

enrolls in an HMO. A contribution does not discriminate financially if the method of determining the contribution is reasonable and is designed to ensure that employees have a fair choice among health benefits plan alternatives.

(2) *Effect of agreements or contracts.* The employing entity or designee is not required to pay more for health benefits as a result of offering the HMO alternative than it would otherwise be required to pay under a collective bargaining agreement or contract that provides for health benefits and is in effect at the time the HMO alternative is included.

(3) *Examples of acceptable employer contributions.* The following are methods that are considered nondiscriminatory:

(i) The employer contribution to the HMO is the same, per employee, as the contribution to non-HMO alternatives.

(ii) The employer contribution reflects the composition of the HMO's enrollment in terms of enrollee attributes that can reasonably be used to predict utilization, experience, costs, or risk. For each enrollee in a given class established on the basis of those attributes, the employer contributes an equal amount, regardless of the health benefits plan chosen by the employee.

(iii) The employer contribution is a fixed percentage of the premium for each of the alternatives offered.

(iv) The employer contribution is determined under a mutually acceptable arrangement negotiated by the HMO and the employer. In negotiating the arrangement, the employer may not insist on terms that would cause the HMO to violate any of the requirements of this part.

(4) *Adjustment of employer contribution.* An employer contribution determined by an acceptable method may in some cases be adjusted if it would result in a nominal payment or no payment at all by HMO enrollees (because the HMO premium is lower than the premiums for the other alternatives offered). If, for example the employer has a policy of requiring all employees to contribute to their health benefits plan, the employer may require HMO enrollees who would otherwise pay little or nothing at all, to make a payment that does not exceed 50 percent of the employee contribution to the principal non-HMO alternative. The principal non-HMO alternative is the one that covers the largest number of enrollees from the particular employer.

(b) *Administrative expenses.* (1) In determining the amount of its contribution to the HMO, the employing entity or designee may not consider administrative expenses incurred in

connection with offering any alternative in the health benefits plan.

(2) However, if the employing entity or designee has special requirements for other than standard solicitation brochures and enrollment literature, it must, in the case of the HMO alternative, determine and distribute any administrative costs attributable to those requirements in a manner consistent with its method of determining and distributing those costs for the non-HMO alternatives.

(c) *Exclusion for contribution for certain benefits.* In determining the amount of the employing entity's contribution or the designee's cost for the HMO alternative, the employing entity or designee may exclude those portions of the contribution allocable to benefits (such as life insurance or insurance for supplemental health benefits)—

(1) For which eligible employees and their eligible dependents are covered notwithstanding selection of the HMO alternative; and

(2) That are not offered on a prepayment basis by the HMO to the employing entity's employees.

(d) *Contributions determined by agreements or contracts or by law.* If the specific amount of the employing entity's contribution for health benefits is fixed by an agreement or contract, or by law, that amount constitutes the employing entity's obligation for contribution toward the HMO premiums.

(e) *Allocation of portion of a contribution determined by an agreement.* In some cases, the employing entity's contribution for health benefits is determined by an agreement that also provides for benefits other than health benefits. In that case, the employing entity must determine, or instruct its designee to determine, what portion of its contribution is applicable to health benefits.

(f) *Retention and availability of data.* Each employing entity or designee must retain the following data for three years and make it available to HCFA upon request:

(1) The data used to compute the level of contribution for each of the plans offered to employees.

(2) Related data about the employees who are eligible to enroll in a plan.

(3) A description of the methodology for computation.

(g) *HCFA review of data.* (1) HCFA may request and review the data specified in paragraph (f) of this section on its own initiative or in response to requests from HMOs or employees.

(2) The purpose of HCFA's review is to determine whether the methodology

and the level of contribution comply with the requirements of this subpart.

(3) HMOs and employees that request HCFA to review must set forth reasonable grounds for making the request.

7. In § 417.155(d)(2) introductory text, "which" is removed and "that" is added in its place.

8. In § 417.159, "The obligation" is revised to read "The decision", and "HMO option" is revised to read "HMO alternative".

9. In the heading of § 417.164, "qualifiers" is removed and "qualification" is added in its place.

10. In § 417.166(a)(1), "change" is removed and "changed" is added in its place.

(Catalog of Federal Domestic Assistance Program No. 93.773, Medicare—Hospital Insurance; and Program No. 93.774, Medicare—Supplementary Medical Insurance Program)

Dated: August 14, 1995.

Bruce C. Vladeck,  
Administrator, Health Care Financing Administration.

Dated: December 5, 1995.

Donna E. Shalala,  
Secretary.

[FR Doc. 96-13629 Filed 5-30-96; 8:45 am]

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## DEPARTMENT OF TRANSPORTATION

### National Highway Traffic Safety Administration

#### 49 CFR Part 571

[Docket No. 96-050; Notice 1]

RIN 2127-AG31

### Federal Motor Vehicle Safety Standards; Air Brake Systems

**AGENCY:** National Highway Traffic Safety Administration (NHTSA), DOT.

**ACTION:** Final rule; technical amendment.

**SUMMARY:** This document revises Standard No. 121, *Air brake systems* to remove obsolete provisions and to update and reorganize the standard. This revision substantially clarifies and simplifies this safety standard without changing any of its substantive requirements.

**EFFECTIVE DATE:** This rule is effective March 1, 1997.

**FOR FURTHER INFORMATION CONTACT:** Mr. Richard Carter, Office of Vehicle Safety Standards, NPS-11, National Highway Traffic Safety Administration, 400 Seventh Street, SW., Washington, DC

20590. Telephone: (202) 366-5274. Fax: (202) 366-4329. For legal issues: Mr. Marvin L. Shaw, Office of Chief Counsel, NCC-20, National Highway Traffic Safety Administration, 400 Seventh Street, SW., Washington, DC 20590. Telephone: (202) 366-2992.

**SUPPLEMENTARY INFORMATION:** Pursuant to the March 4, 1995, directive, "Regulatory Reinvention Initiative," from the President to the heads of departments and agencies, the National Highway Traffic Safety Administration (NHTSA) has undertaken a review of all its regulations and directives. During the course of this review, the agency identified several regulations that are potential candidates for amendment.

One of these regulations is Standard No. 121, *Air brake systems*. There are two major types of changes. The first type of change involves deleting obsolete provisions. For example, S5.3.3.2 of current Standard No. 121 sets forth optional requirements about brake actuation time for systems manufactured before May 3, 1991. Similarly, S6.1.8.1(a) sets forth an optional burnish procedure for vehicles manufactured before September 1, 1994. The second type of change involves updating the Code of Federal Regulations to include the agency's recent amendments to Standard No. 121. For instance, on March 10, 1995, NHTSA amended Standard No. 121 to require air braked vehicles to be equipped with antilock brake systems and to reinstate stopping distance requirements. (60 FR 13216). Portions of these amendments were subsequently revised on December 13, 1995, (60 FR 63965) and February 15, 1996, (61 FR 2412). Today's notice contains the agency's most recent amendments of these provisions. In removing obsolete provisions and updating the standard, the agency's goal is to clarify and simplify Standard No. 121, without changing any of its substantive requirements.

This rulemaking action responds to petitions for reconsideration addressing the agency's antilock brake system rulemaking in which the Heavy Duty Brake Manufacturers Council (HDBMC), the American Automobile Manufacturers Association (AAMA), and Midland-Grau requested that the agency publish a complete and updated version of Standard No. 121.

In rewriting Standard No. 121, a significant issue was what effective date to select. A number of new requirements for Standard No. 121 will take effect in the next few years. Of particular note, the requirements for antilock brake systems and for stopping distance tests

are being phased in for various vehicle types (e.g., truck tractors, trailers, and single unit vehicles) between March 1, 1997, and March 1, 1998. As a result of these new amendments, the standard's requirements vary significantly for different dates over the next two years.

After examining the current standard, NHTSA has concluded that clarifying and simplifying Standard No. 121 can best be accomplished by selecting an effective date of March 1, 1997, the date when truck tractors must first comply with the new antilock brake system and stopping distance requirements. Most of the changes in the regulatory text delete obsolete requirements and provisions which are, or will be, irrelevant by March 1, 1997.

This rulemaking action results in a more straightforward Standard No. 121 that will take mandatory effect on March 1, 1997, with optional compliance for vehicles manufactured before that date. Manufacturers and other interested persons should continue to consult the current Standard No. 121 concerning the additional compliance options that are available before that date. While the existing standard is longer and more complex than desirable, it is well understood by the industry. Moreover, it is not clear that any effort to rewrite Standard No. 121 for an earlier effective date could be successful in achieving the goal of a substantially clarified and simpler standard, given the many additional complex provisions that would have to be retained.

The rewritten Standard No. 121 is organized as follows:

- S1. Scope.
- S2. Purpose.
- S3. Application.
- S4. Definitions.
- S5. Requirements.
- S5.1 Required equipment for trucks and buses.
- S5.2 Required equipment for trailers.
- S5.3 Service brakes—road tests.
- S5.4 Service brakes—dynamometer tests.
- S5.5 Service brakes—antilock systems.
- S5.6 Parking brakes.
- S5.7 Emergency brakes for trucks and buses.
- S5.8 Emergency brakes for trailers.
- S5.9 Final inspection.
- S6. Conditions.
- S6.1 Road test conditions.
- S6.2 Dynamometer test conditions.

#### Rulemaking Analyses and Notices

##### *Executive Order 12866 and DOT Regulatory Policies and Procedures*

NHTSA has considered the impact of this rulemaking action under E.O. 12866 and the Department of Transportation's regulatory policies and procedures. This rulemaking document was not reviewed

under E.O. 12866, "Regulatory Planning and Review." This action has been determined to be not "significant" under the Department of Transportation's regulatory policies and procedures.

The purpose of this rewrite is to clarify and simplify the requirements of Standard No. 121. This rewrite does not substantively change the requirements of the standard. This means that the rulemaking will not have any impacts on safety or the compliance costs for manufacturers. Accordingly, a full regulatory evaluation has not been prepared for this rulemaking.

##### *Regulatory Flexibility Act*

NHTSA has also considered the effects of this regulatory action under the Regulatory Flexibility Act. I hereby certify that this rulemaking will not have a significant economic impact on a substantial number of small entities. For the reasons stated above, simplifying and clarifying Standard No. 121 will not result in any economic impacts on those vehicle manufacturers that are small entities. Further, since no cost changes are associated with this rulemaking, small organizations and small governmental entities should not be affected in their capacity as purchasers of new vehicles.

##### *National Environmental Policy Act*

NHTSA has analyzed this rulemaking for the purposes of the National Environmental Policy Act and determined that it has no significant impact on the quality of human life.

##### *Executive Order 12612 (Federalism)*

NHTSA has analyzed this rulemaking in accordance with the principles and criteria set forth in Executive Order 12612. NHTSA has determined that this rulemaking does not have sufficient federalism implications to warrant the preparation of a Federalism Assessment.

##### *Civil Justice Reform*

This rule will not have any retroactive effect. Under 49 U.S.C. 30103, whenever a Federal motor vehicle safety standard is in effect, a State may not adopt or maintain a safety standard applicable to the same aspect of performance which is not identical to the Federal standard, except to the extent that the state requirement imposes a higher level of performance and applies only to vehicles procured for the State's use. 49 U.S.C. 30161 sets forth a procedure for judicial review of final rules establishing, amending or revoking Federal motor vehicle safety standards. That section does not require submission of a petition for

reconsideration or other administrative proceedings before parties may file suit in court.

