DEPARTMENT OF TRANSPORTATION

National Highway Traffic Safety Administration

49 CFR Part 571

[Docket No. NHTSA–98–4511; Notice 1]

RIN 2127–AD50

Federal Motor Vehicle Safety Standards; Platform Lift Systems for Accessible Motor Vehicles Platform Lift Installations on Motor Vehicles

AGENCY: National Highway Traffic Safety Administration (NHTSA), Department of Transportation.

ACTION: Supplemental notice of proposed rulemaking (SNPRM).

SUMMARY: This document is a supplemental notice proposing to establish two new safety standards: an equipment standard specifying requirements for platform lifts; and a vehicle standard for all vehicles equipped with such lifts.

This SNPRM significantly differs from our original proposal in several respects. Most notably, the scope of our proposal has been expanded to platform lifts installed on all motor vehicles. Other significant changes are additional interlock requirements, improved wheelchair retention and platform slip resistance tests, and, in some instances, lesser compliance standards for lifts installed on vehicles typically used solely for private transport.

The proposed equipment standard would require platform lift manufacturers to ensure that their lifts meet minimum platform dimensions and size limits on platform protrusions and gaps between the platform and either the vehicle floor or the ground. The standard would also require handrails, a threshold warning signal, and retaining barriers for lifts. Performance tests would be specified for wheelchair retention on the platform, lift strength, and platform slip resistance. A set of interlocks is proposed to prevent accidental movement of a lift and the vehicle on which the lift is installed.

The proposed vehicle standard would require vehicle manufacturers who install lifts to use lifts meeting the equipment standard, to install them in accordance with the lift manufacturer's instructions, and to ensure that specific information is made available to lift users.

The purpose of the two standards is to prevent injuries and fatalities during lift operation and to promote the uniformity of Federal standards and guidelines for platform lifts. We have drafted both with the intent of protecting lift users aided by canes or walkers as well as lift users seated in wheelchairs.

DATES: You should submit your comments early enough to ensure that Docket Management receives them not later than October 25, 2000.

ADDRESS: You should mention the docket number of this document in your comments and submit your comments in writing to: Docket Management, Room PL–401, 400 Seventh Street, SW., Washington, DC 20590.

You may call the Docket at 202–366–9324. You may visit the Docket from 10 a.m. to 5 p.m., Monday through Friday.

FOR FURTHER INFORMATION CONTACT: For non-legal issues, you may call Louis Molino, Office of Crashworthiness Standards, at 202–366–1833.

For legal issues, you may call Rebecca MacPherson, Office of the Chief Counsel, at 202–366–2992.

You may send mail to both of these officials at National Highway Traffic Safety Administration, 400 Seventh St., SW., Washington, DC 20590.

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I. Executive Summary

We initiated this rulemaking proceeding concerning safety standards for platform lifts to provide practicable performance-based requirements and compliance procedures for the regulations promulgated by the Department of Transportation (DOT) under the Americans with Disabilities Act of 1990 [1] (ADA) and to ensure the safety of vehicles equipped with those lift systems. Under our statutory authority, [2] we establish Federal motor vehicle safety standards (FMVSS) to reduce motor vehicle crashes and the resulting deaths, injuries, and economic losses. Each standard must be practicable, meet the need for motor vehicle safety, and be stated in objective terms.[3] Our authority extends to both motor vehicles and motor vehicle equipment. Further, we are authorized to regulate non-operational vehicle safety (*i.e.,* safety while being maintained, serviced or repaired or while being entered or exited) as well as operational vehicle safety (*i.e.,* safety while being operated on public roads).

We recognize that the vast majority of the American public does not need to use platform lifts. We believe, however, that individuals who need to use lifts need to be assured that lifts are as safe as possible and need to be protected from the risk associated with using unregulated equipment. For example, we know that from 1991 to 1995, at least 299,734 wheelchair users were injured. 7,121 of these users were injured as a result of some interaction with a motor vehicle. In 1990 the Centers for Disease Control determined that 1.411 million people in the United States use wheelchairs. Thus the figure of 299,734 represents an overall injury rate among the wheelchair-using population of

[1] Pub. L. 101–336, 42 U.S.C. sections 12101, *et seq.*

[2] Formerly the National Traffic and Motor Vehicle Safety Act, currently codified as 49 USC sections 30101 *et seq.*

[3] 49 USC section 30111.

[4] [Reserved]

slightly more than 21 percent. While only 7,121 of these people were injured as a result of interaction with a motor vehicle, approximately 40% of all those injuries (2,808) occurred while the individual was entering or exiting the vehicle, and 26% (1,366) were the direct result of a lift malfunction.

We also believe that the potential for lift-associated injuries will increase with time. NHTSA anticipates that more people will use motor vehicles equipped with lifts as the ADA requirements make transportation more accessible to individuals with mobility impairments and as the proportion of older people in the general population increases. As the number of lift-equipped vehicles increases, the number of lift-related injuries is also likely to go up. Indeed, our analysis has already revealed an upward trend in the number of lift-related injuries.

Issuing motor vehicle safety standards provides the best way to ensure that only lift systems that comply with objective safety requirements are placed in service. The proposed standards would ensure a level of safety and uniformity that would instill confidence in the user population.

Additionally, our regulatory framework provides specific procedures to address quickly vehicles and motor vehicle equipment that are out of compliance or contain a safety defect, including a procedure that can be followed to remedy the situation if a problem is found.

The costs associated with this proposal are relatively low because we anticipate that most lift manufacturers are already complying with the existing voluntary and Federal standards. Accordingly, lift manufacturers generally will not need to make substantial changes to their existing lifts, although some work may be needed to fully comply with the lift standard. A chart detailing which voluntary and Federal standards correspond to each of the requirements proposed in this document can be found at the end of this section.

The proposed vehicle standard would impose no additional upgrade costs on the vehicle manufacturers, although operational testing may impose some additional costs. NHTSA anticipates that those tests would be relatively simple (*e.g.,* does the threshold warning work, is there an excessive gap between the lift and the vehicle) and, therefore, a nominal additional cost. Accordingly, for the ultimate consumer, the increase in cost of lift systems currently in use and the proposed systems would be approximately $268 for smaller vehicles and $280 for larger vehicles.

We are proposing requirements for lifts designed for installation on buses and multipurpose vehicles (MPVs) with a gross vehicle weight rating (GVWR) greater than 3,220 kg (7,100 lbs) which are, in some cases, more stringent than those for lifts designed for other vehicles. We believe that this is appropriate given that most of these vehicles are for public transit and paratransit use rather than for individual use and will generally be used by a larger and more varied population and will have much different pattern of use.

We believe the proposed platform lift standard will be of benefit to lift manufacturers, as well as consumers. The proposed standard was drafted to include or exceed all existing government (FTA, ADA) and voluntary industry (*e.g.,* SAE) standards. A lift manufacturer who certifies its lift to the proposed standard could have confidence that the lift would also meet other major U.S. standards currently in force without additional testing. The table below shows the source of each requirement in the proposed FMVSS No. 141. The reader should note that only five requirements were added by NHTSA that do not already exist in other standards. Of these five, four are based on a comment to the NPRM by a service transportation provider.

SUMMARY OF REQUIREMENTS IN PROPOSED FMVSS 141, ''PLATFORM LIFTS FOR ACCESSIBLE MOTOR VEHICLES'' AND THEIR ANTECEDENTS

Requirement	Based on[1]
Threshold warning signal	SAE.
Max. platform velocity	ADA, FTA.
Max. platform acceleration	FTA, ADA, SAE.
Max. noise level	FTA.
Unobstructed platform operating volume	ADA.
Platform surface protrusions	FTA, ADA.
Gaps, transitions and openings	FTA, ADA, SAE.
Platform deflection	FTA, ADA, SAE.
Edge guards	FTA, ADA, SAE.
Wheelchair retention:	
Dynamic	ADA.
Static	FTA, SAE.
Inner roll stop	FTA, ADA.
Handrails	ADA, SAE.
Platform markings	FTA.
Platform lighting	FTA, ADA.
Platform slip resistance	FTA, ADA.
Platform free fall limits	ADA.
Control systems	FTA, ADA.
Jacking prevention	FTA, SAE.
Backup operation	FTA, ADA, SAE.
Interlocks:	
Original NPRM 5	FTA, ADA.
2 new ones	Comment to NPRM by service provider.
Another 2 new ones	Logical extension of the comment.
Crushing prevention	SAE.
Owner's manual insert	New.
Installation instruction insert	SAE.
Static Load Test I:	
Working load—lift must operate normally with 600 pound load	FTA, ADA, SAE.

SUMMARY OF REQUIREMENTS IN PROPOSED FMVSS 141, ''PLATFORM LIFTS FOR ACCESSIBLE MOTOR VEHICLES'' AND THEIR ANTECEDENTS—Continued

Requirement	Based on[1]
Static Load Test II:	
Proof load—lift must sustain a load of 1800 lbs and operate normally after the load is removed. Safety Factor = 3.	FTA.
Static Load Test III:	
Ultimate load—lift must sustain a load of 2400 lbs without failure, but does not need to operate after removal. SF=4.	ADA, SAE.
Environmental resistance for externally mounted lifts	SAE (based on FMVSS 209).
Fatigue endurance	FTA, SAE.
Operations counter	FTA (optional).

[1] ''Based on'' means that the standard or regulation shown in this column incorporated a requirement for the named area of lift operation. The proposed NHTSA requirement may, or may not be, identical to the requirement in the antecedent standard.

ADA = 49 CFR part 38, Regulations promulgated by DOT to implement the transportation accessibility requirements of the Americans with Disabilities Act, pursuant to guidelines issued by the Architectural and Transportation Barriers Compliance Board.

FTA = Federal Transit Administration Guideline Specifications for Passive and Active Lifts, procurement guidelines.

SAE = Society of Automotive Engineers J2309, ''Design Considerations for Wheelchair Lifts for Entry to or Exit from a Personally Licensed Vehicle,'' an industry consensus voluntary standard, which itself is based primarily on the Department of Veterans' Affairs procurement requirements. The DVA now uses the SAE standard as an alternative to its procurement standard.

II. Background

The ADA sweepingly endorsed the rights of persons with disabilities. The ADA created specific affirmative obligations on private entities who conduct business with the general public. Among these obligations is the requirement that transit and paratransit operators accommodate the needs of individuals with disabilities who wish to use the their services.

Title II of the ADA requires newly purchased, leased, or remanufactured vehicles purchased by public entities, like municipalities and regional transit authorities, and used in fixed route bus systems to be readily accessible to and usable by individuals with disabilities, including individuals who use wheelchairs, canes, and walkers. Title II also requires a public entity operating a demand-responsive transportation system to obtain accessible vehicles unless the system, when viewed in its entirety, provides individuals with disabilities with a level of service equivalent to that provided for individuals without disabilities. Title II further requires public entities operating a fixed route bus system (other than a bus system which provides only commuter service) to provide complementary paratransit and other special transportation services to individuals with disabilities. Title III requires that designated public transportation, provided by private entities, be readily accessible to and usable by individuals with disabilities, including individuals who use wheelchairs, canes, or walkers.

The ADA directed DOT to issue regulations to implement the transportation vehicle provisions in Titles II and III. Additionally, the ADA requires the Architectural and Transportation Barriers Compliance Board (ATBCB) to issue guidelines to assist DOT in establishing these regulations.[5] On September 6, 1991, ATBCB published its final guidelines which specify that to be considered accessible, a vehicle must be equipped with a lift or other level change mechanism and have sufficient clearance to permit a wheelchair to reach a wheelchair securement location once it is on the vehicle. (56 FR 45530) ATBCB stated that ''NHTSA is the appropriate agency to define safety tests'' for platform lifts.[6] On the same day, DOT implemented the ADA by publishing a final rule establishing accessibility regulations at 49 CFR part 38, *Transportation for Individuals with Disabilities, Subpart B—Buses, Vans and Systems,* and by incorporating and requiring compliance with the September 6, 1991 guidelines issued by the ATBCB. (56 FR 45584) This SNPRM collectively refers to the ATBCB's final accessibility guidelines and DOT's final rule as the ''ADAAG.''

III. Notice of Proposed Rulemaking

We published a notice of proposed rulemaking (NPRM) on February 26, 1993 proposing to create a new safety standard for buses equipped with lift systems. (58 FR 11562)

In the 1993 NPRM, we proposed minimum platform dimensions and limits on the size of protrusions on the platform surface and gaps between the platform and either the bus floor or the ground. In addition, we proposed requiring platforms to have wheelchair retaining barriers or devices, handrails, and a threshold warning signal. We also proposed performance tests for the evaluation of lift strength, the ability of the lift to retain a wheelchair on its platform, and the platform's slip resistance. We also proposed operational and interlock requirements to prevent accidental movement of the lift when someone is aboard. Finally, we addressed platform markings, free-fall velocity, jacking (*i.e.,* the continued effort of the lift motor to lower the lift after the lift has already contacted the ground, thereby potentially jacking up or raising that side of the vehicle), and platform deflection.

IV. Comments to the NPRM

We received approximately 35 comments on the NPRM. Commenters included vehicle manufacturers, lift manufacturers, State and local governments, school bus contractors, ATBCB, the American Public Transit Association (APTA), the National Truck Equipment Association (NTEA), advocacy groups representing individuals with disabilities, and individuals.

Most commenters, including lift and vehicle manufacturers, most State organizations, and advocacy groups, believed that there was a safety need for the proposed safety standard. However, some commenters, including a private bus contractor and the California Association of Coordinated Transportation, stated that we had not established such a need.

Commenters also addressed such issues as the extension of the standard

[5] 42 U.S.C. 12204.

[6] Throughout this document, we refer to lifts covered by the proposed standard as ''platform lifts.'' The proposed standards would not apply to ramps or devices where the disabled individual is transferred to a built-in mobility device. The lifts must meet the needs of wheelchair users and other individuals who are unable, due to a disability, to negotiate a vehicle's steps, e.g., individuals who use canes or walkers rather than a wheelchair. We have designed the proposed standard with the needs of all mobility-impaired occupants in mind.

to multipurpose passenger vehicles (MPVs), harmonization with Federal and industry standards, and test procedures and requirements for slip resistance, the control system, handrail deflection, platform protrusions, platform acceleration, fatigue endurance, static load, single point failures, wheelchair retention devices, platform stow and deploy velocity, platform gaps, roll stops, and lift stowing.

Our responses to the relevant comments are discussed below.

V. Supplemental Notice of Proposed Rulemaking (SNPRM)

A. Overview

We have decided that a supplemental notice of proposed rulemaking (SNPRM) will be beneficial for several reasons. First, the comments on the 1993 NPRM are now over six years old. Second, we have decided to propose two standards, instead of one, and to assign each of them a different Federal motor vehicle safety standard number: Standard No. 141, instead of Standard No. 401, and Standard No. 142. We believe that two standards, one addressing the platform lift and another addressing the vehicle on which the lift is installed, would best protect lift occupants and bystanders. This two-prong approach is the same one we took in regulating underride guards. Under today's proposal, lift manufacturers would have to certify that their lifts meet the proposed requirements and lift installers for new vehicles would have to ensure that the lifts are installed according to the lift manufacturer's instructions. The changed standard numbers are consistent with our three existing categories: crash or incident avoidance in the 100 series, crashworthiness in the 200 series, and post-crash events in the 300 series. Third, we have expanded the proposed platform lift safety standard so that it would apply not only to buses, but to all motor vehicles sold with lifts installed. Fourth, our supplemental proposal also refines the initially proposed requirements and test procedures to reflect relevant comments and testing done since the NPRM at our Vehicle Research and Test Center (VRTC) and other test facilities. For example, we have altered the tests for wheelchair retention, inner roll stops, and slip resistance and added a fatigue test and an ultimate load test.

We have also changed the proposed platform lift standard's title to ''Platform Lift Systems for Accessible Motor Vehicles'' (instead of ''Lift Systems for Accessible Transportation''). The modified name is intended to more accurately reflect our authority. We are only authorized to regulate motor vehicles; the term ''transportation'' in the title could have been interpreted to apply to other transportation modes such as light rail. For purposes of this document, the proposed Standard No. 141, ''Platform Lift Systems for Accessible Motor Vehicles'' will be referred to as the lift or platform lift standard; the proposed Standard No. 142, ''Platform Lift Installations on Motor Vehicles'', will be referred to as the vehicle standard.

B. Need for Federal Motor Vehicle Safety Standards

Analysis conducted by our National Center for Statistics and Analysis (NCSA) to support the NPRM revealed eight wheelchair fatalities between 1973 and 1991 due to motor vehicle-related events, including two deaths involving a platform lift. These data were obtained from the Consumer Product Safety Commission's Death Certificate File. Additionally, by analyzing the CPSC's National Electronic Injury Surveillance System's (NEISS) accident data for a five-year period, NCSA determined that between 1986 and 1990, 14 percent of the total number of wheelchair-related injuries resulting from motor-vehicle situations other than collisions were the result of a malfunctioning lift (521 cases out of 3,774). All 521 individuals were treated at the emergency room and released. 28.8 percent of the individuals (150 out of 521) sustained minor injuries, 44.3 percent (231 out of 521) sustained moderate injuries, and 26.9 percent (140 out of 521) sustained serious injuries.[7]

In response to the NPRM, most commenters, including many vehicle and lift manufacturers, advocacy groups, and State and local governments, supported the proposed Federal safety standard for platform lifts. A few commenters claimed that no safety need had been shown and that too few injuries had been documented.

Based on the available information, we have tentatively determined that a Federal motor vehicle safety standard for vehicles equipped with platform lifts will help prevent injuries and fatalities during lift operation. As explained above, NCSA's preliminary analysis showed 521 persons injured by lifts between 1986 and 1990: 381 in vans and 140 in buses. Two deaths were associated with the use of a lift between 1973 and 1991. Additionally, from 1991 to 1995, an estimated 7,121 wheelchair users were injured as a result of some interaction with a motor vehicle.[8] A total of 1,366 people, nineteen percent of the total, were injured by lift malfunction. No lift-related fatalities were reported during that time frame. Approximately three percent of the lift-related injuries from 1991 to 1995 were considered serious.

We believe there may be considerably more injuries due to malfunctioning lifts than the numbers suggest. Any analysis of deaths or injuries based on motor vehicle-incidents will necessarily underrepresent the scope of the problem. Since lift-related injuries frequently are not reported as a motor vehicle incident, no police report is filed. Consequently, the event is not entered in the data bases we access for injury and death information related to motor vehicles (e.g., police reported incidents from states, NASS, and FARS). Additionally, the injury count understates actual injuries, because it does not include incidents in which the injured persons were treated at small hospitals, emergency care centers, or doctor's offices. NEISS only includes injuries treated at hospital emergency centers. In addition, some cases in the NEISS were not included because there was not enough information to identify the accident as conclusively being related to platform lift safety.

We anticipate that more people will use motor vehicles equipped with lifts as the ADA requirements make transportation more accessible to individuals with mobility impairments and as the proportion of older people in the general population increases. NCSA's analysis has already revealed an upward trend in the number of lift-related injuries. As the number of lift-equipped vehicles increases, the number of lift-related injuries is also likely to go up.

In order to accurately explore the level of risk to individuals using lifts, one must first ascertain the size of the potential lift-using population. We recognize that the vast majority of the American public does not need to use platform lifts. In 1990, the Centers for Disease Control conducted a survey on assistive technology devices.[9] The authors of the survey determined that,

[7] The Technical Note for this analysis, ''Wheelchair Occupants Injured in Motor-Vehicle Related Accidents'', can be found under Docket 91–19, Notice 1.

[8] For an analysis of wheelchair/motor vehicle injuries from 1991 to 1995 see Technical Note, ''Wheelchair Users Injuries and Deaths Associated with Motor Vehicle Related Incidents'', September, 1997, located at Docket No. NHTSA–98–4511.

[9] LaPlante MP, Hendershot GE, Moss AJ. Assistive technology devices and home accessibility features: prevalence, payment, need, and trends. Advance data from vital and health statistics; no 217. Hyattsville, Maryland: National Center for Health Statistics. 1992.

as of 1990, 8,487,000 people in the United States use some type of mobility device.[10] Additionally, NCSA has determined that there are approximately 383,000 vehicles with adaptive equipment in the United States.[11] This estimate is based on data from our National Automotive Sampling System.

(1) We request comments on the size of the potential lift-using population. This includes individuals utilizing wheelchairs, canes, or walkers due to a mobility impairment or disability.

(2) We request comments on the number of MPVs which are ramp-equipped rather than lift-equipped. Please specify whether the MPVs are personally licensed vehicles or used for public or commercial transportation.

(3) We request information regarding the number of platform lifts installed on motor vehicles since January 1, 1997. How many of those lifts were installed on motor vehicles by lift manufacturers?

(4) How many of these lifts (manufactured after January 1, 1997) were installed (a) prior to first vehicle sale and (b) after first vehicle sale? How many lifts were installed by companies other than vehicle manufacturers?

Lift accessibility affects a mobility-impaired population that will increasingly be using this equipment. We note, in this regard, that the ADA requires lifts on most transit vehicles manufactured after 1990. The lifts on these vehicles should be safe. Issuing FMVSSs provides the best way to ensure that only systems that comply with objective safety requirements are placed in service. The proposed standards would ensure a level of safety and uniformity that would instill confidence in the user population. While the ADAAG provide a good start, they establish few objective performance criteria. For example, S38.23(b)(6) states, ''The platform surface shall be * * * slip resistant,'' but does not define slip resistance or establish how to demonstrate slip resistance.

