic Examinations

8.2.1 Frequency. All belt manlifts shall be inspected by authorized personnel on a monthly basis at 30-day intervals ± 3 days. Safety stops and rope control shall be checked weekly. Belt manlifts found to be unsafe shall be taken out of service immediately until properly repaired.

8.2.2 Items Covered. The periodic inspection described in para. 8.2.1 shall cover, but not be limited to, the following items:

(a) bearings

(b) belt and belt splice [cuts, damage, tracking (top and bottom)]

(c) bottom pulley and clearance

(d) bottom pulley take-up

(e) brake

(f) drive coupling

(g) driving mechanism

(h) electrical switches
(i) floor braces
(j) floor landings (housekeeping)
(k) guardrails
(l) guide rail supports and fastenings
(m) guide rail (head and foot circles)
(n) handhold and handhold fastenings
(o) hoods
(p) illumination
(q) lubrication
(r) motor
(s) motor coupling
(t) pulley lagging
(u) pulley supports
(v) rollers and slides
(w) safety stops
(x) skip on up- or down-run when mounting step (check drive train)
(y) start/stop control rope
(z) step clearance at top and bottom landings
(aa) step fastenings
(bb) steps
(cc) top pulley
(dd) vibration and misalignment
(ee) warning signs and lights

8.2.3 Unsafe Use. The individual making the inspection shall also make a special point to observe which employees are using the manlift and whether they are complying with the operating rules listed in section 7.

CAUTION: The inspecting individual shall immediately report any unsafe acts or unauthorized use to proper personnel.

8.2.4 Inspection Report. A written inspection report shall be kept of findings at each inspection, and it shall be signed and dated. Records of inspection shall be made available to duly authorized agencies. See Mandatory Appendix II for a sample inspection form.

8.3 Repair or Replacement

Repair or replacement of the following devices shall require tests as outlined in para. 8.1:
(a) brakes as required in para. 5.1.2
(b) split-rail safety stop devices
(c) movable hood/cone

8.4 Documentation

Documentation for all acceptance tests, annual tests, and inspections as required by sections 8 and 9 shall be kept and maintained by the owner or operator or both.

9 MAINTENANCE, REPAIR, REPLACEMENT, AND ALTERATIONS

Section 9 applies to maintenance, repairs, replacements, and alterations. Maintenance, repair, and replacement shall be performed for both new and existing installations. On-site activities shall have established lockout/tag out procedures.

NOTE: Check with the authority having jurisdiction for possible licensing requirements.

9.1 General Requirements

9.1.1 Maintenance, Repair, Replacement, and Alterations

9.1.1.1 Equipment covered within the scope of this Standard shall be maintained in accordance with section 9.

9.1.1.2 Safety devices required by this Standard shall be maintained.

The performance of safety devices installed per subsequent editions of this Standard, as well as the testing procedures, shall be documented by the individual(s) or firm installing the device and this record placed in the on-site documentation. See para. 9.1.2.2(b).

9.1.2 General Maintenance Requirements

9.1.2.1 A written maintenance control program (MCP) shall be in place to maintain the equipment in compliance with the requirements of section 9. The MCP shall specify examinations, alterations, cleaning, lubrication, and adjustments to applicable components at regular intervals (see section 3 for definition of "maintenance") and shall comply with the following:

(a) An MCP for each unit (see para. 9.1.1.1) shall be provided by the individual(s) or firm maintaining the equipment and shall always be viewable on-site by authorized belt manlift personnel (see section 3 for definition of "authorized personnel") from the time of acceptance inspection and test or from the time of equipment installation or alteration (see section 8).

(b) The MCP shall include, but not be limited to, the standard required maintenance tasks, maintenance procedures, and examinations and tests listed with the associated requirement (see sections 8 and 9). Where maintenance/alteration tasks, maintenance/alteration procedures, or examinations have been revised in section 9, the MCP shall be updated. Where manufacturer's specifications are no longer available, best engineering practices shall be used.

(c) The MCP shall reference the on-site equipment documentation (see para. 9.1.2.2) needed to fulfill (b) and the on-site maintenance records (see para. 9.1.3) that record the completion of all associated maintenance tasks specified in para. 9.1.3.1(a).

