

### **229.1 Scope**

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

### **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 Sec. Sec. 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 Sec. Sec. 238.203 through 238.219, and Sec. 238.223 of this chapter by operation of Sec. 238.201(a)(2) of this chapter.

### **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:

Sections 229.9, 229.17, 229.21, 229.23, 229.25, 229.27, 229.29, 229.31, 229.33, 229.55, 229.103, 229.105, 229.113, 229.121, 229.135, Appendix H to part 229

### **229.5 Definitions.**

As used in this part—

**AAR** means the Association of American Railroads.

**Acceptable quality level (AQL).** The AQL is expressed in terms of percent defective or defects per 100 units. Lots having a quality level equal to a specified AQL will be accepted approximately 95 percent of the time when using the sampling plans prescribed for that AQL.

**Anti-Climbers** means the parts at the ends of adjoining rail vehicles in a train that are designed to engage when subjected to large buff loads to prevent the override of one vehicle by another.

**Associate Administrator for Safety** means the Associate Administrator for Safety, Federal Railroad Administration, or that person’s delegate as designated in writing.

**Break** means a fracture resulting in complete separation into parts.

**Build Date** means the date on which the completed locomotive is shipped by the manufacturer or remanufacturer to the customer, or if the railroad manufactures or remanufactures the locomotive itself, the date on which the locomotive is released from the manufacture or remanufacture facility.

**Cab** means that portion of the superstructure designed to be occupied by the crew operating the locomotive.

**Carrier** means *railroad*, as that term is defined below.

**Collision posts** means structural members of the end structures of a rail vehicle that extend vertically from the underframe to which they are securely attached and that provide protection to occupied compartments from an object penetrating the vehicle during a collision.

**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.

**Control cab locomotive** means a locomotive without propelling motors but with one or more control stands.

**Controlling remote distributed power locomotive** means the locomotive in a distributed power consist that received the coded signal from the lead locomotive consist of the train whether commanded automatically by the distributed power system or manually by the locomotive engineer.

**Corner posts** means structural members located at the intersection of the front or rear surface with the side surface of a rail vehicle and which extend vertically from the underframe to the roof.

**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.

**Cruise Control** means a device that controls locomotive power output to obtain a targeted speed. A device that functions only at or below 30 miles per hour is NOT considered a “cruise control for purposes of this part.

**Data element** means one or more data point or value reflecting on-board train operations at a particular time. Data may be actual or “passed through” values or may be derived from a combination of values from other sources.

**dB(A)** means the sound pressure level in decibels measured on the A-weighted scale.

**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.

**Decibel (dB)** means a unit of measurement of sound pressure levels.

**Defective** means, for purposes of section 229.129 of this part, a locomotive equipped with an audible warning device that produces a maximum sound level in excess of 110 dB(A) and/or a minimum sound level below 96 dB(A), as measured 100 feet forward of the locomotive in the direction of travel.

**Design standard** means a criterion adopted by an industry or voluntary consensus standards body, which addresses the design of a locomotive with respect to its crashworthiness and crashworthiness features.

**Designated service** means exclusive operation of a locomotive under the following conditions: (1) The locomotive is not used as an independent unit or the controlling unit in a consist of locomotives except when moving for the purposes of servicing or repair within a single yard area; (2) The locomotive is not occupied by operating or deadhead crews outside a single yard area; and (3) The locomotive is stenciled “Designated Service—DO NOT OCCUPY.”

**Distributed power systems** means a system that provides control of a number of locomotives dispersed throughout a train from a controlling locomotive located in the lead position. The system provides control of the rearward locomotives by command signals originating at the lead locomotive and transmitted to the remote (rearward) locomotives.

**DMU locomotive** means a diesel-powered multiple unit operated locomotive with one or more propelling motors designed to carry passenger traffic.

**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.

**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.

**Event recorder memory module** means that portion of the event recorder used to retain the recorded data as detailed in 229.135(b).

**Excessive noise report** means a report by a locomotive cab occupant that the locomotive is producing an unusual level of noise that significantly interferes with normal cab communications or that is a concern with respect to hearing conservation.

**FRA** means the Federal Railroad Administration.

**Fuel tank, external** means a fuel containment vessel that extends outside the car body structure of a locomotive.

**Fuel tank, internal** means a fuel containment vessel that does not extend outside the car body structure of a locomotive.

**High voltage** means an electrical potential of more than 150 volts.

**Initial terminal** means a location where a train is originally assembled.

**In-service event recorder** means an event recorder that was successfully tested as prescribed in §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.

**Lateral** means the horizontal direction perpendicular to the direction of travel.

**Lead locomotive** means the first locomotive proceeding in the direction of movement.

**Lite locomotive** means a locomotive or a consist of locomotives not attached to any piece of equipment or attached only to a caboose.

**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.

**Locomotive cab** means the compartment or space on board a locomotive where the control stand is located and which is normally occupied by the engineer when the locomotive is operated.

**Longitudinal** means in a direction parallel to the normal direction of travel.

**Lot** means a collection of locomotives, equipped with the same horn model, configuration, and location, and the same air pressure and delivery system, which has been manufactured or processed under essentially the same conditions.

**Mandatory directive** means any movement authority or speed restriction that affects a railroad operation.

**Manufacture** means the act of constructing a locomotive.

**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.

**Monocoque design locomotive** means a locomotive design where the shell or skin acts as a single unit with the supporting frame to resist and transmit the loads acting on the locomotive.

**MU locomotive** means a multiple unit operated electric locomotive –

(1) With one or more propelling motors designed to carry freight or passenger traffic or both; or (2) Without propelling motors but with one or more control stands and a means of picking-up primary power such as a pantograph or third rail.

**Narrow-nose locomotive** means a locomotive with a short hood that spans substantially less than the full width of the locomotive.

**Occupied service** means the operation of a locomotive when the cab is physically occupied by a person.

**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.

**Permanent deformation** means the undergoing of a permanent change in shape of a structural member of a rail vehicle.

**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.

**Powered axle** is an axle equipped with a traction device.

**Power car** means a rail vehicle that propels a Tier II passenger train or is the lead vehicle in a Tier II passenger train, or both.

**Powered axle** is an axle equipped with a traction device.

**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.

**Remanufacture** means the act of constructing a remanufactured locomotive.

**Remanufactured locomotive** means a locomotive rebuilt or refurbished from a previously used or refurbished underframe (“deck”), containing fewer than 25% previously used components (measured by dollar value of the components). For calculation purposes, the percentage of previously used components is determined with equivalent value of new parts and is calculated using dollar values from the same year as the new parts used to remanufacture the locomotive.

**Roof rail** means the longitudinal structural member at the intersection of the side wall and the roof sheathing.

**Sand delivery system** means a permanently stationed or fixed device designed to deliver sand to locomotive sand boxes that do not require the sand to be manually delivered or loaded. A sand delivery system will be considered permanently stationed if it is at a location at least five days a week for at least eight hours per day

**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.

**Self-monitoring event recorder** means an event recorder that has the ability to monitor its own operation and to display an indication to the locomotive operator when any data required to be stored are not stored or when the stored data do not match the data received.

**Semi-monocoque design locomotive** means a locomotive design where the skin or shell acts, to some extent, as a single unit with the supporting frame to resist and transmit the loads acting on the locomotive.

**Semi-permanently coupled** means coupled by means of a drawbar or other coupling mechanism that requires tools to perform the uncoupling operation.