Additionally, our regulatory framework provides specific procedures to quickly address vehicles and motor vehicle equipment that are out of compliance or contain a safety defect, including a procedure that can be followed to remedy the situation if a problem is found. In contrast, the ADAAG provide neither a procedure for establishing the safety of a lift nor one for recalling and repairing lifts of a specific model that are found to be unsafe.

Our decision to propose standards has support among commenters on the NPRM. Several commenters, including Washington State, Mobile-Tech and the Transportation Manufacturing Corporation (TMC), stated that one Federal agency should regulate all lifts. TMC stated that ''the industry should be able to rely on the government to provide a single clear set of regulations to meet the ADA.''

(5) We seek comments as to which of the proposed requirements will most contribute to the reduction of injuries, and why.

C. Harmonization With Governmental and Industry Standards

In developing both the NPRM and the SNPRM, NHTSA has examined existing standards and guidelines for platform lifts and sought to harmonize with them to the extent consistent with its statutory authority to establish safety standards. These existing standards and guidelines include the ADAAG; the set of advisory guidelines developed in 1986 under the sponsorship of the Federal Transit Administration (FTA); procurement standards developed by the Department of Veteran Affairs (DVA standards);[12] school bus standards of Indiana, Arizona, and the Eleventh National Conference on School Transportation; the Canadian Standards Association; the Swedish Board of Transport; the British Code of Practice; and industry-recommended practices developed by the Society of Automotive Engineers (SAE).

We have incorporated many aspects of the ADAAG in its proposed standard because many buses are required by the ADA to be accessible. School buses, which are exempt from the ADA, are required to comply with the accessibility standards of the Rehabilitation Act of 1973, which mirror those of the ADA. Together, these buses comprise the largest number of buses equipped with lifts.

We note that the National Technology Transfer and Advancement Act requires Federal agencies to use technical standards that are developed or adopted by voluntary consensus standards bodies when such technical standards are available (*see* section 12(d) of Pub. L. 104–113) and are consistent with authorizing legislation of the agencies. Consistent with this statute, we have reviewed current industry standards, particularly those prepared by the SAE.[13] In addition, we have reviewed current government standards, particularly those prepared by FTA.[14] This SNPRM incorporates the most relevant requirements of the voluntary standards and guidelines such as those from the DVA, SAE, FTA and the ATBCB, to the extent appropriate.

We have evaluated all of the incorporated standards and believe that they are practicable, objective, and meet a safety need. To the extent an existing standard does not meet these criteria, we have proposed a modified version of that standard or decided against incorporating that standard. Otherwise, we have incorporated existing standards to achieve uniformity.

D. Applicability and Effective Date

In the 1993 NPRM, we proposed a new safety standard for new buses (including school buses) equipped with a platform lift. We requested comments on the appropriateness of applying the proposed requirements to MPVs and to over-the-road buses (*i.e.,* a bus with an elevated passenger deck located over a baggage compartment).

We now propose applying the platform lift safety standard to lifts designed for installation on any vehicle, including over-the-road buses, school buses and MPVs.[15] Seventy-three percent of the injuries reported in the Technical Note supporting the NPRM occurred in MPVs rather than buses. Additionally, our analysis of motor vehicle/wheelchair-related injuries from 1991 to 1995 indicates that approximately 48 percent of all injuries involved MPVs, while only 12 percent involved buses. The majority of vehicles with lifts are MPVs. While not all MPV's are subject to the ADA (*i.e.,* those used only for personal transport), many are, because they are used for commercial transport (*e.g.,* van pools). Further, our concern for the safety of vehicle occupants extends beyond the ADA.

Comments were requested for over-the-road buses because, at the time of the NPRM, the ADA had not required lifts on such vehicles, if privately

[10] The specific breakdown of the types of devices is as follows: crutch—671,000; cane or walking stick—4,400,000; walker—1,687,000; wheelchair—1,411,000; scooter—64,000; other—254,000.

[11] Research Note: Estimating the Number of Vehicles Adapted for Use by Persons with Disabilities (12/97).

[12] *VA Standard Design and Test Criteria for Safety and Quality of Automatic Wheelchair Lift Systems for Passenger Motor Vehicles,* (June, 1977).

[13] Two 1995 SAE Recommended Practices apply to wheelchair platform lifts: J2092—*Testing of Wheelchair Lifts* and J2093—*Design Considerations for Wheelchair Lifts.* The SAE Standard is an update of the DVA procurement standard for wheelchair lifts published in 1977 and applies to lifts installed in personally-licensed vehicles.

[14] *Guideline Specification for Passive Lifts, Active Lifts, Wheelchair Ramps and Securement Devices,* (1992).

[15] Definitions of ''bus'', ''truck'', ''truck tractor'', and ''multi-purpose passenger vehicle'' can be found at 49 CFR Part 571.3. The definition of a ''school bus'' can be found at 49 U.S.C. 30125. The definition of a ''motor home'' used in this document can be found at 49 CFR Parts 571.105 and 571.201.

owned. On September 28, 1998 the Department of Transportation published a final rule which will require over-the-road buses to have lifts, on a graduated basis, starting in 2000.[16] Of the commenters to the 1993 NPRM, only Braun specifically commented on the applicability to this type of vehicle; it favored applying the proposed requirements to over-the-road buses. We tentatively conclude that since these buses will have lifts, those lifts should be subject to this proposed standard. Excluding lifts on over-the-road buses from the proposed standard would be counter-productive to two of the proposed standard's primary purposes: enhancing the safety of both public and private vehicles and promoting the uniformity of government standards.

Most commenters, including bus manufacturers, lift manufacturers, States, and the Paralyzed Veterans of America (PVA) supported applying the requirements to lift-equipped MPVs and buses. They believed that all lift users should be afforded a similar level of safety. TMC stated that the NCSA study indicated that most wheelchair-related injuries involved vans. Thomas Built was concerned that excluding MPVs would allow a manufacturer to circumvent compliance by omitting a seat so that it seated only ten occupants rather than eleven, changing it from a bus to an MPV.

NTEA opposed applying the lift standard to MPVs, claiming that such a requirement would result in an undue burden and increased costs on small businesses. However, most of the compliance burden would be borne by the lift manufacturers, none of whom objected to applying the requirements to MPVs. Additionally, we believe that most of the proposed requirements are already being met on either a volunteer or contractual basis under existing industry and Federal guidelines and standards.

We are proposing to make the new standards, if adopted, effective one year after publication of the final rule in the **Federal Register**. We believe that lift manufacturers generally will not need to make substantial changes to their existing lifts. We recognize, however, that some work may be needed to fully comply with the lift standard. We believe that a one-year lead time should provide plenty of time to adopt any needed changes.

(6) We seek comment on whether an effective date of one year after publication of a final rule would be sufficient to allow platform lift manufacturers to meet the requirements of the proposed platform lift standard.

E. Different Requirements for Platform Lifts Designed for Installation on Vehicles Other Than Buses and Large MPVs

We believe that fewer requirements may be necessary for platform lifts installed on MPVs than for those installed on buses. The reason for this is that lifts designed for MPV's have different usage patterns than those designed for buses. In the NPRM, we proposed a single set of requirements for buses and accordingly made no distinction between vehicle types. We did, however, seek comment on the potential applicability of the proposed standard on MPVs. Most commenters did not distinguish between applying the safety standard to MPVs used in public paratransit and those licensed to individuals for personal use. However, a few commenters, including TMC, appear to have intended their comments on MPV use to apply only to public paratransit cases. Comments were mixed about the need to differentiate the requirements based on vehicle type. Lift-U and Thomas Built stated that only MPVs used for paratransit (and not individually owned MPVs) should have to comply with the lift requirements. Stewart and Stevenson (a lift manufacturer) stated that smaller vehicles should have different requirements because they would have difficulty absorbing the weight of lifts used with larger buses. Mobile-Tech stated no differentiation should be made by vehicle type.

We not only have authority under 49 U.S.C. 30111 to adopt different requirements for vehicles based on differences in vehicle characteristics, we are mandated by law to consider whether our requirements are ''reasonable, practicable, and appropriate for the particular type of vehicle'' to which they apply. Pursuant to this authority and mandate, we are proposing requirements for lifts designed for installation on buses and MPVs with a GVWR greater than 3,220 kg (7,100 lbs)[17] which are, in some cases, more stringent than those for lifts designed for all other vehicles.[18] We believe that this is appropriate given that most of these larger vehicles are for public transit and paratransit use, rather than individual use. Since the lifts on these vehicles will generally be subjected to more stress and cyclic load and will be used by a larger and more varied population, more requirements as to platform size, controls, handrails and lighting appear appropriate.

Under FMVSS No. 208, we differentiate between vehicles having a GVWR of less than or equal to 3,851 kg (8,500 lbs) and those having a higher GVWR. We use this breakpoint because the higher rated trucks or MPVs are typically used to carry equipment or cargo (*e.g.,* maintenance vehicles) and are not primarily used to transport people. However, we believe that a lower dividing line is appropriate for this proposal. We note that the majority of MPVs used for public paratransit have GVWR greater than 3,262 kg (7,200 lbs) (*e.g.,* Ford E250, E350 or equivalent chassis). In contrast, the majority of MPVs modified and licensed to individuals for personal use have a GVWR less than 3,171 kg (7,000 lbs) (*e.g.,* Ford E150, or equivalent chassis). Accordingly, we believe that dividing the vehicles into two groups, buses and MPVs over 3,220 kg (7,100 lbs) and all other vehicles, would adequately delineate personal and transit or paratransit vehicle use. We do note that where the ADA imposes requirements on commercial entities and those entities use a vehicle that weighs less than 3,200 kg (7,100lbs), the commercial entity would still have to meet the applicable ADA requirement.

Among the proposed requirements that would not apply to lifts designed for vehicles other than buses and heavier MPVs are those for platform operating volume, handrails, platform lighting, inner roll stops, or control label lighting. In addition, if a fatigue test were adopted, it would be less stringent for these lifts since we anticipate that the lifts on these vehicles will experience fewer operating cycles per day. Each of these specific requirements are discussed in their respective sections.

Since publishing the NPRM in 1993, we have learned that in addition to buses and vans, lifts are also installed in trucks, truck tractors (*e.g.,* semis), trailers, and motor homes. These vehicles are typically used as personal vehicles. We believe that the lifts on these vehicles are not subjected to the greater use of lifts on buses or larger MPVs. Instead, the lifts installed on these vehicles are more akin to lifts installed on lighter MPVs than on lifts installed on vehicles intended for commercial transit. Additionally, individuals purchasing these lifts are

[16] 63 FR 51669 (9/28/98).

[17] The preamble and the regulatory text references all weights and measurements under the metric system with the English equivalents set out in parentheses. If the proposed regulatory text is adopted, the English equivalents will be dropped from the preamble of the final rule and the final regulatory text.

[18] The next section discusses the differences in such requirements.

unlikely to have the resources to pay for the heavier lifts. Nevertheless, the interface between lift and vehicle on some of these vehicles could pose an unreasonable risk if the platform lifts designed for the vehicles were excluded from the stricter performance requirements contemplated for larger MPVs and buses. We believe that the only serious risk to safety that is not contemplated by the proposed requirements for lighter MPVs is the lack of a mandatory inner roll stop. Accordingly, lifts designed for truck tractors, trailers and motor homes would be subject to the same performance requirements as lighter MPVs except that the lifts would be required to have an inner roll stop. Platform lifts designed for other trucks, *e.g.,* pick-up trucks, would be subject to the same performance requirements as lifts designed for lighter MPVs.

(7) We request comments about the appropriateness of having less stringent requirements for platform lifts designed for installation on vehicles that have lower GVWRs, trucks, trailers, truck tractors and motor homes, and all motor vehicles, other than buses and heavy MPVs, that are presumably for individual use.

(8) We also request comments about whether the proposed breakpoint of a 3,220 kg GVWR (7,100 lbs) for MPVs is appropriate, and whether there is any reason not to permit any of the vehicles referenced in question number 5 to comply with less stringent requirements.

F. Proposed Platform Lift Requirements

1. Threshold Warning Signal

Today's proposal differs from the NPRM in that it contains a threshold warning signal and deletes the audible and visual deployment warnings of the NPRM. The deployment warnings were based on the 1992 FTA guidelines. Since these alarms have been dropped by the FTA in its 1997 and 1999 guidelines, we have also deleted them from the proposed FMVSS.

This notice is proposing to require one signal, which would be a threshold warning alarm. For vehicles other than buses and MPVs with a GVWR greater than 3,220 kg (7,100 lb), the alarm could be either audible or visual. Lift systems designed for installation on buses and larger MPVs would need to have both a visual and an audible alarm since these larger vehicles are generally used for commercial transport. In all vehicles, the alarm would warn lift users if the lift platform were more than one inch below the vehicle's floor reference plane and if any portion of the platform threshold area [19] were occupied by any portion of the lift occupant's body or any piece of equipment. Functionality of the warning system would be tested at the location indicated in figure 3, which is attached to the proposed regulatory text. This warning requirement is based on an SAE standard requiring a warning if the lift user is within 18 inches of the platform and the platform is more than one inch below the vehicle's floor reference plane. We consider this proposed warning requirement to be particularly important in transit and paratransit vehicles where the lift may be used sequentially by more than one individual. It is also important in any personally licensed vehicle in which the lift is fitted such that the user backs onto the lift from the floor of the vehicle (this typically occurs on lifts fitted to the rear of the vehicle). This proposed requirement would not apply to rotary lifts where loading takes place entirely over the surface of the vehicle's floor.

After reviewing the available information, we have decided to drop the audible and visual deployment warnings proposed in the NPRM and to add the threshold warning requirement based on the SAE standard.

(9) We seek comments on whether an audible or visual threshold warning should be required and whether the proposed warning would achieve the desired purpose of avoiding injury to the lift user caused by an out-of-position platform.

(10) We also seek comment on whether a minimum should be specified for the size or weight of an object that causes the threshold warning to operate and, if so, what that minimum should be.

2. Platform Lift Operational Requirements

Compliance with several of the platform lift requirements would be tested in accordance with Static Load Test I which is fully discussed later in this document. Under this test, the lift would be tested both empty and with a 272 kg mass (600 lb load). As an example, this mass requirement is approached by two separate potential weight combinations: that of a 99th percentile male, weighing 109 kg (241 lbs), with a powered wheelchair, weighing 113 kg (250 lbs), for a total weight of 222 kg (491 lbs); and that of a 99th percentile male in a manual wheelchair and an attendant (245 kg (540 lbs)). While these examples are below the 272 kg limit, in some cases people and wheelchairs will weigh more, thus justifying the limit. Additionally, industry standards and the ADA require a 272 kg lifting capacity. Testing with an empty platform would be specified to ensure that the lift operates properly when carrying smaller occupants.

a. Maximum Platform Velocity

We are proposing maximum platform operating speeds for the safety of lift users, especially standees (*e.g.,* individuals who use a cane or walker). Section S5.2.2 specifies a maximum vertical and horizontal velocity of the platform of 152 mm/s (6 in/s). This is the same maximum velocity suggested in the NPRM. We received no comments about the maximum velocity in comments to that document.

We have decided to propose the 152 mm/s (6 in/s) maximum velocity to assure the safety of those on or near the lift and to be consistent with the ADAAG (49 CFR 38.23(b)(10)) and FTA guidelines (section 2.5.11), which also allow a maximum velocity of 152 mm/s (6 in/s).

We stated in the NPRM that a maximum speed limit was necessary for the safety of persons in or near the bus when the lift was being deployed. We were also concerned for the safety of lift users.

In the NPRM, we also discussed, but did not propose, requirements for platform velocity during the stowing (folding) and deploying (unfolding) sequences. Based on our review of the ADA standard, we have decided to propose that during stowing and deploying, the lift platform would have a maximum vertical and horizontal velocity of 305 mm/s (12 in/s). The purpose of this requirement, which is consistent with the ADA standards, is to reduce the potential injuries to bystanders and lift users.

The NPRM proposed that a cycle be completed within 65 seconds. The SNPRM has dropped the maximum cycling time because it is not clearly related to safety.

(11) We request comments about whether there is a safety need for velocity limits on platform stowing and deploying. Are any incidents known to have occurred that are directly related to the excessive velocity of deploying or stowing platform lifts?

[19] The platform threshold area is defined in the proposed regulatory text as the rectangular portion of the vehicle floor defined by moving a line, which lies on the edge of the vehicle floor directly adjacent to the lift platform, through a distance of 18 inches (457 mm) in a direction perpendicular to the line including any portion of a bridging device that lies within this area.

b. Maximum Platform Acceleration

We have decided to propose an acceleration limit of 0.3 g with both no load and with 272 kg (600 lbs) on the platform. The acceleration would be measured along axes horizontal and perpendicular to the lift platform. The no load condition is intended to ensure that even very light occupants would be protected against a sudden increase in lift speed, since very small children may use lifts, especially in school buses. By requiring compliance at any load in between the extremes, we intend to ensure that acceleration remains within the desired limits. In the NPRM, we proposed (section S5.10.3) a maximum platform horizontal and vertical deceleration of 0.3 g, either with no load or with a 600 pound load applied.

Lift-U commented that the platform acceleration limit of 0.3 g should only apply when the platform is loaded with 600 pounds. The commenter also believed that the channel filter class specification (CFC) 60 from SAE J211 required the test to be performed with an instrumented test dummy.

We believe that it would be inappropriate to adopt Lift-U's recommendation to test only when the platform is loaded. The 272 kg (600 lbs) mass requirement is based on a determination that this weight would approximate the upper end of lift users who use a powered wheelchair. It is unlikely that the average lift user, even in a powered wheelchair, would have a mass of 272 kg (600 lbs). Additionally, testing only at the maximum intended load level would fail to address the safety concerns of children in wheelchairs or standees, who may be subjected to greater acceleration since the lift would be carrying lighter loads.

As for Lift-U's concern about having to use a test dummy because of the NPRM's reference to SAE J211, we note that J211 merely provides a frequency response specification for the filter to be used with the accelerometer. We do not intend to specify the use of a test dummy. Section S5.2.3 in this SNPRM clarifies this point and indicates that the accelerometer would be mounted directly to the test platform or to the 272 kg mass (600 lb load).

The 0.3 g acceleration limit was originally specified by the DVA standard. The 0.3 g limit was developed by measuring the acceleration of a test dummy placed in a wheelchair when riding on a lift. The specification was designed to avoid platform acceleration levels that were frightening, uncomfortable, or potentially dangerous to a wheelchair occupant. Since the DVA standard was published, the 0.3 g acceleration limit has been incorporated into the SAE, FTA and ADA lift requirements (J211, section 2.5.11, and 49 CFR 38.23(b)(10), respectively).

We are proposing to depart from the test procedure detailed in SAE J211 by specifying testing with a CFC 3 filter instead of a CFC 60 filter. We believe a CFC 3 filter better achieves the desired result, which is essentially to replicate a wheelchair's damping characteristics. Testing performed at VRTC [20] indicated that the CFC 60 filter does not provide sufficient damping to eliminate extraneous high frequency components of the platform acceleration measurement when the transducer is mounted directly to the platform.

c. Maximum Noise Level

We have decided to propose establishing a maximum permissible noise level of 80 dBA for platform lifts.

In the NPRM, we proposed that the maximum noise level for the lift be limited to 75 dBA. We believed that such a provision was necessary to prevent noise caused by lift operation from obscuring the 85 dBA warning signal, and to allow oral instructions from the transit operator to be heard during lift operation. This proposal was identical to section 2.1.7 of the FTA-sponsored guidelines.

TMC commented that ''the task of isolating the wheelchair lift noise to 75 dba, is unreasonable. The bus engine runs while the lift is operational and the engine noise is limited by regulation to 83 dba.''

We agree with TMC that a maximum noise level of 75 dBA is too low. VRTC measured sound levels at six different locations in an urban setting to measure ambient noise.[21] VRTC found that the sound levels often exceeded 75 dBA, with the loudest location having an average of 79 dBA. Since the ambient noise level in an urban setting may often be greater than 75 dBA, we believe it is reasonable to allow a lift to exceed this noise level. 80 dBA represents the maximum permissible volume of ambient noise that allows for normal communication between two people who are three feet away from each other.[22] We believe that a maximum noise level of 80 dBA should be quiet enough to allow for easy communication between a lift operator and a lift passenger without unduly restricting lift designs. We recognize TMC's concern that bus engines are allowed to run at noise levels up to 83 dBA; however, the existence of such a regulation does not mean that bus engines actually run at that level, only that they can. VRTC tested urban noise levels at bus stops and found the ambient noise at the loudest location was less than 80 dBA. Accordingly, we believe a maximum level of allowable noise is reasonable at 80 dBA.

(12) We request information about whether any injuries can be directly attributed to noise interfering with communication between the lift user and the vehicle's driver, the lift operator, aides, or bystanders.

3. Platform Requirements

a. Unobstructed Platform Operating Volume

We are proposing a minimum clear platform width of 724 mm (28.5 in), on the upper surface of the platform, a minimum clear width of 762 mm (30 in) at and between the heights of 51 mm to 762 mm (2–30 in) above the platform surface, and a minimum clear length of 1,219 mm (48 in) measured from 51 mm (2 in) above the surface of the platform. These minimum platform size requirements are based on the ADA standards. Under the proposed platform lift standard, no part of the lift or bus (except for a required barrier on a platform edge) could intrude into the area above the portion of the platform that would be occupied by a large wheelchair at any point during its operation.

The unobstructed platform operating volume proposed in this document is the same as the one proposed in the NPRM. No commenter addressed the issue of platform operating volume requirements.

