

# TITLE 49--TRANSPORTATION

## CHAPTER II--FEDERAL RAILROAD ADMINISTRATION, DEPARTMENT OF TRANSPORTATION

### PART 229--RAILROAD LOCOMOTIVE SAFETY STANDARDS

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## Subpart A--General

### Sec. 229.1 Scope.

This part prescribes minimum Federal safety standards for all locomotives except those propelled by steam power.

### Sec. 229.3 Applicability.

- (a) Except as provided in paragraphs (b) through (e) of this section, this part applies to all standard gage railroads.
- (b) This part does not apply to:
  - (1) A railroad that operates only on track inside an installation which is not part of the general railroad system of transportation; or
  - (2) Rapid transit operations in an urban area that are not connected with the general railroad system of transportation.
- (c) Paragraphs (a) and (b) of Sec. 229.125 do not apply to Tier II passenger equipment as defined in Sec. 238.5 of this chapter (i.e., passenger equipment operating at speeds exceeding 125 mph but not exceeding 150 mph).
- (d) On or after November 8, 1999, paragraphs (a)(1) and (b)(1) of Sec. 229.141 do not apply to ``passenger equipment'' as defined in Sec. 238.5 of this chapter, unless such equipment is excluded from the requirements of Secs. 238.203 through 238.219, and Sec. 238.223 of this chapter by operation of Sec. 238.201(a)(2) of this chapter.
- (e) Paragraphs (a)(2) through (a)(4), and (b)(2) through (b)(4) of Sec. 229.141 do not apply to ``passenger equipment'' as defined in Sec. 238.5 of this chapter that is placed in service for the first time on or after September 8, 2000, unless such equipment is excluded from the requirements of Secs. 238.203 through 238.219, and Sec. 238.223 of this chapter by operation of Sec. 238.201(a)(2) of this chapter.

[54 FR 33229, Aug. 14, 1989, as amended at 64 FR 25659, May 12, 1999]

### Sec. 229.4 Information collection.

- (a) The information collection requirements in this part have been reviewed by the Office of Management and Budget pursuant to the Paperwork Reduction Act of 1980, Public Law 96-511, and have been assigned OMB control number 2130-0004.
- (b) The information collection requirements are found in the following sections:
  - (1) Section 229.9.
  - (2) Section 229.17.
  - (3) Section 229.21.
  - (4) Section 229.23.
  - (5) Section 229.25.
  - (6) Section 229.27.
  - (7) Section 229.29.
  - (8) Section 229.31.
  - (9) Section 229.33.
  - (10) Section 229.55.
  - (11) Section 229.103.
  - (12) Section 229.105.
  - (13) Section 229.113.
  - (14) Section 229.135.

[50 FR 6953, Feb. 19, 1985, as amended at 58 FR 36613, July 8, 1993]

## Sec. 229.5 Definitions.

As used in this part--

- (a) Break means a fracture resulting in complete separation into parts.
- (b) Cab means that portion of the superstructure designed to be occupied by the crew operating the locomotive.
- (c) Carrier means railroad, as that term is defined below.  
Commuter service means the type of railroad service described under the heading ``Commuter Operations'' in 49 CFR part 209, Appendix A.  
Commuter work train is a non-revenue service train used in the administration and upkeep service of the commuter railroad.
- (d) Control cab locomotive means a locomotive without propelling motors but with one or more control stands.
- (e) Crack means a fracture without complete separation into parts, except that castings with shrinkage cracks or hot tears that do not significantly diminish the strength of the member are not considered to be cracked.
- (f) Dead locomotive means--
  - (1) A locomotive other than a control cab locomotive that does not have any traction device supplying tractive power; or
  - (2) A control cab locomotive that has a locked and unoccupied cab.
- (g) Event recorder means a device, designed to resist tampering, that monitors and records data on train speed, direction of motion, time, distance, throttle position, brake applications and operations (including train brake, independent brake, and, if so equipped, dynamic brake applications and operations) and, where the locomotive is so equipped, cab signal aspect(s), over the most recent 48 hours of operation of the electrical system of the locomotive on which it is installed. A device, designed to resist tampering, that monitors and records the specified data only when the locomotive is in motion shall be deemed to meet this definition provided the device was installed prior to [insert the effective date of the rule] and records the specified data for the last eight hours the locomotive was in motion.
- (h) High voltage means an electrical potential of more than 150 volts.
- (i) In-service event recorder means an event recorder that was successfully tested as prescribed in Sec. 229.25(e) and whose subsequent failure to operate as intended, if any, is not actually known by the railroad operating the locomotive on which it is installed.
- (j) Lite locomotive means a locomotive or a consist of locomotives not attached to any piece of equipment or attached only to a caboose.
- (k) Locomotive means a piece of on-track equipment other than hi-rail, specialized maintenance, or other similar equipment--
  - (1) With one or more propelling motors designed for moving other equipment;
  - (2) With one or more propelling motors designed to carry freight or passenger traffic or both; or
  - (3) Without propelling motors but with one or more control stands.
- Modesty lock means a latch that can be operated in the normal manner only from within the sanitary compartment, that is designed to prevent entry of another person when the sanitary compartment is in use. A modesty lock may be designed to allow deliberate forced entry in the event of an emergency.
- (l) MU locomotive means a multiple operated electric locomotive described in paragraph (i)(2) or (3) of this section.  
Other short-haul passenger service means the type of railroad service described under the heading ``Other short-haul passenger service'' in 49 CFR part 209, Appendix A.  
Potable water means water that meets the requirements of 40 CFR part 141, the Environmental Protection Agency's Primary Drinking Water Regulations, or water that has been approved for drinking and washing purposes by the pertinent state or local authority having jurisdiction.  
For purposes of this section, commercially available, bottled drinking

water is deemed potable water.

- (m) Powered axle is an axle equipped with a traction device.
- (n) Railroad means all forms of non-highway ground transportation that run on rails or electromagnetic guideways, including (1) commuter or other short-haul rail passenger service in a metropolitan or suburban area, and (2) high speed ground transportation systems that connect metropolitan areas, without regard to whether they use new technologies not associated with traditional railroads. Such term does not include rapid transit operations within an urban area that are not connected to the general railroad system of transportation.

Sanitary means lacking any condition in which any significant amount of filth, trash, or human waste is present in such a manner that a reasonable person would believe that the condition might constitute a health hazard; or of strong, persistent, chemical or human waste odors sufficient to deter use of the facility, or give rise to a reasonable concern with respect to exposure to hazardous fumes. Such conditions include, but are not limited to, a toilet bowl filled with human waste, soiled toilet paper, or other products used in the toilet compartment, that are present due to a defective toilet facility that will not flush or otherwise remove the waste; visible human waste residue on the floor or toilet seat that is present due to a toilet facility that overflowed; an accumulation of soiled paper towels or soiled toilet paper on the floor, toilet facility or sink; an accumulation of visible dirt or human waste on the floor, toilet facility, or sink; and strong, persistent chemical or human waste odors in the compartment.

Sanitation compartment means an enclosed compartment on a railroad locomotive that contains a toilet facility for employee use.

- (o) Serious injury means an injury that results in the amputation of any appendage, the loss of sight in an eye, the fracture of a bone, or the confinement in a hospital for a period of more than 24 consecutive hours.

Switching service means the classification of railroad freight and passenger cars according to commodity or destination; assembling cars for train movements; changing the position of cars for purposes of loading, unloading, or weighing; placing locomotives and cars for repair or storage; or moving rail equipment in connection with work service that does not constitute a train movement.

Toilet facility means a system that automatically or on command of the user removes human waste to a place where it is treated, eliminated, or retained such that no solid or non-treated liquid waste is thereafter permitted to be released into the bowl, urinal, or room and that prevents harmful discharges of gases or persistent offensive odors.

Transfer service means a freight train that travels between a point of origin and a point of final destination not exceeding 20 miles and that is not performing switching service.

Unsanitary means having any condition in which any significant amount of filth, trash, or human waste is present in such a manner that a reasonable person would believe that the condition might constitute a health hazard; or strong, persistent, chemical or human waste odors sufficient to deter use of the facility or to give rise to a reasonable concern with respect to exposure to hazardous fumes. Such conditions include, but are not limited to, a toilet bowl filled with human waste, soiled toilet paper, or other products used in the toilet compartment, that are present due to a defective toilet facility that will not flush or otherwise remove the waste; visible human waste residue on the floor or toilet seat that is present due to a toilet facility that overflowed; an accumulation of soiled paper towels or soiled toilet paper on the floor, toilet

facility, or sink; an accumulation of visible dirt or human waste on the floor, toilet facility, or sink; and strong persistent chemical or human waste odors in the compartment.

Washing system means a system for use by railroad employees to maintain personal cleanliness that includes a secured sink or basin, water, antibacterial soap, and paper towels; or antibacterial waterless soap and paper towels; or antibacterial moist towelettes and paper

towels; or any other combination of suitable antibacterial cleansing agents.

- (p) Electronic air brake means a brake system controlled by a computer which provides the means for control of the locomotive brakes or train brakes or both.

[45 FR 21109, Mar. 31, 1980, as amended at 54 FR 33229, Aug. 14, 1989; 58 FR 36613, July 8, 1993; 60 FR 27905, May 26, 1995; 66 FR 4192, Jan. 17, 2001; 67 FR 16049, Apr. 4, 2002]

#### **Sec. 229.7 Prohibited acts.**

- (a) The Locomotive Inspection Act (45 U.S.C. 22-34) makes it unlawful for any carrier to use or permit to be used on its line any locomotive unless the entire locomotive and its appurtenances--
- (1) Are in proper condition and safe to operate in the service to which they are put, without unnecessary peril to life or limb; and
  - (2) Have been inspected and tested as required by this part.
- (b) Any person (an entity of any type covered under 1 U.S.C. 1, including but not limited to the following: a railroad; a manager, supervisor, official, or other employee or agent of a railroad; any owner, manufacturer, lessor, or lessee of railroad equipment, track, or facilities; any independent contractor providing goods or services to a railroad; and any employee of such owner, manufacturer, lessor, lessee, or independent contractor) who violates any requirement of this part or of the Locomotive Inspection Act or causes the violation of any such requirement is subject to a civil penalty of at least \$500 and not more than \$11,000 per violation, except that: Penalties may be assessed against individuals only for willful violations, and, where a grossly negligent violation or a pattern of repeated violations has created an imminent hazard of death or injury to persons, or has caused death or injury, a penalty not to exceed \$22,000 per violation may be assessed. Each day a violation continues shall constitute a separate offense. See appendix B to this part for a statement of agency civil penalty policy.

[45 FR 21109, Mar. 31, 1980, as amended at 53 FR 28601, July 28, 1988; 53 FR 52931, Dec. 29, 1988; 63 FR 11622, Mar. 10, 1998]

#### **Sec. 229.9 Movement of non-complying locomotives.**

- (a) Except as provided in paragraphs (b), (c) and Sec. 229.125(h), a locomotive with one or more conditions not in compliance with this part may be moved only as a lite locomotive or a dead locomotive after the carrier has complied with the following:
- (1) A qualified person shall determine--
    - (i) That it is safe to move the locomotive; and
    - (ii) The maximum speed and other restrictions necessary for safely conducting the movement;
  - (2)
    - (i) The engineer in charge of the movement of the locomotive shall be notified in writing and inform all other crew members in the cab of the presence of the non-complying locomotive and the maximum speed and other restrictions determined under paragraph (a)(1)(ii) of this section.
    - (ii) A copy of the tag described in paragraph (a)(3) of this section may be used to provide the notification required by paragraph (a)(2)(i) of this section.
  - (3) A tag bearing the words "non-complying locomotive" and containing the following information, shall be securely attached to the control stand on each MU or control cab locomotive and to the isolation switch or near the engine start switch on every other type of locomotive--
    - (i) The locomotive number;
    - (ii) The name of the inspecting carrier;
    - (iii) The inspection location and date;
    - (iv) The nature of each defect;

- (v) Movement restrictions, if any;
  - (vi) The destination; and
  - (vii) The signature of the person making the determinations required by this paragraph.
- (b) A locomotive that develops a non-complying condition enroute may continue to utilize its propelling motors, if the requirements of paragraph (a) are otherwise fully met, until the earlier of--
- (1) The next calendar day inspection, or
  - (2) The nearest forward point where the repairs necessary to bring it into compliance can be made.
- (c) A non-complying locomotive may be moved live or dead within a yard, at speeds not in excess of 10 miles per hour, without meeting the requirements of paragraph (a) of this section if the movement is solely for the purpose of repair. The carrier is responsible to insure that the movement may be safely made.
- (d) A dead locomotive may not continue in use following a calendar day inspection as a controlling locomotive or at the head of a train or locomotive consist.
- (e) A locomotive does not cease to be a locomotive because its propelling motor or motors are inoperative or because its control jumper cables are not connected.
- (f) Nothing in this section authorizes the movement of a locomotive subject to a Special Notice for Repair unless the movement is made in accordance with the restrictions contained in the Special Notice.
- (g) Paragraphs (a), (b), and (c) of this section shall not apply to sanitation conditions covered by Secs. 229.137 and 229.139. Sections 229.137 and 229.139 set forth specific requirements for the movement and repair of locomotives with defective sanitation compartments.

