

INFORMATION AND REQUIREMENTS FOR GAS SERVICE

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INDUSTRY TERMS

GENERAL INFORMATION

Article 100

101. Introduction

This handbook, entitled "Information and Requirements for Gas Service", is issued as a means of exchanging pertinent information between NSTAR Gas (here after referred to as "the Company") and its customers, architects, plumbers, engineers, builders, contractors and municipal inspectors. The requirements contained herein are supplementary to the Company's policies, specifications for construction, Schedules of Rate and Terms and Conditions as filed from time to time with the Massachusetts Department of Telecommunications and Energy (DTE).

NSTAR Gas is a local distribution company (LDC) serving 51 communities and covering 1,067 square miles in eastern Massachusetts. NSTAR Gas divisions include towns centered around Cambridge, Framingham, Worcester, New Bedford and Plymouth.

102. Scope

The information contained in this booklet applies to all gas service delivery pressures. The company should be consulted for all requirements on installations.

103. Effective Date

This issue of "Information and Requirements for Gas Service" is effective immediately for all new construction, with reasonable allowance for the completion of work in progress. The Company reserves the right to revise, alter, amend, add to or repeal this information when necessary or appropriate and will endeavor to notify all interested persons. It will be incumbent upon all interested persons to keep themselves informed as to such revisions, alterations, amendments, additions or repeals. The Company assumes no responsibility to notify persons relative to such revisions, alterations, amendments, additions or repeals.

104. Compliance with Requirements

All piping and equipment intended for connection to the Company's facilities will be in accordance with the requirements of the inspection authority having jurisdiction, the Massachusetts Fuel Gas Code and the Code of Massachusetts Regulations (CMR) 220, the National Fire Protection Association code (NFPA) 54, the Department of Telecommunications and Energy (DTE) and the Federal Energy Regulatory Commission (FERC) along with any other applicable codes, and requirements of the Company. Service connection will be made only after the Company receives approval from the appropriate municipal authority having jurisdiction over gas piping (see Article 115).

105. Special Conditions

The Company reserves the right to waive these requirements in special circumstances where conditions warrant and permit. Any waiver of these requirements will not be considered as establishing a precedent nor be considered as affecting the company's right to enforce any other of these requirements. When an installation is not subject to approval by the municipal inspection authority, service connection will be made upon receipt of written notice from the responsible authority that all piping conforms to acceptable standards.

106. Organizational Units

SALES: Sales department representatives are available to assist customers with new service installation procedures and account maintenance. Sales representatives in each district will advise and conduct negotiations with commercial and industrial customers.

CUSTOMER SERVICE: The Customer Service area is available to assist the customer requesting a service turned on or off, by answering questions regarding: payment of bills, residential rates, interest charges, budget billing and other considerations regarding the use of natural gas. The Customer Service area is also available to assist the customer and answer questions on gas appliance usage, service applications, and energy efficiency programs.

GAS OPERATIONS: Gas Supply, Distribution, and Service make up the Gas Operations area which makes inspections with respect to Company requirements, assigns service entrance locations, makes service connections, assigns meter locations, installs and removes meters, maintains and tests meters, and completes construction orders.

- 107. Continuity of Service**
The Company will not be responsible for any failure to supply certain gas pressure levels nor for interruption in delivery service, if such failure or interruption is without willful default or gross negligence on its part. Whenever the integrity of the Company's system or the supply of natural gas is threatened by conditions on its system or on the systems within which it is directly or indirectly interconnected, or whenever it is necessary or desirable to aid in the restoration of service, the Company may, in its sole judgment, curtail or interrupt gas service to some or all of its customers and such curtailment, interruption or reduction will not constitute willful default, or gross negligence, by the Company.
- 108. Supplied Pressure**
The Company does not guarantee any level of delivery pressure to its customers. NSTAR Gas attempts to provide the highest delivery pressure at the necessary flow rate required by its customers.
- 109. Resale of Gas**
The resale of natural gas is not permitted by law.
- 110. Blasting Information**
All blasting and related activity must be performed in accordance with applicable laws and regulations. The construction company, developer or the designated blasting contractor must provide 24 hours advance notice of blasting through the Dig Safe system. In addition, NSTAR Gas must be notified two hours in advance of any blasting to allow NSTAR Gas personnel to monitor blasting activity. Granting of notice does not relieve the construction company, developer or the designated blasting contractor from liability if any damage to NSTAR Gas facilities results from this activity.
- 111. Demolition Information**
In the case of a building demolition, the gas meter and part of the gas service line must be removed. Contact the Distribution Department prior to demolition to request that a gas service line be terminated.
- 112. Wetlands Information**
If a builder will be constructing a home or a development in which the natural gas line will be within 100 feet of existing wetlands, it will be necessary for the builder to supply NSTAR Gas with a copy of its Order of Intent. To save the builder/developer time and money, the Order of Intent should include natural gas as one of the utilities to be installed in the home(s). NSTAR Gas will also require a copy of the Order of Conditions issued by the Conservation Commission along with any site plans that were submitted to the Commission pertaining to the gas utility.

113. Rate Information

The Company will assist the customer in selecting their least expensive rate. However, the customer is responsible for selecting the applicable rate subject to the provisions of the Schedule of Rates. See www.nstaronline.com for rates.

114. Theft

The diversion of natural gas through any method or device used by any person to unlawfully and intentionally prevent or interfere with a gas meter from duly registering the quantity of natural gas supplied by the Company and/or any unlawful or intentional taking of natural gas from any pipe of the Company without the consent of said Company is theft. Where there is evidence of tampering or theft of natural gas, such persons responsible will be liable for prosecution under the penalty of law. The applicable law in Massachusetts is Massachusetts General Laws Annotated (As Amended): Chapter 164, Section 127A.

115. Gas Inspectors

The current telephone numbers for municipal plumbing and gas fitting inspectors within the Company's service territory are:

Acushnet	508-998-0225	Mattapan	617-635-5300
Ashland	508-881-0117	Mattapoisett	508-758-3568
Auburn	508-832-3701	Maynard	978-897-1000
Belmont	617-489-8221	Medford	781-393-2506
Berlin	978-838-2442	Milford	508-634-2315
Bolton	978-365-5218	Millbury	508-865-0438
Boylston	508-869-2426	Natick	508-647-6450
Cambridge	617-349-6115, 6116	Needham	781-455-7542
Carver	508-866-3450	New Bedford	508-979-1518, 1519
Dartmouth	508-999-0720	Northboro	508-393-5010
Dedham	781-326-6280	Northbridge	508-234-6577
Dover	781-444-3392	Plymouth	508-830-4040
Fairhaven	508-979-4019	Rochester	508-783-3871
Framingham	508-620-4838	Roslindale	617-635-5300
Freetown	508-992-7649	Sherborn	508-651-7855
Gleasondale	978-897-2193	Shrewsbury	508-841-8581
Grafton	508-839-8502	Somerville	617-625-6600
Holden	508-829-9026	Southboro	508-485-0717
Holliston	508-429-0606	Stow	978-897-2193
Hopedale	508-473-2679	Sutton	508-865-8723
Hopkinton	508-497-9745	Upton	508-529-6296
Hudson	978-568-9625	Uxbridge	508-278-8603
Hyde Park	617-635-5300	Wayland	508-358-3604
Kingston	781-585-8373	Westboro	508-366-3015
Leicester	508-892-7003	Westwood	781-320-1091
Marion	508-748-3516	Worcester	508-799-8552, 1209, 1215
Marlboro	508-460-3728	W. Boylston	508-835-6091

APPLICATION FOR NEW OR ADDITIONAL SERVICE

Article 200

201. When to Apply for Service

An application for any new or additional service or an alteration to an existing service, should be made as far in advance as possible to ensure adequate time for engineering and construction details to be arranged. A plot plan designating the location of building(s) or addition(s) should be provided with new load data as outlined on the Company's [Application for Gas Service](#). The application may also be requested by telephone or in person at the Company's office.

The application may be requested by telephone or in person at the Company's office. The application also is available on the Company's website: www.nstaronline.com and is attached to the Company's Terms and Conditions.

Please note: if a customer is requesting only Distribution Service from the Company (i.e., transportation service), the customer must separately arrange for their own gas commodity service from a supplier.

202. State and Municipal Permits

Where it is required that a service be run under public ways, the Company must obtain public grants and, in many cases, special permits. These grants and permits can be issued in some instances only after public hearings are held or only during certain periods of the year. Where it is required that a service be run on private property not owned by the customer, a written easement acceptable to the Company must be provided by the owner of such property before service can be installed; it is the customer's responsibility to negotiate with the property owner for said easement (see Article 312). In such cases, delays to service connections can be avoided by applying for service at the earliest possible date.

