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SPECIFICATION: **G-8204-6**

TITLE: **PRESSURE TESTING REQUIREMENTS FOR NEW AND REPLACEMENT GAS MAINS AND SERVICES**

VOLUME: **2 (Section 8.0) and 10**

REGISTRATION NO: **GAS0219**

TARGET TRAINING GROUPS: **Gas Construction, Emergency Response Force (ERF), Gas Transmission Engineering, Gas Distribution Engineering, Per Diem, Gas Contractors, and Construction Management**

REVISIONS: (See ★)

1) This specification has been rewritten in its entirety.

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Gas Operations Standards

TITLE: PRESSURE TESTING REQUIREMENTS FOR NEW AND REPLACEMENT GAS MAINS AND SERVICES

EFFECTIVE DATE: August 26, 2013

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1.0 SCOPE

This specification details the requirements for pressure testing new/replacement mains and services and cured-in-place liners for mains and services.

2.0 LEGAL REQUIREMENTS

This specification is in compliance with the applicable sections stipulated in:

- Code of Federal Regulations, Title 49, Part 192, "Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards."
- Rules and Regulations of the State of New York, Public Service Commission, 16 NYCRR Part 255, "Transmission and Distribution of Gas."
- PSC Order dated 6/29/83 and PSC Correspondence dated 10/20/93 and 3/2/95 (Requirement that 10% of all pressure tests be randomly witnessed by a Company Supervisor)

3.0 DEFINITIONS

3.1 Distribution Main/ Service – A gas main or service operating at less than 125 psig.

3.2 Transmission Main – A gas main service operating at 125 psig or more.

4.0 GENERAL REQUIREMENTS

4.1 All individuals preparing for or performing a main/service pressure test shall be Operator Qualified (or under the direction and observation of one who is qualified) to perform the "covered task" of pressure testing.

4.2 The source of the pressure shall be isolated and the proper pressure stabilized before the required duration of the pressure test can commence.

4.3 All pressure testing shall be performed with due diligence for the safety of Company employees, gas contractors, the general public, and public property.

4.4 All Company personnel, Per Diem, and Gas Contractors shall remain outside the excavation while the pressure test is initiated, except for personnel who are directly responsible for initiating the pressure test. Once the test pressure is reached, all personnel directly responsible for initiating the pressure test shall exit and remain outside the excavation.

4.0 **GENERAL REQUIREMENTS** (Continued)

After the test pressure is reached and stabilized for at least 15 minutes, all exposed fittings, joints and plastic pipe/ tubing shall be checked for leakage with a leak detecting solution. Except for personnel who are directly responsible for performing these leakage checks, all Company personnel, Per Diem, and Gas Contractors shall remain outside the excavation while the pressure test is in progress.

4.5 If any pressure test does not indicate a sound, gas-tight piping system, corrective measures shall be taken and then another pressure test shall be conducted.

5.0 **PRESSURE TESTING REQUIREMENTS FOR DISTRIBUTION MAINS/ SERVICES**

5.1 See Specifications G-8005, "General Specification for the Installation of Gas Distribution Mains" and G-8100, "General Specification for the Installation of Gas Distribution Services" for all environmental requirements.

5.2 Approved End Closures for Pressure Testing Steel Distribution Mains/ Services

A) Welded line (end) cap: all sizes.

B) Blind flange: all sizes.

C) Threaded line (end) cap: only sizes up to and including 4".

D) Restraining type compression line (end) cap: ¾" through 12", except for 10". (See Section 5.5)

E) Non-restraining type compression line (end) cap: all sizes. (See Section 5.6)

5.3 Approved End Closures for Pressure Testing Plastic Distribution Mains/ Services

A) Fused plastic end cap: all IPS sizes.

B) Service head or stab end adapter with stiffener and with an end closure (threaded end cap or valve): sizes up to and including 2" IPS.

C) Met-Fit, LycoFit, or Perfection caps: sizes up to and including 1 ¼" CTS.

D) McElroy Test Caps: sizes up to and including 2" IPS.

