must be replaced no later than 30 calendar days from the time of detection. When staybolts 8 inches or less in length are replaced, they shall be replaced with bolts that have telltale holes 3⁄16 inch to 7⁄32 inch in diameter and at least 1¼ inches deep at each end, or that have telltale holes 3⁄16 inch to 7⁄32 inch in diameter their entire length. At the time of replacement of broken staybolts, adjacent staybolts shall be inspected.

(c) *Assessment of broken staybolts.* Telltale holes leaking, plugged, or missing shall be counted as broken staybolts.

(d) *Prohibited methods of closing telltale holes.* Welding, forging, or riveting broken staybolt ends is prohibited as a method of closing telltale holes.

§ 230.40 Time and method of staybolt testing.

(a) *Time of hammer testing*—(1) General. All staybolts shall be hammer tested at every 31 service day inspection, except as provided in paragraph (a)(2) of this section. All staybolts also shall be hammer tested under hydrostatic pressure any time hydrostatic pressure above the MAWP specified on the boiler specification form (FRA Form No. 4), is applied to the boiler. (See appendix B of this part.)

(2) Exception for inaccessible staybolts. The removal of brickwork or grate bearers for the purpose of hammer testing staybolts during each 31 service day inspection will not be required if the staybolts behind these structural impediments have a telltale hole 3/16 inch to 7/32 inch in diameter their entire length. Whenever the brickwork or grate bearers are removed for any other reason, however, the bolts shall be inspected at that time.

(b) *Method of hammer testing.* If staybolts are tested while the boiler contains water, the hydrostatic pressure must be not less than 95 percent of the MAWP. The steam locomotive owner and/or operator shall tap each bolt with a hammer and determine broken bolts from the sound or the vibration of the sheet. Whenever staybolts are tested while the boiler is not under pressure, such as during the 31 service day inspection, the staybolt test must be made with all the water drained from the boiler.

§ 230.41 Flexible staybolts with caps.

(a) *General.* Flexible staybolts with caps shall have their caps removed during every 5th annual inspection for the purpose of inspecting the bolts for breakage, except as provided in paragraph (b) of this section.

(b) *Drilled flexible staybolts.* For flexible staybolts that have telltale holes between 3⁄16 inch and 7⁄32 inch in diameter, and which extend the entire length of the bolt and into the head not less than one third of the diameter of the head, the steam locomotive owner and/or operator need not remove the staybolt caps if it can be established, by an electrical or other suitable method, that the telltale holes are open their entire length. Any leakage from these telltale holes during the hydrostatic test indicates that the bolt is broken and must be replaced. Before the steam locomotive is placed in service, the inner ends of all telltale holes shall be closed with a fireproof porous material that will keep the telltale holes free of foreign matter and permit steam or water to exit the telltale hole when the bolt is broken or fractured.

(c) *Recordkeeping.* The removal of flexible staybolt caps and other tests shall be reported on FRA Form No. 3. (See appendix B of this part.)

(d) *Testing at request of FRA inspector.* Staybolt caps also shall be removed, or any of the tests in this section made, whenever the FRA inspector or the steam locomotive owner and/or operator considers it necessary due to identifiable safety concerns about the condition of staybolts, staybolt caps or staybolt sleeves.

STEAM GAUGES

§ 230.42 Location of gauges.

Every boiler shall have at least one steam gauge which will correctly indicate the working pressure. The gauge shall be positioned so that it will be kept reasonably cool and can conveniently be read by the engine crew.

§ 230.43 Gauge siphon.

The steam gauge supply pipe shall have a siphon on it of ample capacity

to prevent steam from entering the gauge. The supply pipe shall directly enter the boiler and be maintained steam tight. The supply pipe and its connections shall be cleaned each time the gauge is tested.

§ 230.44 Time of testing.

Steam gauges shall be tested prior to being installed or being reapplied, during the 92 service day inspection, and whenever any irregularity is reported.

§ 230.45 Method of testing.

Steam gauges shall be compared with an accurate test gauge or dead weight tester. While under test load at the MAWP of the boiler to which the gauge will be applied, the gauge shall be set to read that pressure as accurately as the physical limitations of the gauge will allow. Under test the gauge shall read within the manufacturer's tolerance at all points on the gauge up to 25 percent above the allowed pressure. If the manufacturer's tolerance is not known, the gauge must read within 2 percent full scale accuracy at all points on the gauge up to 25 percent above allowed pressure.

§ 230.46 Badge plates.

A metal badge plate showing the allowed steam pressure shall be attached to the boiler backhead in the cab. If boiler backhead is lagged, the lagging and jacket shall be cut away so that the plate can be seen.

§ 230.47 Boiler number.

(a) *Generally*. The builder's number of the boiler, if known, shall be stamped on the steam dome or manhole flange. If the builder's number cannot be obtained, an assigned number, which shall be used in making out specification cards, shall be stamped on the steam dome or manhole flange.

(b) *Numbers after January 10, 1912*. Numbers which are stamped after January 10, 1912 shall be located on the front side of the steam dome or manhole flange at the upper edge of the vertical surface, oriented in a horizontal manner, and have figures at least ⅜ inch high.

(c) *Name of manufacturer or owner*. The number shall be preceded by the name of the manufacturer if the original number is known or the name of the steam locomotive owner if a new number is assigned.

Safety Relief Valves

§ 230.48 Number and capacity.

(a) *Number and capacity*. Every boiler shall be equipped with at least two safety relief valves, suitable for the service intended, that are capable of preventing an accumulation of pressure greater than 6 percent above the MAWP under any conditions of service. An FRA inspector may require verification of sufficient safety valve relieving capacity.

(b) *Determination of capacity*. Safety relief valve capacity may be determined by making an accumulation test with the fire in good, bright condition and all steam outlets closed. Additional safety relief valve capacity shall be provided if the safety relief valves allow an excess pressure of more than 6 percent above the MAWP during this test.

§ 230.49 Setting of safety relief valves.

(a) *Qualifications of individual who adjusts*. Safety relief valves shall be set and adjusted by a competent person who is thoroughly familiar with the construction and operation of the valve being set.

(b) *Opening pressures*. At least one safety relief valve shall be set to open at a pressure not exceeding the MAWP. Safety relief valves shall be set to open at pressures not exceeding 6 psi above the MAWP.

(c) *Setting procedures*. When setting safety relief valves, two steam gauges shall be used, one of which must be so located that it will be in full view of the persons engaged in setting such valves; and if the pressure indicated by the gauges varies more than 3 psi they shall be removed from the boiler, tested, and corrected before the safety relief valves are set. Gauges shall in all cases be tested immediately before the safety relief valves are set or any change made in the setting. When setting safety relief valves, the water level shall not be higher than ¾ of the length of the visible water glass, as measured from the bottom of the glass.