

for
**Self - Propelled
Elevating Work Platforms**



American National Standards Institute
11 West 42nd Street
New York, New York 10036

Date of Publication: November 20, 2006

This Standard was approved by ANSI on August 1, 2006.

The design and manufacturing requirements of this standard apply to all aerial platforms manufactured on or after the effective date. All other provisions of this standard apply to both new and existing units delivered by sale, lease, rental or for any form of beneficial use on or after the effective date.

The effective date is established by the standards developer and not by the American National Standards Institute.

This standard was developed under procedures accredited as meeting the criteria for American National Standards. The Consensus Committee that approved the standard was balanced to assure that individuals from competent and concerned interests have had an opportunity to participate. The proposed standard was made available for public review and comment which provides an opportunity for additional public input from industry, academia, regulatory agencies, and the public-at-large.

The Scaffold Industry Association, Inc. (SIA) does not “approve,” “rate,” or “endorse” any item, construction, proprietary device or activity.

The Scaffold Industry Association, Inc. (SIA) does not take any position with respect to the validity of any patent rights asserted in connection with any items mentioned in this document, and does not undertake to ensure anyone utilizing a standard against liability for infringement of any applicable Letters Patent, nor assume any such liability. Users of this standard are expressly advised that the determination of the validity of any such patent rights, and the risk of the infringement of such rights, is entirely their own responsibility.

Participation by federal agency representative(s) or person(s) affiliated within the industry is not to be interpreted as government or industry endorsement of this standard.

The Scaffold Industry Association, Inc. (SIA) accepts responsibility for only those interpretations issued in accordance with governing ANSI Essential Requirements which preclude the issuance of interpretations by individual volunteers.

**ANSI/SIA
A92.6-2006**

Revision of
ANSI A92.6-1999

**AMERICAN NATIONAL STANDARD
for SELF-PROPELLED ELEVATING
WORK PLATFORMS**

Secretariat
Scaffold Industry Association, Inc.

Approved August 1, 2006
American National Standards Institute, Inc.

American National Standard

Approval of an American National Standard requires verification by ANSI that the requirements for due process, consensus, and other criteria for approval have been met by the standards developer.

Consensus is established when, in the judgment of the ANSI Board of Standards Review, substantial agreement has been reached by directly and materially affected interests. Substantial agreement means much more than a simple majority, but not necessarily unanimity. Consensus requires that all views and objections be considered, and that a concerted effort be made toward their resolution.

The use of American National Standards is completely voluntary; their existence does not in any respect preclude anyone, whether he has approved the standards or not, from manufacturing, marketing, purchasing, or using products, or procedures not conforming to the standards.

The American National Standards Institute does not develop standards and will in no circumstances give an interpretation of any American National Standard. Moreover, no person shall have the right or authority to issue an interpretation of an American National Standard in the name of the American National Standards Institute. Requests for interpretations should be addressed to the secretariat or sponsor whose name appears on the title page of this standard.

CAUTION NOTICE: This American National Standard may be revised or withdrawn at any time. The procedures of the American National Standards Institute require that action be taken to reaffirm, revise, or withdraw this standard no later than five years from the date of approval. Purchasers of American National Standards may receive current information on all standards by calling or writing the American National Standards Institute.

Published by
Scaffold Industry Association, Inc. (SIA)
Post Office Box 20574 , Phoenix, AZ, 85036-0574
www.scaffold.org

Copyright ©2006 by Scaffold Industry Association, Inc.
All rights reserved.

No part of this publication may be reproduced in any form,
in an electronic retrieval system or otherwise, without
the prior written permission of the publisher.

Printed in the United States of America

Foreword

This Foreword is not part of American National Standard for Self Propelled Elevating Work Platforms, ANSI/SIA A92.6-2006.

This standard is one of a series on aerial platforms developed under the committee procedures of the American National Standards Institute. The A92 standards committee was organized by the Institute in 1948. The Scaffold Industry Association, Inc. serves as Secretariat.

The primary objective of this standard is to prevent accidents associated with the use of Self-Propelled Elevating Work Platforms by establishing requirements for design, manufacture, maintenance, performance, use and training.

This revision to ANSI/SIA A92.6 separately addresses each entity to clearly define responsibilities. Care was taken to provide consistency between this and other A92 standards. Definitions have been expanded to clarify interpretation.

Interpretations and Suggestions for Improvement

All inquiries requesting interpretation of the Committee's approved American National Standards must be in writing and directed to the Secretariat. The A92 Committee shall approve the interpretation before submission to the inquirer. No one but the A92 Committee is authorized to provide any interpretation of this standard.

The A92 Committee solicits comments on and criticism of the requirements of the standards. The standards will be revised from time to time where necessary or desirable, as demonstrated by the experience gained from the application of the standards. Proposals for improvement of this standard will be welcome. Proposals should be as specific as possible, citing the paragraph number(s), the proposed wording, and a detailed rationale for the proposal including any pertinent documentation.

All requests for interpretation and all suggestions for improvement shall be forwarded in writing to the ASC A92 Committee, c/o Secretariat ~ Scaffold Industry Association, Post Office Box 20574, Phoenix, AZ, 85036-0574.

This standard was processed and approved for submittal to ANSI by Accredited Standards Committee Aerial Platforms, A92. The ASC A92 committee approval of the standard does not necessarily imply that all committee members voted for its approval. At the time the ASC A92 committee approved this standard, the A92 Aerial Platforms Committee had the following members:

David Merrifield, Chairman
Lincoln L. Schoenberger, Vice-Chairman

<i>Organization Represented</i>	<i>Name of Representative</i>
Alimak Hek, Inc.	Gregory E. Janda
Altec Hi Line	Eric Lumberg
	Matthew Trefz
Altec Industries	Bryan D. Player
American Rental Association	Richard Stollery
Arrowhead Product Development, Inc.	Gary Werkhoven
Association of Equipment Manufacturers	Dan Moss
Brewington & Company	John J. Brewington
C.W. Wright Construction Co.	Michael C. Stiles
Carolina Power & Light Company	John W. Cook, Jr.
	Ronald Upchurch
Edison Electric Institute	Gene Tootle
Diversified Inspections / ITL	Leland S. Bisbee
	Joe Vanderlugt

Donald Reichert & Associates.....	Donald Reichert
Eckstine & Associates.....	Dennis Eckstine
Equipment Safety Consultants, Inc.....	Charles “Mark” Recard
Evulich and Associates	Barris Evulich
Florida Power & Light Company.....	Mike Paulson
	Robert Sterba
Ford Motor Company	Ronald Bonner
Fraco Products.....	Francois Villeneuve
	Tim Riley
Genie Industries.....	Rick Curtin
	Ronald W. Barnhart
George Robson Construction Ltd.....	C. Denton Elliott
Global Rental Company.....	Joshua Chard
Hayden Enterprises.....	H.B. “Bud” Hayden, Jr.
Hydro-Mobile, Inc.....	Vincent DeQuoy
	Christian Corriveau
IEEE.....	Lewis M. Whisonant
Intercontinental Equipment Company, LLC.....	Gary A. McAlexander
JLG Industries, Inc.....	Stephen Forgas
	Todd Miorin
Kinetics	Ernest A. Jones
Lift-A-Loft Corporation.....	William P. Fulton
MAT-3, Inc.....	John J. Mlaker
McDonough Construction Rentals, Inc.	James Jensen
	Eric A. Schmidt
MEC Aerial Work Platforms	David E. White
	Nathan Woodsmith
New York State Department of Transportation.....	Francis L. Bonesteel
OEM Controls.....	Lincoln F. Schoenberger
PCD, LLC.....	Paul Young
Phenix Technologies.....	Mark A. Miller
Pike Electric, Inc.....	Zach Blackmon
Power Equipment Leasing Company, Inc.	Tracy Kurt Schroeder
Progress Energy Florida.....	F.J. Wooldridge
Rental Service Corporation.....	Ben Fort
Reynolds Engineering Services, Inc.....	Stephen Reynolds
Salt River Project	Ray A. Ybarra
	Derral Crance
Scaffold Industry Association.....	David Merrifield
Sexton's Equipment Rental, Inc.	David L. Sexton
Skyjack, Inc.....	Brad Boehler
Snorkel International.....	Richard Hoffelmeyer
	Harlan H. Henke
Southern Company.....	Douglas Bailey
	Richard Harper
Sunbelt Rentals.....	Byron Adkins
Terex-Telelect.....	Elroy D. Severson
The Von Corporation.....	Fred H. von Herrmann
Time Manufacturing Company.....	James Christian
	Ken Krause
USDOL/OSHA.....	Garvin Branch
Vollmer-Gray Engineering	Paul Guthorn
Waco Boom Company.....	Bob Simon
	Louis Haak

Subcommittee A92.6 Self Propelled Elevating Work Platforms, which developed this standard, had the following members:

H.B. “Bud” Hayden Jr., Chairman

Byron G. Adkins	Ben Fort	Donald Reichert
Robert D. Backer	Lyle D. Grider	Gene Rovinsky
Brad Boehler	Sean Grieve	Lincoln F. Schoenberger
Ron Bonner	Paul Guthorn	Richard Stollery
Rick Curtin	Richard L. Hoffelmeyer	David White
Dennis W. Eckstine	Les Knoll	Nathan Woodsmith
C. Denton Elliott	Evaldas Latvys	Ray A. Ybarra
Barris Evulich	David Merrifield	
Stephen Forgas	Charles "Mark" Recard	

Contents

Section	Page
1. Scope, Purpose and Application	11
1.1 Scope	11
1.1.1 Equipment Covered	11
1.1.2 Effective Dates	11
1.1.3 Equipment Not Covered	11
1.2 Purpose	12
1.3 Application	12
2. Referenced and related American National Standards and Scaffold Industry Association publications	12
2.1 Referenced American National Standards	12
2.2 Other referenced Standards and Regulations	12
2.3 Related American National Standards	12
2.4 Referenced Scaffold Industry Association publication(s)	12
2.5 Related Scaffold Industry Association publication(s)	12
3. Definitions	13
4. Responsibilities of Manufacturers	15
4.1 Basic principles	15
4.2 Rated work load	15
4.2.1 Multiple ratings	15
4.3 Quality control	15
4.4 Proof test	16
4.5 Welding Standards	16
4.6 Structural, rope and chain safety factors	16
4.6.1 Structural safety factors	16
4.6.1.1 Ductile elements	16
4.6.1.2 Nonductile elements	16
4.6.1.3 Structural safety factor formulas	16
4.6.2 Wire rope or chain safety factor	16
4.7 Controls	16
4.7.1 Upper controls	16
4.7.2 Lower controls	17
4.7.3 Emergency stop device	17
4.7.4 Emergency lowering	17
4.7.5 Security	17
4.7.6 Slope warning	17
4.8 Stability testing	17
4.8.1 Horizontal load test	17
4.8.2 Vertical load test	17
4.8.3 Static load test on slope	17

4.8.4 Test requirements for driving	17
4.8.4.1 Curb test	18
4.8.4.2 Depression test	18
4.9 Interlock requirements	18
4.9.1 Driving	18
4.9.2 Stabilizing devices	18
4.10 Bursting safety factors	18
4.11 System protection	18
4.11.1 Unintended platform motion	18
4.11.1.1 Hydraulic/pneumatic system	18
4.11.1.2 Wire rope/chain system	18
4.11.2 Unintended retraction of outriggers or stabilizers	18
4.12 Personal protection and warning systems.....	18
4.12.1 Personal protection	19
4.12.2 Warning for platform lowering	19
4.13 Platforms	19
4.13.1 Width and surface	19
4.13.2 Guardrail system	19
4.13.2.1 Top rail	19
4.13.2.2 Mid-rail	19
4.13.2.3 Flexible materials	19
4.13.2.4 Structural integrity	19
4.13.3 Toeboards	19
4.13.4 Access	19
4.13.5 Anchorage(s) for Personal Fall Protection	19
4.14 Instructions and markings	19
4.14.1 Manufacturer's (remanufacturer's) information	19
4.14.2 Platform work loads	20
4.15 Brakes	20
4.15.1 Holding brakes	20
4.15.2 Dynamic brakes	20
4.15.3 Combination brakes	20
4.16 Power system	20
4.16.1 Fuel and exhaust	20
4.16.2 Battery location	20
4.16.3 Hourmeter	21
4.17 Manuals	21
4.17.1 Operating and maintenance manuals	21
4.17.2 Repair and parts manual	21
4.18 Weather-resistant storage	21
4.19 Electrical system	21
4.20 Training and training materials	21
4.21 Manufacturer as dealer	21
4.22 Remanufacture	21
5. Responsibilities of Dealers	21

5.1 Basic principles	21
5.2 Manuals	21
5.2.1 Machine manual(s)	21
5.2.2 Manual of Responsibilities	21
5.3 Pre-delivery preparation	22
5.4 Maintenance, inspection and repair	22
5.4.1 Maintenance	22
5.4.2 Inspection	22
5.4.3 Repairs	22
5.5 Maintenance safety precautions	22
5.6 Replacement parts	22
5.7 Training	22
5.8 Familiarization on delivery	22
5.9 Dealer as user	22
5.10 Assistance to owners and users	22
5.11 Record retention and dissemination	22
5.11.1 Record retention	22
5.11.2 Proof of training	23
5.11.3 Record dissemination	23
5.12 Modifications	23
5.13 Manufacturer's (remanufacturer's) safety bulletins	23
5.14 Responsibilities upon sale	23
6. Responsibilities of Owners	23
6.1 Basic principles	23
6.2 Responsibilities upon purchase	23
6.3 Manuals	24
6.3.1 Machine manual(s)	24
6.3.2 Manual of Responsibilities	24
6.4 Maintenance, inspection and repair	24
6.4.1 Maintenance	24
6.4.2 Inspection	24
6.4.3 Repairs	24
6.5 Predelivery preparation	24
6.6 Frequent inspection	24
6.7 Annual inspection	24
6.8 Maintenance safety precautions	25
6.9 Replacement parts	25
6.10 Maintenance training	25
6.11 Training	25
6.11.1 Operator training	25
6.11.2 Assistance to user	25
6.12 Familiarization upon delivery	25
6.13 Operation	25
6.14 Assistance to users and operators	25
6.15 Record retention and dissemination	25