E) Restraining type compression end cap: IPS sizes up to and including 12", except for 10". (See Section 5.5)

5.0 **PRESSURE TESTING REQUIREMENTS FOR DISTRIBUTION MAINS/ SERVICES** (Continued)

5.4 Approved End Closures for Pressure Testing Copper Distribution Services

A) Restraining type compression end cap (IPS size) with gasket adapter for CTS: sizes 1" and 1 ¼".

B) Service head or stab end adapter (for copper only) with an end closure (threaded end cap or valve): sizes up to 1 ¼" CTS.

C) Restraining type compression coupling (for copper to IPS), with a plastic pipe and compression line (end) cap. The coupling is not restraining on the copper size.

5.5 Compression Line (End) Caps

A) All **restraining type** compression line (end) caps **shall be braced** to prevent movement or pullout during the pressure test. See Specification G-8153, "Reinforcing Compression Fittings."

NOTE: The reuse of a **restraining type compression line** (end) cap is permissible, provided that the cap is inspected for wear, tear, and damage *before each reuse.* The cap shall be replaced if there are any worn/damaged parts (e.g. gasket, grip ring, back up ring, bolts, etc.).

B) For 90 psig pressure test, **non-restraining type** compression line (end) caps shall be secured as follows:

- Line cap sizes ¾" to 2" shall be **braced**.
- Line cap sizes 3" to 30" and greater shall be **reinforced per Drawing EO-16031-B**, "Reinforcement of Non-Restraining Type Compression Line Caps on 3" to 30" Dia. Steel Gas Mains and Services."

C) For 150 psig pressure test, **non-restraining type** compression line (end) caps shall be secured as follows:

- Line cap sizes ¾" to 1 ¼" shall be **braced**.
- Line cap sizes 1 ½" and greater shall be **reinforced per Drawing EO-16031-B.**

D) See G-8153 and G-100,285, "Compression End Couplings, Tees, Elbows, Line Caps, and Riser Tees for Gas Pipe and Tubing" for approved compression couplings, caps, and fittings.

5.0 **PRESSURE TESTING REQUIREMENTS FOR DISTRIBUTION MAINS/ SERVICES** (Continued)

5.6 Compression Fittings

A) Exposed **non-restraining type** compression fittings (couplings, tees, elbows, and riser tees) to be included in a pressure test shall first **be reinforced** per Drawing EO-16880-B, "Reinforcement of Non-Restraining Compression Couplings for 2" to 24" Dia. Mains."

B) Exposed **restraining type** compression fittings do not require reinforcement.

C) When Company M&S plates or layouts indicate that **buried (non-exposed) non-restraining type** compression fittings will be included in a pressure test, the embedment calculation shall be performed to determine if reinforcement is required. See Specification G-8153.

5.7 Cured In Place Liners

For pressure testing mains/ services with cured in place liners, all buried non-restraining compression couplings or joints must be reinforced per Specification G-8153. If impractical to reinforce the compression couplings or joints, **the end of the pipe must be anchored or braced to prevent movement or pullout during the pressure test.** Contact Gas Distribution Engineering to design the required anchoring or blocking the ends of the pipe.

5.8 Maximum Allowable Operating Pressure (MAOP)

Most of the high-pressure distribution systems in the CECONY service territory have a Maximum Allowable Operating Pressure (MAOP) of 99 psig **except for:**

- MAOP of 80 psig – 3rd Ward (Queens)
- MAOP of 75 psig – Hell Gate (Bronx)
- MAOP of 60 psig – East 180th St/Bronx Zoo and Rikers Island (Bronx), Yorktown, and Cortlandt (Westchester)

5.9 Distribution Mains

A) All "tie-in sections" (that are not part of the pressure test) on distribution mains shall be soap tested for leakage with leak detecting solution **only after** the line has been gassed-in and the line pressure has been achieved.

5.0 **PRESSURE TESTING REQUIREMENTS FOR DISTRIBUTION MAINS/ SERVICES** (Continued)

5.9 Distribution Mains (Continued)

B) Exposed Sections of Steel Main 100' or Less

- Soap test all joints/welds, uncoated portions of longitudinal seams, and exposed fittings after the pipe has been gassed-in and the line pressure has been achieved.