Unobstructed platform operating volume requirements address the safety of passengers in several ways. These requirements ensure that:

- Parts of the lift are not introduced into the space occupied by the user while the lift is in motion;
- Users do not injure themselves trying to enter lifts that are too small for their mobility devices; and
- Mobility device users are not left waiting at the bus stop because their devices would not fit on the lift.

We have decided not to propose an unobstructed platform requirement for platform lifts designed for installation on vehicles other than buses and MPVs with a GVWR greater than 3,220 kg (7,100 lbs). We believe requiring all lifts to comply with the proposed requirement could require major vehicle

[20] *Determination of Electronic Filtering for Post-Processing of Wheelchair Lift Acceleration Data,* (July, 1996) Docket No. NHTSA–4511.

[21] *An Evaluation of the Proposed Wheelchair Lift Safety Test Procedure,* (June, 1996).

[22] W.E. Woodson, B. Tillman, P. Tillman, *Human Factors Design Handbook, Second Edition,* McGraw, Hill, Inc. (1992).

structural modifications of some vehicles with a lower GVWR. If so, lift manufacturers can address platform dimensions and recommend appropriate vehicles and wheelchairs without referring to a uniform federal regulation. We also believe that users of personally-licensed vehicles will work with the lift installer in purchasing a lift of an appropriate size for their vehicles and wheelchairs. To assist secondary purchasers of lift-equipped vehicles, the vehicle owner's manual must specify the unobstructed platform operating volume so that lift users will know whether their wheelchair will fit on the lift.

(13) We request comments on our decision not to propose platform operating volume requirements for platform lifts designed for installation on vehicles other than buses and MPVs with a GVWR greater than 3,220 kg (7,100 lbs), but to require the manufacturer to provide an insert for the vehicle owner's manual that details the operating volume.

b. Platform Surface Protrusions

For vehicles over 3,200 kg (7,100 lbs) we propose that the upper surface of the lift platform be free from protrusions greater than 6.5 mm (0.25 in) high, and a method for measuring the height of protrusions has been added since the NPRM. The purpose of this proposed requirement is to facilitate movement on and off the platform by prohibiting protrusions that constitute obstacles to wheelchair occupants and tripping hazards to standees. After reviewing the available information, we have decided to propose the same protrusion requirements as the ADAAG for these vehicles, and retain the requirement proposed in the NPRM for all other vehicles.

ATBCB commented in response to the NPRM that the platform protrusion requirement proposed at that time was less stringent than the ADAAG.[23] PVA requested that we follow the ADAAG requiring less than 6.5 mm (0.25 in) protrusions regardless of whether they are perpendicular to the lift surface. TMC stated that its passive lift is designed with a hinge in the middle of the platform that has a 25.4 mm (1 in) protrusion above the platform surface. It claimed that the platform surface has a gradual slope that never exceeds 1:8 as it approaches the hinge. Flxible stated that our proposals differed from the ADAAG, but are acceptable and do not negate ADA and FTA guidelines. No other manufacturer stated that they would be unable to meet the proposed protrusion requirements.

In consideration of the comments of, and discussions with, the FTA and ATBCB, have changed the proposed requirement for buses and larger MPVs (those more likely to be subject to ADAAG and used by multiple people daily) to mirror the ADAAG, and we propose a method for measuring platform protrusions. We recognize that the proposed standard does not resolve TMC's concerns. However, since we received no other comments which indicated that the protrusion limits could not be met, we believe the requirements proposed today are practicable and safe. For all other vehicles (those used more often in private transportation), we continue to believe that slightly higher protrusions can be allowed for smooth rise without either compromising safety or decreasing the vehicle's accessibility as long as the transition between the platform and the protrusion is gradual. We believe that allowing protrusions to be between 6.5 mm and 13 mm (0.25–0.5 in) in these vehicles is consistent with safety for vehicles that will be used by one person with one type of mobility aid. This is also consistent with the transition requirements described in the next section.

c. Gaps, Transitions and Openings

This proposal contains several requirements dealing with gaps and openings in the lift platform and between the platform and other portions of the lift. Openings in the upper surface of the lift platform could be no greater than 19 mm (0.75 in). Since many platforms are made of open mesh, it is important that the openings be small enough that there is no risk of either wheelchair casters or the tips of a cane or walker becoming stuck in the platform surface, which can result in the lift user falling or being tipped out of his or her wheelchair. The 19 mm (0.75 in) limitation is based on the SAE standard.

In the NPRM, we proposed that vertical gaps could not exceed 15.9 mm (0.625 in) and horizontal gaps could not exceed 13 mm (0.5 in). We were concerned that gaps between the lift platform surface and the vehicle could contribute to an injury by trapping a wheelchair caster or the tip of a cane or other mobility device. We noted that our proposal was consistent with both the FTA-sponsored guidelines and ADAAG (36 CFR 1192.23(b)(7); 49 CFR 38.23(b)(7)).

PVA supported the proposed gap limits, claiming that they would prevent wheelchair casters from dropping into gaps. Lift-U and TMC believed that the proposed gap requirements needed to be clarified due to varying lift designs.

Based on the comments and other available information, we have decided to propose platform gap requirements that differ from those in the NPRM. In the NPRM, we made several assumptions in drafting the proposed gap requirements. Key among these assumptions was that the lift would always be attached to the side of the vehicle. We are now aware of some lift designs which allow for the lift to be attached to the rear of the vehicle. Other assumptions were that the outer barrier would always serve as the vehicle entrance ramp, that the outer barrier and inner roll stop would always be completely vertical when deployed, and that there would be no gaps between the barriers and the platform edge. The proposal in the SNPRM makes no such assumptions and allows for a test block to ensure that any gaps between these structures be limited. We believe that such a test block provides a simple, yet objective means of measuring gaps between the platform and its barriers. The NPRM also did not propose to require edge guards when vehicle loading took place completely within the vehicle (*e.g.,* within the step well of a bus). This position fails to adequately address the risk from gaps between the lift platform and the interior sides of the vehicle; these gaps potentially lead to a greater risk of injury than gaps between a lift platform and edge guards attached to the platform because of the relative motion.

Under the proposed requirement, no vertical surface transition could be more than 6.5 mm (0.25 in) at either the ground or vehicle level; horizontal gaps would be limited to 13 mm (0.5 in). The total allowable rise of any sloped surface, typically ramps or bridging devices, would be limited to 76 mm (3 in). The allowable slope on the portion of the rise between 6.5 mm and 13 mm (0.25–0.5 in) above the ground, platform surface or vehicle surface would be limited to a 1:2 ratio; a 1:8 ratio would be allowed for the portion of the ramp above 13 mm (0.5 in). This proposed requirement is consistent with the ADA standard for ground-level platform entrances. It matches the ground-level entrance requirements in the NPRM, except that it adds the requirement that the maximum rise cannot exceed three inches.

To facilitate entering and exiting the vehicle, the ADA, FTA and SAE standards require the height of the platform and vehicle floor to be within 15.9 mm (0.625 in) of each other and the horizontal gap between them be no

[23] The ADAAG requirement reads, ''The platform surface shall be free of any protrusions over ¼ inch high * * *''.

more than 13 mm (0.5 in). These requirements were originally found in the DVA standard. Many current lift designs use a bridging device between the lift and the vehicle floor. For these designs, the relative height and gap between the platform and the vehicle floor is not as important as the transitions and slopes that the users must traverse to enter and exit the vehicle. Accordingly, we believe that there is no compelling reason to have different specifications for entrance and exit of the platform at floor level than for entrance or exit of the platform at ground level. By using the ADA ground ramp specification at the vehicle floor level as well as the 13 mm (0.5 in) horizontal gap specification, we believe it would be imposing a more stringent requirement at the vehicle floor level than currently contemplated by the ADA standard. This more stringent standard should allow for an easier entrance into the vehicle because of less abrupt transitions.

Gaps between the upper surface of the lift platform and either the outer barriers or the inner roll stops [24] could be no greater than 15.9 mm (0.625 in) when fully deployed. The gaps would be tested with a test block which would require that a block with dimensions of 15.9 x 15.9 x 102 mm (0.625 x 0.625 x 4.0 in) not pass between any gaps. Since the test is a dimensional check, no force would need to be applied against the block. Gaps between the lift and edge guards permanently fixed to the ramp could not exceed 13 mm (0.5 in) throughout the range of lift operation. Edge guards which are an integral part of the vehicle may not be further than 6.5 mm (0.25 in) from the platform throughout lift operation.

d. Platform Deflection

We propose requiring that the platform angle not deviate from the vehicle floor by more than one degree when the platform is unloaded and by more than three degrees when the platform is loaded. The platform load for testing would have a mass of 272 kg (600 lbs), centrally placed on the lift. The amount of deviation would be measured throughout the lift cycle. This technique is consistent with the one used in the DVA standard that a specified deflection limit may not be exceeded both before and after loading. The three degree limit is consistent with both the FTA-sponsored guidelines (sections 2.2.5 and 3.1.3) and the ADAAG (49 CFR 38.23(b)(9)). This proposal is designed to correct an assumption we made in drafting the NPRM that lifts would only deflect in one direction (outward). Under this proposal, platform deflection could not exceed the stated limits in any direction. Testing throughout the lift cycle is consistent with the FTA requirement that lifts must meet the deflection limit during the entire lift cycle.

Under the NPRM's proposed test requirement, platform deflection would have been measured when unloaded and when the platform is loaded with a 272 kg mass (600 lbs). The difference between the two measurements was supposed to be less than three degrees, with a three degree limit allowed for the loaded platform.

Stewart and Stevenson preferred what it termed simpler, more descriptive language in establishing deflection amounts of the lift during tests. PVA supported our proposal to limit platform deflection to three degrees.

Platform deflection adversely affects the lift user's sense of security and balance. Additionally, excessive platform deflection could allow manual wheelchairs to be propelled towards the outer barrier, and possibly to gain sufficient momentum to pass over it. By limiting deflection to three degrees when loaded, the deflection angle would not require excessive arm strength for a wheelchair occupant to maneuver onto and off the platform. Additionally, by limiting the level of deflection in any direction, a safe platform angle would be maintained throughout the entire lift cycle.

In this SNPRM, we are proposing minor modifications in the platform deflection requirement. First, the NPRM measured deflection in a single vertical plane, assuming that only the lift would deflect and then only directly away from the vehicle. The NPRM did not account for any roll of the vehicle, which could increase the overall amount of deflection, or for deflection of the lift towards the vehicle or in a direction perpendicular to its mounting location. The revised requirement would not allow deflection greater than three degrees in any direction. Second, this SNPRM would require that the platform angle be compared to the vehicle floor angle in both the loaded and unloaded conditions.

(14) We request comment on whether, in addition to defining a limit on platform deflection with respect to the vehicle floor in FMVSS No. 141, that platform deflection with respect to the ground be limited by a specific requirement in FMVSS No. 142. In effect, this limit would dictate the extent to which the vehicle suspension would allow the vehicle to roll when the lift platform is loaded. Please specify an appropriate value for each vehicle type on which a lift might be installed.

e. Edge Guards

We propose that certain platform sides (*i.e.*, those which parallel the direction that a wheelchair would travel during entry or exit) be equipped with edge guards.

We have decided to propose the same edge guard requirements that were proposed in the NPRM. We continue to believe that such guards can help prevent a wheelchair from sliding off or being driven off the side of the platform.

PVA supported the proposal for edge guards of 38 mm (1.5 in). Lift-U stated that to prevent a trip hazard to ambulatory passengers the requirement should include the following: ''For lifts that serve as the vehicle steps when in the stowed position, edge guards shall not extend outboard beyond the lowest step riser.''

Edge guards can prevent a wheelchair from sliding off or being driven off the side of the platform. We propose requiring that the edge guard be 38 mm (1.5 in) high, a height we believe would be sufficient to deflect the motion of the wheelchair and alert the wheelchair occupant that the wheelchair is at the edge of the platform. Edge guards of this height are required by both the FTA-sponsored guidelines (section 2.2.6.1) and the ADAAG (49 CFR 38.23(b)(5)).

(15) We request comments on whether any existing lifts have edge guards that extend beyond the lowest step riser when the lift, in a stowed position, converts into vehicle steps. Do such edge guards create a tripping hazard when the lift is stowed?

f. Wheelchair Retention

This notice proposes that lifts be equipped with a wheelchair retention device that can sustain a direct force of 7,117 N (1,600 lbs) and can keep a wheelchair in an upright position throughout the range of lift operation. It is anticipated that most wheelchair retention devices would consist of an outer barrier that is permanently affixed to the lift platform.

In the NPRM, we proposed a wheelchair retention requirement that was patterned after the ADA standard. (49 CFR 38.23(b)(5)) We reasoned that there is a potential for severe injury

[24] Inner roll stops are barriers at the transition point between the lift and the vehicle. They are designed to prevent pinching or shearing of an occupant or a wheelchair between the vehicle and the lift platform when the lift moves. Outer barriers are located on the edge of the lift that is distant from the edge of the vehicle. They are designed to prevent an individual or wheelchair from falling or rolling off the lift when it is in motion or when the lift is at the vehicle's floor level.

because a wheelchair falling off a platform could drop as much as three feet. To allow manufacturers to pursue new designs, we proposed requiring ''a means of retaining a wheelchair'' rather than requirement that might be more design-restrictive.

In the NPRM, we specified a performance-related dynamic test procedure to evaluate wheelchair retention. Among the proposed test conditions were testing with a specific wheelchair (the Invacare Ranger II), using test loads representing 5th percentile females and 95th percentile males, using ballast, and requiring a test impact velocity of 1.8 m/s (4 mph). We proposed pass/fail criteria based on retention of the wheelchair on the platform with the wheelchair upright and resting on its wheels. We requested comments on the merits of a dynamic test versus a static test such as in the FTA-sponsored guidelines for active lifts (section 3.1.6.2, Option B). We also requested comments on how this static test could be applied to retention systems which do not make use of an outer barrier.

TMC favored a static test over the proposed dynamic wheelchair retention test. It stated that the standard proposed in the NPRM is not a design standard and would not give reproducible results. Analytical Engineering stated that the wheelchair retention specifications should be amended so that a reasonable equivalent static load can be applied through a set of standard wheelchairs or a similar load apparatus. Braun favored the dynamic outer barrier test, claiming that tests cannot be duplicated by static testing. Thomas Built, Lift-U, and the Florida Department of Education also favored dynamic testing.

We have decided to propose adding a 7117 N (1,600 pound) static overload requirement, in addition to the NPRM's dynamic impact test for wheelchair retention. This static load requirement (S5.5.7.3) is consistent with the SAE and DVA Standards. Testing at VRTC [25] has shown that the dynamic impact test alone is insufficient to measure a restraining device's structural integrity because the load it applies to the barrier begins and ends in a fraction of a second and does not achieve a 7,117 N (1,600 lbs) level. We believe that having both a dynamic impact and static test on the wheelchair retention device would be complementary since they test for different problems. (The static test only tests for structural integrity, while the dynamic test ensures that the wheelchair (especially a powered chair) cannot climb over the barrier.) We note that even though the SAE and DVA standards have only a static load requirement, they also specify that the wheelchair retention device must be an outer barrier with a minimum height of 76 mm (3 in). In order to avoid specifying a particular design, the SNPRM proposes the dynamic test to ensure the wheelchair would be kept on the lift if the wheelchair were driven into the wheelchair retention device. For outer barriers, which are the most common wheelchair retention device, these failure modes include climbing over and pushing down the barrier. By contrast, the static overload requirement provides a means of determining whether the wheelchair retention device has a sufficient design factor of safety.

Based on testing at VRTC, [26] we have decided to propose certain revisions to the test procedure for wheelchair retention (S6.4.3). We have added proposed text to clarify that the test device, representing a motorized wheelchair, must be under its own power when impacting the wheelchair retention device. We believe that this modification more accurately reflects the real world, particularly in determining if the test device could go over an outer barrier. The proposed impact speeds have also been changed to match more closely the speeds a powered wheelchair is capable of achieving. The test device would be set up so the foot rests, at their lowest point, have a height one inch below the barrier. This would allow the front of the foot rest to clear the barrier; this tends to raise the wheelchair upon impact with the barrier, causing higher barriers to be climbed. The test would be run with no load in the wheelchair and with the lift platform level with the ground. The testing at VRTC found this configuration to be the worst case scenario in relation to the height of barrier climbed. The testing also indicated that a load in the wheelchair and inclination of the lift platform contributed to the wheelchair tipping over the barrier. The modified impact test procedure is designed to avoid this failure mode which cannot be prevented by the traditional outer barrier designs.

It should be noted that the selection of this test device should in no way be interpreted as an indication that only mobility aids fitting such description may be safely carried. NHTSA recognizes that all types of mobility aids including all designs of manual and powered wheelchairs, scooters, and other devices are used as seats on motor vehicles.

A new dynamic requirement is being proposed for rotary lifts, which are loaded at the vehicle level while the lift is inside the vehicle (S.5.5.7.2). These types of lifts are typically referred to by the industry as rotary lifts because the platform rotates out of the vehicle with its plane parallel with the vehicle floor. The direction of ground level loading is parallel to the vehicle's side rather than perpendicular to it. Rotary lifts usually have outer barriers on both ends of the platform which are perpendicular to the direction of loading. The new test procedure for rotary lifts (S6.4.4) would assess the wheelchair retention device on both sides of the platform at a point in the lift operation between the ground and vehicle floor.

Instead of proposing a specific wheelchair model, we have decided to propose the critical dimensions, configuration and components necessary to define a wheelchair with sufficient specificity to ensure that any wheelchair used for testing purposes would perform equivalently in the dynamic impact of the wheelchair retention device. These parameters include the center of gravity, mass, wheel size and wheel type, axle separation, frame configuration, seat type and footrest design. The proposed parameters are consistent with several of the most popular wheelchairs currently being produced.[27] Should there be a significant change in wheelchair design, these criteria would have to be changed.

g. Inner Roll Stop

We propose requiring an inner roll stop to prevent a wheelchair from rolling off the platform's inner edge. For arc lifts, i.e., lifts which move in arcing motion from vehicle edge to a distance away from the vehicle edge during operation, this device prevents the lift occupant from falling off the inner edge. For all lifts, it prevents injuries due to pinching and shearing of the occupant's legs or feet between the platform and the vehicle. For elevator lifts, i.e., lifts which move vertically during operation, it is possible for the vehicle wall below the wheelchair lift entry door to perform the function of the inner roll stop.

In the NPRM, we proposed a static test, noting that we had no information about any incidents involving a failure of the inner roll stop to retain a wheelchair on the platform. We further

[25] Further details of this testing can be found in report, *Wheelchair Retention Device Impact Test Analysis,* (July, 1996) Docket No. NHTSA–4511.

[26] Id.

[27] Further detail on the selection of parameters for the test wheelchair can be found in report, *Determination of Center of Gravity of Cross-Bar Framed Power Wheelchairs,* (July, 1996) Docket No. NHTSA–4511.

noted that the possible scenarios appear to involve less risk of serious injury than if a wheelchair were to fall off the outer edge of the platform. The NPRM's proposed inner roll stop test was based on the FTA-sponsored guidelines (section 3.1.6.2), modified by specifying the length of time that the load is applied and the amount of permissible deflection.

The NPRM allowed the deployment of outer barriers or inner roll stops when occupied by a user or mobility aid. AATP and Alameda-Contra Costa Transit District recommended that barriers not be allowed to rise when occupied. Alameda commented that a wheelchair user had been injured when her chair flipped over due to the caster being on the outer barrier when it began to deploy. The agency has decided to propose a requirement in the section on interlocks (S5.11.2.7–8) to reduce the likelihood of this occurring.

Thomas Built believed that while an inner roll stop should be required, the requirement should depend entirely on the lift configuration. For instance, with its elevator lift, the inner roll stop is inherent to the lift design, so a separate stop is unnecessary. Stewart and Stephenson stated that a deployable inner roll stop (or inner barrier) should be a part of all lifts.

We believe that the new proposal, along with its associated test procedure (S6.5), is more comprehensive and representative of the real world than the NPRM. It both assures adequate strength for the roll stop and more clearly specifies a test to determine if the roll stop prevents pinching.

We have decided to propose a two part requirement (S5.5.8.3). First, to ensure an inner roll stop has adequate strength, the proposed regulation would require the inner roll stop to prevent the front wheels of a wheelchair from passing over the inboard edge of the platform when it is at ground level. This would be tested by impacting the roll stop with a wheelchair. Second, the roll stop would have to prevent pinching of the wheelchair between the platform and any other structure throughout the range of passenger operation. This would be tested by placing a wheelchair on the platform and attempting to move it toward the roll stop as the platform is raised.

We have decided to propose requiring the inner roll stop for all lifts designed for installation all vehicles over 3,220 kg (7,100 lbs) GVWR. The inner roll stop would not be required for lifts designed for vehicle under this GVW rating. However, if one were not supplied for those vehicles, the vehicle owner's manual and the operating instructions would be required to specify that when the lift is loaded at ground level, the wheelchair must face outward. Lack of an inner roll stop is consistent with the SAE standard and current lift designs on the market for personally-licensed vehicles. Due to the small size of many lifts in personally-licensed vehicles, the wheelchair must face away from the vehicle to fit on the platform. It is unlikely that wheelchair or scooter users in this orientation would be pinched between the vehicle and the platform. It is also unlikely that multiple mobility device users would use a lift in a personal vehicle. Consequently, we believe that there is no need to require the inner roll stop in this instance. Likewise, the rear wheels are unlikely to pass over the edge of the platform without first impacting the side of the vehicle due to their size. We are not proposing to exempt lifts designed for truck tractors, trailer, motor homes, or other larger vehicles typically used only by individuals from the inner roll stop requirement, because we are concerned that the rear wheels of a wheelchair could pass over the edge of the platform without first impacting the vehicle, given the distance of the vehicle's undercarriage from the ground.

