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ADDENDUM 1

Page 16, **Section 4.6**, *delete the entire section and renumber all subsequent sections*:

4.6 Bore Size and Rated Working Pressure

The bore size and rated working pressure designation of a choke and kill system and the components shall consist of the values provided in Table 2, Table 3, and Table 4.

Page 35, **Table 10**, *replace with the following*:

Table 10—Quality Control Requirements for Bodies, Bonnets, Rigid Choke and Kill Lines, and End and Outlet Connections

Quality Requirement	Bodies, Bonnets, and End and Outlet Connections	Rigid Choke and Kill Lines
Tensile testing	7.4.6.2	Note
Impact testing	7.4.6.3	Note
Hardness testing	7.4.6.4	Note
Dimensional verification	7.4.6.5	Note
Traceability	7.4.6.6	Note
Chemical analysis	7.4.6.7	Note
Visual examination	N/A	Note
Surface NDE	7.4.6.9	Note
Volumetric NDE	7.4.6.10	Note
Serialization	7.4.6.13	Note
Weld NDE – General	7.4.6.11.1	7.4.6.11.1
Weld examination – Visual	7.4.6.11.2	7.4.6.11.2
Weld NDE – Surface	7.4.6.11.3	7.4.6.11.3
Weld NDE – Volumetric	7.4.6.11.4	7.4.6.11.4
Weld NDE – Hardness testing	7.4.6.11.5	7.4.6.11.5
Repair welds	7.4.6.12	7.4.6.12
NOTE Requirements for rigid piping (prior to assembly as Rigid Choke and Kill Lines) are found in Section 7.4.15.		

Page 53, **Section 7.5**, *replace the entire section with the following:*

7.5 Assembled Equipment

7.5.1 General: Quality Control Requirements

Quality control requirements for assembled equipment shall be performed as identified in Table 24.

7.5.2 Serialization

Assembled equipment shall be serialized.

7.5.3 Records

7.5.3.1 Traceability Record

A record shall be maintained in which serialized parts and individual heat traceable parts (except for replaceable parts, such as orifices and wear trim) are listed as traceable to the assembly.

Table 23—Quality Control Requirements for Male and Female Subs

Quality Requirement	Section
Tensile testing	7.4.6.2
Impact testing	7.4.6.3
Hardness testing	7.4.6.4
Dimensional verification	7.4.6.5
Traceability	7.4.6.6
Chemical analysis	7.4.6.7
Visual examination	N/A
Surface NDE	7.4.6.9
Volumetric NDE	7.4.6.10
Serialization	7.4.6.13
Weld NDE – General	7.4.6.11.1
Weld examination – Visual	7.4.6.11.2
Weld NDE – Surface	7.4.6.11.3
Weld NDE – Volumetric	7.4.6.11.4
Weld NDE – Hardness testing	7.4.6.11.5
Repair welds	7.4.6.12

Table 24—Quality Control Requirements—Assembled Equipment

Equipment Type	Activity				
	Hydrostatic Body Test	Seal Test	Functional Test	Traceability	Serialization
Positive Drilling Choke	7.5.5.2	7.5.5.3	N/A	7.5.3.1	7.5.2
Manually Actuated Drilling Choke	7.5.5.2	7.5.5.3	7.5.7.2	7.5.3.1	7.5.2
Drilling Choke Actuator	7.5.6.1[a] 7.5.6.2	7.5.6.4	7.5.6.3	7.5.3.1	7.5.2
Drilling Choke and Actuator Assembly	7.5.5.2 7.5.5.4[a]	7.5.5.3	7.5.7.3	7.5.3.1	7.5.2
Drilling Choke Control System	7.5.14.1	N/A	7.5.14.2	7.5.3.1	7.5.2
Articulated Choke and Kill Line	7.5.8	N/A	N/A	7.5.3.1	7.5.2
Flexible Choke and Kill Line	7.5.9	N/A	N/A	7.5.3.1	7.5.2
Union or Swivel Union	7.5.10	N/A	N/A	7.5.3.1	7.5.2
Rigid Choke and Kill Line	7.5.11	N/A	N/A	7.5.3.1	7.5.2
Buffer Chamber	7.5.12	N/A	N/A	7.5.3.1	7.5.2
Choke and Kill Manifold Assembly	7.5.13	N/A	N/A	7.5.3.1	7.5.2

[a] If applicable: See text.
N/A = Not Applicable.

