

## VEHICLE EQUIPMENT SAFETY COMMISSION

### Regulation VESC-12

## MINIMUM REQUIREMENTS FOR CONSTRUCTION AND EQUIPMENT OF SPECIAL MOTOR VEHICLES

Approved August 1974 Amended August 1975 Amended August 1978 Amended August 1982

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#### VESC-12

## MINIMUM REQUIREMENTS FOR CONSTRUCTION AND EQUIPMENT OF SPECIAL MOTOR VEHICLES

#### 1. PURPOSE

- 1.1 To establish equipment requirements for the manufacture of special motor vehicles, or the assembly and construction of vehicles from new or used parts or kits, or the alteration of a motor vehicle which places it in the category of a special motor vehicle, for the purpose of reducing the danger of death and injury to the operators and passengers of the vehicles subject to this regulation and to other users of the public highways.
- 1.2 To establish minimum construction and performance requirements that are technically feasible and based on sound engineering to achieve operational safety and to furnish state administrators with a guide for registration eligibility and in-use conformity for vehicles in this category.

#### 2. SCOPE

- This regulation sets forth performance and equipment requirements necessary for the safe operation of special motor vehicles upon the public highways. Vehicles constructed, reconstructed or modified after the effective date of this regulation shall comply with all provisions unless specifically excepted.
- 2.2 A jurisdiction may grant exceptions from the requirements of this regulation or permit the use of other equipment or devices.
- 2.3 This regulation does not apply to vehicles modified for the handicapped.

#### 3. **DEFINITIONS**

3.1 SPECIAL MOTOR VEHICLES\*-Passenger vehicles,

<sup>\*</sup>An antique vehicle or vehicle restored to the original configuration and specifications of a recognized manufacturer is not considered to be a "special motor vehicle" and is not covered by this standard since most states have regulations for the antique category.

multi-purpose passenger vehicles, trucks and buses with a gross vehicle weight rating of 10,000 pounds or less equipped with two or more axles having at least two wheels per axle and which are intended for use on public highways. The term "special motor vehicle" shall include the following types:

**Type I** — Vehicles which retain their original body configuration with changes made to the steering, brake system, power train, or suspension systems.

Type II — Vehicles changed from the recognized vehicle manufacturer's original body configuration but which retain the general appearance, including changes to the body, chassis, or engine, of the original vehicle. This type may also include changes and modifications to the engine, chassis, steering, brake system, power train, or suspension systems.

**Type III** — All special motor vehicles which are custom built with fabricated parts or parts taken from existing vehicles excluding Type I and Type II vehicles.

3.2 RECOGNIZED MANUFACTURER — A person engaged in the manufacture, assembly, or importation of a special motor vehicle intended for use on the public highways or for distribution and sale in interstate commerce (person means every natural person, firm, co-partnership, association or corporation).

#### 4. MANUFACTURER'S CERTIFICATION

4.1 The manufacturer or assembler of a special motor vehicle (Types I, II or III) shall provide a certification of fact that the vehicle is designed and manufactured for use on the public highways and complies with the performance and equipment requirements of this regulation. Nothing contained herein shall preclude the administrator from requiring a certificate of inspection to insure compliance with the regulation.

#### **BODY REQUIREMENTS**

#### 5. DEFROSTER AND DEFOGGING DEVICE

5.1 Every closed special motor vehicle shall be equipped with a device capable of defogging or defrosting the windshield area.

#### 6. DOOR LATCHES

6.1 Every special motor vehicle equipped with side doors leading directly into a compartment that contains one or more seating positions shall be equipped with mechanically actuated door latches which firmly and automatically secure the door when pushed closed and which allow each door to be opened both from the inside and outside by the actuation of a convenient lever, handle or other suitable device.

#### 7. ENCLOSED PASSENGER COMPARTMENT

7.1 A special motor vehicle with an enclosed passenger compartment and powered by an internal combustion engine shall be constructed to prevent the entry of exhaust fumes into the passenger compartment.

#### 8 FLOOR PAN

8.1 A special motor vehicle shall be equipped with a floor pan under the entire passenger compartment. The floor pan shall be capable of supporting the weight of the number of occupants that the vehicle is designed to carry in the designated seating positions.

#### 9. GLAZING

9.1 Windshields — A special motor vehicle shall be equipped with a laminated safety glass windshield that complies with the provisions appearing in the current ANSI Z26.1 Standard. The windshield shall be framed and in such a position that it affords continous horizontal frontal protection to the driver and front seat occupants. The minimum vertical height of the unobstructed windshield glass shall be 6 inches, or as originally equipped by a recognized manufacturer.