203. Availability of Service

Prior to ordering equipment or starting piping, it is important that the customer contact the Company to make sure of the availability to characteristics of the service desired and to determine if the Company has requirements additional to those contained herein for such service. Designation of service entrance and meter locations must be made before gas service piping is started. The Company does not accept responsibility for information given orally relative to the type of service available at specific locations unless such information is confirmed in writing by an authorized representative of the Company.

The type and/or size of service requested by a customer may not be available at a given location. Please consult the Company for information regarding availability of service prior to ordering new, additional or replacement equipment. Service may be available only through special negotiation and at the expense of the customer.

204. Additional Loads

Company facilities are normally designed to meet the customer's initial requirements when the service is installed. When an additional load is contemplated, the company should be notified as early as possible to avoid unnecessary delay and so that proper provision can be made to furnish the additional service. The customer must not proceed to make additions until notified by the Company of the conditions under which it can supply the increased load. The customer will be held responsible for damage to Company equipment caused by load being added without notice to the Company. The customer must contact the Sales Department with the following information:

- a) Account number and service address
- b) The total gas load (expressed in CFH or MMBtu/Hour) of the appliances or equipment currently connected to the existing gas line
- c) The new gas load (expressed in CFH or MMBtu/hour) and pressure requirements of the new equipment being installed.

Upon receiving this information, the Company will:

- a) Perform a load acceptance analysis to determine if the existing meter and gas line have enough capacity to handle the increased gas flow.
- b) If the existing meter and/or gas line require upgrading, Sales will perform a revenue analysis to determine if the revenue the Company receives from the increased gas flow is enough to offset the cost of upgrading the service. The customer may be required to provide a non-refundable contribution toward this upgrade.

- 205. Relocation or Alternation of Service**
Wherever changes are made in existing customer piping installations involving relocation, replacement, or additions, the entire customer piping installation shall, to a practicable extent, be built to meet the latest requirements. Decision as to be actual changes required in any specific case will be determined by consultation with the Company and with the local inspection authority. The customer piping changes must be approved by the local inspection authority before the Company will connect to the customer's equipment. Contractors must check with the Company and the local inspection authority before bidding on customer piping installations. The Company must be notified sufficiently in advance in order to provide for the required change in customer piping facilities and to determine the conditions under which such changes will be made. In some instances there may be a charge to the customer for customer piping relocation. Early contact with the Company will help avoid unnecessary delays in providing customer piping.
- 206. Customer Cost**
The installation of a new or additional gas service may require a contribution toward construction cost by the customer. Customers should contact the Sales Department for information prior to ordering equipment or starting construction.
- 207. Inspection Certificates**
The Company will not light new, upgraded, or repaired customer piping until approval has been issued by the appropriate municipal authority having jurisdiction over natural gas installations. It is the responsibility of the contractor to follow whatever procedure is required by the local inspection authority so that the Company will receive the approval prior to the time when natural gas must be supplied. Municipal approval may be required to light a gas service, or for an installation that has been warned with a red tag, in some cities and towns served by the Company.
- 208. Main Extension Policy**
Customers who desire gas service shall complete and sign an Application for Gas Service.
- Generally, the Company will make a capital investment to extend gas main and/or service at no charge to reach a new customer, provided that the estimated revenue from the distribution services to the new customer yields, at a minimum, the rate of return set for the Company and allowed by the DTE in the Company's last rate case.
- If the amount or nature of the service applied for, or the distance of the premises to be served from existing, suitable gas distribution facilities, or the difficulty of access thereto is such that the estimated income from the service applied for is insufficient to yield a reasonable return to the Company, a non-

refundable customer contribution will be required such that the minimum allowable rate of return on the Company's investment is achieved.

In instances where a customer contribution is necessary, payment is required prior to the installation of facilities.

While the Company will generally attempt to design its facilities in a manner that will cause the least cost to the customer, safety and reliability must always be the primary considerations. The Company may refuse to supply service to loads of unusual characteristics, which, in its sole judgment, might adversely affect the quality of service supplied to other customers, the public safety or the safety of the Company's personnel.

301. Standard System Characteristics

The characteristics of natural gas service normally supplied by the Company attempt to provide adequate flows from system pressure ranges as follows:

Low Pressure (LP) – A gas pressure range, as defined by the Company, typically below 1 psig.

Intermediate Pressure (IP) – A gas pressure range, as defined by the Company, between Low and High Pressure.

High Pressure (HP) – A gas pressure range, as defined by the Company, usually in a broad range above 60 psig.

302. Availability of Service

The type and/or size of service requested by a customer may not be available at a given location. Please consult the Company for information regarding availability of service prior to ordering new, additional or replacement equipment. Service may be available only through special negotiation and at the expense of the customer.

303. Number of Services

Generally, not more than one service will be installed to a building or structure.

304. Customer Requirements

Customers may be required to supply space for gas piping on private property and may be required to furnish and install bollards (or bumper posts) to adequately protect the meter fit if deemed necessary by the local inspection authority and the representative of NSTAR Gas. Conduit for Commercial pulse Accumulator (CPA) meter reading installations and/or concrete meter support pads must also be installed in accordance with specifications furnished by the Company. If additional paving or road restoration is required, charges will be passed on to the customer. Please refer to the back of the Application for Gas Service form.

305. Residential Service

The following procedures apply to obtaining natural gas service as a residential customer. Once the gas service line and meter fit are installed by NSTAR Gas, it is the customer's responsibility to have the internal gas piping completed, tied into the necessary gas equipment and then tied to the exterior gas meter fit. In order to set the meter, the heating system must be wired, the thermostats installed, and the permanent electrical power must be on. The flue pipe and all other necessary venting must be completed. Boilers and hot water tanks must be filled with water and permanent plumbing for this equipment must be in place. A metal inspection tag must be visible on the equipment or at the meter fit. The owner should then contact the NSTAR Gas Sales Representative (24 hours in advance) to request a meter set and turn-on.

306. Customer Property Access

Meter sets and turn-on's are scheduled for weekdays from 8:00 a.m. to 4:00 p.m. After-hour service is available at the customer's expense. If the service technician determines that the meter cannot be set due to customer requirements not being met, subsequent calls will be subject to NSTAR Gas' normal charge service rates. When a Company service technician arrives at the site, they must be able to easily gain access to the building or to the roof.

307. Deposit Conditions

The prerequisites for a deposit from non-residential customers including the following:

- a) New account service
- b) Revised service due to increased load
- c) Bills more than 45 days past due twice in the last 18 months
- d) Accounts with a previous service shut-off for non-payment.

The amount of the deposit is:

- a) Based on the preceding 12-month usage
- b) An amount equal to two times the average bill or the single highest month's bill, whichever is greater.

The acceptable methods of payment including the following:

- a) Cash or check
- b) Surety bond
- c) Letter of credit

Deposit Conditions (Cont'd.)

The Company reserves the right to waive the requirements for a security deposit generally determined by the following conditions:

- a) A good payment record on the customer's previous account
- b) A good credit reference from another company.

Bills are payable on receipt. Any bills unpaid after 25 days from receipt (55 days for municipal and government accounts) are charged a late payment fee.

308. Company Warranty Statement

The Company will cooperate with its customers or their representative for all pressures and services provided.

HOWEVER, NEITHER BY INSPECTION, NOR BY RENDERING OF ADVISORY SERVICE, NOR IN ANY OTHER WAY DOES THE COMPANY GIVE ANY WARRANTY, EXPRESSED OR IMPLIED, AS TO THE ADEQUACY, SAFETY, OR OTHER CHARACTERISTICS OF ANY EQUIPMENT, PIPES, APPLIANCES, OR DEVICES OWNED, USED OR MAINTAINED BY CUSTOMERS.

309. Emergency Generators

The cost to provide a gas service line for an emergency generator in a facility, no matter how large the gas load, will be at the customer's expense.

310. Final Connections

The customer and/or their agent will make final connections of its piping to Company facilities. The Company will not permit or tolerate unauthorized persons to connect to Company equipment.

311. Public Grants and Special Permits

Before piping can be installed under public ways, the Company must obtain public grants, state permits and/or excavation or street opening permits. In some cases, special permits must also be obtained from other companies maintaining facilities in such public ways.

Also, some municipalities may not issue grants or permits during some periods of the year. These grants and permits can be issued some instances only after public hearings are held. Under such circumstances, delays of service connections can be minimized by applying for service at the earliest possible date.

312.