[45 FR 21109, Mar. 31, 1980, as amended at 61 FR 8887, Mar. 6, 1996; 67 FR 16050, Apr. 4, 2002]

#### **Sec. 229.11 Locomotive identification.**

- (a) The letter 'F' shall be legibly shown on each side of every locomotive near the end which for identification purposes will be known as the front end.
- (b) The locomotive number shall be displayed in clearly legible numbers on each side of each locomotive.

#### **Sec. 229.13 Control of locomotives.**

Except when a locomotive is moved in accordance with Sec. 229.9, whenever two or more locomotives are coupled in remote or multiple control, the propulsion system, the sanders, and the power brake system of each locomotive shall respond to control from the cab of the controlling locomotive. If a dynamic brake or regenerative brake system is in use, that portion of the system in use shall respond to control from the cab of the controlling locomotive.

#### **Sec. 229.14 Non-MU control cab locomotives.**

On each non-MU control cab locomotive, only those components added to the passenger car that enable it to serve as a lead locomotive, control the locomotive actually providing tractive power, and otherwise control the movement of the train, are subject to this part.

#### **Sec. 229.17 Accident reports.**

- (a) In the case of an accident due to a failure from any cause of a locomotive or any part or appurtenance of a locomotive, or a person coming in contact with an electrically energized part or appurtenance, that results in serious injury or death of one or more persons, the carrier operating the locomotive shall immediately report the accident by toll free telephone, Area Code 800-424-0201. The report shall state

the nature of the accident, number of persons killed or seriously injured, the place at which it occurred, the location at which the locomotive or the affected parts may be inspected by the FRA, and the name, title and phone number of the person making the call. The locomotive or the part or parts affected by the accident shall be preserved intact by the carrier until after the FRA inspection.

- (b) Written confirmation of the oral report required by paragraph (a) of this section shall be immediately mailed to the Federal Railroad Administration, RRS-25, Washington, DC 20590, and contain a detailed description of the accident, including to the extent known, the causes and the number of persons killed and injured. The written report required by this paragraph is in addition to the reporting requirements of 49 CFR part 225.

#### **Sec. 229.19 Prior waivers.**

All waivers of every form and type from any requirement of any order or regulation implementing the Locomotive Inspection Act, applicable to one or more locomotives except those propelled by steam power, shall lapse on August 31, 1980, unless a copy of the grant of waiver is filed prior to that date with the Office of Safety (RRS-23), Federal Railroad Administration, Washington, DC 20590.

### **Subpart B--Inspections and Tests**

#### **Sec. 229.21 Daily inspection.**

- (a) Except for MU locomotives, each locomotive in use shall be inspected at least once during each calendar day. A written report of the inspection shall be made. This report shall contain the name of the carrier; the initials and number of the locomotive; the place, date and time of the inspection; a description of the non-complying conditions disclosed by the inspection; and the signature of the employee making the inspection. Except as provided in Secs. 229.9, 229.137, and 229.139, any conditions that constitute non-compliance with any requirement of this part shall be repaired before the locomotive is used. Except with respect to conditions that do not comply with Sec. 229.137 or Sec. 229.139, a notation shall be made on the report indicating the nature of the repairs that have been made. Repairs made for conditions that do not comply with Sec. 229.137 or Sec. 229.139 may be noted on the report, or in electronic form. The person making the repairs shall sign the report. The report shall be filed and retained for at least 92 days in the office of the carrier at the terminal at which the locomotive is cared for. A record shall be maintained on each locomotive showing the place, date and time of the previous inspection.
- (b) Each MU locomotive in use shall be inspected at least once during each calendar day and a written report of the inspection shall be made. This report may be part of a single master report covering an entire group of MU's. If any non-complying conditions are found, a separate, individual report shall be made containing the name of the carrier; the initials and number of the locomotive; the place, date, and time of the inspection; the non-complying conditions found; and the signature of the inspector. Except as provided in Secs. 229.9, 229.137, and 229.139, any conditions that constitute non-compliance with any requirement of this part shall be repaired before the locomotive is used. Except with respect to conditions that do not comply with Sec. 229.137 or Sec. 229.139, a notation shall be made on the report indicating the nature of the repairs that have been made. Repairs made for conditions that do not comply with Sec. 229.137 or Sec. 229.139 may be noted on the report, or in electronic form. A notation shall be made on the report indicating the nature of the repairs that have been made. The person making the repairs shall sign the report. The report shall be filed in the office of the carrier at the place where the inspection is made or at one central location and retained for at least 92 days.

- (c) Each carrier shall designate qualified persons to make the inspections required by this section.

[45 FR 21109, Mar. 31, 1980, as amended at 50 FR 6953, Feb. 19, 1985; 67 FR 16050, Apr. 4, 2002]

**Sec. 229.23 Periodic inspection: General.**

- (a) Each locomotive and steam generator shall be inspected at each periodic inspection to determine whether it complies with this part. Except as provided in Sec. 229.9, all non-complying conditions shall be repaired before the locomotive or the steam generator is used. Except as provided in Sec. 229.33, the interval between any two periodic inspections may not exceed 92 days. Periodic inspections shall only be made where adequate facilities are available. At each periodic inspection, a locomotive shall be positioned so that a person may safely inspect the entire underneath portion of the locomotive.
- (b) The periodic inspection of the steam generator may be postponed indefinitely if the water suction pipe to the water pump and the leads to the main switch (steam generator switch) are disconnected, and the train line shut-off-valve is wired closed or a blind gasket applied. However, the steam generator shall be so inspected before it is returned to use.
- (c) After April 30, 1980, each new locomotive shall receive an initial periodic inspection before it is used. Except as provided in Sec. 229.33, each locomotive in use on or before April 30, 1980, shall receive an initial periodic inspection within 92 days of the last 30-day inspection performed under the prior rules (49 CFR 230.331 and 230.451). At the initial periodic inspection, the date and place of the last tests performed that are the equivalent of the tests required by Secs. 229.27, 229.29, and 229.31 shall be entered on Form FRA F 6180-49A. These dates shall determine when the tests first become due under Secs. 229.27, 229.29, and 229.31. Out of use credit may be carried over from Form FRA F 6180-49 and entered on Form FRA F 6180-49A.
- (d) Each periodic inspection shall be recorded on Form FRA F 6180-49A. The form shall be signed by the person conducting the inspection and certified by that person's supervisor that the work was done. The form shall be displayed under a transparent cover in a conspicuous place in the cab of each locomotive.
- (e) At the first periodic inspection in each calendar year the carrier shall remove from each locomotive Form FRA F 6180-49A covering the previous calendar year. If a locomotive does not receive its first periodic inspection in a calendar year before April 2 because it is out of use, the form shall be promptly replaced. The Form FRA F 6180-49A covering the preceding year for each locomotive, in or out of use, shall be signed by the railroad official responsible for the locomotive and filed as required in Sec. 229.23(f). The date and place of the last periodic inspection and the date and place of the last test performed under Secs. 229.27, 229.29, and 229.31 shall be transferred to the replacement Form FRA F 6180-49A.
- (f) The mechanical officer of each railroad who is in charge of a locomotive shall maintain in his office a secondary record of the information reported on Form FRA F 6180-49A under this part. The secondary record shall be retained until Form FRA F 6180-49A has been removed from the locomotive and filed in the railroad office of the mechanical officer in charge of the locomotive. If the Form FRA F 6180-49A removed from the locomotive is not clearly legible, the secondary record shall be retained until the Form FRA F 6180-49A for the succeeding year is filed. The Form F 6180-49A removed from a locomotive shall be retained until the Form FRA F 6180-49A for the succeeding year is filed.

[45 FR 21109, Mar. 31, 1980, as amended at 45 FR 39852, June 12, 1980; 50 FR 6953, Feb. 19, 1985]

**Sec. 229.25 Tests: Every periodic inspection.**

Each periodic inspection shall include the following:

- (a) All mechanical gauges used by the engineer to aid in the control or braking of the train or locomotive, except load meters used in conjunction with an auxiliary brake system, shall be tested by comparison with a dead-weight tester or a test gauge designed for this purpose.
- (b) All electrical devices and visible insulation shall be inspected.
- (c) All cable connections between locomotives and jumpers that are designed to carry 600 volts or more shall be thoroughly cleaned, inspected, and tested for continuity.
- (d) Each steam generator that is not isolated as prescribed in Sec. 229.23(b) shall be inspected and tested as follows:
  - (1) All automatic controls, alarms and protective devices shall be inspected and tested.
  - (2) Steam pressure gauges shall be tested by comparison with a dead-weight tester or a test gauge designed for this purpose. The siphons to the steam gauges shall be removed and their connections examined to determine that they are open.
  - (3) Safety valves shall be set and tested under steam after the steam pressure gauge is tested.
- (e) The event recorder, if installed, shall be inspected, maintained, and tested in accordance with the instructions of the manufacturer, supplier, or owner thereof and in accordance with the following criteria:
  - (1) A written copy of the instructions in use shall be kept at the point where the work is performed.
  - (2) The event recorder shall be tested prior to performing any maintenance work on it. At a minimum, the event recorder test shall include cycling all required recording parameters and determining the full range of each parameter by reading out recorded data. A micro-processor based event recorder, equipped to perform self-tests, has passed the pre-maintenance inspection requirement if it has not indicated a failure.
  - (3) If this test does not reveal that the device is recording all the specified data and that all recordings are within the designed recording parameters, this fact shall be noted on the data verification result required to be maintained by this section and maintenance and testing shall be performed as necessary until a subsequent test is successful.
  - (4) When a successful test is accomplished, a copy of those data verification results shall be maintained with the locomotive's maintenance records until the next one is filed.
  - (5) A railroad's event recorder periodic maintenance shall be considered effective if ninety percent (90%) of the recorders inbound in any given month for periodic inspection are still fully functional; maintenance practices and test intervals shall be adjusted as necessary to yield effective periodic maintenance.

[45 FR 21109, Mar. 31, 1980, as amended at 58 FR 36614, July 8, 1993; 60 FR 27905, May 26, 1995; 66 FR 4192, Jan. 17, 2001]

**Sec. 229.27 Annual tests.**

Each locomotive shall be subjected to the tests and inspections included in paragraphs (b) and (c) of this section, and each non-MU locomotive shall also be subjected to the tests and inspections included in paragraph (a) of this section, at intervals that do not exceed 368 calendar days:

- (a)(1) The filtering devices or dirt collectors located in the main reservoir supply line to the air brake system shall be cleaned, repaired, or replaced.
- (2) Brake cylinder relay valve portions, main reservoir safety

valves, brake pipe vent valve portions, feed and reducing valve portions in the air brake system (including related dirt collectors and filters) shall be cleaned, repaired, and tested.

