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Railroad Power Brakes And Drawbars

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PART 232—RAILROAD POWER BRAKES AND DRAWBARS

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APPENDIX—Specifications and requirements for power brakes and appliances for operating power-brake systems for freight service.

AUTHORITY: The provisions of this Part 232 issued under secs. 1, 3, 5, and 6, 27 Stat. 523, as amended, secs. 1-3, 32 Stat. 943, as amended, secs. 1, 2, 3, and 6, 36 Stat. 298-299, sec. 6 (e) and (f), 80 Stat. 939; 45 U.S.C. 1, 3, 5, 6, 8-10, 11, 12, 15, 16, 49 U.S.C. 1655.

SOURCE: The provisions of this Part 232 appear at 33 F.R. 19679, Dec. 25, 1968, unless otherwise noted.

§ 232.1 Power brakes; minimum percentage.

On and after September 1, 1910, on all railroads used in interstate commerce, whenever, as required by the Safety Appliance Act as amended March 2, 1903, any train is operated with power or train brakes, not less than 85 percent of the cars of such train shall have their brakes used and operated by the engineer of the locomotive drawing such train, and all

power-brake cars in every such train which are associated together with the 85 percent shall have their brakes so used and operated.

§ 232.2 Drawbars; standard height.

Except on cars specified in the proviso in section 6 of the Safety Appliance Act of March 2, 1893 (sec. 6, 27 Stat. 532, 45 U.S.C. 6) as the same was amended April 1, 1896 (29 Stat. 85; 45 U.S.C. 6) the standard height of drawbars heretofore designated in compliance with law is hereby modified and changed in the manner hereinafter prescribed, to wit: The maximum height of drawbars for freight cars measured perpendicularly from the level of the tops of rails to the centers of drawbars for standard-gauge railroads in the United States subject to said act shall be 34½ inches, and the minimum height of drawbars for freight cars on such standard-gauge railroads measured in the same manner shall be 31½ inches, and on narrow-gauge railroads in the United States subject to said act the maximum height of drawbars for freight cars measured from the level of the tops of rails to the centers of drawbars shall be 26 inches, and the minimum height of drawbars for freight cars on such narrow-gauge railroads measured in the same manner shall be 23 inches, and on 2-foot-gauge railroads in the United States subject to said act the maximum height of drawbars for freight cars measured from the level of the tops of rails to the centers of drawbars shall be 17½ inches, and the minimum height of drawbars for freight cars on such 2-foot-gauge railroads measured in the same manner shall be 14½ inches.

§ 232.3 Power brakes and appliances for operating power-brake systems.

(a) The specifications and requirement for power brakes and appliances for operating power-brake systems for freight

service set forth in the appendix to the report on further hearing, of May 30, 1945, are hereby adopted and prescribed. (See Appendix to this Part for order in Docket 13528.)

RULES FOR INSPECTION, TESTING AND MAINTENANCE OF AIR BRAKE EQUIPMENT

§ 232.10 General rules; locomotives.

(a) Air brake and hand brake equipment on locomotives including tender must be inspected and maintained in accordance with the requirements of the Locomotive Inspection and United States Safety Appliance Acts and related orders and regulations of the Federal Railroad Administrator (FRA).

(b) It must be known that air brake equipment on locomotives is in a safe and suitable condition for service.

(c) Compressor or compressors must be tested for capacity by orifice test as often as conditions require but not less frequently than required by law and orders of the FRA.

(d) Main reservoirs shall be subjected to tests periodically as required by law and orders of the FRA.

(e) Air gauges must be tested periodically as required by law and orders of the FRA, and whenever any irregularity is reported. They shall be compared with an accurate deadweight tester, or test gauge. Gauges found inaccurate or defective must be repaired or replaced.

(f) (1) All operating portions of air brake equipment together with dirt collectors and filters must be cleaned, repaired and tested as often as conditions require to maintain them in a safe and suitable condition for service, and not less frequently than required by law and orders of the FRA.

(2) On locomotives so equipped, hand brakes, parts, and connections must be inspected, and necessary repairs made

as often as the service requires, with date being suitably stencilled or tagged.

(g) The date of testing or cleaning of air brake equipment and the initials of the shop or station at which the work was done shall be placed on a card displayed under transparent covering in the cab of each locomotive unit.