Easements

In the event the Company must extend a gas main or gas service line through privately owned property, an easement must be supplied to the Company by the owner, without charge to the Company, allowing the gas service line to be installed. The purpose of the easement is to obtain legal permission from an owner to allow NSTAR Gas to install and service its facilities. Easements must also be supplied by builders for common driveways within their developments or in any case where the property on which the gas line is located will eventually belong to more than one owner. The easement must be recorded and filed by the customer with the appropriate Register of Deeds. The customer must provide a copy of both the legal description along with the appropriate site plan to NSTAR Gas before installation of the gas line is started.

PRIVATE PROPERTY CONSTRUCTION

Article 400

401. Residential Service

Installation from the street main to the individual house foundation can be completed when the foundation is installed and backfilled to within approximately 6 inches of final grade. Water, sewer, or septic and electric conduit must be installed prior to the installation of the gas line. Natural gas services are activated with natural gas upon completion of installation of the gas service line.

The gas line should run parallel to the water, sewer, and electric services with a minimum distance of 3 feet between utilities. Individual towns may vary in the minimum distance required (see Article 404). If the gas line is crossing other utilities, any repairs to those lines may result in an accidental excavation and disruption of the gas line. Some municipalities do not allow crossing of utilities. NSTAR Gas will supply an as-built drawing of the main and gas line installation only upon request.

NSTAR Gas will size all gas lines up to the new or existing meter fit from the gas main, but will not size internal piping systems for a plumber or heating contractor.

Work performed by NSTAR Gas will be excavated and backfilled according to Company standards. Customers will be responsible for resurfacing on private property. Please refer to the back of the Application for Gas Service.

402. Service for Builders and Developers

NSTAR Gas will install all underground gas service lines. The gas main will be installed after the water, sewer or septic, drains, electrical crossovers, and electrical main conduit are in place and prior to paving. This timing is critical as safety is the primary concern. Upon completion of the gas main and crossover installations, the main is tested and natural gas is immediately installed into the new main. It is imperative that all road excavation be completed at the time the new main is installed. The installation from the street main to a new individual house foundation can be completed when the foundation is installed and backfilled to within approximately 6 inches of final grade. Conduit for gas crossovers can be installed by the customer provided that the installation is performed according to the Company specifications.

The new mains are sited by the NSTAR Gas Planning Department. With some exceptions, installation generally adheres to the following: the gas line should run parallel to the water, sewer, and electric services (see Article 404). In addition, the drain, water, and sewer are in the "paved way"; electrical,

telephone and cable are on one side of the road, and the natural gas main will be on the opposite side of the road, in the grass strip, or underneath the sidewalk.

A typical trench for gas pipe is 36 inches deep and 12 inches wide. Installation of #10, solid core, yellow wrapped, copper wire is placed in the bottom of the trench. Approximately 6 inches of sand is placed over the wire (sand utilized shall be free of any stone and will be of masonry quality). Plastic pipe is then installed and another 6 inches of sand is placed on top of the pipe. A yellow terra tape is placed approximately 1 foot below finished grade to indicate the gas main location. Plastic pipe, wire and tape are considered facilities of NSTAR Gas and can only be installed by designated contractors or by qualified NSTAR Gas personnel. NSTAR Gas must size all gas lines up to the new or existing meter fit from the gas main, but will not size internal piping systems for a plumber or heating contractor.

403. Service for Commercial and Industrial Customers

The customer must sign an original Application for Gas Service that will be provided by the NSTAR Gas sales representative. No faxing of these materials is permitted. The customer must request Company authorization, prior to installing equipment with use greater than 100,000 Btu/hr, to be sent to the appropriate local inspection authority. Commercial and industrial customers should provide advanced notice to start a new service process in addition to providing the following:

- a) Site plans
- b) Utility plans
- c) Total gas load and pressure requirements
- d) Desired meter location (NSTAR Gas reserves the right to determine the final meter location)
- e) Final grade
- f) A security deposit may be required (see Article 307).

To open an account in the name of a corporation, the Company requires:

- a) A copy of articles of incorporation
- b) The address of the principal place of business of the corporation
- c) A list of corporate officers.

To open an account as a Limited Partnership, the Company requires:

- a) A copy of articles of organization
- b) The address of the principal place of business of partnership
- c) The partnership percentage of responsibility

Service for Commercial and Industrial Customers (Cont'd.)

To open an account as a Trust, the Company requires:

- a) Copy of declaration of trust
- b) The address of the principal place of business of trust
- c) The date, book, and page in the Registry of Deeds

To open an account "Doing Business As" (DBA), the Company requires:

- a) The applicant's name and their social security number.
- b) The address of their principal place of business of DBA.

404. Separation from Other Services or Systems

Underground services shall have a horizontal separation of at least 3 feet from all other services or systems. In case of unavoidable crossing, the gas service shall be kept at least 6 inches away from other services or systems. Some municipalities do not allow crossing of utilities.

405. Dig Safe

NSTAR Gas is a member and promoter of the Dig Safe Program. This program was created to promote public safety, avoid costly damage to underground facilities, and reduce cost and time of notifications. Both Federal and State laws require contractors to notify the appropriate utility companies before excavating. Dig Safe simplifies this process by requiring only one telephone call. Dig Safe will contact the utilities that have underground lines in that area and within 72 hours, not including holidays and weekends, the area will have the appropriate utility markings. **Caution:** some utilities do not mark underground facilities on private property. It is the responsibility of the property owner to ensure all underground utilities are marked prior to the installation of the gas service. Please call before you begin digging, trenching, demolishing, boring, backfilling, grading, landscaping, or other earth moving operations. There is no charge for this service. Dig Safe's hours of operation are Monday through Friday, 6:00AM to 6:00PM. Off-hour coverage is provided for emergencies only. In Massachusetts call 1-888-344-7233.

In the event that a natural gas line is accidentally hit, please shut down any equipment, move all personnel away from the immediate area, and notify NSTAR Gas immediately at 1-800-572-9337 or 1-800-592-2000. NSTAR Gas will dispatch its personnel to that location as quickly as possible.

SERVICE ENTRANCE REQUIREMENTS

Article 500

501. Location of Service and Metering Equipment

The customer may request a specific location for the installation of the gas metering equipment, and the Company will consider this request, but the Company reserves the right to determine the location for installation of such equipment (see Article 604).

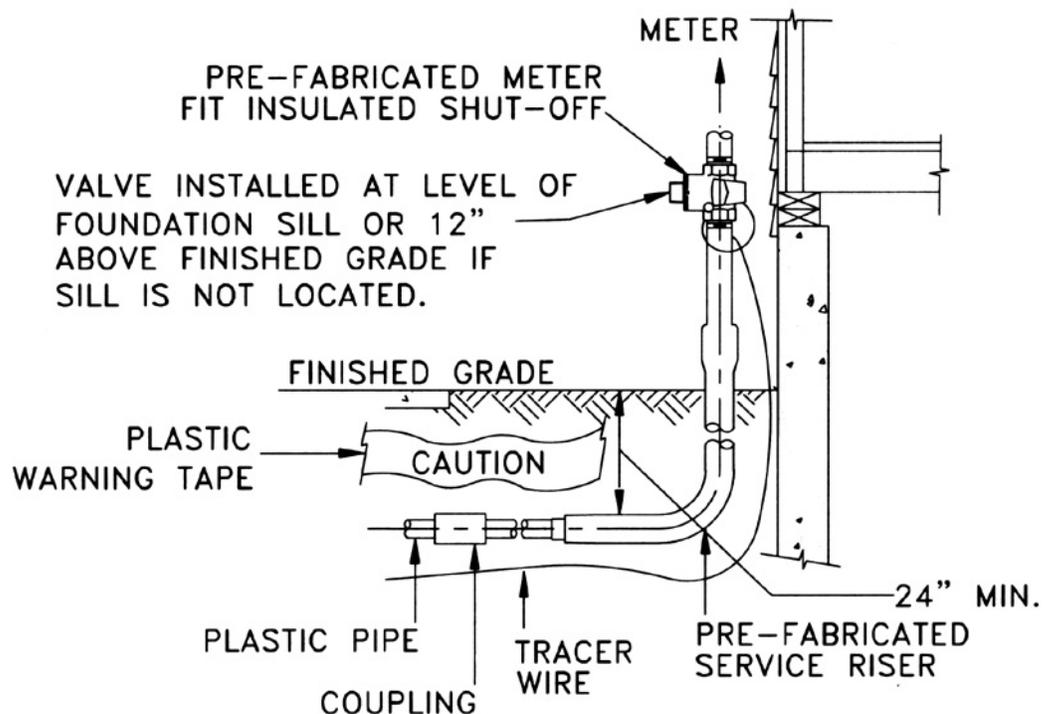
502. Rating of Service Equipment

The minimum ratings for service equipment shall be in accordance with the Massachusetts Fuel Gas Code. Service equipment rated in excess of 14 inches water column must be specifically approved by the Company prior to installation (see Article 612).

