

CANADIAN PACIFIC RAILWAY COMPANY

MECHANICAL DEPARTMENT

**MAINTENANCE REGULATION - STEAM LOCOMOTIVES**

**SUBJECT:** INSTALLATION AND MAINTENANCE OF  
LOCOMOTIVE BRICK ARCHES.

**ISSUE:** ROAD AND SHOP.

**REGULATION NO.** SL-13-8

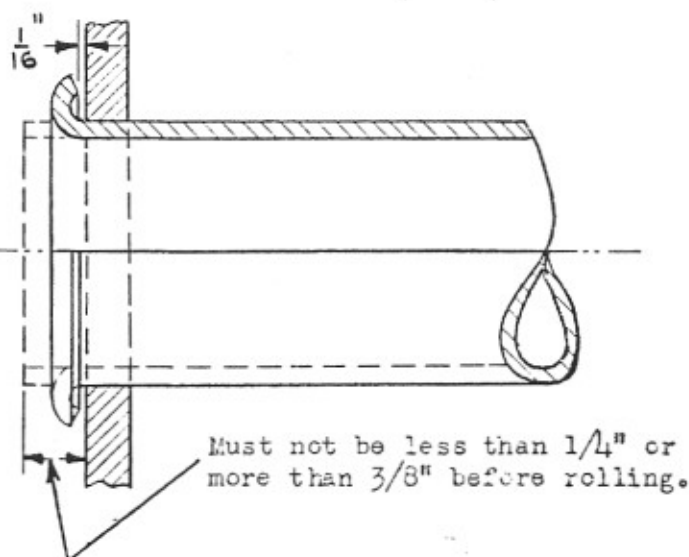
**PAGE** 2 of 2

**DATE** January 1952

**SUPERSEDES** 13-MR-8 October 1932

warped or defective in any other way must be renewed. Slightly warped tubes may be straightened with tool list No. 15-T-918, drawing D-15-T-923. When boiler is empty, arch tubes must be hammer tested to locate thin spots. Arch tubes must not be welded or safe ended. In order to keep record of arch tube mileage, show the words "arch tubes applied" and date in lower right hand corner of form 181.

5. **BRICKS.** When it is necessary to remove bricks, all slag should be cut from tubes and bricks with special hatchet shown on drawing B-15-T-917, list No. 15-T-919. This will permit removal of bricks without breakage. When bricks are removed, for caulking or cleaning boiler tubes, they should be piled in back of firebox, and not passed or thrown out of fire door. The less they are handled, the less the breakage.
6. **ORDERING.** The number, length, diameter and thickness of tubes for various classes of locomotives will be found on 13-MR-9. Brick numbers and the number required per engine is also given for various classes of power on 13-MR-9. This information is given for ordering purposes only. When ordering bricks, only those which have to be renewed frequently should be ordered in quantity.
7. **STORING.** Particular care must be taken to store bricks in a dry place. If wet bricks are installed in a locomotive firebox the moisture forms steam and causes the bricks to seam and check. Bricks must be absolutely dry to give proper service. When storing, pile all bricks of the same pattern together so that stock may be easily checked.



**NOTE:** Pending revision this Maintenance Regulation supersedes immediately LR card 13-MR-8 (dated October 1932) which should be destroyed.

CANADIAN PACIFIC RAILWAY COMPANY

MECHANICAL DEPARTMENT

(A2)

MAINTENANCE REGULATION - STEAM LOCOMOTIVES

SUBJECT: REDUCTION OF BOILER PRESSURE  
WHILE EFFECTING REPAIRS.

REGULATION NO. SL-13-10

PAGE 1 of 1

DATE March 1957

ISSUE: ROAD AND SHOP

SUPERSEDES (1st issue)

IMPORTANT

The steam pressure of locomotive boilers must be reduced to zero before attempting to hammer up or caulk any staybolt or crown bolt on any part of the fire box, where leakage is of such a nature that repairs are deemed necessary.

Reference File 8156 - March 8, 1957.

Approved as System Standard by Chief of Motive Power & Rolling Stock

CANADIAN PACIFIC RAILWAY COMPANY

MECHANICAL DEPARTMENT

MAINTENANCE REGULATION - STEAM LOCOMOTIVES

SUBJECT: DRIVING BOXES, SHOES AND WEDGES.

ISSUE: ROAD AND SHOP.

REGULATION NO. SL-17-1  
PAGE 1 of 1  
DATE January 1952  
SUPERSEDES 17-MR-1 Feb. 1934

1. GENERAL.

NEW BOXES, to be accurately machined to dimensions shown on driving box drawings, the fit between bottom jaws for spreader casting should not be finished until after the brass is pressed in on account of jaws spreading. Fit in top of box for spring saddles must be machined on all new boxes.

BOXES UNDER REPAIRS, the distance between jaws on boxes for spreader castings must not be less than drawing size nor more than  $1/8$ " larger. On boxes using grease cellars only, the allowance is not less than drawing size nor more than  $1/4$ " between jaws.

2. FITTING DRIVING BOX BRASSES. Main driving box brasses must be bored  $1/100$  of an inch larger than actual diameter of journal. All other driving box brasses must be bored  $1/64$  of an inch larger than actual diameter of journal. Standard driving box brasses must be machined in accordance with drawing B-52-L-904. After machining operations, all sharp edges and burrs must be removed by scraping.
3. LIMIT OF WEAR ON BRASSES. Standard type of driving box brasses with original crown thickness less than 2 inches must be renewed when crown is worn  $3/8$  of an inch. Brasses with original crown thickness 2 inches and over may have this limit extended to  $3/4$  of an inch. In both cases brasses must be renewed if they will not meet the fitting tolerances called for in Clause No. 2.
4. SHOES AND WEDGES. Engines receiving No. 1 or No. 2 repairs must not be turned out with more than one liner on either shoe or wedge, such liners to be not less than  $1/8$ " thick and not more than  $3/8$ " and must be securely riveted in place with  $3/8$ " rivets. After liners are applied, machine face of shoe and wedge to suit distance across faces of box.

At No. 3 and running repairs, not more than two (2) such liners may be used.

Wedge bolt heads must be a good fit in the wedge at each No. 1 and No. 2 repair.

5. LUBRICATION. See Maintenance Regulation SL-52-2 for instructions regarding lubrication of driving boxes.

NOTE: Pending revision, this Maintenance Regulation supersedes immediately LR card 17-MR-1 (dated February 1934), which should be destroyed.

## CANADIAN PACIFIC RAILWAY COMPANY

## MECHANICAL DEPARTMENT

MAINTENANCE REGULATION - STEAM LOCOMOTIVESSUBJECT: APPLICATION OF DRIVING BOX BRASSES.

REGULATION NO. SL-17-2

PAGE 1

DATE December 1951

SUPERSEDES 17-MR-2 Feb. 1922

ISSUE: Shop.

Seating Pressures:

Brasses are to be pressed into boxes under the range shown in the table below. Pressures shown are based on the assumption that all existing boxes are cast steel. If cast iron boxes are encountered on some of the older power, the seating pressure to be used is to be 30% less than that shown for cast steel boxes.

Spring of box:

Brasses must be removed and refitted if the box spreads more than  $\frac{3}{64}$  of an inch due to pressure of seating brass. The spread is to be measured at the bottom of the cellar or spreader fit.

Fastening:

All brasses are to be held in place in the box by means of a steel plug applied as shown on drawing B-17-L-833. The diameter of the plug when new is to be 1" and hole may be reamed to a maximum diameter of  $1 \frac{1}{8}$ ".

TABLE OF SEATING PRESSURES

<u>Dia. of Journal</u>	<u>Pressure in tons per sq. in.</u>
7"	13 to 16
$7 \frac{1}{4}$ "	13 to 16
$7 \frac{1}{2}$ "	15 to 20
8"	16 to 21
$8 \frac{1}{2}$ "	17 to 22
9"	20 to 25
$9 \frac{1}{2}$ "	22 to 27
10"	25 to 30
$10 \frac{1}{2}$ "	27 to 32
11"	28 to 33
$11 \frac{1}{2}$ "	29 to 34
12"	30 to 35
$12 \frac{1}{2}$ "	32 to 37

# CANADIAN PACIFIC RAILWAY COMPANY

## MECHANICAL DEPARTMENT

### MAINTENANCE REGULATION - STEAM LOCOMOTIVES

SUBJECT: TENDER BRAKE BEAMS

REGULATION NO. SL-21-1

NO. OF SHEETS 1 of 2

DATE December 1950  
SUPERSEDES 21-MR-1 May 1932 (see note)

ISSUE: ROAD AND SHOP

#### 1. TENDER BRAKE BEAM TYPES

- \* (a) All four wheel tender trucks with the exception of the F2 class are equipped with the Simplex Truss Type of brake beam.
- (b) The F2 class, 7000 gallon tenders ~~with~~ four wheel trucks, and all 12,000 gallon tenders with six wheel trucks are equipped with the clasp type of brake.
- (c) On tenders of less than 5000 gallons capacity, 6" - I section brake beams may be used if available, but no new I section beams are to be purchased.

