

deck located over a baggage compartment.

*Rapid rail* means a subway-type transit vehicle railway operated on exclusive private rights-of-way with high-level platform stations. Rapid rail may also operate on elevated or at-grade level track separated from other traffic.

*Remanufactured vehicle* means a vehicle which has been structurally restored and has had new or rebuilt major components installed to extend its service life.

*Specified public transportation* means transportation by bus, rail, or any other conveyance (other than aircraft) provided by a private entity to the general public, with general or special service (including charter service) on a regular and continuing basis.

*Tram* means any of several types of motor vehicles consisting of a tractor unit, with or without passenger accommodations, and one or more passenger trailer units, including but not limited to vehicles providing shuttle service to remote parking areas, between hotels and other public accommodations, and between and within amusement parks and other recreation areas.

*Used vehicle* means a vehicle with prior use.

#### § 1192.4 Miscellaneous instructions.

(a) *Dimensional conventions.* Dimensions that are not noted as minimum or maximum are absolute.

(b) *Dimensional tolerances.* All dimensions are subject to conventional engineering tolerances for material properties and field conditions, including normal anticipated wear not exceeding accepted industry-wide standards and practices.

(c) *Notes.* The text of these guidelines does not contain notes or footnotes. Additional information, explanations, and advisory materials are located in the appendix.

(d) *General terminology.* The terms used in this part shall have the following meanings:

(1) *Comply with* means meet one or more specification of these guidelines.

(2) *If or if \* \* \* then* denotes a specification that applies only when the conditions described are present.

(3) *May* denotes an option or alternative.

(4) *Shall* denotes a mandatory specification or requirement.

(5) *Should* denotes an advisory specification or recommendation and is used only in the appendix to this part.

### Subpart B—Buses, Vans and Systems

#### § 1192.21 General.

(a) New, used or remanufactured buses and vans (except over-the-road buses covered by subpart G of this part), to be considered accessible by regulations issued by the Department of Transportation in 49 CFR part 37, shall comply with the applicable provisions of this subpart.

(b) If portions of the vehicle are modified in a way that affects or could affect accessibility, each such portion shall comply, to the extent practicable, with the applicable provisions of this subpart. This provision does not require that inaccessible buses be retrofitted with lifts, ramps or other boarding devices.

#### § 1192.23 Mobility aid accessibility.

(a) *General.* All vehicles covered by this subpart shall provide a level-change mechanism or boarding device (e.g., lift or ramp) complying with paragraph (b) or (c) of this section and sufficient clearances to permit a wheelchair or other mobility aid user to reach a securement location. At least two securement locations and devices, complying with paragraph (d) of this section, shall be provided on vehicles in excess of 22 feet in length; at least one securement location and device, complying with paragraph (d) of this section, shall be provided on vehicles 22 feet in length or less.

(b) *Vehicle lift*—(1) *Design load.* The design load of the lift shall be at least 600 pounds. Working parts, such as cables, pulleys, and shafts, which can be expected to wear, and upon which the lift depends for support of the load, shall have a safety factor of at least six, based on the ultimate strength of the material. Nonworking parts, such as platform, frame, and attachment hardware which would not be expected to wear, shall have a safety factor of at

least three, based on the ultimate strength of the material.

(2) *Controls*—(i) *Requirements*. The controls shall be interlocked with the vehicle brakes, transmission, or door, or shall provide other appropriate mechanisms or systems, to ensure that the vehicle cannot be moved when the lift is not stowed and so the lift cannot be deployed unless the interlocks or systems are engaged. The lift shall deploy to all levels (i.e., ground, curb, and intermediate positions) normally encountered in the operating environment. Where provided, each control for deploying, lowering, raising, and stowing the lift and lowering the roll-off barrier shall be of a momentary contact type requiring continuous manual pressure by the operator and shall not allow improper lift sequencing when the lift platform is occupied. The controls shall allow reversal of the lift operation sequence, such as raising or lowering a platform that is part way down, without allowing an occupied platform to fold or retract into the stowed position.

(ii) *Exception*. Where the lift is designed to deploy with its long dimension parallel to the vehicle axis and which pivots into or out of the vehicle while occupied (i.e., *rotary lift*), the requirements of this paragraph prohibiting the lift from being stowed while occupied shall not apply if the stowed position is within the passenger compartment and the lift is intended to be stowed while occupied.

(3) *Emergency operation*. The lift shall incorporate an emergency method of deploying, lowering to ground level with a lift occupant, and raising and stowing the empty lift if the power to the lift fails. No emergency method, manual or otherwise, shall be capable of being operated in a manner that could be hazardous to the lift occupant or to the operator when operated according to manufacturer's instructions, and shall not permit the platform to be stowed or folded when occupied, unless the lift is a rotary lift and is intended to be stowed while occupied.