- (3) The date and place of the cleaning, repairing, and testing shall be recorded on Form FRA F 6180-49A and the person performing the work and that person's supervisor shall sign the form. A record of the parts of the air brake system that are cleaned, repaired, and tested shall be kept in the carrier's files or in the cab of the locomotive.
- (4) At its option, a carrier may fragment the work required by this paragraph. In that event, a separate air record shall be maintained under a transparent cover in the cab. The air record shall include the locomotive number, a list of the air brake components, and the date and place of the last inspection and test of each component. The signature of the person performing the work and the signature of that person's supervisor shall be included for each component. A duplicate record shall be maintained in the carrier's files.
- (b) The load meter shall be tested. Each device used by the engineer to aid in the control or braking of the train or locomotive that provides an indication of air pressure electronically shall be tested by comparison with a test gauge or self-test designed for this purpose. An error of greater than five percent or three pounds per square inch shall be corrected. The date and place of the test shall be recorded on Form FRA F 6180-49A, and the person conducting the test and that person's supervisor shall sign the form.
- (c) Each steam generator that is not isolated as prescribed in Sec. 229.23(b), shall be subjected to a hydrostatic pressure at least 25 percent above the working pressure and the visual return water-flow indicator shall be removed and inspected.

[45 FR 21109, Mar. 31, 1980, as amended at 66 FR 4192, Jan. 17, 2001]

#### **Sec. 229.29 Biennial tests.**

- (a) Except for the valves and valve portions on non-MU locomotives that are cleaned, repaired, and tested as prescribed in Sec. 229.27(a), all valves, valve portions, MU locomotive brake cylinders and electric-pneumatic master controllers in the air brake system (including related dirt collectors and filters) shall be cleaned, repaired, and tested at intervals that do not exceed 736 calendar days. The date and place of the cleaning, repairing, and testing shall be recorded on Form FRA F 6180-49A, and the person performing the work and that person's supervisor shall sign the form. A record of the parts of the air brake system that are cleaned, repaired, and tested shall be kept in the carrier's files or in the cab of the locomotive.
- (b) At its option, a carrier may fragment the work required by this section. In that event, a separate air record shall be maintained under a transparent cover in the cab. The air record shall include the locomotive number, a list of the air brake components, and the date and place of the inspection and test of each component. The signature of the person performing the work and the signature of that person's supervisor shall be included for each component. A duplicate record shall be maintained in the carrier's files.

#### **Sec. 229.31 Main reservoir tests.**

- (a) Except as provided in paragraph (c) of this section, before it is put in service and at intervals that do not exceed 736 calendar days, each main reservoir other than an aluminum reservoir shall be subjected to a hydrostatic pressure of at least 25 percent more than the maximum working pressure fixed by the chief mechanical officer. The test date, place, and pressure shall be recorded on Form FRA F 6180-49A, and the person performing the test and that person's supervisor shall sign the form.
- (b) Except as provided in paragraph (c) of this section, each main reservoir other than an aluminum reservoir shall be hammer tested over

its entire surface while the reservoir is empty at intervals that do not exceed 736 calendar days. The test date and place shall be recorded on Form FRA F 6180-49A, and the person performing the test and that person's supervisor shall sign the form.

- (c) Each welded main reservoir originally constructed to withstand at least five times the maximum working pressure fixed by the chief mechanical officer may be drilled over its entire surface with telltale holes that are three-sixteenths of an inch in diameter. The holes shall be spaced not more than 12 inches apart, measured both longitudinally and circumferentially, and drilled from the outer surface to an extreme depth determined by the formula--

$$D=(.6PR/(S-0.6P))$$

where:

D=extreme depth of telltale holes in inches but in no case less than one-sixteenth inch;

P=certified working pressure in pounds per square inch;

S=one-fifth of the minimum specified tensile strength of the material in pounds per square inch; and

R=inside radius of the reservoir in inches.

One row of holes shall be drilled lengthwise of the reservoir on a line intersecting the drain opening. A reservoir so drilled does not have to meet the requirements of paragraphs (a) and (b) of this section, except the requirement for a hydrostatic test before it is placed in use.

Whenever any such telltale hole shall have penetrated the interior of any reservoir, the reservoir shall be permanently withdrawn from service. A reservoir now in use may be drilled in lieu of the tests provided for by paragraphs (a) and (b) of this section, but it shall receive a hydrostatic test before it is returned to use.

- (d) Each aluminum main reservoir before being placed in use and at intervals that do not exceed 736 calendar days thereafter, shall be--
- (1) Cleaned and given a thorough visual inspection of all internal and external surfaces for evidence of defects or deterioration; and
  - (2) Subjected to a hydrostatic pressure at least twice the maximum working pressure fixed by the chief mechanical officer, but not less than 250 p.s.i. The test date, place, and pressure shall be recorded on Form FRA F 6180-49A, and the person conducting the test and that person's supervisor shall sign the form.

### **Sec. 229.33 Out-of-use credit.**

When a locomotive is out of use for 30 or more consecutive days or is out of use when it is due for any test or inspection required by Sec. 229.23, 229.25, 229.27, 229.29, or 229.31, an out-of-use notation showing the number of out-of-use days shall be made on an inspection line on Form FRA F 6180-49A. A supervisory employee of the carrier who is responsible for the locomotive shall attest to the notation. If the locomotive is out of use for one or more periods of at least 30 consecutive days each, the interval prescribed for any test or inspection under this part may be extended by the number of days in each period the locomotive is out of use since the last test or inspection in question. A movement made in accordance with Sec. 229.9 is not a use for purposes of determining the period of the out-of-use credit.

## **Subpart C--Safety Requirements**

### **General Requirements**

#### **Sec. 229.41 Protection against personal injury.**

Fan openings, exposed gears and pinions, exposed moving parts of mechanisms, pipes carrying hot gases and high-voltage equipment, switches, circuit breakers, contactors, relays, grid resistors, and fuses shall be in non-hazardous locations or equipped with guards to prevent personal injury.

#### **Sec. 229.43 Exhaust and battery gases.**

- (a) Products of combustion shall be released entirely outside the cab and other compartments. Exhaust stacks shall be of sufficient height or other means provided to prevent entry of products of combustion into the cab or other compartments under usual operating conditions.
- (b) Battery containers shall be vented and batteries kept from gassing excessively.

#### **Sec. 229.45 General condition.**

All systems and components on a locomotive shall be free of conditions that endanger the safety of the crew, locomotive or train. These conditions include: insecure attachment of components, including third rail shoes or beams, traction motors and motor gear cases, and fuel tanks; fuel, oil, water, steam, and other leaks and accumulations of oil on electrical equipment that create a personal injury hazard; improper functioning of components, including slack adjusters, pantograph operating cylinders, circuit breakers, contactors, relays, switches, and fuses; and cracks, breaks, excessive wear and other structural infirmities of components, including quill drives, axles, gears, pinions, pantograph shoes and horns, third rail beams, traction motor gear cases, and fuel tanks.

### **Brake System**

#### **Sec. 229.46 Brakes: General.**

The carrier shall know before each trip that the locomotive brakes and devices for regulating all pressures, including but not limited to the automatic and independent brake valves, operate as intended and that the water and oil have been drained from the air brake system.

#### **Sec. 229.47 Emergency brake valve.**

- (a) Except for locomotives with cabs designed for occupancy by only one person, each road locomotive shall be equipped with a brake pipe valve that is accessible to a member of the crew, other than the engineer, from that crew member's position in the cab. On car body type locomotives, a brake pipe valve shall be attached to the wall adjacent to each end exit door. The words ``Emergency Brake Valve'' shall be legibly stenciled or marked near each brake pipe valve or shall be shown on an adjacent badge plate.
- (b) MU and control cab locomotives operated in road service shall be equipped with an emergency brake valve that is accessible to another crew member in the passenger compartment or vestibule. The words ``Emergency Brake Valve'' shall be legibly stenciled or marked near each valve or shall be shown on an adjacent badge plate.

**Sec. 229.49 Main reservoir system.**

- (a)(1) The main reservoir system of each locomotive shall be equipped with at least one safety valve that shall prevent an accumulation of pressure of more than 15 pounds per square inch above the maximum working air pressure fixed by the chief mechanical officer of the carrier operating the locomotive.
- (2) Except for non-equipped MU locomotives built prior to January 1, 1981, each locomotive that has a pneumatically actuated system of power controls shall be equipped with a separate reservoir of air under pressure to be used for operating those power controls. The reservoir shall be provided with means to automatically prevent the loss of pressure in the event of a failure of main air pressure, have storage capacity for not less than three complete operating cycles of control equipment and be located where it is not exposed to damage.
- (b) A governor shall be provided that stops and starts or unloads and loads the air compressor within 5 pounds per square inch above or below the maximum working air pressure fixed by the carrier.
- (c) Each compressor governor used in connection with the automatic air brake system shall be adjusted so that the compressor will start when the main reservoir pressure is not less than 15 pounds per square inch above the maximum brake pipe pressure fixed by the carrier and will not stop the compressor until the reservoir pressure has increased at least 10 pounds.

**Sec. 229.51 Aluminum main reservoirs.**

- (a) Aluminum main reservoirs used on locomotives shall be designed and fabricated as follows:
  - (1) The heads and shell shall be made of Aluminum Association Alloy No. 5083-0, produced in accordance with American Society of Mechanical Engineers (ASME) Specification SB-209, as defined in the ``ASME Boiler and Pressure Vessel Code'' (1971 edition), section II, Part B, page 123, with a minimum tensile strength of 40,000 p.s.i. (40 k.s.i.).
  - (2) Each aluminum main reservoir shall be designed and fabricated in accordance with the ``ASME Boiler and Pressure Vessel Code,'' section VIII, Division I (1971 edition), except as otherwise provided in this part.
  - (3) An aluminum main reservoir shall be constructed to withstand at least five times its maximum working pressure or 800 p.s.i., whichever is greater.
  - (4) Each aluminum main reservoir shall have at least two inspection openings to permit complete circumferential visual observation of the interior surface. On reservoirs less than 18 inches in diameter, the size of each inspection opening shall be at least that of 1 1/2-inch threaded iron pipe, and on reservoirs 18 or more inches in diameter, the size of each opening shall be at least that of 2-inch threaded iron pipe.
- (b) The following publications, which contain the industry standards incorporated by reference in paragraph (a) of this section, may be obtained from the publishers and are also on file in the Office of Safety of the Federal Railroad Administration, Washington, DC 20590. Sections II and VIII of the ``ASME Boiler and Pressure Vessel Code'' (1971 edition) are published by the American Society of Mechanical Engineers, United Engineering Center, 345 East 47th Street, New York, New York 10017.

**Sec. 229.53 Brake gauges.**

All mechanical gauges and all devices providing indication of air pressure electronically that are used by the engineer to aid in the control or braking of the train or locomotive shall be located so that they may be conveniently read from the engineer's usual position during operation of the locomotive. A gauge or device shall not be more than five percent or three pounds per square inch in error, whichever is less.

[66 FR 4192, Jan. 17, 2001]

**Sec. 229.55 Piston travel.**

- (a) Brake cylinder piston travel shall be sufficient to provide brake shoe clearance when the brakes are released.
- (b) When the brakes are applied on a standing locomotive, the brake cylinder piston travel may not exceed 1\1/2\ inches less than the total possible piston travel. The total possible piston travel for each locomotive shall be entered on Form FRA F 6180-49A.
- (c) The minimum brake cylinder pressure shall be 30 pounds per square inch.

**Sec. 229.57 Foundation brake gear.**

A lever, rod, brake beam, hanger, or pin may not be worn through more than 30 percent of its cross-sectional area, cracked, broken, or missing. All pins shall be secured in place with cotters, split keys, or nuts. Brake shoes shall be fastened with a brake shoe key and aligned in relation to the wheel to prevent localized thermal stress in the edge of the rim or the flange.