6.15.1 Record retention	25
6.15.2 Proof of training	26
6.15.3 Record dissemination	26
6.16 Modifications	26
6.17 Manufacturer's Safety Bulletins	26
6.18 Responsibilities upon sale	26
7. Responsibilities of Users	26
7.1 Basic principles	26
7.2 Manuals	26
7.2.1 Machine manuals	26
7.2.2 Manual of Responsibilities	26
7.3 Inspection and maintenance	26
7.3.1 Frequent inspection	27
7.3.2 Annual inspection	27
7.3.3 Prestart inspection	27
7.3.4 Maintenance safety precautions	27
7.4 Replacement parts	27
7.5 Maintenance training	27
7.6 Operator training and retraining	27
7.6.1 Trainee records	27
7.7 Familiarization before use	27
7.8 Workplace inspection	27
7.9 Determination of hazardous locations	28
7.10 Operator warnings and instructions	28
7.11 User as Operator	30
7.12 Shutdown of aerial platform	30
7.13 Record retention and dissemination	30
7.13.1 Record retention	30
7.13.2 Record dissemination	30
7.13.3 Proof of training	30
7.14 Modifications	30
7.15 Manufacturer's safety bulletins	30
8. Responsibilities of Operators	30
8.1 Basic principles	31
8.2 Manuals	31
8.2.1 Machine manuals	31
8.2.2 Manual of Responsibilities	31
8.3 Prestart inspection	31
8.4 Problems or malfunctions	31
8.5 Training, retraining, and familiarization	31
8.5.1 General training	31
8.5.2 Retraining	31
8.5.3 Familiarization	31
8.6 Before operation	31

8.7 Workplace inspection	32
8.8 Prior to each elevation	32
8.9 Understanding of hazardous locations	32
8.10 Operator warnings and instructions	32
8.11 Record of training	34
9. Responsibilities of Lessors	34
9.1 Basic principles	34
9.2 Lessor as a dealer	34
9.3 Lessor as an owner	34
9.4 Lessor as a user	34
9.5 Lessor as an operator	34
10. Responsibilities of Lessees	34
10.1 Basic principles	34
10.2 Lessee as a Dealer	34
10.3 Lessee as an Owner	34
10.4 Lessee as a User	34
10.5 Lessee as an Operator	34
11. Responsibilities of Broker	34
11.1 Responsibilities upon sale	34
11.2 Responsibilities with re-rents, leases, or any other form of beneficial use	35
Figure 1 – Typical Examples of Equipment Covered	36
Figure 2 (a & b) – Illustration of Horizontal Load Tests	37
Figure 2 (c & d) – Illustration of Static Tests Required on a Slope	38
Figure 3 – Illustration of a Depression Test	39

American National Standard for Self-Propelled Elevating Work Platforms

1. Scope, Purpose and Application.

1.1 Scope.

1.1.1 Equipment Covered. This standard applies to self-propelled integral chassis aerial platforms having a platform that cannot be positioned completely beyond the base and are used to position personnel, along with their necessary tools and materials, at work locations. Aerial platforms are power operated with primary functions including drive controlled from the platform (see Figure 1 for examples on page 36).

1.1.2 Effective Dates. The Standard will become effective May 20, 2007 as follows:

- (1) Design, manufacture and remanufacture requirements. The design and manufacturing requirements of this Standard will apply to all aerial platforms manufactured on or after the effective date. Aerial platforms remanufactured on or after the effective date of this standard shall comply with the requirements of this standard.
- (2) Rebuild/recondition requirements. Rebuilt/reconditioned aerial platforms shall comply with the standard in effect as of the date of their original manufacture.
- (3) Responsibilities for dealers, owners, users, operators, lessors, lessees and brokers. All provisions detailed for dealers, owners, users, operators, lessors, lessees and brokers apply to both new and existing units delivered by sale, lease, rental or any form of beneficial use on or after the effective date.

1.1.3 Equipment Not Covered.

- (1) Ladder and ladder stands such as those covered in American National Standards for Ladder and Ladder Stands, ANSI A14 series.
- (2) Scaffolding such as those covered in American National Standard for Construction and Demolition Operations Scaffolding Safety Requirements, ANSI A10.8-1988.

- (3) Vehicle and trailer-mounted elevating and rotating aerial platforms such as those covered in American National Standard for Vehicle-Mounted Elevating and Rotating Aerial Devices, ANSI/SIA A92.2-2001.
- (4) Non self-propelled elevating aerial platforms such as those covered in American National Standard for Manually-Propelled Elevating Aerial Platforms, ANSI/SIA A92.3-2006.
- (5) Self-propelled elevating aerial platforms such as those covered in American National Standard for Boom-Supported Elevating Work Platforms, ANSI/SIA A92.5-2006.
- (6) Vehicle-mounted vertical lift devices such as those covered in American National Standard for Airline Ground Supported Vehicle-Mounted Vertical Lifts, ANSI/ SIA A92.7-1990 (Reaffirmed 1998).
- (7) Vehicle-Mounted Bridge Inspection and Maintenance Devices, ANSI/SIA A92.8-1993 (reaffirmed 1998).
- (8) Mast Climbing Work Platforms, ANSI/SIA A92.9-1993 (Reaffirmed 1998).
- (9) Suspended powered platforms for exterior building maintenance, ANSI A120.1-1996.
- (10) Vertically adjustable equipment used primarily to raise and lower materials and equipment from one elevation to another such as American National Standards in the A17, B30 and B56 series.
- (11) Fire-fighting equipment such as that covered in American National Standard for Automotive Fire Apparatus, ANSI/NFPA 1901-1991.
- (12) Construction and demolition operation digger derricks such as those covered in American National Standard for Construction and Demolition Safety Requirements, Definitions and Specifications, ANSI A 10.31-1995.
- (13) An attachment or device which is intended to convert a non-self-propelled elevating aerial platform to a self-propelled elevating aerial platform, unless the resulting elevating aerial platform is within the scope of equipment covered as defined in 1.1.1 of this standard.

1.2 Purpose. This standard applies to self-propelled elevating aerial platforms to achieve the following objectives:

- (1) Prevention of accidents and personal injuries.
- (2) Establishment of criteria for design, manufacture, remanufacture, rebuild/recondition, testing, performance, inspection, training, maintenance, and operation.
- (3) Establishment and understanding by designers, manufacturers, dealers, owners, users, operators, lessors, lessees and brokers of their respective responsibilities.

1.3 Application. The rapid development of a wide variety of self-propelled elevating aerial platform designs necessitates the establishment of standards for their design, manufacture, (remanufacture), rebuild/recondition, maintenance, inspection, testing, training, performance, and use.

2. Referenced and related American National Standards and Scaffold Industry Association publications.

2.1 Referenced American National Standards. This standard is intended to be used in conjunction with the following American National Standards. When these referenced standards are superseded by a revision approved by the American National Standards Institute, the revision shall apply:

ANSI/SIA A92.2-2001, Vehicle-Mounted Elevating and Rotating Aerial Devices.

ANSI Z535.1 - 2002, Safety Color Code.

ANSI Z535.3 - 2002, Criteria for Safety Symbols.

ANSI Z535.4 - 2002, Product Safety Signs and Labels.

ANSI/AWS D 1 - 2004, Structural Welding Code Steel.

ANSI/AWS D1.2 - 2003, Structural Welding Code Aluminum.

ANSI/NFPA 58-1995, Storage and Handling of Liquefied Petroleum Gases.

ANSI/NFPA 70-1999, National Electrical Code.

ANSI/NFPA 505-1996, Powered Industrial Trucks, Including Type Designations, Areas of Use, Maintenance, and Operation.

2.2 Other referenced Standards and Regulations.

This Standard is also intended to be used in conjunction with the following:

- (1) SAE J821 - 1985 for Electrical Systems for Construction, Agriculture and Off-Road Machines.
- (2) Code of Federal Regulations (CFR) 1910.333

2.3 Related American National Standards. The standards listed here are for information only and are not essential for the completion of the requirements of this standard. When these related standards are superseded by a revision approved by the American National Standards Institute, the revision shall apply.

ANSI/SIA A92.2-2001, Vehicle-Mounted Elevating and Rotating Aerial Devices

ANSI/SIA A92.3-2006, Manually Propelled Elevating Aerial Platforms.

ANSI/SIA A92.5-2006, Boom-Supported Elevating Work Platforms.

ANSI/SIA A92.7-1990 (Reaffirmed 1998), Airline Ground Support Vehicle-Mounted Vertical Lift Devices

ANSI/SIA A92.8-2006, Vehicle-Mounted Bridge Inspection and Maintenance Devices.

ANSI/SIA A92.9-1993 (Reaffirmed 1998), Mast Climbing Work Platforms (R 1998).

ANSI A10.4-1990, Personnel Hoists.

ANSI A10.8-1988, Construction and Demolition Operations Scaffolding Safety Requirements.

ANSI A120.1-2001, Suspended Powered Platforms for Exterior Building Maintenance.

ANSI A10.31-1995, Construction and Demolition Digger Derricks Safety Requirements, Definitions, and Specifications.

ANSI/NFPA 1901-1991, Automotive Fire Apparatus.

2.4. Referenced Scaffold Industry Association publication(s).

This standard is intended to be used in conjunction with the following SIA publication:
ANSI/SIA A92.6-2006 Manual of Responsibilities for Dealers, Owners, Users, Operators, Lessors, Lessees, and Brokers of Self-Propelled Elevating Work Platforms.

2.5. Related Scaffold Industry Association

publication(s). The publications listed here are for information only and are not essential for the completion of the requirements of this standard.

ANSI/SIA A92.2 – 2001 Manual of Responsibilities for Dealers, Owners, Users, Operators, Lessors, Lessees and Brokers of Vehicle Mounted Elevating and Rotating Aerial Devices.

ANSI/SIA A92.3-2006 Manual of Responsibilities for Dealers, Owners, Users, Operators, Lessors, Lessees and Brokers of Manually Propelled Elevating Aerial Platforms.

ANSI/SIA A92.5-2006 Manual of Responsibilities for Dealers, Owners, Users, Operators, Lessors, Lessees and Brokers of Boom-Supported Elevating Work Platforms.

ANSI/SIA A92.9-1993 Manual of Responsibilities for Dealers, Owners, Lessors, and Lessees of Mast Climbing Work Platforms.

3. Definitions

Aerial platform. A mobile device that has an adjustable position platform, supported from ground level by a structure.

Anchorage(s). A secure point of attachment to be used with personal fall protection equipment (PFPE).

Authorized personnel (authorized person). Personnel approved or assigned to perform a specific type of duty or duties at a specific location or locations at a work site.

Base. The relevant contact points of the aerial platform that form the stability fulcrum (e.g. wheels, casters, outriggers, stabilizers).

Broker. An independent business entity or person that arranges a lease or transfer of ownership of an aerial platform, but does not own the aerial platform. If the entity or person is an employee of the buyer, seller, lessor or lessee of the aerial platform, he shall not be considered a broker.

Chassis. The integral part of the aerial platform that provides mobility and support for the elevating assembly.

Configuration. All positions in which an aerial platform or any part thereof can be placed within its intended operating limits.

Critical component(s). Load supporting elements which support or stabilize the platform or aerial platform.

Dealer. A person or entity who buys from a manufacturer or distributor and who generally sells, rents, and services aerial platforms.

Delivery. Transfer of care, control, and custody of the aerial platform from one person or entity to another person or entity.

Directional controls. Controls that initiate functions that affect movement of the platform or the aerial platform.

Ductile materials. Materials having a minimum elongation of 10% in 2 inches (50.8mm).

Elevating assembly. The mechanisms used to position the platform relative to the aerial platform chassis.

Familiarization. Providing information regarding the control functions and safety devices for the aerial platform(s) to a qualified person or operator who controls the movement of the aerial platform(s) being delivered.

Guardrail system. A vertical barrier primarily intended to protect against personnel falling to lower levels.

Hazardous location. Any location that contains, or has the potential to contain, an explosive or flammable atmosphere as defined in ANSI/NFPA 505 – 1996, Powered Industrial Trucks.

Instability. A condition of an aerial platform in which the sum of the moments that tend to overturn the unit exceeds the sum of the moments tending to resist overturning.

Insulated platform. A platform designed and tested to meet the specific electrical insulation ratings consistent with the manufacturer's identification plate.

Interlock. A control or mechanism that, under specified conditions, automatically allows or prevents the operation of another control or mechanism.

Lessee. A person(s) or entity to whom an aerial platform is provided by lease, rental, loan, or other arrangement. A lessee may also be a dealer, owner, user or operator.

Lessor. A person(s) or entity who leases, rents, loans, or otherwise provides an aerial platform to another party

for the beneficial use of that party (the user). A lessor may also be a dealer, owner, lessee, user, or operator.

Maintenance. The act of upkeep such as inspection, lubrication, refueling, cleaning, adjustment and scheduled part(s) replacement.

Manual of Responsibilities. A document containing the definitions (Section 3) and the requirements mandated in this Standard for the following entities: Dealers (Section 5); Owners (Section 6); Users (Section 7); Operators (Section 8); Lessors (Section 9); Lessees (Section 10), and Brokers (Section 11).

Manufacturer. A person or entity who makes, builds, or produces an aerial platform.

Maximum travel height. The maximum platform height or the most adverse configuration(s) with respect to stability in which travel is permitted by the manufacturer.

Modification, modified. To make a change(s) to an aerial platform that affects the operation, stability, safety factors, rated load or safety of the aerial platform in any way.

Most adverse stability condition(s). The permitted configuration of the aerial platform most likely to cause instability while maintaining stability. Factors to be considered shall include:

- (1) With zero load to maximum test load.
- (2) Up to and including maximum platform height.
- (3) All positions and configurations of the platform(s).
- (4) All wheel and axle positions.
- (5) Forward and backward configurations of the elevating assembly.
- (6) All other moveable features which affect the stability of the aerial platform.

Multiple rating(s), multiple rated loads. Two or more different rated work loads based on alternative configurations of the aerial platform.

Operation. Performance of functions of an aerial platform within the scope of its specifications and in accordance with the manufacturer's instructions, the

user's work rules, and applicable governmental regulations.

Operator. A qualified person who controls the movement of an aerial platform.

Outriggers. Devices that increase the stability of the aerial platform and that are capable of lifting and leveling the aerial platform.

Override. To take over aerial platform movement control functions at the upper control station by those at the lower control station.

Owner. A person or entity who has possession of an aerial platform by virtue of proof of purchase.

Passive. Under specified conditions, automatically performed and not requiring any specific action to accomplish.

Platform. The portion of an aerial platform intended to be occupied by personnel with their necessary tools and materials.

Platform height. The vertical distance measured from the floor of the platform to the surface upon which the machine is being supported.

Powered functions. Those which control motion of the platform or the aerial platform and are caused by electro-mechanical, hydraulic or pneumatic forces.

Qualified person. One who, by possession of a recognized degree, certificate, or professional standing, or by extensive knowledge, training, and experience, has successfully demonstrated his/her ability to solve or resolve problems related to the subject matter, the work, or the project.

Rated horizontal force. The maximum permissible horizontal force at the top rail which can be applied to the aerial platform as specified by the manufacturer.

Rated work load. The designed carrying capacity of the aerial platform as specified by the manufacturer.