(h) (1) Minimum brake cylinder piston travel must be sufficient to provide proper brake shoe clearance when brakes are released.

(2) Maximum brake cylinder piston travel when locomotive is standing must not exceed the following:

Steam locomotives:	Inches
Cam type of driving wheel brake....	3½
Other types of driving wheel brakes..	6
Engine truck brake.....	8
Engine trailer truck brake.....	8
Tender brake (truck mounted and tender bed mounted).....	8
Tender brake (body mounted).....	9
Locomotives other than steam:	
Driving wheel brake.....	6
Swivel type truck brake with brakes on more than one truck operated by one brake cylinder.....	7
Swivel type truck brake equipped with one brake cylinder.....	8
Swivel type truck brake equippea with two or more brake cylinders..	6

(1) (1) Foundation brake rigging, and safety supports, where used, must be maintained in a safe and suitable condition for service. Levers, rods, brake beams, hangars and pins must be of ample strength and must not bind or foul in any way that will affect proper operation of brakes. All pins must be properly applied and secured in place with suitable locking devices. Brake shoes must be properly applied and kept approximately in line with treads of wheels or other braking surfaces.

(2) No part of the foundation brake rigging and safety supports shall be closer to the rails than specified by law and orders of the FRA.

(j) (1) Main reservoir leakage: Leakage from main air reservoir and related piping shall not exceed an average of 3 pounds per minute in a test of three minutes' duration, made after the pressure has been reduced 40 percent below maximum pressure.

(2) Brake pipe leakage: Brake pipe leakage must not exceed 5 pounds per minute after a reduction of 10 pounds has been made from brake pipe air pressure of not less than 70 pounds.

(3) Brake cylinder leakage: With a full service application of brakes, and with communication to the brake cylinders closed, brakes must remain applied not less than five minutes.

(4) The main reservoir system of each unit shall be equipped with at least one safety valve, the capacity of which shall be sufficient to prevent an accumulation of pressure of more than 10 pounds per square inch above the maximum setting of the compressor governor fixed by the chief mechanical officer of the carrier operating the locomotive.

(5) A suitable governor shall be provided that will stop and start the air compressor within 5 pounds above or below the pressures fixed.

(6) Compressor governor when used in connection with the automatic air brake system shall be so adjusted that the compressor will start when the main reservoir pressure is not less than 15 pounds above the maximum brake-pipe pressure fixed by the rules of the carrier and will not stop the compressor until the reservoir pressure has increased not less than 10 pounds.

(k) The communicating signal system on locomotives when used in passenger service must be tested and known to be in a safe and suitable condition for service before each trip.

(l) Enginemen when taking charge of locomotives must know that the brakes

are in operative condition.

(m) In freezing weather drain cocks on air compressors of steam locomotives must be left open while compressors are shut off.

(n) Air pressure regulating devices must be adjusted for the following pressures:

LOCOMOTIVES		Pounds
(1) Minimum brake pipe air pressure:		
Road Service.....		70
Switch Service.....		60
(2) Minimum differential between brake pipe and main reservoir air pressures, with brake valve in running position.....		15
(3) Safety valve for straight air brake		30-55
(4) Safety valve for LT, ET, No. 8-EL, No. 14 EL, No. 6-DS, No. 8-BL and No. 6-SL equipment.....		30-60
(5) Safety valve for HSC and No. 24-EL equipment.....		30-75
(6) Reducing valve for independent or straight air brake.....		30-50
(7) Self-lapping portion for electro-pneumatic brake (minimum full application pressure).....		50
(8) Self-lapping portion for independent air brake (full application pressure).....		30-50
(9) Reducing valve for air signal.....		40-60
(10) Reducing valve for high-speed brake (minimum).....		50
CARS		
(11) Reducing valve for high-speed brake.....		50-60
(12) Safety valve for PS, LN, UC, AML, AMU and AB-1-B air brakes....		50-60
(13) Safety valve for HSC air brake....		50-77
(14) Governor valve for water raising system.....		60
(15) Reducing valve for water raising system.....		20-30

§ 232.11 Train air brake system tests.

(a) Supervisors are jointly responsible with inspectors, enginemen and train-

men for condition of air brake and air signal equipment on motive power and cars to the extent that it is possible to detect defective equipment by required air tests.

(b) Communicating signal system on passenger equipment trains must be tested and known to be in a suitable condition for service before leaving terminal.