7.5.3.2 Pressure Test Records

Tests shall be continuously recorded. The pressure test record shall identify the actual test pressure, the pressure-holding period, the recording device, and the assembly serial number and shall be dated and signed.

7.5.4 Hydrostatic Body Testing

7.5.4.1 General

Assembled equipment shall be subjected to a hydrostatic body test prior to final acceptance. Water or water with additives shall be used as the testing fluid. Body test pressure shall not be applied as a differential pressure across internal closure mechanisms of chokes or valves.

NOTE Tests may be completed prior to or after painting or coating.

7.5.4.2 Hydrostatic Body Test Method

The hydrostatic body test shall consist of the following steps:

1) the initial pressure-holding period of not less than three minutes;
2) the reduction of the pressure to zero;
3) the second pressure-holding period of not less than 15 minutes.

The timing of the test shall not start until the test pressure has been stabilized within the manufacturer's specified test range and the external assembly surfaces are dry.

7.5.4.3 Test Pressure

The minimum hydrostatic body test pressure shall be determined by the rated working pressure of the equipment and shall be as shown in Table 25.

Table 25—Minimum Hydrostatic Body Test Pressures

Rated Working Pressure [Units in psi (MPa)]	Hydrostatic Body Test Pressure, Minimum [Units in psi (MPa)]
2000 (13.80)	3000 (20.70)
3000 (20.70)	4500 (31.03)
5000 (34.50)	7500 (51.75)
6000 (41.40)	9000 (62.10)
7500 (51.75)	11,250 (77.63)
10,000 (69.00)	15,000 (103.50)
15,000 (103.50)	22,500 (155.25)
20,000 (138.00)	30,000 (207.00)

7.5.4.4 Acceptance Criteria

Test results shall be acceptable if there is no visible leakage during the hold periods. Pressure shall not vary from the test pressure at the start of the test by more than 5 % or 500 psi (3.45 MPa), whichever is less, during the entire hold period, and shall not drop below the test pressure.

7.5.5 Hydrostatic Testing for Adjustable and Positive Drilling Chokes

7.5.5.1 General

NOTE If the choke is prepared for installation of an actuator that includes body closure (e.g. the bonnet assembly), the tests of 7.5.5 may be conducted with a representative test fixture (dummy actuator) installed on the choke.

When a representative test fixture is used, the body-to-actuator connection test of 7.5.5.4 shall be performed.

7.5.5.2 Body Test

Each choke shall be subjected to a hydrostatic body test prior to final acceptance. The hydrostatic body test shall be in accordance with 7.5.4.

7.5.5.3 Hydrostatic Seat-to-body Seal Test

7.5.5.3.1 General

A hydrostatic seat-to-body seal test shall be performed by applying rated working pressure and holding for a minimum of five minutes.

NOTE A blind seat may be used.

7.5.5.3.2 Acceptance Criteria

Test results shall be acceptable if there is no visible leakage during the hold period. Pressure shall not vary from the test pressure at the start of the test by more than 5 % or 500 psi (3.45 MPa), whichever is less, during the entire hold period, and shall not drop below the test pressure.

7.5.5.4 Body-to-actuator Connection Test

If the wellbore pressure-containing parts of an actuated drilling choke and of the drilling choke actuator have been previously and separately subjected to body testing in accordance with 7.5.5.1 and 7.5.6.1.1, the body-to-actuator connection shall be tested after final assembly and prior to final acceptance. The test method shall conform to 7.5.4.2, the minimum test pressure shall be rated working pressure, and the acceptance criteria shall be as specified in 7.5.4.4.

