

shall be protected by being enclosed in a sheath or tube;

(3) Be properly supported in a manner to prevent chafing;

(4) Not be so located as to be likely to be charred, overheated, or enmeshed in moving parts;

(5) Not have terminals or splices located above the fuel tank except for the fuel sender wiring and terminal; and

(6) Be protected when passing through holes in metal by a grommet, or other means, or the wiring shall be encased in a protective covering.

(b) The complete wiring system including lamps, junction boxes, receptacle boxes, conduit and fittings must be weather resistant.

(c) Harness connections shall be accomplished by a mechanical means.

[53 FR 49397, Dec. 7, 1988]

§ 393.29 Grounds.

The battery ground and trailer return ground connections on a grounded system shall be readily accessible. The contact surfaces of electrical connections shall be clean and free of oxide, paint, or other nonconductive coating.

§ 393.30 Battery installation.

Every storage battery on every vehicle, unless located in the engine compartment, shall be covered by a fixed part of the motor vehicle or protected by a removable cover or enclosure. Removable covers or enclosures shall be substantial and shall be securely latched or fastened. The storage battery compartment and adjacent metal parts which might corrode by reason of battery leakage shall be painted or coated with an acid-resisting paint or coating and shall have openings to provide ample battery ventilation and drainage. Wherever the cable to the starting motor passes through a metal compartment, the cable shall be protected against grounding by an acid and waterproof insulating bushing. Wherever a battery and a fuel tank are both placed under the driver's seat, they shall be partitioned from each other, and each compartment shall be provided with an independent cover, ventilation, and drainage.

§ 393.31 Overload protective devices.

(a) The current to all low tension circuits shall pass through overload protective devices except that this requirement shall not be applicable to battery-to-starting motor or battery-to-generator circuits, ignition and engine control circuits, horn circuits, electrically-operated fuel pump circuits, or electric brake circuits.

(b) Trucks, truck-tractors, and buses meeting the definition of a commercial motor vehicle and manufactured after June 30, 1953 shall have protective devices for electrical circuits arranged so that:

(1) The headlamp circuit or circuits shall not be affected by a short circuit in any other lighting circuits on the motor vehicle; or

(2) The protective device shall be an automatic reset overload circuit breaker if the headlight circuit is protected in common with other circuits.

[33 FR 19735, Dec. 25, 1968, as amended at 53 FR 49397, Dec. 7, 1988]

§ 393.32 Detachable electrical connections.

Electrical wiring between towing and towed vehicles shall be contained in a cable or cables or entirely within another substantially constructed protective device. All such electrical wiring shall be mechanically and electrically adequate and free of short or open circuits. Suitable provision shall be made in every such detachable connection to afford reasonable assurance against connection in an incorrect manner or accidental disconnection. Detachable connections made by twisting together wires from the towed and towing units are prohibited. Precaution shall be taken to provide sufficient slack in the connecting wire or cable to accommodate without damage all normal motions of the parts to which they are attached.

§ 393.33 Wiring, installation.

Electrical wiring shall be systematically arranged and installed in a workmanlike manner. All detachable wiring, except temporary wiring connections for driveaway-towaway operations, shall be attached to posts or terminals by means of suitable cable

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terminals which conform to the SAE Standard¹ for "Cable Terminals" or by cable terminals which are mechanically and electrically at least equal to such terminals. The number of wires attached to any post shall be limited to the number which such post was designed to accommodate. The presence of bare, loose, dangling, chafing, or poorly connected wires is prohibited.

Subpart C—Brakes

§ 393.40 Required brake systems.

(a) *General.* A bus, truck, truck tractor, or a combination of motor vehicles must have brakes adequate to control the movement of, and to stop and hold, the vehicle or combination of vehicles.

(b) *Specific systems required.* (1) A bus, truck, truck tractor, or combination of motor vehicles must have—

(i) A service brake system that conforms to the requirements of § 393.52; and

(ii) A parking brake system that conforms to the requirements of § 393.41.

(2) A bus, truck, truck tractor, or a combination of motor vehicles manufactured on or after July 1, 1973, must have an emergency brake system that conforms to the requirements of § 393.52(b) and consists of either—

(i) Emergency features of the service brake system; or

(ii) A system separate from the service brake system.

A control by which the driver applies the emergency brake system must be located so that the driver can readily operate it when he/she is properly restrained by any seat belt assembly provided for his/her use. The control for applying the emergency brake system may be combined with either the control for applying the service brake system or the control for applying the parking brake system. However, all three controls may not be combined.

(c) *Interconnected systems.* (1) If the brake systems specified in paragraph (b) of this section are interconnected in any way, they must be designed, constructed, and maintained so that, upon the failure of any part of the operating mechanism of one or more of the sys-

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tems (except the service brake actuation pedal or valve)—

(i) The vehicle will have operative brakes; and

(ii) In the case of a vehicle manufactured on or after July 1, 1973, the vehicle will have operative brakes capable of performing as specified in § 393.52(b).

(2) A motor vehicle to which the emergency brake system requirements of Federal Motor Vehicle Safety Standard No. 105 (§ 571.105 of this title) applied at the time of its manufacture conforms to the requirements of paragraph (c)(1) of this section if—

(i) It is maintained in conformity with the emergency brake requirements of Standard No. 105 in effect on the date of its manufacture; and

(ii) It is capable of performing as specified in § 393.52(b), except upon structural failure of its brake master cylinder body or effectiveness indicator body.

(3) A bus conforms to the requirements of paragraph (c)(1) of this section if it meets the requirements of § 393.44 and is capable of performing as specified in § 393.52(b).

[36 FR 20297, Oct. 20, 1971, as amended at 37 FR 5251, Mar. 11, 1972]

§ 393.41 Parking brake system.

(a) Every commercial motor vehicle manufactured on and after March 7, 1990, except an agricultural commodity trailer, converter dolly, heavy hauler or pulpwood trailer, shall at all times be equipped with a parking brake system adequate to hold the vehicle or combination under any condition of loading as required by FMVSS 571.121. An agricultural commodity trailer, heavy hauler or pulpwood trailer shall carry sufficient chocking blocks to prevent movement when parked.

(b) The parking brake system shall at all times be capable of being applied in conformance with the requirements of paragraph (a) of the section by either the driver's muscular effort, or by spring action, or by other energy, provided, that if such other energy is depended on for application of the parking brake, then an accumulation of such energy shall be isolated from any common source and used exclusively for the operation of the parking brake.

¹ See footnote 1 to § 393.24(c).