**Sec. 229.59 Leakage.**

- (a) Leakage from the main air reservoir and related piping may not exceed an average of 3 pounds per square inch per minute for 3 minutes after the pressure has been reduced to 60 percent of the maximum pressure.
- (b) Brake pipe leakage may not exceed 5 pounds per square inch per minute.
- (c) With a full service application at maximum brake pipe pressure and with communication to the brake cylinders closed, the brakes shall remain applied at least 5 minutes.
- (d) Leakage from control air reservoir, related piping, and pneumatically operated controls may not exceed an average of 3 pounds per square inch per minute for 3 minutes.

**Draft System**

**Sec. 229.61 Draft system.**

- (a) A coupler may not have any of the following conditions:
  - (1) A distance between the guard arm and the knuckle nose of more than 5\1/8\ inches on standard type couplers (MCB contour 1904) or more than 5\5/16\ inches on D&E couplers.
  - (2) A crack or break in the side wall or pin bearing bosses outside of the shaded areas shown in Figure 1 or in the pulling face of the knuckle.  
[GRAPHIC] [TIFF OMITTED] TC01AP91.004
  - (3) A coupler assembly without anti-creep protection.
  - (4) Free slack in the coupler or drawbar not absorbed by friction devices or draft gears that exceeds one-half inches.
  - (5) A broken or cracked coupler carrier.
  - (6) A broken or cracked yoke.

- (7) A broken draft gear.
- (b) A device shall be provided under the lower end of all drawbar pins and articulated connection pins to prevent the pin from falling out of place in case of breakage.

### **Suspension System**

#### **Sec. 229.63 Lateral motion.**

- (a) Except as provided in paragraph (b), the total uncontrolled lateral motion between the hubs of the wheels and boxes, between boxes and pedestals or both, on any pair of wheels may not exceed 1 inch on non-powered axles and friction bearing powered axles, or  $\frac{3}{4}$  inch on all other powered axles.
- (b) The total uncontrolled lateral motion may not exceed  $1\frac{1}{4}$  inches on the center axle of three-axle trucks.

#### **Sec. 229.64 Plain bearings.**

A plain bearing box shall contain visible free oil and may not be cracked to the extent that it will leak oil.

#### **Sec. 229.65 Spring rigging.**

- (a) Protective construction or safety hangers shall be provided to prevent spring planks, spring seats or bolsters from dropping to track structure in event of a hanger or spring failure.
- (b) An elliptical spring may not have its top (long) leaf broken or any other three leaves broken, except when that spring is part of a nest of three or more springs and none of the other springs in the nest has its top leaf or any other three leaves broken. An outer coil spring or saddle may not be broken. An equalizer, hanger, bolt, gib, or pin may not be cracked or broken. A coil spring may not be fully compressed when the locomotive is at rest.
- (c) A shock absorber may not be broken or leaking clearly formed droplets of oil or other fluid.

#### **Sec. 229.67 Trucks.**

- (a) The male center plate shall extend into the female center plate at least  $\frac{3}{4}$  inch. On trucks constructed to transmit tractive effort through the center plate or center pin, the male center plate shall extend into the female center plate at least  $1\frac{1}{2}$  inches. Maximum lost motion in a center plate assemblage may not exceed  $\frac{1}{2}$  inch.
- (b) Each locomotive shall have a device or securing arrangement to prevent the truck and locomotive body from separating in case of derailment.
- (c) A truck may not have a loose tie bar or a cracked or broken center casting, motor suspension lug, equalizer, hanger, gib or pin. A truck frame may not be broken or have a crack in a stress area that may affect its structural integrity.

#### **Sec. 229.69 Side bearings.**

- (a) Friction side bearings with springs designed to carry weight may not have more than 25 percent of the springs in any one nest broken.
- (b) Friction side bearings may not be run in contact unless designed to carry weight. Maximum clearance of side bearings may not exceed one-fourth inch on each side or a total of one-half inch on both sides, except where more than two side bearings are used under the same rigid superstructure. The clearance on one pair of side bearings under the same rigid superstructure shall not exceed one-fourth inch on each side or a total of one-half inch on both sides; the other side bearings under the same rigid superstructure may have one-half inch clearance on each side or a total of 1 inch on both sides. These clearances apply where

the spread of the side bearings is 50 inches or less; where the spread is greater, the side bearing clearance may only be increased proportionately.

#### **Sec. 229.71 Clearance above top of rail.**

No part or appliance of a locomotive except the wheels, flexible nonmetallic sand pipe extension tips, and trip cock arms may be less than 2\1/2\ inches above the top of rail.

#### **Sec. 229.73 Wheel sets.**

- (a) The variation in the circumference of wheels on the same axle may not exceed \1/4\ inch (two tape sizes) when applied or turned.
- (b) The maximum variation in the diameter between any two wheel sets in a three-powered-axle truck may not exceed \3/4\ inch, except that when shims are used at the journal box springs to compensate for wheel diameter variation, the maximum variation may not exceed 1\1/4\ inch. The maximum variation in the diameter between any two wheel sets on different trucks on a locomotive that has three-powered-axle trucks may not exceed 1\1/4\ inch. The diameter of a wheel set is the average diameter of the two wheels on an axle.
- (c) On standard gauge locomotives, the distance between the inside gauge of the flanges on non-wide flange wheels may not be less than 53 inches or more than 53\1/2\ inches. The distance between the inside gauge of the flanges on wide flange wheels may not be less than 53 inches or more than 53\1/4\ inches.
- (d) The distance back to back of flanges of wheels mounted on the same axle shall not vary more than \1/4\ inch.

#### **Sec. 229.75 Wheels and tire defects.**

Wheels and tires may not have any of the following conditions:

- (a) A single flat spot that is 2\1/2\ inches or more in length, or two adjoining spots that are each two or more inches in length.
- (b) A gouge or chip in the flange that is more than 1\1/2\ inches in length and \1/2\ inch in width.
- (c) A broken rim, if the tread, measured from the flange at a point five-eighths inch above the tread, is less than 3\3/4\ inches in width.
- (d) A shelled-out spot 2\1/2\ inches or more in length, or two adjoining spots that are each two or more inches in length.
- (e) A seam running lengthwise that is within 3\3/4\ inches of the flange.
- (f) A flange worn to a \7/8\ inch thickness or less, gauged at a point \3/8\ inch above the tread.
- (g) A tread worn hollow \5/16\ inch or more on a locomotive in road service or \3/8\ inch or more on a locomotive in switching service.
- (h) A flange height of 1\1/2\ inches or more measured from tread to the top of the flange.
- (i) Tires less than 1\1/2\ inches thick.
- (j) Rims less than 1 inch thick on a locomotive in road service or less than \3/4\ inch on a locomotive in yard service.
- (k) A crack or break in the flange, tread, rim, plate, or hub.
- (l) A loose wheel or tire.
- (m) Fusion welding may not be used on tires or steel wheels of locomotives, except for the repair of flat spots and worn flanges on locomotives used exclusively in yard service. A wheel that has been welded is a welded wheel for the life of the wheel.

### **Electrical System**

#### **Sec. 229.77 Current collectors.**

- (a) Pantographs shall be so arranged that they can be operated from the engineer's normal position in the cab. Pantographs that

automatically rise when released shall have an automatic locking device to secure them in the down position.

- (b) Each pantograph operating on an overhead trolley wire shall have a device for locking and grounding it in the lowest position, that can be applied and released only from a position where the operator has a clear view of the pantograph and roof without mounting the roof.

**Sec. 229.79 Third rail shoes.**

When locomotives are equipped with both third rail and overhead collectors, third-rail shoes shall be deenergized while in yards and at stations when current collection is exclusively from the overhead conductor.

**Sec. 229.81 Emergency pole; shoe insulation.**

- (a) Each locomotive equipped with a pantograph operating on an overhead trolley wire shall have an emergency pole suitable for operating the pantograph. Unless the entire pole can be safely handled, the part of the pole which can be safely handled shall be marked to so indicate. This pole shall be protected from moisture when not in use.
- (b) Each locomotive equipped with third-rail shoes shall have a device for insulating the current collecting apparatus from the third rail.

**Sec. 229.83 Insulation or grounding of metal parts.**

All unguarded noncurrent-carrying metal parts subject to becoming charged shall be grounded or thoroughly insulated.

**Sec. 229.85 Doors and cover plates marked ``Danger''.**

All doors and cover plates guarding high voltage equipment shall be marked ``Danger--High Voltage'' or with the word ``Danger'' and the normal voltage carried by the parts so protected.

**Sec. 229.87 Hand-operated switches.**

All hand-operated switches carrying currents with a potential of more than 150 volts that may be operated while under load shall be covered and shall be operative from the outside of the cover. Means shall be provided to show whether the switches are open or closed. Switches that should not be operated while under load shall be legibly marked with the words ``must not be operated under load'' and the voltage carried.

**Sec. 229.89 Jumpers; cable connections.**

- (a) Jumpers and cable connections between locomotives shall be so located and guarded to provide sufficient vertical clearance. They may not hang with one end free.
- (b) Cable and jumper connections between locomotive may not have any of the following conditions:
  - (1) Broken or badly chafed insulation.
  - (2) Broken plugs, receptacles or terminals.
  - (3) Broken or protruding strands of wire.

**Sec. 229.91 Motors and generators.**

A motor or a generator may not have any of the following conditions:

- (a) Be shorted or grounded.
- (b) Throw solder excessively.
- (c) Show evidence of coming apart.
- (d) Have an overheated support bearing.
- (e) Have an excessive accumulation of oil.

## **Internal Combustion Equipment**

### **Sec. 229.93 Safety cut-off device.**

The fuel line shall have a safety cut-off device that--

- (a) Is located adjacent to the fuel supply tank or in another safe location;
- (b) Closes automatically when tripped and can be reset without hazard; and
- (c) Can be hand operated from clearly marked locations, one inside the cab and one on each exterior side of the locomotive.

### **Sec. 229.95 Venting.**

Fuel tank vent pipes may not discharge on the roof nor on or between the rails.

### **Sec. 229.97 Grounding fuel tanks.**

Fuel tanks and related piping shall be electrically grounded.

### **Sec. 229.99 Safety hangers.**

Drive shafts shall have safety hangers.

### **Sec. 229.101 Engines.**

- (a) The temperature and pressure alarms, controls and related switches of internal combustion engines shall function properly.
- (b) Whenever an engine has been shut down due to mechanical or other problems, a distinctive warning notice giving reason for the shut-down shall be conspicuously attached near the engine starting control until repairs have been made.
- (c) Wheel slip/slide protection shall be provided on a locomotive with an engine displaying a warning notice whenever required by Sec. 229.115(b).

## **Steam Generators**

### **Sec. 229.103 Safe working pressure; factor of safety.**

The safe working pressure for each steam generator shall be fixed by the chief mechanical officer of the carrier. The minimum factor of safety shall be four. The fixed safe working pressure shall be indicated on FRA Form F 6180-49A.

### **Sec. 229.105 Steam generator number.**

An identification number shall be marked on the steam generator's separator and that number entered on FRA Form F 6180-49A.

### **Sec. 229.107 Pressure gauge.**

(a) Each steam generator shall have an illuminated steam gauge that correctly indicates the pressure. The steam pressure gauge shall be graduated to not less than one and one-half times the allowed working pressure of the steam generator.

(b) Each steam pressure gauge on a steam generator shall have a siphon that prevents steam from entering the gauge. The pipe connection shall directly enter the separator and shall be steam tight between the separator and the gauge.

**Sec. 229.109 Safety valves.**

Every steam generator shall be equipped with at least two safety valves that have a combined capacity to prevent an accumulation of pressure of more than five pounds per square inch above the allowed working pressure. The safety valves shall be independently connected to the separator and located as closely to the separator as possible without discharging inside of the generator compartment. The ends of the safety valve discharge lines shall be located or protected so that discharged steam does not create a hazard.

**Sec. 229.111 Water-flow indicator.**

- (a) Steam generators shall be equipped with an illuminated visual return water-flow indicator.
- (b) Steam generators shall be equipped with an operable test valve or other means of determining whether the steam generator is filled with water. The fill test valve may not discharge steam or hot water into the steam generator compartment.