503. Typical Gas Service

Typical Plastic Gas Service Line Installing Delivering Intermediate and Low Pressure Gas.

NOTE: Some existing gas service lines are steel.



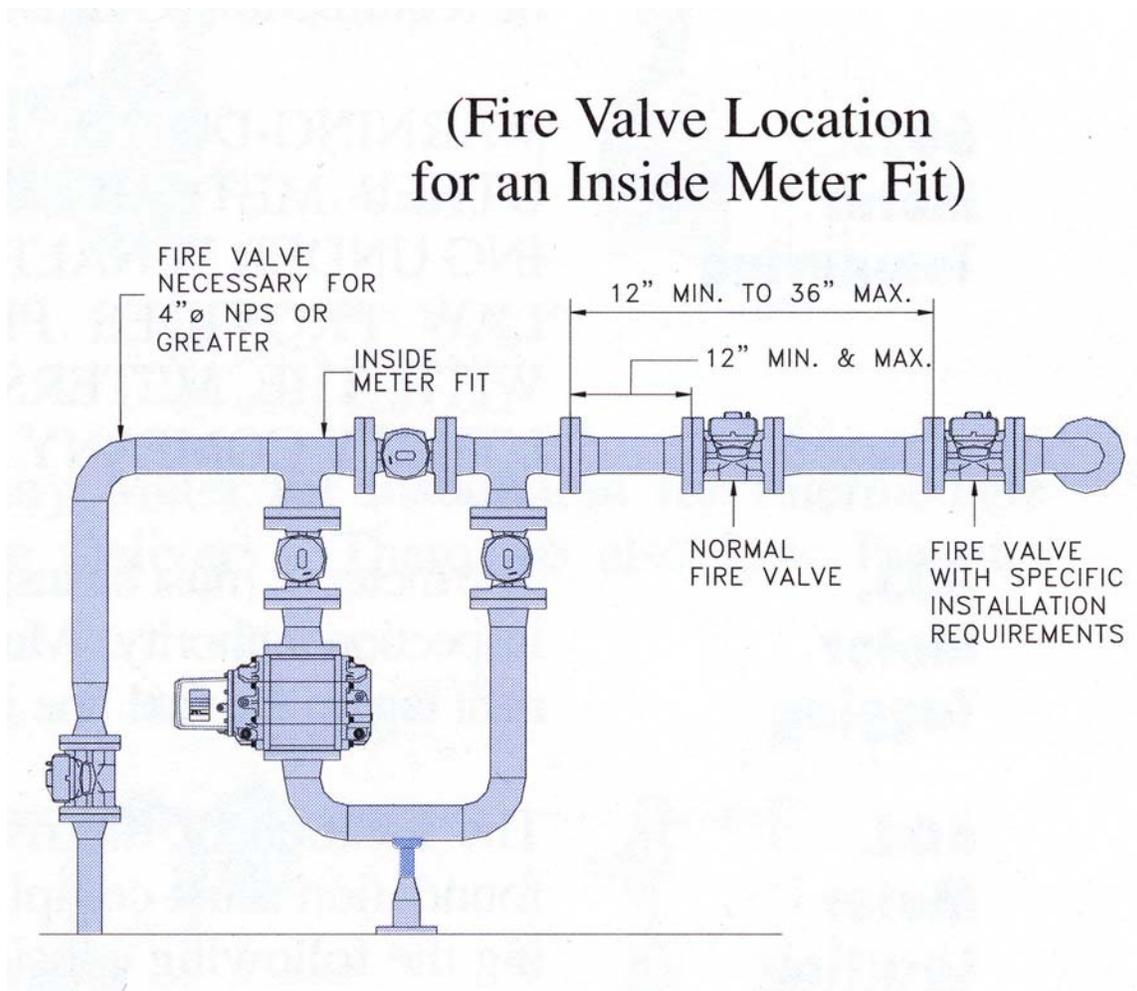
504.

Fire Valves

If the gas service exceeds 4 inches in diameter, the customer shall install a fire valve.

INSIDE METER FIT

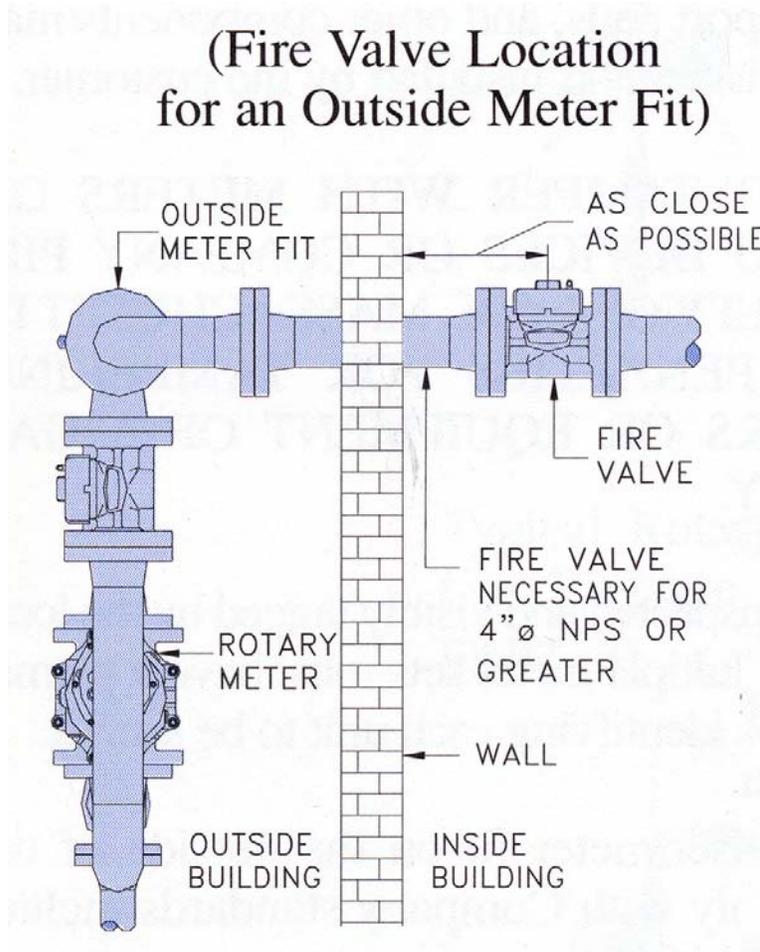
A fire valve shall be installed on the outlet piping side of the meter fit if the meter fit is inside the building. An approved fire valve shall be installed not further than 12 inches from the outlet of an inside meter fit. The connection shall be by rigid pipe and fittings. It may be installed more than 12 inches away, but less than 36 inches away if the valve is specifically approved within installation requirements included. In no case shall the fire valve be installed more than 36 inches away from the meter fit.



Fire Valves (Cont'd.)

OUTSIDE METER FIT

A fire valve shall be installed inside the building just prior to penetrating the inside wall if the meter fit is outside the building. See the fire valve location for an outside meter fit drawing.



METERS

Article 600

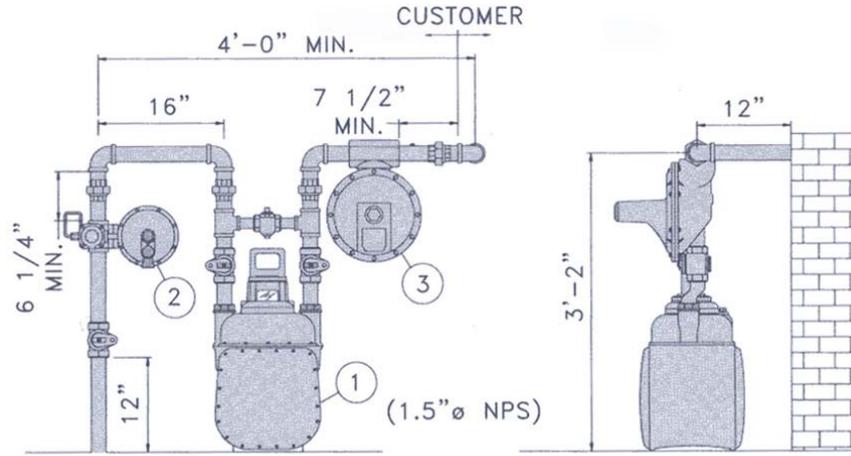
- 601. Scope**
The installation of piping and equipment for all types of meter shall comply with the requirements set forth in the following Article. Meters will be provided, maintained, installed, moved and removed only by authorized Company employees. No change in metering equipment of any nature whatsoever is to be undertaken by any other persons except when special permission is first obtained from the Company. Commercial Pulse Accumulator (CPA) conduit, bollards, concrete support pads, and other components may be required to be furnished and installed by the customer.
- 602. Meter Tampering**
WARNING – DO NOT TAMPER WITH METERS OF OTHER METERING DEVICES OR COMPANY PIPING UNDER PENALTY OF LAW. MASSACHUSETTS LAW PROVIDES PENALTIES FOR TAMPERING WITH THE METERS OR EQUIPMENT OF A GAS UTILITY COMPANY.
- 603. Meter Tagging**
The meter fit must be inspected and visibly tagged by the local inspection authority. Multiple meter sets must have a permanent tag on the fuel line identifying each unit to be served.
- 604. Meter Location**
The location of the riser/meter fit on the outside of the foundation must comply with Company standards including the following considerations:
- a) The meter fit should be located at the front or sides of the building or house.
 - b) The meter fit should be 3 feet away from any windows, louvers, vents, or any opening to the building or house.
 - c) The meter fit should be 3 feet away from any electrical device, electrical outlet, transformers, or any other potential ignition source.
 - d) The meter fit should be 10 feet from any forced air intake.
 - e) The meter fit cannot be underneath porches, decks or overhangs.