C) Exposed Sections of Direct Buried Plastic Main 100' or Less

- Soap test the entire pipe length after the pipe has been gassed-in and the line pressure has been achieved.

D) Sections of Main Greater Than (>) 100' and less than or equal to (≤) 1000'

- The test medium shall be air or an inert gas. Water shall be used only when directed by Gas Transmission Engineering or Gas Distribution Engineering.
- The minimum test pressure (after stabilization) shall be **1 ½ times the MAOP or 90 psig**, whichever is greater, **for a minimum of one (1) hour.** A calibrated pressure gauge that will indicate two (2) psig increments or less shall be used for testing.

E) Sections of Main Greater Than (>) 1000'

- The test medium shall be air or an inert gas. Water shall be used only when directed by Gas Transmission Engineering or Gas Distribution Engineering.
- The minimum test pressure (after stabilization) shall be **1 ½ times the MAOP or 90 psig**, whichever is greater, **for a minimum of two (2) hours.** A calibrated pressure gauge that will indicate two (2) psig increments or less shall be used for testing.

F) Plastic Main Insertions

- The test medium shall be air or an inert gas. The minimum test pressure shall be **1 ½ times the MAOP or 90 psig**, whichever is greater. A calibrated pressure gauge that will indicate two (2) psig increments or less shall be used for testing.

5.0 **PRESSURE TESTING REQUIREMENTS FOR DISTRIBUTION MAINS/ SERVICES** (Continued)

F) Plastic Main Insertions (Continued)

- For insertions 1000' or less, the test duration (after stabilization) shall be a **minimum of one (1) hour**.

  Alternatively, the test duration may be **30 minutes prior to insertion**, followed by a **30 minute test after insertion** and a visible inspection of the plastic pipe for damage (i.e., gauges, scrapes, dents) per Specification G-8005.

- For insertions greater than (>) 1000', the test duration (after stabilization) shall be a **minimum of two (2) hours**.

  Alternatively, the test duration may be **1 ½ hours prior to insertion**, followed by a **30 minute test after insertion** and a visible inspection of the plastic pipe for damage (i.e., gauges, scrapes, dents) per Specification G-8005.

- All "aboveground" pressure testing shall be performed with "extra due diligence" to secure the pipe during the pressure test for the safety of employees, contractors, and the general public.

  "Aboveground" pressure tests shall be limited to less than or equal to (≤) 4" diameter plastic pipe (straight and coiled).

- "Aboveground" pressure tests on greater than or equal to (≥) 6" diameter plastic pipe (straight and coiled) must be reviewed and approved by Gas Transmission Engineering or Gas Distribution Engineering.

5.10 Distribution Services

A) The test medium shall be air or inert gas. The test pressure shall be 90 psig or 1 ½ times the MAOP, **whichever is greater**.

For tests on service lines to operate at less than 100 psig, the test indicator must be such that any loss of pressure can be readily detected.

5.0 **PRESSURE TEST REQUIREMENTS FOR DISTRIBUTION MAINS/ SERVICES** (Continued)

5.10 Distribution Services (Continued)

B) The test duration shall be as follows:

- 2" diameter and smaller - **15 minutes**
- Greater than 2" diameter - **30 minutes**

C) The limits of the pressure test shall be as follows. The service connection to the main need not be included in these tests if it is not feasible to do so. However, it must be soap tested at line pressure.

1. Inside meter or meter/regulator set

   From the main to the first fitting inside the wall of the customer's structure through which the service enters.

2. Outside meter or meter/ regulator set

   From the main to the meter riser valve (service head valve), if any, or the first fitting on the riser upstream of the regulator where one is installed.

3. Inside meter with an outside regulator

   From the main to the first fitting on the riser upstream of the regulator.

