ISO 13847:2013-12 (E)

Petroleum and natural gas industries - Pipeline transportation systems - Welding of pipelines

Contents

Page

Foreword v

Introduction vi

1 Scope 1

2 Normative references 1

3 Termsanddefinitions 3

4 Symbols and abbreviated terms 5
4.1 Symbols 5
4.2 Abbreviated terms 5

5 Compliance 6

6 Information to be supplied by the company 6

7 Weldingproceduresspecificationandqualificationrequirements 8
7.1 General 8
7.2 Welding procedure specification 9
7.3 Welding of test piece 9
7.4 Inspection and testing of test pieces 10
7.5 Re-testing 18
7.6 Essential variables and range of approval 19
7.7 WPS for repair welding 23
7.8 Period of validity 24

8 Approval and testing of welders and welding operators 25
8.1 General 25
8.2 Approval for manual and semi-automatic welding 25
8.3 Approval for mechanized welding 25
8.4 Approval for automatic welding 25
8.5 Test welding 25
8.6 Inspection and testing of test welds 26
8.7 Re-testing 27
8.8 Range of approval 27
8.9 Records 28
8.10 Period of validity 28

9 Production welding 28
9.1 General 28
9.2 Equipment 28
9.3 Working clearance 28
9.4 Weather conditions 29
9.5 Pipe end preparation 29
9.6 Support 29
9.7 Line-up 29
9.8 Tack welding 30
9.9 Earthing or grounding 30
9.10 Electrodes and filler materials 30

9.11 Shielding gases 30
9.12 Preheating 31
9.13 Arc strikes 31
9.14 Backing 31
9.15 Internal weld bead 32
9.16 Weld metal deposition 32
9.17 Weld cleaning and peening 32
9.18 Partially completed welds 32
9.19 Post-weld heat treatment 33
9.20 Pipe and weld record 34

10 Non-destructive testing 34
10.1 General 34
10.2 NDT personnel 34
10.3 NDT procedure approval 34
10.4 Visual examination 34
10.5 Radiographic testing 35
10.6 Ultrasonic testing 37
10.7 Magnetic particle testing 38
10.8 Liquid penetrant testing 39
10.9 NDT report 39

11 Acceptance criteria for non-destructive testing 39
11.1 General 39
11.2 Right of rejection 39
11.3 Visual testing 39
11.4 Radiographic testing 40
11.5 Ultrasonic testing 42
11.6 Surface testing 43
11.7 Discontinuities in pipe or fittings 43
11.8 Acceptance criteria -- ECA 43

12 Repair and removal of defects 43
12.1 General 43
12.2 Authorization for repair 44
12.3 Multiple repairs 44
12.4 Defect removal and preparation for repair 44

13 Documentation 44

Annex A (informative)SpecialrequirementsforweldingofCRApipelinesandCRA-clad steel pipelines . 46

Annex B (informative) Hyperbaric welding 48

Annex C (informative) Recommendations for brazing and aluminothermic welding of anode leads . 50

Annex D (informative)Branchandfilletweldingonin-servicepipelines 51

Annex E (informative) Welding of European onshore natural gas transmission pipelines 57

Annex F (informative) Welding of gas distribution systems in Europe 61

Annex G (normative) Automatic ultrasonic testing of girth welds 63

Annex H (informative) Examples of NDT reports 68

Annex I (informative)Timeofflightdiffractiontechnique(ToFD) 72

Bibliography 80