*246-5000g (imperial)*

#### 2. Before applying new or reclaimed beams to any tender trucks the following check should be made.

- (a) Capacity of tender
- (b) Class or serial number on tender identification plate
- (c) Class of beam with which the truck should be equipped as shown in the table below

<u>TENDER WATER CAPACITY</u>	<u>TYPE OF BEAM</u>	<u>DRAWING NO.</u>
Under 5000 gallons	6" - I Section--only if reclaimed beam available	B-21-L-230
<del>7000 gal.-F2 class only</del>	<del>Simplex Clasp Type</del>	<del>B-21-L-533 B-21-L-536</del>
<del>7800 gal. and under except F2 class</del>	<del>Simplex No. 1</del>	<del>D-21-L-424</del>
<del>8000 gal. originally built for G3d class</del>	<del>Simplex No. 6</del>	<del>D-21-L-425</del>
<del>8000 gal., except as in line above</del>	<del>Simplex No. 5</del>	<del>D-21-L-426</del>
<del>10,000 gal.</del>	<del>Simplex No. 5</del>	<del>D-21-L-426</del>
<del>12,000 gal.</del>	<del>Clasp Type</del>	<del>D-21-L-457</del>

- 3. STANDARD DISTANCE BETWEEN CENTRES of brake heads is 60 inches. New beams will be rejected if over 60 1/8" or less than 59 7/8" between centres. Beams under repair must be made standard if found to vary more than 1/8" either way from 60 inch centres.

## CANADIAN PACIFIC RAILWAY COMPANY

## MECHANICAL DEPARTMENT

MAINTENANCE REGULATION - STEAM LOCOMOTIVESSUBJECT: TENDER BRAKE BEAMS

REGULATION NO. SL-21-1

NO. OF SHEETS 2 of 2

DATE December 1950

SUPERSEDES 21-MR-1 May 1932  
(see note)

ISSUE: ROAD AND SHOP

4. RIGHT AND LEFT HAND BRAKE BEAMS are distinguished by the following rule:  
Face the beam with the centre strut pointing away from you; if the top of the brake lever would come on the right it is a right hand beam. If on the left, it is a left hand beam.
5. SIMPLEX BEAMS can be identified as follows:

TYPE	DIA. OF TRUSS ROD	FULCRUM	
		Patt. No	Dwg. No
No 4 Beam	1 5/8"	BB-65 R & L	B-21-L-413
No 5 Beam	1 3/4"	BB-65 R & L	B-21-L-413
No 6 Beam	2"	BB-208 R BB-209 L	B-21-L-429

NOTE: Pending revision, this Maintenance Regulation supersedes immediately MR card 21-MR-1 dated May 1932, which should be destroyed.

## CANADIAN PACIFIC RAILWAY COMPANY

## MECHANICAL DEPARTMENT

MAINTENANCE REGULATION - STEAM LOCOMOTIVES

SUBJECT: DAILY BRAKE TESTS  
AND  
WEEKLY GAUGE TESTS.

ISSUE: ROAD AND SHOP.

REGULATION NO. SL-22-1

NO. OF SHEETS 1 of 3

DATE April 1951

SUPERSEDES December 1950

1. ENGINES BEFORE BEING SUPPLIED FOR SERVICE MUST BE INSPECTED AND TESTED as follows;
2. STANDARD PRESSURES as called for on this regulation must be used for these tests and when variation exceeds 2 pounds, trouble must be corrected.

Passenger and Passenger Switching Locomotives		Freight, Mixed and Freight Switching Locomotives		All Locomotives
Main Reservoir Pressure	Brake Pipe Pressure	Main Reservoir Pressure	Brake Pipe Pressure	Signal Straight and Independent Brake Pressure
125 Pounds	90 Pounds	110 Pounds	70 Pounds	45 Pounds

NOTE: When operating conditions require special brake pipe and main reservoir pressures, authorization is given in current time table. For example, B.C. time table, at the present time, shows special pressures for certain trains.

3. FEED VALVES must be maintained so as to open and close promptly at the proper pressure for service required. In no case must the variation exceed 2 pounds without being corrected. When renewing feed valve, if using lead gasket a new gasket must be applied, if using W.A.B. Co's gasket, it may be re-applied when in good condition.
4. AIR COMPRESSOR GOVERNOR must be adjusted and maintained, for class of service required.
5. APPLY AUTOMATIC BRAKE, noting piston travel and angle of all levers on engine, trailing and tender trucks, after which place brake valve handle in running position and see if brake shoes are clear of wheels and pistons return to end of cylinders. On engines having E.T. equipment, after applying automatic brake, return valve handle to release position while inspection of levers and piston travel is being made, after which note on brake cylinder gauge that pressure does not vary more than amount allowed by paragraph No. 2.
6. ON ENGINES EQUIPPED WITH PEDESTALS, relay vent valve must be tested by making a 20-pound reduction, then place brake valve handle in emergency position. If relay valve fails to open, trouble must be found and corrected. Operation of brake pipe vent valve is to be checked in similar manner. When any joint in body of pedestal is broken, new gasket must be applied.



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CANADIAN PACIFIC RAILWAY COMPANY

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MAINTENANCE REGULATION - STEAM LOCOMOTIVES

SUBJECT: DAILY BRAKE TESTS  
AND  
WEEKLY GAUGE TESTS

ISSUE: ROAD AND SHOP.

REGULATION NO. SL-22-1  
NO. OF SHEETS 2 of 3  
DATE April 1951  
SUPERSEDES SL-22-1 Dec. 1950

7. ADJUST PISTON TRAVEL AND BRAKE HEADS if necessary. Tender and truck brake gear to be so adjusted that with brake applied cylinder levers are at right angles to pull rods, then apply straight air or independent brake (full application), noting that the gauge registers 45 pounds and when released that the gauge hand returns to Zero.
8. EXAMINE ALL BRAKE BEAM HANGERS, safety hangers, connecting rods and levers, seeing that proper pins and cotters are applied.
9. PISTON TRAVEL MUST BE ADJUSTED AS FOLLOWS:

On engine truck to 5 inches when exceeding 7 inches.  
On trailing truck to 3 inches when exceeding  $4\frac{1}{2}$  inches.  
On driver brake to 4 inches when exceeding 5 inches.  
On tender trucks to 6 inches when exceeding 8 inches.

Adjustment must be made on driver brakes so as to keep levers at right angles to pull rods when brakes are applied.

10. WHEN TESTING FOR LEAKS in piping, use full air pressure and apply soap suds to locate leaks. All air hose, air piping, and clamps, including reservoir clamps, supports and brackets, must be inspected and kept tight.
11. GAUGE TESTS. All air gauge pressures must be tested once each week on freight engines, and on all locomotives used in passenger service, before being supplied for service.  
Correctly adjusted test gauge to be applied to hose coupling on rear of tender to show condition of pump governor, feed valve, brake valve, pressure reducing valve and accuracy of engine gauge.
12. WHEN TESTS ARE COMPLETED, after each run, or as soon as engine is placed in roundhouse, shut off steam supply line to air compressor and then open all drain cocks in the following order: 1st, main reservoirs; 2nd, air compressor; 3rd, drain cock at bottom of dirt collectors, if equipped; 4th, angle and cut out cocks on brake and signal pipes on front of engine and rear of tender. These cocks must remain open until engine is being prepared for service.
13. PREPARING ENGINE FOR SERVICE: fill oil cups, compressor lubricators, and oil the swab, using valve oil only.  
Place automatic brake valve handle on lap position, start the compressor slowly, close compressor drain cocks, and after reservoir is drained of moisture, close reservoir drain cocks; also drain cocks at bottom of dirt collectors and when maximum main reservoir pressure has been obtained move brake handle to release position until brake pipe is thoroughly blown out, then close angle cocks at front of engine and rear of tender.