5.0 **PRESSURE TESTING REQUIREMENTS FOR DISTRIBUTION MAINS/ SERVICES** (Continued)

Table 1: Pressure Testing Requirements for Steel and Direct Buried Plastic Distribution Mains

MATERIAL	LENGTH	TEST METHOD	TEST PRESSURE	PRESSURE DURATION (after stabilization)
Steel & Plastic Mains	Tie-In Sections	Soap test joints/ welds, uncoated sections, & exposed fittings	Line Pressure	N/A
Exposed Steel Mains	100' or less	Soap test joints/ welds, uncoated sections, & exposed fittings	Line Pressure-	N/A
Exposed Plastic Mains	100' or less	Soap test entire length of pipe	Line Pressure	N/A
Steel & Plastic Mains	> 100' & ≤ 1000'	Pressure test with air or inert gas	1 ½ times MAOP **OR** 90 psig (whichever is greater)	One (1) hour
Steel & Plastic Mains	> 1000'	Pressure test with air or inert gas	1 ½ times MAOP **OR** 90 psig (whichever is greater)	Two (2) hours

Table 2: Pressure Testing Requirements for Plastic Distribution Main Insertions

MATERIAL	LENGTH	TEST METHOD	TEST PRESSURE	PRESSURE DURATION (after stabilization)
Plastic Main Insertions	≤ 1000'	Pressure test with air or inert gas	1 ½ times MAOP **OR** 90 psig (whichever is greater)	One (1) hour **OR** 30 minutes prior to insertion **AND** 30 minutes after insertion
Plastic Main Insertions	> 1000'	Pressure test with air or inert gas	1 ½ times MAOP **OR** 90 psig (whichever is greater)	Two (2) hours **OR** 1 ½ hours prior to insertion **AND** 30 minutes after insertion

Table 3: Pressure Testing Requirements for Distribution Services

MATERIAL	Service Size	TEST METHOD	TEST PRESSURE	PRESSURE DURATION (after stabilization)
Plastic, Copper, or Steel	≤ 2"	Pressure test with air or inert gas	1 ½ times MAOP **OR** 90 psig (whichever is greater)	15 minutes
Plastic, Copper, or Steel	> 2"	Pressure test with air or inert gas	1 ½ times MAOP **OR** 90 psig (whichever is greater)	30 minutes
At line pressure, soap test service connection to main.				

6.0 PRESSURE TESTING REQUIREMENTS FOR TRANSMISSION MAINS/ SERVICES

6.1 Notification

At least five (5) business days prior to starting the pressure test, Gas Transmission Engineering shall notify the Gas and Water Division of the Department of Public Service (PSC). In order to maintain continuity of service during emergencies, shorter notice is permissible. Pressure tests are not considered satisfactory, unless certified by a designated PSC inspector.

6.2 The test medium shall be water.

The discharge of water from a hydrostatic pressure test (process or industrial wastewater) to publicly owned sewer systems is regulated. Refer to CEP 02.04, "Wastewater Discharges to Publicly Owned Sewer Systems or On-Site Septic Disposal Systems" for the requirements for proper discharge of this wastewater. A pig, sphere, or similar equipment shall be used to remove any remaining water from the tested pipe, where practical, and shall be disposed of in the proper manner. Contact Gas EH&S for assistance.

6.3 Each segment of a new/replaced steel transmission main/service must be strength tested in accordance with this section to substantiate the proposed MAOP.

NOTE: The section of pipe to be used for the "tie-in piece" shall have been previously strength tested in accordance with this section.

The "tie-in welds" shall be tested for leakage (a soap test is acceptable) **only after** the line has been gassed-in and the line pressure has been achieved.

6.4 The minimum test pressure shall be 1 ½ times the MAOP.

6.5 Test Duration (after pressure stabilization)

- 12 hours
- 4 hours for a short length of pipeline (100 feet or less), which has not been backfilled and where, throughout its entire length, its entire circumference can be readily examined visually for the detection of leaks.

  NOTE: Contact the PSC for concurrence to perform a 4 hour test for exposed lengths greater than 100 feet.
- 2 hours for transmission service lines 2" diameter and smaller.

