

Part II

NORTH AMERICAN STANDARD VEHICLE OUT-OF-SERVICE CRITERIA

POLICY STATEMENT

The purpose of this part is to identify Critical Vehicle Inspection Items and provide criteria for declaring vehicles out-of-service subsequent to a safety inspection.

Except where state, provincial, territorial, or federal laws preclude enforcement of a named item, motor carrier safety enforcement personnel and their jurisdictions shall comply with these out-of-service violation standards.

NOTE: Decal Qualification: Each vehicle (i.e. motorcoach, school bus, other bus, truck, truck tractor, semi-trailer, trailer, converter dollies, etc.) used singularly or in combination may qualify for a CVSA decal if it passes inspection, and a CVSA decal shall be applied. "Pass Inspection" means that during a North American Standard Level I or Level V Inspection no defects are found in the Critical Vehicle Inspection Items.

For the purpose of a CVSA decal issuance, if no violation is detected during a North American Standard Level I or Level V Inspection due to a hidden part which includes the Critical Vehicle Inspection Items, a decal shall be applied.

The decal criteria applies only to the condition of the vehicle, not the driver. It is possible for a driver to be out-of-service and still have vehicle(s) qualify for a decal. If each vehicle, whether used singly or in a combination, passes inspection, a current CVSA decal shall be affixed and no other CVSA decals shall be visible.

OUT-OF-SERVICE: Authorized personnel shall declare "out-of-service" any motor vehicle which by reason of its mechanical condition or loading would be likely to cause an accident or breakdown. An "out-of-service vehicle" sticker shall be used to declare vehicles "out-of-service." No motor carrier shall require nor shall any person operate, or any inspector release any commercial motor vehicle declared "out-of-service" until all repairs required by the "out-of-service notice" have been satisfactorily completed to where a violation no longer exists.

When a vehicle is declared out-of-service for a condition resulting from an accumulation of violations, all violations that contributed to the specific out-of-service condition must be repaired (e.g. a vehicle, or vehicles in combination declared out-of-service for 20 percent defective brake violations must have all the 20 percent defective brake violations repaired prior to being released; or, a vehicle declared out-of-service for two tires at less than 1/32 inch (.8mm) tread depth must have both tire violations repaired prior to the vehicle being released, etc.).

An out-of-service condition cannot be corrected by creating a new violation (e.g. if a vehicle is declared out-of-service for three missing wheel fasteners on one wheel, wheel fasteners from other wheels cannot be removed to correct this out-of-service condition, etc.).

When vehicles in combination are declared out-of-service for 20 percent defective brake violations, any vehicle within the combination that does not contain a brake violation that contributed to the 20 percent defective brake out-of-service condition is allowed to proceed providing it does not contain any other out-of-service conditions.

No person shall remove the “out-of-service vehicle” sticker from any motor vehicle prior to completion of all repairs required by the “out-of-service notice.”

Violations, other than out-of-service conditions, detected during the inspection process will not preclude the completion of the current trip or dispatch. However, such violations must be corrected or repaired prior to re-dispatch.

These criteria are neither suited nor intended to serve as vehicle maintenance or performance standards.

FMCSR code references in the *North American Standard Out-of-Service Criteria* are simply recommendations to help inspectors find an appropriate citation. Other violation codes may be more suitable for a specific condition.

***1. BRAKE SYSTEMS**

***a. Defective Brakes**

The number of defective brakes is equal to or greater than 20 percent of the service brakes on the vehicle or combination. A defective brake includes any brake that meets one of the following conditions. (396.3(a)(1))

NOTE: Steering axle brakes under “Front Steering Axle(s) Brakes”, are to be included in the 20 percent criterion.

Defective Brake Chart (below) shall be used in determining when a vehicle/combination is to be declared out-of-service.

Total Number of Brakes Required to be on a Vehicle Combination	Total Number of Defective Brakes Necessary to Declare the Vehicle or Combination Out-of-Service
4	1
6	2
8	2
10	2
12	3
14	3
16	4
18	4
20	4
22	5
**	

**** Vehicle Combination with More Than 22 Brakes – Total Number of Defective Brakes Necessary to Declare the Vehicle Combination Out-of-Service.**

Determine the number of defective brakes required by using 20 percent of the total number of brakes on the vehicle or combination (e.g. $24 \times 0.2 = 4.8$ brakes). Round all fractions up to the next whole number (e.g. 4.8 brakes = 5 required defective brakes).