**Sec. 229.113 Warning notice.**

Whenever any steam generator has been shut down because of defects, a distinctive warning notice giving reasons for the shut-down shall be conspicuously attached near the steam generator starting controls until the necessary repairs have been made. The locomotive in which the steam generator displaying a warning notice is located may continue in service until the next periodic inspection.

**Cabs and Cab Equipment**

**Sec. 229.115 Slip/slide alarms.**

- (a) Except for MU locomotives, each locomotive used in road service shall be equipped with a device that provides an audible or visual alarm in the cab of either slipping or sliding wheels on powered axles under power. When two or more locomotives are coupled in multiple or remote control, the wheel slip/slide alarm of each locomotive shall be shown in the cab of the controlling locomotive.
- (b) Except as provided in Sec. 229.9, an equipped locomotive may not be dispatched in road service, or continue in road service following a daily inspection, unless the wheel slip/slide protective device of whatever type--
  - (1) Is functioning for each powered axle under power; and
  - (2) Would function on each powered axle if it were under power.
- (c) Effective January 1, 1981, all new locomotives capable of being used in road service shall be equipped with a device that detects wheel slip/slide for each powered axle when it is under power. The device shall produce an audible or visual alarm in the cab.

**Sec. 229.117 Speed indicators.**

- (a) After December 31, 1980, each locomotive used as a controlling locomotive at speeds in excess of 20 miles per hour shall be equipped with a speed indicator which is--
  - (1) Accurate within <sup>[plusmn]</sup>3 miles per hour of actual speed at speeds of 10 to 30 miles per hour and accurate within <sup>[plusmn]</sup>5 miles per hour at speeds above 30 miles per hour; and
  - (2) Clearly readable from the engineer's normal position under all light conditions.
- (b) Each speed indicator required shall be tested as soon as possible after departure by means of speed test sections or equivalent procedures.

**Sec. 229.119 Cabs, floors, and passageways.**

- (a) Cab seats shall be securely mounted and braced. Cab doors shall be equipped with a secure and operable latching device.
- (b) Cab windows of the lead locomotive shall provide an undistorted view of the right-of-way for the crew from their normal position in the cab. (See also, Safety Glazing Standards, 49 CFR part 223, 44 FR 77348, Dec. 31, 1979.)
- (c) Floors of cabs, passageways, and compartments shall be kept free from oil, water, waste or any obstruction that creates a slipping, tripping or fire hazard. Floors shall be properly treated to provide secure footing.
- (d) The cab shall be provided with proper ventilation and with a heating arrangement that maintains a temperature of at least 50 degrees Fahrenheit 6 inches above the center of each seat in the cab.
- (e) Similar locomotives with open end platforms coupled in multiple control and used in road service shall have a means of safe passage between them; no passageway is required through the nose of car body locomotives. There shall be a continuous barrier across the full width of the end of a locomotive or a continuous barrier between locomotives.
- (f) Containers shall be provided for carrying fusees and torpedoes. A single container may be used if it has a partition to separate fusees from torpedoes. Torpedoes shall be kept in a closed metal container.

**Sec. 229.121 Locomotive cab noise.**

- (a) After August 31, 1980, the permissible exposure to a continuous noise in a locomotive cab shall not exceed an eight-hour time-weighted average of 90dB(A), with a doubling rate of 5dB(A) as indicated in the table. Continuous noise is any sound with a rise time of more than 35 milliseconds to peak intensity and a duration of more than 500 milliseconds to the time when the level is 20dB below the peak.

| Duration permitted (hours) | Sound level<br>(dB(A)) |
|----------------------------|------------------------|
| 12.....                    | 87                     |
| 8.....                     | 90                     |
| 6.....                     | 92                     |
| 4.....                     | 95                     |
| 2.....                     | 100                    |
| 1\1/2\.....                | 102                    |
| 1.....                     | 105                    |
| \1/2\.....                 | 110                    |
| \1/4\ or less.....         | 115                    |

- (b) When the continuous noise exposure is composed of two or more periods of noise exposure of different levels, their combined effect shall be considered. Exposure to different levels for various periods of time shall be computed according to the following formula:

$$D = T_1/L_1 + T_2/L_2 + \dots + T_n/L_n$$

where:

D = noise dose.

T = the duration of exposure (in hours) at a given continuous noise level.

L = the limit (in hours) for the level present during the time T (from the table).

If the value of D exceeds 1, the exposure exceeds permissible levels.

- (c) Exposure to continuous noise shall not exceed 115dB(A).
- (d) Noise measurements shall be made under typical operating conditions using a sound level meter conforming, at a minimum, to the requirements of ANSI S1.4-1971, Type 2, and set to an A-weighted slow response or with an audiodosimeter of equivalent accuracy and precision.
- (e) In conducting sound level measurements with a sound level meter, the microphone shall be oriented vertically and positioned approximately 15 centimeters from and on axis with the crew member's ear. Measurements with an audiodosimeter shall be conducted in accordance with manufacturer's procedures as to microphone placement and orientation.

**Sec. 229.123 Pilots, snowplows, end plates.**

After January 1, 1981, each lead locomotive shall be equipped with an end plate that extends across both rails, a pilot, or a snowplow. The minimum clearance above the rail of the pilot, snowplow or end plate shall be 3 inches, and the maximum clearance 6 inches.

**Sec. 229.125 Headlights and auxiliary lights.**

- (a) Each lead locomotive used in road service shall have a headlight that produces at least 200,000 candela. If a locomotive or locomotive consist in road service is regularly required to run backward for any portion of its trip other than to pick up a detached portion of its train or to make terminal movements, it shall also have on its rear a headlight that produces at least 200,000 candela. Each headlight shall be arranged to illuminate a person at least 800 feet ahead and in front of the headlight.
- (b) Each locomotive or locomotive consist used in yard service shall have two headlights, one located on the front of the locomotive or locomotive consist and one on its rear. Each headlight shall produce at least 60,000 candela and shall be arranged to illuminate a person at least 300 feet ahead and in front of the headlight.
- (c) Headlights shall be provided with a device to dim the light.
- (d) Effective December 31, 1997, each lead locomotive operated at a speed greater than 20 miles per hour over one or more public highway-rail crossings shall be equipped with operative auxiliary lights, in addition to the headlight required by paragraph (a) or (b) of this section. A locomotive equipped on March 6, 1996 with auxiliary lights in conformance with Sec. 229.133 shall be deemed to conform to this section until March 6, 2000. All locomotives in compliance with Sec. 229.133(c) shall be deemed to conform to this section. Auxiliary lights shall be composed as follows:
  - (1) Two white auxiliary lights shall be placed at the front of the locomotive to form a triangle with the headlight.
  - (i) The auxiliary lights shall be at least 36 inches above the top of the rail, except on MU locomotives and control cab locomotives where such placement would compromise the integrity of the car body or be otherwise impractical. Auxiliary lights on such MU locomotives and control cab locomotives shall be at least 24 inches above the top of the rail.
  - (ii) The auxiliary lights shall be spaced at least 36 inches apart if the vertical distance from the headlight to the horizontal axis of the auxiliary lights is 60 inches or more.
  - (iii) The auxiliary lights shall be spaced at least 60 inches apart if the vertical distance from the headlight to the horizontal axis of the auxiliary lights is less than 60 inches.
- (2) Each auxiliary light shall produce at least 200,000 candela.
- (3) The auxiliary lights shall be focused horizontally within 15 degrees of the longitudinal centerline of the locomotive.
- (e) Auxiliary lights required by paragraph (d) of this section may be arranged
  - (1) to burn steadily or
  - (2) flash on approach to a crossing.

If the auxiliary lights are arranged to flash;

- (i) they shall flash alternately at a rate of at least 40 flashes per minute and at most 180 flashes per minute,
  - (ii) the railroad's operating rules shall set a standard procedure for use of flashing lights at public highway-rail grade crossings, and
  - (iii) the flashing feature may be activated automatically, but shall be capable of manual activation and deactivation by the locomotive engineer.
- (f) Auxiliary lights required by paragraph (d) of this section shall be continuously illuminated immediately prior to and during movement of the locomotive, except as provided by railroad operating rules, timetable or special instructions, unless such exception is disapproved by FRA. A railroad may except use of auxiliary lights at a specific public highway-rail grade crossing by designating that exception in the railroad's operating rules, timetable, or a special order. Any exception from use of auxiliary lights at a specific public grade crossing can be disapproved for a stated cause by FRA's Associate Administrator for Safety or any one of FRA's Regional Administrators, after investigation by FRA and opportunity for response from the railroad.
- (g) Movement of locomotives with defective auxiliary lights.
- (1) A lead locomotive with only one failed auxiliary light must be repaired or switched to a trailing position before departure from the place where an initial terminal inspection is required for that train.
  - (2) A locomotive with only one auxiliary light that has failed after departure from an initial terminal, must be repaired not later than the next calendar inspection required by Sec. 229.21.
  - (3) A lead locomotive with two failed auxiliary lights may only proceed to the next place where repairs can be made. This movement must be consistent with Sec. 229.9.
- (h) Any locomotive subject to Part 229, that was built before December 31, 1948, and that is not used regularly in commuter or intercity passenger service, shall be considered historic equipment and excepted from the requirements of paragraphs (d) through (h) of this section.

[45 FR 21109, Mar. 31, 1980, as amended at 61 FR 8887, Mar. 6, 1996]

**Sec. 229.127 Cab lights.**

- (a) Each locomotive shall have cab lights which will provide sufficient illumination for the control instruments, meters, and gauges to enable the engine crew to make accurate readings from their normal positions in the cab. These lights shall be located, constructed, and maintained so that light shines only on those parts requiring illumination and does not interfere with the crew's vision of the track and signals. Each controlling locomotive shall also have a conveniently located light that can be readily turned on and off by the persons operating the locomotive and that provides sufficient illumination for them to read train orders and timetables.
- (b) Cab passageways and compartments shall have adequate illumination.

**Sec. 229.129 Audible warning device.**

- (a) After August 31, 1980, each lead locomotive shall be provided with an audible warning device that produces a minimum sound level of 96db(A) at 100 feet forward of the locomotive in its direction of travel. The device shall be arranged so that it can be conveniently operated from the engineer's normal position in the cab.
- (b) Measurement of the sound level shall be made using a sound level meter conforming, at a minimum, to the requirements of ANSI S1.4-1971, Type 2, and set to an A-weighted slow response. While the locomotive is on level tangent track, the microphone shall be positioned 4 feet above the ground at the center line of the track, and shall be oriented with respect to the sound source in accordance with the manufacturer's

recommendations.

- (c) A 4dB(A) measurement tolerance is allowable for a given measurement.

**Sec. 229.131 Sanders.**

Except for MU locomotives, each locomotive shall be equipped with operable sanders that deposit sand on each rail in front of the first power operated wheel set in the direction of movement.