(4) *Power or equipment failure*. Platforms stowed in a vertical position, and deployed platforms when occupied, shall have provisions to prevent their deploying, falling, or folding any faster

than 12 inches/second or their dropping of an occupant in the event of a single failure of any load carrying component.

(5) *Platform barriers*. The lift platform shall be equipped with barriers to prevent any of the wheels of a wheelchair or mobility aid from rolling off the platform during its operation. A movable barrier or inherent design feature shall prevent a wheelchair or mobility aid from rolling off the edge closest to the vehicle until the platform is in its fully raised position. Each side of the lift platform which extends beyond the vehicle in its raised position shall have a barrier a minimum 1½ inches high. Such barriers shall not interfere with maneuvering into or out of the aisle. The loading-edge barrier (outer barrier) which functions as a loading ramp when the lift is at ground level, shall be sufficient when raised or closed, or a supplementary system shall be provided, to prevent a power wheelchair or mobility aid from riding over or defeating it. The outer barrier of the lift shall automatically raise or close, or a supplementary system shall automatically engage, and remain raised, closed, or engaged at all times that the platform is more than 3 inches above the roadway or sidewalk and the platform is occupied. Alternatively, a barrier or system may be raised, lowered, opened, closed, engaged, or disengaged by the lift operator, provided an interlock or inherent design feature prevents the lift from rising unless the barrier is raised or closed or the supplementary system is engaged.

(6) *Platform surface*. The platform surface shall be free of any protrusions over ¼ inch high and shall be slip resistant. The platform shall have a minimum clear width of 28½ inches at the platform, a minimum clear width of 30 inches measured from 2 inches above the platform surface to 30 inches above the platform, and a minimum clear length of 48 inches measured from 2 inches above the surface of the platform to 30 inches above the surface of the platform. (See Fig. 1)

(7) *Platform gaps*. Any openings between the platform surface and the raised barriers shall not exceed ⅝ inch in width. When the platform is at vehicle floor height with the inner barrier

(if applicable) down or retracted, gaps between the forward lift platform edge and the vehicle floor shall not exceed  $\frac{1}{2}$  inch horizontally and  $\frac{5}{8}$  inch vertically. Platforms on semi-automatic lifts may have a hand hold not exceeding  $1\frac{1}{2}$  inches by  $4\frac{1}{2}$  inches located between the edge barriers.

(8) *Platform entrance ramp.* The entrance ramp, or loading-edge barrier used as a ramp, shall not exceed a slope of 1:8, measured on level ground, for a maximum rise of 3 inches, and the transition from roadway or sidewalk to ramp may be vertical without edge treatment up to  $\frac{1}{4}$  inch. Thresholds between  $\frac{1}{4}$  inch and  $\frac{1}{2}$  inch high shall be beveled with a slope no greater than 1:2.

(9) *Platform deflection.* The lift platform (not including the entrance ramp) shall not deflect more than 3 degrees (exclusive of vehicle roll or pitch) in any direction between its unloaded position and its position when loaded with 600 pounds applied through a 26 inch by 26 inch test pallet at the centroid of the platform.

(10) *Platform movement.* No part of the platform shall move at a rate exceeding 6 inches/second during lowering and lifting an occupant, and shall not exceed 12 inches/second during deploying or stowing. This requirement does not apply to the deployment or stowage cycles of lifts that are manually deployed or stowed. The maximum platform horizontal and vertical acceleration when occupied shall be 0.3g.

(11) *Boarding direction.* The lift shall permit both inboard and outboard facing of wheelchair and mobility aid users.

(12) *Use by standees.* Lifts shall accommodate persons using walkers, crutches, canes or braces or who otherwise have difficulty using steps. The platform may be marked to indicate a preferred standing position.

(13) *Handrails.* Platforms on lifts shall be equipped with handrails on two sides, which move in tandem with the lift, and which shall be graspable and provide support to standees throughout the entire lift operation. Handrails shall have a usable component at least 8 inches long with the lowest portion a minimum 30 inches above the platform and the highest portion a maximum 80

inches above the platform. The handrails shall be capable of withstanding a force of 100 pounds concentrated at any point on the handrail without permanent deformation of the rail or its supporting structure. The handrail shall have a cross-sectional diameter between  $1\frac{1}{4}$  inches and  $1\frac{1}{2}$  inches or shall provide an equivalent grasping surface, and have eased edges with corner radii of not less than  $\frac{1}{8}$  inch. Handrails shall be placed to provide a minimum  $1\frac{1}{2}$  inches knuckle clearance from the nearest adjacent surface. Handrails shall not interfere with wheelchair or mobility aid maneuverability when entering or leaving the vehicle.