6.0 **PRESSURE TESTING REQUIREMENTS FOR TRANSMISSION MAINS/ SERVICES** (Continued)

6.6 A calibrated pressure gauge, with increments of 5 psig or less, and a dead-weight tester shall be used. Dead-weight tester readings shall be taken at least hourly for the first and last two hours of the test. Calibrated pressure, temperature (pipe and ambient), and dead-weight tester readings shall be recorded per Section 9.5.

7.0 **WITNESS REQUIREMENTS FOR PRESSURE TESTING DISTRIBUTION MAINS/ SERVICES**

7.1 Pressure tests performed by Company crews and Per Diem on all **distribution mains (10" diameter and less) and services** shall be witnessed and documented (including employee number and his/her initials or signature) by any of the following:

- Company Gas Supervisor
- Company Operator Qualified Gas Mechanic
- Operator Qualified Per Diem Gas Mechanic (Operating Engineer)

7.2 A Company Gas Supervisor must witness and document (including employee number and his/her initials or signature) at least **fifty percent (50%)** of all pressure tests on distribution services performed by Company crews, Per Diem, and Gas Contractors managed by Gas Operations. This fifty percent (50%) shall be randomly selected without prior notification to the person performing the actual construction and gassing-in of the service line.

7.3 Pressure tests performed by Company crews and Per Diem on all **distribution mains 12" and larger** shall be witnessed and documented (including employee number and his/her initials or signature) by a Company Operator Qualified (OQ) Gas Supervisor.

7.0 **WITNESS REQUIREMENTS FOR PRESSURE TESTING DISTRIBUTION MAINS/ SERVICES** (Continued)

7.4 Pressure tests performed by all Gas Contractors on all **distribution mains and services** shall be witnessed and documented (including employee number and his/her initials or signature) as follows:

A) Distribution Services (all sizes)

- A Company Gas Supervisor, Construction Representative (CR), Company Construction Inspector (CI), or Chief Construction Inspector (CCI) shall witness and document **at least fifty percent (50%)** of all Gas Contractor performed pressure tests on services. (See Section 7.2)

- The **remaining fifty percent (50%)** shall be witnessed and documented by an Operator Qualified Gas Contractor Mechanic (Operating Engineer).

B) Distribution Mains (10" and smaller)

- A Company Gas Supervisor, CR, CI, or CCI shall witness and document **one hundred percent (100%)** of Gas Contractor performed pressure tests on distribution mains 10" and less in diameter.

C) Distribution Mains (12" and larger)

- An OQ CCI or a Company OQ Gas Supervisor shall witness and document **one hundred percent (100%)** of Gas Contractor performed pressure test on mains 12" and larger in diameter. If a CCI is not Operator Qualified, then the pressure test shall be witnessed by both the CCI **and** a Company OQ Gas Supervisor together.

7.0 **WITNESS REQUIREMENTS FOR PRESSURE TESTING DISTRIBUTION MAINS/ SERVICES** (Continued)

Table 4: Witness Requirements for Pressure Testing Distribution Main/Services

PRESSURE TEST PERFORMED BY	SERVICES	MAINS ≤ 10"	MAINS ≥12"
Company Personnel	≥ 50% random witness by Company Gas Supervisor Remainder by Company OQ Gas Mechanic	100% by Company Gas Supervisor **OR** Company OQ Gas Mechanic	100% by Company OQ Gas Supervisor
Per Diem	≥ 50% random witness by Company Gas Supervisor Remainder by Company OQ* Per Diem Gas Mechanic	100% by Company Gas Supervisor **OR** OQ Per Diem Gas Mechanic	100% by Company OQ Gas Supervisor
Gas Contractors Managed by Gas Ops	≥ 50% random witness by Company Gas Supervisor Remainder by Contractor OQ Gas Mechanic	100% by Company Gas Supervisor	100% by Company OQ Gas Supervisor
Gas Contractors Managed by Construction Management	≥ 50% random witness by Company CR, CI, OR CCI Remainder by Contractor OQ Gas Mechanic	100% by Company CR, CI, **OR** CCI	100% by Company OQ CCI **OR** Company CCI together with Company OQ Gas Supervisor

OQ = Gas Operator Qualified, CR = Construction Representative, CI = Construction Inspector, CCI = Chief Construction Inspector