Rebuild/recondition. The act of disassembly, repair or adjustment of an aerial platform or component, utilizing replacement parts and components, in accomplishing work beyond the scope of maintenance (as described and used in the standard) in order to restore, to the extent possible, the aerial platform or component to the original manufactured specifications.

Remanufacture. The modification of an aerial platform, either by the original manufacturer or another qualified entity, so that the aerial platform will comply with the ANSI Standard in effect on the date the modification is completed.

Repair. The act of restoring to good condition that which has been broken, damaged or worn due to use, abuse or other reasons.

Shall. The word “shall” is to be understood as being mandatory.

Should. The word “should” indicates that the rule is a recommendation, the advisability of which depends on the facts in each situation.

Stability/Stable. A condition of an aerial platform in which the sum of the moments that tend to overturn the unit is less than or equal to the sum of the moments tending to resist overturning.

Stabilizers. Devices that increase the stability of the aerial platform but are not capable of lifting or leveling the aerial platform.

Training. Instruction to enable the trainee to become a qualified person regarding the task to be performed, including knowledge regarding potential hazards.

Unintended motion. Motion of the aerial platform or platform without activation of any control.

Unrestricted rated workload. The maximum designed carrying capacity of the aerial platform allowed by the manufacturer in all operating configurations.

User. A person(s) or entity who has care, control and custody of the aerial platform. This person or entity may also be the employer of the operator, a dealer, owner, lessor, lessee, or operator.

4. Responsibilities of Manufacturers.

4.1 Basic principles. Sound engineering principles consistent with all data available regarding the parameters of intended use and expected environment shall be applied in the design, testing, and manufacture of aerial platforms, with due consideration for the knowledge that the unit will be carrying personnel.

4.2 Rated work load. The rated work load of an aerial platform shall not be less than 250 pounds (114 kg). Either single or multiple ratings may be used.

- 4.2.1 Multiple ratings.** Where multiple ratings are used, the following conditions shall be complied with:
- (1) When the rated workload is different for alternative configurations of the aerial platform, the manufacturer (remanufacturer) shall clearly describe these configurations, and the rated workload of each configuration, in the manual and on the platform. Examples of alternate configurations are, but shall not be limited to, the following:
 - (a) Outriggers or stabilizers extended to firm footing versus not extended;
 - (b) Platform and extension(s) extended versus retracted;
 - (c) Platform attachment(s) attached versus unattached;
 - (d) Elevating assembly elevated versus lowered;
 - (e) Axles extended versus retracted.
 - (2) When the rated workload of the alternate configuration depends on the location of the platform in relation to the base, the manufacturer (remanufacturer) shall display the appropriate rated workload of that configuration to the operator at the control station(s).
 - (3) The unrestricted rated work load, the rated number of occupants, and the rated horizontal force shall be displayed at each access to the platform and operator control station.

4.3 Quality control. The manufacturer shall establish and follow a written quality control procedure to ensure compliance with Section 4 of this standard.

4.4 Proof test. Each production aerial platform on level ground shall sustain a load test which shall include the movement of the platform with a uniformly distributed platform load equaling 1.50 times the rated work load being imposed throughout the range of motions which confirm the integrity of the aerial platform. A visual inspection shall be made to determine whether this test has produced an adverse effect on any component.

4.5 Welding Standards. All welding, including pressure applications such as hydraulic cylinders, shall conform to ANSI/AWS D1.1 - 2004 and ANSI/AWS D1.2 - 2003, or ANSI/AWS-D14.3-94, except welder and procedure qualifications may be in accordance with one of the following:

AWS B2.1 1998: Specification for Welding Procedure and Performance Qualification.

ANSI/AMSE: 1998 Boiler and Pressure Vessel Code, Section IX, Welding and Bracing Qualifications.

EN 287-1: 1992 Approval Testing of Welders-Fusion Welding-Part 1, Steels.

EN 287-2: 1992 Approval of Welders-Fusion Welding-Part II, Aluminum and Aluminum Alloys.

EN 288: 1992 Specifications and Approval of Welding Procedures for Metallic Materials.

4.6 Structural, rope and chain safety factors .

4.6.1 Structural safety factors.

4.6.1.1 Ductile elements. All load supporting elements of the aerial platform made of ductile materials shall have a structural safety factor of not less than 2 to 1 based on:

- (1) The minimum yield strength of the materials used
- (2) The column strength of the structure.

4.6.1.2 Nonductile elements. Elements of the aerial platform that are made of nonductile materials shall have a structural safety factor of not less than 5 to 1 based on the minimum ultimate strength of the materials used.

4.6.1.3 Structural safety factor formulas. The design stress or column load used in determining the structural safety factor shall be the maximum stresses or column load developed within the element with the machine operating at its rated work load, used in the type of service for which it was designed, and operated in

accordance with the manufacturers operating instructions.

The design stress shall include the effects of stress concentration and dynamic loading as shown in the following formula:

$$\text{Structural Safety Factor} = \frac{a}{(a_1 + a_2) f_1 f_2}$$

Where:

a = minimum yield strength for materials described in 4.6.1.1 or ultimate strength for materials described in 4.6.1.2

a₁ = stress due to the weight of the structure

a₂ = stress due to the rated work load

f₁ = stress concentration factor

f₂ = dynamic loading factor

The column load shall include the effects of dynamic loading as shown in the following formula:

$$\text{Structural Safety Factor} = \frac{b}{(b_1 + b_2) f_2}$$

Where:

b = column critical buckling load

b₁ = column load due to the weight of the structure

b₂ = column load due to the rated work load

f₂ = the dynamic loading factor

The value of f₁ and f₂ may be determined by experimental stress analysis on a prototype unit. Otherwise, the values of f₁ and f₂ shall be not less than 1.10 and 1.25, respectively.

4.6.2 Wire rope or chain safety factor. Where the platform is supporting its rated work load by a system of wire ropes or chains, or both, the safety factor of the wire rope or chain system shall not be less than 8 to 1 based on ultimate strength.

4.7 Controls.

4.7.1 Upper controls. Upper controls shall be provided at the platform, and shall:

- (1) Be readily accessible to the operator.
- (2) Be oriented and/or move in the approximate direction of the function which they control with the control box in its normal position for operation. Control boxes not permanently attached shall have their normal location and orientation clearly marked.
- (3) Include a separate control which shall be continuously activated by the operator for upper directional controls to be operational,

which can be released by the operator independently from the directional controls, and which renders the upper controls inoperative when released.

- (4) Be of the type that automatically return to the "off" or "neutral" position when released, if used to control any movement of the aerial platform.
- (5) Be protected against activation other than that initiated by the operator.
- (6) Be clearly marked.

4.7.2 Lower controls. Lower controls shall be readily accessible from ground level and shall:

- (1) Override upper controls for powered functions.
- (2) Be provided for all powered functions except drive and steering.
- (3) Be of the type that automatically return to the "off" or "neutral" position when released.
- (4) Be protected against activation other than that initiated by the operator.
- (5) Be clearly marked.

4.7.3 Emergency stop device. The aerial platform shall be equipped with readily identifiable emergency stop devices, located at the upper control and lower control stations, which will deactivate all powered functions that affect the movement of the platform or aerial platform.

4.7.4 Emergency lowering. Any aerial platform equipped with a powered elevating assembly shall be supplied with clearly marked emergency lowering means readily accessible from ground level.

4.7.5 Security. A security means shall be provided to protect against unauthorized use of the aerial platform.

4.7.6 Slope warning. All aerial platforms shall be fitted with a warning device which is activated automatically when the aerial platform is at or beyond a slope (or slopes where the slope varies by direction) established by the manufacturer. The warning device may be inoperative when the platform is not elevated. The machine must pass the Horizontal Load Test (4.8.1) at the maximum slope on which the warning device first activates.

4.8 Stability testing. A sample unit of each model shall remain stable, in the most adverse stability condition(s),

or as noted in the specific test description, during the following tests:

4.8.1 Horizontal load test. The rated horizontal load (or side load) shall be established by this test. The aerial platform shall withstand a minimum horizontal force of 50 pounds (223 N) per rated number of occupants, 0.15 times rated work load (15%), or 100 pounds (445 N), whichever is greater, applied to a point on the upper periphery (top rail) of the aerial platform and while on the maximum slope on which the warning device required in paragraph 4.7.6 of this Standard first activates. The rated work load shall be applied such that the center of gravity of the load is in the vertical plane which intersects the platform floor:

- (1) 12 inches (0.30 m) inboard from the guardrail;

or,

- (2) On the platform centerline, whichever is less.

NOTE: The horizontal force shall be applied in the direction most likely to cause instability. (See figures 2A and 2B Shown on page 37 for typical test positions.)

4.8.2 Vertical load test. The aerial platform shall sustain, on a level surface, a static test load equal to 1.50 times its rated work load (150%). The test load shall be placed with its center of gravity 12 inches (0.30 m) inboard from the guardrail or on the platform center line, whichever places the center of gravity of the load closest to the guardrail.

4.8.3 Static load test on slope. The aerial platform shall be tested on a slope 5 degrees greater than the slope for which it is rated by the manufacturer. The test shall be conducted:

- (1) While sustaining static vertical load equal to 1.33 times the rated work load of the platform applied to the platform floor surface at a location 12 inches (0.30m) inboard from the railing or floor transition, or on the platform centerline, whichever places the center of gravity of the load closest to the guardrail. (See Figure 2C and 2D on page 38.)

- (2) With no load on the platform.

When intended configurations include multiple platform floor zones with individual rated work loads, each platform floor zone shall be loaded, based on its rating and the above requirements.

4.8.4 Test requirements for driving.

4.8.4.1 Curb test. A dynamic stability test shall be performed on the maximum slope for which the aerial platform is rated by the manufacturer up to and including maximum travel height. The platform shall carry a test load whose center of gravity is located 6 inches (0.15m) above the platform floor and distributed over the leading half of the platform and equal to 1.33 times the rated work load. The machine shall be driven at its maximum attainable speed for that configuration into a fixed curb high enough to stop the machine. The most adverse stability condition may be with wheels turned.

4.8.4.2 Depression test. A dynamic stability test shall be performed on the maximum slope for which the aerial platform is rated by the manufacturer up to and including maximum travel height. The platform shall carry a test load(s) whose center of gravity is located 6 inches (0.15m) above the platform floor(s) and distributed over the leading half of the platform(s) and equal to the rated work load. The machine shall be driven into a 24 inch (0.60m) square hole with a vertical drop of 4 inches (0.10m) at its maximum attainable forward speed for that configuration with one front wheel aligned perpendicular to the edge of the test hole. The test shall also be performed at the maximum attainable reverse speed for that configuration with one rear wheel aligned perpendicular to an edge of the test hole. In both the forward and reverse tests the steer wheels shall be parallel with the length of the machine.

When performing the test, the test wheel shall enter the hole at all locations along that edge of the test hole (see Figure 3 on page 39).

The drive control shall be maintained until the wheel bottoms in the test hole or a structural member of the machine makes contact on the surface around the test hole.

4.9 Interlock requirements.

4.9.1 Driving. If the drive height or drive speed must be reduced to meet the requirements of paragraphs 4.8.4.1 and 4.8.4.2, these functions shall be interlocked. Additionally, any configuration of the aerial platform that does not meet the requirements of paragraphs

4.8.4.1 and 4.8.4.2 shall require the drive function to be interlocked to prevent driving.

4.9.2 Stabilizing devices. For aerial platforms requiring the use of outriggers, extendible axles or other devices to meet the stability requirements of the Standard, interlocks shall be provided to prevent elevating or extending the platform unless all stabilizing devices are properly deployed. Interlocks shall also be provided to prevent the retraction of outriggers, extendible axles or other stabilizing devices while the platform is elevated or extended.

4.10 Bursting safety factors. All critical components and hoses of hydraulic and pneumatic systems shall have a minimum bursting strength of four times the operating pressure for which the system is designed. Non-critical components shall have a minimum bursting strength of two times the operating pressure for which the system is designed.

4.11 System protection.

4.11.1 Unintended platform motion.

4.11.1.1 Hydraulic/pneumatic system. Where positioning of the platform is accomplished by hydraulic or pneumatic means, the system shall be so equipped as to prevent motion unintended by the operator in the event of a hydraulic or pneumatic line failure. This requirement does not apply to protected metallic tubing on fittings installed between a cylinder and the holding device.

4.11.1.2 Wire rope/chain system. Where positioning of the platform is accomplished by wire rope or chain, the system shall prevent motion unintended by the operator in the event of failure of a single wire rope or chain.

4.11.2 Unintended retraction of outriggers or stabilizers. Hydraulically or pneumatically actuated outriggers or stabilizers, or both, shall be so constructed as to prevent their retraction in the event of failure of a hydraulic or pneumatic line.

4.12 Personal protection and warning system.

4.12.1 Personal protection. Personnel on the platform shall be protected against the hazards of moving parts of the aerial platform.

4.12.2 Warning for platform lowering. While the platform is being lowered, utilizing the upper controls, a warning device shall be activated at ground level.

4.13 Platforms.

4.13.1 Width and surface. Platform width shall be not less than 18 inches (0.46m). The platform floor shall have a slip resistant surface.

4.13.2 Guardrail system. The platform shall include a guardrail system around its periphery. If the guardrail system is removable or can be lowered, the means used to secure it in the normal operating position shall be readily accessible for inspection and maintenance.

4.13.2.1 Top rail. The guardrail system shall include a top rail around its upper periphery. The height of the top rail above the platform shall be 42 inches (1.07m) plus or minus 3 inches (7.6 cm) above the platform surface. Equivalent structure may be used in place of top rails and shall meet the strength requirements of section 4.13.2.4.

4.13.2.2 Mid-rail. The guardrail system shall include a mid-rail approximately midway between the top rail and the platform surface. Equivalent structure may be used in place of mid-rails, but shall meet the strength requirements described in 4.13.2.4.

4.13.2.3 Flexible materials. Flexible materials such as cables, chains, and ropes shall not be used in the guardrail system, except they may be used as a mid-rail at access openings 30 inches (0.76m) wide, or less.

4.13.2.4 Structural integrity. Each top rail, midrail, or equivalent vertical barrier shall withstand a concentrated test load of 300 pounds (1340 N) applied at any point in all directions without reaching ultimate strength.

4.13.3 Toeboards. The platform shall include toeboards on all sides. The minimum toeboard height

shall be 4 inches (0.10 m). Toeboards may be omitted at the access opening(s).