CANADIAN PACIFIC RAILWAY COMPANY

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MAINTENANCE REGULATION - STEAM LOCOMOTIVES

SUBJECT: DAILY BRAKE TESTS  
AND  
WEEKLY GAUGE TESTS

ISSUE: ROAD AND SHOP.

REGULATION NO. SL-22-1

NO. OF SHEETS 3 of 3

DATE April 1951

SUPERSEDES SL-22-1 Dec. 1950

14. WHEN ANY TROUBLE OCCURS, or has been reported with any part of the air brake or air signal, test must be made as per maintenance regulation covering part, or parts, to locate trouble and when found must be corrected.
15. ENGINEER'S TEST. In addition to shop tests, the engineer must make the following tests, when taking charge of locomotive - apply and release air brakes, operate the air signal and blow out the steam heat line before locomotive leaves shop track.

NOTE: Pending revision, this Maintenance Regulation supersedes immediately MR card 22-MR-1 dated May 1933, which should be destroyed.

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CANADIAN PACIFIC RAILWAY COMPANY

MECHANICAL DEPARTMENT

**MAINTENANCE REGULATION - STEAM LOCOMOTIVES**

**SUBJECT: MONTHLY AND OTHER BRAKE TESTS**

**REGULATION NO. SL-22-2**

**NO. OF SHEETS 1 of 2**

**DATE December 1950**

**SUPERSEDES 22-MR-2 May 1933**

**see not**

**ISSUE: ROAD AND SHOP.**

1. DRIVER BRAKE, TRUCK AND TENDER BRAKE CYLINDERS must be cleaned, properly lubricated with standard lubricant, and tested at every No. 1 repair. If, under test, the leakage at proper piston travel exceeds two lbs. per minute from 50 lbs. brake cylinder pressure, the leak must be found and corrected.
2. DRIVER BRAKE, TRUCK AND TENDER BRAKE CYLINDERS on engines in service must be cleaned, lubricated with standard lubricant, and tested when leakage is such that with full service application from maximum brake pipe pressure and with communication to the brake cylinders closed, the brakes on locomotive and tender fail to remain applied for over five minutes.
3. TO TEST FOR BRAKE CYLINDER LEAKAGE on engines with E.T. equipment, apply brake with independent valve. Close cut out cock in distributing valve supply pipe and observe brake cylinder gauge, which will indicate the amount of leak from cylinders. To determine which cylinders are leaking, in addition to the above, close cut out cock in pipes leading to the truck brake cylinder, and then observe pressure registered on gauge, and if there is no drop in pressure, this procedure is also to be followed for driver brake cylinders and then tender brake cylinders.
4. SLACK ADJUSTERS, Automatic slack adjusters at brake cylinders, also manual slack adjusters on 6 wheel tender trucks, must be cleaned and lubricated when driving brake cylinders are cleaned.
5. RECORDING OF TESTS. For method of recording tests and cleaning, see Maintenance Regulation sheet SL-22-6.
6. DISTRIBUTING VALVES, TRIPLE, DOUBLE CHECK, REDUCING, AND SAFETY VALVES, ALSO DIRT COLLECTORS, must be cleaned as often as conditions require to maintain them in a safe and suitable condition, but must be removed from service every (6) six months and replaced with valves which have been properly cleaned, lubricated, stencilled and tested on standard testing device. All of the above valves which have been removed must be sent to the nearest test rack for cleaning, testing and stencilling, in accordance with W.A.B. Co's pamphlet No. 5039 of current issue.
7. FEED VALVES AND VENT VALVES must not be allowed to remain over (3) three months in passenger service, or (6) six months in freight service, without being removed, cleaned and tested. All valves removed must be sent to the nearest test rack for cleaning, testing and stencilling, in accordance with W.A.B. Co's pamphlet No. 2388 and 2386 of current issue.

When renewing feed valve, if using lead gasket, a new gasket must be applied; if using W.A.B. Co's gasket, it may be re-applied when in good condition.

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## CANADIAN PACIFIC RAILWAY COMPANY

## MECHANICAL DEPARTMENT

## MAINTENANCE REGULATION - STEAM LOCOMOTIVES

SUBJECT: MONTHLY AND OTHER BRAKE TESTS

REGULATION NO. SL-22-2

NO. OF SHEETS 2 of 2.

DATE December 1950

SUPERSEDES 22-MR-2 May 1933 (see note)

ISSUE: ROAD AND SHOP.

8. RELAY VENT VALVES must be cleaned every (6) six months and when engines are shopped for general repairs. Pedestals must be removed at each general repair and new gaskets applied.
9. AIR COMPRESSOR STRAINER must be examined and filtering material cleaned or renewed at every No. 1 repairs, also between general repairs when found necessary to do so.
10. STENCILLING. Old stencil marks must be completely removed or painted out with black quick drying paint to specification No. 92, and re-stencilled with white stencil paint No. 20-0 to specification No. 92.

Pending revision, this Maintenance Regulation supersedes immediately MR Card 22-MR-2 dated May 1933, which should be destroyed.

# CANADIAN PACIFIC RAILWAY COMPANY

## MECHANICAL DEPARTMENT

### MAINTENANCE REGULATION - STEAM LOCOMOTIVES

SUBJECT: METHOD OF TESTING

REGULATION NO. SL-22-3

Brake Valves, Distributing Valves, Safety Valves, No. OF SHEETS 1 of 3

Brake Pipe Vent Valves, Feed Valves, Signal Valves, DATE December 1950

ISSUE: ROAD AND SHOP.

SUPERSEDES 22-MR-3 April 1933 (see note)

1. BRAKE PIPE VENT VALVE. Inspection of brake pipe vent valve should include examination of the exhaust port to determine that it is not plugged. In case the vent valve produces an emergency application when a full service application is made by the automatic brake valve, the vent valve must be removed for cleaning, repairing and testing in accordance with W.A.B. Instruction Leaflet No. 2386, of current issue.
2. DISTRIBUTING VALVE TEST. To test distributing valve make a twenty pound service reduction, release with automatic brake valve and place brake valve handle in holding position, then note that application cylinder and its connections are not leaking by observing brake cylinder gauge which should indicate any loss in pressure. Place automatic brake valve handle in running position and after all air has escaped from brake cylinders, make a five pound service reduction and note if brakes apply promptly. Failure to do so indicates defective distributing valve which must be changed for one in good condition.
3. ENGINEER'S BRAKE VALVE. While testing, note carefully the condition of the equalizing piston and preliminary exhaust port. With preliminary exhaust port free from dirt the time required to reduce the brake pipe pressure, with 10" x 14 1/2" equalizing reservoirs, from 70 to 50 lbs. should be not more than eleven, or less than nine seconds. With clear preliminary exhaust port the equalizing piston must lift and reduce brake pipe pressure at commencement of preliminary exhaust.

With standard pressure in brake pipe, place handle in service position until black hand on gauge drops to Zero, then close double-heading cock under brake valve and place handle in lap position.

Harmful rotary valve leakage will be indicated by blow at the brake pipe exhaust. Leakage past the body gasket or rotary valve into the equalizing reservoir will be indicated by an increase in pressure on the equalizing reservoir gauge.

Leakage from the equalizing reservoir will be indicated by a decrease in pressure on the same gauge.

If engine is equipped with E.T. brake and brake cylinder pressure increases (shown by gauge) or the safety valve blows intermittently, it indicates leakage past rotary valve into application cylinder of distributing valve. Where engines are equipped with pedestals and relay valves, brake valves used must be those with sanding ports.

4. FEED VALVE. If feed valve permits variation in pressure of more than two pounds, it must be replaced by one in good condition. Cleaned and repaired feed valves must be tested as per W.A.B. Instruction Leaflet Number 2388, of current issue.
5. INDEPENDENT BRAKE VALVE. It is important to observe that no external leakage exists in brake valve or its pipe connections, and that the handle and return spring work properly. To test for leaky rotary valve, make a partial independent application of brakes, placing handle on lap. If brake

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Approved as System Standard by Chief of Motive Power & Rolling Stock.

MAINTENANCE REGULATION - STEAM LOCOMOTIVES

SUBJECT: METHOD OF TESTING

REGULATION NO. SL-22-3

Brake Valves, Distributing Valves, Safety Valves,

NO. OF SHEETS 2 of 3

Brake Pipe Vent Valves, Feed Valves, Signal Valves,

DATE December 1950

ISSUE: ROAD AND SHOP.

