fillet weld, or a furnace may be attached to either tube-sheet by flaring the end that extends beyond the outside face of the head to an angle of 20 deg to 30 deg, and using a circumferential fillet weld, provided the requirements of PFT-20.2.1 through PFT-20.2.5 are met.

PFT-20.2.1 The area of the head around the furnace is stayed by tubes, stays, or both in accordance with the requirements of this Section.

PFT-20.2.2 The joint is wholly outside the furnace.

PFT-20.2.3 The throat dimension of the full fillet weld is not less than 0.7 times the thickness of the head.

PFT-20.2.4 Unless protected by refractory material, the furnace does not extend beyond the outside face of the tubesheet a distance greater than the thickness of the tubesheet. Any excess shall be removed before welding.

PFT-20.2.5 The construction conforms in all other respects to the requirements of this Section including welding and postweld heat treating, except that volumetric examination is not required.

PFT-20.3 Full Penetration Weld Construction. A furnace may be attached by a full penetration weld with the furnace extending at least through the full thickness of the tubesheet or head but not beyond the toe of the weld, and the toe shall not project beyond the face of the tubesheet or head by more than \( \frac{7}{8} \) in. (10 mm) unless protected from overheating by refractory material or other means. Alternatively, the furnace may abut the tubesheet or head with a full-penetration weld made through the furnace. The weld may be applied from either or both sides and shall have an external fillet weld with a minimum throat of \( \frac{1}{8} \) in. (6 mm). No weld preparation machining shall be performed on the flat tubesheet or head. The edge of the tubesheet or head shall be examined when required by PG-93 and shall not extend beyond the edge of the furnace by more than \( \frac{7}{8} \) in. (10 mm) unless protected from overheating by refractory material or other means.

PFT-20.4 Throat Sheets. Throat sheets and inside and outside front furnace sheets when fully stayed may be attached as required in PFT-11.4.
depending on the plate thickness, and a value of \( p \) equal to the waterleg inside width, but shall be not less than \( \frac{3}{8} \) in. (13 mm).

**PFT-21.3** For waterlegs of vertical firetube boilers that are attached to tubesheets or crownsheets, the unstayed distance from a line of support on the tubesheet or crown sheet provided by tubes or stays to the inside surface of the outer wall of the waterleg shall comply with the spacing requirements of PFT-25.2 [see Figure A-8, Illustration (p)].

**STAYED SURFACES**

**PFT-22 GENERAL**

The rules of Parts PG and PW pertaining to stays and stayed surfaces that are applicable to firetube boilers shall be used in conjunction with the following requirements.

**PFT-23 WORKING PRESSURE FOR STAYED CURVED SURFACES**

**PFT-23.1** The maximum allowable working pressure for a stayed curved surface shall be the sum of the pressure as determined in PFT-23.1.1 and the lesser pressure determined from either PFT-23.1.2 or PFT-23.1.3.

**PFT-23.1.1** The maximum working pressure computed without allowing for the holding power of the stays, due allowance being made for the weakening effect of any holes provided for construction.

**PFT-23.1.2** The maximum working pressure obtained by the equation given in PG-46 using 1.3 for the value of \( C \).
Explanation: PFT-21.2 gives ½ in (13 mm) as the minimum flat plate/mudring thickness for illustrations (d) and (e) in Figure PFT-21, but then it says to calculate the required thickness using eg. PG-46.1(1) using 2.1 or 2.2 for the value of C, depending on the plate thickness. Per PG-46, 2.1 is C when plates are not over 7/16 in (11 mm). Since plate thickness is required to be ½ in (13 mm) or thicker, 2.1 would never be used for C.