9.2 Side and Rear Glass — These items are not required, but if they are present, they must comply with the provisions of the current ANSI 726.1 Standard.

#### 10. DRIVER VISIBILITY

- 10.1 The special motor vehicle shall be provided with a windshield and side windows or openings which allow the driver a minimum outward horizontal vision capability, 90° each side of a vertical plane passing through the fore and aft centerline of the vehicle. This range of vision may be interrupted by window framing not exceeding two inches in width each and windshield-door post support areas not exceeding four inches in width at each side location.
- 10.2 A special motor vehicle shall have no obstruction forward of the windshield which extends more than two inches upward into the horizontally forward projected vision area of the windshield except windshield wiper components.

#### 11. HOODLATCHES

11.1 A front opening hood shall be equipped with a primary and a secondary latching system to hold the hood in a closed position.

#### 12. INSTRUMENTATION

- 12.1 Speedometer A special motor vehicle shall be equipped with an operating speedometer calibrated to indicate "miles per hour," and may also indicate "kilometers per hour."
- 12.2 Odometer A special motor vehicle shall be equipped with an operating odometer calibrated to indicate "total miles driven," and may also indicate "total kilometers driven."

#### 13. REAR VIEW MIRROR

13.1 A special motor vehicle shall be equipped with at least two rear view mirrors each having substantially unit magnification. One shall be mounted on the inside of the vehicle in such a position that it affords the driver a clear view at least two hundred (200) feet to the rear. The other shall be

mounted on the outside of the vehicle on the driver's side in such a position that it affords the driver a clear view to the rear. When an inside mirror does not give a clear view to the rear, an outside mirror shall be required on each side of the vehicle which meet the requirements of this section. The mirror mounting shall provide for mirror adjustment by tilting in both horizontal and vertical directions. Each mirror shall have a minimum of ten square inches of reflective surface.

#### 14. SEAT BELTS

14.1 Seat belt requirements for the three types of special motor vehicles defined under Section 3.1 are as follows:

Type I and Type II Special Motor Vehicles — Shall be equipped with at least a Type I seat belt (lap belt) in compliance with FMVSS 209, for each occupant seating position.

Type III Special Motor Vehicles — Shall be equipped with a Type II seat belt system (lap belt plus upper torso restraint belt), in compliance with FMVSS 209, for the driver and right front seat occupant. Type I seat belts (lap belts) shall be provided at all other designated seating positions.

14.2 All seat belts shall be anchored in compliance with FMVSS 210.

#### 15. WINDSHIELD WIPERS

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A special motor vehicle shall be equipped with at least one windshield wiper, vacuum or electric operated, which effectively clears a horizontally projected windshield area of no less than fifty square inches directly in front of the driver. The operation of the windshield wiper(s) shall be controlled by the driver from within the vehicle.

#### **CHASSIS REQUIREMENTS**

#### 16. ACCELERATOR CONTROL SYSTEMS

16.1 A special motor vehicle shall be equipped with an accelerator control system that returns the engine throttle to

an idle position when the driver removes the actuating force from the accelerator control and the geometry of the throttle linkage shall be so designed that the throttle will not lock in an open position. A vehicle equipped with cruise control is exempt when the cruise control is actuated.

#### 17. BRAKES

- 17.1 Service Brakes A special motor vehicle shall be equipped with brakes acting on all wheels. The service brakes, upon application, must be capable of stopping the vehicle within a 12 foot lane, and:
  - (A) Developing an average tire to road braking or retardation force of not less than 62.2% of the gross vehicle weight;
  - (B) Decelerating the vehicle at a rate of not less than 20 feet per second, per second; or
  - (C) Stopping the vehicle within a distance of 48.4 feet from a speed of 30 MPH.

Tests shall be made on a level, dry, concreete or asphalt surface free from loose material.

17.2 Parking Brake — A special motor vehicle shall be equipped with a parking brake operating on at least two wheels on the same axle which, when applied, shall be capable of holding the vehicle on any grade on which the vehicle is operated. Parking brakes must be separately actuated so that failure of any part of the service brake actuation system would not diminish the vehicle's parking brake holding capability.

#### 18. BUMPERS

- A special motor vehicle shall be equipped with a bumper on both the front and rear of the vehicle with exception of special motor vehicles where the original or predominant body configuration, provided by a recognized manufacturer, did not include such bumper or bumpers in the design of the vehicle.
- The horizontal bumper shall be at least 4.5 inches in vertical height, centered on the vehicle's centerline, and extend

no less than the width of the respective wheel track distances. They shall be horizontal load bearing bumpers and attach to the vehicle frame to effectively transfer impact when engaged.