(c) *Vehicle ramp—(1) Design load.* Ramps 30 inches or longer shall support a load of 600 pounds, placed at the centroid of the ramp distributed over an area of 26 inches by 26 inches, with a safety factor of at least 3 based on the ultimate strength of the material. Ramps shorter than 30 inches shall support a load of 300 pounds.

(2) *Ramp surface.* The ramp surface shall be continuous and slip resistant; shall not have protrusions from the surface greater than  $\frac{1}{4}$  inch high; shall have a clear width of 30 inches; and shall accommodate both four-wheel and three-wheel mobility aids.

(3) *Ramp threshold.* The transition from roadway or sidewalk and the transition from vehicle floor to the ramp may be vertical without edge treatment up to  $\frac{1}{4}$  inch. Changes in level between  $\frac{1}{4}$  inch and  $\frac{1}{2}$  inch shall be beveled with a slope no greater than 1:2.

(4) *Ramp barriers.* Each side of the ramp shall have barriers at least 2 inches high to prevent mobility aid wheels from slipping off.

(5) *Slope.* Ramps shall have the least slope practicable and shall not exceed 1:4 when deployed to ground level. If the height of the vehicle floor from which the ramp is deployed is 3 inches or less above a 6-inch curb, a maximum slope of 1:4 is permitted; if the height of the vehicle floor from which the ramp is deployed is 6 inches or less, but greater than 3 inches, above a 6-inch curb, a maximum slope of 1:6 is permitted; if the height of the vehicle floor from which the ramp is deployed is 9 inches or less, but greater than 6

inches, above a 6-inch curb, a maximum slope of 1:8 is permitted; if the height of the vehicle floor from which the ramp is deployed is greater than 9 inches above a 6-inch curb, a slope of 1:12 shall be achieved. Folding or telescoping ramps are permitted provided they meet all structural requirements of this section.

(6) *Attachment.* When in use for boarding or alighting, the ramp shall be firmly attached to the vehicle so that it is not subject to displacement when loading or unloading a heavy power mobility aid and that no gap between vehicle and ramp exceeds  $\frac{5}{8}$  inch.

(7) *Stowage.* A compartment, securement system, or other appropriate method shall be provided to ensure that stowed ramps, including portable ramps stowed in the passenger area, do not impinge on a passenger's wheelchair or mobility aid or pose any hazard to passengers in the event of a sudden stop or maneuver.

(8) *Handrails.* If provided, handrails shall allow persons with disabilities to grasp them from outside the vehicle while starting to board, and to continue to use them throughout the boarding process, and shall have the top between 30 inches and 38 inches above the ramp surface. The handrails shall be capable of withstanding a force of 100 pounds concentrated at any point on the handrail without permanent deformation of the rail or its supporting structure. The handrail shall have a cross-sectional diameter between  $\frac{1}{4}$  inches and  $1\frac{1}{2}$  inches or shall provide an equivalent grasping surface, and have eased edges with corner radii of not less than  $\frac{1}{8}$  inch. Handrails shall not interfere with wheelchair or mobility aid maneuverability when entering or leaving the vehicle.

(d) *Securement devices—(1) Design load.* Securement systems on vehicles with GVWRs of 30,000 pounds or above, and their attachments to such vehicles, shall restrain a force in the forward longitudinal direction of up to 2,000 pounds per securement leg or clamping mechanism and a minimum of 4,000 pounds for each mobility aid. Securement systems on vehicles with GVWRs of up to 30,000 pounds, and their attachments to such vehicles, shall restrain a force in the forward longitudinal direc-

tion of up to 2,500 pounds per securement leg or clamping mechanism and a minimum of 5,000 pounds for each mobility aid.

(2) *Location and size.* The securement system shall be placed as near to the accessible entrance as practicable and shall have a clear floor area of 30 inches by 48 inches. Such space shall adjoin, and may overlap, an access path. Not more than 6 inches of the required clear floor space may be accommodated for footrests under another seat provided there is a minimum of 9 inches from the floor to the lowest part of the seat overhanging the space. Securement areas may have fold-down seats to accommodate other passengers when a wheelchair or mobility aid is not occupying the area, provided the seats, when folded up, do not obstruct the clear floor space required. (See Fig. 2)

(3) *Mobility aids accommodated.* The securement system shall secure common wheelchairs and mobility aids and shall either be automatic or easily attached by a person familiar with the system and mobility aid and having average dexterity.