(16) We request comments on whether there are any platform lifts designed for installation on vehicles under 3,220 kg (7,100 lbs) which, when used appropriately with compatible wheelchairs, allow the wheelchair occupant to be pinched between the vehicle and the lift.

h. Handrails

We have decided to propose that handrail displacement be limited to 25 mm (1 in) when a force of 445 N (100 lbs) is applied and to 102 mm (4 in) when a force of 1,112 N (250 lbs) is applied. We believe that it is more appropriate to test at two force levels than at a single force level of 445 N (100 lbs). The 445 N (100 lbs) force's purpose is to assure that the handrail is stable and has adequate clearance around it. The 1,112 N (250 lbs) force's purpose is to assure that the handrail is sufficiently strong to prevent catastrophic failure.

In the NPRM, we proposed requiring lifts to have movable handrails. The NPRM specified such characteristics as the handrails' length (203 mm (8 inches)) and a maximum allowable deflection of 3.2 mm (0.125 in) (i.e., ability to withstand a 100 pound force).[28]

Ricon commented that the requirement of a maximum handrail deflection of 3.2 mm (0.125 in) while under a load of 445 N (100 lbs) ''is not consistent with current industry practice nor is it practical in terms of the wheelchair lift design environment.'' The commenter reported measuring handrail deflections of 45 to 51 mm (1.75–2.0 in) when subjected to 334 N (75 lbs) applied load. Ricon recommended a displacement limit of 32 mm (1.25 in) with a 334 N (75 lb) applied load.

We believe Ricon's recommendation is too lenient. We agree, however, that the requirement proposed in the NPRM may have been too stringent. We believe that the allowable displacements proposed in this SNPRM are achievable goals for a well designed handrail. Handrails assist passengers in moving on and off the platform, provide a sense of security to occupants during lift operation, and help prevent lateral movement of wheelchairs. ADAAG require movable handrails for all lifts (49 CFR 38.23(b)(13)).

In evaluating handrail displacement due to applied load, we assumed a U-shaped handrail with a maximum height of 965 mm (38 in) and tube diameter of 38 mm (1.5 in). We further assumed that the handrail is made of 1010 hot-rolled steel with a wall thickness of 1.6 mm (0.0625 in). A load applied perpendicular to the vertical plane of the handrail at the top would yield the maximum displacement. We also assumed that the handrail is cantilevered or rigidly attached to the lift platform at its base. The displacement of the handrail under these conditions can be represented by equation (1), which is half of the displacement of a single cantilever beam.

Equation One: $x = (PL^3)/(6EI)$

P = Applied Load

L = Distance from base to applied load = 0.946 m (37.25 in)

E = Modulus of Elasticity of handrail material = 20×10^{10} Pa (29×10^6 psi)

I = Moment of inertia of handrail cross-section

The moment of inertia of a hollow tube is given in equation (2).

Equation Two: $I = (D^4 - d^4)\pi/64$

D = Tube outer diameter = 0.0381 m (1.5 in)

d = Tube inner diameter = 0.0349 m (1.375 in)

Substitution of values into equations (1) and (2) results in a displacement of x = 10.3 mm (0.41 in) for a 445 N (100 lb) force, an amount that exceeds the

[28] Handrail displacement consists of three parts: (1) looseness in the handrail's components at the attachment point to the platform, (2) deformation of the handrail components due to applied load, and (3) deformation of the lift platform where the handrail is attached.

NPRM's proposed limit of 3.2 mm (0.125 in).

A real-world handrail design would not be as rigid as a cantilever beam because the handrail is attached to the lift platform which would deform when loaded. It is difficult to estimate the displacement caused by deformation of the platform since it is design dependent. However, any deformation at the platform attachment point would have an even greater effect at the opposite end of the handrail. Thus, the actual displacement due to applied load could be much greater than calculated from the deformation of the handrail alone.

There are several problems with estimating displacement caused by any looseness in the handrail components at the point of attachment. Such a measurement would be both design and construction dependent as well as being affected by wear in specific components. Any looseness at the point of attachment to the lift platform would be multiplied at the distal end of the handrail.

In tentatively selecting the displacement limit for the 445 N (100 lb) force, we have assumed that the components of displacement caused by the deformation of the handrail and the deformation of the lift platform each cause 10.2 mm (0.4 in) of displacement. We further assume that the component of displacement due to looseness in the handrail contributes half as much to the total displacement. Thus, the proposed displacement limit is set to a value of x = 25 mm (1.00 in).

We took a different approach to determine the displacement limit at the 1,112 N (250 lb) force level. At this force level, it is possible that the yield strength of handrail components may be exceeded. Therefore, while it is acceptable for the handrail to permanently bend, it would be impermissible for it to break. With the yield strength of the material exceeded, equation (1) is no longer valid. The requirement for displacement must be sufficient to assure that the handrail has not fractured in a catastrophic way. The displacement for the 1112 N (250 lb) force is, therefore, set at x = 102 mm (4 in).

We note that handrails would not be required for lifts designed for vehicles other than buses and MPVs with a GVWR greater than 3,220 kg (7,100 lbs). While handrails are important in public transit where there may be standees on the lift platform, lifts in personally licensed MPVs, trucks, truck tractors, or motor homes are usually occupied each time by the same wheelchair user. Additionally, a wheelchair user may be unfamiliar with the lift on a public transit vehicle, leading to a greater risk of injury if a support mechanism is not provided. However, unfamiliarity should not be a problem with the lifts installed on personally-owned vehicles. A user who desires a handrail on the lift installed in his personal vehicle has the option of purchasing a lift equipped with one.

i. Platform Markings

NHTSA tentatively concludes that it is appropriate to require lifts on buses and MPVs with a GVWR over 3,220 kg (7,100 lbs) to be equipped with platform markings. We are proposing platform markings to provide greater visibility for the edges of the lift, thus reducing the potential for injuries. Throughout the range of operation, all platform edges, the visible edge of the vehicle floor or bridging device, and any designated standing areas would be outlined with markings at least one inch wide and of a color that contrasts with the color of the rest of the platform by 60 percent. These requirements are based on the FTA-sponsored guidelines (section 2.2.9).

In the NPRM, which proposed the same requirements (for buses fitted with lifts) without specifying the degree of color contrast, NHTSA requested comments about two alternate methods of designating the amount of contrast required. Under the first alternative, the lift would be marked with a contrasting color or shade observable with the unaided eye from 3.05 meters (10 ft). Under the second alternative, the lift would be marked with a contrasting color or shade with at least 70 percent contrast, defined as follows:

$$\text{Contrast} = 100*((L1–L2)/L1)$$

where:

L1 = luminance in footlamberts of the lighter color or shade, and

L2 = luminance in footlamberts of the darker color or shade.

While Lift-U and Iowa stated that platform marking requirements were not necessary, PVA and Braun supported such requirements. Several other commenters addressed specific aspects of the marking and illumination requirements. All American Transit stated that the designated standing area should be 305 mm to 330 mm (12–13 in) wide with a solid contrasting color band running laterally across the lift. It also stated that 15 different color patterns and contrasting color shades do not comply with NHTSA's 70 percent contrast alternative. Analytical Engineering favored the 70 percent contrast alternative, but requested clarification about whether the source of illumination was natural or artificial. Flxible stated that it uses white or yellow platform markings which meet ADA contrast criteria and that the mat area is always black. Flxible suggested allowing either footprints or a boxed perimeter area to designate the lift standing zone. Braun and Lift-U favored specifying a degree of contrast with a test procedure that would involve testing the degree of contrast in platform markings with the unaided eye from ten feet. Iowa recommended specifying a single color to keep costs low. Florida stated that the degree of contrast for platform perimeter markings should be specified and that only the perimeter should be marked. TMC stated that the degree of color contrast on the standing area of the platform should be left to the judgment of the lift manufacturer and/or transit provider.

Based on our continued belief that platforms should be marked, we are proposing the same platform marking information as in the NPRM. The agency believes marking the platform surface, as well as any roll stops and retention devices contributes to the safety of lift users because they will be able to accurately gauge the lift's perimeter both during daylight and when the lift is illuminated. One minor change to the NPRM is that rather than proposing footprints, the standing area would be outlined. NHTSA is proposing alternative number two, with a color contrast of 60 percent. We have decreased the amount of color contrast proposed in the NPRM because, based on testing at VRTC, we believe significantly more contrast combinations will be able to satisfy a contrast requirement of 60 percent and that there is no diminution of safety.

j. Platform Lighting

NHTSA tentatively concludes that it is appropriate to require lifts on buses and MPVs with a GVWR over 3,220 kg (7,100 lbs) to be equipped with lighting. We are concerned that without such lighting, a lift user could be injured in poor light conditions. We believe that the lighting from the vehicle's interior would be insufficient to illuminate the lift. Under the proposed standard, based on the FTA guidelines, the vehicle would have sufficient lighting to provide at least 54 lumens per square meter (5 lm/ft^2) of illuminance on all portions of the lift platform throughout the range of operation. At ground level, all portions of the lift's unloading ramp would be required to have at least one lumen per square foot of illuminance.

The proposed lighting requirements would apply to all lifts designed for installation on buses, including school

buses, and MPV over 3,220 kg (7,100 lbs).

In the NPRM, we decided not to propose a lighting requirement, even though the FTA-sponsored guidelines and ADAAG contained such requirements. We stated that even though lighting is an important safety feature at night time or during times of low ambient light, this may be one area that does not need to be covered by both the ADA standards and a safety standard. Any bus required to be accessible by the ADA will have illumination for the lift. We believed that the only lift-equipped vehicles which will not be subject to the ADA are school buses.

We requested comments about whether there should be a lighting requirement for school buses.

Thomas, Iowa, and PVA supported a lighting requirement for both lift operation and lift control illumination, because buses operate at night. Washington State stated that the lighting requirement should be uniform for all vehicles. In contrast, St. Paul Schools stated that lights should not be required because the light from the interior of the bus is sufficient to light the lift.

We have tentatively decided not to apply the lift lighting requirements to lifts designed for vehicles other than buses and MPVs with a GVWR of greater than 3,220 kg (7,100 lbs). The NPRM did not contemplate a distinction between lighter and heavier MPVs. However, the agency notes that the current industry standard for lifts in personally-licensed vehicles (SAE J2093) does not require lighting. Moreover, users of personally-licensed vehicle are typically familiar with the use of their lifts and in many cases the user is the operator. These individuals can have lighting installed if they believe it is necessary.

k. Platform Slip Resistance

A slip resistant platform surface is important to reduce the potential for injuries for both wheelchair and non-wheelchair lift users. The FTA-sponsored guidelines (section 2.2.2) and the ADAAG (49 CFR 38.23(b)(6)) specify that the platform surface should be slip resistant. NHTSA proposes that the lift platform surfaces have a static coefficient of friction of at least 0.65 when tested, while wet, in any direction. The test procedure for testing slip resistance is based on the ANSI/RESNA WC–13 test procedure.[29]

The coefficient of friction would be tested by wetting the platform surface in the manner prescribed in the standard. Testing would occur within 30 seconds of wetting the platform surface with distilled water.

The proposed test procedure differs completely from the one proposed in the NPRM. The previously proposed test called for the equivalent of a coefficient of friction of not less than 0.6. Instead of specifying the requirement in terms of coefficient of friction, we proposed a surrogate requirement whose satisfaction by a platform surface would be equivalent to its compliance with this coefficient of friction. We believed that the 30 degree value required under that test was consistent with the 0.6 coefficient of friction. The agency requested comments on the merits of both the test proposed and other methods of measuring surface friction.

Commenters stated that the test was too costly and cumbersome since it required testing with three separate wheelchairs and because no wheelchair could remain upright when positioned on a platform that was angled 30 degrees.

We believe that the commenters' concerns were valid since many wheelchairs will tip over at any angle greater than seventeen degrees. Since the originally proposed test was impractical, the SNPRM proposes, with some modification, an established voluntary industry standards test.

l. Platform Free Fall Limits

This proposal would limit the free fall velocity of a failing lift system to 305 mm/s (12 in/s) as the result of a single-point failure. Additionally, any single-point failure could not change the lift platform's angular orientation by more than two degrees in any direction. These two limitations would need to be met when the lift is under its own power. The requirements proposed today differ from the one in the NPRM only in the addition of a maximum allowance in the change of platform angle due to a single-point failure of the lift system.

Commenters on the NPRM had stated that they believed it was impossible to protect against multi-system failures of the lift system. NHTSA tentatively agrees with this assessment and has accordingly made the platform requirement on the change in angle applicable only to single-point system failures.

We believe that a free fall speed in excess of 305 mm/s (12 in/s) and excessive change in platform angle could result in serious injury to lift occupants. We believe the requirement is now consistent with the ADA standard which specifies that no single-point failure may cause an occupant to be dropped.

m. Control Systems

New requirements for the control panel are being proposed today. The new requirements would still require that the controls be clearly marked in English, but otherwise differ substantially from a panel similar to the one illustrated in the NPRM.

The new proposal differs significantly from the NPRM because the original proposal was deemed too design restrictive. The new proposal should allow for all types of controls on all types of lifts.

Concerns were raised in response to the NPRM that many lift operators may have a limited command of English. NHTSA recognizes this as a potential problem and considered using visual icons to explain appropriate lift use. Such symbols, however, may only complicate any potential problem since there is no universal system of icons which apply to the required lift functions. We believe that individuals with limited English can be properly trained on how to operate the lift and to recognize the few words required for the control panel.

Under this proposal, a vehicle with a platform lift system would be required to have a minimum set of switches. More switches could be provided at the discretion of the manufacturer, but those listed below would be the required minimum.

The system must have a switch which can activate the control system. This would be marked as the ''power switch''. The system would also have a switch used to move the lift from a stowed position to the vehicle floor loading position (marked either ''deploy'' or ''unfold''), a switch to lower the lift platform (marked ''down'') and to raise the lift (marked ''up''), and a switch to move the lift from the vehicle floor loading position to a stowed position (marked ''stow'' or ''fold''). The characters would be at least one inch in height to allow for easy viewing and, in buses and MPVs over 3,220 kg (7,100 lbs), would be illuminated when the vehicle's headlights are on. All functions in the control system would be required to be activated in a sequential fashion so that no two functions could be performed at the same time. The controls could be activated through the use of one or more switches. To avoid confusion, we would like to point out that a switch commonly called a ''rocker switch'' is, in fact two switches, one at either end of the rocker. Hence a rocker switch with ''up'' on one end and ''down'' on

[29] *Evaluation of ANSI/RESNA WC/13 to Determine the Coefficient of Friction of wheelchair Lift Platforms,* (July, 1996), Docket No. NHTSA–4511.

the other would meet the requirement for a switch for each of those functions.

On lifts designed for installation in buses and on MPVs over 3,200 kg (7,100 pounds), all controls would be required to be located together in an area where the lift operator has an unobstructed view of the lift and any occupants at all times. However, additional power switches could be installed in another location to protect against inadvertent activation of the lift system. The requirement that all controls be located together is proposed to address the following concerns:

- A lift operator should be able to immediately appraise all the available controls with the assurance that there are no other controls in a different location.
- A single set of controls would prevent the inadvertent operation of the platform lift by a second person.

This requirement is not proposed for MPVs under 3,200 kg and the other vehicle types typically used as personal vehicles, because these lifts must be operated by the user and hence controls for different functions must be available in different locations. For example, ''on'', ''fold'', and ''unfold'' may be located at the vehicle driver's position and/or near the lift's doorway, while ''up'' and ''down'' may need to be located on the lift itself. This presents no safety hazard to someone who is both the lift operator and its passenger and who is familiar with its operation through daily use.

Simple instructions, including instructions on how to operate the lift's back-up system, would be provided near the controls and would be in English. This requirement would not preclude a manufacturer from additionally providing instructions in a language other than English.

The agency is aware that lift systems on personally-licensed vehicles are commonly equipped with remote control systems which use fewer than four switches and have no ''power'' switch. These systems are powered at all times. We are considering exempting lifts designed for installation on vehicles other than buses and multipurpose passenger vehicles with a GVWR greater than 3,200 kg (7,100 lbs) from the control requirements, however we have several safety concerns about the controls currently available. The agency is seeking comment on those control systems to help us address those concerns.

Any single-point failure in the control system would not prevent operation of the vehicle's interlocks.

(17) NHTSA requests comments on whether there are icons for lift operation adopted by voluntary standards groups or by the lift industry.

(18) NHTSA requests comments on whether, absent industry-accepted icons, pictographs depicting proper lift operation would be helpful or practicable.

(19) NHTSA requests comments on whether commenters have experienced, or know of instances involving, inadvertent lift deployments, or other unsafe situations, which would not have occurred had the user needed to first switch on the power system?

(20) NHTSA requests comments on whether commenters have experienced, or know of instances involving, inadvertent lift deployments, or other unsafe situations, that were the result of different switches for opening doors, unfolding lift platforms, or lowering the lift platform to the ground?

(21) NHTSA requests comments on whether application of the control requirements described above, and given in S5.7 of the proposed regulatory text, would result in undue hardship to the users of lifts in private vehicles or increase the cost to manufacture the control systems for lifts in those vehicles?

n. Jacking Prevention

Jacking, or the continued effort of the lift mechanism to lower the lift platform after it has already contacted the ground, can cause serious damage to a lift system. This continued force on the ground leads to the vehicle lifting from the ground, much like a tire jack raises a vehicle. Such damage, while not harmful to the individual using the lift at the time, can result in an unsafe condition for future lift occupants. Accordingly, NHTSA proposes that the lift's control system or design prevent the raising of any portion of the vehicle by the lift system if continued force is exerted in a downward motion on a lift that is at its ground level loading position. This requirement would not apply to lift systems that are being operated in their manual back-up mode.

This proposal is unchanged from the one in the NPRM and is adopted from the FTA guidelines (section 2.5.6)

o. Backup Operation

Under this proposal, a lift system would be required to have a manually-operated backup system that allows for full use of the lift in the event of a power failure. The backup would allow for full lift use so that any occupants in the vehicle or on the lift could be safely transported off the vehicle or lift and the lift could then be stowed so that vehicle movement is not impeded. Operating instructions would be located near the control panel and in the vehicle owner's manual. This requirement, which is essentially unchanged from the one proposed in the NPRM, is consistent with the FTA guidelines (section 2.5.7) and the ADAAG (49 CFR 38.23 (b)(3), which require ''an emergency method of operation.''

p. Interlocks

Interlocks are electrical or mechanical devices which prevent the operation of a device until a particular event has occurred. The use of interlocks in a lift system is designed to prevent injury due to mechanical or human error. The interlock system proposed today consists of ten separate interlocks.

Five of these interlocks were proposed, in some form, in the NPRM and are consistent with FTA guidelines (section 2.5.8) and ADAAG (49 CFR 38.23(b)(2) and 38.23(b)(5)).

The first interlock would prevent the forward and rearward motion of the vehicle when the lift is not in its stowed position (S5.11.2.1). This is to prevent injury to a lift passenger from the vehicle's beginning to move while the lift is occupied and also to prevent injuries to passengers and bystanders and property damage that could be caused by moving the vehicle with the lift deployed. The second interlock would prevent the deployment of the lift system unless the vehicle's lift access door is open and some affirmative action has been taken to prevent the vehicle from moving (S5.11.2.2). This action may be as simple as setting the parking brake.

Two separate interlocks are proposed to prevent movement of the lift, either up or down, if the lift's inner roll stop (S5.11.2.4) or its wheelchair retention device (S5.11.2.5) is not deployed. These two requirements are designed to keep lift occupants secure during lift movement.

The lift must be incapable of stowage if any portion of the lift platform is occupied by either a portion of the lift user's body or a mobility aid (S5.11.2.3). The interlock proposed in the NPRM only prevented platform stowage when the lift was occupied by an object weighing 50 pounds or more. It did not account for very small occupants who may use the lift. A new interlock is being proposed that would prevent the stowage of a wheelchair retention device unless the lift platform is within three inches of the ground (S5.11.2.6). This interlock should prevent serious injury due to the retention device prematurely releasing a wheelchair while the lift platform is a considerable distance from the ground. The agency is not proposing to add an interlock

addressing the possible stowage of an inner roll stop. Lift manufacturers would already have to satisfy an operational test in which the inner roll stop would prevent any pinching or shearing. Additionally, we are not aware of any injuries caused by a prematurely stowing inner roll stop and, therefore, an interlock may constitute an unnecessary expense.

Two additional interlocks were added to this proposal based on comments by the Alameda-Contra Costa Transit District which reported that it knew of an incident in which a wheelchair flipped over because the outer barrier began to deploy while the wheelchair was on it, as well as on comments by AATP, Inc. The new interlock requirements would not allow the deployment of an occupied outer barrier (S5.11.2.8) or inner roll stop (S5.11.2.9).

In addition to the three new interlocks designed to prevent injuries from moving retention barriers, two new interlock requirements are being proposed in this document. First, the lift would have to stop moving once it encounters resistance while moving in a downward manner (5.11.2.7). This is to prevent potential crushing injuries and jacking and is consistent with SAE standards. Second, the lift could not move either up or down when both the vehicle floor or its bridging device and the lift is occupied (S5.2.11.10). This new interlock proposal is intended to prevent any injury from the bridging device shifting before the lift occupant is safely aboard either the vehicle or the lift.