18.3 Maximum bumper heights shall be determined by weight category of gross vehicle weight rating (GVWR) measured from a level surface to the highest point on the bottom of the bumper. (Vehicles not equipped with a bumper(s) because it was not required in the design of the vehicle, measurement shall be made to the bottom of the frame rail.) Maximum heights are as follows:

	Front	Rear
Passenger Vehicles	22 inches	22 inches
4,500 lbs. and under GVWR	24 inches	26 inches
4,501 lbs. to 7,500 lbs. GVWR	27 inches	29 inches
7,501 lbs. to 10,000 lbs. GVWR	28 inches	30 inches

#### 19. EXHAUST SYSTEM

- 19.1 A special motor vehicle shall be equipped with a leakproof exhaust system that includes the exhaust manifold(s), headers, the piping leading from the flange of the exhaust manifold(s), the muffler(s), and the tail piping.
- 19.2 Exhaust systems on property-carrying vehicles shall discharge the exhaust fumes to the rear of that part of the vehicle designed and normally used for carrying the driver and passengers.
- 19.3 Exhaust systems on passenger vehicles shall discharge the exhaust fumes at a location to the rear of the vehicle body or direct the exhaust fumes outward from the side of the vehicle body at a location rearward of any operable side windows.
- 19.4 No part of the exhaust system shall pass through any area of the vehicle that is used as a passenger compartment, nor in close proximity to the fuel system without being properly shielded. No part of the exhaust system may contain a muffler cut-out or by-pass.

#### 20. FENDERS

All wheels of a special motor vehicle shall be equipped with fenders designed to cover the entire tire tread width that

comes in contact with the road surface. Coverage of the tire tread circumference shall be from at least 15° in front and to at least 75° to the rear of the vertical centerline at each wheel measured from the center of the wheel rotation. At no time shall the tire come in contact with the body, fender, chassis, or suspension of the vehicle.

#### 21. FRAME

A special motor vehicle shall be equipped with a frame. If an existing frame from a recognized manufacturer is not used and a special frame is fabricated, it shall be constructed of wall box tubing, wall channel or unitized construction capable of supporting the vehicle, its load and the torque produced by the power source under all conditions of operation. Specially fabricated frames shall meet the SEMA "Recommended Practice for Chassis Construction of Special Motor Vehicles."

#### 22. FUEL SYSTEM

- A special motor vehicle shall have all fuel components securely fastened to the vehicle so as not to interfere with the vehicle's operation. The components (tank, tubing, hoses, pump, etc.) shall be of leakproof design and be securely attached with fasteners designed for the purpose.
- Fuel lines shall be positioned so as not to be in contact with high temperature surfaces or moving components.

#### 23. STEERING AND SUSPENSION

- 23.1 Steering Wheel A special motor vehicle shall be equipped with a circular steering wheel having an outside diameter of not less than 13 inches.
- The steering wheel shall move not less than two turns or more than six turns, and the steering system shall remain unobstructed when turning from stop to stop.
- The steering box mount shall be securely welded or bolted to the vehicle frame.
- While the vehicle is in a sharp turn at a speed of between 5 and 15 MPH, release of the steering wheel shall result in a

distinct tendency for the vehicle to increase its turning radius.\*

- 23.5 A special motor vehicle shall have steering capability for negotiating right and left turns of a 32 foot radius or less measured from the center of the turn circle to the outside front wheel track.
- 23.6 With engine on and the wheels in the straight ahead position, turn the steering wheel in one direction until there is a perceptible movement of a front wheel. If a point on the steering wheel rim moves more than the value shown in Table 1 before perceptible return movement of the wheel under observation, there is excessive lash or free play in the steering system.

#### TABLE 1 STEERING SYSTEM FREE PLAY VALUES

Steering wheel diameter (inches)	Lash (inches)
16 or less	2
18	21/4
20	
22	23/4

- The ground clearance for a special motor vehicle shall be such that the vehicle shall be able to be in motion on its four rims on a flat surface with no other parts of the vehicle touching that surface.
- The spring mounts and shackles shall be properly aligned and of sufficient strength so as to support the gross weight of the vehicle and provide free travel in an up and down movement under all conditions of operation. Rear coil spring suspension systems shall incorporate anti-sway devices to control lateral movement.
- 23.9 A special motor vehicle shall have a suspension system that allows movement between the unsprung axles and wheels

<sup>\*</sup>Stability tests shall be performed on a dry, level concrete or asphalt road having no loose surface contaminant, and the vehicle's tires shall be inflated to the recommended pressure in accordance with the tire load per FMVSS 109. The vehicle shall contain a front seat passenger or simulated equivalent 150 lbs. weight secured to the seat in addition to the driver.

and the chassis body and shall be equipped with a damping device at each wheel location. The suspension system shall be capable of providing a minimum relative motion of plus and minus 2 inches. When any corner of the vehicle is depressed and released, the damping device shall stop vertical body motion within 2 cycles.

