

Postle Industries, Inc.

Cleveland, OH USA

Phone: 216-265-9000

Fax: 216-265-9030

E-Mail: sparky@postle.com

Web Site: www.hardbandingsolutions.com



WORK STRING TUBING UPSET CONNECTION REBUILDING with POSTALLOY® TUBE-WELD 110

Patent Pending

The rebuilding of the upset connection area on workstring tubing box or pin is very different from traditional hardbanding applications. Applying within the listed parameters is an absolute must for successful applications. Careful attention to preheating procedures and temperatures as well as slow cooling during post-welding procedures is critical. Particular attention should be given to inspection of services for cracks using MPI methods. The procedure below outlines the basic requirements to successfully rebuild upset connection area with **Postalloy® Tube-Weld 110** wire. Some adjustments will be required to accommodate various diameters of upset connection area.



**Please note that this procedure could be harmful to the threads of the tool joint and re-cutting of connections will be required. Prior to build up, Upset connection area must be at least 1 1/8" longer than minimum to allow for recut.*

PROCEDURE:

1. All previously worn hardbanding should be removed using proper preheat to a minimum of 100° (38°C) and post welding slow cooling procedures.
2. Upset connection area should be cleaned and buffed with wire brush and sanded or ground to a bright bare metal finish. All threaded areas shall be cleaned of thread compound.
3. The complete upset connection area should be inspected for cracks and defects using MPI methods.
4. If any cracks are found, then the length should be rejected from this procedure.
5. If any defects cannot be ground out, then the length should be rejected from this procedure.
6. The upset connection area is now ready for the application of **Postalloy® Tube-Weld 110**.
7. Preheat the entire upset connection area to 100F (38°C). This is to sweat all moisture from upset connection area.
8. **USE DC STRAIGHT POLARITY** (Electrode Negative)
9. Only use a 75/25 Argon/CO2 mixture as a shielding gas. DO NOT use a 98/2 Argon/Oxygen mixture. Commence welding, starting at 1" (25mm) from the threaded end of the upset connection area working toward the tubing pipe body. Apply with a 50% tie-in (minimum 1/8" (3.2mm) overlap) on previous band to eliminate voids and imperfections. See Fig.1 for complete welding setup.
10. It is desirable to completely rebuild the upset connection area to the desired thickness all at one time. This may require multiple layers. Interpass temperature should not exceed 800°F (427°C). If this temperature is exceeded, discontinue welding until the interpass temperature cools to 450°F (232°C). At that point welding can resume. If for any reason the welding cycle must be interrupted, such as a shift ending, upset connection area should be wrapped in a thermal blanket. Do not allow to cool below 300°F (149°C).

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11. After the completion of welding, the upset connection area should be wrapped in a thermal blanket and covered with insulating container to ensure slow cooling to room temperature. Cooling rates should be no more than 100°F/hour.
12. The complete build up and adjacent areas of the base material should be MPI inspected for cracks. These areas shall be free of all cracks, voids and porosity. If cracking, or porosity should occur in the buildup area or base material, the length should be rejected. Voids may be repaired following recommended preheat and post cool procedures.
13. The outside diameter of upset connection area can now be machined to new dimensions followed with recut of the threaded area as required.
14. At this time the application of a **Duraband®NC** as a hardband for OD protection, following the Work String Tubing Hardband Procedure, will complete this procedure. If length of upset connection area is too short omit this step.

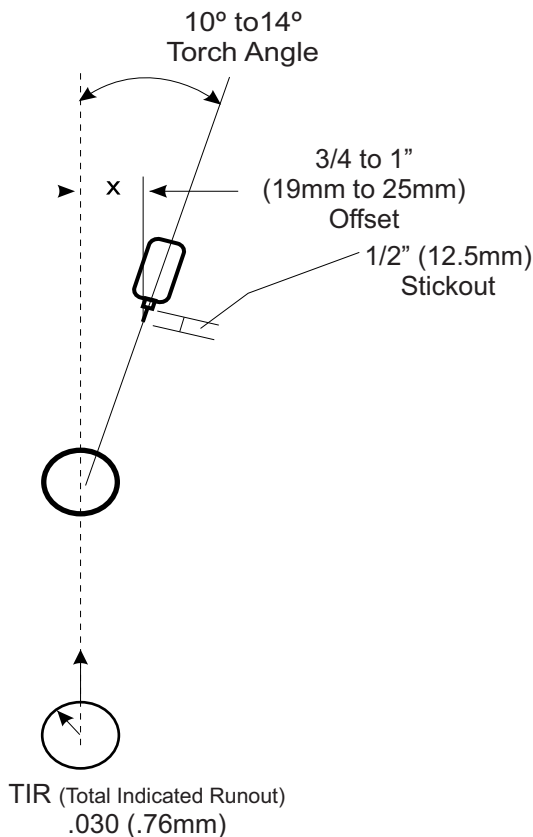


FIG. 1

Upset Connection OD	Seconds per Rev.	Offset
2.906" (74mm)	42	3/4"(19mm)
3.438" (87mm)	50	3/4"(19mm)

TYPICAL WELDING PARAMETERS

Process: Gas Shielding GMA
 Shielding Gas: 75% Argon/25% Co2 Only*
(DO NOT USE 98% Argon/2% O2)
 Flow Rate: 32-37 CFH (15-17.5 LPM)
 Wire Size: .045" (1.14mm) Tube-Weld 110
 Preheat: 80-100°F (27-38°C)
 Polarity: DC STRAIGHT* (Electrode Negative)
 Amperage: 165 (165-190)
 Volts: 21.5 (21-22)
 Oscillation Width: 3/8" (9.5mm)
AUTO STEP-OVER MUST BE USED*
 Oscillation Speed: 80-100 per Minute
 Overlap: Minimum 1/8" (3.2mm)
 Rotation Speed: 2.906" (74mm) 42 Sec/Revolution
 3.438" (87mm) 50 Sec/Revolution
 Torch Angle: 12° (10°-14°)
 Offset: 3/4" (19mm) 3/4 to 1 (19-25mm)
 Stickout: 1/2" (12.5mm)
 Max Interpass Temperature: 800°F (427°C)
 Post Weld: Slow Cool to Room Temperature

*** 75% ARGON/25% Co2 GAS, STRAIGHT POLARITY AND AUTO STEP-OVER MUST BE USED FOR PROPER APPLICATION NO EXCEPTIONS!**



Acceptable



Acceptable



Not Acceptable