#### List of Subjects in 49 CFR Part 571

Imports, Motor vehicle safety, Motor vehicles, Rubber and rubber products, Tires.

In consideration of the foregoing, NHTSA amends 49 CFR Part 571 as follows:

### PART 571—FEDERAL MOTOR VEHICLE SAFETY STANDARDS

1. The authority citation for Part 571 continues to read as follows:

Authority: 49 U.S.C. 322, 30111, 30115, 30117, and 30166; delegation of authority at 49 CFR 1.50.

2. Section 571.121 is revised to read as follows:

#### § 571.121 Standard No. 121; Air brake systems.

*S1. Scope.* This standard establishes performance and equipment requirements for braking systems on vehicles equipped with air brake systems.

*S2. Purpose.* The purpose of this standard is to insure safe braking performance under normal and emergency conditions.

*S3. Application.* This standard applies to trucks, buses, and trailers equipped with air brake systems. However, it does not apply to:

(a) Any trailer that has a width of more than 102.36 inches with extendable equipment in the fully retracted position and is equipped with two short track axles in a line across the width of the trailer.

(b) Any vehicle equipped with an axle that has a gross axle weight rating (GAWR) of 29,000 pounds or more;

(c) Any truck or bus that has a speed attainable in 2 miles of not more than 33 mph;

(d) Any truck that has a speed attainable in 2 miles of not more than 45 mph, an unloaded vehicle weight that is not less than 95 percent of its gross vehicle weight rating (GVWR), and no capacity to carry occupants other than the driver and operating crew;

(e) Any trailer that has a GVWR of more than 120,000 pounds and whose body conforms to that described in the definition of heavy hauler trailer set forth in S4;

(f) Any trailer that has an unloaded vehicle weight which is not less than 95 percent of its GVWR; and

(g) Any load divider dolly.

#### S4. Definitions.

*Agricultural commodity trailer* means a trailer that is designed to transport

bulk agricultural commodities in off-road harvesting sites and to a processing plant or storage location, as evidenced by skeletal construction that accommodates harvest containers, a maximum length of 28 feet, and an arrangement of air control lines and reservoirs that minimizes damage in field operations.

*Air brake system* means a system that uses air as a medium for transmitting pressure or force from the driver control to the service brake, including an air-over-hydraulic brake subsystem, but does not include a system that uses compressed air or vacuum only to assist the driver in applying muscular force to hydraulic or mechanical components.

*Air-over-hydraulic brake subsystem* means a subsystem of the air brake system that uses compressed air to transmit a force from the driver control to a hydraulic brake system to actuate the service brakes.

*Antilock brake system* or *ABS* means a portion of a service brake system that automatically controls the degree of rotational wheel slip during braking by:

(1) Sensing the rate of angular rotation of the wheels;

(2) Transmitting signals regarding the rate of wheel angular rotation to one or more controlling devices which interpret those signals and generate responsive controlling output signals; and

(3) Transmitting those controlling signals to one or more modulators which adjust brake actuating forces in response to those signals.

*Auto transporter* means a truck and a trailer designed for use in combination to transport motor vehicles, in that the towing vehicle is designed to carry cargo at a location other than the fifth wheel and to load this cargo only by means of the towed vehicle.

*Common diaphragm* means a single brake chamber diaphragm which is a component of the parking, emergency, and service brake systems.

*Container chassis trailer* means a semitrailer of skeleton construction limited to a bottom frame, one or more axles, specially built and fitted with locking devices for the transport of intermodal shipping containers, so that when the chassis and container are assembled, the units serve the same function as an over the road trailer.

*Directly controlled wheel* means a wheel for which the degree of rotational wheel slip is sensed, either at that wheel or on the axle shaft for that wheel and corresponding signals are transmitted to one or more modulators that adjust the brake actuating forces at that wheel. Each modulator may also adjust the brake actuating forces at other wheels

that are on the same axle or in the same axle set in response to the same signal or signals.

*Full-treadle brake application* means a brake application in which the treadle valve pressure in any of the valve's output circuits reaches 85 pounds per square inch (psi) within 0.2 seconds after the application is initiated, or in which maximum treadle travel is achieved within 0.2 seconds after the application is initiated.

*Heavy hauler trailer* means a trailer which has one or more of the following characteristics, but which is not a container chassis trailer:

(1) Its brake lines are designed to adapt to separation or extension of the vehicle frame; or

(2) Its body consists only of a platform whose primary cargo-carrying surface is not more than 40 inches above the ground in an unloaded condition, except that it may include sides that are designed to be easily removable and a permanent "front end structure" as that term is used in § 393.106 of this title.

*Independently controlled wheel* means a directly controlled wheel for which the modulator does not adjust the brake actuating forces at any other wheel on the same axle.

*Indirectly controlled wheel* means a wheel at which the degree of rotational wheel slip is not sensed, but at which the modulator of an antilock braking system adjusts its brake actuating forces in response to signals from one or more sensed wheel(s).

*Initial brake temperature* means the average temperature of the service brakes on the hottest axle of the vehicle 0.2 mile before any brake application in the case of road tests, or 18 seconds before any brake application in the case of dynamometer testing.

*Intermodal shipping container* means a reusable, transportable enclosure that is especially designed with integral locking devices for securing the container to the trailer to facilitate the efficient and bulk shipping and transfer of goods by, or between various modes of transport, such as highway, rail, sea and air.

*Load divider dolly* means a trailer composed of a trailer chassis and one or more axles, with no solid bed, body, or container attached, and which is designed exclusively to support a portion of the load on a trailer or truck excluded from all the requirements of this standard.

*Maximum drive-through speed* means the highest possible constant speed at which the vehicle can be driven through 200 feet of a 500-foot radius curve arc without leaving the 12-foot lane.

*Maximum treadle travel* means the distance that the treadle moves from its position when no force is applied to its position when the treadle reaches a full stop.

*Peak friction coefficient* or *PFC* means the ratio of the maximum value of braking test wheel longitudinal force to the simultaneous vertical force occurring prior to wheel lockup, as the braking torque is progressively increased.

*Pulpwood trailer* means a trailer that is designed exclusively for harvesting logs or pulpwood and constructed with a skeletal frame with no means for attachment of a solid bed, body, or container, and with an arrangement of air control lines and reservoirs designed to minimize damage in off-road operations.

*Straddle trailer* means a trailer that is designed to transport bulk agricultural commodities from the harvesting location as evidenced by a framework that is driven over the cargo and lifting arms that suspend the cargo for transit.

*Wheel lockup* means 100 percent wheel slip.

**S5. Requirements.** Each vehicle shall meet the following requirements under the conditions specified in S6.

**S5.1 Required equipment for trucks and buses.** Each truck and bus shall have the following equipment:

**S5.1.1 Air compressor.** An air compressor of sufficient capacity to increase air pressure in the supply and service reservoirs from 85 psi to 100 psi when the engine is operating at the vehicle manufacturer's maximum recommended r.p.m. within a time, in seconds, determined by the quotient (Actual reservoir capacity x 25) / Required reservoir capacity.

**S5.1.1.1 Air compressor cut-in pressure.** The air compressor governor cut-in pressure shall be 100 psi or greater.

**S5.1.2 Reservoirs.** One or more service reservoir systems, from which air is delivered to the brake chambers, and either an automatic condensate drain valve for each service reservoir or a supply reservoir between the service reservoir system and the source of air pressure.

**S5.1.2.1** The combined volume of all service reservoirs and supply reservoirs shall be at least 12 times the combined volume of all service brake chambers. For each brake chamber type having a full stroke at least as great as the first number in Column 1 of Table V, but no more than the second number in Column 1 of Table V, the volume of each brake chamber for purposes of calculating the required combined service and supply reservoir volume

shall be either that specified in Column 2 of Table V or the actual volume of the brake chamber at maximum travel of the brake piston or pushrod, whichever is lower. The volume of a brake chamber not listed in Table V is the volume of the brake chamber at maximum travel of the brake piston or pushrod. The reservoirs of the truck portion of an auto transporter need not meet this requirement for reservoir volume.

**S5.1.2.2** Each reservoir shall be capable of withstanding an internal hydrostatic pressure of five times the compressor cutout pressure or 500 psi, whichever is greater, for 10 minutes.

**S5.1.2.3** Each service reservoir system shall be protected against loss of air pressure due to failure or leakage in the system between the service reservoir and the source of air pressure, by check valves or equivalent devices whose proper functioning can be checked without disconnecting any air line or fitting.

**S5.1.2.4** Each reservoir shall have a condensate drain valve that can be manually operated.

**S5.1.3 Towing vehicle protection system.** If the vehicle is intended to tow another vehicle equipped with air brakes, a system to protect the air pressure in the towing vehicle from the effects of a loss of air pressure in the towed vehicle.

**S5.1.4 Pressure gauge.** A pressure gauge in each service brake system, readily visible to a person seated in the normal driving position, that indicates the service reservoir system air pressure. The accuracy of the gauge shall be within plus or minus 7 percent of the compressor cut-out pressure.

**S5.1.5 Warning signal.** A signal, other than a pressure gauge, that gives a continuous warning to a person in the normal driving position when the ignition is in the "on" ("run") position and the air pressure in the service reservoir system is below 60 psi. The signal shall be either visible within the driver's forward field of view, or both audible and visible.

**S5.1.6 Antilock brake system.**

**S5.1.6.1(a)** Each single-unit vehicle manufactured on or after March 1, 1998, shall be equipped with an antilock brake system that directly controls the wheels of at least one front axle and the wheels of at least one rear axle of the vehicle. Wheels on other axles of the vehicle may be indirectly controlled by the antilock brake system.

**(b)** Each truck tractor manufactured on or after March 1, 1997, shall be equipped with an antilock brake system that directly controls the wheels of at least one front axle and the wheels of at least one rear axle of the vehicle, with

the wheels of at least one axle being independently controlled. Wheels on other axles of the vehicle may be indirectly controlled by the antilock brake system. A truck tractor shall have no more than three wheels controlled by one modulator.

**S5.1.6.2 Antilock malfunction signal and circuit.**

**(a)** Each truck tractor manufactured on or after March 1, 1997, and each single unit vehicle manufactured on or after March 1, 1998, shall be equipped with an indicator lamp, mounted in front of and in clear view of the driver, which is activated whenever there is a malfunction that affects the generation or transmission of response or control signals in the vehicle's antilock brake system. The indicator lamp shall remain activated as long as such a malfunction exists, whenever the ignition (start) switch is in the "on" ("run") position, whether or not the engine is running. Each message about the existence of such a malfunction shall be stored in the antilock brake system after the ignition switch is turned to the "off" position and automatically reactivated when the ignition switch is again turned to the "on" ("run") position. The indicator lamp shall also be activated as a check of lamp function whenever the ignition is turned to the "on" ("run") position. The indicator lamp shall be deactivated at the end of the check of lamp function unless there is a malfunction or a message about a malfunction that existed when the key switch was last turned to the "off" position.