- 23.10 There shall be no heating or welding of coil springs, leaf springs, or torsion bars.
- No special motor vehicle shall be constructed or loaded so that the weight on the wheels of any axle is less than 30% of the gross weight of the vehicle.
- A special motor vehicle shall be capable of stable, controlled operation while transversing a slalom-type path passing alternately to the left and right of at least four cones or markers arranged in a straight line and spaced 60 feet apart at a minimum velocity of 25 MPH.

#### 24. TIRES & RIMS

The tires and rims on special motor vehicles shall comply with FMVSS 109, 110, 117, 119, 120 and VESC-7 as applicable. Each front tire shall measure a minimum of 60% of the tread width of the rear tires.

#### **ELECTRICAL SYSTEM REQUIREMENTS**

#### 25. DIMMER SWITCH

25.1 The headlamp circuit shall be equipped with a driver-controlled high and low beam selector switch.

#### 26. HAZARD WARNING SWITCH

A Type III special motor vehicle shall be equipped with a hazard warning switch causing all turn signal lamps to flash simultaneously.

#### 27. HEADLAMP SWITCH

27.1 The headlamp switch must activate the headlamps, tail lamps, license plate lamp, parking lamps, and the instrument panel illumination lamp(s).

#### 28. HEADLAMP SYSTEM

28.1

A special motor vehicle shall be equipped with two 7 inch round Type 2 or rectangular Type 2B headlamp units or two pairs of 53/4 inch round Type 1 and Type 2 units or two pairs of rectangular Type 1A and Type 2A units, in compliance with SAE Standards J566, J571d, J579c, J580a, and J1132 as applicable. Type 1 (or 1A) headlamp units shall be mounted at the same height, one each equidistant on each side of the vertical centerline, and as far apart as practical. Type 2 (or 2A or 2B) headlamps shall be mounted at the same height, one each equidistant on each side of the vertical centerline, and as far apart as practical. Type 2 or 2A units shall be mounted above or outboard of Type 1 or 1A units. The headlamps shall be mounted on the front forward of the windshield in a plane that is perpendicular to a vehicle plane through the longitudinal centerline of the vertical. The headlamps shall be mounted not less than 24 inches nor more than 54 inches (72 inches for trucks) above the road surface when measured to the headlamp center. Lamp sub-body(ies) shall be constructed with adequate adjustments to afford proper aiming of the headlamp(s) in compliance with SAE J580b. Alternative headlamp systems shall comply with FMVSS 108.

#### 29. HIGH BEAM INDICATOR

An indicator shall be provided to show the driver when the high beam of the headlamp system is energized. The indicator shall emit a light other than white plainly visible to the driver under normal driving conditions.

#### 30. HORN

A special motor vehicle shall be equipped with an operable horn capable of emitting sound audible under normal conditions from a distance of not less than 200 feet, but no horn or other warning device shall emit an unreasonably loud or harsh sound or whistle. The device used to actuate the horn shall be easily accessible to the driver when operating the vehicle.

#### 31. LICENSE PLATE LAMP

At least one white lamp shall be provided at the rear license plate to illuminate the plate.

#### 32. PARKING LAMPS

Two white or yellow (amber) parking position lamps in compliance with SAE J222 shall be mounted on the front, one on each side and equidistant from the vertical centerline, at the same height, and as far apart as practical. The parking lamps shall be mounted not less than 15 inches nor more than 72 inches above the roadway.

#### 33. REFLEX REFLECTORS\*

33.1 Two red Class A reflectors in compliance with SAE J594e shall be mounted on the rear symmetrically disposed about the vertical centerline. The reflex reflectors shall be mounted not less than 15 inches nor more than 60 inches above the roadway.

#### 34. SAFETY SWITCH

34.1 A special motor vehicle if equipped with automatic transmission shall be equipped with a safety switch that prevents the starter motor from being actuated except when the gear selector is in the neutral or parked position.