SUPERSEDES 22-LR-3 April 1933 (see note)

5. INDEPENDENT BRAKE VALVE. (Cont'd).

cylinder pressure increases gradually, rotary valve is leaking and repairs must be made. Apply the brakes with automatic brake valve and leave automatic brake valve handle in lap position, then move independent brake valve handle to release position, this should release the brakes. If it fails to do so, the application cylinder and distributing valve release pipes are crossed.

6. SIGNAL. All reducing valves must be adjusted to carry 45 lbs. in signal system. All stop cocks, joints, unions, signal pipes and hose, must be examined carefully for leakage. Attach test gauge to signal line hose to ascertain if signal gauge registers correctly, using Westinghouse coupling device, piece number 13775. While making test with light engine see that the pressure reducing valve responds promptly and charges signal line quickly. The signal valve should act and sound the whistle with a reduction of from 3 to 5 lbs. Signal valve found in bad order must be replaced at once by one known to be in good condition, and valve removed must be forwarded to main shop for repairs and testing in accordance with W.A.B. Instruction Leaflet Number 2377, of current issue.

On engines equipped with E.T. brake, and with a reasonably tight signal pipe, should the whistle blow when an independent brake application is made, it indicates leaky check valve, or an improper operating reducing valve. Keep the pressure reducing valve, signal valve and whistle free from dirt and keep whistle adjusted and clamped.

All signal valves sent to the shop for repairs or signal valves on engines receiving repairs, should be removed, taken apart and all parts and all details carefully examined so as to make sure that all parts are in correct alignment and condition. If there is any doubt about the life remaining in the diaphragm, it is to be replaced.

7. STRAIGHT AIR BRAKE VALVE. No leakage must exist in pipes or connections. To test, make partial application noting on the gauge that brake cylinder pressure does not gradually increase. Should it increase look for defect in application valve or seat. To test S-3-A straight air brake valve, apply automatic brake and leave automatic brake valve handle in lap position, then move straight air brake valve handle to full release, this should release the driver brakes. If it fails to do so, the double-seated check valve in driver brake release attachment is at fault.
8. SAFETY VALVE. When testing safety valves, 90 pounds brake pipe pressure must be used. Note that valve is screwed in place properly, that cap nut is screwed down on regulating nut making an airtight joint with the body and that all vent holes and ports are open. Make an emergency application of brakes, allowing handle to remain in emergency position, and note if proper brake cylinder pressure is obtained. If safety valve is properly adjusted (68 lbs. on E.T. equipment and 53 lbs. on engines

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## CANADIAN PACIFIC RAILWAY COMPANY

## MECHANICAL DEPARTMENT

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MAINTENANCE REGULATION - STEAM LOCOMOTIVES

## SUBJECT:

METHOD OF TESTING

REGULATION NO. SL-22-3

NO. OF SHEETS 3 of 3

DATE December 1950

SUPERSEDES 22-MR-3 April 1933  
(see note)

ISSUE: ROAD AND SHOP.

## 8. SAFETY VALVE. (Cont'd)

and tenders equipped with straight air), it will permit pressure in brake cylinders, in excess of those adjustments, to escape. If valve, before closing, allows cylinder pressure to reduce below above limits, the trouble is either enlarged holes leading from valve spring chamber or dirt making piston valve too tight a fit; defective safety valve must be removed and replaced by one known to be in operative condition.

NOTE: Pending revision, this Maintenance Regulation supersedes immediately MR card 22-MR-3 dated April 1933, which should be destroyed.

Approved as System Standard by Chief of Motive Power & Rolling Stock.

MAINTENANCE REGULATION - STEAM LOCOMOTIVESSUBJECT: LOCOMOTIVE AIR COMPRESSOR  
TESTS, MAINTENANCE AND REPAIRS

REGULATION NO. SL-22-4

PAGE 1 of 3

DATE August 1950

SUPERSEDES December 1950

ISSUE: ROAD AND SHOP

ENGINE HOUSE TESTS.

1. THE LIFT OF ALL COMPRESSOR AIR VALVES must be maintained at  $3/32$  of an inch.
2. ALL COMPRESSORS IN SERVICE SHALL BE TESTED for capacity, using the orifice test, as often as conditions may require, but not less frequently than once each three months.
3. TESTS - Before commencing tests, main reservoir leakage in excess of two ★ pounds per minute must be found and corrected. The diameter of orifice, speed of compressor, and air pressure to be maintained, are given in the following table which shall be used for altitudes up to and including 1000 ft. For altitudes over 1000 ft., the speed of the compressor may be increased 5 single strokes per minute for each 1000 ft. increase in altitude.

SIZE OF COMPRESSOR	SINGLE STROKES PER MINUTE	DIAMETER OF ORIFICE	CONSTANT AIR PRESSURE TO BE MAINTAINED
11 inch	100	$3/16$ inch	60
$8\frac{1}{2}$ inch C.C.	100	$9/32$ inch	60

Standard orifice holder and discs, drawing No. B-22-L-296 must be used coupled directly to main reservoir.

4. COMPRESSORS MUST BE REMOVED FROM SERVICE if they fail to conform to test requirements.

SHOP TESTS.

5. In addition to air brake shop test, all compressors receiving general repairs must be tested after application to engines in manner as described in Clause 3, except that performance must meet requirements in following table:

SIZE OF COMPRESSOR	SINGLE STROKES PER MINUTE	DIAMETER OF ORIFICE	CONSTANT AIR PRESSURE TO BE MAINTAINED
11 inch	85	$3/16$ inch	60
$8\frac{1}{2}$ inch C.C.	90	$9/32$ inch	60

MAINTENANCE

6. CLEANING - THE AIR END OF ALL COMPRESSORS must be washed out at every No. 1 repair and as often between shoppings as considered necessary but not less frequently than every six months at the same time as the rod and crank pin tests are made. If, however, compressors are equipped with a cartridge type filter at the air intake, the necessity for washing out between No. 1 repairs may be determined by the locomotive foreman in charge.



# CANADIAN PACIFIC RAILWAY COMPANY

## MECHANICAL DEPARTMENT

### MAINTENANCE REGULATION - STEAM LOCOMOTIVES

SUBJECT: LOCOMOTIVE AIR COMPRESSOR  
TESTS, MAINTENANCE AND REPAIRS

REGULATION NO. SL-22-4  
PAGE 2 of 3  
DATE August 1953  
SUPERSEDES December 1950

ISSUE: ROAD AND SHOP

TO CLEAN THE AIR COMPRESSOR AT NO. 1 REPAIR it should be placed in a vat containing an approved cleaning solution and left in the vat for three hours with the solution at boiling temperature. When the compressor is removed it is to be washed out by pumping clean water through it for a period of at least twenty minutes.

BETWEEN SHOPPINGS THE AIR COMPRESSOR AND THE FIRST MAIN RESERVOIR is to be washed out in the following manner.

- (1) Close out-out cock on first main reservoir.
- (2) Break joint at discharge end of first main reservoir and blank off line beyond union to prevent access of foreign matter into air lines while joint is broken.
- (3) Couple inlet end of compressor and outlet end of first main reservoir by piping or a hose to the barrel containing an approved cleaning solution and by working the air compressor, pump the solution through the compressor and the first main reservoir for at least two(2) hours after which clean water is to be pumped through compressor and reservoir until it becomes clear at the discharge end of the reservoir.

If the position of the reservoir is such that it is difficult to pipe from the discharge end of the reservoir to the barrel containing the solution then the joint at the discharge end should be blanked off to prevent water from entering the air lines. The drain cock on the bottom of the reservoir should then be removed and a discharge line piped from the outlet to the barrel.

After washing and rinsing, the air end of the air compressor must be lubricated by removing the outside top intake valve cap and pouring in two (2) ounces of C.C. 50 compressor oil. Care should be taken to see that valve cap is properly tightened up when replaced.

7. Care must be taken when applying air compressor to locomotive to see that true bearing is obtained between compressor lugs and bracket. Tighten up two diagonally opposite lugs and pack between other lugs and bracket if necessary.
8. GRINDING AIR AND STEAM CYLINDERS - Air cylinders must be reground when worn  $1/64$ " out of parallel. Steam cylinders must be reground when worn  $1/32$ " out of parallel.
9. WHEN ANY CYLINDER IS REGROUND ON AN AIR COMPRESSOR, other cylinders in line must also be ground.
10. WHEN AN 11 INCH COMPRESSOR CYLINDER IS WORN OVER  $11 \frac{1}{8}$ ", it must be rebored to  $11 \frac{1}{2}$ ", rebushed, and re-bored to standard diameter new.
11. CHAMFER IN STEAM AND AIR CYLINDERS must be maintained standard for cylinder diameter. By-pass grooves in low pressure steam cylinders must be maintained as per drawing.

