

1.0 PURPOSE

To establish and maintain documented procedures to ensure that the testing is carried out as per the applicable specifications / standards for the Bend pipe manufactured by BENDCO.

2.0 SCOPE

This work instruction is intended for carrying out Guided Bend Test of Hot Pulled Induction Bend.

3.0 RESPONSIBILITY

Officer/Engineer/ Sr. Engineer /Asst. Manager (LAB) and HOD (QA/QC) shall be responsible for testing & maintaining of records.

4.0 APPLICABLE CODE & TESTING FREQUENCY

- ASTM A 370 Latest Edition : "Standard Test Methods and Definitions for Mechanical Testing of Steel Products".
- API 5L 45th Edition Dec 2012: "Specification for Line Pipe".
- ISO 15590-1:2009 : 'Petroleum and natural gas industries —Induction bends, fittings and flanges for Pipeline transportation systems.'
- Quality Assurance Plan –QAP, Process Chart
- Customer Specification / Other specification.

5.0 SAMPLE ORIENTATION

One root & one face bend specimen shall be taken from the of bend pipes at 90° to the weld seam keeping the weld at the center of the specimen.

6.0 TEST SPECIMEN TOLERANCE

The test specimen taken from the Bend pipe shall be prepared as per specification API 5L 45th Edition Dec 2012 / ASTM A 370 Latest Edition / Approved Drawing.

7.0 PREPARATION OF THE TEST SPECIMEN

MANUFACTURING PROCEDURE SPECIFICATION AND INSPECTION TEST PLAN FOR INDUCTION BENDING GUIDED BEND TEST		PAGE 1	PASADENA, TEXAS November 17, 2020
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Prepared By:	GORDON AAKER		DECEMBER 07, 2016
Reviewed By:			
Approved By:			
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7.1 The specimen shall be machined on both sides to get the specified width. They shall represent the actual thickness of the Bend pipe from which they were cut. The specimen shall be prepared as per Approved Drawing.

7.2 The Weld reinforcement shall be removed from both the side and the surface shall be ground off well.

Weld Reinforcement Removed



7.3 The shar corners shall be filed.

7.4 Samples shall be etched to reveal the weld zone and the center of the weld shall be marked.

8.0 METHOD

8.1 The maximum value for **Mandrel** diameter (A) shall be calculated using the following formula / applied specification.

$$\text{MANDREL DIAMETER} = (1.15 (D - 2t) / \epsilon D / t - 2 \epsilon - 1) - t$$

Where:

ϵ = strain value

D = outside diameter

t = thickness of the sample

1.5 = Peaking Factor

Gap between the Roller (B) = A + 2t + 3.2mm

Table 23- Strain value for guided-bend test

PIPE GRADE	STRAIN VALUE A ϵ
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BENDING PROCEDURE 26

**P. O. Box 5811
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8.2 Place the bottom roller center. The jig should match the weld

L210 or A	0.1650
L245 or B	0.1375
L290 or X42	0.1375
L320 or X46	0.1325
L360 or X52	0.1250
L390 or X56	0.1175
L415 or X60	0.1125
L450 or X65	0.1100
L485 or X70	0.1025
L555 or X80	0.0950
L625 or X90 0.0850	0.0850
L690 or X100 0.0800	0.0800
L830 or X120 0.0675	0.0675
A For intermediate grades, the strain values shall be obtained by interpolation, based upon the specified minimum tensile strength, with the interpolated value rounded to the nearest multiple of 0.0025.	

specimen on the with weld at the centerline of the the centerline of portion.

8.3 Start the hydraulic switch.

START THE LOAD



8.4 Specimen shall be bent approximately 180° at room temperature.

BENT SPECIMENS

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8.5 The speed of bending is ordinarily not an important factor.

8.6 After bending switch off the machine & release, the pressure by opening the hydraulic valve.

9.0 ACCEPTANCE CRITERIA

As per Process chart / QAP

10.0 RE-TEST CRITERIA

As per API 5L 45th Edition Dec 2012/ Customer specification/QAP.

11.0 INVALIDATION OF TESTS

Specimen showing material defects or defective preparation, whether observed before or after breaking, may be discarded and replacements shall be considered as original specimens.

12.0 RECORDS

Test results shall be recorded on Bendco Form:

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