Chapter ILHR 42

REPAIRS, ALTERATIONS AND MISCELLANEOUS REQUIREMENTS

Note: Chapter ILHR 42 as it existed on February 29, 1988, was repealed and a new chapter ILHR 42 was created effective March 1, 1988.

Subchapter I — Welded Repairs and Alterations

ILHR 42.01 General requirements. (1) ACCEPTABLE METHODS. Welded repairs or alterations to any boiler or pressure vessel or their fittings, settings, or appurtenances shall be completed in accordance with the requirements of ss. ILHR 42.01 to 42.20. Other methods may be acceptable provided they are approved by the department. In the absence of specific rules, the rules for new construction shall apply. Except as provided in s. ILHR 42.02 (1), no welded repair or alteration may be made without the prior approval of an authorized inspector who shall, if it is considered necessary, inspect the object before granting an approval.

(2) ACCEPTANCE OF REPAIRS AND ALTERATIONS. Repairs or alterations shall be acceptable to the authorized inspection agency responsible for the inservice inspection of the boiler or pressure vessel. It shall be the responsibility of the organization making the repair or alteration to provide for inspection, documentation and certification of the work and to ensure prior acceptance of the procedures for the work by the inspection agency responsible for inservice inspection of the boiler or pressure vessel.

History: Cr. Register, February, 1988, No. 386, eff. 3-1-88.

ILHR 42.02 General rules for repairs. (1) AUTHORIZATION. Repairs to boilers and pressure vessels shall be performed by an organization in possession of a valid National Board repair "R" certificate of authorization, a valid ASME certificate of authorization containing provisions for welded repairs or a valid weld repair program which has been reviewed and verified by the department or an authorized inspection agency. The repair organization shall have a documented quality control program containing a description of the scope of work they intend to perform with supporting welding procedures and qualification reports in accordance with the ASME Code Section IX. Welded repairs of a routine nature as specified in the scope of the repair organization's quality control program may be performed without prior approval of the authorized inspector.

Note 1: See s. ILHR 41.06 for penalties for violations of these rules.

Note 2: The department will assist an organization in preparing a quality control program for welded repairs that will comply with the intent of ss. ILHR 42.01 and 42.02. Organizations who hold ASME certificates or National Board "R" certificates are already in possession of approved quality control programs.

(2) EXAMPLES OF REPAIRS. Repairs shall be work such as, but not limited to, the following examples:

(a) Welded repairs or replacements of pressure parts or attachments that have failed in a weld or in the base material;

(b) The addition of welded attachments to pressure parts such as, but not limited to:

1. Studs for insulation or refractory lining,

2. Hex steel or expanded metal for refractory lining,

3. Ladder clips,

4. Brackets,

5. Tray support rings,

6. Corrosion-resistant strip lining,

7. Corrosion-resistant weld overlay, and

8. Weld build-up of wasted areas.

(c) Replacement of heat exchanger tube sheets in accordance with the original design;

(d) Replacement of boiler or heat exchanger tubes where welding is involved;

(e) In a boiler, a change in the arrangement of tubes in furnace walls, economizer or superheater sections;

(f) Replacement of pressure retaining parts identical to those existing on the boiler or pressure vessel and described on the original manufacturer's data report such as, but not limited to:

1. Replacement of furnace floor tubes or sidewall tubes, or both, in a boiler,

2. Replacement of a shell or head in accordance with the original design,

3. Rewelding a circumferential or longitudinal seam in a shell or head, and

4. Replacement of nozzles;

(g) Installation of new nozzles or openings of such a size that reinforcement is not a consideration, such as the installation of a 3-inch pipe size nozzle to a shell or head of 3/8-inch or less in thickness, or the addition of a 2-inch pipe size nozzle to a shell or head of any thickness;

(h) The addition of a nozzle where reinforcement is a consideration may be considered to be a repair provided the nozzle is identical to one in the original design, is located in a similar part of the vessel, and is not closer than 3 times its diameter from another nozzle. The addition of such a nozzle shall be restricted by any service requirements;

(i) The installation of a flush patch to a boiler or pressure vessel;

(j) The replacement of a shell course in a cylindrical pressure vessel;

(k) Welding of gage holes;

(l) Welding of wasted or distorted flange faces;

(m) Replacement of slip-on flanges with weld neck flanges or vice versa; and

(n) Seal welding of butt straps and rivets.

History: Cr. (2) Register, February, 1988, No. 386, eff. 3-1-88; cr. (1) eff. 12-1-88; am. (1), Register, February, 1990, No. 410, eff. 3-1-90.

ILHR 42.03 General rules for alterations. (1) AUTHORIZATION. Alterations to boilers and pressure vessels, with the exception of rerating as specified in s. ILHR 42.30, shall be performed by an organization in possession of a valid ASME certificate of authorization, provided the alterations are within the scope of the authorization. The required engineering calculations shall be provided by the ASME certificate holder. When welding is necessary to complete the alteration, it shall be performed by the ASME certificate holder or an organization qualified under s. ILHR 42.02 (1).

(2) NAMEPLATE. (a) The organization responsible for the preparation of the report of alteration shall also be responsible for adding a stamping or nameplate to the boiler or pressure vessel.

(b) The stamping or nameplate shall be applied adjacent to the original manufacturer's stamping or nameplate in letters at least 5/32 inch high.

