



SURFACE VEHICLE STANDARD

J2358™

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Low-Speed Vehicles

RATIONALE

Occupant protection system updated per recommendation of SAE Ride and Seating Committee and others.

Roof crush test reviewed and updated.

Headlamps reformatted to align with other SAE Standards, and replaced Tables 1 and 2 with Figures 4A and 4B.

Aligned park brake requirements to agree with other FMVSS vehicles.

Added procedures for determining traction coefficient and pavement friction.

Added pedestrian warning system.

Clarified the test vehicle and battery state of charge for speed, acceleration, and braking tests.

FOREWORD

This SAE Standard was developed to establish safety and performance requirements for the design and operation of powered low-speed vehicles (LSVs), operated on public streets or roads where permitted by law. This document considers speed, acceleration, stability, braking systems, operational controls, lighting, electrical systems, fuel systems, and general configurations. Safety codes and standards are intended to enhance public health and safety. Standards result from consideration of factors such as technological advances, new data, and changing environmental needs.

One purpose of the document is to serve as a guide to governmental authorities having jurisdiction over subjects within the scope of the document. It is expected, however, that the document will find a major application in industry, serving as a guide to manufacturers of the vehicles.

If adopted for governmental use, references to other national standards may be changed to refer to the corresponding governmental regulations.

The use of LSVs is subject to certain hazards that cannot be eliminated or guarded against by mechanical means. Only the exercise of care and good judgment will minimize these hazards. It is therefore essential to have competent and careful operators, who are not physically or mentally impaired, thoroughly trained in the safe operation of LSVs. It is recommended that the operator be capable of obtaining a valid motor vehicle operator's license.

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Documents

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1. SCOPE

This SAE Standard defines the safety and performance requirements for low-speed vehicles (LSVs). The safety specifications in this document apply to any powered vehicle with a minimum of four wheels, a maximum level ground speed of more than 32 km/h (20 mph) but not more than 40 km/h (25 mph), and a maximum gross vehicle weight of 1361 kg (3000 pounds), that is intended for operating on designated roadways where permitted by law.

1.1 Purpose

The purpose of this document is to promote safety in the design, manufacture, maintenance, and operation of LSVs. Regulatory authorities desiring to formulate safety rules and regulations may use this SAE Standard as a guide. This document is also intended for voluntary use by others associated with manufacturing or utilizing LSVs. This document is intended to provide guidance in the manufacture of LSVs meeting the requirements of Part 571.500 of Title 49 of the Code of Federal Regulations as established by the National Highway Traffic Safety Administration.

2. REFERENCES

2.1 Applicable Documents

The following publications form a part of this specification to the extent specified herein. Unless otherwise indicated, the latest issue of SAE publications shall apply.

2.1.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

SAE/ANSI Z26.1-Feb96 Glazing Materials

SAE J268 Rear View Mirrors - Motorcycles

SAE J272 Vehicle Identification Number Systems

SAE J377 Vehicular Traffic Sound Signaling Devices (Horns)

SAE J383 Motor Vehicle Seat Belt Anchorages - Design Recommendations

SAE J384 Motor Vehicle Seat Belt Anchorages - Test Procedure

SAE J386 Operator Restraint System for Off-Road Work Machines

SAE J585 Tail Lamps (Rear Position Lamps) for Use on Motor Vehicles Less than 2032 mm in Overall Width

SAE J586 Stop Lamps for Use on Motor Vehicles Less than 2032 mm in Overall Width

SAE J588 Turn Signal Lamps for Use on Motor Vehicles Less than 2032 mm in Overall Width

SAE J592 Sidemarker Lamps for Use on Road Vehicles Less than 2032 mm in Overall Width

SAE J594 Reflex Reflectors

SAE J1623 Off-Highway Vehicle Headlamps

SAE J1718 Measurement of Hydrogen Gas Emission from Battery-Powered Passenger Cars and Light Trucks During Battery Charging

SAE J1957	Center High Mounted Stop Lamp Standard for Vehicles Less than 2032 mm Overall Width
SAE J2292	Combination Pelvic and Upper Torso Operator and Occupant Restraint Systems for Off-Road Work Machiens

2.1.2 ANSI Accredited Publications

Copies of these documents are available online at <http://webstore.ansi.org/>.

ANSI/NFPA 30-1990	Fuel handling and storage
ANSI/NFPA 58-1992	LPG fuel handling and storage
ANSI Z535.1-2006	Safety Colors
ANSI Z535.4-2007	Product Safety Signs and Labels

2.1.3 NASA Publications

NASA Technical Services, NASA STI Program STI Support Services, Mail Stop 148, NASA Langley Research Center, Hampton, VA 23681-2199, 757-864-9658, Fax: 757-864-6500, <http://ntrs.nasa.gov/>.