**(b)** Each truck tractor manufactured on or after March 1, 2001, and each single unit vehicle manufactured on or after March 1, 2001, that is equipped to tow another air-braked vehicle, shall be equipped with an electrical circuit that is capable of transmitting a malfunction signal from the antilock brake system(s) on one or more towed vehicle(s) (e.g., trailer(s) and dolly(ies)) to the trailer ABS malfunction lamp in the cab of the towing vehicle, and shall have the means for connection of this electrical circuit to the towed vehicle. Each such truck tractor and single unit vehicle shall also be equipped with an indicator lamp, separate from the lamp required in S5.1.6.2(a), mounted in front of and in clear view of the driver, which is activated whenever the malfunction signal circuit described above receives a signal indicating an ABS malfunction on one or more towed vehicle(s). The indicator lamp shall remain activated as long as an ABS malfunction signal from one or more towed vehicle(s) is present, whenever the ignition (start) switch is in the "on" ("run") position, whether or

not the engine is running. The indicator lamp shall also be activated as a check of lamp function whenever the ignition is turned to the "on" ("run") position. The indicator lamp shall be deactivated at the end of the check of lamp function unless a trailer ABS malfunction signal is present.

**S5.1.6.3 Antilock power circuit for towed vehicles.** Each truck tractor manufactured on or after March 1, 1997, and each single unit vehicle manufactured on or after March 1, 1998, that is equipped to tow another air-braked vehicle shall be equipped with one or more electrical circuits that provide continuous power to the antilock system on the towed vehicle or vehicles whenever the ignition (start) switch is in the "on" ("run") position. Such a circuit shall be adequate to enable the antilock system on each towed vehicle to be fully operable.

**S5.1.7 Service brake stop lamp switch.** A switch that lights the stop lamps when the service brake control is statically depressed to a point that produces a pressure of 6 psi or less in the service brake chambers.

**S5.1.8 Brake distribution and automatic adjustment.** Each vehicle shall be equipped with a service brake system acting on all wheels.

(a) *Brake adjuster.* Wear of the service brakes shall be compensated for by means of a system of automatic adjustment. When inspected pursuant to S5.9, the adjustment of the service brakes shall be within the limits recommended by the vehicle manufacturer.

(b) *Brake indicator.* For each brake equipped with an external automatic adjustment mechanism and having an exposed pushrod, the condition of service brake under-adjustment shall be displayed by a brake adjustment indicator that is discernible when viewed with 20/40 vision from a location adjacent to or underneath the vehicle, when inspected pursuant to S5.9.

**S5.2 Required equipment for trailers.** Each trailer shall have the following equipment:

**S5.2.1 Reservoirs.** One or more reservoirs to which the air is delivered from the towing vehicle.

**S5.2.1.1** The total volume of each service reservoir shall be at least eight times the combined volume of all service brake chambers serviced by that reservoir. For each brake chamber type having a full stroke at least as great as the first number in Column 1 of Table V, but no more than the second number in column 1, the volume of each brake chamber for purposes of calculating the required total service reservoir volume

shall be either the number specified in Column 2 of Table V or the actual volume of the brake chamber at maximum travel of the brake piston or pushrod, whichever is lower. The volume of a brake chamber not listed in Table V is the volume of the brake chamber at maximum travel of the brake piston or pushrod. The reservoirs on a heavy hauler trailer and the trailer portion of an auto transporter need not meet this requirement for reservoir volume.

**S5.2.1.2** Each reservoir shall be capable of withstanding an internal hydrostatic pressure of 500 psi for 10 minutes.

**S5.2.1.3** Each reservoir shall have a condensate drain valve that can be manually operated.

**S5.2.1.4** Each service reservoir shall be protected against loss of air pressure due to failure or leakage in the system between the service reservoir and its source of air pressure by check valves or equivalent devices.

**S5.2.2 Brake distribution and automatic adjustment.** Each vehicle shall be equipped with a service brake system acting on all wheels.

(a) *Brake adjuster.* Wear of the service brakes shall be compensated for by means of a system of automatic adjustment. When inspected pursuant to S5.9, the adjustment of the service brakes shall be within the limits recommended by the vehicle manufacturer.

(b) *Brake indicator.* For each brake equipped with an external automatic adjustment mechanism and having an exposed pushrod, the condition of service brake under-adjustment shall be displayed by a brake adjustment indicator in a manner that is discernible when viewed with 20/40 vision from a location adjacent to or underneath the vehicle, when inspected pursuant to S5.9.

**S5.2.3 Antilock brake system.**

**S5.2.3.1(a)** Each semitrailer (including a trailer converter dolly) manufactured on or after March 1, 1998, shall be equipped with an antilock brake system that directly controls the wheels of at least one axle of the vehicle. Wheels on other axles of the vehicle may be indirectly controlled by the antilock brake system.

(b) Each full trailer manufactured on or after March 1, 1998, shall be equipped with an antilock brake system that directly controls the wheels of at least one front axle of the vehicle and at least one rear axle of the vehicle. Wheels on other axles of the vehicle may be indirectly controlled by the antilock brake system.

**S5.2.3.2 Antilock malfunction signal.** Each trailer (including a trailer converter dolly) manufactured on or after March 1, 2001, that is equipped with an antilock brake system shall be equipped with an electrical circuit that is capable of signaling a malfunction in the trailer's antilock brake system, and shall have the means for connection of this antilock brake system malfunction signal circuit to the towing vehicle. The electrical circuit need not be separate or dedicated exclusively to this malfunction signaling function. The signal shall be present whenever there is a malfunction that affects the generation or transmission of response or control signals in the trailer's antilock brake system. The signal shall remain present as long as the malfunction exists, whenever power is supplied to the antilock brake system. Each message about the existence of such a malfunction shall be stored in the antilock brake system whenever power is no longer supplied to the system, and the malfunction signal shall be automatically reactivated whenever power is again supplied to the trailer's antilock brake system. In addition, each trailer manufactured on or after March 1, 2001, that is designed to tow other air-brake equipped trailers shall be capable of transmitting a malfunction signal from the antilock brake systems of additional trailers it tows to the vehicle towing it.

**S5.2.3.3 Antilock malfunction indicator.** In addition to the requirements of S5.2.3.2, each trailer (including a trailer converter dolly) manufactured on or after March 1, 1998, and before March 1, 2009, shall be equipped with an external indicator lamp that is activated whenever there is a malfunction that affects the generation or transmission of response or control signals in the trailer's antilock brake system. The indicator lamp shall remain activated as long as such a malfunction exists, whenever power is supplied to the antilock brake system. Each message about the existence of such a malfunction shall be stored in the antilock brake system whenever power is no longer supplied to the system, and the malfunction signal shall be automatically reactivated when power is again supplied to the trailer's antilock brake system. The indicator lamp shall also be activated as a check of lamp function whenever power is supplied to the antilock brake system and the vehicle is stationary. The indicator lamp shall be deactivated at the end of the check of lamp function unless there is a malfunction or a message about a malfunction that existed when power

was last supplied to the antilock brake system.

**S5.3 Service brakes—road tests.** The service brake system on each truck tractor manufactured before March 1, 1997, shall, under the conditions of S6, meet the requirements of S5.3.3 and S5.3.4, when tested without adjustments other than those specified in this standard. The service brake system on each truck tractor manufactured on or after March 1, 1997, shall, under the conditions of S6, meet the requirements of S5.3.1, S5.3.3, S5.3.4, and S5.3.6, when tested without adjustments other than those specified in this standard. The service brake system on each bus and truck (other than a truck tractor) manufactured before March 1, 1998, shall, under the conditions of S6, meet the requirements of S5.3.3, and S5.3.4, when tested without adjustments other than those specified in this standard. The service brake system on each bus and truck (other than a truck tractor) manufactured on or after March 1, 1998, shall, under the conditions of S6, meet the requirements of S5.3.1, S5.3.3, and S5.3.4 when tested without adjustments other than those specified in this standard. The service brake system on each trailer shall, under the conditions of S6, meet the requirements of S5.3.3, S5.3.4, and S5.3.5 when tested without adjustments other than those specified in this standard. However, a heavy hauler trailer and the truck and trailer portions of an auto transporter need not meet the requirements of S5.3.

**S5.3.1 Stopping distance—trucks and buses.** When stopped six times for each combination of vehicle type, weight, and speed specified in S5.3.1.1, in the sequence specified in Table I, each truck tractor manufactured on or after March 1, 1997, and each single unit vehicle manufactured on or after March 1, 1998, shall stop at least once in not more than the distance specified in Table II, measured from the point at which movement of the service brake control begins, without any part of the vehicle leaving the roadway, and with wheel lockup permitted only as follows:

(a) At vehicle speeds above 20 mph, any wheel on a nonsteerable axle other than the two rearmost nonliftable, nonsteerable axles may lock up, for any duration. The wheels on the two rearmost nonliftable, nonsteerable axles may lock up according to S5.3.1(b).

(b) At vehicle speeds above 20 mph, one wheel on any axle or two wheels on any tandem may lock up for any duration.

(c) At vehicle speeds above 20 mph, any wheel not permitted to lock in S5.3.1 (a) or (b) may lock up repeatedly,

with each lockup occurring for a duration of one second or less.

(d) At vehicle speeds of 20 mph or less, any wheel may lock up for any duration.

**S5.3.1.1** Stop the vehicle from 60 mph on a surface with a peak friction coefficient of 0.9 with the vehicle loaded as follows:

(a) Loaded to its GVWR,

(b) In the truck tractor only configuration plus up to 500 lbs., and

(c) At its unloaded vehicle weight (except for truck tractors) plus up to 500 lbs. (including driver and instrumentation). If the speed attainable in two miles is less than 60 mph, vehicle shall stop from a speed in Table II that is 4 to 8 mph less than the speed attainable in 2 miles.

**S5.3.2 [Reserved]**

**S5.3.3 Brake actuation time.** Each service brake system shall meet the requirements of S5.3.3.1 (a) and (b).

**S5.3.3.1(a)** With an initial service reservoir system air pressure of 100 psi, the air pressure in each brake chamber shall, when measured from the first movement of the service brake control, reach 60 psi in not more than 0.45 second in the case of trucks and buses, 0.50 second in the case of trailers, other than trailer converter dollies, designed to tow another vehicle equipped with air brakes, 0.55 second in the case of trailer converter dollies, and 0.60 second in the case of trailers other than trailers designed to tow another vehicle equipped with air brakes. A vehicle designed to tow another vehicle equipped with air brakes shall meet the above actuation time requirement with a 50-cubic-inch test reservoir connected to the control line output coupling. A trailer, including a trailer converter dolly, shall meet the above actuation time requirement with its control line input coupling connected to the test rig shown in Figure 1.

(b) For a vehicle that is designed to tow another vehicle equipped with air brakes, the pressure in the 50-cubic-inch test reservoir referred to in S5.3.3.1(a) shall, when measured from the first movement of the service brake control, reach 60 psi not later than the time the fastest brake chamber on the vehicle reaches 60 psi or, at the option of the manufacturer, in not more than 0.35 second in the case of trucks and buses, 0.55 second in the case of trailer converter dollies, and 0.50 second in the case of trailers other than trailer converter dollies.

**S5.3.4 Brake release time.** Each service brake system shall meet the requirements of S5.3.4.1 (a) and (b).

**S5.3.4.1(a)** With an initial service brake chamber air pressure of 95 psi, the

air pressure in each brake chamber shall, when measured from the first movement of the service brake control, fall to 5 psi in not more than 0.55 second in the case of trucks and buses; 1.00 second in the case of trailers, other than trailer converter dollies, designed to tow another vehicle equipped with air brakes; 1.10 seconds in the case of trailer converter dollies; and 1.20 seconds in the case of trailers other than trailers designed to tow another vehicle equipped with air brakes. A vehicle designated to tow another vehicle equipped with air brakes shall meet the above release time requirement with a 50-cubic-inch test reservoir connected to the control line output coupling. A trailer, including a trailer converter dolly, shall meet the above release time requirement with its control line input coupling connected to the test rig shown in Figure 1.