(c) Each train must have the air brakes in effective operating condition, and at no time shall the number and location of operative air brakes be less than permitted by Federal requirements. When piston travel is in excess of 10½ inches, the air brakes cannot be considered in effective operating condition.

(d) Condensation must be blown from the pipe from which air is taken before connecting yard line or motive power to train.

§ 232.12 Initial terminal road train air brake tests.

(a) (1) Each train must be inspected and tested as specified in this section by a qualified person at points—

(i) Where the train is originally made up (initial terminal);

(ii) Where train consist is changed, other than by adding or removing a solid block of cars, and the train brake system remains charged; and

(iii) Where the train is received in interchange if the train consist is changed other than by—

(A) Removing a solid block of cars from the head end or rear end of the train;

(B) Changing motive power;

(C) Removing or changing the caboose; or

(D) Any combination of the changes listed in (A), (B), and (C) of this subparagraph.

Where a carman is to perform the inspection and test under existing or future collective bargaining agreement, in those circumstances a carman alone will be considered a qualified person.

(2) A qualified person participating in the test and inspection or who has knowledge that it was made shall notify the engineer that the initial terminal road train air brake test has been satisfactorily performed. The qualified person shall provide the notification in writing if the road crew will report for duty after the qualified person goes off duty. The qualified person also shall provide the notification in writing if the train that has been inspected is to be moved in excess of 500 miles without being subjected to another test pursuant to either this section or § 232.13 of this part. (Approved by the Office of Management and Budget under OMB control number 2130-0008.)

(b) Each carrier shall designate additional inspection points not more than 1,000 miles apart where intermediate inspection will be made to determine that—

(1) Brake pipe pressure leakage does not exceed five pounds per minute;

(2) Brakes apply on each car in response to a 20-pound service brake pipe pressure reduction; and

(3) Brake rigging is properly secured and does not bind or foul.

(c) Train airbrake system must be charged to required air pressure, angle cocks and cutout cocks must be properly positioned, air hose must be properly coupled and must be in condition for service. An examination must be made for leaks and necessary repairs made to reduce leakage to a minimum. Retaining

valves and retaining valve pipes must be inspected and known to be in condition for service. If train is to be operated in electropneumatic brake operation, brake circuit cables must be properly connected.

(d) (1) After the airbrake system on a freight train is charged to within 15 pounds of the setting of the feed valve on the locomotive, but to not less than 60 pounds, as indicated by an accurate gauge at rear end of train, and on a passenger train when charged to not less than 70 pounds, and upon receiving the signal to apply brakes for test, a 15-pound brake pipe service reduction must be made in automatic brake operations, the brake valve lapped, and the number of pounds of brake pipe leakage per minute noted as indicated by brake pipe gauge, after which brake pipe reduction must be increased to full service. Inspection of the train brakes must be made to determine that angle cocks are properly positioned, that the brakes are applied on each car, that piston travel is correct, that brake rigging does not bind or foul, and that all parts of the brake equipment are properly secured. When this inspection has been completed, the release signal must be given and brakes released and each brake inspected to see that all have released.

(2) When a passenger train is to be operated in electropneumatic brake operation and after completion of test of brakes as prescribed by subparagraph (1) of this paragraph the brake system must be recharged to not less than 90 pounds air pressure, and upon receiving the signal to apply brakes for test, a minimum 20 pound electropneumatic brake application must be made as indicated by the brake cylinder gage. Inspection of the train brakes must then

be made to determine if brakes are applied on each car. When this inspection has been completed, the release signal must be given and brakes released and each brake inspected to see that all have released.

(3) When the locomotive used to haul the train is provided with means for maintaining brake pipe pressure at a constant level during service application of the train brakes, this feature must be cut out during train airbrake tests.

(e) Brake pipe leakage must not exceed 5 pounds per minute.

(f) (1) At initial terminal piston travel of body-mounted brake cylinders which is less than 7 inches or more than 9 inches must be adjusted to nominally 7 inches.

(2) Minimum brake cylinder piston travel of truck-mounted brake cylinders must be sufficient to provide proper brake shoe clearance when brakes are released. Maximum piston travel must not exceed 6 inches.

