



SURFACE VEHICLE RECOMMENDED PRACTICE

J2093™

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Design Considerations for Wheelchair Lifts for Entry to
or Exit from a Personally Licensed Vehicle

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The compliance requirements for wheelchair lifts to assist persons with limited mobility in entering or leaving a vehicle are now mandatory in the Federal Motor Vehicle Safety Standards 49 CFR § 571.403 and 49 CFR § 571.404.

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Documents

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1. **Scope**—This SAE Recommended Practice applies to electrically powered hydraulic or mechanically operated platform devices which permit a person seated in a manual or powered wheelchair to enter or exit a personally licensed vehicle.

The minimum performance and durability requirements are specified for satisfactory installation of wheelchair lifting devices in a personally licensed vehicle to be used by a person seated in a wheelchair to be lifted from the ground plane to the vehicle floor level in a reliable and safe manner.

- 1.1 SAE J2092 is the test procedure to verify compliance with this document.

2. **References**

- 2.1 **Applicable Publications**—These Standards, Specifications, or Recommended Practices promulgated by the following agencies and specified herein are applicable to the design, manufacture, and/or use of wheelchair lifts. Use the current issue of each document.

- 2.1.1 SAE PUBLICATIONS—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J258—Circuit Breaker—Internal Mounted—Automotive Reset
SAE J514—Hydraulic Tube Fittings
SAE J516—Hydraulic Hose Fitting
SAE J517—Hydraulic Hose
SAE J518—Hydraulic Flanged Tube, Pipe, and Hose Connections, Four-Bolt Split Flange Type
SAE J537—Storage Batteries
SAE J553—Circuit Breakers
SAE J561—Electrical Terminals—Eyelet and Spade Type
SAE J858—Electrical Terminals—Blade Type
SAE J928—Electrical Terminals—Pin and Receptacle Type
SAE J1292—Automobile, Truck, Truck-Tractor, Trailer, and Motor Coach Wiring
SAE J2092—Testing of Wheelchair Lifts for Entry to or Exit from a Personally Licensed Vehicle

- 2.1.2 ANSI PUBLICATIONS—Available from American National Standards Institute, 11 West 42nd Street, New York, NY 10036-8002.

ANSI A17.1—Elevators, Dumbwaiters, Escalators, and Moving Walks
ANSI A117.1—Specifications of Making Buildings and Facilities Accessible to, and Usable by Making Buildings and Facilities Accessible to, the Physically Handicapped
ANSI A120.0—Safety Requirements for Powered Platforms for Exterior Building Maintenance
ANSI B1.5—Acme Screw Threads
ANSI B1.8—Stub Acme Threads
ANSI B15.1—Safety Standard for Mechanical Power Transmission Apparatus
ANSI B29.1—Transmission, Roller Chains and Sprocket Teeth (for Standard Base Series Chain)
ANSI B30.2—Overhead and Gantry Cranes
ANSI B30.9—Safety Standards for Cranes, Derricks, Hoists, Hooks, Jacks, and Slings
ANSI B153.1—Safety Requirements for the Construction, Care, and Use of Automotive Lifts

- 2.1.3 ASTM PUBLICATIONS—Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM D 1005-51 (R1972)—Measurement of Dry Film Thickness of Organic Coatings
ASTM D 2200-67—Pictorial Surface Preparation Standards for Painting Steel Surfaces

- 2.1.4 AWS PUBLICATIONS—Available from American Welding Society, 2501 N.W. 7th Street, Miami, FL 33125.

AWS D1.1-72—Structural Welding Code
AWS D10.7-60—Recommended Practices for Gas Shielded Arc Welding of Aluminum and Aluminum Alloy Pipe

- 2.1.5 FMVSS PUBLICATIONS—Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402-9371.

Federal Motor Vehicle Safety Standard No. 302, Flammability of Interior Materials

- 2.1.6 MILITARY SPECIFICATIONS—Available from DODSSP, Subscription Services Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

Military Standards, 1427 C Human Engineering Design Criteria for Military Systems Equipment

- 2.1.7 OTHER PUBLICATIONS

Human Factors Design Handbook—Wesley E. Woodson, McGraw Hill Book Company 1981
McElroy, Frank E. (ed): Accident Prevention Manual for Industrial Operations. 6th Edition, National Safety Council, Chicago, IL, 1969, pp. 641–657
Rossnagel, W.E.: Handbook of Rigging, 3rd Edition, McGraw-Hill Book Company, New York, NY, 1964, pp. 41–83
Wire rope manufacturers' recommendations

3. Definitions

- 3.1 **Access Path**—The minimum open area between horizontal and vertical structures of the lift through which a client must pass while entering or exiting a vehicle.
- 3.2 **Fasteners**—Devices used to secure, by mechanical means, other devices or parts in place. These include but are not limited to, bolts, nuts, screws, washers, pins, rivets, and clamps.
- 3.3 **Ground Plane**—The surface (normally horizontal) on which the vehicle is resting.
- 3.4 **Lift Electrical Components**—All electrical hardware used on a wheelchair lift. These include but are not limited to, batteries, circuit breakers, motors, switches, wiring, and terminals.
- 3.5 **Lift Controls**—Devices by which an operator controls the lift operation including switches, handles, etc.
- 3.6 **Lift Platform**—That portion of a wheelchair lift device on which the wheelchair rests while being raised or lowered.
- 3.7 **Pinch Point**—A term for a hazardous location which exists when two closely spaced mechanical components move in opposite directions, or at a point of contact between belt and pulley, chain and sprocket, or similar moving parts of machinery.
- 3.8 **Proof Load**—Static test load to insure mechanical integrity at critical points.
- 3.9 **Rated Load**—Load under which a device will operate continuously.
- 3.10 **Outer Roll Stop**—A term for a device on a wheelchair lift that prevents a wheelchair from rolling off the lift platform.
- 3.11 **Shall**—The term "Shall," where used, is to be construed as mandatory.
- 3.12 **Shear Point**—A term for a hazardous location where a moving (e.g., reciprocating or sliding) part approaches or crosses another part.
- 3.13 **Should**—The term "Should," where used, shall be construed as advisory.
- 3.14 **Vehicle Floor**—The surface of the vehicle on which the wheelchair rests immediately after entering.
- 3.15 **Weatherproof**—The term applied to equipment so constructed or protected that exposure to weather will not interfere with successful operation.
- 3.16 **Wheelchair Ground Plane**—The plane that defines the surface upon which the wheelchair rests.
- 3.17 **Wire Rope Components**—A term encompassing but not limited to, wire, rope, sheaves (pulleys) clips, thimbles, end fittings, and winch hardware.

4. Design Requirements

- 4.1 A wheelchair lift shall be constructed to withstand the following:
 - 4.1.1 **ACCELERATED LIFE CYCLE TEST**—An accelerated life shall be performed by repeating the wheelchair lift cycle 4400 times carrying a rated load of 600 lb.