**Sec. 229.133 Interim locomotive conspicuity measures--auxiliary external lights.**

- (a) A locomotive at the head of a train or other movement is authorized to be equipped with auxiliary external lights, additional to the headlight required by Sec. 229.125, for the purpose of improved conspicuity. A locomotive that is equipped with auxiliary external lights in conformance with the specifications or performance standards set forth in paragraph (b) of this section on the date of issuance of a final rule that requires additional or other external lights on locomotives for improved conspicuity, as required by section 202(u) of the Federal Railroad Safety Act of 1970, shall be deemed to conform to the requirements of the final rule for four years following the date of issuance of that final rule.
- (b) Each qualifying arrangement of auxiliary external lights shall conform to one of the following descriptions:
- (1) Ditch lights. (i) Ditch lights shall consist of two white lights, each producing a steady beam of at least 200,000 candela, placed at the front of the locomotive, at least 36 inches above the top of the rail.
- (ii) Ditch lights shall be spaced at least 36 inches apart if the vertical distance from the headlight to the horizontal axis of the ditch lights is 60 inches or more.
- (iii) Ditch lights shall be spaced at least 60 inches apart if the vertical distance from the headlight to the horizontal axis of the ditch lights is less than 60 inches.
- (iv) Ditch lights shall be focused horizontally within 45 degrees of the longitudinal centerline of the locomotive.
- (2) Strobe lights. (i) Strobe lights shall consist of two white stroboscopic lights, each with ``effective intensity,' ' as defined by the Illuminating Engineering Society's Guide for Calculating the Effective Intensity of Flashing Signal Lights (November 1964), of at least 500 candela.
- (ii) The flash rate of strobe lights shall be at least 40 flashes per minute and at most 180 flashes per minute.
- (iii) Strobe lights shall be placed at the front of the locomotive, at least 48 inches apart, and at least 36 inches above the top of the rail.
- (3) Crossing lights. (i) Crossing lights shall consist of two white lights, placed at the front of the locomotive, at least 36 inches above the top of the rail.
- (ii) Crossing lights shall be spaced at least 36 inches apart if the vertical distance from the headlight to the horizontal axis of the ditch lights is 60 inches or more.
- (iii) Crossing lights shall be spaced at least 60 inches apart if the vertical distance from the headlight to the horizontal axis of the ditch lights is less than 60 inches.
- (iv) Each crossing light shall produce at least 200,000 candela, either steadily burning or alternately flashing.
- (v) The flash rate of crossing lights shall be at least 40 flashes per minute and at most 180 flashes per minute.
- (vi) Crossing lights shall be focused horizontally within 15 degrees of the longitudinal centerline of the locomotive.
- (4) Oscillating light. (i) An oscillating light shall consist of:
- (A) One steadily burning white light producing at least 200,000 candela in a moving beam that depicts a circle or a horizontal figure

``8'' to the front, about the longitudinal centerline of the locomotive;  
or

- (B) Two or more white lights producing at least 200,000 candela each, at one location on the front of the locomotive, that flash alternately with beams within five degrees horizontally to either side of the longitudinal centerline of the locomotive.
- (ii) An oscillating light may incorporate a device that automatically extinguishes the white light if display of a light of another color is required to protect the safety of railroad operations.
- (c)(1) Any lead locomotive equipped with oscillating lights as described in paragraph (b)(4) that were ordered for installation on that locomotive prior to January 1, 1996, is considered in compliance with Sec. 229.125(d) (1) through (3).
- (2) Any lead locomotive equipped with strobe lights as described in paragraph (b)(2) and operated at speeds no greater than 40 miles per hour, is considered in compliance with Sec. 229.125(d) (1) through (3) until the locomotive is retired or rebuilt, whichever comes first.
- (3) Any lead locomotive equipped with two white auxiliary lights spaced at least 44 inches apart on at least one axis which was equipped with these auxiliary lights before May 30, 1994, will be considered in compliance with Sec. 229.125(d) (1) through (3) until the locomotive is retired or rebuilt, whichever comes first.

[58 FR 6902, Feb. 3, 1993, as amended at 59 FR 24963, May 13, 1994; 59 FR 39705, Aug. 4, 1994; 61 FR 8887, Mar. 6, 1996]

#### **Sec. 229.135 Event recorders.**

- (a) Duty to equip. Effective May 5, 1995, and except as provided in paragraph (b) of this section, any train operated faster than 30 miles per hour shall have an in-service event recorder in the lead locomotive. The presence of the event recorder shall be noted on Form FRA F6180-49A, under the REMARKS section, except that an event recorder designed to allow the locomotive to assume the lead position only if the recorder is properly functioning is not required to have its presence noted on Form FRA F6180-49A. For the purpose of this section, ``train'' includes a locomotive or group of locomotives with or without cars, and ``lead locomotive'' means the locomotive from whose cab the crew is operating the train and, when cab control locomotives and/or MU locomotives are coupled together, is the first locomotive proceeding in the direction of movement. The duty to equip the lead locomotive may be met with an event recorder located elsewhere than the lead locomotive provided that such event recorder monitors and records the required data as though it were located in the lead locomotive.
- (b) Response to defective equipment. A locomotive on which the event recorder has been taken out of service as provided in paragraph (c) of this section may remain as the lead locomotive only until the next calendar-day inspection. A locomotive with an inoperative event recorder is not deemed to be in improper condition, unsafe to operate, or a non-complying locomotive under Secs. 229.7 and 229.9, and notwithstanding any other requirements in this chapter, inspection, maintenance, and testing of event recorders is limited to the requirements set forth in Sec. 229.25(e).
- (c) Removal from service. A railroad may remove an event recorder from service and, if a railroad knows that an event recorder is not monitoring or recording the data specified in Sec. 229.5(g), shall remove the event recorder from service. When a railroad removes an event recorder from service, a qualified person shall cause to be recorded the date the device was removed from service on Form FRA F6180-49A, under the REMARKS section. An event recorder designed to allow the locomotive to assume the lead position only if the recorder is properly functioning is not required to have its removal from service noted on Form FRA F6180-49A.
- (d) Preserving accident data. For the purposes of this section, the term ``event recorder'' includes all locomotive-mounted recording

devices designed to record information concerning the functioning of a locomotive or train regardless of whether the device meets the definition of "event recorder" in Sec. 229.5.

- (1) Accidents required to be reported to the Federal Railroad Administration. If any locomotive equipped with an event recorder is involved in an accident that is required to be reported to FRA, the railroad using the locomotive shall, to the extent possible, and to the extent consistent with the safety of life and property, preserve the data recorded by the device for analysis by FRA. This preservation requirement permits the railroad to extract and analyze such data; provided the original or a first-order accurate copy of the data shall be retained in secure custody and shall not be utilized for analysis or any other purpose except by direction of FRA or the National Transportation Safety Board. This preservation requirement shall expire 30 days after the date of the accident unless FRA or the Board notifies the railroad in writing that the data are desired for analysis.
- (2) Relationship to other laws. Nothing in this section is intended to alter the legal authority of law enforcement officials investigating potential violation(s) of State criminal law(s) and nothing in this chapter is intended to alter in any way the priority of National Transportation Safety Board investigations under 49 U.S.C. 1131 and 1134, nor the authority of the Secretary of Transportation to investigate railroad accidents under 49 U.S.C. 5121, 5122, 20107, 20111, 20112, 20505, 20702, 20703, and 20902.
- (e) Disabling event recorders. Except as provided in paragraph (c) of this section, any individual who willfully disables an event recorder is subject to civil penalty and to disqualification from performing safety-sensitive functions on a railroad as provided in Sec. 218.55 of this chapter and any individual who tampers with or alters the data recorded by such a device is subject to a civil penalty as provided in appendix B of this part and to disqualification from performing safety-sensitive functions on a railroad if found unfit for such duties under the procedures in 49 CFR part 209.

[58 FR 36614, July 8, 1993, as amended at 60 FR 27905, May 26, 1995]

**Sec. 229.137 Sanitation, general requirements.**

- (a) Sanitation compartment. Except as provided in paragraph (b) of this section, all lead locomotives in use shall be equipped with a sanitation compartment. Each sanitation compartment shall be:
  - (1) Adequately ventilated;
  - (2) Equipped with a door that:
    - (i) Closes, and
    - (ii) Possesses a modesty lock by [18 months after publication of the final rule];
  - (3) Equipped with a toilet facility, as defined in this part;
  - (4) Equipped with a washing system, as defined in this part, unless the railroad otherwise provides the washing system to employees upon reporting for duty or occupying the cab for duty, or where the locomotive is equipped with a stationary sink that is located outside of the sanitation compartment;
  - (5) Equipped with toilet paper in sufficient quantity to meet employee needs, unless the railroad otherwise provides toilet paper to employees upon reporting for duty or occupying the cab for duty; and
  - (6) Equipped with a trash receptacle, unless the railroad otherwise provides portable trash receptacles to employees upon reporting for duty or occupying the cab for duty.
- (b) Exceptions. (1) Paragraph (a) of this section shall not apply to:
  - (i) Locomotives engaged in commuter service or other short-haul passenger service and commuter work trains on which employees have ready access to railroad-provided sanitation facilities outside of the locomotive or elsewhere on the train, that meet otherwise applicable sanitation standards, at frequent intervals during the course of their

work shift;

- (ii) Locomotives engaged in switching service on which employees have ready access to railroad-provided sanitation facilities outside of the locomotive, that meet otherwise applicable sanitation standards, at frequent intervals during the course of their work shift;
  - (iii) Locomotives engaged in transfer service on which employees have ready access to railroad-provided sanitation facilities outside of the locomotive, that meet otherwise applicable sanitation standards, at frequent intervals during the course of their work shift;
  - (iv) Locomotives of Class III railroads engaged in operations other than switching service or transfer service, that are not equipped with a sanitation compartment as of June 3, 2002. Where an unequipped locomotive of a Class III railroad is engaged in operations other than switching or transfer service, employees shall have ready access to railroad-provided sanitation facilities outside of the locomotive that meet otherwise applicable sanitation standards, at frequent intervals during the course of their work shift, or the railroad shall arrange for enroute access to such facilities;
  - (v) Locomotives of tourist, scenic, historic, or excursion railroad operations, which are otherwise covered by this part because they are not propelled by steam power and operate on the general railroad system of transportation, but on which employees have ready access to railroad-provided sanitation facilities outside of the locomotive, that meet otherwise applicable sanitation standards, at frequent intervals during the course of their work shift; and
  - (vi) Except as provided in Sec. 229.14 of this part, control cab locomotives designed for passenger occupancy and used in intercity push-pull service that are not equipped with sanitation facilities, where employees have ready access to railroad-provided sanitation in other passenger cars on the train at frequent intervals during the course of their work shift.
- (2) Paragraph (a)(3) of this section shall not apply to:
- (i) Locomotives of a Class I railroad which, prior to [the effective date of this section], were equipped with a toilet facility in which human waste falls via gravity to a holding tank where it is stored and periodically emptied, which does not conform to the definition of toilet facility set forth in this section. For these locomotives, the requirements of this section pertaining to the type of toilet facilities required shall be effective as these toilets become defective or are replaced with conforming units, whichever occurs first. All other requirements set forth in this section shall apply to these locomotives as of June 3, 2002; and
  - (ii) With respect to the locomotives of a Class I railroad which, prior to June 3, 2002, were equipped with a sanitation system other than the units addressed by paragraph (b)(2)(i) of this section, that contains and removes human waste by a method that does not conform with the definition of toilet facility as set forth in this section, the requirements of this section pertaining to the type of toilet facilities shall apply on locomotives in use on July 1, 2003. However, the Class I railroad subject to this exception shall not deliver locomotives with such sanitation systems to other railroads for use, in the lead position, during the time between June 3, 2002, and July 1, 2003. All other requirements set forth in this section shall apply to the locomotives of this Class I railroad as of June 3, 2002.
- (c) Defective, unsanitary toilet facility; prohibition in lead position. Except as provided in paragraphs (c)(1) through (5) of this section, if the railroad determines during the daily inspection required by Sec. 229.21 that a locomotive toilet facility is defective or is unsanitary, or both, the railroad shall not use the locomotive in the lead position. The railroad may continue to use a lead locomotive with a toilet facility that is defective or unsanitary as of the daily inspection only where all of the following conditions are met:
- (1) The unsanitary or defective condition is discovered at a location where there are no other suitable locomotives available for use, ie., where it is not possible to switch another locomotive into the