4.13.4 Access. The aerial platform shall include means for personnel to use in entering to/exiting from the platform when in the lowered position. When the distance between the access level and the floor of the platform in its access position exceeds 20 inches (0.50m), the aerial platform shall be equipped with an access ladder. The access system shall permit and, by proper placement of components, promote achievement of three point support while ascending or descending the access system. The steps or rungs shall not be more than 12 inches (0.30m) apart. The steps or rungs shall be divided equally over the distance between the first step or rung and the floor of the platform. The height of the first step above the ground shall be a maximum of 20 inches (0.50m). Each step or rung shall be at least 12.5 inches (0.32m) wide, at least 1 inch (25mm) deep, and shall be slip resistant. The front of the steps or rungs shall be at least 6 inches (0.15m) horizontally away from the supporting structure of any other components of the aerial platform. The access ladder shall be symmetrical with the access opening.

4.13.5 Anchorage(s) for Personal Fall Protection.

Aerial platforms designed to allow use with the guardrail system or sections of the guardrail system removed shall have anchorage(s) for personal fall protection conforming to the following requirements:

- (1) The location of the anchorage(s) shall be identified and the number of anchorages shall equal or exceed the number of rated occupants.
- (2) More than one occupant may attach to a single anchorage if the anchorage is rated for more than one person.
- (3) When provided, each anchorage shall be capable of withstanding a static force of 3,600 lb. (16,000 N) for each person allowed by the manufacturer without reaching ultimate strength. The strength requirement shall only apply to the anchorage(s) and their attachment to the aerial platform.
- (4) The anchorage(s) shall be positioned to minimize lanyard slack.

4.14 Instructions and markings.

4.14.1 Manufacturer's (remanufacturer's)

information. The following information shall be displayed on all aerial platforms in a clearly visible, accessible area and in a durable manner:

- (1) Warnings, cautions, or restrictions for safe operation and maintenance in accordance with:
ANSI Z535. 1 – 2002 Safety Color Code.
ANSI Z535.3 – 2002 Criteria for Safety Symbols.
ANSI Z535.4 – 2002 Product Safety Signs and Labels.
- (2) The make, model, serial number, and manufacturer's (remanufacturer's) name and address.
- (3) The rated work load including rated number of occupants.
- (4) The maximum platform height.
- (5) The maximum travel height, if not equal to the maximum platform height.
- (6) The nominal voltage ratings of the batteries if battery powered.
- (7) A notice to study the Operating Manual before using the equipment.
- (8) A notice of the inspections required by Sections 6, 7 and 8 of this standard.
- (9) An alternative configuration statement. If an aerial platform may have several alternative configurations, the manufacturer shall clearly describe these alternatives, including the rated capacity in each situation. If the rated work load of the aerial platform is the same in all configurations these additional descriptions are not necessary.
- (10) A statement of whether or not the platform or any portion thereof is electrically insulated. If equipped with an insulated platform, the level of protection and applicable test standard shall be stated, in accordance with ANSI/SIA A92.2-2001.
- (11) Warnings against replacing without manufacturer's consent, components critical to machine stability, i.e. batteries or ballasted tires, with lighter weight components. The minimum weights of such components shall be specified.
- (12) Wheels and/or outrigger loads. Total weight of the aerial platform and wheel loading for the worst loading condition exerted by the wheels and/or outriggers as applicable.
- (13) When an anchorage(s) is provided, the location of such anchorage point(s) shall be clearly marked.
- (14) Warnings and instructions intended to prevent electric shock and inform the operator of the minimum approach distance (MAD) requirements found in the Code of Federal Regulations (CFR) 1910.333(c).
- (15) A statement of compliance with Section 4 of this standard.

4.14.2 Platform work loads. The rated work load, side load, and number of occupants shall be clearly displayed at each access to the platform and on the platform extension(s), if so equipped.

4.15 Brakes. The aerial platform shall be equipped with a passive brake which will hold the unit on any slope it is capable of climbing.

4.15.1 Holding brakes. The aerial platform shall be equipped with a brake which is automatically applied when the drive function is not activated and shall hold the unit on any slope it is capable of climbing, subject to adequate traction on the braking wheels. The system shall provide two braking members to prevent total loss of capability should one member lose traction or supporting surface contact.

4.15.2 Dynamic brakes. The aerial platform shall be capable of stopping on a slope having adequate traction, when descending any slope the unit is capable of climbing. The system shall provide two braking members to prevent total loss of capability should one member lose traction or supporting surface contact.

4.15.3 Combination brakes. Holding and dynamic brake systems may be combined as one system if one system meets the requirements of paragraphs 4.15.1 and 4.15.2.

4.16 Power system.

4.16.1 Fuel and exhaust. Fuel lines of internal combustion engine powered aerial platforms shall be supported to minimize chafing and positioned to minimize exposure to engine and exhaust heat. Liquid fuel lines shall be hard lines except where isolation from vibration requires a flexible connection. LP-gas engine fuel systems shall comply with ANSI NFPA 58-1995. The exhaust system shall be provided with a muffler positioned to minimize noise and exhaust gas exposure to the operators and personnel located in proximity to the aerial platform.

4.16.2 Battery location. The battery(ies) shall be secured, guarded and ventilated so as to prevent damage and build-up of hydrogen gas. The battery(ies) shall be

readily accessible for inspection, service and replacement.

4.16.3 Hourmeter. An hourmeter shall be provided to record accumulated time of operation while the power system is energized or activated.

4.17 Manuals.

4.17.1 Operating and maintenance manuals. The manufacturer (remanufacturer) shall provide with each aerial platform, at the time of delivery, an appropriate manual(s) containing the following:

- (1) Descriptions, specification, and ratings of the aerial platform, including the data specified in 4.14.
- (2) Maximum hydraulic and pneumatic operating pressure and the maximum voltage of the electrical systems which are part of the aerial platform.
- (3) Instructions regarding intended use, operation, safety and maintenance.
- (4) Information required to perform the responsibilities set forth in Sections 5 through 11 of this Standard, i.e., the “Manual of Responsibilities”.

4.17.2 Repair and parts manual. The manufacturer (remanufacturer) shall make available an appropriate manual(s) listing repair and parts information.

4.18 Weather-resistant storage. The manufacturer (remanufacturer) shall provide a weather-resistant storage location on the aerial platform for the manual(s) specified in Section 4.17.1.

4.19 Electrical system. Electrical wiring and components shall comply, as applicable, with the requirements of the Standard SAE J821.

4.20 Training and training materials. Manufacturers (remanufacturers) shall develop and offer training materials that will aid dealers, owners and users in meeting their responsibilities as outlined in this standard.

4.21 Manufacturer as dealer. Whenever a manufacturer (remanufacturer) sells, rents or leases an aerial platform directly to an owner or user, the manufacturer (remanufacturer) shall assume the

responsibilities of a dealer as outlined in Section 5 of this Standard.

4.22 Remanufacture. Whenever an aerial platform is remanufactured by an entity other than the original manufacturer, the remanufacturer shall assume the responsibilities of a manufacturer as set forth in section 4 of this Standard.

5. Responsibilities of Dealers.

5.1 Basic principles. Sound principles of safety, training, inspection, maintenance, application, and operation consistent with all data available regarding the parameters of intended use and expected environment shall be applied in the training of operators, in maintenance, application, safety provisions and operation of the aerial platform with due consideration of the knowledge that the aerial platform will be carrying personnel.

5.2 Manuals.

5.2.1 Machine manual(s). Dealers shall keep and maintain a copy(ies) of the :

- (1) Operating manual
- (2) Maintenance manual
- (3) Parts manual
- (4) Repair manual

The operating manual and maintenance manual shall be provided with each rental, lease or sale delivery and shall be stored in the weather resistant storage compartment on the aerial platform. Manual(s) are considered an integral part of the aerial platform and are vital to communicate necessary safety information to owners, users and operators. In addition, repair and parts manuals should be provided with each sale delivery.

5.2.2 Manual of Responsibilities. The current Manual of Responsibilities for Dealers, Owners, Users, Operators, Lessors, Lessees, and Brokers of Self-Propelled Elevating Work Platforms shall be provided and stored in the weather resistant storage compartment.

5.3 Pre-delivery preparation. Aerial platforms shall be inspected, serviced and adjusted to the manufacturer's requirements prior to each delivery by sale, lease or rental.

5.4 Maintenance, inspection and repair.

5.4.1 Maintenance. When a dealer accomplishes preventative maintenance on the aerial platform, it shall be in accordance with the manufacturer's (remanufacturer's) recommendations, the environment, and severity of use.

5.4.2 Inspection. When the dealer accomplishes frequent and annual inspections, they shall be accomplished in accordance with the manufacturer's (remanufacturer's) manuals.

5.4.3 Repairs. Repairs accomplished to correct malfunctions and problems shall be in accordance with the manufacturer's (remanufacturer's) manuals and instructions.

5.5 Maintenance safety precautions. Before adjustments and repairs are started on an aerial platform, the following precautions shall be taken as applicable:

- (1) Power plant stopped and starting means rendered inoperative;
- (2) All controls in the "Off" position and all operating systems secured from inadvertent motion by brakes, blocks, or other means;
- (3) Elevating assembly and platform lowered to the full down position, if possible, or otherwise secured by blocking or cribbing to prevent dropping;
- (4) Hydraulic oil pressure relieved from all hydraulic circuits before loosening or removing hydraulic components;
- (5) Safety props or latches installed where applicable as prescribed by the manufacturer.

5.6 Replacement parts. When parts or components are replaced, they shall be identical or equivalent to original aerial platform parts or components.

5.7 Training. The dealer shall offer appropriate training to facilitate owners, users, and operators to comply with requirements set forth in this standard

regarding the inspection, maintenance, use, application, and operation of the aerial platform.

5.8 Familiarization on delivery. Upon delivery by sale, lease, rental or any form of use, the dealer shall have the responsibility with the person designated by the receiving entity for accepting the aerial platform to:

- (1) identify the weather resistant compartment (for manual storage).
- (2) confirm the manuals, as specified by the manufacturer, are on the aerial platform.
- (3) review control functions
- (4) review safety devices specific to the model aerial platform being delivered.

5.9 Dealer as user. Whenever a dealer directs personnel to operate an aerial platform (loading, unloading, inspecting, sales demonstrations, or any form of use), the dealer shall assume the responsibilities of users as specified in Section 7 of this standard. All personnel authorized to operate the aerial platform shall have been:

- (1) Trained.
- (2) Familiarized with the aerial platform to be operated.
- (3) Made aware of the responsibilities of operators as outlined in Section 8 of this Standard .

5.10 Assistance to owners and users. If a dealer is unable to answer an owner's or user's question(s) relating to rated capacity, intended use, maintenance, repair, inspection, or operation of the aerial platform, the dealer shall obtain the proper information from the manufacturer, or a qualified person if the manufacturer is no longer in business, and provide that information to the owner or user.

5.11 Record retention and dissemination.

5.11.1 Record retention. The dealer shall retain the following records for at least 4 years:

- (1) Name and address of the purchaser of each aerial platform by serial number and date of delivery.
- (2) Records of the predelivery preparation performed prior to each delivery.
- (3) Records of frequent and annual machine inspections accomplished.
- (4) Records of repairs accomplished to correct malfunctions and problems.
- (5) Name of the person(s) trained.

- (6) Name of the person(s) providing the training.
- (7) Date of training.
- (8) Name of person(s) receiving familiarization with the aerial platform upon each delivery unless this individual has been provided with familiarization on the same model, or one having characteristics consistent with the one being delivered, within the prior 90 days.
- (9) Name of person(s) providing familiarization with the aerial platform upon each delivery.

5.11.2 Proof of training. The dealer should provide trainees who successfully complete training a means to evidence they are trained. The dealer shall provide such proof if requested by the trainee. The document evidencing training shall include the following information:

- (1) Name of trainee
- (2) Name of entity providing training or retraining.
- (3) Name of trainer(s).
- (4) Clear identification that training covered Self-Propelled Elevating Work Platforms.
- (5) Date of training.

5.11.3 Record dissemination. Upon request, the dealer shall provide the following information:

- (1) To the owner of the aerial platform, a copy of frequent or annual inspections performed.
- (2) To the owner of the aerial platform, a copy of repairs accomplished.
- (3) To a user, proof of training for an operator, including name of trainer and date of training.
- (4) To a user, the name of the person(s) receiving familiarization upon delivery of the aerial platform.

5.12 Modifications. Modification, alteration or remanufacture of an aerial platform shall be made only with prior written permission of the manufacturer. Should the original manufacturer no longer exist, a qualified person may approve such modifications. All modifications shall meet the applicable manufacturer's requirements as specified in section 4 (Responsibilities of manufacturers) of this Standard.

5.13 Manufacturer's (remanufacturer's) safety bulletins. The dealer shall comply with safety related bulletins as received from the manufacturer (remanufacturer).

5.14 Responsibilities upon sale. When the aerial platform is sold, the dealer:

- (1) Shall, upon delivery, ensure the operating and maintenance manuals are conveyed to the owner.
- (2) Shall, upon delivery, provide a copy of the current Manual of Responsibilities for Dealers, Owners, Users, Operators, Lessors, Lessees and Brokers of Self-Propelled Elevating Work Platforms.
- (3) Should, within 60 days of sale, provide repair and parts manuals.
- (4) Shall, within 60 days of the sale, notify the manufacturer (remanufacturer) or its successor (if existing) of the sale, providing the full name and address of the purchaser.
- (5) Should, if the aerial platform is used, accomplish an annual machine inspection prior to delivery and provide a copy to the purchaser within 60 days of the sale.
- (6) Shall, upon delivery, familiarize the person designated by the receiving entity with the aerial platform being acquired.

6. Responsibilities of Owners.

6.1 Basic principles. Sound principles of safety, training, inspection, maintenance, application, and operation consistent with all data available regarding the parameters of intended use and expected environment shall be applied in the performance of the responsibilities of owners with due consideration of the knowledge that the aerial platform will be carrying personnel.

6.2 Responsibilities upon purchase. Upon purchase of the aerial platform, the buyer:

- (1) Shall ensure the operating and maintenance manuals have been received.
- (2) Should acquire repair and parts manuals within sixty days (60) of acquisition.
- (3) Shall within sixty days (60) of acquisition of the aerial platform provide the manufacturer (remanufacturer), or its successor, (if existing) with the full name and address of the buyer along with the model and serial number of the aerial platform acquired.
- (4) Shall, if the aerial platform is used, ensure that frequent and annual inspections are current.
- (5) Shall become familiar with and conform with the responsibilities of owners as set forth in the Manual

of Responsibilities for Self-Propelled Elevating Work Platforms.

6.3 Manuals.

6.3.1 Machine manual(s). Owners shall provide a copy(ies) of the operating and maintenance manual(s) with each rental, lease, or sales delivery by ensuring they are properly stored in the weatherproof compartment that is a part of the aerial platform. The manual(s) is considered an integral part of the aerial platform and is vital to communicate necessary safety information to owners, users and operators. In addition, repair and parts manuals should be provided with each sale delivery.

