ISO 15590-4:2019 (E)

Petroleum and natural gas industries — Factory bends, fittings and flanges for pipeline transportation systems — Part 4: Factory cold bends

Contents

Foreword

Introduction

1 Scope

2 Normative references

3 Terms and definitions

4 Symbols and abbreviated terms

4.1 Symbols
4.2 Abbreviated terms

5 Conformance

5.1 Units of measurement
5.2 Rounding
5.3 Conformity to this document

6 Designation of cold bends

7 Pressure rating and design

8 Information provided by the purchaser

8.1 General information
8.2 Additional information
8.3 Information on the mother pipe

9 Manufacturing

9.1 Mother pipe
9.2 Qualification test bend
9.3 Production cold bending
9.4 Post-bending heat treatment
9.5 Forming and sizing after bending
9.6 Strip/plate end welds
9.7 Jointers and girth welds
9.8 End preparation

10 Testing and inspection

10.1 General requirements
10.2 Extent of testing and inspection
10.2.1 Qualification test bend
10.2.2 Production bends
10.2.3 Production test bends
10.3 Chemical composition
10.4 Physical testing
10.4.1 General
10.4.2 Tensile testing
10.4.2.1 Test pieces
10.4.2.2 Test method
10.4.3 Charpy V-notch impact testing
10.4.3.1 Test pieces
10.4.3.2 Test method

10.4.3.3 Requirements
10.4.4 Through-thickness hardness testing
10.4.4.1 Test method
10.4.4.2 Requirements
10.4.5 Surface hardness testing
10.4.5.1 Test method
10.4.5.2 Requirements
10.4.6 Metallographic examination
10.4.6.1 Test method
10.4.6.2 Requirements
10.4.7 Guided bend testing
10.4.7.1 Test pieces
10.4.7.2 Test method
10.4.8 Flattening tests
10.5 Non-destructive testing
10.5.1 Visual inspection
10.5.2 Weld seam testing
10.5.3 Inspection of bend ends
10.5.4 Magnetic particle testing or liquid-penetrant testing on the bend body
10.5.5 Ultrasonic testing on the bend body
10.5.6 Level of residual magnetism
10.5.7 Repairs
10.5.8 NDT personnel
10.6 Dimensions
10.7 Gauging
10.8 Hydrostatic testing

11 Inspection document

12 Marking

Annex A (normative) Manufacturing procedure specification

A.1 General
A.2 Manufacturing procedure specification

Annex B (normative) PSL 2S cold bends ordered for sour service

B.1 Introduction
B.2 Additional information provided by the purchaser
B.3 Manufacturing
B.3.1 Manufacturing procedure
B.3.2 Pipe manufacturing
B.4 Testing and inspection
B.4.1 Tensile properties
B.4.2 HIC/SWC test
B.4.2.1 Test pieces
B.4.2.2 Test method
B.4.2.3 Requirements
B.4.3 SSC test
B.4.3.1 Test pieces
B.4.3.2 Test method
B.4.4 Requirements
B.4.5 Hardness test
B.4.5.1 Test pieces
B.4.5.2 Requirements
B.5 Hard spots
B.6 Inspection
B.7 Non-destructive inspection
B.7.1 Laminar imperfections at the pipe ends
B.7.2 Ultrasonic testing on the bend body
B.7.3 Ultrasonic inspection of SAW seam welds
B.7.4 Non-destructive inspection of HFW weld seams

Page count: 31