

Replace with (a) and (b) on next page

(b) Design as a reinforced opening in accordance with the Construction Code shall satisfy (a).

(c) As an alternative to (a), pressure pads may be designed as structural pads in accordance with 3.4 or as pre-qualified designs in accordance with 3.5.

requirements of 3.2(a), extend for a distance of at least s in each direction beyond the area predicted, by the next refueling outage, to infringe upon the required thickness,³ where

$$s \geq 0.75 \sqrt{R t_{nom}} \text{ and } s \geq 1 \text{ in. (25 mm)}$$

3.4 SPECIFIC DESIGN REQUIREMENTS — STRUCTURAL PADS

Structural pads shall meet the requirements of 3.2, Figure 1, and the following:

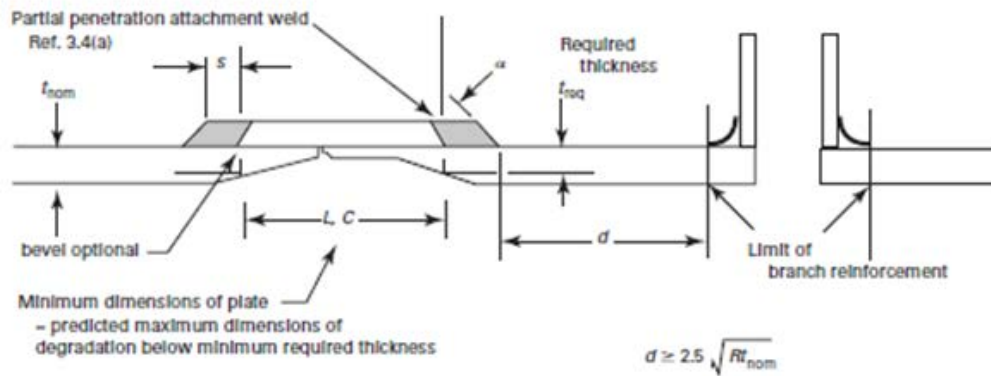
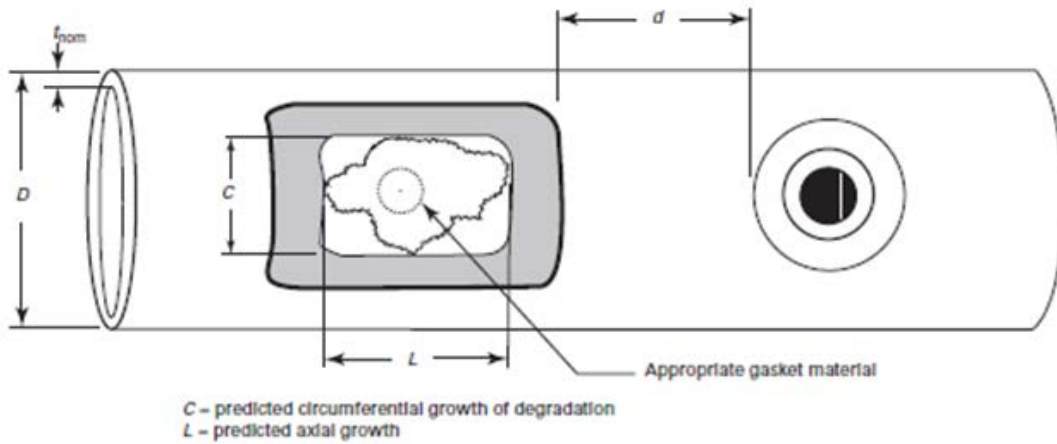
(a) Structural pads shall be attached by partial-penetration welds (see Figure 1) that, unless otherwise established by analysis in accordance with the

where

$R = D/2 =$ outer radius of the piping
 $t_{nom} =$ nominal wall thickness of the piping

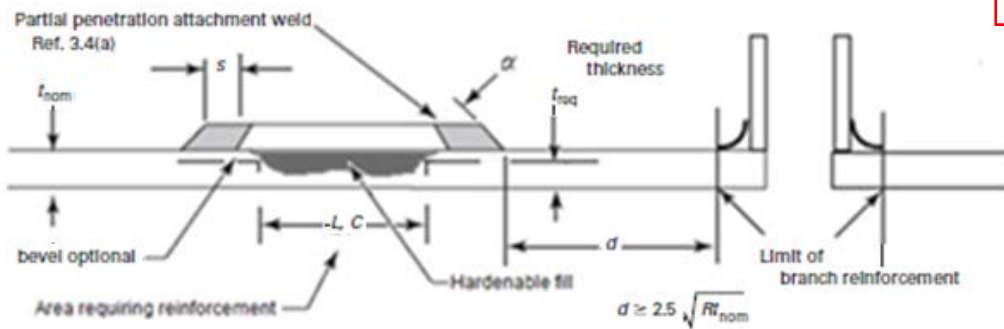
³ Design thickness as prescribed by the Construction Code.

