Master Hand Hole (MHH) Plug Welding Recommendations

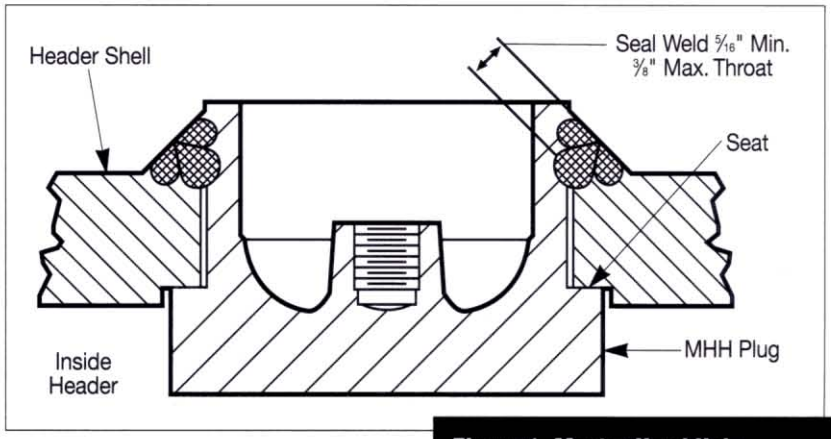

Figure 1 ***Master Hand Hole plug welding.***

Purpose

This plant service bulletin advises owners and operators of B&W equipment on the recommended seal welding procedure for Master Hand Hole (MHH) plugs.

Problem

MHH plugs are available in carbon steel (SA-181-70) or 2¼Cr-1Mo (SA-182 F22 CL3) for installation in various header and piping materials. Some seal welding methods have resulted in weld failure.

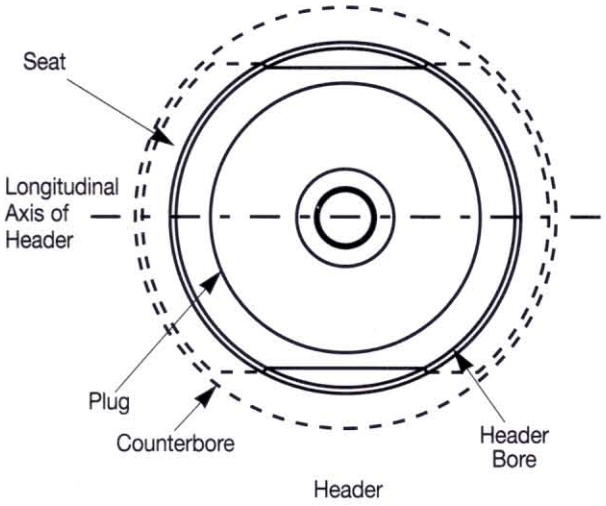

Figure 2 ***Orientation of MHH plug shear bars to axis of header.***

Recommendation

The recommended welding procedure for the installation of a new MHH plug or the re-use of an old plug is the same. Plug material identification is stamped on the bottom (rounded) surface. Carbon-steel MHH plugs are stamped 80MM, SM17, SM16 or SM70SI. 2¼Cr-1Mo MHH plugs are stamped 78MM, AM17, AM16 or AM70SI.

It is acceptable to re-use an old MHH plug if it can be cleaned up and weld metal can replace any removed MHH plug material, while providing the required fillet weld throat (Figure 1). If the MHH seat is damaged, it can be weld repaired and machined. (**Caution: Machining must not enlarge diameter of hole.**)

MHH plugs should be installed and seal welded using the following procedure:

1. Repair any damage to the header, including any necessary weld repair and PWHT. Do not attempt any weld repair to the header while welding in the hand hole cap.

2. Thoroughly clean the MHH plug shaft and seat, as well as the header seat, bore and welding surfaces, by removing all weld spatter, debris, oxides, paint and preservatives.

3. Install hand hole plug into header, align the MHH plug shear lugs with the axis of the header (Figure 2) and pull the plug snugly against the header seat with a mechanical device.

4. Experience has shown that a 3/32"-diameter electrode is satisfactory. Electrode material selection is based on the material of the MHH and header and is shown in Table 1. The electrode should be heated to 250°–400°F for at least two hours prior to using.

5. Preheat the header and plug to the temperature listed in Table 1, and maintain preheated temperature during the entire welding process, including the time

(continued on reverse side)

between weld passes. The base header material should be preheated for a distance equal to the thickness of the header, but not less than 3" in all directions from the point prior to welding.

6. Seal weld with three passes (reference Figure 1), checking the root pass visually for cracks before proceeding. Small tack welds are not advised due to the tendency for cracking. Do not remove the mechanical device until after completion of all fillet weld passes. The seal weld throat dimension should be a minimum of 5/16" and a maximum of 3/8".

Table 1
Electrode Material Selection and Preheat Temperature

Items		Carbon-Steel Header (P1)	1¼Cr-½Mo Header (P4)	2¼Cr-1Mo Header (P5)
Carbon-Steel MHH Plug	Electrode	E7015-A1 E7016-A1 E7018-A1	Unacceptable Header/Cap Material Combination	Unacceptable Header/Cap Material Combination
	Preheat Temperature	200°F Minimum		
2¼ Cr-1Mo MHH Plug	Electrode	E7015-A1 E7016-A1 E7018-A1	E8015-B2 E8016-B2 E8018-B2	E9015-B3 E9016-B3 E9018-B3
	Preheat Temperature	550° F +/- 50° F	550° F +/- 50° F	550° F +/- 50° F

7. Immediately following welding, visually inspect and remove the mechanical device, cover the area with an insulating blanket, and allow to cool to ambient temperature.

The above procedure eliminates the need for stress relieving the seal weld in any of the material grades and is the reason a seal weld, rather than a strength weld, is recommended. The maximum throat dimension of the seal weld is 3/8" to comply with the post-weld heat treatment exemptions listed in ASME Section I PW-39. A weld throat dimension in excess of 3/8" is possible, but this would violate the ASME Section I rules for exemption from post-weld heat treatment.

Support

Contact Field Service Engineering through your local B&W district service office to coordinate your inspection and repair efforts, and to answer any questions.

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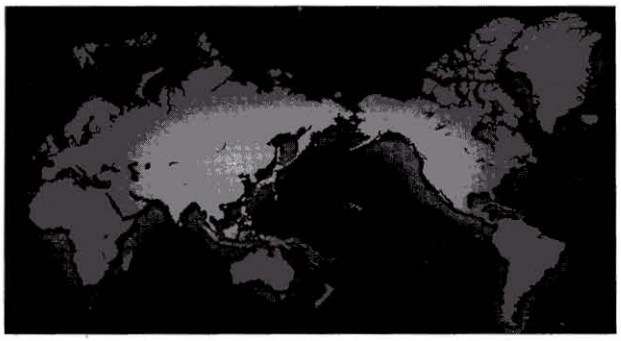

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