CANADIAN PACIFIC RAILWAY COMPANY

MECHANICAL DEPARTMENT

MAINTENANCE REGULATION - STEAM LOCOMOTIVES

SUBJECT: LOCOMOTIVE AIR COMPRESSOR  
TESTS, MAINTENANCE AND REPAIRS

REGULATION NO. SL-22-4  
PAGE 3 of 3  
DATE August 1953  
SUPERSEDES December 1950

ISSUE: ROAD AND SHOP.

12. MAIN VALVE must be bushed when worn  $3/64$ " by boring out to  $4\ 1/8$ " on 11" compressors, pressing in bush and boring to standard diameter new. Left main valve cylinder head must be bushed when worn  $1/16$ " by boring out to 3" on 11" compressor, pressing in bush and boring out to standard diameter new.
13. ~~X~~ ON THE  $8\ 1/2$ " CROSS COMPOUND COMPRESSOR, when the large, small or main valve piston bush is worn more than  $1/64$ " it must be renewed.
14. WHEN WEAR BETWEEN REVERSING VALVE AND REVERSING VALVE ROD SHOULDERS on any compressor reaches  $3/64$ " ascertain by template which part is worn and renew it. Maximum side clearance between valve rings and grooves is three thousandths of an inch.
15. REVERSING VALVE MUST BE RENEWED IN ALL COMPRESSORS whenever reversing valve chamber is bushed.
16. New piston rings can be purchased in steps of  $1/16$  and must be machined and topped off to suit new or reground cylinders.
17. BEARING FACES on compressor lugs must be checked up for alignment.
18. AFTER WORK IS COMPLETE on compressor, all openings must be suitably capped.
19. TEST LUBRICATORS and make sure that oil passages to air and steam cylinders are kept open and that no oil is being lost through leaky joints.
20. RECORDING OF TESTS - For method of recording tests and cleaning, see Maintenance Regulation sheet SL-22-6.

## CANADIAN PACIFIC RAILWAY COMPANY

## MECHANICAL DEPARTMENT

## MAINTENANCE REGULATION - STEAM LOCOMOTIVES

SUBJECT: REPORTS AND RECORDS OF TESTS AND CLEANING  
OF AIR BRAKE AND SIGNAL EQUIPMENT

REGULATION NO. SL-22-6

NO. OF SHEETS 1 of 2

DATE December 1950

SUPERSEDES 22-MR-6 May 1933

ISSUE: ROAD AND SHOP.

1. ALL TESTS OR CLEANING of air brake and signal equipment, called for by Maintenance Regulation sheets SL-22-1 to SL-22-5, must be recorded or reported as follows:

TEST	PERIOD FOR TESTING OR CLEANING	RECORD OF TEST OR CLEANING	REMARKS
CYLINDER - Driving Brake	At General Repairs or as required by Test	ENGINES IN CANADIAN SERVICE- Add note on back of form M.P. 72, giving date of cleaning.	See sheet SL-22-2
Trailing Truck		ENGINES IN INTERNATIONAL SERVICE -	Clauses 1 & 2
Tender Truck		Record on Cab Card M.P. 90	
RESERVOIR - Hydro Test	Every 12 months	Form M.P. 72 and M.P. 66	See sheet SL-22-5 Clause 1
RESERVOIR - Hammer Test	Every 18 months	ENGINES IN CANADIAN SERVICE- Form M.P. 72	See sheet SL-22-5 Clause 2
		ENGINES IN INTERNATIONAL SERVICE - Add note on bottom of form M.P. 66	
COMPRESSOR- Orifice Test	Every 3 months	ENGINES IN CANADIAN SERVICE- Record of Serial Number of compressor and date of test to be recorded in office of Locomotive Foreman.	See sheet SL-22-4 Clause 2
		ENGINES IN INTERNATIONAL SERVICE - Record on form M.P. 90	
AIR GAUGES	PASSENGER - Daily or before each trip	ENGINES IN CANADIAN AND INTERNATIONAL SERVICE - Keep record in Locomotive Foreman's office of numbers of engines tested and date, also the amount gauge is out.	See sheet SL-22-1 Clause 11
	FREIGHT - Weekly	ENGINES IN INTERNATIONAL SERVICE - Every 3 months, record of the last test made must be shown on form M.P. 90 posted in cab.	over -

Approved as System Standard by Chief of Motive Power & Rolling Stock.

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## CANADIAN PACIFIC RAILWAY COMPANY

## MECHANICAL DEPARTMENT

MAINTENANCE REGULATION - STEAM LOCOMOTIVESSUBJECT: REPORTS AND RECORDS OF TESTS AND CLEANING  
OF AIR BRAKE AND SIGNAL EQUIPMENT.

REGULATION NO. SL-22-6

NO. OF SHEETS 2 of 2

DATE December 1950

SUPERSEDES 22-MR-6 May 1933.

ISSUE: ROAD AND SHOP.

<u>TEST</u>	<u>PERIOD FOR TESTING OR CLEANING</u>	<u>RECORD OF TEST OR CLEANING</u>	<u>REMARKS</u>
DISTRIBUTING VALVE			
TRIPLE "			
DOUBLE CHECK "			
REDUCING "	Every 6 months	Stencil date on each	
SAFETY "		part when cleaned and	See sheet
RELAY "		tested.	SL-22-2
DIRT COLLECTORS			Clauses 6, 7, 8 and 10.
FEED VALVES	Passenger Service		
VENT VALVES	3 months		
	Freight Service		
	6 months		

NOTE: Pending revision, this Maintenance Regulation supersedes immediately  
MR card 22-MR-6 dated May 1933, which should be destroyed.

Approved as System Standard by Chief of Motive Power &amp; Rolling Stock.

MAINTENANCE REGULATION - STEAM LOCOMOTIVES

SUBJECT: Regulation governing application  
of Tubular Glasses to Water Gauge  
Mountings.

ISSUE: ROAD AND SHOPS.

REGULATION NO. SL-24-1

NO. OF SHEETS 1 of 1

DATE Nov. 6/50 (2nd issue)

SUPERSEDES Issue of Aug. 18/50

APPLICATION

The following regulations are effective immediately and they supersede all previous instructions in connection with this subject. The new regulations automatically dispense with the use of the tapered gauge to drawing A-18-T-274 for measuring the internal diameter of the tubular water glass.

RENEWAL OF GLASSES

- (a) Gauge glasses are to be renewed at each monthly washout on all engines equipped with the new modified standard mountings having a copper circulating pipe as per drawing D-24-L-1356 and also on any engines where the water glass mountings are applied directly to the water column.
- (b) Gauge glasses are to be renewed every two weeks on all engines of 250 lbs. boiler pressure and over, which are equipped with the old standard mountings. X

High pressure engines in pool service will have the gauge glass changed at whatever point it happens to be at the end of the two week period, which can be determined from form M.P. 70 or 72 in cab, which shows date of last monthly washout.

- (c) Provided that operating conditions permit, gauge glasses may be left in service for one month on engines with low pressure boilers (under 250 lbs. pressure) and equipped with the old standard mountings. This decision will be left to the judgment of the locomotive foremen in the various terminals. )

RETENTION OF USED GLASSES

~~It will be necessary to retain only the last two used glasses,~~  
~~the glasses being only those removed from engines at the home terminal.~~

CANADIAN PACIFIC RAILWAY COMPANY

MECHANICAL DEPARTMENT

MAINTENANCE REGULATION - STEAM LOCOMOTIVES

SUBJECT: MAINTENANCE OF TOP AND LINE CHECKS.

REGULATION NO. SL-24-2

PAGE 1 of 2

DATE February 1952 (1st issue)

SUPERSEDES

ISSUE: ROAD AND SHOP.

Section 1. Shop.

- a. All top checks and lift type line checks are to be removed at every general repair and completely stripped, thoroughly cleaned and examined. All cast iron or steel bodies may be cleaned in a lye bath and afterwards washed off thoroughly. Brass parts, spindles, valves and valve seats should be cleaned by hand.
- b. After examination, all parts are to be repaired or renewed where necessary particular attention being paid to the condition of spindles and the connection of valve seat to spindle.
- c. All valve seats and valves are to be reground.
- d. The threads on all plugs and connections to be carefully examined to see if they are in good condition and that there is a proper fit between the male and female threads.
- e. When re-assembled top check valves and the valves on lift type line checks are to have the following lift:

Engines with two inspirators . . . . . 3/8" on each side.  
Engines with exhaust steam injector on one  
side and inspirator on other . . . . . 3/8" on each side.  
Engines with water pump on one side and  
inspirator on the other . . . . . 3/8" on inspirator  
side and 1/4" on  
pump side.