We are not proposing at this time to quantify the amount of resistance necessary to activate the interlock that is designed to prevent jacking or crush injuries, even though NHTSA has required a quantifiable level of force not be exceeded in FMVSS No. 118 on power windows and sun roofs. Likewise, we have not proposed a specific test to measure whether a lift platform, outer barrier or inner roll stop are occupied. The agency recognizes that it will need to develop some way of measuring an unacceptable level of resistance and lift occupation as part of its compliance test procedure. However, we first seek comment on how best to measure an unacceptable threshold for resistance and occupancy.

(22) The agency seeks comment on any known injuries which have occurred due to an improperly stowing inner roll stop. In addition, the agency seeks comment on whether it should add an interlock that would prevent or limit the stowage of an inner roll stop while the lift platform is moving and the form this interlock should take.

(23) NHTSA requests comment on whether it should specify a quantifiable amount of resistance that would trigger the operation of an interlock to prevent jacking and crush injuries, and if so, what that amount should be.

(24) NHTSA requests comment on whether it should specify a means of determining if a lift platform, inner roll stop, vehicle floor, bridging device, or outer barrier are occupied, and if so, what that means should be.

(25) The agency requests comment on whether there are methods that platform lift manufacturers are using or contemplate using to determine resistance and occupancy other than force or weight detection.

q. Owner's Manual Insert

Under this proposal, the lift manufacturer would be required to provide a lift installer with an insert for the vehicle owner's manual that would contain three important pieces of information:

- A maintenance schedule, since insufficient maintenance has been identified as a safety risk to users;
- Lift usage instructions, which provide redundancy in case the instructions located near the lift are lost or damaged; and,
- For lifts designed for vehicles other than buses and MPVs over 3,220 kg (7,100 lbs), the lift's platform operating volume and whether the wheelchair user must enter the lift with the rear wheels nearest the vehicle.

This last set of instructions is to protect lift users from shearing or pinching their feet between the lift and the vehicle due to the possible lack of an inner roll stop which is not required for lifts on vehicles other than buses and MPVs greater than 3,220 kg (7,100 lbs).

r. Installation Instruction Insert

Lifts may be manufactured according to all of the proposed requirements discussed above but still be unsafe due to improper installation. NHTSA believes the lift manufacturers are in the best position to know how to properly install their lifts, as well as which vehicles are suitable for their lifts. Accordingly, we assume that each lift is delivered to the installer with printed instructions for proper installation, as well as a diagram or schematic depicting proper lift installation.

We are proposing a new requirement that lift manufacturers include with each set of installation instructions a page which specifies a list of vehicle make/models for which the lift was designed or a list of vehicle characteristics necessary for lift installation consistent with the lift manufacturer's compliance certification (*e.g.,* appropriate vehicle weight, dimensions, structural integrity), and any instructions that must be placed in the vehicle owner's manual, or elsewhere in the vehicle in order to comply with the requirements of FMVSS No. 141 once the lift is installed. Lift manufacturers may choose to include simple test procedures to assure that the lift, once installed, is fully operational and continues to meet the lift requirements of the standard.

(26) The agency requests comment on whether, and to what extent, it is common for lifts to be delivered to the installer without printed installation instructions and whether installers believe the new regulation should require lift manufacturers to include installation instructions with each lift.

4. Test Conditions and Procedures

NHTSA is proposing a series of test procedures to determine whether a lift complies with the various sections of the proposed standard. Each lift would be required to be capable of meeting all of the tests specified in the proposed standard, both separately and in the sequence specified. The point in the testing at which compliance with each requirement is to be checked is also specified. Where a range of values is specified, the equipment must be able to meet the requirements at all points within the range.

Although compliance with the proposed requirements may be tested with the lift attached to a vehicle, several of the required tests can also be performed on test jigs without the loss of rigor or an alteration in test outcome. Testing via a test jig may prove substantially cheaper than performing all tests while the lift is attached to the test vehicle. Tests that may have an effect on the vehicle/lift interface (*i.e.,* the inner roll stop, static load I, fatigue endurance, and static load II), must be performed on the lift while it is attached to the vehicle. All other tests may be performed on the test jig.

The slip resistance test, environmental resistance test, wheelchair retention impact test, handrail test, wheelchair retention overload test, and static load test III could be performed on a test jig rather than on the lift when attached to the vehicle. The attachment hardware could be replaced if damaged as a result of removing the lift from or installing the lift on the vehicle or test jig. The static load test III, which tests for ultimate load, could be performed on the test jig since the intent of the test is to over-stress the lift to determine if the design

safety factor has been met rather than to over-stress the hardware attaching the lift to the vehicle.

Static load test I is an operational test in which the lift is exercised through its full cycle of movement. The lift is required to function in both loaded (272 kg (600 lb)) and unloaded conditions.

Static load test II would require testing the lift system with a load of 816 kg (1,800 lbs) (proof load). Static load test II has a safety factor of three (*i.e.,* three times the weight requirement of static load test I) and tests the durability of the lift system and its components. The 816 kg (1,800 lb) static load test requires proof of lift operation after the test and is consistent with the applicable FTA guideline.

The proposed static load test III would require testing the entire lift system with a load of 1,088 kg (2,400 lbs) (ultimate load), which is the same as the highest load under the DVA and SAE standards. Since both the DVA standard and the SAE standard require an ultimate load of 1,088 kg (2,400 lbs) for the entire lift system, we have tentatively determined that 1,088 kg (2,400 lbs) is an appropriate weight for testing the lift system with an ultimate load. The ADAAG takes a different approach by specifying a design factor of safety of six for components likely to wear (such as cables, pulleys and shafts) and a design factor of safety of three for non-working components (like the platform, frame and attachment hardware) with a working load of 600 pounds. [30]. This requires no testing on the part of the manufacturer, but a design analysis. We are confident that a lift which meets the battery of tests proposed here would meet, or exceed, the ADAAG factor of safety requirements.

We believe our proposal, using three static tests and a fatigue test is consistent with the level of safety sought by the SAE, DVA, FTA, and ADAAG. [31]

a. Test Pallet and Load

All static load tests would be conducted using a test pallet which would mimic the size of a standard powered wheelchair. The test pallet base would measure 660 mm × 686 mm (26 in × 27 in). The test pallet for the static load test I and the fatigue endurance test (if adopted) would be made of a rectangular steel plate of uniform thickness. The load which rests on the pallet would be made of rectangular steel plates of uniform thickness with dimensions between 533 mm and 686 mm (21–27 in). This proposal varies from the NPRM in that it specifies the test pallet base rather than allowing a base within a range of dimensions.

b. Static Load Test I—Working Load

Using the control panel, the test operator would deploy the stowed platform, center a test pallet on the lift platform and center a load with a total mass of 272 kg (600 lbs) on the pallet, and lower the platform to the ground level loading position, stopping once midway through the process. The pallet would be removed from the platform and the lift cycled up, stowed, and cycled back down, stopping midway in each up or down cycle. The test pallet would then be reloaded onto the platform which would be cycled up to the vehicle floor level loading position, stopping once midway through the cycle. The pallet would be removed and the lift stowed. The operator would turn off the power supply and repeat the test manually, using the lift's manual backup mode.

The test procedure for the static load test I has not changed since the NPRM, except that more aspects of lift performance would be required to be measured under this proposal. In all, 44 specific requirements of proposed FMVSS No. 141 would be assessed using the static load test I; only six of these standard requirements are new. Unlike the NPRM, this proposal clearly specifies which requirements must be checked under static load test I.

c. Static Load Test II—Proof Load

The static load test II, which tests the lift system with a load of 816 kg (1,800 lbs), is designed to ensure that the lift/vehicle system can safely sustain loads up to three times the maximum expected load of 272 kg (600 lbs) and remain operable. The test would require a loaded pallet to be placed on the lift platform while the lift is at the vehicle floor level loading position. The load would remain on the platform for two minutes, after which it would be removed. The lift and vehicle would be examined for separation, fractures or breakage, and static load test I would be repeated. Repeating static load test I will determine whether all lift components still function.

This proposed test is the same as the static load test II in the NPRM except that the repeated static load test I was referred to as static load test III in the NPRM. This proposal specifies a different test for static load test III.

d. Static Load Test III—Ultimate Load

NHTSA has incorporated static load test III into this proposal to ensure that the lift could support the heaviest wheelchair/user combination without catastrophic failure. The lift is not required to operate at this static load. It is anticipated that a load this size is likely to cause permanent deformation to the lift/vehicle system. The test would require a test pallet and load with a mass of 1,088 kg (2,400 lbs) be placed on the lift platform. The loaded pallet would be left on the platform for two minutes and then removed. The lift would then be inspected for separation, fracture, or breakage.

This test differs from Static Load Test II, the proof test, in that the lift need not remain operable after application of this load. Static Load Test I is *not* repeated after Static Load Test III as it is with Test II.

We have included questions below about the extent to which test III adds to the safety benefits and cost of test II and how our proposed test procedures compare to the requirements of ADAAG.

(27) NHTSA requests comments about the extent to which static load test III adds safety benefits to those of static load test II.

(28) NHTSA requests comments on the estimated costs of testing based on the proposed requirements, for tests performed by or for lift manufacturers, vehicle manufacturers, and, if applicable, lift installers.

(29) NHTSA requests comments from lift manufacturers currently making ADA-compliant lifts on how they test their lift systems for compliance with 49 CFR 38.23(b)(1), and whether the level of safety required by the tests proposed here meets that required by 49 CFR 38.23(b)(1).

G. Additional Platform Lift Requirements Under Consideration

This section sets forth some additional requirements being considered by the agency for inclusion in the final rule. These proposed requirements are new and were not addressed in the NPRM. We request comment on whether, based on their costs and their safety benefits, any or all the requirements should be adopted in the final rule.

[30] 49 CFR 38.23 (b)(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.

[31] Fatigue testing is more appropriate for identifying problems with components that wear, than a separate, higher, safety factor for these components during a static test.

We considered proposing requirements that would require lift components to meet voluntary industry standards regarding mechanical, electrical and hydraulic components.[32] Platform lifts have a variety of designs and may utilize many different types of mechanical, hydraulic, and electrical components. The FTA guidelines and SAE standards identify relevant industry standards for such components and require compliance with those standards. We believe incorporation of relevant voluntary industry standards could be design restrictive and may provide for a level of redundancy at the component level which would not add to the overall safety of the lift system. Accordingly, NHTSA has decided against proposing these component requirements.

(30) NHTSA requests comments on whether these requirements on components have sufficient safety value to merit inclusion in FMVSS No. 141.

1. Environmental Resistance

Some lifts are designed to be stowed outside the vehicle. Many of these lifts are stowed under the vehicle's undercarriage, but they may also be stowed in another manner. Accordingly, the lifts are exposed to the weather at all times. The SAE standard requires such externally mounted lifts to comply with the salt spray tests of FMVSS No. 209. Since corrosion may accelerate wear, NHTSA is proposing to adopt the SAE requirements for externally mounted lifts. Attachment hardware, whether located outside of the vehicle or within the vehicle compartment, would likewise be subject to the hardware requirements of FMVSS No. 209, which permit compliance either by passing the salt spray test or by being electroplated. These requirements are proposed as S5.4 and S6.3 of the standard.

(31) NHTSA requests comments on whether these or other environmental resistance tests merit inclusion in FMVSS No. 141.

2. Fatigue Endurance

If adopted, fatigue cycle testing would be required for all platform lifts. The testing is intended to simulate the real world use of the lift and would identify failure modes associated with wear and the fatigue fracture of components. Static testing alone is insufficient since the ability to carry a static load, even with an added factor of safety, does not always correlate with the ability to withstand the repeated application of lower level loads. With repeated loading, small flaws in lift components may increase in size and become cracks. The cracks can spread until there is insufficient material to sustain the applied load, creating the possibility of catastrophic failure. The FTA guideline requires a fatigue test in which the lift is tested through 15,600 cycles, with the first 600 cycles using 272 kg mass (600 lb load) and the remaining 15,000 cycles using 181 kg mass (400 lb load). The SAE standard requires 4,400 cycles using 272 kg mass (600 lb load), with one-half of the cycles tested with a load and one-half of the cycles tested empty. The California Highway Patrol and U-Lift support the adoption of a test similar to the one found in the FTA guidelines.

NHTSA has decided to propose incorporating these two requirements for lifts designed to be installed on buses and MPVs over 3,220 kg (7,100 lbs). We believe the form of fatigue testing in the SAE standard more closely represents actual use. However, lifts designed for buses and larger MPVs are more appropriately subjected to a larger number of cycles than those designed for other vehicles, since the lift systems for transit and paratransit vehicles will be subjected to more use than the lift system on a personally-owned vehicle. A single load level of 600 pounds is consistent with ADAAG.

Lifts designed for installation on vehicle other than buses and larger MPVs would be required to meet the SAE test. The applied load would be 272 kg (600 lbs) during half of the 15,600 up and down cycles of the fatigue testing. Half of the 15,600 cycles would be unloaded and incorporate a fold and unfold sequence. These requirements would be included as S5.6.1 and S6.7 of the proposed standard.

(32) NHTSA requests comments on whether these fatigue endurance tests merit inclusion in FMVSS No. 141.

3. Operations Counter

NHTSA is considering whether to require lift systems to have an operations counter that would record each complete up and down cycle of the lift. The counter would enable the vehicle owner to closely follow the manufacturer's maintenance schedule. Proper maintenance has been identified as a crucial factor related to lift safety. The FTA guidelines make the use of such a counter optional. These requirements would be included as S5.11, S5.12 and S5.12.2 of the standard.

(33) NHTSA requests comments on whether an operations counter should be included in FMVSS No. 141.

H. Proposed Vehicle Requirements

NHTSA is also proposing a vehicle standard, FMVSS No. 142, which would apply to new vehicles equipped with platform lifts. We are concerned that a lift that meets the proposed platform lift standard could nevertheless be unsafe if the lift were improperly installed or if the required instructions and warnings were not placed in the vehicle by the lift installer. The proposed vehicle standard would apply to all motor vehicles. Certification that a lift complies with FMVSS No. 141 is the responsibility of the platform lift manufacturer. The proposed vehicle standard does not impose any additional certification requirements. However, vehicle manufacturers, including alterers who modify a vehicle prior to sale to the vehicle's first purchaser, should be aware that under the applicable statute,[33] they will be responsible for the recall (and all associated costs) on non-compliant platform lifts. They may seek reimbursement for the cost of a recall from the lift manufacturer. Lift manufacturers would be responsible for the recall of all non-compliant lifts installed in a vehicle after first purchase.

1. Installation Requirements

Under the proposed vehicle standard, the vehicle manufacturer would have to install a platform lift in accordance with the lift manufacturer's written instructions. Since not all platform lifts are appropriate for all types of vehicles, and the proposed lift standard is less stringent for some types of vehicles, a platform lift could only be installed on a vehicle of the type identified by the lift manufacturer as appropriate for that particular lift. Likewise, the platform lift must be installed according to the installation instructions which may include operational tests to assure that the lift is properly installed and operates safely.

(34) NHTSA requests comments on whether a vehicle standard requiring compliance with a platform lift manufacturer's installation instructions will adequately ensure that platform lifts are safely installed. If not, what additional requirements are necessary?

2. Owner's Manual Insert Requirements

The vehicle manufacturer would also be required to ensure that the vehicle owner's manual inserts required by the proposed platform lift standard are

[32] *E.g.,* ANSI B1.5, ''Acme Screw Threads, 1994''; SAE EJ429, ''Mechanical & Material Requirements for Externally Threaded Fasteners'', August 1983; SAE J1292, ''Automobile, Truck, Truck Tractor, Trailer & Motor Coach Wiring'', October 1981; and SAE J517, ''Hydraulic Hose'', June 1994.

[33] 49 U.S.C. 30118.

actually placed in the vehicle owner's manual. The inserts can serve their purpose only if they are placed where a vehicle user can readily find and use them. NHTSA believes that only the vehicle manufacturer can guarantee the insert's proper placement. The items that a vehicle manufacturer would have to ensure were placed in the vehicle owner's manual under this proposed standard are (a) simple instructions regarding lift operation, including back-up operation, as specified in S5.10 of the proposed FMVSS No. 141; (b) the maintenance schedule specified in S5.12 of the proposed FMVSS No. 141; and (c) for vehicles with a GVWR less than or equal to 3,220 kg (7,100 lb), the dimensions constituting the unobstructed platform operating volume and information on whether a wheelchair user must back on to the lift platform because the lift does not have an inner roll stop.

3. Control System

NHTSA believes that only the vehicle manufacturer can ensure that the control system set forth in the proposed lift standard is installed in a manner consistent with that standard. Accordingly, we have tentatively determined that for buses and MPVs over 3,220 kg (7,100 lbs) GVWR, the vehicle manufacturer should be required to ensure that all lift operating controls be located together and in a position where the control operator has a direct, unobstructed view of the lift passenger, and any wheelchair, throughout the range of lift operation. The platform lift manufacturer would be required to provide the vehicle manufacturer with instructions regarding proper placement of the control system as part of the installation instructions.

The vehicle manufacturer would also be required to place a copy of the lift operating instructions near the controls so that all potential lift operators would have ready access to those instructions.

VI. Regulatory Analyses and Notices

Executive Order 12866 and DOT

Regulatory Policies and Procedures

Executive Order 12866, ''Regulatory Planning and Review'' (58 FR 51735, October 4, 1993), provides for making determinations whether a regulatory action is ''significant'' and therefore subject to Office of Management and Budget (OMB) review and to the requirements of the Executive Order. The Order defines a ''significant regulatory action'' as one that is likely to result in a rule that may:

(1) Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or Tribal governments or communities;

(2) Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;

(3) Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or

(4) Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order.

We have considered the impact of this rulemaking action under Executive Order 12866 and the Department of Transportation's regulatory policies and procedures. This rulemaking document was reviewed by the Office of Management and Budget under E.O. 12866, ''Regulatory Planning and Review.'' This action has been determined to be ''significant'' under the Department of Transportation's regulatory policies and procedures because of the level of public interest in the rulemaking.

However, this action would not be economically significant. The agency estimates that between 8,288 and 10,425 buses and MPVs larger than 3,220 kg (7,100 lbs) would be subject to the proposed standards, either directly or indirectly, annually. We believe the average cost of a new lift, excluding the cost of installation, is approximately $5000. This rulemaking would add approximately $291 to the cost of each lift system of the type design for larger vehicles. The cost of upgrade per lift would be approximately $280, and the cost of certification per lift would be approximately $11.

For lifts designed for installation on MPVs under 3,220 kg (7,100 lbs), trucks, truck tractors, and motor homes, and any other motor vehicles we believe that between 8,800 and 17,000 lifts per year would be required to comply with the proposed platform lift standard. This rulemaking would add approximately $268 to the cost of each lift system. The cost of upgrade per lift would be approximately $255, and the cost of certification per lift would be approximately $13.

The figures given for upgrade costs are relatively low because we anticipate that most lift manufacturers are already complying with the existing voluntary and Federal standards. The proposed vehicle standard would impose no additional upgrade costs on the vehicle manufacturers, although operational testing may impose some additional costs. NHTSA anticipates that those tests would be relatively simple (e.g., does the threshold warning work, is there an excessive gap between the lift and the vehicle) and, therefore, a nominal additional cost.

Regulatory Flexibility Act

Pursuant to the Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*, as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996) whenever an agency is required to publish a notice of rulemaking for any proposed or final rule, it must prepare and make available for public comment a regulatory flexibility analysis that describes the effect of the rule on small entities (i.e., small businesses, small organizations, and small governmental jurisdictions). However, no regulatory flexibility analysis is required if the head of an agency certifies the rule will not have a significant economic impact on a substantial number of small entities. SBREFA amended the Regulatory Flexibility Act to require Federal agencies to provide a statement of the factual basis for certifying that a rule will not have a significant economic impact on a substantial number of small entities.

The businesses and organizations likely to be affected by a rulemaking concerning this rulemaking are:

- Transit, paratransit, intercity, and school bus manufacturers (SB),
- Life manufacturers (SB),
- Public/private transit and paratransit bus owners and operators (e.g., municipal transit authorities) (SO/SB),
- Public/private and city/county school bus operators (SB/SO/SGJ),
- School bus manufacturers that make/sell their own lift equipment (SB), and
- Dealers and distributors of school buses (SB).

We have prepared a regulatory flexibility analysis (RFA) which is contained in the Preliminary Regulatory Evaluation (PRE). The PRE is entered in the docket. Based on this analysis, we have tentatively concluded that the proposed rule will not have a significant economic impact on a substantial number of small entities.

Executive Order 13132

We have analyzed this proposal in accordance with Executive Order 13132 (''Federalism''). We have determined that this proposal may have federalism implications. Many states and local transit authorities already have their own minimum lift performance

requirements for transit, paratransit, intercity and school buses in order to safely accommodate persons with disabilities. However, our initial determination is that the federalism implications are not sufficiently defined at this time to warrant preparation of a Federalism consultation. It should be noted that, regardless of that determination, the we find that the objective of the proposed rulemaking, establishing minimum performance requirements for transit, paratransit, intercity, school bus and personal transport lifts, requires action that can only be implemented effectively at the national level.

Executive Order 13045

Executive Order 13045 (62 FR 19885, April 23, 1997) applies to any rule that: (1) is determined to be ''economically significant'' as defined under E.O. 12866, and (2) concerns an environmental, health or safety risk that NHTSA has reason to believe may have a disproportionate effect on children. If the regulatory action meets both criteria, we must evaluate the environmental health or safety effects of the planned rule on children, and explain why the planned regulation is preferable to other potentially effective and reasonably feasible alternatives considered by us.

