WC-3262 Category C Full and Partial Penetration Closure Welds in Containments

WC-3262.1 WELDS in the end closures using a single cover plate [Figure WC-4265-2, sketch (a)] and made after the containment is loaded may be full or partial penetration and shall be examined in accordance with Table WC-3262-1 either by magnetic particle or liquid penetrant method. The design stress intensities values of Section II, Part D, Subpart 1, Tables 2A, 2B, and 4 shall be reduced by the stress reduction factor provided in Table WC-3262-1. The welds shall be tested in accordance with WC-6720.

WC-3262.2 For welds in the end closures using two cover plates [Figure WC-4265-2, sketch (b)] and made after the containment is loaded, the following apply:

(c) The inner cover plate weld shall use a design stress reduction factor of 0.9. The root and final layers shall be examined by the liquid penetrant or magnetic particle method in accordance with Article WC-5000, and shall be tested in accordance with WC-6720.

(b) The outer cover plate weld shall use the stress reduction factors of Table WC-3262-1 and shall be examined to the requirements of Table WC-3262-1.

WC-3262.3 Vent and drain cover plate welds may be full penetration welds examined in accordance with WC-5250 partial penetration welds using the examination and stress reduction factors of Table WC-3262-1.

WC-3262.4 For partial penetration closure welds, a fatigue strength reduction factor of not less than 4.0 shall be used when fatigue analysis is required.

WC-3260 SPECIAL CONTAINMENT REQUIREMENTS

WC-3261 Category A or B Joints Between Sections of Unequal Thickness

In general, a tapered transition section as shown in Figure WC-3261-1, shall be provided at joints of Categories A and B between sections that differ in thickness by more than one-fourth the thickness of the thinner section. The transition section may be formed by any process that will provide a uniform taper. An ellipsoidal or hemispherical head that has a greater thickness than a cylinder of the same inside diameter may be machined to the outside diameter of the cylinder, provided the remaining thickness is at least as great as that required for a shell of the same diameter. A uniform taper is not required for flanged hubs. The adequacy of the transition shall be evaluated by stress analysis. Stress intensity limitations are given in Section II Appendixes, Mandatory Appendix XIII. The requirements of this paragraph do not apply to flanged hubs.

<table>
<thead>
<tr>
<th>Examination Factors and Examinations for Closure Welds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examination Requirements</td>
</tr>
<tr>
<td>Volumetric Examination</td>
</tr>
<tr>
<td>Liquid Penetrant or Magnetic Particle</td>
</tr>
<tr>
<td>Examination: Root and each successive 1/8 in. (6 mm) of weld thickness and the final layer</td>
</tr>
</tbody>
</table>

NOTES:
1. All examinations shall be performed and accepted to the requirements of Article WC-5000.
2. Mid layer is defined at approximately one-half of the maximum weld thickness.

GENERAL NOTE: Length of taper may include the width of the weld.

where:

\[
c = \text{minimum thickness of weld metal from the root to the face of the weld}
\]

\[
t = \text{thickness of attached member}
\]
WC-3262.2 For welds in the end closures using two cover plates [Figure WC-4265-2, sketch (b)] and made after the containment is loaded, the following apply:

(a) The inner cover plate weld shall use a design stress reduction factor of 0.9. The root and final layers shall be examined by the liquid penetrant or magnetic particle method in accordance with Article WC-5000, and shall be tested in accordance with WC-6720.

(b) The outer cover plate weld shall use the stress reduction factors of Table WC-3262-1 and shall be examined to the requirements of Table WC-3262-1.

WC-3262.3 Vent and drain cover plate welds may be full penetration welds examined in accordance with WC-5250 partial penetration welds using the examination and stress reduction factors of Table WC-3262-1.

WC-3262.4 For partial penetration closure welds, a fatigue strength reduction factor of not less than 4.0 shall be used when fatigue analysis is required.

WC-3700 STRAIN-BASED ACCEPTANCE CRITERIA

The strain-based acceptance criteria are applicable only to the metallic portions of storage containments subject to energy-limited dynamic events. It is not the intent of this subarticle to permit significant regions or major portions of the containment to experience strains at or near the limits of these strain-based acceptance criteria without consideration of the overall component deformation. These strain-based acceptance criteria are established to address the regions of the containment that experience high strains due to the effects of direct impacts. Deformation limits, if any, provided in the Design Specification shall be satisfied.

Section III Appendices, Nonmandatory Appendix FF provides the strain-based acceptance criteria.

Table WC-3262-1
Stress Reduction Factors and Examinations for Closure Welds

<table>
<thead>
<tr>
<th>Examination Requirements</th>
<th>Stress Reduction Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volumetric Examination</td>
<td>1.00</td>
</tr>
<tr>
<td>Liquid Penetrant or Magnetic Particle Examination: Root and each successive 1/4 in. (6 mm) of weld thickness and the final layer</td>
<td>0.90</td>
</tr>
<tr>
<td>Liquid Penetrant or Magnetic Particle Examination: Root, mid, and final layer [Note (2)]</td>
<td>0.80</td>
</tr>
</tbody>
</table>

NOTES:
(1) All examinations shall be performed and accepted to the requirements of Article WC-5000.
(2) Mid layer is defined as approximately one-half of the maximum weld thickness.