

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 pipes manufactured By ABC.

2.0 SCOPE

This work instruction is intended to determine the % shear area of the fracture of the base metal of Hot Pulled Induction Bend.

1.0 RESPONSIBILITY

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

4.0 APPLICABLE CODE & FREQUENCY FOR TESTING

- 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.
- API RP 5L3-96: "Recommended Practice for Conducting Drop-Weight Tear Tests on Line Pipe".
- Quality Assurance Plan – QAP, Process Chart
- Customer Specification / Other applicable specification.

5.0 SAMPLE ORIENTATION

The specimens shall be oriented circumferentially from a location 90° from the weld with the axis of the notch oriented throughout the pipe wall thickness.

6.0 PREPARATION OF THE TEST SPECIMEN

6.1 The specimen shall be removed from the pipe wall by sawing, shearing or flame cutting with or without machining, provided the dimensions of the finished specimen are within the tolerances.

6.2 The specimens shall be flattened, machined to finished size.

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6.3 The pressed notch or chevron notch shall be made in the specimen either through a tool with mirror geometry with an included angle of $45^\circ \pm 2^\circ$.

7.0 METHOD

7.1 Specimen shall be prepared as per API RP 5L 3 :1996 / Approved Drawing

7.2 The testing machine may be of such configuration that has sufficient energy to completely break the specimens in one impact.

Specimen in Testing for Breaking

7.3 The velocity of the hammer at impact shall be in the range of 16 to 30 ft/sec (5 to 9 m/sec).

7.4 The specimen shall be completely immersed in a bath of a suitable liquid at specified temperature $+ 2^\circ\text{F}$ (1°C) for soaking for the duration as given in API RP 5L 3: 1996.

Immersed Tank

7.5 The specimen shall be separated from each other and the both sides & bottom.

7.6 Provision shall be made for circulation to ensure uniform bath temperature.

7.7 The specimen shall be inserted in the testing machine so that the notch is lined up with the centerline of the hammer tip. The notch should be centered between the supports of the anvil.

7.8 The specimens shall be removed from the bath and broken as described herein within a time period of 10 seconds. If this time is exceeded, the specimen shall be returned to the bath for a minimum of 10 minutes.

7.9 Sample is evaluated by determining the shear area of the fractured surface.

Test Samples

7.10 Shear area is calculated as under.

$$\% \text{ shear area} = (71-2t) t - \frac{3}{4} AB / (71-2t) t$$

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Where:

A = the width of the cleavage fracture in mm.

B = the length of the cleavage fracture in mm.

t = thickness of the sample in mm.

8.0 ACCEPTANCE CRITERIA

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

9.0 RE-TEST CRITERIA

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

10.0 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.

11.0 RECORDS

Test results shall be recorded on Bendco Form:

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