- * (1) Absence of effective braking action upon application of the service brakes (such as any brake lining/pad failing to move or contact braking surface upon application). (393.48(a))

Inspection Bulletin 2005-01 – Trailer Brake Controller (TBC) 2005 Ford SuperDuty Vehicles

- (2) Drum (Cam-Type and Wedge) Air Brakes

- (a) Missing or broken brake shoe, lining, return spring (shoe or chamber), anchor pin, spider, cam roller, camshaft, pushrod, yoke, clevis pin, brake adjuster, parking brake power spring, or air chamber mounting bolt. (393.48(a))

Inspection Bulletin 2006-01 – Camshaft Bushings

- (b) Loose air chamber, spider, or camshaft support bracket. (393.48(a))

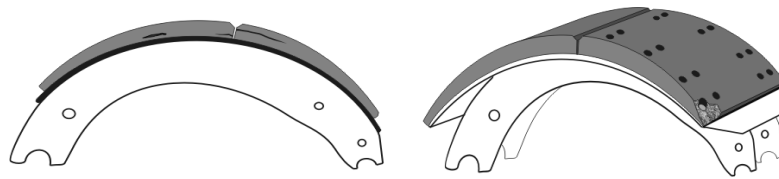
- (c) Defective lining conditions.

- i. Lining cracks or voids that exceed 1/16 inch (1.6mm) in width observable on the edge of the lining. (393.47(a))
- ii. Portion of a lining segment missing such that a fastening device (rivet or bolt) is exposed when viewing the lining from the edge. (393.47(a))
- iii. Crack that exceeds 1-1/2 inch (38.1mm) in length. (393.47(a))
- iv. Loose lining segment. (Approximately 1/16 inch (1.6mm) or more movement.) (393.47(a))
- v. Complete lining segment missing. (393.47(a))
- vi. The friction surface of the brake drum and the brake friction material are contaminated by oil or grease. (393.47(a))

NOTE: Refer to “Wheels, Rims and Hubs” if wheel seal is actively leaking.

- vii. Lining thickness less than 1/4 inch (6.5mm) or to wear indicator if lining is so marked, measured at the shoe center. (393.47(d)(2))

Inspection Bulletin 2007-01 – Express Brake International, Inc. – Segmented Brake Linings



*Cracks or voids that exceed 1/16” in width.
Cracks that exceed 1-1/2” in length.*

Portion of lining missing that exposes a fastening device.

- (3) Air Disc Brakes (Exposed Pushrods and Direct Coupled – Air Chamber to Caliper)
- (a) Missing or broken caliper, brake pad, pad retaining component, pushrod, yoke, clevis pin, brake adjuster, parking brake power spring, chamber return spring, or air chamber mounting bolt. (393.48(a))
 - (b) Loose or missing brake chamber or caliper mounting bolt. (393.48(a))
 - (c) Rotor has evidence of metal to metal contact over the rotor friction surface on either side. (393.48(a))
 - (d) Rotor has severe rusting on the rotor friction surface on either side (light rusting on the friction surface is normal). (393.48(a))
 - (e) The friction surface of the brake rotor and the brake friction material are contaminated by oil or grease. (393.47(a))
- NOTE:** Refer to “Wheels, Rims and Hubs” if wheel seal is actively leaking.
- (f) Brake pad thickness less than 1/16 inch (1.6mm) or to wear indicator if pad is so marked. (393.47(d)(2))
- (4) Audible Air Leak at Air Chamber. (Example: ruptured diaphragm, loose chamber clamp, etc.) (396.3(a)(1))
- NOTE:** Refer to “Air Loss Rate”.
- (5) Brake Adjustment Limits. Bring reservoir pressure between 90 – 100 psi (620 – 690 kPa), turn engine off and then fully apply the brakes. All brake measurements shall be made in 1/8 inch (3.2mm) increments.
- (a) One brake at 1/4 inch (6.5mm) or more beyond the adjustment limit. (Example: Type 30 clamp type air chamber pushrod measured at 2-1/4 inches (57.15mm) would be one defective brake.) (393.47(e))

COMMERCIAL VEHICLE SAFETY ALLIANCE
NORTH AMERICAN STANDARD OUT-OF-SERVICE CRITERIA
REFERENCE CHARTS

Reference: "Defective Brakes" of Part II of the *North American Standard Out-of-Service Criteria*.