NSTAR Gas will supply an as-built drawing of the main and gas line installation upon request.

605.

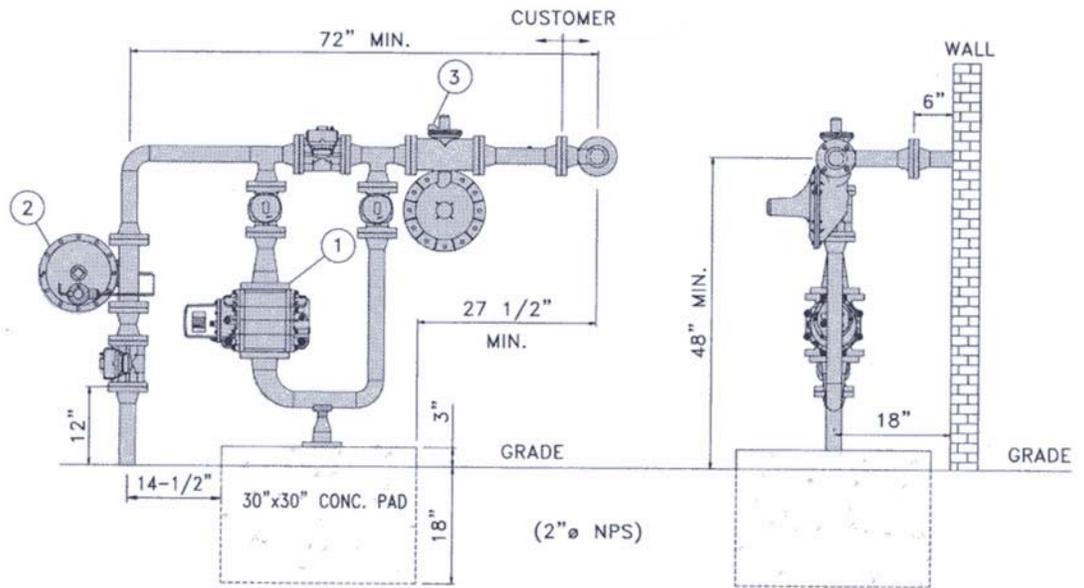
Typical Commercial and Industrial Meter Appearance

Typical 800 and 1000-Meter Installations for Intermediate Gas Pressure Delivery. There are also Low-pressure meter fits.



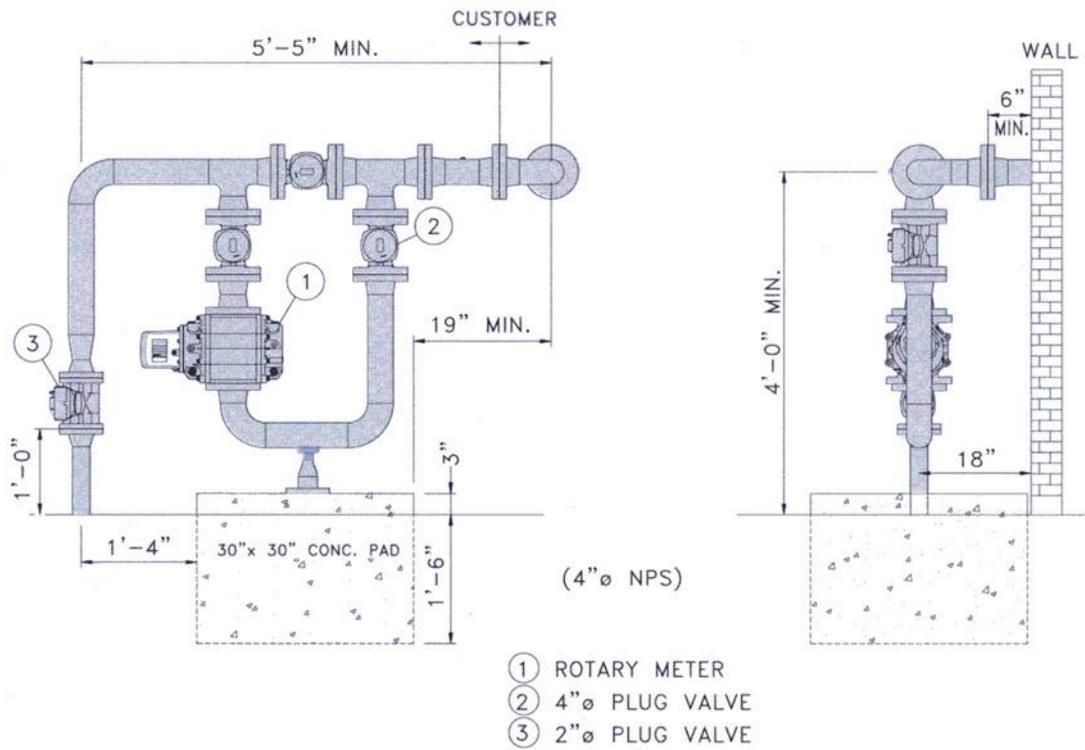
- ① DIAPHRAGM METER: AL-800,AL-1000
- ② METER REGULATOR
- ③ METER REGULATOR

Typical Rotary Meter Fit Installation for Intermediate Gas Pressure Delivery. There are also Low-pressure meter fits.

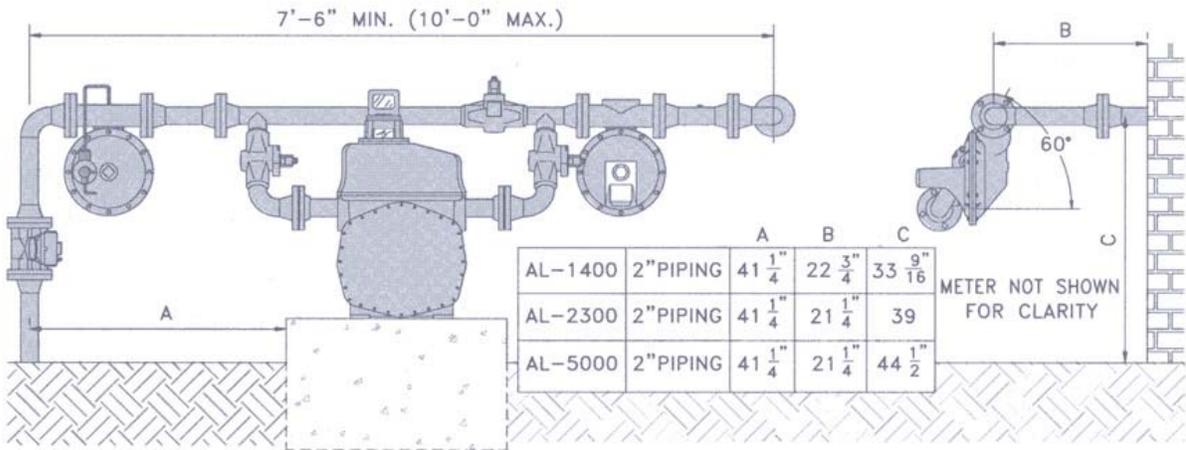


- ① ROTARY METER
- ② METER REGULATOR
- ③ METER REGULATOR

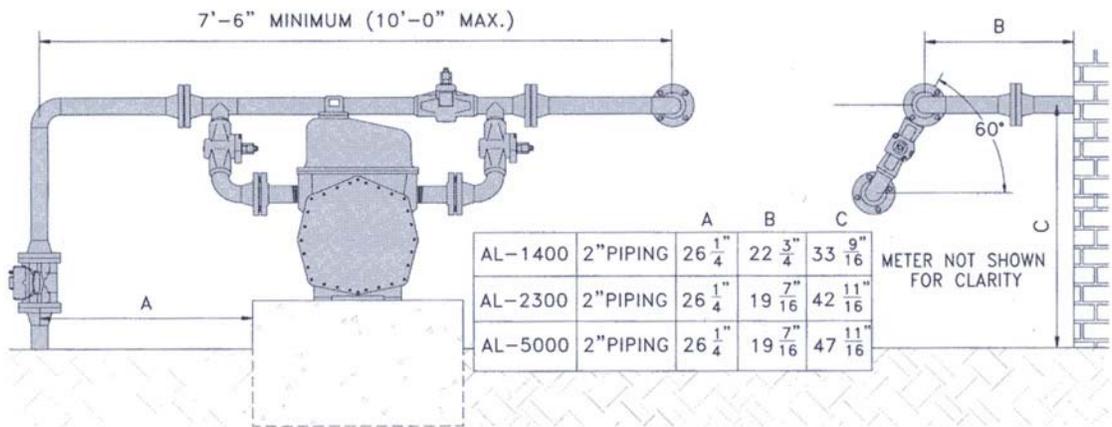
Typical Rotary Meter Fit Installation for Low Gas Pressure Delivery. There are also Intermediate-pressure meter fits.