(3) Piston travel of brake cylinders on freight cars equipped with other than standard single capacity brake, must be adjusted as indicated on badge plate or stenciling on car located in a conspicuous place near brake cylinder

(g) When test of airbrakes has been completed the engineman and conductor must be advised that train is in proper condition to proceed.

(h) During standing test, brakes must not be applied or released until proper signal is given.

(i) (1) When train airbrake system is tested from a yard test plant, an engineer's brake valve or a suitable test device must be used to provide increase and reduction of brake pipe air pressure or electropneumatic brake application and release at the same or a slower rate

as with engineer's brake valve and yard test plant must be connected to the end which will be nearest to the hauling road locomotive.

(2) When yard test plant is used, the train airbrakes system must be charged and tested as prescribed by paragraphs (c) to (g) of this section inclusive, and when practicable should be kept charged until road motive power is coupled to train, after which, an automatic brake application and release test of airbrakes on rear car must be made. If train is to be operated in electropneumatic brake operation, this test must also be made in electropneumatic brake operation before proceeding.

(3) If after testing the brakes as prescribed in subparagraph (2) of this paragraph the train is not kept charged until road motive power is attached, the brakes must be tested as prescribed by paragraph (d) (1) of this section and if train is to be operated in electropneumatic brake operation as prescribed by paragraph (d) (2) of this section.

(j) Before adjusting piston travel or working on brake rigging, cutout cock in brake pipe branch must be closed and air reservoirs must be drained. When cutout cocks are provided in brake cylinder pipes, these cutout cocks only may be closed and air reservoirs need not be drained.

§ 232.13 Road train and intermediate terminal train air brake tests.

(a) Passenger trains: Before motive power is detached or angle cocks are closed on a passenger train operated in either automatic or electro-pneumatic brake operation, except when closing

angle cocks for cutting off one or more cars from the rear end of train, automatic air brake must be applied. After recoupling, brake system must be recharged to required air pressure and before proceeding and upon receipt of proper request or signal, application and release tests of brakes on rear car must be made from locomotive in automatic brake operation. If train is to be operated in electro-pneumatic brake operation, this test must also be made in electro-pneumatic brake operation before proceeding. Inspector or trainman must determine if brakes on rear car of train properly apply and release.

(b) Freight trains: Before motive power is detached or angle cocks are closed on a freight train, brakes must be applied with not less than a 20 pound brake pipe reduction. After recoupling and angle cocks are opened, it must be known that brake pipe air pressure is being properly restored as indicated by the caboose gauge and that brakes on rear car are released. In the absence of a caboose gauge, air brake test must be made as prescribed by that portion of paragraph (a) of this section pertaining to automatic brake operation.

(c) (1) At a point other than initial terminal where locomotive or caboose is changed, or where one or more consecutive cars are cut off from rear end or head end of train with consist otherwise remaining intact, after train brake system is charged to within 15 pounds of feed valve setting on locomotive but not less than 60 pounds as indicated at rear of freight train, and on a passenger train to at least 70 pounds, a 20 pound brake pipe reduction must be made and it must be determined that brakes on rear car apply and release properly.

(2) Before proceeding it must be known that brake pipe pressure as indicated at rear of freight train is being restored.

(3) On trains operating with electro-pneumatic brakes, with brake system charged to not less than 70 pounds, test must be made to determine that rear brakes apply and release properly from a minimum 20 pounds electro-pneumatic brake application as indicated by brake cylinder gauge.

(d) (1) At a point other than a terminal where one or more cars are added to a train, and after the train brake system is charged to not less than 60 pounds as indicated by a gauge at the rear of freight train and on a passenger train to not less than 70 pounds, tests of air brakes must be made to determine that brake pipe leakage does not exceed five (5) pounds per minute as indicated in the brake pipe gauge after a 15 pound brake pipe reduction. After the leakage test is completed, brake pipe reduction must be increased to full service, and it must be known that the brakes on each of these cars and on the rear car of train apply and release. Cars added to train which have not been inspected in accordance with § 232.12 (c)-(j) must be so inspected and tested at next terminal where facilities are available for such attention.

(2) (1) At a terminal where a solid block of cars which has been previously charged and tested as prescribed by § 232.12 (c)-(j) is added to a train, test must be made to determine that brakes on the rear car of train apply and release.