(4) *Orientation.* In vehicles in excess of 22 feet in length, at least one securement device or system required by paragraph (a) of this section shall secure the wheelchair or mobility aid facing toward the front of the vehicle. In vehicles 22 feet in length or less, the required securement device may secure the wheelchair or mobility aid either facing toward the front of the vehicle or rearward. Additional securement devices or systems shall secure the wheelchair or mobility aid facing forward or rearward. Where the wheelchair or mobility aid is secured facing the rear of the vehicle, a padded barrier shall be provided. The padded barrier shall extend from a height of 38 inches from the vehicle floor to a height of 56 inches from the vehicle floor with a width of 18 inches, laterally centered immediately in back of the seated individual. Such barriers need not be solid provided equivalent protection is afforded.

(5) *Movement.* When the wheelchair or mobility aid is secured in accordance with manufacturer's instructions, the securement system shall limit the

movement of an occupied wheelchair or mobility aid to no more than 2 inches in any direction under normal vehicle operating conditions.

(6) *Stowage.* When not being used for securement, or when the securement area can be used by standees, the securement system shall not interfere with passenger movement, shall not present any hazardous condition, shall be reasonably protected from vandalism, and shall be readily accessed when needed for use.

(7) *Seat belt and shoulder harness.* For each wheelchair or mobility aid securement device provided, a passenger seat belt and shoulder harness, complying with all applicable provisions of 49 CFR part 571, shall also be provided for use by wheelchair or mobility aid users. Such seat belts and shoulder harnesses shall not be used in lieu of a device which secures the wheelchair or mobility aid itself.

#### § 1192.25 Doors, steps and thresholds.

(a) *Slip resistance.* All aisles, steps, floor areas where people walk and floors in securement locations shall have slip-resistant surfaces.

(b) *Contrast.* All step edges, thresholds, and the boarding edge of ramps or lift platforms shall have a band of color(s) running the full width of the step or edge which contrasts from the step tread and riser, or lift or ramp surface, either light-on-dark or dark-on-light.

(c) *Door height.* For vehicles in excess of 22 feet in length, the overhead clearance between the top of the door opening and the raised lift platform, or highest point of a ramp, shall be a minimum of 68 inches. For vehicles of 22 feet in length or less, the overhead clearance between the top of the door opening and the raised lift platform, or highest point of a ramp, shall be a minimum of 56 inches.

#### § 1192.27 Priority seating signs.

(a) Each vehicle shall contain sign(s) which indicate that seats in the front of the vehicle are priority seats for persons with disabilities, and that other passengers should make such seats available to those who wish to use them. At least one set of forward-facing seats shall be so designated.

(b) Each securement location shall have a sign designating it as such.

(c) Characters on signs required by paragraphs (a) and (b) of this section shall have a width-to-height ratio between 3:5 and 1:1 and a stroke width-to-height ratio between 1:5 and 1:10, with a minimum character height (using an upper case "X") of  $\frac{5}{8}$  inch, with "wide" spacing (generally, the space between letters shall be  $\frac{1}{16}$  the height of upper case letters), and shall contrast with the background either light-on-dark or dark-on-light.

#### § 1192.29 Interior circulation, handrails and stanchions.

(a) Interior handrails and stanchions shall permit sufficient turning and maneuvering space for wheelchairs and other mobility aids to reach a securement location from the lift or ramp.

(b) Handrails and stanchions shall be provided in the entrance to the vehicle in a configuration which allows persons with disabilities to grasp such assists from outside the vehicle while starting to board, and to continue using such assists throughout the boarding and fare collection process. Handrails shall have a cross-sectional diameter between  $1\frac{1}{4}$  inches and  $1\frac{1}{2}$  inches or shall provide an equivalent grasping surface, and have eased edges with corner radii of not less than  $\frac{1}{8}$  inch. Handrails shall be placed to provide a minimum  $1\frac{1}{2}$  inches knuckle clearance from the nearest adjacent surface. Where on-board fare collection devices are used on vehicles in excess of 22 feet in length, a horizontal passenger assist shall be located across the front of the vehicle and shall prevent passengers from sustaining injuries on the fare collection device or windshield in the event of a sudden deceleration. Without restricting the vestibule space, the assist shall provide support for a boarding passenger from the front door through the boarding procedure. Passengers shall be able to lean against the assist for security while paying fares.

(c) For vehicles in excess of 22 feet in length, overhead handrail(s) shall be provided which shall be continuous except for a gap at the rear doorway.

(d) Handrails and stanchions shall be sufficient to permit safe boarding, on-