7.5.6 Drilling Choke Actuators

7.5.6.1 Actuator Hydrostatic Body Test—Wellbore Pressure-containing Parts

7.5.6.1.1 General

If the drilling choke actuator assembly includes components that contain wellbore fluid and pressure when the actuator is installed on the drilling choke, such as the bonnet, stem, and stem seal, those components shall be subjected to hydrostatic body test to verify structural integrity of the pressure-containing parts prior to final acceptance.

This test shall be conducted with the actuator installed on the choke or with the actuator installed on a representative test fixture (dummy body). In the latter case, the body-to-actuator connection test of 7.5.5.4 shall also be performed when the actuator is installed on the choke.

7.5.6.1.2 Method, Test Pressure, and Acceptance Criteria

The hydrostatic body test of the actuator wellbore pressure-containing parts shall conform to 7.5.4.2, 7.5.4.3, and 7.5.4.4.

7.5.6.2 Actuator Hydrostatic Body Test—Control Fluid Pressure-containing Parts

7.5.6.2.1 General

Prior to final acceptance, each hydraulic or pneumatic actuator shall be subjected to an actuator hydrostatic body test to verify structural integrity of the parts that contain hydraulic or pneumatic control fluid.

7.5.6.2.2 Method

The test pressure of the actuator shall be a minimum of 1.5 times the maximum rated working pressure for hydraulic or pneumatic control fluid supplied to the actuator.

NOTE The actuator hydrostatic body test may be performed concurrently with the drilling choke control system test of 7.5.14. For hydraulic actuators, water (with or without additives) or other appropriate hydraulic fluid shall be the test medium.

For pneumatic actuators, water (with or without additives), nitrogen gas, air, or other appropriate gas or hydraulic fluid shall be used as the test medium.

Double-acting actuators shall be tested in both open and closed directions.

7.5.6.2.3 Acceptance Criteria

Test results shall be acceptable if there is no visible leakage during the hold periods. Pressure shall not vary from the test pressure at the start of the test by more than 5 % or 500 psi (3.45 MPa), whichever is less, during the entire hold period, and shall not drop below the test pressure.

NOTE Where gas is to be used as the test medium (nitrogen, air, or other appropriate gas), the acceptance criteria are defined in B.7.4.2.

7.5.6.3 Actuator Functional Test

7.5.6.3.1 Method

Each hydraulic or pneumatic actuator shall be tested for proper operation by cycling the actuator from the minimum stroke position to the maximum stroke position for a minimum of three cycles.

NOTE The actuator may be tested with the equipment for which it is intended or tested separately.

The test medium shall be suitable hydraulic fluid (for a hydraulic system) or a gas such as nitrogen, air, or other appropriate gas (for a pneumatic system).

7.5.6.3.2 Acceptance Criteria

The actuator shall operate smoothly in both directions.

7.5.6.4 Actuator Seal Test

7.5.6.4.1 Method

Actuator seals shall be pressure tested in two steps by applying pressure of 20 % and 100 % of the maximum rated working pressure to the actuator. The minimum test duration shall be ten minutes at 20 % and five minutes at 100 % for pneumatic actuators; three minutes at each test pressure for hydraulic actuators.

The test period shall not begin until the test pressure has stabilized and the pressure-monitoring device has been isolated from the pressure source. The test pressure and time for each hold period shall be recorded.

7.5.6.4.2 Acceptance Criteria

The actuator shall show no visible leakage during each hold period.

NOTE Where gas is to be used as the test medium (nitrogen, air, or other appropriate gas), the acceptance criteria are defined in B.7.4.2.

7.5.7 Functional Testing for Adjustable Drilling Choke Assemblies

7.5.7.1 General

The adjustable manual drilling choke or adjustable drilling choke and actuator assembly shall be tested in accordance with this section prior to final acceptance.

7.5.7.2 Manually Actuated Choke Torque Test

7.5.7.2.1 General

The breakaway and running torque for manually actuated chokes shall be measured and documented.

7.5.7.2.2 Method

The measurement method shall be documented by the manufacturer’s written specification.

7.5.7.2.3 Acceptance Criteria

The acceptance criteria shall be as follows:

a) continued smooth operation, without binding or chattering,

b) the operating force or torque shall be within the manufacturer’s specification.