(1) When cars which have not been previously charged and tested as prescribed by § 232.12 (c)-(j) are added to a train, such cars may either be given inspection and tests in accordance with § 232.12 (c)-(j), or tested as prescribed by subparagraph (1) of this paragraph prior to departure in which case these cars must be inspected and tested in accordance with § 232.12 (c)-(j) at next terminal.

(3) Before proceeding it must be known that the brake pipe pressure at the rear of freight train is being restored.

(e) (1) Transfer train and yard train movements not exceeding 20 miles, must have the air brake hose coupled between all cars, and after the brake system is charged to not less than 60 pounds, a 15 pound service brake pipe reduction must be made to determine that the brakes are applied on each car before releasing and proceeding.

(2) Transfer train and yard train movements exceeding 20 miles must have brake inspection in accordance with § 232.12 (c)-(j).

(f) The automatic air brake must not be depended upon to hold a locomotive, cars or train, when standing on a grade, whether locomotive is attached or detached from cars or train. When required, a sufficient number of hand brakes must be applied to hold train, before air brakes are released. When ready to start, hand brakes must not be released until it is known that the air brake system is properly charged.

[33 F.R. 19679, Dec. 25, 1968, as amended at 37 F.R. 12237, June 21, 1972]

§ 232.14 Inbound brake equipment inspection.

(a) At points where inspectors are employed to make a general inspection of trains upon arrival at terminals, visual inspection must be made of retaining valves and retaining valve pipes, release valves and rods, brake rigging, safety supports, hand brakes, hose and position of angle cocks and make necessary repairs or mark for repair tracks any cars to which yard repairs cannot be promptly made.

(b) Freight trains arriving at terminals where facilities are available and at which special instructions provide for immediate brake inspection and repairs,

shall be left with air brakes applied by a service brake pipe reduction of 20 pounds so that inspectors can obtain a proper check of the piston travel. Trainmen will not close any angle cock or cut the locomotive off until the 20 pound service reduction has been made. Inspection of the brakes and needed repairs should be made as soon thereafter as practicable.

§ 232.15 Double heading and helper service.

(a) When more than one locomotive is attached to a train, the engineer of the leading locomotive shall operate the brakes. On all other motive power units in the train the brake pipe cutout cock to the brake valve must be closed, the maximum main reservoir pressure maintained and brake valve handles kept in the prescribed position. In case it becomes necessary for the leading locomotive to give up control of the train short of the destination of the train, a test of the brakes must be made to see that the brakes are operative from the automatic brake valve of the locomotive taking control of the train.

(b) The electro-pneumatic brake valve on all motive power units other than that which is handling the train must be cut out, handle of brake valve kept in the prescribed position, and air compressors kept running if practicable.

§ 232.16 Running tests.

When motive power, engine crew or train crew has been changed, angle cocks have been closed except for cutting off one or more cars from the rear end of train or electro-pneumatic brake circuit cables between power units and/or cars have been disconnected, running test of train air brakes on passenger train must be made, as soon as speed of train permits, by use of automatic brake if operating in automatic brake operation or by use of electro-pneumatic brake if operat-

ing in electro-pneumatic brake operation. Steam or power must not be shut off unless required and running test must be made by applying train air brakes with sufficient force to ascertain whether or not brakes are operating properly. If air brakes do not properly operate, train must be stopped, cause of failure ascertained and corrected and running test repeated.

§ 232.17 Freight and passenger train car brakes.

(a) *Testing and repairing brakes on cars while on shop or repair tracks.*

(1) When a freight car having brake equipment due for period attention is on shop or repair tracks where facilities are available for making air brake repairs, brake equipment must be given attention in accordance with the requirements of the currently effective AAR Code of Rules for cars in interchange. Brake equipment shall then be tested by use of a single car testing device as prescribed by the currently effective AAR Code of Tests.

(2) (i) When a freight car having an air brake defect is on a shop or repair track, brake equipment must be tested by use of a single car testing device as prescribed by currently effective AAR Code of Tests.

(ii) All freight cars on shop or repair tracks shall be tested to determine that the air brakes apply and release. Piston travel on a standard body mounted brake cylinder which is less than 7 inches or more than 9 inches must be adjusted to nominally 7 inches. Piston travel of brake cylinders on all freight cars equipped with other than standard single capacity brake, must be adjusted as indicated on badge plate or stenciling

¹ Available at Association of American Railroads.

on car located in a conspicuous place near brake cylinder. After piston travel has been adjusted and with brakes released, sufficient brake shoe clearance must be provided.