- lead position, or the location is not equipped to clean the sanitation compartment if unsanitary or repair the toilet facility if defective;
- (2) The locomotive, while noncompliant, did not pass through a location where it could have been cleaned if unsanitary, repaired if defective, or switched with another compliant locomotive, since its last daily inspection required by this part;
  - (3) Upon reasonable request of a locomotive crewmember operating a locomotive with a defective or unsanitary toilet facility, the railroad arranges for access to a toilet facility outside the locomotive that meets otherwise applicable sanitation standards;
  - (4) If the sanitation compartment is unsanitary, the sanitation compartment door shall be closed and adequate ventilation shall be provided in the cab so that it is habitable; and
  - (5) The locomotive shall not continue in service in the lead position beyond a location where the defective or unsanitary condition can be corrected or replaced with another compliant locomotive, or the next daily inspection required by this part, whichever occurs first.
- (d) Defective, unsanitary toilet facility; use in trailing position. If the railroad determines during the daily inspection required by Sec. 229.21 that a locomotive toilet facility is defective or is unsanitary, or both, the railroad may use the locomotive in trailing position. If the railroad places the locomotive in trailing position, they shall not haul employees in the unit unless the sanitation compartment is made sanitary prior to occupancy. If the toilet facility is defective and the unit becomes occupied, the railroad shall clearly mark the defective toilet facility as unavailable for use.
  - (e) Defective, sanitary toilet facility; use in switching, transfer service. If the railroad determines during the daily inspection required by Sec. 229.21 that a locomotive toilet facility is defective, but sanitary, the railroad may use the locomotive in switching service, as set forth in paragraph (b)(1)(ii) of this section, or in transfer service, as set forth in paragraph (b)(1)(iii) of this section for a period not to exceed 10 days. In this instance, the railroad shall clearly mark the defective toilet facility as unavailable for use. After expiration of the 10-day period, the locomotive shall be repaired or used in the trailing position.
  - (f) Lack of toilet paper, washing system, trash receptacle. If the railroad determines during the daily inspection required by Sec. 229.21 that the lead locomotive is not equipped with toilet paper in sufficient quantity to meet employee needs, or a washing system as required by paragraph (a)(4) of this section, or a trash receptacle as required by paragraph (a)(6) of this section, the locomotive shall be equipped with these items prior to departure.
  - (g) Inadequate ventilation. If the railroad determines during the daily inspection required by Sec. 229.21 that the sanitation compartment of the lead locomotive in use is not adequately ventilated as required by paragraph (a)(1) of this section, the railroad shall repair the ventilation prior to departure, or place the locomotive in trailing position, in switching service as set forth in paragraph (b)(1)(ii) of this section, or in transfer service as set forth in paragraph (b)(1)(iii) of this section.
  - (h) Door closure and modesty lock. If the railroad determines during the daily inspection required by Sec. 229.21 that the sanitation compartment on the lead locomotive is not equipped with a door that closes, as required by paragraph (a)(2)(i) of this section, the railroad shall repair the door prior to departure, or place the locomotive in trailing position, in switching service as set forth in paragraph (b)(1)(ii) of this section, or in transfer service as set forth in paragraph (b)(1)(iii) of this section. If the railroad determines during the daily inspection required by Sec. 229.21 that the modesty lock required by paragraph (a)(2)(ii) of this section is defective, the modesty lock shall be repaired pursuant to the requirements of Sec. 229.139(e).
  - (i) Equipped units; retention and maintenance. Except where a railroad downgrades a locomotive to service in which it will never be

occupied, where a locomotive is equipped with a toilet facility as of [the effective date of the final rule], the railroad shall retain and maintain the toilet facility in the locomotive consistent with the requirements of this part, including locomotives used in switching service pursuant to paragraph (b)(1)(ii) of this section, and in transfer service pursuant to paragraph (b)(1)(iii) of this section.

- (j) Newly manufactured units; in-cab facilities. All locomotives manufactured after June 3, 2002, except switching units built exclusively for switching service and locomotives built exclusively for commuter service, shall be equipped with a sanitation compartment accessible to cab employees without exiting to the out-of-doors for use. No railroad may use a locomotive built after June 3, 2002, that does not comply with this subsection.
- (k) Potable water. The railroad shall utilize potable water where the washing system includes the use of water.

[67 FR 16050, Apr. 4, 2002]

#### **Sec. 229.139 Sanitation, servicing requirements.**

- (a) The sanitation compartment of each lead locomotive in use shall be sanitary.
- (b) All components required by Sec. 229.137(a) for the lead locomotive in use shall be present consistent with the requirements of this part, and shall operate as intended such that:
  - (1) All mechanical systems shall function;
  - (2) Water shall be present in sufficient quantity to permit flushing;
  - (3) For those systems that utilize chemicals for treatment, the chemical (chlorine or other comparable oxidizing agent) used to treat waste must be present; and
  - (4) No blockage is present that prevents waste from evacuating the bowl.
- (c) The sanitation compartment of each occupied locomotive used in switching service pursuant to Sec. 229.137(b)(1)(ii), in transfer service pursuant to Sec. 229.137(b)(1)(iii), or in a trailing position when the locomotive is occupied, shall be sanitary.
- (d) Where the railroad uses a locomotive pursuant to Sec. 229.137(e) in switching or transfer service with a defective toilet facility, such use shall not exceed 10 calendar days from the date on which the defective toilet facility became defective. The date on which the toilet facility becomes defective shall be entered on the daily inspection report.
- (e) Where it is determined that the modesty lock required by Sec. 229.137(a)(2) is defective, the railroad shall repair the modesty lock on or before the next 92-day inspection required by this part.

[67 FR 16050, Apr. 4, 2002]

#### **Subpart D--Design Requirements**

#### **Sec. 229.141 Body structure, MU locomotives.**

- (a) MU locomotives built new after April 1, 1956 that are operated in trains having a total empty weight of 600,000 pounds or more shall have a body structure designed to meet or exceed the following minimum specifications:
  - (1) The body structure shall resist a minimum static end load of 800,000 pounds at the rear draft stops ahead of the bolster on the center line of draft, without developing any permanent deformation in any member of the body structure.
  - (2) An anti-climbing arrangement shall be applied at each end that is designed so that coupled MU locomotives under full compression shall mate in a manner that will resist one locomotive from climbing the other. This arrangement shall resist a vertical load of 100,000 pounds

without exceeding the yield point of its various parts or its attachments to the body structure.

- (3) The coupler carrier and its connections to the body structure shall be designed to resist a vertical downward thrust from the coupler shank of 100,000 pounds for any horizontal position of the coupler, without exceeding the yield points of the materials used. When yielding type of coupler carrier is used, an auxiliary arrangement shall be provided that complies with these requirements.
  - (4) The outside end of each locomotive shall be provided with two main vertical members, one at each side of the diaphragm opening; each main member shall have an ultimate shear value of not less than 300,000 pounds at a point even with the top of the underframe member to which it is attached. The attachment of these members at bottom shall be sufficient to develop their full shear value. If reinforcement is used to provide the shear value, the reinforcement shall have full value for a distance of 18 inches up from the underframe connection and then taper to a point approximately 30 inches above the underframe connection.
  - (5) The strength of the means of locking the truck to the body shall be at least the equivalent of an ultimate shear value of 250,000 pounds.
- (b) MU locomotives built new after April 1, 1956 that are operated in trains having a total empty weight of less than 600,000 pounds shall have a body structure designed to meet or exceed the following minimum specifications:
- (1) The body structure shall resist a minimum static end load of 400,000 pounds at the rear draft stops ahead of the bolster on the center line of draft, without developing any permanent deformation in any member of the body structure.
  - (2) An anti-climbing arrangement shall be applied at each end that is designed so that coupled locomotives under full compression shall mate in a manner that will resist one locomotive from climbing the other. This arrangement shall resist a vertical load of 75,000 pounds without exceeding the yield point of its various parts or its attachments to the body structure.
  - (3) The coupler carrier and its connections to the body structure shall be designed to resist a vertical downward thrust from the coupled shank of 75,000 pounds for any horizontal position of the coupler, without exceeding the yield points of the materials used. When a yielding type of coupler carrier is used, an auxiliary arrangement shall be provided that complies with these requirements.
  - (4) The outside end of each MU locomotive shall be provided with two main vertical members, one at each side of the diaphragm opening; each main member shall have an ultimate shear value of not less than 200,000 pounds at a point even with the top of the underframe member to which it is attached. The attachment of these members at bottom shall be sufficient to develop their full shear value, the reinforcement shall have full value for a distance of 18 inches up from the underframe connection and then taper to a point approximately 30 inches above the underframe connection.
  - (5) The strength of the means of locking the truck to the body shall be at least the equivalent of an ultimate shear value of 250,000 pounds.

**Appendix A to Part 229--Form FRA 6180-49A**

Editorial Note: Appendix A, published at 45 FR 21118, Mar. 31, 1980, as part of the original document, is not carried in the CFR. Copies of Form FRA F6180-49A are available by contacting the Federal Railroad Administration, Office of Standards and Procedures, 400 7th St., SW., Washington, DC 20590.

Appendix B To Part 229--Schedule of Civil Penalties\1\

| Section | Violation | Willful violation |
|---------|-----------|-------------------|
|---------|-----------|-------------------|

**Subpart A--General**

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|  |               |               |
|--|---------------|---------------|
| 229.7 Prohibited acts: Safety deficiencies not governed by specific regulations: To be assessed on relevant facts..... | \$1,000-5,000 | \$2,000-7,500 |
| 229.9 Movement of noncomplying locomotives....   | (\1\)         | (\1\)         |
| 229.11 Locomotive identification.....  | 1,000         | 2,000         |
| 229.13 Control of locomotives.....   | 2,500         | 5,000         |
| 229.17 Accident reports.....   | 2,500         | 5,000         |
| 229.19 Prior Waivers.....  | (\1\)         | (\1\)         |

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**Subpart B--Inspection and tests**

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|   |       |        |
|---|-------|--------|
| 229.21 Daily inspection:  |       |        |
| (a)(b):   |       |        |
| (1) Inspection overdue.....   | 2,000 | 4,000  |
| (2) Inspection report not made, improperly executed, or not retained.   | 1,000 | 2,000  |
| (c) Inspection not performed by a qualified person.....   | 1,000 | 2,000  |
| 229.23 Periodic inspection General  |       |        |
| (a)(b):   |       |        |
| (1) Inspection overdue.....   | 2,500 | 5,000  |
| (2) Inspection performed improperly or at a location where the underneath portion cannot be safely inspected... | 2,500 | 5,000  |
| (c)(d):   |       |        |
| (1) Form missing.....   | 1,000 | 2,000  |
| (2) Form not properly displayed.....  | 1,000 | 2,000  |
| (3) Form improperly executed.....   | 1,000 | 2,000  |
| (e) Replace Form FRA F 6180-49A by April 2  | 1,000 | 2,000  |
| (f) Secondary record of the information reported on Form FRA F 6180.49A.....                                    | 1,000 | 2,000  |
| 229.25  |       |        |
| (a) through (e)(4) Tests: Every periodic inspection.....  | 2,500 | 5,000  |
| (e)(5) Ineffective maintenance.....   | 8,000 | 16,000 |
| 229.27 Annual tests.....  | 2,500 | 5,000  |
| 229.29 Biennial tests.....  | 2,500 | 5,000  |
| 229.31:   |       |        |
| (a) Biennial hydrostatic tests of main reservoirs.....  | 2,500 | 5,000  |
| (b) Biennial hammer tests of main reservoirs.....   | 2,500 | 5,000  |
| (c) Drilled telltale holes in welded main reservoirs.....   | 2,500 | 5,000  |
| (d) Biennial tests of aluminum main reservoirs.....   | 2,500 | 5,000  |
| 229.33 Out-of-use credit.....   | 1,000 | 2,000  |

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**Subpart C--Safety Requirements**

