



GAS OPERATING AND MAINTENANCE PROCEDURES MANUAL

SECTION 8. OPERATIONS AND MAINTENANCE

8.250 PURGING OF MAINS AND SERVICES

1.0 SCOPE

1.1 This procedure covers the purging of gas mains and services.

2.0 REFERENCES

2.1 16 NYCRR Parts 255.629, 255.727, and 255.751

2.2 *Purging Principles and Practice* by the American Gas Association

3.0 ACRONYMS

3.1 Cubic Feet (CF)

3.2 Combustible Gas Indicator (CGI)

3.3 Cubic Feet per Minute (CFM)

3.4 Feet per Minute (ft/min)

3.5 Personal Protective Equipment (PPE)

3.6 Pounds per Square Inch Gauge (psig)

4.0 DEFINITIONS

4.1 Inert Gas: A noncombustible gas such as nitrogen.

4.2 Purge Point: The locations where purging gas is either added to or vented from the pipeline being purged.

4.3 Qualified Individual: An operator employee or contractor that has been evaluated, and can perform assigned covered tasks and can recognize and react to abnormal operating conditions.

5.0 RESPONSIBILITIES

5.1 Division Gas Operations is responsible for:

5.1.1 Purging all air from mains and services before they are energized or reenergized.

5.1.2 Purging all natural gas from mains and services being abandoned.

5.2 Division Gas Engineering is responsible for:

5.2.1 Writing purging procedures when required.

6.0 GENERAL

6.1 Purging gas mains or services requires at least two qualified individuals present.

6.1.1 One person controls the flow of the purging medium into the pipeline at one of the purge points.

6.1.2 The other person controls the flow of purging medium out of the pipeline at the other purge point.

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- 6.2 New gas mains, services, extensions, and tie-ins shall be purged of all air before being placed in service.
 - 6.2.1 Purging shall only be completed after a successful pressure test in accordance with section 5 of the *Gas Operating and Maintenance Procedures Manual*.
 - 6.2.2 Tie in pieces for new or replacement mains shall be installed before purging.
- 6.3 All mains and services to be abandoned shall be:
 - 6.3.1 Abandoned in accordance with procedure 8.550 (Abandonment or Inactivation of Natural Gas Facilities).
 - 6.3.2 Disconnected from all sources of natural gas.
 - 6.3.3 Completely purged of all natural gas.
- 6.4 Written purging procedures shall be created for purging of all gas mains except for situations where only one pair of purge points will be used and inert gas is not required. Written purging procedures may be combined with tie in procedures and shall contain the following information:
 - 6.4.1 The location of purge points and the order in which each shall be used.
 - 6.4.2 The purging method required to be used.
 - 6.4.3 The estimated amount of inert gas required.
- 6.5 All sources of ignition shall be eliminated at the purge points. Precautions shall be taken to prevent accidental ignition from static electricity.
 - 6.5.1 Mitigation of accidental ignition and PPE required during purging shall be in accordance with procedure 11.200 (Prevention of Accidental Ignition).
 - 6.5.2 Static electricity hazards shall be mitigated in accordance with standard TM5.36.50 (Bonding and Grounding During Construction) in the *IUSA Gas Construction Standards*.
 - 6.5.3 Plastic pipe shall not be used as a vent stack due to the hazard of static electricity buildup.
- 6.6 The purging process shall not be interrupted once started in order to eliminate the chance of leaving a combustible mixture in the pipeline. Purging shall be continued until the following readings are achieved at the vent point using a calibrated CGI:
 - 6.6.1 100% gas reading when energizing or reenergizing a gas main or service.
 - 6.6.2 0% gas reading when abandoning a gas main or service.
- 6.7 To minimize mixing in the pipe, purging gases shall be introduced as rapidly as possible. Where purging is being completed against bag or diaphragm stoppers, injection speed and pressure shall be reduced to avoid disrupting the stoppers.
- 6.8 When estimating the number of nitrogen gas cylinders required to complete a purging job, assume a standard cylinder size of 225 CF.
 - 6.8.1 Different suppliers and manufacturers may have different tank sizes; therefore a final estimate shall be based on the availability per the supplier.



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6.8.2 The values listed in Table 2 of this procedure may be used to estimate the total quantity of nitrogen required depending on pipeline diameter and length of pipeline being purged.