#### 35. STOP LAMPS\*

Two red stop lamps in compliance with SAE J586c shall be mounted on the rear, one on each side equidistant from the vertical centerline of the vehicle, at the same height, and as far apart as practical. The stop lamps shall be mounted not less than 15 inches nor more than 72 inches above the roadway. Type I vehicles, which were originally equipped with only one stop lamp, need not be equipped with two lamps providing the original lamp is located in accordance with the original design configuration.

#### 36. TAIL LAMP SYSTEM\*

Two red lamps in compliance with SAE J585e shall be mounted on the rear, one on each side equidistant from the vertical centerline, at the same height, and as far apart as practical. The tail lamps shall be mounted not less than 15 inches nor more than 72 inches above the roadway. Type I vehicles, which were originally equipped with only one tail lamp, need not be equipped with two tail lamps providing

<sup>\*</sup>Combination lighting devices are acceptable.

the original lamp is located in accordance with the original design configuration.

#### 37. TURN SIGNAL INDICATOR

37.1 If the front signal lamp(s) are not readily visible to the driver, there shall be an illumination indicator to give the operator a clear, unmistakable indication that the turn signal system is turned on. The illumination indicator shall consist of one or more bright lights flashing at the same frequency as the signal lamps, and it shall emit a light other than white.

#### 38. TURN SIGNAL LAMPS\*

Two Class A red or yellow (amber) turn signal lamps and 38.1 two Class A yellow (amber) turn signal lamps in compliance with SAE J588e shall be mounted as follows: At or near the front, one yellow (amber) lamp on each side equidistant from the vertical centerline, at the same height, and as far apart as practical. On the rear, one red or yellow (amber) lamp on each side equidistant from the vertical centerline, at the same height, and as far apart as practical. All turn signal lamps shall be mounted not less than 15 inches nor more than 83 inches above the roadway. Type I vehicles which were originally equipped with only one tail lamp need not be equipped with two tail lamps providing the original lamp is located in accordance with the original design configuration. Type I vehicles are exempt from turn signal requirements if not originally equipped.

#### 39. TURN SIGNAL SWITCH

39.1 A special motor vehicle (if equipped with turn signals) shall be equipped with a switch controlled by the operator of the vehicle which shall cause the turn signal lamps to function. The switch shall be self-cancelling and capable of cancellation by a manually-operated control.

<sup>\*</sup>Combination lighting devices are acceptable.

#### REFERENCE MATERIAL

ANSI – American National Standards Institute, Inc., 1430 Broadway, New York, New York 10018 (212) 354-3300.

ANSI - Z26.1 "Safety Code for Safety Glazing Materials for Glazing Motor Vehicles Operating on Land Highways"

FMVSS - Federal Motor Vehicle Safety Standards, National Highway Traffic Safety Administration, U. S. Department of Transportation, Room 4423, Washington, D.C. 20590 (202) 426-0874.

FMVSS 108 "Lamps, Reflective Devices, and Associated Equipment"

FMVSS 109 "New Pneumatic Tires"

FMVSS 110 "Tire Selection and Rims - Passenger Cars"

FMVSS 117 "Retreaded Pneumatic Tires - Passenger Cars"

FMVSS 119 "New Pneumatic Tires for Vehicles Other than Passenger Cars"

FMVSS 120 "Tire Selection and Rims for Vehicles Other than Passenger Cars"

FMVSS 205 "Glazing Materials"

FMVSS 209 "Seat Belt Assemblies"

FMVSS 210 "Seat Belt Assembly Anchorages"

SAE - Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, Pennsylvania 15096 (412) 776-4841

SAE J222 "Parking Lamps (Position Lamps)"

SAE J566 "Headlamp Mountings"

SAE J571d "Dimensional Specifications for Sealed Beam Headlamp Units"

SAE J579c "Sealed Beam Headlamp Units for Motor Vehicles"

SAE J580a "Sealed Beam Headlamp Assembly"

SAE J580b "Sealed Beam Headlamp Assembly"

SAE J585e "Tail Lamps (Rear Position Lamps)"

SAE J586c "Stop Lamps"

SAE J588e "Turn Signal Lamps"

SAE J594e "Reflex Reflectors"

SAE J1132 "142mm X 200mm Sealed Beam Headlamp Units"

SEMA – Speciality Equipment Market Association, 11540 East Slauson Avenue, Whittier, California 90606 (213) 692-9402

"SEMA Recommended Practice for Chassis Construction of Special Motor Vehicles"

VESC- Vehicle Equipment Safety Commission, Suite 802, 4660 Kenmore Avenue, Alexandria, Virginia 22304 (703) 823-1994

VESC-7 "Safe Operating Condition of Tires Including Tire Tread Depth Requirements (Passenger Car Type Tires)"

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