ISO 15463:2003-12 (E)

Petroleum and natural gas industries - Field inspection of new casing, tubing and plain-end drill pipe

Contents

Page

Foreword vi

Introduction vii

1 Scope 1

2 Conformance 1
2.1 Normative references 1
2.2 Units of measurement 1
2.3 Tables and figures 2

3 Normative references 2

4 Terms, definitions, symbols and abbreviated terms 2
4.1 Terms and definitions 2
4.2 Symbols and abbreviated terms 13

5 Application 15
5.1 Basis for inspection 15
5.2 Applicability of inspections 15
5.3 Repeatability of results 15
5.4 Consequences of variability 15

6 Ordering information 16

7 Quality assurance 16

8 Qualification of inspection personnel 17
8.1 General 17
8.2 Written procedure 17
8.3 Qualification of inspection personnel 17
8.4 Training programs 18
8.5 Examinations 18
8.6 Experience 18
8.7 Requalification 18
8.8 Documentation 18
8.9 NDT personnel certification 19

9 General inspection procedures 19
9.1 General 19
9.2 Documents at job site 19
9.3 Pre-inspection procedures 19
9.4 Records and notification 19
9.5 Post-inspection procedures 20
9.6 Job site checklist 21
9.7 Documentation 21

10 Acceptance criteria, disposition and responsibility 21
10.1 General 21
10.2 Basis for acceptance 21
10.3 Responsibility for Rejections 21

11 Visual and dimensional inspection 22
11.1 General 22
11.2 Application 22
11.3 Drift mandrels 22
11.4 Precision callipers (micrometer, vernier calliper or dial calliper) 22
11.5 Length and diameter-measuring devices (steel rules, steel length or diameter-measuring tapes, and other non-adjustable measuring devices) 22
11.6 Depth gauges 22
11.7 External surface illumination 23
11.8 Internal surface illumination 23
11.9 Full-length visual inspection (FLVI) of new OCTG 24
11.10 Outside diameter verification 24
11.11 Straightness 24
11.12 Drift testing 25
11.13 Visual thread inspection (VTI) 26

12 Hardness testing 29
12.1 General 29
12.2 Application 29
12.3 Equipment 30
12.4 Calibration 30
12.5 Standardization 30
12.6 Procedures 31

13 Magnetic particle inspection (MPI) 31
13.1 General 31
13.2 Application 32
13.3 Equipment and materials 32
13.3.1 Internal conductors 32
13.4 Magnetic particles 33
13.5 Illumination equipment and optical aids 33
13.6 General procedures 34
13.7 Calibration 34
13.8 Standardization 35
13.9 Periodic checks 35
13.10 End area inspection (SEA) 36
13.11 Inspection of unattached couplings (UCMPI) 37
13.12 Full-length magnetic particle inspection (FLMPI) 38

14 Electromagnetic inspection (EMI) 38
14.1 General 38
14.2 Equipment 39
14.3 Application 39
14.4 Calibration 39
14.5 Standardization 40
14.6 Equipment requirements and periodic checks 42
14.7 Inspection procedure 42

15 Residual magnetism and demagnetization 42
15.1 General 42
15.2 Application 43
15.3 Services 43

16 Gamma-ray wall thickness inspection 44
16.1 General 44
16.2 Application 44
16.3 Equipment 44
16.4 Calibration and standardization 44
16.5 Inspection procedure 45

17 Electromagnetic grade comparison 45

17.1 General 45
17.2 Application 45
17.3 Equipment 45
17.4 Calibration and Standardization 45
17.5 Inspection procedure 46

18 Ultrasonic inspection 46
18.1 General 46
18.2 Application 47
18.3 General procedures for calibration, standardization, and inspection 47
18.4 Inspection for longitudinal, transverse, and oblique imperfections 48
18.5 Standardization 49
18.6 Procedure for the detection of longitudinal, transverse, and oblique imperfections 49
18.7 Inspection of the body wall for wall thinning 49
18.8 Ultrasonic inspection of longitudinal welds 50
18.9 Manual ultrasonic thickness gauging 52
18.10 Manual ultrasonic shear-wave inspection 54

19 Evaluation of imperfections and deviations 55
19.1 General 55
19.2 Application 55
19.3 Equipment 55
19.4 Calibration and standardization procedures 56
19.5 Procedure for evaluating outside-surface-breaking pipe body imperfections 56
19.6 Procedure for evaluating inside-surface-breaking pipe body imperfections 58
19.7 Procedure for evaluating welds 58
19.8 Procedure for evaluating grinds 59
19.9 Procedure for evaluating large-area wall reduction 59
19.10 Procedure for evaluating imperfections in upsets 60
19.11 Procedure for evaluation of outside surface imperfections on couplings 61
19.12 Procedure for evaluation of visually-located thread imperfections 61
19.13 Procedure for triangle location and coupling makeup position 64
19.14 Procedure for evaluating straightness 64
19.15 Procedure for evaluating pipe diameter 65

20 Hydrostatic pressure testing 65
20.1 General 65
20.2 Application 66
20.3 Equipment, safety, and general procedures 66
20.4 Equipment calibration 67
20.5 Operating procedure 67

21 Marking 68
21.1 General 68
21.2 Authority 69
21.3 Guidelines 69
21.4 Marking of prime OCTG 70
21.5 Marking of no-drift OCTG 70
21.6 Marking of conditioned OCTG 70
21.7 Marking of conditionable OCTG (still to be conditioned) 71
21.8 Marking of non-conditionable OCTG (rejects) 71
21.9 Marking of OCTG not meeting ISO/API standards for hardness 71
21.10 Marking of prime couplings and connectors 72
21.11 Marking of conditioned couplings and connectors 72
21.12 Marking of conditionable couplings and connectors (still to be conditioned) 72
21.13 Marking of non-conditionable couplings and connectors (rejects) 72

Annex A (normative) Tables in SI units 74

Annex B (normative) Figures 91

Annex C (normative) Tables in USC units 96

Bibliography 112