Man-Systems Integration Standards, Volume I, Section 3, Anthropometry and Biomechanics, <http://msis.jsc.nasa.gov/sections/section03.htm>.

2.1.4 ISO Publications

Copies of these documents are available online at <http://webstore.ansi.org/>.

ISO 3864	Graphical Symbols, Safety Colors, and Safety Signs
EC Directive 97/24/EC	

2.2 Related Publications

The following publications are provided for information purposes only and are not a required part of this SAE Technical Report.

2.2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

TSB 003	Rules for SAE Use of SI (Metric) Units
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3. DEFINITIONS - GLOSSARY OF COMMONLY USED WORDS AND PHRASES

3.1 ACCELERATOR

A foot operated pedal used by the operator to control the speed of the vehicle.

3.2 ACCESSORY

A LSV manufacturer approved device installed on the vehicle to enhance its usability or functionality.

3.3 BODY RESTRAINT

A hand hold or combination hand hold/hip restraint anchored securely to the body or seat platform of the LSV creating a barrier to help prevent an occupant from sliding outside of the vehicle.

3.4 BRAKE PEDAL

The foot operated pedal used by the operator to operate the braking system of the vehicle.

3.5 BRAKING SYSTEM

The system used to slow or stop the movement of the vehicle.

3.6 CENTER OF GRAVITY OF THE TEST LOAD

The point, at which the load mass is concentrated, located horizontally in the center of the load-bearing surface and vertically by its distance above the surface.

3.7 CHARGED BATTERY

Full charge is to be established using manufacturer's recommended charging procedure and appropriate equipment.

3.8 CLOSED COMMUNITY

A private residential area, resort or other private facility. The facility's ingress and egress being controlled by its owners or an association representing the owners or its members.

3.9 CONTROLLING PARTY

The owner, person(s) or organization(s) responsible for the conduct of the operator and maintenance of the LSV.

3.10 CURB WEIGHT

Weight of vehicle with full fuel load, operating fluids, and batteries, without material load or personnel load.

3.11 OPERATOR SEAT

The seat located directly behind the steering wheel.

3.12 OPERATOR SIDE

The side of the LSV that contains the operator seat and steering wheel.

3.13 ENGINE EXHAUST SYSTEM

The exhaust system includes all parts and their supports used to conduct exhaust gases from the engine.

3.14 FIRE HAZARD

Any condition which presents the possibility of creating a fire by ignition of a combustible material.

3.15 FIRE PROTECTION EQUIPMENT

Equipment used to prevent, control, or extinguish a fire in accordance with state and local fire protection codes.

3.16 FUEL SYSTEM (If So Powered/Equipped)

The fuel system includes all tanks, lines, hoses, pumps, filters, canisters, connections, caps, and fittings necessary to fill and carry fuel or vapor from the fuel tank to the engine.

3.17 GROSS VEHICLE WEIGHT RATING (GVWR)

The maximum allowable total vehicle weight recommended by the manufacturer, including the vehicle's curb weight plus the combined weights of all vehicle occupants any cargo loads, the trailer tongue weight, and the weights of any installed options, attachments and/or accessories. Installation of options, attachments, and/or accessories may reduce the allowable cargo capacity below the stated limit.

3.18 HAND HOLD

A readily accessible device mounted securely to the vehicle that can be encircled by the fingers of one hand for the purpose of holding on.

3.19 HEADLAMP

A lighting device mounted on the front of the vehicle to provide illumination ahead of the vehicle.

3.20 HILL BRAKE

See parking brake.

3.21 HORN

An audible warning device used to signal the presence of the vehicle.

3.22 INSULATED TOOLS

Tools which are covered with a non-conducting material to prevent an inadvertent electrical short circuit and to protect the user from the dangers of electrical shock.

3.23 KEY

A physical device or an electronic code which, when inserted into the starting system (by physical or electronic means), enables the vehicle operator to activate the engine or motor.

3.24 LOW-SPEED VEHICLE (LSV)

Any powered vehicle with a minimum of four-wheels, a maximum level ground speed of more than 32 km/h (20 mph) but not more than 40 km/h (25 mph), and a maximum gross vehicle weight of 1361 kg (3000 pounds), that is intended for operating on designated roadways where permitted by law.

3.25 OCCUPANT PROTECTIVE STRUCTURE

A frame or other structural enclosure for the protection of occupants of LSVs to minimize the possibility of serious occupant injury resulting from accidental upsets.