8.0 **WITNESS REQUIREMENTS FOR PRESSURE TESTING TRANSMISSION MAINS/ SERVICES**

8.1 An engineer from Gas Transmission Engineering must witness and document (including employee number and his/her signature) the results of all pressure tests performed on **transmission mains/ services**. An inspector from the PSC shall also certify the satisfactory completion of the pressure test.
(See Section 9.1)

9.0 RECORDS AND RETENTION

9.1 A record of **distribution main/service** pressure tests shall be made and shall contain at least all of the following information:

1. Name and employee number Company Operator Qualified Gas Mechanic or Operator Qualified Contractor Gas Mechanic (Operating Engineer) performing the pressure test and also the name, employee number, and signature/initials of the witness (if required).
2. Test medium used (if other than air)
3. Test pressure
4. Test duration
5. Location and date of test
6. Length, diameter, material, and line pressure of the main/service tested

9.2 Pressure test results for **distribution mains** shall be recorded on the "Emergency Sketch" or "As-Constructed" drawing. Pressure test results for **distribution services** shall be recorded on the 50-13R (or electronic equivalent) or "Opening Ticket."

9.3 The respective Area Gas Operations organization where the distribution main/service is installed shall retain the pressure test records as follows:

- Pressure test records for distribution mains shall be retained for the useful life of the pipeline.
- Pressure test records for distribution services shall be maintained for at least 5 years.

9.4 The respective organization that witnesses the pressure test shall track the pressure tests performed by either their Company personnel or the Gas Contractors they manage to ensure the required witness percentages are achieved annually.

9.5 Pressure tests for **transmission mains/ services** shall be recorded on a pressure chart, temperature (pipe and ambient) chart, and pressure/temperature table. The pressure/temperature table shall be initialed/ signed by the following:

- Engineer from Gas Transmission Engineering who witnesses the pressure test (include his/her employee number)
- Mechanic from Pressure Control who records pressure and temperature during test (including his/her employee number)
- PSC Inspector

9.0 **RECORDS AND RETENTION** (Continued)

9.6 Gas Transmission Engineering shall retain the transmission mains/ services pressure test records per Specification G-8218, "Gas Transmission Records Management and Retention."

10.0 **REFERENCES**

EO-15185-A	Reinforcement of Buried Compression Line Caps Installed On Cast Iron Mains (Attached to G-8153)
EO-16031-B	Reinforcement of Non-Restraining Type Compression Line Caps on 3" t 30" Diameter Steel Gas Mains and Services (Attached to G-8153)
EO-16880-B	Reinforcement of Non-Restraining Compression Couplings For 2" – 24" Diameter Steel Mains (Attached to G-8153)
G-8005	General Specification for the Installation of Gas Distribution Mains
G-8100	General Specification for the Installation of Gas Services
G-8149	Responsibility for Maintenance/ Replacement of Gas Services and Testing Requirements for Temporarily Disconnected Gas Service
G-8153	Reinforcing Buried Compression Fittings
G-8218	Gas Transmission Records Management and Retention
G-100,285	Compression End Couplings, Tees, Elbows, Line Caps, and Riser Tees for Gas Pipe and Tubing
CEP 02.04	Wastewater Discharges To Publicly Owned Sewer Systems Or On-Site Septic Disposal Systems

- PSC Case 15686, order dated 6/29/83 and issued 7/11/83 – Order directing Con Edison to revise its construction standards to require a Company Supervisor to witness and endorse the record of each service line pressure test.
- Case 94-G-0650, AVP Mr. V. Richard Conforti letter dated 10/20/93 to the Honorable John J. Kelliher, Secretary, State of New York, Public Service Commission (Letter petitions relief from 100% service witness by Company Supervisor)
- PSC Recommendation at the Session of 2/22/95. Issued and effective 3/2/95 Recommendation reduces 100% service pressure test witness by Company Supervisor to 10% random witness.
- In January, 2003, Construction Management Best Practices Committee recommended the pressure test witnessing be increased as discussed in Section 7.0