Brake Adjustment: Shall not exceed those specifications contained here under relating to "Brake Adjustment Limit". (Dimensions are in inches.)

CLAMP TYPE BRAKE CHAMBER DATA

<u>TYPE</u>	<u>OUTSIDE DIAMETER</u>	<u>BRAKE ADJUSTMENT LIMIT</u>
6	4-1/2 (114mm)	1-1/4 (31.75mm)
9	5-1/4 (133mm)	1-3/8 (34.93mm)
12	5-11/16 (145mm)	1-3/8 (34.93mm)
16	6-3/8 (162mm)	1-3/4 (44.45mm)
20	6-25/32 (172mm)	1-3/4 (44.45mm)
24	7-7/32 (184mm)	1-3/4 (44.45mm)
30	8-3/32 (206mm)	2 (50.80mm)
36	9 (229mm)	2-1/4 (57.15mm)

NOTE: Service chambers with housings that are permanently crimped and sealed together are considered clamp type chambers even though they do not have a separate clamp band.

NOTE: A brake found at the adjustment limit is not a defect for the purposes of the 20 percent rule.

'LONG STROKE' CLAMP TYPE BRAKE CHAMBER DATA

<u>TYPE</u>	<u>OUTSIDE DIAMETER</u>	<u>BRAKE ADJUSTMENT LIMIT</u>
12	5-11/16 (145mm)	1-3/4 (44.45mm)
16	6-3/8 (162mm)	2 (50.80mm)
20 (2-1/2" rated stroke)	6-25/32 (172mm)	2 (50.80mm)
20 (3" rated stroke)	6-25/32 (172mm)	2-1/2 (63.50mm)
24 (2-1/2" rated stroke)	7-7/32 (184mm)	2 (50.80mm)
24 (3" rated stroke)	7-7/32 (184mm)	2-1/2 (63.50mm)
30	8-3/32 (206mm)	2-1/2 (63.50mm)

NOTE: Rated stroke is indicated on a tag and is only used to identify chamber size.

NOTE: Service chambers with housings that are permanently crimped and sealed together are considered clamp type chambers even though they do not have a separate clamp band.

NOTE: A brake found at the adjustment limit is not a defect for the purposes of the 20 percent rule.

BOLT TYPE BRAKE CHAMBER DATA

<u>TYPE</u>	<u>OUTSIDE DIAMETER</u>	<u>BRAKE ADJUSTMENT LIMIT</u>
A	6-15/16 (176mm)	1-3/8 (34.93mm)
B	9-3/16 (234mm)	1-3/4 (44.45mm)
C	8-1/16 (205mm)	1-3/4 (44.45mm)
D	5-1/4 (133mm)	1-1/4 (31.75mm)
E	6-3/16 (157mm)	1-3/8 (34.93mm)
F	11 (279mm)	2-1/4 (57.15mm)
G	9-7/8 (251mm)	2 (50.80mm)

NOTE: A brake found at the adjustment limit is not a defect for the purposes of the 20 percent rule.

ROTOCHAMBER DATA

<u>TYPE</u>	<u>OUTSIDE DIAMETER</u>	<u>BRAKE ADJUSTMENT LIMIT</u>
9	4-9/32 (109mm)	1-1/2 (38.10mm)
12	4-13/16 (122mm)	1-1/2 (38.10mm)
16	5-13/32 (138mm)	2 (50.80mm)
20	5-15/16 (151mm)	2 (50.80mm)
24	6-13/32 (163mm)	2 (50.80mm)
30	7-1/16 (180mm)	2-1/4 (57.15mm)
36	7-5/8 (194mm)	2-3/4 (69.85mm)
50	8-7/8 (226mm)	3 (76.20mm)

NOTE: A brake found at the adjustment limit is not a defect for the purposes of the 20 percent rule.

DD-3 BRAKE CHAMBER DATA

<u>TYPE</u>	<u>OUTSIDE DIAMETER</u>	<u>BRAKE ADJUSTMENT LIMIT</u>
30	8-1/8 (206mm)	2-1/4 (57.15mm)

NOTE: This chamber has three air lines and is found on motorcoaches.

NOTE: A brake found at the adjustment limit is not a defect for the purposes of the 20 percent rule.

WEDGE BRAKE DATA

The combined movement of both brake shoe lining scribe marks shall not exceed 1/8 inch (3.20mm).