This rule is not subject to the Executive Order because it is not economically significant as defined in E.O. 12866. Nor does it involve decisions based on health risks that disproportionately affect children.

Executive Order 12778

Pursuant to Executive Order 12778, ''Civil Justice Reform,'' we have considered whether this proposed rule would have any retroactive effect. We conclude that it would not have such effect. Under 49 U.S.C. 30103, whenever a Federal motor vehicle safety standard is in effect, a State may not adopt or maintain a safety standard applicable to the same aspect of performance which is not identical to the Federal standard, except to the extent that the state requirement imposes a higher level of performance and applies only to vehicles procured for the State's use. 49 U.S.C. 30161 sets forth a procedure for judicial review of final rules establishing, amending or revoking Federal motor vehicle safety standards. That section does not require submission of a petition for reconsideration or other administrative proceedings before parties may file suit in court.

National Environmental Policy Act

We have analyzed this proposed amendment for the purposes of the National Environmental Policy Act and determined that it would not have any significant impact on the quality of the human environment.

Paperwork Reduction Act

Under the Paperwork Reduction Act of 1995, a person is not required to respond to a collection of information by a Federal agency unless the collection displays a valid OMB control number. This proposal proposes new information collection requirements in that both new regulations would require certain disclosures to third parties. These requirements and our estimates of the burden to lift and vehicle manufacturers are given below. There is no burden to the general public.

- Estimated burden to lift manufacturers to produce an insert for the vehicle owner's manual stating the lift's platform operating volume, maintenance schedule, and instructions regarding the lift operating procedures: 10 manufacturers × 24 hrs amortized over 5 yrs = 48 hrs per year.
- Estimated burden to lift manufacturers to produce an insert for the lift installation instructions identifying the vehicles on which the lift is designed to be installed: 10 manufacturers × 24 hrs amortized over 5 yrs = 48 hrs per year.
- Estimated burden to lift manufacturers to produce two labels for operating and backup lift operation:

10 manufacturers × 24 hrs amortized over 5 yrs = 48 hrs per year
Total estimated burden = 144 hrs per year

- Cost to lift manufacturers to produce:

Label for operating instructions: 27,398 lifts × $0.13 per label = $3,561.74
Label for backup operations: 27,398 lifts × $0.13 per label = $3,561.74
Owner's manual insert: 27,398 lifts × $0.04 per page × 1 page = $1,095.92
Installation instruction insert: 27,398 lifts × $0.04 per page × 1 page = $1,095.92
Total annual cost = $9,315.32

Organizations and individuals desiring to submit comments on the information collection requirements should direct them to the Office of Information and Regulatory Affairs, OMB, Room 10235, New Executive Office Building, Washington, DC 20503; Attention Desk Officer for National Highway Traffic Safety Administration.

NHTSA will consider comments by the public on this proposed collection of information in evaluating:

- Whether the proposed collection of information is necessary for the safety of lift users,
- The accuracy of the agency's estimate of the burden of the proposed collection of information,
- The quality, utility, and clarity of the information to be collected, and
- The opportunities to minimize the information collection burden.

OMB is required to make a decision concerning the collection of information contained in this proposal between 30 and 60 days after publication of this notice in the **Federal Register**. Therefore, a comment to OMB is best assured of having its full effect if OMB receives it within 30 days of the publication of this proposal. This does not affect the deadline for public comment to the National Highway Traffic Safety Administration on the merits of the proposed regulations.

National Technology Transfer and Advancement Act

Section 12(d) of the National Technology Transfer and Advancement Act (NTTAA) requires NHTSA to evaluate and use existing voluntary consensus standards [34] in its regulatory activities unless doing so would be inconsistent with applicable law (*e.g.,* the statutory provisions regarding NHTSA's vehicle safety authority) or otherwise impractical. In meeting that requirement, we are required to consult with voluntary, private sector, consensus standards bodies. Examples of organizations generally regarded as voluntary consensus standards bodies include the American Society for Testing and Materials (ASTM), the Society of Automotive Engineers (SAE), and the American National Standards Institute (ANSI). If NHTSA does not use available and potentially applicable voluntary consensus standards, we are required by the Act to provide Congress, through OMB, an explanation of the reasons for not using such standards.

We have considered and, to the extent consistent with our statutory obligations, proposed several voluntary standards and guidelines as part of this rulemaking. A full description of the agency's actions in this regard can be found elsewhere in this document under section V. C ''Harmonization with Governmental and Industry Standards''

[34] Voluntary consensus standards are technical standards developed or adopted by voluntary consensus standards bodies. Technical standards are defined by the NTTAA as ''performance-based or design-specific technical specifications and related management systems practices.'' They pertain to ''products and processes, such as size, strength, or technical performance of a product, process or material.''

as well as throughout the discussion on the specific requirements proposed today.

Unfunded Mandates Reform Act

Section 202 of the Unfunded Mandates Reform Act of 1995 (UMRA) requires Federal agencies to prepare a written assessment of the costs, benefits and other effects of proposed or final rules that include a Federal mandate likely to result in the expenditure by State, local or tribal governments, in the aggregate, or by the private sector, of more than $100 million in any one year (adjusted for inflation with base year of 1995). Before promulgating a NHTSA rule for which a written statement is needed, section 205 of the UMRA generally requires us to identify and consider a reasonable number of regulatory alternatives and adopt the least costly, most cost-effective or least burdensome alternative that achieves the objectives of the rule. The provisions of section 205 do not apply when they are inconsistent with applicable law. Moreover, section 205 allows us to adopt an alternative other than the least costly, most cost-effective or least burdensome alternative if we publish with the final rule an explanation why that alternative was not adopted.

This proposal does not propose to impose any unfunded mandates under the Unfunded Mandates Reform Act of 1995. This proposal does not meet the definition of a Federal mandate because it would not result in costs of $100 million or more to either State, local, or tribal governments, in the aggregate, or to the private sector. We anticipate that the total cost of this rule, if issued, would be between eight and ten million dollars, well below the $100 million threshold of the Unfunded Mandates Reform Act. Thus, this proposal is not subject to the requirements of sections 202 and 205 of the UMRA.

Regulation Identifier Number (RIN)

The Department of Transportation assigns a regulation identifier number (RIN) to each regulatory action listed in the Unified Agenda of Federal Regulations. The Regulatory Information Service Center publishes the Unified Agenda in April and October of each year. You may use the RIN contained in the heading at the beginning of this document to find this action in the Unified Agenda.

VII. Comments

How Do I Prepare and Submit Comments?

Your comments must be written and in English. To ensure that your comments are correctly filed in the Docket, please include the docket number of this document in your comments.

Your comments must not be more than 15 pages long. (49 CFR 553.21). We established this limit to encourage you to write your primary comments in a concise fashion. However, you may attach necessary additional documents to your comments. There is no limit on the length of the attachments.

Please submit two copies of your comments, including the attachments, to Docket Management at the address given above under ADDRESS.

How Can I Be Sure That My Comments Were Received?

If you wish Docket Management to notify you upon its receipt of your comments, enclose a self-addressed, stamped postcard in the envelope containing your comments. Upon receiving your comments, Docket Management will return the postcard by mail.

How Do I Submit Confidential Business Information?

If you wish to submit any information under a claim of confidentiality, you should submit three copies of your complete submission, including the information you claim to be confidential business information, to the Chief Counsel, NHTSA, at the address given above under **FOR FURTHER INFORMATION CONTACT**. In addition, you should submit two copies, from which you have deleted the claimed confidential business information, to Docket Management at the address given above under ADDRESS. When you send a comment containing information claimed to be confidential business information, you should include a cover letter setting forth the information specified in our confidential business information regulation. (49 CFR part 512.)

Will the Agency Consider Late Comments?

We will consider all comments that Docket Management receives before the close of business on the comment closing date indicated above under DATES. To the extent possible, we will also consider comments that Docket Management receives after that date. If Docket Management receives a comment too late for us to consider it in developing a final rule (assuming that one is issued), we will consider that comment as an informal suggestion for future rulemaking action.

How Can I Read the Comments Submitted by Other People?

You may read the comments received by Docket Management at the address given above under **ADDRESS.** The hours of the Docket are indicated above in the same location.

You may also see the comments on the Internet. To read the comments on the Internet, take the following steps:

1. Go to the Docket Management System (DMS) Web page of the Department of Transportation (http://dms.dot.gov/).
2. On that page, click on ''search.''
3. On the next page (http://dms.dot.gov/search/), type in the four-digit docket number shown at the beginning of this document. Example: If the docket number were ''NHTSA–1998–1234,'' you would type ''1234.'' After typing the docket number, click on ''search.''
4. On the next page, which contains docket summary information for the docket you selected, click on the desired comments. You may download the comments.

Please note that even after the comment closing date, we will continue to file relevant information in the Docket as it becomes available. Further, some people may submit late comments. Accordingly, we recommend that you periodically check the Docket for new material.

List of Subjects in 49 CFR Part 571

Imports, Motor vehicle safety, Motor vehicles, Rubber and rubber products, Tires.

In consideration of the foregoing, it is proposed that 49 CFR part 571 be amended as follows:

PART 571—FEDERAL MOTOR VEHICLE SAFETY STANDARDS

1. The authority citation for part 571 of title 49 would continue to read as follows:

Authority: 49 U.S.C. 322, 30111, 30115, 30117, 30166 delegation of authority at 49 CFR 1.50.

2. Section 571.3 would be amended by adding a definition of ''motor home'' to § 571.3(b) as follows:

§ 571.3 Definitions.

* * * * *

(b) *Other definitions.* As used in this chapter—

* * * * *

Motor home means a motor vehicle with motive power that is designed to

provide temporary residential accommodations, as evidenced by the presence of at least four of the following facilities: Cooking; refrigeration or ice box; self-contained toilet; heating and/or air conditioning; a potable water supply system including a faucet and a sink; and a separate 110–125 volt electrical power supply and/or an LP gas supply.

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§ 571.105 [Amended]

3. Section 571.105 would be amended by removing the definition of ''motor home'' contained in § 571.105 S4., Definitions.

4. Section 571.141 would be added to read as follows:

§ 571.141 Standard No. 141; Platform lift systems for motor vehicles.

S1. *Scope.* This standard specifies requirements for platform lifts used to assist persons with limited mobility in entering or leaving a vehicle.

S2. *Purpose.* The purpose of this standard is to prevent injuries and fatalities to passengers and bystanders during the operation of platform lifts installed in motor vehicles.

S3. *Application.* This standard applies to platform lifts designed to carry passengers into and out of motor vehicles.

S4. *Definitions.*

Bridging device means that portion of a platform lift which provides a transitional surface between the lift platform and vehicle floor.

Cycle means deploying a platform lift from a stowed position, lowering the lift to the ground level loading position, raising the lift to the vehicle floor level loading position, and stowing the lift. The term includes operation of any wheelchair retention device, bridging device, and inner roll stop.

Deploy means with respect to a platform lift, its movement from a stowed position to a vehicle floor level loading position. With respect to a wheelchair retention device or inner roll stop, the term means the movement of the device or stop to a fully functional position intended to prevent a passenger from disembarking the lift platform or being pinched between the platform and vehicle.

Floor reference plane means the plane nominally perpendicular to the longitudinal vehicle reference plane for platform lifts that deploy from the side of the vehicle or perpendicular to the transverse vehicle reference plane for lifts that deploy from the rear of the vehicle, and tangent to the outermost edge of the vehicle floor surface adjacent to the lift platform. (See figure 1.)

Gap means a discontinuity in a plane surface, or between two adjacent surfaces.

Lift reference plane means the nominally vertical plane that is defined by two orthogonal axes passing through the geometric center of the lift platform surface. One axis is perpendicular to the platform reference plane and the other is parallel to the direction of wheelchair travel during loading of the lift. (See figure 1.)

Loading position means, with respect to a platform lift, a position at which a passenger can either embark or disembark a lift. The two loading positions are at vehicle floor and ground level.

Longitudinal vehicle reference plane means the nominally vertical longitudinal plane that contains the longitudinal axis of the vehicle and that moves along with the vehicle body in response to the loading of the vehicle suspension. (See figure 1.)

Platform lift means a level change device, including any integration of existing vehicle components, and excluding a ramp, used to assist persons with limited mobility in entering or leaving a vehicle.

Platform reference plane means a plane tangent to the platform surface at its geometric center. (See figure 1.)

Platform surface means the passenger carrying surface of the lift platform.

Platform threshold area means the rectangular area of the vehicle floor defined by moving a line that lies on the portion of the edge of the vehicle floor directly adjacent to the lift platform, through a distance of 457 mm (18 inches) across the vehicle floor in a direction perpendicular to the edge. Any portion of a bridging device which lies on this area must be considered part of that area.

Range of passenger operation means the portion of the lift cycle during which the platform is at or between the ground and vehicle level loading positions.

Stow means with respect to a platform lift, its movement from a vehicle floor level loading position to the position maintained during normal vehicle travel; and, with respect to a wheelchair retention device, bridging device, or inner roll stop, its movement from a fully functional position to a position intended to allow a passenger to embark or disembark the lift platform.

Test pallet means a platform on which required test loads are placed for handling and moving.

Transverse vehicle reference plane means the nominally vertical transverse plane that contains the transverse axis of the vehicle and that moves along with the vehicle body in response to the loading of the vehicle suspension. (See figure 1.)

Wheelchair means a wheeled seating system for the support and conveyance of a person with physical disabilities, comprised of at least a frame, a seat, and wheels.

S5. *Requirements.* Each platform lift manufactured for installation on a motor vehicle must meet the applicable requirements in this section. Where a range of values is specified, the equipment must be able to meet the requirements at all points within the range. The test procedures in S6 will be used to determine compliance with all requirements, except S5.3, S5.7, S5.8.9 and S5.13. Compliance with those paragraphs will be determined through inspection and/or analysis.

S5.1 *Threshold warning signal.*

S5.1.1 Except when the platform lift is operated manually in backup mode as required by S5.10, the lift must meet the requirements of S5.1.2 during the lift operation specified in S6.6.

S5.1.2 Except for platform lifts where platform loading takes place wholly over the vehicle floor, a visual or audible warning must activate if the platform is more than 25 mm (1 inch) below the floor reference plane and any portion of a passenger's body or mobility aid is on the platform threshold area.

S5.1.2.1 For platform lifts designed for installation on buses and multipurpose passenger vehicles with a GVWR greater than 3,220 kg (7,100 lbs), the threshold warning signal must have both a visual and an audible component.

S5.1.2.2 The visual warning required by S5.1.2 must be a flashing red beacon having a minimum of 20 candela and provision must be made for the beacon to be installed such that it can be seen by a passenger backing onto the platform lift from the interior of the vehicle.

S5.1.2.3 The audible warning required by S5.1.2 must be a minimum of 85 dBA between 500 and 3000 Hz.

S5.1.2.4 The intensity of the visual or audible warnings required by S5.1.2 must be measured at the location 914 mm (3 ft) above the center of the platform threshold area. (See figure 3.)

S5.2 *Platform lift operational requirements.*

S5.2.1 The platform lift must meet the requirements of S5.2.2 through S5.2.4, during the lift operations specified in S6.6. These requirements must be satisfied both with and without a 272 kg mass (600 lb load) on the lift platform, except for S5.2.2.2. S5.2.2.2 must be satisfied without any load.

S5.2.2 *Maximum platform velocity.*

S5.2.2.1 Throughout the range of passenger operation, neither the vertical nor the horizontal velocity of the platform must be greater than 152 mm (6 inches) per second.

S5.2.2.2 During the stow and deploy operations, neither the vertical nor horizontal velocity of the platform must be greater than 305 mm (12 inches) per second.

S5.2.3 *Maximum platform acceleration.* Throughout the range of passenger operation, neither the horizontal nor vertical acceleration of the platform must exceed 0.3 g, after the accelerometer output is filtered with a channel frequency class (CFC) 3 filter. The filter must meet the requirements of SAE J211 with F_H = 3 Hz and F_N = 5 Hz. The accelerometer is to be located at the geometric center of the platform and must be mounted directly on the platform when it is unloaded and on the 272 kg mass (600 lb load) specified in S6.1 when the platform is loaded.

S5.2.4 *Maximum noise level.* Except as provided in S5.1.2 and S5.1.4, the noise level of the platform lift may not exceed 80 dB as measured at any lift operator's position designated by the platform lift manufacturer for the intended vehicle and in the area on the lift defined in S5.5.2.2 and 5.5.2.3, during the range of passenger operation.

S5.3 *Environmental resistance.*

S5.3.1 *Attachment hardware.* Attachment hardware of a platform lift, after being subjected to the conditions specified in S6.3, must be free of ferrous corrosion on significant surfaces except for permissible ferrous corrosion, as defined in FMVSS No. 209, at peripheral surface edges or edges of holes on underfloor reinforcing plates and washers. Alternatively, such hardware at or near the vehicle floor must be protected against corrosion by an electrodeposited coating of nickel, or copper and nickel with at least a service condition number of SC2, and other attachment hardware must be protected by an electrodeposited coating of nickel, or copper and nickel with a service condition number of SC1, in accordance with American Society for Testing and Materials B456–94, ''Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium,'' but such hardware may not be racked for electroplating in locations subjected to maximum stress.

S5.3.2 *Externally mounted platform lifts.* A platform lift or its components, which are not located in the occupant compartment of the motor vehicle when the lift is in a stowed position, after being subjected to the conditions specified in S6.3, must be free of ferrous corrosion on significant surfaces except for permissible ferrous corrosion, as defined in FMVSS No. 209, at peripheral surface edges and edges of holes and continue to function properly.

S5.4 *Platform requirements.*

S5.4.1 During the platform lift operations specified in S6.6, the vehicle must meet the requirements of S5.4.2 through S5.4.6, S5.4.7.4, S5.4.9.2 through S5.4.9.5, S5.4.10 and S5.4.11, both with and without a 272 kg mass (600 lb load) on the platform.

S5.4.2 *Unobstructed platform operating volume.*

S5.4.2.1 Except as provided in S5.4.3, no portion of the platform lift must intersect the platform operating volume as specified in S5.4.2.2 and S5.4.2.3 throughout the range of passenger operation.

S5.4.2.2 For platform lifts designed for installation on buses and multipurpose passenger vehicles with a GVWR greater than 3,220 kg (7,100 lbs), the platform operating volume is the sum of an upper part and a lower part. The lower part is a rectangular solid whose base is 724 mm (28.5 inches) wide by the length of the platform surface, whose height is 51 mm (2 inches), and which is resting on the platform surface with each side of the base parallel with the nearest side of the platform surface. The width is perpendicular to the lift reference plane and the length is parallel to the lift reference plane (See Figure 2). The upper part is a rectangular solid whose base is 762 mm (30 inches) by 1,219 mm (48 inches), whose height is 711 mm (28 inches), whose base is tangent to the top surface of the lower rectangular solid, and whose vertical centroidal axis coincides with that of the lower rectangular solid.

S5.4.2.3 For platform lifts designed for installation on vehicles other than buses and multipurpose passenger vehicles with a GVWR greater than 3,220 kg (7,100 lbs), the platform operating volume is as specified in the vehicle owner's manual.

S5.4.3 *Platform surface protrusions.*

S5.4.3.1 For platform lifts designed for installation on buses and multipurpose passenger vehicles with a GVWR greater than 3,220 kg (7,100 lbs), except as required for deployment of the wheelchair retention device and inner roll stop, throughout the range of passenger operation, the platform surface may have no protrusions which rise more than 6.5 mm (0.25 inches) above the platform surface, measured perpendicular to the platform surface by a device with its base centered between 50 mm (1.97 inches) and 100mm (3.94 inches) from the protrusion. The base of the protrusion measurement device shall have a cross-section not less than 25mm (0.98 inches) and not more than 50 mm (1.97 inches).

S5.4.3.2 For platform lifts designed for installation vehicles other than buses and multipurpose passenger vehicles with a GVWR greater than 3,220 kg (7,100 lbs), except as required for deployment of the wheelchair retention device and inner roll stop, throughout the range of passenger operation, the platform surface may have no protrusions which rise more than 13 mm (0.50 inches) above the platform surface, measured perpendicular to the platform surface by a device with its base centered between 50 mm (1.97 inches) and 100mm (3.94 inches) from the protrusion. All portions of the sides of a protrusion that are between 6.5 mm (0.25 inches) and 13 mm (0.50 inches) above the platform must have a slope not greater than 1:2, measured with respect to the platform surface at the location of the protrusion. The base of the protrusion measurement device shall have a cross-section not less than 25mm (0.98 inches) and not more than 50 mm (1.97 inches).

S5.4.4 *Gaps, transitions and openings.*

S5.4.4.1 When the platform lift is at the ground level loading position, any vertical surface transition measured perpendicular to the ground over which a passenger may traverse to enter or exit the platform, may be not greater than 6.5 mm (0.25 inches). When the lift is at the vehicle level loading position, any vertical surface transition measured perpendicular to the floor reference plane over which a passenger may traverse to enter or exit the platform, may be not greater than 6.5 mm (0.25 inches).