- f. When used, the swing type valve line check is to be removed and properly cleaned, examined, and repaired, renewing parts where necessary. Seat and valve to be reground.

When re-assembled, care should be taken to see that the swing valve moves freely in the body.

Section 2. Road.

- a. In accordance with the Board of Transport Commissioners' General Order 760 all boiler checks must be maintained in good operating condition, free from scale, foreign matter or leaks that would obstruct the flow of water to the boiler.
- b. In accordance with Board of Transport Commissioners' General Order 473, all top checks and line checks must be examined once each month and this should be done at the time of the monthly washout period.
- c. The lift of valves must be maintained to within 1/16" above or below that specified in paragraph "e" of Section 1, of this regulation.

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Approved as System Standard by Chief of Motive Power & Rolling Stock.

(64) CANADIAN PACIFIC RAILWAY COMPANY (62)

MECHANICAL DEPARTMENT

MAINTENANCE REGULATION - STEAM LOCOMOTIVES

SUBJECT: MAINTENANCE OF TOP AND LINE CHECKS.

REGULATION NO. SL-24-2

PAGE 2 of 2

DATE February 1952 (1st issue)

SUPERSEDES

ISSUE: ROAD AND SHOP.

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Section 2. Road (Continued)

- d. All top checks are to be removed from boiler at the annual hydrostatic test so that the opening into the boiler can be examined and cleaned out if necessary.

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## MAINTENANCE REGULATION - STEAM LOCOMOTIVES

SUBJECT: CROSSHEAD, WRIST PIN AND KEY.

REGULATION NO. SL-26-1

PAGE 1 of 1

DATE January 1952

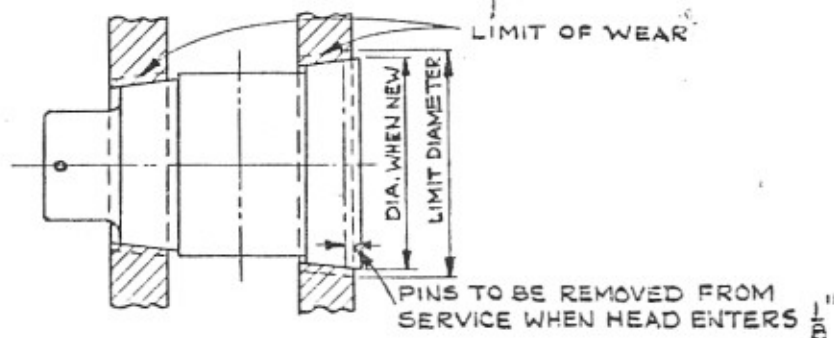
SUPERSEDES 26-MR-1 June 1930

ISSUE: ROAD AND SHOP.

1. VERTICAL SLACK between crosshead and guides must not exceed a total of  $1/8"$  on any type of crosshead.  
Alligator Crosshead with loose wearing blocks may be shimmed with a maximum of  $1/8"$  of packing under blocks.  
Crosshead must be kept central between guides by shimming at top and bottom.
2. SIDE PLAY between crosshead and guides must not exceed a total of  $1/4"$ .
3. CROSSHEAD KEY must be made of grade 75 or tire steel.  
CROSSHEAD KEY must be secured by two  $3/8"$  split pins, or one split cotter as called for by drawings.
4. WRIST PIN must be replaced when wrist pin hole is worn large enough to allow head to enter  $1/8"$  inside face of crosshead, as shown by sketch on back of this page. Wrist pins so removed, if large enough, may be used again on other crossheads.
5. SCRAPPING OF ALLIGATOR AND LAIRD CROSSHEADS must be done when wrist pin holes are worn to limit diameters shown in table below. Measurement to be taken at the large end of the hole.

ALLIGATOR AND LAIRD TYPE CROSSHEAD WRIST PIN HOLE

CLASSES	Diam. New	Limit Diam.
D4, U3.	$4 \frac{5}{16}"$	$4 \frac{9}{16}"$
D6bd,	$4 \frac{3}{4}"$	5"
D9, D10, G1, G2, M3, M4, V3, V4.	$4 \frac{7}{32}"$	$4 \frac{15}{32}"$
K1, T1.	$6 \frac{1}{8}"$	$6 \frac{3}{8}"$
N2, P1, R2, W1.	$5 \frac{5}{16}"$	$5 \frac{9}{16}"$
F2, G3, G4, H1.	$5 \frac{1}{2}"$	$5 \frac{3}{4}"$
R3.	$5 \frac{1}{4}"$	$5 \frac{1}{2}"$
S2	$5 \frac{3}{4}"$	6"



NOTE: Pending revision, this Maintenance Regulation supersedes immediately MR Card 26-MR-1 (dated June 1930), which should be destroyed.

Approved as System Standard by Chief of Motive Power & Rolling Stock.

## MECHANICAL DEPARTMENT

MAINTENANCE REGULATION - STEAM LOCOMOTIVES

SUBJECT: MAINTENANCE OF INSPIRATORS, LIFTING,  
NON-LIFTING AND EXHAUST STEAM INJECTORS.

REGULATION NO. SL-49-1

PAGE 1 of 1

DATE February 1952 (1st issue)

SUPERSEDES

ISSUE: ROAD AND SHOP.

Section 1. Shop Maintenance.

- a. All inspirators and/or injectors must be removed from the engine at every general repair and are to be completely overhauled. Since all of these units are specialties, those making repairs should be guided by the maintenance instructions issued by the suppliers and where special tools are necessary to prevent damage to parts they should be used.
- b. The bodies of the units are to be thoroughly cleaned and inspected for cracks.
- c. All parts especially nozzles are to be examined and replaced, where necessary.
- d. All valves and seats to be reground or renewed, if necessary.
- e. Every inspirator or injector must be in proper working order before being applied to locomotive and must be tested as soon as possible after engine is steamed up. Where two injectors or inspirators are used, both must be tested before the engine leaves the shop.

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Section 2. Road Maintenance.

- a. All injectors and/or inspirators must be maintained in good operating condition, free from scale, dirt or leaks which would prevent or obstruct the proper flow of water to the boiler.
- b. Before being dispatched from a terminal or any point where crews are changed, all injectors or inspirators must be tested separately to ensure that they are in proper condition to supply the boiler requirements.

This must be done regardless of whether the engine is or is not equipped with a feedwater pump.

- c. If an inspirator or injector is found defective, it must be removed and replaced by a unit of the same type and capacity and that is known to be in proper working condition.

MAINTENANCE REGULATION - STEAM LOCOMOTIVESSUBJECT: MAINTENANCE OF RADIUS RODS

REGULATION NO. SL-51-1  
PAGE 1 of 2  
DATE August 1953  
SUPERSEDES first issue

ISSUE: SHOP

1. All new radius rods must be magnafluxed for defects before being put into service.
2. All radius rods removed from an engine at general repair must be thoroughly cleaned and magnafluxed for defects before being returned to service.
3. If any cracks or flaws are found in the body of a radius rod between the front and centre connecting pin holes, the rod is to be scrapped. In no case may any welding be done on a radius rod within these limits either for defects or to restore worn surfaces.
4. If no cracking is found at any of the connecting pin holes, worn surfaces may be restored to standard by building up the faces with weld metal as specified in the Welding Manual, sheets 146.
5. If the connecting pin holes are not cracked, they are to be restored to standard diameter by plug welding as specified in the Welding Manual, Sheet 146.
6. If the connecting pin holes are found to be cracked and all cracks can be removed by reaming to not more than 1/4 inch over the standard diameter at the large end of the taper, then same may be done and the holes plug welded as specified in the Welding Manual Sheets 146. The rod must be re-magnafluxed after reaming and before any welding is done. Worn surfaces may also be built up to restore them to correct thickness.
7. If cracks are found at any of the connecting pin holes and they cannot be removed by reaming to 1/4 inch over the nominal diameter at the large end of the taper then the following rules shall apply.
  - (a) If the front connecting pin hole is affected, the rod is to be scrapped.
  - (b) If either the centre or back connecting pin holes are affected then new ends may be applied. The length to be governed by whether the centre or back, or both holes are affected.