**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.

**Short hood** means the part of the locomotive above the underframe located between the cab and the nearest end of the locomotive.

**Standards body** means an industry and/or professional organization or association which conducts research and develops and/or issues policies, criteria, principles, and standards related to the rail industry.

**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.

**Throttle position** means any and all of the discrete output positions indicating the speed/tractive effort characteristic requested by the operator of the locomotive on which the throttle is installed. Together, the discrete output positions shall cover the entire range of possible speed/tractive effort characteristics. If the throttle has continuously variable segments, the event recorder shall capture either: (1) The exact level of speed/tractive effort characteristic requested, on a scale of zero (0) to one hundred percent (100%) of the output variable or (2) A value converted from a percentage to a comparable 0-8 digital signal.

**Tier II** means operating at speeds exceeding 125 mph but not exceeding 150 mph.

**Time** means either “time-of-day” or “elapsed time” (from an arbitrarily determined event) as determined by the manufacturer. In either case, the recorder must be able to convert to an accurate time-of-day with the time zone stated unless it is Greenwich mean time (UTC).

**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.

**Ultimate strength** means the load at which a structural member fractures or ceases to resist any load.

**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.

**Upper 99% confidence limit** means the noise level below which 99% of all noise level measurements must lie.

**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.

**Wide-nose locomotive** means a locomotive with a short hood that spans the full width of the locomotive.

### **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 \$550 and not more than \$16,000 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 \$27,000 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.

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

(a) Except as provided in paragraphs (b), (c), §229.125(g), and §229.131(b) and (c)(1), 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 en route 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 Sec. Sec. 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.

#### **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.

#### **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.

#### **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.

#### **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.

#### **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**

#### **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 Sec. Sec. 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 Sec. Sec. 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.

#### **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 Sec. Sec. 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 Sec. Sec. 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 Sec. Sec. 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.

### **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) Event recorder A microprocessor-based self-monitoring event recorder, if installed, is exempt from periodic inspection under paragraphs (e)(1) through (e)(5) of this section and shall be inspected annually as required by 229.27(d). Other types of event recorders, 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 and a hard copy version, written in the English language, shall be made available upon request of a governmental agent empowered to request it.

(2) The event recorder shall be tested before any maintenance work is performed on it. At a minimum, the event recorder test shall include cycling as practical, all required recording elements and determining the full range of each element by reading out recorded data.

(3) If the pre-maintenance test does not reveal that the device is recording all the specified data and that all recordings are within the designed recording elements, this fact shall be noted, 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 in any medium 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 for periodic inspection in any given calendar month are still fully functional; maintenance practices and test intervals shall be adjusted as necessary to yield effective periodic maintenance.

### **229.27 Annual tests.**

A locomotive, except for a DMU or MU locomotive, shall be subjected to the tests and inspections prescribed in paragraphs (a), (b), and (c) of this section. A DMU locomotive or an MU locomotive shall be subjected to the tests and inspections prescribed in paragraphs (b) and (c) of this section. A locomotive, including a DMU locomotive or an MU locomotive, equipped with a microprocessor-based event recorder that includes a self-monitoring feature, shall be subjected to the tests and inspections prescribed in paragraph (d) of this section. All testing under this section shall be performed 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.

(d) A microprocessor-based event recorder with a self-monitoring feature equipped to verify that all data elements required by this part are recorded, requires further maintenance only if either or both of the following conditions exist:

(1) The self-monitoring feature displays an indication of a failure. If a failure is displayed, further maintenance and testing must be performed until a subsequent test is successful. When a successful test is accomplished, a record, in any medium, shall be made of that fact and of any maintenance work necessary to achieve the

successful result. This record shall be available at the location where the locomotive is maintained until a record of a subsequent successful test is filed.

(2) A download of the event recorder, taken within the preceding 30 days and reviewed for the previous 48 hours of locomotive operation, reveals a failure to record a regularly recurring data element or reveals that any required data element is not representative of the actual operations of the locomotive during this time period. If the review is not successful, further maintenance and testing shall be performed until a subsequent test is successful. When a successful test is accomplished, a record, in any medium, shall be made of that fact and of any maintenance work necessary to achieve the successful result. This record shall be kept at the location where the locomotive is maintained until a record of a subsequent successful test is filed. The download shall be taken from information stored in the certified crashworthy crash hardened event recorder memory module if the locomotive is so equipped.

### **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.

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

(a) Before it is placed in service, each main reservoir other than an aluminum reservoir shall be subjected to a pneumatic or 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, block eighteen. Except as provided in paragraph (c) of this section, 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 pneumatic or 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 shall

receive a hydrostatic test before it is returned to use or may receive a pneumatic test if conducted by the manufacturer in an appropriately safe environment.

### **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**

#### **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.

#### **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.

#### **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**

#### **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.

#### **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) DMU, 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.

#### **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 1/1/1981 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.

#### **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.

#### **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.

#### **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.

### **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.

### **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**

### **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.

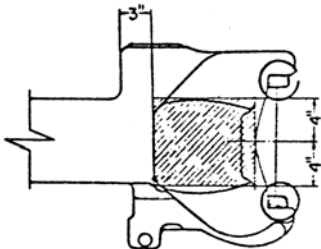


Figure 1

(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 1/2 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**

### **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 3/4 inch on all other powered axles.

(b) The total uncontrolled lateral motion may not exceed 1-1/4 inches on the center axle of three-axle trucks.

### **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.

**229.67 Trucks.**

- (a) The male center plate shall extend into the female center plate at least 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 1-1/2 inches. Maximum lost motion in a center plate assemblage may not exceed 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.

**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.

**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.

**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.

**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**

### **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.

### **229.79 Third rail shoes.**

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

### **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.

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

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

### **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.

### **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.

**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.

**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**

**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.

**229.95 Venting.**

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

**229.97 Grounding fuel tanks.**

Fuel tanks and related piping shall be electrically grounded.

**229.99 Safety hangers.**

Drive shafts shall have safety hangers.

**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**

**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.

**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.

**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.

**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.

**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.

**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**

**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.

**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 3 miles per hour of actual speed at speeds of 10 to 30 miles per hour and accurate within 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.

#### **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.

#### **229.121 Locomotive cab noise.**

(a) Performance Standards for Locomotives.

(1) When tested for static noise in accordance with paragraph (a)(3) of this section, all locomotives of each design or model that are manufactured after October 29, 2007, shall average less than or equal to 85 dB(A), with an upper 99% confidence limit of 87 dB(A). The railroad may rely on certification from the equipment manufacturer for a production run that this standard is met. The manufacturer may determine the average by testing a representative sample of locomotives or an initial series of locomotives, provided that there are suitable manufacturing quality controls and verification procedures in place to ensure product consistency.

(2) In the maintenance of locomotives that are manufactured in accordance with paragraph (a)(1) of this section, a railroad shall not make any alterations that cause the average sound level for that locomotive design or model to exceed:

(i) 82 dB(A) if the average sound level for a locomotive design or model is less than 82 dB(A); or

(ii) 85 dB(A) if the average sound level for a locomotive design or model is 82 dB(A) to 85 dB(A), inclusive,

(3) The railroad or manufacturer shall follow the static test protocols set forth in appendix H of this part to determine compliance with paragraph (a)(1) of this section; and, to the extent reasonably necessary to evaluate the effect of alterations during maintenance, to determine compliance with paragraph (a)(2) of this section.