6.3.2 Manual of Responsibilities. The current Manual of Responsibilities for Dealers, Owners, Users, Operators, Lessors, Lessees, and Brokers of Self-Propelled Elevating Work Platforms shall be provided and stored in the weather resistant storage compartment.

6.4 Maintenance, inspection and repair.

6.4.1 Maintenance. The owner of an aerial platform shall arrange that the maintenance specified in this standard is properly performed on a timely basis. The owner shall establish a preventive maintenance program in accordance with the manufacturer's (remanufacturer's) recommendations and taking into account the environment of the work place and severity of use of the aerial platform.

6.4.2 Inspection. The owner shall arrange for frequent and annual inspections to be performed in accordance with the recommendations of the manufacturer (remanufacturer). All malfunctions and problems identified in the inspection shall be corrected before the aerial platform is returned to service.

6.4.3 Repairs. When the aerial platform is damaged or in need of repair, all malfunctions and problems identified shall be corrected before the aerial platform is returned to service.

6.5 Predelivery preparation. Aerial platforms shall be inspected, serviced, and adjusted in accordance with the manufacturer's (remanufacturer's) requirements prior to each delivery by sale, lease or rental.

6.6 Frequent inspection. The owner of an aerial platform shall ensure that a frequent inspection is performed in accordance with the manufacture's (remanufacturer's) instructions, for the aerial platform:

- (1) That was purchased used. This inspection shall be accomplished unless it is determined that the frequent and annual inspections are current;
- (2) That has been in service for three (3) months or 150 hours, whichever comes first;
- (3) That has been out of service for a period longer than three months.

The inspection shall be made by a person qualified as a mechanic on the specific type of aerial platform or one having similar design characteristics. The inspection shall be in accordance with items specified by the manufacturer (remanufacturer) for a frequent inspection and shall include, but not be limited to the following:

- (1) All functions and their controls for speed(s) smoothness, and limits of motion;
- (2) Lower controls including the provisions for overriding of upper controls
- (3) All chain and cable mechanisms for adjustment and worn or damaged parts;
- (4) All emergency and safety devices;
- (5) Lubrication of all moving parts, inspection of filter element(s), hydraulic oil, engine oil, and coolant as specified by the manufacturer;
- (6) Visual inspection of structural components and other critical components such as fasteners, pins, shafts and locking devices;
- (7) Placard, warnings and control markings;
- (8) Additional items specified by the manufacturer.

The owner shall not place the aerial platform into service until all malfunctions and problems have been corrected.

6.7 Annual inspection. The owner of an aerial platform shall ensure that an annual inspection is performed on the aerial platform no later than thirteen (13) months from the date of the prior annual inspection. The inspection shall be performed by a person(s) qualified as a mechanic on the specific make and model of the aerial platform or one having similar design characteristics. The inspection shall be in accordance with items specified by the manufacturer (remanufacturer) for an annual inspection. The owner shall not place the aerial platform into service until all malfunctions and problems have been corrected.

6.8 Maintenance safety precautions. Before adjustments and repairs are started on an aerial platform, the following precautions shall be taken as applicable:

- (1) Power plant stopped and starting means rendered inoperative;
- (2) All controls in the "off" position and all operating systems secured from inadvertent motion by brakes, blocks, or other means;
- (3) Elevating assembly and platform lowered to the full down position, if possible, or otherwise secured by blocking or cribbing to prevent dropping;
- (4) Hydraulic oil pressure relieved from all hydraulic circuits before loosening or removing hydraulic components;
- (5) Safety props or latches installed where applicable as prescribed by the manufacturer.

6.9 Replacement parts. When parts or components are replaced, they shall be identical or equivalent to original aerial platform parts or components.

6.10 Maintenance training. The owners shall train their maintenance personnel in inspection and maintenance of the aerial platform in accordance with the manufacturer's recommendations and sections 6.2 through 6.11 of this standard.

6.11 Training.

6.11.1 Operator training. Whenever an owner directs or authorizes an employee to operate an aerial platform (loading, unloading, inspecting or any form of use) the owner shall assume the responsibilities of the user as specified in Section 7 of this standard and shall ensure the person has been:

- (1) Trained.
- (2) Familiarized with the aerial platform to be operated.
- (3) Made aware of the responsibilities of operators as outlined in Section 8 of this Standard.

6.11.2 Assistance to user. Upon request of the user, when an owner leases, rents or provides an aerial platform for any form of beneficial use, the owner at that time shall offer to do training or advise the user where training may reasonably be secured.

6.12 Familiarization upon delivery. Upon delivery for lease, rental or any form of beneficial use, the owner shall have the responsibility with the person designated by the receiving entity for accepting the aerial platform to:

- (1) Identify the weather resistant compartment (for manual storage).
- (2) Confirm that the manuals, as specified by the manufacturer, are on the aerial platform.
- (3) Review control functions with the operator or person(s) designated by the user.
- (4) Review safety devices specific to the model aerial platform being delivered.

6.13 Operation. When an owner operates an aerial platform, the owner shall have the responsibilities of users as specified in Section 7 of this standard and his operating personnel shall have responsibilities of operators as specified in Section 8 of this standard.

6.14 Assistance to users and operators. If an owner is unable to answer a user's or operator's question(s) relating to rated capacity, intended use, maintenance, repair, inspection, or operation of the aerial platform, the owner shall obtain the proper information from the dealer or manufacturer and provide that information to the user or operator.

6.15 Record retention and dissemination.

6.15.1 Record retention. The owner shall date and retain the following records for at least 4 years:

- (1) Name and address of the purchaser of each aerial platform by serial number and date of delivery.
- (2) Written records of the frequent and annual inspections and repairs performed. The record shall include deficiencies found, corrective action accomplished and identification of the person(s) performing the inspection and repairs.
- (3) Written records of repairs accomplished on the aerial platform. The records shall include corrective action accomplished and identification of the person(s) performing the repairs.
- (4) Pre-delivery preparation performed prior to each delivery.
- (5) Name of the person(s) trained.
- (6) Name of person(s) providing training.
- (7) Name of person(s) receiving familiarization upon delivery, unless the individual has been provided

with familiarization on the same model, or one having characteristics consistent with the one being delivered, within the prior 90 days.

- (8) Name of person(s) providing familiarization upon delivery.

6.15.2 Proof of training. Owners providing training should provide successful trainees a means to evidence their training and shall provide such proof if requested by the trainee. The document evidencing training shall include the following information:

- (1) Name of trainee
- (2) Name of entity providing training or retraining.
- (3) Name of trainer(s).
- (4) Clear identification that training covered Self Propelled Elevating Work Platforms.
- (5) Date of training

6.15.3 Record dissemination. Upon request, an owner accomplishing training and/or familiarization shall provide the following:

- (1) to a user, proof of training for an operator, including name of trainer and date of training;
- (2) to a user, the name of the person(s) receiving familiarization upon delivery of the aerial platform.

6.16 Modifications. Modification, alteration or remanufacture of an aerial platform shall be made only with prior written permission of the manufacturer (remanufacturer). Should the manufacturer (remanufacturer) no longer exist, a qualified person may approve such modifications. All modifications shall meet the applicable manufacturer's requirements as specified in section 4 (Responsibilities of manufacturers) of this Standard.

6.17 Manufacturer's Safety Bulletins. The owner shall comply with safety-related bulletins as received from the manufacturer (remanufacturer) or the dealer

6.18 Responsibilities upon sale. Upon sale of the aerial platform, the seller:

- (1) Shall, upon delivery, ensure the operating and maintenance manuals are conveyed to the new owner.
- (2) Shall, upon delivery, provide a copy of the current Manual of Responsibilities for Dealers, Operators, Users, Lessors, Lessees, and Brokers of Self-

Propelled Elevating Work Platforms to the new owner.

- (3) Should provide repair and parts manuals to the new owner.
- (4) Shall, upon the request of the new owner, offer to do training or advise where training may reasonably be obtained.

7. Responsibilities of Users.

7.1 Basic principles. The information in this standard must be supplemented by good job management, safety control, and the application of sound principles of safety, training, inspection, maintenance, application, and operation, consistent with all data available regarding the parameters of intended use and expected environment. Since the user has direct control over the application and operation of aerial platforms, conformance with good safety practices in this area is the responsibility of the user and the operating personnel, including the operator. Decisions on the use and operation of the aerial platform must always be made with due consideration for the fact that the aerial platform will be carrying personnel whose safety is dependent on those decisions.

7.2 Manuals.

7.2.1 Machine manuals. Users shall keep and maintain a copy(ies) of the operating and maintenance manual(s) in the weather resistant storage compartment provided by the manufacturer. The manual(s) is considered an integral part of the aerial platform and is vital to communicate necessary safety information to users and operators.

7.2.2 Manual of Responsibilities. The current Manual of Responsibilities for Dealers, Owners, Users, Operators, Lessors, Lessees, and Brokers of Self-Propelled Elevating Work Platforms shall be provided and stored in the weather resistant storage compartment.

7.3 Inspection and maintenance. Users shall inspect and maintain the aerial platform as required to ensure proper operation. The frequency of inspection and maintenance shall be in accordance with the manufacturer's recommendations taking into account the environment of the work place and the severity of use of the aerial platform. Aerial platforms that are not in

proper operating condition shall be immediately removed from service until repaired. Repairs shall be made by a qualified person and the repairs shall be in conformance with the manufacturer's recommendations.

7.3.1 Frequent inspection. Users of an aerial platform shall ensure that frequent inspections are conducted as outlined in Section 6.6 of this standard.

7.3.2 Annual inspection. Users of an aerial platform shall ensure that annual inspections are conducted as outlined in Section 6.7 of this standard.

7.3.3 Prestart inspection. Before use each day or at the beginning of each shift, the aerial platform shall be given a visual inspection and functional test including but not limited to the following:

- (1) Operating and emergency controls.
- (2) Safety devices.
- (3) Air, hydraulic and fuel system leaks.
- (4) Cables and wiring harness.
- (5) Loose or missing parts.
- (6) Tires and wheels.
- (7) Placards, warnings, control markings, and operating manual(s).
- (8) Outriggers, stabilizers, and other structures.
- (9) Guardrail system.
- (10) Items specified by the manufacturer.

7.3.4 Maintenance safety precautions. Before adjustments and repairs are started on an aerial platform, the following precautions shall be taken as applicable:

- (1) Powerplant stopped and starting means rendered inoperative;
- (2) All controls in the "Off" position and all operating systems secured from inadvertent motion by brakes, blocks, or other means;
- (3) Elevating assembly and platform lowered to the full down position, if possible, or otherwise secured by blocking or cribbing to prevent dropping;
- (4) Hydraulic oil pressure relieved from all hydraulic circuits before loosening or removing hydraulic components;
- (5) Safety props or latches installed where applicable as prescribed by the manufacturer (remanufacturer);
- (6) Precautions specified by the manufacturer (remanufacturer).

7.4 Replacement parts. When parts or components are replaced, they shall be identical or equivalent to original aerial platform parts or components.

7.5 Maintenance training. The user shall ensure only qualified personnel inspect and maintain the aerial platform in accordance with the manufacturer's (remanufacturer's) recommendations and sections 7.3 and 7.4 of this standard.

7.6 Operator training and retraining. Whenever a user directs or authorizes an individual to operate an aerial platform the user shall ensure the person has been:

- (1) Trained before being assigned to operate the aerial platform.
- (2) Familiarized with the aerial platform to be operated.
- (3) Made aware of responsibilities of operators as outlined in Section 8 of this Standard.
- (4) Retrained, if necessary, based on the user's observation and evaluation of the operator.

7.6.1 Trainee records. A record of the trainee's aerial platform instruction shall be maintained by the user for at least 4 years.

7.7 Familiarization before use. The user shall permit only properly trained personnel to operate an aerial platform. The user shall ensure that before use the operator is familiar with the model of the aerial platform to be operated, and specifically:

- (1) knows where the weather resistant compartment for manual storage is located.
- (2) knows the operating and maintenance manuals supplied by the manufacturer (remanufacturer) are stored in the weather resistant compartment and is familiar with the operating and safety manuals.
- (3) understands all control functions, placards and warnings.
- (4) is aware of and understands all safety devices specific to the model aerial platform being used.

7.8 Workplace inspection. Before the aerial platform is used and during use, the user shall check the area in which the aerial platform is to be used for possible hazards such as, but not limited to:

- (1) Drop-offs or holes, including those concealed by water, ice, mud, etc.
- (2) Slope(s).

- (3) Bumps and floor obstructions.
- (4) Debris.
- (5) Overhead obstructions and high voltage conductors.
- (6) Hazardous locations and atmospheres (reference ANSI/NFPA 505-1996).
- (7) Inadequate surface and support to withstand all load forces imposed by the aerial platform in all operating configurations.
- (8) Wind and weather conditions.
- (7) Presence of unauthorized persons.
- (8) Other possible unsafe conditions.

7.9 Determination of hazardous locations. It shall be the responsibility of the user to determine the hazard classification of the intended location of operation. Aerial platforms operated in hazardous locations shall be approved in accordance with, and of the type required, by ANSI/NFPA 505-1996.

7.10 Operator warnings and instructions. The user shall direct personnel operating the aerial platform to be in compliance with the provisions set forth in section 8 of this standard. The user shall monitor their performance and supervise their work to ensure the use, application and operation of the aerial platform is in conformance with the provisions set forth in this standard, warn personnel of potential hazards, provide means to protect against identified hazards, and explain the potential consequences of not following proper operating guidelines. Instructions and guidelines regarding proper operation shall include, but not necessarily be limited to the following issues and subjects:

- (1) **Fall protection.** The guardrail system of the aerial platform provides fall protection. If occupant(s) of the platform are required to wear personal fall protection equipment (PFPE), occupants shall comply with instructions provided by the aerial platform manufacturer (remanufacturer) regarding anchorage(s).
- (2) **Slope and grade.** The aerial platform shall not be operated in any manner on grades, side slopes or ramps exceeding those for which the aerial platform is rated by the manufacturer (remanufacturer).
- (3) **Deployment of stability enhancing means.** Outriggers, stabilizers, extendible axles, oscillating axles or other stability enhancing means shall be deployed and locked into place as required by the manufacturer (remanufacturer).

