

§ 230.97

(c) *Bearings and bushings.* Bearings and bushings shall so fit the rods as to be in a safe and suitable condition for service, and means shall be provided to prevent bushings from turning in the rod. Straps shall fit and be securely bolted to rods. Floating bushings need not be provided with means to prevent bushings from turning.

(d) *Side motion of rods.* The total amount of side motion of each rod on its crank pin shall not exceed ¼ inch.

(e) *Oil and grease cups.* Oil and grease cups shall be securely attached to rods, and grease cup plugs shall be equipped with a suitable fastening that will prevent them from being ejected.

(f) *Main rod bearings.* The bore of main rod bearings shall not exceed pin diameters more than ⅜ inch at front or back end. The total lost motion at both ends shall not exceed ⅜ inch.

(g) *Side rod bearings.* The bore of side rod bearings shall not exceed pin diameters more than ⅝ inch on main pin nor more than ⅜ inch on other pins.

§ 230.97 Crank pins.

(a) *General provisions.* Crank pins shall be securely applied. Securing the fit of a loose crank pin by shimming, prick punching, or welding is not permitted.

(b) *Maintenance.* Crank pin collars and collar fasteners shall be maintained in a safe and suitable condition for service.

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RUNNING GEAR

§ 230.98 Driving, trailing, and engine truck axles.

(a) *Condemning defects.* Driving, trailing, and engine truck axles with any of the following defects shall be removed from service immediately and repaired (see appendix A of this part for inspection requirements):

- (1) Bent axle;
- (2) Cut journals that cannot be made to run cool without turning;
- (3) Transverse seams in iron or steel axles;
- (4) Seams in axles causing journals to run hot;
- (5) Axles that are unsafe on account of usage, accident or derailment;
- (6) Any axle worn ½ inch or more in diameter below the original/new journal diameter, except as provided in paragraph (a)(7) of this section;
- (7) Any driving axles other than main driving axles with an original or new diameter greater than 6 inches that are worn ¼ inch or more in diameter below the original/new diameter.

(b) *Journal diameter stamped.* For steam locomotives with plain bearings, the original/new journal diameter shall be stamped on one end of the axle no later than January 18, 2005.

§ 230.99 Tender truck axles.

The minimum diameters of axles for various axle loads shall be as follows:

Axle load (in pounds)	Minimum diameter of journal (in inches)	Minimum diameter of wheel seat (in inches)	Minimum diameter of center (in inches)
50000	5½	7⅜	6⅞
38000	5	6¾	5⅞
31000	4½	6¼	5⅝
22000	3¾	5	4⅝
15000	3¼	4⅝	3⅞

§ 230.100 Defects in tender truck axles and journals.

(a) *Tender truck axle condemning defects.* Tender truck axles with any of the following defects shall be removed from service immediately and repaired:

- (1) Axles that are bent;
- (2) Collars that are broken, cracked, or worn to ¼ inch or less in thickness;

(3) Truck axles that are unsafe on account of usage, accident, or derailment;

(4) A fillet in the back shoulder that is worn out; or

(5) A gouge between the wheel seats that is more than ⅛ of an inch in depth.

(b) *Tender truck journal condemning defects.* Tender truck journals with any

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of the following defects shall be removed from service immediately and repaired :

- (1) Cut journals that cannot be made to run cool without turning;
- (2) Seams in axles causing journals to run hot;
- (3) Overheating, as evidenced by pronounced blue black discoloration;
- (4) Transverse seams in journals of iron or steel axles; or
- (5) Journal surfaces having any of the following:
 - (i) A circumferential score;
 - (ii) Corrugation;
 - (iii) Pitting;
 - (iv) Rust;
 - (v) Etching.

§ 230.101 Steam locomotive driving journal boxes.

- (a) *Driving journal boxes.* Driving journal boxes shall be maintained in a safe and suitable condition for service. Not more than one shim may be used between the box and bearing.
- (b) *Broken bearings.* Broken bearings shall be renewed.
- (c) *Loose bearings.* Loose bearings shall be repaired or renewed.

§ 230.102 Tender plain bearing journal boxes.

- Plain bearing journal boxes with the following defects shall be removed from service immediately and repaired:
- (a) A box that does not contain visible free oil;
 - (b) A box lid that is missing, broken, or open except to receive servicing;
 - (c) A box containing foreign matter, such as dirt, sand, or coal dust that can reasonably be expected to damage the bearing; or have a detrimental effect on the lubrication of the journal and bearing;
 - (d) A lubricating pad that:
 - (1) Is missing;
 - (2) Is not in contact with the journal;
 - (3) Has a tear extending half the length or width of the pad, or more, except by design;
 - (4) Shows evidence of having been scorched, burned, or glazed;
 - (5) Contains decaying or deteriorated fabric that impairs proper lubrication of the pad;

- (6) Has an exposed center core (except by design); or
- (7) Has metal parts contacting the journal;
 - (e) A plain bearing that:
 - (1) Is missing, cracked, broken;
 - (2) Has a bearing liner loose;
 - (3) Has a broken out piece; or
 - (4) Has indications of having been overheated, as evidenced by:
 - (i) Melted babbitt;
 - (ii) Smoke from hot oil; or
 - (iii) Journal surface damage; or
 - (f) A plain bearing wedge that:
 - (1) Is missing, cracked or broken; or
 - (2) Is not located in its design position.

§ 230.103 Tender roller bearing journal boxes.

Tender roller bearing journal boxes shall be maintained in a safe and suitable condition.

§ 230.104 Driving box shoes and wedges.

Driving box shoes and wedges shall be maintained in a safe and suitable condition for service.

§ 230.105 Lateral motion.

- (a) *Condemning limits.* The total lateral motion or play between the hubs of the wheels and the boxes on any pair of wheels shall not exceed the following limits:

	Inches
Engine truck wheels (with swing centers)	1
Engine truck wheels (with rigid centers)	1½
Trailing truck wheels	1
Driving wheels	¾

- (b) *Limits increased.* These limits may be increased on steam locomotives operating on track where the curvature exceeds 20 degrees when it can be shown that conditions require additional lateral motion.

- (c) *Non-interference with other parts.* The lateral motion shall in all cases be kept within such limits that the driving wheels, rods, or crank pins will not interfere with other parts of the steam locomotive.