This rule will apply whether or not new ends have to be applied to relocate dowel pin holes.

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CANADIAN PACIFIC RAILWAY COMPANY

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MAINTENANCE REGULATION - STEAM LOCOMOTIVES

SUBJECT: MAINTENANCE OF RADIUS RODS.

REGULATION NO. SL-51-1  
PAGE 2 of 2  
DATE August 1953  
SUPERSEDES first issue

ISSUE: SHOP

8.
  - (a) If dowel pin holes are located at the centre of the link block connecting pin hole, new ends are to be applied as shown in the welding manual and the dowel pin holes re-drilled at the side of the pin as shown on drawing A-51-L-1500.
  - (b) Dowel pin holes when located at the side of the link block connecting pin holes and when reamed to limit diameter may be restored by machining out a groove and filling same with weld metal as specified in the welding manual. The limit diameter to which the dowel pin hole may be reamed is governed by the amount of metal left between the edge of the dowel pin hole at the large end of the taper and the outer or inner face of the rod. In no case after reaming may this dimension be less than  $17/64$ " to allow  $1/64$ " for reaming to obtain clean metal for welding and retain the  $1/4$ " limit thickness specified in the welding manual.
9. See Welding Manual, Sheet 146 for instructions regarding normalizing of radius rods after any welding is done.

## MAINTENANCE REGULATION - STEAM LOCOMOTIVES

SUBJECT: GREASE LUBRICATION OF DRIVING BOXES.

REGULATION NO. SL-52-2

PAGE 1 of 1

DATE February 1952

SUPERSEDES 52-MR-2 August 1932

ISSUE: ROAD AND SHOP.

1. THE STANDARD GREASE LUBRICATOR for driving boxes is the Franklin Railway Supply Co's., No. 4.
2. APPLYING GREASE LUBRICATORS:
  - (a) Lubricator must fit box properly.
  - (b) See that concave surface of perforated plate fits the journal and that the plate fits freely in the cellar. Spread a thin coat of grease over the top before putting it up to ensure lubrication at the start.
  - (c) Follower plate must fit freely in cellar. Indicators attached to this plate, which project through the bottom of the cellar, should be long enough to leave  $\frac{3}{4}$ " of grease at the thinnest part of the cake when the top of the indicator eye is flush with the under side of the cellar.
  - (d) See that the follower springs are working.
  - (e) Fill all grooves or cavities in the brass with grease before putting the box on journal.

## 3. PACKING GREASE LUBRICATORS:

When the eye of the indicator pin is nearly flush with the bottom of the cellar, the lubricator must be re-filled. Take off the end plate, draw down the follower plate with a hook in the indicator eyes (see Drawing B-70-L-65 for this hook), and take out the perforated plate. Clean out the grease remaining in the cellar, scraping off dirt and preserving good grease to be worked over for further use. Clean the perforated plate by steam or in a lye vat (never heat it in a fire), refit it to the journal, then slip it on to a fresh cake of grease. To ensure lubrication when starting, roll the plate into the cake with a piece of pipe until grease comes through the perforations. Slip the grease cake and perforated plate into the cellar together and see that they are free to move in it. Replace and fasten the end plate.

4. WATER must not be allowed to enter the lubricator while there is any grease in it. Cover the boxes at boiler washouts to keep out dirty water, scale and mud.
5. GREASE SUPPLY must be kept clean and protected from moisture. Clean grease removed from cellars may be mixed with new grease in making up cakes.
6. SHOES, WEDGES AND HUB FACES must be lubricated by oil through holes and grooves in boxes as shown on Drawing B-52-L-905.
7. INSPECT the lubricator after every trip but do not disturb it unless the grease is nearly all used or the journal running unusually warm. It is important that the perforated plate fit the journal closely as hot boxes may be due to improper fitting.

NOTE: Pending revision, this Maintenance Regulation supersedes immediately MR Card 52-MR-2 (dated August 15th, 1932) which should be destroyed.

Approved as System Standard by Chief of Motive Power & Rolling Stock.

CANADIAN PACIFIC RAILWAY COMPANY

MECHANICAL DEPARTMENT

MAINTENANCE REGULATION - STEAM LOCOMOTIVES

SUBJECT: INSTRUCTIONS FOR CHECKING AND  
LUBRICATING STOKERS.

ISSUE: ROAD AND SHOP.

REGULATION NO. SL-52-3

NO. OF SHEETS 1 of 1

DATE December 1950

SUPERSEDES 52-MR-3 July 1943 (see note)

1. The water in crank case should be drained off and oil level checked with gauge every time an engine is dispatched.
2. Every 90 days or at each quarterly shop test the crank case should be completely drained of oil and water, and the crank case flushed out with hot water through the oil filling pipe with the drain wide open. After drainage is completed the crank case covers are to be removed and motion parts examined for any slackness or other defects. Gland packing on piston and valve rods should be examined, taking care to see that the gland packing nuts are not pulled up to the limit.
3. If everything is in order the drain valves are to be closed, crank case covers applied and the crank case filled up with standard car oil to the proper gauge level. Under no circumstances must reclaimed oil be used.
4. Conveyor trough gear housing is to be greased every 30 days.
5. Pinion shaft is to be greased every time engine is dispatched.)
6. Oil box on tender for lubricating universal joints should be oiled every time engine is dispatched.)

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name fixed*

NOTE: Pending revision, this Maintenance Regulation supersedes immediately MR card 52-MR-3 dated July 1943, which should be destroyed.



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CANADIAN PACIFIC RAILWAY COMPANY

MECHANICAL DEPARTMENT

**MAINTENANCE REGULATION - STEAM LOCOMOTIVES**

**SUBJECT:** DETROIT LUBRICATORS  
ENGINE HOUSE AND SHOP INSTRUCTIONS

**REGULATION NO.** SL-52-4

**NO. OF SHEETS** 1 of 2

**DATE** November 1950

**SUPERSEDES** 52-MR-4 April 1917  
(see note)

**ISSUE:** ROAD AND SHOPS.

ENGINE HOUSE

1. TO PROVE LUBRICATOR and lubricating system are in proper working order tests and inspections should be made as described in the following clauses:
2. IF WATER IS MURKY or cloudy, blow it out.
3. TO TEST LUBRICATOR to see that it is working properly:
  - (a) See that lubricator is filled. Nothing but valve oil must be used in lubricators. If there is not sufficient oil to fill reservoir, use water to make up the required quantity.
  - (b) Turn on full boiler pressure, both at boiler connection and at top of condenser.
  - (c) Open water valve. Three turns will give full port opening.
  - (d) Adjust feeds.
  - (e) If feeds are sluggish or do not respond properly close all feed stems. Then close water valves and lastly close steam valve. Open steam valve slightly - just crack the valve opening. Then open one feed at a time. Air and water will probably appear followed by a solid stream of oil. When it appears shut off feed. Repeat for all feeds. Then re-start lubricator as described in paragraphs (b), (c) and (d). This test does away with necessity of draining lubricator to clean out obstructed feeds and passages.
4. OIL PIPES to be examined up to point where they pass beneath jacket to see that they contain no traps and that fall of pipes is not less than 3/4 inch in one foot.
5. STEEL CHOKES to be examined and if diameter of long hole in direction of steam chest is greater than 3-32-inch, reverse ends; unless both ends have opening greater than 3-32-inch in which case new steel choke should be applied.

Make sure that holes in choke are not obstructed.  
Examine brass seat in which choke rests. Seat should be machined or renewed if there are any signs of cutting. As there is a tendency for steam to cut brass seats these should be examined closely.  
When engines have been laid up and are put back into service, steel choke should be removed and examined and cleaned of any rust.
6. ON STATIONARY CHOKES care should be taken to see that the drain opening is free and can be blown through. Blow out from both steam chest and lubricator ends to make sure both ends of choke are not obstructed. If diameter of passage through choke is greater than 3-32-inch replace choke.
7. IF LUBRICATOR IS REPORTED AS FEEDING ERRATIC or LOSING OIL, test for defect as follows:
  - (a) See that reservoir is two-thirds full of oil.
  - (b) Start lubricator in same manner as described in clause three, paragraphs (b), (c) and (d).

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CANADIAN PACIFIC RAILWAY COMPANY

MECHANICAL DEPARTMENT

MAINTENANCE REGULATION - STEAM LOCOMOTIVES

SUBJECT: DETROIT LUBRICATORS  
ENGINE HOUSE AND SHOP INSTRUCTIONS

ISSUE: ROAD AND SHOPS.