(b) For vehicles designed to tow another vehicle equipped with air brakes, the pressure in the 50-cubic-inch test reservoir referred to in S5.3.4.1(a) shall, when measured from the first movement of the service brake control, fall to 5 psi in not more than 0.75 seconds in the case of trucks and buses, 1.10 seconds in the case of trailer converter dollies, and 1.00 seconds in the case of trailers other than trailer converter dollies.

**S5.3.5 Control signal pressure differential—converter dollies and trailers designed to tow another vehicle equipped with air brakes.**

(a) For a trailer designed to tow another vehicle equipped with air brakes, the pressure differential between the control line input coupling and a 50-cubic-inch test reservoir attached to the control line output coupling shall not exceed the values specified in S5.3.5(a) (1), (2), and (3) under the conditions specified in S5.3.5(b) (1) through (4):

(1) 1 psi at all input pressures equal to or greater than 5 psi, but not greater than 20 psi;

(2) 2 psi at all input pressures equal to or greater than 20 psi but not greater than 40 psi; and

(3) Not more than a 5-percent differential at any input pressure equal to or greater than 40 psi.

(b) The requirements in S5.3.5(a) shall be met—

(1) When the pressure at the input coupling is steady, increasing or decreasing;

(2) When air is applied to or released from the control line input coupling using the trailer test rig shown in Figure 1;

(3) With a fixed orifice consisting of a 0.0180 inch diameter hole (no. 77 drill bit) in a 0.032 inch thick disc installed

in the control line between the trailer test rig coupling and the vehicle's control line input coupling; and

(4) Operating the trailer test rig in the same manner and under the same conditions as it is operated during testing to measure brake actuation and release times, as specified in S5.3.3 and S5.3.4, except for the installation of the orifice in the control line to restrict airflow rate.

**S5.3.6 Stability and control during braking—truck tractors.** When stopped four consecutive times for each combination of weight, speed, and road conditions specified in S5.3.6.1 and S5.3.6.2, each truck tractor manufactured on or after March 1, 1997, shall stop at least three times within the 12-foot lane, without any part of the vehicle leaving the roadway.

**S5.3.6.1** Using a full-treadle brake application for the duration of the stop, stop the vehicle from 30 mph or 75 percent of the maximum drive-through speed, whichever is less, on a 500-foot radius curved roadway with a wet level surface having a peak friction coefficient of 0.5 when measured on a straight or curved section of the curved roadway using an American Society for Testing and Materials (ASTM) E1136 standard reference tire, in accordance with ASTM Method E1337-90, at a speed of 40 mph, with water delivery.

**S5.3.6.2** Stop the vehicle with the vehicle

(a) Loaded to its GVWR, and

(b) At its unloaded weight plus up to 500 pounds (including driver and instrumentation), or at the manufacturer's option, at its unloaded weight plus up to 500 pounds (including driver and instrumentation) and plus not more than an additional 1000 pounds for a roll bar structure on the vehicle.

**S5.4 Service brake system—dynamometer tests.** When tested without prior road testing, under the conditions of S6.2, each brake assembly shall meet the requirements of S5.4.1, S5.4.2, and S5.4.3 when tested in sequence and without adjustments other than those specified in the standard. For purposes of the requirements of S5.4.2 and S5.4.3, an average deceleration rate is the change in velocity divided by the deceleration time measured from the onset of deceleration.

**S5.4.1 Brake retardation force.** The sum of the retardation forces exerted by the brakes on each vehicle designed to be towed by another vehicle equipped with air brakes shall be such that the quotient sum of the brake retardation forces / sum of GAWR's relative to brake chamber air pressure, and shall have values not less than those shown in

Column 1 of Table III. Retardation force shall be determined as follows:

**S5.4.1.1** After burnishing the brake pursuant to S6.2.6, retain the brake assembly on the inertia dynamometer. With an initial brake temperature between 125°F. and 200°F., conduct a stop from 50 m.p.h., maintaining brake chamber air pressure at a constant 20 psi. Measure the average torque exerted by the brake from the time the specified air pressure is reached until the brake stops and divide by the static loaded tire radius specified by the tire manufacturer to determine the retardation force. Repeat the procedure six times, increasing the brake chamber air pressure by 10 psi each time. After each stop, rotate the brake drum or disc until the temperature of the brake falls to between 125°F. and 200°F.

**S5.4.2 Brake power.** When mounted on an inertia dynamometer, each brake shall be capable of making 10 consecutive decelerations at an average rate of 9 f.p.s.p.s. from 50 m.p.h. to 15 m.p.h., at equal intervals of 72 seconds, and shall be capable of decelerating to a stop from 20 m.p.h. at an average deceleration rate of 14 f.p.s.p.s. 1 minute after the 10th deceleration. The series of decelerations shall be conducted as follows:

**S5.4.2.1** With an initial brake temperature between 150°F. and 200°F. for the first brake application, and the drum or disc rotating at a speed equivalent to 50 m.p.h., apply the brake and decelerate at an average deceleration rate of 9 f.p.s.p.s. to 15 m.p.h. Upon reaching 15 m.p.h., accelerate to 50 m.p.h. and apply the brake for a second time 72 seconds after the start of the first application. Repeat the cycle until 10 decelerations have been made. The service line air pressure shall not exceed 100 psi during any deceleration.

**S5.4.2.2** One minute after the end of the last deceleration required by S5.4.2.1 and with the drum or disc rotating at a speed of 20 m.p.h., decelerate to a stop at an average deceleration rate of 14 f.p.s.p.s.

**S5.4.3 Brake recovery.** Except as provided in S5.4.3(a) and (b), starting two minutes after completing the tests required by S5.4.2, a vehicle's brake shall be capable of making 20 consecutive stops from 30 mph at an average deceleration rate of 12 f.p.s.p.s., at equal intervals of one minute measured from the start of each brake application. The service line air pressure needed to attain a rate of 12 f.p.s.p.s. shall be not more than 85 lb/in<sup>2</sup>, and not less than 20lb/in<sup>2</sup> for a brake not subject to the control of an antilock system, or 12 lb/in<sup>2</sup> for a brake

subject to the control of an antilock system.

(a) Notwithstanding S5.4.3, neither front axle brake of a truck-tractor is subject to the requirements set forth in S5.4.3.

(b) Notwithstanding S5.4.3, neither front axle brake of a bus or a truck other than a truck-tractor is subject to the requirement set forth in S5.4.3 prohibiting the service line air pressure from being less than 20 lb/in<sup>2</sup> for a brake not subject to the control of an antilock system or 12 lb/in<sup>2</sup> for a brake subject to the control of an antilock system.

#### **S5.5 Antilock system.**

##### **S5.5.1 Antilock system malfunction.**

On a truck tractor manufactured on or after March 1, 1997, that is equipped with an antilock brake system and a single unit vehicle manufactured on or after March 1, 1998, that is equipped with an antilock brake system, a malfunction that affects the generation or transmission of response or control signals of any part of the antilock system shall not increase the actuation and release times of the service brakes.

**S5.5.2 Antilock system power—trailers.** On a trailer (including a trailer converter dolly) manufactured on or after March 1, 1998, that is equipped with an antilock system that requires electrical power for operation, the power shall be obtained from the towing vehicle through one or more electrical circuits which provide continuous power whenever the powered vehicle's ignition (start) switch is in the "on" ("run") position. The antilock system shall automatically receive power from the stoplamp circuit, if the primary circuit or circuits are not functioning. Each trailer (including a trailer converter dolly) manufactured on or after March 1, 1998, that is equipped to tow another air-braked vehicle shall be equipped with one or more circuits which provide continuous power to the antilock system on the vehicle(s) it tows. Such circuits shall be adequate to enable the antilock system on each towed vehicle to be fully operable.

##### **S5.6 Parking brakes.**

(a) Except as provided in S5.6(b) and S5.6(c), each vehicle other than a trailer converter dolly shall have a parking brake system that under the conditions of S6.1 meets the requirements of:

- (1) S5.6.1 or S5.6.2, at the manufacturer's option, and
- (2) S5.6.3, S5.6.4, S5.6.5, and S5.6.6.

(b) At the option of the manufacturer, for vehicles equipped with brake systems which incorporate a common diaphragm, the performance requirements specified in S5.6(a) which must be met with any single leakage-type failure in a common diaphragm

may instead be met with the level of leakage-type failure determined in S5.6.7. The election of this option does not affect the performance requirements specified in S5.6(a) which apply with single leakage-type failures other than failures in a common diaphragm.

(c) At the option of the manufacturer, the trailer portion of any agricultural commodity trailer, heavy hauler trailer, or pulpwood trailer may meet the requirements of § 393.43 of this title instead of the requirements of S5.6(a).

S5.6.1 *Static retardation force.* With all other brakes made inoperative, during a static drawbar pull in a forward or rearward direction, the static retardation force produced by the application of the parking brakes shall be:

(a) In the case of a vehicle other than a truck-tractor that is equipped with more than two axles, such that the quotient static retardation force/GAWR is not less than 0.28 for any axle other than a steerable front axle; and

(b) In the case of a truck-tractor that is equipped with more than two axles, such that the quotient static retardation force/GVWR is not less than 0.14.

S5.6.2 *Grade holding.* With all parking brakes applied, the vehicle shall remain stationary facing uphill and facing downhill on a smooth, dry portland cement concrete roadway with a 20-percent grade, both

(a) When loaded to its GVWR, and

(b) At its unloaded vehicle weight plus 500 pounds (including driver and instrumentation).

S5.6.3 *Application and holding.* Each parking brake system shall meet the requirements of S5.6.3.1 through S5.6.3.4.

S5.6.3.1 The parking brake system shall be capable of achieving the minimum performance specified either in S5.6.1 or S5.6.2 with any single leakage-type failure, in any other brake system, of a part designed to contain compressed air or brake fluid (excluding failure of a component of a brake chamber housing but including failure of any brake chamber diaphragm that is part of any other brake system including a diaphragm which is common to the parking brake system and any other brake system), when the pressures in the vehicle's parking brake chambers are at the levels determined in S5.6.3.4.

S5.6.3.2 A mechanical means shall be provided that, after a parking brake application is made with the pressures in the vehicle's parking brake chambers at the levels determined in S5.6.3.4, and all air and fluid pressures in the vehicle's braking systems are then bled down to zero, and without using electrical power, holds the parking

brake application with sufficient parking retardation force to meet the minimum performance specified in S5.6.3.1 and in either S5.6.1 or S5.6.2.

S5.6.3.3 For trucks and buses, with an initial reservoir system pressure of 100 psi and, if designed to tow a vehicle equipped with air brakes, with a 50 cubic inch test reservoir connected to the supply line coupling, no later than three seconds from the time of actuation of the parking brake control, the mechanical means referred to in S5.6.3.2 shall be actuated. For trailers, with the supply line initially pressurized to 100 psi using the supply line portion of the trailer test rig (Figure 1) and, if designed to tow a vehicle equipped with air brakes, with a 50 cubic inch test reservoir connected to the rear supply line coupling, no later than three seconds from the time venting to the atmosphere of the front supply line coupling is initiated, the mechanical means referred to in S5.6.3.2 shall be actuated. This requirement shall be met for trucks, buses and trailers both with and without any single leakage-type failure, in any other brake system, of a part designed to contain compressed air or brake fluid (consistent with the parenthetical phrase specified in S5.6.3.1).