FIG. 1 STRUCTURAL PAD



(a) Mitigation of Internal Corrosion

Insert figures (a) and (b)



(b) Mitigation of External Corrosion

Unless otherwise established by analysis in accordance with the requirements of 3.2(a), ~~structural pads shall be attached by partial penetration attachment welds (see Fig. 1) that extend for a distance of at least s in each direction beyond the area predicted, by the next refueling outage, to infringe upon the required thickness^{2,3}~~

(a) Structural pads shall be attached by partial-penetration welds (see Fig. 1) that, unless

(changed from 2 to 3)

thickness,³ where

$s \geq 0.75\sqrt{Rt_{nom}}$

where and

$s \geq 1 \text{ in. (25 mm)}$

$R = D/2 =$ outer radius of the component

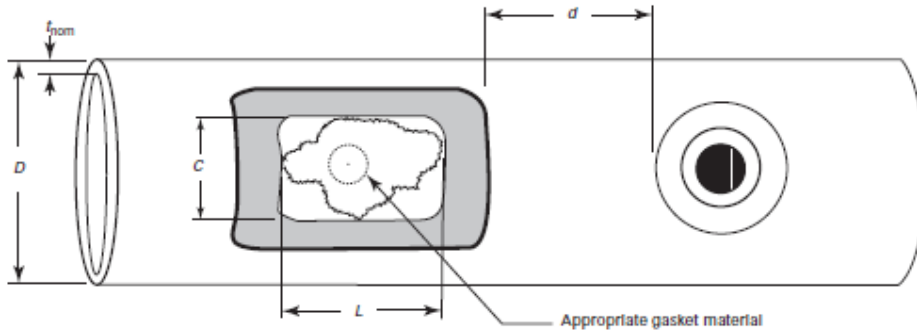
$s = 1 \text{ in. (25 mm)}$ minimum

$t_{nom} =$ nominal wall thickness of the component

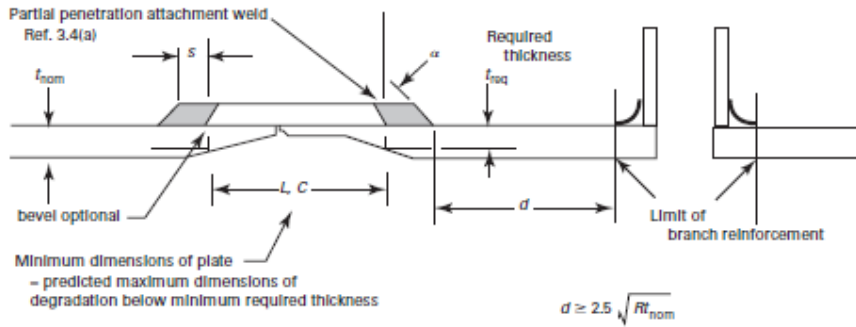
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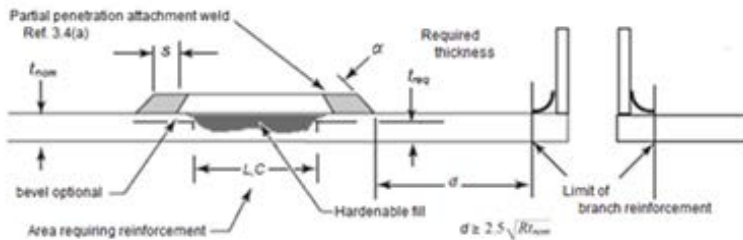
FIG. 1 STRUCTURAL PAD



C - predicted circumferential growth of degradation
L - predicted axial growth



(a) Mitigation of Internal Corrosion



(b) Mitigation of External Corrosion

Changed from 2 to 3

³ Design thickness as prescribed by the Construction Code.

MANDATORY APPENDIX I

AMBIENT-TEMPERATURE TEMPER BEAD WELDING

I-1 GENERAL REQUIREMENTS

(a) This Mandatory Appendix applies to dissimilar austenitic filler metal welds between P-Nos. 1, 3, 12A, 12B, and 12C² materials and their associated welds and welds joining P-No. 8 or 43 materials to P-Nos. 1, 3, 12A, 12B, and 12C² materials with the following limitation. This Mandatory Appendix shall not be used to repair SA-302 Grade B material unless the material has been modified to include from 0.4% to 1.0% nickel, quenching, tempering, and application of a fine grain practice.