7.0 PURGING SERVICE LINES

- 7.1 Inert gas is not required to purge service lines less than six inches in diameter.
- 7.2 Services six inches or greater in diameter shall be purged in accordance with the requirements for gas mains.
- 7.3 New services shall be purged from the main end and vented at the house end.
- 7.4 It is preferable to vent services being abandoned at the main end. However, venting at either end is acceptable.
- 7.5 The service line valve shall be operated before purging to ensure that it works properly and can be closed.
- 7.6 When setting up the vent point, precautions shall be taken to ensure that gas is not being vented into a building or other closed space.
 - 7.6.1 Gas tight mechanical fittings shall be used on any piping utilized to direct vented gas away from buildings or closed spaces.
- 7.7 Purging shall continue until the endpoint specified in section 6.6 of this procedure is reached.
- 7.8 Upon completion of the purge and closing of the service line valve, check any exposed pipe and fittings for leakage using leak detection soap solution or a calibrated CGI.
- 7.9 The exposed service line valve shall be plugged and locked if the service turn on will not be completed immediately.

8.0 PURGING MAINS, GENERAL

- 8.1 All vent stacks shall be sized to be one pipe size larger than the purging gas inlet hose or one inch nominal pipe size, whichever is larger.
- 8.2 Vent stacks for purging gas mains shall extend at least seven feet above grade.
- 8.3 When purging multiple pipe segments only one purge point shall be vented at a time.
 - 8.3.1 The farthest point from where the purging medium is injected into the pipeline should be vented first.
 - 8.3.2 Then the next farthest point should be vented.
- 8.4 The flow of natural gas into the gas main being purged shall be controlled. Valves, purging bypasses, or non-hydraulic plastic squeeze off tools are acceptable methods of control.
 - 8.4.1 The use of plastic squeeze off tools to control purging flow shall be minimized where possible due to the potential for static discharge through the pipe wall. Static charge builds on the inside of the pipe wall due turbulence of gas flowing through the slightly open squeeze tool. The

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amount of static charge generated increases as the duration of the purging process increases.

- 8.4.2 Purging bypasses, or using a nearby by valve to control flow, should be used when purging 6 and 8 inch diameter plastic gas mains when:
- The volume of gas main being purged requires the use of inert gas.
 - More than one branch off the 6 or 8 inch diameter pipe will be purged, since this necessitates increased time duration throttling through the squeeze off tool.
- 8.4.3 For all sizes of plastic pipe, where an existing valve is available, that valve shall be used in order to minimize the use of the squeeze off tool as a method to control purging flow.
- 8.4.4 Loosening rubber or polyurethane coated steel stopping heads on Mueller tapping equipment shall not be used to control purging flow, except when using a bypass stopper with H-17160 or H-17161 bottom out fittings. In order to prevent damage to the Mueller tapping equipment, the machine bypass or an external shall be used to control flow.
- 8.5 The flow of the purging gas shall not be interrupted during purging.
- 8.6 Three purging processes are used to purge mains depending on the size and volume of piping to be purged:
- 8.6.1 Mains four inches or less in nominal diameter or sections less than 40 cubic feet of volume should be purged using air or natural gas. However, using inert gas is acceptable for mains of these sizes or volumes.
- 8.6.2 All mains six inches and greater in nominal diameter shall be purged using inert gas.
- For lengths of gas main less than 500 feet long, simply filling with inert gas shall be used.
 - For longer lengths of gas main slug purging may be used, where practical, in order to reduce the amount of inert gas required. Due to pressures used for injecting the inert gas, slug purging shall not be combined with bag or diaphragm stoppers.
- 8.7 On projects with two way gas feeds or where there is flexibility in choosing the vent points, consideration shall be given to public safety. Vent points should be located as far from the public as possible.
- 8.8 In cases where it is anticipated that noise of nuisance odor calls from purging could occur, public outreach should be conducted before work starts.
- 9.0 PURGING MAINS, BY USING AIR OR NATURAL GAS**
- 9.1 Air or natural gas shall only be used to purge mains if:
- 9.1.1 The main is four inches or less in nominal diameter, or
- 9.1.2 Is a tie in or cut dead section less than 40 cubic feet in volume. Table 1 shows the maximum allowable length of various pipe sizes to stay below



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the 40 cubic feet volume limit.