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REGULATION NO. SL-52-4  
NO. OF SHEETS 2 of 2  
DATE November 1950  
SUPERSEDES 52-MR-4 April 1917  
(see note)

7. IF LUBRICATOR IS REPORTED AS FEEDING EMULSIC etc. (Cont'd)
- (c) Close all feed stems tight and then close water valve.
  - (d) Open all vents under sight feed glasses and then close steam valve. If lubricator is defective oil will appear at one or all of the vents in a foaming mass.
8. A DEFECTIVE LUBRICATOR must be removed and replaced with a sound one. Particular care must be taken to see that defective lubricators are not re-applied but turned in for repair.
9. ON NEW OR REPAIRED LUBRICATORS see that oil channel below feeds is blown out clean as follows:
- (a) If lubricator is empty remove the two end feeds. Open steam and water valves and blow through.
  - (b) If oil reservoir of lubricators equipped with oil control valve, contains oil, remove end feeds and slack down one feed nozzle. Nozzle can be slacked down with tool list No. 15T863-5. In this case water valve and oil control valves must be kept closed. Open steam valve just sufficient to cause flow of steam down around feed. Before re-applying feed stems raise ball check in nozzle by means of a small piece of wire and allow steam to blow through.
  - (c) If oil reservoir of lubricators not equipped with oil control valve, contains oil, remove only one end feed and open the other two feed stems. Then open steam valve only and blow through.

SHOP

10. LUBRICATOR TO BE LOCATED in proper position where it is easily accessible and where feeds can be seen without difficulty.
11. OIL PIPES to have proper fall as outlined in clause 4 and to be of proper size, preferably 1/2 inch O.D.
12. LUBRICATOR TAIL PIPE CENTER PIECES to be faced up if damaged or bruised.
13. BOTTOM CHANNEL OF LUBRICATOR to be blown out thoroughly on lubricators with oil control valves.
14. OIL PIPES TO BE BLOWN OUT with steam before being connected up.
15. CHOKES TO BE EXAMINED to see that they are perfectly free from asbestos.
16. IF ANY TESTS ARE NECESSARY they shall be made as outlined in clauses one to nine inclusive.

NOTE: Pending revision, this Maintenance Regulation supersedes immediately MR card 52-MR-4 dated April 1917, which should be destroyed.

## CANADIAN PACIFIC RAILWAY COMPANY

## MECHANICAL DEPARTMENT

## MAINTENANCE REGULATION - STEAM LOCOMOTIVES

SUBJECT: METHOD OF INSPECTING FOR CRACKS AND  
FLAWS - MAIN AND SIDE ROD ANNEALING.

ISSUE: ROAD AND SHOP.

REGULATION NO. SL-53-1

PAGE 1 of 2

DATE January 1952

SUPERSEDES 53-MR-1 October 1918

1. HAMMER TEST. Piston rods, main rods and main side rod straps whenever removed, frames, pedestal binders, axles, crank pins, eccentric straps, sheaves, crank arms, crosshead arms, main rods and side rods on engines receiving No. 1 or 2 machinery repairs are to be thoroughly cleaned and painted with a mixture of white lead and machine or red engine oil. Parts so treated are to be struck sharply with a hammer or machined if required, after which cracks or flaws can be detected by oil oozing from them.
2. ANNEALING. (a) All new rods and straps are to be annealed; after forging and before machining; after first five years of service; thereafter as provided for in clause 2 (b).  
(b) In addition to the hammer test all main and side rods (except as provided for in 2 (a) are to be annealed at first No. 1 or 2 machinery repairs after date of issue of this card and thereafter once in every four years.
3. METHOD OF ANNEALING. Annealing furnace is to be of the muffle type, and equipped with two electrical pyrometers to ensure proper temperature regulation, the pyrometer leads being located as nearly as possible on a level with the rods when in position for annealing. The bottom of the furnace is to be covered with a bed of sand on which the rods are to be placed on their edge (not on their sides) care being taken to pack sand well around the bottom of the rods to give them a firm uniform support. This is important to prevent warping. Main rods and main side rods are to be annealed with straps in place. Bolts are to be driven home, and to have nuts in place, slightly slackened off; rods to be placed in the furnace with the bolt heads down. All wedge bolt and grease plug holes are to be plugged with asbestos cement to prevent scaling.  
  
After furnace is charged to capacity, the temperature is to be raised to 1460 degrees F. Burners are then to be shut off, and the furnace kept closed for half an hour, then opened and rods cooled as quickly as possible without danger of warping. Care must be taken to see that the rods are not exposed to any draughts of cold air entering the furnace during cooling. After annealing, all rods and straps are to be thoroughly inspected for defects which may be brought out by heating.
4. HANDLING OF RODS. As annealing will necessitate more handling, additional care should be taken to prevent rods becoming badly nicked by rough handling or the use of square shanked bars. Such nicks are frequently the initial cause of rod failures.
5. RECORD OF ANNEALING. All rods annealed are to be reported on work report M.P. 19, copy of which is to be forwarded to the Chief Mechanical Engineer, Montreal, or the Superintendent of Motive Power, Winnipeg, who will keep proper records, and be responsible for the annealing being carried out at the proper intervals. In addition date of annealing and station symbol must be stamped on rods and straps in positions shown on drawing 62-L-1567.

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Approved as System Standard by Chief of Motive Power & Rolling Stock.

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CANADIAN PACIFIC RAILWAY COMPANY

MECHANICAL DEPARTMENT

MAINTENANCE REGULATION - STEAM LOCOMOTIVES

SUBJECT: METHOD OF INSPECTING FOR CRACKS AND  
FLAWS - MAIN AND SIDE ROD ANNEALING.

REGULATION NO. SL-53-1

PAGE 2 of 2

DATE January 1952

SUPERSEDES 53-MR-1 October 1918

ISSUE: ROAD AND SHOP.

6. KEY WAY INSPECTION. When driving wheels are examined, eccentrics must be removed to permit proper inspection of key ways for flaws.

NOTE: Pending revision, this Maintenance Regulation supersedes immediately MR card 53-MR-1 (dated October 1, 1918) which should be destroyed.

Approved as System Standard by Chief of Motive Power & Rolling Stock.

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# CANADIAN PACIFIC RAILWAY COMPANY

## MECHANICAL DEPARTMENT

### MAINTENANCE REGULATION - STEAM LOCOMOTIVES

**SUBJECT:** DEFECTS WHICH WILL PROHIBIT LOCOMOTIVE BEING SUPPLIED FOR SERVICE. INSPECTION BY BOARD OF TRANSPORT COMMISSIONERS FOR CANADA AND INTERSTATE COMMERCE COMMISSION INSPECTORS.

**ISSUE:** ROAD.

**REGULATION NO.** SL-53-2

**NO. OF SHEETS** 1 of 1

**DATE** November 1950

**SUPERSEDES** 53-MR-2 April 1936  
(See note)

1. Locomotives must not leave engine house or terminals with defects beyond the limits defined by the orders of the Board of Transport Commissioners for Canada, the Company's own regulations, or, for engines in International Service, orders of the Interstate Commerce Commission. In particular, attention is called to the following items:

Air brakes and air compressors.

Air signal.

Bell.

Boiler appurtenances, gauge glass, try cocks, inspirators, and feed pumps, must be known to be in correct working condition.

Couplers.

Drawbars.

Fire protective appliances.

Headlight and other electrical equipment.

Posting of test and inspection reports in cab.

Safety appliances.

Springs.

Steam leaks, obscuring vision of enginemen.

Wheels and tyres must be in good condition and within defined limits for wear or defects.

Whistle.

INSPECTION BY BOARD OF TRANSPORT COMMISSIONERS FOR CANADA AND  
INTERSTATE COMMERCE COMMISSION INSPECTORS.

2. All locomotives are subject to inspection at any time for any defect by the Boards of Transport Commissioners for Canada and Interstate Commerce Commission inspectors. Defects reported to the Mechanical Officer in charge must be corrected before locomotives concerned are supplied for service when such defects are enumerated in Section 1 of this card or are such that they do not comply with Orders of the B. of T.C. or I.C.C. Defects which are reported and are not covered by Section 1 or Government Orders must be corrected when, in the opinion of the Mechanical Officer in charge, such defects make, or are liable to develop and make, a locomotive unsafe for operation.

**NOTE:** Pending revision, this Maintenance Regulation supersedes immediately MR card 53-MR-2 dated April 1936, which should be destroyed.

Approved as System Standard by Chief of Motive Power & Rolling Stock.