

Procedure 5b: Weld Build-Up of Wasted Areas Non PWHT

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| A# | 2710237 | Facility | Medicine Hat West, Taber South |
| CRN# | H 0995.2 | LSD | 13-18-010-16W4 |
| S/N | L-8-325 | | |
| MAWP | 75 PSIG | Vessel Description | Treater; Repair to Spare Fire Tube 18" X .625" SA-516-70 Sour Service |
| Material | SA-516-70 | | |
| Shell Thickness | .375" | Scope of Work: Weld build up of pitted areas on a firetube as per IRIS report details attached. | |
| Head Thickness | .598" | | |

Scope

*Anthony Marks
Jan 8/08*

1. The weld build up of wasted areas in a firetube constructed of P-I Group 1 or 2 materials.
2. Weld build up shall not exceed the lesser of one-half the vessel wall thickness or a maximum of 12.7 mm (1/2").

Procedure

Weld Preparation

1. Area to be welded to shall be cleaned to white metal for a distance of 10 mm beyond the expected weld area.

Hydrogen Bake out and Sulfur removal: (remove this section if this firetube is not in sour service)

2. Vessels that have been exposed to sour or sulfur bearing process streams shall required the weld attachment area to undergo a "Bake Out" procedure. This procedure shall consist of heating the weld attachment area and 10 cm on each side to 315 C (600 F) and holding that temperature for a minimum of 60 minutes. Bake out should be done prior to cutting out, if cutout is done thermally. Stipulate controls methods.



Note

The Bake Out temperature shall be limited to 450 C (842 F) to stay within the elastic limit of a P1 material so as to avoid the possibility of plastic deformation due to over heating.

3. *Bake Out* is performed by either induction coil (use thermocouples as control instrumentation) or propane torch

Procedure
continued...

(use temperature-sensitive crayons – upper and lower temperature to be controlled). Oxyacetylene torches are **not** acceptable.

4. If induction coils are used, a 250 C (482 F) four-hours heat treatment may be substituted for the normal 315 C (600 F) one-hour heat treatment.

Preheat and Welding:

Non-Post Weld Heat Treated Equipment

5. Minimum pre-heat shall be 80 C (176 F) for a 100 mm band on both sides of the weld build-up area.



Note

The 80 C (176 F) pre-heat temperature has been selected for alignment with NB-23, Appendix B assuming the specific carbon content of the material is not known.

6. Welds shall be completed using new 2.4 mm (3/32”) E 7018-1 electrodes.

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7. Maximum interpass temperature shall not exceed 230 C (450 F).
 8. The Owner’s Inspector, shall witness seal on the box being broken and ensure that once the box has been opened the electrodes are stored in an oven.
 9. Use only stringer beads where the width of the weld weave is a maximum of 7 mm.
 10. No down hand welding shall be used.
 11. Once the welds are completed the weld area shall be wrapped with an insulating blanket and allowed to slow cool to 100 C (212 F). The cooling rate shall not exceed 260 C (500 F) / hour.
 12. Once the finished weld has cooled below 100 C (212 F) grind off the cap of the weld smooth and contour to the original shape of the firetube.

Post Welding NDE:

Procedure

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13. Perform MT 12 hours after completion of the work

14. No hydrotest is required.

Documentation:

15. Ensure Company Approved Contractor has completed QC documentation.

16. Sign off ABSA AB-40 and ensure one copy is submitted to ABSA and one is retained on file in the equipment inspection file.

Procedure 2: Weld Build-Up of Wasted Areas Non PWHT

| Section | Comments | Sign Off | Date |
|--|----------|---------------------|-----------------|
| Scope | | <i>Anthony Cole</i> | <i>Jan 8/08</i> |
| Procedure | | <i>Anthony Cole</i> | <i>Jan 8/08</i> |
| Weld Preparation | | | |
| Step 1 | | | |
| Hydrogen Bake Out and Sulphur Removal | | | |
| Step 2 | | | |
| Step 3 | | | |
| Step 4 | | | |
| Preheat and Welding | | | |
| Step 5 | | | |
| Step 6 | | | |
| Step 7 | | | |
| Step 8 | | | |
| Step 9 | | | |
| Step 10 | | | |
| Step 11 | | | |
| Step 12 | | | |
| Post Welding NDE | | | |
| Step 13 | | | |
| Step 14 | | | |
| Documentation | | | |
| Step 15 | | | |
| Step 16 | | | |