(iii) When a car is equipped for use in passenger train service not due for periodical air brake repairs, as indicated by stenciled or recorded cleaning dates, is on shop or repair tracks, brake equipment must be tested by use of single car testing device as prescribed by currently effective AAR Code of Tests. Piston travel of brake cylinders must be adjusted if required, to the standard travel for that type of brake cylinder. After piston travel has been adjusted and with brakes released, sufficient brake shoe clearance must be provided.

(iv) Before a car is released from a shop or repair track, it must be known that brake pipe is securely clamped, angle cocks in proper position with suitable clearance, valves, reservoirs and cylinders tight on supports and supports securely attached to car.

(3) (1) If triple valve, control valves or brake cylinders on a freight car do not meet requirements during single car test as specified by the currently effective AAR Code of Tests,¹ brake equipment must be given attention specified by currently effective AAR approved Code of Rules¹ for cars in interchange.

(ii) If, on passenger equipment cars, triple valves, control valves, brake cylinders, slack adjusters, high speed reducing valves, relay valves, quick service valves, vent valves, brake application valves or conductor's valves do

not meet requirements during single car test as prescribed by paragraph (a)(2)(ii) of this section, and if speed governor control, magnet valves, or wheel slide control does not operate properly when tested by a suitable test device, defective part or parts must be repaired or replaced and new cleaning date must be stenciled or recorded as required.

(4) When cars are on shop or repair tracks hand brakes and connections must be inspected, tested and necessary repairs made to insure they are in a suitable condition for safe and effective operation.

(b) *Periodical repairs.* Brake equipment on cars must be cleaned, repaired, lubricated and tested as often as required to maintain it in a safe and suitable condition for service but not less frequently than as required by currently effective AAR Code of Rules¹ for cars in interchange.

§ 232.19 [Removed]

**APPENDIX—SPECIFICATIONS AND REQUIREMENTS
FOR POWER BRAKES AND APPLIANCES FOR
OPERATING POWER-BRAKE SYSTEMS FOR
FREIGHT SERVICE**

PURPOSE

The purpose of this specification is to define and prescribe requirements for power brakes and appliances for operating power-brake systems.

DEFINITIONS

For purposes of this specification, terms used herein are defined as follows:

1. *Power brake.* A combination of parts operated by compressed air and controlled manually, pneumatically or electrically, by means of which the motion of a car or locomotive is retarded or arrested.

2. *Power-brake system.* The power brakes on locomotives and cars of a train so interconnected that they can be operated together and by means of which the motion of the train is retarded or arrested.

3. *Brake valve.* The valve of the locomotive equipment by means of which operation of the power-brake system is controlled.

4. *Equalizing reservoir.* The small reservoir connected to the brake valve only, the pressure of which is reduced by the engineer for making service applications.

5. *Brake pipe.* The line of pipe and hose extending throughout the length of the train by means of which compressed air is supplied to the brake devices on the several cars and the pressures so controlled as to effect the application and release of the brakes.

6. *Operating valve.* Device on each car, the operation of which result in (a) Admission of air to brake cylinder, (b) release of air from brake cylinder, and (c) charging of one or more reservoirs.

7. *Service reduction.* A decrease in brake-pipe pressure, usually of from 5 to 25 pounds, at a rate sufficiently rapid to move the operating valve to service position, but at a rate not rapid enough to operate the valve to emergency position. Quick service is that feature of the operating valve which provides for local reduction of brake-pipe pressure.

8. *Service application.* A brake application which results from one or more service reductions.

9. *Full service reduction.* A service reduction sufficient in amount to cause equalization of pressure in brake cylinder with pressure in the reservoir from which compressed air is supplied to brake cylinder.

10. *Full service application.* A brake application which results from one or more brake-pipe reductions sufficient in amount to cause a full service reduction.

11. *Emergency reduction.* A depletion of brake-pipe pressure at a rate sufficiently rapid to move the operating valve to emergency position.

12. *Emergency application.* A brake application which results from an emergency reduction.

13. *Emergency brake-cylinder pressure.* The force per square inch exerted upon piston in brake cylinder by compressed air which is admitted to brake cylinder as a result of an emergency reduction. Effective emergency brake-cylinder pressure is a pressure not less than 15 percent nor more than 20 percent greater than the brake-cylinder pressure obtained from a full service reduction on the

game car and from the same initial pressures.

