ISO 13680:2024-05 (E)

Oil and gas industries including lower carbon energy - Corrosion-resistant alloy seamless products for use as casing, tubing, coupling stock and accessory material - Technical delivery conditions

Contents

Page

Foreword vi

1 Scope 1

2 Normative references 1

3 Terms,definitions,abbreviatedtermsandsymbols 4
3.1 Terms and definitions 4
3.2 Abbreviated terms 6
3.3 Symbols 7

4 General 8
4.1 Dual normative references 8
4.2 Units of measurement 8

5 Information supplied by the purchaser 8

6 Manufacturing process 10
6.1 Melting practices 10
6.2 Product manufacturing process 10
6.3 Pipe end sizing 11
6.4 Straightening 11
6.5 Processes requiring validation 11
6.6 Traceability 12
6.7 Manufacturing procedure qualification test 12
6.8 Process for update of alloys and/or grades 12

7 Material requirements 12
7.1 Chemical composition 12
7.2 Tensile properties 13
7.3 Hardness properties 13
7.4 Charpy V-notch test properties -- General requirements 13
7.4.1 Evaluation of test results 13
7.4.2 Critical thickness 13
7.4.3 Specimen size, orientation and hierarchy 13
7.4.4 Alternative size impact test specimens 14
7.4.5 Sub-size test specimens 14
7.4.6 Test temperature 14
7.5 Charpy V-notch -- Absorbed energy requirements for coupling stock and accessory material -- All grades 14
7.5.1 General 14
7.5.2 Requirements for all grades 14
7.6 Charpy V-notch -- Absorbed energy requirements for pipe -- All grades 15
7.7 Flattening requirements 16
7.8 Charpy V-notch test properties at low temperature for group 2 16
7.8.1 General 16
7.8.2 Evaluation of test results 16
7.8.3 Selection of test specimens 17
7.8.4 Test temperature 17

7.8.5 Absorbed energy requirements 17
7.9 Corrosion properties 17
7.9.1 General 17
7.9.2 Pitting corrosion properties for group 2 17
7.10 Microstructure properties 17
7.10.1 Group 1 17
7.10.2 Group 2 17
7.10.3 Groups 3 and 4 18
7.11 Surface condition 18
7.12 Defects 18
7.12.1 Pipe 18

7.12.2 Coupling stock and accessory material 19
7.12.3 Process control plan 19

8 Dimensions, masses and tolerances 19
8.1 Outside diameter, wall thickness and mass 19
8.2 Length 19
8.3 Tolerances 19
8.3.1 Tolerance on outside diameter, wall thickness and mass 19
8.3.2 Inside diameter, d 20
8.3.3 Straightness 20
8.3.4 Drift requirements 20
8.4 Product ends 20

9 Inspection and testing 20
9.1 Test equipment 20
9.2 Type and frequency of tests 20
9.3 Testing of chemical composition 20
9.3.1 Chemical analysis 20
9.3.2 Test method 21
9.3.3 Chromium depletion test -- Groups 2, 3 and 4 21
9.4 Testing of mechanical characteristics 21
9.4.1 Test lot 21
9.4.2 Selection and preparation of samples and test pieces 21
9.5 Tensile test 21
9.5.1 Orientation and size of test pieces 21
9.5.2 Test method 21
9.5.3 Invalidation of test 22
9.5.4 Retest 22
9.6 Hardness test 22
9.6.1 Test pieces 22
9.6.2 Test method 22
9.6.3 Invalidation of tests 23
9.6.4 Periodic checks of hardness-testing machines 23
9.6.5 Verification of hardness-testing machines and indenters 24
9.6.6 Retests 25
9.7 Impact or flattening test 25
9.7.1 Test pieces 25
9.7.2 Frequency of testing 25
9.7.3 Impact test method 26
9.7.4 Flattening test method 26
9.7.5 Impact test retest 26
9.7.6 Flattening test retest 27
9.7.7 Invalidation of tests 27
9.8 Impact test at low temperature for group 2 27
9.9 Pitting corrosion test for group 2 27
9.10 Microstructural examination 28
9.10.1 Test pieces 28
9.10.2 Test method 28
9.10.3 Retest 29
9.11 Dimensional testing 29

9.11.1 General 29
9.11.2 Outside diameter 29
9.11.3 Wall thickness at end of products 29
9.11.4 Wall thickness of product body 30
9.12 Drift test 30
9.12.1 Non-upset and external upset pipe 30
9.12.2 Internal upset pipe 30
9.12.3 Drift mandrel coating 30
9.13 Length 30
9.14 Straightness 30

9.15 Mass determination 30
9.16 Visual inspection 30
9.16.1 General 30
9.16.2 Pipe body, coupling stock and accessory material 31
9.16.3 Pipe ends 31
9.16.4 Disposition 31
9.17 Non-destructive examination 31
9.17.1 General 31
9.17.2 NDE personnel 32
9.17.3 Products 32
9.17.4 Pup joints 32
9.17.5 Untested ends 32
9.17.6 Upset ends 33
9.17.7 Reference standards 33
9.17.8 NDE system capability records 33
9.17.9 All product group 1 34
9.17.10 Full-body NDE of product -- Groups 2, 3 and 4 34
9.17.11 Pipe, coupling stock and accessory material requiring further evaluation 34
9.17.12 Evaluation of indications (prove-up) 35
9.17.13 Disposition of pipe containing defects 35
9.17.14 Disposition of coupling stock and accessory material containing defects 36
9.18 Positive material identification 37

10 Surface treatment 37
10.1 Group 1 37
10.2 Groups 2, 3 and 4 37

11 Marking 38
11.1 General 38
11.2 Colour-code identification 38
11.3 Marking content and sequence 38
11.4 Marking for couplings, pup joints and accessories after threading 39

12 Surface protection -- Group 1 39

13 Documents 40
13.1 Electronic media 40
13.2 Retention of records 40
13.3 Test certificates 40

14 Handling, packaging and storage 41
14.1 General 41
14.2 Handling 41
14.3 Packaging 41
14.3.1 General 41
14.3.2 Identification 41
14.4 Storage 42

Annex A (normative) Tables in SI units 43

Annex B (normative) Figures in SI (USC) units 66

Annex C (normative) Tables in USC units 71

Annex D (normative) Purchaser inspection 94

Annex E (normative) Cleanliness requirements 95

Annex F (normative) Coupling blanks and accessory material from bar 97

Annex G (normative)Productspecificationlevel2(PSL-2) 111

Annex H (normative)Standardizedmanufacturingprocedurequalificationtest 113

Annex I (informative) Photographic examples of microstructures, groups 2, 3 and 4 117

Bibliography 121