Table 1: Maximum Length of Pipe to Stay Below 40 Cubic Feet of Volume	
Nominal Pipe Size	Maximum Length Allowed for Air or Natural Gas Purge
6 inch	187 feet
8 inch	109 feet
10 inch	69 feet
12 inch	48 feet
16 inch	31 feet
20 inch	19 feet
24 inch	13 feet

9.2 With this method:

9.2.1 Natural gas from the pipeline being tied into is used to purge main to 100% gas.

9.2.2 Air from a compressor is used to purge main to 0% gas.

9.3 Purging shall continue until the endpoint specified in section 6.6 of this procedure is reached.

10.0 PURGING MAINS, BY FILLING WITH INERT GAS

10.1 Filling with inert gas may be used to purge any size or length of gas main.

10.2 Following the pressure test, the main shall be blown down to atmospheric pressure before commencing purging.

10.3 The purge points shall be opened one at a time and the main filled with inert gas.

10.4 The volume of inert gas added to the pipeline shall be no less than 125% of pipeline volume being purged.

10.4.1 When estimating injection amounts any error shall on the side of injecting too much inert gas.

10.4.2 In the event that the inert gas volume added to the pipeline is greater than 125% of the pipeline volume and the purging endpoint specified in section 6.6 is not reached, then air or natural gas may be used to finish purging.

10.5 Table 2, should be used to determine the amount of inert gas required. The allowance for filling the pipe to 125% of its volume has been included in the table.

Table 2: Purging Gas Required by Pipe Size	
Nominal Pipe Size	Volume of Purging Gas per 100 feet of Pipe for 125% Fill
6 inch	27 cubic feet
8 inch	45 cubic feet



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10 inch	73 cubic feet
12 inch	103 cubic feet
16 inch	162 cubic feet
20 inch	253 cubic feet
24 inch	369 cubic feet

10.6 If the gas main is being purged into service, natural gas shall be introduced into the piping until the purge endpoint specified in section 6.6 is reached.

11.0 PURGING MAINS, BY USING AN INERT GAS SLUG

11.1 Mains six inches and greater in diameter, which are longer than 500 feet, may be purged using an inert gas slug.

11.2 Gas Technical Services shall be contacted in the event assistance is needed with slug purging.

11.3 Slug purging uses a slug of inert gas to separate the air and combustible gas in a pipeline.

11.3.1 Mixing and degradation of the inert gas slug occurs while it travels down the pipeline.

11.3.2 Enough inert gas shall be added to retain a 100 foot long inert slug at the venting purge point.

11.4 Table 3 lists pipeline diameters and various pipeline lengths along with the total amount of inert gas to inject into the pipeline for a 100 foot long inert slug at the purge point. Use the injection rate and elapsed time to estimate the total amount of inert gas that has been injected. Error on the side of injecting too much inert gas.

11.5 After injecting the inert gas slug immediately start injecting:

11.5.1 Natural gas if the pipeline is being purged into service.

11.5.2 Air if the pipeline is being purged out of service.

11.6 The natural gas or air injected after the inert gas slug shall be injected at the same rate as the inert gas. Purging shall continue until the endpoint specified in section 6.6 of this procedure is reached.

11.7 Table 4 shows the required velocity and inert gas injection rates for the slug purging process. Also shown are example hose sizes and cylinder regulator settings to for creating the required inert gas injection rate.

Table 3: Inert Gas Injection Amount Required for Slug Purging							
Nominal Pipe Size	Cubic Feet of Inert Gas to Inject as Slug (Main Table)						
	Pipeline Length (Immediately Below)						
	500 ft	1,000 ft	2,000 ft	5,000 ft	10,000 ft	20,000 ft	30,000 ft
6 inch	46	56	70	98	129	173	261



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8 inch	77	94	117	164	217	291	439
10 inch	121	147	184	257	340	457	688
12 inch	173	211	263	368	486	653	985
16 inch	280	342	430	605	802	1,080	1,632
20 inch	448	548	689	968	1,283	1,728	2,611

Table 4: Inert Gas Injection Rates for Purging

Nominal Pipe Size	Minimum Purging Velocity for Pipe Size	Minimum Inert Gas Injection Rate	Hose Required	Inert Gas Cylinder Regulator Setting
6 inch	130 ft/min	29 CFM	50 feet of 3/4 inch Hose	6 psig
8 inch	150 ft/min	56 CFM	50 feet of 3/4 inch Hose	17 psig
10 inch	165 ft/min	96 CFM	50 feet of 3/4 inch Hose	34 psig
12 inch	180 ft/min	149 CFM	50 feet of 1 1/4 inch Hose	11 psig
16 inch	210 ft/min	273 CFM	50 feet of 1 1/4 inch Hose	27 psig
20 inch	235 ft/min	489 CFM	50 feet of 2 inch Hose	11 psig
24 inch	270 ft/min	796 CFM	50 feet of 2 inch Hose	25 psig