S5.6.3.4 The parking brake chamber pressures for S5.6.3.1 and S5.6.3.2 are determined as follows. For trucks and buses, with an initial reservoir system pressure of 100 psi and, if designed to tow a vehicle equipped with air brakes, with a 50 cubic inch test reservoir connected to the supply line coupling, any single leakage type failure, in any other brake system, of a part designed to contain compressed air or brake fluid (consistent with the parenthetical phrase specified in S5.6.3.1), is introduced in the brake system. The parking brake control is actuated and the pressures in the vehicle's parking brake chambers are measured three seconds after that actuation is initiated. For trailers, with the supply line initially pressurized to 100 psi using the supply line portion of the trailer test rig (Figure 1) and, if designed to tow a vehicle equipped with air brakes, with a 50 cubic inch test reservoir connected to the rear supply line coupling, any single leakage type failure, in any other brake system, of a part designed to contain compressed air or brake fluid (consistent with the parenthetical phrase specified in S5.6.3.1), is introduced in the brake system. The front supply line coupling is vented to the atmosphere and the pressures in the vehicle's parking brake chambers are measured three seconds after that venting is initiated.

S5.6.4 *Parking brake control—trucks and buses.* The parking brake control shall be separate from the service brake control. It shall be operable by a person seated in the normal driving position. The control shall be identified in a manner that specifies the method of control operation. The parking brake control shall control the parking brakes of the vehicle and of any air braked vehicle that it is designed to tow.

S5.6.5 *Release Performance.* Each parking brake system shall meet the requirements specified in S5.6.5.1 through S5.6.5.4.

S5.6.5.1 For trucks and buses, with initial conditions as specified in S5.6.5.2, at all times after an application actuation of the parking brake control, and with any subsequent level of pressure, or combination of levels of pressure, in the reservoirs of any of the vehicle's brake systems, no reduction in parking brake retardation force shall result from a release actuation of the parking brake control unless the parking brakes are capable, after such release, of being reapplied at a level meeting the minimum performance specified either in S5.6.1 or S5.6.2. This requirement shall be met both with and without the engine on, and with and without single leakage-type failure, in any other brake system, of a part designed to contain compressed air or brake fluid (consistent with the parenthetical phrase specified in S5.6.3.1).

S5.6.5.2 The initial conditions for S5.6.5.1 are as follows: The reservoir system pressure is 100 psi. If the vehicle is designed to tow a vehicle equipped with air brakes, a 50 cubic inch test reservoir is connected to the supply line coupling.

S5.6.5.3 For trailers, with initial conditions as specified in S5.6.5.4, at all times after actuation of the parking brakes by venting the front supply line coupling to the atmosphere, and with any subsequent level of pressure, or combination of levels of pressure, in the reservoirs of any of the vehicle's brake systems, the parking brakes shall not be releasable by repressurizing the supply line using the supply line portion of the trailer test rig (Figure 1) to any pressure above 70 psi, unless the parking brakes are capable, after such release, of reapplication by subsequent venting of the front supply line coupling to the atmosphere, at a level meeting the minimum performance specified either in S5.6.1 or S5.6.2. This requirement shall be met both with and without any single leakage-type failure, in any other brake system, of a part designed to contain compressed air or brake fluid (consistent with the parenthetical phrase specified in S5.6.3.1).



S5.6.5.4 The initial conditions for S5.6.5.3 are as follows: The reservoir system and supply line are pressurized to 100 psi, using the supply line portion of the trailer test rig (Figure 1). If the vehicle is designed to tow a vehicle equipped with air brakes, a 50 cubic inch test reservoir is connected to the rear supply line coupling.

S5.6.6 *Accumulation of actuation energy.* Each parking brake system shall meet the requirements specified in S5.6.6.1 through S5.6.6.6.

S5.6.6.1 For trucks and buses, with initial conditions as specified in S5.6.6.2, the parking brake system shall be capable of meeting the minimum performance specified either in S5.6.1 or S5.6.2, with any single leakage-type failure, in any other brake system, of a part designed to contain compressed air or brake fluid (consistent with the parenthetical phrase specified in S5.6.3.1) at the conclusion of the test sequence specified in S5.6.6.3.

S5.6.6.2 The initial conditions for S5.6.6.1 are as follows: The engine is on. The reservoir system pressure is 100 psi. If the vehicle is designed to tow a vehicle equipped with air brakes, a 50 cubic inch test reservoir is connected to the supply line coupling.

S5.6.6.3 The test sequence for S5.6.6.1 is as follows: The engine is turned off. Any single leakage type failure, in any other brake system, of a part designed to contain compressed air or brake fluid (consistent with the parenthetical phrase specified in S5.6.3.1), is then introduced in the brake system. An application actuation of the parking brake control is then made. Thirty seconds after such actuation, a release actuation of the parking brake control is made. Thirty seconds after the release actuation, a final application actuation of the parking brake control is made.

S5.6.6.4 For trailers, with initial conditions as specified in S5.6.6.5, the parking brake system shall be capable of meeting the minimum performance specified either in S5.6.1 or S5.6.2, with any single leakage-type failure, in any other brake system, of a part designed to contain compressed air or brake fluid (consistent with the parenthetical phrase specified in S5.6.3.1), at the conclusion of the test sequence specified in S5.6.6.6.

S5.6.6.5 The initial conditions for S5.6.6.4 are as follows: The reservoir system and supply line are pressurized to 100 psi, using the supply line portion of the trailer test rig (Figure 1). If the vehicle is designed to tow a vehicle equipped with air brakes, a 50 cubic inch test reservoir is connected to the rear supply line coupling.

S5.6.6.6 The test sequence for S5.6.6.4 is as follows. Any single leakage type failure, in any other brake system, of a part designed to contain compressed air or brake fluid (consistent with the parenthetical phrase specified in S5.6.3.1), is introduced in the brake system. The front supply line coupling is vented to the atmosphere. Thirty seconds after the initiation of such venting, the supply line is repressurized with the trailer test rig (Figure 1). Thirty seconds after the initiation of such repressurizing of the supply line, the front supply line is vented to the atmosphere. This procedure is conducted either by connection and disconnection of the supply line coupling or by use of a valve installed in the supply line portion of the trailer test rig near the supply line coupling.

S5.6.7 *Maximum level of common diaphragm leakage-type failure/ Equivalent level of leakage from the air chamber containing that diaphragm.*

In the case of vehicles for which the option in S5.6(b) has been elected, determine the maximum level of common diaphragm leakage-type failure (or equivalent level of leakage from the air chamber containing that diaphragm) according to the procedures set forth in S5.6.7.1 through S5.6.7.2.3.

S5.6.7.1 *Trucks and buses.*

S5.6.7.1.1 According to the following procedure, determine the threshold level of common diaphragm leakage-type failure (or equivalent level of leakage from the air chamber containing that diaphragm) at which the vehicle's parking brakes become unreleasable. With an initial reservoir system pressure of 100 psi, the engine turned off, no application of any of the vehicle's brakes, and, if the vehicle is designed to tow a vehicle equipped with air brakes, a 50 cubic inch test reservoir connected to the supply line coupling, introduce a leakage-type failure of the common diaphragm (or equivalent leakage from the air chamber containing that diaphragm). Apply the parking brakes by making an application actuation of the parking brake control. Reduce the pressures in all of the vehicle's reservoirs to zero, turn on the engine and allow it to idle, and allow the pressures in the vehicle's reservoirs to rise until they stabilize or until the compressor shut-off point is reached. At that time, make a release actuation of the parking brake control, and determine whether all of the mechanical means referred to in S5.6.3.2 continue to be actuated and hold the parking brake applications with sufficient parking retardation force to meet the minimum performance specified in either S5.6.1

or S5.6.2. Repeat this procedure with progressively decreasing or increasing levels (whichever is applicable) of leakage-type diaphragm failures or equivalent leakages, to determine the minimum level of common diaphragm leakage-type failure (or equivalent level of leakage from the air chamber containing that diaphragm) at which all of the mechanical means referred to in S5.6.3.2 continue to be actuated and hold the parking brake applications with sufficient parking retardation forces to meet the minimum performance specified in either S5.6.1 or S5.6.2.

S5.6.7.1.2 At the level of common diaphragm leakage-type failure (or equivalent level of leakage from the air chamber containing that diaphragm) determined in S5.6.7.1.1, and using the following procedure, determine the threshold maximum reservoir rate (in psi per minute). With an initial reservoir system pressure of 100 psi, the engine turned off, no application of any of the vehicle's brakes and, if the vehicle is designed to tow a vehicle equipped with air brakes, a 50 cubic inch test reservoir connected to the supply line coupling, make an application actuation of the parking brake control. Determine the maximum reservoir leakage rate (in psi per minute), which is the maximum rate of decrease in air pressure of any of the vehicle's reservoirs that results after that parking brake application.

S5.6.7.1.3 Using the following procedure, introduce a leakage-type failure of the common diaphragm (or equivalent leakage from the air chamber containing that diaphragm) that results in a maximum reservoir leakage rate that is three times the threshold maximum reservoir leakage rate determined in S5.6.7.1.2. With an initial reservoir system pressure of 100 psi, the engine turned off, no application of any of the vehicle's brakes and, if the vehicle is designed to tow a vehicle equipped with air brakes, a 50 cubic inch test reservoir connected to the supply line coupling, make an application actuation of the parking brake control. Determine the maximum reservoir leakage rate (in psi per minute), which is the maximum rate of decrease in air pressure of any of the vehicle's reservoirs that results after that parking brake application. The level of common diaphragm leakage-type failure (or equivalent level of leakage from the air chamber containing that diaphragm) associated with this reservoir leakage rate is the level that is to be used under the option set forth in S5.6(b).

S5.6.7.2 *Trailers.*

S5.6.7.2.1 According to the following procedure, determine the

threshold level of common diaphragm leakage-type failure (or equivalent level of leakage from the air chamber containing that diaphragm) at which the vehicle's parking brakes become unreleasable. With an initial reservoir system and supply line pressure of 100 psi, no application of any of the vehicle's brakes, and, if the vehicle is designed to tow a vehicle equipped with air brakes, a 50 cubic inch test reservoir connected to the supply line coupling, introduce a leakage-type failure of the common diaphragm (or equivalent leakage from the air chamber containing that diaphragm). Make a parking brake application by venting the front supply line coupling to the atmosphere, and reduce the pressures in all of the vehicle's reservoirs to zero. Pressurize the supply line by connecting the trailer's front supply line coupling to the supply line portion of the trailer test rig (Figure 1) with the regulator of the trailer test rig set at 100 psi, and determine whether all of the mechanical means referred to in S5.6.3.2 continue to be actuated and hold the parking brake applications with sufficient parking retardation forces to meet the minimum performance specified in either S5.6.1 or S5.6.2. Repeat this procedure with progressively decreasing or increasing levels (whichever is applicable) of leakage-type diaphragm failures or equivalent leakages, to determine the minimum level of common diaphragm leakage-type failure (or equivalent level of leakage from the air chamber containing that diaphragm) at which all of the mechanical means referred to in S5.6.3.2 continue to be actuated and hold the parking brake applications with sufficient parking retardation forces to meet the minimum performance specified in either S5.6.1 or S5.6.2.