- (4) **Guardrail system.** Guardrails shall be installed and positioned, and access gates or openings shall be closed per the manufacturer's (remanufacturer's) instructions.
- (5) **Distribution of load.** The load and its distribution on the platform and any platform extension(s) shall be in accordance with the manufacturer's (remanufacturer's) rated capacity for that specific configuration.
- (6) **Maintain overhead clearance.** The operator shall be instructed to ensure that adequate clearance is maintained from overhead obstructions and energized electrical conductors and parts.
- (7) **Electrocution hazard.** All applicable safety related work practices intended to prevent electric shock covered by the Code of Federal Regulations (CFR) 1910.333 shall be defined and explained to the operator by a qualified person. In particular, such person shall direct the operator, commensurate with the operator's qualifications, to maintain the appropriate minimum approach distance (MAD) from energized power lines and parts covered by CFR 1910.333 (c).
- (8) **Personal protective equipment (PPE).** The user shall direct the operator to ensure all personnel on the platform wear personal protective equipment (PPE) as required.
- (9) **Personnel footing.** Personnel shall maintain a firm footing on the platform floor while working thereon. Climbing by occupants on the midrail or toprail of the aerial platform is prohibited. The use of planks, ladders, or any other devices on the platform for achieving additional height or reach is prohibited.
- (10) **Precaution for other moving equipment.** When other moving equipment and vehicles are present, special precautions shall be taken to comply with local ordinances or safety standards established for the workplace. Warnings such as, but not limited to, flags, roped off areas, flashing lights, and barricades shall be used as appropriate.
- (11) **Reporting problems or malfunctions.** The user shall direct the operator to immediately report to a supervisor any problem(s) or malfunction(s) that become evident during operation. The user shall ensure all problems and malfunctions are repaired prior to continued use.
- (12) **Reporting potentially hazardous locations.** The user shall direct the operator to immediately report

to a supervisor any potentially hazardous location(s) that become evident during operation.

- (13) **Hazardous location operation.** Operation of aerial platforms not approved and marked for operation in a hazardous location shall be prohibited.
- (14) **Entanglement.** Care shall be taken to prevent rope, electric cords, and hoses, etc., from becoming entangled in the aerial platform.
- (15) **Capacity limitations.** Rated capacities shall not be exceeded when loads are transferred to the platform at any height.
- (16) **Work area.** The user shall direct the operator to ensure the area surrounding the aerial platform is clear of personnel and equipment before lowering the platform.
- (17) **Fueling.** The engine (if applicable) shall be shut down while fuel tanks are being filled. Fueling shall be done in a well-ventilated area free of flame, sparks, or other hazards that may cause fire or explosion.
- (18) **Battery charging.** Batteries shall only be charged in a well-ventilated area free of flame, sparks, or other hazards that may cause fire or explosion.
- (19) **Improper platform stabilization.** The aerial platform shall not be positioned against another object to steady the platform or improve stability.
- (20) **Misuse as a crane.** The aerial platform shall not be used as a crane.
- (21) **Unusual operating support conditions.** The aerial platform shall not be operated from a position on trucks, trailers, railway cars, floating vessels, scaffolds, or similar equipment unless the application is approved in writing by the manufacturer (remanufacturer) or a qualified person.
- (22) **Travel speeds.** The user shall direct the operator to limit travel speed according to conditions, including the condition of the support surface, congestion, visibility, slope, location of personnel, and other factors leading to hazards which may cause collision(s) or result in potential injury(ies) to personnel.
- (23) **Driving requirements.** Before and during driving the aerial platform, the user shall direct the operator to:
 - (a) Maintain a clear view of the support surface and route of travel.
 - (b) Ensure personnel in the worksite area that may be affected are aware of the movement, communicating and maneuvering the aerial

platform as required to protect against personal injury.

- (c) Maintain a safe distance from obstacles, debris, drop-offs, holes, depressions, ramps, and other hazards to ensure safe travel.
- (d) Maintain a safe distance from overhead obstacles and energized electrical conductors.
- (24) **Stunt driving.** The user shall inform the operator that stunt driving and horseplay are prohibited.
- (25) **Securing the aerial platform.** The user shall direct the operator to implement means provided to protect against use by an unauthorized person(s).
- (26) **Altering safety devices.** Interlocks or other safety devices shall not be altered or disabled.
- (27) **Snagged platform.** If the platform/basket or supporting assembly becomes caught, snagged, or otherwise prevented from normal motion by adjacent structures or other obstacles such that control reversal does not free the platform, all personnel shall be removed from the platform/basket before attempts are made to free the platform using lower controls.
- (28) **Vacating (or entering) an elevated aerial platform.** If permitted by the manufacturer, personnel shall only vacate or enter a raised aerial platform by following the guidelines and instructions provided by the manufacturer (remanufacturer).
- (29) **Modifications.** Modification or alteration of an aerial platform or the fabrication and attaching of frameworks, or the mounting of attachments for holding tools or materials onto the platform or the guardrail system shall only be accomplished with the prior written permission of the manufacturer (remanufacturer). Should the manufacturer (remanufacturer) no longer exist, a qualified person may approve such modifications. All modifications shall meet the applicable manufacturer's requirements as specified in section 4 (Responsibilities of manufacturers) of this Standard.
- (30) **Assistance to the operator.** If an operator encounters any suspected malfunction of the aerial platform, or any hazard or potentially unsafe condition relating to capacity, intended use or safe operation of the aerial platform, the operator shall cease operation of the aerial platform and request further information from the user.
- (31) **Problems or malfunctions.** Any problem(s) or malfunction(s) that affect the safety of operations

shall be repaired prior to the use of the aerial platform.

(32) Carrying materials (larger than the platform.)

The user shall ensure that only tools and materials which are evenly distributed and can be safely handled by a person(s) working from the platform are transported.

(33) Rated horizontal force. The user shall direct the operator not to exceed the manufacturer's (remanufacturer's) rated horizontal force.

(34) Bridge cranes. When an aerial platform is to operate within the area of travel of a bridge crane or similar equipment, steps shall be taken to prevent a collision with the aerial platform.

(35) Adequate support requirements. The user shall insure the support surface is adequate for the aerial platform and the load carried.

(36) Leveling the aerial platform. Outriggers and leveling devices supplied by the manufacturer (remanufacturer) shall be utilized to level the aerial platform when provided.

(37) Protecting against unauthorized use. The user shall direct the operator not to use, rent, lease, or provide the aerial platform for any form of beneficial use unless so authorized.

7.11 User as Operator. If a user is also the operator of an aerial platform, the user shall have the responsibilities of operators specified in Section 8 of this standard as well as responsibilities of users as specified in Section 7 of this standard.

7.12 Shutdown of aerial platform. The user shall authorize and direct the operating personnel to cease operation of the aerial platform in case of any suspected malfunctions of the aerial platform, or any hazard or potentially unsafe condition that may be encountered, and to request further information as to safe operation from the owner, dealer, or manufacturer before further operation of the aerial platform.

7.13 Record retention and dissemination.

7.13.1 Record retention. The user shall retain the following records for at least 4 years:

- (1) Names of the operator(s) trained and retrained.
- (2) Names of operator(s) provided familiarization.
- (3) The owner (or the entity designated by the owner) is responsible to ensure frequent and annual

inspections are conducted and written records are maintained. The records shall include the date of the inspection, any deficiencies found, the corrective action recommended and identification of the person(s) performing the inspection.

- (4) When employees of the user accomplish repairs on the aerial platform, the user shall maintain written records. The record shall include the date of repair, a description of the work accomplished, and identification of the person(s) performing the repair.

7.13.2 Record dissemination

- (1) When the user directs personnel to accomplish frequent or annual inspections, not later than 60 days after the inspections, the appropriate records shall be provided to the owner of the aerial platform.
- (2) When the user directs personnel to accomplish repairs on the aerial platform, not later than 60 days after the repairs are accomplished, the appropriate records shall be provided to the owner.

7.13.3 Proof of training. Users providing training should provide successful trainees a means to evidence their training and shall provide such proof if requested by the trainee. The document evidencing training shall include the following information:

- (1) Name of trainee.
- (2) Name of entity providing training or retraining.
- (3) Name of trainer(s).
- (4) Clear identification that training covered Self Propelled Elevating Work Platforms.
- (5) Date of training.

7.14 Modifications. Modification, alteration or remanufacture of an aerial platform shall be made only with prior written permission of the manufacturer (remanufacturer). Should the manufacturer (remanufacturer) no longer exist, a qualified person may approve such modifications. All modifications shall meet the applicable manufacturer's requirements as specified in section 4 (Responsibilities of manufacturers) of this Standard.

7.15 Manufacturer's safety bulletins. The user shall comply with safety-related bulletins as received from the manufacturer (remanufacturer), dealer or owner.

8. Responsibilities of Operators.

8.1 Basic principles. The information in this standard shall be supplemented by good judgment, safety control, and caution in evaluating each situation. Since the operator is in direct control of the aerial platform, conformance with good safety practices in this area is the responsibility of the operator. The operator shall make decisions on the use and operation of the aerial platform with due consideration for the fact that his or her own safety as well as the safety of other personnel on the platform is dependent on those decisions.

8.2 Manuals.

8.2.1 Machine manuals. The operator shall ensure the operating and maintenance manuals are stored in the weather resistant storage compartment on the aerial platform. The manual(s) is considered an integral part of the aerial platform and is vital to communicate necessary safety information to the operator. The operator shall be familiar with the manuals and reference them as required.

8.2.2 Manual of Responsibilities. The operator shall be familiar with the requirements for operators as set forth in Section 8 of the Manual of Responsibilities for dealers, owners, users, operators, lessors, lessees, and brokers of Self-Propelling Elevating Work Platforms. The current Manual of Responsibilities for Dealers, Owners, Users, Operators, Lessors, Lessees, and Brokers of Self-Propelled Elevating Work Platforms shall be provided and stored in the weather resistant storage compartment.

8.3 Prestart inspection. Before use each day or at the beginning of each shift, the aerial platform shall be given a visual inspection and functional test including but not limited to the following:

- (1) Operating and emergency controls.
- (2) Safety devices.
- (3) Personal protective devices.
- (4) Air, hydraulic, and fuel systems leaks.
- (5) Cables and wiring harness.
- (6) Loose or missing parts.
- (7) Tires and wheels.
- (8) Placards, warnings, control markings, and operating manual(s).
- (9) Outriggers, stabilizers and other structures.
- (10) Guardrail system.
- (11) Items specified by the manufacturer (remanufacturer).

8.4 Problems or malfunctions. Any problems or malfunctions that affect the safety of operations shall be repaired prior to the use of the aerial platform.

8.5 Training, retraining, and familiarization.

8.5.1 General training. Only personnel who have received general instructions regarding the inspection, application and operation of aerial platforms, including recognition and avoidance of hazards associated with their operation, shall operate an aerial platform. Such items covered shall include, but not necessarily be limited to, the following issues and requirements:

- (1) The purpose and use of manuals.
- (2) That operating manuals are an integral part of the aerial platform and must be stored properly in the weather resistant compartment when not in use.
- (3) A pre-start inspection.
- (4) Responsibilities associated with problems or malfunctions affecting the operation of the aerial platform.
- (5) Factors affecting stability.
- (6) The purpose of placards and decals.
- (7) Workplace inspection.
- (8) Safety rules and regulations.
- (9) Authorization to operate.
- (10) Operator warnings and instructions.
- (11) Actual operation of the aerial platform. Under the direction of a qualified person, the trainee shall operate the aerial platform for a sufficient period of time to demonstrate proficiency in the actual operation of the aerial platform.

8.5.2 Retraining. The operator shall be retrained, when so directed by the user, based on the user's observation and evaluation of the operator.

8.5.3 Familiarization. When an operator is directed to operate an aerial platform he/she is not familiar with, the operator shall receive instructions regarding the following items:

- (1) The location of the weather resistant compartment (for manual storage).
- (2) The purpose and function of all controls.
- (3) Safety devices and operating characteristics specific to the aerial platform.

8.6 Before operation. Before operation, the operator shall:

- (1) Read and understand the manufacturer's (remanufacturer's) operating instruction(s) and user's safety rules or have them explained.

- (2) Understand all labels, warnings and instructions displayed on the aerial platform or have them explained.
- (3) Ensure all occupants of the aerial platform wear appropriate personal protection equipment (PPE) for the conditions, including the environment in which the aerial platform will be operated.

8.7 Workplace inspection. Before the aerial platform is used and during use, the operator shall check the area in which the aerial platform is to be used for possible hazards such as, but not limited to:

- (1) Drop-offs or holes, including those concealed by water, ice, mud, etc.
- (2) Slope(s).
- (3) Bumps and floor obstructions.
- (4) Debris.
- (5) Overhead obstructions and electrical conductors.
- (6) Hazardous locations and atmospheres (reference ANSI/NFPA 505-1995).
- (7) Inadequate surface and support to withstand all load forces imposed by the aerial platform in all operating configurations.
- (8) Wind and weather conditions.
- (9) Presence of unauthorized persons.
- (10) Other possible unsafe conditions.

8.8 Prior to each elevation. Before each elevation of the platform, the operator shall ensure:

- (1) Outriggers, stabilizers, extendible axles, or other stability enhancing means, are used as required by the manufacturer.
- (2) Guardrails are installed and access gates or openings are closed per manufacturer's (remanufacturer's) instructions.
- (3) The load and its distribution on the platform and any platform extension(s) are in accordance with the manufacturer's (remanufacturer's) rated capacity for that specific configuration.
- (4) All personnel on the aerial platform have appropriate safety gear for the work and environment envisioned.

8.9 Understanding of hazardous locations. It shall be the responsibility of the operator to understand the hazard classification of the intended location of operation according to ANSI/NFPA 505 - 1996.

8.10 Operator warnings and instructions. The operator shall ensure the operation of the aerial platform is in compliance with the following:

- (1) **Fall protection.** The guardrail system of the aerial platform provides fall protection. If occupant(s) of the platform are required to wear personal fall protection equipment (PFPE), occupants shall comply with instructions provided by the aerial platform manufacturer (remanufacturer) regarding anchorage(s).
- (2) **Slope and grade.** The aerial platform shall not be operated in any manner on grades, side slopes or ramps exceeding those for which the aerial platform is rated by the manufacturer (remanufacturer).
- (3) **Deployment of stability enhancing means.** Outriggers, stabilizers, extendible axles, oscillating axles or other stability enhancing means shall be deployed and locked into place as required by the manufacturer (remanufacturer).
- (4) **Guardrail system.** Guardrails shall be installed and positioned, and access gates or openings shall be closed per the manufacturer's (remanufacturer's) instructions.
- (5) **Distribution of load.** The load and its distribution on the platform and any platform extension(s) shall be in accordance with the manufacturer's rated capacity for that specific configuration.
- (6) **Maintaining overhead clearance.** The operator shall ensure that adequate clearance is maintained from overhead obstructions and energized electrical conductors and parts.
- (7) **Electrocution hazard.** The operator shall perform only that work for which he or she is qualified, in compliance with all applicable safety related work practices intended to prevent electric shock covered by the Code of Federal Regulations (CFR) 1910.333. The operator's level of competence shall be established only by persons qualified to do so. Operators shall maintain the appropriate minimum approach distance (MAD) from energized power lines and parts covered by CFR 1910.333 (c).
- (8) **Personal protective equipment (PPE).** The operator shall ensure all occupants of the platform wear personal protective equipment as required.
- (9) **Personnel footing.** Personnel shall maintain firm footing on the platform floor while working thereon. Climbing by occupants on the midrail or toprail of the aerial platform is prohibited. The use of planks, ladders, or any other devices on the platform for achieving additional height or reach is prohibited.
- (10) **Precaution for other moving equipment.** When other moving equipment and vehicles are present, special precautions shall be taken to comply with local ordinances or safety standards established for the workplace. Warnings such as, but not limited to, flags, roped off areas, flashing lights, and barricades shall be used as appropriate.