- (b) A brake found at 1/8 inch (3.2mm) beyond the brake adjustment limit shall be considered 0.5 (1/2) a defective brake for determining the number of defective brakes per the 20 percent defective brake criterion. (Example: Type 30 clamp type brake chamber pushrods measure – Two (2) at 2-1/8 inches (54mm) equal 1 defective brake.) (393.47(e))

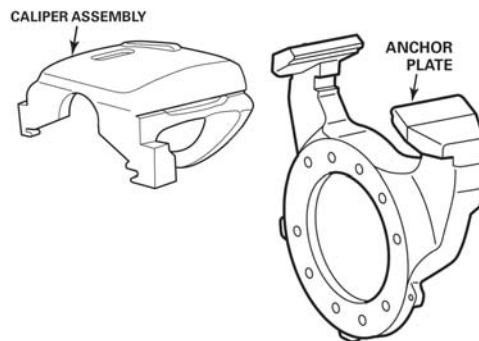
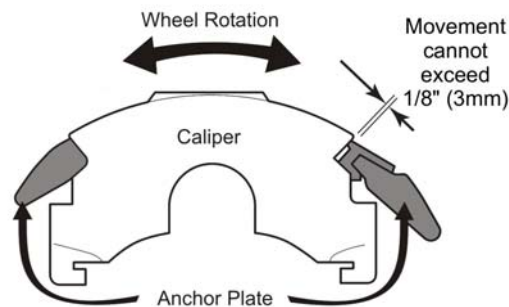
NOTE: When the vehicle, or combination of vehicles, is declared out-of-service for 20 percent brake violations, all brakes found beyond the brake adjustment limit must be repaired.

NOTE: When calculating/determining the number of defective brakes, round all fractions down to the next whole number (e.g. 4.5 brake violations = 4 defective brakes).

- (c) Any wedge brake where the combined brake lining movement of both top and bottom shoes exceeds 1/8 inch (3.2mm). (393.47(f))

(6) Hydraulic and Electric Brakes

- (a) Missing or broken caliper, brake pad, shoe, or lining. (393.48(a))
- (b) Movement of the caliper within the anchor plate, in the direction of wheel rotation, exceeds 1/8 inches (3.2mm). (393.48(a))



- (c) Rotor has evidence of metal to metal contact over the rotor friction surface on either side. (393.48(a))
- (d) Rotor has severe rusting on the rotor friction surface on either side (light rusting on the friction surface is normal). (393.48(a))
- (e) Friction surface of the brake rotor and the brake friction material are contaminated by oil, grease, or brake fluid. (393.47(a))

NOTE: Refer to “Wheels, Rims and Hubs” if wheel seal is actively leaking.

- (f) Lining or pad with a thickness 1/16 inch (1.6mm) or less at the shoe center for disc or drum brakes. (393.47(d)(2))

(7) Missing brake on any axle required to have brakes. (393.42(a))

*b. Front Steering Axle(s) Brakes

In addition to being included in the 20 percent criterion, the following place a vehicle in an out-of-service condition:

* (1) Any inoperative brake (such as any brake lining/pad failing to move or contact braking surface upon application) or missing brake on either wheel of any steering axle of any vehicle equipped or required to be equipped with steering axle brakes, including the dolly and front axle of a full trailer. This includes tractors required to have steering axle brakes. (Missing - 393.42(a) or Inoperative - 393.48(a))

(2) Drum (Cam-Type and Wedge) Air Brakes

(a) Mismatched air chamber sizes. (393.47(b))

NOTE: Mismatched air chamber size excludes long stroke air chamber versus regular stroke air chamber and excludes differences in design type such as type 20 clamp versus type 20 rotochamber. A bolt chamber with any other chamber type is a mismatch.

(b) Mismatched brake adjuster length. (393.47(c))

(c) Defective lining conditions.

- i. Lining cracks or voids that exceed 1/16 inch (1.6mm) in width observable on the edge of the lining. (393.47(a))
- ii. Portion of a lining segment missing such that a fastening device (rivet or bolt) is exposed when viewing the lining from the edge. (393.47(a))
- iii. Crack that exceeds 1-1/2 inch (38.1mm) in length. (393.47(a))
- iv. Loose lining segment. (Approximately 1/16 inch (1.6mm) or more movement.) (393.47(a))

- v. Complete lining segment missing. (393.47(a))
- vi. The friction surface of the brake drum and the brake friction material are contaminated by oil or grease. (393.47(a))

NOTE: Refer to “Wheels, Rims and Hubs” if wheel seal is actively leaking.