S5.6.7.2.2 At the level of common diaphragm leakage-type failure (or equivalent level of leakage from the air chamber containing that diaphragm) determined in S5.6.7.2.1, and using the following procedure, determine the threshold maximum reservoir leakage rate (in psi per minute). With an initial reservoir system and supply line pressure of 100 psi, no application of any of the vehicle's brakes and, if the vehicle is designed to tow a vehicle equipped with air brakes, a 50 cubic inch test reservoir connected to the rear supply line coupling, make a parking brake application by venting the front supply line coupling to the atmosphere. Determine the maximum reservoir leakage rate (in psi per minute), which is the maximum rate of decrease in air pressure of any of the vehicle's

reservoirs that results after that parking brake application.

S5.6.7.2.3 Using the following procedure, a leakage-type failure of the common diaphragm (or equivalent leakage from the air chamber containing that diaphragm) that results in a maximum reservoir leakage rate that is three times the threshold maximum reservoir leakage rate determined in S5.6.7.2.2. With an initial reservoir system and supply line pressure of 100 psi, no application of any of the vehicle's brakes and, if the vehicle is designed to tow a vehicle equipped with air brakes, a 50 cubic inch test reservoir connected to the rear supply line coupling, make a parking brake application by venting the front supply line coupling to the atmosphere. Determine the maximum reservoir leakage rate (in psi per minute), which is the maximum rate of decrease in air pressure of any of the vehicle's reservoirs that results after that parking brake application. The level of common diaphragm leakage-type failure (or equivalent level of leakage from the air chamber containing that diaphragm) associated with this reservoir leakage rate is the level that is to be used under the option set forth in S5.6(b).

S5.7 *Emergency brake system for trucks and buses.* Each vehicle shall be equipped with an emergency brake system which, under the conditions of S6.1, conforms to the requirements of S5.7.1 through S5.7.3. However, the truck portion of an auto transporter need not meet the road test requirements of S5.7.1 and S5.7.3.

S5.7.1 *Emergency brake system performance.* When stopped six times for each combination of weight and speed specified in S5.3.1.1, except for a loaded truck tractor with an unbraked control trailer, on a road surface having a PFC of 0.9, with a single failure in the service brake system of a part designed to contain compressed air or brake fluid (except failure of a common valve, manifold, brake fluid housing, or brake chamber housing), the vehicle shall stop at least once in not more than the distance specified in Column 5 of Table II, measured from the point at which movement of the service brake control begins, except that a truck-tractor tested at its unloaded vehicle weight plus up to 500 pounds shall stop at least once in not more than the distance specified in Column 6 of Table II. The stop shall be made without any part of the vehicle leaving the roadway, and with unlimited wheel lockup permitted at any speed.

S5.7.2 *Emergency brake system operation.* The emergency brake system shall be applied and released, and be

capable of modulation, by means of the service brake control.

S5.7.3 *Towing vehicle emergency brake requirements.* In addition to meeting the other requirements of S5.7, a vehicle designed to tow another vehicle equipped with air brakes shall—

(a) In the case of a truck-tractor in the unloaded condition and a single unit truck which is capable of towing an airbrake equipped vehicle and is loaded to GVWR, be capable of meeting the requirements of S5.7.1 by operation of the service brake control only, with the trailer air supply line and air control line from the towing vehicle vented to the atmosphere in accordance with S6.1.14;

(b) In the case of a truck-tractor loaded to GVWR, be capable of meeting S5.7.1 by operation of the service brake control only, with the air control line from the towing vehicle vented to the atmosphere in accordance with S6.1.14; and

(c) Be capable of modulating the air in the supply or control line to the trailer by means of the service brake control with a single failure in the towing vehicle service brake system as specified in S5.7.1.

S5.8 *Emergency brakes for trailers.* Each trailer shall meet the requirements of S5.8.1 through S5.8.3.

S5.8.1 *Emergency braking capability.* Each trailer other than a trailer converter dolly shall have a parking brake system that conforms to S5.6 and that applies with the force specified in S5.6.1 or S5.6.2 when the air pressure in the supply line is at atmospheric pressure. A trailer converter dolly shall have, at the manufacturer's option—

(a) A parking brake system that conforms to S5.6 and that applies with the force specified in S5.6.1 or S5.6.2 when the air pressure in the supply line is at atmospheric pressure, or

(b) An emergency system that automatically applies the service brakes when the service reservoir is at any pressure above 20 lb/in<sup>2</sup> and the supply line is at atmospheric pressure. However, any agricultural commodity trailer, heavy hauler trailer, or pulpwood trailer shall meet the requirements of S5.8.1 or, at the option of the manufacturer, the requirements of § 393.43 of this title.

S5.8.2 *Supply line pressure retention.* Any single leakage type failure in the service brake system (except for a failure of the supply line, a valve directly connected to the supply line or a component of a brake chamber housing) shall not result in the pressure in the supply line falling below 70 psi, measured at the forward trailer supply

coupling. A trailer shall meet the above supply line pressure retention requirement with its brake system connected to the trailer test rig shown in Figure 1, with the reservoirs of the trailer and test rig initially pressurized to 100 psi and the regulator of the trailer test rig set at 100 psi; except that a trailer equipped with an air-applied, mechanically-held parking brake system and not designed to tow a vehicle equipped with air brakes, at the manufacturer's option, may meet the requirements of S5.8.4 rather than those of S5.8.2 and S5.8.3.

**S5.8.3 Automatic application of parking brakes.** With an initial reservoir system pressure of 100 psi and initial supply line pressure of 100 psi, and if designed to tow a vehicle equipped with air brakes, with a 50 cubic inch test reservoir connected to the rear supply line coupling, and with any subsequent single leakage type failure in any other brake system, of a part designed to contain compressed air or brake fluid (consistent with the parenthetical phrase specified in S5.6.3.1), whenever the air pressure in the supply line is 70 psi or higher, the parking brakes shall not provide any brake retardation as a result of complete or partial automatic application of the parking brakes.

**S5.8.4 Automatic application of air-applied, mechanically held parking brakes.** With its brake system connected to the supply line portion of the trailer test rig (Figure 1) and the regulator of the trailer test rig set at 100 psi, and with any single leakage type failure in the service brake system (except for a failure of the supply line, a valve directly connected to the supply line or a component of a brake chamber, but including failure of any common diaphragm), the parking brakes shall not provide any brake retardation as a result of complete or partial automatic application of the parking brakes.

**S5.9 Final inspection.** Inspect the service brake system for the condition of adjustment and for the brake indicator display in accordance with S5.1.8 and S5.2.2.

**S6. Conditions.** The requirements of S5 shall be met by a vehicle when it is tested according to the conditions set in this S6, without replacing any brake system part or making any adjustments to the brake system except as specified. Unless otherwise specified, where a range of conditions is specified, the vehicle must be capable of meeting the requirements at all points within the range. On vehicles equipped with automatic brake adjusters, the automatic brake adjusters must remain activated at all times. Compliance of vehicles manufactured in two or more stages

may, at the option of the final-stage manufacturer, be demonstrated to comply with this standard by adherence to the instructions of the incomplete vehicle manufacturer provided with the vehicle in accordance with § 568.4(a)(7)(ii) and § 568.5 of title 49 of the Code of Federal Regulations.

**S6.1 Road test conditions.**

**S6.1.1** Except as otherwise specified, the vehicle is loaded to its GVWR, distributed proportionally to its GAWRs. During the burnish procedure specified in S6.1.8, truck tractors shall be loaded to their GVWR, by coupling them to an unbraked flatbed semitrailer, which semitrailer shall be loaded so that the weight of the tractor-trailer combination equals the GVWR of the truck tractor. The load on the unbraked flatbed semitrailer shall be located so that the truck tractor's wheels do not lock during burnish.

**S6.1.2** The inflation pressure is as specified by the vehicle manufacturer for the GVWR.

**S6.1.3** Unless otherwise specified, the transmission selector control is in neutral or the clutch is disengaged during all decelerations and during static parking brake tests.

**S6.1.4** All vehicle openings (doors, windows, hood, trunk, cargo doors, etc.) are in a closed position except as required for instrumentation purposes.

**S6.1.5** The ambient temperature is between 32° F. and 100° F.

**S6.1.6** The wind velocity is zero.

**S6.1.7** Unless otherwise specified, stopping tests are conducted on a 12-foot wide level, straight roadway having a peak friction coefficient of 0.9. For road tests in S5.3, the vehicle is aligned in the center of the roadway at the beginning of a stop. Peak friction coefficient is measured using an ASTM E1136 standard reference test tire in accordance with ASTM method E1337-90, at a speed of 40 mph, without water delivery for the surface with PFC of 0.9, and with water delivery for the surface with PFC of 0.5.

**S6.1.8** For vehicles with parking brake systems not utilizing the service brake friction elements, burnish the friction elements of such systems prior to the parking brake test according to the manufacturer's recommendations. For vehicles with parking brake systems utilizing the service brake friction elements, burnish the brakes as follows: With the transmission in the highest gear appropriate for a speed of 40 mph, make 500 snubs between 40 mph and 20 mph at a deceleration rate of 10 f.p.s.p.s., or at the vehicle's maximum deceleration rate if less than 10 f.p.s.p.s. Except where an adjustment is specified, after each brake application

accelerate to 40 mph and maintain that speed until making the next brake application at a point 1 mile from the initial point of the previous brake application. If the vehicle cannot attain a speed of 40 mph in 1 mph, continue to accelerate until the vehicle reaches 40 mph or until the vehicle has traveled 1.5 miles from the initial point of the previous brake application, whichever occurs first. Any automatic pressure limiting valve is in use to limit pressure as designed. The brakes may be adjusted up to three times during the burnish procedure, at intervals specified by the vehicle manufacturer, and may be adjusted at the conclusion of the burnishing, in accordance with the vehicle manufacturer's recommendation.

**S6.1.9** Static parking brake tests for a semitrailer are conducted with the front-end supported by an unbraked dolly. The weight of the dolly is included as part of the trailer load.

**S6.1.10** In a test other than a static parking test, a truck tractor is tested at its GVWR by coupling it to an unbraked flatbed semi-trailer (hereafter, control trailer) as specified in S6.1.10.2 to S6.1.10.4.

**S6.1.10.1** [Reserved]

**S6.1.10.2** The center of gravity height of the ballast on the loaded control trailer shall be less than 24 inches above the top of the tractor's fifth wheel.

**S6.1.10.3** The control trailer has a single axle with a GAWR of 18,000 pounds and a length, measured from the transverse centerline of the axle to the centerline of the kingpin, of  $258 \pm 6$  inches.

**S6.1.10.4** The control trailer is loaded so that its axle is loaded at 4,500 pounds and the tractor is loaded to its GVWR, loaded above the kingpin only, with the tractor's fifth wheel adjusted so that the load on each axle measured at the tire-ground interface is most nearly proportional to the axles' respective GAWRs, without exceeding the GAWR of the tractor's axle or axles or control trailer's axle.

**S6.1.11 Special drive conditions.** A vehicle equipped with an interlocking axle system or a front wheel drive system that is engaged and disengaged by the driver is tested with the system disengaged.

**S6.1.12 Lifiable axles.** A vehicle with a liftable axle is tested at GVWR with the liftable axle down and at unloaded vehicle weight with the liftable axle up.