(b) Maintenance of Locomotives.

(1) If a railroad receives an excessive noise report, and if the condition giving rise to the noise is not required to be immediately corrected under part 229, the railroad shall maintain a record of the report, and repair or replace the item identified as substantially contributing to the noise:

(i) on or before the next periodic inspection required by §229.23; or

(ii) if the railroad determines that the repair or replacement of the item requires significant shop or material resources that are not readily available, at the time of the next major equipment repair commonly used for the particular type of maintenance needed.

(2) Conditions that may lead a locomotive cab occupant to file an excessive noise report include, but are not limited to: defective cab window seals; defective cab door seals; broken or inoperative windows; deteriorated

insulation or insulation that has been removed for other reasons; broken or inoperative doors; and air brakes that vent inside of the cab.

(3) A railroad has an obligation to respond to an excessive noise report that a locomotive cab occupant files. The railroad meets its obligation to respond to an excessive noise report, as set forth in paragraph (b)(1) of this section, if the railroad makes a good faith effort to identify the cause of the reported noise, and where the railroad is successful in determining the cause, if the railroad repairs or replaces the items cause the noise.

(4) Recordkeeping.

(i) A railroad shall maintain a written or electronic record of any excessive noise report, inspection, test, maintenance, replacement, or repair completed pursuant to §229.121(b) and the date on which that inspection, test, maintenance, replacement, or repair occurred. If a railroad elects to maintain an electronic record, the railroad must satisfy the conditions listed in §227.121(a)(2)(i) through (v).

(ii) The railroad shall retain these records for 92 days if they are made pursuant to §229.21, or for one year if they are made pursuant to §229.23.

(iii) The railroad shall establish an internal, auditable, monitorable system that contains these records.

### **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.

### **229.125 Headlights and auxiliary lights.**

(a) Each lead locomotive used in road service shall have a headlight that produces a peak intensity of at least 200,000 candelas. 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. For purposes of this section, a headlight shall be comprised of either one or two lamps.

(1) If a locomotive is equipped with a single-lamp headlight, the single lamp shall produce a peak intensity of at least 200,000 candelas.

The following lamps meet the standard set forth in this paragraph (a)(1): a single operative PAR-56, 200-watt, 30-volt lamp; or an operative lamp of equivalent design and intensity.

(2) If a locomotive is equipped with a dual-lamp headlight, a peak intensity of at least 200,000 candelas shall be produced by the headlight based either on a single lamp capable of individually producing the required peak intensity or on the candela produced by the headlight with both lamps illuminated. If both lamps are needed to produce the required peak intensity, then both lamps in the headlight shall be operational.

The following lamps meet the standard set forth in this paragraph (a)(2): a single operative PAR-56, 200-watt, 30-volt lamp; two operative PAR-56, 350-watt, 75-volt lamps; or operative lamp(s) of equivalent design and intensity.

(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 a peak intensity of at least 200,000 candelas or shall produce at least 3,000 candela at an angle of 7.5 degrees and at least 400 candela at an angle of 20 degrees from the centerline of the locomotive when the light is aimed parallel to the tracks. Any of the following lamps meet the standard set forth in this paragraph (d)(2): an operative PAR-56, 200-watt, 30-volt lamp; an operative PAR-56,350-watt, 75-volt lamp; or an operative lamp of equivalent design and intensity.

(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.

### **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.

### **229.129 Locomotive Horn**

(a) Each lead locomotive shall be equipped with a locomotive horn that produces a minimum sound level of 96 dB(A) and a maximum sound level of 110 dB(A) at 100 feet forward of the locomotive in its direction of travel.

The locomotive horn shall be arranged so that it can be conveniently operated from the engineer's usual position during operation of the locomotive.

(b)(1) Each locomotive built on or after September 18, 2006 shall be tested in accordance with this section to ensure that the horn installed on such locomotive is in compliance with paragraph (a) of this section. Locomotives built on or after September 18, 2006 may, however, be tested in accordance with an acceptance sampling scheme such that there is a probability of .05 or less of rejecting a lot with a proportion of defectives equal to an AQL of 1% or less, as set forth in 7 CFR part 43.

(2) Each locomotive built before September 18, 2006 shall be tested in accordance with this section before June 24, 2010 to ensure that the horn installed on such locomotive is in compliance with paragraph (a) of this section.

(3) Each remanufactured locomotive, as determined pursuant to §229.5 of this part, shall be tested in accordance with this section to ensure that the horn installed on such locomotive is in compliance with paragraph (a).

(4)(i) Except as provided in paragraph (b)(4)(ii) of this section, each locomotive equipped with a replacement locomotive horn shall be tested, in accordance with paragraph (c) of this section, before the next two annual tests required by §229.27 of this part are completed.

(ii) Locomotives that have already been tested individually or through acceptance sampling, in accordance with paragraphs (b)(1), (b)(2), or (b)(3) of this section, shall not be required to undergo sound level testing when equipped with a replacement locomotive horn, provided the replacement locomotive horn is of the same model as the locomotive horn that was replaced and the mounting location and type of mounting are the same.

(c) Testing of the locomotive horn sound level shall be in accordance with the following requirements:

(1) A properly calibrated sound level meter shall be used that, at a minimum, complies with the requirements of International Electrotechnical Commission (IEC) Standard 61672-1 (2002-05) for a Class 2 instrument.

(2) An acoustic calibrator shall be used that, at a minimum, complies with the requirements of IEC standard 60942 (1997-11) for a Class 2 instrument.

(3) The manufacturer's instructions pertaining to mounting and orienting the microphone; positioning of the observer; and periodic factory recalibration shall be followed.

(4) A microphone windscreen shall be used and tripods or similar microphone mountings shall be used that minimize interference with the sound being measured.

(5) The test site shall be free of large reflective structures, such as barriers, hills, billboards, tractor trailers or other large vehicles, locomotives or rail cars on adjacent tracks, bridges or buildings, within 200 feet to the front and sides of the locomotive. The locomotive shall be positioned on straight, level track.

(6) Measurements shall be taken only when ambient air temperature is between 32 degrees and 104 degrees Fahrenheit inclusively; relative humidity is between 20 percent and 95 percent inclusively; wind velocity is not more than 12 miles per hour and there is no precipitation.

(7) With the exception of cab-mounted or low-mounted horns, the microphone shall be located 100 feet forward of the front knuckle of the locomotive, 15 feet above the top of the rail, at an angle no greater than 20 degrees from the center line of the track, and oriented with respect to the sound source according to the manufacturer's recommendations. For cab-mounted and low-mounted horns, the microphone shall be located 100 feet forward of the front knuckle of the locomotive, four feet above the top of the rail, at an angle no greater than 20 degrees from the center line of the track, and oriented with respect to the sound source according to the manufacturer's recommendations. The observer shall not stand between the microphone and the horn.

(8) Background noise shall be minimal: the sound level at the test site immediately before and after each horn sounding event shall be at least 10 dB(A) below the level measured during the horn sounding.

(9) Measurement procedures. The sound level meter shall be set for A-weighting with slow exponential response and shall be calibrated with the acoustic calibrator immediately before and after compliance tests. Any change in the before and after calibration levels shall be less than 0.5 dB. After the output from the locomotive horn system has reached a stable level, the A-weighted equivalent sound level (slow response) for a 10-second duration (LAeq, 10s) shall be obtained either directly using an integrating-averaging sound level meter, calculated indirectly. The arithmetic-average of a series of at least six such 10-second duration readings shall be used to determine compliance. The standard deviation of the readings shall be less than 1.5 dB.