- vii. Lining with a thickness less than 3/16 inch (4.8mm) for a shoe with a continuous strip of lining or 1/4 inch (6.5mm) for a shoe with two lining blocks for drum brakes or to wear indicator if lining is so marked. (393.47(d)(1))

Inspection Bulletin 2007-01 – Express Brake International, Inc. – Segmented Brake Linings

(3) Air Disc Brakes (Exposed Pushrods and Direct Coupled – Air Chamber to Caliper)

- (a) Mismatched air chamber sizes. (393.47(b))

NOTE: Mismatched air chamber size excludes long stroke air chamber versus regular stroke air chamber. A mismatch on an air disc brake exists only when there is measurable difference in air chamber clamp sizes.

- (b) Mismatched brake adjuster length. (393.47(c))
- (c) Missing brake pad. (393.47(a))
- (d) Rotor has evidence of metal to metal contact over the rotor friction surface on either side. (393.48(a))
- (e) Rotor has severe rusting on the rotor friction surface on either side (light rusting on the friction surface is normal). (393.48(a))
- (f) The friction surface of the brake rotor and the brake friction material are contaminated by oil or grease. (393.47(a))

NOTE: Refer to “Wheels, Rims and Hubs” if wheel seal is actively leaking.

- (g) Brake pad thickness less than 1/16 inch (1.6mm) or to wear indicator if lining is so marked. (393.47(d)(1))

(4) Hydraulic Brakes

- (a) Missing lining or pad. (393.47(a))
- (b) Movement of the caliper within the anchor plate, in the direction of wheel rotation, exceeds 1/8 inches (3.2mm). (393.48(a))

- (c) Rotor has evidence of metal to metal contact over the rotor friction surface on either side. (393.48(a))
- (d) Rotor has severe rusting on the rotor friction surface on either side (light rusting on the friction surface is normal). (393.48(a))
- (e) The friction surface of the brake drum or rotor and the brake friction material are contaminated by oil, grease, or brake fluid. (393.47(a))

NOTE: Refer to “Wheels, Rims and Hubs” if wheel seal is actively leaking.

- (f) Lining with a thickness 1/16 inch (1.6mm) or less at the shoe center for disc or drum brakes. (393.47(d)(1))

End of 20% Brake Criterion

c. Spring Brake Chambers

Any non-manufactured holes or cracks in the spring brake housing section of a parking brake. (396.3(a)(1))

d. Trailer Breakaway and Emergency Braking

- (1) Missing or inoperable breakaway braking system on a trailer or converter dolly. (393.43(d))
- (2) On any trailer equipped with spring brakes; more than 25 percent of the spring brakes are inoperative. (393.43(d))

e. Parking Brake

No brakes on the vehicle or combination are applied upon actuation of the parking brake control, including driveline hand controlled parking brakes. (393.41)

f. Brake Smoke/Fire

Brake malfunction causing smoke or fire to emit from the wheel end. (393.48(a))

Example: Brake lining continuously in contact with brake drum or rotor.

NOTE: This does not include overheating due to severe brake use.

NOTE: Refer to “Wheels, Rims and Hubs”; as the cause may either be the brakes or a problem in the hub and bearing area.

g. Brake Drums or Rotors (Disc)

- (1) ** Any portion of the drum has any external crack, or has any crack that opens upon brake application. (393.47(a))
- (2) ** Any rotor (disc) with a crack in length of more than 75 percent of the friction surface and passes completely through the rotor to the center vent from either side or completely through a solid rotor. (393.47(a))
- (3) Any portion of the drum or rotor (disc) missing or in danger of falling away. (393.47(a))

** **NOTE:** Do not confuse short hairline heat check cracks with flexural cracks.

h. Brake Hose/Tubing

- (1) Any damage extending through the outer reinforcement ply. (393.45(a))

NOTE: Rubber impregnated fabric cover is not a reinforcement ply.

NOTE: Thermoplastic nylon tube may have braid reinforcement or color difference between cover and inner tube. Exposure of second color is an out-of-service condition.