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|   |             |             |
|---|-------------|-------------|
| 229.41 Protection against personal injury.....                        | 2,500       | 5,000       |
| 229.43 Exhaust and battery gases.....                                 | 2,500       | 5,000       |
| 229.45 General condition: To be assessed based on relevant facts..... | 1,000-5,000 | 2,000-7,500 |
| 229.46 Brakes: General.....   | 2,500       | 5,000       |
| 229.47 Emergency brake valve.....                                     | 2,500       | 5,000       |
| 229.49 Main reservoir system:   |             |             |
| (a)(1) Main reservoir safety valve.....                               | 2,500       | 5,000       |
| (2) Pneumatically actuated control                                    | 2,500       | 5,000       |

|   |       |       |       |
|---|-------|-------|-------|
| reservoir.....  |       |       |       |
| (b)(c) Main reservoir governors.....  | 2,500 |       | 5,000 |
| 229.51 Aluminum main reservoirs.....  | 2,500 |       | 5,000 |
| 229.53 Brake gauges.....  | 2,500 |       | 5,000 |
| 229.55 Piston travel.....   | 2,500 |       | 5,000 |
| 229.57 Foundation brake gear.....   | 2,500 |       | 5,000 |
| 229.59 Leakage.....   | 2,500 |       | 5,000 |
| 229.61 Draft system.....  | 2,500 |       | 5,000 |
| 229.63 Lateral motion.....  | 2,500 |       | 5,000 |
| 229.64 Plain bearing.....   | 2,500 |       | 5,000 |
| 229.65 Spring rigging.....  | 2,500 |       | 5,000 |
| 229.67 Trucks.....  | 2,500 |       | 5,000 |
| 229.69 Side bearings.....   | 2,500 |       | 5,000 |
| 229.71 Clearance above top of rail.....   | 2,500 |       | 5,000 |
| 229.73 Wheel sets.....  | 2,500 |       | 5,000 |
| 229.75 Wheel and tire defects:  |       |       |       |
| (a),(d) Slid flat or shelled spot(s):   |       |       |       |
| (1) One spot 2\1/2\ or more but less than 3 in length.  | 2,500 | 5,000 |       |
| (2) One spot 3 or more in length.....   | 5,000 | 7,500 |       |
| (3) Two adjoining spots each of which is 2 or more in length but less than 2\1/2\ in length                     | 2,500 | 5,000 |       |
| (4) Two adjoining spots each of which are at least 2 in length, if either spot is 2\1/2\ or more in length..... | 5,000 | 7,500 |       |
| (b) Gouge or chip in flange of:   |       |       |       |
| (1) more than 1\1/2\ but less than 1\5/8\ in length; and more than \1/2\ but less than \5/8\ in width.....      | 2,500 | 5,000 |       |
| (2) 1\5/8\ or more in length and \5/8\ or more in width.....  | 5,000 | 7,500 |       |
| (c) Broken rim.....   | 5,000 |       | 7,500 |
| (e) Seam in tread.....  | 2,500 |       | 5,000 |
| (f) Flange thickness of:  |       |       |       |
| (1) \7/8\ or less but more than \13/16\.....  | 2,500 | 5,000 |       |
| (2) \13/16\ or less.....  | 5,000 | 7,500 |       |
| (g) Tread worn hollow.....  | 2,500 |       | 5,000 |
| (h) Flange height of:   |       |       |       |
| (1) 1\1/2\ or greater but less than 1\5/8\.....   | 2,500 | 5,000 |       |
| (2) 1\5/8\ or more.....   | 5,000 | 7,000 |       |
| (i) Tire thickness.....   | 2,500 |       | 5,000 |
| (j) Rim thickness:  |       |       |       |
| (1) Less than 1 in road service and \3/4\ in yard service.....  | 2,500 | 5,000 |       |
| (2) \15/16\ or less in road service and \11/16\ in yard service.....  | 5,000 | 7,500 |       |
| (k) Crack of less than 1.....   | 5,000 | 7,500 |       |
| (1) Crack of less than 1...   | 2,500 | 5,000 |       |
| (2) Crack of 1 or more.....   | 5,000 | 7,500 |       |
| (3) Break.....  | 5,000 | 7,500 |       |
| (l) Loose wheel or tire.....  | 5,000 | 7,500 |       |
| (m) Welded wheel or tire.....   | 5,000 | 7,500 |       |
| 229.77 Current collectors.....  | 2,500 |       | 5,000 |
| 229.79 Third rail shoes and beams.....  | 2,000 |       | 4,000 |
| 229.81 Emergency pole; shoe insulation.....   | 2,500 |       | 5,000 |
| 229.83 Insulation or grounding.....   | 5,000 |       | 7,500 |

|   |       |       |
|---|-------|-------|
| 229.85 Door and cover plates marked ``Danger''                          | 2,500 | 5,000 |
| 229.87 Hand operated switches.....                                      | 2,500 | 5,000 |
| 229.89 Jumpers; cable connections:                                      |       |       |
| (a) Jumpers and cable connections; located<br>and guarded.....          | 2,500 | 5,000 |
| (b) Condition of jumpers and cable<br>connections.....                  | 2,500 | 5,000 |
| 229.91 Motors and generators.....                                       | 2,500 | 5,000 |
| 229.93 Safety cut-off device.....                                       | 2,500 | 5,000 |
| 229.95 Venting.....   | 2,500 | 5,000 |
| 229.97 Grounding fuel tanks.....  | 2,500 | 5,000 |
| 229.99 Safety hangers.....  | 2,500 | 5,000 |
| 229.101 Engines:  |       |       |
| (a) Temperature and pressure alarms,<br>controls, and switches.....     | 2,500 | 5,000 |
| (b) Warning notice.....   | 2,500 | 5,000 |
| (c) Wheel slip/slide protection.....                                    | 2,500 | 5,000 |
| 229.103 Safe working pressure; factor of<br>safety.....                 | 2,500 | 5,000 |
| 229.105 Steam generator number.....                                     | 500   | 1,000 |
| 229.107 Pressure gauge.....   | 2,500 | 5,000 |
| 229.109 Safety valves.....  | 2,500 | 5,000 |
| 229.111 Water-flow indicator.....                                       | 2,500 | 5,000 |
| 229.113 Warning notice.....   | 2,500 | 5,000 |
| 229.115 Slip/slide alarms.....  | 2,500 | 5,000 |
| 229.117 Speed indicators.....   | 2,500 | 5,000 |
| 229.119 Cabs, floors, and passageways:                                  |       |       |
| (a)(1) Cab set not securely mounted or<br>braced.....                   | 2,500 | 5,000 |
| (2) Insecure or improper latching<br>device.....                        | 2,500 | 5,000 |
| (b) Cab windows of lead locomotive.....                                 | 2,500 | 5,000 |
| (c) Floors, passageways, and compartments.                              | 2,500 | 5,000 |
| (d) Ventilation and heating arrangement...                              | 2,500 | 5,000 |
| (e) Continuous barrier.....   | 2,500 | 5,000 |
| (f) Containers for fuses and torpedoes....                              | 2,500 | 5,000 |
| 229.121 Locomotive cab noise.....                                       | 2,500 | 5,000 |
| 229.123 Pilots, snowplows, end plates.....                              | 2,500 | 5,000 |
| 229.125   |       |       |
| (a) Headlights.....   | 2,500 | 5,000 |
| (d) Auxiliary lights.....   | 2,500 | 5,000 |
| 229.127 Cab lights.....   | 2,500 | 5,000 |
| 229.129 Audible warning device.....                                     | 2,500 | 5,000 |
| 229.131 Sanders.....  | 1,000 | 2,000 |
| 229.135   |       |       |
| (a) Lead locomotive without in-service event<br>recorder.....           | 2,500 | 5,000 |
| (b) Improper response to out of service<br>event recorder.....          | 2,500 | 5,000 |
| (c) Unauthorized removal from service.....                              | 2,500 | 5,000 |
| Failure to remove from service a recorder<br>known to have failed.....  | 2,500 | 5,000 |
| (d) Failure to preserve data or unauthorized<br>extraction of data..... | 2,500 | 5,000 |
| (e) Tampering with device or data.....                                  | 2,500 | 7,500 |

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**Subpart D--Design Requirements**

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|  |         |          |
|--|---------|----------|
| 229.141 Body structure, MU locomotives.....  | 2,500   | 5,000    |
| 229.137 Sanitation, general:   |         |          |
| (a) Sanitation compartment in lead unit,<br>complete failure to provide required<br>items..... | \$5,000 | \$10,000 |

|   |       |        |
|---|-------|--------|
| (1) Ventilation.....  | 2,500 | 5,000  |
| (2) Door missing.....   | 2,000 | 4,000  |
| (2)(i) Door doesn't close.....  | 1,000 | 2,000  |
| (2)(ii) No modesty lock.....  | 1,000 | 2,000  |
| (3) Not equipped with toilet in lead..  | 5,000 | 10,000 |
| (4) Not equipped with washing system..  | 1,000 | 2,000  |
| (5) Lack of paper.....  | 1,000 | 2,000  |
| (6) Lack of trash receptacle.....   | 1,000 | 2,000  |
| (b) Exceptions:   |       |        |
| (1)(i) Commuter service, failure to meet conditions of exception.....                       | 2,500 | 5,000  |
| (1)(ii) Switching service, failure to meet conditions of exception.....                     | 2,500 | 5,000  |
| (1)(iii) Transfer service, failure to meet conditions of exception.....                     | 2,500 | 5,000  |
| (1)(iv) Class III, failure to meet conditions of exception.....                             | 2,500 | 5,000  |
| (1)(v) Tourist, failure to meet conditions of exception.....                                | 2,500 | 5,000  |
| (1)(vi) Control cab locomotive, failure to meet conditions of exception.....                | 2,500 | 5,000  |
| (2) Noncompliant toilet.....  | 5,000 | 10,000 |
| (c) Defective/unsanitary toilet in lead unit.....   | 2,500 | 5,000  |
| (1-5) Failure to meet conditions of exception.....  | 2,500 | 5,000  |
| (d) Defective/unsanitary unit; failure to meet conditions for trailing position....         | 2,500 | 5,000  |
| (e) Defective/sanitary unit; failure to meet conditions for switching/transfer service..... | 2,500 | 5,000  |
| (f) Paper, washing, trash holder; failure to equip prior to departure.....                  | 2,500 | 5,000  |
| (g) Inadequate ventilation; failure to repair or move prior to departure.....               | 2,500 | 5,000  |
| (h) Door closure/modesty lock; failure to repair or move.....                               | 1,000 | 2,000  |
| (i) Failure to retain/maintain of equipped units.....                                       | 2,500 | 5,000  |
| (j) Failure to equip new units/in-cab facility.....   | 2,500 | 5,000  |
| (k) Failure to provide potable water.....   | 2,500 | 5,000  |
| 229.139 Servicing requirements:   |       |        |
| (a) Lead occupied unit not sanitary.....  | 2,500 | 5,000  |
| (b) Components not present/operating.....   | 2,500 | 5,000  |
| (c) Occupied unit in switching, transfer service, in trailing position not sanitary.....    | 2,500 | 5,000  |
| (d) Defective unit used more than 10 days.  | 2,500 | 5,000  |
| (e) Failure to repair defective modesty lock.....   | 1,000 | 2,000  |

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\1\ A penalty may be assessed against an individual only for a willful violation. Generally, when two or more violations of these regulations are discovered with respect to a single locomotive that is used by a railroad, the appropriate penalties set forth above are aggregated up to a maximum of \$10,000 per day. However, a failure to perform, with respect to a particular locomotive, any of the inspections and tests required under subpart B of this part will be treated as a violation separate and distinct from, and in addition to, any substantive violative conditions found on that locomotive. Moreover, the Administrator reserves the right to assess a penalty of up to \$22,000 for any violation where circumstances warrant. See 49 CFR part 209, appendix A.

Failure to observe any condition for movement set forth in Sec. 229.9 will deprive the railroad of the benefit of the movement-for-repair provision and make the railroad and any responsible individuals liable for penalty under the particular regulatory section(s) concerning the substantive defect(s) present on the locomotive at the time of movement. Failure to comply with Sec. 229.19 will result in the lapse of any affected waiver.

[53 FR 52931, Dec. 29, 1988, as amended at 58 FR 36615, July 8, 1993; 61 FR 8888, Mar. 6, 1996; 63 FR 11622, Mar. 10, 1998; 67 FR 16052, Apr. 4, 2002]

Appendix C to Part 229--FRA Locomotive Standards--Code of Defects

Editorial Note: Appendix C, published at 45 FR 21121, Mar. 31, 1980, as part of the original document, is not carried in the CFR.