(c) The stamping or nameplate for all alterations to a boiler or pressure vessel shall be as follows:

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ALTERED BY _____

_____ PSIG AT _____ °F
(MAWP) (Temp)

_____
(Manufacturer's Alteration Number, if used)

_____
(Date Altered)

(3) REPORTS. A copy of the original manufacturer's data report and any required manufacturer's partial data reports shall be a part of the completed report of alteration and shall be attached thereto. Where the manufacturer's data report is unavailable, documentation acceptable to the department shall be submitted.

(4) TEST. A pressure test shall be applied after the alteration has been completed, at a pressure of at least the operating pressure, but not to exceed 150% of the maximum allowable working pressure. In lieu of a pressure test, if approved by the authorized inspector, radiographic testing or ultrasonic testing may be utilized.

Note: Where water is used in a hydrostatic test, the temperature of the water should not be less than 70°F and the maximum temperature during inspection should not exceed 120°F. If a test is conducted at 1½ times the maximum allowable working pressure (MAWP) and the owner specifies a temperature higher than 120°F, the pressure should be reduced to the MAWP and the temperature should be reduced to 120°F for the close examination.

(5) EXAMPLES OF ALTERATIONS. Alterations shall be work such as, but not limited to the following examples:

(a) To increase the maximum allowable working pressure or temperature of a boiler or pressure vessel regardless of whether or not a physical change was made to the boiler or pressure vessel;

(b) The addition of new nozzles or openings in a boiler or pressure vessel except those classified as repairs;

(c) A change in the dimensions or contour of a pressure vessel;

(d) In a boiler, an increase in any heating surface which results in increasing the heat output or the final temperature above that specified in the original design;

(e) The addition of a pressurized jacket to a pressure vessel;

(f) Replacement of a pressure retaining part in a boiler or pressure vessel with a material of different nominal strength or nominal composition from that used in the original design; and

(g) A decrease in the minimum temperature such that additional mechanical tests are required as specified in ASME code section VIII.

History: Cr. Register, February, 1988, No. 386, eff. 3-1-88; am. (1), Register, December, 1992, No. 444, eff. 1-1-93.

ILHR 42.04 Reports. (1) GENERAL. Except as provided in sub. (2), anyone making welded repairs or alterations in accordance with these rules shall furnish the department with a report of every welded repair or alteration. The report shall be signed by the authorized inspector who inspected or approved the repair or alteration. The owner of the equipment shall retain a copy of the report for review by an authorized inspector.

The report shall contain the information indicated on department form SB-190 or National Board Form R-1. Form SB-190 shall be filed by organizations who do not possess an ASME certificate of authorization or a National Board R certificate.

Note: See Appendix A for sample copies of forms SB-190 and R-1.

(2) EXEMPTIONS. The following items require the prior approval of the authorized inspector but are exempt only from the reporting requirements of sub. (1):

(a) The welded repair or replacement of tubes in boilers or pressure vessels; and

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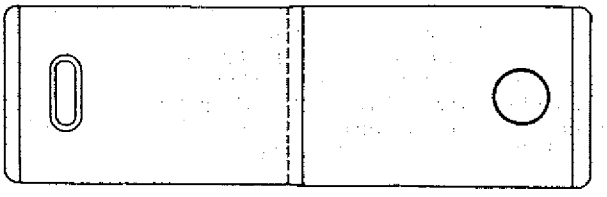
around the complete circumference of the tube is restricted, or when it is necessary to repair a small bulge. This is referred to as a window patch. Window patches shall be applied as specified in Figure 42.17-2 or by other equivalent methods.

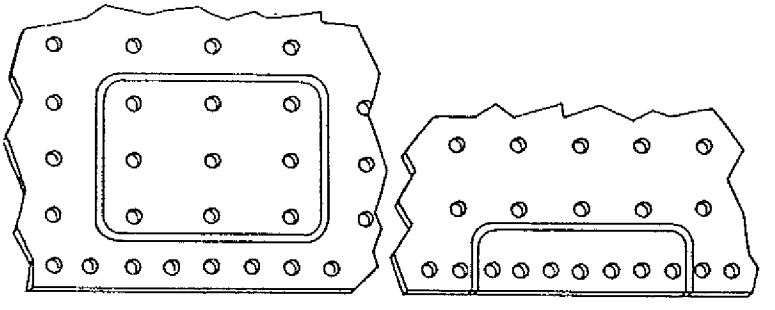
(3) LAPPED AND FILLET WELDED PATCHES. Lapped and fillet welded patches may be applied provided they are not exposed to radiant heat. Lapped and fillet welded patches may be applied on the pressure side of the sheet. The maximum diameter of the opening repaired may not exceed 8 inches or 16 times the thickness of the plate. Lapped and fillet welded patches shall have a minimum lap of ½-inch. If the area to be patched includes a riveted seam, rivets shall be removed before the patch is applied and new rivets driven before the patch is welded at the edges. New staybolts shall be installed in the patched area, and the heads of the staybolts shall not be covered by welding.

History: Cr. Register, February, 1988, No. 386, eff. 3-1-88; am. (3), Register, December, 1992, No. 444, eff. 1-1-93.

Figure 42.17-1
FLUSH PATCHES



FLUSH PATCHES IN UNSTAYED AREAS



FLUSH PATCHES IN STAYED AREAS

Before installing a flush patch, the defective metal shall be removed until sound metal is reached. The patch shall be rolled or pressed to the proper shape or curvature. The edges shall align without overlap.

In stayed areas, the weld seams shall come between staybolt rows or riveted seams.

Patches shall be made from material that is at least equal in quality and thickness to the original material.

Patches may be of any shape or size. Corners of patches shall have a radius of such size as is necessary to avoid creating a stress point.