3.26 OPERATOR OR DRIVER

A person authorized by the regulatory authority or controlling party to operate the LSV from the driver's seat only. This person (male or female) shall fall into the 5 to 95% male range of the appropriate measurements contained in NASA Man-Systems Integration Standards, Volume I, Section 3, ANTHROPOMETRY AND BIOMECHANICS.

3.27 PARKING BRAKE

The portion of the brake system used to hold one or more brakes continually in an applied position for the purpose of holding the vehicle stationary while parked.

3.28 PEDESTRIAN WARNING SYSTEM (PWS)

An audible device used to alert pedestrians of the presence of electric and hybrid vehicles in an effort to reduce the number of pedestrian-related injuries.

3.29 RATED CAPACITY

The total weight of material load and personnel load for a vehicle. Rated capacity = GVW rating less curb weight.

3.30 REAR VIEW MIRROR

A device having a reflecting surface used to provide a view to the rear of a vehicle.

3.31 REFLEX REFLECTOR

A device used on a vehicle to indicate its presence by reflecting light.

3.32 REGULATORY AUTHORITY

A Closed Community or local, state, or federal governing authority, as applicable.

3.33 REVERSE WARNING INDICATOR

A device installed to alert the operator that the vehicle is in the reverse mode and is ready to proceed in a reverse or rearward direction.

3.34 ROLL-OVER

A rotation of the vehicle 180 degrees or more in any direction from its normal upright position.

3.35 SERVICE BRAKE

The primary braking system of the LSV used to reduce the speed or stop the vehicle.

3.36 SIDE MARKER LAMP

A lamp used to indicate the presence and orientation of a vehicle by marking its overall length.

3.37 STOP LAMP

A red lamp that provides steady light to the rear of the vehicle, activated when the brake is applied, to indicate the action of the operator of the vehicle to diminish speed or stop.

3.38 STOPPING DISTANCE

The distance traveled between the point of brake application and where the vehicle comes to rest.

3.39 TAIL LAMP

An energized red lamp which provides rear marking of the vehicle.

3.40 TEST VEHICLE

Unless otherwise stated, the test vehicle shall conform to the manufacturer's performance specifications. All original equipment manufacturer approved attachments, optional and accessory items offered by the manufacturer shall be considered in performing each test, which shall be conducted with attachments, optional and accessory items installed, or not installed so as to create the most severe test conditions.

3.41 TURN SIGNAL

A flashing lamp indicating the vehicle operator's action to change direction.

3.42 WIRING SYSTEM ASSEMBLIES

Includes all wires, terminals, and connectors required to conduct electrical current to the motor, starter/generator, and any other electrical functions.

4. PART I - SAFETY STANDARD FOR LOW-SPEED VEHICLES

4.1 Interpretation

4.1.1 Mandatory and Advisory Rules

To carry out the provisions of this document, whenever the word "shall" is used, it is to be understood as mandatory, and the word "should" as recommended.

5. PART II - FOR THE CONTROLLING PARTY

5.1 Maintenance and Operation

5.1.1 General Safety Practices

5.1.1.1 Introduction

It is recommended that Part II of this document be adopted in the vehicle manufacturer's manuals to encourage safe operation and proper maintenance. The safe operation is enhanced when LSVs are operated within a specific set of operation instructions, safety rules, and practices established to meet actual terrain and driving conditions.

Like other machines, LSVs can cause injury if improperly used or maintained. This section contains broad safety practices recommended for safe vehicle operation. Before operation, the controlling party and operator shall become familiar with and abide by all regulatory authority laws, rules and ordinances, including, but not limited to, licensing requirements governing the operation of LSVs.

The safety information contained in Part II is intended to provide the controlling party and operator with basic safety information and to encourage safe operation and practices.

5.1.1.2 General Operation

LSV controlling parties and operators shall abide by the rules of the road and equipment requirements as established by regulatory authorities, observe extra caution when in the proximity of larger vehicles and pedestrians, and use defensive driving techniques.

5.1.2 Vehicle Maintenance

LSVs can become hazardous if maintenance is neglected or improperly performed. Therefore, the vehicle maintenance shall be performed by trained personnel and follow procedures in accordance with the manufacturer's recommendations.

5.1.2.1 Preventive Maintenance

A regularly scheduled inspection and preventive maintenance program in accordance with the manufacturer's recommendation should be established. Such a program will be a valuable tool in providing safe, properly operating LSVs, and will help to avoid accidents.

5.1.2.2 Parts and Material

Original equipment manufacturer's replacement parts and materials, or equivalent shall be used.