- (11) **Reporting problems or malfunctions.** The operator shall immediately report to a supervisor any problem(s) or malfunction(s) that become evident during operation. The operator shall ensure all problem(s) or malfunction(s) that affect the safety of operations are repaired prior to continued use.
- (12) **Reporting potentially hazardous locations.** The operator shall immediately report to a supervisor any potentially hazardous location(s) that become evident during operation.
- (13) **Hazardous location operation.** Operation of aerial platforms not approved and marked for operation in a hazardous location shall be prohibited.
- (14) **Entanglement.** Care shall be taken to prevent rope, electric cords, and hoses, etc., from becoming entangled in the aerial platform.
- (15) **Capacity limitations.** Rated capacities shall not be exceeded when loads are transferred to the platform at any height.
- (16) **Work area.** The operator shall ensure the area surrounding the aerial platform is clear of personnel and equipment before lowering the platform.
- (17) **Fueling.** The engine (if applicable) shall be shut down while fuel tanks are being filled. Fueling shall be done in a well-ventilated area free of flame, sparks, or other hazards that may cause fire or explosion.
- (18) **Battery charging.** Batteries shall only be charged in a well-ventilated area free of flame, sparks, or other hazards that may cause fire or explosion.
- (19) **Improper platform stabilization.** The aerial platform shall not be positioned against another object to steady the platform or improve stability.
- (20) **Misuse as a crane.** The aerial platform shall not be used as a crane.
- (21) **Unusual operating support conditions.** The aerial platform shall not be operated from a position on trucks, trailers, railway cars, floating vessels, scaffolds, or similar equipment unless the application is approved in writing by the manufacturer (remanufacturer) or a qualified person.
- (22) **Travel speeds.** The operator shall limit travel speed according to conditions, including the condition of the support surface, congestion, visibility, slope, location of personnel, and other factors leading to hazards which may cause collision(s) or result in potential injury(ies) to personnel.
- (23) **Driving requirements.** Before and during driving the aerial platform, the operator shall:
 - (a) Maintain a clear view of the support surface and route of travel.
 - (b) Ensure personnel in the worksite area that may be affected are aware of the movement, communicating and maneuvering the aerial platform as required to protect against personal injury.
- (c) Maintain a safe distance from obstacles, debris, drop-offs, holes, depressions, ramps, and other hazards to ensure safe travel.
- (d) Maintain a safe distance from overhead obstacles and energized electrical conductors.
- (24) **Stunt driving.** Stunt driving and horseplay are prohibited.
- (25) **Securing the aerial platform.** The operator shall implement means provided to protect against use by an unauthorized person(s)
- (26) **Altering safety devices.** Interlocks or other safety devices shall not be altered or disabled.
- (27) **Snagged platform.** If the platform/basket or supporting assembly becomes caught, snagged, or otherwise prevented from normal motion by adjacent structures or other obstacles such that control reversal does not free the platform, all personnel shall be removed from the platform/basket before attempts are made to free the platform using lower controls.
- (28) **Vacating (or entering) an elevated aerial platform.** If permitted by the manufacturer, personnel shall only vacate or enter a raised aerial platform by following the guidelines and instructions provided by the manufacturer (remanufacturer).
- (29) **Modifications.** Modification or alteration of an aerial platform or the fabrication and attaching of frameworks, or the mounting of attachments for holding tools or materials onto the platform or the guardrail system shall only be accomplished with the prior written permission of the manufacturer (remanufacturer). Should the manufacturer (remanufacturer) no longer exist, a qualified person may approve such modifications. All modifications shall meet the applicable manufacturer's requirements as specified in section 4 (Responsibilities of manufacturers) of this Standard.
- (30) **Assistance to the operator.** If an operator encounters any suspected malfunction of the aerial platform, or any hazard or potentially unsafe condition relating to capacity, intended use or safe operation of the aerial platform, the operator shall cease operation of the aerial platform and request further information from the user.
- (31) **Problem(s) or malfunction(s).** Any problems or malfunctions that affect the safety of operations shall be repaired prior to the use of the aerial platform.
- (32) **Carrying materials (larger than the platform.)** The operator shall ensure only tools and materials which are evenly distributed and can be safely

handled by a person(s) working from the platform, shall be transported.

- (33) **Rated horizontal force.** The operator shall not permit personnel on the platform to exceed the manufacturer's (remanufacturer's) rated horizontal force.
- (34) **Bridge cranes.** When an aerial platform is to operate within the area of travel of a bridge crane or similar equipment, steps shall be taken to prevent a collision with the aerial platform.
- (35) **Adequate support requirements.** The operator shall ensure the support surface is adequate for the aerial platform and the load carried.
- (36) **Leveling the aerial platform.** Outriggers and leveling devices supplied by the manufacturer shall be utilized to level the aerial platform when provided.
- (37) **Protecting against unauthorized use.** The operator shall not use, rent, lease, or provide the aerial platform for any form of beneficial use to another entity without the authorization of the user.

8.11 Record of training. When provided or when obtained upon the operator's request, proof of training provided by the training entity should be retained by the operator. Records shall contain the following information:

- (1) Name of trainee.
- (2) Name of entity providing training or retraining.
- (3) Name of trainer(s).
- (4) Clear identification that training covered Self Propelled Elevating Work Platforms.
- (5) Date of training.

9. Responsibilities of Lessors.

9.1 Basic principles. Sound principles of safety, training, inspection, maintenance, application, and operation consistent with all data available regarding the parameters of intended use and expected environment shall be applied in the performance of responsibilities of lessors with due consideration of the knowledge that the aerial platform will be carrying personnel.

9.2 Lessor as a dealer. When a lessor is a dealer for the manufacturer of the aerial platform being leased, the lessor shall have the responsibilities of dealers as specified in Section 5 of this standard.

9.3 Lessor as an owner. When a lessor is the owner of the aerial platform being leased, the lessor shall have the responsibilities of owners as specified in Section 6 of this standard.

9.4 Lessor as a user. When a lessor is the user of the aerial platform, the lessor shall have the responsibilities of users as specified in Section 7 of this standard.

9.5 Lessor as an operator. When a lessor is the operator of the aerial platform, the lessor shall have the responsibilities of operators as specified in Section 8 of this standard.

10. Responsibilities of Lessees.

10.1 Basic principles. Sound principles of safety, training, inspection, maintenance, application, and operation consistent with all data available regarding the parameters of intended use and expected environment shall be applied in the performance of responsibilities of lessees with due consideration of the knowledge that the aerial platform will be carrying personnel.

10.2. Lessee as a Dealer. When a lessee is also the dealer for the manufacturer (remanufacturer) of the aerial platform, the lessee shall have the responsibilities of dealers as specified in Section 5 of this standard.

10.3. Lessee as an Owner. When a lessee is the owner of the aerial platform, the lessee shall have the responsibilities of owners as specified in Section 6 of this standard.

10.4 Lessee as a User. When a lessee is the user of the aerial platform, the lessee shall have the responsibilities of users as specified in Section 7 of this standard.

10.5 Lessee as an Operator. When a lessee is the operator of the aerial platform, the lessee shall have the responsibilities of operators as specified in Section 8 of this standard.

11. Responsibilities of Broker.

11.1 Responsibilities upon sale. The broker shall:

- (1) Upon delivery, ensure the operating and maintenance manuals are provided to the new owner.
- (2) Upon delivery, provide a copy of the current Manual of Responsibilities for Dealers, Operators, Users, Lessors, Lessees, and Brokers of Self-Propelled Elevating Work Platforms to the new owner.

- (3) Maintain records of the sale for a minimum of four
- (4) years.

11.2 Responsibilities with re-rents, leases, or any other form of beneficial use. When compensation is received as a result of a re-rent, lease or any form of beneficial use of an aerial platform, the broker shall:

- (1) Upon delivery, ensure the operating and maintenance manuals are provided to the user.
- (2) Upon delivery, provide a copy of the current Manual of Responsibilities for Dealers, Operators, Users, Lessors, Lessees, and Brokers of Self-Propelled Elevating Work Platforms.
- (3) Ensure operating personnel are familiarized with the aerial platform prior to use.
- (4) Retain records of the transaction for a minimum of four (4) years.

Figure 1 - Typical Examples of Equipment Covered

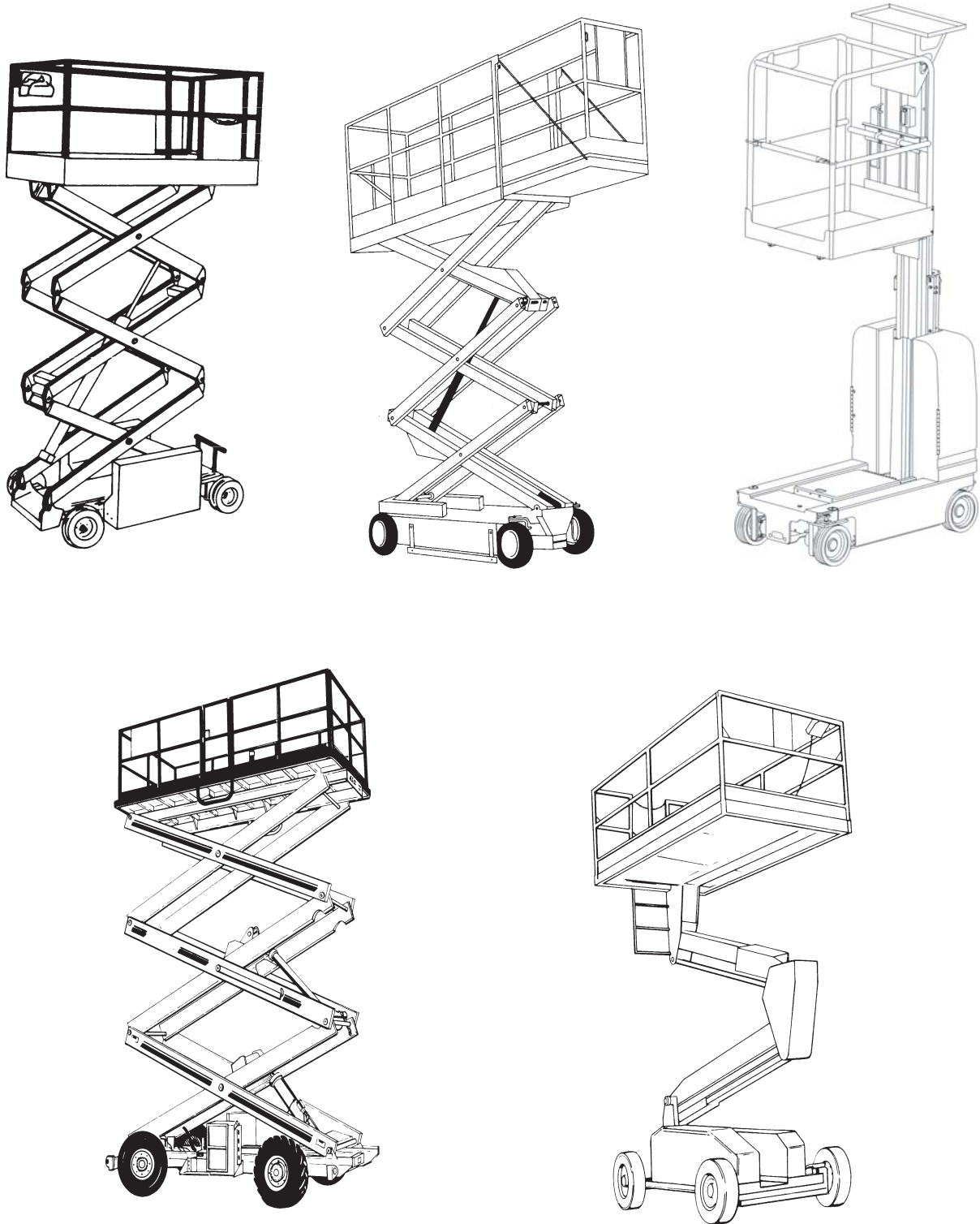
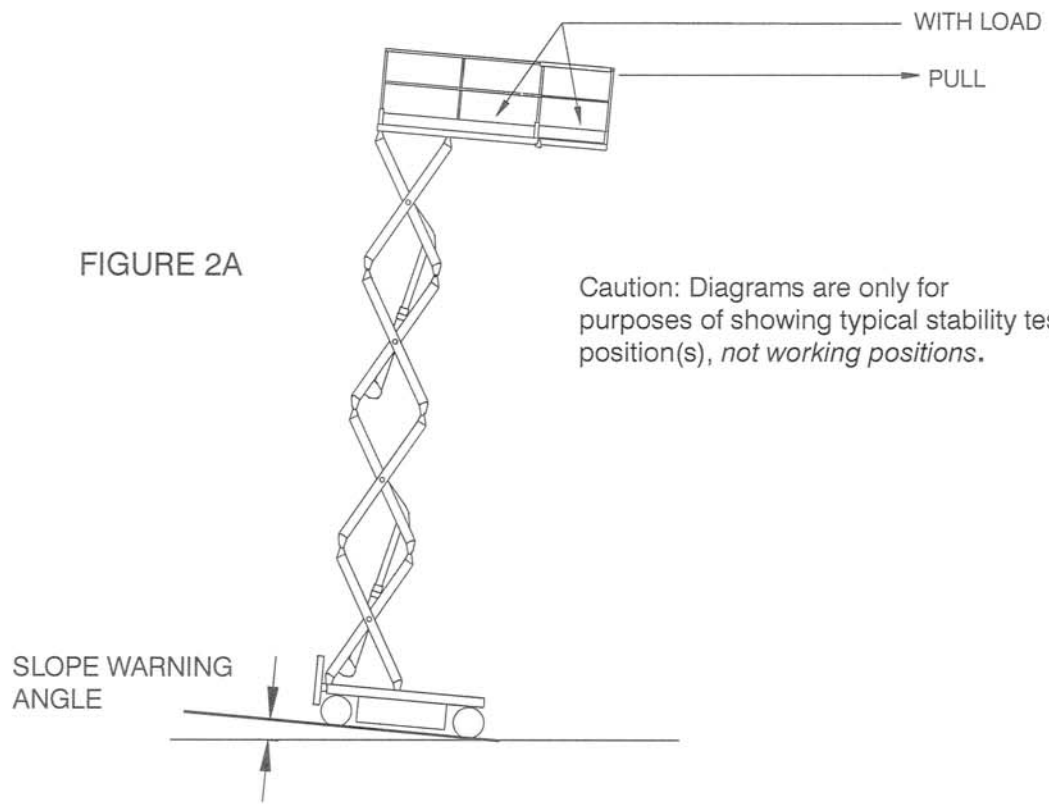