**S6.1.13 Trailer test rig.**

(a) The trailer test rig shown in Figure 1 is calibrated in accordance with the calibration curves shown in Figure 3.

For the requirements of S5.3.3.1 and S5.3.4.1, the pressure in the trailer test rig reservoir is initially set at 100 psi for actuation tests and 95 psi for release tests.

(b) The trailer test rig shown in Figure 1(a) is capable of increasing the pressure in a 50 cubic inch reservoir from atmospheric to 60 lb/in<sup>2</sup> in 0.06 second, measured from the first movement of the service brake control to apply service brake pressure and of releasing pressure in such a reservoir from 95 to 5 lb/in<sup>2</sup> in 0.22 second measured from the first movement of the service brake control to release service brake pressure.

S6.1.14 In testing the emergency braking system of towing vehicles under S5.7.3(a) and S5.7.3(b), the hose(s) is vented to the atmosphere at any time not less than 1 second and not more than 1 minute before the emergency stop begins, while the vehicle is moving at the speed from which the stop is to be made and any manual control for the towing vehicle protection system is in the position to supply air and brake control signals to the vehicle being towed. No brake application is made from the time the line(s) is vented until the emergency stop begins and no manual operation of the parking brake system or towing vehicle protection

system occurs from the time the line(s) is vented until the stop is completed.

S6.1.15 *Initial brake temperature.* Unless otherwise specified, the initial brake temperature is not less than 150° F and not more than 200° F.

6.2 *Dynamometer test conditions.*

S6.2.1 The dynamometer inertia for each wheel is equivalent to the load on the wheel with the axle loaded to its GAWR. For a vehicle having additional GAWRs specified for operation at reduced speeds, the GAWR used is that specified for a speed of 50 mph, or, at the option of the manufacturer, any speed greater than 50 mph.

S6.2.2 The ambient temperature is between 75° F. and 100° F.

S6.2.3 Air at ambient temperature is directed uniformly and continuously over the brake drum or disc at a velocity of 2,200 feet per minute.

S6.2.4 The temperature of each brake is measured by a single plug-type thermocouple installed in the center of the lining surface of the most heavily loaded shoe or pad as shown in Figure 2. The thermocouple is outside any center groove.

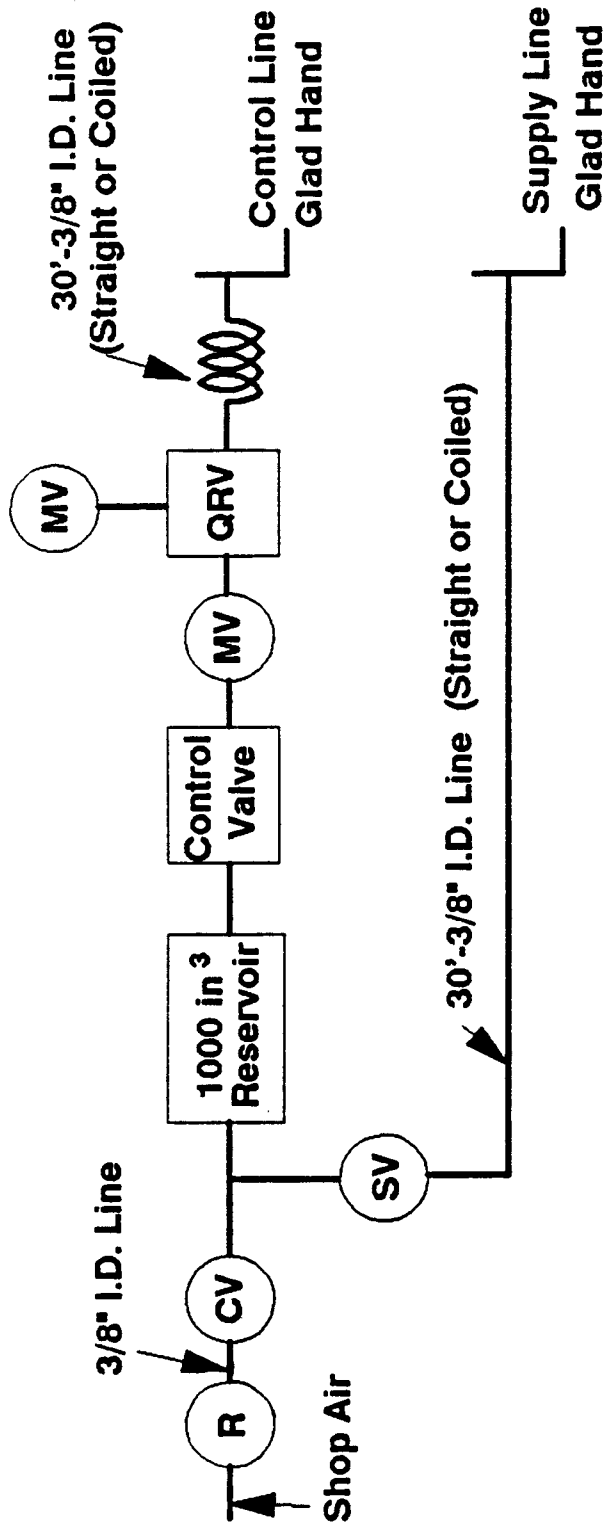
S6.2.5 The rate of brake drum or disc rotation on a dynamometer or responding to the rate of rotation on a vehicle at a given speed is calculated by

assuming a tire radius equal to the static loaded radius specified by the tire manufacturer.

S6.2.6 Brakes are burnished before testing as follows: place the brake assembly on an inertia dynamometer and adjust the brake as recommended by the vehicle manufacturer. Make 200 stops from 40 mph at a deceleration of 10 f.p.s.p.s., with an initial brake temperature on each stop of not less than 315° F and not more than 385° F. Make 200 additional stops from 40 mph at a deceleration of 10 f.p.s.p.s. with an initial brake temperature on each stop of not less than 450° F and not more than 550° F. The brakes may be adjusted up to three times during the burnish procedure, at intervals specified by the vehicle manufacturer, and may be adjusted at the conclusion of the burnishing, in accordance with the vehicle manufacturer's recommendation.

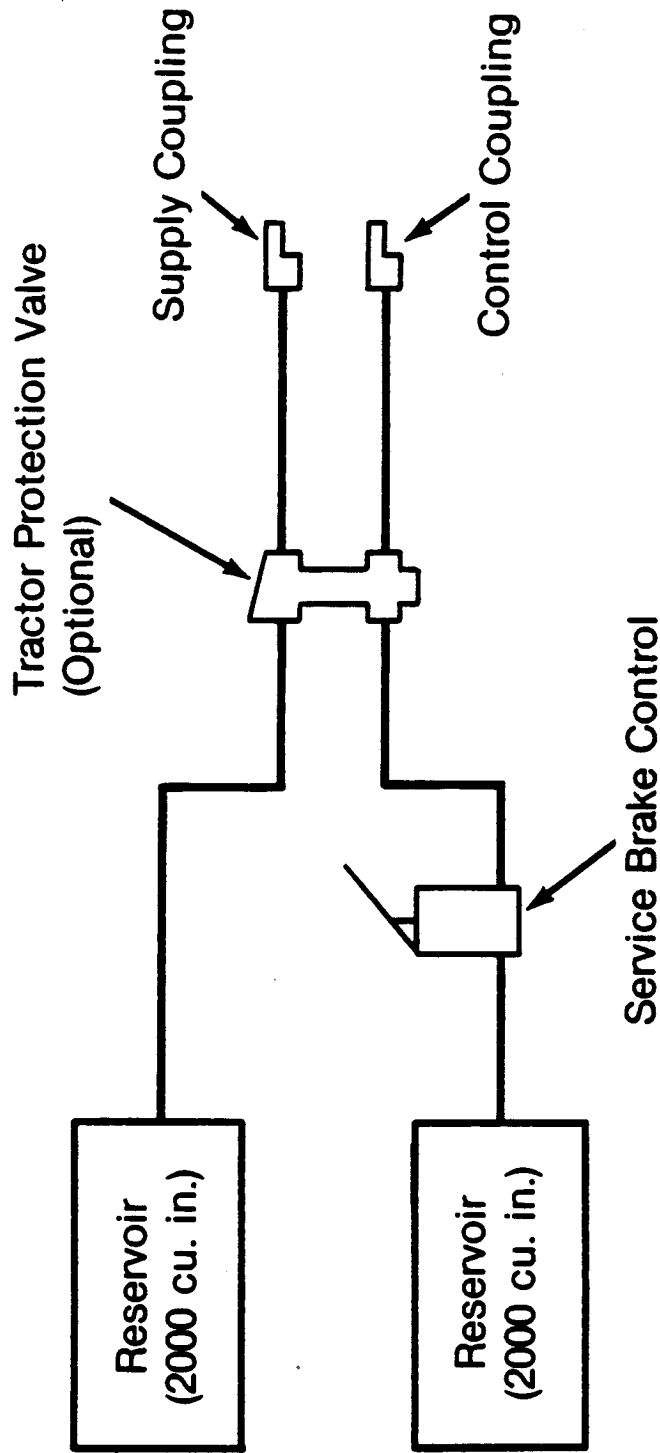
S6.2.7 The brake temperature is increased to a specified level by conducting one or more stops from 40 m.p.h. at a deceleration of 10 f.p.s.p.s. The brake temperature is decreased to a specified level by rotating the drum or disc at a constant 30 m.p.h.