S5.4.4.2 When the platform lift is at the ground or vehicle level loading position, the slope of any surface over which a passenger must traverse to enter or exit the platform must have a rise to run not greater than 1:2 on the portion of the rise between 6.5 mm (0.25 inches) and 13 mm (0.5 inches), and 1:8 on the portion of the rise between 13 mm (0.5 inches) and 76 mm (3.0 inches). The rise of any sloped surface may not be greater than 76 mm (3.0 inches). When the lift is at the ground level loading position, measurements must be made perpendicular to the ground. When the lift is at the vehicle level loading position, measurements must be made perpendicular to the floor reference plane.

S5.4.4.3 When the inner roll stop or any outer barrier is deployed, any gap between the inner roll stop and lift

platform and any gap between the outer barrier and lift platform must prevent passage of the clearance test block when its long axis is held perpendicular to the platform reference plane. The clearance test block is made of a rigid material and is 15.9 × 15.9 × 102 mm (0.625 × 0.625 × 4.0 inches) with all corners having a 1.6 mm (0.0625 inch) radius.

S5.4.4.4 When the lift platform is at the ground or vehicle level loading position, any horizontal gap over which a passenger must traverse to enter or exit the platform must prevent passage of a 13 mm (0.5 inch) diameter sphere.

S5.4.4.5 Throughout the range of passenger operation, any opening in the platform surface must prevent passage of a 19 mm (0.75 inch) diameter sphere.

S5.4.4.6 Throughout the range of passenger operation, any gap between the platform sides and edge guards which move with the platform must prevent passage of a 13 mm (0.5 inch) diameter sphere. Where structures fixed to the vehicle are used as edge guards, the horizontal gap between the platform side and vehicle structure must prevent passage of a 6.5 mm (0.25 inch) diameter sphere.

S5.4.5 *Platform deflection.* Throughout the range of passenger operation, the angle of the stationary lift platform relative to the vehicle, may not be more than 1 degree with no load on the platform and may not be more than 3 degrees with a 272 kg mass (600 lb load) on the platform. The angle must be measured between axes perpendicular to the floor and platform reference planes.

S5.4.6 *Edge guards.*

S5.4.6.1 The platform lift must have edge guards which extend continuously along each side of the lift platform parallel to the direction of wheelchair movement during loading and unloading.

S5.4.6.2 Edge guards which move with the platform must have vertical sides facing the platform surface and have a minimum height of 38 mm (1.5 inches), measured vertically from the platform surface.

S5.4.6.3 *Deployment.* Except whenever any part of the platform surface is below a horizontal plane 76 mm (3 in) above the ground, the edge guard must be deployed throughout the range of passenger operation.

S5.4.7 *Wheelchair retention.*

S5.4.7.1 *Impact I.* Except for platform lifts designed so that platform loading takes place wholly over the vehicle floor, the lift must have a means of retaining the test device specified in S6.4.2 upright with all of its wheels on the platform surface, vehicle floor, bridging device or on a combination of the platform surface, vehicle floor, and bridging device, throughout its range of passenger operation, except as provided in S5.4.7.4. The lift will be tested in accordance with S6.4.3 to determine compliance with this section.

S5.4.7.2 *Impact II.* For platform lifts designed so that platform loading takes place wholly over the vehicle floor, the lift must have means of retaining the test device specified in S6.4.2 upright with all of its wheels on the platform surface, throughout the range of passenger operation, except as provided in S5.4.7.4. The lift will be tested in accordance with S6.4.4 to determine compliance with this section.

S5.4.7.3 *Overload.* The deployed wheelchair retention device(s) must be capable of sustaining 7,117 N (1,600 lb force) when tested in accordance with S6.10. No separation, fracture, or breakage of the wheelchair retention device may occur as a result of conducting the test in S6.10.

S5.4.7.4 *Deployment.* Except whenever any part of the platform surface is below a horizontal plane 76 mm (3 inches) above the ground, the wheelchair retention device(s) must be deployed throughout the range of passenger operation.

S5.4.8 *Inner roll stop.*

S5.4.8.1 Platform lifts designed for installation on vehicles with a GVWR greater than 3,220 kg (7,100 lbs) must have an inner roll stop that meets the requirements of S5.4.8.3.

S5.4.8.2 Platform lifts designed for installation on vehicles with a GVWR less than or equal to 3,220 kg (7,100 lbs) must:

(a) Have an inner roll stop that meets the requirements of S5.4.8.3; or

(b) have operating instructions near the lift controls and in the vehicle owner's manual, as specified in S5.7.6 and S5.12.3, that contain a warning that wheelchairs should back onto the platform when entering from the ground.

S5.4.8.3 When tested in accordance with S6.5, platform lifts with a ground level loading direction towards the vehicle, must have an inner roll stop that provides a means that prevents:

(a) The front wheels of the test device specified in S6.4.2 from passing over the edge of the platform where the roll stop is located, when the lift is at the ground level loading position; and

(b) any portion of the test device specified in S6.4.2 from being contacted simultaneously with a portion of the lift platform and any other structure, throughout the lift's range of passenger operation.

S5.4.9 *Handrails.*

S5.4.9.1 For platform lifts designed for installation on buses and multipurpose passenger vehicles with a GVWR greater than 3,220 kg (7,100 lbs), throughout the range of passenger operation, there must be a handrail located on each side of the lift that meets the requirements of S5.4.9.2 through S5.4.9.8. For lifts designed for installation on vehicles other than buses and multipurpose passenger vehicles with a GVWR greater than 3,220 kg (7,100 lbs) and equipped with handrails, the handrails must meet the requirement of S5.4.9.2 through 5.4.9.8, throughout the range of passenger operation.

S5.4.9.2 The graspable portion of each handrail may be not less than 762 mm (30 inches) and not more than 965 mm (38 inches) above the platform surface, measured vertically.

S5.4.9.3 The cross section of the graspable portion of each handrail may be not less than 31.5 mm (1.25 inches) and not more than 38 mm (1.5 inches) in diameter or width, and may have not less than a 3.2 mm (0.125 inch) radii on any corner.

S5.4.9.4 The vertical projection of the graspable portion of each handrail must intersect two vertical planes that are perpendicular to the direction of travel of a wheelchair on the lift when entering or exiting the platform, and are 203 mm (8 inches) apart.

S5.4.9.5 Throughout the range of passenger operation, the handrails must move such that the position of the handrails relative to the platform surface does not change.

S5.4.9.6 When tested in accordance with S6.9.1, each handrail must withstand 445 N (100 pounds force) applied at any point and in any direction on the handrail without more than 25 mm (1.00 inches) of displacement relative to the platform surface. After removal of the load, the handrail must exhibit no permanent deformation.

S5.4.9.7 When tested in accordance with S6.9.1, there must be at least 38 mm (1.5 inches) of clearance between each handrail and any portion of the vehicle, throughout the range of passenger operation.

S5.4.9.8 When tested in accordance with S6.9.2, each handrail must withstand 1,112 N (250 pounds force) applied at any point and in any direction on the handrail without sustaining any failure, such as cracking, separation, fracture, or more than 102 mm (4 inches) of displacement of any point on the handrails relative to the platform surface.

S5.4.10 *Platform Markings.* For platform lifts designed for installation

on buses and multipurpose passenger vehicles with a GVWR greater than 3,220 kg (7,100 lbs), throughout the range of passenger operation, all edges of the platform surface, the visible edge of the vehicle floor or bridging device adjacent to the platform lift, and any designated standing area must be outlined. The outlines must be at least 25 mm (1 inch) wide and of a color that contrasts with its background by 60 percent, determined according to the following equation:

$$\text{Contrast} = 100 \times [(L1 - L2)/L1]$$

where:

L1 = luminance of the lighter color or shade, and

L2 = luminance of the darker color or shade.

L1 and L2 are measured perpendicular to the platform surface with illumination provided by a diffuse light and a resulting illuminance of the platform surface of 323 lm/m² (30 lumen/sqft).

S5.4.11 *Platform lighting.* Platform lifts designed for installation on buses and multipurpose passenger vehicles with a GVWR greater than 3,220 kg (7,100 lbs) must have a light or a set of lights which provides at least 54 lm/m² (5 lumen/sqft) of illuminance on all portions of the surface of the lift platform, throughout the range of passenger operation. The illuminance measured on all portions of the surface of a passenger unloading ramp at ground level must be at least 11 lm/m² (1 lumen/sqft).

S5.4.12 *Platform slip resistance.* When tested in accordance with S6.2, the coefficient of friction, in any direction, of any part of a wet platform surface may be not less than 0.65.

S5.5 *Structural integrity.*

S5.5.1 *Fatigue endurance.* Platform lifts designed for installation on buses and MPVs with a GVWR greater than 3,220 kg (7,100 lbs.) must be operated through 15,600 cycles as specified in S6.7. Lifts designed for installation on vehicles other than buses and multipurpose vehicles with a GVWR over 3,220 kg (7,100 lbs) must be operated through 4,400 cycles as specified in S6.7. No separation, fracture, or breakage of any vehicle or lift component may occur as a result of conducting the fatigue test in S6.7.

S5.5.2 *Proof load.* The platform lift must be capable of holding an 816 kg mass (1,800 lb load), as specified in S6.8, without separation, fracture, or breakage of any vehicle or lift component. After the test, the lift must pass Static Load Test I, see S6.6.

S5.5.3 *Ultimate Load.* The platform lift must be capable of holding a 1,088 kg mass (2,400 lb load), as specified in S6.11, without separation, fracture, or breakage of the platform, supporting structure, or lifting mechanism.

S5.6 *Platform Free Fall Limits.* In the event of any single-point failure of systems for raising, lowering or supporting the platform, the platform, loaded as specified in S6.6.3, may not fall vertically faster than 305 mm (12 inches) per second or change angular orientation more than 2 degrees from the orientation prior to the failure. This requirement applies whenever the lift is under primary power source operation or manual backup operation.

S5.7 Control systems.

S5.7.1 The platform lift must meet the requirements of S5.7.2 through S5.7.8 and, when operated by means of the control system specified in 5.7.2, must perform the lift operations specified in S6.6.

S5.7.2 The platform lift system must have a control system that performs at least the following functions:

(a) Activates the control system by providing power to the system. This function must be identified as ''POWER'' on the control.

(b) Moves the lift from a stowed position to a vehicle floor level loading position. This function must be identified as ''DEPLOY'' or ''UNFOLD'' on the control.

(c) Lowers the lift platform. This function must be identified as ''DOWN'' on the control.

(d) Raises the lift platform. This function must be identified as ''UP'' on the control.

(e) Moves the lift from a vehicle floor level loading position to a stowed position. This function must be identified as ''STOW'' or ''FOLD'' on the control.

S5.7.3 The functions specified in S5.7.2 must be activated in a momentary fashion, by one switch or by a combination of switches.

S5.7.4 The control system specified in S5.7.2 must prevent the simultaneous performance of more than one function.

S5.7.5 For platform lifts designed for installation on buses and multipurpose passenger vehicles with a GVWR greater than 3,220 kg (7,100 lbs), all controls, including those specified in S5.7.2, must be positioned together and in a location such that a person standing at and facing the controls has a direct, unobstructed view of the platform lift passenger and the passenger's wheelchair, if the passenger is using a wheelchair, throughout the lift's range of passenger operation. Additional power controls may be positioned in other locations.

S5.7.6 Simple instructions regarding the platform lift operating procedures, including backup operations as specified by S5.9, must be located near the controls. These instructions must be written in English.

S5.7.7 Each operating function of each platform lift control must be identified with characters which are at least 2.5 mm (0.1 inch) in height. For lifts designed for installation on buses and multipurpose passenger vehicles with a GVWR greater than 3,220 kg (7,100 lbs), the characters must be illuminated in accordance with S5.3 of Standard No. 101, when the vehicle's headlights are illuminated.

S5.7.8 The power switch must have two functions: ''ON'' and ''OFF''. The ''ON'' function must allow platform lift operation. When the power switch is in the ''ON'' position, an indicator light near the controls must be activated. The ''OFF'' function must prevent lift movement.

S5.7.9 Any single-point failure in the control system may not prevent the operation of any of the interlocks as specified in S5.10.

S5.8 *Jacking prevention.*

S5.8.1 Except when the platform lift is operated in backup mode as required by S5.9, during the lift operations specified in S6.6, the lift system must meet the requirements of S5.8.2, both with and without a 272 kg mass (600 lb load) on the lift.

S5.8.2 The control system or platform lift design must prevent raising of any portion of the vehicle by the lift system when lowering the lift is attempted while the lift is at the ground level loading position.

S5.9 *Backup operation.*

S5.9.1 During the lift operations specified in S6.6, the platform lift must meet the requirements of S5.9.2, both with and without a 272 kg mass (600 lb load) on the lift.

S5.9.2 The platform lift must be equipped with a manual backup operating mode that can, in the event there is a loss of the primary power source for operating the lift, lower the platform to the ground level loading position and raise the platform to the vehicle floor level loading position from any position in its cycle. During backup operation of the lift, the wheelchair retention device and inner roll stop must be manually deployable and stowable. The operating instructions near the lift controls and in the vehicle owner's manual, as specified in S5.7.6 and S5.12.3, must contain information on manual operation of the wheelchair retention device and inner roll stop during backup operation of the lift.

S5.10 *Interlocks.*

S5.10.1 Except when the platform lift is operated in backup mode as required by S5.9, during the lift

operations specified in S6.6, the requirements of S5.10.2 must be met, both with and without a 272 kg mass (600 lb load) on the lift.

S5.10.2 The platform lift system must have interlocks that prevent:

S5.10.2.1 Forward or rearward mobility of the vehicle unless the platform lift is stowed;

S5.10.2.2 Operation of the platform lift from the stowed position until forward and rearward mobility of the vehicle is inhibited, by means of a parking brake, placing the transmission in park, or other positive device other than the vehicle's service brakes, and the lift access door is open;

S5.10.2.3 Except for platform lifts designed to be occupied while stowed, stowing of the platform lift when occupied by any portion of a passenger's body, and/or a mobility aid;

S5.10.2.4 Movement of the platform lift up or down unless any inner roll stop required to comply with S5.4.8.3 is deployed;

S5.10.2.5 Movement of the platform lift up or down when the platform surface is above the horizontal plane which is 76 mm (3 inches) above the ground level loading positions unless the wheelchair retention device required to comply with S5.4.7 is deployed;

S5.10.2.6 Stowing of the wheelchair retention device required to comply with S5.4.7 unless the platform surface is below the horizontal plane 76 mm (3 inches) above the ground level loading position.

S5.10.2.7 Further downward motion of the platform lift, when the lift contacts an object in its path while lowering;

S5.10.2.8 In the case of a platform lift that is equipped with an outer barrier, deployment of the outer barrier, when occupied by any portion of a passenger's body or mobility aid;

S5.10.2.9 Deployment of any inner roll stop required to comply with S5.4.8.3, when the inner roll stop is occupied by any portion of a passenger's body or mobility aid; and

S5.10.2.10 Movement of the platform lift down, when both the vehicle floor or any bridging device and lift platform are occupied by any portion of a passenger's body or mobility aid.

S5.11 *Operations counter.* The platform lift must have an operations or cycle counter that records each complete up and down cycle through the range of passenger operation. Determination of compliance with this requirement will be made during the lift operations specified in S6.6.

S5.12 *Vehicle owner's manual insert.* The lift manufacturer must provide with the lift inserts for the vehicle owner's manual which provide specific information about the platform lift:

S5.12.1 For vehicles other than buses and multipurpose vehicles with a GVWR over 3,220 kg (7,100 lbs), the dimensions which constitute the unobstructed platform operating volume;

S5.12.2 Maintenance schedule based on the number of cycles on the operations counter specified in S5.11.

S5.12.3 Simple instructions regarding the platform lift operating procedures, including backup operations, as specified by S5.9.

S5.13 *Installation instructions insert.* The manufacturer of a platform lift must include with the installation instructions for each lift, a page that identifies:

(a) The vehicles on which the lift is designed to be installed. Vehicles may be identified by listing the make and model of the vehicles for which the lift is suitable, or by specifying the design elements that would make a vehicle an appropriate host for the particular lift, and for which the platform lift manufacturer has certified compliance.

(b) Any informational material that must be placed in the vehicle owner's manual or elsewhere in the vehicle in order to comply with the requirements of this standard.

S6. *Test conditions and procedures.* Each platform lift must be capable of meeting all of the tests specified in this standard, both separately, and in the sequence specified in this section. The tests specified in S6.5 through S6.8 are performed on a single lift and vehicle combination. The tests specified in S6.2 through S6.4, and S6.9 through S6.11 may be performed with the same lift installed on a test jig rather than in a vehicle. Certification tests of requirements in S5.1 through S5.11 may be performed on a single lift and vehicle combination, except for the requirements of S5.5.3. Attachment hardware may be replaced if damaged by removal and reinstallation of the lift between a test jig and vehicle.

S6.1 *Test Pallet and Load.* The surface of the test pallet that rests on the platform used for the tests specified in S6.6 through S6.8 and S6.11 has sides that measure between 660 mm (26 inches) and 686 mm (27 inches). For the tests specified in S6.6 and S6.7, the test pallet is made of a rectangular steel plate of uniform thickness and the load which rests on the test pallet is made of rectangular steel plate or plates of uniform thickness and sides that measure between 533 mm (21 inches) and 686 mm (27 inches).

S6.2 *Slip Resistance Test.*

S6.2.1 To determine compliance with S5.4.12:

S6.2.2 Clean any 450mm × 100mm (17.5 in × 3.94 in) section of the platform, with household glass cleaner (ammonia hydroxide solution). Wet the cleaned section of the platform by evenly spraying 3 ml (0.10 oz) of distilled water per 100 cm^2 (15.5 in^2)of surface area. Begin the test specified in S6.2.3 within 30 seconds of completion of the wetting process.

S6.2.3 Use the test procedure defined in ANSI/RESNA Standard WC13–1991, ''Wheelchairs—Determination of Coefficient of Friction of Test Surfaces'' except for clauses 5.3, Force gage and 6, Test procedure, on the wet section of platform. In lieu of clauses 5.3 and 6.1, implement the requirements of S6.2.3.1 and 6.2.3.2.

S6.2.3.1 *Force Gage.* The pulling force is measured, at a frequency of at least 10 Hz, by a force gauge that has been calibrated to an accuracy of 2 percent in the range of 25N to 100N.

S6.2.3.2 *Test procedure.* Before the test, prepare the surface of the test rubber by lightly abrading with waterproof silicon carbide paper, grade P120, weight D (120 wet and dry). Then wipe the surface clean with a dry cloth or brush. No solvents or other cleaning materials may be used. To determine the coefficient of friction for the wet platform section pull the test block, with the test rubber attached, by machine at a rate of 20 ± 2mm/s. The machine and test block must be rigidly linked by a device which exhibits a stiffness ≥ $1x10^5$ N/m. Pull the test block for a minimum of 13 seconds. Record the pulling force over the final 10 seconds of the test at a minimum frequency of 10 Hz. Repeat the test at least 5 times, on any one area of the platform surface, in a single direction. Calculate the average pulling force for each trial, F_1 through F_n, where n is the number of trials. Measure the weight of the test block with the force gauge and call it F_b. Calculate the coefficient of friction, μ_p, from the following equation:

$$\mu_p = \frac{F_1 + F_2 + F_3 + \ . \ . \ . \ F_n}{n \times F_b}$$

S6.3 *Environmental Resistance Test.*

S6.3.1 Perform the procedures specified in S6.3.2 through S6.3.5 to determine compliance with S5.3.

S6.3.2 Attachment hardware, as specified in S5.3.1, and externally mounted platform lifts or components, as specified in S5.3.2, must be tested in accordance with American Society of Testing and Materials B117–94, ''Standard Method of Salt Spray (Fog) Testing.'' Any surface coating or material not intended for permanent retention on the metal parts during service life must be removed prior to testing. Except as specified in S6.3.3, the period of the test is to be 50 hours, consisting of two periods of 24 hours exposure to salt spray followed by one hour drying.

S6.3.3 For attachment hardware located within the occupant compartment of the motor vehicle and not at or near the floor, the period of the test is to be 25 hours, consisting of one period of 24 hours exposure to salt spray followed by one hour drying.

S6.3.4 For performance of this test, externally mounted platform lifts or components may be installed on test jigs rather than on the vehicle. The lift must be in a stowed position. The configuration of the test setup must be such that areas of the lift which would be exposed to the outside environment during actual use are not protected from the salt spray by the test jig.

S6.3.5 At the end of the test, any surface exposed to the salt spray must be washed thoroughly with water to remove the salt. After drying for at least 24 hours under laboratory conditions the platform lift or components is to be examined for ferrous corrosion on significant surfaces, that is, all surfaces that can be contacted by a sphere 2 centimeters in diameter.

S6.4 *Wheelchair Retention Impact Test.*

S6.4.1 Determine compliance with S5.4.7.1 and S5.4.7.2 using the test device specified in S6.4.2, under the procedures specified in S6.4.3 and S6.4.4.

S6.4.2 The test device is an unloaded power wheelchair whose size is appropriate for a 95th percentile male and that has the dimensions, configuration and components described in paragraphs (a)–(j). If the dimension in paragraph (i) is measured for a particular wheelchair by determining its tipping angle, the batteries are prevented from moving from their original position—

(a) A cross-braced steel frame;

(b) A sling seat integrated in the frame;

(c) Belt drive;

(d) Detachable footrests, with the lowest point of the footrest adjustable in a range not less than 25 mm (1 inch) to 123 mm (5 inches) from the ground;

(e) Pneumatic rear wheels with a diameter not less than 495 mm (19.5 inches) and not more than 521 mm (20.5 inches);

(f) Pneumatic front wheels with a diameter not less than 190 mm (7.5 inches) and not more than 216 mm (8.5 inches);

(g) A distance between front and rear axles not less than 457 mm (18 inches) and not more than 533 mm (21 inches);

(h) A horizontal distance between rear axle and center of gravity not less than 114 mm (4.5 inches) and not more than 152 mm (6.0 inches);

(i) A vertical distance between ground and center of gravity not less than 260 mm (10.25 inches) and not more than 298 mm (11.75 inches);

(j) A mass of not less than 72.5 kg (160 lbs) and not more than 86.0 kg (190 lbs).