(10) Written reports of locomotive horn testing required by this part shall be made and shall reflect horn type; the date, place, and manner of testing; and sound level measurements. These reports, which shall be signed by

the person who performs the test, shall be retained by the railroad, at a location of its choice, until a subsequent locomotive horn test is completed and shall be made available, upon request, to FRA as provided by 49 U.S.C. 20107.

(d) This section does not apply to locomotives of rapid transit operations which are otherwise subject to this part.

### **229.131 Sanders.**

(a) Prior to departure from an initial terminal, each locomotive, except for MU locomotives, shall be equipped with operative sanders that deposit sand on each rail in front of the first power operated wheel set in the direction of movement or shall be handled in accordance with the requirements contained in §229.9. (b) A locomotive being used in road service with sanders that become inoperative after departure from an initial terminal shall be handled in accordance with the following:

(1) A lead locomotive being used in road service that experiences inoperative sanders after departure from an initial terminal may continue in service until the earliest of the following occurrences:

(i) Arrival at the next initial terminal;

(ii) arrival at a location where it is placed in a facility with a sand delivery system;

(iii) the next periodic inspection under §229.23; or

(iv) fourteen calendar days from the date the sanders are first discovered to be inoperative; and

(2) A trailing locomotive being used in road service that experiences inoperative sanders after departure from an initial terminal may continue in service until the earliest of the following occurrence:

(i) Arrival at the next initial terminal;

(ii) arrival at a location where it is placed in a facility with a sand delivery system; or

(iii) the next periodic inspection under §229.23.

(c) A locomotive being used in switching service shall be equipped with operative sanders that deposit sand on each rail in front of the first power operated wheel set in the direction of movement. If the sanders become inoperative, the locomotive shall be handled in accordance with the following:

(1) A locomotive being used in switching service at a location not equipped with a sand delivery system may continue in service for seven calendar days from the date the sanders are first discovered inoperative or until its next periodic inspection under §229.23, which ever occurs first; and

(2) A locomotive being used in switching service at locations equipped with a sand delivery system shall be handled in accordance with the requirements contained in §229.9.

(d) A locomotive being handled under the provisions contained in paragraph (b) and (c)(1) of this section shall be tagged in accordance with §229.9(a).

### **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 candelas, 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 candelas, 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 candelas 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.

### **229.135 Event recorders.**

- (a) Duty to equip and record. Except as provided in paragraphs (c) and (d) of this section, a train operated faster than 30 miles per hour shall have an in-service event recorder, of the type described in paragraph (b) of this section, in the lead locomotive. The presence of the event recorder shall be noted on Form FRA F6180–49A (by writing the make and model of event recorder with which the locomotive is equipped) 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. 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. The event recorder shall record the most recent 48 hours of operation of the electrical system of the locomotive on which it is installed.
- (b) Equipment requirements. Event recorders shall monitor and record data elements required by this paragraph with at least the accuracy required of the indicators displaying any of the required elements to the engineer.
  - (1) A lead locomotive originally ordered before October 1, 2006, and placed in service before October 1, 2009, including a controlling remote distributed power locomotive, a lead manned helper locomotive, a DMU

locomotive, and an MU locomotive, except as provided in paragraphs (c) and (d) of this section, shall have an in-service event recorder that records the following data elements:

- (i) Train speed;
- (ii) Selected direction of motion;
- (iii) Time;
- (iv) Distance;
- (v) Throttle position;
- (vi) Applications and operations of the train automatic air brake;
- (vii) Applications and operations of the independent brake;
- (viii) Applications and operations of the dynamic brake, if so equipped; and
- (ix) Cab signal aspect(s), if so equipped and in use.

(2) A locomotive originally manufactured before October 1, 2006, and equipped with an event recorder that uses magnetic tape as its recording medium shall have the recorder removed from service on or before October 1, 2009 and replaced with an event recorder with a certified crashworthy event recorder memory module that meets the requirements of Appendix D of this part and that records at least the same number of data elements as the recorder it replaces.

(3) A lead locomotive, a lead manned helper locomotive, and a controlling remotely distributed power locomotive, other than a DMU or MU locomotive, originally ordered on or after October 1, 2006 or placed in service on or after October 1, 2009, shall be equipped with an event recorder with a certified crashworthy event recorder memory module that meets the requirements of Appendix D of this part. The certified event recorder memory module shall be mounted for its maximum protection. (Although other mounting standards may meet this standard, an event recorder memory module mounted behind and below the top of the collision posts and above the platform level is deemed to be mounted “for its maximum protection.”) The event recorder shall record, and the certified crashworthy event recorder memory module shall retain, the following data elements:

- (i) Train speed;
- (ii) Selected direction of motion;
- (iii) Time;
- (iv) Distance;
- (v) Throttle position;
- (vi) Applications and operations of the train automatic air brake, including emergency applications. The system shall record, or provide a means of determining, that a brake application or release resulted from manipulation of brake controls at the position normally occupied by the locomotive engineer. In the case of a brake application or release that is responsive to a command originating from or executed by an on-board computer (e.g., electronic braking system controller, locomotive electronic control system, or train control computer), the system shall record, or provide a means of determining, the involvement of any such computer;
- (vii) Applications and operations of the independent brake;
- (viii) Applications and operations of the dynamic brake, if so equipped;
- (ix) Cab signal aspect(s), if so equipped and in use;(x) End-of-train (EOT) device loss of communication front to rear and rear to front;
- (xi) Electronic controlled pneumatic braking (ECP) message (and loss of such message), if so equipped;
- (xii) EOT armed, emergency brake command, emergency brake application;
- (xiii) Indication of EOT valve failure;
- (xiv) EOT brake pipe pressure (EOT and ECP devices);
- (xv) EOT marker light on/off;
- (xvi) EOT “low battery” status;
- (xvii) Position of on/off switch for headlights on lead locomotive;
- (xviii) Position of on/off switch for auxiliary lights on lead locomotive;
- (xix) Horn control handle activation;
- (xx) Locomotive number;
- (xxi) Locomotive automatic brake valve cut in;
- (xxii) Locomotive position in consist (lead or trail);
- (xxiii) Tractive effort;

(xxiv) Cruise control on/off, if so equipped and in use; and

(xxv) Safety-critical train control data routed to the locomotive engineer's display with which the engineer is required to comply, specifically including text messages conveying mandatory directives, and maximum authorized speed. The format, content, and proposed duration for retention of such data shall be specified in the product safety plan submitted for the train control system under subpart H of part 236 of this chapter, subject to FRA approval under this paragraph. If it can be calibrated against other data required by this part, such train control data may, at the election of the railroad, be retained in a separate certified crashworthy memory module.