7.5.7.3 Remotely Actuated Choke Functional Test

7.5.7.3.1 Method

Each remotely actuated drilling choke and actuator assembly shall be tested for proper operation by cycling the actuator from the minimum stroke position to the maximum stroke position for a minimum of three cycles, with the choke at its maximum rated working pressure. Test media shall be a suitable fluid or a gas such as air or nitrogen.

NOTE When a liquid is used to pressurize the choke, the choke pressure may be adjusted to allow for fluid displacement due to stem movement.

7.5.7.3.2 Acceptance Criteria

The choke and actuator shall operate smoothly in both directions.

7.5.8 Articulated Choke and Kill Lines

Each articulated choke and kill line assembly shall be subjected to a hydrostatic body test in accordance with 7.5.4 prior to final acceptance.

7.5.9 Flexible Choke and Kill Lines

Each flexible line assembly shall be subjected to a hydrostatic body test in accordance with 7.5.4, with the exception that there shall be a single hold period with minimum hold time of one hour.

7.5.10 Unions and Swivel Unions

Each union and swivel union shall be subjected to a hydrostatic body test in accordance with 7.5.4 prior to final acceptance.

7.5.11 Rigid Choke and Kill Line

Each rigid choke and kill line shall be subjected to a hydrostatic body test in accordance with 7.5.4 prior to final acceptance.

See Annex E for information on the evaluation of pipe thermal expansion.

7.5.12 Buffer Chamber

Each buffer chamber assembly shall be subjected to a hydrostatic body test in accordance with 7.5.4. The body test pressure shall be as specified in Table 25; however, for buffer chambers having connectors of more than one pressure rating, the test pressure shall be determined by the lowest rated working pressure.

7.5.13 Choke and Kill Manifold Assembly

The manifold assembly shall be subjected to a hydrostatic body test in accordance with 7.5.4. For manifolds assembled entirely with equipment that has been previously subjected to a hydrostatic body test, the test pressure shall be rated working pressure. For manifolds with untested components, other than loose connectors, the test pressure shall be as specified in Table 25.

NOTE Loose connectors, as defined in API Specification 6A, do not require hydrostatic testing.

Testing shall be performed prior to final acceptance. All equipment upstream of the choke isolation valve (1st valve downstream of the choke valve) shall be tested in accordance with the manifold inlet pressure rating. Equipment downstream of the choke isolation valve (1st valve downstream of the choke valve) shall be tested in accordance with the lowest pressure rated component.

7.5.14 Drilling Choke Controls

7.5.14.1 Pressure Test

7.5.14.1.1 General

The test shall be conducted on the control system of remotely controlled equipment. All components from the power unit outlet to the control line connectors shall be tested.

7.5.14.1.2 Method

The test shall be in accordance with 7.5.4, with the exception that the test pressure shall be a minimum of 1.5 times the hydraulic system rated working pressure. The test medium shall be suitable hydraulic fluid (for a hydraulic system) or a gas such as nitrogen, air, or other appropriate gas (for a pneumatic system).

7.5.14.1.3 Acceptance Criteria

There shall be no visible leakage during the hold period.

NOTE Where gas is to be used as the test medium (nitrogen, air, or other appropriate gas), the acceptance criteria are defined in B.7.4.2.

7.5.14.2 Functional Test

7.5.14.2.1 Method

The control system shall be function tested in accordance with the manufacturer's written procedures.

NOTE The test may be performed in conjunction with the functional test of the drilling choke and actuator assembly, at the manufacturer's option.

7.5.14.2.2 Acceptance Criteria

Acceptance criteria shall be as specified in the manufacturer's written procedures.

Page 72, **Section 10.8.7**, *change*:

10.8.7 Length Tolerance

The standard overall length tolerances of flexible lines 20 ft (6 m) and under shall be ±2$^{1}/_{2}$ in. (65 mm) with the tolerance of longer lines being ±2 %. The standard tolerance for length change from atmospheric to working pressure is a maximum of ±2 % of the overall length.

The length tolerance for LMRP choke and kill lines shall be specified by the manufacturer, after length and orientation modelling are completed.

