

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