(4) A DMU locomotive and an MU locomotive originally ordered on or after October 1, 2006 or placed in service on or after October 1, 2009, shall be equipped with an event recorder with a certified crashworthy event recorder memory module that meets the requirements of Appendix D of this part. The certified event recorder memory module shall be mounted for its maximum protection. (Although other mounting standards may meet this standard, an event recorder memory module mounted behind the collision posts and above the platform level is deemed to be mounted "for its maximum protection.") The event recorder shall record, and the certified crashworthy event recorder memory module shall retain, the following data elements:

(i) Train speed;

(ii) Selected direction of motion;

(iii) Time;

(iv) Distance;

(v) Throttle position;

(vi) Applications and operations of the train automatic air brake, including emergency applications. The system shall record, or provide a means of determining, that a brake application or release resulted from manipulation of brake controls at the position normally occupied by the locomotive engineer. In the case of a brake application or release that is responsive to a command originating from or executed by an on-board computer (e.g., electronic braking system controller, locomotive electronic control system, or train control computer), the system shall record, or provide a means of determining, the involvement of any such computer;

(vii) Applications and operations of the independent brake, if so equipped;

(viii) Applications and operations of the dynamic brake, if so equipped;

(ix) Cab signal aspect(s), if so equipped and in use;

(x) Emergency brake application(s);

(xi) Wheel slip/slide alarm activation (with a property-specific minimum duration); (xii) Lead locomotive headlight activation switch on/off;

(xiii) Lead locomotive auxiliary lights activation switch on/off;

(xiv) Horn control handle activation;

(xv) Locomotive number;

(xvi) Locomotive position in consist (lead or trail);

(xvii) Tractive effort; (xviii) Brakes apply summary train line;

(xix) Brakes released summary train line;

(xx) Cruise control on/off, if so equipped and used; and

(xxi) Safety-critical train control data routed to the locomotive engineer's display with which the engineer is required to comply, specifically including text messages conveying mandatory directives, and maximum authorized speed. The format, content, and proposed duration for retention of such data shall be specified in the product safety plan submitted for the train control system under subpart H of part 236 of this chapter, subject to FRA approval under this paragraph. If it can be calibrated against other data required by this part, such train control data may, at the election of the railroad, be retained in a separate certified crashworthy memory module.

(5) A locomotive equipped with an event recorder that is remanufactured, as defined in this part, on or after October 1, 2007, shall be equipped with an event recorder with a certified crashworthy event recorder memory module that meets the requirements of Appendix D to this part and is capable of recording, at a minimum, the same data as the recorder that was on the locomotive before it was remanufactured.

(6) An event recorder originally manufactured after January 1, 2010, that is installed on any locomotive identified in paragraph (b)(1) of this section shall be an event recorder with a certified crashworthy event recorder memory module that meets the requirements of Appendix D to this part and that is capable of recording, at a minimum, the same data as the event recorder that was previously on the locomotive.

(c) Removal from service. Notwithstanding the duty established in paragraph (a) of this section to equip certain locomotives with an in-service event recorder, a railroad may remove an event recorder from service and, if a railroad knows that an event recorder is not monitoring or recording required data, shall remove the event recorder from service. When a railroad removes an event recorder from service, a qualified person shall record the date that the device was removed from service on Form FRA F6180–49A, under the REMARKS section, unless the event recorder is designed to allow the locomotive to assume the lead position only if the recorder is properly functioning.

(d) Response to defective equipment. Notwithstanding the duty established in paragraph (a) of this section to equip certain locomotives with an in-service event recorder, 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 §§229.7 and 229.9, and, other than the requirements of Appendix D of this part, the inspection, maintenance, and testing of event recorders are limited to the requirements set forth in §§229.25(e) and 229.27(d).

(e) Preserving accident data. If any locomotive equipped with an event recorder, or any other locomotive-mounted recording device or devices designed to record information concerning the functioning of a locomotive or train, is involved in an accident/incident that is required to be reported to FRA under part 225 of this chapter, the railroad that was using the locomotive at the time of the accident shall, to the extent possible, and to the extent consistent with the safety of life and property, preserve the data recorded by each such device for analysis by FRA. This preservation requirement permits the railroad to extract and analyze such data, provided the original downloaded data file, or an unanalyzed exact copy of it, 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 one (1) year after the date of the accident unless FRA or the Board notifies the railroad in writing that the data are desired for analysis.

(f) 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.

(g) 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 §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 part 218 of this chapter and to disqualification from performing safety-sensitive functions on a railroad if found unfit for such duties under the procedures in part 209 of this chapter.

### **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 en route 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, DMU, MU, and 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, i.e., 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.

### **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.

### **Subpart D—Locomotive Crashworthiness Design Requirements**

#### **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.
- (6) On or after November 8, 1999, paragraph (a)(1) of this section does not apply to “passenger equipment” as defined in §238.5 of this chapter, unless such equipment is excluded from the requirements of §§238.203 through 238.219, and §238.223 of this chapter by operation of §238.201(a)(2) of this chapter. Paragraphs (a)(2) through (a)(4) of this section do not apply to “passenger equipment” as defined in §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 §§238.203 through 238.219, and §238.223 of this chapter by operation of §238.201(a)(2) of this chapter

(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.

(6) On or after November 8, 1999, paragraph (a)(1) of this section does not apply to “passenger equipment” as defined in §238.5 of this chapter, unless such equipment is excluded from the requirements of §§238.203 through 238.219, and §238.223 of this chapter by operation of §238.201(a)(2) of this chapter. Paragraphs (a)(2) through (a)(4) of this section do not apply to “passenger equipment” as defined in §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 §§238.203 through 238.219, and §238.223 of this chapter by operation of §238.201(a)(2) of this chapter.

#### **229.201 Purpose and scope.**

(a) Purpose. The purpose of this subpart is to help protect locomotive cab occupants in the event that a locomotive collides with another locomotive or piece of on-track equipment, a shifted load on a freight car on an adjacent parallel track, or a highway vehicle at a highway-rail grade crossing.

(b) This subpart prescribes minimum crashworthiness standards for locomotives. It also establishes the requirements for obtaining FRA approval of: new locomotive crashworthiness design standards; changes to FRA-approved locomotive crashworthiness design standards; and alternative locomotive crashworthiness designs.

#### **229.203 Applicability.**

(a) Except as provided in paragraphs (b) and (c) of this section, this subpart applies to all locomotives manufactured or remanufactured on or after January 1, 2009.

(b) Cab cars and power cars. The requirements of this subpart do not apply to cab control cars, MU locomotives, DMU locomotives, and semi-permanently coupled power cars that are subject to the design requirements for such locomotives set forth in part 238 of this chapter.

(c) Locomotives used in designated service. Locomotives used in designated service are exempt from the requirements of this subpart, with the exception of §229.233 (minimum requirements for fuel tank design), which remains applicable to such locomotives.

#### **§229.205 General requirements.**

(a) Each wide-nose locomotive used in occupied service must meet the minimum crashworthiness performance requirements set forth in Appendix E of this part. Compliance with those performance criteria must be established by:

(1) Meeting an FRA-approved crashworthiness design standard (including AAR S-580, Locomotive Crashworthiness Requirements). The Director of the Federal Register approves incorporation by reference of the AAR S-580 (revised July 2005), "Locomotive Crashworthiness Requirements," in this section in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. You may obtain a copy of the incorporated standard from the Association of American Railroads, 50 F Street NW, Washington, DC 20001. You may inspect a copy of the incorporated standard at the Federal Railroad Administration, Docket Clerk, 1120 Vermont Ave., NW Suite 7000, Washington, DC 20590 or at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030, or go to [http://www.archives.gov/federal\\_register/code\\_of\\_federal\\_regulations/ibr\\_locations.html](http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html);

(2) Meeting new design standards and changes to existing design standards approved by FRA pursuant to §229.207; or

(3) Meeting an alternative crashworthiness design approved by FRA pursuant to §229.209.