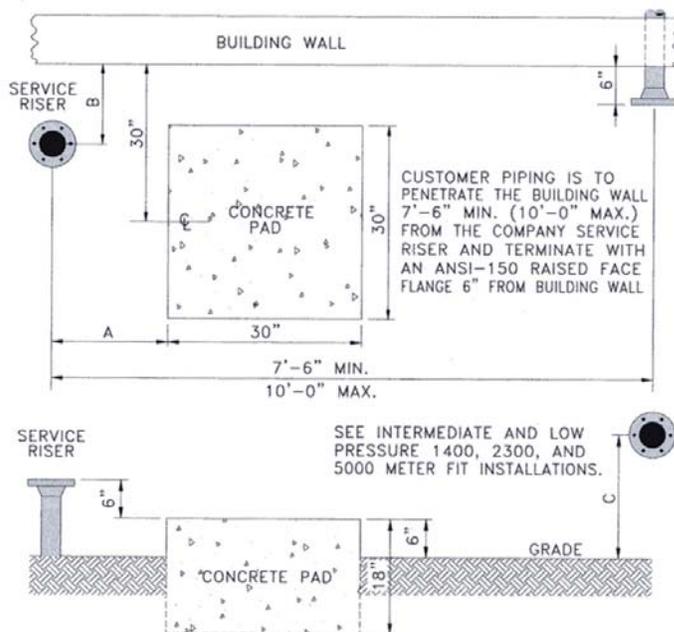
Typical 1400, 2300, and 5000 Meter Fit Installation for Intermediate Gas Pressure Delivery.



Typical 1400, 2300, and 5000 Meter Fit Installation for Low Gas Pressure Delivery.



Typical Concrete Pad Installation



606. **Meter Mounting**
Meter fits shall be mounted on concrete pads as specified by the NSTAR Gas Representative where appropriate.
607. **Clearances**
Ample workspace shall be provided around meter to allow for testing, reading and repairing. Fencing, if installed, is to have a minimum clearance of 30 inches from all equipment, with at least a 36-inch door directly in front of the meter.

608. Moving or Removing Meter Equipment

If a customer requests or is required to have their existing gas meter related, they must call their NSTAR Gas representative for assistance. The Company will perform a meter relocation at the customer's expense if the customer requests it. For example, if a customer is renovating their home and it makes sense to relocate the meter, the steps required to relocate the meter area as follows:

- a) Customer contacts the Technical Services Department at 508-305-6890 or 508-305-6887.
- b) A distribution foreman visits customer site, assesses work to be performed.
- c) Customer provides NSTAR Gas with a check for the full amount of the meter relocation cost.
- d) NSTAR Gas schedules and relocates the meter.

609. Additional Meters

To add a new meter to an existing gas line the NSTAR Gas representative must be contacted with the following information:

- a) Account information and service address
- b) The total gas load (expressed in CFH or MMBtu/Hour) of the appliances or equipment currently connected to the existing gas line.
- c) The number of new meters requested.

In certain cases, a deposit may be required by the Company prior to proceeding. In all cases each meter will be treated as a separate account and NSTAR Gas will not combine multiple meters into one account.

610. Protection from Damage

Where in the judgment of the Company a meter installation may be subject to damage, the customer may be required to provide suitable protection or enclosures for the meter equipment or relocate the equipment at their expense.

611. Standard Meter Installation

The following list includes requirements for setting a gas meter:

- a) Where required, the customer must provide a concrete pad to support the gas meter. Protective posts (bollards) may be provided by the Company where the meter is subject to damage by vehicle traffic.
- b) The gas line and meter fit must be installed.
- c) All gas piping (inside the structure) must be completed and tied into gas equipment.
- d) The gas line must be tied into the meter fit by the builder's plumber.
- e) The gas-fired equipment must be permanently, electrically wired and the thermostat completely installed (appliance to be lit must be installed in accordance with the Massachusetts Fuel Gas Code).

- f) The flue pipe must be installed as necessary for all gas-fired equipment.
- g) Gas piping must be inspected by the city or town gas inspector and a visible inspection tag left at the riser or gas equipment.
- h) The builder should specify which equipment should be turned on by the service person when the meter is set.
- i) The Company will light all equipment during initial installation for residential accounts and must be present as the customer's installer lights all gas-fired equipment for non-residential accounts.
- j) If the service technician determines that the meter cannot be set due to customer requirements not being met, subsequent calls will be subject to NSTAR Gas' normal charge service rates.

NSTAR Gas will supply an as-built drawing of the main and gas line installation upon request.

612.

Elevated Pressure

The Massachusetts Fuel Gas Code 248 CMR 5.00 allows for requests for elevated pressure (greater than low pressure) when the gas utilization equipment specifically requires higher pressure; when low-pressure installation design requires pipe size in excess of 4 inches IPS, and all CNG facilities. In order to apply to the State Board of Examiners of Plumbers and Gas Fitters for a variance for elevated pressure review, the applicant must provide the necessary documentation. The Company must approve the request before the application can be sent. The following items must be presented to the Company representative before an application can be processed:

- a) Piping plans stamped by a Massachusetts Professional Engineer showing all of the existing gas piping and the proposed elevated gas piping and equipment. The request shall indicate the individual loads, the total requested load, and elevations and dimensions in either equivalent or developed length. Where pressure reduction is required, the plan shall indicate the necessary pressure reduction regulators and vents.
- b) If the equipment specifically requires elevated pressure, a copy of the equipment specifications indicating the requested pressure shall be included.
- c) Copies of the material specifications shall be included for any material of equipment that is subject to the elevated pressure indicating that it can sustain the requested pressure.
- d) Diagrams of the equipment gas train shall indicate that it complies with 248 CMR Article 7.00 of the Massachusetts Fuel Gas Code.
- e) The Fuel Gas Code allows for a 10% pressure drop in the piping plan. The request should allow for this. If a specifically engineered piping plan uses another method, be sure to include a description of the method and documentation.

- f) The Company requires that all elevated gas piping, fittings, and controls subject to the elevated pressure be welded.
- g) Modifications to existing systems will be evaluated on an individual basis.

613.

CPA Connections

When a commercial or industrial customer decides to purchase its natural gas from a competitive gas producer or energy marketer, an additional metering device may or may not be required. A Commercial Pulse Accumulator (CPA) accumulates data from the gas meter and supplies the information to the Company through a voice grade analog telephone line. The customer is responsible for all charges related to the installation of the CPA. Ask the Company representative for installation requirements.

GAS INDUSTRY INFORMATION

Article 700

701. Customer Choice

The natural gas industry has undergone significant restructuring in the past few years. In the past, local gas utilities like NSTAR Gas used to buy natural gas from the interstate pipeline companies, who in turn purchased gas from suppliers in the gas-producing regions of the United States. When interstate pipelines were deregulated, gas utilities then purchased gas directly from the producers. Today, in more and more regions around the country, residential, commercial and industrial customers are able to buy their natural gas directly from a gas producer or energy marketer.

Some things about the gas industry are going to remain the same. NSTAR Gas will still be your local distribution company. We are still in the business of delivering natural gas to you, reading meters, connecting new customers and repairing leaks. If you smell gas and need to report a gas leak, call NSTAR Gas immediately. You can also call NSTAR Gas if you want to increase your gas service, have trouble with your heating system or have questions about your account.

