§ 238.403 Crash energy management.

(a) Each power car and trailer car shall be designed with a crash energy management system to dissipate kinetic energy during a collision. The crash energy management system shall provide a controlled deformation and collapse of designated sections within the unoccupied volumes to absorb collision energy and to reduce the decelerations on passengers and crew members resulting from dynamic forces transmitted to occupied volumes.

(b) The design of each unit shall consist of an occupied volume located between two normally unoccupied volumes. Where practical, sections within the unoccupied volumes shall be designed to be structurally weaker than the occupied volume. During a collision, the designated sections within

§ 238.15.

(c) The running brake test shall be conducted in accordance with the railroad's established operating rules, and shall be made by applying brakes in a manner that allows the engineer to ascertain whether the brakes are operating properly.

(d) If the engineer determines that the brakes are not operating properly, the engineer shall stop the train and follow the procedures provided in § 238.15.

§ 238.319 Running brake test.

(a) As soon as conditions safely permit, a running brake test shall be performed on each passenger train after the train has received, or was required under this part to have received, either a Class I, Class IA, or Class II brake test.

(b) A running brake test shall be performed whenever the control stand used to control the train is changed to facilitate the movement of a passenger train from one track to another within a terminal complex while not in passenger service.

(c) The running brake test shall be conducted in accordance with the railroad's established operating rules, and shall be made by applying brakes in a manner that allows the engineer to ascertain whether the brakes are operating properly.

(d) If the engineer determines that the brakes are not operating properly, the engineer shall stop the train and follow the procedures provided in § 238.15.

§ 238.321 Out-of-service credit.

When a passenger car is out of service for 30 or more consecutive days or is out of service when it is due for any test or inspection required by § 238.307 or § 238.309 an out of use notation showing the number of out of service days shall be made in the records required under §§ 238.307(e) and 238.309(f). If the passenger car is out of service for one or more periods of at least 30 consecutive days, the interval prescribed for any test or inspection required by §§ 238.307 and 238.309 may be extended by the number of days in each period the passenger car is out of service since the last test or inspection in question.

A movement made in accordance with § 229.9 of this chapter or § 238.17 is not considered service for the purposes of determining the out-of-service credit.

(1) The brakes on the rear unit of the train apply and release in response to a signal from the engineer's brake valve or controller of the leading or controlling unit, or a gauge or similar device located at the rear of the train or in the cab of the rear unit indicates that brake pipe pressure changes are properly communicated at the rear of the train;

(2) For MU locomotives that utilize an electric signal to communicate a service brake application and only a pneumatic signal to propagate an emergency brake application, the emergency brake application functions as intended.

(3) The communicating signal system is tested and known to be operating as intended; a tested and operating two-way radio system meets this requirement.

§ 238.319 Running brake test.

(a) As soon as conditions safely permit, a running brake test shall be performed on each passenger train after the train has received, or was required under this part to have received, either a Class I, Class IA, or Class II brake test.

(b) A running brake test shall be performed whenever the control stand used to control the train is changed to facilitate the movement of a passenger train from one track to another within a terminal complex while not in passenger service.

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§ 238.321 Out-of-service credit.

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A movement made in accordance with § 229.9 of this chapter or § 238.17 is not considered service for the purposes of determining the out-of-service credit.

[71 FR 61862, Oct. 19, 2006]
the unoccupied volumes shall start to
deform and eventually collapse in a
controlled fashion to dissipate energy
before any structural damage occurs to
the occupied volume.

(c) At a minimum, each Tier II pas-
senger train shall be designed to meet
the following requirements:

(1) Thirteen megajoules (MJ) shall be
absorbed at each end of the train
through the controlled crushing of un-
occupied volumes, and of this amount a
minimum of 5 MJ shall be absorbed
ahead of the operator’s cab in each
power car;

(2) A minimum of an additional 3 MJ
shall be absorbed by the power car
structure between the operator’s cab
and the first trailer car; and

(3) The end of the first trailer car ad-
jonet to each power car shall absorb a
minimum of 5 MJ through controlled
crushing.

(d) For a 30-mph collision of a Tier II
passenger train on tangent, level track
with an identical stationary train:

(1) When seated anywhere in a trailer
car, the velocity at which a 50th-per-
centile adult male contacts the seat
back ahead of him shall not exceed 25
mph; and

(2) The deceleration of the occupied
volumes of each trailer car shall not
exceed 8g. For the purpose of dem-
onstrating compliance with this para-
graph, deceleration measurements may
be processed through a low-pass filter
having a bandwidth of 50 Hz.

(e) Compliance with paragraphs (a)
through (d) of this section shall be
demonstrated by analysis using a dy-
namic collision computer model. For
the purpose of demonstrating compli-
ance, the following assumptions shall
be made:

(1) The train remains upright, in line,
and with all wheels on the track
throughout the collision; and

(2) Resistance to structural crushing
follows the force-versus-displacement
relationship determined during the
structural analysis required as part of
the design of the train.

(f) Passenger seating shall not be per-
mitted in the leading unit of a Tier II
passenger train.

§ 238.405  Longitudinal static compres-
sive strength.

(a) To form an effective crash refuge
for crewmembers occupying the cab of
a power car, the underframe of the cab
of a power car shall resist a minimum
longitudinal static compressive force
of 2,100,000 pounds without permanent
deformation to the cab, unless equiva-
 lent protection to crewmembers is pro-
vided under an alternate design ap-
proach, validated through analysis and
testing, and approved by FRA under
the provisions of §238.21.

(b) The underframe of the occupied
volume of each trailer car shall resist a
minimum longitudinal static compres-
sive force of 800,000 pounds without per-
manent deformation to the car. To
demonstrate compliance with this re-
quirement, the 800,000-pound load shall
be applied to the underframe of the oc-
cupied volume as it would be trans-
mitted to the underframe by the full
structure of the vehicle.

(c) Unoccupied volumes of a power
car or a trailer car designed to crush as
part of the crash energy management
design are not subject to the require-
ments of this section.

§ 238.407  Anti-climbing mechanism.

(a) Each power car shall have an
anti-climbing mechanism at its for-
ward end capable of resisting an ulti-
mate upward or downward static
vertical force of 200,000 pounds. A
power car constructed with a crash en-
ergy management design is permitted
to crush in a controlled manner before
the anti-climbing mechanism fully en-
gages.

(b) Interior train coupling points be-
tween units, including between units of
articulated cars or other permanently
joined units of cars, shall have an anti-
climbing mechanism capable of resist-
ing an upward or downward vertical
force of 100,000 pounds without yield-
ing.

(c) The forward coupler of a power
car shall be attached to the car body to
resist a vertical downward force of
100,000 pounds for any horizontal posi-
tion of the coupler without yielding.