(b) A monocoque or semi-monocoque design locomotive must be designed in accordance with the provisions of AAR S-580, applicable to those types of locomotives, in accordance with §§238.405(a), 238.409 and 238.411 of this chapter, or in accordance with a standard or design approved by FRA as providing at least equivalent safety.

(c) A narrow-nose locomotive must be designed in accordance with the provisions of AAR S-580, applicable to that type of locomotive (notwithstanding any limitation of scope contained in that standard) or in accordance with a standard or design approved by FRA as providing at least equivalent safety.

#### **229.206 Design requirements.**

Each locomotive used in occupied service must meet the minimum anti-climber, emergency egress, emergency interior lighting, and interior configuration design requirements set forth in AAR S-580 (incorporated by reference, see §229.205).

#### **§229.207 New locomotive crashworthiness design standards and changes to existing FRA-approved locomotive crashworthiness design standards.**

(a) General. The following procedures govern consideration and action upon requests for FRA approval of new locomotive crashworthiness design standards and changes to existing FRA-approved locomotive crashworthiness design standards, including AAR S-580 (incorporated by reference, see §229.205). Only a standards body which has adopted an FRA-approved locomotive crashworthiness design standard may initiate these procedures for FRA approval of changes to the standard.

(b) Petitions for FRA approval of new locomotive crashworthiness design standards. Each petition for FRA approval of a locomotive crashworthiness design standard must be titled "Petition for FRA Approval of a New Locomotive Crashworthiness Design Standard," must be submitted to the Associate Administrator for Safety, Federal Railroad Administration, 1120 Vermont Ave., NW., Mail Stop 25, Washington, DC 20590, and must contain the following:

(1) The name, title, address, telephone number and e-mail address of the primary person to be contacted with regard to review of the petition;

(2) The proposed locomotive design standard, in detail;

(3) The intended type of service for locomotives designed under the proposed standard; and

(4) Appropriate data and analysis showing how the proposed design standard either satisfies the requirements of §229.205 for the type of locomotive design or provides at least an equivalent level of safety. Types of data and analysis to be considered are described in §229.211(c)(1).

(c) Petitions for FRA approval of substantive changes to an FRA-approved locomotive crashworthiness design standard. Each petition for approval of a substantive change to an FRA-approved locomotive crashworthiness design standard must be titled "Petition for FRA Approval of Changes to a Locomotive Crashworthiness Design Standard," must be submitted to the Associate Administrator for Safety, Federal Railroad

Administration, 1120 Vermont Ave., NW., Mail Stop 25, Washington, DC 20590, and must contain the following:

- (1) The name, title, address, telephone number and e-mail address of the primary person to be contacted with regard to review of the petition;
  - (2) The proposed change, in detail;
  - (3) The intended type of service for locomotives built with the proposed change; and
  - (4) Appropriate data and analysis showing how the resulting standard either satisfies the requirements for the type of locomotive set forth in §229.205 or provides at least an equivalent level of safety. Types of data and analysis to be considered are described in §229.211(c)(1).
- (d) Petitions for FRA approval of non- substantive changes to the existing FRA- approved crashworthiness design standards.

(1) Each petition for approval of a non-substantive change to an FRA- approved locomotive crashworthiness design standard must be titled “Petition for FRA Approval of Non-substantive Changes to a Locomotive Crashworthiness Design Standard,” must be submitted to the Associate Administrator for Safety, Federal Railroad Administration, 1120 Vermont Ave., NW, Mail Stop 25, Washington, DC 20590, and must contain the following:

- (i) The name, title, address, telephone number and e-mail address of the primary person to be contacted with regard to review of the petition;
  - (ii) The proposed change, in detail; and (iii) Detailed explanation of how the proposed change results in a non-substantive change to the existing FRA- approved crashworthiness design standard.
- (2) If FRA determines that the proposed change is substantive, FRA will process the petition in accordance with paragraph (c) of this section.

#### **229.209 Alternative locomotive crashworthiness designs.**

(a) General. The following procedures govern consideration and action upon requests for FRA approval of locomotive crashworthiness designs which are not consistent with any FRA-approved locomotive crashworthiness design standard.

(b) Petitions for FRA approval of alternative locomotive crashworthiness designs. Each petition for FRA approval of an alternative locomotive crashworthiness design must be titled “Petition for FRA Approval of Alternative Locomotive Crashworthiness Design,” must be submitted to the Associate Administrator for Safety, Federal Railroad Administration, 1120 Vermont Ave., NW, Mail Stop 25, Washington, DC 20590, and must contain the following:

- (1) The name, title, address, telephone number and e-mail address of the primary person to be contacted with regard to review of the petition;
- (2) The proposed locomotive crashworthiness design, in detail;
- (3) The intended type of service for locomotives built under the proposed design; and
- (4) Appropriate data and analysis showing how the design either satisfies the requirements of §229.205 for the type of locomotive or provides at least an equivalent level of safety. Types of data and analysis to be considered are described in §229.211(c)(1).

#### **229.211 Processing of petitions.**

(a) Federal Register notice. FRA will publish in the Federal Register notice of receipt of each petition submitted under §§229.207(b), 229.207(c), or 229.209.

(b) Comment. Not later than 60 days from the date of publication of the notice in the Federal Register concerning a petition submitted under §§229.207(b), 229.207(c), or 229.209(b), any person may comment on the petition.

(1) Each comment must set forth specifically the basis upon which it is made, and contain a concise statement of the interest of the commenter in the proceeding.

(2) Each comment must be submitted to the U.S. Department of Transportation Central Docket Management System, Nassif Building, Room PL-401, 400 Seventh Street, SW., Washington, DC 20590, and must contain the assigned docket number which appeared in the Federal Register for that proceeding. The form of such

submission may be in written or electronic form consistent with the standards and requirements established by the Central Docket Management System and posted on its Web site at <http://dms.dot.gov>.

(3) In the event FRA requires additional information to appropriately consider the petition, FRA will conduct a hearing on the petition in accordance with the procedures provided in §211.25 of this chapter.

(c) Disposition of petitions.

(1) In order to determine compliance with the performance criteria in Appendix E of this part, FRA will consider proper documentation of competent engineering analysis, or practical demonstrations, or both which may include validated computer modeling, structural crush analysis, component testing, full scale crash testing in a controlled environment, or any combination of the foregoing, together with evidence of effective peer review.

(2) If FRA finds that the petition complies with the requirements of this subpart and that the proposed change or new design standard satisfies the requirements of §229.205 for the type of locomotive, the petition will be granted, normally within 90 days of its receipt. If the petition is neither granted nor denied within 90 days, the petition remains pending for decision. FRA may attach special conditions to the granting of the petition. Following the granting of a petition, FRA may reopen consideration of the petition for cause stated. Any decision granting or denying a petition is placed in the public docket for the petition.

(3) If FRA finds that the petition does not comply with the requirements of this subpart, or that the proposed change or new design standard does not satisfy the performance criteria contained in Appendix E of this part (where applicable), the petition will be denied, normally within 90 days of its receipt. If the petition is neither granted nor denied within 90 days, the petition remains pending for decision. FRA may re-open a denial of a petition for cause stated.

(4) When FRA grants or denies a petition, or reopens consideration of the petition, written notice will be sent to the petitioner and other interested parties and a copy of the notice will be placed in the public docket of this proceeding.

