SOUTHWEST FABRICATING & WELDING CO., INC.

21061

PROCEDURE NUMBER 4-106

COLD BENDING OF CARBON STEEL & FERRITIC ALLOY

SUBMITTED TO Ebasco

FOR CONTRACT NO. 435085

SF&W S.O. NO. 3301 - 3308

SUPPLEMENT NO. 1

ATTACHMENT NO. —

PAGE NO.	PROCEDURE REVISION NO. & DATE								
	0 5/4/73	1	2	3	4	5	6	7	8
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MANAGER Q.A.	
ENGINEERING	
OPERATIONS	

SOUTHWEST FABRICATING & WELDING CO. INC.

COLD BENDING OF CARBON STEEL AND FERRITIC ALLOY

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DATE 4-30-73

1. Cold bending is defined as forming at temperatures below 700°F.

2. Pipe shall be selected so that the minimum wall thickness after bending shall be not less than the calculated minimum wall thickness required for straight pipe.

3. Welded pipe shall have the longitudinal seam on the neutral axis of the bend.

4. The centerline radius of a bend will not normally be less than five (5) times the nominal pipe diameter and shall not be less than permitted by Fig. 2 in PFI Std ES-3.

5. Bending dies shall be used when they are available at Southwest Fabricating & Welding Co. Methods and controls shall be such that the difference between the maximum and minimum diameter at any cross section of the bend shall not exceed 8% of the average measured outside diameter of the straight portion of the pipe.

6. Buckling shall be kept to an absolute minimum and shall not exceed the limits specified in PFI Std ES-3 and outlined below:

   a) The maximum vertical height of any wave, measured from the average height of two adjoining crests to the valley, shall not exceed 3% of the nominal pipe size.

   b) The minimum ratio of the distance between crests as compared to the height between crests and the included valley shall be 12 to 1.

   c) Buckles exceeding the limits defined in a) and b) above shall not be repaired without approval of the Manager of Quality Assurance.

7. Where surface checking is evident, it shall be removed by grinding and the ground surface shall be examined using an approved liquid penetrant or magnetic particle procedure.

8. Carbon steel bends with wall thickness greater than 3/4" shall be stress relieved.

9. Ferritic alloy bends greater than 4" pipe size and over 1/2" wall thickness shall be stress relieved.

10. Ferritic alloy bends with a bend diameter less than 20 pipe diameters shall be stress relieved.

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BY	JSA									
DATE	5/4/73									
APPROVED	EJP									

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SUPPLEMENT #1

S. O. 3301 thru 3304

Change Paragraph #4 to read:

4. The centerline radius of a bend shall not be less than five times the nominal pipe diameter.

Change the second sentence of Paragraph #5 to read:

Methods and controls shall be such that the difference between the maximum and minimum diameter at any cross section of the bend shall not exceed 6% of the average measured outside diameter of the straight portion of the pipe or two inches (2") whichever is greater.

Change Paragraph 6 (a) to read:

6. a) The maximum vertical height of any wave, measured from the average height of two adjoining crests to the valley, shall not exceed 3/8" in depth over a 12" length.

Approved:

C N Thomas

R C Gu

B G Goodwin

REVISION	0	1	2	3	4	5	6	7	8	9
BY	D.F.H.									
DATE	3/28/74									
APPROVED	EJD									