S6.4.3 Conduct the test in accordance with the procedures in paragraphs (a) through (e) to determine compliance with S5.4.7.1. In the case of platform lifts designed for installation on vehicles with a GVWR equal to or less than 3,220 kg (7,100 lbs), perform both (e)(1) and (2), unless the operating directions specify a required direction of wheelchair movement onto the platform. When a direction is indicated in the operating instructions, perform the procedure specified in paragraph (e)(1) or (2) with the test device oriented as required by the operating instructions.

(a) Place the lift platform at the vehicle floor level loading position.

(b) If the wheelchair retention device is an outer barrier, the footrests are adjusted such that at their lowest point they have a height 25 mm (1 inch) less than the outer barrier. If the wheelchair retention device is not an outer barrier, the footrests are adjusted such that at their lowest point they have a height 51 mm (2 inches) above the platform.

(c) Position the test device with its plane of symmetry coincident with the lift reference plane and at a distance from the platform sufficient to achieve the impact velocities required by paragraph (e) of this section.

(d) Accelerate the test device onto the platform under its own power such that the test device impacts the wheelchair retention device at each speed, direction, and load condition combination specified in paragraph (e) of this section. Maintain power to the drive motors until all wheelchair motion has ceased except rotation of the drive wheels. Note the position of the wheelchair after its motion has ceased following each impact to determine compliance with S5.4.7. If necessary, after each impact, adjust or replace the footrests to restore them to their original condition.

(e) The test device is operated at the following speeds, in the following directions—

(1) At a speed of not less than 2.0 m/s (4.4 mph) and not more than 2.1 m/s (4.7 mph), forward, with a load of 0 kg (0 lbs).

(2) At a speed of not less than 1.75 m/s (3.9 mph) and not more than 1.85 m/s (4.1 mph), rearward, with a load of 0 kg (0 lbs).

S6.4.4 For rotary platform lifts, conduct the test under the procedures in (a)–(e) to determine compliance with S5.4.7.2. In the case of lifts designed for installation on vehicles with a GVWR less than or equal to 3,220 kg (7,100 lbs), perform the test in both possible test device orientations unless a required direction of wheelchair movement onto the platform is indicated in the operating instructions. For lifts designed for installation on vehicles with a GVWR less than or equal to 3,220 kg (7,100 lbs) where a required direction of wheelchair movement onto the platform is indicated in the operating instructions, perform the test with the test device oriented as required by the operating instructions.

(a) Adjust the footrests of the test device to the shortest length. Place the test device on the platform with its plane of symmetry coincident with the lift reference plane.

(b) Position the platform surface 90 mm (3.5 in) ± 10 mm (0.4 in) above the ground level position.

(c) Slowly move the test device in the forward direction until it contacts a wheelchair retention device. Activate the controller of the test device such that, if the test device were unloaded and unrestrained on a flat, level surface, it would achieve a maximum forward velocity of not less than 2.0 m/s (4.4 mph) and not more than 2.1 m/s (4.7 mph).

(d) Realign the test device on the platform so that its plane of symmetry is coincident with the lift reference plane. Slowly move the test device in the rearward direction until it contacts a wheelchair retention device. Activate the controller of the test device such that, if the test device were unloaded and unrestrained on a flat, level surface, it would achieve a maximum rearward velocity of not less than 1.75 m/s (3.9 mph) and not more than 1.85 m/s (4.1 mph).

(e) During the impacts specified in paragraphs (c) and (d), maintain power to the drive motors until all test device motion has ceased except rotation of the drive wheels. Note the position of the test device after its motion has ceased following each impact to determine compliance with S5.4.7.2.

S6.5 *Inner Roll Stop Test.* Determine compliance with S5.4.8 using the test device specified in S6.4.2, in an unloaded condition, in accordance with the procedures specified in (a) through (f).

(a) Place the lift platform at the ground level loading position, such that the platform is level.

(b) Adjust the footrests of the test device to the shortest length. Position the test device on the ground at a distance from the platform sufficient to achieve the impact velocity required by (c) of this section. The plane of symmetry of the test device is coincident with the lift reference plane and the forward direction of travel is onto the platform.

(c) Accelerate the test device onto the platform such that the vehicle impacts the inner roll stop at a speed of not less than 1.5 m/s (3.4 mph) and not more than 1.6 m/s (3.6 mph). Determine compliance with S5.4.8.3(a).

(d) If necessary, adjust or replace the footrests to restore them to the condition they were in prior to the impact. Reposition the test device on the platform with its plane of symmetry coincident with the lift reference plane. Slowly move the test device in the forward direction until it contacts the inner roll stop.

(e) Apply a static load to the inner roll stop by activating the controller of the test device such that, if the test device were unrestrained on a flat and level surface, it would achieve a maximum forward velocity of not less than 2.0 m/s and not more than 2.1 m/s.

(f) Raise the platform to the vehicle loading position. Determine compliance with S5.4.8.3(b).

S6.6 *Static Load Test I—Working Load.*

S6.6.1 By use of the lift controls specified in S5.7.2, perform the operations specified in S6.6.2 through S6.6.8 in the order they are specified. During the lift operations specified in:

(a) S6.6.3, determine compliance of the platform lift with S5.1.2;

(b) S6.6.3 through S6.6.8, determine compliance of the platform lift with S5.7.2 through 5.7.8 and 5.10.2.1;

(c) S6.6.4 through 6.6.7, determine compliance of the platform lift with S5.2.2.1, S5.2.3, S5.2.4, S5.4.2 through S5.4.6, S5.4.7.4, S5.4.9.2 through S5.4.9.5, S5.4.10, S5.4.11, S5.10.2.4, S5.10.2.5 and S5.11;

(d) S6.6.3 and S6.6.8, determine compliance of the platfrom lift with S5.2.2.2;

(e) S6.6.9, determine compliance of the platform lift with S5.10;

(f) S6.6.2 and S6.6.3, determine compliance of the platform lift with S5.10.2.2;

(g) S6.6.7 and S6.6.8, determine compliance of the platform lift with S5.10.2.3;

(h) S6.6.5 and S6.6.7, determine compliance of the platform lift with S5.10.2.7;

(i) S6.6.4 and S6.6.6, determine compliance of the platform lift with S5.8, S5.10.2.6, S5.10.2.8 and S5.10.2.9.

S6.6.2 Put the lift platform in the stowed position.

S6.6.3 Deploy the lift platform. Center a static load on the upper surface of the test pallet such that the total mass (weight) of the static load and test pallet is 272 kg (600 lbs). Center the loaded test pallet on the platform surface.

S6.6.4 Lower the lift platform from the vehicle floor level loading position to the ground level loading position, stopping once midway between the two positions. Remove the test pallet from the lift platform.

S6.6.5 Raise the lift platform from the ground level loading position to the vehicle floor level loading position, stopping once midway between the two positions.

S6.6.6 Lower the lift platform from the vehicle floor level loading position to the ground level loading position, stopping once midway between the two positions.

S6.6.7 Center the loaded test pallet on the platform surface. Raise the lift platform from the ground level loading position to the vehicle floor level loading position, stopping once midway between the two positions.

S6.6.8 Remove the pallet from the lift platform. Stow the lift.

S6.6.9 Turn power off to the lift and repeat 6.6.3 through 6.6.8, using the backup operating mode as specified by S5.9.

S6.7 *Fatigue endurance test.*

S6.7.1 Perform the test procedure specified in S6.7.2 through S6.7.9 and determine compliance with S5.5.1.

S6.7.2 Put the unloaded lift platform at the ground level loading position. Center a static load on the upper surface of the test pallet such that the total weight (mass) of the static load and test pallet is 272 kg (600 lbs.). Center the loaded test pallet on the platform surface.

S6.7.3 For platform lifts designed for installation on buses and MPVs with GVWR greater than 3,220 kg (7,100 lbs.), by use of the lift controls specified in S5.7.2, perform the operation specified in S6.7.3.1 through S6.7.3.3 in the order they are given.

S6.7.3.1 Raise and lower the lift platform through the range of passenger operation 3,900 times.

S6.7.3.2 Remove the test pallet from the lift platform. Raise the lift platform to the vehicle floor loading position, stow the lift, deploy the lift and lower the lift platform to the ground level loading position 3,900 times.

S6.7.3.3 Perform the test sequence specified in S6.7.3.1 and S6.7.3.2 four times.

S6.7.4 For platform lifts designed for installation on vehicles other than buses and multipurpose vehicles with a GVWR over 3,220 kg (7,100 lbs), by use of the lift controls specified in S5.7.2, perform the operation specified in S6.7.4.1 through S6.7.4.3 in the order they are given.

S6.7.4.1 Raise and lower the lift platform through the range of passenger operation 1,100 times.

S6.7.4.2 Remove the test pallet from the lift platform. Raise the lift platform to the vehicle floor loading position, stow the lift, deploy the lift and lower the lift platform to the ground level loading position 1,100 times.

S6.7.4.3 Perform the test sequence specified in S6.7.3.1 and S6.7.4.2 four times.

S6.7.5 Each sequence of lift operations specified in S6.7.3.1, S6.7.3.2, S6.7.4.1 and S6.7.4.2 must be done in blocks of 10 cycles with a 1 minute maximum rest period between each cycle in any block. The minimum rest period between each block of 10 cycles is to be such that the temperature of the lift components is maintained below the values specified by the manufacturer or that degrade the lift function.

S6.7.6 During the test sequence specified in S6.7.2 through S6.7.4, perform any lift maintenance as specified in the vehicle owner's manual.

S6.8 *Static Load Test II—proof load.*

S6.8.1 Perform the test procedures specified in S6.8.2 through S6.8.5 and determine compliance with S5.5.2.

S6.8.2 Center a static load on the upper surface of the test pallet such that the total mass (weight) of the static load and test pallet is 816 kg (1,800 lbs).

S6.8.3 When the lift platform is at the vehicle floor level loading position, center the loaded test pallet on the platform surface. Fully place the pallet on the platform within 1 minute of beginning to place it.

S6.8.4 Two minutes after fully placing the loaded test pallet on the platform surface, remove the loaded test pallet and examine the platform lift and vehicle for separation, fracture or breakage.

S6.8.5 After completing the static load test specified in S6.8.2 through S6.8.4, repeat Static Load Test I specified in S6.6.

S6.9 *Handrail test.*

S6.9.1 To determine compliance with S5.4.9.6 and S5.4.9.7, apply 4.4 N (1 lb. force) through an area of 1290 mm^2 (2 $in.^2$) in any direction at any point on the handrail. Use this position of the handrail relative to the lift platform as the reference point for the measurement of handrail displacement. Apply 445 N (100 lb. force) through an area of 1290 mm^2 (2 $in.^2$) in a direction and location opposite to that of the 4.4 N (1 lb. force). Attain the force within 1 minute after beginning to apply it. Five seconds after attaining the force, measure the amount of displacement of the handrail relative to the reference point, and measure the distance between the outside of the handrail and the nearest portion of the vehicle. Release the 445 N (100 lb. force) and reapply the 4.4 N (1 lb. force) in the direction and location that it was first applied. Five seconds after attaining the force, measure the position of the handrail with respect to the reference point to determine if there is any permanent deformation of the handrail relative to the lift platform.

S6.9.2. To determine compliance with S5.4.9.8, apply 4.4 N (1 lb. force) through an area of 1,290 mm^2 (2 in^2) in any direction at any point on the handrail. Use this position of the handrail relative to the lift platform as the reference point for the measurement of handrail displacement. Apply 1,112 N (250 lb. force) through an area of 1,290 mm^2 (2 in^2) in a direction and location opposite to that of the 1 4.4 N (1 lb force). Attain the force within 1 minute after beginning to apply it. Five seconds after attaining the force, measure the amount of displacement of the handrail relative to the reference point. Maintain the force for two minute. Release the force and inspect the handrail for cracking, separations or fractures.

S6.10 *Wheelchair Retention Overload Test.*

S6.10.1 Perform the test procedures as specified in S6.10.2 through S6.10.5 to determine compliance with S5.4.7.2.

S6.10.2 Position the platform surface 89 mm (3.5 inches) above the ground level loading position. Apply 7,117 N (1,600 lb. force) to the wheelchair retention device in a direction parallel to both the platform lift and platform reference planes. Attain the force within 1 minute after beginning to apply it.

S6.10.3 For a wheelchair retention device that is in the form of an outer barrier, apply the force through a rectangular area with a height of 25 mm (1 inch) and a width spanning the entire barrier. Distribute the force evenly about an axis 64 mm (2.5 inches) above the platform reference plane. If the bottom edge of the outer barrier falls 51 mm (2 inches) or more above the platform reference plane, distribute the force about an axis 13 mm (0.5 inches) above the bottom edge of the barrier.

S6.10.4 For a wheelchair retention device other than an outer barrier, place the test device specified in S6.4.2 on the lift platform with its plane of symmetry coincident with the lift reference plane and directed such that forward motion is impeded by the wheelchair retention device. Move the test device forward until it contacts the wheelchair retention device. Remove the test device from the platform. Apply the force specified in S6.10.2 distributed evenly at all areas of the wheelchair retention device which made contact with the test device when it was moved forward. Attain the force within 1 minute after beginning to apply it.

S6.10.5 After maintaining the force for two minutes, remove it and examine the wheelchair retention device for separation, fracture or breakage.

S6.11 *Static Load Test III—ultimate load.*

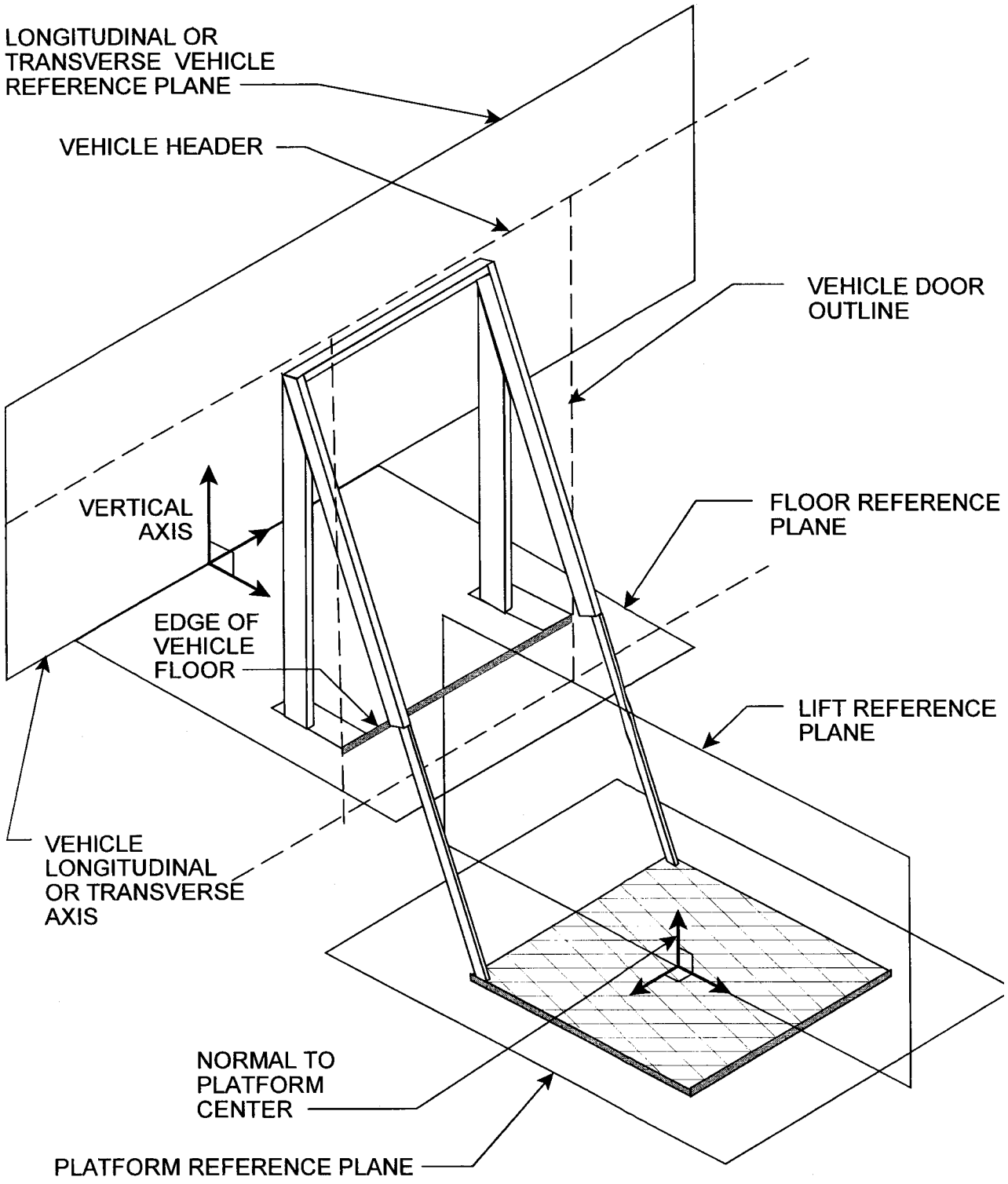
S6.11.1 Perform the test procedures as specified in S6.11.2 through S6.11.5 to determine compliance with S5.5.3.

S6.11.2 Reinforce the vehicle structure where the lift is attached such that it will not deform to an extent perceptible without a measuring instrument during application of the load specified in S6.11.3 or remove the platform lift from the vehicle and install it on a test jig that will not deform to an extent perceptible without a measuring instrument during application of the load specified in S6.11.3.

S6.11.3 Place a static load on the upper surface of the test pallet such that the center of gravity of the load is over the geometric center of the pallet and the total mass (weight) of the static load and test pallet is 1,088 kg (2,400 pounds).

S6.11.4 When the lift platform is at the vehicle floor level loading position, center the loaded test pallet on the platform surface. Fully place the pallet on the platform within 1 minute of beginning to place it.

S6.11.5 Two minutes after fully placing the loaded test pallet on the platform surface, remove the loaded test pallet and examine the platform lift for separation, fracture or breakage.



PLANES OF REFERENCE

FIGURE 1

BILLING CODE 4910–59–C

5. Section 571.142 would be added to read as follows:

§ 571.142 Standard No. 142; Platform lift installations in motor vehicles.

S1. *Scope.* This standard specifies requirements for vehicles equipped with a platform lift used to assist persons with limited mobility in entering or leaving a vehicle.

S2. *Purpose.* The purpose of this standard is to prevent injuries and fatalities to passengers and bystanders during the operation of platform lifts installed in motor vehicles.

S3. *Application.* This standard applies to motor vehicles, with a platform lift to carry passengers into and out of the vehicle.

S4. *Requirements.*

S4.1 *Installation Requirements.*

S4.1.1 Each vehicle must be equipped with a platform lift certified as meeting Federal Motor Vehicle Safety Standard No. 141, Lift Systems for Motor Vehicles (§ 571.141).

S4.1.2 Platform lifts must be attached to the vehicle in accordance with the installation instructions or procedures provided pursuant to S5.13 of Standard 141. The vehicle must be of a type identified in the installation instructions as appropriate for the platform lift and as certified by the platform lift manufacturer.

S4.1.3 Once installed, the platform lift must be fully operational and capable of meeting all operational tests specified in the platform lift manufacturer's installation instructions.

S4.2 *Owner's Manual Insert Requirements.* The vehicle owner's manual must contain inserts pertaining to the platform lift which specify:

S4.2.1 For vehicles other than buses and multipurpose vehicles with a GVWR over 3,220 kg (7,100 lbs), the dimensions which constitute the unobstructed platform operating volume;

S4.2.2 For vehicles with a GVWR less than or equal to 3,220 kg (71,000 lbs), information on whether a wheelchair user must back on to the lift platform due to the absence of an inner roll stop;

S4.2.3 Maintenance schedule based on the number of cycles on the operations counter specified in S5.11 of Standard 141; and

S4.2.4 Simple instructions regarding the platform lift operating procedures, including back-up operations, as specified in S5.9 of Standard 141.

S4.3 *Control System.*

S4.3.1 For buses and MPVs with a GVWR greater than 3,220 kg (7,100 lbs), any and all controls provided for the lift by the platform lift manufacturer, including those specified in S5.7 of standard 141, must be located together and in a position such that the control operator has a direct, unobstructed view of the platform lift passenger and their wheelchair (if the passenger is using a wheelchair) throughout the lift's range of passenger operation. Additional power controls may be located in other positions.

S4.3.2 Simple instructions regarding the platform lift operating procedures, including backup operations as specified by S5.9 of Standard 141, must be located near the controls. These instructions must be written in English.

§ 571.201 [Amended]

6. Section 571.201 would be amended by removing the definition of ''motor home'' contained in § 571.201 S3, Definitions.

§ 571.205 [Amended]

7. Section 571.205 would be amended by removing the definition of ''motor home'' contained in § 571.205 S4, Definitions.

§ 571.208 [Amended]

8. Section 571.208 would be amended by removing and reserving S4.2.4.1(a).

Issued on July 20, 2000.

Stephen R. Kratzke,

Associate Administrator for Performance Safety Standards.

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