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10.8.7 Tolerances

The standard overall length tolerances of flexible lines 20 ft (6 m) and under shall be ±2$^{1}/_{2}$ in. (64 mm) with the tolerance of longer lines being ±2 %. The standard tolerance for length change from atmospheric to working pressure is a maximum of ±2 % of the overall length.

The length tolerance for LMRP choke and kill lines shall be specified by the manufacturer, after length and orientation modeling is completed.

Flexible choke and kill lines shall be full bore, with actual inside diameter not lower than 95 % of their nominal inside diameter at their narrowest point, including end termination and end connector.

Page 90, **Section B.10.4**, *change*:

A dynamic test at room temperature shall be performed as follows.

1) With the choke closed, apply rated working pressure at room temperature
2) Open the choke, depressurize the system.
3) Close the choke.
4) Repeat the process a minimum of 160 times fully open to fully closed and back to fully open.

Mating parts shall be free of lubrication not specified in the manufacturing assembly procedures or maintenance procedures. Stem cycle operation shall be smooth and without binding or chattering during operational cycles in accordance with the manufacturer's written specification. Additionally, there shall be no visible leakage during the dynamic testing.

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A dynamic test at room temperature shall be performed as follows.

1) With the choke closed, apply rated working pressure at room temperature.
2) Open the choke, while maintaining the pressure.
3) Close the choke.
4) Repeat steps 1–3 a minimum of 160 times.

The test fluid shall be water, water with additives, or gas. Mating parts shall be free of lubrication not specified in the manufacturing assembly procedures or maintenance procedures. Stem cycle operation shall be smooth, i.e. without binding or chattering, during operational cycles, in accordance with the manufacturer's written specification. Additionally, there shall be no visible leakage during the dynamic testing.

Page 90, **Section B.10.5**, *change*:

A dynamic test at maximum rated temperature shall be performed as follows.

1) With the choke fully closed, apply rated working pressure and maximum rated temperature.
2) Open the choke, depressurize the system.
3) Close the choke.
4) Repeat the process a minimum of 20 times fully open to fully closed and back to fully open.

The test fluid shall be water, water with additives, or gas. Mating parts shall be free of lubrication not specified in the manufacturing assembly procedures or maintenance procedures. Stem cycle operation shall be smooth and without binding or chattering during operational cycles in accordance with the manufacturer's written specification.

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A dynamic test at maximum rated temperature shall be performed as follows.

1) With the choke closed, apply rated working pressure and maximum rated temperature.
2) Open the choke, while maintaining the pressure.
3) Close the choke.
4) Repeat steps 1–3 a minimum of 20 times.

The test fluid shall be water, water with additives, or gas. Mating parts shall be free of lubrication not specified in the manufacturing assembly procedures or maintenance procedures. Stem cycle operation shall be smooth, i.e. without binding or chattering, during operational cycles, in accordance with the manufacturer's written specification.

Page 90, **Section B.10.6**, *change*:

A dynamic test at minimum rated temperature shall be performed as follows.

1) With the choke fully closed, apply and maintain rated working pressure and minimum rated temperature.
2) Open the choke, depressurize the system.
3) Close the choke.
4) Repeat the process a minimum of 20 times fully open to fully closed and back to fully open.

The test fluid shall be water or water with additives. Mating parts shall be free of lubrication not specified in the manufacturing assembly procedures or maintenance procedures. Stem cycle operation shall be smooth and without binding or chattering during operational cycles in accordance with the manufacturer's written specification.

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A dynamic test at minimum rated temperature shall be performed as follows.

1) With the choke closed, apply and maintain rated working pressure and minimum rated temperature.
2) Open the choke, while maintaining the pressure.
3) Close the choke.
4) Repeat steps 1–3 a minimum of 20 times.

The test fluid shall be water, water with additives, or gas. Mating parts shall be free of lubrication not specified in the manufacturing assembly procedures or maintenance procedures. Stem cycle operation shall be smooth, i.e. without binding or chattering, during operational cycles, in accordance with the manufacturer's written specification.