- (2) Bulge/swelling when air pressure is applied. (393.45(a))
- (3) Audible air leak at other than a proper connection. (393.45(a))
Inspection Bulletin 2010-05 – MCI Buses with Detroit Diesel Engines
- (4) Improperly joined such as a splice made by sliding the hose ends over a piece of tubing and clamping the hose to the tube. (393.45(a))
- (5) Damaged by heat, broken, or crimped in such a manner as to restrict air flow. (393.45(a))

i. Air Pressure Gauge

Inoperative or defective primary or secondary air pressure gauge. (393.51(c))

*j. Low Air Pressure Warning Device

Low air pressure warning device missing, inoperative, or does not operate continuously if either the primary or secondary reservoir is 55 psi (379 kPa) and below, or 1/2 of the governor cut-out pressure, whichever is less. (393.51(c))

NOTE: If either an audible or visual warning device is working as required, vehicle should not be declared out-of-service.

k. Air Loss Rate

If an air leak is discovered and either the primary or secondary reservoir pressure is not maintained when: (396.3(a)(1))

- (1) Governor is cut-in;
- (2) Reservoir pressure is between 80 – 90 psi (551 – 620 kPa);
- (3) Engine is at idle; and,
- (4) Service brakes are fully applied.

*l. Tractor Protection System

Inoperable or missing tractor protection system components including a tractor protection valve and/or trailer supply valve. (393.43(b))

NOTE: An inoperative tractor protection system is defined as one of the following conditions:

1. The trailer supply valve fails to close before pressure drops below 20 psi (138 kPa) in either the primary or secondary system.
2. When air escapes from either glad hand when brakes are applied after the tractor protection valve has closed.

Inspection Bulletin 2010-01 – Tractor Protection Systems

*m. Air Reservoir (Tank)

An air reservoir (tank) separated at either end from the attachment point(s) allowing movement of more than 1 inch (25.4mm) in any direction. (396.3(a)(1))

n. Air Compressor

(Normally to be inspected when readily visible or when conditions indicate compressor problems.)

- (1) Loose compressor mounting bolts. (396.3(a)(1))
- (2) Cracked, broken, or loose pulley. (396.3(a)(1))
- (3) Cracked or broken mounting brackets, braces, or adapters. (396.3(a)(1))

o. Hydraulic Brakes

(Including: Power Assist over Hydraulic and Engine Driven Hydraulic Booster)

- (1) No pedal reserve with engine running. (393.40(b))
- (2) Master cylinder less than 1/4 full. (396.3(a)(1))

NOTE: Normally to be inspected when readily visible or problems are apparent.

- (3) Power assist unit fails to operate. (396.3(a)(1))
- (4) Seeping or swelling brake hose(s) under application of pressure. (393.45(a))
- (5) Hydraulic hose(s) abraded (chafed) through outer cover-to-fabric layer. (393.45(b)(2))
- (6) Fluid lines or connections restricted, crimped, cracked, or broken. (393.45(a))
- (7) Any visually observed leaking hydraulic fluid in the brake system upon full application. (393.45(a))
- (8) Brake failure light/low fluid warning light on and/or inoperative. (393.51(b))

p. Vacuum System

- (1) Insufficient vacuum reserve to permit one full brake application after engine is shut off. (393.50(b))
- (2) Vacuum hose(s) or line(s) restricted, abraded (chafed) through outer cover-to-cord ply, crimped, cracked, broken, or has collapse of vacuum hose(s) when vacuum is applied. (393.45(b)(2))

q. Performance-Based Brake Test (PBBT)

Failing to develop a total brake force as a percentage of gross vehicle or combination weight of 43.5 or more on an approved PBBT. (393.52(a))

NOTE: The out-of-service notice will be satisfactorily completed: (1) If an approved PBBT is available, the vehicle shall be retested on an approved PBBT and achieve a total brake force as a percentage of gross vehicle or combination weight of 43.5 or more; or (2) If an approved PBBT is unavailable, each of the brake fault areas identified on the inspection report shall be inspected and repaired.

NOTE: In the United States, an approved PBBT must meet the FMCSA functional specifications 65 FR 48799, August 9, 2000.

2. COUPLING DEVICES

NOTE: The following criterion only applies when the device is in use.

a. Fifth Wheels: (Lower Coupler Assembly)

- (1) Mounting to Frame
 - (a) More than 20 percent of fasteners on either side missing or ineffective. (393.70(b)(1)(i))
 - (b) Any movement between mounting components. (393.70(b)(1)(i))