DIN EN ISO 11961:2020-12 (E)

Petroleum and natural gas industries - Steel drill pipe (ISO 11961: 2018 + Amd 1:2020); English version EN ISO 11961:2018 + A1:2020, only on CD-ROM

Contents

Page

Foreword ... **viii**

Introduction ... **ix**

1 Scope ... **1**

2 Normative references ... **1**

3 Terms, definitions, symbols and abbreviated terms ... **2**
3.1 Terms and definitions ... 2
3.2 Symbols and abbreviated terms ... 7

4 Conformance ... **9**
4.1 Dual citing of normative references ... 9
4.2 Units of measurement ... 9

5 Information to be supplied when placing orders for drill-pipe ... **9**
5.1 Grades D95 and F105 ... 9
5.2 General information ... 10
5.3 Additional information ... 10

6 Requirements for drill-pipe ... **11**
6.1 General ... 11
6.2 Dimensions, masses and connections ... 11
6.2.1 Standard configuration ... 11
6.2.2 Alternative configurations ... 12
6.2.3 Drill-pipe weld neck diameters ... 12
6.2.4 Tool-joint inside diameters ... 12
6.2.5 Length ... 12
6.2.6 Length of tool-joint outside diameter ... 12
6.2.7 End-drift ... 12
6.2.8 Drill-pipe body and tool-joint alignment ... 12
6.2.9 Weld-zone profile ... 13
6.3 Material requirements ... 13
6.3.1 General ... 13
6.3.2 Weld-zone yield strength ... 13
6.3.3 Weld-zone hardness ... 13
6.3.4 Weld-zone Charpy V-notch absorbed-energy requirements ... 14
6.3.5 Weld-zone Charpy V-notch absorbed energy — Alternative requirements ... 14
6.3.6 Weld-zone transverse side bend properties ... 14
6.3.7 Sulfide stress cracking test — Grades D and F ... 14
6.4 Process of manufacture for drill-pipe ... 15
6.4.1 Processes requiring validation ... 15
6.4.2 Welding qualification ... 15
6.4.3 Welding of tool joints to drill-pipe body and post-weld heat treatment ... 15
6.4.4 Weld machining ... 15
6.4.5 Internal coating ... 15
6.4.6 External coating ... 15
6.4.7 Thread protection ... 16
6.5 Traceability ... 16
6.6 Testing — General ... 16
6.6.1 Test equipment calibration ... 16
6.6.2 Dimensional inspection ... 16
6.6.3 Drill-pipe length ... 16
6.6.4 Straightness ... 16
6.6.5 End-drift test ... 16
6.6.6 Internal profile ... 17
6.6.7 Drill-pipe body and tool-joint alignment ... 17
6.7 Testing of welds ... 17

6.7.1 Lot size 17
6.7.2 Test specimens 17
6.8 Tensile test 17
6.8.1 Procedures 17
6.8.2 Test equipment calibration 17
6.8.3 Specimens 17
6.8.4 Frequency 18
6.8.5 Defective specimen 18
6.8.6 Re-tests 18
6.9 Hardness test 18
6.9.1 Procedures 18
6.9.2 Surface hardness test 18
6.9.3 Surface hardness — Re-test 18
6.9.4 Through-wall hardness test 19
6.9.5 Through-wall hardness — Re-tests 19
6.10 Charpy V-notch impact test 19
6.10.1 Procedures 19
6.10.2 Specimen size and orientation 19
6.10.3 Test frequency 19
6.10.4 Re-tests 19
6.10.5 Defective specimens 20
6.11 Transverse side-bend test 20
6.11.1 Procedure 20
6.11.2 Specimens 20
6.11.3 Test frequency 20
6.11.4 Re-tests 20
6.12 Imperfections and defects in drill-pipe 20
6.12.1 General 20
6.12.2 Weld zone defects 21
6.12.3 Process control plan 21
6.13 Visual inspection of the drill-pipe weld zone 21
6.13.1 General 21
6.13.2 Disposition of defects 21
6.14 Non-destructive examination of the weld zone 21
6.14.1 General 21
6.14.2 Wet fluorescent magnetic-particle inspection 21
6.14.3 Ultrasonic inspection — Procedure 22
6.14.4 Ultrasonic inspection — Reference standard 22
6.14.5 Ultrasonic inspection — System capability records 22
6.14.6 Disposition of defects 23
6.15 Marking of drill-pipe 23
6.15.1 General 23
6.15.2 Drill-pipe marking 23
6.15.3 Traceability marking 23
6.15.4 Drill-pipe marking on the pipe body 23
6.15.5 Drill-pipe marking on the tool joint 24
6.16 Minimum facility requirements for drill-pipe manufacturers 24
6.17 Documentation requirements of drill-pipe 24
6.17.1 Standard documentation 24
6.17.2 Supplementary documents 25
6.17.3 Electronic data interchange 25
6.17.4 Retention of records 25
7 Requirements for drill-pipe body 25
7.1 Information to be supplied when placing orders for drill-pipe bodies 25
7.2 Dimensional and mass requirements 26
7.2.1 General 26
7.2.2 Configuration 26
7.2.3 Internal upset area 26