Page 91, **Section B.10.7**, *change*:

The pressure-temperature cycles shall be performed with the choke partially open following these steps.

1) Raise temperature to room temperature.
2) Apply testing pressure at room temperature and maintain while raising temperature to maximum rated temperature.
3) Hold pressure and temperature for 1 h minimum.
4) Reduce to minimum rated temperature while maintaining test pressure.
5) Hold pressure and temperature for 1 h minimum.
6) Raise to room temperature while maintaining test temperature.
7) Release pressure and raise temperature to maximum rated value.
8) Apply testing pressure and hold for 1 h minimum.
9) Release pressure and reduce temperature to minimum rated temperature.
10) Apply test pressure and hold for 1 h minimum.
11) Release pressure and raise to room temperature.
12) Apply testing pressure and hold for 1 h minimum.
13) Release pressure.

The test fluid shall be water or water with additives. The test results shall be acceptable if during this test there is no visible leakage.

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The pressure-temperature cycles shall be performed with the choke partially open, following these steps.

1) Raise temperature to room temperature.
2) Apply test pressure at room temperature and maintain within 50 % and 100 % of the test pressure while raising temperature to maximum rated temperature.
3) Hold test pressure (100 %) and temperature for one hour minimum.
4) Reduce to minimum rated temperature while maintaining pressure within 50 % to 100 % of the test pressure.
5) Hold test pressure (100 %) and temperature for one hour minimum.
6) Raise to room temperature while maintaining pressure within 50 % to 100 % of the test pressure.
7) Release pressure and raise temperature to maximum rated value.
8) Apply test pressure (100 %) while maintaining temperature and hold for one hour minimum.
9) Release pressure and reduce temperature to minimum rated temperature.
10) Apply test pressure (100 %) while maintaining temperature and hold for one hour minimum.
11) Release pressure and raise to room temperature.
12) Apply test pressure (100 %) while maintaining temperature and hold for one hour minimum.
13) Release pressure.

The test fluid shall be water, water with additives, or gas. The test results shall be acceptable if during this test there is no visible leakage.

Page 95, **Section B.12.3.2**, *change*:

The line shall be pressurized three separate times to the rated working pressure (+0, –500 psi [3.45 MPa], or −5 %, whichever is less) and rated temperature (±10 °F, [±5.6 °C]). The first pressurization shall be held for 24 h. The second and third pressure applications shall be held for 12 h. After each cycle the line shall be vented and held for at least one hour at atmospheric pressure between pressure applications. The rate of venting shall be 1000 psi/min (6.9 MPa/min) +100 psi/minute (0.69 MPa/min) from rated working pressure down to 1000 psi (69 MPa).

Following completion of Series 1 testing, the flexible line shall maintain the minimum ID in accordance with manufacturer's written specification.

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The line shall be pressurized three separate times to the rated working pressure (+0, –500 psi [3.45 MPa], or −5 %, whichever is less) and rated temperature (±10 °F [±5.6 °C]). The first pressurization shall be held for 24 hours. The second and third pressure applications shall be held for 12 hours.

At the end of each pressure cycle, the line shall be vented in a single operation down to atmospheric pressure and the line shall remain for at least one hour at atmospheric pressure between pressure applications.

The venting rate shall be a minimum of 1000 psi/min (6.9 MPa/min) +100 psi/min (0.69 MPa/min) from rated working pressure down to 1000 psi (69 MPa). Below 1000 psi, venting shall be free of constraints to prevent retaining part of internal pressure into the flexible pipe.

Following completion of Series 1 testing, the flexible line shall maintain ID with a maximum of 10 % bore reduction compared with nominal flexible pipe ID.

Page 97, **Section B.13**, *add new sections and renumber all subsequent sections*:

B.13 Design Validation of Buffer Chamber

Design validation requirements for the choke and kill manifold buffer chamber shall be satisfied by the hydrostatic test specified in 7.5.12.

B.14 Design Validation of Choke and Kill Manifold Assembly

Design validation requirements for the choke and kill manifold assembly shall be satisfied by the hydrostatic test specified in 7.5.13.