702. Local Distribution Company

Local, state and/or federal government agencies regulate public utilities. The natural gas company that serves your community operates under a “franchise” obtained from the local government regulatory agency. This is a special privilege granted to an individual or a corporation to solely provide a given service to the community. In the case of a public utility, it also includes occupying and using public ways. In return for the franchise rights for a specific geographical area, a natural gas company agrees to operate under certain rules established by the government. This company must:

- a) Charge reasonable prices for the use of its pipeline as determined by government agencies.
- b) Offer the same quality of service and prices without discrimination to its customers within each rate class based on general usage characteristics.

By meeting these obligations, a natural gas company has the opportunity to earn a fair return on investment determined by the governmental agency.

703. Energy Marketers

Energy marketers will compete for the opportunity to supply the natural gas to your home or business. The competitive market is expected to put a downward pressure on prices, meaning that your gas bill may ultimately be lower than before.

Ask your LDC representative for a list of energy marketers who are qualified to operate on the NSTAR Gas system.

704. Energy Service Companies (ESCO's)

Energy Service Companies (ESCO's) provide energy engineering services to commercial and industrial customers. Many of these companies have the engineering and energy expertise to help customers reduce their energy bills and maintenance costs. In addition, many ESCO's have the ability to finance equipment projects for the customer and eliminate their initial installation costs. Energy marketers and ESCOs are unregulated and may compete in the LDC service territory through natural gas commodity sales.

705. Energy Saving Initiatives

The following natural gas powered technologies have assisted commercial and industrial customers reduce energy bills, reduce overall energy consumption, and clean up emissions:

- * Natural Gas Fired Co-Generation, Engine Driven Air Compressors, Chillers and Motors
- * Absorption Chillers
- * Desiccant Dehumidification
- * Infrared Heating
- * Natural Gas Vehicles

Contact us to find out more about new technologies and how energy marketed and ESCO's can help you to finance projects, design and trouble shoot systems, and produce overall energy savings.

Sales Department: **1-866-678-2744**

801. Natural Gas Efficiency

Clean Burning – Natural gas is a clean burning fuel that produces no soot accumulation. This has the effect of maintaining peak boiler efficiency and minimizing or eliminating heat loss up the chimney due to soot accumulation of heat exchanger surfaces. The principal emission, carbon dioxide, does not contribute to air pollution or acid rain.

Improve Combustion – Natural gas mixes with air readily ensuring complete combustion.

Prolonged Boiler Life – Natural gas contains virtually no sulfur, thereby eliminating corrosion due to the formation of sulfuric acid in the products of combustion.

Reduced Maintenance – The superior combustion characteristics of natural gas, as outlined above, reduce the frequency with which boiler cleaning and maintenance must be carried out.

Fuel Handling – Natural gas does not need to be pumped from heated storage tanks and atomized with steam or compressed air prior to combustion. This reduces the equipment required for combustion of the fuel and eliminates the operating cost associated with heaters, pumps and compressors.

No Inventory Required – Using natural gas does not require that the customer maintain an inventory of fuel. Typically, customers are not required to pay for up to 30 days after burning the fuel.

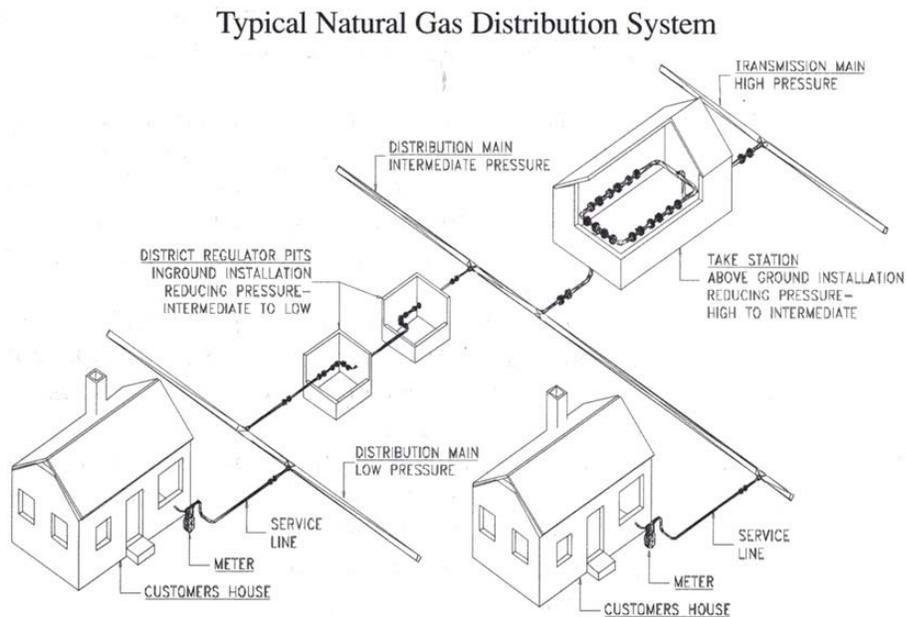
Supply Reliability – A supply of natural gas will always be available, irrespective of weather conditions. Most of our distribution facilities are underground and therefore protected from storm damage.

Domestic Supplies - The majority of all natural gas supplied by the Company is produced domestically.

802.

Natural Gas Source

The majority of natural gas burned at your facility comes from the Gulf Coast. It is transported by gas transmission companies that deliver it through two major pipelines to the northeast. These cross-country pipelines deliver natural gas at high pressure to NSTAR Gas and other local distribution companies to take stations as shown in the Typical Natural Gas Distribution System diagram below. Our distribution mains then transmit the gas throughout the system delivering it to customers at low and intermediate pressures. The pressure is reduced at the meter to the necessary pressure for the customer. District regulator pits further reduce system pressures to anywhere from intermediate pressures to low pressure. The LDC attempts to provide the highest pressure possible to commercial and industrial customers, but may be hindered due to reduced pressure distribution mains in some areas.



803.

Natural Gas Characteristics

Natural gas is lighter than air at normal temperatures, rises when released, and safely dissipates into the atmosphere, unless trapped within a tight enclosure.

Natural gas is flammable, colorless, and odorless. To make its use safe, odorant must be added so that it is easily detectable if a leak occurs. Odorizing natural gas is complicated and costly, but is essential to ensure the safety of our customers and the general public. The State of Massachusetts has one of the most stringent "Level of Detectability" laws in the United States. The law states, natural gas must be readily detectable to the average

human nose at a level of fifteen one hundredths of one percent gas in air mixture.

Natural gas contains trace quantities of sulfur (S) in the form of H₂S (hydrogen sulfide) and mercaptan (i.e., odorant). After odorization, the average sulfur content of the natural gas is approximately 0.5 grains per 100 cubic feet of gas. This result is 0.0017% sulfur by weight or 0.000714 lbs. per million Btu (lbs/MMBtu). By comparison 1% sulfur residual oil (No. 6 oil) contains 588 times more sulfur than natural gas and 0.3% sulfur No. 2 oil contains 176 times more sulfur.

804. Energy Content

There are two energy content reference points: (1) higher heating value and (2) lower heating value. (Heating value and energy content are used interchangeably.) “Higher heating value” is the total heat content of the natural gas. This includes water vapor, nitrogen, or other non-combustible elements and compounds contained in a typical sample. “Lower heating value” is limited to heat content of the combustible compounds themselves. Higher and Lower heating values are also called “wet” and “dry” respectively. The higher heating value of natural gas ranges from 1,000 to 1,100 British Thermal Units per cubic foot (Btu/cf).

Lower heating values range from 900 Btu/cf to 1,000 Btu/cf. Natural gas’ nominal heating value is typically 1,000 Btu/cf or 37.7 mega-joules per cubic meter (Mj/m³)

Natural gas requires a temperature of approximately 1,100°F to ignite in its pure state. Its flammability range is approximately 4.5% to 14.5% concentration by volume, when mixed with air. This will vary slightly, depending upon the exact composition of the natural gas. It is important to note that mixtures of natural gas outside these concentration ranges will not ignite. Natural gas weighs 0.046 pounds per cubic foot (lbs./cf) at atmospheric pressure and requires about 0.765 pounds of air to burn one cubic foot without excess air.

805. Natural Gas Properties

Methane, CH₄, is the principal component of natural gas. Other elements are also present in natural gas, but to a much lesser degree. These are heavy paraffinic hydrocarbons – ethane, propane, and butane. Most natural gas contains from 5% to 20% of nitrogen, while some gases contain carbon dioxide and hydrogen sulfide, with traces of argon, hydrogen, and helium. “Raw” natural gas goes through several processes to clean it for use. These cleaning processes remove unwanted compounds in varying degrees.

The composition, specific gravity, and energy content of “raw” natural gas vary depending on the well that produced the gas. No single set of

specifications cover all situations regarding the quality of “raw” material. All natural gas distribution companies must meet specific quality standards. The following table represents a typical cubic foot volume of a natural gas sample’s individual component properties.