BILLING CODE 4910-59-P



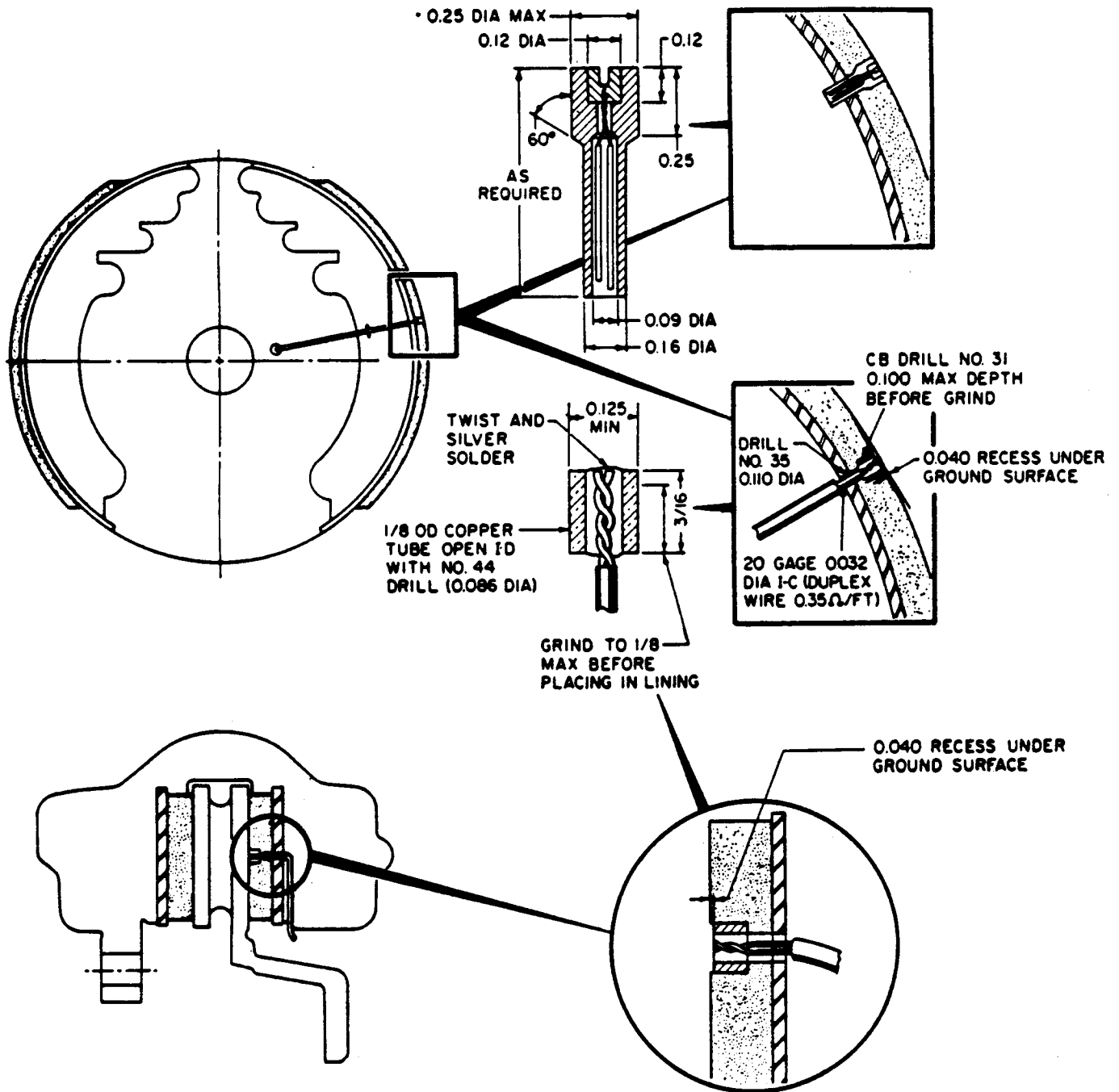
- SV - Shut-off Valve
- R - Regulator (set at 100 psi for service brake actuation tests;  
95 psi for service brake release tests;  
100 psi for parking brake tests in S5.6.3.3, S5.6.3.4, S5.6.5.4, and S5.6.6.5,  
and for the supply line pressure retention test in S5.8.2; and any  
pressure above 70 psi for parking brake test in S5.6.5.3.)
- CV - Check Valve
- MV - Metering Valve (Variable or Fixed)
- QRV - Quick Release Valve

**Figure 1. Trailer Test Rig.**



**Figure 1(a). Trailer Test Rig.**

# FIGURE 2 THERMOCOUPLE INSTALLATION



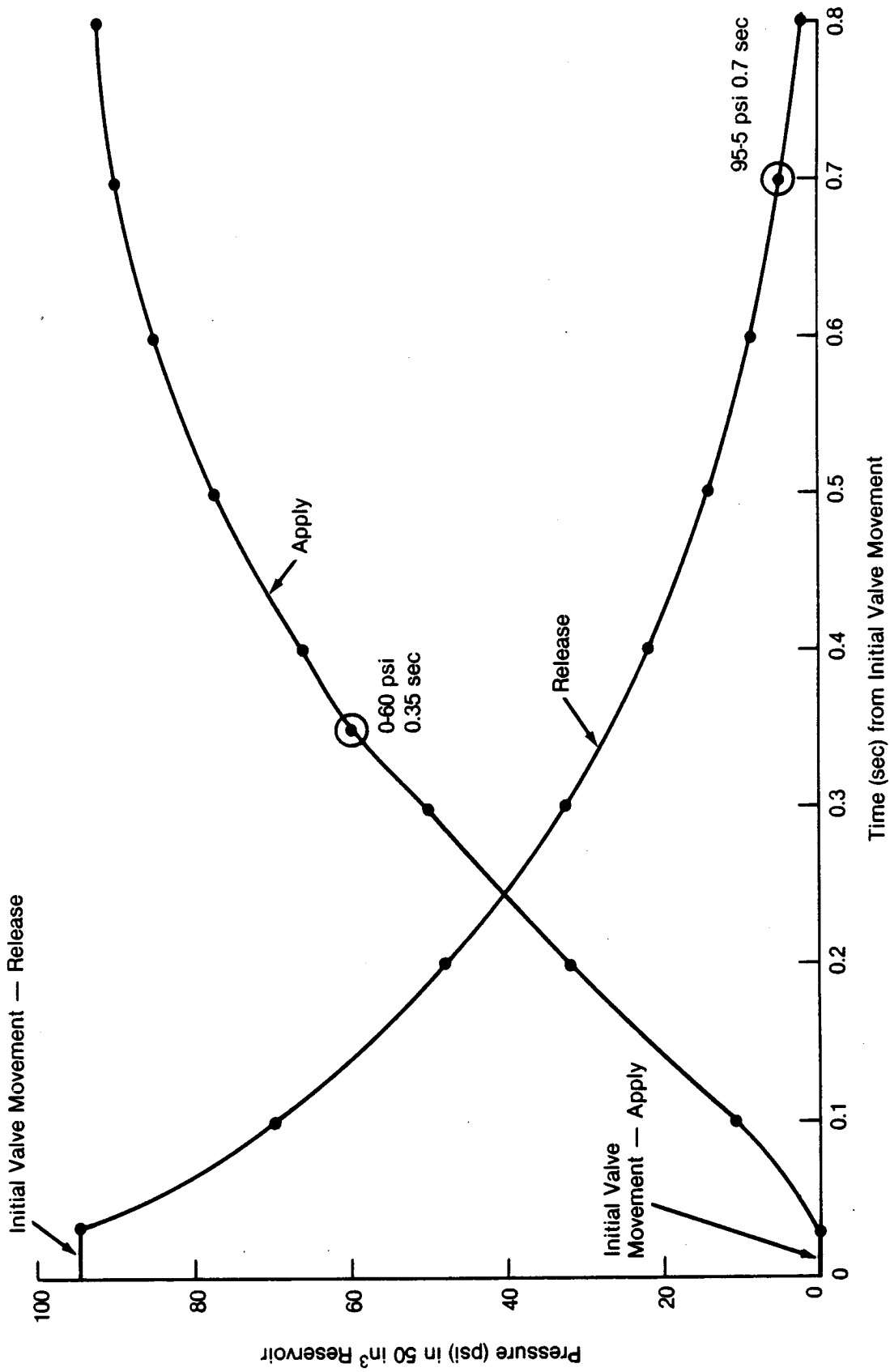


Figure 3. Pressure vs. Time for 50 in³ Test Reservoir.



Table I.—Stopping Sequence

- |   |   |   |
|---|---|---|
| <p>1. Burnish.</p> <p>2. Stops on a peak friction coefficient surface of 0.5:</p> <p>(a) With the vehicle at gross vehicle weight rating (GVWR), stop the vehicle from 30 mph using the service brake, for a truck tractor with a loaded unbraked control trailer.</p> <p>(b) With the vehicle at unloaded weight plus up to 500 lbs., stop the vehicle from 30 mph using the service brake, for a truck tractor.</p> <p>3. Manual adjustment of the service brakes allowed for truck tractors,</p> | <p>within the limits recommended by the vehicle manufacturer.</p> <p>4. Other stops with vehicle at GVWR:</p> <p>(a) 60 mph service brake stops on a peak friction coefficient surface of 0.9, for a truck tractor with a loaded unbraked control trailer, or for a single-unit vehicle.</p> <p>(b) 60 mph emergency brake stops on a peak friction coefficient of 0.9, for a single-unit vehicle. Truck tractors are not required to be tested in the loaded condition.</p> <p>5. Parking brake test with the vehicle loaded to GVWR.</p> <p>6. Manual adjustment of the service brakes allowed for truck tractors and single-unit vehicles, within the limits</p> | <p>recommended by the vehicle manufacturer.</p> <p>7. Other stops with the vehicle at unloaded weight plus up to 500 lbs.:</p> <p>(a) 60 mph service brake stops on a peak friction coefficient surface of 0.9, for a truck tractor or for a single-unit vehicle.</p> <p>(b) 60 mph emergency brake stops on a peak friction coefficient of 0.9, for a truck tractor or for a single-unit vehicle.</p> <p>8. Parking brake test with the vehicle at unloaded weight plus up to 500 lbs.</p> <p>9. Final inspection of service brake system for condition of adjustment.</p> |
|---|---|---|

TABLE II.—STOPPING DISTANCE IN FEET

Vehicle speed in miles per hour	Service brake				Emergency brake	
	PFC 0.9	PFC 0.9	PFC 0.9	PFC 0.9	PFC 0.9	PFC 0.9
	(1)	(2)	(3)	(4)	(5)	(6)
20	32	35	38	40	83	85
25	49	54	59	62	123	131
30	70	78	84	89	170	186
35	96	106	114	121	225	250
40	125	138	149	158	288	325
45	158	175	189	200	358	409
50	195	216	233	247	435	504
55	236	261	281	299	520	608
60	280	310	335	355	613	720

Note: (1) Loaded and unloaded buses; (2) Loaded single unit trucks; (3) Unloaded truck tractors and single unit trucks; (4) Loaded truck tractors tested with an unbraked control trailer; (5) All vehicles except truck tractors; (6) Unloaded truck tractors.

TABLE III.—BRAKE RETARDATION FORCE

Column 1 Brake Retardation Force, GAWR	Column 2 Brake Chamber Pressure, PSI
0.05	20
0.12	30
0.18	40
0.25	50
0.31	60
0.37	70
0.41	80

TABLE V.—BRAKE CHAMBER RATED VOLUMES—Continued

Brake chamber type (Nominal area of piston or diaphragm in square inches)	Column 1 Full stroke (Inches)	Column 2 Rated volume (Cubic Inches)
Type 16	2.25/2.70	50
Type 18	2.25/2.70	55
Type 20	2.25/2.70	60
Type 24	2.25/2.70	70
Type 30	2.50/3.20	95
Type 36	3.00/3.60	135

Issued on: May 23, 1996.  
 Barry Felrice,  
 Associate Administrator for Safety Performance Standards.  
 [FR Doc. 96-13557 Filed 5-30-96; 8:45 am]  
**BILLING CODE 4910-59-P**

TABLE IV.—[RESERVED]

TABLE V.—BRAKE CHAMBER RATED VOLUMES

Brake chamber type (Nominal area of piston or diaphragm in square inches)	Column 1 Full stroke (Inches)	Column 2 Rated volume (Cubic Inches)
Type 9	1.75/2.10	25
Type 12	1.75/2.10	30
Type 14	2.25/2.70	40

**DEPARTMENT OF COMMERCE**

**National Oceanic and Atmospheric Administration**

**50 CFR Part 630**

[Docket No. 960314073-6145-02; I.D. 030896E]

**RIN 0648-AI23**

**Atlantic Swordfish Fishery; 1996 Quotas, Minimum Size, Adjustment**

**AGENCY:** National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

**ACTION:** Final rule.

**SUMMARY:** NMFS issues this final rule to amend the regulations governing the Atlantic swordfish fishery to: Reduce the annual total allowable catch (TAC) to 2,625 metric tons (mt) dressed weight (dw) via a split season (June 1 - May 31), decrease the minimum size to 73 cm (29 inches) cleithrum to caudal keel measure, eliminate the trip allowance for undersized fish, and make reporting requirements consistent with the