Figure 2 - Illustration of Horizontal Load Tests

(See paragraph 4.8.1 on page 17)

FIGURE 2A



WITH LOAD

FIGURE 2B

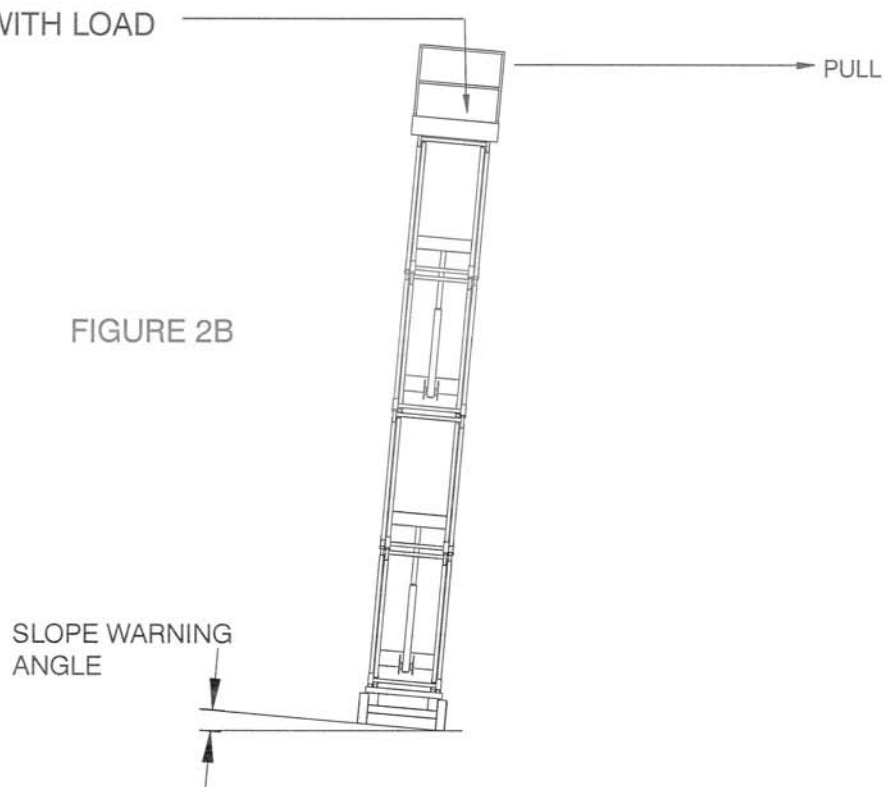


Figure 2 - Illustration of Static Tests Required on a Slope

(See paragraph 4.8.3 on page 17)

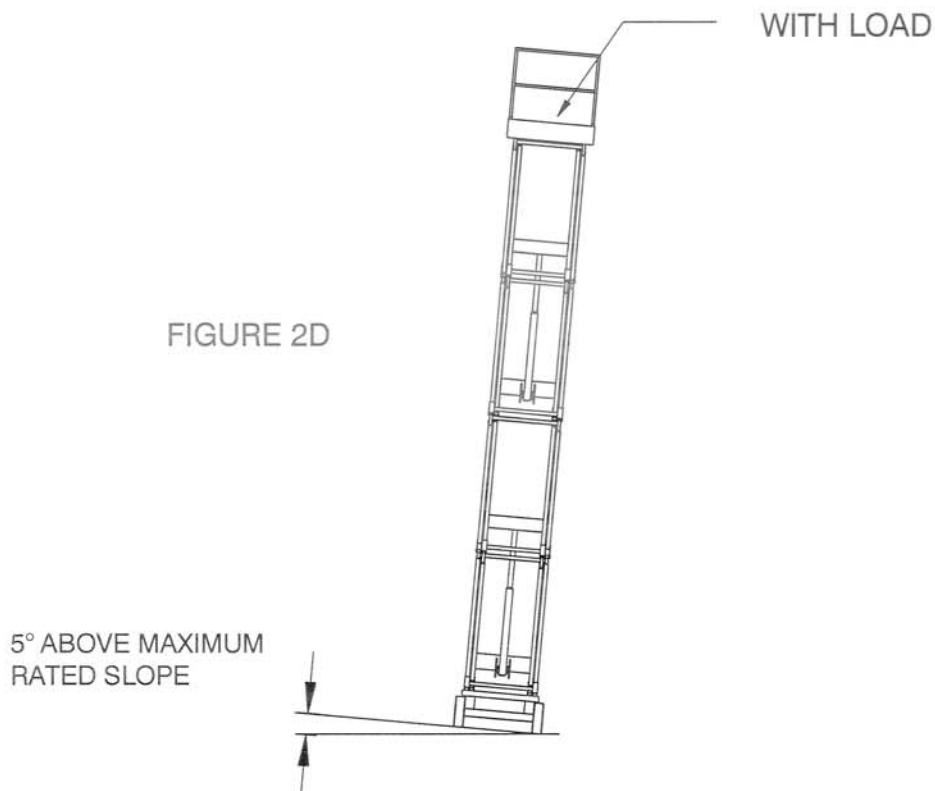
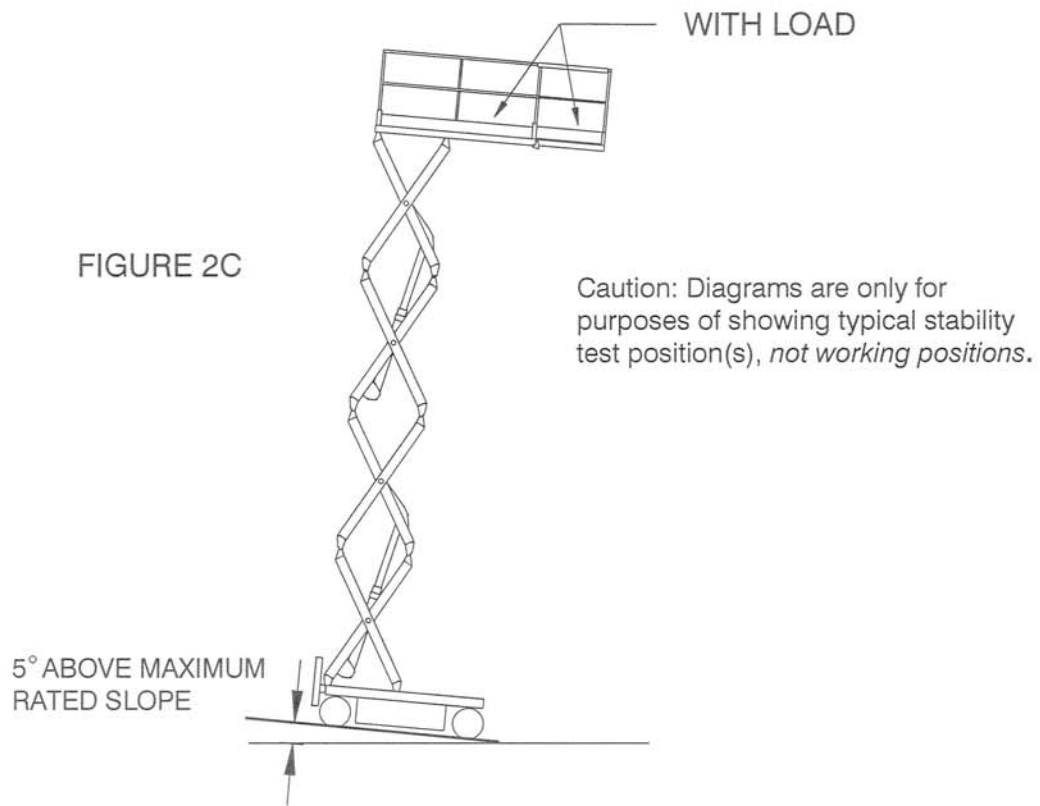
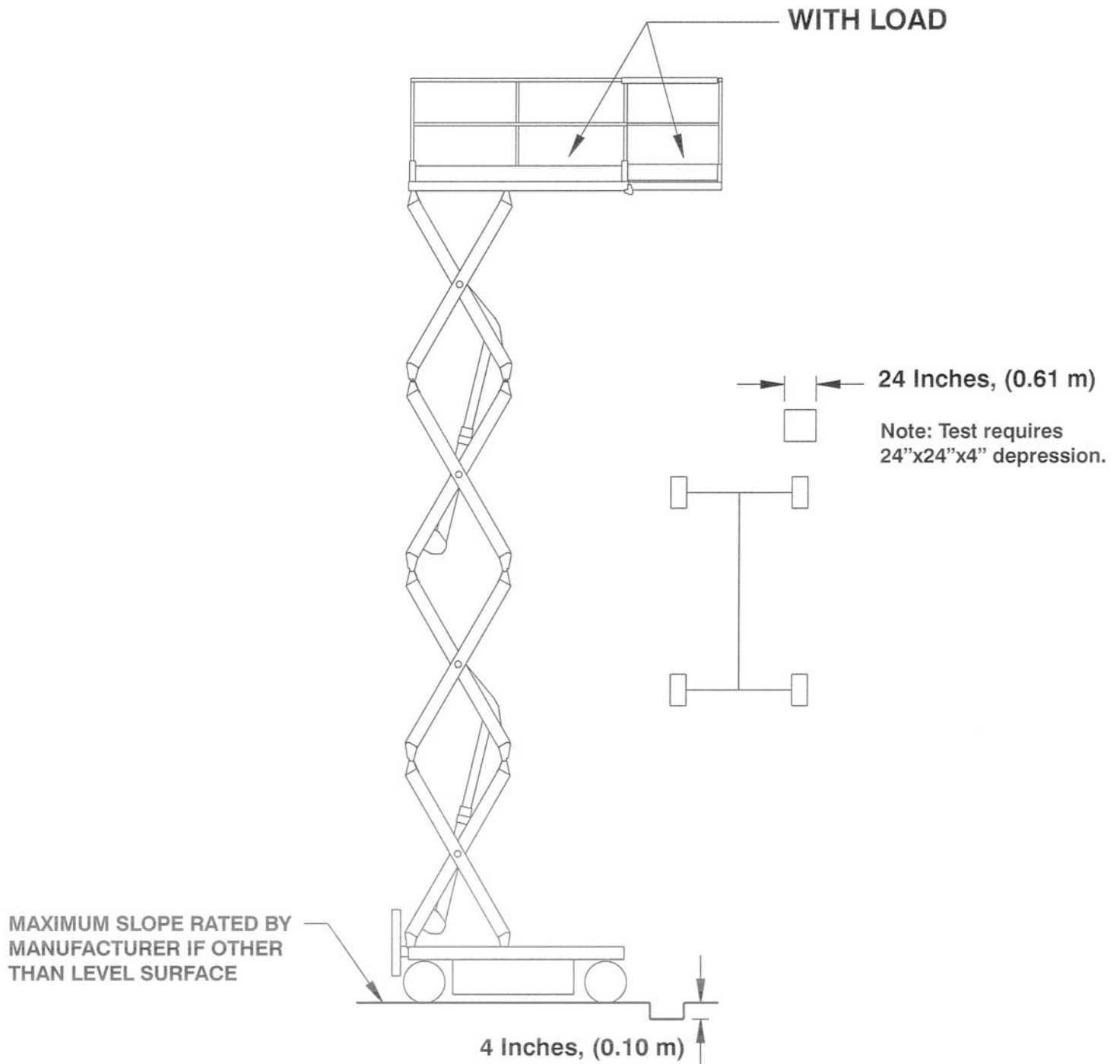


Figure 3 - Illustration of Depression Test

(See paragraph 4.8.4.2 on page 18)



ANSI/ SIA Standards Reorder Form

Standards: \$35 members/ \$45 non-members

Manuals of Responsibilities: \$4.95 members/ \$5.45 non-members

Qty	Item	Total
	A92.2 - Vehicle-Mounted Elevating and Rotating Aerial Devices	
	A92.2 Manual of Responsibilities	
	A92.3 - Manually-Propelled Elevating Work Platforms	
	A92.3 Manual of Responsibilities	
	A92.5 - Boom-Supported Elevating Work Platforms	
	A92.5 Manual of Responsibilities	
	A92.6 - Self-Propelled Elevating Work Platforms	
	A92.6 Manual of Responsibilities	
	A92.7 - Airline Ground Support Vehicle-Mounted Vertical Lift Devices	
	A92.7 Manual of Responsibilities	
	A92.8 - Vehicle-Mounted Bridge Inspection and Maintenance Devices	
	A92.8 Manual of Responsibilities	
	A92.9 - Mast-Climbing Work Platforms	
	A92.9 Manual of Responsibilities	

Name _____

Company _____

Address _____

City _____ State _____ Zip _____

Phone _____ Fax _____ Email _____

Payment Information: Visa Mastercard American Express

Credit Card #: _____

Expiration: _____ **CV Code:** _____

Scaffold Industry Association ~ P.O. Box 20574 ~ Phoenix, AZ 85036

Phone: 602.257.1144~Fax:602.257.1166

Email: info@scaffold.org

**This page
intentionally
left blank**

**This page
intentionally
left blank**

American National Standards for Aerial Work Platforms

ANSI/SIA A92.2 - 2001	Vehicle-Mounted Elevating and Rotating Aerial Devices
ANSI/SIA A92.3 - 2006	Manually Propelled Elevating Aerial Platforms
ANSI/SIA A92.5 - 2006	Boom-Supported Elevating Work Platforms
ANSI/SIA A92.6 - 2006	Self -Propelled Elevating Work Platforms
ANSI/SIA A92.7 - 1990	Airline Ground Support Vehicle-Mounted Vertical Lift Devices
ANSI/SIA A92.8 - 1993	Vehicle-Mounted Bridge Inspection and Maintenance Devices
ANSI/SIA A92.9 - 1993	Mast-Climbing Work Platforms

ANSI/SIA A92 Standards are under continual development. Contact the Scaffold Industry Association for updated information. Information is available online at www.scaffold.org.

**Scaffold Industry Association, Inc.
'The Voice of the Scaffold and Access Industry'
Post Office Box 20574
Phoenix, Arizona 85036-0574
Telephone: 602.257.1144
Fax: 602.257.1166**

**Email: info@scaffold.org / sia@scaffold.org
Web: www.scaffold.org**