(d) Where the MCP is maintained remotely, instructions for on-site locating or viewing of the MCP in either hard copy or electronic format shall be posted on the controller or adjacent to the belt manlift. The instructions shall be permanently legible, with characters a minimum of 0.125 in. (3 mm) high.

(e) The specified scheduled maintenance intervals (see section 8) shall, as applicable, be based on

(1) equipment age, condition, and accumulated wear
(2) design and inherent quality of the equipment
(3) usage
(4) environmental conditions
(5) improved technology
(6) the manufacturer's recommendations

9.1.2.2 On-Site Documentation. The following documents shall be kept permanently for each unit, on-site and in hard copy, for use by belt manlift personnel:

(a) up-to-date wiring diagrams detailing circuits of all electrical protective devices and critical operating circuits

(b) procedures for inspections and tests and procedures or methods required for elevator personnel to perform maintenance, repairs, replacements, and adjustments

(1) all procedures specifically identified in this Standard shall be written (e.g., para. 8.1.9, emergency brake and para. 8.1.10, mechanical splice)

(2) unique maintenance procedures or methods required for inspection, tests, and replacement of equipment applied under alternative arrangements shall be provided by the manufacturer or installer

(c) written procedures for evacuation procedures for belt manlift by authorized personnel

9.1.3 Maintenance Records. Maintenance records shall document compliance with section 9. Instructions for locating the maintenance records of each unit for viewing on-site shall be posted on the controller or adjacent to the belt manlift. The provided instructions shall be permanently legible, with characters a minimum of 0.125 in. (3 mm) high. These records shall be retained for the most recent 5 yr or from the date of installation or adoption of this Standard edition, whichever is less, or as specified by the authority having jurisdiction. Existing maintenance records up to 5 yr shall be retained.

9.1.3.1 On-Site Maintenance Records

(a) MCP Records

(1) A record shall include the maintenance tasks listed with the associated requirements of section 9 identified in the MCP and other tests, examinations, and adjustments. The specified scheduled intervals shall be maintained.

(2) The specified scheduled maintenance intervals (see Mandatory Appendix II) shall be based on the criteria given within section 9, as applicable.

(3) MCP records shall be viewable on-site by belt manlift personnel in either hard copy or electronic format acceptable to the authority having jurisdiction and shall include, but are not limited to, the following:

(-a) site name and address
(-b) service provider name
(-c) conveyance identification (I.D.) and type
(-d) date of record
(-e) a description of the maintenance task, interval, and associated requirements of section 9
(-f) indication of completion of maintenance task
(-g) All tests as required by section 8 shall be kept with the on-site records. A test tag, complying with para. 8.1.11, shall also be provided.

NOTE: A site-specific MCP (SSMCP) (see para. 9.1.4) that includes all maintenance needs is required for each unit.

(b) Repair and Replacement Records. Repairs and replacements shall be recorded, and the records shall be kept on-site for viewing by belt manlift personnel in either hard copy or electronic format. Instructions for locating the records of each unit for immediate viewing shall be posted on the controller or adjacent to the belt manlift. The provided instructions shall be permanently legible, with characters a minimum of 0.125 in. (3 mm) high. The record shall include an explanation of the repair or replacement, date, and name of the individual(s) or firm performing the task. The record of repairs and replacements shall be retained by the owner of the equipment for the most recent 5 yr or from the date of installation or adoption of this Standard edition, whichever is less, or as specified by the authority having jurisdiction, and shall be a permanent record for the installation. These records may be kept remotely from the site but shall be readily accessible and it shall be indicated on the unit where they can be accessed.

9.1.3.2 Callbacks (Trouble Calls). A record of callbacks shall be maintained and shall include the description of reported trouble, dates, time, and corrective action(s) taken that are reported by any means to belt manlift personnel. These records shall be made available to belt manlift personnel when performing corrective action. For belt manlift personnel other than personnel performing the corrective action, records shall be available upon request.

9.1.4 Site-Specific Maintenance Control Program. The site-specific maintenance control program (SSMCP) shall contain specific detailed procedures to meet the requirements of the MCP and shall not be generic in nature for each belt manlift unit. The SSMCP is the responsibility of the service provider and the individual performing the maintenance, repairs, replacements, alterations, and tests.