7.2.4 Outside-diameter tolerance 26
7.2.5 Inside diameter 26
7.2.6 Pipe-body wall thickness and tolerance 27
7.2.7 Length 27
7.2.8 Mass 27
7.2.9 Straightness 27
7.2.10 Upset and drill-pipe body alignment 27
7.2.11 Upset ovality 28
7.3 Material requirements 28
7.3.1 Chemical composition 28
7.3.2 Tensile requirements 28
7.3.3 Charpy V-notch absorbed-energy requirements — Grade E 28
7.3.4 Charpy V-notch absorbed-energy requirements — Grades X, G, S, D and F 28
7.3.5 Charpy V-notch absorbed-energy requirements — Alternative temperature 29
7.3.6 Surface hardness requirements 29
7.4 Process of manufacture 29
7.4.1 Processes requiring validation 29
7.4.2 General 29
7.4.3 Heat treatment 29
7.4.4 External coating 29
7.5 Traceability 29
7.6 Testing — General 30
7.6.1 Test-equipment calibration 30
7.6.2 Heat-treatment lot 30
7.7 Testing of chemical composition 30
7.7.1 Heat analysis 30
7.7.2 Product analysis 30
7.7.3 Test method 30
7.7.4 Re-test of product analysis 30
7.8 Tensile tests 31
7.8.1 Procedures 31
7.8.2 Test equipment calibration 31
7.8.3 Test specimens 31
7.8.4 Frequency of testing 31
7.8.5 Heat control test 31
7.8.6 Re-tests 31
7.8.7 Defective specimens 32
7.9 Charpy V-notch impact tests 32
7.9.1 Procedure 32
7.9.2 Specimen size and location 32
7.9.3 Frequency of testing 32
7.9.4 Heat control test 32
7.9.5 Re-test 32
7.9.6 Defective specimens 33
7.10 Drill-pipe-body wall thickness 33
7.11 Drill-pipe-body length 33
7.12 Internal upset 33
7.13 Internal profile 33
7.14 Straightness 34
7.15 Upset and drill-pipe body alignment 34
7.16 Mass determination 34
7.17 Imperfections and defects of drill-pipe body 34
7.17.1 General 34
7.17.2 Surface-breaking pipe-body defects 34
7.17.3 Surface-breaking upset defects 35
7.17.4 Elephant hide 35
7.17.5 Quench cracks 35
7.17.6 Process control plan 35

7.18 Visual inspection of drill-pipe body 35
7.18.1 General 35
7.18.2 Coverage 35
7.18.3 Disposition 35
7.18.4 Elephant hide 35
7.19 Non-destructive examination 36
7.19.1 General 36
7.19.2 Coverage 36
7.19.3 Applicable standards 36
7.19.4 Reference standards 37
7.19.5 Documented procedures 37
7.19.6 Inspection thresholds 37
7.19.7 Automated inspection-system signal evaluation 37
7.19.8 NDE system capability records 37
7.19.9 Evaluation of indications (prove-up) 38
7.19.10 Disposition of defects 38
7.20 Marking 39
7.20.1 General 39
7.20.2 Paint-stencilled marking sequence 39
7.21 Minimum facility requirements for drill-pipe-body manufacturer 40
7.22 Documentation requirements 40
7.22.1 Certificate of inspection 40
7.22.2 Tally list 41
7.22.3 Electronic data interchange 41
7.22.4 Retention of records 41

8 Requirements for tool joints 41
8.1 Information to be supplied when placing orders for tool joints 41
8.2 Dimensional requirements 42
8.2.1 General 42
8.2.2 Configuration 42
8.2.3 Tool-joint type 42
8.2.4 Dimensions 42
8.2.5 Rotary shouldered connection 42
8.3 Material requirements 42
8.3.1 Chemical composition 42
8.3.2 Tensile requirements 42
8.3.3 Hardness 43
8.3.4 Charpy V-notch absorbed energy requirements 43
8.4 Process of manufacture 43
8.4.1 Processes requiring validation 43
8.4.2 Material 43
8.4.3 Heat treatment 43
8.4.4 Threading 43
8.4.5 Surface treatment to minimize galling 44
8.4.6 Break-in procedure 44
8.4.7 Hard banding 44
8.4.8 Thread protection 44
8.5 Traceability 44
8.6 Testing — General 44
8.6.1 Test-equipment calibration 44
8.6.2 Heat-treatment lot 44
8.7 Testing of chemical composition 44
8.7.1 General 44
8.7.2 Product analyses 45
8.7.3 Test method 45
8.8 Tensile tests 45
8.8.1 Procedures 45
8.8.2 Test-equipment calibration 45

8.8.3 Test specimens 45
8.8.4 Frequency of test 45
8.8.5 Heat control tensile tests 45
8.8.6 Re-test 46
8.8.7 Defective specimens 46
8.9 Hardness tests 46
8.9.1 Procedure 46
8.9.2 Test specimen 46
8.9.3 Frequency of testing 46
8.9.4 Heat control hardness tests 46
8.9.5 Re-tests 46
8.10 Charpy V-notch impact tests 47
8.10.1 Procedures 47
8.10.2 Specimen size and location 47
8.10.3 Frequency of testing 47
8.10.4 Heat control test 47
8.10.5 Re-test 47
8.10.6 Defective specimens 48
8.11 Imperfections and defects 48
8.11.1 General 48
8.11.2 Surface breaking defects 48
8.11.3 Quench cracks 48
8.11.4 Process control plan 48
8.12 Non-destructive examination 48
8.12.1 General 48
8.12.2 Wet magnetic-particle inspection 48
8.12.3 Disposition of defects 49
8.13 Marking 49
8.13.1 General 49
8.13.2 Die stamp marking 49
8.14 Minimum facility requirements for tool-joint manufacturers 49
8.15 Documentation requirements for tool joints 50
8.15.1 Certificate of inspection 50
8.15.2 Electronic data interchange 50
8.15.3 Retention of records 51
Annex A (normative) **Tables in SI units** **52**
Annex B (normative) **Figures in SI (USC) units** **69**
Annex C (normative) **Tables in USC units** **81**
Annex D (normative) **Purchaser inspection** **98**
Annex E (informative) **Supplementary requirements** **99**
Annex F (informative) **Procedures used to convert from USC units to SI units for drill-pipe** **102**
Annex G (normative) **Product specification levels** **106**
Bibliography **108**