(b) The maximum area of an individual weld overlay based on the finished surface over the ferritic base material shall be 1,000 in.² (65 0000 mm²). 650 000

(c) Repair/replacement activities on a dissimilar metal weld in accordance with this Mandatory Appendix are limited to those along the fusion line of a nonferritic weld to ferritic base material on which $\frac{1}{8}$ in. (3 mm) or less of nonferritic weld deposit exists above the original fusion line.

(d) If a defect penetrates into the ferritic base material, repair of the base material, using a nonferritic weld filler material, may be performed in accordance with this Mandatory Appendix, provided the depth of repair in the base material does not exceed $\frac{3}{8}$ in. (10 mm).

(e) Prior to welding, the area to be welded and a band around the area of at least $1\frac{1}{2}$ times the component thickness or 5 in. (130 mm), whichever is less, shall be at least 50°F (10°C).

(f) Welding materials shall meet the Owner's Requirements and the Construction Code and Cases specified in the Repair/Replacement Plan. Welding materials shall be controlled so that they are identified as acceptable until consumed.

(g) Peening may be used, except on the initial and final layers.

I-2 WELDING QUALIFICATIONS

The welding procedures and operators shall be qualified in accordance with Section IX and the requirements of I-2.1 and I-2.2.

I-2.1 Procedure Qualification.

(a) The base materials for the welding procedure qualification shall be of the same P-Number and Group Number as the materials to be welded. The materials shall be postweld heat treated to at least the time and temperature that was applied to the materials being welded.

(b) The maximum interpass temperature for the first three layers of the test assembly shall be 150°F (66°C).

(c) The weld overlay shall be qualified using groove weld coupon. The test assembly groove depth shall be at least 1 in. (25 mm). The test assembly thickness shall be at least twice the test assembly groove depth. The test assembly shall be large enough to permit removal of the required test specimens. The test assembly dimensions on either side of the groove shall be at least 6 in. (150 mm). The qualification test plate shall be prepared in accordance with Figure I-1.

(d) Ferritic base material for the procedure qualification test shall meet the impact test requirements of the Construction Code and Owner's Requirements. If such requirements are not in the Construction Code and Owner's Requirements, the impact properties shall be determined by Charpy V-notch impact tests of the procedure qualification base material at or below the lowest service temperature of the item to be repaired. The location and orientation of the test specimens shall be similar to those required in (e), but shall be in the base metal.

(e) Charpy V-notch tests of the ferritic heat-affected zone (HAZ) shall be performed at the same temperature as the base metal test of (d). Number, location, and orientation of test specimens shall be as follows:

(1) The specimens shall be removed from a location as near as practical to a depth of one-half the thickness of the deposited weld metal. The coupons for HAZ impact specimens shall be taken transverse to the axis of the weld and etched to define the HAZ. The notch of the Charpy V-notch specimen shall be cut approximately normal to the material surface in such a manner as to include as much HAZ as possible in the resulting fracture.

(2) If the material thickness permits, the axis of a specimen shall be inclined to allow the root of the notch to be aligned parallel to the fusion line.

(3) If the test material is in the form of a plate or forging, the axis of the weld shall be oriented parallel to the principal direction of rolling or forging.

(4) The Charpy V-notch test shall be performed in accordance with SA-370. Specimens shall be in accordance with SA-370, Fig. 11, Type A. The test shall consist of a set of three full-size 10 mm × 10 mm specimens. The lateral expansion, percent shear, absorbed energy, test temperature, orientation, and location of all test specimens shall be reported in the Procedure Qualification Record.

(f) The average lateral expansion value of the three HAZ Charpy V-notch specimens shall be equal to or greater than the average lateral expansion value of the three unaffected base metal specimens. However, if the average lateral expansion value of the HAZ Charpy V-notch specimens is less than the average value for the unaffected

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- (b) The maximum area of an individual weld overlay based on the finished surface over the ferritic base material shall be 1000 in.² (650000 mm²).
- (c) Repair/replacement activities on a dissimilar-metal weld in accordance with this Appendix are limited to those along the fusion line of a nonferritic weld to ferritic base material on which 1/8 in. (3 mm) or less of nonferritic weld deposit exists above the original fusion line.
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