

DIN EN ISO 13679:2007-01 (E)

Petroleum and natural gas industries - Procedures for testing casing and tubing connections (ISO 13679:2002); English version EN ISO 13679:2006

Contents

Page

Foreword	5
Introduction	6
1 Scope.....	8
2 Normative references	8
3 Terms, definitions, symbols and abbreviated terms	9
3.1 Terms and definitions	9
3.2 Symbols and abbreviated terms	11
4 General requirements	15
4.1 Connection geometry, test load envelope and performance data sheet	15
4.2 Quality control	16
5 General test requirements.....	16
5.1 Test classes	16
5.2 Test matrix	17
5.3 Test programme	21
5.4 Calibration and accreditation requirements.....	22
5.5 Rehearsal tests.....	23
5.6 Material property tests.....	23
5.7 Make-up and break-out procedures	24
5.8 Internal pressure leak detection	25
5.9 Internal pressure leak trap device.....	25
5.10 External pressure leak detection.....	32
5.11 Data acquisition and test methods	35
5.12 Thermal cycling tests	37
6 Connection test specimen preparation	39
6.1 General connection test objectives	39
6.2 Connection test specimen identification and marking	40
6.3 Connection test specimen preparation	40
6.4 Connection test specimen machining	42
6.5 Machining tolerances	43
6.6 Tolerance limits on machining objectives.....	44
6.7 Grooved torque shoulder	44
7 Test procedures	45
7.1 Principle	45
7.2 Make-up/break-out tests.....	45
7.3 Test load envelope tests	47
7.4 Limit load tests	59
7.5 Limit load test path (see Figures 18 and 19).....	62
8 Acceptance criteria	64
8.1 Make-up and break-out tests	64
8.2 Test load envelope tests	65
8.3 Limit load tests	65
9 Test reports	66
Annex A (normative) Connection geometry and performance data sheet.....	67
Annex B (informative) Connection test load envelope and limit loads.....	74
Annex C (normative) Data forms	92

Annex D (normative) Connection full test report	122
Annex E (normative) Connection testing summary report.....	125
Annex F (informative) Frame load range determination	128
Annex G (informative) Interpolation and extrapolation considerations	129
Annex H (informative) Special application testing	131
Annex I (informative) Rationale for design basis	137
Annex J (normative) Independent seal testing of connections with metal-to-metal and resilient seals.....	140
Bibliography.....	146
Table 1 — Test matrix — Test series and specimen identification numbers.....	18
Table 2 — Connection test specimen objectives for all CAL.....	39
Table 3 — Guidelines for selecting connection test specimens for testing a metal-to-metal sealing, tapered thread connection with a torque shoulder.....	40
Table 4 — Tolerance limits on machining objectives.....	43
Table 5 — Specimen description and summary of test series for a metal-to-metal sealing, tapered thread connection with a torque shoulder	45
Table 6 — Test Series A load steps (see Figures 13 or 14, as applicable) — Testing in quadrants I, II, III, IV (no bending) at ambient temperature	49
Table 7 — Test Series B load steps without bending for connection rated equal to pipe body (see Figure 15) — Testing in quadrants I and II without bending at ambient temperature	53
Table 8 — Test Series B load steps with bending for connection rated equal to pipe body (see Figure 16) — Testing in quadrants I and II with bending at ambient temperature	54
Table A.1 — Connection geometry and performance property data sheet.....	68
Table A.2 — Example Series A test load envelope for a connection rated equal to pipe body — 178 mm $D \times 10,16$ mm wall thickness \times grade P-110 (7 in 29 lb/ft P-110) strength (see Figure A.1).....	69
Table A.3 — Detailed load steps	70
Table B.1 — Areas and dimensions	77
Table B.2 — Required dimensions for critical cross-section computation	91
Table F.1 — Typical results from frame load range determination (200 kN to 2 000 kN).....	128
Figure 1 — Connection application level test programme.....	19
Figure 2 — Collared leak trap device for internal pressure leak detection.....	26
Figure 3 — Flexible boot leak trap device for internal pressure leak detection	27
Figure 4 — Ported box leak trap device for internal pressure leak detection.....	27
Figure 5 — Internal pressure leak detection by bubble method	29
Figure 6 — Example of a plot for determining leak detection sensitivity.....	30
Figure 7 — Leak detection by helium mass spectrometer method	31
Figure 8 — Example set-up for Test Series A	32

Figure 9 — Example of leak detection system for Test Series A.....33

Figure 10 — Test Series C thermal/mechanical cycles for CAL II, III, and IV.....37

Figure 11 — Connection test specimen nomenclature and unsupported length41

Figure 12 — Torque shoulder pressure bypassing grooves.....44

Figure 13 — Test Series A load path for connection rated greater than or equal to pipe body
in compression.....51

Figure 14 — Test Series A load path for connection rated less than pipe body in compression52

Figure 15 — Test Series B load paths without bending for connection rated equal to pipe body.....56

Figure 16 — Test Series B load paths with bending for connection rated equal to pipe body57

Figure 17 — Test Series B load paths for connection rated less than pipe body in compression
and with bending58

Figure 18 — Limit load test paths for connections rated equal to or stronger than pipe body60

Figure 19 — Limit load test paths for connections weaker than pipe body61

Figure A.1 — Example series A test load envelope for a connection rated equal to pipe body
[178 mm $D \times 10,16$ mm wall thickness \times grade P-110 (7 in 29 lb/ft P-110)].....73

Figure B.1 — Pipe body and connection test load envelopes at specified dimensions75

Figure C.1 — Recommended layout of mother joints for test and material specimens.....93

Figure G.1 — Example premium connection design space130

Figure J.1 — Ported box leak trap device for internal pressure leak detection showing
modifications for resilient seal142

Figure J.2 — Connection acceptance levels with resilient seal ring.....143

Figure J.3 — Alternative testing sequence for a connection with metal-to-metal (MTM) and
resilient seal (RS) features145