#### **229.213 Locomotive manufacturing information.**

(a) Each railroad operating a locomotive subject to the requirements of this subpart must retain the following information:

(1) The date upon which the locomotive was manufactured or remanufactured;

(2) The name of the manufacturer or remanufacturer of the locomotive; and

(3) The design specification to which the locomotive was manufactured or remanufactured.

(b) The information required in paragraph (a) of this section must be located permanently in the locomotive cab or be provided within two business days upon request of FRA or an FRA- certified State inspector.

#### **229.215 Retention and inspection of designs.**

(a) Retention of records—original designs. Each manufacturer or remanufacturer of a locomotive subject to this subpart shall retain all records of the original locomotive designs, including supporting calculations and drawings, pertaining to crashworthiness features required by this subpart. These records must be retained for the lesser period of:

(1) The life of such locomotive, except that records for a locomotive destroyed in a rail equipment accident/incident shall be retained for at least 12 months following the accident/incident; or

(2) Twenty years after the date of manufacture or, if remanufactured, twenty years after the date of remanufacture.

(b) Retention of records—repairs and modifications. Each owner or lessee of a locomotive subject to this subpart shall retain all records of repair or modification to crashworthiness features required by this subpart. These records must be retained for the lesser period of:

(1) The life of such locomotive, except that records for a locomotive destroyed in a rail equipment accident/incident shall be retained for at least 12 months following the accident/incident, or

(2) Twenty years after the date on which the repair or modification was performed.

(c) Inspection of records. Each custodian of records referred to in paragraphs (a) and (b) shall, upon request by FRA or an FRA-certified State inspector, make available for inspection and duplication within 7 days, any records referred to in paragraphs (a) and (b) of this section.

(d) Third party storage of records. Each custodian of records referred to in paragraphs (a) and (b) of this section may delegate storage duties to a third party; however, the custodian retains all responsibility for compliance with this section.

**229.217 Fuel tank.**

(a) External fuel tanks. Locomotives equipped with external fuel tanks shall, at a minimum, comply with the requirements of AAR S-5506, "Performance Requirements for Diesel Electric Locomotive Fuel Tanks" (October 1, 2001), except for section 4.4. This paragraph does not apply to locomotives subject to the fuel tank safety requirements of §238.223 or §238.423 of this chapter. The Director of the Federal Register approves incorporation by reference of the AAR S-5506, "Performance Requirements for Diesel Electric Locomotive Fuel Tanks" (October 1, 2001) in this section in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. You may obtain a copy of the incorporated standard from the Association of American Railroads, 50 F Street NW., Washington, DC 20001. You may inspect a copy of the incorporated standard at the Federal Railroad Administration, Docket Clerk, 1120 Vermont Ave., NW. Suite 7000, Washington, DC 20590 or at the National Archives and Records Administration (NARA). For more information on the availability of this material at NARA, call 202-741-6030, or go to [http://www.archives.gov/federal\\_register/code\\_of\\_federal\\_regulations/ibr\\_locations.html](http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html).

(b) Internal fuel tanks. Locomotives equipped with internal fuel tanks shall, at a minimum, comply with the requirements of §238.223(b) of this chapter.

**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<sup>(1)</sup>**

Section	Violation	Willful Violation
<b>Subpart A—General</b>		
<b>229.7 Prohibited acts:</b>		
Safety deficiencies not governed by specific regulations:		
To be assessed on relevant Facts .	\$1,000 - 5,000	2,000 – 7,500
<b>229.9 Movement of noncomplying locomotives</b>	(1)	(1)
<b>229.11 Locomotive identification</b>	1,000	2,000
<b>229.13 Control of locomotives</b>	2,500	5,000
<b>229.17 Accident reports</b>	2,500	5,000
<b>229.19 Prior Waivers</b>	(1)	(1)

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<sup>1</sup>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 \$16,000 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 \$27,000 for any violation where circumstances warrant. See 49 CFR part 209, appendix A. Failure to observe any condition for movement set forth in §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 substantive defect(s) present on the locomotive at the time of movement. Failure to comply with §229.19 will result in a lapse of any affected waiver.

**Subpart B--Inspection and Tests**

Section	Violation	Willful Violation
<b>229.21 Daily inspection:</b>		
(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
<b>229.23 Periodic inspection General</b>		
(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 F6180.49A	1,000	2,000
<b>229.25 (a) through (e)(4) Tests:</b>		
Every periodic inspection	2,500	5,000
(e)(5) Ineffective maintenance	8,000	16,000
<b>229.27 Annual tests</b>	2,500	5,000
<b>229.29 Biennial tests</b>	2,500	5,000
<b>229.31:</b>		
(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
<b>229.33 Out-of-use credit</b>	1,000	2,000

**Subpart C--Safety Requirements**

Section	Violation	Willful Violation
<b>229.41 Protection against personal injury</b>	2,500	5,000
<b>229.43 Exhaust and battery gases</b>	2,500	5,000
<b>229.45 General condition:</b>		
To be assessed based on relevant facts	1,000-5000	2,000-7,500
<b>229.46 Brakes: General</b>	2,500	5,000
<b>229.47 Emergency brake valve</b>	2,500	5,000
<b>229.49 Main reservoir system:</b>		
(a)(1) Main reservoir safety valve	2,500	5,000
(2) Pneumatically actuated control reservoir	2,500	5,000
(b)(c) Main reservoir governors	2,500	5,000
<b>229.51 Aluminum main reservoirs</b>	2,500	5,000
<b>229.53 Brake gauges</b>	2,500	5,000
<b>229.55 Piston travel</b>	2,500	5,000
<b>229.57 Foundation brake gear</b>	2,500	5,000
<b>229.59 Leakage</b>	2,500	5,000
<b>229.61 Draft system</b>	2,500	5,000
<b>229.63 Lateral motion</b>	2,500	5,000
<b>229.64 Plain bearing</b>	2,500	5,000
<b>229.65 Spring rigging</b>	2,500	5,000
<b>229.67 Trucks</b>	2,500	5,000
<b>229.69 Side bearings</b>	2,500	5,000
<b>229.71 Clearance above top of rail</b>	2,500	5,000
<b>229.73 Wheel sets</b>	2,500	5,000
<b>229.75 Wheel and tire defects:</b>		
(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 length	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
<b>229.77 Current collectors</b>	2,500	5,000
<b>229.79 Third rail shoes and beams</b>	2,000	4,000
<b>229.81 Emergency pole; shoe insulation</b>	2,500	5,000
<b>229.83 Insulation or grounding</b>	5,000	7,500
<b>229.85 Door and cover plates marked "Danger"</b>	2,500	5,000
<b>229.87 Hand operated switches</b>	2,500	5,000
<b>229.89 Jumpers; cable connections:</b>		
(a) Jumpers and cable connections; located and guarded	2,500	5,000
(b) Condition of jumpers and cable connections	2,500	5,000
<b>229.91 Motors and generators</b>	2,500	5,000
<b>229.93 Safety cut-off device</b>	2,500	5,000
<b>229.95 Venting</b>	2,500	5,000
<b>229.97 Grounding fuel tanks</b>	2,500	5,000
<b>229.99 Safety hangers</b>	2,500	5,000
<b>229.101 Engines:</b>		
(a) Temperature and pressure alarms, controls, & switches	2,500	5,000
(b) Warning notice	2,500	5,000
(c) Wheel slip/slide protection	2,500	5,000
<b>229.103 Safe working pressure; factor of safety</b>	2,500	5,000
<b>229.105 Steam generator number</b>	500	1,000
<b>229.107 Pressure gauge</b>	2,500	5,000
<b>229.109 Safety valves</b>	2,500	5,000
<b>229.111 Water-flow indicator</b>	2,500	5,000
<b>229.113 Warning notice</b>	2,500	5,000
<b>229.115 Slip/slide alarms</b>	2,500	5,000
<b>229.117 Speed indicators</b>	2,500	5,000
<b>229.119 Cabs, floors, and passageways:</b>		
(a)(1) Cab set not securely mounted or braced	2,500	5,000
(2) Insecure or improper latching 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
<b>229.121 Locomotive cab noise</b>	2,500	5,000
(a) Performance Standards		
(1) Failure to meet sound level	5,000	7,500
(2) Improper maintenance alterations	2,500	5,000
(3) Failure to comply with static test protocols	2,500	5,000
(b) Maintenance of locomotives		
(1) Failure to maintain excessive noise report record correspond to report as required	2,500	5,000
(3) Failure to make good faith effort as required	2,500	5,000
(4) Failure to maintain record as required	2,000	4,000
<b>229.123 Pilots, snowplows, end plates</b>	2,500	5,000
<b>229.125</b>		
(a) Headlights	2,500	5,000
(d) Auxiliary lights	2,500	5,000
<b>229.127 Cab lights</b>	2,500	5,000
<b>229.129 Locomotive Horn</b>	2,500	5,000
(a) Prescribed sound levels	2,500	5,000
Arrangement of horn	2,500	5,000
(b) Failure to perform sound level test	2,500	5,000
(c) Sound level test improperly performed	2,500	5,000
Record of sound level test improperly executed, or not retained	1,000	4,000
<b>229.131 Sanders</b>	1,000	2,000
<b>229.135</b>		
(a) Lead locomotive without in-service event recorder	2,500	5,000
(b) Failure to meet equipment requirements	2,500	5,000
(c) Unauthorized removal or failure to remove from service	2,500	5,000
(d) Improper response to out of service event recorder	2,500	5,000

