(1) The coiled tubing has a straight segment (pigtail) at each end that is at least 51 mm (2 inches) in length and is encased in a spring guard or similar device which prevents the tubing from kinking at the fitting at which it is attached to the vehicle; and

(2) The spring guard or similar device has at least 51 mm (2 inches) of closed coils or similar surface at its interface with the fitting and extends at least 38 mm (1½ inches) into the coiled segment of the tubing from its straight segment.

(d) *Brake tubing and hose connections.* All connections for air, vacuum, or hydraulic braking systems shall be installed so as to ensure an attachment free of leaks, constrictions or other conditions which would adversely affect the performance of the brake system.

[70 FR 48050, Aug. 15, 2005]

§ 393.46 [Reserved]

§ 393.47 Brake actuators, slack adjusters, linings/pads and drums/rotors.

(a) *General requirements.* Brake components must be constructed, installed and maintained to prevent excessive fading and grabbing. The means of attachment and physical characteristics must provide for safe and reliable stopping of the commercial motor vehicle.

(b) *Brake chambers.* The service brake chambers and spring brake chambers on each end of an axle must be the same size.

(c) *Slack adjusters.* The effective length of the slack adjuster on each end of an axle must be the same.

(d) *Linings and pads.* The thickness of the brake linings or pads shall meet the applicable requirements of this paragraph—

(1) *Steering axle brakes.* The brake lining/pad thickness on the steering axle of a truck, truck-tractor or bus shall not be less than 4.8 mm (3/16 inch) at the shoe center for a shoe with a continuous strip of lining; less than 6.4 mm (¼ inch) at the shoe center for a shoe with two pads; or worn to the wear indicator if the lining is so marked, for air drum brakes. The steering axle brake lining/pad thickness shall not be less than 3.2 mm (⅛ inch) for air disc brakes, or 1.6 mm (1/16 inch) or less for hydraulic disc, drum and electric brakes.

(2) *Non-steering axle brakes.* An air braked commercial motor vehicle shall not be operated with brake lining/pad thickness less than 6.4 mm (¼ inch) or to the wear indicator if the lining is so marked (measured at the shoe center for drum brakes); or less than 3.2 mm (⅛ inch) for disc brakes. Hydraulic or electric braked commercial motor vehicles shall not be operated with a lining/pad thickness less than 1.6 mm (1/16 inch) (measured at the shoe center) for disc or drum brakes.

(e) *Clamp and Roto-Chamber Brake Actuator Readjustment limits.* The pushrod travel for clamp and roto-chamber type actuators must be less than 80 percent of the rated strokes listed in SAE J1817—Long Stroke Air Brake Actuator Marking, July 2001 (See § 393.7 (b) for information on incorporation by reference and availability of this document), or 80 percent of the rated stroke marked on the brake chamber by the chamber manufacturer, or the readjustment limit marked on the brake chamber by the chamber manufacturer. The pushrod travel for Type 16 and 20 long stroke clamp type brake actuators must be less than 51 mm (2 inches) or 80 percent of the rated stroke marked on the brake chamber by the chamber manufacturer, or the readjustment limit marked on the brake chamber by the chamber manufacturer.

(f) *Wedge Brake Adjustment.* The movement of the scribe mark on the lining shall not exceed 1.6 mm (1/16 inch).

(g) *Drums and rotors.* The thickness of the drums or rotors shall not be less than the limits established by the brake drum or rotor manufacturer.

[70 FR 48051, Aug. 15, 2005]

§ 393.48 Brakes to be operative.

(a) *General rule.* Except as provided in paragraphs (b), (c), and (d) of this section, all brakes with which a motor vehicle is equipped must at all times be capable of operating.

(b) *Devices to reduce or remove front-wheel braking effort.* A commercial motor vehicle may be equipped with a device to reduce the front wheel braking effort (or in the case of a three-axle truck or truck tractor manufactured