SPECIFICATIONS

General Requirements

14. The design of the operating valve shall be such as will insure efficient and reliable operation, both in its application and release functions and when intermingled with other types of power brakes. It shall be so constructed that the rate of brake-cylinder pressure development may be adjusted to meet such changes in train operating conditions as may develop in the future.

15. The design of the service and emergency valves shall be such as to permit their removal for cleaning and repair without disturbing pipe joints.

16. The portions of the car brake which control the brake application and release, and also the brake cylinder, shall be adequately protected against the entrance of foreign matter.

17. The apparatus conforming to the requirements of these specifications shall be so constructed, installed and maintained as to be safe and suitable for service.

Service Requirements

The apparatus shall be so designed and constructed that: (based upon 70 pounds brake-pipe pressure and train length of 150 cars)

18. With a service reduction of 5 pounds in the equalizing reservoir at the brake valve all brakes will apply.

19. An initial 5-pound equalizing-reservoir reduction at the brake valve will produce substantially 10 pounds brake-cylinder pressure throughout the train, including brakes having piston travel in excess of 8 inches.

20. With an equalizing-reservoir reduction of 10 pounds, the difference in time of obtaining substantially 10 pounds pressure in the brake cylinder of the first and one hundred and fiftieth brakes will be nominally 20 seconds or less.

21. A brake-pipe reduction of 10 pounds will result in pressure in each brake cylinder of not less than 15 pounds nor more than 25 pounds.

22. A total brake-pipe reduction of 25 pounds will result in equalization of brake-cylinder pressure with pressure in the reservoir from which compressed air is supplied to

the brake cylinder, and brake-cylinder pressure of not less than 48 pounds nor more than 52 pounds will be obtained.

23. Quick service activity of the train brakes will cease when the initial quick service action has been completed.

24. The quick service feature of the brake will produce substantially uniform time of quick service transmission regardless of the unavoidable variations in frictional resistance of the parts.

25. The brake will so function as to prevent a degree of wave action in brake-pipe pressure sufficient to cause undesired release of any brake while the brakes are being applied.

26. The degree of stability will be sufficient to prevent undesired service application occurring as a result of unavoidable minor fluctuations of brake-pipe pressure.

27. The brake-cylinder pressure increase resulting from quick service operation will be less when the brake is reapplied with pressure retained in the brake cylinder than with applications made when the brake-cylinder pressure is zero.

28. Undesired quick action will not result with any rate of change in brake-pipe pressure which may occur during service application or release of the brake.

29. In the normal release of train brakes, individual car brake will not start recharging from the brake pipe until brake-pipe pressure has increased sufficiently to have accomplished the release of adjacent valves.

30. The recharge of auxiliary reservoirs in the forward portion of the train will be automatically retarded while full release position of the brake valve is being used to initiate the release of train brakes.

31. After a 15-pound service reduction has been made and brake-valve exhaust has closed, in a release operation in which brake valve is moved to release position and after 15 seconds is moved to running position, air operating valves will move to release position nance machines built prior to September 21, 1945;

d. Export, industrial, and other than railroad owned cars which are not to be used in service by respondents, except for movement as shipments on their own wheels to given destinations, provided that any such car so

moved shall be properly identified by a card attached to each side of car, signed by shipper, stating that such movement is being made under authority of this order; and

e. Industrial and other than railroad owned cars which are not to be used in service by respondents except for movement within the limits of a single switching district.

And, that the effective date of said order of September 21, 1945, as amended, be, and it is hereby, extended until further order of the FRA, insofar as it applies to:

f. Narrow-gauge cars, and

g. Cars being returned from Canada or Mexico to owners in the United States, provided each such car being returned is routed directly to owner and is properly identified by a card attached to each side of car, signed by shipper, stating that the movement is being made under authority of this order.

(72 Stat. 86, 45 U.S.C. 9; sec. 6 (e), (f), 80 Stat. 939, 49 U.S.C. 1655; and sec. 1.49(c) of the regulations of the Office of the Secretary of Transportation, 49 CFR 1.49(c))

Issued in Washington, D.C., on August 17, 1982.

Robert W. Blanchette,
Administrator.

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