(e) Failure to preserve data or unauthorized extraction of data	2,500	5,000
(g) Tampering with device or data	2,500	5,000
<b>229.137 Sanitation, general:</b>		
(a) Sanitation compartment, in lead unit, complete failure to provide required 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 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
<b>229.139 Servicing requirements:</b>		
(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

## Subpart D--Design Requirements

Section	Violation	Willful Violation
<b>229.141 Body structure, MU locomotives</b>	2,500	5,000
<b>229.205 General requirements:</b>		
(a)(1) Wide-nose locomotive not designed in compliance with AAR S-580-2005	5,000	7,500
(2) Wide-nose locomotive not designed in compliance with new approved design standard	5,000	7,500
(3) Wide-nose locomotive not designed in compliance with alternate approved design standard	5,000	7,500
(b) Monocoque or semi-monocoque locomotive not in compliance with design requirements	5,000	7,500
(c) Narrow-nose not in compliance with design requirements	5,000	7,500
<b>229.206 Design requirements:</b>		
Locomotive fails to meet—		
(1) Emergency egress requirements	2,500	5,000
(2) Emergency interior lighting requirements	2,500	5,000
<b>229.213 Locomotive manufacturing information:</b>		
(a) Failure to retain required information	2,500	5,000
(b) Failure to produce required information	2,500	5,000
<b>229.215 Retention and inspection of designs:</b>		
(a) Failure to retain required design records	2,500	5,000
(b) Failure to retain required repair or modification records	2,500	5,000
(c) Failure to make records available when requested	2,500	5,000
<b>229.217 Fuel tank:</b>		
(a) External fuel tank	5,000	7,500
(b) Internal fuel tank	5,000	7,500

## 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.

## Appendix D to Part 229 Criteria for Certification of Crashworthy Event Recorder Memory Module

Effective Date(s): October 1, 2005

**Editorial Note:** Appendix D, effective October 1, 2005 is not printed in this booklet, but can be found on the web at <http://ecfr.gpoaccess.gov/>

Section 229.135(b) requires that certain locomotives be equipped with an event recorder that includes a certified crashworthy event recorder memory module. This appendix prescribes the requirements for certifying an event recorder memory module (ERMM) as crashworthy, including the performance criteria and test sequence for establishing the crashworthiness of the ERMM as well as the marking of the event recorder containing the crashworthy ERMM.

## Appendix E to Part 229 Performance Criteria for Locomotive Crashworthiness

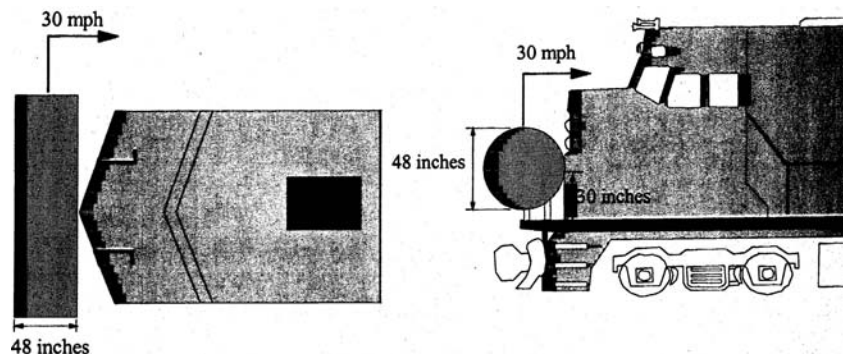
This appendix provides performance criteria for the crashworthiness evaluation of alternative locomotive designs, and design standards for wide-nosed locomotives and any for other locomotive, except monocoque/semi-monocoque design locomotives and narrow-nose design locomotives. Each of the following criteria describes a collision scenario and a given performance measure for protection provided to cab occupants, normally through structural design. Demonstration that these performance criteria have been satisfied may be accomplished through any of the methods described in §229.205. This performance criteria is intended to prevent intrusion into the cab seating area occupied by crews. This excludes inner and outer vestibule areas.

(a) Front end structure (collision posts).

(1) Objective. The front end structure of the locomotive must withstand a frontal impact with a proxy object which is intended to simulate lading carried by a heavy highway vehicle (see figure 1).

(2) Proxy object characteristics and orientation. The proxy object must have the following characteristics: Cylindrical shape; 48-inch diameter; 126-inch length; 65,000 pound minimum weight; and uniform density. The longitudinal axis of the proxy object must be oriented horizontally perpendicular to the longitudinal axis of the locomotive.

(3) Impact and result. The front end structure of the locomotive must withstand a 30-mph impact with the proxy object resulting in no more than 24 inches of crush along the longitudinal axis of the locomotive, measured from the foremost point on the collision post, and with no more than 12 inches of intrusion into the cab. The center of impact must be 30 inches above the top of the locomotive underframe along the longitudinal centerline of the locomotive.



## **Appendix F and Appendix G**

Appendices F and G are added to Part 229 and reserved for future use.

## **Appendix H to Part 229 Static Noise Test Protocols – In-Cab Static**

**Editorial Note:** Appendix H, effective September 29, 2006 is not printed in this booklet, but can be found on the web at <http://ecfr.gpoaccess.gov/>