The specific gravity of natural gas ranges from 0.55 to 1.0. Most architects, engineers, and energy professionals use 0.60 for design purposes.

806. Natural Gas Components

Compound	Formula	Content (%)	Energy Content (Btu/cf)	Specific Gravity	Boiling Point (°F)	Mol Wt. (g/mole)
<i>Methane</i>	CH ₄	95.70%	1,012.3	0.5301	-258.73	16.0430
<i>Ethane</i>	C ₂ H ₆	2.21%	1,773.7	0.0230	-127.49	30.0700
<i>Propane</i>	C ₃ H ₈	0.40%	2,251.9	0.0061	-43.75	44.0970
<i>Isobutane</i>	C ₄ H ₁₀	0.07%	3,259.4	0.0014	10.78	58.1230
<i>Normal Butane</i>	C ₄ H ₁₀	0.08%	3,269.8	0.0016	31.08	58.1230
<i>Iso-pentane</i>	C ₅ H ₁₂	0.03%	4,010.2	0.0008	82.12	72.1500
<i>Normal Pentane</i>	C ₅ H ₁₂	0.02%	4,018.2	0.0006	96.92	72.1500
<i>Normal Heptane</i>	C ₆ H ₁₆	0.06%	5,515.2	0.0020	209.16	100.204
<i>Carbon Dioxide</i>	CO ₂	0.77%	0.0	0.0116	-109.26	44.0100
<i>Nitrogen</i>	N ₂	0.66%	0.0	0.0064	-320.45	28.0134
Totals	N/A	100.00%	1,028	N/A	N/A	N/A

807.

Conversions

Natural gas heating value fluctuates as it passes through the distribution system. The heating value of gas can range from .95 MMBtu/MCF to 1.090 MMBtu/MCF.

Btu Rating = (.950-1.050) MMBtu/MCF

1 MCF*(Btu Rating) = 1 MMBtu

1 MMBtu/(Btu Rating) = 1 MCF

1 Therm = (MCF) * 10

However, if the Btu rating is assumed to be 1.0 MMBtu/MCF, the following ratios apply:

1 CF = one cubic foot of gas = 1,000 Btu

1CFH = one cubic foot of gas per hour = 1,000 Btu/hour

1 CCF = 100 CF = 100,000 Btu = 1 Therm

1 MCF = 10 CCF = 1,000,000 Btu = 10 Therms

1MMBtu = 1,000 Mbtu = 1 MCF = 1 DekaTherm = 10 Therms

The following conversions allow for an approximate comparison to natural gas in Btu units for oil, propane, and coal.

1 Barrel = 42 Gallons

1 Gallon #2 Oil = (138,000 – 139,000) Btu

1 Gallon #4 Oil = (145,000) Btu

1 Gallon #6 Oil = (148,000 – 150,000) Btu

1 Gallon Propane = 91,600 Btu

1 Ton Coal = 25,000,000 Btu

808.

Compressed Natural Gas Refueling Facilities

This section applies to all refueling facilities; public and private, capable of dispensing compressed natural gas (CNG), and located within the Company's service territory. Safe design, installation and operation of natural gas vehicle refueling facilities and refueling compressors are imperative. All compressed natural gas refueling installations must be permitted by the authority having jurisdiction prior to installation. Failure to obtain necessary permits may seriously delay the operation of the facility. This section should be considered as a guide in obtaining permits for CNG facilities. IN ALL CASES, IT IS THE RESPONSIBILITY OF THE OWNER/INSTALLER OF THE CNG REFUELING FACILITY TO MAKE CERTAIN ALL NECESSARY PERMITS AND APPROVALS HAVE BEEN OBTAINED PRIOR TO INSTALLING AND OPERATING A CNG REFUELING FACILITY.

In order to ensure the proper design, installation, and operation of CNG refueling facilities certain authorities have jurisdiction over CNG refueling facility permitting, in addition to the Company. The local electrical and

plumbing inspectors require municipal electrical and plumbing permits. In some areas and in certain instances, the local building inspector will require a municipal building permit. The local fire department chief will require a municipal permit including equipment and installation approval from the Office of the State Fire Marshall. The State Board of Examiners for Plumbers and Gas Fitters requires an elevated gas pressure permit. The customer is responsible for securing all permits. The following procedures may be used as a guide.

1. Develop detailed design and installation plans of the CNG facility, including all plumbing, electrical, mechanical, equipment and site work. Plans must be drawn up and stamped by a Massachusetts Licensed Professional Engineer. Plans must conform to NFPA Code 52, 1992 Edition, 527 CMR 26.00 and all applicable municipal codes and Company requirements. Plans must state that the facility conforms to NFPA Standard 52-1992.
2. The customer must obtain local municipal plumbing, electrical, building, and fire department permits.
3. The customer must submit to the Company a signed application for elevated gas pressure. The OUTLET pressure of the CNG refueling installation must be stated on the application. The application must include the specifications of all CNG equipment and appurtenances (see Article 612). Once the application has been signed by the Company, the customer must submit the application to the State Board of Examiners for Plumbers and Gas Fitters.
4. The customer must request from the office of the State Fire Marshall an "Application for Approval of CNG Installations" and submit the request to the State Fire Marshall and local Fire Chief.
5. Upon completion of the installation, the customer must request inspection tags from the plumbing inspector and a final inspection by the local Fire Chief and State Fire Marshall. The design engineer of record will be required to submit a post installation inspection to the State Fire Marshall verifying the installation complies with Standard NFPA 52-1992.

INDUSTRY TERMS

As-Built Plan	Drawings containing completed condition of installation.
BTU	A British Thermal Unit is a unit of measurement for heat required to raise one pound of water one degree Fahrenheit.
CFH	Cubic Feet per Hour is a measurement of flow for natural gas.
Commercial Customer	A customer who is engaged in commerce.
Conduit	Protective shell through which electrical wiring or gas pipe is run.
Customer	An individual, firm, or organization, which purchases services at one location under one rate classification, contract, or rate schedule. If service is supplied at more than one location or under more than one rate schedule, each location and rate schedule shall be counted as a separate customer.
Degree Day	A degree-day accrues for each degree that the mean outside temperature, for 24 hours, is below 65 degrees Fahrenheit.
Deregulation	State and government process of making the energy industry more competitive.
Elevated Pressure	Pressure that is higher than the normal delivery pressure of 14 inches water column.
Fit (Meter Fit)	The gas piping connecting the gas riser to the customer's fuel line.
Gas Booster	A compressor used to raise pressure in a gas pipeline.
Gas Main	That portion of the distribution system, which transports natural gas to individual gas service lines, in turn to serve either individual customers or individual buildings.
Gas Distribution Service Line	see explanation for: Service Line

Industrial Customer	A customer engaged in an industry of manufacturing, production or service.
Load	The amount of gas delivered or required at any specified point or points on a system. A load originates primarily at the gas consuming equipment of the customers. Also, to load a pressure regulator is to set the regulator to maintain a given pressure as the rate of gas flow through the regulator varies.
Meter	An instrument for measuring, indicating, and recording the volume of gas that has passed through it.
Meter Pad	A base designed to support a meter and piping assembly usually made of concrete.
Open Trench	An area of ground that has been excavated.
Pressure	When expressed with reference to pipe, the force per unit area exerted by the medium in the pipe.
PSIG	Pounds per square inch gauge.
Regulator	Pressure regulating device.
Residential Customer	A customer taking service for domestic use at a single private dwelling, in an individual home, apartment, or condominium.
Riser	General term for vertical runs of gas piping.
Service Line	All components that bring natural gas from the main in the street to the meter.
Service Relay	The replacement of an existing gas service line with that of a new gas service line.
Service Riser	A vertical pipe, either inside or outside a foundation wall, from the grade of the service pipe to the meter fit.
Shut-off Cock	The shut-off valve, located at the top of the gas riser, connecting the system source to the meter fit.
Site Utility Plan	An engineering drawing or set of drawings that contain the location or proposed locations of all utilities including water, sewer, gas, electric, steam, telephone, or any other buried or above ground medium to move energy or information.

Subdivision	A tract of land surveyed and divided into lots for purposes of sale.
Telemetry	Use of an electrical apparatus transmitting data to a distant point for indicating, recording, or integrating the values of a variable quantity.
Therms	A unit of heating value equivalent to 100,000 BTU's.
Threadolets	A pipe nipple device that is intended to be welded to the outside diameter of a pipe on one end and that is threaded on the other end.
In.w.c.	Inches Water Column is a unit of measurement for pressure equal to a certain pressure exerted by a specified height of water.